EXHIBIT A

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UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

SAN FRANCISCO DIVISION

TWITTER, INC., a Delaware corporation, Plaintiff, v. VOIP-PAL.COM, INC., a Nevada corporation, Defendant.	No. 5:21-cv-9773 **FIRST AMENDED COMPLAINT FOR DECLARATORY JUDGMENT**

I. INTRODUCTION

1. This First Amended Complaint for declaratory judgment of noninfringement and invalidity arises from a real and immediate controversy between plaintiff Twitter, Inc. ("Twitter"), and defendant VoIP-Pal.com Inc. ("VoIP-Pal"), as to whether Twitter infringes any claims of U.S. Patents 8,630,234 and 10,880,721,[1] both entitled, "Mobile Gateway."

2. Since 2016, Twitter and VoIP-Pal have been embroiled in a series of lawsuits involving VoIP-Pal's patents in the field of routing communications in a packet-switched network such as an Internet Protocol network. Those lawsuits have been part of a large litigation campaign in which VoIP-Pal has asserted patents against Twitter and other major technology companies such as Apple, AT&T, Verizon, Amazon, Facebook, WhatsApp, Google, T-Mobile, Samsung Electronics, and Huawei.

3. VoIP-Pal's litigation campaign began in 2016, when it filed lawsuits against Twitter, Apple, AT&T, and Verizon alleging infringement of two patents that are part of a patent family that VoIP-Pal refers to as the "Routing, Billing, Rating" or "RBR" patents (the "2016 Cases"; e.g., Exhibit 3). All patents in the RBR family share a common specification. In 2018, VoIP-Pal filed additional lawsuits against Apple and Amazon to assert four other RBR patents (the "2018 Cases"). The 2016 and 2018 Cases were originally filed in the District of Nevada but were transferred to this Court in 2018.

4. This Court found all six RBR patents asserted in the 2016 and 2018 Cases to be invalid under 35 U.S.C. § 101 for claiming ineligible subject matter. *E.g.*, *VoIP-Pal.com, Inc. v. Twitter, Inc.*, Case No. 18-cv-04523-LHK, ECF No. 82 (Exhibit 4). On March 16, 2020, the Court of Appeals for the Federal Circuit affirmed those judgments of invalidity.

5. Dissatisfied with the outcome of the 2016 and 2018 Cases in this Court, VoIP-Pal went forum shopping. In April 2020, VoIP-Pal filed lawsuits in the Western District of Texas against Facebook, WhatsApp, Google, Amazon, Apple, AT&T, and Verizon to assert a seventh patent in the RBR family, U.S. Patent 10,218,606 (the "'606 patent") (the "2020 Texas Cases").

[1] U.S. Patent 8,630,234 and 10,880,721 are referred to herein as the "Mobile Gateway" patents. U.S. Patent 8,630,234 is referred to as the "'234 patent" (Exhibit 1), and U.S. Patent 10,880,721 is referred to as the "'721 patent" (Exhibit 2).

The claims of the ’606 patent asserted in those new lawsuits are very similar to the claims of the six RBR patents that VoIP-Pal previously asserted in the 2016 and 2018 Cases and were found to be invalid by this Court.

6. On April 8, 2020, VoIP-Pal issued a press release stating that VoIP-Pal is considering taking further action and is not finished taking action in the wake of the recent Federal Circuit decision affirming this Court’s judgment in the 2016 Cases that two of VoIP-Pal’s previously-asserted patents are invalid under 35 U.S.C. § 101 (Exhibit 5).

7. On April 8, 2020, after seeing VoIP-Pal’s lawsuits in Texas against Facebook, WhatsApp, Google, Amazon, and Apple and VoIP-Pal’s press release, Twitter filed an action for declaratory judgment of noninfringement of the ’606 patent against VoIP-Pal in this Court (Case No. 20-cv-02397; see Exhibit 7). Soon thereafter, Apple, AT&T, and Verizon filed similar declaratory judgment actions in this Court against VoIP-Pal based on the ’606 patent (collectively with Twitter the “2020 DJ Actions”). On April 14, 2020, Apple filed a first amended complaint that added claims for declaratory judgment of noninfringement and invalidity of an eighth patent in the RBR family, U.S. Patent 9,935,872 (the “’872 patent”).

8. In July 2020, VoIP-Pal filed motions to dismiss the 2020 DJ Actions for lack of subject matter jurisdiction, lack of personal jurisdiction, and improper venue. In December 2020, the Court denied VoIP-Pal’s motions to dismiss. *E.g.*, *Twitter, Inc. v. VoIP-Pal.com, Inc.*, Case No. 20-cv-02397, ECF No. 50 (Exhibit 8); *Apple Inc. v. VoIP-Pal.com, Inc.*, Case No. 20-cv-02460, ECF No. 60.

9. Between December 2020 and April 2021, VoIP-Pal and Twitter communicated many times about potential settlement with respect to the ’606 patent and VoIP-Pal’s other patents. Since December 2020, Twitter’s position has been that Twitter is unwilling to enter into a piecemeal settlement with VoIP-Pal that addresses only one or some of VoIP-Pal’s patents, and that any settlement must be global in the sense of encompassing VoIP-Pal’s entire patent portfolio. Twitter has communicated that position to VoIP-Pal multiple times, and VoIP-Pal has refused to offer Twitter a license or covenant not to sue for VoIP-Pal’s entire patent portfolio.

10. For example, on January 11, 2021, VoIP-Pal proposed that VoIP-Pal and Twitter enter into a settlement for the ’606 patent and all other RBR patents. Twitter observed that such a settlement would not cover VoIP-Pal’s entire patent portfolio and expressly noted that VoIP-Pal had recently touted receiving a U.S. patent and a European patent in the Mobile Gateway family. Twitter later rejected VoIP-Pal’s proposed settlement for all RBR patents in part because it would not have covered all of VoIP-Pal’s patents, including the Mobile Gateway patents.

11. On March 24, 2021, VoIP-Pal filed another motion to dismiss the 2020 DJ Actions—this time based on a limited covenant not to sue for the ’606 patent. *E.g.*, Case No. 20-cv-02397, ECF No. 62. That limited covenant not to sue was insufficient to eliminate subject matter jurisdiction for Twitter’s declaratory judgment claims for the reasons explained in Twitter’s opposition to that motion. *Id.*, ECF No. 66.

12. In response to Twitter’s opposition, on April 9, 2021, VoIP-Pal offered a broader covenant not to sue for the ’606 patent and asked Twitter to stipulate to dismissal of Twitter’s declaratory judgment action. Twitter responded in part that, at a minimum, any covenant not to sue to resolve Twitter’s declaratory judgment action against the ’606 patent should also include the ’872 patent. Twitter also stated that it expects VoIP-Pal to sue Twitter in the future and that only a covenant not to sue that covers VoIP-Pal’s entire patent portfolio would resolve the broader dispute between Twitter and VoIP-Pal concerning VoIP-Pal’s patent portfolio. VoIP-Pal declined to extend the covenant to include VoIP-Pal’s patents other than the ’606 patent.

13. On April 14, 2021, VoIP-Pal filed a reply brief in support of its motion to dismiss, which granted Twitter the broader covenant not to sue for the ’606 patent that VoIP-Pal had offered on April 9. *Id.*, ECF No. 68. VoIP-Pal also granted similar broader covenants not to sue to Apple, AT&T, and Verizon. On August 30, 2021, this Court granted VoIP-Pal’s motion to dismiss Twitter’s 2020 DJ Action in view of VoIP-Pal’s broader covenant not to sue for the ’606 patent (but denied VoIP-Pal’s motion to dismiss the other 2020 DJ Actions). However, the Court retained jurisdiction over Twitter’s 2020 DJ Action to consider Twitter’s motion for attorney fees, which is fully briefed and under submission to the Court.

14. On April 15, 2021, Twitter and VoIP-Pal participated in a court-supervised settlement conference in Twitter's 2020 DJ Action, which did not result in settlement.

15. Following that unsuccessful settlement conference, on April 16, 2021, Twitter filed an action for declaratory judgment of noninfringement of the '872 patent. *Twitter, Inc. v. VoIP-Pal.com, Inc.*, Case No. 5:21-cv-02769-LHK, ECF No. 1 (the "2021 DJ Action"; Exhibit 10). In response, VoIP-Pal filed a motion to dismiss for lack of subject matter jurisdiction, lack of personal jurisdiction, and for improper venue. *Id.* at ECF No. 25. On November 2, 2021, the Court denied VoIP-Pal's motion to dismiss Twitter's 2021 DJ Action. *Id.* at ECF No. 38 (Exhibit 11).

16. On June 25, 2021, VoIP-Pal filed lawsuits in the Western District of Texas against Apple, AT&T, Verizon, Amazon, Facebook, WhatsApp, Google, and T-Mobile alleging infringement of the two Mobile Gateway patents (the "Texas Mobile Gateway Cases"). The complaints in those lawsuits identify claim 20 of the '234 patent and claim 38 of the '721 patent as exemplary asserted claims, but VoIP-Pal asserts many other claims.

17. The Mobile Gateway patents are not members of the RBR family, but they are very similar to the eight RBR patents that were or are at issue in the 2016 and 2018 Cases, the 2020 Texas Cases, and the 2020 DJ Actions. The Mobile Gateway patents concern the same technology as the previously-asserted RBR patents—namely, routing of communications in a packet-switched network. The claims of the Mobile Gateway patents are very similar to the claims of the RBR patents previously asserted by VoIP-Pal (Exhibit 12).

18. VoIP-Pal's infringement allegations in the Texas Mobile Gateway Cases are very similar to VoIP-Pal's infringement allegations in the 2016 and 2018 Cases and/or 2020 Texas Cases against Twitter, Apple, AT&T, Verizon, and/or Amazon. For example, VoIP-Pal's infringement allegations for the Mobile Gateway patents are directed to some of the same accused instrumentalities that VoIP-Pal accused of infringement in VoIP-Pal's prior lawsuits, such as messaging involving text, images, and videos.

19. VoIP-Pal has sued every defendant from the 2016 and 2018 Cases for infringement of the Mobile Gateway patents other than Twitter. On information and belief, the

reason that VoIP-Pal has not sued Twitter for infringement of the Mobile Gateway patents to date is strategic— for example, concern that, if VoIP-Pal filed a lawsuit to assert the Mobile Gateway patents against Twitter while Twitter's 2020 and/or 2021 DJ Actions were pending, they might be deemed to be first-filed cases such that VoIP-Pal would end up litigating the Mobile Gateway patents in this Court.

20. On November 17, 2021, the parties participated in a second court-supervised settlement conference in Twitter's 2020 DJ Action, which did not result in settlement.

21. On November 30, 2021, VoIP-Pal filed lawsuits in the Western District of Texas against Samsung Electronics and Huawei Technologies alleging infringement of the two Mobile Gateway patents.

22. Following this Court's denial of VoIP-Pal's motion to dismiss Twitter's 2021 DJ Action (Exhibit 10), on December 9, 2021, VoIP-Pal filed a motion to dismiss based on a covenant not to sue for the '872 patent. On information and belief, VoIP-Pal plans to file a lawsuit against Twitter for infringement of the Mobile Gateway patents after Twitter's 2021 DJ Action is dismissed.

23. Twitter believes that it does not infringe and has not infringed any claims of the Mobile Gateway patents, including claim 20 of the '234 patent and claim 38 of the '721 patent, which were exemplary claims identified in the complaints in VoIP-Pal's Texas Mobile Gateway Cases. Since December 2020, Twitter has repeatedly informed VoIP-Pal that any resolution of the disputes concerning VoIP-Pal's patents must cover VoIP-Pal's entire patent portfolio, but VoIP-Pal has refused to offer a license or covenant not to sue to Twitter for VoIP-Pal's entire patent portfolio.

24. VoIP-Pal's actions have created a real, substantial, and immediate controversy between VoIP-Pal and Twitter as to whether Twitter's products and/or services infringe any claims of the Mobile Gateway patents. The facts and allegations recited herein show that there is a real, substantial, immediate, and justiciable controversy concerning this issue.

II. PARTIES

25. Plaintiff Twitter is a company incorporated under the laws of Delaware, with headquarters at 1355 Market Street, Suite 900, San Francisco, California.

26. Twitter operates a global Internet platform for public self-expression and conversation in real time. People with a Twitter account can post "Tweets"—messages of 280 characters or less, sometimes with pictures or video, and those messages can be read by other people using the Twitter platform. They may, in turn, "Retweet" those messages to their own followers. Users can include "hashtagged" keywords (indicated by a "#") in their Tweets to facilitate searching for messages on the same topic. People who use Twitter can also send direct messages to other users that can contain images and video. Each day, people post hundreds of millions of Tweets, engaging in public conversation on virtually every conceivable topic. Twitter's products and services are provided through the Twitter platform.

27. Based on information and belief, defendant VoIP-Pal is a company incorporated under the laws of Nevada and recently relocated its principal place of business from Bellevue, Washington, to 7215 Bosque Blvd, Suite 102, Waco, Texas 76710. *See* https://www.voip-pal.com/contact-us.

28. Based on information and belief, VoIP-Pal is the owner of the Mobile Gateway patents.

III. JURISDICTION AND VENUE

29. This First Amended Declaratory Judgment Complaint includes counts for declaratory relief under the patent laws of the United States, 35 U.S.C. §§ 1, *et seq.*

30. Twitter seeks declaratory relief under 28 U.S.C. §§ 2201 and 2202.

31. This Court has subject matter jurisdiction over the claims alleged in this action under 28 U.S.C. §§ 1331, 1332, 1338, 2201, and 2202 because this Court has exclusive jurisdiction over declaratory judgment claims arising under the patent laws of the United States pursuant to 28 U.S.C. §§ 1331, 1338, 2201, and 2202. Jurisdiction is also proper under 28 U.S.C. § 1332 because Twitter and VoIP-Pal are citizens of different states, and the value of the controversy exceeds $75,000.

32. This Court can provide the declaratory relief sought in this First Amended Declaratory Judgment Complaint because an actual case and controversy exists between the parties within the scope of this Court's jurisdiction pursuant to 28 U.S.C. § 2201. An actual case and controversy exists at least for the reasons set forth in Sections I, II, and IV of this Complaint (¶¶ 1-28, 38-76).

33. This Court has personal jurisdiction over VoIP-Pal because VoIP-Pal has purposefully directed activities in this District that form the basis of Twitter's claim against VoIP-Pal—namely, prosecuting the 2016 Case involving two RBR patents against Twitter in this District, and voluntarily transferring from Nevada to this District the 2016 Cases against Apple, AT&T, and Verizon and the 2018 Cases against Apple and Amazon. VoIP-Pal also has retained counsel located in California to prosecute its patent portfolio and to represent VoIP-Pal in the 2016 and 2018 Cases; the 2020 Texas Action; the 2020 DJ Actions filed by Twitter, Apple, AT&T, and Verizon in this Court; the 2021 DJ Action filed by Twitter; and the Texas Mobile Gateway cases, including Lewis Hudnell of the Hudnell Law Group in Mountain View, California. In addition, on information and belief, on or about April 20, 2016, VoIP-Pal representative Ray Leon met with representatives of Apple in the Northern District of California in connection with VoIP-Pal's patent enforcement campaign.

34. This Court found the foregoing activities to be a sufficient basis for personal jurisdiction in the context of the 2020 DJ Actions for the '606 patent (and '872 patent for Apple) and Twitter's 2021 DJ Action for the '872 patent, and those activities also support personal jurisdiction for the present action for the Mobile Gateway patents. As a result of VoIP-Pal's actions described in this First Amended Complaint, there is a real, substantial, live, immediate, and justiciable case or controversy concerning the Mobile Gateway patents between VoIP-Pal and Twitter, a company that resides and operates in this District. As a result of VoIP-Pal's actions described above, VoIP-Pal has established sufficient minimum contacts with the Northern District of California such that VoIP-Pal is subject to specific personal jurisdiction in the Northern District of California for this action. Further, the exercise of personal jurisdiction based on those

repeated and highly-pertinent contacts does not offend traditional notions of fair play and substantial justice.

35. Venue is proper in this District under 28 U.S.C. §§ 1391 and 1400, including because, under Ninth and Federal Circuit law, venue in declaratory judgment actions for noninfringement of patents is determined under the general venue statute, 28 U.S.C. § 1391.

36. Under 28 U.S.C. § 1391(b)(1), venue is proper in any judicial district where a defendant resides. An entity with the capacity to sue and be sued, such as VoIP-Pal, is deemed to reside, if a defendant, in any judicial district in which such defendant is subject to the court's personal jurisdiction with respect to the civil action in question under 28 U.S.C. § 1391(c).

37. As discussed above, VoIP-Pal is subject to personal jurisdiction with respect to this action in the Northern District of California, and thus, for the purposes of this action, VoIP-Pal resides in the Northern District of California and venue is proper under 28 U.S.C. § 1391.

IV. FACTUAL BACKGROUND

A. VoIP-Pal's 2016 and 2018 Cases And The RBR Patents

38. In 2016, VoIP-Pal filed lawsuits in the District of Nevada against Twitter, Apple, AT&T, and Verizon, alleging infringement of two RBR patents, U.S. Patents 8,542,815 ("the '815 patent") and 9,179,005 ("the '005 patent"; Exhibit 3). Twitter filed a motion to transfer for improper venue, which sought transfer to this Court. Twitter's motion was granted, after which VoIP-Pal agreed to transfer its actions against Apple, AT&T, and Verizon to this Court. Between August and November of 2018, all four of those actions were transferred to this Court and consolidated for pretrial purposes: Twitter (Case No. 18-cv-04523-LHK), Verizon (Case No. 18-cv-06054-LHK), AT&T (Case No. 18-cv-06177-LHK), and Apple (Case No. 18-cv-06217-LHK) (i.e., the 2016 Cases).

39. In the 2016 Cases, Twitter, Apple, AT&T, and Verizon filed a motion to dismiss under Fed. R. Civ. P. 12(b)(6) because the asserted claims of the '815 and '005 patents are invalid under 35 U.S.C. § 101. On March 25, 2019, this Court granted the motion to dismiss and found all asserted claims of the '815 and '005 patents to be invalid (Exhibit 4). VoIP-Pal appealed. On March 16, 2020, the Federal Circuit affirmed this Court's judgment of invalidity.

40. In May and June 2018, VoIP-Pal filed two additional lawsuits against Apple and Amazon in the District of Nevada, alleging infringement of four other RBR patents, U.S. Patents 9,537,762; 9,813,330; 9,826,002; and 9,948,549. The asserted claims of those four RBR patents are very similar to the asserted claims of the two RBR patents in the 2016 Cases.

41. In October and November 2018, VoIP-Pal voluntarily agreed to transfer to this Court the 2018 Cases against Apple (Case No. 5:18-cv-06216-LHK) and Amazon (Case No. 5:18-cv-07020-LHK) (i.e., the 2018 Cases).

42. In the 2018 Cases, Apple and Amazon filed a motion to dismiss under Fed. R. Civ. P. 12(b)(6) that the asserted claims of the four asserted patents are invalid under 35 U.S.C. § 101. On November 1, 2019, this Court granted Apple's and Amazon's motion to dismiss and found all asserted claims of the patents in the 2018 Cases to be invalid. VoIP-Pal appealed. On November 3, 2020, the Federal Circuit affirmed this Court's judgment of invalidity.

B. VoIP-Pal's 2020 Texas Cases And Press Release, And Twitter's, Apple's, AT&T's, And Verizon's 2020 DJ Actions

43. During April 2-7, 2020, VoIP-Pal filed four new lawsuits in the Western District of Texas, Waco Division, asserting a seventh RBR patent, the '606 patent, against defendants Facebook and WhatsApp (Case No. 20-cv-267), Google (Case No. 20-cv-269), and previous defendants Amazon (Case No. 20-cv-272) and Apple (Case No. 20-cv-275). On April 24, 2020, VoIP-Pal filed new lawsuits in the same court asserting the '606 patent against previous defendants AT&T (Case No. 20-cv-325) and Verizon Wireless (Case No. 20-cv-327).

44. The claims of the '606 patent that VoIP-Pal asserts in the 2020 Texas Cases are very similar to claims of the six patents that VoIP-Pal asserted against Twitter, Apple, AT&T, and Verizon in the 2016 and 2018 Cases and were held to be invalid (for example, claim 74 of the '005 patent; Exhibit 3).

45. VoIP-Pal's infringement allegations in the 2020 Texas Cases are similar to VoIP-Pal's infringement allegations in the 2016 and 2018 Cases (including against all of the same prior defendants except for Twitter) and are directed to accused instrumentalities that are similar to

Twitter's products and services (for example, communications involving text, images, and videos).

46. On April 8, 2020, VoIP-Pal issued a press release that announced the filing of the 2020 Texas Cases against Facebook, WhatsApp, Google, Amazon, and Apple (Exhibit 5 and https://www.voip-pal.com/voip-pal-new-patent-lawsuits-april-). The press release also mentioned the Federal Circuit's affirmance of this Court's judgment of invalidity in the 2016 Cases against Twitter, Apple, AT&T, and Verizon. The press release states that, in the wake of the Federal Circuit decision, VoIP-Pal is considering taking further action and "planning their next moves." VoIP-Pal's CEO is quoted as saying, "Our legal team is assessing our next moves regarding this Alice decision and we expect to announce our intentions soon. ***I can tell you; we are not finished***," and "We remain firm in our resolve to achieve monetization for our shareholders and will continue to see this fight through until a successful resolution is reached. Patience is a virtue." (Exhibit 5 (emphasis added).)

47. On April 8, 2020, after seeing VoIP-Pal's lawsuits in Texas against Facebook, WhatsApp, Google, Amazon, and Apple and VoIP-Pal's press release, Twitter filed an action for declaratory judgment of noninfringement of the '606 patent against VoIP-Pal in this Court (Case No. 20-cv-02397).

48. On April 10, 2020, Apple filed an action for declaratory judgment of noninfringement and invalidity of the '606 patent against VoIP-Pal in this Court (Case No. 20-cv-02460). On April 14, 2020, Apple filed a first amended complaint that added claims for declaratory judgment of noninfringement and invalidity of the '872 patent.

49. On April 24, 2020, VoIP-Pal filed lawsuits in the Western District of Texas asserting the '606 patent against AT&T and Verizon. Soon thereafter, AT&T and Verizon filed declaratory judgment actions against VoIP-Pal for the '606 patent in this Court. *AT&T Corp. et al. v. VoIP-Pal.com, Inc.*, Case No. 20-cv-02995; *Cellco Partnership d/b/a Verizon Wireless v. VoIP-Pal.com, Inc.*, Case No. 20-cv-03092.

50. On June 4, 2020, counsel for Twitter asked counsel for VoIP-Pal whether VoIP-Pal would be willing to grant Twitter a covenant not to sue based on the ’606 patent. On June 11, 2020, counsel for VoIP-Pal declined to discuss a covenant not to sue.

51. On June 26, 2020, Twitter filed a first amended complaint that added a claim for a declaratory judgment of invalidity of the ’606 patent (Exhibit 7).

52. On July 10, 2020, VoIP-Pal filed motions to dismiss Twitter’s, Apple’s AT&T’s, and Verizon’s 2020 DJ Actions for lack of subject matter jurisdiction, lack of personal jurisdiction, and improper venue. In December 2020, this Court denied VoIP-Pal’s motions to dismiss, finding that subject matter jurisdiction and personal jurisdiction exist and that venue is proper. *E.g.*, Case No. 20-cv-02397, ECF No. 50 (Twitter) (Exhibit 8); Case No. 20-cv-02460, ECF No. 60 (Apple).

53. On December 2, 2020, counsel for Twitter and VoIP-Pal had a telephone call in which VoIP-Pal offered to pay Twitter $250,000 for Twitter to dismiss its declaratory judgment action against the ’606 patent. Twitter informed VoIP-Pal that Twitter is not interested in a piecemeal settlement in view of VoIP-Pal’s other patents, including the ’872 patent (which was the subject of declaratory judgment claims advanced by Apple), and the likelihood that VoIP-Pal would sue Twitter again in the future. Twitter’s counsel asked if VoIP-Pal would be willing to discuss a global settlement by which VoIP-Pal would agree not to sue Twitter on any of its patents. VoIP-Pal’s counsel declined to discuss such a global settlement. VoIP-Pal did not deny the likelihood that VoIP-Pal would sue Twitter again in the future.

54. On January 4, 2021, counsel for Twitter corresponded with counsel for VoIP-Pal to state that, in view of VoIP-Pal’s litigation history and patent portfolio, Twitter is not interested in pursuing a piecemeal resolution that would resolve only the current action and to note that VoIP-Pal declined to discuss a broader resolution that would include the ’872 patent.

55. On January 11, 2021, counsel for Twitter and VoIP-Pal had a telephone call in which VoIP-Pal proposed to enter into a settlement for the ’606 patent and “all family members” (i.e., all RBR patents), for a payment by Twitter of $1 million. Twitter observed that VoIP-Pal’s proposal would not cover VoIP-Pal’s entire patent portfolio and expressly noted that VoIP-Pal

had recently touted receiving a U.S. patent and a European patent in ***the Mobile Gateway family***. That recently-issued U.S. Mobile Gateway patent was the '721 patent, which issued on December 29, 2020. Twitter asked if VoIP-Pal would agree to a settlement that would include patents other than those in the RBR family. VoIP-Pal's counsel said he would check with VoIP-Pal, but VoIP-Pal did not respond to that inquiry.

56. On January 15, 2021, Twitter declined VoIP-Pal's proposed settlement for the RBR patent family. Twitter's reasons for declining VoIP-Pal's offer included that it would not have covered all of VoIP-Pal's patents (including the recently-touted Mobile Gateway patent), Twitter's belief that VoIP-Pal's RBR patents are invalid under 35 U.S.C. § 101, and VoIP-Pal's demand for a $1 million payment was unreasonable.

57. On March 24, 2021, VoIP-Pal filed additional motions to dismiss Twitter's, Apple's, AT&T's, and Verizon's 2020 DJ Actions—this time based on covenants not to sue that VoIP-Pal granted in the motions. *E.g.*, *Twitter*, Case No. 20-cv-02397, ECF No. 62 (Mar. 21, 2021). That covenant was insufficient to eliminate subject matter jurisdiction for reasons explained in Twitter's opposition. *Id.*, ECF No. 66 (Apr. 7, 2021). In response, on April 9, 2021, VoIP-Pal offered a broader covenant not to sue based on the '606 patent and asked Twitter to stipulate to dismissal of Twitter's declaratory judgment action.

58. On April 12, 2021, Twitter responded in part that, at a minimum, a covenant not to sue to resolve Twitter's declaratory judgment action against the '606 patent should also include the '872 patent. Twitter also stated that it expects VoIP-Pal to sue Twitter in the future for infringement of other patents and that even a broader covenant that includes the '606 and '872 patents would not be sufficient to resolve the broader dispute between Twitter and VoIP-Pal based on VoIP-Pal's patent portfolio. Twitter stated, in view of the broader dispute between VoIP-Pal and Twitter concerning VoIP-Pal's patent portfolio, VoIP-Pal can eliminate that broader dispute only by offering a covenant not to sue that covers VoIP-Pal's entire patent portfolio and future related patents and applications.

59. On April 13, 2021, VoIP-Pal responded by declining to discuss at that time a covenant not to sue for more than the ’606 patent. VoIP-Pal did not deny Twitter’s stated expectation that VoIP-Pal plans to sue Twitter in the future.

60. On April 14, 2021, VoIP-Pal filed its reply brief in support of its motion to dismiss, which granted Twitter the broader covenant not to sue for the ’606 patent that VoIP-Pal had offered on April 9. Case No. 20-cv-02397, ECF No. 68. In view of the circumstances and the broad dispute between Twitter and VoIP-Pal concerning VoIP-Pal’s patents, Twitter believed that the broader covenant not to sue was insufficient to eliminate subject matter jurisdiction.

61. On April 15, 2021, Twitter and VoIP-Pal participated in a court-supervised settlement conference pursuant to the court’s ADR program, which did not result in settlement.

62. On May 25, 2021, Verizon and VoIP-Pal filed a joint stipulation of dismissal for Verizon’s 2020 DJ Case, and the Court dismissed without prejudice the next day.

63. On August 25, 2021, this Court denied VoIP-Pal’s motions to dismiss Apple’s and AT&T’s 2020 DJ Actions, finding that VoIP-Pal’s covenants not to sue to be insufficient to eliminate subject matter jurisdiction. Case No. 20-cv-02460, ECF No. 96 (Apple; Exhibit 9); Case No. 20-cv-02995, ECF No. 97 (AT&T). The Court also expressly found that the Mobile Gateway patents concern the same technology as the RBR patents and are asserted against the same accused products as in VoIP-Pal’s earlier lawsuits:

> The ’234 patent and the ’721 patent [Mobile Gateway patents] ***concern the same technology*** as the patents involved in the 2016 cases, the 2018 cases, the 2020 Texas cases, and the instant case [the RBR patents]. Moreover, the 2021 cases [Texas Mobile Gateway Cases] involve the same accused products as the 2016 cases, the 2020 Texas cases, and the instant case.

Id. at 7 (emphasis added) (Exhibit 9).

64. On August 30, 2021, the Court granted VoIP-Pal’s motion to dismiss Twitter’s 2020 DJ Action based on the broader covenant not to sue for the ’606 patent and entered judgment but retained jurisdiction to consider Twitter’s motion for attorney fees. Case No. 20-cv-02397, ECF No. 89 at 17. In setting the briefing schedule for Twitter’s motion for attorney

fees, the Court referred the parties to a court-supervised settlement conference. Case No. 20-cv-02397, ECF No. 92 (Sep. 13, 2021).

C. Twitter Files The 2021 DJ Action For The ’872 Patent

65. Following the unsuccessful settlement conference on April 15, 2021, in Twitter’s 2020 DJ Action, Twitter filed an action for declaratory judgment of noninfringement for an eighth RBR patent, the ’872 patent, on April 16, 2021. *Twitter, Inc. v. VoIP-Pal.com, Inc.*, Case No. 5:21-cv-02769-LHK, ECF No. 1 (i.e., the 2021 DJ Action; Exhibit 10). Twitter’s complaint recounted the history of the parties’ settlement discussions. The claims of the ’872 patent are very similar to claims of the ’606 patent and the six patents that VoIP-Pal asserted against Twitter, Apple, AT&T, and Verizon in the 2016 and 2018 Cases and were held to be invalid (for example, claim 74 of the ’005 patent).

66. On June 21, 2021, VoIP-Pal filed a motion to dismiss Twitter’s DJ action for the ’872 patent for lack of subject matter jurisdiction, lack of personal jurisdiction, and for improper venue. Case No. 5:21-cv-02769-LHK, ECF No. 25. That motion rehashed the arguments that the Court had previously rejected in denying VoIP-Pal’s first motion to dismiss the present action.

67. On November 2, 2021, the Court denied VoIP-Pal’s motion to dismiss Twitter’s DJ action for the ’872 patent. Case No. 5:21-cv-02769-LHK, ECF No. 38 (Exhibit 11).

D. The Texas Mobile Gateway Cases

68. On June 25, 2021, VoIP-Pal filed new lawsuits in the Western District of Texas against Apple, AT&T, Verizon, Amazon, Facebook, WhatsApp, Google, and T-Mobile to assert the two Mobile Gateway patents (i.e., the Texas Mobile Gateway Cases; e.g., Exhibit 6).

69. The Mobile Gateway patents are not members of the RBR family, but they are very similar to the eight RBR patents that were or are at issue in the 2016 and 2018 Cases, the 2020 Texas Cases, and the 2020 DJ Actions. The Mobile Gateway patents concern the same technology as the previously-asserted RBR patents—namely, routing of communications in a packet-switched network.

70. The claims of the Mobile Gateway patents are very similar to the claims of the RBR patents. Like the invalidated claims of the RBR patents, the claims of the Mobile Gateway patents describe (in purely functional terms with functions generic to a computer): sending/receiving data (e.g., IP addresses) between generic telecommunications devices; retrieving data from storage; determining whether data matches certain characteristics; and routing a call based on the determining step. Also like the claims of the RBR patents, the claims of the Mobile Gateway patents fail to describe ***how*** to achieve these results. As an example, Exhibit 12 is a claim chart that shows the similarity between claim 38 of the '721 patent (Mobile Gateway) and claim 74 of the '005 patent (RBR).

71. VoIP-Pal's infringement allegations in the Texas Mobile Gateway Cases are very similar to VoIP-Pal's infringement allegations in the 2016 and 2018 Cases and/or 2020 Texas Cases against Twitter, Apple, AT&T, Verizon, and/or Amazon. For example, VoIP-Pal's infringement allegations for the Mobile Gateway patents are directed to some of the same accused instrumentalities that VoIP-Pal accused of infringement in VoIP-Pal's prior lawsuits against Twitter, Apple, AT&T, and/or Verizon, such as messaging involving text, images, and videos.

72. VoIP-Pal has sued every defendant from the 2016 and 2018 Cases for infringement of the Mobile Gateway patents other than Twitter. On information and belief, the reason that VoIP-Pal has not sued Twitter for infringement of the Mobile Gateway patents to date is strategic—for example, concern that, if VoIP-Pal filed a lawsuit to assert the Mobile Gateway patents against Twitter while Twitter's 2020 and/or 2021 DJ Actions were pending, they might be deemed to be first-filed cases such that VoIP-Pal would end up litigating the Mobile Gateway patents in this Court.

E. Second Settlement Conference In Twitter's 2020 DJ Action And Twitter's Belief That VoIP-Pal Plans To Sue Twitter For Infringement Of The Mobile Gateway Patents After Twitter's 2021 DJ Action Has Concluded

73. Twitter's 2020 DJ Action was dismissed because of VoIP-Pal's covenant not to sue for the '606 patent. Notwithstanding that dismissal, the Court retained jurisdiction to hear Twitter's motion for attorney fees and sua sponte ordered the parties to participate in a second

court-supervised settlement conference. On November 17, 2021, Twitter and VoIP-Pal participated in a second court-supervised settlement conference, which did not result in settlement.

74. On December 9, 2021, VoIP-Pal filed a motion to dismiss Twitter's 2021 DJ Action based on a covenant not to sue for the '872 patent. Case No. 21-cv-02769, ECF No. 43.

75. On information and belief, based on VoIP-Pal's litigation history against Twitter and other companies and the events described above, Twitter expects that VoIP-Pal will sue Twitter for infringement of the Mobile Gateway patents after Twitter's 2021 DJ Action has concluded. Especially concerning to Twitter was that on May 25, 2021, VoIP-Pal and Verizon stipulated to the dismissal of Verizon's 2020 DJ Action (Case No. 20-cv-03092, ECF No. 73), but just one month later, on June 25, 2021, VoIP-Pal sued Verizon for infringement of the Mobile Gateway patents. Based on VoIP-Pal's filing of its motion to dismiss Twitter's 2021 DJ Action based on a covenant not to sue for the '872 patent, Twitter believes that VoIP-Pal plans to sue Twitter for infringement of the Mobile Gateway patents soon after Twitter's 2021 DJ Action has concluded.

76. Twitter believes that it does not infringe and has not infringed any claims of the Mobile Gateway patents.

FIRST CLAIM FOR RELIEF
(DECLARATORY JUDGMENT OF NONINFRINGEMENT OF THE '234 PATENT BY TWITTER)

1. The facts and allegations contained in the preceding paragraphs are incorporated by reference herein.

2. In view of the facts and allegations set forth above, there is an actual, substantial, immediate, and justiciable controversy between Twitter and VoIP-Pal regarding whether Twitter's products and services infringe any claims of the '234 patent.

3. For example, an actual case and controversy exists at least because of the facts, events, and activities described in Sections I, II, and IV of this Complaint (¶¶ 1-28, 38-76), and Twitter believes it does not infringe and has not infringed any claims of the '234 patent.

4. Twitter does not infringe and has not infringed any claims of the ’234 patent because, for example, no Twitter product or service meets or embodies the limitation of an “access code request message ... [comprising a] location identifier identifying a location of the mobile telephone,” “access code … determined from said location identifier and/or based on a location pre-associated with the mobile telephone,” “access code ... wherein said access code expires after a period of time,” “access code … that enables a local call to be made,” and “access code identifying a communication channel.”

5. In view of the foregoing, there is an actual, substantial, immediate, and justiciable controversy between Twitter and VoIP-Pal regarding whether Twitter’s products and services infringe any claims of the ’234 patent.

6. Twitter is entitled to a judgment declaring that no Twitter products or services infringe the ’234 patent.

SECOND CLAIM FOR RELIEF
(DECLARATORY JUDGMENT OF NONINFRINGEMENT OF THE ’721 PATENT BY TWITTER)

7. The facts and allegations contained in the preceding paragraphs are incorporated by reference herein.

8. In view of the facts and allegations set forth above, there is an actual, substantial, immediate, and justiciable controversy between Twitter and VoIP-Pal regarding whether Twitter’s products and services infringe any claims of the ’721 patent.

9. For example, an actual case and controversy exists at least because of the facts, events, and activities described in Sections I, II, and IV of this Complaint (¶¶ 1-28, 38-76), and Twitter believes it does not infringe and has not infringed any claims of the ’721 patent.

10. Twitter does not infringe and has not infringed any claims of the ’721 patent because, for example, no Twitter product or service meets or embodies the limitation of an “access code request message [comprising] a location identifier identifying a geographical location of the wireless apparatus,” “access code [] based on the location identifier,” and “access code identifying a communications channel on a [gateway/network element].”

11. In view of the foregoing, there is an actual, substantial, immediate, and justiciable controversy between Twitter and VoIP-Pal regarding whether Twitter's products and services infringe any claims of the '721 patent.

12. Twitter is entitled to a judgment declaring that no Twitter products or services infringe the '721 patent.

THIRD CLAIM FOR RELIEF
(DECLARATORY JUDGMENT OF INVALIDITY OF THE '234 PATENT BY TWITTER)

13. The facts and allegations contained in the preceding paragraphs are incorporated by reference herein.

14. In view of the facts and allegations set forth above, there is an actual, substantial, immediate, and justiciable controversy between Twitter and VoIP-Pal regarding whether any claim of the '234 patent is valid.

15. For example, an actual case and controversy exists at least because of the facts, events, and activities described in Sections I, II, and IV of this Complaint (¶¶ 1-28, 38-76), and Twitter believes that all claims of the '234 patent are invalid.

16. The claims of the Mobile Gateway patents are similar to the claims of the RBR patents. This Court found all six RBR patents asserted in the 2016 and 2018 Cases to be invalid under 35 U.S.C. § 101 for claiming ineligible subject matter. *E.g.*, *VoIP-Pal.com, Inc. v. Twitter, Inc.*, Case No. 18-cv-04523-LHK, ECF No. 82 (Exhibit 4). On March 16, 2020, the Court of Appeals for the Federal Circuit affirmed those judgments of invalidity. Like the invalidated claims of the RBR patents, the claims of the Mobile Gateway patents describe (in purely functional terms with functions generic to a computer): sending/receiving data (e.g., IP addresses) between generic telecommunications devices; retrieving data from storage; determining whether data matches certain characteristics; and routing a call based on the determining step. Also like the claims of the RBR patents, the claims of the Mobile Gateway patents fail to describe ***how*** to achieve these results. As an example, Exhibit 12 is a claim chart that shows the similarity between claim 38 of the '721 patent (Mobile Gateway) and claim 74 of the '005 patent (RBR).

17. The claims of ’234 patent are invalid in view of prior art—for example, as shown by inter partes review petitions filed by Google and Meta Platforms.

18. The claims of the ’234 patent are invalid 35 U.S.C. § 112—for example, the defendants’ claim construction briefing in the Texas Mobile Gateway Cases show indefiniteness.

19. In view of the foregoing, there is an actual, substantial, immediate, and justiciable controversy between Twitter and VoIP-Pal regarding whether any claim of the ’234 patent is valid.

20. Twitter is entitled to a judgment declaring that the claims of the ’234 patent are invalid at least under 35 U.S.C. §§ 101, 102, 103 and/or 112.

FOURTH CLAIM FOR RELIEF
(DECLARATORY JUDGMENT OF INVALIDITY OF THE ’721 PATENT BY TWITTER)

21. The facts and allegations contained in the preceding paragraphs are incorporated by reference herein.

22. In view of the facts and allegations set forth above, there is an actual, substantial, immediate, and justiciable controversy between Twitter and VoIP-Pal regarding whether any claim of the ’721 patent is valid.

23. For example, an actual case and controversy exists at least because of the facts, events, and activities described in Sections I, II, and IV of this Complaint (¶¶ 1-28, 38-76), and Twitter believes that all claims of the ’721 patent are invalid.

24. The claims of the Mobile Gateway patents are similar to the claims of the RBR patents. This Court found all six RBR patents asserted in the 2016 and 2018 Cases to be invalid under 35 U.S.C. § 101 for claiming ineligible subject matter. *E.g.*, *VoIP-Pal.com, Inc. v. Twitter, Inc.*, Case No. 18-cv-04523-LHK, ECF No. 82 (Exhibit 4). On March 16, 2020, the Court of Appeals for the Federal Circuit affirmed those judgments of invalidity. Like the invalidated claims of the RBR patents, the claims of the Mobile Gateway patents describe (in purely functional terms with functions generic to a computer): sending/receiving data (e.g., IP addresses) between generic telecommunications devices; retrieving data from storage; determining whether data matches certain characteristics; and routing a call based on the

determining step. Also like the claims of the RBR patents, the claims of the Mobile Gateway patents fail to describe ***how*** to achieve these results. As an example, Exhibit 12 is a claim chart that shows the similarity between claim 38 of the ’721 patent (Mobile Gateway) and claim 74 of the ’005 patent (RBR).

25. The claims of ’721 patent are invalid in view of prior art—for example, as shown by inter partes review petitions filed by Google and Meta Platforms.

26. The claims of the ’721 patent are invalid 35 U.S.C. § 112—for example, the defendants’ claim construction briefing in the Texas Mobile Gateway Cases show indefiniteness.

27. In view of the foregoing, there is an actual, substantial, immediate, and justiciable controversy between Twitter and VoIP-Pal regarding whether any claim of the ’721 patent is valid.

28. Twitter is entitled to a judgment declaring that the claims of the ’721 patent are invalid at least under 35 U.S.C. §§ 101, 102, 103, and/or 112.

PRAYER FOR RELIEF

Twitter respectfully requests that this Court enter judgment against VoIP-Pal as follows:

A. A declaration that the Twitter products and services do not infringe any claims of the ’234 patent;

B. A declaration that the claims of the ’234 patent are invalid;

C. A declaration that the Twitter products and services do not infringe any claims of the ’721 patent;

D. A declaration that the claims of the ’721 patent are invalid;

E. For attorney’s fees and costs;

F. Such other and further relief as this Court or a jury may deem just and proper.

DATED: September 9, 2022

PERKINS COIE LLP By:

/s/ Sarah Fowler

Sarah Fowler
Moeka Takagi
Gene Lee
Thomas Matthew

Attorneys for Plaintiff Twitter, Inc.

EXHIBIT 1

US008630234B2

(12) **United States Patent**
Bjorsell et al.

(10) **Patent No.: US 8,630,234 B2**
(45) **Date of Patent: Jan. 14, 2014**

(54) **MOBILE GATEWAY**

(75) Inventors: **Johan Emil Viktor Bjorsell**, Vancouver (CA); **Maksym Sobolyev**, New Westminster (CA); **Pentti Kalevi Huttunen**, Vancouver (CA); **Emil Malak**, Vancouver (CA)

(73) Assignee: **Digifonica (International) Limited**, Vancouver (CA)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 338 days.

(21) Appl. No.: **13/056,277**

(22) PCT Filed: **Jul. 28, 2009**

(86) PCT No.: **PCT/CA2009/001062**

§ 371 (c)(1),
(2), (4) Date: **Jan. 27, 2011**

(87) PCT Pub. No.: **WO2010/012090**

PCT Pub. Date: **Feb. 4, 2010**

(65) **Prior Publication Data**

US 2011/0122827 A1 May 26, 2011

Related U.S. Application Data

(60) Provisional application No. 61/129,898, filed on Jul. 28, 2008.

(51) **Int. Cl.**
H04W 4/00 (2009.01)

(52) **U.S. Cl.**
USPC **370/328**; 455/432.1

(58) **Field of Classification Search**
USPC 370/310–338
See application file for complete search history.

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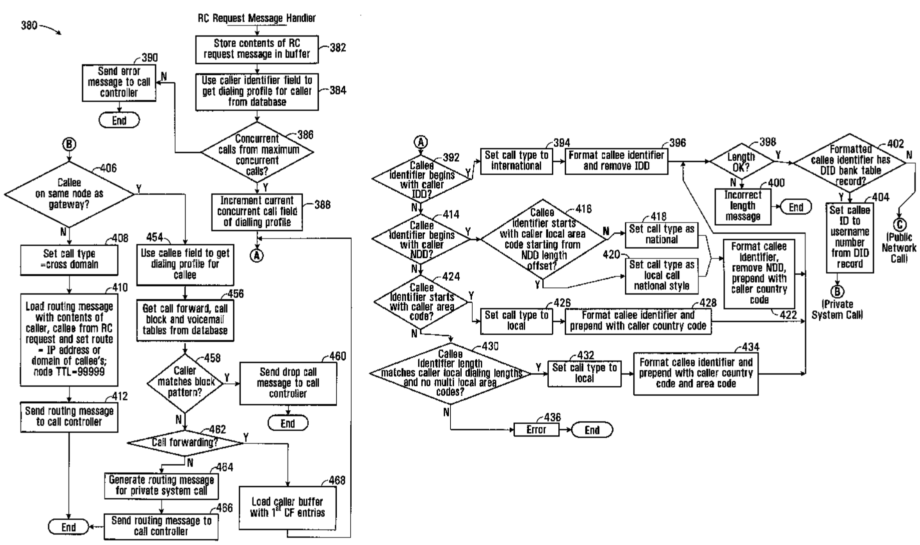
Primary Examiner — Xavier S Wong
Assistant Examiner — M Mostazir Rahman
(74) *Attorney, Agent, or Firm* — Knobbe, Martens, Olson & Bear LLP

(57) **ABSTRACT**

A method of initiating a call to a callee using a mobile telephone involves: receiving, from a user of the mobile telephone, a callee identifier associated with the callee; transmitting an access code request message to an access server, said access code request message including said callee identifier; receiving an access code reply message from the access server in response to said access code request message, said access code reply message including an access code different from said callee identifier and associated with said callee identifier; and initiating a call with the mobile telephone using said access code to identify the callee.

78 Claims, 17 Drawing Sheets



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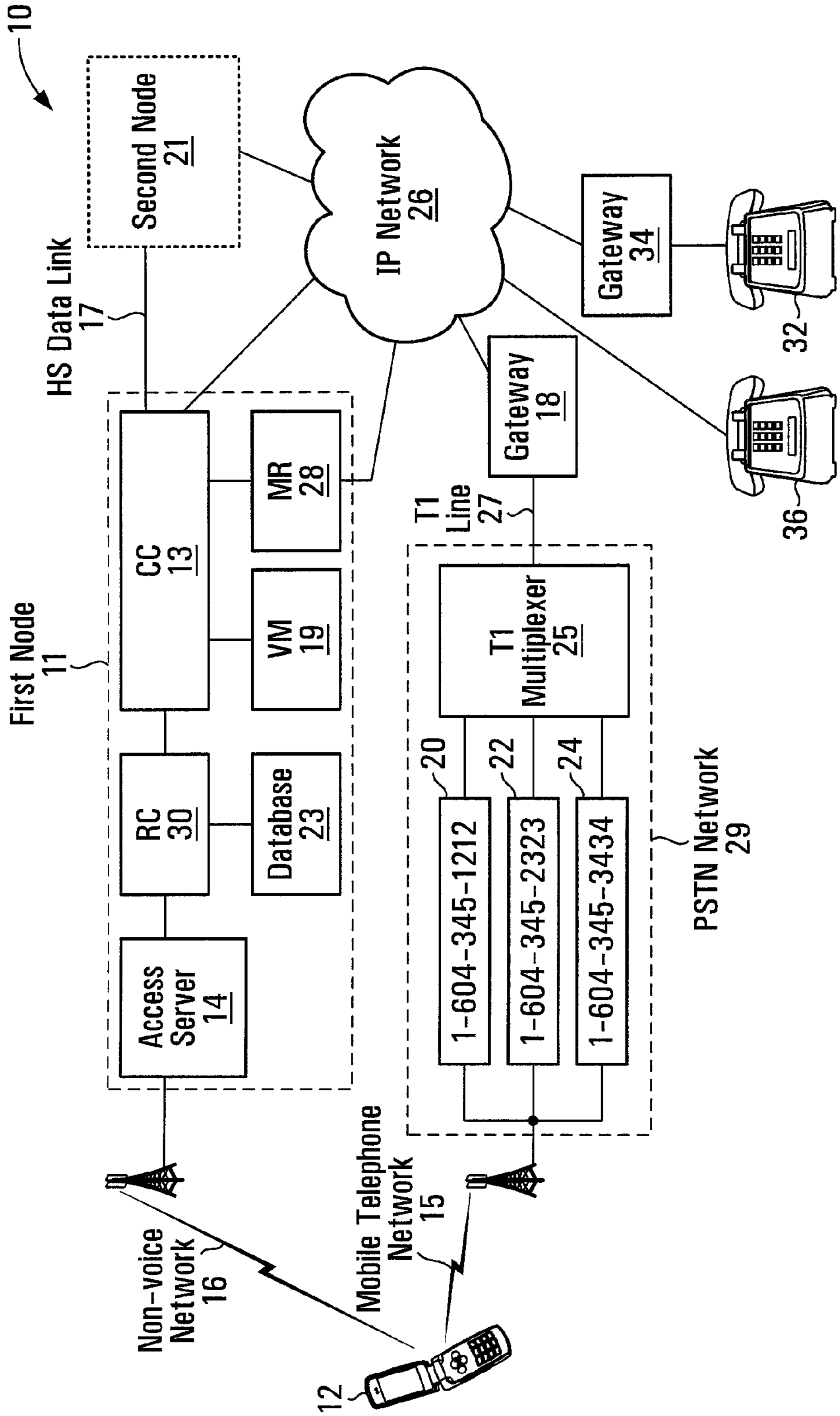

10
Second Node
21
HS Data Link
17
IP Network
26
Gateway
34
32
Gateway
18
36
First Node
11
CC
13
MR
28
VM
19
RC
30
Database
23
Access Server
14
T1 Line
27
T1 Multiplexer
25
20
22
24
1-604-345-1212
1-604-345-2323
1-604-345-3434
PSTN Network
29
Non-voice Network
16
Mobile Telephone Network
15
12

FIG. 1

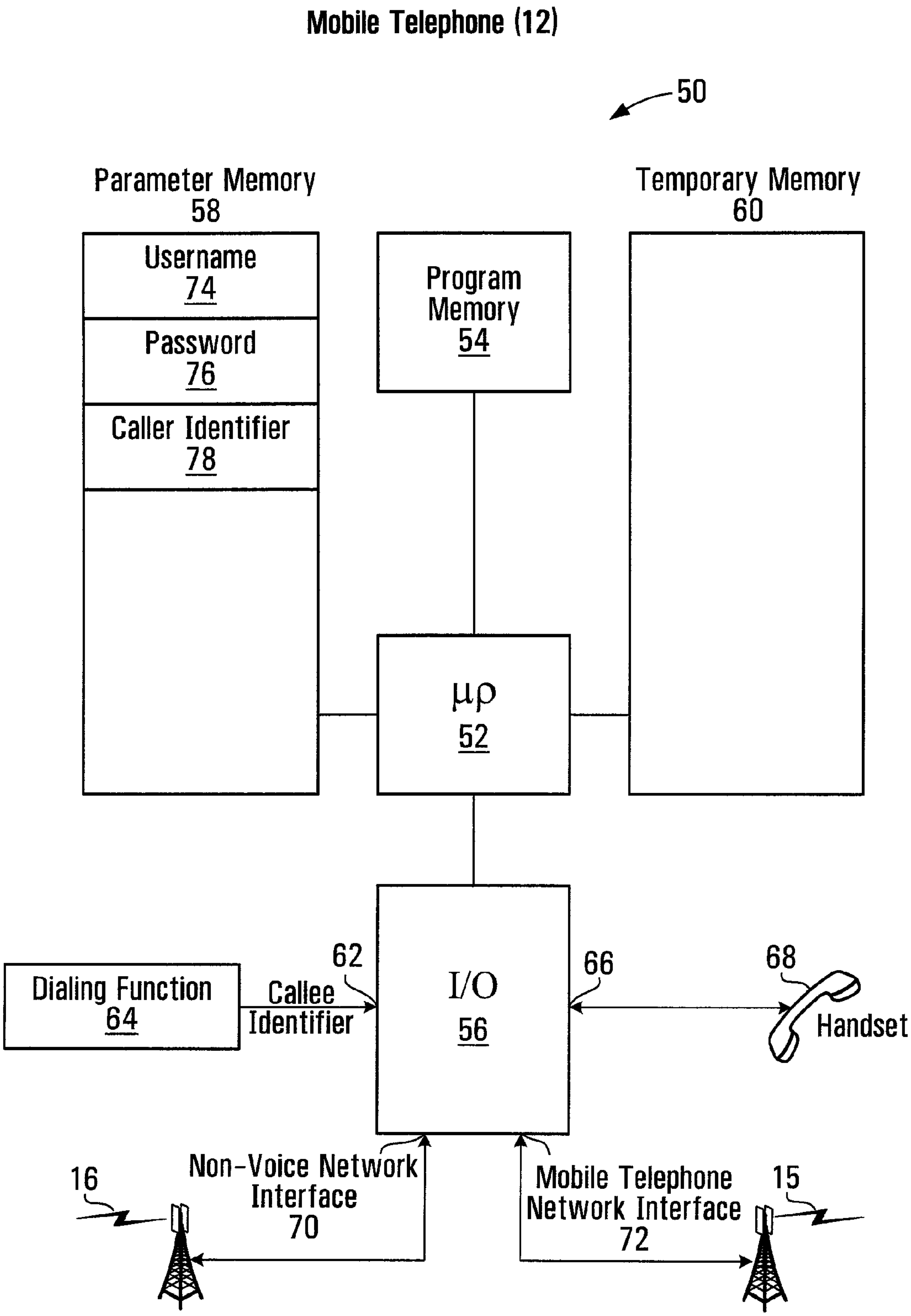

Mobile Telephone (12)
50
Parameter Memory
58
Username
74
Password
76
Caller Identifier
78
Program Memory
54
Temporary Memory
60
μρ
52
I/O
56
Dialing Function
64
62
Callee Identifier
66
68
Handset
16
Non-Voice Network Interface
70
Mobile Telephone Network Interface
72
15

FIG. 2

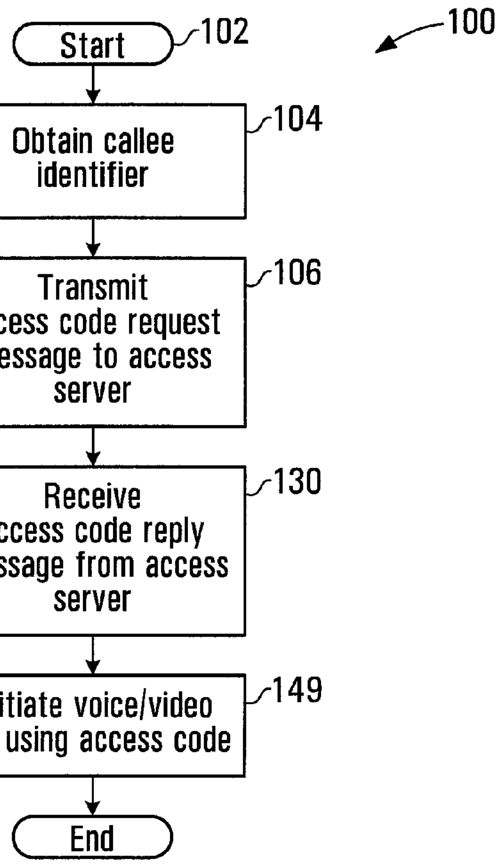
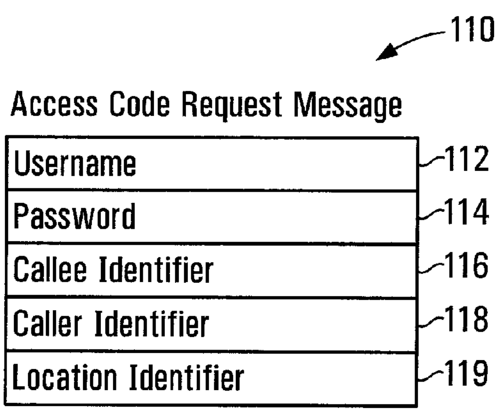


FIG. 3



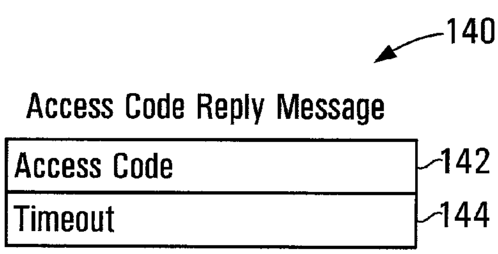


FIG. 5

FIG. 4

Access Server (14)

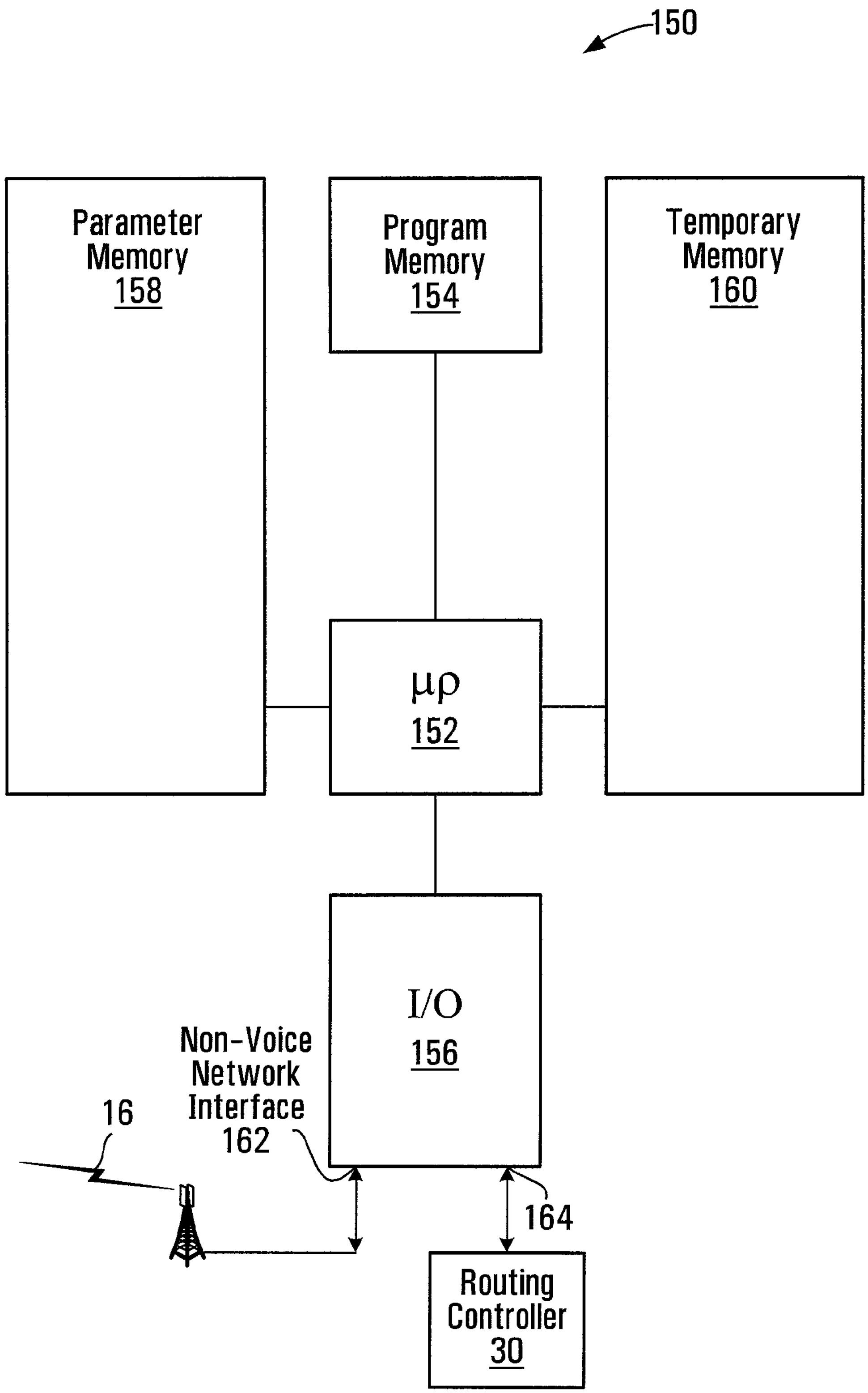


FIG. 6

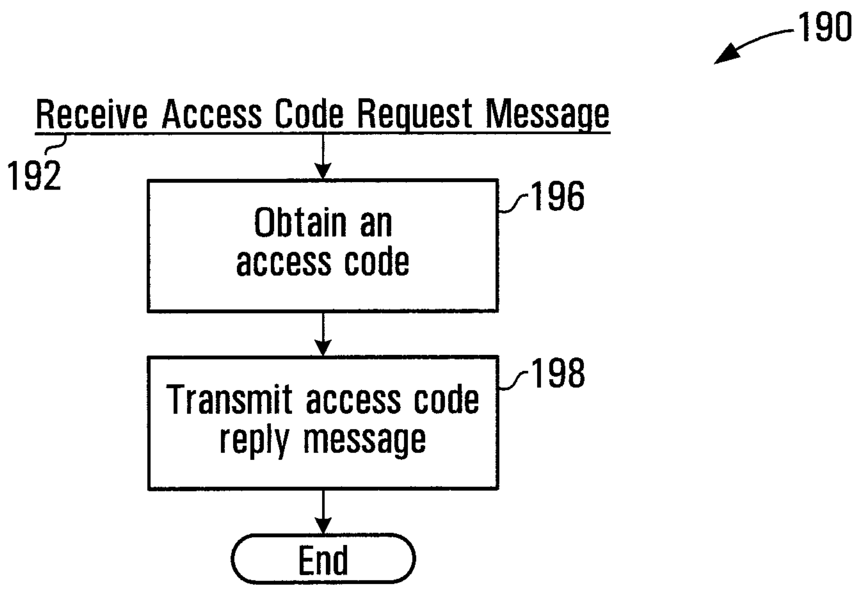

190
Receive Access Code Request Message
192
Obtain an access code
196
Transmit access code reply message
198
End

FIG. 7

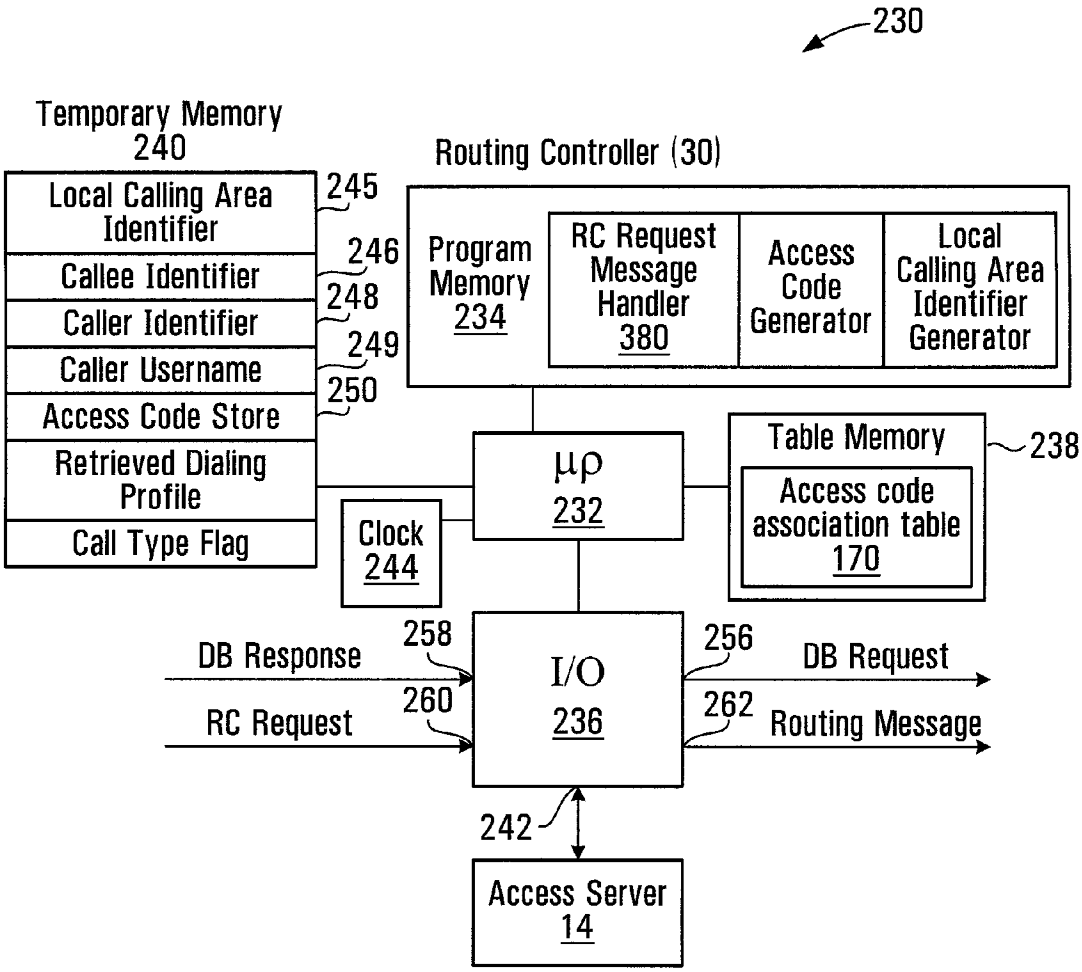

230
Temporary Memory
240
Local Calling Area Identifier
Callee Identifier
Caller Identifier
Caller Username
Access Code Store
Retrieved Dialing Profile
Call Type Flag
245
246
248
249
250
Routing Controller (30)
Program Memory
234
RC Request Message Handler
380
Access Code Generator
Local Calling Area Identifier Generator
Table Memory
238
Access code association table
170
μρ
232
Clock
244
I/O
236
DB Response
258
RC Request
260
256
DB Request
262
Routing Message
242
Access Server
14

FIG. 8

200

Dialing Profile for a User

202	Username	Assigned on Subscription
204	Domain	Domain Associated with User
206	NDD	1
208	IDD	011
210	Country Code	1
212	Local Area Codes	604;778
214	Caller Minimum Local # Length	10
216	Caller Maximum Local # Length	10
218	Reseller	Retailer
220	Maximum # of concurrent calls	Assigned on Subscription
222	Current # of concurrent calls	Assigned on Subscription
224	Default Local Calling Area Identifier	Assigned on Subscription

FIG. 9

170

	Local Calling Area Identifier (171)	Access Code (173)	Channel Identifier (175)	Callee Identifier (177)	Caller Identifier (179)	Caller Username (183)
172	XXXX	1-604-345-1212	20			
174	XXXX	1-604-345-2323	22	1-403-789-1234	1-416-444-1441	2001 1050 8667
176	XXXX	1-604-345-3434	24			
178	XXXX	1-416-234-4646	XX	1-604-321-1234	1-416-444-1234	2001 1050 4141
180	XXXX	1-416-234-6868	XY			

Timeout (181)	Timestamp (182)
10	06-15-2008 10:31
10	06-15-2008 14:21

FIG. 10

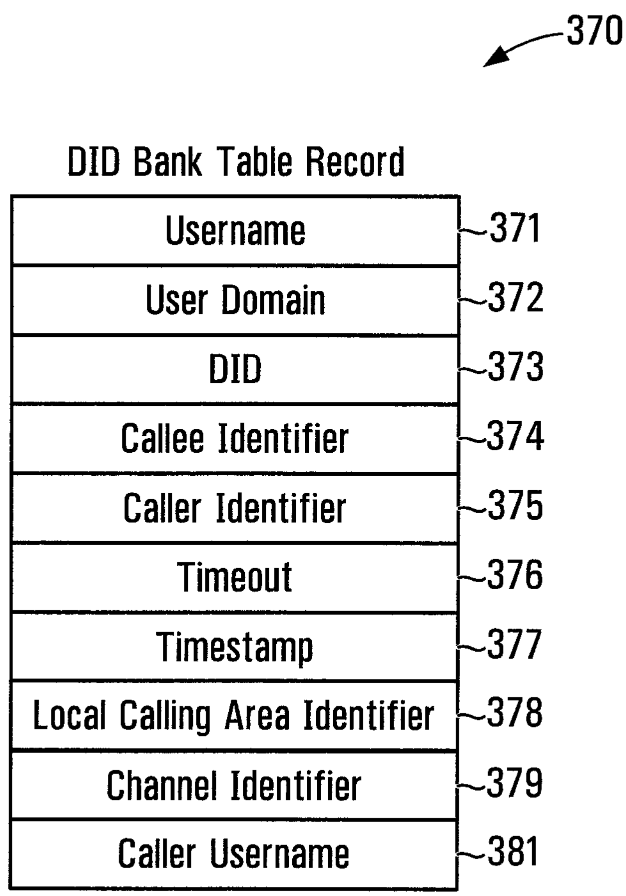
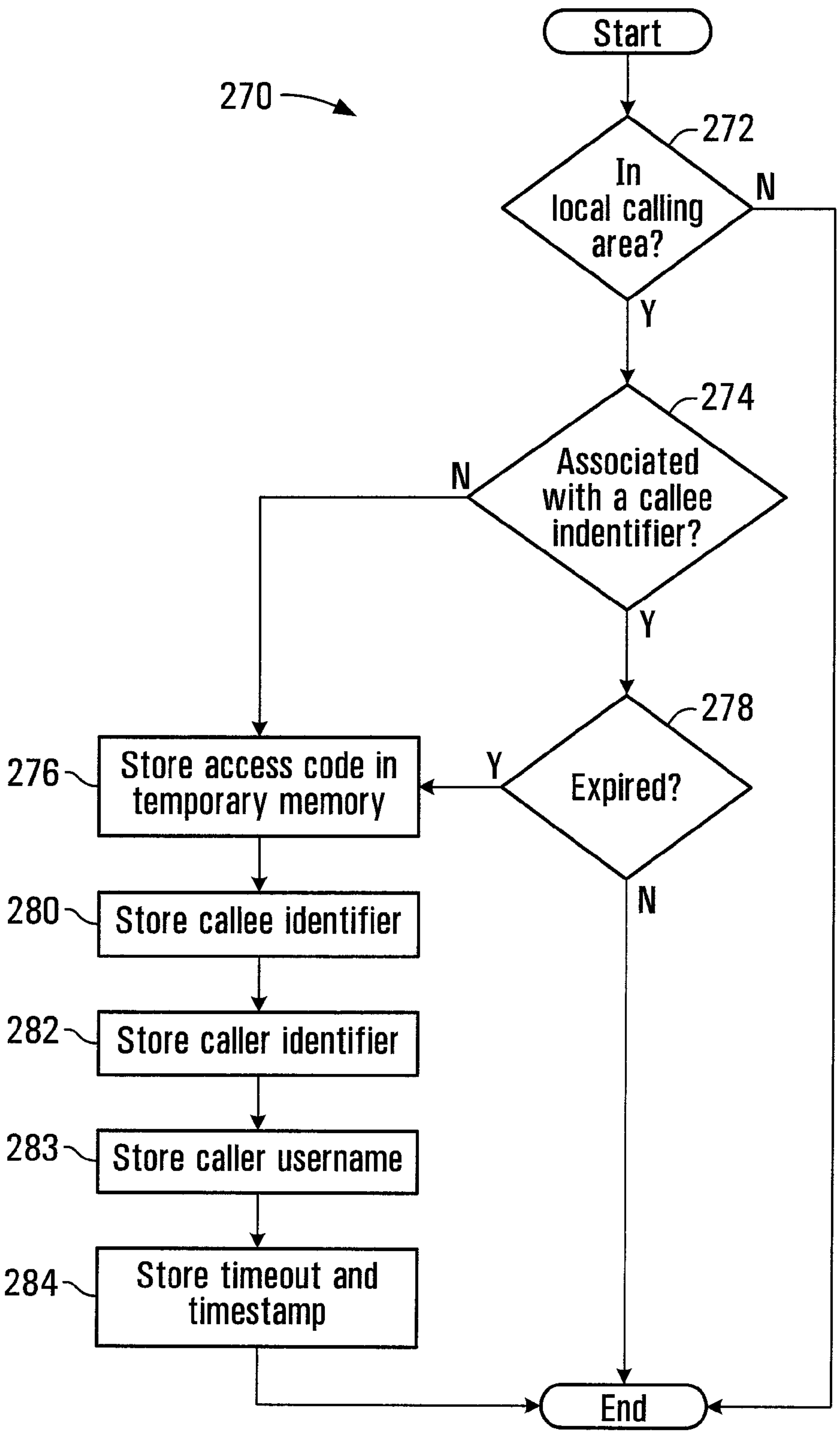

370
DID Bank Table Record
Username 371
User Domain 372
DID 373
Callee Identifier 374
Caller Identifier 375
Timeout 376
Timestamp 377
Local Calling Area Identifier 378
Channel Identifier 379
Caller Username 381

FIG. 11



Start
270
272
In local calling area?
N
Y
274
Associated with a callee indentifier?
N
Y
278
Expired?
Y
N
276
Store access code in temporary memory
280
Store callee identifier
282
Store caller identifier
283
Store caller username
284
Store timeout and timestamp
End

FIG. 12

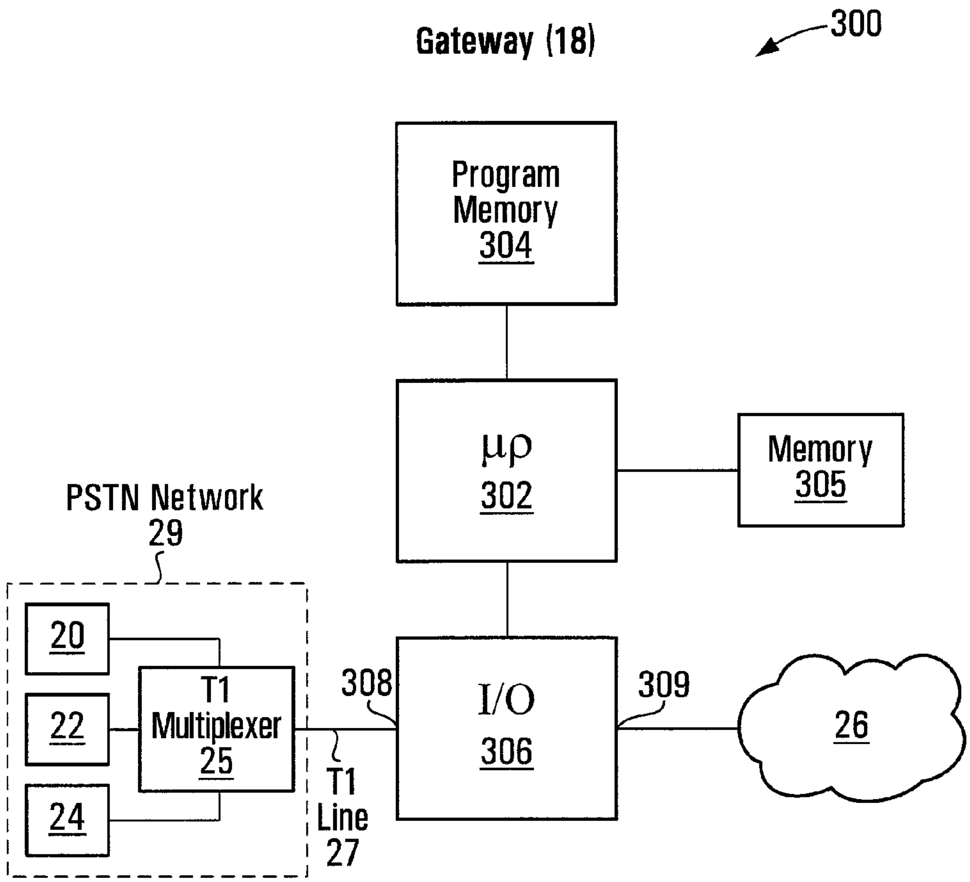


FIG. 13

310

SIP Invite Message

312	Caller Identifier	1-604-678-1234@20.14.102.5
314	Callee Identifier	1-604-345-1212
315	Digest Parameter	XXXXXXX
316	Call Identifer	FF10@20.14.102.5
317	IP Address	20.14.102.5
318	Gateway UDP Port	12378

FIG. 14

Call Controller (13)

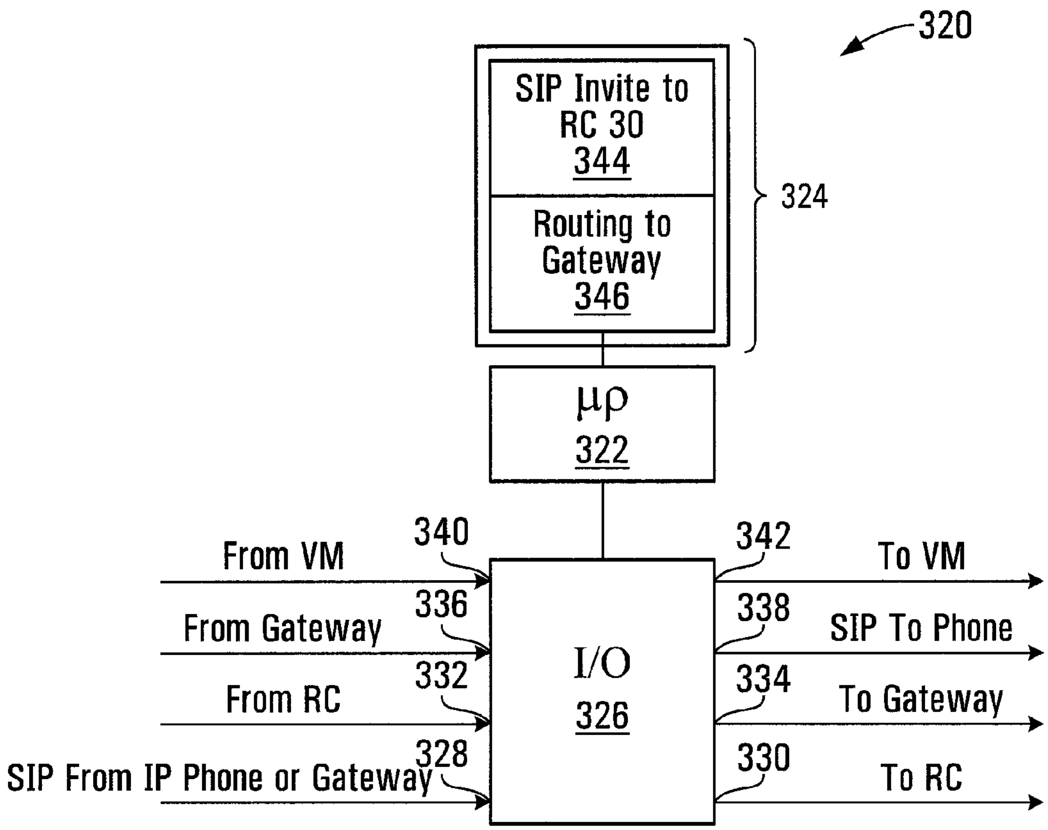


FIG. 15

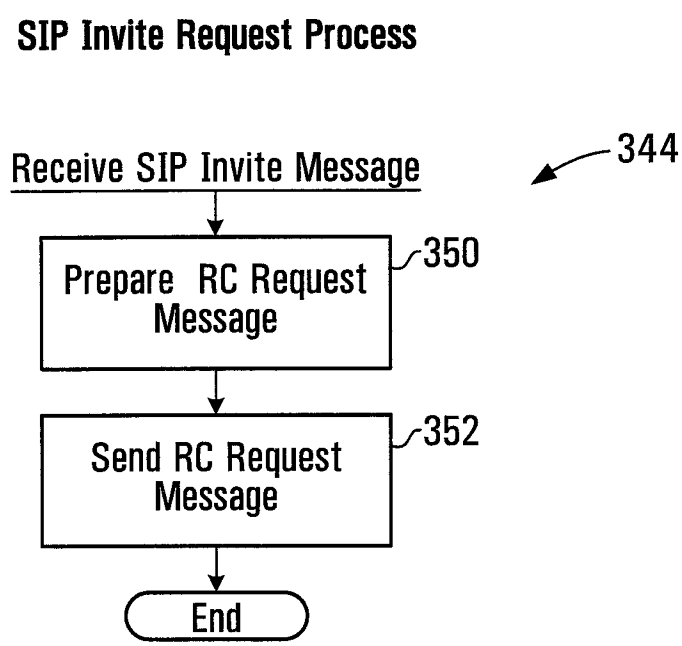

SIP Invite Request Process
Receive SIP Invite Message
344
Prepare RC Request Message
350
Send RC Request Message
352
End

FIG. 16

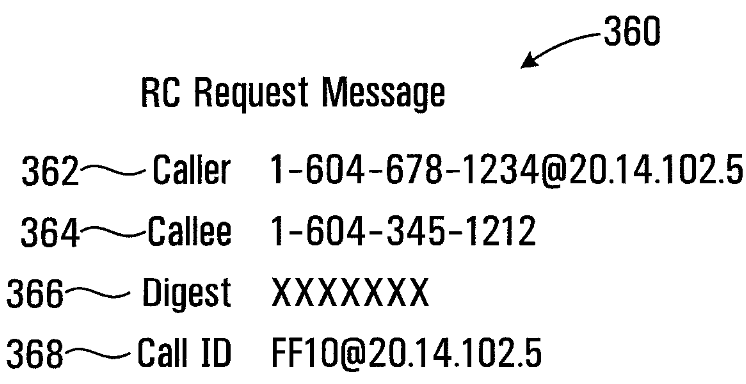

360
RC Request Message
362 Caller 1-604-678-1234@20.14.102.5
364 Callee 1-604-345-1212
366 Digest XXXXXXX
368 Call ID FF10@20.14.102.5

FIG. 17

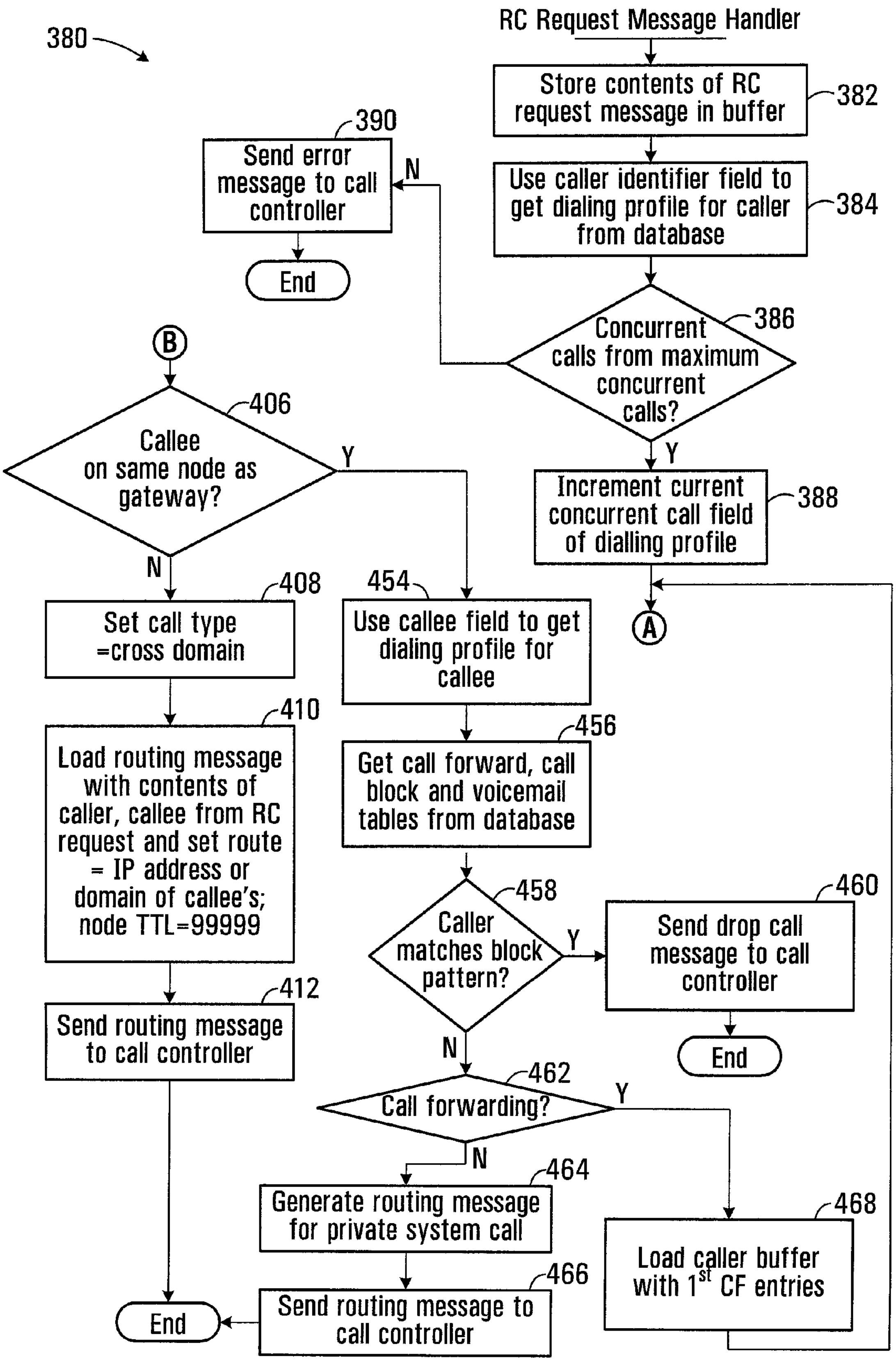

380
RC Request Message Handler
Store contents of RC request message in buffer
382
Use caller identifier field to get dialing profile for caller from database
384
Concurrent calls from maximum concurrent calls?
386
N
Send error message to call controller
390
End
Y
Increment current concurrent call field of dialling profile
388
A
B
Callee on same node as gateway?
406
N
Set call type =cross domain
408
Load routing message with contents of caller, callee from RC request and set route = IP address or domain of callee's; node TTL=99999
410
Send routing message to call controller
412
End
Y
Use callee field to get dialing profile for callee
454
Get call forward, call block and voicemail tables from database
456
Caller matches block pattern?
458
Y
Send drop call message to call controller
460
End
N
Call forwarding?
462
N
Generate routing message for private system call
464
Send routing message to call controller
466
End
Y
Load caller buffer with 1st CF entries
468

FIG. 18A

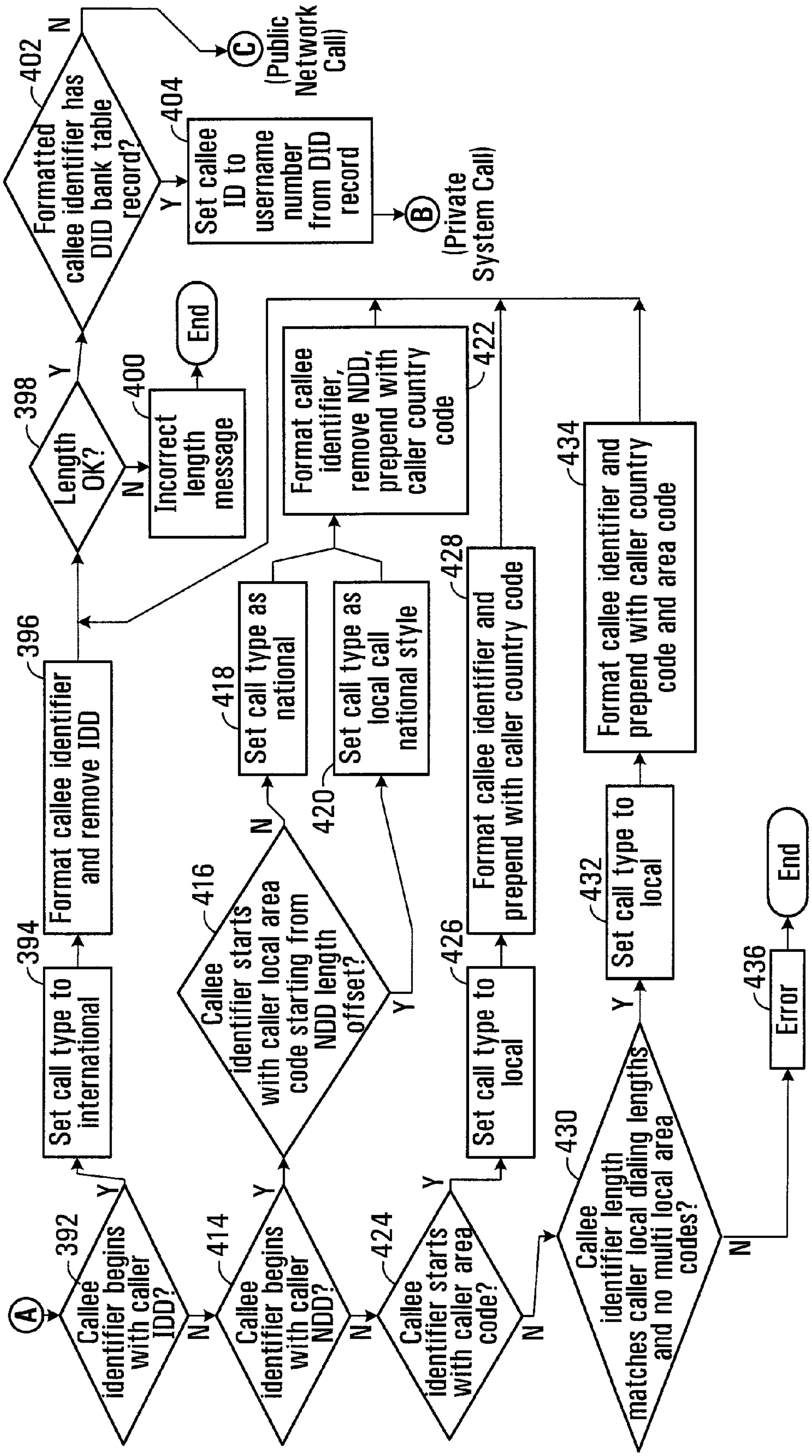

A
392
Callee identifier begins with caller IDD?
Y
N
394
Set call type to international
396
Format callee identifier and remove IDD
398
Length OK?
Y
N
400
Incorrect length message
End
402
Formatted callee identifier has DID bank table record?
Y
N
C
(Public Network Call)
404
Set callee ID to username number from DID record
B
(Private System Call)
414
Callee identifier begins with caller NDD?
Y
N
416
Callee identifier starts with caller local area code starting from NDD length offset?
Y
N
418
Set call type as national
420
Set call type as local call national style
422
Format callee identifier, remove NDD, prepend with caller country code
424
Callee identifier starts with caller area code?
Y
N
426
Set call type to local
428
Format callee identifier and prepend with caller country code
430
Callee identifier length matches caller local dialing lengths and no multi local area codes?
Y
N
432
Set call type to local
434
Format callee identifier and prepend with caller country code and area code
436
Error
End

FIG. 18B

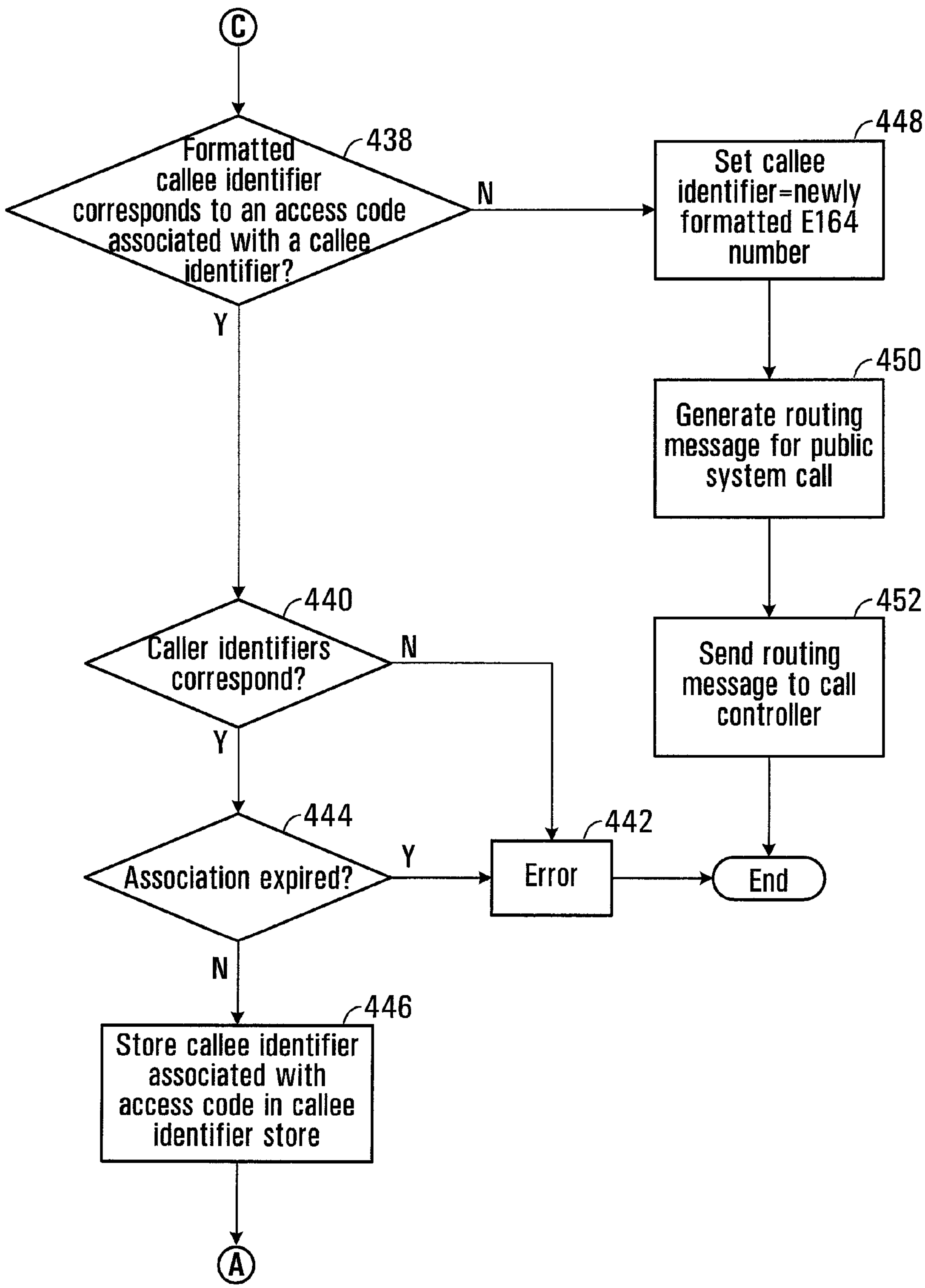

C
Formatted callee identifier corresponds to an access code associated with a callee identifier?
438
N
Y
Set callee identifier=newly formatted E164 number
448
Generate routing message for public system call
450
Send routing message to call controller
452
Caller identifiers correspond?
440
N
Y
Association expired?
444
Y
N
Error
442
End
Store callee identifier associated with access code in callee identifier store
446
A

FIG. 18C

Gateway Node Association Table

480

	Gateway IP Address (486)	Node Identifier (488)
482	20.14.102.5	2
484	104.12.131.12	5

FIG. 19

MOBILE GATEWAY

This application is a national phase entry of PCT/CA2009/001062, filed Jul. 28, 2009, which claims priority to U.S. Provisional Application No. 61/129,898, filed Jul. 28, 2008, both of which are incorporated by reference in their entirety.

BACKGROUND OF THE INVENTION

1. Field of Invention

This invention relates generally to telecommunication, and more particularly to methods, systems, apparatuses, and computer readable media for initiating or enabling a call with a mobile telephone to a callee.

2. Description of Related Art

Mobile telephone service providers often charge significant fees for long distance telephone calls, particularly when the mobile telephone is roaming in another mobile telephone service provider's network.

One known technique for avoiding the long distance charges of mobile telephone service providers is to use a "calling card". A "calling card" may permit the user of the mobile telephone to place a call to a local telephone number or to a less-expensive telephone number (such as a toll-free number, for example) instead of placing the call directly to the callee. The user may thus avoid the long distance charges of the mobile telephone service provider, which may be higher than the charges for using the "calling card". However, this technique can be cumbersome and undesirable, because it may require the user of the mobile telephone to follow a number of complicated or cumbersome steps in order to initiate a call to the callee, for example.

SUMMARY OF THE INVENTION

In accordance with one aspect of the invention there is provided a method of initiating a call to a callee using a mobile telephone. The method involves receiving, from a user of the mobile telephone, a callee identifier associated with the callee; transmitting an access code request message to an access server, the access code request message including the callee identifier; receiving an access code reply message from the access server in response to the access code request message, the access code reply message including an access code different from the callee identifier and associated with the callee identifier; and initiating a call with the mobile telephone using the access code to identify the callee.

Transmitting may involve transmitting the access code request message to the access server on a non-voice network.

Transmitting may involve transmitting a location identifier of a location associated with the mobile telephone to the access server.

Transmitting the location identifier may involve transmitting an IP address of the mobile telephone in a wireless IP network.

Transmitting the location identifier may involve transmitting an identifier of a wireless voice signal station in wireless communication with the mobile telephone.

Transmitting the location identifier may involve transmitting a user-configured identifier of a location associated with the mobile telephone.

Receiving the access code reply message may involve receiving the access code reply message from the access server on a non-voice network.

Receiving the access code reply message may involve receiving, in the access code reply message, an access code temporarily associated with the callee identifier.

Receiving the access code reply message may involve receiving, in the access code reply message, a telephone number identifying a channel operably configured to cooperate with an IP network to cause a call involving the mobile telephone and the callee to be routed through the IP network.

Initiating the call may involve engaging a routing controller to route the call on the IP network to the callee.

The method may further involve: receiving from the mobile telephone the access code request message; communicating with a routing controller to obtain from the routing controller the access code wherein the access code identifies a channel and is useable by the mobile telephone to cause the routing controller to establish a call to the callee using the channel; and transmitting the access code reply message to the mobile telephone.

In accordance with another aspect of the invention, there is provided a mobile telephone. The mobile telephone includes: provisions for receiving, from a user of the mobile telephone, a callee identifier associated with the callee; transmitting provisions for transmitting an access code request message to an access server, the access code request message including the callee identifier; provisions for receiving an access code reply message from the access server in response to the access code request message, the access code reply message including an access code different from the callee identifier and associated with the callee identifier; and provisions for initiating a call using the access code to identify the callee.

The transmitting provisions may include a non-voice network interface for transmitting the access code request message to the access server on a non-voice network.

The access code request message may further include a location identifier of a location associated with the mobile telephone.

The location identifier may include an IP address of the mobile telephone in a wireless IP network.

The location identifier may include an identifier of a wireless voice signal station in wireless communication with the mobile telephone.

The location identifier may include a user-configured identifier of a location associated with the mobile telephone.

The provisions for receiving an access code reply message may include a non-voice network interface for receiving the access code reply message on a non-voice network.

The access code may include a telephone number.

The means for initiating may involve a mobile telephone network interface.

In accordance with another aspect of the invention, there is provided a system for initiating a call to a callee. The system includes the mobile telephone, a routing controller, and an access server. The access server includes: provisions for receiving from the mobile telephone the access code request message; provisions for communicating with the routing controller to obtain from the routing controller the access code wherein the access code identifies a channel and is useable by the mobile telephone to cause the routing controller to establish a call to the callee using the channel; and provisions for transmitting the access code reply message including the access code to the mobile telephone.

In accordance with another aspect of the invention, there is provided a mobile telephone. The mobile telephone includes a processor circuit, a network interface in communication with the processor circuit, and a computer readable medium in communication with the processor circuit and encoded with codes for directing the processor circuit to: receive, from a user of the mobile telephone, a callee identifier associated with the callee; cause an access code request message to be transmitted to an access server, the access code request message including the callee identifier; receive an access code reply message from the access server in response to the access code request message, the access code reply message including an access code different from the callee identifier and associated with the callee identifier; and initiate a call using the access code to identify the callee.

The network interface may include a non-voice network interface, and the codes for directing the processor circuit to cause the access code request message to be transmitted may include codes for directing the processor circuit to cause the access code request message to be transmitted to the access server using the non-voice network interface on a non-voice network.

The access code request message may further include a location identifier of a location associated with the mobile telephone.

The location identifier may include an IP address of the mobile telephone in a wireless IP network.

The location identifier may include an identifier of a wireless voice signal station in wireless communication with the mobile telephone.

The location identifier may include a user-configured identifier of a location associated with the mobile telephone.

The network interface may include a non-voice network interface, and the codes for directing the processor circuit to receive an access code reply message may include codes for directing the processor circuit to cause the access code reply message to be received from the access server using the non-voice network interface on a non-voice network.

The access code may include a telephone number identifying a channel operably configured to cooperate with an IP network to cause a call involving the mobile telephone and the callee to be routed through the IP network.

The network interface may include a mobile telephone network interface, and the codes for directing the processor circuit to initiate may include codes for directing the processor circuit to cause a call to be initiated using the mobile telephone network interface on a mobile telephone network.

In accordance with another aspect of the invention, there is provided a system for initiating a call to a callee. The system includes: the mobile telephone; a routing controller; and an access server comprising a processor circuit and a computer readable medium in communication with the processor circuit. The computer readable medium is encoded with codes for directing the processor circuit to: receive from the mobile telephone the access code request message; communicate with the routing controller to obtain from the routing controller the access code wherein the access code identifies a channel and is useable by the mobile telephone to cause the routing controller to establish a call to the callee using the channel; and transmit the access code reply message to the mobile telephone.

In accordance with another aspect of the invention, there is provided a computer readable medium encoded with codes for directing a processor circuit to: receive, from a user of a mobile telephone, a callee identifier associated with a callee; transmit an access code request message to an access server, the access code request message including the callee identifier; receive an access code reply message from the access server in response to the access code request message, the access code reply message including an access code different from the callee identifier and associated with the callee identifier; and initiate a call using the access code to identify the callee.

In accordance with another aspect of the invention, there is provided a method for enabling a mobile telephone to initiate a call to a callee through a channel. The method involves:

receiving from the mobile telephone an access code request message including a callee identifier associated with the callee; communicating with a routing controller to obtain from the routing controller an access code identifying the channel, the access code being different from the callee identifier and useable by the mobile telephone to initiate a call to the callee using the channel; and transmitting an access code reply message including the access code to the mobile telephone.

Receiving may involve receiving the access code request message on a non-voice network.

The method may further involve causing the routing controller to produce the access code.

Producing may involve selecting the access code from a pool of access codes, where each access code in the pool of access codes identifies a respective telephone number.

The method may further involve determining a local calling area associated with the mobile telephone.

Determining may involve accessing a dialing profile associated with the caller, the dialing profile including a location field having contents identifying at least a default location of the caller.

Determining may involve receiving an IP address of the mobile telephone in a wireless IP network.

Determining may involve receiving an identifier of a wireless voice signal station in wireless communication with the mobile telephone.

Determining may involve receiving a user-configured identifier of a location associated with the mobile telephone.

Selecting may involve selecting an access code in the local calling area associated with the mobile telephone.

Each access code in the pool of access codes may further identify a respective channel operably configured to cooperate with an IP network to cause a call involving the mobile telephone and the callee to be routed through the IP network.

The method may further involve causing the routing controller to establish communication through the IP network in response to a call received on the channel.

Producing may further involve storing a caller identifier associated with the mobile telephone in association with the access code.

Causing the routing controller to establish communication may involve causing the routing controller to establish communication only if the caller identifier associated with the access code identifies the mobile telephone.

Producing may further involve storing the callee identifier in association with the access code.

Producing may further involve searching the pool of access codes for an access code associated with the callee identifier to identify the channel usable by the mobile telephone to initiate a call to the callee.

Producing may further involve storing, in association with the access code, a timestamp for use in determining when the usability of the access code to initiate a call to the callee will expire.

Causing the routing controller to establish communication may involve causing the routing controller to establish communication only if the usability of the access code to initiate a call to the callee has not expired.

Transmitting may involve transmitting the access code reply message on a non-voice network.

In accordance with another aspect of the invention, there is provided a system for enabling a mobile telephone to initiate a call to a callee through a channel. The system includes: provisions for receiving from the mobile telephone an access code request message including a callee identifier associated with the callee; provisions for communicating with the routing controller to obtain from the routing controller an access code identifying the channel, the access code being different from the callee identifier and useable by the mobile telephone to initiate a call to the callee using the channel; and provisions for transmitting an access code reply message including the access code to the mobile telephone.

The provisions for receiving may include a non-voice network interface for receiving the access code request message on a non-voice network.

The system may further include provisions for producing the access code.

The provisions for producing may include a processor circuit operably configured to select the access code from a pool of access codes, where each access code in the pool of access codes identifies a respective telephone number.

The processor circuit may be operably configured to determine a local calling area associated with the mobile telephone.

The processor circuit may be operably configured to determine a local calling area associated with the mobile telephone using a dialing profile associated with the caller, the dialing profile including a location field having contents identifying at least a default location of the caller.

The processor circuit may be operably configured to determine a local calling area associated with the mobile telephone using an IP address of the mobile telephone in a wireless IP network.

The processor circuit may be operably configured to determine a local calling area associated with the mobile telephone using an identifier of a wireless voice signal station in wireless communication with the mobile telephone.

The processor circuit may be operably configured to determine a local calling area associated with the mobile telephone using a user-configured identifier of a location associated with the mobile telephone.

The processor circuit may be operably configured to select an access code in the local calling area associated with the mobile telephone.

Each access code in the pool of access codes may further identify a respective channel operably configured to cooperate with an IP network to cause a call involving the mobile telephone and the callee to be routed through the IP network.

The processor circuit may be operably configured to establish communication through the IP network in response to a call received on the channel.

The processor circuit may be operably configured to store a caller identifier associated with the mobile telephone in association with the access code.

The processor circuit may be operably configured to cause the routing controller to establish communication only if the caller identifier associated with the access code identifies the mobile telephone.

The processor circuit may be operably configured to store the callee identifier in association with the access code.

The processor circuit may be operably configured to search the pool of access codes for an access code associated with the callee identifier to identify the channel usable by the mobile telephone to initiate a call to the callee.

The processor circuit may be operably configured to store, in association with the access code, a timestamp for use in determining when the usability of the access code to initiate a call to the callee will expire.

The processor circuit may operably configured to establish communication only if the usability of the access code to initiate a call to the callee has not expired.

The provisions for transmitting may include a non-voice network interface for transmitting the access code reply message on a non-voice network.

In accordance with another aspect of the invention, there is provided a system for enabling a mobile telephone to initiate a call to a callee through a channel. The system includes a processor circuit, a network interface in communication with the processor circuit, and a computer readable medium in communication with the processor circuit and encoded with codes for directing the processor circuit to: receive from the mobile telephone an access code request message including a callee identifier associated with the callee; communicate with the routing controller to obtain from the routing controller an access code identifying the channel, the access code being different from the callee identifier and useable by the mobile telephone to initiate a call to the callee using the channel; and cause an access code reply message including the access code to be transmitted to the mobile telephone.

The network interface may include a non-voice network interface, and the codes for directing the processor circuit to receive may include codes for directing the processor circuit to cause the access code request message to be received using the non-voice network interface on a non-voice network.

The computer readable medium may be further encoded with codes for directing the processor circuit to cause the access code to be produced.

The codes for directing the processor circuit to cause the access code to be produced may cause the access code to be selected from a pool of access codes, where each access code in the pool of access codes identifies a respective telephone number.

The computer readable medium may be further encoded with codes for directing the processor circuit to cause to be determined a local calling area associated with the mobile telephone.

The codes for directing the processor circuit to cause to be determined may cause a dialing profile associated with the caller to be accessed, the dialing profile including a location field having contents identifying at least a default location of the caller.

The codes for directing the processor circuit to cause to be determined may cause to be received an IP address of the mobile telephone in a wireless IP network.

The codes for directing the processor circuit to cause to be determined may cause to be received an identifier of a wireless voice signal station in wireless communication with the mobile telephone.

The codes for directing the processor circuit to cause to be determined may cause to be received a user-configured identifier of a location associated with the mobile telephone.

The codes for directing the processor circuit to cause the access code to be produced may further cause to be selected an access code in the local calling area associated with the mobile telephone.

Each access code in the pool of access codes may further identify a respective channel operably configured to cooperate with an IP network to cause a call involving the mobile telephone and the callee to be routed through the IP network.

The computer readable medium may be further encoded with codes for directing the processor circuit to cause communication through the IP network to be established in response to a call received on the channel.

The codes for directing the processor circuit to cause the access code to be produced may cause a caller identifier associated with the mobile telephone to be stored in association with the access code.

The codes for directing the processor circuit to cause communication to be established may cause communication to be established only if the caller identifier associated with the access code identifies the mobile telephone.

The codes for directing the processor circuit to cause the access code to be produced may cause the callee identifier to be stored in association with the access code.

The codes for directing the processor circuit to cause the access code to be produced may cause the pool of access codes to be searched for an access code associated with the callee identifier to identify the channel usable by the mobile telephone to initiate a call to the callee.

The codes for directing the processor circuit to cause the access code to be produced may cause a timestamp for use in determining when the usability of the access code to initiate a call to the callee will expire, to be stored in association with the access code.

The codes for directing the processor circuit to cause communication to be established may cause communication to be established only if the usability of the access code to initiate a call to the callee has not expired.

The network interface may include a non-voice network interface, and the codes for directing the processor circuit to transmit include codes for directing the processor circuit to cause the access code reply message to be transmitted using the non-voice network interface on a non-voice network.

In accordance with another aspect of the invention, there is provided a computer readable medium encoded with codes for directing a processor circuit to: receive from the mobile telephone an access code request message including a callee identifier associated with the callee; communicate with the routing controller to obtain from the routing controller an access code identifying the channel, the access code being different from the callee identifier and useable by the mobile telephone to initiate a call to the callee using the channel; and cause an access code reply message including the access code to be transmitted to the mobile telephone.

Other aspects and features of the present invention will become apparent to those ordinarily skilled in the art upon review of the following description of specific embodiments of the invention in conjunction with the accompanying figures.

BRIEF DESCRIPTION OF THE DRAWINGS

In drawings which illustrate embodiments of the invention,

FIG. **1** is a block diagram of a system for enabling a mobile telephone to initiate a call through a channel to a callee in accordance with a first embodiment in the invention;

FIG. **2** is a block diagram of mobile telephone shown in FIG. **1**;

FIG. **3** is a flow chart of a process executed by the mobile telephone shown in FIG. **1**;

FIG. **4** is a schematic representation of an access code request message transmitted between the mobile telephone and an access server shown in FIG. **1**;

FIG. **5** is a schematic representation of an access code reply message transmitted between the mobile telephone and the access server shown in FIG. **1**;

FIG. **6** is a block diagram of the access server shown in FIG. **1**;

FIG. **7** is a flow chart of a process executed by the access server shown in FIG. **1**;

FIG. **8** is a block diagram of a routing controller shown in FIG. **1**;

FIG. **9** is a tabular representation of a dialing profile stored in a database accessible by the routing controller illustrated in FIG. **1**;

FIG. **10** is a tabular representation of an access code association table stored in memory accessible by the routing controller shown in FIG. **1**;

FIG. **11** is a schematic representation of a DID bank table record stored in a database shown in FIG. **1**;

FIG. **12** is a flow chart of a process executed by the routing controller illustrated in FIG. **1**;

FIG. **13** is a block diagram of a gateway shown in FIG. **1**;

FIG. **14** is a tabular representation of an SIP invite message transmitted between the gateway and a call controller illustrated in FIG. **1**;

FIG. **15** is a block diagram of the call controller illustrated in FIG. **1**;

FIG. **16** is a flow chart of a process executed by the call controller illustrated in FIG. **1**;

FIG. **17** is a tabular representation of an RC request message transmitted between the call controller and the routing controller illustrated in FIG. **1**

FIGS. **18**A-**18**C are a flow chart of a process executed by the routing controller illustrated in FIG. **1**; and

FIG. **19** is a tabular representation of a gateway node association table stored in the database illustrated in FIG. **1**.

DETAILED DESCRIPTION

Referring to FIG. **1**, a system for enabling a mobile telephone to initiate a call to a callee is shown generally at **10**. The system **10** includes a first node **11**, a second node **21**, and a mobile telephone **12**.

The first and second nodes **11** and **21** in the illustrated embodiment may support "voice-over-IP" (VoIP) calls between telephones and/or videophones using the Internet protocol (IP), as described in PCT Publication No. WO 2008/052340, which is hereby incorporated by reference in its entirety herein. In the embodiment shown, the first node **11** is located in a geographical area, such as Vancouver, British Columbia, Canada, for example, and the second node **21** is located in London, England, for example. Different nodes may be located in different geographical regions throughout the world to provide telephone/videophone service to subscribers in respective regions. These nodes may be in communication with each other by high speed/high data throughput links including optical fiber, satellite, and/or cable links illustrated generally at **17**, forming a backbone to the system. These nodes may alternatively, or in addition, be in communication with each other through conventional internet services.

In the embodiment shown, the first node **11** provides telephone/videophone service to western Canadian customers from Vancouver Island to Ontario. Another node (not shown) may be located in Eastern Canada to provide services to subscribers in that area, for example.

Other nodes of the type shown may also be employed within the geographical area serviced by a node to provide for call load sharing, for example, within a region of the geographical area serviced by the node. However, in general, all nodes may be similar and have the properties described in connection with the first node **11**.

In this embodiment, the first node **11** includes a call controller (CC) **13**, an access server **14**, a routing controller (RC) **30**, a database **23**, a voicemail server **19**, and a media relay **28**. Each of these may be implemented as separate modules on a common computer system or by separate computers, for example. The voicemail server **19** need not be included in the node and can be provided by a third party service provider. Although the access server **14** is illustrated as being part of the first node **11**, access servers in alternative embodiments may be separate from the node and may be in communication with one or more nodes, for example.

The mobile telephone **12** is configured to place calls over a mobile telephone network, illustrated generally at **15**, in a manner well-known in the art. Furthermore, the mobile telephone **12** and the access server **14** are configured to communicate with each other, preferably on a non-voice network illustrated generally at **16**, such as a "WiFi" wireless IP network or a General Packet Radio Service (GPRS) network, for example. However, in alternative embodiments, the mobile telephone **12** and the access server **14** may communicate with each other over other networks, such as a mobile telephone network using Short Message Service (SMS) messages, for example.

The system **10** further includes a gateway **18** in communication with at least one, and preferably a plurality of, channels, which are illustrated schematically at **20**, **22**, and **24**, to which the mobile telephone **12** may initiate a call over the mobile telephone network **15**. The channels **20**, **22**, and **24** maybe telephone lines in a Public Switched Telephone Network (PSTN) **29**. The channels **20**, **22**, and **24** maybe associated with PSTN telephone numbers in a local calling area associated with the mobile telephone **12**, and thus these channels preferably depend on a geographical location of the mobile telephone. The expression "local calling area" herein refers generally to a set of telephone numbers, typically defined by a geographical region, to which telephone calls may be placed by callers within the local calling area at either no additional charge or at a lower additional charge than would be required for calls to numbers that are outside of the local calling area. However, it will be appreciated that in other embodiments, the gateway **18** may be in communication with any number of channels, which need not be PSTN telephone lines. Also, in the illustrated embodiment, the channels **20**, **22**, and **24** are associated with telephone numbers for Vancouver, British Columbia, Canada and the surrounding area, although it will be appreciated that these channels may include PSTN telephone lines associated with other areas, for example, which may not necessarily be in a local calling area associated with the mobile telephone **12**.

In the illustrated embodiment, each of the channels **20**, **22**, and **24** is configured by a PSTN service provider (which, in Canada, may be Bell Canada or Telus, for example) to direct calls that are received on the channels to the gateway **18**. In the illustrated embodiment, the PSTN service provider has configured the channels **20**, **22**, and **24** to communicate with a T1 multiplexer **25**, which multiplexes the channels **20**, **22**, and **24** in a manner known in the art onto one or more T1 lines **27** that are in communication with the gateway **18**. The gateway **18** is in communication with an IP network shown generally at **26**. The channels **20**, **22**, and **24** are thus configured to cooperate with the IP network **26** (via the gateway **18** in the illustrated embodiment) to cause a call involving the mobile telephone **12** and the callee to be routed through the IP network in response to a call received at one of the channels.

Also, in the illustrated embodiment, the access server **14** is in communication with the routing controller **30** of the first node **11**, and the routing controller **30** is configurable to associate a callee identifier with one of the channels **20**, **22**, and **24**, as described below. A callee identifier associated with one of the channels **20**, **22**, and **24** may be a telephone number of a PSTN telephone **32** that is in communication with the IP network **26** through a gateway **34**, or it may be a telephone number of a VoIP telephone **36** that is directly in communication with the IP network **26**, for example. Other routing controllers **30** of other nodes, such as the second node **21**, for example, may also associate callee identifiers with other channels that are in communication with other gateways (not shown).

Mobile Telephone

Referring to FIG. **2**, in this embodiment, the mobile telephone (**12**) includes a processor circuit shown generally at **50**. The processor circuit **50** includes a microprocessor **52**, a program memory **54**, an input/output (I/O) port **56**, parameter memory **58**, and temporary memory **60**. The program memory **54**, I/O port **56**, parameter memory **58**, and temporary memory **60** are all in communication with the microprocessor **52**. The processor circuit **50** may alternatively include a plurality of processors, a plurality of program memories, a plurality of temporary memories, and/or a plurality of I/O ports, or these components may alternatively be combined into a single device. However, for simplicity, the components of the processor circuit **50** are illustrated as shown in the example of FIG. **2**.

In the illustrated embodiment, the I/O port **56** includes a dialing input **62** for receiving a callee identifier from a key pad, for example, or from a voice recognition unit, or from pre-stored callee identifiers stored in the parameter memory **58**, for example. For illustration purposes only, a myriad of possible dialing functions for providing a callee identifier are represented by the block entitled dialing function **64**. A callee identifier may be a telephone number of a callee, for example.

The I/O port **56** also includes a handset interface **66** for receiving and producing signals to and from a handset **68** that may be placed close to the user's ear and mouth, for producing and receiving audible signals for and from the user. It will be appreciated that alternatively, the handset **68** may include a camera and video screen, for example, and that video or other types of signals may be transmitted additionally or alternatively to audible signals.

The I/O port **56** also includes a non-voice network interface **70** for transmitting information to, and receiving information from, the non-voice network **16** illustrated in FIG. **1**, for example, and preferably interfaces with a high-speed internet connection.

The I/O port **56** in the illustrated embodiment further includes a mobile telephone network interface **72** for transmitting signals to and receiving signals from a mobile telephone service provider over a network such as a Global System for Mobile communications (GSM) or a Code Division Multiple Access (CDMA) network, such as the mobile telephone network **15** illustrated in FIG. **1**, for example. Again, for simplicity, a mobile telephone network interface is illustrated, although it will be appreciated that video signals or other signals may be handled similarly when the mobile telephone (**12**) is facilitating communication of one or more of these types of signals. It will also be appreciated that alternatively, the non-voice network interface **70** and mobile telephone network interface **72** need not be distinct, but may be a single interface for communication over a single network, for example, or may be configured to communicate over a plurality of different networks, for example.

In the illustrated embodiment, the parameter memory **58** includes a username field **74** and a password field **76**, although it will be appreciated that the username and password may not be necessary, or may be input by the user as required, for example. The parameter memory **58** in the illustrated embodiment also includes a caller identifier field **78** for storing a caller identifier, which may be a telephone number associated with the mobile telephone (**12**) for identifying a "channel" such as a telephone line assigned to the mobile telephone that may be used to call back to the mobile telephone, for example. Generally, the contents of the username field **74**, the password field **76**, and the caller identifier field **78** are set once when the user first subscribes to the system.

The usernames referred to herein, such as the username in the username field **74**, preferably include a twelve digit number such as 2001 1050 8667, for example, wherein the leftmost digit is a continent code (such as "2" to indicate North America, for example), followed by a three-digit country code (such as "001" to indicate Canada and the United States, for example), a four-digit dealer code (such as "1050", for example), and a unique four-digit number code (such as "8667", for example), as discussed more generally in PCT Publication No. 2008/052340. Therefore, a prefix of a username referred to herein preferably indicates a geographical region associated with the user, or with the access code, and more preferably indicates a node associated with the user or access code.

The program memory **54** stores blocks of codes for directing the microprocessor **52** to carry out the functions of the mobile telephone (**12**), which are illustrated by example below.

Referring to FIGS. **2** and **3**, a flow chart representing functions performed by blocks of code that direct the microprocessor **52** to initiate a call with the mobile telephone **12** to a callee is shown generally at **100**. The blocks shown in FIG. **3** generally represent codes that may be stored in the program memory **54** for example, for directing the microprocessor **52** to perform various functions relating to initiating a call with the mobile telephone (**12**) to a callee. The actual code to implement each block may be written in any suitable programming language, such as Java, C, and/or C++, for example.

The process **100** begins at **102**, in response to an interrupt produced at or for the microprocessor **52** by the dialing function **64**. Upon initiation of the process **100**, block **104** directs the microprocessor **52** to obtain a callee identifier from the dialing function **64** at the dialing input **62** of the I/O port **56** in the illustrated embodiment. The callee identifier is associated with a desired callee, and may be a telephone number of the callee, for example. The microprocessor **52** thus receives, from a user of the mobile telephone (**12**), a callee identifier associated with a callee.

Block **106** directs the microprocessor **52** to transmit, using the non-voice network interface **70** in the illustrated embodiment, an access code request message, the access code request message including the callee identifier obtained at block **104**, to the access server **14** (illustrated in FIG. **1**). In general, preferably block **106** directs the microprocessor **52** to cause an access code request message to be transmitted to the access server **14** over a non-voice network, such as an internet, using WiFi or GPRS technology for example. However, it will be appreciated that block **106** may direct the microprocessor **52** to transmit an access code request message to the access server **14** using any suitable technique, which may alternatively include a voice network, for example.

Referring to FIG. **4**, an exemplary access code request message is shown generally at **110**. The access code request message **110** includes a username field **112**, a password field **114**, a callee identifier field **116**, and a caller identifier field **118**. In the illustrated embodiment, values for the username, password, and caller identifier fields **112**, **114**, and **118** are retrieved from the username, password, and caller identifier fields **74**, **76**, and **78** respectively in the parameter memory **58** of the processor circuit **50** (illustrated in FIG. **2**), and a value for the callee identifier field **116** is obtained from the dialing function **64** in block **104**, and may be stored in the temporary memory (**60**), for example. It will be appreciated that the username field **112**, password field **114**, and caller identifier field **118** are not essential, although these fields are preferable in order to identify the user of the mobile telephone for billing purposes, for example.

Referring to FIGS. **1** and **4**, it will be appreciated that in order to minimize charges from the mobile telephone service provider of the mobile telephone **12**, the channels **20**, **22**, **24** will preferably be local or relatively inexpensive telephone lines associated with a geographical location, more particularly a pre-defined local calling area, associated with the mobile telephone **12**. Therefore, the exemplary access code request message **110** further includes a location identifier field **119**. The location identifier stored in the location identifier field **119** preferably identifies a location of the mobile telephone **12** for use in determining a local calling area associated with the mobile telephone **12**.

For example, the location identifier in the location identifier field **119** may include an IP address of the mobile telephone **12** in a wireless IP network, such as the non-voice network **16** to which the non-voice network interface **70** shown in FIG. **2** is connected, because this IP address may be an indicator of a geographical location of the mobile telephone **12**. The location identifier may also or alternatively include an identifier of a wireless voice signal station in wireless communication with the mobile telephone. In the illustrated embodiment, the wireless voice signal station is part of the mobile telephone network **15** that is in communication with the mobile telephone **12** through the mobile telephone network interface **72** illustrated in FIG. **2**. In still other embodiments, the location identifier may include a user-configured identifier of a geographical location or local calling area where the mobile telephone **12** is or may be situated. The location identifier may thus be pre-determined and stored in the parameter memory **58** shown in FIG. **2** or may be acquired from non-voice network or wireless voice signal station or from user input, for example. Therefore, in summary, the location identifier in the location identifier field **119** may include one or more of an IP address of the mobile telephone **12** in a wireless IP network, an identifier of a wireless voice signal station in wireless communication with the mobile telephone, and a user-configured identifier.

As described below, the location identifier in the location identifier field **119** may be used to determine a local calling area associated with the mobile telephone **12**, within which local calling area channels (illustrated as **20**, **22**, and **24** in FIG. **1**) are available to the mobile telephone **12** for the lowest cost to the user. However, it will be appreciated that the location identifier may only approximately identify a local calling area, and may not necessarily identify the lowest cost channel (illustrated as **20**, **22**, and **24** in FIG. **1**) for the mobile telephone **12**. It will also be appreciated that in other embodiments, the location identifier field **119** may be omitted.

Referring back to FIG. **3**, the process **100** continues at block **130**, which directs the microprocessor (**52**) to receive an access code reply message from the access server (**14**) in response to the access code request message that was transmitted at block **106**.

Referring to FIG. **5**, an exemplary access code reply message is shown generally at **140**. The access code reply message **140** includes an access code field **142** and a timeout field **144**. In the illustrated embodiment, the access code field **142** stores an access code which is a telephone number associated with a telephone line associated with one of the channels **20**, **22**, or **24** in FIG. **1**. It will be appreciated that the access code is different from the callee identifier in the callee identifier field **116** shown in FIG. **4**, in that the access code identifies a channel, other than that provided by the callee identifier provided by the dialing function **64** in FIG. **2**, that the mobile telephone (**12**) can use to initiate a call to the callee. It will be appreciated that use of the access code facilitates avoidance of long distance or roaming charges that a mobile telephone service provider would charge for a call placed directly using the callee identifier using conventional calling processes, for example.

Still referring to FIG. **5**, the timeout field **144** in the illustrated embodiment stores a value that indicates a period of time, for example a number of minutes, during which the access code in the access code field **142** is associated with the callee identifier in the callee identifier field **116** of the exemplary access code request message **110** illustrated in FIG. **4**, such that the access code is only temporarily associated with the callee identifier. In one embodiment, the value stored in the timeout field **144** indicates 10 minutes, for example. It will be appreciated that in other embodiments, the timeout field **144** may not be necessary, but preferably it is included.

In the illustrated embodiment, the program codes in block **130** direct the microprocessor **52** to receive the access code reply message over a non-voice network, such as a WiFi or GPRS network (illustrated at **16** in FIG. **1**) via the non-voice network interface **70** shown in FIG. **2**. However, it will be appreciated that the access code reply message may be received on any suitable network, even a voice network, for example.

Referring back to FIGS. **2** and **3**, block **149** directs the microprocessor **52** to initiate a call with the mobile telephone (**12**) on the mobile telephone network **15** (illustrated in FIG. **1**) using the access code received in the access code field **142** of the access code reply message **140** (shown in FIG. **5**) to identify the callee. In the illustrated embodiment, the codes in block **149** direct the microprocessor **52** to initiate a call to the channel (**20**, **22**, or **24**) identified by the access code, using the mobile telephone network interface **72** of the I/O port **56** of the mobile telephone (**12**), to engage the mobile telephone network (**15**).

Referring to FIG. **1**, in the embodiment shown, the access code in the access code field (**142**) is a telephone number identifying a channel **20**, **22**, or **24** that is in communication with the gateway **18** to the IP network **26**. Through the gateway **18**, the channel **20**, **22**, or **24** is thus operably configured to cooperate with the IP network **26** to cause a call from the mobile telephone **12** to the callee to be routed through the IP network. Routing the call through the IP network may involve engaging the routing controller **30** to route the call on the IP network **26** to the callee, as described below. However, it will be appreciated that in other embodiments, the access code need not be a telephone number, but may be any code identifying a channel through which the mobile telephone **12** can initiate a call. Alternatively, if the mobile telephone is capable of voice over IP communications, the access code may be used to identify an IP address in the IP network to which the call is routed. In this embodiment, the IP address may act as the access code. The process **100** shown in FIG. **3** is then ended.

Access Server

Referring to FIG. **6**, the access server (**14**) includes a processor circuit shown generally at **150**. The processor circuit **150** includes a microprocessor **152**, program memory **154**, an I/O port **156**, parameter memory **158**, and temporary memory **160**. The program memory **154**, I/O port **156**, parameter memory **158**, and temporary memory **160** are all in communication with the microprocessor **152**. The processor circuit **150** may alternatively include a plurality of microprocessors or I/O ports, for example, and the components of the illustrated processor circuit **150** may also alternatively be combined into a single device.

The program memory **154** stores blocks of codes for directing the microprocessor **152** to carry out the functions of the access server **14**. The I/O port **156** includes a non-voice network interface **162** for communicating with the non-voice network **16** illustrated in FIG. **1**. The I/O port **156** also includes a routing controller interface **164** for interfacing with the routing controller **30** illustrated in FIG. **1**.

Referring to FIGS. **6** and **7**, a flow chart of blocks of code for directing the microprocessor **152** of the access server (**14**) to provide an access code to the mobile telephone (**12**) is shown generally at **190**. The blocks **190** in FIG. **7** generally represent codes that may be stored in the program memory **154** for directing the microprocessor **152** to perform various functions to provide the access to the mobile telephone (**12**) to enable the mobile telephone to place a call through a channel (**20**, **22**, or **24**).

The process **190** begins at **192**, in response to an interrupt created by or for the microprocessor **152** when it receives an access code request message **110** (as illustrated in FIG. **4**) from the mobile telephone (**12**). In the illustrated embodiment, the access code request message (**110**) is received via the non-voice network interface **162** through a non-voice network (**16**) such as a WiFi or GPRS network, for example. However, it will be appreciated that other embodiments may use different techniques for receiving the access code request message (**110**) from the mobile telephone (**12**).

The process **190** continues at block **196**, which directs the microprocessor **152** to communicate with the routing controller **30** to obtain from the routing controller an access code identifying a channel (illustrated as **20**, **22**, or **24** in FIG. **1**) in communication with the gateway (**18**), wherein the access code is different from the callee identifier in the callee identifier field **116** (shown in FIG. **4**) and is usable by the mobile telephone (**12**) to initiate a call to the callee using the channel, as further described below. Therefore, block **196** preferably causes an access code to be produced by retransmitting the access code request message **110** illustrated in FIG. **4** that was received at **192** from the mobile telephone (**12**), to the routing controller **30** through the routing controller interface **164** of the I/O port **156**.

The process **190** continues at block **198**, which directs the microprocessor **152** to transmit an access code reply message (**140**), including the access code obtained by block **196**, to the mobile telephone (**12**). An exemplary access code reply message is shown in FIG. **5**. In the illustrated embodiment, an access code reply message (**140**) is produced by the routing controller **30** in a manner described below in response to the access code request message (**110**) that was transmitted to the routing controller at block **196**, and the access code reply message (**140**) is received from the routing controller through the routing controller interface **164** of the I/O port **156**. Block **198** then causes the access code reply message that was received from the routing controller to be retransmitted to the mobile telephone (**12**). In the illustrated embodiment, the codes in block **198** direct the microprocessor **152** to transmit the access code reply message (**140**) using the non-voice network interface **162** to the non-voice network **16**, which may be a WiFi or GPRS network, for example. However, it will be appreciated that other embodiments may employ other types of networks for communicating the access code reply message (**140**) to the mobile telephone (**12**). The process **190** is then ended.

In summary, referring to FIG. **1**, the access server **14** generally acts as an interface to the routing controller **30** for relaying access code request messages and access code reply messages between the mobile telephone **12** and the routing controller. Therefore, it will be appreciated that in alternative embodiments, the access server **14** and the routing controller **30** need not be separate, but may, for example, be combined in a single component.

Routing Controller (RC)

Referring to FIG. **1**, generally, the routing controller **30** executes a process to facilitate communication between callers and callees. The function of a routing controller generally in a VoIP system is described in PCT Publication No. WO 2008/052340.

Referring to FIG. **8**, the routing controller (**30**) includes a processor circuit shown generally at **230**. The processor circuit **230** includes a microprocessor (or more generally a processor) **232**, program memory **234**, an I/O port **236**, table memory **238**, temporary memory **240**, and a clock **244**. The program memory **234**, I/O port **236**, table memory **238**, temporary memory **240**, and clock **244** are all in communication with the processor **232**. The processor circuit **230** may include a plurality of microprocessors, for example, and the aforementioned components of the processor circuit **230** may be combined, for example. The program memory **234** includes blocks of code for directing the processor **232** to carry out the functions of the routing controller (**30**), and the I/O port **236** includes an access server interface **242** for communicating with the access server **14**.

In the illustrated embodiment as described above, the access server (**14**) transmits (at block **196** illustrated in FIG. **7**) an access code request message (**110**) to the routing controller (**30**) in order to obtain from the routing controller (**30**) an access code. When an access code request message (**110**) is received at the access server interface **242**, the processor **232** preferably stores certain values from the access code request message in stores in the temporary memory **240** for ease of retrieval. In particular, the temporary memory **240** includes a callee identifier store **246** for storing the callee identifier from the callee identifier field **116** in the access code request message **110** illustrated in FIG. **4**, a caller identifier store **248** for storing the caller identifier that was stored in the caller identifier field **118** of the access code request message **110** illustrated in FIG. **4**, a caller username store **249** for storing the caller username that was stored in the caller username field **112** of the access code request message **110** illustrated in FIG. **4**, and an access code store **250** for storing an access code that is selected when the routing controller (**30**) receives an access code request message (**110**). The temporary memory **240** also includes a local calling area identifier store **245** for storing an identifier of a local calling area associated with the mobile telephone (**12**). The clock **244** generally maintains and stores a representation of a current date and time.

The I/O port **236** further includes a database request port **256** through which a request to the database (**23** in FIG. **1**) can be made, and also includes a database response port **258** for receiving a reply from the database (**23**). The I/O port **236** further includes a routing controller (RC) request message input **260** for receiving an RC request message (illustrated in FIG. **17**) from the call controller (**13** in FIG. **1**) and includes a routing message output **262** for sending a routing message back to the call controller **13**. The I/O port **236** thus acts to receive a caller identifier and a callee identifier contained in an RC request message from the call controller, the RC request message being received in response to initiation of a call by a subscriber of the system, as described below.

The program memory **234** includes blocks of codes for directing the processor **232** to carry out various functions of the routing controller (**30**). One of these blocks includes an RC request message handler **380** which directs the routing controller (**30**) to produce a routing message in response to a received RC request message, an example of which is illustrated in FIG. **17**. The RC request message handler process is shown in greater detail at **380** in FIGS. **18**A through **18**C. Another of these blocks in the program memory **234** includes an access code generator, which is described at **270** in FIG. **12**, and which directs the routing controller (**30**) to produce an access code as directed by the program codes in block **196** shown in FIG. **7**. Yet another of these blocks in the program memory **234** includes a local calling area identifier generator, which directs the routing controller (**30**) to produce a local calling area identifier using the location identifier from the location identifier field **119** of the access code request message **110** illustrated in FIG. **4**.

Local Calling Area Identifier Generator

Referring to FIG. **1**, it will be appreciated that preferably, a call made by the mobile telephone **12** using the access code obtained from the access server **14** will be a local call for the mobile telephone **12**, based on a geographical location of the mobile telephone. Therefore, blocks in the program memory **234** include a local calling area identifier generator, which directs the routing controller **30** to produce a local calling area identifier.

For example, the local calling area identifier generator may direct the microprocessor **152** to access a dialing profile associated with the caller. The dialing profile may be identified using the username in the username field **112** in the access code request message **110** illustrated in FIG. **4**, and to store in the local calling area identifier field **245** a default location of the caller retrieved from the dialing profile associated with the caller.

Referring to FIG. **9**, an exemplary dialing profile is illustrated generally at **200** and includes a username field **202**, a domain field **204**, and calling attributes comprising a national dialing digits (NDD) field **206**, an international dialing digits (IDD) field **208**, a country code field **210**, a local area codes field **212**, a caller minimum local number length field **214**, a caller maximum local number length field **216**, a reseller field **218**, a maximum number of concurrent calls field **220**, a current number of concurrent calls field **222**, and a default local calling area identifier field **224**. Therefore, in some embodiments, the local calling area identifier generator directs the microprocessor **152** to determine a local calling area associated with the mobile telephone (**12**) by retrieving the default local calling area identifier from the default local calling area identifier field **224** of the dialing profile **200**.

Effectively, the dialing profile **200** is a record identifying calling attributes of the caller identified by the username in the username field **202**. More generally, dialing profiles **200** represent calling attributes of respective users, and are discussed in more detail in PCT publication No. WO 2008/052340. As described in PCT publication No. WO 2008/052340, a dialing profile of the type shown in FIG. **9**, and also other records such as direct-in-dial (DID) records, call blocking records, call forwarding records, and voicemail records, may be created whenever a user registers with the system or agrees to become a subscriber to the system.

Alternatively, the local calling area identifier generator may generate a local calling area identifier to be stored in the local calling area identifier store **245** using the location identifier from the location identifier field **119** of the access code request message **110** illustrated in FIG. **4**. As described above, the location identifier field (**119**) may store one or more of an IP address of the mobile telephone (**12**) in a wireless IP network, an identifier of a wireless voice signal station in wireless communication with the mobile telephone, and a user-configured identifier. One or more of these values may be used to identify a local calling area that is or is likely to be associated with the mobile telephone (**12**) in order to generate a local calling area identifier to be stored in the local calling area identifier store **245**.

For example, it has been found that services available from web sites such as http://www.ip2location.com/ and http://www.serviceobjects.com/products/dots_ipgeo.asp, for example, can produce a name of a location, and also latitude and longitude values, associated with an IP address. Using this information derived from an IP address, or other information from the location identifier field (**119**), a local calling area may be identified by hierarchical jurisdictional designations (such as country, province, and city in Canada or country, state, and city in the United States) and encoded as codes identifying the local calling area. These codes may then be stored in the local calling area identifier store **245**.

Access Code Association Table

In the illustrated embodiment, the table memory **238** (shown in FIG. **8**) includes an access code association table **170**, an example of which is illustrated in FIG. **10**, for associating access codes with callee identifiers, caller identifiers, caller usernames, timeouts, and timestamps. Although the routing controller (**30**) is illustrated in this embodiment as a separate component from the access server (**14**), it will be appreciated that in other embodiments, the routing controller (**30**) may be part of or integrated with the access server (**14**), and in these other embodiments, the access code association table **170** may be part of or integrated with the access server.

Referring to FIGS. **1** and **10**, the access code association table **170** generally includes a plurality of records, each having an access code field **173** storing an access code. The access codes in the access code association table **170** may thus form a pool of access codes, where each access code may identify a respective telephone number. In the illustrated embodiment, the access codes in the access code fields **173** of records of the access code association table **170** identify respective channels (illustrated by example only as **20**, **22**, and **24**) that are operably configured to cooperate with the IP network **26** via the gateway **18** to cause a call involving the mobile telephone **12** to be routed through the IP network.

Referring to FIG. **10**, the exemplary access code association table **170** includes records **172**, **174**, **176**, **178**, and **180**, each having respective fields for storing a local calling area identifier **171**, an access code **173**, a channel identifier **175**, a callee identifier **177**, a caller identifier **179**, a caller username **183**, a timeout **181**, and a timestamp **182**. Generally, a record in the access code association table **170** will be created for each access code that identifies a channel (such as the channels **20**, **22**, and **24** illustrated in FIG. **1**) that is configured or configurable to establish communication through a gateway (such as the gateway **18** illustrated in FIG. **1**) to an IP network (**26** in FIG. **1**) in response to a call received at the channel. When a record is created in respect of a channel, the local calling area identifier field **171** is preferably initialized with an identifier of a local calling area associated with the channel, the access code field **173** is preferably initialized with an access code associated with the channel, and the channel identifier field **175** is preferably initialized with an identifier of the channel. The remaining fields (for storing a callee identifier **177**, a caller identifier **179**, a caller username **183**, a timeout **181**, and a timestamp **182**) are preferably initialized with default "null" values when a record is created. The fields for storing a local calling area identifier **171**, an access code **173**, a channel identifier **175** preferably remain generally constant during ordinary operation of the access code association table **170**, although the values stored in the fields for storing a callee identifier **177**, a caller identifier **179**, a caller username **183**, a timeout **181**, and a timestamp **182** may vary as described below. It will be appreciated that in some embodiments, one or more of the fields for storing a local calling area identifier **171**, a channel identifier **175**, a caller identifier **179**, a caller username **183**, a timeout **181**, and a timestamp **182** may not be required and be omitted.

As noted above, the local calling area identifier field **171** is preferably initialized with an identifier of a local calling area associated with the channel. The local calling area identifier field **171** preferably stores codes that are encoded in the same manner as the codes in the local calling area identifier store **245**, as described above, so that an access code in the local calling area identified by the codes in the local calling area identifier store **245** may be identified by searching the access code association table **170** for an access code associated with a local calling area identifier in the associated local calling area identifier field **171** that matches the local calling area identifier in the local calling area identifier store **245**. It has been found that information available from web sites such as http://en.wikipedia.org/wiki/List_of_NANP_area_codes, and services available from web sites such as http://www.serviceobjects.com/demos/PhoneExchangeDemo.asp, for example, may be used to determine a local calling area identifier associated with a given access code where, for example, the access code is a PSTN telephone number.

In the exemplary access code association table **170**, the access codes in the access code fields **173** are telephone numbers for PSTN lines, three of which are in the 604 area code in Vancouver, British Columbia, Canada, and two of which are in the 416 area code in Toronto, Ontario, Canada. It will be appreciated that the access code association table **170** is an example only, and other access code association tables may include any number of access codes, which need not be PSTN telephone numbers, and which need not be limited to particular geographical areas.

In the exemplary access code association table **170**, the access code field **173** in the record **174** stores an access code 1-604-345-2323, which may be a local telephone number for Vancouver, British Columbia, Canada, and the callee identifier field **177** of the record **174** stores a callee identifier 1-403-789-1234, which may be a telephone number for a callee in Calgary, Alberta, Canada for example, thereby associating the callee identifier 1-403-789-1234 with the access code 1-604-345-2323. Furthermore, the caller identifier field **179** of the record **174** stores a caller identifier 1-416-444-1441 and the caller username field **183** stores a caller username 2001 1050 8667, thereby associating the caller identifier 1-416-444-1441 and caller username 2001 1050 8667 with the aforementioned access code and callee identifier. The caller identifier 1-416-444-1441 may be associated with a mobile telephone normally geographically located in Toronto, Ontario, Canada, but which may be in Vancouver and is therefore using a Vancouver-based access code to place a call to a Calgary-based number, for example. In the example record **174**, the timestamp field **182** indicates that the callee identifier 1-403-789-1234, the caller identifier 1-416-444-1441, and the caller username 2001 1050 8667 were associated with the access code 1-604-345-2323 on Jun. 15, 2008 at 10:31 am, and the timeout field **181** indicates that this association is to expire 10 minutes after the time indicated in the timestamp field.

Likewise, the exemplary record **178** indicates that the callee identifier 1-604-321-1234, the caller identifier 1-416-444-1234, and the caller username 2001 1050 4141 were associated with the access code 1-416-234-4646 on Jun. 15, 2008 at 2:21 pm, and the timeout field **181** of the record **178** indicates that this association is to expire within 10 minutes of the time in the timestamp field **182**.

It will also be appreciated that the access code association table **170** may, in other embodiments, be substituted with other data structures or storage media. For example, in alternative embodiments, as described below, a DID record of the type shown at **370** in FIG. **11** may associate an access code with a callee identifier and with other information such as a caller identifier, a timeout value, and a timestamp value, additionally or alternatively to the access code association table **170**.

DID Bank Table Records

As described in PCT Publication No. 2008/052340, a DID bank table record may be created and stored in a DID bank table in the database (**23** in FIG. **1**) when a user registers with the system, to associate the username of the user and a host name of the node with which the user is associated, with a number on the PSTN network formatted in compliance with the E.164 standard set by the International Telecommunication Union (ITU). However, as explained below, DID records may, in some embodiments, also associate usernames and host names with respective access codes, and may also associate access codes with respective callee identifiers and with other information such as caller identifiers, timeout values, and timestamp values.

Referring to FIG. **11**, an exemplary DID bank table record is shown generally at **370**, and includes a username field **371**, a user domain field **372**, and a DID field **373**. The username field **371** may store a username of a user of the system, in which case the user domain field **372** stores a host name of the node with which the user is associated, and the DID field **373** stores an E.164 number on the PSTN network associated with the user. Exemplary host names stored in the user domain field **372** include sp.yvr.digifonica.com for Vancouver, British Columbia, Canada and sp.lhr.digifonica.com for London England, for example, as described in PCT Publication No. 2008/052340. If the user has multiple telephone numbers, then multiple records of the type shown at **370** would be included in the DID bank table, each having the same username and user domain, but different DID field **373** contents reflecting the different telephone numbers associated with that user.

However, DID fields **373** of DID bank table records **370** may also store access codes, in which case the username field **371** may store a username associated with the access code. In these DID bank table records **370**, the user domain field **372** stores a host name of the node with which the access code is associated. Therefore, DID bank table records **370** may, in some embodiments, associate usernames and host names with respective access codes.

The exemplary DID bank table record **370** further includes a callee identifier field **374**, a caller identifier field **375**, a timeout field **376**, a timestamp field **377**, a local calling area identifier field **378**, a channel identifier field **379**, and a caller username field **381**, which may be used in an analogous manner to the callee identifier field **177**, the caller identifier field **179**, the timeout field **181**, the timestamp field **182**, the local calling area identifier field **171**, the channel identifier field **175**, and the caller username field **183** respectively of the access code association table **170** illustrated in FIG. **10**. The DID bank table records **370** may thus associate access codes with respective local calling area identifiers, callee identifiers, caller identifiers, caller usernames, timeouts, and timestamps, although the caller identifier field **375**, timeout field **376**, timestamp field **377**, local calling area identifier field **378**, channel identifier field **379**, and caller username field **381** may not be necessary, and one or more of these fields may be omitted in some embodiments.

Furthermore, it will be appreciated that the callee identifier field **374**, caller identifier field **375**, timeout field **376**, and timestamp field **377** of the DID bank table record **370** may be omitted for DID table records that are not in respect of access codes, but rather are in respect of telephone numbers of users of the system, for example, as described in PCT Publication No. 2008/052340. The callee identifier field **374**, caller identifier field **375**, timeout field **376**, and timestamp field **377** of the DID bank table record **370** may also be omitted in embodiments where the access code association table **170** includes records with these types of fields.

For simplicity, the following description is directed to embodiments wherein an access code association table **170** associates access codes with respective callee identifiers, caller identifiers, timeout values, and timestamp values. However, it will be appreciated that the processes described herein for records in the access code association table **170** may additionally or alternatively be applied to DID bank table records **370** in an analogous manner.

Access Code Generator

Referring back to FIGS. **1**, **4**, and **8** in the illustrated embodiment as described above, the access server **14** transmits (at block **196** illustrated in FIG. **7**) an access code request message **110** to the routing controller **30** in order to obtain from the routing controller **30** an access code. When an access code request message **110** is received at the access server interface **242**, the processor **232** preferably authenticates the user by making various enquiries of databases to which it has access, to determine whether or not the password in the password field **114** of the access code request message **110** matches a password stored in the database in association with the username in the username field **112**. Various functions may be used to pass encryption keys or hash codes back and forth to ensure that the transmittal of passwords is secure. If the user is successfully authenticated, the processor **232** then preferably produces an access code.

Referring to FIGS. **8** and **12**, a process for producing an access code is shown generally at **270**. Essentially the process **270** determines whether the access code in a given record (referred to below as the "currently addressed record") in the access code association table shown at **170** in FIG. **10** is within the local calling area identified by the local calling area identifier store **245**, and whether the access code is currently available for association with a callee identifier. In order to produce an access code in response to receiving an access code request message (**110**) from the access server (**14**), the processor **232** of the routing controller (**30**) preferably searches the pool of access codes in the access code association table (**170**) to identify an access code identifying a channel usable by the mobile telephone (**12**) to initiate a call to the callee, using the process **270** until an available access code in the local calling area identified by the local calling area identifier store **245** is identified. The access code generator thus preferably selects an access code from the pool of access codes in the access code association table (**170**), and preferably selects an access code in a local calling area associated with the mobile telephone (**12**).

Starting with the first record in the access code association table, the process **270** begins at block **272**, which directs the processor **232** of the routing controller (**30**) to determine whether the access code in the currently addressed record of the access code association table **170** is associated with the same local calling area as the mobile telephone (**12**) as identified by the contents of the local calling area identifier store **245**. If at block **272** the access code of the currently addressed record is not associated with the same local calling area as the mobile telephone (**12**), the process **270** ends, the next record in the access code association table **170** is addressed, and the process is repeated for the next record in the access code association table.

However, if at block **272** the access code of the currently addressed record is associated with the same local calling area as the mobile telephone (**12**), or if the access code request message **110** (illustrated in FIG. **4**) did not include a local calling area identifier, then the process **270** continues at block **274**, which directs the processor **232** to determine whether the access code of the currently addressed record is associated with a callee identifier. To do this, the processor **232** determines whether the callee identifier field (**177**) of the currently addressed record stores a "null" value that was assigned to it on initialization, or whether the callee identifier field instead stores a callee identifier. In other words the processor checks to see whether the currently addressed record has already been in use.

If at block **274** the callee identifier field (**177**) of the currently addressed record in the access code association table (**170**) does store a callee identifier and not the "null" value that was assigned to the callee identifier field on initialization (for example, records **174** and **178** in FIG. **10**), then the access code of that record is associated with a callee identifier, and the process **270** continues at block **278**, which directs the processor **232** to determine whether the association of the callee identifier with the access code has expired. In the illustrated embodiment, the codes at block **278** direct the processor **232** to determine whether the sum of the contents of the timestamp field (**182**) and of the timeout field (**181**) in the currently addressed record of the access code association table **170** (shown in FIG. **10**) is less than the current time represented by the clock **244**. If at block **278** the sum of the timeout and timestamp fields in the currently addressed record of the access code association table **170** is less than the time represented by the clock **244**, then the association of the callee identifier with the access code is not expired and the process **270** ends, the next record in the access code association table (**170**) is addressed, and the process **270** is repeated for the next record in the access code association table.

However, if at block **278** the sum of the contents of the timeout and timestamp fields (**181** and **182**) in the currently addressed record of the access code association table (**170**) is not less than the time represented by the clock **244**, then the association of the callee identifier with the access code has expired, and the process **270** continues at block **276** which directs the processor **232** to store the contents of the access code field **173** of the currently addressed record in the access code store **250** of the temporary memory **240** of the routing controller **30**.

Referring to FIGS. **8**, **10**, and **12**, if at block **274** the callee identifier field in the currently addressed record does not store a callee identifier but stores instead the "null" value that was assigned to the callee identifier field on initialization (for example, records **172**, **176**, and **180**), then the access code of that record is not associated with a callee identifier, and the process **270** continues at block **276**, which directs the processor **232** to store the access code from the access code field **173** of the currently addressed record, in the access code store **250** in the temporary memory **240**.

After the selected access code is stored in the access code store **250** at block **276**, the process **270** continues at block **280**, which directs the processor **232** to store the callee identifier from the callee identifier store **246** in the callee identifier field **177** of the currently addressed record, thereby creating an association of the callee identifier with the selected access code.

The process **270** then continues at block **282**, which directs the processor **232** to store the caller identifier from the caller identifier store **248** (which identifies the mobile telephone **12** shown in FIG. **1**) in the caller identifier field **179** of the currently addressed record of the access code association table **170**, thereby also storing the caller identifier in association with the selected access code.

The process **270** then continues at block **283**, which directs the processor **232** to store the caller username from the caller username store **249** in the caller username field **183** of the currently addressed record of the access code association table **170**, thereby also storing the caller username in association with the selected access code.

The process **270** then continues at block **284**, which directs the processor **232** to store timeout and timestamp values in the timeout and timestamp fields **181** and **182** of the currently addressed record of the access code association table **170**, thus further storing, in association with the selected access code, a timestamp for use in determining when the usability of the access code to initiate a call to the callee will expire. A default value, such as 10 minutes, for example may be stored in the timeout field **181** of the currently addressed record. Also, the current time indicated by the clock **244** is preferably stored in the timestamp field **182** of the currently addressed record.

In alternative embodiments, the access code association table (**170**) might not include fields for a caller identifier, caller username, a timeout, or a timestamp. In these embodiments, one or more of blocks **282**, **283**, and **284** described above are not necessary, and one or more of the caller identifier store **248** and the caller username store **249** may be omitted.

In summary, the access code generator in the illustrated embodiment responds to receiving an access code request message **110** illustrated in FIG. **4** from the access server (**14**) by first authenticating the user, and then by searching through a pool of access codes, using the process **270** shown in FIG. **12**, to identify an access code that is associated with the local calling area identified by the local calling area identifier store (**245**) and that is not previously and validly associated with another callee identifier. It will be appreciated that in alternative embodiments, different data structures and algorithms may be preferable for identifying an access code that meets the aforementioned criteria. For example, in accordance with conventional database design that is well-known in the art, the records illustrated in the access code association table **170** illustrated in FIG. **10** may alternatively be organized in a binary tree according to the value in the local calling area identifier field **171**, or in separate tables for respective local calling area identifiers, for example, in order to enable a more efficient search of the access code association table for an access code that satisfies the aforementioned criteria. Therefore, the access code association table (**170**) and the process **270** illustrated in FIG. **12** are examples only, and one of ordinary skill in the art will readily appreciate numerous alternative data structures and algorithms.

Gateway

Referring to FIG. **13**, in this embodiment, the gateway (**18**) includes a processor circuit shown generally at **300**, which includes a microprocessor **302**. The processor circuit **300** also includes a program memory **304**, a memory **305**, and an I/O port **306**, all of which are in communication with the microprocessor **302**. The processor circuit **300** may include multiple processors etc., and the aforementioned components of the processor circuit **300** may alternatively be combined.

The I/O port **306** includes a channel interface **308**, which, in the illustrated embodiment, is in communication with the channels **20**, **22**, and **24** that were also illustrated in FIG. **1**. Where, as in the illustrated embodiment, the channels **20**, **22**, and **24** are PSTN telephone lines in the PSTN network **29**, the channel interface **308** may, for example, be a T1 port for communication with one or more T1 lines (illustrated at **27** in FIG. **1**) of a PSTN service provider, in a manner well-known in the art. The I/O port in the illustrated embodiment also includes an internet interface **309** for interfacing with the IP network **26** illustrated in FIG. **1**. The program memory **304** stores blocks of codes for directing the microprocessor **302** to carry out the functions of the gateway (**18**). It has been found that the AS5350 Universal Gateway available from Cisco Systems, Inc. of San Jose, Calif. may, for example, be suitable as the gateway (**18**).

Referring back to FIG. **1**, and also still to FIG. **13**, when a call is received on one of the channels **20**, **22**, or **24**, the microprocessor **302** causes the I/O port **306** to use the internet interface **309** to send a Session Initiation Protocol (SIP) Invite message to a pre-determined node with which the gateway **18** is associated, which in the illustrated embodiment is the first node **11**. Generally, the gateway **18** will be associated with a node that is geographically closest to the gateway, in order to minimize transmission times over the IP network **26**. In response to the SIP Invite message, the call controller **13** sends an RC request message to the routing controller **30** which makes various enquiries of the database **23** to produce a routing message that is sent back to the call controller **13**. The call controller **13** then communicates with the media relay **28** to cause a communications link including an audio path (and a videopath if a videophone call) to be established through the media relay to the same node, a different node, or to a communications supplier gateway as shown generally at **34** to carry audio, and where applicable, video traffic to the call recipient or callee.

Referring to FIG. **14**, an exemplary SIP Invite message is shown generally at **310** and includes a caller identifier field **312**, a callee identifier field **314**, a digest parameter field **315**, a call identifier field **316**, an IP address field **317**, and a gateway UDP port field **318**. Examples of values for the fields in the SIP Invite message **310** are shown for illustration purposes only in FIG. **14**. The caller identifier in the caller identifier field **312** is preferably in the form of the telephone number of the caller followed by the "@" symbol, which in turn is followed by the IP address of the gateway (**18**) in the IP network (**26**). The caller identifier may be determined by retrieving calling line identification (CLID) information from the signal provided by the PSTN network (**29**) to the gateway (**18**) for example. Where the caller identification information is not available to the gateway (**18**), the caller identifier in the caller identifier field **312** preferably includes a pre-assigned number (such as 11111, for example) indicating that the caller identification information was not available, followed by the "@" symbol and then by the IP address of the gateway (**18**).

The callee identifier in the callee identifier field **314** is the access code identifying the channel (**20**, **22**, or **24** in the example of FIG. **1**) on which the call was placed, and which was received from the access server (**14**). In the illustrated example, the access code is the PSTN telephone number 1-604-345-1212 corresponding to the channel **20** illustrated in FIG. **1**, and to the access code stored in the access code field **173** of the record **172** in the exemplary access code association table **170** illustrated in FIG. **10**.

The digest parameter in the digest parameter field **315** is generated by the gateway (**18**) and may uniquely identify the SIP session that is initiated with the SIP Invite message **310**.

The call identifier in the call identifier field **316** is, in the illustrated embodiment, a four-digit hexadecimal number generated by the gateway (**18**) to identify the call, followed by the "@" symbol, which in turn is followed by the IP address of the gateway.

The IP address in the IP address field **317** is the IP address of the gateway (**18**) in the IP network (**26**), and the gateway UDP port number in the gateway UDP port field **318** includes a UDP port identifier identifying a UDP port at which the audio/video path will be terminated at the gateway (**18**).

It should be noted that throughout the description of the embodiments of this invention, the IP/UDP addresses of all elements such as the gateway (**18**) will be assumed to be valid IP/UDP addresses directly accessible via the Internet or a private IP network, for example, depending on the specific implementation of the system. As such, it will be assumed, for example, that the gateway (**18**) will have an IP/UDP address directly accessible by the call controllers and the media relays on their respective nodes, and those addresses will not be obscured by Network Address Translation (NAT) or similar mechanisms. In other words, the IP/UDP information contained in SIP messages (for example the SIP Invite message or the RC Request message which will be described below) will match the IP/UDP addresses of the IP packets carrying these SIP messages.

It will be appreciated that in many situations, the IP addresses assigned to various elements of the system may be in a private IP address space, and thus not directly accessible from other elements. Furthermore, it will also be appreciated that NAT is commonly used to share a "public" IP address between multiple devices, for example between home PCs and IP telephones sharing a single Internet connection. For example, the gateway (**18**) may be assigned an IP address such as 192.168.0.5. This address is located in so called "non-routable" (IP) address space and cannot be accessed directly from the Internet. In order for this device to communicate with other computers located on the Internet, the IP address has to be converted into a "public" IP address, for example 24.14.102.5 assigned by the Internet Service Provider, by a device performing NAT, typically a router. In addition to translating the IP address, NAT typically also translates UDP port numbers, for example an audio path originating at the gateway (**18**) and using a UDP port **12378** at its private IP address, may have be translated to a UDP port **23465** associated with the public IP address of the NAT device. In other words, when a packet originating from the gateway (**18**) arrives at an Internet-based node, the source IP/UDP address contained in the IP packet header will be 24.14.102.5:23465, whereas the source IP/UDP address information contained in the SIP message inside this IP packet will be 192.168.0.5:12378. The mismatch in the IP/UDP addresses may cause a problem for SIP-based VoIP systems because, for example, a node will attempt to send messages to a private address but the messages will never get there.

Call Controller

Referring to FIG. **15**, the call controller (**13**) includes a processor circuit shown generally at **320**. The processor circuit **320** includes a microprocessor **322**, program memory **324**, and an I/O port **326**. The program memory **324** and the I/O port **326** are in communication with the microprocessor **322**. The processor circuit **320** may include a plurality of microprocessors, a plurality of program memories, and a plurality of I/O ports to be able to handle a large volume of calls. However, for simplicity, the processor circuit **320** will be described as having only one microprocessor **322**, program memory **324**, and I/O port **326**, it being understood that there may be more.

Generally, the I/O port **326** includes an input **328** for receiving messages such as the SIP Invite message from the gateway (**18**) or from a VoIP telephone (**36** in FIG. **1**, for example). The I/O port **326** also has an RC request message output **330** for transmitting an RC request message to the routing controller **30** of FIG. **1**, an RC message input **332** for receiving routing messages from the routing controller **30**, a gateway output **334** for transmitting messages to the gateway **18** and/or **34** shown in FIG. **1** to advise the gateway **18** and/or **34** to establish an audio path, for example, and a gateway input **336** for receiving messages from the gateway **18** and/or **34**. The I/O port **326** further includes a SIP output **338** for transmitting messages to the gateway (**18** and/or **34**) or VoIP telephone (**36**, for example) to advise the gateway **18** and/or **34** or IP telephone of the IP addresses of the gateways which will establish the audio/video path. The I/O port **326** further includes a voicemail server input and output **340** and **342** respectively for communicating with the voicemail server **19** shown in FIG. **1**.

While certain inputs and outputs have been shown as separate, it will be appreciated that some may be a single IP address and IP port. For example, the messages sent to the routing controller (**30**) and received from the routing controller (**30**) may be transmitted and received on the same single IP port.

The program memory **324** includes blocks of code for directing the microprocessor **322** to carry out various functions of the call controller (**13**). For example, these blocks of code include a first block **344** for causing the processor circuit **320** to execute a SIP Invite to RC Request process to produce an RC Request Message in response to a received SIP Invite message. In addition, there is a Routing Message to Gateway message block **346** which causes the processor circuit **320** of the call controller to produce a gateway query message in response to a received routing message from the routing controller (**30**).

Referring to FIGS. **15** and **16**, the SIP Invite to RC Request process is shown in more detail at **344**. On receipt of a SIP Invite message of the type shown in FIG. **14**, block **350** directs the processor circuit **320** to produce an RC Request Message. Block **352** then directs the processor circuit **320** to cause the RC Request Message to be sent to the routing controller **30** illustrated in FIG. **1**.

Referring to FIG. **17**, an exemplary RC request message is shown generally at **360** and includes a caller identifier field **362**, a callee identifier field **364**, a digest parameters field **366**, and a call identifier field **368**. These fields may be populated with the contents of the caller identifier field **312**, callee identifier field **314**, digest parameter field **315**, and call identifier field **316** respectively of the SIP Invite message **310** illustrated in FIG. **14**. In other embodiments, the RC request message may further include a type field (not shown) containing a type code to indicate whether the call is from a third party or from a system subscriber. Other variations of an RC request message are explained in PCT Publication No. WO 2008/052340. A type field (not shown) in the RC request message **360** may be advantageous in embodiments where SIP Invite messages may also be received from an IP telephone that is using VoIP software to make a voice call. However, in the embodiments that are illustrated herein, SIP Invite messages originate from the gateway (**18**), and therefore a type designation is not necessary and may be omitted from the RC request message **360**. In embodiments where a SIP Invite message may be received from an IP telephone, the SIP invite to RC request process shown in FIG. **16** may require additional steps, as illustrated in FIG. 5 of PCT Publication No. WO 2008/052340.

RC Request Message Handler

As illustrated in FIG. **8**, the program memory **234** includes an RC request message handler **380** which directs the routing controller (**30**) to produce a routing message in response to a received RC request message (**360**). Referring to FIG. **18**A, the RC request message handler **380** begins with a first block **382** that directs the RC processor circuit (**230**) to separately store the contents of the callee identifier field **364** and caller identifier field **362** of the RC request message (**360**) in the callee identifier store **246** and the caller identifier store **248** respectively of FIG. **8**.

Block **384** then directs the RC processor circuit (**230**) to use the contents of the caller username store **249** to locate and retrieve from the database (**23**) a dialing profile **200** associated with the caller, as described above and illustrated in FIG. **9**, for example. The retrieved dialing profile may then be stored in the temporary memory **240**, for example.

The RC request message handler **380** continues at block **386**, which directs the processor circuit (**230**) of the routing controller to determine whether the contents of the current number of concurrent calls field **222** of the dialing profile **200** shown in FIG. **9** are less than the contents of the maximum number of concurrent calls field **220** of the dialing profile for the caller and, if so, block **388** directs the processor circuit to increment the contents of the current number of concurrent calls field **222** and the processor circuit (**230**) is directed to point A in FIG. **18**B. If the contents of the current number of concurrent calls field **222** are equal to or greater than the contents of the maximum number of concurrent calls field **220**, then block **390** directs the processor circuit (**230**) to send an error message back to the call controller (**13**) to cause the call controller to notify the caller that the maximum number of concurrent calls has been reached and no further calls can exist concurrently, including the presently requested call.

Assuming that block **386** allows the call to proceed, the RC processor circuit (**230**) is directed to perform certain checks on the callee identifier in the callee identifier field **246** in FIG. **8**. These checks are shown in greater detail in FIG. **18**B.

Referring to FIG. **18**B, the RC processor circuit (**230**) is directed to a first block **392** that causes it to determine whether a digit pattern of the callee identifier includes a pattern that matches the contents of the international dialing digits (IDD) field **208** in the dialing profile **200** (shown in FIG. **9**) associated with the caller. If so, then block **394** directs the RC processor circuit (**230**) to set a call type code identifier variable maintained by the processor to indicate that the call is an international call, and block **396** directs the processor to produce a reformatted callee identifier by reformatting the callee identifier into a predefined digit format. In this embodiment, this is done by removing the pattern of digits matching the IDD field contents (**208**) of the caller dialing profile **200** to effectively shorten the callee identifier. Then, block **398** directs the RC processor circuit (**230**) to determine whether or not the callee identifier has a length which meets criteria establishing it as a number compliant with the E.164 Standard set by the ITU. If the length does not meet these criteria, then block **400** directs RC processor circuit (**230**) to send back to the call controller (**13**) a message indicating the length is not correct. The process **380** is then ended. At the call controller **13**, routines (not shown) stored in the program memory **324** may direct the processor circuit (**320** of FIG. **15**) to respond to the incorrect length message by transmitting a message back to the mobile telephone (**12** shown in FIG. **1**) to indicate that an invalid number has been dialed.

If the length of the amended callee identifier meets the criteria set forth at block **398**, then block **402** directs the RC processor circuit (**230**) to make a database request to the database (**23**) to determine whether or not the amended callee identifier is found in the DID field (**373**) of a record such as shown in FIG. **11** in the DID bank table. If at block **402** the RC processor circuit (**230**) receives a response from the database (**23**) indicating that the reformatted callee identifier produced at block **396** is found in the DID field (**373**) of a record in the DID bank table, then the callee is a subscriber to the system and the call is classified as a private network call by directing the processor to block **404**, which directs the RC processor circuit (**230**) to copy the contents of the corresponding username field (**371** in FIG. **11**) from the callee DID bank table record (**370** in FIG. **11**) into the callee identifier store (**246** in FIG. **8**). Thus, the RC processor circuit (**230**) locates a subscriber username associated with the reformatted callee identifier. The processor (**232**) is then directed to point B in FIG. **18**A.

Calls to Subscribers in Different Nodes

Referring back to FIG. **1**, as noted above, the gateway **18** is preferably associated with a pre-determined node, which in the illustrated embodiment is the first node **11**. Referring back to FIG. **18**A, block **406** directs the processor (**232** of FIG. **8**) to execute a process to determine whether or not the node associated with the reformatted callee identifier in the callee identifier store (**246** in FIG. **8**, which, at block **404**, was set to be a username of the callee) is the same node that is associated with the gateway **18** illustrated in FIG. **1**.

To do this, the processor (**232**) may, for example, identify a node associated with the gateway (**18**) by using an IP address associated with the gateway to determine a node identifier of the gateway. An IP address associated with the gateway (**18**) may, for example, be obtained from either the caller identifier field **362** or the call identifier field **368** of the RC request message **360** illustrated in FIG. **17**, as each of these fields includes a portion following an "@" symbol that indicates an IP address of the gateway. In order to determine a node identifier associated with the gateway (**18**) using the IP address associated with gateway (**18**), the processor **232** (illustrated in FIG. **8**) may access a gateway node association table stored in the database **23** (illustrated in FIG. **1**).

Referring to FIG. **19**, an exemplary gateway node association table is shown generally at **480**. The exemplary gateway node association table **480** includes first and second records **482** and **484**, each having a respective gateway IP address field **486** and a respective node identifier field **488**. It will be appreciated that the exemplary gateway node association table **480** is an example for illustration purposes only. The values in the gateway IP address fields **486** are preferably initialized when a gateway (such as the gateway **18** illustrated in FIG. **1**) is installed as part of the system (**10**), and are preferably updated as the IP addresses of the respective gateways may change from time to time. The values in the node identifier fields **488** are also preferably initialized when a gateway (such as the gateway **18** illustrated in FIG. **1**) is installed as part of the system (**10**).

As indicated above, the reformatted callee identifier in the callee identifier store (**246** in FIG. **8**) was set at block **404** in FIG. **18**B to be a username of the callee from the username field **371** (illustrated in FIG. **11**), and in this embodiment, a prefix of the username of the callee preferably indicates a node associated with the callee. In the illustrated embodiment, the left-most digit in the username of the callee is a continent code, which is a sufficient prefix to identify a node associated with the callee. However, it will be appreciated that in other embodiments, other prefixes or other information may identify the associated node. Preferably, the values in the node identifier fields **488** correspond to the prefixes of the usernames in the username fields **371** (illustrated in FIG. **11**), so that the node associated with the callee is the same node that is associated with the gateway **18** illustrated in FIG. **1** if the prefix of the username of the callee matches the node identifier associated with the gateway (**18**). Therefore, in the illustrated embodiment, if the reformatted callee identifier in the callee identifier store (**246** in FIG. **8**) is 2001 1050 8667, for example, then in the example of FIG. **19**, the node associated with the callee is the same node as the node identified by the continent code "2" that is associated with the gateway associated with the IP address 20.14.102.5 in the record **482**, but is not the same node as the node identified by the continent code "5" that is associated with the gateway associated with the IP address 104.12.131.12 in the record **484**.

Referring back to FIG. **18**A, if at block **406** the prefix of the username of the callee does not match the node identifier associated with the gateway (**18**), then the call is a "cross-domain" call, and block **408** in FIG. **18**A directs the processor (**232** in FIG. **8**) to set a call type flag in the temporary memory (**240** in FIG. **8**) to indicate the call is a cross-domain call. Then, block **410** of FIG. **18**A directs the processor (**232** of FIG. **8**) to produce a routing message identifying an address on the private network with which the callee identified by the contents of the callee ID buffer is associated and to set a time to live for the call at a maximum value of 99999, for example. Routing messages and time to live values, and also a method of determining the node in the system with which the callee is associated, are further described in PCT Publication No. WO 2008/052340. Once a routing message is produced at block **410**, block **412** directs the processor (**232** in FIG. **8**) to cause the routing message to be sent to the call controller **13** shown in FIG. **1**, and the process ends.

Referring back to FIG. **18**B, if at block **392**, the callee identifier stored in the callee identifier store (**246** in FIG. **8**) does not begin with an international dialing digit, then block **414** directs the processor (**232**) to determine whether or not the callee identifier begins with the same national dial digit code as assigned to the caller. To do this, the processor (**232**) is directed to refer to the retrieved caller dialing profile as shown in FIG. **9**. In FIG. **9**, the national dialing digit code **206** is the number 1. Thus, if the callee identifier begins with the number 1, then the processor (**232**) is directed to block **416** in FIG. **18**B.

Block **416** directs the processor (**232** of FIG. **8**) to examine the callee identifier to determine whether or not the digits following the NDD digit identify an area code that is the same as any of the area codes identified in the local area codes field **212** of the caller dialing profile **200** shown in FIG. **9**. If not, block **418** of FIG. **18**B directs the processor (**232**) to set the call type flag to indicate that the call is a national call. If the digits following the NDD digit identify an area code that is the same as a local area code associated with the caller as indicated by the caller dialing profile, block **420** directs the processor (**232**) to set the call type flag to indicate a local call, national style. After executing block **418** or **420**, block **422** directs the processor (**232**) to format the callee identifier into a pre-defined digit format to produce a re-formatted callee identifier by removing the national dialed digit and prepending a caller country code identified by the country code field **210** of the caller dialing profile shown in FIG. **9**. The processor (**232**) is then directed to block **398** of FIG. **18**B to perform other processing as already described above.

If at block **414**, the callee identifier does not begin with a national dialed digit, block **424** directs the processor (**232**) to determine whether the callee identifier begins with digits that identify the same area code as the caller. Again, the reference for this is the retrieved caller dialing profile shown in FIG. **9**. The processor (**232**) determines whether or not the first few digits of the callee identifier identify an area code corresponding to the contents of any area code identifier stored in the local area code field **212** of the retrieved caller dialing profile **200** (illustrated in FIG. **9**). If so, then block **426** directs the processor (**232**) to set the call type flag to indicate that the call is a local call. It should be noted that the call will not necessarily be a local call in every case where the first few digits of the callee identifier identify an area code corresponding to the contents of an area code identifier stored in the local area code field **212** (illustrated in FIG. **9**), and other determinations of when a call is to be considered local may be appropriate. However, it has been found that the determination described above for block **424** is satisfactory for some purposes. Next, block **428** directs the processor (**232**) to format the callee identifier into a pre-defined digit format to produce a reformatted callee identifier by prepending the caller country code to the callee identifier, the caller country code being determined from the country code field **210** of the retrieved caller dialing profile **200** shown in FIG. **9**. The processor (**232**) is then directed to block **398** for further processing as described above.

If at block **424**, the callee identifier does not start with the same area code as the caller, block **430** directs the processor (**232** of FIG. **8**) to determine whether the number of digits in the callee identifier, i.e. the length of the callee identifier, is within the range of digits indicated by the caller minimum local number length field **214** and the caller maximum local number length field **216** of the retrieved caller dialing profile **200** shown in FIG. **9**, and whether there is more than one area code identifier stored in the local area code field **212** of the retrieved caller dialing profile. If the number of digits in the callee identifier is within the aforementioned range and there is only one area code identifier stored in the local area code field (**212**), then block **432** directs the processor (**232**) to set the call type flag to indicate a local call and block **434** directs the processor (**232**) to format the callee identifier into a pre-defined digit format to produce a reformatted callee identifier by prepending to the callee identifier the caller country code (as indicated by the country code field **210** of the retrieved caller dialing profile **200** shown in FIG. **9**) followed by the caller area code as indicated by the local area code stored in the local area code field **212** of the caller dialing profile **200** shown in FIG. **9**. The processor (**232**) is then directed to block **398** of FIG. **18**B for further processing as described above.

If at block **430**, the callee identifier has a length that does not fall within the range specified by the caller minimum local number length field (**214** in FIG. **9**) and the caller maximum local number length field (**216** in FIG. **9**), or if there is more than one area code identifier stored in the local area code field **212** of the retrieved caller dialing profile **200** illustrated in FIG. **9**, then block **436** directs the processor (**232**) to send an error message back to the call controller (**13**), and the process ends.

In alternative embodiments, such as those illustrated in PCT Publication No. WO 2008/052340, an additional block (**402** in FIG. **8**B of PCT Publication No. WO 2008/052340) may determine whether the callee identifier is a valid username. However, in the embodiment disclosed herein, the callee identifier is assumed to be a telephone number of the callee, and not a username.

From FIG. **18**B, it will be appreciated that there are certain groups of blocks of codes that direct the processor **232** in FIG. **8** to determine whether the callee identifier has certain features such as an international dialing digit, a national dialing digit, an area code and a length that meet certain criteria, and cause the processor **232** to reformat the callee identifier stored in the callee identifier store **246** in FIG. **8**, as necessary into a predetermined target format including only a country code, area code, and a normal telephone number, for example, to cause the callee identifier to be compatible with the E.164 number plan standard in this embodiment. This enables block **402** in FIG. **18**B to have a consistent format of callee identifiers for use in searching through the DID bank table records **370** of the type shown in FIG. **11** to determine how to route calls to subscribers on the same system. Effectively, therefore blocks **392**, **414**, **424**, and **430** establish call classification criteria for classifying the call as a public network call or a private network call. Block **402** classifies the call, depending on whether or not the formatted callee identifier has a DID bank table record, and this depends on how the call classification criteria are met.

Calls to Non-Subscribers

Not all calls will be to subscribers, and this will be detected by the processor **232** of FIG. **8** when it executes block **402** in FIG. **18**B, and does not find a DID bank table record (**370** illustrated in FIG. **11**) that is associated with the callee, in the DID bank table. When this occurs, the call is classified as a public network call, by directing the processor (**232**) to point C in FIG. **18**C.

Referring to FIG. **18**C, block **438** directs the processor (**232**) to determine whether the formatted callee identifier in the callee identifier store **246** in FIG. **8** corresponds to an access code in the access code field **173** of a record in the access code association table **170** illustrated in FIG. **10** that is associated with a callee identifier. Because the callee identifier in the callee identifier store **246** in FIG. **8** has been formatted as described above with reference to FIG. **18**B, block **438** may involve determining whether an access code in the access code field **173** of a record of the access code association table **170** (illustrated in FIG. **10**) matches the formatted callee identifier in the callee identifier store **246** in FIG. **8**, and also whether a callee identifier (as opposed to the "null" value assigned on initialization) is stored in the callee identifier field **177** in association with the access code. As noted above, for simplicity, this description is directed to embodiments wherein an access code association table **170** associates access codes with respective callee identifiers, caller identifiers, timeout values, and timestamp values, although it will be appreciated that the processes described herein for records in the access code association table **170** may additionally or alternatively be applied to DID bank table records **370** in an analogous manner.

If at block **438** the formatted callee identifier in the callee identifier store **246** in FIG. **8** is the same as an access code in the access code field (**173**) of a record of the access code association table **170** illustrated in FIG. **10** that is associated with a callee identifier, then block **440** directs the processor (**232**) to determine whether the caller identifier in the caller identifier store **248** (illustrated in FIG. **8**) is the same as the caller identifier in the caller identifier field (**179**) of the record of the access code association table (**170**), and thus whether the caller identifier in the caller identifier field (**179**) of the record of the access code association table (**170**) identifies the mobile telephone identified by the caller identifier in the caller identifier store **248**. If not, then block **442** directs the processor (**232**) to send an error message to the call controller (**13**), and the process ends.

But if at block **440** the caller identifier in the caller identifier store **248** (illustrated in FIG. **8**) corresponds to the caller identifier in the caller identifier field (**179**) of the record of the access code association table (**170**), then the routing controller (**30**) will produce a routing message that will cause the call controller to establish communication through the IP network (**26**) to the callee in response to a call received at a channel (**20**, **22**, or **24**). Preferably, block **444** includes codes that direct the processor (**232**) to determine whether the association of the access code with the callee identifier has expired, and thus whether the usability of the access code to initiate a call to the callee has expired, in the manner described above for block **278** in FIG. **12**. If at block **444** the association of the access code with the callee identifier has expired, then block **442** directs the processor (**232**) to send an error message to the call controller (**13**), and the process ends. Thus the routing controller produces a routing message that causes the call controller to establish the call only when the association of the access code with the callee identifier has not expired.

It will be appreciated that in alternative embodiments, one or more of the caller identifier, timeout, and timestamp fields **179**, **181**, and **182** may be omitted from the access code association table **170** illustrated in FIG. **10**, and in these embodiments, one or more of the blocks **440**, **442**, and **444** may also be omitted.

If at block **444** the association of the access code with the callee identifier has not expired, or if one or both of blocks **440** and **444** is omitted, then block **446** directs the processor (**232**) to store the callee identifier from the callee identifier field **177** of the record of the access code association table (**170**) in the callee identifier store **246** illustrated in FIG. **8**. The processor (**232**) is then directed to point A in FIG. **18**B to repeat the steps illustrated in FIG. **18**B using the callee identifier retrieved from the callee identifier field (**177**) in the record of the access code association table (**170**).

However, if at block **438** the formatted callee identifier in the callee identifier store **246** in FIG. **8** does not correspond to an access code in a record of the access code association table **170** illustrated in FIG. **10** that is associated with a callee identifier, then block **448** of FIG. **18**B causes the processor (**232**) to set the contents of the callee identifier store **246** of FIG. **8** to be the newly formatted callee identifier, i.e., a number compatible with the E.164 standard. Then, block **450** of FIG. **18**B directs the processor (**232**) to generate a routing message identifying a gateway to the public network usable by the call controller (**13**) to establish a "public system" call. In one embodiment, block **450** includes codes that, for example, direct the processor (**232**) to search a database of route or master list records and to search a database of supplier records to identify at least one supplier operable to supply a communications link for the call, and to load a routing message buffer with supplier information, time to live values, and timeout values. An example of an implementation of these steps is described with reference to blocks **410**, **412**, **560**, **562**, **563**, **564**, **566**, and **571** in FIGS. **8**B and **8**D in PCT Publication No. WO 2008/052340. Next, block **452** directs the processor **232** of FIG. **10** to send the routing message to the call controller **13** in FIG. **1**, and the process ends.

Calls to Subscribers within the Same Node

Referring back to FIG. **18**A, if at block **406**, the prefix of the username of the callee matches the node identifier associated with the gateway (**18**), then the call is on one domain, and block **454** directs the processor (**232**) to use the callee identifier in the callee identifier store **246** illustrated in FIG. **8** (which, at block **404**, was set to be a username of the callee) to locate and retrieve a dialing profile for the callee. The dialing profile may be of the type shown in FIG. **9**, for example. Block **456** of FIG. **18**A then directs the processor **232** of FIG. **8** to get call block, call forward, and voicemail records from the database **23** of FIG. **1**, based on the username identified in the callee dialing profile retrieved by the processor at block **454**. Exemplary call block, call forward, and voicemail records are described in PCT Publication No. WO 2008/052340.

Then block **458** directs the processor **232** of FIG. **8** to determine whether or not the caller identifier received in the RC request message matches a block pattern stored in the call block record associated with the callee and retrieved at block **454**. If the caller identifier matches a block pattern, then block **460** directs the processor to send a drop call or non-completion message to the call controller (**13**) and the process is ended. If the caller identifier does not match a block pattern associated with the callee, then block **462** directs the processor (**232**) to determine whether or not call forwarding is required, as described in PCT Publication No. WO 2008/052340.

If at block **462**, the call forwarding record for the callee indicates that no call forwarding is required, then the processor (**232**) is directed to block **464**, which directs the processor (**232**) to generate a routing message identifying an address on the private network, associated with the callee for a "private system" call. In one embodiment, block **464** includes codes that, for example, direct the processor (**232**) to store, in a routing message buffer, a username and domain of the callee, time to live values, and an IP address of the current node, to determine whether or not the user identified by the callee identifier has paid for voicemail service and if so, to store voicemail information in the routing message buffer. An example of an implementation of these steps is described with reference to blocks **609**, **620**, **640**, **642**, and **644** in FIGS. **8**A and **8**C in PCT Publication No. WO 2008/052340, which is incorporated herein by reference. Next, block **466** directs the processor **232** of FIG. **8** to cause the routing message to be sent to the call controller **13** in FIG. **1**, and the process ends.

But if at block **462**, the call forwarding record for the callee indicates that call forwarding is required, then block **468** directs the processor (**232**) to search a dialing profile table to find a dialing profile record as shown in FIG. **9**, for the user identified by the destination number field of the call forward record, as illustrated in PCT Publication No. WO 2008/052340. The processor (**232**) is further directed to store the username and domain for that user and a time to live value in a routing message buffer, an example of which is described in PCT Publication No. WO 2008/052340. This process is repeated for each call forwarding record associated with the callee identified by the callee identifier store **246** in FIG. **8** to add to the routing message buffer all call forwarding usernames and domains associated with the callee.

Referring to FIGS. **1**, **18**A, and **18**C, the routing message sent at one of blocks **412**, **452**, and **466** is received at the call controller **13** and the call controller interprets the receipt of the routing message as a request to establish a call. Referring to FIG. **15**, the program memory **324** of the call controller **13** includes a routing to gateway routine depicted generally at **346**.

Where a routing message received at the call controller **13** is of the type produced at block **464** shown in FIG. **18**A, indicating that the callee is a system subscriber on the same node as the gateway (**18**) (such as a user of the VoIP telephone **36** illustrated in FIG. **1**), the routing to gateway routine **346** may direct the microprocessor **322** to cause a message to be sent back through the IP network **26** shown in FIG. **1** to the VoIP telephone (**36**), using the IP address of the VoIP telephone (**36**) that is available from the callee username.

Alternatively, if the routing message received at the call controller **13** is of the type produced at block **410** shown in FIG. **18**A, identifying a domain associated with another node in the system, the call controller **13** may send a SIP invite message along the high speed/high data throughput link **17** in communication with the other node. The other node may function as explained above and in PCT Publication No. WO 2008/052340, in response to receipt of a SIP invite message.

If the routing message received at the call controller **13** is of the type produced at block **450** shown in FIG. **18**C, indicating that the callee is not a subscriber to the system (such as a user of the PSTN telephone **32** that is in communication with the IP network **26** through the gateway **34** as illustrated in FIG. **1**), the call controller sends one or more SIP invite messages to the suppliers identified in the routing message to identify the IP address of a supplier that is able to carry the call, such as the IP address of the gateway **34** illustrated in the example of FIG. **1**. A process for identifying the IP address of a supplier that is able to carry the call is given in PCT Publication No. WO 2008/052340, which is incorporated herein by reference. In some cases, the gateway of the supplier that is able to carry the call will be the gateway **18** illustrated in FIG. **1**, that is, the same gateway through which the caller telephone (**12**) initiated the call. For simplicity, the following description assumes that the gateways **18** and **34** are distinct gateways. It will be understood that in some cases, they may be the same gateway, but in these cases, the following steps may still be applied.

Referring to FIG. **1**, the IP address of the gateway **34** is sent in a message from the call controller **13** to the media relay **28**, which responds with a message indicating an IP address to which the gateway **18** should send its audio/video traffic, and an IP address to which the gateway **34** should send its audio/video for the call. The call controller conveys the IP address at which the media relay **28** expects to receive audio/video from the gateways **18** and **34**, to the gateways **18** and **34** in one or more messages. The gateway **18** replies to the call controller **13** with an IP address at which it would like to receive audio/video, and the call controller conveys that IP address to the media relay **28**. The call may then be conducted between the caller and callee through the media relay **28** and the gateways **18** and **34**.

If the call controller **13** receives a routing message of the type produced at block **464** shown in FIG. **18**A, indicating that the callee is a system subscriber on the same node as the gateway (**18**) (such as a user of the VoIP telephone **36** illustrated in FIG. **1**), and which has at least one call forwarding number and/or a voicemail number, the call controller attempts to establish a call to the callee VoIP telephone **36** by seeking from the callee telephone a message indicating an IP address to which the media relay **28** should send audio/video. If no such message is received from the callee telephone, no call is established. If no call is established within a predetermined time, the call controller **13** attempts to establish a call with the next user identified in the call routing message in the same manner. This process is repeated until all call forwarding possibilities have been exhausted, in which case the call controller communicates with the voicemail server **19** identified in the routing message to obtain an IP address to which the media relay **28** should send audio/video and the remainder of the process mentioned above for establishing IP addresses at the media relay and the caller telephone is carried out to establish audio/video paths to allowing the caller to leave a voicemail message with the voicemail server.

When an audio/video path through the media relay **28** is established, a call timer maintained by the call controller **13** preferably logs the start date and time of the call and logs the call ID and an identification of the route (i.e., audio/video path IP address) for later use in billing.

Terminating the Call

Referring back to FIG. **1**, in the event that the caller terminates a call, the gateway **18** sends a SIP bye message to the call controller **13**. Similarly, in the event that the callee terminates the call, the gateway **34** or the VoIP telephone **36** of the callee sends a SIP bye message to the call controller **13**. Exemplary SIP bye messages are described in PCT Publication No. WO 2008/052340. The SIP bye message is received at the call controller **13**, and the call controller executes a process that involves decrementing the contents of the current number of concurrent calls field **222** dialing profile **200** of the caller as illustrated in FIG. **9**, generating an RC call stop message (not shown), sending the RC call stop message to the routing controller **30**, and sending a "bye" message to the party that did not terminate the call. An exemplary RC call stop message, and an example of how these steps may be implemented, are described in PCT Publication No. WO 2008/052340, which is incorporated herein by reference.

When the routing controller **30** receives the RC call stop message from the call controller **13**, the routing controller executes an RC call stop message process that involves making various updates to subscriber, reseller, and supplier account records (not shown) following the call. Examples of subscriber, reseller, and supplier account records, and of updates to subscriber, reseller, and supplier account records, are described in PCT Publication No. WO 2008/052340, which is incorporated herein by reference.

While specific embodiments of the invention have been described and illustrated, such embodiments should be considered illustrative of the invention only and not as limiting the invention.

What is claimed is:

1. A method of roaming with a mobile telephone, the method comprising:

receiving, from a user of the mobile telephone, a callee identifier associated with the callee;

transmitting an access code request message to an access server to seek an access code from a pool of access codes wherein each access code in said pool of access codes identifies a respective telephone number or Internet Protocol (IP) network address that enables a local call to be made to call the callee identified by the callee identifier, said access code request message including said callee identifier and a location identifier separate and distinctive from said callee identifier, said location identifier identifying a location of the mobile telephone;

receiving an access code reply message from the access server in response to said access code request message, said access code reply message including an access code different from said callee identifier and associated with said location identifier and/or associated with a location pre-associated with the mobile telephone and wherein said access code expires after a period of time; and

initiating a call with the mobile telephone using said access code to identify the callee.

2. The method of claim **1** wherein transmitting comprises transmitting said access code request message to said access server on a non-voice network.

3. The method of claim **1** wherein transmitting said location identifier comprises transmitting an IP address of the mobile telephone in a wireless IP network.

4. The method of claim **1** wherein transmitting said location identifier comprises transmitting an identifier of a wireless voice signal station in wireless communication with the mobile telephone.

5. The method of claim **1** wherein transmitting said location identifier comprises transmitting a user-configured identifier of a location associated with the mobile telephone.

6. The method of claim **1** wherein receiving said access code reply message comprises receiving said access code reply message from said access server on a non-voice network.

7. The method of claim **1** wherein receiving said access code reply message comprises receiving, in said access code reply message, an access code temporarily associated with said callee identifier.

8. The method of claim **1** wherein receiving said access code reply message comprises receiving, in said access code reply message, a telephone number identifying a channel operably configured to cooperate with an IP network to cause a call involving the mobile telephone and the callee to be routed through the IP network.

9. The method of claim **8** wherein initiating said call comprises engaging a routing controller to route said call on said IP network to the callee.

10. The method of claim **1** further comprising:

receiving from the mobile telephone said access code request message;

communicating with a routing controller to obtain from the routing controller said access code wherein said access code identifies a communications channel associated with said location identifier and wherein said access code is useable by the mobile telephone to cause the routing controller to establish a call to the callee using the channel; and

transmitting said access code reply message to the mobile telephone.

11. A mobile telephone apparatus comprising:

means for receiving, from a user of the mobile telephone, a callee identifier associated with the callee;

transmitting means for transmitting an access code request message to an access server to seek an access code from a pool of access codes wherein each access code in said pool of access codes identifies a respective telephone number or Internet Protocol (IP) network address that enables a local call to be made to call the callee identified by the callee identifier, said access code request message including said callee identifier and a location identifier separate and distinctive from said callee identifier, said location identifier identifying a location of the mobile telephone;

means for receiving an access code reply message from the access server in response to said access code request message, said access code reply message including an access code different from said callee identifier and associated with said location identifier and/or associated with a location pre-associated with the mobile telephone and wherein said access code expires after a period of time; and

means for initiating a call using said access code to identify the callee.

12. The mobile telephone apparatus of claim **11** wherein said transmitting means comprises a non-voice network interface for transmitting said access code request message to said access server on a non-voice network.

13. The mobile telephone apparatus of claim **11** wherein said location identifier comprises an IP address of the mobile telephone in a wireless IP network.

14. The mobile telephone apparatus of claim **11** wherein said location identifier comprises an identifier of a wireless voice signal station in wireless communication with the mobile telephone.

15. The mobile telephone apparatus of claim **11** wherein said location identifier comprises a user-configured identifier of a location associated with the mobile telephone.

16. The mobile telephone apparatus of claim **11** wherein said means for receiving an access code reply message comprises a non-voice network interface for receiving said access code reply message on a non-voice network.

17. The mobile telephone apparatus of claim **11** wherein said access code includes a telephone number.

18. The mobile telephone apparatus of claim **11** wherein said means for initiating comprises a mobile telephone network interface.

19. A system for enabling roaming by a mobile telephone, the system comprising the mobile telephone apparatus of claim **11** and further comprising:

a routing controller; and

an access server comprising:

means for receiving from the mobile telephone said access code request message;

means for communicating with said routing controller to obtain from said routing controller said access code wherein said access code identifies a channel associated with said location identifier and wherein said access code is useable by the mobile telephone to cause the routing controller to establish a call to the callee using the channel; and

means for transmitting said access code reply message including said access code to the mobile telephone.

20. A mobile telephone apparatus comprising:

a processor circuit;

a network interface in communication with said processor circuit; and

a computer readable medium in communication with said processor circuit and encoded with codes for directing said processor circuit to:

receive, from a user of the mobile telephone, a callee identifier associated with the callee;

cause an access code request message to be transmitted to an access server to seek an access code from a pool of access codes wherein each access code in said pool of access codes identifies a respective telephone number or Internet Protocol (IP) network address that enables a local call to be made to call the callee identified by the callee identifier, said access code request message including said callee identifier and a location identifier separate and distinctive from said callee identifier, said location identifier identifying a location of the mobile telephone;

receive an access code reply message from the access server in response to said access code request message, said access code reply message including an access code different from said callee identifier and associated with said location identifier and/or associated with a location pre-associated with the mobile telephone and wherein said access code expires after a period of time; and

initiate a call using said access code to identify the callee.

21. The mobile telephone apparatus of claim **20** wherein said network interface comprises a non-voice network interface, and wherein said codes for directing said processor circuit to cause said access code request message to be transmitted include codes for directing said processor circuit to cause said access code request message to be transmitted to said access server using said non-voice network interface on a non-voice network.

22. The mobile telephone apparatus of claim **20** wherein said location identifier comprises an IP address of the mobile telephone in a wireless IP network.

23. The mobile telephone apparatus of claim **20** wherein said location identifier comprises an identifier of a wireless voice signal station in wireless communication with the mobile telephone.

24. The mobile telephone apparatus of claim **20** wherein said location identifier comprises a user-configured identifier of a location associated with the mobile telephone.

25. The mobile telephone apparatus of claim **20** wherein said network interface comprises a non-voice network interface, and wherein said codes for directing said processor circuit to receive an access code reply message include codes for directing said processor circuit to cause said access code reply message to be received from said access server using said non-voice network interface on a non-voice network.

26. The mobile telephone apparatus of claim **20** wherein said access code includes a telephone number identifying a channel operably configured to cooperate with an IP network to cause a call involving the mobile telephone and the callee to be routed through the IP network.

27. The mobile telephone apparatus of claim **20** wherein said network interface comprises a mobile telephone network interface, and wherein said codes for directing said processor circuit to initiate include codes for directing said processor circuit to cause a call to be initiated using said mobile telephone network interface on a mobile telephone network.

28. A system for enabling roaming by a mobile telephone, the system comprising the mobile telephone of claim **20** and further comprising:

a routing controller; and

an access server comprising a processor circuit and a computer readable medium in communication with the processor circuit, the computer readable medium encoded with codes for directing said processor circuit to:

receive from the mobile telephone said access code request message;

communicate with said routing controller to obtain from said routing controller said access code wherein said access code identifies a channel associated with said location identifier and wherein said access code is useable by the mobile telephone to cause the routing controller to establish a call to the callee using the channel; and

transmit said access code reply message to the mobile telephone.

29. A non-transitory computer readable medium encoded with codes for directing a processor circuit to enable mobile telephone roaming, said codes being operable to direct the processor circuit to:

receive, from a user of a mobile telephone, a callee identifier associated with a callee;

transmit an access code request message to an access server to seek an access code from a pool of access codes telephone wherein each access code in said pool of access codes identifies a respective telephone number or Internet Protocol (IP) network address to enable a local call to be made to call the callee identified by the callee identifier, said access code request message including said callee identifier and a location identifier separate and distinctive from said callee identifier, said location identifier identifying a location of the mobile telephone;

receive an access code reply message from the access server in response to said access code request message, said access code reply message including an access code different from said callee identifier and associated with said callee location identifier and/or associated with a location pre-associated with the mobile telephone and wherein said access code expires after a period of time; and

initiate a call using said access code to identify the callee.

30. A method for enabling mobile telephone roaming, the method comprising:

receiving from the mobile telephone an access code request message including a callee identifier associated with the callee and a location identifier separate and distinctive from said callee identifier, identifying a location of the mobile telephone;

producing an access code identifying a communication channel based on said location identifier and/or based on a location pre-associated with the mobile telephone, said access code being different from the callee identifier and useable by the mobile telephone to initiate a call to the callee using the channel, and wherein said access code expires after a period of time and wherein producing said access code comprises selecting said access code from a pool of access codes, wherein each access code in said pool of access codes identifies a respective telephone number or Internet Protocol (IP) network address; and

transmitting an access code reply message including said access code, to the mobile telephone.

31. The method of claim **30** wherein receiving comprises receiving said access code request message on a non-voice network.

32. The method of claim **30** wherein producing said access code comprises causing a routing controller operably configured to route a call between said caller and said callee to produce said access code.

33. The method of claim **30** further comprising determining from said location identifier a local calling area associated with the mobile telephone and selecting an access code associated with a calling area matching said local calling area associated with the mobile telephone.

34. The method of claim **33** further comprising accessing a location field of a dialing profile associated with the caller when a local calling area cannot be determined from the contents of said location identifier and determining a local calling area associated with the mobile telephone from the contents of said location field and selecting an access code associated with a calling area matching the local calling area associated with the mobile telephone.

35. The method of claim **30** wherein said location identifier comprises an IP address of the mobile telephone in a wireless IP network.

36. The method of claim **30** wherein said location identifier comprises an identifier of a wireless voice signal station in wireless communication with the mobile telephone.

37. The method of claim **30** wherein said location identifier comprises a user-configured identifier of a location associated with the mobile telephone.

38. The method of claim **30** wherein at least one of said access codes in said pool of access codes identifies an IP network address as a possible channel through which said call can be conducted.

39. The method of claim **38** further comprising enabling communications between said caller and said callee to be established through an IP network in response to a call received at said IP network address.

40. The method of claim **30** wherein said access code request message includes a caller identifier and wherein the method further comprises associating said caller identifier included in said access code request message with the selected access code.

41. The method of claim **40** further comprising associating said callee identifier included in said access code request message with the selected access code.

42. The method of claim **41** wherein said associating said caller identifier and said callee identifier with the selected access code occurs only when:

a) the access code is not already associated with a callee id; or

b) the access code is already associated with a callee id, and a timeout value associated with that callee id has expired.

43. The method of claim **30** wherein producing further comprises associating a timestamp with said access code, for use in determining when the usability of said access code to initiate a call to the callee will expire, and causing said timestamp to be included in said access code reply message transmitted to the mobile telephone.

44. The method of claim **43** further comprising enabling communications to be established between said caller and said callee when the mobile telephone seeks to establish a call to said callee using the access code transmitted in the access code reply message when said timestamp associated with said access code indicates the usability of said access code has not expired and not enabling said communications to be established when said timestamp indicates the usability of said access code has expired.

45. The method of claim **30** wherein transmitting comprises transmitting said access code reply message on a non-voice network.

46. A system for enabling mobile telephone roaming, the system comprising:

means for receiving from the mobile telephone an access code request message including a callee identifier associated with the callee and a location identifier separate and distinctive from said callee identifier, identifying a location of the mobile telephone;

means for producing an access code identifying a communication channel based on said location identifier and/or based on a location pre-associated with the mobile telephone, said access code being different from the callee identifier and useable by the mobile telephone to initiate a call to the callee using the channel and wherein said access code expires after a period of time and wherein said means for producing said access code comprises means for selecting said access code from a pool of access codes wherein each access code in said pool of access codes identifies a respective telephone number or Internet Protocol (IP) network address; and

means for transmitting an access code reply message including said access code to the mobile telephone.

47. The system of claim **46** wherein said means for receiving comprises a non-voice network interface for receiving said access code request message on a non-voice network.

48. The system of claim **46** wherein said means for producing said access code comprises a routing controller operably configured to route a call between said caller and said callee.

49. The system of claim **46** wherein said processor circuit is operably configured to determine a local calling area associated with the mobile telephone from said location identifier and to select an access code associated with a calling area matching said local calling area associated with the mobile telephone.

50. The system of claim **49** further comprising:

a dialing profile associated with the caller, said dialing profile including a location field; and

wherein said processor circuit is operably configured to determine a local calling area associated with the mobile telephone from the contents of said location field and to select an access code associated with a calling area matching the local calling area associated with the mobile telephone, when a local calling area associated with the mobile telephone cannot be determined from said location identifier.

51. The system of claim **46** wherein said location identifier includes an IP address of the mobile telephone in a wireless IP network.

52. The system of claim **46** wherein said location identifier includes an identifier of a wireless voice signal station in wireless communication with the mobile telephone.

53. The system of claim **46** wherein said location identifier includes a user-configured identifier of a location associated with the mobile telephone.

54. The system of claim **46** wherein at least one of said access codes in said pool of access codes identifies an IP network address as a possible channel through which said call can be conducted.

55. The system of claim **46** wherein said processor circuit is operably configured to enable communications between said caller and said callee to be established through an IP network in response to a call received at said IP network address.

56. The system of claim **46** wherein said access code request message includes a caller identifier and wherein said processor circuit is operably configured to associate said caller identifier with the selected access code.

57. The system of claim **56** wherein said processor circuit is operably configured to associate said callee identifier included in said access code request message with the selected access code.

58. The system of claim **57** wherein said processor circuit is operably configured to associate said caller identifier and said callee identifier with the selected access code only when:

a) the access code is not already associated with a callee id; or

b) the access code is already associated with a callee id, and a timeout value associated with that callee id has expired.

59. The system of claim **46** wherein said processor circuit is operably configured to associate a timestamp with said access code, for use in determining when the usability of said access code to initiate a call to the callee will expire, and to cause said timestamp to be included in said access code reply message transmitted to the mobile telephone.

60. The system of claim **59** wherein said processor circuit is operably configured to enable communications to be established between said caller and said callee when the mobile telephone seeks to establish a call to said callee using the access code transmitted in the access code reply message when said timestamp associated with said access code indicates the usability of said access code has not expired and to prevent said communications from being established when said timestamp indicates the usability of said access code has expired.

61. The system of claim **46** wherein said means for transmitting comprises a non-voice network interface for transmitting said access code reply message on a non-voice network.

62. A system for enabling mobile telephone roaming, the system comprising:

a processor circuit;

a network interface in communication with said processor circuit; and a computer readable medium in communication with said processor circuit and encoded with codes for directing said processor circuit to:

receive from the mobile telephone an access code request message including a callee identifier associated with the callee and a location identifier separate and distinctive from said callee identifier, identifying a location of the mobile telephone;

communicate with a routing controller to obtain from said routing controller an access code identifying a communication channel, said access code being determined from said location identifier and/or based on a location pre-associated with the mobile telephone and said access code being different from the callee identifier and useable by the mobile telephone to initiate a call to the callee using the channel, and wherein said access code expires after a period of time and wherein said access code is selected from a pool of access codes and wherein each access code in said pool of access codes identifies a respective telephone number or Internet Protocol (IP) network address; and

cause an access code reply message including said access code to be transmitted to the mobile telephone.

63. The system of claim **62** wherein said network interface comprises a non-voice network interface, and wherein said codes for directing said processor circuit to receive include codes for directing said processor circuit to cause said access code request message to be received using said non-voice network interface on a non-voice network.

64. The system of claim **62** wherein said codes for directing said processor circuit include codes for directing said processor circuit to cause a routing controller to produce said access code.

65. The system of claim **62** wherein said codes for directing said processor circuit include codes for directing said processor circuit to determine from said location identifier a local calling area associated with the mobile telephone and to select an access code associated with a calling area matching said local calling area associated with the mobile telephone.

66. The system of claim **65** wherein said codes for directing said processor circuit include codes for directing said processor circuit to access a location field of a dialing profile associated with the caller when a local calling area cannot be determined from the contents of said location identifier and determine a local calling area associated with the mobile telephone from the contents of said location field and select an access code associated with a calling area matching the local calling area associated with the mobile telephone.

67. The system of claim **62** wherein said location identifier comprises an IP address of the mobile telephone in a wireless IP network.

68. The system of claim **62** wherein said location identifier comprises an identifier of a wireless voice signal station in wireless communication with the mobile telephone.

69. The system of claim **62** wherein said location identifier comprises a user-configured identifier of a location associated with the mobile telephone.

70. The system of claim **62** wherein at least one of said access codes in said pool of access codes identifies an IP network address as a possible channel through which said call can be conducted.

71. The system of claim **70** wherein said codes for directing said processor circuit include codes for directing said processor circuit to enable communications between said caller and said callee to be established through an IP network in response to a call received at said IP network address.

72. The system of claim **62** wherein said access code request message includes a caller identifier and wherein said codes for directing said processor circuit include codes for directing said processor circuit to associate said caller identifier included in said access code request message with the selected access code.

73. The system of claim **72** wherein said codes for directing said processor circuit include codes for directing said processor circuit to associate said callee identifier included in said access code request message with the selected access code.

74. The system of claim **73** wherein said codes for directing said processor circuit include codes for directing said processor circuit to associate said caller identifier and said callee identifier with the selected access code only when:

a) the access code is not already associated with a callee id; or

b) the access code is already associated with a callee id, and a timeout value associated with that callee id has expired.

75. The system of claim **62** wherein said codes for directing said processor circuit include codes for directing said processor circuit to associate a timestamp with said access code, for use in determining when the usability of said access code to initiate a call to the callee will expire, and to cause said timestamp to be included in said access code reply message.

76. The system of claim **75** wherein said codes for directing said processor circuit include codes for directing said processor circuit to enable communications to be established between said caller and said callee when the mobile telephone seeks to establish a call to said callee using the access code transmitted in the access code reply message when said timestamp associated with said access code indicates the usability of said access code has not expired and to prevent said communications from being established when said timestamp indicates the usability of said access code has expired.

77. The system of claim **62** wherein said network interface comprises a non-voice network interface, and wherein codes for directing said processor circuit to transmit include codes for directing said processor circuit to cause said access code reply message to be transmitted using said non-voice network interface on a non-voice network.

78. A non-transitory computer readable medium encoded with codes for directing a processor circuit to enable mobile telephone roaming, the codes being operable to direct the processor circuit to:

receive from the mobile telephone an access code request message including a callee identifier associated with the callee and a location identifier separate and distinctive from said callee identifier, identifying a location of the mobile telephone;

communicate with a routing controller to obtain from said routing controller an access code identifying a communication channel, based on said location identifier and/or based on a location pre-associated with the mobile telephone, said access code being different from the callee identifier and useable by the mobile telephone to initiate a call to the callee using the channel, and wherein said access code expires after a period of time and wherein said access code is selected from a pool of access codes, wherein each access code in said pool of access codes identifies a respective telephone number or Internet Protocol (IP) network address; and

cause an access code reply message including said access code to be transmitted to the mobile telephone.

* * * * *

EXHIBIT 2

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(12) **United States Patent**
Björsell et al.

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(54) **MOBILE GATEWAY**

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See application file for complete search history.

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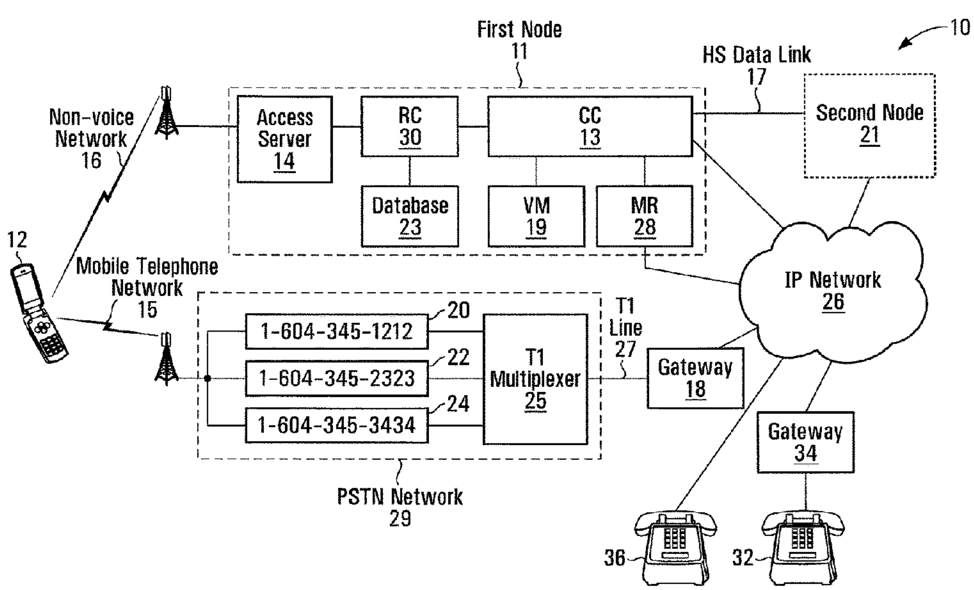
(57) **ABSTRACT**

A method of initiating a call to a callee using a mobile telephone involves: receiving, from a user of the mobile telephone, a callee identifier associated with the callee; transmitting an access code request message to an access server, the access code request message including the callee identifier; receiving an access code reply message from the access server in response to the access code request message, the access code reply message including an access code different from the callee identifier and associated with the callee identifier; and initiating a call with the mobile telephone using the access code to identify the callee.

141 Claims, 17 Drawing Sheets



Related U.S. Application Data

(60) Provisional application No. 61/129,898, filed on Jul. 28, 2008.

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Document Title: Complaint for Patent Infringement [Jury Demand]; Case Title: *Voip-Pal.com, Inc., a Nevada corporation*, Plaintiff, v. *Verizon Wireless Services, LLC, a Delaware limited liability corporation; Verizon Communications, Inc., a Delaware corporation; AT&T, Inc., a Delaware corporation; AT&T Corp., a Delaware corporation; and Does I through X*, inclusive, Defendants; Case No: 2:16-CV-00271; Court: United States District Court District of Nevada. Attachments: Table of Exhibits; Exhibit A; Exhibit B; Exhibit C; Exhibit D; Exhibit E; Chart 1 to Exhibit E; Chart 2 to Exhibit E; Chart 3 to Exhibit E; Chart 4 to Exhibit E; Chart 5 to Exhibit E; Chart 6 to Exhibit E; Exhibit F; Chart 1 to Exhibit F; Chart 2 to Exhibit F; Chart 3 to Exhibit F; Chart 4 to Exhibit F; Chart 5 to Exhibit F; Chart 6 to Exhibit F; Exhibit G; Exhibit H; and Addendum 1 to Exhibit H.
Document Title: Complaint for Patent Infringement [Jury Demand] ; Case Title: *Voip-Pal.com, INC., a Nevada corporation*, Plaintiff, v. *Apple, Inc., a California corporation*; Defendants; Case No: 2:16-CV-00260; Court: United States District Court District of Nevada. Attachments: Table of Exhibits; Exhibit A; Exhibit B; Exhibit C; Exhibit D; Chart 1 to Exhibit D; Chart 2 to Exhibit D; Chart 3 to Exhibit D; Chart 4 to Exhibit D; Exhibit E; Exhibit F; and Addendum 1 to Exhibit F.
Letter dated Nov. 30, 2015, from VoIP-Pal.com Inc. giving notice and inviting the company listed herein below to contact VoIP-Pal.com about U.S. Pat. Nos. 9,179,005 and 8,542,815 and related patents listed in the accompanying Attachment A. Sent to the following company: Apple Inc. In the U.S.
Letter dated Dec. 1, 2015, from VoIP-Pal.com Inc. giving notice and inviting the company listed herein below to contact VoIP-Pal.com about U.S Pat Nos. 9,179,005 and 8,542,815 and related patents listed in the accompanying Attachment A. Sent to the following company; Verizon Communications in the U.S.
Letters dated December 18, 2015, from VoIP-Pal.com Inc. giving notice and inviting the companies listed herein below to contact VoIP-Pal.com about U.S. Pat. Nos. 9,179,005 and 8,542,815 and related patents listed in the accompanying Attachment A. (Please Note: Attachment A is attached here only to the first letter.) Sent to the following companies: Airtel in India; Alcatel-Lucent in France; Avaya Inc. In the U.S.; AT&T in the U.S.; Blackberry in Canada; Cable One in the U.S.; CenturyLink in the U.S.; Charter Communications in the U.S.; Cisco Systems in the U.S.; Comcast in the U.S.; Cox Communications in the U.S.; Cricket Wireless in the U.S.; Facebook in the U.S.; Freedom Pop in the U.S.; Frontier Communications in the U.S.; Google Inc. in the U.S.; HP in the U.S.; Juniper Networks in the U.S.; LoopPay, Inc. in the U.S.; Magic Jack in the U.S.; MetroPCS in the U.S.; Ooma in the U.S.; PayPal in the U.S.; Republic Wireless in the U.S.; Rok Mobile in the U.S.; Samsung Electronics—America in the U.S.; ShoreTel, Inc. in the U.S.; Siemens in Germany; Skype Usa in the U.S.; Sprint in the U.S.; Square Cash in the U.S.; Suddenlink Communications in the U.S.; Talktone in the U.S.; Tango in the U.S.; Time Warner Cable in the U.S.; 1-Mobile in the U.S.; Twitter in the U.S.; US Cellular in the U.S.; Venmo in the U.S.; Virgin Mobile USA in the U.S.; Vodafone in the UK; and Vonage in the U.S.
Letters dated Jan. 4, 2016, from VoIP-Pal.com Inc. giving notice and inviting the companies listed herein below to contact VoIP-Pal.com about U.S. Pat. Nos. 9,179,005 and 8,542,815 and related patents listed in the accompanying Attachment A. (Please Note: Attachment A is attached here only to the first letter.) Sent to the following companies: Rogers Communications Inc. in Canada; Shaw Cable in Canada; Walmart in Alaska; and WIND Mobile in Canada.
Letters dated Jan. 21, 2016, from VoIP-Pal.com Inc. giving notice and inviting the companies listed herein below to contact VoIP-Pal.com about U.S. Pat. Nos. 9,179,005 and 8,542,815 and related patents listed in the accompanying Attachment A. (Please Note: Attachment A is attached here only to the first letter.) Sent to the following companies: Alibaba (China) Co., Ltd in China; Comwave Telecommunications in Canada; and Intel in the U.S.
Letters dated Feb. 2, 2016, from VoIP-Pal.com Inc. giving notice and inviting the companies listed herein below to contact VoIP-Pal.com about U.S. Pat. Nos. 9,179,005 and 8,542,815 and related patents listed in the accompanying Attachment A. (Please Note: Attachment A is attached here only to the first letter.) Sent to the following companies: Netflix Inc. in the U.S.; Skype Technologies in the U.S.; and WhatsApp Inc. in the U.S.
Document Title: United States Patent and Trademark Office; Before the Patent Trial and Appeal Board; *Apple Inc*., Petitioner v. *VoIp-Pal.com Inc*., Patent Owner; Case No. TBD, U.S. Pat. No. 9,179,005; Petition for Inter Partes Review of U.S. Pat. No. 9,179,005; Dated Jun. 15, 2016. 70 sheets.
Document Title: In the United States Patent and Trademark Office; Petition for Inter Partes Review Pursuant to 37 C.F.R. §42.100 ET SEQ.; In re U.S. Pat. No. 9,179,005; Currently in Litigation Styled: *VoIP-Pal.com, Inc*. v. *Apple Inc*., Case No: 2:16-cv-00260-RFB-VCF; Issued: Nov. 3, 2015; Application Filed: Aug. 13, 2013; Applicant: Clay Perreault, et al.; Title: Producing Routing Messages for Voice Over IP Communications; Declaration of Henry H. Houh, PhD; Signed Jun. 14, 2016. 143 sheets.
Document Title: United States Patent and Trademark Office; Before the Patent Trial and Appeal Board; *Apple Inc*., Petitioner v. *VoIP-Pal.com Inc*., Patent Owner; Case No. TBD, U.S. Pat. No. 8,542,815; Petition for Inter Partes Review of U.S. Pat. No. 8,542,815; Dated Jun. 15, 2016. 67 sheets.
Document Title: In the United States Patent and Trademark Office; Petition for Inter Partes Review Pursuant to 37 C.F.R. §42.100 ET SEQ.; In re U.S. Pat. No. 8,542,815; Currently in Litigation Styled: *VoIP-Pal.com, Inc*. v. *Apple Inc*., Case No: 2:16-cv-00260-RFB-VCF; Issued: Sep. 24, 2013; Application Filed: Nov. 1, 2007; Applicant: Clay Perreault, et al.; Title: Producing Routing Messages for Voice Over IP Communications; Declaration of Henry H. Houh, PhD; Signed Jun. 14, 2016, 143 sheets.
Document Title: Petition for Inter Partes Review of U.S. Pat. No. 8,542,815; United States Patent and Trademark Office; Before the Patent Trial and Appeal Board; *Unified Patents Inc*., Petitioner v. *Voip-Pal.com Inc*., Patent Owner; IPR2016-01082; U.S. Pat. No. 8,542,815; Producing Routing Messages for Voice Over IP Communications; Dated May 24, 2016. 64 sheets.
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Exhibit A, Case 2:16-cv-02338-RFB-CWH, Filed Oct. 6, 2016, U.S. Pat. No. 8,542,815 B2, Issued Sep. 24, 2013, to Clay Perrault et al., 60 pages.

Exhibit B, Case 2:16-cv-02338-RFB-CWH, Filed Oct. 6, 2016, U.S. Pat. No. 9,179,005 B2, Issued Nov. 3, 2015, to Clay Perrault et al., 63 pages.

Exhibit C, Case 2:16-cv-02338-RFB-CWH, Filed Oct. 6, 2016, Letter dated Dec. 18, 2015 giving notice of U.S. Pat. Nos. 8,542,815 B2; 9,179,005 B2; and related Patents listed in Attachment A, 4 pages.

Exhibit D, Case 2:16-cv-02338-RFB-CWH, Filed Oct. 6, 2016, Asserted Claims and Infringement Conditions, United States District Court, District of Nevada, *Voip-Pal.com, Inc., a Nevada corporation*, Plaintiff v. *Twitter, Inc., a California corporation*, Defendants, 6 pages.

Chart 1 to Exhibit D, Case 2.16-cv-02338-RFB-CWH, Filed Oct. 6, 2016, Chart 1, Asserted Claims and Infringement Conditions Concerning U.S. Pat. No. 8,542,815, United States District Court, District of Nevada, *Voip-Pal.com, Inc., a Nevada corporation*, Plaintiff v. *Twitter, Inc., a California corporation*, Defendants, 20 pages.

Chart 2 to Exhibit D, Case 2:16-cv-02338-RFB-CWH, Filed Oct. 6, 2016, Chart 2, Asserted Claims and Infringement Conditions Concerning U.S. Pat. No. 9,179,005, United States District Court, District of Nevada, *Voip-Pal.com, Inc., a Nevada corporation*, Plaintiff v. *Twitter, Inc., a California corporation*, Defendants, 28 pages.

Exhibit E, Case 2:16-cv-02338-RFB-CWH, Filed Oct. 6, 2016, VPLM Active U.S. Patent Matters as of October 1, 2016, 2 pages.

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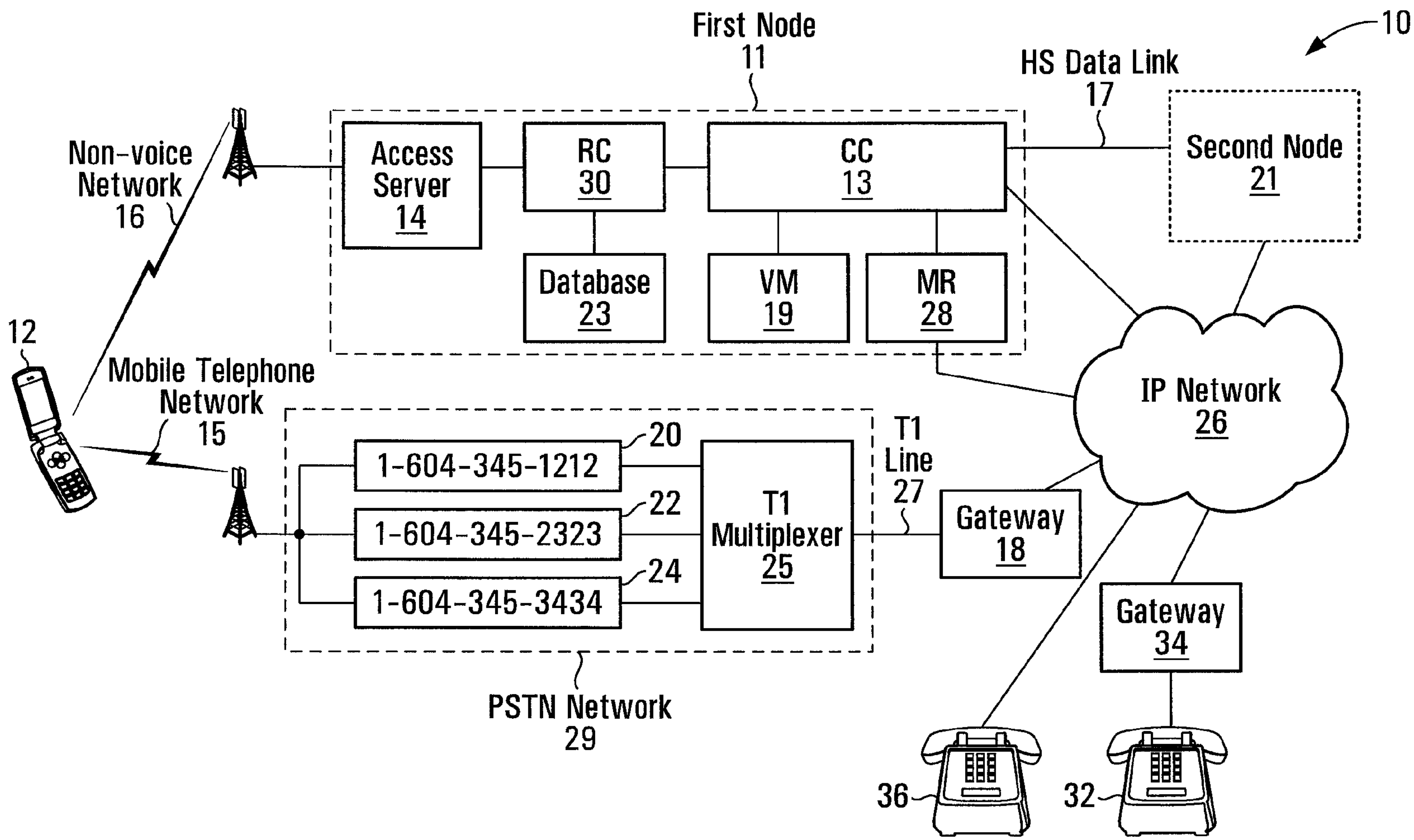

10
First Node
11
HS Data Link
17
Non-voice
Network
16
Access
Server
14
RC
30
CC
13
Second Node
21
Database
23
VM
19
MR
28
12
Mobile Telephone
Network
15
IP Network
26
20
1-604-345-1212
22
1-604-345-2323
24
1-604-345-3434
T1
Multiplexer
25
T1
Line
27
Gateway
18
Gateway
34
PSTN Network
29
36
32

FIG. 1

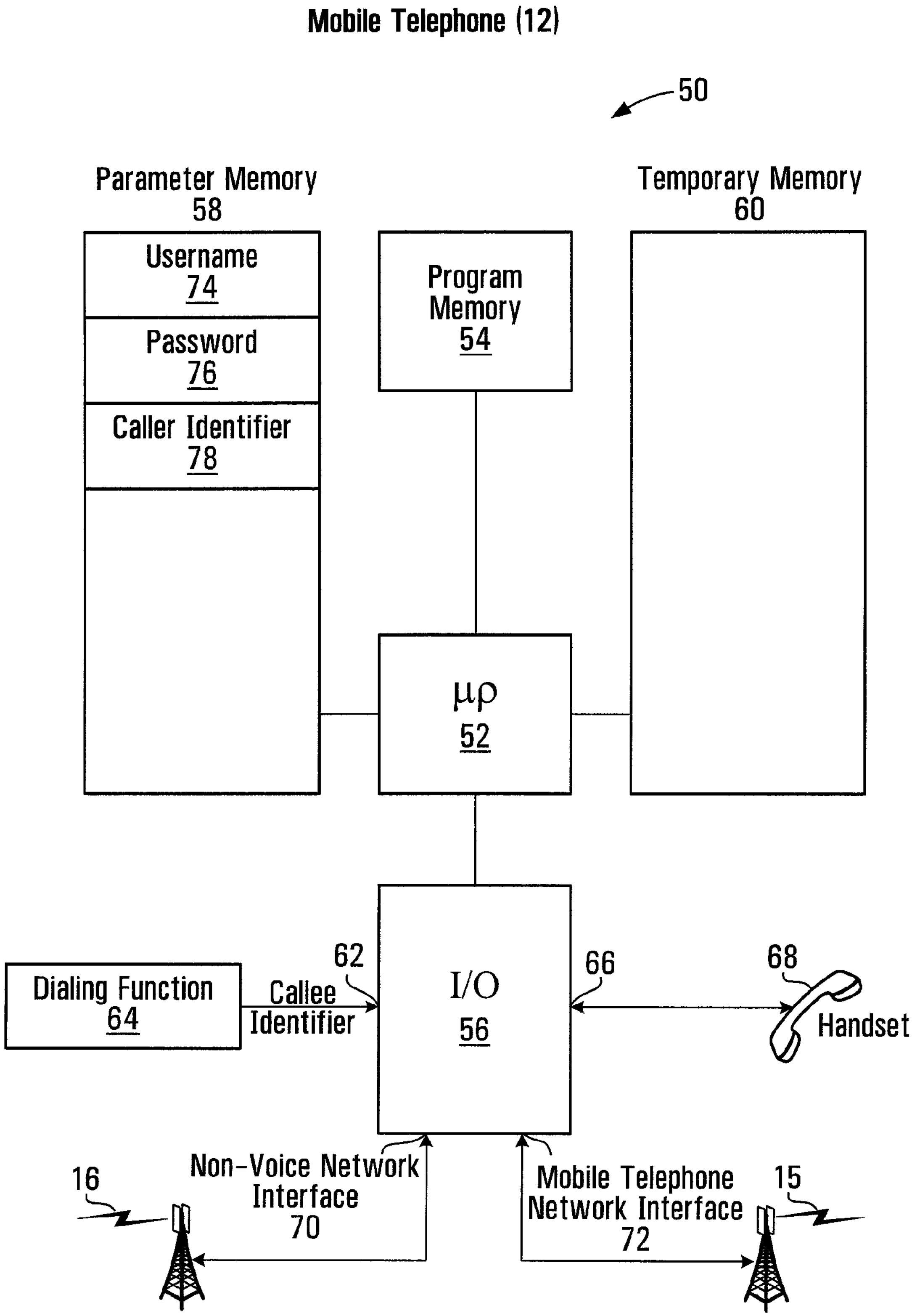

Mobile Telephone (12)
50
Parameter Memory
58
Username
74
Password
76
Caller Identifier
78
Program Memory
54
Temporary Memory
60
μρ
52
I/O
56
Dialing Function
64
62
Callee Identifier
66
68
Handset
16
Non-Voice Network Interface
70
Mobile Telephone Network Interface
72
15

FIG. 2

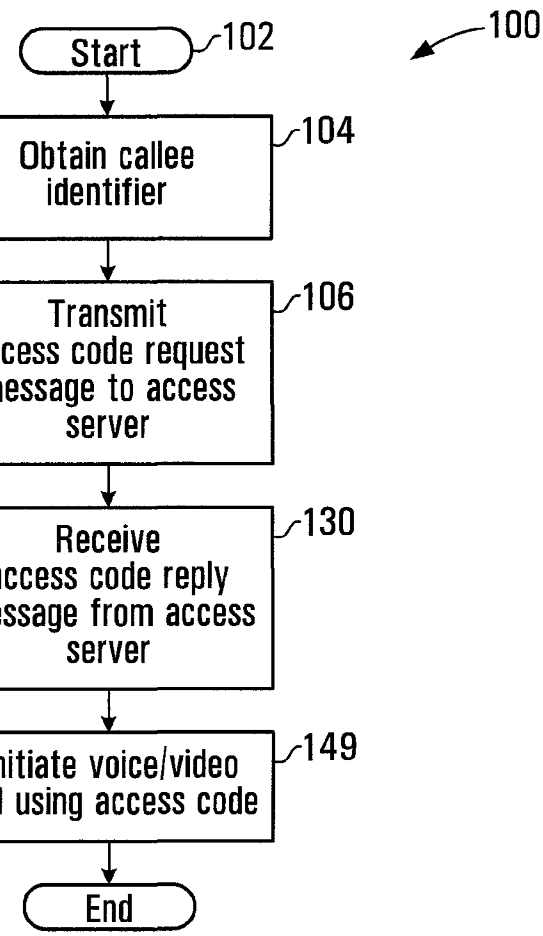


FIG. 3

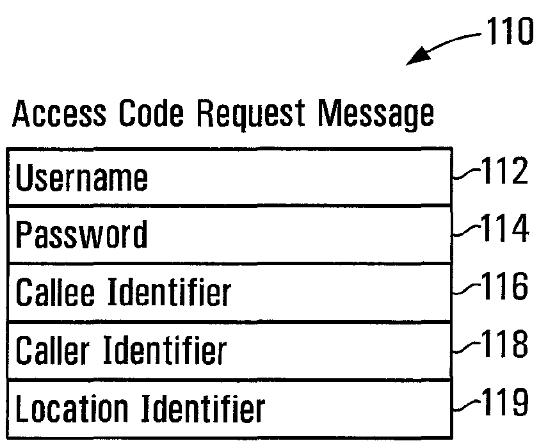


FIG. 4

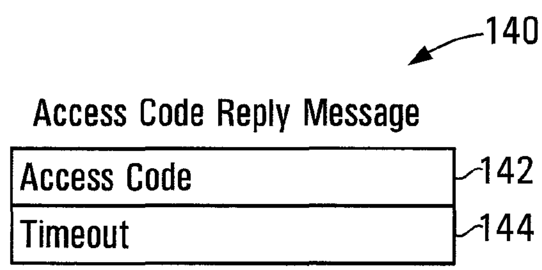
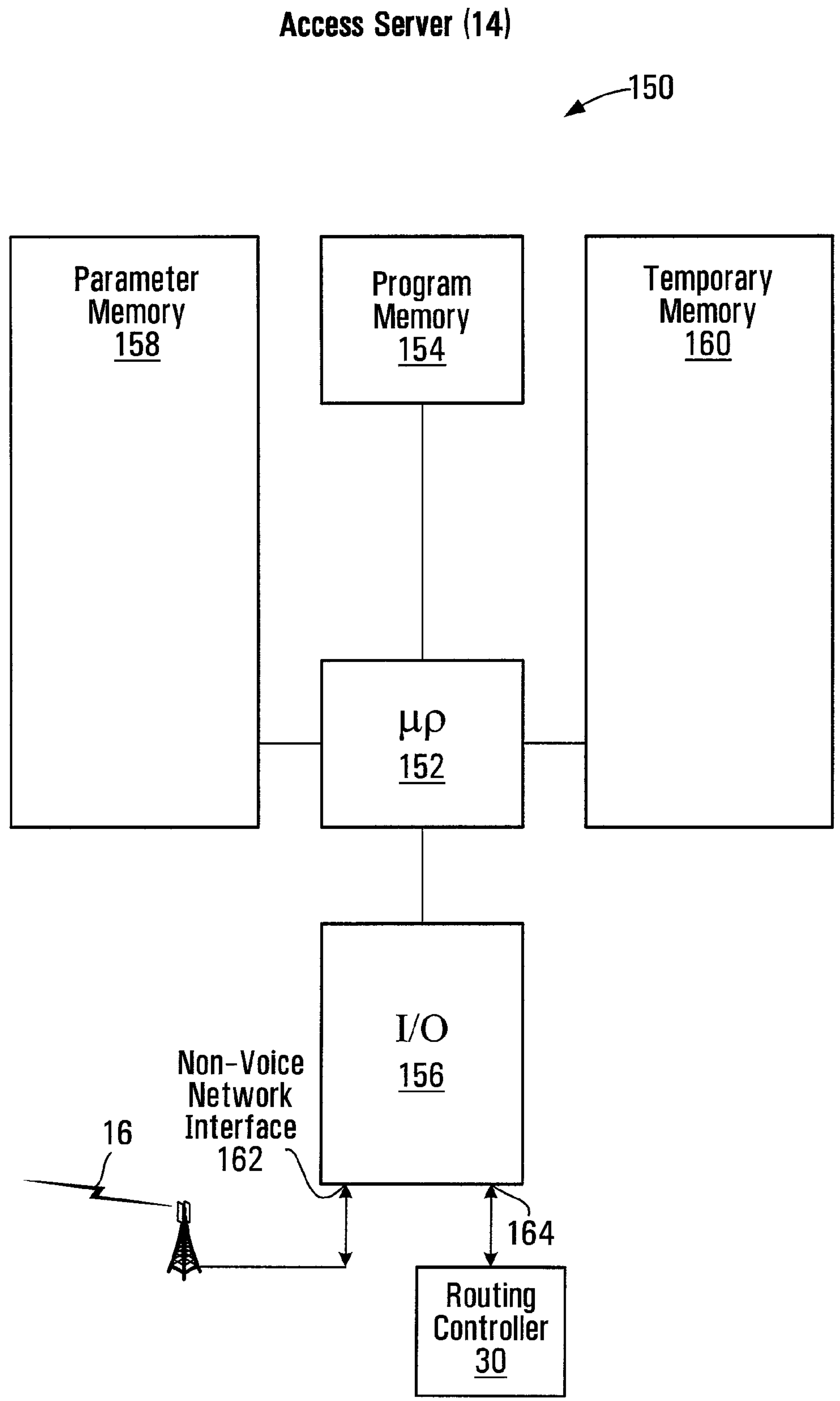


FIG. 5



Access Server (14)
150
Parameter Memory 158
Program Memory 154
Temporary Memory 160
μρ 152
I/O 156
Non-Voice Network Interface 162
16
164
Routing Controller 30

FIG. 6

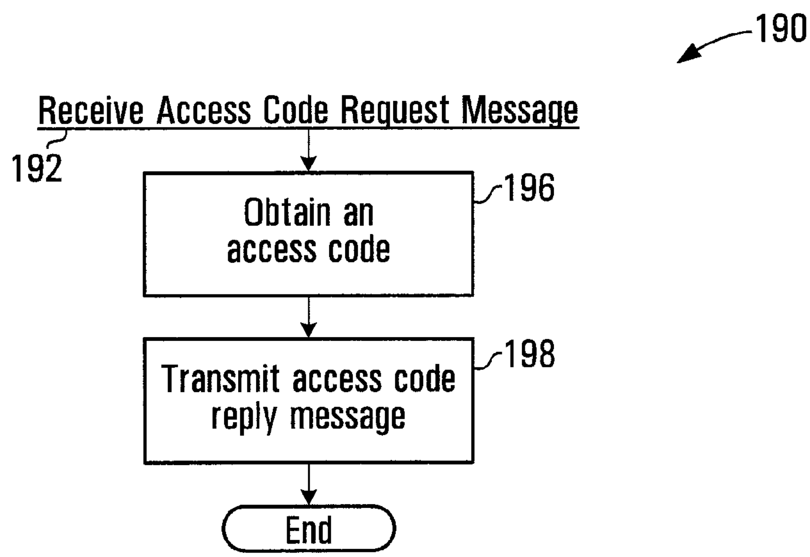

190
Receive Access Code Request Message
192
Obtain an access code
196
Transmit access code reply message
198
End

FIG. 7

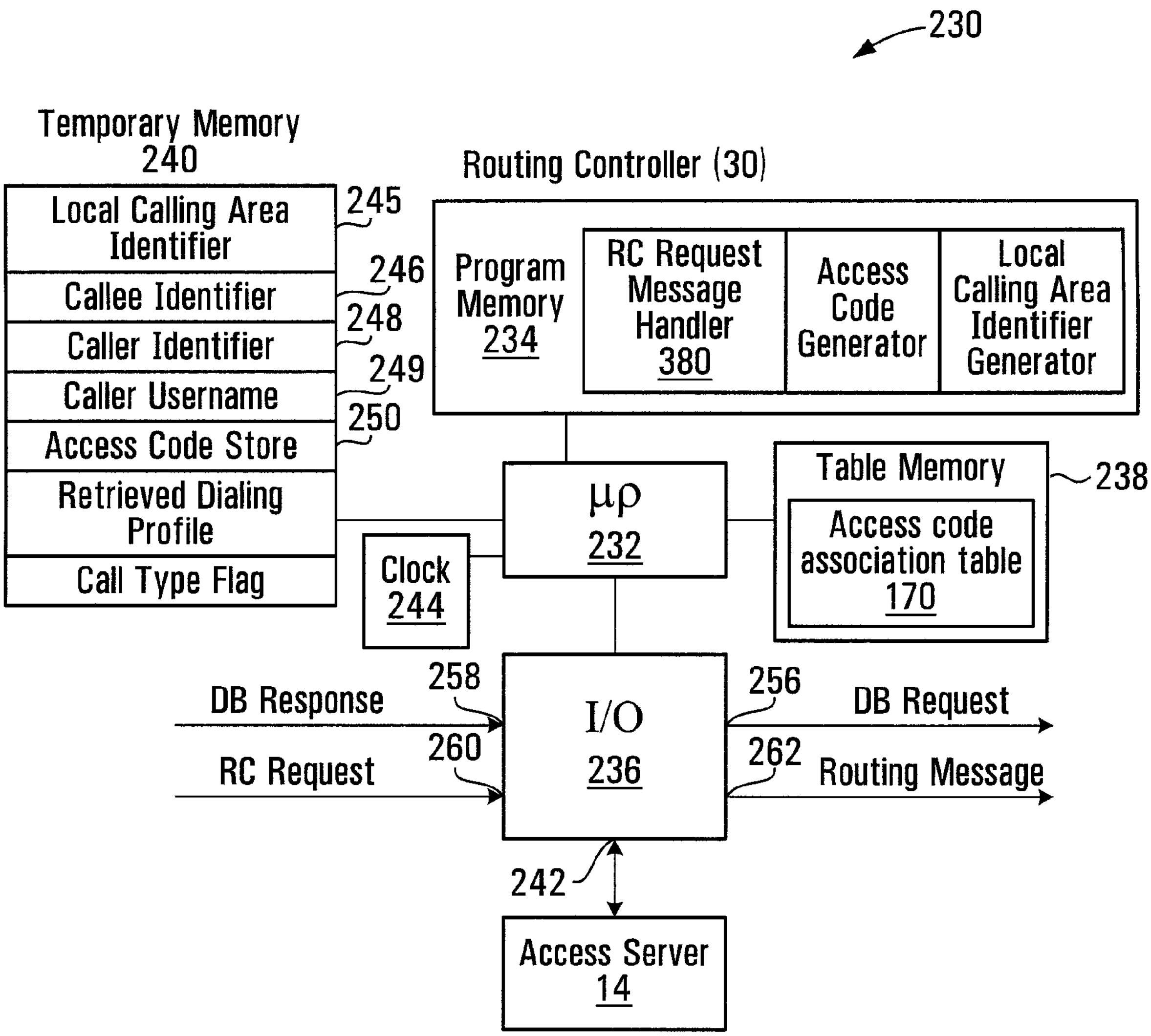

230
Temporary Memory
240
Local Calling Area Identifier
245
Callee Identifier
246
Caller Identifier
248
Caller Username
249
Access Code Store
250
Retrieved Dialing Profile
Call Type Flag
Routing Controller (30)
Program Memory
234
RC Request Message Handler
380
Access Code Generator
Local Calling Area Identifier Generator
μρ
232
Table Memory
238
Access code association table
170
Clock
244
DB Response
258
RC Request
260
I/O
236
256
DB Request
262
Routing Message
242
Access Server
14

FIG. 8

200

Dialing Profile for a User

202 ~ **Username**	Assigned on Subscription
204 ~ **Domain**	Domain Associated with User
206 ~ **NDD**	1
208 ~ **IDD**	011
210 ~ **Country Code**	1
212 ~ **Local Area Codes**	604;778
214 ~ **Caller Minimum Local # Length**	10
216 ~ **Caller Maximum Local # Length**	10
218 ~ **Reseller**	Retailer
220 ~ **Maximum # of concurrent calls**	Assigned on Subscription
222 ~ **Current # of concurrent calls**	Assigned on Subscription
224 ~ **Default Local Calling Area Identifier**	Assigned on Subscription

FIG. 9

170

	171	173	175	177	179	183	181	182
	Local Calling Area Identifier	Access Code	Channel Identifier	Callee Identifier	Caller Identifier	Caller Username	Timeout	Timestamp
172	XXXX	1-604-345-1212	20					
174	XXXX	1-604-345-2323	22	1-403-789-1234	1-416-444-1441	2001 1050 8667	10	06-15-2008 10:31
176	XXXX	1-604-345-3434	24					
178	XXXX	1-416-234-4646	XX	1-604-321-1234	1-416-444-1234	2001 1050 4141	10	06-15-2008 14:21
180	XXXX	1-416-234-6868	XY					

FIG. 10

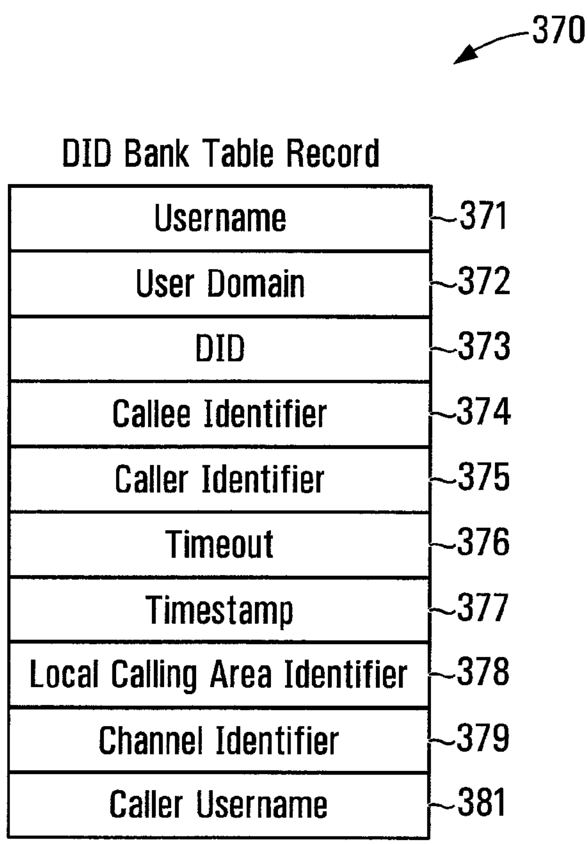
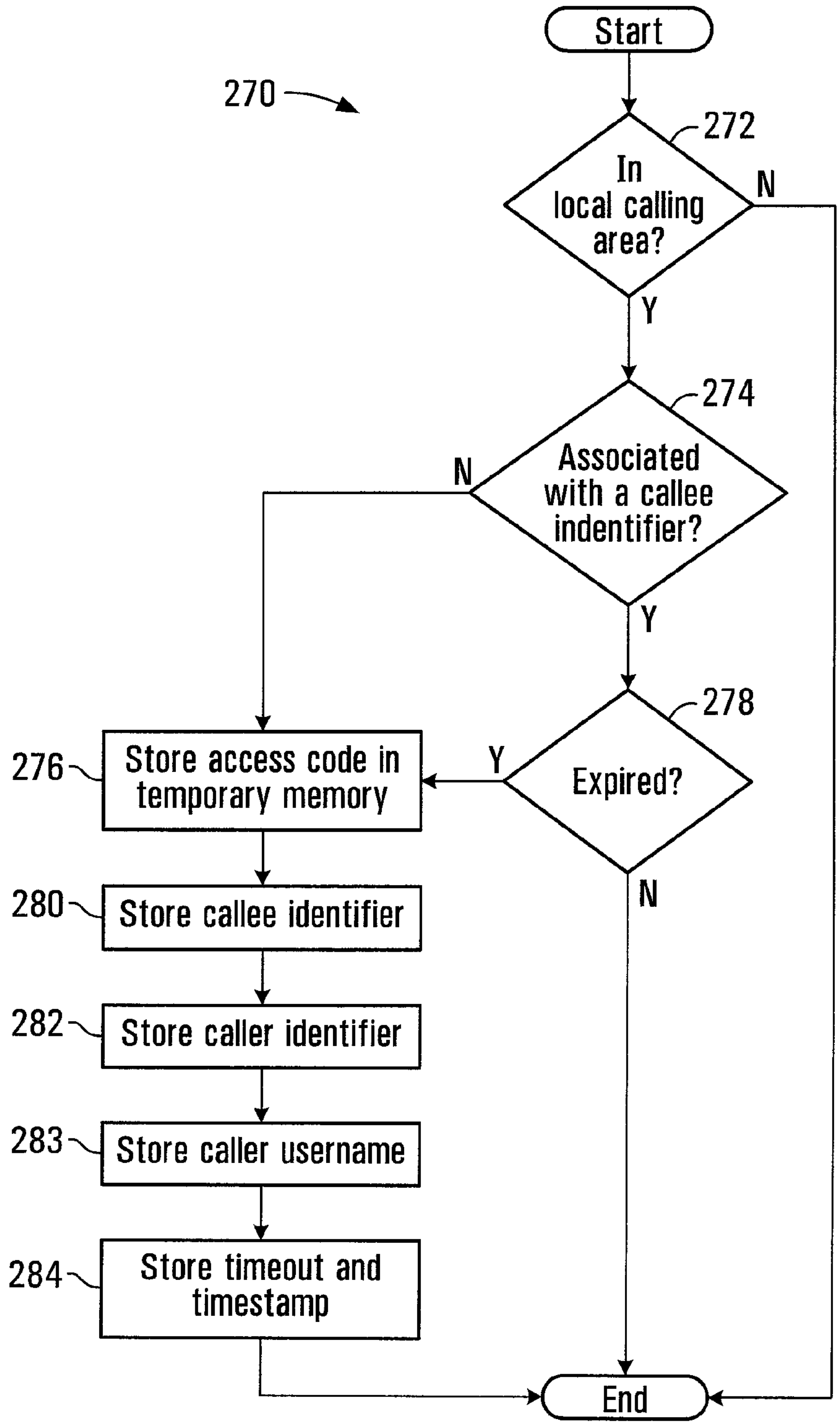

370
DID Bank Table Record
Username 371
User Domain 372
DID 373
Callee Identifier 374
Caller Identifier 375
Timeout 376
Timestamp 377
Local Calling Area Identifier 378
Channel Identifier 379
Caller Username 381

FIG. 11



270
Start
272
In local calling area?
N
Y
274
Associated with a callee indentifier?
N
Y
278
Expired?
Y
N
276
Store access code in temporary memory
280
Store callee identifier
282
Store caller identifier
283
Store caller username
284
Store timeout and timestamp
End

FIG. 12

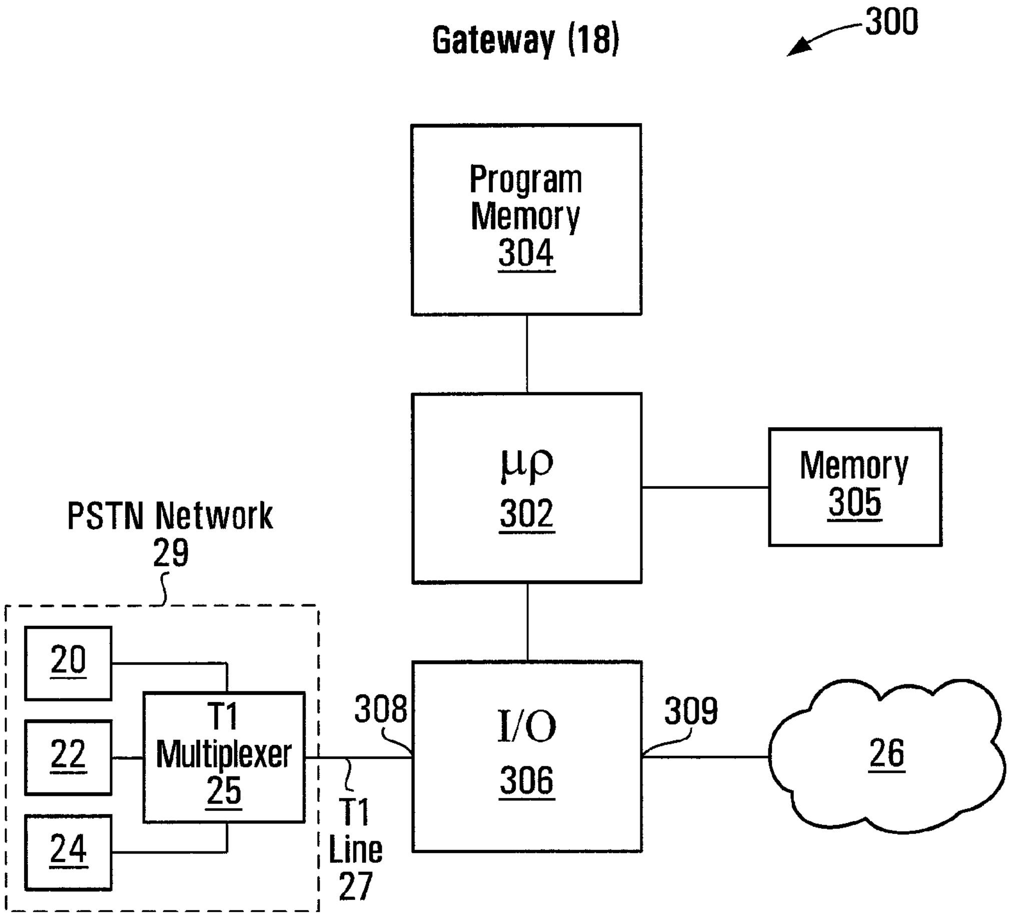


FIG. 13

310

SIP Invite Message

312	Caller Identifier	1-604-678-1234@20.14.102.5
314	Callee Identifier	1-604-345-1212
315	Digest Parameter	XXXXXXX
316	Call Identifer	FF10@20.14.102.5
317	IP Address	20.14.102.5
318	Gateway UDP Port	12378

FIG. 14

Call Controller (13)

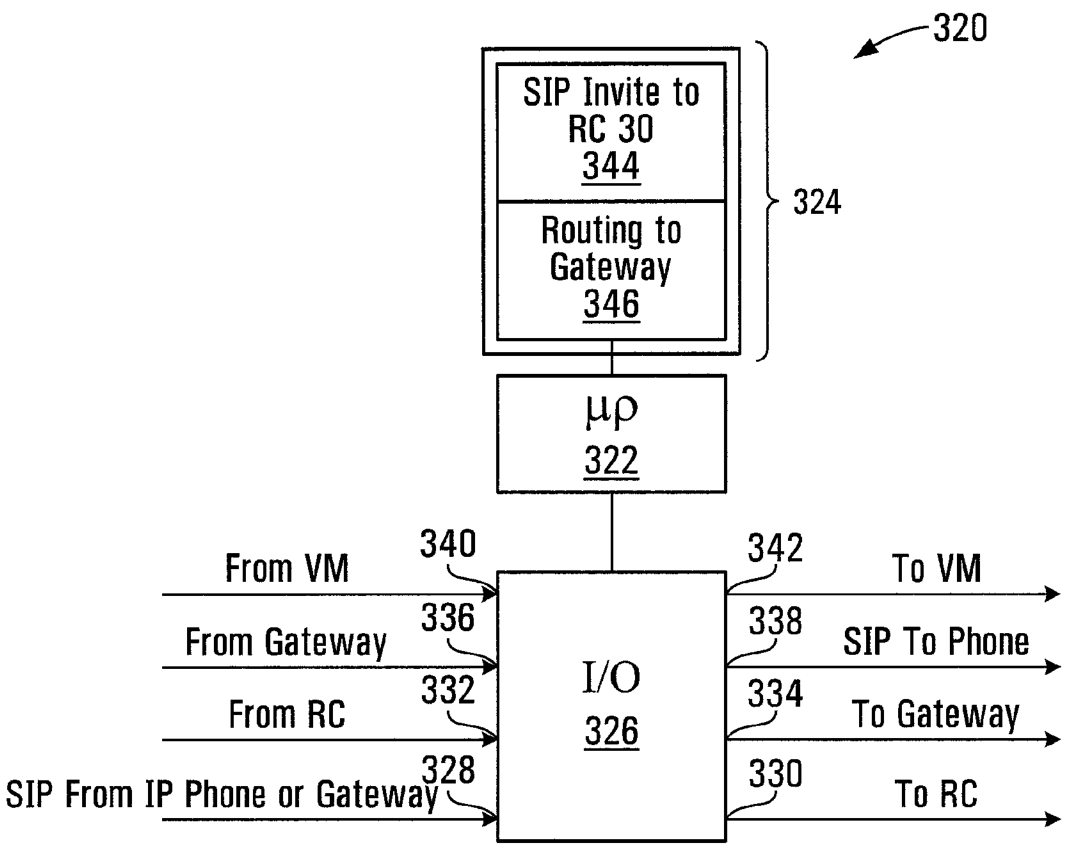


FIG. 15

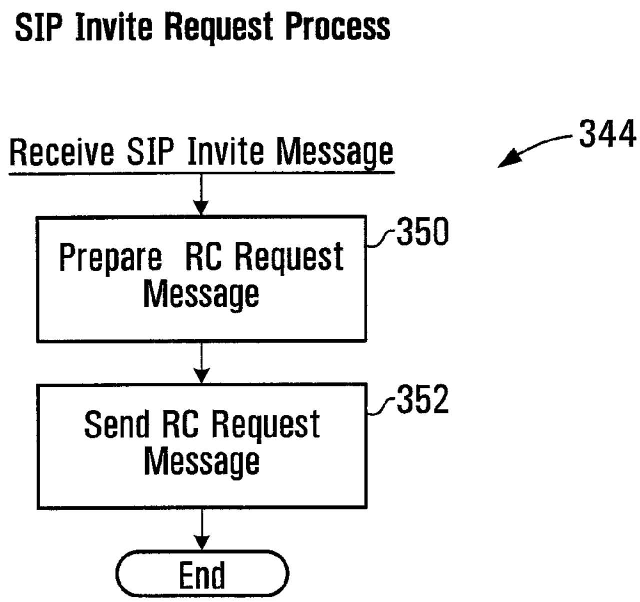


FIG. 16

360

RC Request Message

362	Caller	1-604-678-1234@20.14.102.5
364	Callee	1-604-345-1212
366	Digest	XXXXXXX
368	Call ID	FF10@20.14.102.5

FIG. 17

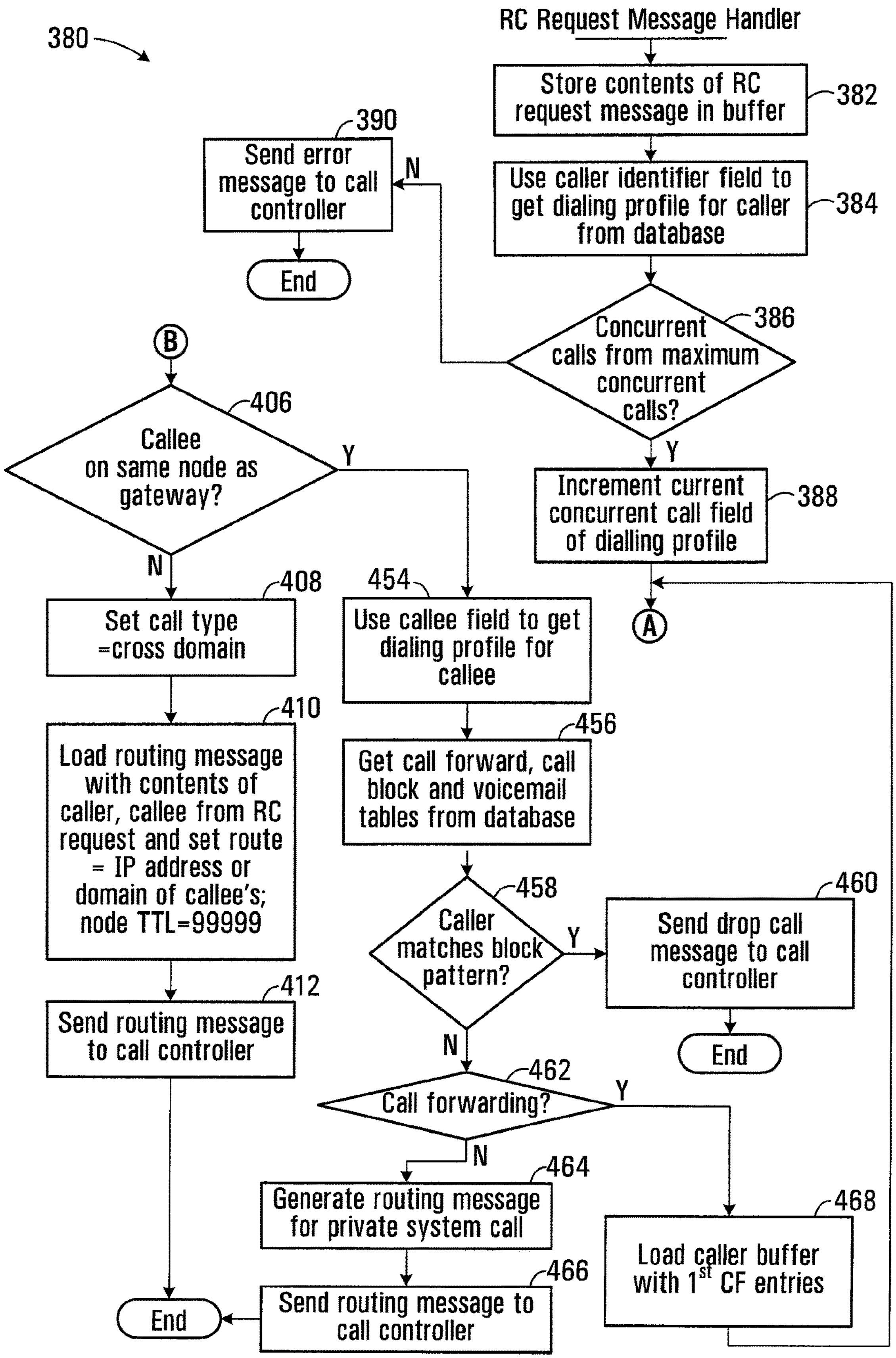

380
RC Request Message Handler
Store contents of RC request message in buffer
382
Use caller identifier field to get dialing profile for caller from database
384
Concurrent calls from maximum concurrent calls?
386
N
Send error message to call controller
390
End
Y
Increment current concurrent call field of dialling profile
388
A
B
Callee on same node as gateway?
406
N
Set call type =cross domain
408
Load routing message with contents of caller, callee from RC request and set route = IP address or domain of callee's; node TTL=99999
410
Send routing message to call controller
412
End
Y
Use callee field to get dialing profile for callee
454
Get call forward, call block and voicemail tables from database
456
Caller matches block pattern?
458
Y
Send drop call message to call controller
460
End
N
Call forwarding?
462
N
Generate routing message for private system call
464
Send routing message to call controller
466
Y
Load caller buffer with 1st CF entries
468

FIG. 18A

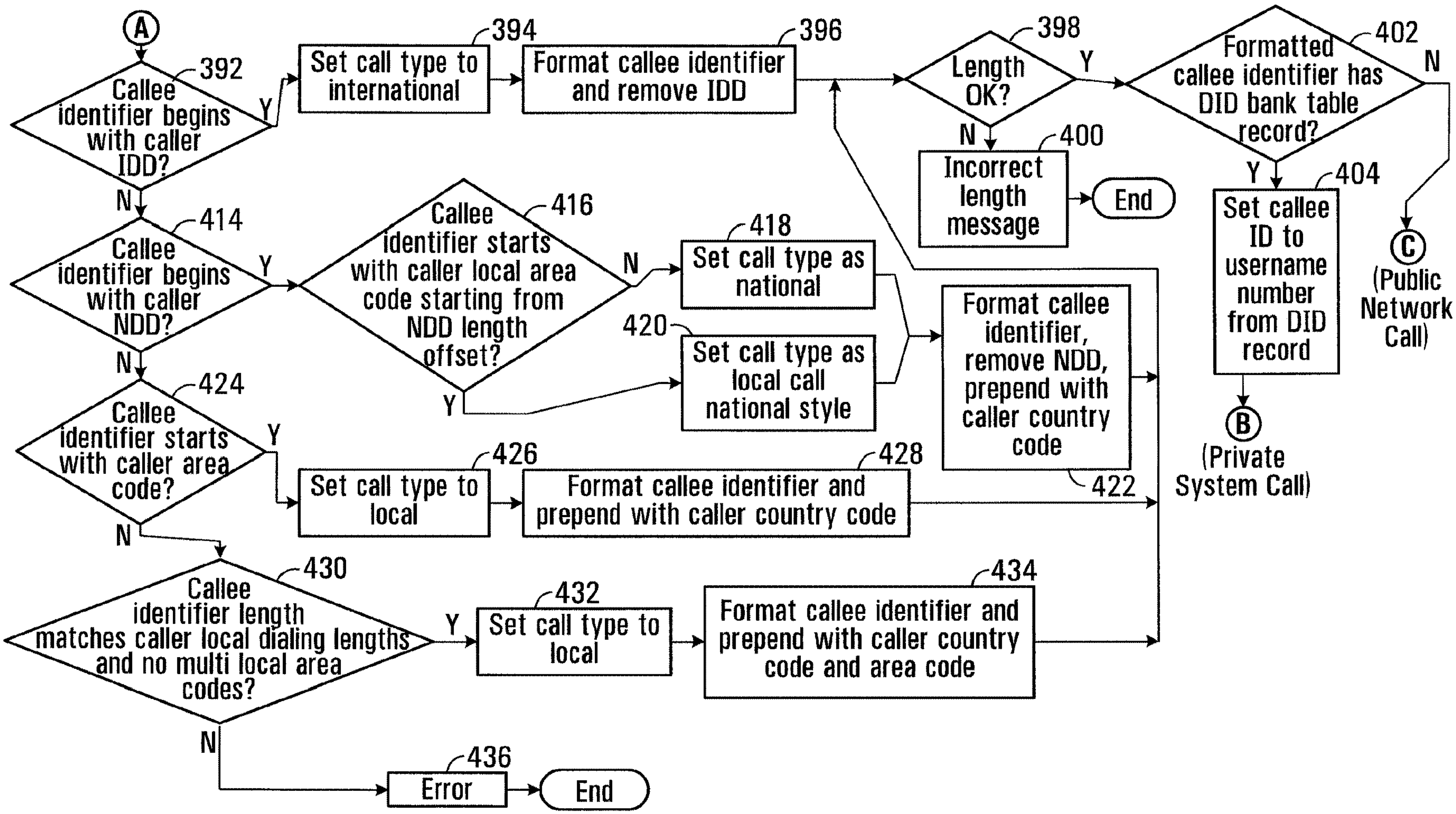

A
Callee identifier begins with caller IDD?
392
Y
N
Set call type to international
394
Format callee identifier and remove IDD
396
Length OK?
398
Y
N
Incorrect length message
400
End
Formatted callee identifier has DID bank table record?
402
Y
N
Set callee ID to username number from DID record
404
B
(Private System Call)
C
(Public Network Call)
Callee identifier begins with caller NDD?
414
Callee identifier starts with caller local area code starting from NDD length offset?
416
Set call type as national
418
Set call type as local call national style
420
Format callee identifier, remove NDD, prepend with caller country code
422
Callee identifier starts with caller area code?
424
Set call type to local
426
Format callee identifier and prepend with caller country code
428
Callee identifier length matches caller local dialing lengths and no multi local area codes?
430
Set call type to local
432
Format callee identifier and prepend with caller country code and area code
434
Error
436
End

FIG. 18B

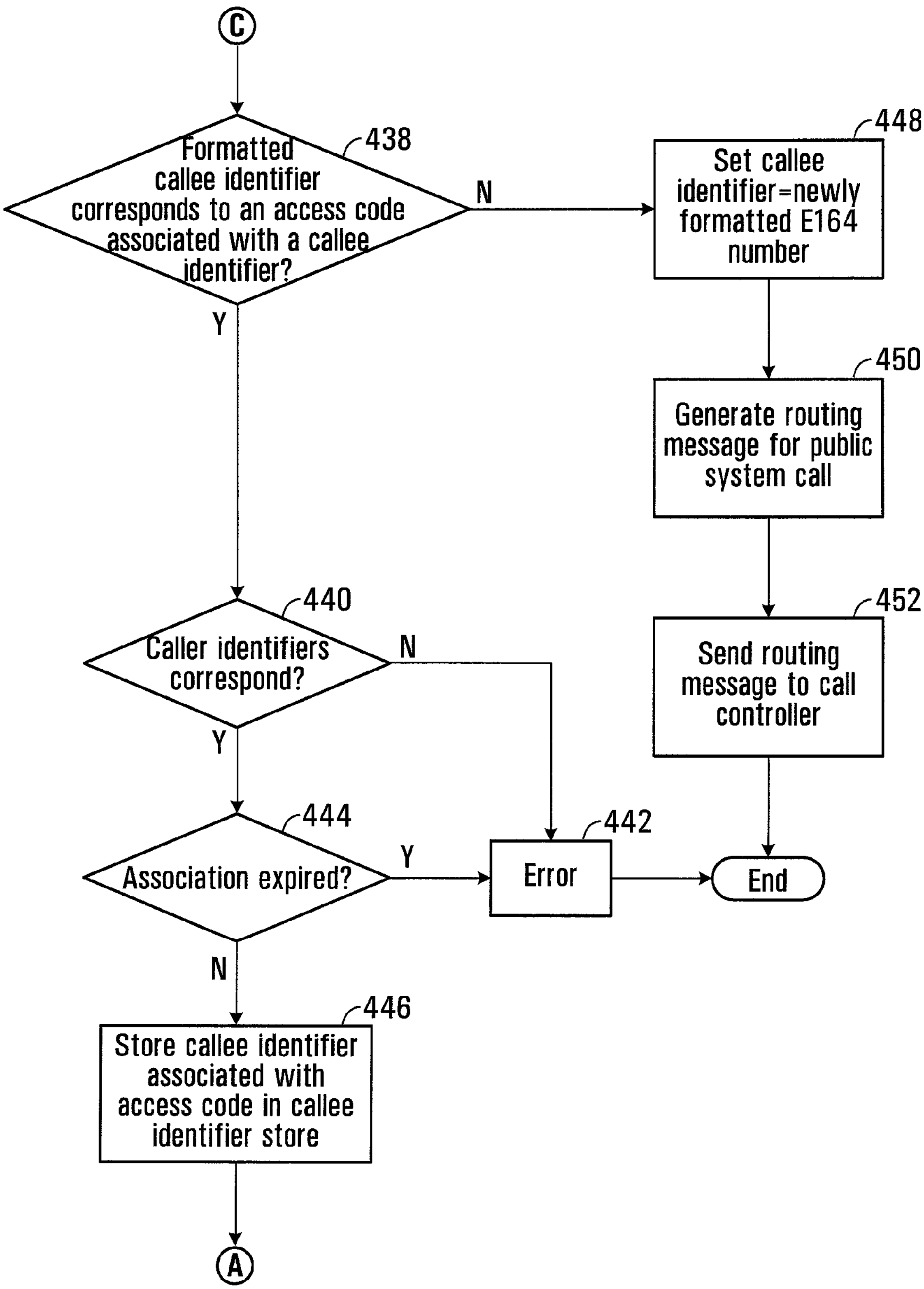

C
Formatted callee identifier corresponds to an access code associated with a callee identifier?
438
N
Y
Set callee identifier=newly formatted E164 number
448
Generate routing message for public system call
450
Send routing message to call controller
452
Caller identifiers correspond?
440
N
Y
Association expired?
444
Y
N
Error
442
End
Store callee identifier associated with access code in callee identifier store
446
A

FIG. 18C

480

Gateway Node Association Table

Gateway IP Address	Node Identifier
20.14.102.5	2
104.12.131.12	5

FIG. 19

MOBILE GATEWAY

INCORPORATION BY REFERENCE TO ANY PRIORITY APPLICATIONS

This application is a continuation of U.S. application Ser. No. 13/056,277, filed Jan. 27, 2011, entitled "Mobile Gateway", which is a national phase entry of PCT/CA2009/001062, filed Jul. 28, 2009, which claims priority to U.S. Provisional Application No. 61/129,898, filed Jul. 28, 2008, all of which are incorporated by reference in their entireties.

BACKGROUND

Field

This invention relates generally to telecommunication, and more particularly to methods, systems, apparatuses, and computer readable media for initiating or enabling a call with a mobile telephone to a callee.

Description of the Related Technologies

Mobile telephone service providers often charge significant fees for long distance telephone calls, particularly when the mobile telephone is roaming in another mobile telephone service provider's network.

One known technique for avoiding the long distance charges of mobile telephone service providers is to use a "calling card". A "calling card" may permit the user of the mobile telephone to place a call to a local telephone number or to a less-expensive telephone number (such as a toll-free number, for example) instead of placing the call directly to the callee. The user may thus avoid the long distance charges of the mobile telephone service provider, which may be higher than the charges for using the "calling card". However, this technique can be cumbersome and undesirable, because it may require the user of the mobile telephone to follow a number of complicated or cumbersome steps in order to initiate a call to the callee, for example.

SUMMARY OF CERTAIN EMBODIMENTS

In accordance with one aspect there is provided a method of initiating a call to a callee using a mobile telephone. The method involves receiving, from a user of the mobile telephone, a callee identifier associated with the callee; transmitting an access code request message to an access server, the access code request message including the callee identifier; receiving an access code reply message from the access server in response to the access code request message, the access code reply message including an access code different from the callee identifier and associated with the callee identifier; and initiating a call with the mobile telephone using the access code to identify the callee.

Transmitting may involve transmitting the access code request message to the access server on a non-voice network.

Transmitting may involve transmitting a location identifier of a location associated with the mobile telephone to the access server.

Transmitting the location identifier may involve transmitting an IP address of the mobile telephone in a wireless IP network.

Transmitting the location identifier may involve transmitting an identifier of a wireless voice signal station in wireless communication with the mobile telephone.

Transmitting the location identifier may involve transmitting a user-configured identifier of a location associated with the mobile telephone.

Receiving the access code reply message may involve receiving the access code reply message from the access server on a non-voice network.

Receiving the access code reply message may involve receiving, in the access code reply message, an access code temporarily associated with the callee identifier.

Receiving the access code reply message may involve receiving, in the access code reply message, a telephone number identifying a channel operably configured to cooperate with an IP network to cause a call involving the mobile telephone and the callee to be routed through the IP network.

Initiating the call may involve engaging a routing controller to route the call on the IP network to the callee.

The method may further involve: receiving from the mobile telephone the access code request message; communicating with a routing controller to obtain from the routing controller the access code wherein the access code identifies a channel and is useable by the mobile telephone to cause the routing controller to establish a call to the callee using the channel; and transmitting the access code reply message to the mobile telephone.

In accordance with another aspect, there is provided a mobile telephone. The mobile telephone includes: provisions for receiving, from a user of the mobile telephone, a callee identifier associated with the callee; transmitting provisions for transmitting an access code request message to an access server, the access code request message including the callee identifier; provisions for receiving an access code reply message from the access server in response to the access code request message, the access code reply message including an access code different from the callee identifier and associated with the callee identifier; and provisions for initiating a call using the access code to identify the callee.

The transmitting provisions may include a non-voice network interface for transmitting the access code request message to the access server on a non-voice network.

The access code request message may further include a location identifier of a location associated with the mobile telephone.

The location identifier may include an IP address of the mobile telephone in a wireless IP network.

The location identifier may include an identifier of a wireless voice signal station in wireless communication with the mobile telephone.

The location identifier may include a user-configured identifier of a location associated with the mobile telephone.

The provisions for receiving an access code reply message may include a non-voice network interface for receiving the access code reply message on a non-voice network.

The access code may include a telephone number.

The means for initiating may involve a mobile telephone network interface.

In accordance with another aspect, there is provided a system for initiating a call to a callee. The system includes the mobile telephone, a routing controller, and an access server. The access server includes: provisions for receiving from the mobile telephone the access code request message; provisions for communicating with the routing controller to obtain from the routing controller the access code wherein the access code identifies a channel and is useable by the mobile telephone to cause the routing controller to establish a call to the callee using the channel; and provisions for transmitting the access code reply message including the access code to the mobile telephone.

In accordance with another aspect, there is provided a mobile telephone. The mobile telephone includes a processor circuit, a network interface in communication with the processor circuit, and a computer readable medium in communication with the processor circuit and encoded with codes for directing the processor circuit to: receive, from a user of the mobile telephone, a callee identifier associated with the callee; cause an access code request message to be transmitted to an access server, the access code request message including the callee identifier; receive an access code reply message from the access server in response to the access code request message, the access code reply message including an access code different from the callee identifier and associated with the callee identifier; and initiate a call using the access code to identify the callee.

The network interface may include a non-voice network interface, and the codes for directing the processor circuit to cause the access code request message to be transmitted may include codes for directing the processor circuit to cause the access code request message to be transmitted to the access server using the non-voice network interface on a non-voice network.

The access code request message may further include a location identifier of a location associated with the mobile telephone.

The location identifier may include an IP address of the mobile telephone in a wireless IP network.

The location identifier may include an identifier of a wireless voice signal station in wireless communication with the mobile telephone.

The location identifier may include a user-configured identifier of a location associated with the mobile telephone.

The network interface may include a non-voice network interface, and the codes for directing the processor circuit to receive an access code reply message may include codes for directing the processor circuit to cause the access code reply message to be received from the access server using the non-voice network interface on a non-voice network.

The access code may include a telephone number identifying a channel operably configured to cooperate with an IP network to cause a call involving the mobile telephone and the callee to be routed through the IP network.

The network interface may include a mobile telephone network interface, and the codes for directing the processor circuit to initiate may include codes for directing the processor circuit to cause a call to be initiated using the mobile telephone network interface on a mobile telephone network.

In accordance with another aspect, there is provided a system for initiating a call to a callee. The system includes: the mobile telephone; a routing controller; and an access server comprising a processor circuit and a computer readable medium in communication with the processor circuit. The computer readable medium is encoded with codes for directing the processor circuit to: receive from the mobile telephone the access code request message; communicate with the routing controller to obtain from the routing controller the access code wherein the access code identifies a channel and is useable by the mobile telephone to cause the routing controller to establish a call to the callee using the channel; and transmit the access code reply message to the mobile telephone.

In accordance with another aspect, there is provided a computer readable medium encoded with codes for directing a processor circuit to: receive, from a user of a mobile telephone, a callee identifier associated with a callee; transmit an access code request message to an access server, the access code request message including the callee identifier; receive an access code reply message from the access server in response to the access code request message, the access code reply message including an access code different from the callee identifier and associated with the callee identifier; and initiate a call using the access code to identify the callee.

In accordance with another aspect, there is provided a method for enabling a mobile telephone to initiate a call to a callee through a channel. The method involves: receiving from the mobile telephone an access code request message including a callee identifier associated with the callee; communicating with a routing controller to obtain from the routing controller an access code identifying the channel, the access code being different from the callee identifier and useable by the mobile telephone to initiate a call to the callee using the channel; and transmitting an access code reply message including the access code to the mobile telephone.

Receiving may involve receiving the access code request message on a non-voice network.

The method may further involve causing the routing controller to produce the access code.

Producing may involve selecting the access code from a pool of access codes, where each access code in the pool of access codes identifies a respective telephone number.

The method may further involve determining a local calling area associated with the mobile telephone.

Determining may involve accessing a dialing profile associated with the caller, the dialing profile including a location field having contents identifying at least a default location of the caller.

Determining may involve receiving an IP address of the mobile telephone in a wireless IP network.

Determining may involve receiving an identifier of a wireless voice signal station in wireless communication with the mobile telephone.

Determining may involve receiving a user-configured identifier of a location associated with the mobile telephone.

Selecting may involve selecting an access code in the local calling area associated with the mobile telephone.

Each access code in the pool of access codes may further identify a respective channel operably configured to cooperate with an IP network to cause a call involving the mobile telephone and the callee to be routed through the IP network.

The method may further involve causing the routing controller to establish communication through the IP network in response to a call received on the channel.

Producing may further involve storing a caller identifier associated with the mobile telephone in association with the access code.

Causing the routing controller to establish communication may involve causing the routing controller to establish communication only if the caller identifier associated with the access code identifies the mobile telephone.

Producing may further involve storing the callee identifier in association with the access code.

Producing may further involve searching the pool of access codes for an access code associated with the callee identifier to identify the channel usable by the mobile telephone to initiate a call to the callee.

Producing may further involve storing, in association with the access code, a timestamp for use in determining when the usability of the access code to initiate a call to the callee will expire.

Causing the routing controller to establish communication may involve causing the routing controller to establish communication only if the usability of the access code to initiate a call to the callee has not expired.

Transmitting may involve transmitting the access code reply message on a non-voice network.

In accordance with another aspect, there is provided a system for enabling a mobile telephone to initiate a call to a callee through a channel. The system includes: provisions for receiving from the mobile telephone an access code request message including a callee identifier associated with the callee; provisions for communicating with the routing controller to obtain from the routing controller an access code identifying the channel, the access code being different from the callee identifier and useable by the mobile telephone to initiate a call to the callee using the channel; and provisions for transmitting an access code reply message including the access code to the mobile telephone.

The provisions for receiving may include a non-voice network interface for receiving the access code request message on a non-voice network.

The system may further include provisions for producing the access code.

The provisions for producing may include a processor circuit operably configured to select the access code from a pool of access codes, where each access code in the pool of access codes identifies a respective telephone number.

The processor circuit may be operably configured to determine a local calling area associated with the mobile telephone.

The processor circuit may be operably configured to determine a local calling area associated with the mobile telephone using a dialing profile associated with the caller, the dialing profile including a location field having contents identifying at least a default location of the caller.

The processor circuit may be operably configured to determine a local calling area associated with the mobile telephone using an IP address of the mobile telephone in a wireless IP network.

The processor circuit may be operably configured to determine a local calling area associated with the mobile telephone using an identifier of a wireless voice signal station in wireless communication with the mobile telephone.

The processor circuit may be operably configured to determine a local calling area associated with the mobile telephone using a user-configured identifier of a location associated with the mobile telephone.

The processor circuit may be operably configured to select an access code in the local calling area associated with the mobile telephone.

Each access code in the pool of access codes may further identify a respective channel operably configured to cooperate with an IP network to cause a call involving the mobile telephone and the callee to be routed through the IP network.

The processor circuit may be operably configured to establish communication through the IP network in response to a call received on the channel.

The processor circuit may be operably configured to store a caller identifier associated with the mobile telephone in association with the access code.

The processor circuit may be operably configured to cause the routing controller to establish communication only if the caller identifier associated with the access code identifies the mobile telephone.

The processor circuit may be operably configured to store the callee identifier in association with the access code.

The processor circuit may be operably configured to search the pool of access codes for an access code associated with the callee identifier to identify the channel usable by the mobile telephone to initiate a call to the callee.

The processor circuit may be operably configured to store, in association with the access code, a timestamp for use in determining when the usability of the access code to initiate a call to the callee will expire.

The processor circuit may operably configured to establish communication only if the usability of the access code to initiate a call to the callee has not expired.

The provisions for transmitting may include a non-voice network interface for transmitting the access code reply message on a non-voice network.

In accordance with another aspect, there is provided a system for enabling a mobile telephone to initiate a call to a callee through a channel. The system includes a processor circuit, a network interface in communication with the processor circuit, and a computer readable medium in communication with the processor circuit and encoded with codes for directing the processor circuit to: receive from the mobile telephone an access code request message including a callee identifier associated with the callee; communicate with the routing controller to obtain from the routing controller an access code identifying the channel, the access code being different from the callee identifier and useable by the mobile telephone to initiate a call to the callee using the channel; and cause an access code reply message including the access code to be transmitted to the mobile telephone.

The network interface may include a non-voice network interface, and the codes for directing the processor circuit to receive may include codes for directing the processor circuit to cause the access code request message to be received using the non-voice network interface on a non-voice network.

The computer readable medium may be further encoded with codes for directing the processor circuit to cause the access code to be produced.

The codes for directing the processor circuit to cause the access code to be produced may cause the access code to be selected from a pool of access codes, where each access code in the pool of access codes identifies a respective telephone number.

The computer readable medium may be further encoded with codes for directing the processor circuit to cause to be determined a local calling area associated with the mobile telephone.

The codes for directing the processor circuit to cause to be determined may cause a dialing profile associated with the caller to be accessed, the dialing profile including a location field having contents identifying at least a default location of the caller.

The codes for directing the processor circuit to cause to be determined may cause to be received an IP address of the mobile telephone in a wireless IP network.

The codes for directing the processor circuit to cause to be determined may cause to be received an identifier of a wireless voice signal station in wireless communication with the mobile telephone.

The codes for directing the processor circuit to cause to be determined may cause to be received a user-configured identifier of a location associated with the mobile telephone.

The codes for directing the processor circuit to cause the access code to be produced may further cause to be selected an access code in the local calling area associated with the mobile telephone.

Each access code in the pool of access codes may further identify a respective channel operably configured to cooperate with an IP network to cause a call involving the mobile telephone and the callee to be routed through the IP network.

The computer readable medium may be further encoded with codes for directing the processor circuit to cause communication through the IP network to be established in response to a call received on the channel.

The codes for directing the processor circuit to cause the access code to be produced may cause a caller identifier associated with the mobile telephone to be stored in association with the access code.

The codes for directing the processor circuit to cause communication to be established may cause communication to be established only if the caller identifier associated with the access code identifies the mobile telephone.

The codes for directing the processor circuit to cause the access code to be produced may cause the callee identifier to be stored in association with the access code.

The codes for directing the processor circuit to cause the access code to be produced may cause the pool of access codes to be searched for an access code associated with the callee identifier to identify the channel usable by the mobile telephone to initiate a call to the callee.

The codes for directing the processor circuit to cause the access code to be produced may cause a timestamp for use in determining when the usability of the access code to initiate a call to the callee will expire, to be stored in association with the access code.

The codes for directing the processor circuit to cause communication to be established may cause communication to be established only if the usability of the access code to initiate a call to the callee has not expired.

The network interface may include a non-voice network interface, and the codes for directing the processor circuit to transmit include codes for directing the processor circuit to cause the access code reply message to be transmitted using the non-voice network interface on a non-voice network.

In accordance with another aspect, there is provided a computer readable medium encoded with codes for directing a processor circuit to: receive from the mobile telephone an access code request message including a callee identifier associated with the callee; communicate with the routing controller to obtain from the routing controller an access code identifying the channel, the access code being different from the callee identifier and useable by the mobile telephone to initiate a call to the callee using the channel; and cause an access code reply message including the access code to be transmitted to the mobile telephone.

Other aspects and features will become apparent to those ordinarily skilled in the art upon review of the following description of specific embodiments of the invention in conjunction with the accompanying figures.

BRIEF DESCRIPTION OF THE DRAWINGS

In drawings which illustrate embodiments,

FIG. **1** is a block diagram of a system for enabling a mobile telephone to initiate a call through a channel to a callee in accordance with a first embodiment in the invention;

FIG. **2** is a block diagram of mobile telephone shown in FIG. **1**;

FIG. **3** is a flow chart of a process executed by the mobile telephone shown in FIG. **1**;

FIG. **4** is a schematic representation of an access code request message transmitted between the mobile telephone and an access server shown in FIG. **1**;

FIG. **5** is a schematic representation of an access code reply message transmitted between the mobile telephone and the access server shown in FIG. **1**;

FIG. **6** is a block diagram of the access server shown in FIG. **1**;

FIG. **7** is a flow chart of a process executed by the access server shown in FIG. **1**;

FIG. **8** is a block diagram of a routing controller shown in FIG. **1**;

FIG. **9** is a tabular representation of a dialing profile stored in a database accessible by the routing controller illustrated in FIG. **1**;

FIG. **10** is a tabular representation of an access code association table stored in memory accessible by the routing controller shown in FIG. **1**;

FIG. **11** is a schematic representation of a DID bank table record stored in a database shown in FIG. **1**;

FIG. **12** is a flow chart of a process executed by the routing controller illustrated in FIG. **1**;

FIG. **13** is a block diagram of a gateway shown in FIG. **1**;

FIG. **14** is a tabular representation of an SIP invite message transmitted between the gateway and a call controller illustrated in FIG. **1**;

FIG. **15** is a block diagram of the call controller illustrated in FIG. **1**;

FIG. **16** is a flow chart of a process executed by the call controller illustrated in FIG. **1**;

FIG. **17** is a tabular representation of an RC request message transmitted between the call controller and the routing controller illustrated in FIG. **1**;

FIGS. **18**A-**18**C are a flow chart of a process executed by the routing controller illustrated in FIG. **1**; and

FIG. **19** is a tabular representation of a gateway node association table stored in the database illustrated in FIG. **1**.

DETAILED DESCRIPTION OF CERTAIN EMBODIMENTS

Referring to FIG. **1**, a system for enabling a mobile telephone to initiate a call to a callee is shown generally at **10**. The system **10** includes a first node **11**, a second node **21**, and a mobile telephone **12**.

The first and second nodes **11** and **21** in the illustrated embodiment may support "voice-over-IP" (VoIP) calls between telephones and/or videophones using the Internet Protocol (IP), as described in PCT Publication No. WO 2008/052340, which is hereby incorporated by reference in its entirety herein. In the embodiment shown, the first node **11** is located in a geographical area, such as Vancouver, British Columbia, Canada, for example, and the second node **21** is located in London, England, for example. Different nodes may be located in different geographical regions throughout the world to provide telephone/videophone service to subscribers in respective regions. These nodes may be in communication with each other by high speed/high data throughput links including optical fiber, satellite, and/or cable links illustrated generally at **17**, forming a backbone to the system. These nodes may alternatively, or in addition, be in communication with each other through conventional internet services.

In the embodiment shown, the first node **11** provides telephone/videophone service to western Canadian customers from Vancouver Island to Ontario. Another node (not shown) may be located in Eastern Canada to provide services to subscribers in that area, for example.

Other nodes of the type shown may also be employed within the geographical area serviced by a node to provide for call load sharing, for example, within a region of the geographical area serviced by the node. However, in general, all nodes may be similar and have the properties described in connection with the first node **11**.

In this embodiment, the first node **11** includes a call controller (CC) **13**, an access server **14**, a routing controller (RC) **30**, a database **23**, a voicemail server **19**, and a media relay **28**. Each of these may be implemented as separate modules on a common computer system or by separate computers, for example. The voicemail server **19** need not be included in the node and can be provided by a third party service provider. Although the access server **14** is illustrated as being part of the first node **11**, access servers in alternative embodiments may be separate from the node and may be in communication with one or more nodes, for example.

The mobile telephone **12** is configured to place calls over a mobile telephone network, illustrated generally at **15**, in a manner well-known in the art. Furthermore, the mobile telephone **12** and the access server **14** are configured to communicate with each other, preferably on a non-voice network illustrated generally at **16**, such as a "WiFi" wireless IP network or a General Packet Radio Service (GPRS) network, for example. However, in alternative embodiments, the mobile telephone **12** and the access server **14** may communicate with each other over other networks, such as a mobile telephone network using Short Message Service (SMS) messages, for example.

The system **10** further includes a gateway **18** in communication with at least one, and preferably a plurality of, channels, which are illustrated schematically at **20**, **22**, and **24**, to which the mobile telephone **12** may initiate a call over the mobile telephone network **15**. The channels **20**, **22**, and **24** maybe telephone lines in a Public Switched Telephone Network (PSTN) **29**. The channels **20**, **22**, and **24** maybe associated with PSTN telephone numbers in a local calling area associated with the mobile telephone **12**, and thus these channels preferably depend on a geographical location of the mobile telephone. The expression "local calling area" herein refers generally to a set of telephone numbers, typically defined by a geographical region, to which telephone calls may be placed by callers within the local calling area at either no additional charge or at a lower additional charge than would be required for calls to numbers that are outside of the local calling area. However, it will be appreciated that in other embodiments, the gateway **18** may be in communication with any number of channels, which need not be PSTN telephone lines. Also, in the illustrated embodiment, the channels **20**, **22**, and **24** are associated with telephone numbers for Vancouver, British Columbia, Canada and the surrounding area, although it will be appreciated that these channels may include PSTN telephone lines associated with other areas, for example, which may not necessarily be in a local calling area associated with the mobile telephone **12**.

In the illustrated embodiment, each of the channels **20**, **22**, and **24** is configured by a PSTN service provider (which, in Canada, may be Bell Canada or Telus, for example) to direct calls that are received on the channels to the gateway **18**. In the illustrated embodiment, the PSTN service provider has configured the channels **20**, **22**, and **24** to communicate with a T1 multiplexer **25**, which multiplexes the channels **20**, **22**, and **24** in a manner known in the art onto one or more T1 lines **27** that are in communication with the gateway **18**. The gateway **18** is in communication with an IP network shown generally at **26**. The channels **20**, **22**, and **24** are thus configured to cooperate with the IP network **26** (via the gateway **18** in the illustrated embodiment) to cause a call involving the mobile telephone **12** and the callee to be routed through the IP network in response to a call received at one of the channels.

Also, in the illustrated embodiment, the access server **14** is in communication with the routing controller **30** of the first node **11**, and the routing controller **30** is configurable to associate a callee identifier with one of the channels **20**, **22**, and **24**, as described below. A callee identifier associated with one of the channels **20**, **22**, and **24** may be a telephone number of a PSTN telephone **32** that is in communication with the IP network **26** through a gateway **34**, or it may be a telephone number of a VoIP telephone **36** that is directly in communication with the IP network **26**, for example. Other routing controllers **30** of other nodes, such as the second node **21**, for example, may also associate callee identifiers with other channels that are in communication with other gateways (not shown).

Mobile Telephone

Referring to FIG. **2**, in this embodiment, the mobile telephone (**12**) includes a processor circuit shown generally at **50**. The processor circuit **50** includes a microprocessor **52**, a program memory **54**, an input/output (I/O) port **56**, parameter memory **58**, and temporary memory **60**. The program memory **54**, I/O port **56**, parameter memory **58**, and temporary memory **60** are all in communication with the microprocessor **52**. The processor circuit **50** may alternatively include a plurality of processors, a plurality of program memories, a plurality of temporary memories, and/or a plurality of I/O ports, or these components may alternatively be combined into a single device. However, for simplicity, the components of the processor circuit **50** are illustrated as shown in the example of FIG. **2**.

In the illustrated embodiment, the I/O port **56** includes a dialing input **62** for receiving a callee identifier from a key pad, for example, or from a voice recognition unit, or from pre-stored callee identifiers stored in the parameter memory **58**, for example. For illustration purposes only, a myriad of possible dialing functions for providing a callee identifier are represented by the block entitled dialing function **64**. A callee identifier may be a telephone number of a callee, for example.

The I/O port **56** also includes a handset interface **66** for receiving and producing signals to and from a handset **68** that may be placed close to the user's ear and mouth, for producing and receiving audible signals for and from the user. It will be appreciated that alternatively, the handset **68** may include a camera and video screen, for example, and that video or other types of signals may be transmitted additionally or alternatively to audible signals.

The I/O port **56** also includes a non-voice network interface **70** for transmitting information to, and receiving information from, the non-voice network **16** illustrated in FIG. **1**, for example, and preferably interfaces with a high-speed internet connection.

The I/O port **56** in the illustrated embodiment further includes a mobile telephone network interface **72** for transmitting signals to and receiving signals from a mobile telephone service provider over a network such as a Global System for Mobile communications (GSM) or a Code Division Multiple Access (CDMA) network, such as the mobile telephone network **15** illustrated in FIG. **1**, for example. Again, for simplicity, a mobile telephone network interface is illustrated, although it will be appreciated that video signals or other signals may be handled similarly when the mobile telephone (**12**) is facilitating communication of one or more of these types of signals. It will also be appreciated that alternatively, the non-voice network interface **70** and mobile telephone network interface **72** need not be distinct, but may be a single interface for communication over a single network, for example, or may be configured to communicate over a plurality of different networks, for example.

In the illustrated embodiment, the parameter memory **58** includes a username field **74** and a password field **76**, although it will be appreciated that the username and password may not be necessary, or may be input by the user as required, for example. The parameter memory **58** in the illustrated embodiment also includes a caller identifier field **78** for storing a caller identifier, which may be a telephone number associated with the mobile telephone (**12**) for identifying a "channel" such as a telephone line assigned to the mobile telephone that may be used to call back to the mobile telephone, for example. Generally, the contents of the username field **74**, the password field **76**, and the caller identifier field **78** are set once when the user first subscribes to the system.

The usernames referred to herein, such as the username in the username field **74**, preferably include a twelve digit number such as 2001 1050 8667, for example, wherein the left-most digit is a continent code (such as "2" to indicate North America, for example), followed by a three-digit country code (such as "001" to indicate Canada and the United States, for example), a four-digit dealer code (such as "1050", for example), and a unique four-digit number code (such as "8667", for example), as discussed more generally in PCT Publication No. 2008/052340. Therefore, a prefix of a username referred to herein preferably indicates a geographical region associated with the user, or with the access code, and more preferably indicates a node associated with the user or access code.

The program memory **54** stores blocks of codes for directing the microprocessor **52** to carry out the functions of the mobile telephone (**12**), which are illustrated by example below.

Referring to FIGS. **2** and **3**, a flow chart representing functions performed by blocks of code that direct the microprocessor **52** to initiate a call with the mobile telephone **12** to a callee is shown generally at **100**. The blocks shown in FIG. **3** generally represent codes that may be stored in the program memory **54** for example, for directing the microprocessor **52** to perform various functions relating to initiating a call with the mobile telephone (**12**) to a callee. The actual code to implement each block may be written in any suitable programming language, such as Java, C, and/or C++, for example.

The process **100** begins at **102**, in response to an interrupt produced at or for the microprocessor **52** by the dialing function **64**. Upon initiation of the process **100**, block **104** directs the microprocessor **52** to obtain a callee identifier from the dialing function **64** at the dialing input **62** of the I/O port **56** in the illustrated embodiment. The callee identifier is associated with a desired callee, and may be a telephone number of the callee, for example. The microprocessor **52** thus receives, from a user of the mobile telephone (**12**), a callee identifier associated with a callee.

Block **106** directs the microprocessor **52** to transmit, using the non-voice network interface **70** in the illustrated embodiment, an access code request message, the access code request message including the callee identifier obtained at block **104**, to the access server **14** (illustrated in FIG. **1**). In general, preferably block **106** directs the microprocessor **52** to cause an access code request message to be transmitted to the access server **14** over a non-voice network, such as an internet, using WiFi or GPRS technology for example. However, it will be appreciated that block **106** may direct the microprocessor **52** to transmit an access code request message to the access server **14** using any suitable technique, which may alternatively include a voice network, for example.

Referring to FIG. **4**, an exemplary access code request message is shown generally at **110**. The access code request message **110** includes a username field **112**, a password field **114**, a callee identifier field **116**, and a caller identifier field **118**. In the illustrated embodiment, values for the username, password, and caller identifier fields **112**, **114**, and **118** are retrieved from the username, password, and caller identifier fields **74**, **76**, and **78** respectively in the parameter memory **58** of the processor circuit **50** (illustrated in FIG. **2**), and a value for the callee identifier field **116** is obtained from the dialing function **64** in block **104**, and may be stored in the temporary memory (**60**), for example. It will be appreciated that the username field **112**, password field **114**, and caller identifier field **118** are not essential, although these fields are preferable in order to identify the user of the mobile telephone for billing purposes, for example.

Referring to FIGS. **1** and **4**, it will be appreciated that in order to minimize charges from the mobile telephone service provider of the mobile telephone **12**, the channels **20**, **22**, **24** will preferably be local or relatively inexpensive telephone lines associated with a geographical location, more particularly a pre-defined local calling area, associated with the mobile telephone **12**. Therefore, the exemplary access code request message **110** further includes a location identifier field **119**. The location identifier stored in the location identifier field **119** preferably identifies a location of the mobile telephone **12** for use in determining a local calling area associated with the mobile telephone **12**.

For example, the location identifier in the location identifier field **119** may include an IP address of the mobile telephone **12** in a wireless IP network, such as the non-voice network **16** to which the non-voice network interface **70** shown in FIG. **2** is connected, because this IP address may be an indicator of a geographical location of the mobile telephone **12**. The location identifier may also or alternatively include an identifier of a wireless voice signal station in wireless communication with the mobile telephone. In the illustrated embodiment, the wireless voice signal station is part of the mobile telephone network **15** that is in communication with the mobile telephone **12** through the mobile telephone network interface **72** illustrated in FIG. **2**. In still other embodiments, the location identifier may include a user-configured identifier of a geographical location or local calling area where the mobile telephone **12** is or may be situated. The location identifier may thus be pre-determined and stored in the parameter memory **58** shown in FIG. **2** or may be acquired from non-voice network or wireless voice signal station or from user input, for example. Therefore, in summary, the location identifier in the location identifier field **119** may include one or more of an IP address of the mobile telephone **12** in a wireless IP network, an identifier of a wireless voice signal station in wireless communication with the mobile telephone, and a user-configured identifier.

As described below, the location identifier in the location identifier field **119** may be used to determine a local calling area associated with the mobile telephone **12**, within which local calling area channels (illustrated as **20**, **22**, and **24** in FIG. **1**) are available to the mobile telephone **12** for the lowest cost to the user. However, it will be appreciated that the location identifier may only approximately identify a local calling area, and may not necessarily identify the lowest cost channel (illustrated as **20**, **22**, and **24** in FIG. **1**) for the mobile telephone **12**. It will also be appreciated that in other embodiments, the location identifier field **119** may be omitted.

Referring back to FIG. **3**, the process **100** continues at block **130**, which directs the microprocessor (**52**) to receive an access code reply message from the access server (**14**) in response to the access code request message that was transmitted at block **106**.

Referring to FIG. **5**, an exemplary access code reply message is shown generally at **140**. The access code reply message **140** includes an access code field **142** and a timeout field **144**. In the illustrated embodiment, the access code field **142** stores an access code which is a telephone number associated with a telephone line associated with one of the channels **20**, **22**, or **24** in FIG. **1**. It will be appreciated that the access code is different from the callee identifier in the callee identifier field **116** shown in FIG. **4**, in that the access code identifies a channel, other than that provided by the callee identifier provided by the dialing function **64** in FIG. **2**, that the mobile telephone (**12**) can use to initiate a call to the callee. It will be appreciated that use of the access code facilitates avoidance of long distance or roaming charges that a mobile telephone service provider would charge for a call placed directly using the callee identifier using conventional calling processes, for example.

Still referring to FIG. **5**, the timeout field **144** in the illustrated embodiment stores a value that indicates a period of time, for example a number of minutes, during which the access code in the access code field **142** is associated with the callee identifier in the callee identifier field **116** of the exemplary access code request message **110** illustrated in FIG. **4**, such that the access code is only temporarily associated with the callee identifier. In one embodiment, the value stored in the timeout field **144** indicates 10 minutes, for example. It will be appreciated that in other embodiments, the timeout field **144** may not be necessary, but preferably it is included.

In the illustrated embodiment, the program codes in block **130** direct the microprocessor **52** to receive the access code reply message over a non-voice network, such as a WiFi or GPRS network (illustrated at **16** in FIG. **1**) via the non-voice network interface **70** shown in FIG. **2**. However, it will be appreciated that the access code reply message may be received on any suitable network, even a voice network, for example.

Referring back to FIGS. **2** and **3**, block **149** directs the microprocessor **52** to initiate a call with the mobile telephone (**12**) on the mobile telephone network **15** (illustrated in FIG. **1**) using the access code received in the access code field **142** of the access code reply message **140** (shown in FIG. **5**) to identify the callee. In the illustrated embodiment, the codes in block **149** direct the microprocessor **52** to initiate a call to the channel (**20**, **22**, or **24**) identified by the access code, using the mobile telephone network interface **72** of the I/O port **56** of the mobile telephone (**12**), to engage the mobile telephone network (**15**).

Referring to FIG. **1**, in the embodiment shown, the access code in the access code field (**142**) is a telephone number identifying a channel **20**, **22**, or **24** that is in communication with the gateway **18** to the IP network **26**. Through the gateway **18**, the channel **20**, **22**, or **24** is thus operably configured to cooperate with the IP network **26** to cause a call from the mobile telephone **12** to the callee to be routed through the IP network. Routing the call through the IP network may involve engaging the routing controller **30** to route the call on the IP network **26** to the callee, as described below. However, it will be appreciated that in other embodiments, the access code need not be a telephone number, but may be any code identifying a channel through which the mobile telephone **12** can initiate a call. Alternatively, if the mobile telephone is capable of voice over IP communications, the access code may be used to identify an IP address in the IP network to which the call is routed. In this embodiment, the IP address may act as the access code. The process **100** shown in FIG. **3** is then ended.

Access Server

Referring to FIG. **6**, the access server (**14**) includes a processor circuit shown generally at **150**. The processor circuit **150** includes a microprocessor **152**, program memory **154**, an I/O port **156**, parameter memory **158**, and temporary memory **160**. The program memory **154**, I/O port **156**, parameter memory **158**, and temporary memory **160** are all in communication with the microprocessor **152**. The processor circuit **150** may alternatively include a plurality of microprocessors or I/O ports, for example, and the components of the illustrated processor circuit **150** may also alternatively be combined into a single device.

The program memory **154** stores blocks of codes for directing the microprocessor **152** to carry out the functions of the access server **14**. The I/O port **156** includes a non-voice network interface **162** for communicating with the non-voice network **16** illustrated in FIG. **1**. The I/O port **156** also includes a routing controller interface **164** for interfacing with the routing controller **30** illustrated in FIG. **1**.

Referring to FIGS. **6** and **7**, a flow chart of blocks of code for directing the microprocessor **152** of the access server (**14**) to provide an access code to the mobile telephone (**12**) is shown generally at **190**. The blocks **190** in FIG. **7** generally represent codes that may be stored in the program memory **154** for directing the microprocessor **152** to perform various functions to provide the access to the mobile telephone (**12**) to enable the mobile telephone to place a call through a channel (**20**, **22**, or **24**).

The process **190** begins at **192**, in response to an interrupt created by or for the microprocessor **152** when it receives an access code request message **110** (as illustrated in FIG. **4**) from the mobile telephone (**12**). In the illustrated embodiment, the access code request message (**110**) is received via the non-voice network interface **162** through a non-voice network (**16**) such as a WiFi or GPRS network, for example. However, it will be appreciated that other embodiments may use different techniques for receiving the access code request message (**110**) from the mobile telephone (**12**).

The process **190** continues at block **196**, which directs the microprocessor **152** to communicate with the routing controller **30** to obtain from the routing controller an access code identifying a channel (illustrated as **20**, **22**, or **24** in FIG. **1**) in communication with the gateway (**18**), wherein the access code is different from the callee identifier in the callee identifier field **116** (shown in FIG. **4**) and is usable by the mobile telephone (**12**) to initiate a call to the callee using the channel, as further described below. Therefore, block **196** preferably causes an access code to be produced by retransmitting the access code request message **110** illustrated in FIG. **4** that was received at **192** from the mobile telephone (**12**), to the routing controller **30** through the routing controller interface **164** of the I/O port **156**.

The process **190** continues at block **198**, which directs the microprocessor **152** to transmit an access code reply message (**140**), including the access code obtained by block **196**, to the mobile telephone (**12**). An exemplary access code reply message is shown in FIG. **5**. In the illustrated embodiment, an access code reply message (**140**) is produced by the routing controller **30** in a manner described below in response to the access code request message (**110**) that was transmitted to the routing controller at block **196**, and the access code reply message (**140**) is received from the routing controller through the routing controller interface **164** of the I/O port **156**. Block **198** then causes the access code reply message that was received from the routing controller to be retransmitted to the mobile telephone (**12**). In the illustrated embodiment, the codes in block **198** direct the microprocessor **152** to transmit the access code reply message (**140**) using the non-voice network interface **162** to the non-voice network **16**, which may be a WiFi or GPRS network, for example. However, it will be appreciated that other embodiments may employ other types of networks for communicating the access code reply message (**140**) to the mobile telephone (**12**). The process **190** is then ended.

In summary, referring to FIG. **1**, the access server **14** generally acts as an interface to the routing controller **30** for relaying access code request messages and access code reply messages between the mobile telephone **12** and the routing controller. Therefore, it will be appreciated that in alternative embodiments, the access server **14** and the routing controller **30** need not be separate, but may, for example, be combined in a single component.

Routing Controller (RC)

Referring to FIG. **1**, generally, the routing controller **30** executes a process to facilitate communication between callers and callees. The function of a routing controller generally in a VoIP system is described in PCT Publication No. WO 2008/052340.

Referring to FIG. **8**, the routing controller (**30**) includes a processor circuit shown generally at **230**. The processor circuit **230** includes a microprocessor (or more generally a processor) **232**, program memory **234**, an I/O port **236**, table memory **238**, temporary memory **240**, and a clock **244**. The program memory **234**, I/O port **236**, table memory **238**, temporary memory **240**, and clock **244** are all in communication with the processor **232**. The processor circuit **230** may include a plurality of microprocessors, for example, and the aforementioned components of the processor circuit **230** may be combined, for example. The program memory **234** includes blocks of code for directing the processor **232** to carry out the functions of the routing controller (**30**), and the I/O port **236** includes an access server interface **242** for communicating with the access server **14**.

In the illustrated embodiment as described above, the access server (**14**) transmits (at block **196** illustrated in FIG. **7**) an access code request message (**110**) to the routing controller (**30**) in order to obtain from the routing controller (**30**) an access code. When an access code request message (**110**) is received at the access server interface **242**, the processor **232** preferably stores certain values from the access code request message in stores in the temporary memory **240** for ease of retrieval. In particular, the temporary memory **240** includes a callee identifier store **246** for storing the callee identifier from the callee identifier field **116** in the access code request message **110** illustrated in FIG. **4**, a caller identifier store **248** for storing the caller identifier that was stored in the caller identifier field **118** of the access code request message **110** illustrated in FIG. **4**, a caller username store **249** for storing the caller username that was stored in the caller username field **112** of the access code request message **110** illustrated in FIG. **4**, and an access code store **250** for storing an access code that is selected when the routing controller (**30**) receives an access code request message (**110**). The temporary memory **240** also includes a local calling area identifier store **245** for storing an identifier of a local calling area associated with the mobile telephone (**12**). The clock **244** generally maintains and stores a representation of a current date and time.

The I/O port **236** further includes a database request port **256** through which a request to the database (**23** in FIG. **1**) can be made, and also includes a database response port **258** for receiving a reply from the database (**23**). The I/O port **236** further includes a routing controller (RC) request message input **260** for receiving an RC request message (illustrated in FIG. **17**) from the call controller (**13** in FIG. **1**) and includes a routing message output **262** for sending a routing message back to the call controller **13**. The I/O port **236** thus acts to receive a caller identifier and a callee identifier contained in an RC request message from the call controller, the RC request message being received in response to initiation of a call by a subscriber of the system, as described below.

The program memory **234** includes blocks of codes for directing the processor **232** to carry out various functions of the routing controller (**30**). One of these blocks includes an RC request message handler **380** which directs the routing controller (**30**) to produce a routing message in response to a received RC request message, an example of which is illustrated in FIG. **17**. The RC request message handler process is shown in greater detail at **380** in FIGS. **18**A through **18**C. Another of these blocks in the program memory **234** includes an access code generator, which is described at **270** in FIG. **12**, and which directs the routing controller (**30**) to produce an access code as directed by the program codes in block **196** shown in FIG. **7**. Yet another of these blocks in the program memory **234** includes a local calling area identifier generator, which directs the routing controller (**30**) to produce a local calling area identifier using the location identifier from the location identifier field **119** of the access code request message **110** illustrated in FIG. **4**.

Local Calling Area Identifier Generator

Referring to FIG. **1**, it will be appreciated that preferably, a call made by the mobile telephone **12** using the access code obtained from the access server **14** will be a local call for the mobile telephone **12**, based on a geographical location of the mobile telephone. Therefore, blocks in the program memory **234** include a local calling area identifier generator, which directs the routing controller **30** to produce a local calling area identifier.

For example, the local calling area identifier generator may direct the microprocessor **152** to access a dialing profile associated with the caller. The dialing profile may be identified using the username in the username field **112** in the access code request message **110** illustrated in FIG. **4**, and to store in the local calling area identifier field **245** a default location of the caller retrieved from the dialing profile associated with the caller.

Referring to FIG. **9**, an exemplary dialing profile is illustrated generally at **200** and includes a username field **202**, a domain field **204**, and calling attributes comprising a national dialing digits (NDD) field **206**, an international dialing digits (IDD) field **208**, a country code field **210**, a local area codes field **212**, a caller minimum local number length field **214**, a caller maximum local number length field **216**, a reseller field **218**, a maximum number of concurrent calls field **220**, a current number of concurrent calls field **222**, and a default local calling area identifier field **224**. Therefore, in some embodiments, the local calling area identifier generator directs the microprocessor **152** to determine a local calling area associated with the mobile telephone (**12**) by retrieving the default local calling area identifier from the default local calling area identifier field **224** of the dialing profile **200**.

Effectively, the dialing profile **200** is a record identifying calling attributes of the caller identified by the username in the username field **202**. More generally, dialing profiles **200** represent calling attributes of respective users, and are discussed in more detail in PCT publication No. WO 2008/052340. As described in PCT publication No. WO 2008/052340, a dialing profile of the type shown in FIG. **9**, and also other records such as direct-in-dial (DID) records, call blocking records, call forwarding records, and voicemail records, may be created whenever a user registers with the system or agrees to become a subscriber to the system.

Alternatively, the local calling area identifier generator may generate a local calling area identifier to be stored in the local calling area identifier store **245** using the location identifier from the location identifier field **119** of the access code request message **110** illustrated in FIG. **4**. As described above, the location identifier field (**119**) may store one or more of an IP address of the mobile telephone (**12**) in a wireless IP network, an identifier of a wireless voice signal station in wireless communication with the mobile telephone, and a user-configured identifier. One or more of these values may be used to identify a local calling area that is or is likely to be associated with the mobile telephone (**12**) in order to generate a local calling area identifier to be stored in the local calling area identifier store **245**.

For example, it has been found that services available from web sites such as http://www.ip2location.com/ and http://www.serviceobjects.com/products/dots_ipgeo.asp, for example, can produce a name of a location, and also latitude and longitude values, associated with an IP address. Using this information derived from an IP address, or other information from the location identifier field (**119**), a local calling area may be identified by hierarchical jurisdictional designations (such as country, province, and city in Canada or country, state, and city in the United States) and encoded as codes identifying the local calling area. These codes may then be stored in the local calling area identifier store **245**.

Access Code Association Table

In the illustrated embodiment, the table memory **238** (shown in FIG. **8**) includes an access code association table **170**, an example of which is illustrated in FIG. **10**, for associating access codes with callee identifiers, caller identifiers, caller usernames, timeouts, and timestamps. Although the routing controller (**30**) is illustrated in this embodiment as a separate component from the access server (**14**), it will be appreciated that in other embodiments, the routing controller (**30**) may be part of or integrated with the access server (**14**), and in these other embodiments, the access code association table **170** may be part of or integrated with the access server.

Referring to FIGS. **1** and **10**, the access code association table **170** generally includes a plurality of records, each having an access code field **173** storing an access code. The access codes in the access code association table **170** may thus form a pool of access codes, where each access code may identify a respective telephone number. In the illustrated embodiment, the access codes in the access code fields **173** of records of the access code association table **170** identify respective channels (illustrated by example only as **20**, **22**, and **24**) that are operably configured to cooperate with the IP network **26** via the gateway **18** to cause a call involving the mobile telephone **12** to be routed through the IP network.

Referring to FIG. **10**, the exemplary access code association table **170** includes records **172**, **174**, **176**, **178**, and **180**, each having respective fields for storing a local calling area identifier **171**, an access code **173**, a channel identifier **175**, a callee identifier **177**, a caller identifier **179**, a caller username **183**, a timeout **181**, and a timestamp **182**. Generally, a record in the access code association table **170** will be created for each access code that identifies a channel (such as the channels **20**, **22**, and **24** illustrated in FIG. **1**) that is configured or configurable to establish communication through a gateway (such as the gateway **18** illustrated in FIG. **1**) to an IP network (**26** in FIG. **1**) in response to a call received at the channel. When a record is created in respect of a channel, the local calling area identifier field **171** is preferably initialized with an identifier of a local calling area associated with the channel, the access code field **173** is preferably initialized with an access code associated with the channel, and the channel identifier field **175** is preferably initialized with an identifier of the channel. The remaining fields (for storing a callee identifier **177**, a caller identifier **179**, a caller username **183**, a timeout **181**, and a timestamp **182**) are preferably initialized with default "null" values when a record is created. The fields for storing a local calling area identifier **171**, an access code **173**, a channel identifier **175** preferably remain generally constant during ordinary operation of the access code association table **170**, although the values stored in the fields for storing a callee identifier **177**, a caller identifier **179**, a caller username **183**, a timeout **181**, and a timestamp **182** may vary as described below. It will be appreciated that in some embodiments, one or more of the fields for storing a local calling area identifier **171**, a channel identifier **175**, a caller identifier **179**, a caller username **183**, a timeout **181**, and a timestamp **182** may not be required and be omitted.

As noted above, the local calling area identifier field **171** is preferably initialized with an identifier of a local calling area associated with the channel. The local calling area identifier field **171** preferably stores codes that are encoded in the same manner as the codes in the local calling area identifier store **245**, as described above, so that an access code in the local calling area identified by the codes in the local calling area identifier store **245** may be identified by searching the access code association table **170** for an access code associated with a local calling area identifier in the associated local calling area identifier field **171** that matches the local calling area identifier in the local calling area identifier store **245**. It has been found that information available from web sites such as http://en.wikipedia.org/wiki/List_of_NANP_area_codes, and services available from web sites such as http://www.serviceobjects.com/demos/PhoneExchangeDemo.asp, for example, may be used to determine a local calling area identifier associated with a given access code where, for example, the access code is a PSTN telephone number.

In the exemplary access code association table **170**, the access codes in the access code fields **173** are telephone numbers for PSTN lines, three of which are in the 604 area code in Vancouver, British Columbia, Canada, and two of which are in the 416 area code in Toronto, Ontario, Canada. It will be appreciated that the access code association table **170** is an example only, and other access code association tables may include any number of access codes, which need not be PSTN telephone numbers, and which need not be limited to particular geographical areas.

In the exemplary access code association table **170**, the access code field **173** in the record **174** stores an access code 1-604-345-2323, which may be a local telephone number for Vancouver, British Columbia, Canada, and the callee identifier field **177** of the record **174** stores a callee identifier 1-403-789-1234, which may be a telephone number for a callee in Calgary, Alberta, Canada for example, thereby associating the callee identifier 1-403-789-1234 with the access code 1-604-345-2323. Furthermore, the caller identifier field **179** of the record **174** stores a caller identifier 1-416-444-1441 and the caller username field **183** stores a caller username 2001 1050 8667, thereby associating the caller identifier 1-416-444-1441 and caller username 2001 1050 8667 with the aforementioned access code and callee identifier. The caller identifier 1-416-444-1441 may be associated with a mobile telephone normally geographically located in Toronto, Ontario, Canada, but which may be in Vancouver and is therefore using a Vancouver-based access code to place a call to a Calgary-based number, for example. In the example record **174**, the timestamp field **182** indicates that the callee identifier 1-403-789-1234, the caller identifier 1-416-444-1441, and the caller username 2001 1050 8667 were associated with the access code 1-604-345-2323 on Jun. 15, 2008 at 10:31 am, and the timeout field **181** indicates that this association is to expire 10 minutes after the time indicated in the timestamp field.

Likewise, the exemplary record **178** indicates that the callee identifier 1-604-321-1234, the caller identifier 1-416-444-1234, and the caller username 2001 1050 4141 were associated with the access code 1-416-234-4646 on Jun. 15, 2008 at 2:21 pm, and the timeout field **181** of the record **178** indicates that this association is to expire within 10 minutes of the time in the timestamp field **182**.

It will also be appreciated that the access code association table **170** may, in other embodiments, be substituted with other data structures or storage media. For example, in alternative embodiments, as described below, a DID record of the type shown at **370** in FIG. **11** may associate an access code with a callee identifier and with other information such as a caller identifier, a timeout value, and a timestamp value, additionally or alternatively to the access code association table **170**.

DID Bank Table Records

As described in PCT Publication No. 2008/052340, a DID bank table record may be created and stored in a DID bank table in the database (**23** in FIG. **1**) when a user registers with the system, to associate the username of the user and a host name of the node with which the user is associated, with a number on the PSTN network formatted in compliance with the E.164 standard set by the International Telecommunication Union (ITU). However, as explained below, DID records may, in some embodiments, also associate usernames and host names with respective access codes, and may also associate access codes with respective callee identifiers and with other information such as caller identifiers, timeout values, and timestamp values.

Referring to FIG. **11**, an exemplary DID bank table record is shown generally at **370**, and includes a username field **371**, a user domain field **372**, and a DID field **373**. The username field **371** may store a username of a user of the system, in which case the user domain field **372** stores a host name of the node with which the user is associated, and the DID field **373** stores an E.164 number on the PSTN network associated with the user. Exemplary host names stored in the user domain field **372** include sp.yvr.digifonica.com for Vancouver, British Columbia, Canada and sp.lhr.digifonica.com for London England, for example, as described in PCT Publication No. 2008/052340. If the user has multiple telephone numbers, then multiple records of the type shown at **370** would be included in the DID bank table, each having the same username and user domain, but different DID field **373** contents reflecting the different telephone numbers associated with that user.

However, DID fields **373** of DID bank table records **370** may also store access codes, in which case the username field **371** may store a username associated with the access code. In these DID bank table records **370**, the user domain field **372** stores a host name of the node with which the access code is associated. Therefore, DID bank table records **370** may, in some embodiments, associate usernames and host names with respective access codes.

The exemplary DID bank table record **370** further includes a callee identifier field **374**, a caller identifier field **375**, a timeout field **376**, a timestamp field **377**, a local calling area identifier field **378**, a channel identifier field **379**, and a caller username field **381**, which may be used in an analogous manner to the callee identifier field **177**, the caller identifier field **179**, the timeout field **181**, the timestamp field **182**, the local calling area identifier field **171**, the channel identifier field **175**, and the caller username field **183** respectively of the access code association table **170** illustrated in FIG. **10**. The DID bank table records **370** may thus associate access codes with respective local calling area identifiers, callee identifiers, caller identifiers, caller usernames, timeouts, and timestamps, although the caller identifier field **375**, timeout field **376**, timestamp field **377**, local calling area identifier field **378**, channel identifier field **379**, and caller username field **381** may not be necessary, and one or more of these fields may be omitted in some embodiments.

Furthermore, it will be appreciated that the callee identifier field **374**, caller identifier field **375**, timeout field **376**, and timestamp field **377** of the DID bank table record **370** may be omitted for DID table records that are not in respect of access codes, but rather are in respect of telephone numbers of users of the system, for example, as described in PCT Publication No. 2008/052340. The callee identifier field **374**, caller identifier field **375**, timeout field **376**, and timestamp field **377** of the DID bank table record **370** may also be omitted in embodiments where the access code association table **170** includes records with these types of fields.

For simplicity, the following description is directed to embodiments wherein an access code association table **170** associates access codes with respective callee identifiers, caller identifiers, timeout values, and timestamp values. However, it will be appreciated that the processes described herein for records in the access code association table **170** may additionally or alternatively be applied to DID bank table records **370** in an analogous manner.

Access Code Generator

Referring back to FIGS. **1**, **4**, and **8** in the illustrated embodiment as described above, the access server **14** transmits (at block **196** illustrated in FIG. **7**) an access code request message **110** to the routing controller **30** in order to obtain from the routing controller **30** an access code. When an access code request message **110** is received at the access server interface **242**, the processor **232** preferably authenticates the user by making various enquiries of databases to which it has access, to determine whether or not the password in the password field **114** of the access code request message **110** matches a password stored in the database in association with the username in the username field **112**. Various functions may be used to pass encryption keys or hash codes back and forth to ensure that the transmittal of passwords is secure. If the user is successfully authenticated, the processor **232** then preferably produces an access code.

Referring to FIGS. **8** and **12**, a process for producing an access code is shown generally at **270**. Essentially the process **270** determines whether the access code in a given record (referred to below as the "currently addressed record") in the access code association table shown at **170** in FIG. **10** is within the local calling area identified by the local calling area identifier store **245**, and whether the access code is currently available for association with a callee identifier. In order to produce an access code in response to receiving an access code request message (**110**) from the access server (**14**), the processor **232** of the routing controller (**30**) preferably searches the pool of access codes in the access code association table (**170**) to identify an access code identifying a channel usable by the mobile telephone (**12**) to initiate a call to the callee, using the process **270** until an available access code in the local calling area identified by the local calling area identifier store **245** is identified. The access code generator thus preferably selects an access code from the pool of access codes in the access code association table (**170**), and preferably selects an access code in a local calling area associated with the mobile telephone (**12**).

Starting with the first record in the access code association table, the process **270** begins at block **272**, which directs the processor **232** of the routing controller (**30**) to determine whether the access code in the currently addressed record of the access code association table **170** is associated with the same local calling area as the mobile telephone (**12**) as identified by the contents of the local calling area identifier store **245**. If at block **272** the access code of the currently addressed record is not associated with the same local calling area as the mobile telephone (**12**), the process **270** ends, the next record in the access code association table **170** is addressed, and the process is repeated for the next record in the access code association table.

However, if at block **272** the access code of the currently addressed record is associated with the same local calling area as the mobile telephone (**12**), or if the access code request message **110** (illustrated in FIG. **4**) did not include a local calling area identifier, then the process **270** continues at block **274**, which directs the processor **232** to determine whether the access code of the currently addressed record is associated with a callee identifier. To do this, the processor **232** determines whether the callee identifier field (**177**) of the currently addressed record stores a "null" value that was assigned to it on initialization, or whether the callee identifier field instead stores a callee identifier. In other words the processor checks to see whether the currently addressed record has already been in use.

If at block **274** the callee identifier field (**177**) of the currently addressed record in the access code association table (**170**) does store a callee identifier and not the "null" value that was assigned to the callee identifier field on initialization (for example, records **174** and **178** in FIG. **10**), then the access code of that record is associated with a callee identifier, and the process **270** continues at block **278**, which directs the processor **232** to determine whether the association of the callee identifier with the access code has expired. In the illustrated embodiment, the codes at block **278** direct the processor **232** to determine whether the sum of the contents of the timestamp field (**182**) and of the timeout field (**181**) in the currently addressed record of the access code association table **170** (shown in FIG. **10**) is less than the current time represented by the clock **244**. If at block **278** the sum of the timeout and timestamp fields in the currently addressed record of the access code association table **170** is less than the time represented by the clock **244**, then the association of the callee identifier with the access code is not expired and the process **270** ends, the next record in the access code association table (**170**) is addressed, and the process **270** is repeated for the next record in the access code association table.

However, if at block **278** the sum of the contents of the timeout and timestamp fields (**181** and **182**) in the currently addressed record of the access code association table (**170**) is not less than the time represented by the clock **244**, then the association of the callee identifier with the access code has expired, and the process **270** continues at block **276** which directs the processor **232** to store the contents of the access code field **173** of the currently addressed record in the access code store **250** of the temporary memory **240** of the routing controller **30**.

Referring to FIGS. **8**, **10**, and **12**, if at block **274** the callee identifier field in the currently addressed record does not store a callee identifier but stores instead the "null" value that was assigned to the callee identifier field on initialization (for example, records **172**, **176**, and **180**), then the access code of that record is not associated with a callee identifier, and the process **270** continues at block **276**, which directs the processor **232** to store the access code from the access code field **173** of the currently addressed record, in the access code store **250** in the temporary memory **240**.

After the selected access code is stored in the access code store **250** at block **276**, the process **270** continues at block **280**, which directs the processor **232** to store the callee identifier from the callee identifier store **246** in the callee identifier field **177** of the currently addressed record, thereby creating an association of the callee identifier with the selected access code.

The process **270** then continues at block **282**, which directs the processor **232** to store the caller identifier from the caller identifier store **248** (which identifies the mobile telephone **12** shown in FIG. **1**) in the caller identifier field **179** of the currently addressed record of the access code association table **170**, thereby also storing the caller identifier in association with the selected access code.

The process **270** then continues at block **283**, which directs the processor **232** to store the caller username from the caller username store **249** in the caller username field **183** of the currently addressed record of the access code association table **170**, thereby also storing the caller username in association with the selected access code.

The process **270** then continues at block **284**, which directs the processor **232** to store timeout and timestamp values in the timeout and timestamp fields **181** and **182** of the currently addressed record of the access code association table **170**, thus further storing, in association with the selected access code, a timestamp for use in determining when the usability of the access code to initiate a call to the callee will expire. A default value, such as 10 minutes, for example may be stored in the timeout field **181** of the currently addressed record. Also, the current time indicated by the clock **244** is preferably stored in the timestamp field **182** of the currently addressed record.

In alternative embodiments, the access code association table (**170**) might not include fields for a caller identifier, caller username, a timeout, or a timestamp. In these embodiments, one or more of blocks **282**, **283**, and **284** described above are not necessary, and one or more of the caller identifier store **248** and the caller username store **249** may be omitted.

In summary, the access code generator in the illustrated embodiment responds to receiving an access code request message **110** illustrated in FIG. **4** from the access server (**14**) by first authenticating the user, and then by searching through a pool of access codes, using the process **270** shown in FIG. **12**, to identify an access code that is associated with the local calling area identified by the local calling area identifier store (**245**) and that is not previously and validly associated with another callee identifier. It will be appreciated that in alternative embodiments, different data structures and algorithms may be preferable for identifying an access code that meets the aforementioned criteria. For example, in accordance with conventional database design that is well-known in the art, the records illustrated in the access code association table **170** illustrated in FIG. **10** may alternatively be organized in a binary tree according to the value in the local calling area identifier field **171**, or in separate tables for respective local calling area identifiers, for example, in order to enable a more efficient search of the access code association table for an access code that satisfies the aforementioned criteria. Therefore, the access code association table (**170**) and the process **270** illustrated in FIG. **12** are examples only, and one of ordinary skill in the art will readily appreciate numerous alternative data structures and algorithms.

Gateway

Referring to FIG. **13**, in this embodiment, the gateway (**18**) includes a processor circuit shown generally at **300**, which includes a microprocessor **302**. The processor circuit **300** also includes a program memory **304**, a memory **305**, and an I/O port **306**, all of which are in communication with the microprocessor **302**. The processor circuit **300** may include multiple processors etc., and the aforementioned components of the processor circuit **300** may alternatively be combined.

The I/O port **306** includes a channel interface **308**, which, in the illustrated embodiment, is in communication with the channels **20**, **22**, and **24** that were also illustrated in FIG. **1**. Where, as in the illustrated embodiment, the channels **20**, **22**, and **24** are PSTN telephone lines in the PSTN network **29**, the channel interface **308** may, for example, be a T1 port for communication with one or more T1 lines (illustrated at **27** in FIG. **1**) of a PSTN service provider, in a manner well-known in the art. The I/O port in the illustrated embodiment also includes an internet interface **309** for interfacing with the Internet Protocol (IP) network **26** illustrated in FIG. **1**. The program memory **304** stores blocks of codes for directing the microprocessor **302** to carry out the functions of the gateway (**18**). It has been found that the AS5350 Universal Gateway available from Cisco Systems, Inc. of San Jose, Calif. may, for example, be suitable as the gateway (**18**).

Referring back to FIG. **1**, and also still to FIG. **13**, when a call is received on one of the channels **20**, **22**, or **24**, the microprocessor **302** causes the I/O port **306** to use the internet interface **309** to send a Session Initiation Protocol (SIP) Invite message to a pre-determined node with which the gateway **18** is associated, which in the illustrated embodiment is the first node **11**. Generally, the gateway **18** will be associated with a node that is geographically closest to the gateway, in order to minimize transmission times over the IP network **26**. In response to the SIP Invite message, the call controller **13** sends an RC request message to the routing controller **30** which makes various enquiries of the database **23** to produce a routing message that is sent back to the call controller **13**. The call controller **13** then communicates with the media relay **28** to cause a communications link including an audio path (and a videopath if a videophone call) to be established through the media relay to the same node, a different node, or to a communications supplier gateway as shown generally at **34** to carry audio, and where applicable, video traffic to the call recipient or callee.

Referring to FIG. **14**, an exemplary SIP Invite message is shown generally at **310** and includes a caller identifier field **312**, a callee identifier field **314**, a digest parameter field **315**, a call identifier field **316**, an IP address field **317**, and a gateway UDP port field **318**. Examples of values for the fields in the SIP Invite message **310** are shown for illustration purposes only in FIG. **14**. The caller identifier in the caller identifier field **312** is preferably in the form of the telephone number of the caller followed by the "@" symbol, which in turn is followed by the IP address of the gateway (**18**) in the IP network (**26**). The caller identifier may be determined by retrieving calling line identification (CLID) information from the signal provided by the PSTN network (**29**) to the gateway (**18**) for example. Where the caller identification information is not available to the gateway (**18**), the caller identifier in the caller identifier field **312** preferably includes a pre-assigned number (such as 11111, for example) indicating that the caller identification information was not available, followed by the "@" symbol and then by the IP address of the gateway (**18**).

The callee identifier in the callee identifier field **314** is the access code identifying the channel (**20**, **22**, or **24** in the example of FIG. **1**) on which the call was placed, and which was received from the access server (**14**). In the illustrated example, the access code is the PSTN telephone number 1-604-345-1212 corresponding to the channel **20** illustrated in FIG. **1**, and to the access code stored in the access code field **173** of the record **172** in the exemplary access code association table **170** illustrated in FIG. **10**.

The digest parameter in the digest parameter field **315** is generated by the gateway (**18**) and may uniquely identify the SIP session that is initiated with the SIP Invite message **310**.

The call identifier in the call identifier field **316** is, in the illustrated embodiment, a four-digit hexadecimal number generated by the gateway (**18**) to identify the call, followed by the "@" symbol, which in turn is followed by the IP address of the gateway.

The IP address in the IP address field **317** is the IP address of the gateway (**18**) in the IP network (**26**), and the gateway UDP port number in the gateway UDP port field **318** includes a UDP port identifier identifying a UDP port at which the audio/video path will be terminated at the gateway (**18**).

It should be noted that throughout the description of the embodiments of this invention, the IP/UDP addresses of all elements such as the gateway (**18**) will be assumed to be valid IP/UDP addresses directly accessible via the Internet or a private IP network, for example, depending on the specific implementation of the system. As such, it will be assumed, for example, that the gateway (**18**) will have an IP/UDP address directly accessible by the call controllers and the media relays on their respective nodes, and those addresses will not be obscured by Network Address Translation (NAT) or similar mechanisms. In other words, the IP/UDP information contained in SIP messages (for example the SIP Invite message or the RC Request message which will be described below) will match the IP/UDP addresses of the IP packets carrying these SIP messages.

It will be appreciated that in many situations, the IP addresses assigned to various elements of the system may be in a private IP address space, and thus not directly accessible from other elements. Furthermore, it will also be appreciated that NAT is commonly used to share a "public" IP address between multiple devices, for example between home PCs and IP telephones sharing a single Internet connection. For example, the gateway (**18**) may be assigned an IP address such as 192.168.0.5. This address is located in so called "non-routable" (IP) address space and cannot be accessed directly from the Internet. In order for this device to communicate with other computers located on the Internet, the IP address has to be converted into a "public" IP address, for example 24.14.102.5 assigned by the Internet Service Provider, by a device performing NAT, typically a router. In addition to translating the IP address, NAT typically also translates UDP port numbers, for example an audio path originating at the gateway (**18**) and using a UDP port 12378 at its private IP address, may have be translated to a UDP port 23465 associated with the public IP address of the NAT device. In other words, when a packet originating from the gateway (**18**) arrives at an Internet-based node, the source IP/UDP address contained in the IP packet header will be 24.14.102.5:23465, whereas the source IP/UDP address information contained in the SIP message inside this IP packet will be 192.168.0.5:12378. The mismatch in the IP/UDP addresses may cause a problem for SIP-based VoIP systems because, for example, a node will attempt to send messages to a private address but the messages will never get there.

Call Controller

Referring to FIG. **15**, the call controller (**13**) includes a processor circuit shown generally at **320**. The processor circuit **320** includes a microprocessor **322**, program memory **324**, and an I/O port **326**. The program memory **324** and the I/O port **326** are in communication with the microprocessor **322**. The processor circuit **320** may include a plurality of microprocessors, a plurality of program memories, and a plurality of I/O ports to be able to handle a large volume of calls. However, for simplicity, the processor circuit **320** will be described as having only one microprocessor **322**, program memory **324**, and I/O port **326**, it being understood that there may be more.

Generally, the I/O port **326** includes an input **328** for receiving messages such as the SIP Invite message from the gateway (**18**) or from a VoIP telephone (**36** in FIG. **1**, for example). The I/O port **326** also has an RC request message output **330** for transmitting an RC request message to the routing controller **30** of FIG. **1**, an RC message input **332** for receiving routing messages from the routing controller **30**, a gateway output **334** for transmitting messages to the gateway **18** and/or **34** shown in FIG. **1** to advise the gateway **18** and/or **34** to establish an audio path, for example, and a gateway input **336** for receiving messages from the gateway **18** and/or **34**. The I/O port **326** further includes a SIP output **338** for transmitting messages to the gateway (**18** and/or **34**) or VoIP telephone (**36**, for example) to advise the gateway **18** and/or **34** or IP telephone of the IP addresses of the gateways which will establish the audio/video path. The I/O port **326** further includes a voicemail server input and output **340** and **342** respectively for communicating with the voicemail server **19** shown in FIG. **1**.

While certain inputs and outputs have been shown as separate, it will be appreciated that some may be a single IP address and IP port. For example, the messages sent to the routing controller (**30**) and received from the routing controller (**30**) may be transmitted and received on the same single IP port.

The program memory **324** includes blocks of code for directing the microprocessor **322** to carry out various functions of the call controller (**13**). For example, these blocks of code include a first block **344** for causing the processor circuit **320** to execute a SIP Invite to RC Request process to produce an RC Request Message in response to a received SIP Invite message. In addition, there is a Routing Message to Gateway message block **346** which causes the processor circuit **320** of the call controller to produce a gateway query message in response to a received routing message from the routing controller (**30**).

Referring to FIGS. **15** and **16**, the SIP Invite to RC Request process is shown in more detail at **344**. On receipt of a SIP Invite message of the type shown in FIG. **14**, block **350** directs the processor circuit **320** to produce an RC Request Message. Block **352** then directs the processor circuit **320** to cause the RC Request Message to be sent to the routing controller **30** illustrated in FIG. **1**.

Referring to FIG. **17**, an exemplary RC request message is shown generally at **360** and includes a caller identifier field **362**, a callee identifier field **364**, a digest parameters field **366**, and a call identifier field **368**. These fields may be populated with the contents of the caller identifier field **312**, callee identifier field **314**, digest parameter field **315**, and call identifier field **316** respectively of the SIP Invite message **310** illustrated in FIG. **14**. In other embodiments, the RC request message may further include a type field (not shown) containing a type code to indicate whether the call is from a third party or from a system subscriber. Other variations of an RC request message are explained in PCT Publication No. WO 2008/052340. A type field (not shown) in the RC request message **360** may be advantageous in embodiments where SIP Invite messages may also be received from an IP telephone that is using VoIP software to make a voice call. However, in the embodiments that are illustrated herein, SIP Invite messages originate from the gateway (**18**), and therefore a type designation is not necessary and may be omitted from the RC request message **360**. In embodiments where a SIP Invite message may be received from an IP telephone, the SIP invite to RC request process shown in FIG. **16** may require additional steps, as illustrated in FIG. 5 of PCT Publication No. WO 2008/052340.

RC Request Message Handler

As illustrated in FIG. **8**, the program memory **234** includes an RC request message handler **380** which directs the routing controller (**30**) to produce a routing message in response to a received RC request message (**360**). Referring to FIG. **18**A, the RC request message handler **380** begins with a first block **382** that directs the RC processor circuit (**230**) to separately store the contents of the callee identifier field **364** and caller identifier field **362** of the RC request message (**360**) in the callee identifier store **246** and the caller identifier store **248** respectively of FIG. **8**.

Block **384** then directs the RC processor circuit (**230**) to use the contents of the caller username store **249** to locate and retrieve from the database (**23**) a dialing profile **200** associated with the caller, as described above and illustrated in FIG. **9**, for example. The retrieved dialing profile may then be stored in the temporary memory **240**, for example.

The RC request message handler **380** continues at block **386**, which directs the processor circuit (**230**) of the routing controller to determine whether the contents of the current number of concurrent calls field **222** of the dialing profile **200** shown in FIG. **9** are less than the contents of the maximum number of concurrent calls field **220** of the dialing profile for the caller and, if so, block **388** directs the processor circuit to increment the contents of the current number of concurrent calls field **222** and the processor circuit (**230**) is directed to point A in FIG. **18**B. If the contents of the current number of concurrent calls field **222** are equal to or greater than the contents of the maximum number of concurrent calls field **220**, then block **390** directs the processor circuit (**230**) to send an error message back to the call controller (**13**) to cause the call controller to notify the caller that the maximum number of concurrent calls has been reached and no further calls can exist concurrently, including the presently requested call.

Assuming that block **386** allows the call to proceed, the RC processor circuit (**230**) is directed to perform certain checks on the callee identifier in the callee identifier field **246** in FIG. **8**. These checks are shown in greater detail in FIG. **18**B.

Referring to FIG. **18**B, the RC processor circuit (**230**) is directed to a first block **392** that causes it to determine whether a digit pattern of the callee identifier includes a pattern that matches the contents of the international dialing digits (IDD) field **208** in the dialing profile **200** (shown in FIG. **9**) associated with the caller. If so, then block **394** directs the RC processor circuit (**230**) to set a call type code identifier variable maintained by the processor to indicate that the call is an international call, and block **396** directs the processor to produce a reformatted callee identifier by reformatting the callee identifier into a predefined digit format. In this embodiment, this is done by removing the pattern of digits matching the IDD field contents (**208**) of the caller dialing profile **200** to effectively shorten the callee identifier. Then, block **398** directs the RC processor circuit (**230**) to determine whether or not the callee identifier has a length which meets criteria establishing it as a number compliant with the E.164 Standard set by the ITU. If the length does not meet these criteria, then block **400** directs RC processor circuit (**230**) to send back to the call controller (**13**) a message indicating the length is not correct. The process **380** is then ended. At the call controller **13**, routines (not shown) stored in the program memory **324** may direct the processor circuit (**320** of FIG. **15**) to respond to the incorrect length message by transmitting a message back to the mobile telephone (**12** shown in FIG. **1**) to indicate that an invalid number has been dialed.

If the length of the amended callee identifier meets the criteria set forth at block **398**, then block **402** directs the RC processor circuit (**230**) to make a database request to the database (**23**) to determine whether or not the amended callee identifier is found in the DID field (**373**) of a record such as shown in FIG. **11** in the DID bank table. If at block **402** the RC processor circuit (**230**) receives a response from the database (**23**) indicating that the reformatted callee identifier produced at block **396** is found in the DID field (**373**) of a record in the DID bank table, then the callee is a subscriber to the system and the call is classified as a private network call by directing the processor to block **404**, which directs the RC processor circuit (**230**) to copy the contents of the corresponding username field (**371** in FIG. **11**) from the callee DID bank table record (**370** in FIG. **11**) into the callee identifier store (**246** in FIG. **8**). Thus, the RC processor circuit (**230**) locates a subscriber username associated with the reformatted callee identifier. The processor (**232**) is then directed to point B in FIG. **18**A.

Calls to Subscribers in Different Nodes

Referring back to FIG. **1**, as noted above, the gateway **18** is preferably associated with a pre-determined node, which in the illustrated embodiment is the first node **11**. Referring back to FIG. **18**A, block **406** directs the processor (**232** of FIG. **8**) to execute a process to determine whether or not the node associated with the reformatted callee identifier in the callee identifier store (**246** in FIG. **8**, which, at block **404**, was set to be a username of the callee) is the same node that is associated with the gateway **18** illustrated in FIG. **1**.

To do this, the processor (**232**) may, for example, identify a node associated with the gateway (**18**) by using an IP address associated with the gateway to determine a node identifier of the gateway. An IP address associated with the gateway (**18**) may, for example, be obtained from either the caller identifier field **362** or the call identifier field **368** of the RC request message **360** illustrated in FIG. **17**, as each of these fields includes a portion following an "@" symbol that indicates an IP address of the gateway. In order to determine a node identifier associated with the gateway (**18**) using the IP address associated with gateway (**18**), the processor **232** (illustrated in FIG. **8**) may access a gateway node association table stored in the database **23** (illustrated in FIG. **1**).

Referring to FIG. **19**, an exemplary gateway node association table is shown generally at **480**. The exemplary gateway node association table **480** includes first and second records **482** and **484**, each having a respective gateway IP address field **486** and a respective node identifier field **488**. It will be appreciated that the exemplary gateway node association table **480** is an example for illustration purposes only. The values in the gateway IP address fields **486** are preferably initialized when a gateway (such as the gateway **18** illustrated in FIG. **1**) is installed as part of the system (**10**), and are preferably updated as the IP addresses of the respective gateways may change from time to time. The values in the node identifier fields **488** are also preferably initialized when a gateway (such as the gateway **18** illustrated in FIG. **1**) is installed as part of the system (**10**).

As indicated above, the reformatted callee identifier in the callee identifier store (**246** in FIG. **8**) was set at block **404** in FIG. **18**B to be a username of the callee from the username field **371** (illustrated in FIG. **11**), and in this embodiment, a prefix of the username of the callee preferably indicates a node associated with the callee. In the illustrated embodiment, the left-most digit in the username of the callee is a continent code, which is a sufficient prefix to identify a node associated with the callee. However, it will be appreciated that in other embodiments, other prefixes or other information may identify the associated node. Preferably, the values in the node identifier fields **488** correspond to the prefixes of the usernames in the username fields **371** (illustrated in FIG. **11**), so that the node associated with the callee is the same node that is associated with the gateway **18** illustrated in FIG. **1** if the prefix of the username of the callee matches the node identifier associated with the gateway (**18**). Therefore, in the illustrated embodiment, if the reformatted callee identifier in the callee identifier store (**246** in FIG. **8**) is 2001 1050 8667, for example, then in the example of FIG. **19**, the node associated with the callee is the same node as the node identified by the continent code "2" that is associated with the gateway associated with the IP address 20.14.102.5 in the record **482**, but is not the same node as the node identified by the continent code "5" that is associated with the gateway associated with the IP address 104.12.131.12 in the record **484**.

Referring back to FIG. **18**A, if at block **406** the prefix of the username of the callee does not match the node identifier associated with the gateway (**18**), then the call is a "cross-domain" call, and block **408** in FIG. **18**A directs the processor (**232** in FIG. **8**) to set a call type flag in the temporary memory (**240** in FIG. **8**) to indicate the call is a cross-domain call. Then, block **410** of FIG. **18**A directs the processor (**232** of FIG. **8**) to produce a routing message identifying an address on the private network with which the callee identified by the contents of the callee ID buffer is associated and to set a time to live for the call at a maximum value of 99999, for example. Routing messages and time to live values, and also a method of determining the node in the system with which the callee is associated, are further described in PCT Publication No. WO 2008/052340. Once a routing message is produced at block **410**, block **412** directs the processor (**232** in FIG. **8**) to cause the routing message to be sent to the call controller **13** shown in FIG. **1**, and the process ends.

Referring back to FIG. **18**B, if at block **392**, the callee identifier stored in the callee identifier store (**246** in FIG. **8**) does not begin with an international dialing digit, then block **414** directs the processor (**232**) to determine whether or not the callee identifier begins with the same national dial digit code as assigned to the caller. To do this, the processor (**232**) is directed to refer to the retrieved caller dialing profile as shown in FIG. **9**. In FIG. **9**, the national dialing digit code **206** is the number 1. Thus, if the callee identifier begins with the number 1, then the processor (**232**) is directed to block **416** in FIG. **18**B.

Block **416** directs the processor (**232** of FIG. **8**) to examine the callee identifier to determine whether or not the digits following the NDD digit identify an area code that is the same as any of the area codes identified in the local area codes field **212** of the caller dialing profile **200** shown in FIG. **9**. If not, block **418** of FIG. **18**B directs the processor (**232**) to set the call type flag to indicate that the call is a national call. If the digits following the NDD digit identify an area code that is the same as a local area code associated with the caller as indicated by the caller dialing profile, block **420** directs the processor (**232**) to set the call type flag to indicate a local call, national style. After executing block **418** or **420**, block **422** directs the processor (**232**) to format the callee identifier into a pre-defined digit format to produce a re-formatted callee identifier by removing the national dialed digit and prepending a caller country code identified by the country code field **210** of the caller dialing profile shown in FIG. **9**. The processor (**232**) is then directed to block **398** of FIG. **18**B to perform other processing as already described above.

If at block **414**, the callee identifier does not begin with a national dialed digit, block **424** directs the processor (**232**) to determine whether the callee identifier begins with digits that identify the same area code as the caller. Again, the reference for this is the retrieved caller dialing profile shown in FIG. **9**. The processor (**232**) determines whether or not the first few digits of the callee identifier identify an area code corresponding to the contents of any area code identifier stored in the local area code field **212** of the retrieved caller dialing profile **200** (illustrated in FIG. **9**). If so, then block **426** directs the processor (**232**) to set the call type flag to indicate that the call is a local call. It should be noted that the call will not necessarily be a local call in every case where the first few digits of the callee identifier identify an area code corresponding to the contents of an area code identifier stored in the local area code field **212** (illustrated in FIG. **9**), and other determinations of when a call is to be considered local may be appropriate. However, it has been found that the determination described above for block **424** is satisfactory for some purposes. Next, block **428** directs the processor (**232**) to format the callee identifier into a pre-defined digit format to produce a reformatted callee identifier by prepending the caller country code to the callee identifier, the caller country code being determined from the country code field **210** of the retrieved caller dialing profile **200** shown in FIG. **9**. The processor (**232**) is then directed to block **398** for further processing as described above.

If at block **424**, the callee identifier does not start with the same area code as the caller, block **430** directs the processor (**232** of FIG. **8**) to determine whether the number of digits in the callee identifier, i.e. the length of the callee identifier, is within the range of digits indicated by the caller minimum local number length field **214** and the caller maximum local number length field **216** of the retrieved caller dialing profile **200** shown in FIG. **9**, and whether there is more than one area code identifier stored in the local area code field **212** of the retrieved caller dialing profile. If the number of digits in the callee identifier is within the aforementioned range and there is only one area code identifier stored in the local area code field (**212**), then block **432** directs the processor (**232**) to set the call type flag to indicate a local call and block **434** directs the processor (**232**) to format the callee identifier into a pre-defined digit format to produce a reformatted callee identifier by prepending to the callee identifier the caller country code (as indicated by the country code field **210** of the retrieved caller dialing profile **200** shown in FIG. **9**) followed by the caller area code as indicated by the local area code stored in the local area code field **212** of the caller dialing profile **200** shown in FIG. **9**. The processor (**232**) is then directed to block **398** of FIG. **18**B for further processing as described above.

If at block **430**, the callee identifier has a length that does not fall within the range specified by the caller minimum local number length field (**214** in FIG. **9**) and the caller maximum local number length field (**216** in FIG. **9**), or if there is more than one area code identifier stored in the local area code field **212** of the retrieved caller dialing profile **200** illustrated in FIG. **9**, then block **436** directs the processor (**232**) to send an error message back to the call controller (**13**), and the process ends.

In alternative embodiments, such as those illustrated in PCT Publication No. WO 2008/052340, an additional block (**402** in FIG. **8**B of PCT Publication No. WO 2008/052340) may determine whether the callee identifier is a valid username. However, in the embodiment disclosed herein, the callee identifier is assumed to be a telephone number of the callee, and not a username.

From FIG. **18**B, it will be appreciated that there are certain groups of blocks of codes that direct the processor **232** in FIG. **8** to determine whether the callee identifier has certain features such as an international dialing digit, a national dialing digit, an area code and a length that meet certain criteria, and cause the processor **232** to reformat the callee identifier stored in the callee identifier store **246** in FIG. **8**, as necessary into a predetermined target format including only a country code, area code, and a normal telephone number, for example, to cause the callee identifier to be compatible with the E.164 number plan standard in this embodiment. This enables block **402** in FIG. **18**B to have a consistent format of callee identifiers for use in searching through the DID bank table records **370** of the type shown in FIG. **11** to determine how to route calls to subscribers on the same system. Effectively, therefore blocks **392**, **414**, **424**, and **430** establish call classification criteria for classifying the call as a public network call or a private network call. Block **402** classifies the call, depending on whether or not the formatted callee identifier has a DID bank table record, and this depends on how the call classification criteria are met.

Calls to Non-Subscribers

Not all calls will be to subscribers, and this will be detected by the processor **232** of FIG. **8** when it executes block **402** in FIG. **18**B, and does not find a DID bank table record (**370** illustrated in FIG. **11**) that is associated with the callee, in the DID bank table. When this occurs, the call is classified as a public network call, by directing the processor (**232**) to point C in FIG. **18**C.

Referring to FIG. **18**C, block **438** directs the processor (**232**) to determine whether the formatted callee identifier in the callee identifier store **246** in FIG. **8** corresponds to an access code in the access code field **173** of a record in the access code association table **170** illustrated in FIG. **10** that is associated with a callee identifier. Because the callee identifier in the callee identifier store **246** in FIG. **8** has been formatted as described above with reference to FIG. **18**B, block **438** may involve determining whether an access code in the access code field **173** of a record of the access code association table **170** (illustrated in FIG. **10**) matches the formatted callee identifier in the callee identifier store **246** in FIG. **8**, and also whether a callee identifier (as opposed to the "null" value assigned on initialization) is stored in the callee identifier field **177** in association with the access code. As noted above, for simplicity, this description is directed to embodiments wherein an access code association table **170** associates access codes with respective callee identifiers, caller identifiers, timeout values, and timestamp values, although it will be appreciated that the processes described herein for records in the access code association table **170** may additionally or alternatively be applied to DID bank table records **370** in an analogous manner.

If at block **438** the formatted callee identifier in the callee identifier store **246** in FIG. **8** is the same as an access code in the access code field (**173**) of a record of the access code association table **170** illustrated in FIG. **10** that is associated with a callee identifier, then block **440** directs the processor (**232**) to determine whether the caller identifier in the caller identifier store **248** (illustrated in FIG. **8**) is the same as the caller identifier in the caller identifier field (**179**) of the record of the access code association table (**170**), and thus whether the caller identifier in the caller identifier field (**179**) of the record of the access code association table (**170**) identifies the mobile telephone identified by the caller identifier in the caller identifier store **248**. If not, then block **442** directs the processor (**232**) to send an error message to the call controller (**13**), and the process ends.

But if at block **440** the caller identifier in the caller identifier store **248** (illustrated in FIG. **8**) corresponds to the caller identifier in the caller identifier field (**179**) of the record of the access code association table (**170**), then the routing controller (**30**) will produce a routing message that will cause the call controller to establish communication through the IP network (**26**) to the callee in response to a call received at a channel (**20**, **22**, or **24**). Preferably, block **444** includes codes that direct the processor (**232**) to determine whether the association of the access code with the callee identifier has expired, and thus whether the usability of the access code to initiate a call to the callee has expired, in the manner described above for block **278** in FIG. **12**. If at block **444** the association of the access code with the callee identifier has expired, then block **442** directs the processor (**232**) to send an error message to the call controller (**13**), and the process ends. Thus the routing controller produces a routing message that causes the call controller to establish the call only when the association of the access code with the callee identifier has not expired.

It will be appreciated that in alternative embodiments, one or more of the caller identifier, timeout, and timestamp fields **179**, **181**, and **182** may be omitted from the access code association table **170** illustrated in FIG. **10**, and in these embodiments, one or more of the blocks **440**, **442**, and **444** may also be omitted.

If at block **444** the association of the access code with the callee identifier has not expired, or if one or both of blocks **440** and **444** is omitted, then block **446** directs the processor (**232**) to store the callee identifier from the callee identifier field **177** of the record of the access code association table (**170**) in the callee identifier store **246** illustrated in FIG. **8**. The processor (**232**) is then directed to point A in FIG. **18**B to repeat the steps illustrated in FIG. **18**B using the callee identifier retrieved from the callee identifier field (**177**) in the record of the access code association table (**170**).

However, if at block **438** the formatted callee identifier in the callee identifier store **246** in FIG. **8** does not correspond to an access code in a record of the access code association table **170** illustrated in FIG. **10** that is associated with a callee identifier, then block **448** of FIG. **18**B causes the processor (**232**) to set the contents of the callee identifier store **246** of FIG. **8** to be the newly formatted callee identifier, i.e., a number compatible with the E.164 standard. Then, block **450** of FIG. **18**B directs the processor (**232**) to generate a routing message identifying a gateway to the public network usable by the call controller (**13**) to establish a "public system" call. In one embodiment, block **450** includes codes that, for example, direct the processor (**232**) to search a database of route or master list records and to search a database of supplier records to identify at least one supplier operable to supply a communications link for the call, and to load a routing message buffer with supplier information, time to live values, and timeout values. An example of an implementation of these steps is described with reference to blocks **410**, **412**, **560**, **562**, **563**, **564**, **566**, and **571** in FIGS. **8**B and **8**D in PCT Publication No. WO 2008/052340. Next, block **452** directs the processor **232** of FIG. **10** to send the routing message to the call controller **13** in FIG. **1**, and the process ends.

Calls to Subscribers within the Same Node

Referring back to FIG. **18**A, if at block **406**, the prefix of the username of the callee matches the node identifier associated with the gateway (**18**), then the call is on one domain, and block **454** directs the processor (**232**) to use the callee identifier in the callee identifier store **246** illustrated in FIG. **8** (which, at block **404**, was set to be a username of the callee) to locate and retrieve a dialing profile for the callee. The dialing profile may be of the type shown in FIG. **9**, for example. Block **456** of FIG. **18**A then directs the processor **232** of FIG. **8** to get call block, call forward, and voicemail records from the database **23** of FIG. **1**, based on the username identified in the callee dialing profile retrieved by the processor at block **454**. Exemplary call block, call forward, and voicemail records are described in PCT Publication No. WO 2008/052340.

Then block **458** directs the processor **232** of FIG. **8** to determine whether or not the caller identifier received in the RC request message matches a block pattern stored in the call block record associated with the callee and retrieved at block **454**. If the caller identifier matches a block pattern, then block **460** directs the processor to send a drop call or non-completion message to the call controller (**13**) and the process is ended. If the caller identifier does not match a block pattern associated with the callee, then block **462** directs the processor (**232**) to determine whether or not call forwarding is required, as described in PCT Publication No. WO 2008/052340.

If at block **462**, the call forwarding record for the callee indicates that no call forwarding is required, then the processor (**232**) is directed to block **464**, which directs the processor (**232**) to generate a routing message identifying an address on the private network, associated with the callee for a "private system" call. In one embodiment, block **464** includes codes that, for example, direct the processor (**232**) to store, in a routing message buffer, a username and domain of the callee, time to live values, and an IP address of the current node, to determine whether or not the user identified by the callee identifier has paid for voicemail service and if so, to store voicemail information in the routing message buffer. An example of an implementation of these steps is described with reference to blocks **609**, **620**, **640**, **642**, and **644** in FIGS. **8**A and **8**C in PCT Publication No. WO 2008/052340, which is incorporated herein by reference. Next, block **466** directs the processor **232** of FIG. **8** to cause the routing message to be sent to the call controller **13** in FIG. **1**, and the process ends.

But if at block **462**, the call forwarding record for the callee indicates that call forwarding is required, then block

468 directs the processor (**232**) to search a dialing profile table to find a dialing profile record as shown in FIG. **9**, for the user identified by the destination number field of the call forward record, as illustrated in PCT Publication No. WO 2008/052340. The processor (**232**) is further directed to store the username and domain for that user and a time to live value in a routing message buffer, an example of which is described in PCT Publication No. WO 2008/052340. This process is repeated for each call forwarding record associated with the callee identified by the callee identifier store **246** in FIG. **8** to add to the routing message buffer all call forwarding usernames and domains associated with the callee.

Referring to FIGS. **1**, **18**A, and **18**C, the routing message sent at one of blocks **412**, **452**, and **466** is received at the call controller **13** and the call controller interprets the receipt of the routing message as a request to establish a call. Referring to FIG. **15**, the program memory **324** of the call controller **13** includes a routing to gateway routine depicted generally at **346**.

Where a routing message received at the call controller **13** is of the type produced at block **464** shown in FIG. **18**A, indicating that the callee is a system subscriber on the same node as the gateway (**18**) (such as a user of the VoIP telephone **36** illustrated in FIG. **1**), the routing to gateway routine **346** may direct the microprocessor **322** to cause a message to be sent back through the IP network **26** shown in FIG. **1** to the VoIP telephone (**36**), using the IP address of the VoIP telephone (**36**) that is available from the callee username.

Alternatively, if the routing message received at the call controller **13** is of the type produced at block **410** shown in FIG. **18**A, identifying a domain associated with another node in the system, the call controller **13** may send a SIP invite message along the high speed/high data throughput link **17** in communication with the other node. The other node may function as explained above and in PCT Publication No. WO 2008/052340, in response to receipt of a SIP invite message.

If the routing message received at the call controller **13** is of the type produced at block **450** shown in FIG. **18**C, indicating that the callee is not a subscriber to the system (such as a user of the PSTN telephone **32** that is in communication with the IP network **26** through the gateway **34** as illustrated in FIG. **1**), the call controller sends one or more SIP invite messages to the suppliers identified in the routing message to identify the IP address of a supplier that is able to carry the call, such as the IP address of the gateway **34** illustrated in the example of FIG. **1**. A process for identifying the IP address of a supplier that is able to carry the call is given in PCT Publication No. WO 2008/052340, which is incorporated herein by reference. In some cases, the gateway of the supplier that is able to carry the call will be the gateway **18** illustrated in FIG. **1**, that is, the same gateway through which the caller telephone (**12**) initiated the call. For simplicity, the following description assumes that the gateways **18** and **34** are distinct gateways. It will be understood that in some cases, they may be the same gateway, but in these cases, the following steps may still be applied.

Referring to FIG. **1**, the IP address of the gateway **34** is sent in a message from the call controller **13** to the media relay **28**, which responds with a message indicating an IP address to which the gateway **18** should send its audio/video traffic, and an IP address to which the gateway **34** should send its audio/video for the call. The call controller conveys the IP address at which the media relay **28** expects to receive audio/video from the gateways **18** and **34**, to the gateways **18** and **34** in one or more messages. The gateway **18** replies to the call controller **13** with an IP address at which it would like to receive audio/video, and the call controller conveys that IP address to the media relay **28**. The call may then be conducted between the caller and callee through the media relay **28** and the gateways **18** and **34**.

If the call controller **13** receives a routing message of the type produced at block **464** shown in FIG. **18**A, indicating that the callee is a system subscriber on the same node as the gateway (**18**) (such as a user of the VoIP telephone **36** illustrated in FIG. **1**), and which has at least one call forwarding number and/or a voicemail number, the call controller attempts to establish a call to the callee VoIP telephone **36** by seeking from the callee telephone a message indicating an IP address to which the media relay **28** should send audio/video. If no such message is received from the callee telephone, no call is established. If no call is established within a pre-determined time, the call controller **13** attempts to establish a call with the next user identified in the call routing message in the same manner. This process is repeated until all call forwarding possibilities have been exhausted, in which case the call controller communicates with the voicemail server **19** identified in the routing message to obtain an IP address to which the media relay **28** should send audio/video and the remainder of the process mentioned above for establishing IP addresses at the media relay and the caller telephone is carried out to establish audio/video paths to allowing the caller to leave a voicemail message with the voicemail server.

When an audio/video path through the media relay **28** is established, a call timer maintained by the call controller **13** preferably logs the start date and time of the call and logs the call ID and an identification of the route (i.e., audio/video path IP address) for later use in billing.

Terminating the Call

Referring back to FIG. **1**, in the event that the caller terminates a call, the gateway **18** sends a SIP bye message to the call controller **13**. Similarly, in the event that the callee terminates the call, the gateway **34** or the VoIP telephone **36** of the callee sends a SIP bye message to the call controller **13**. Exemplary SIP bye messages are described in PCT Publication No. WO 2008/052340. The SIP bye message is received at the call controller **13**, and the call controller executes a process that involves decrementing the contents of the current number of concurrent calls field **222** dialing profile **200** of the caller as illustrated in FIG. **9**, generating an RC call stop message (not shown), sending the RC call stop message to the routing controller **30**, and sending a "bye" message to the party that did not terminate the call. An exemplary RC call stop message, and an example of how these steps may be implemented, are described in PCT Publication No. WO 2008/052340, which is incorporated herein by reference.

When the routing controller **30** receives the RC call stop message from the call controller **13**, the routing controller executes an RC call stop message process that involves making various updates to subscriber, reseller, and supplier account records (not shown) following the call. Examples of subscriber, reseller, and supplier account records, and of updates to subscriber, reseller, and supplier account records, are described in PCT Publication No. WO 2008/052340, which is incorporated herein by reference.

While specific embodiments of the invention have been described and illustrated, such embodiments should be considered illustrative of the invention only and not as limiting the invention.

What is claimed is:

1. A method of establishing communications between a wireless device and a destination node of a communications network, the method comprising:

receiving from a user of the wireless device a destination node identifier associated with the destination node;

transmitting an access code request message to an access server, the access code request message including the destination node identifier and a location identifier identifying a geographical location of the wireless device;

receiving an access code reply message from the access server in response to the access code request message, the access code reply message including an access code based on the location identifier in the access code request message, the access code identifying a communications channel on a gateway through which communications between the wireless device and the destination node can be conducted, the access code being distinct from the destination node identifier; and

in response to receiving the access code reply message, causing the wireless device to use the access code received in the access code reply message to initiate communications from the wireless device to the destination node through the channel identified by the access code, wherein the access code is based on the location identifier transmitted in the access code request message and enables the communications to be established from the wireless device to the destination node through the channel on the gateway identified by the access code.

2. The method of claim **1**, wherein transmitting comprises transmitting the access code request message to the access server on a non-voice network.

3. The method of claim **1**, wherein transmitting comprises transmitting the access code request message as a Short Messaging Service (SMS) message.

4. The method of claim **1**, wherein transmitting comprises transmitting the access code request message on a voice network.

5. The method of claim **4**, wherein transmitting the access code request message on a voice network comprises transmitting the access code request message as a Short Messaging Service (SMS) message.

6. The method of claim **1**, wherein the location identifier comprises an Internet Protocol (IP) address of the wireless device in a wireless Internet Protocol (IP) network.

7. The method of claim **1**, wherein the location identifier comprises an identifier of a wireless voice signal station in wireless communication with the wireless device.

8. The method of claim **1**, wherein the location identifier comprises a user-configured identifier of a location associated with the wireless device.

9. The method of claim **1**, wherein receiving the access code reply message comprises receiving the access code reply message from the access server on a non-voice network.

10. The method of claim **1**, wherein receiving the access code reply message comprises receiving the access code reply message as a Short Messaging Service (SMS) message.

11. The method of claim **1**, wherein receiving comprises receiving the access code reply message on a voice network.

12. The method of claim **11**, wherein receiving the access code reply message on a voice network comprises receiving the access code reply message as a Short Messaging Service (SMS) message.

13. The method of claim **1**, wherein receiving the access code reply message comprises receiving, in the access code reply message, an access code temporarily associated with the destination node identifier.

14. The method of claim **1**, wherein receiving the access code reply message comprises receiving, in the access code reply message, a telephone number or an Internet Protocol (IP) address.

15. The method of claim **14**, wherein establishing communications between the wireless device and the destination node comprises engaging a routing controller to route the call on a public switched telephone network (PSTN) or an IP network to the destination node.

16. The method of claim **1** further comprising:

receiving at the access server, the access code request message from the wireless device;

causing the access server to communicate with a routing controller to obtain from the routing controller the access code, wherein the access code identifies a communications channel associated with the location identifier and wherein the access code is useable by the wireless device in a subsequent communication to cause the routing controller to establish a call to the destination node using the communications channel; and

causing the access server to transmit the access code reply message to the wireless device.

17. The method of claim **16**, wherein transmitting the access code reply message comprises transmitting the access code reply message as a Short Messaging Service (SMS) message.

18. The method of claim **16**, wherein transmitting the access code reply message comprises transmitting the access code reply message on a voice network.

19. The method of claim **18**, wherein transmitting the access code reply message on a voice network comprises transmitting the access code request message as a Short Messaging Service (SMS) message.

20. A wireless apparatus comprising:

means for receiving from a user of the wireless apparatus a destination node identifier associated with a destination node with which the user wishes to communicate;

means for transmitting an access code request message to an access server, the access code request message including the destination node identifier and a location identifier identifying a geographical location of the wireless apparatus;

means for receiving an access code reply message from the access server in response to the access code request message, the access code reply message including an access code based on the location identifier in the access code request message, the access code identifying a communications channel on a gateway through which communications between the wireless apparatus and the destination node can be conducted, the access code being distinct from the destination node identifier; and

means for causing the wireless apparatus to establish communications with the destination node through the communications channel identified by the access code in the access code reply message, the access code being based on the location identifier transmitted in the access code request message.

21. The apparatus of claim **20**, wherein the means for transmitting comprises a non-voice network interface for transmitting the access code request message to the access server on a non-voice network.

22. The apparatus of claim **20**, wherein the means for transmitting includes means for transmitting the access code request message as a Short Messaging Service (SMS) message.

23. The apparatus of claim **20**, wherein the means for transmitting comprises means for transmitting the access code request message on a voice network.

24. The apparatus of claim **23**, wherein the means for transmitting the access code request message on a voice network comprises means for transmitting the access code request message as a Short Messaging Service (SMS) message.

25. The apparatus of claim **20**, wherein the location identifier comprises an Internet Protocol (IP) address of the wireless apparatus in a wireless IP network.

26. The apparatus of claim **20**, wherein the location identifier comprises an identifier of a wireless voice signal station in wireless communication with the wireless apparatus.

27. The apparatus of claim **20**, wherein the location identifier comprises a user-configured identifier of a location associated with the wireless apparatus.

28. The apparatus of claim **20**, wherein the means for receiving an access code reply message comprises a non-voice network interface for receiving the access code reply message on a non-voice network.

29. The apparatus of claim **20**, wherein the means for receiving the access code request message comprises means for receiving the access code request message as a Short Messaging Service (SMS) message.

30. The apparatus of claim **20**, wherein the means for receiving the access code request message comprises means for receiving the access code request message on a voice network.

31. The apparatus of claim **30**, wherein the means for receiving the access code request message on a voice network comprises means for receiving the access code request message as a Short Messaging Service (SMS) message.

32. The apparatus of claim **20**, wherein the access code includes a telephone number or an IP address.

33. The wireless apparatus of claim **20**, wherein the means for causing the wireless apparatus to establish communications comprises a mobile telephone network interface.

34. A system for enabling roaming by a wireless apparatus, the system comprising the wireless apparatus of claim **20** and further comprising:

a routing controller;

the access server, wherein the access server comprises:

means for receiving from the wireless apparatus the access code request message;

means for communicating with the routing controller to obtain from the routing controller the access code wherein the access code identifies a communications channel associated with the location identifier and wherein the access code is useable by the wireless apparatus to cause the routing controller to establish a call to the destination node using the communications channel; and

means for transmitting the access code reply message including the access code to the wireless apparatus.

35. The system of claim **34**, wherein the means for transmitting the access code reply message comprises means for transmitting the access code reply message as a Short Messaging Service (SMS) message.

36. The system of claim **34**, wherein the means for transmitting the access code reply message comprises means for transmitting the access code reply message on a voice network.

37. The system of claim **36**, wherein the means for transmitting the access code reply message on a voice network comprises means for transmitting the access code request message as a Short Messaging Service (SMS) message.

38. A wireless apparatus comprising:

a processor circuit comprising at least one processor;

a network interface in communication with the processor circuit; and

a non-transitory computer readable medium having computer executable codes stored thereon for directing the processor circuit to:

receive from a user of the wireless apparatus a destination node identifier associated with a destination node with which the user wishes to communicate;

transmit an access code request message to an access server, the access code request message including the destination node identifier and a location identifier identifying a geographical location of the wireless apparatus;

receive an access code reply message from the access server in response to the access code request message, the access code reply message including an access code based on the location identifier in the access code request message, the access code identifying a communications channel on a gateway through which communications between the wireless apparatus and the destination node can be conducted, the access code being distinct from the destination node identifier; and

initiate communications from the wireless apparatus, via the network interface, using the access code based on the location identifier, to establish communications between the wireless apparatus and the destination node through the communications channel identified by the access code.

39. The apparatus of claim **38**, wherein the network interface comprises a non-voice network interface, and wherein the codes for directing the processor circuit to cause the access code request message to be transmitted include codes for directing the processor circuit to cause the access code request message to be transmitted to the access server using the non-voice network interface on a non-voice network.

40. The apparatus of claim **38**, wherein the codes for directing the processor circuit to cause an access code to be transmitted to the access code server include codes for directing the processor circuit to cause the access code request message to be transmitted as a Short Messaging Service (SMS) message.

41. The apparatus of claim **38**, wherein the network interface comprises a voice network interface and wherein the codes for directing the processor circuit to cause an access code to be transmitted to the access code server include codes for directing the processor circuit to cause the access code request message to be transmitted on a voice network.

42. The apparatus of claim **41**, wherein the codes for directing the processor circuit to cause an access code to be transmitted to the access code server include codes for directing the processor circuit to cause the access code request message to be transmitted as a Short Messaging Service (SMS) message on the voice network.

43. The wireless apparatus of claim **38**, wherein the location identifier comprises an Internet Protocol (IP) address of the wireless apparatus in a wireless IP network.

44. The wireless apparatus of claim **38**, wherein the location identifier comprises an identifier of a wireless voice signal station in wireless communication with the wireless apparatus.

45. The wireless apparatus of claim **38**, wherein the location identifier comprises a user-configured identifier of a location associated with the wireless apparatus.

46. The wireless apparatus of claim **38**, wherein the network interface comprises a non-voice network interface, and wherein the codes for directing the processor circuit to receive an access code reply message include codes for directing the processor circuit to cause the access code reply message to be received from the access server using the non-voice network interface on a non-voice network.

47. The wireless apparatus of claim **38**, wherein the access code includes a telephone number or an IP address.

48. The wireless apparatus of claim **38**, wherein the network interface comprises a mobile telephone network interface, and wherein the codes for directing the processor circuit to establish communications between the wireless apparatus and the destination node to include codes for directing the processor circuit to cause a call to be initiated using the mobile telephone network interface on a mobile telephone network.

49. A system for enabling roaming by a wireless apparatus, the system comprising the wireless apparatus of claim **38** and further comprising:

a routing controller; and

an access server comprising a processor circuit and a computer readable medium in communication with the processor circuit, the computer readable medium encoded with codes for directing the processor circuit of the access server to:

receive the access code request message from the wireless apparatus;

communicate with the routing controller to obtain from the routing controller the access code wherein the access code identifies a communications channel associated with the location identifier and wherein the access code is useable by the wireless apparatus to cause the routing controller to establish a call to the destination node using the communications channel; and

transmit the access code reply message to the wireless apparatus.

50. A non-transitory computer readable medium having stored thereon computer executable codes for directing a processor circuit of a wireless device to establish communications with a destination node on a network, the codes comprising codes for directing the processor circuit to:

cause the wireless device to receive from a user of the wireless device a destination node identifier associated with the destination node;

cause the wireless device to transmit an access code request message to an access server, the access code request message including the destination node identifier and a location identifier identifying a geographical location of the wireless device;

cause the wireless device to receive an access code reply message comprising an access code identifying an Internet Protocol (IP) address based on the location identifier in the access code request message, the access code representing a communications channel of a network element in the network through which communications between the wireless device and the destination node can be conducted, the communications channel being associated with the geographical location of the wireless device, the access code being distinct from the destination node identifier; and

cause the wireless device to use the access code comprising the Internet Protocol (IP) address based on the location identifier to establish communications between the wireless device and the destination node through the communications channel of the network element identified by the access code.

51. A method for enabling a wireless device to establish communications with a destination node, the method comprising:

receiving from the wireless device an access code request message including a destination node identifier associated with the destination node and a location identifier identifying a geographical location of the wireless device;

in response to receiving the access code request message, causing a routing controller to produce an access code identifying a communications channel on a gateway through which communications between the wireless device and the destination node can be conducted, the access code being based on the location identifier of the access code request message received from the wireless device, wherein the access code is useable by the wireless device to initiate communications with the destination node through the communications channel; and

transmitting, to the wireless device, an access code reply message including the access code based on the location identifier, to cause the wireless device to use the access code to initiate communications with the destination node through the communications channel.

52. The method of claim **51**, wherein receiving comprises receiving the access code request message on a non-voice network.

53. The method of claim **51**, wherein receiving the access code request message comprises receiving the access code request message as a Short Messaging Service (SMS) message.

54. The method of claim **51**, wherein receiving comprises receiving the access code request message on a voice network.

55. The method of claim **54**, wherein receiving the access code request message on a voice network comprises receiving the access code request message as a Short Messaging Service (SMS) message.

56. The method of claim **51**, wherein the routing controller is operably configured to route a call between the wireless device and the destination node when the wireless device uses the access code to establish communications between the wireless device and the destination node.

57. The method of claim **51**, wherein causing the routing controller to produce the access code comprises causing the access code to be selected from a pool of access codes.

58. The method of claim **57** further comprising determining from the location identifier a local calling area associated with the wireless device and causing the access server to select an access code associated with a calling area matching the local calling area associated with the wireless device.

59. The method of claim **57**, further comprising accessing a location field of a dialing profile associated with the wireless device when a local calling area cannot be determined from the location identifier and determining a local calling area associated with the wireless device from the contents of the location field and selecting an access code associated with a calling area matching the local calling area associated with the wireless device.

60. The method of claim **51**, wherein the location identifier comprises an Internet Protocol (IP) address of the wireless device in a wireless IP network.

61. The method of claim **51**, wherein the location identifier comprises an identifier of a wireless voice signal station in wireless communication with the wireless device.

62. The method of claim **51**, wherein the location identifier comprises a user-configured identifier of a location associated with the wireless device.

63. The method of claim **57**, wherein at least one of the access codes in the pool of access codes identifies an IP network address as a possible communications channel through which the communications can be conducted.

64. The method of claim **51**, wherein the access code identifies an IP network address as a possible communications channel through which the communications can be conducted, the method further comprising enabling communications between the wireless device and the destination node to be established through an IP network in response to a call received at the IP network address from the wireless device using the access code identifying the IP network address.

65. The method of claim **57**, wherein at least one of the access codes identifies a telephone number as a possible communications channel through which the communications can be conducted.

66. The method of claim **65**, further comprising enabling communications between the wireless device and the destination node to be established through a public switched telephone network (PSTN) in response to a call received at the telephone number from the wireless device using the access code identifying the telephone number.

67. The method of claim **51**, wherein the access code request message includes a caller identifier and wherein the method further comprises associating the caller identifier included in the access code request message with the access code produced by the routing controller.

68. The method of claim **64**, further comprising enabling the routing controller to facilitate communications in response to use of the access code by the wireless device only if the caller identifier associated with the access code used by the wireless device to establish communications with the destination node identifies the wireless device.

69. The method of claim **67**, further comprising associating the destination node identifier included in the access code request message with the access code produced by the routing controller.

70. The method of claim **69**, wherein the associating the caller identifier and the destination node identifier with the selected access code occurs only when:

a) the access code is not already associated with a destination node identifier; or

b) the access code is already associated with another destination node identifier, and a timeout value associated with the another destination node identifier has expired.

71. The method of claim **51**, further comprising causing a timestamp to be associated with the access code, for use in determining when the usability of the access code to initiate a call to the destination node will expire, and causing the timestamp to be included in the access code reply message transmitted to the wireless device.

72. The method of claim **71**, further comprising causing communications to be permitted between the wireless device and the destination node when the wireless device seeks to establish a call to the destination node using the access code transmitted in the access code reply message when the timestamp associated with the access code indicates the usability of the access code has not expired, and causing the communications to be prevented when the timestamp indicates the usability of the access code has expired.

73. The method of claim **51**, wherein transmitting comprises transmitting the access code reply message on a non-voice network.

74. The method of claim **51**, wherein transmitting the access code reply message comprises transmitting the access code reply message as a Short Messaging Service (SMS) message.

75. The method of claim **51**, wherein transmitting comprises transmitting the access code reply message on a voice network.

76. The method of claim **75**, wherein transmitting the access code reply message on a voice network comprises transmitting the access code reply message as a Short Messaging Service (SMS) message.

77. An apparatus for enabling a wireless device to establish communications with a destination node, the apparatus comprising:

means for receiving from the wireless device an access code request message including a destination node identifier associated with the destination node and a location identifier identifying a geographical location of the wireless device;

means for causing a routing controller to produce an access code identifying a communications channel on a gateway through which communications between the wireless device and the destination node can be conducted, in response to receiving the access code request message, such that the access code is produced based on the location identifier of the access code request message received from the wireless device and such that the access code is useable by the wireless device to initiate communications with the destination node through the communications channel; and

means for transmitting an access code reply message including the access code to the wireless device, wherein the access code in the access code reply message is based on the location identifier and is used by the wireless device to initiate communications with the destination node through the communications channel on the gateway.

78. The apparatus of claim **77**, wherein the means for receiving comprises a non-voice network interface for receiving the access code request message on a non-voice network.

79. The apparatus of claim **77**, wherein the means for receiving the access code request message comprises means for receiving the access code request message as a Short Messaging Service (SMS) message.

80. The apparatus of claim **77**, wherein the means for receiving comprises means for receiving the access code request message on a voice network.

81. The apparatus of claim **80**, wherein the means for receiving the access code request message on a voice network comprises means for receiving the access code request message as a Short Messaging Service (SMS) message.

82. The apparatus of claim **77**, further comprising the routing controller and wherein routing controller is operably configured to route a call between the wireless device and the destination node.

83. The apparatus of claim **82**, wherein the routing controller is operably configured to select the access code from a pool of access codes.

84. The apparatus of claim **83**, wherein the routing controller is operably configured to determine a local calling area associated with the wireless device from the location identifier and to select an access code associated with a calling area matching the local calling area associated with the wireless device.

85. The apparatus of claim **83**, further comprising:

a dialing profile associated with the wireless device, the dialing profile including a location field; and

wherein the routing controller is operably configured to determine a local calling area associated with the wireless device from the contents of the location field and to select an access code associated with a calling area matching the local calling area associated with the wireless device, when a local calling area associated with the wireless device cannot be determined from the location identifier.

86. The apparatus of claim **77**, wherein the location identifier includes an Internet Protocol (IP) address of the wireless device in a wireless IP network.

87. The apparatus of claim **77**, wherein the location identifier includes an identifier of a wireless voice signal station in wireless communication with the wireless device.

88. The apparatus of claim **77**, wherein the location identifier includes a user-configured identifier of a location associated with the wireless device.

89. The apparatus of claim **83**, wherein at least one of the access codes in the pool of access codes identifies an IP network address as a possible communications channel through which the communications can be conducted.

90. The apparatus of claim **77**, wherein the access code identifies an IP network address as a possible communications channel through which the communications can be conducted, and wherein the routing controller is operably configured to enable communications between the wireless device and the destination node to be established through an IP network in response to a call received at the IP network address from the wireless device using the access code identifying the IP network address.

91. The apparatus of claim **83**, wherein at least one of the access codes in the pool of access codes identifies a telephone number as a possible communications channel through which the communications can be conducted.

92. The apparatus of claim **91**, wherein the routing controller is operably configured to enable communications between the wireless device and the destination node to be established through a public switched telephone network (PSTN) in response to a call received at the telephone number from the wireless device using the access code identifying the telephone number.

93. The apparatus of claim **83**, wherein the access code request message includes a caller identifier and wherein the routing controller is operably configured to associate the caller identifier with the selected access code.

94. The apparatus of claim **93**, wherein the routing controller is operably configured to facilitate communications between the wireless device and the destination node in response to use of the access code by the wireless device only if the caller identifier associated with the access code used by the wireless device to establish communications with the destination node identifies the wireless device.

95. The apparatus of claim **93**, wherein the routing controller is operably configured to associate the destination node identifier included in the access code request message with the selected access code.

96. The apparatus of claim **95**, wherein the routing controller is operably configured to associate the caller identifier and the destination node identifier with the selected access code only when:

a) the access code is not already associated with a destination node identifier; or

b) the access code is already associated with another destination node identifier, and a timeout value associated with the another destination node identifier has expired.

97. The apparatus of claim **82**, wherein the routing controller is operably configured to associate a timestamp with the access code, for use in determining when the usability of the access code to initiate a call to the destination node will expire, and to cause the timestamp to be included in the access code reply message transmitted to the wireless device.

98. The apparatus of claim **97**, wherein the routing controller is operably configured to enable communications to be established between the wireless device and the destination node when the wireless device seeks to establish a call to the destination node using the access code transmitted in the access code reply message when the timestamp associated with the access code indicates the usability of the access code has not expired and to prevent the communications from being established when the timestamp indicates the usability of the access code has expired.

99. The apparatus of claim **77**, wherein the means for transmitting comprises a non-voice network interface for transmitting the access code reply message on a non-voice network.

100. The apparatus of claim **77**, wherein the means for transmitting the access code reply message comprises means for transmitting the access code reply message as a Short Messaging Service (SMS) message.

101. The apparatus of claim **77**, wherein the means for transmitting comprises means for transmitting the access code reply message on a voice network.

102. The apparatus of claim **101**, wherein the means for transmitting the access code reply message on a voice network comprises means for transmitting the access code reply message as a Short Messaging Service (SMS) message.

103. An apparatus for enabling a wireless device to establish communications with a destination node, the apparatus comprising:

a processor circuit including at least one processor;

a network interface in communication with the processor circuit; and

a non-transitory computer readable medium having stored thereon computer executable codes for directing the at least one processor to:

receive from the wireless device an access code request message including a destination node identifier associated with the destination node and a location identifier identifying a geographical location of the wireless device;

cause a routing controller to produce an access code identifying a communications channel on a gateway through which communications between the wireless device and the destination node can be conducted, in response to receiving the access code request message, such that the access code is produced based on the location identifier of the access code request message received from the wireless device and such that the access code is useable by the wireless device to initiate communications with the destination node through the communications channel; and

transmit an access code reply message including the access code to the wireless device, wherein the access code in the access code reply message is based on the location identifier and is used by the wireless device to initiate communications with the destination node through the communication channel.

104. The apparatus of claim **103**, wherein the network interface comprises a non-voice network interface, and wherein the codes for directing the processor circuit to receive include codes for directing the processor circuit to cause the access code request message to be received using the non-voice network interface on a non-voice network.

105. The apparatus of claim **103**, wherein the codes includes codes for directing the processor circuit to receive the access code request message as a Short Messaging Service (SMS) message.

106. The apparatus of claim **103**, wherein the codes include codes for directing the processor circuit to receive the access code request message on a voice network.

107. The apparatus of claim **106**, wherein the codes include codes for directing the processor circuit to receive the access code request message as a Short Messaging Service (SMS) message.

108. The apparatus of claim **103** further comprising the routing controller.

109. The apparatus of claim **108**, wherein the routing controller is operably configured to cause the access code to be selected from a pool of access codes, wherein none of the access codes in the pool of access codes identifies a respective telephone number.

110. The apparatus of claim **109**, wherein the routing controller is operably configured to determine from the location identifier a local calling area associated with the wireless device and to select an access code associated with a calling area matching the local calling area associated with the wireless device.

111. The apparatus of claim **109**, wherein the routing controller is operably configured to access a location field of a dialing profile associated with the wireless device when a local calling area cannot be determined from the contents of the location identifier and to determine a local calling area associated with the wireless device from the contents of the location field and to select an access code associated with a calling area matching the local calling area associated with the wireless device.

112. The apparatus of claim **103**, wherein the location identifier comprises an Internet Protocol (IP) address of the wireless device in a wireless IP network.

113. The apparatus of claim **103**, wherein the location identifier comprises an identifier of a wireless voice signal station in wireless communication with the wireless device.

114. The apparatus of claim **103**, wherein the location identifier comprises a user-configured identifier of a location associated with the wireless device.

115. The apparatus of claim **109**, wherein at least one of the access codes in the pool of access codes identifies an IP network address as a possible communications channel through which the communications can be conducted.

116. The apparatus of claim **103**, wherein the access code identifies an IP network address as a possible communications channel through which the communications can be conducted, and wherein the routing controller is operably configured to enable communications between the wireless device and the destination node to be established through an IP network in response to a call received at the IP network address from the wireless device using the access code identifying the IP network address.

117. The apparatus of claim **108**, wherein the routing controller is operably configured to cause the access code to be selected from a pool of access codes, and wherein at least one of the access codes in the pool of access codes identifies a telephone number as a possible communications channel through which the communications can be conducted.

118. The apparatus of claim **117**, wherein the routing controller is operably configured to enable communications between the wireless device and the destination node to be established through a public switched telephone network (PSTN) in response to a call received at the telephone number from the wireless device using the access code identifying the telephone number.

119. The apparatus of claim **108**, wherein the access code request message includes a caller identifier and wherein the routing controller is operably configured to associate the caller identifier included in the access code request message with an access code selected by the routing controller.

120. The apparatus of claim **119**, wherein the routing controller is operably configured to facilitate communications between the wireless device and the destination node in response to the access code used by the wireless device only if the caller identifier associated with the access code used by the wireless device to establish communications with the destination node identifies the wireless device.

121. The apparatus of claim **119**, wherein the routing controller is operably configured to associate the destination node identifier included in the access code request message with the selected access code.

122. The apparatus of claim **121**, wherein the routing controller is operably configured to associate the caller identifier and the destination node identifier with the selected access code only when:

a) the access code is not already associated with another destination node identifier; or

b) the access code is already associated with a destination node identifier, and a timeout value associated with the another destination node identifier has expired.

123. The apparatus of claim **122**, wherein the routing controller is operably configured to associate a timestamp with the access code, for use in determining when the usability of the access code to initiate a call to the destination node will expire, and to cause the timestamp to be included in the access code reply message.

124. The apparatus of claim **103**, wherein the routing controller is operably configured to enable communications to be established between the wireless device and the destination node when the wireless device seeks to establish a call to the destination node using the access code transmitted in the access code reply message when a timestamp associated with the access code indicates that usability of the access code has not expired and to prevent the communications from being established when the timestamp indicates that the usability of the access code has expired.

125. The apparatus of claim **103**, wherein the network interface comprises a non-voice network interface, and wherein codes for directing the processor circuit to transmit include codes for directing the processor circuit to cause the access code reply message to be transmitted using the non-voice network interface on a non-voice network.

126. The apparatus of claim **103**, wherein the codes include codes for directing the processor circuit to cause the access code reply message to be transmitted as a Short Messaging Service (SMS) message.

127. The apparatus of claim **103**, wherein the codes include codes for directing the processor circuit to cause the access code reply message to be transmitted on a voice network.

128. The apparatus of claim **127**, wherein the codes include codes for directing the processor circuit to cause the access code reply message to be transmitted as a Short Messaging Service (SMS) message.

129. A non-transitory computer readable medium encoded with computer executable codes for directing a processor circuit of a wireless device to establish communications with a destination node, the codes comprising codes for directing the processor circuit to:

receive from the wireless device an access code request message including a destination node identifier associated with the destination node and a location identifier identifying a geographical location of the wireless device;

cause a routing controller to produce an access code comprising an Internet Protocol (IP) network address identifying a communications channel on a gateway through which communications between the wireless device and the destination node can be conducted, in response to receiving the access code request message, such that the access code is produced based on the location identifier of the access code request message received from the wireless device and such that the access code is useable by the wireless device to initiate communications with the destination node through the communications channel; and

transmit an access code reply message including the access code to the wireless device, wherein the Internet Protocol (IP) address of the access code is based on the location identifier and is used by the wireless device to initiate communications with the destination node through the communication channel on the gateway.

130. A method of operating an apparatus for enabling a wireless device to establish communications with a destination node, the method comprising:

receiving from the wireless device a request message including a destination node identifier associated with the destination node and a location identifier associated with a geographical location of the wireless device, wherein the location identifier comprises a first Internet Protocol (IP) address associated with the wireless device;

in response to receiving the request message, producing an access code identifying a second Internet Protocol (IP) address associated with an IP network communication device through which communications between the wireless device and the destination node can be conducted, wherein the access code is produced based on the location identifier received from the wireless device, wherein the access code is useable by the wireless device to initiate communications with the destination node through the IP network communication device; and

transmitting a reply message including the access code to the wireless device, wherein the second Internet Protocol (IP) address is based on the location identifier and is used by the wireless device to initiate communications with the destination node through a communication channel on the IP network communication device.

131. The method of claim **130** wherein the access code is produced based on the destination node identifier.

132. The method of claim **131** wherein the destination node identifier comprises a phone number associated with the destination node.

133. The method of claim **130** further comprising, if the destination node is a PSTN telephone on the public switched telephone network (PSTN), establishing communications from the wireless device to a communications supplier gateway operable to connect to the PSTN telephone via the public switched telephone network (PSTN).

134. The method of claim **51**, wherein causing the routing controller to produce the access code further comprises:

determining, from the location identifier, a current location of the wireless device; and

searching an access code association database table to identify an access code associated with the current location of the wireless device but not presently associated with communications to any destination node, to produce the access code transmitted in the access code reply message.

135. The method of claim **1** wherein the access code request message is transmitted from the wireless device via a WiFi network and the access code reply message is received by the wireless device via the WiFi network.

136. The method of claim **1**, wherein the destination node identifier and the location identifier are transmitted at the same time.

137. The method of claim **51**, wherein the access code is based on an area code corresponding to a location identified by the location identifier.

138. The method of claim **51**, wherein the access code reply message identifies an Internet Protocol (IP) network address of the communications channel through which the communications can be conducted, wherein the access code is useable by the wireless device to initiate the communications with the destination node through the communications channel.

139. The apparatus of claim **103**, wherein the access code reply message identifies an Internet Protocol (IP) network address associated with the communications channel through which the communications can be conducted, wherein the Internet Protocol (IP) network address is useable by the wireless device to initiate the communications with the destination node through the communications channel.

140. The method of claim **1**, further comprising:

(a) receiving, in the access code reply message, an Internet Protocol (IP) address; and

(b) establishing the communications between the wireless device and the destination node based on the Internet Protocol (IP) address received in the access code reply message.

141. The method of claim **1**, wherein the access code received in the access code reply message does not comprise a telephone number.

* * * * *

EXHIBIT 3

US009179005B2

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(54) **PRODUCING ROUTING MESSAGES FOR VOICE OVER IP COMMUNICATIONS**

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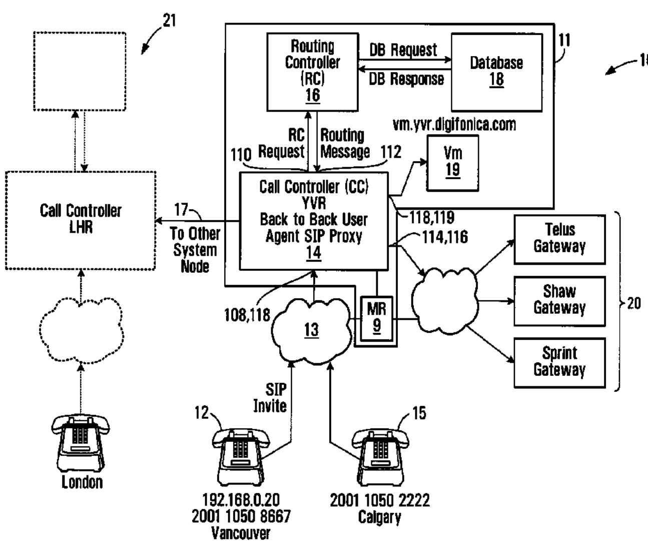
(57) **ABSTRACT**

A process and apparatus to facilitate communication between callers and callees in a system comprising a plurality of nodes with which callers and callees are associated is disclosed. In response to initiation of a call by a calling subscriber, a caller identifier and a callee identifier are received. Call classification criteria associated with the caller identifier are used to classify the call as a public network call or a private network call. A routing message identifying an address, on the private network, associated with the callee is produced when the call is classified as a private network call and a routing message identifying a gateway to the public network is produced when the call is classified as a public network call.

99 Claims, 32 Drawing Sheets



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KR	10-2009-0095621	A	9/2009
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WO	WO 2006/078175	A3	7/2006
WO	WO 2007/044454	A2	4/2007
WO	WO 2007/056158	A2	5/2007
WO	WO 2007/087077	A2	8/2007
WO	WO 2007/087077	A3	8/2007
WO	WO 2008/027065	A1	3/2008
WO	WO 2008/052340	A1	5/2008
WO	WO 2008/064481	A1	6/2008
WO	WO 2008/085614	A2	7/2008
WO	WO 2008/085614	A3	7/2008
WO	WO 2008/086350	A2	7/2008
WO	WO 2008/086350	A3	7/2008
WO	WO 2008/103652	A1	8/2008
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WO	WO 2008/085614	A8	12/2008
WO	WO 2008/151406	A1	12/2008
WO	WO 2008/151406	A8	12/2008
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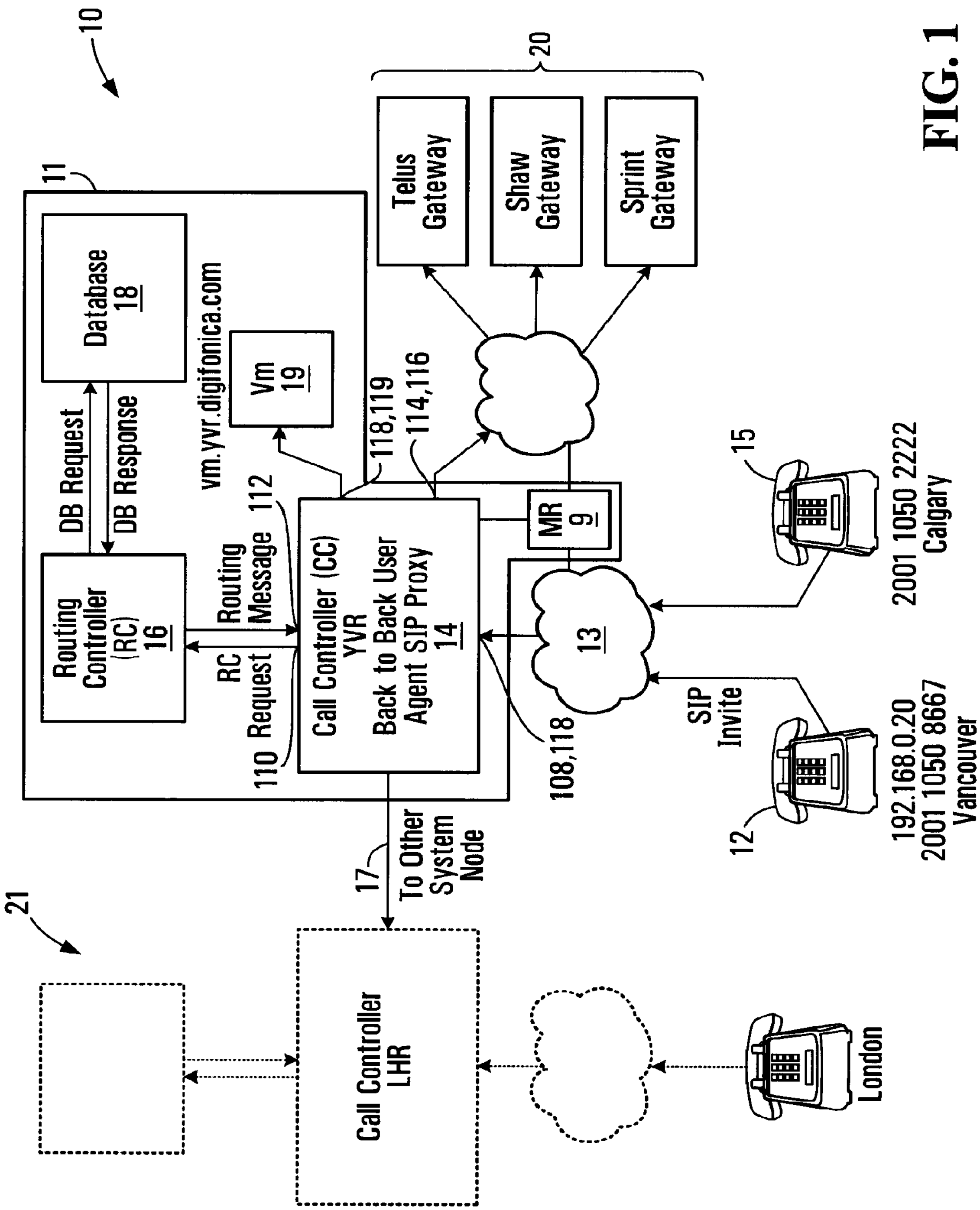

10
11
Database 18
DB Request
DB Response
Routing Controller (RC) 16
vm.yvr.digifonica.com
Vm 19
Routing Message 112
RC Request 110
Call Controller (CC) YVR Back to Back User Agent SIP Proxy 14
118,119
114,116
108,118
MR 9
13
20
Telus Gateway
Shaw Gateway
Sprint Gateway
15
2001 1050 2222
Calgary
SIP Invite
12
192.168.0.20
2001 1050 8667
Vancouver
17
To Other System Node
21
Call Controller LHR
London

FIG. 1

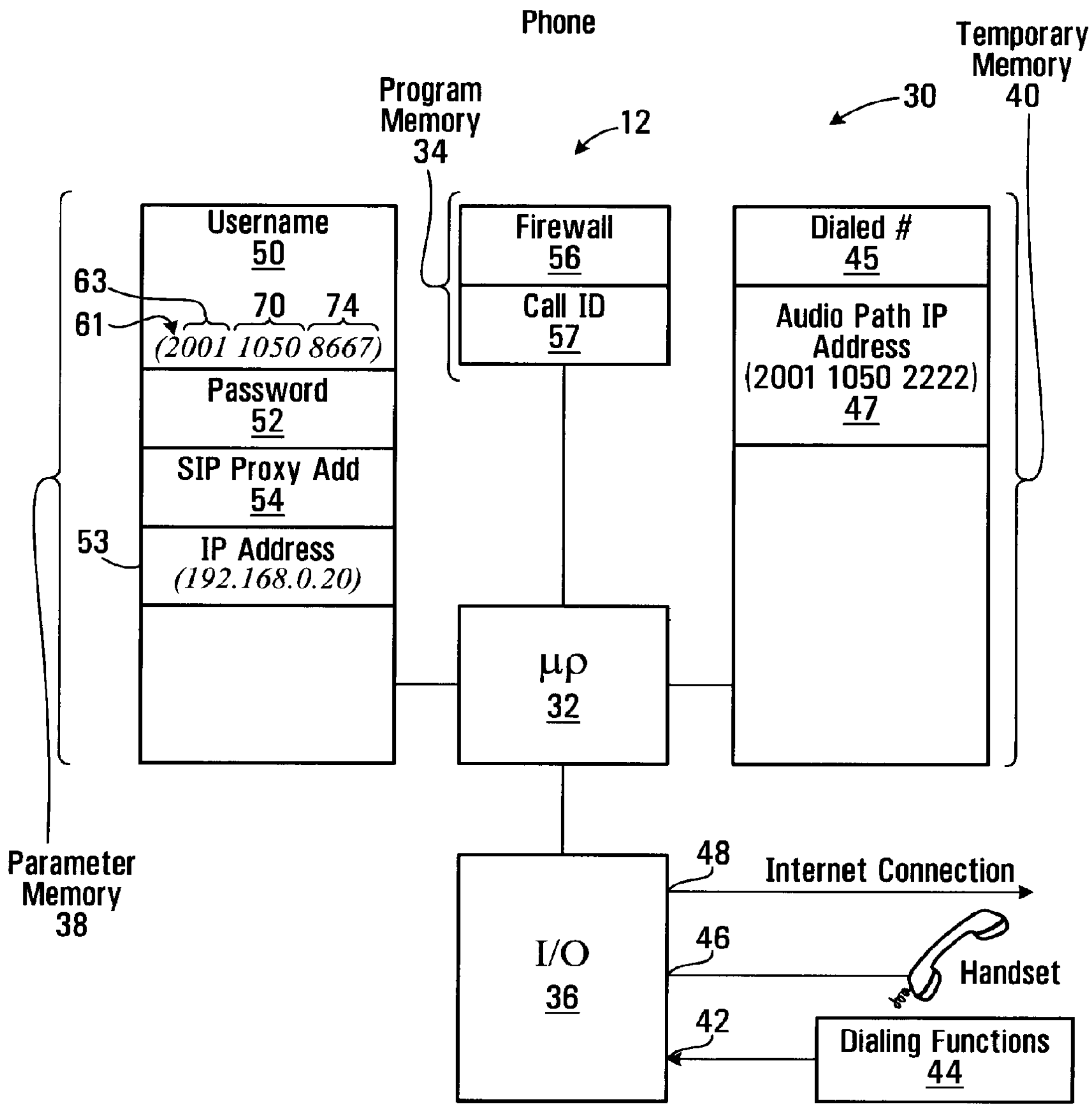

Phone
Program Memory 34
12
30
Temporary Memory 40
Username 50
63
61
70
74
(2001 1050 8667)
Password 52
SIP Proxy Add 54
53
IP Address (192.168.0.20)
Firewall 56
Call ID 57
Dialed # 45
Audio Path IP Address (2001 1050 2222) 47
μρ 32
I/O 36
48
Internet Connection
46
Handset
42
Dialing Functions 44
Parameter Memory 38

FIG. 2

SIP Invite Message

60	Caller	2001 1050 8667
62	Callee	2001 1050 2222
64	Digest Parameters	XXXXXXX
65	Call ID	FF10@ 192.168.0.20
67	IP Address	192.168.0.20
69	Caller UDP Port	1

FIG. 3

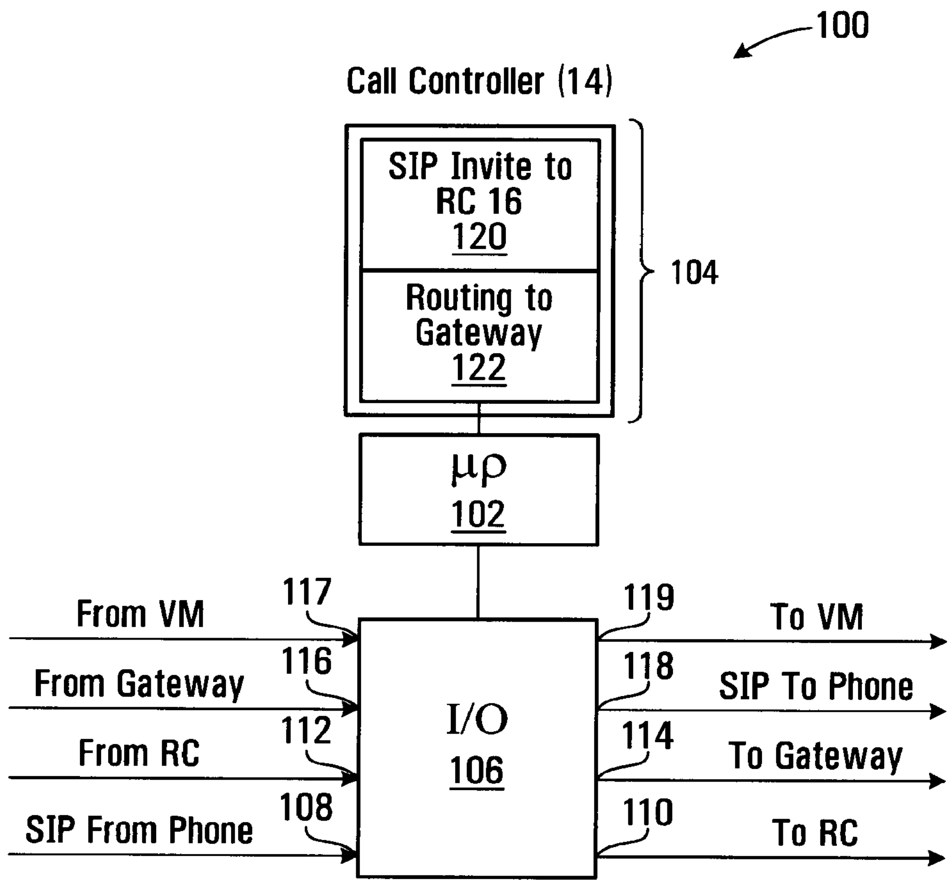


FIG. 4

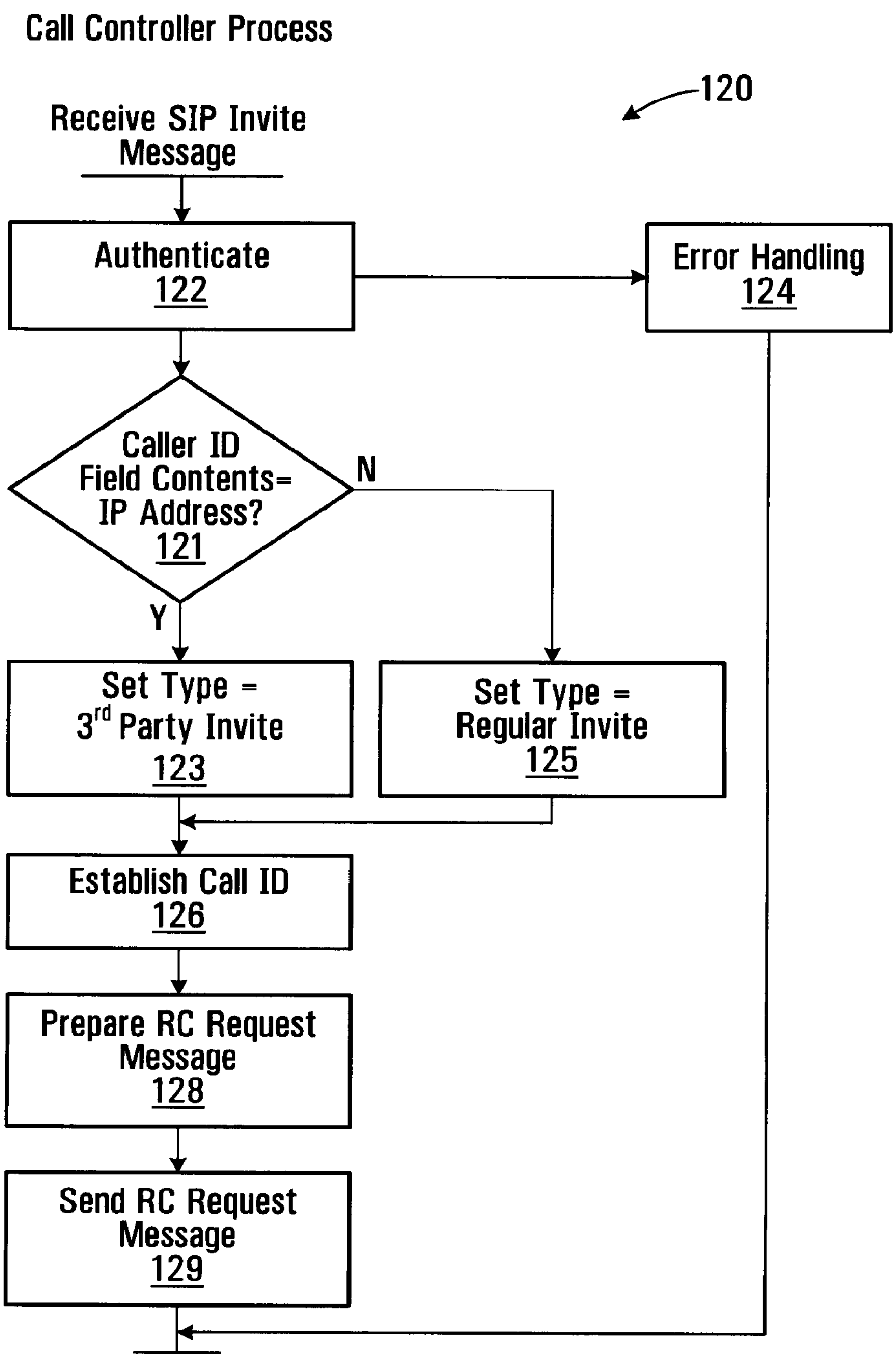

Call Controller Process
120
Receive SIP Invite Message
Authenticate 122
Error Handling 124
Caller ID Field Contents= IP Address? 121
N
Y
Set Type = 3rd Party Invite 123
Set Type = Regular Invite 125
Establish Call ID 126
Prepare RC Request Message 128
Send RC Request Message 129

FIG. 5

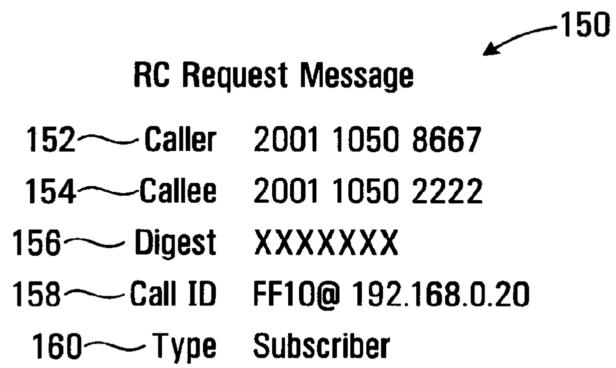

150
RC Request Message
152 Caller 2001 1050 8667
154 Callee 2001 1050 2222
156 Digest XXXXXXX
158 Call ID FF10@ 192.168.0.20
160 Type Subscriber

FIG. 6

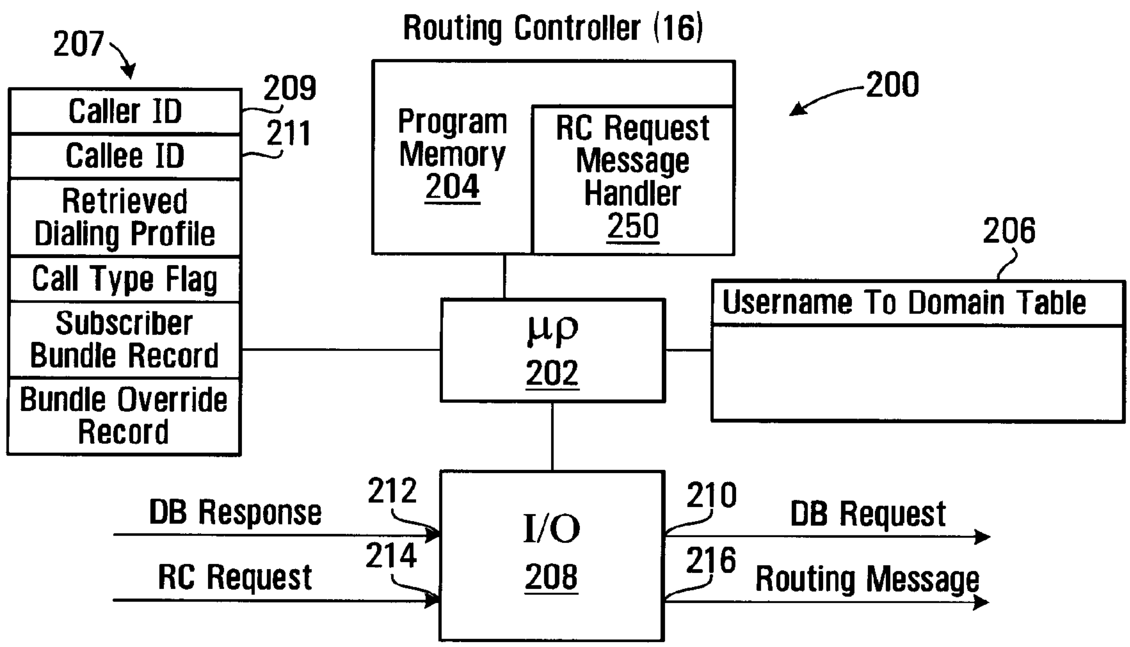

Routing Controller (16)
207
Caller ID
209
Callee ID
211
Retrieved Dialing Profile
Call Type Flag
Subscriber Bundle Record
Bundle Override Record
Program Memory 204
RC Request Message Handler 250
200
206
Username To Domain Table
µp 202
DB Response
212
RC Request
214
I/O 208
210
DB Request
216
Routing Message

FIG. 7

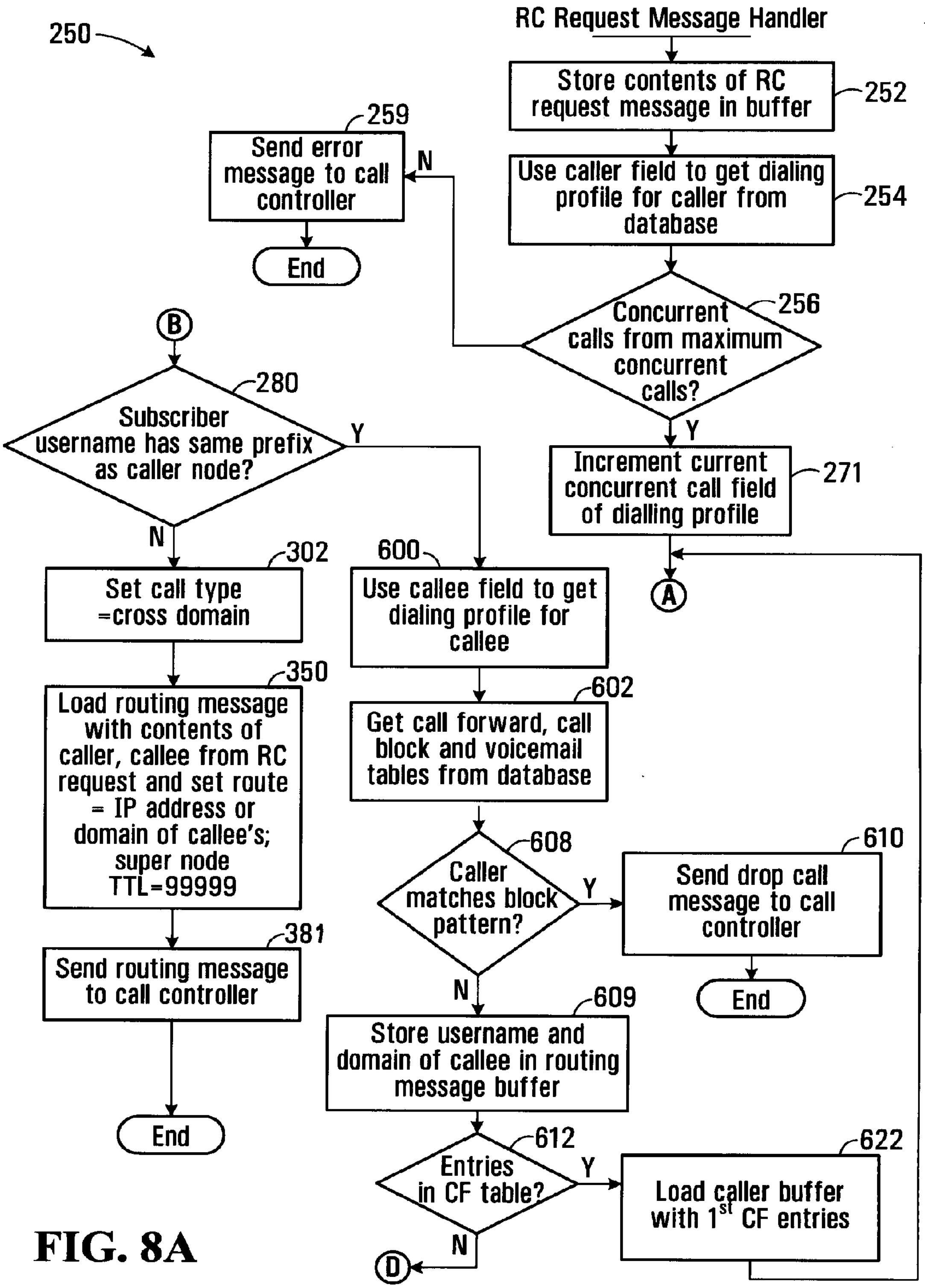

250
RC Request Message Handler
Store contents of RC request message in buffer
252
Use caller field to get dialing profile for caller from database
254
Concurrent calls from maximum concurrent calls?
256
N
Y
Send error message to call controller
259
End
Increment current concurrent call field of dialling profile
271
A
B
Subscriber username has same prefix as caller node?
280
Y
N
Set call type =cross domain
302
Load routing message with contents of caller, callee from RC request and set route = IP address or domain of callee's; super node TTL=99999
350
Send routing message to call controller
381
End
Use callee field to get dialing profile for callee
600
Get call forward, call block and voicemail tables from database
602
Caller matches block pattern?
608
Y
N
Send drop call message to call controller
610
End
Store username and domain of callee in routing message buffer
609
Entries in CF table?
612
Y
N
D
Load caller buffer with 1st CF entries
622

FIG. 8A

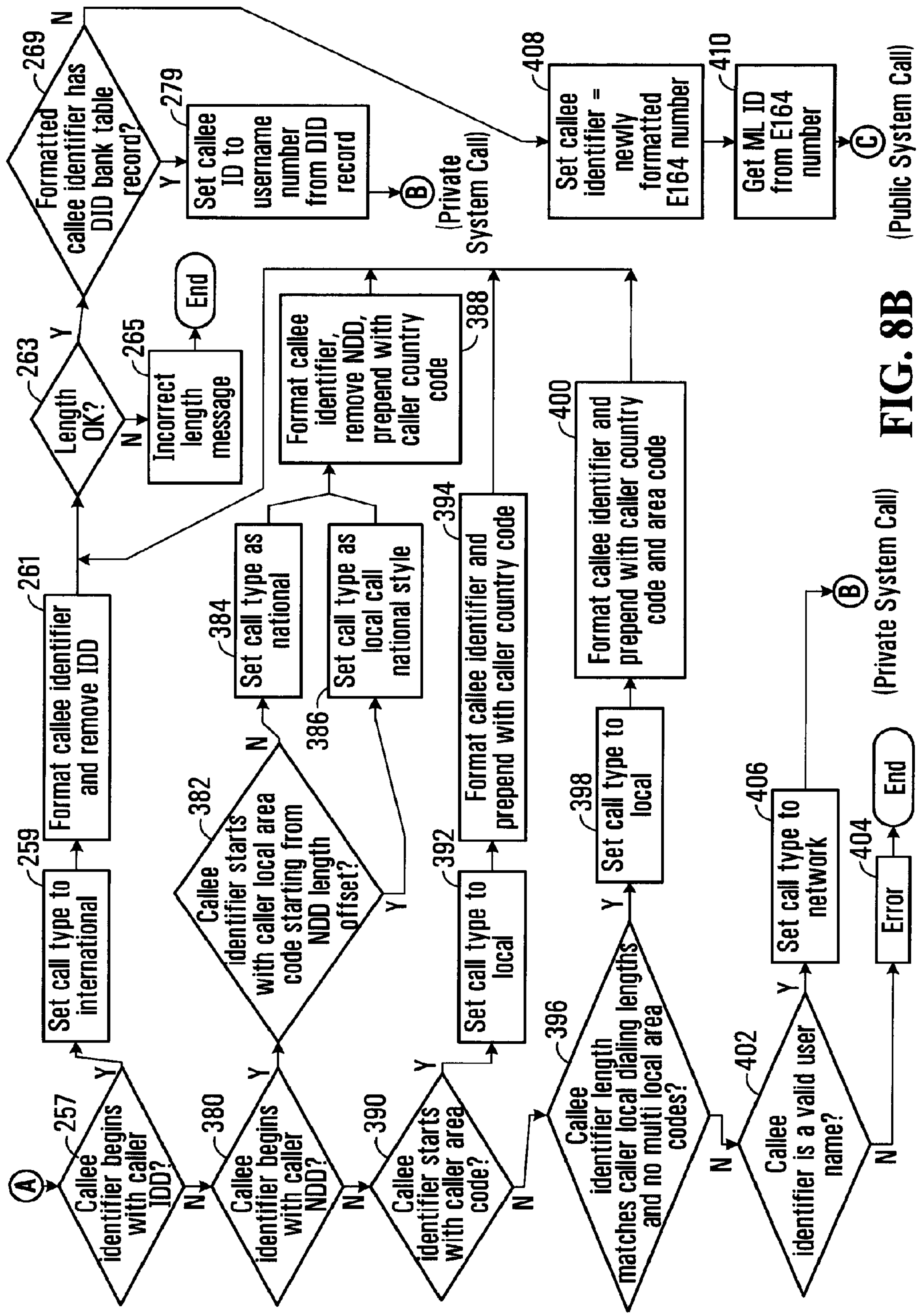

A
Callee identifier begins with caller IDD?
257
Y
N
Set call type to international
259
Format callee identifier and remove IDD
261
Length OK?
263
Y
N
Incorrect length message
265
End
Formatted callee identifier has DID bank table record?
269
Y
N
Set callee ID to username number from DID record
279
B
(Private System Call)
Callee identifier begins with caller NDD?
380
Callee identifier starts with caller local area code starting from NDD length offset?
382
Set call type as national
384
Set call type as local call national style
386
Format callee identifier, remove NDD, prepend with caller country code
388
Callee identifier starts with caller area code?
390
Set call type to local
392
Format callee identifier and prepend with caller country code
394
Callee identifier length matches caller local dialing lengths and no multi local area codes?
396
Set call type to local
398
Format callee identifier and prepend with caller country code and area code
400
Callee identifier is a valid user name?
402
Error
404
End
Set call type to network
406
B
(Private System Call)
Set callee identifier = newly formatted E164 number
408
Get ML ID from E164 number
410
C
(Public System Call)

FIG. 8B

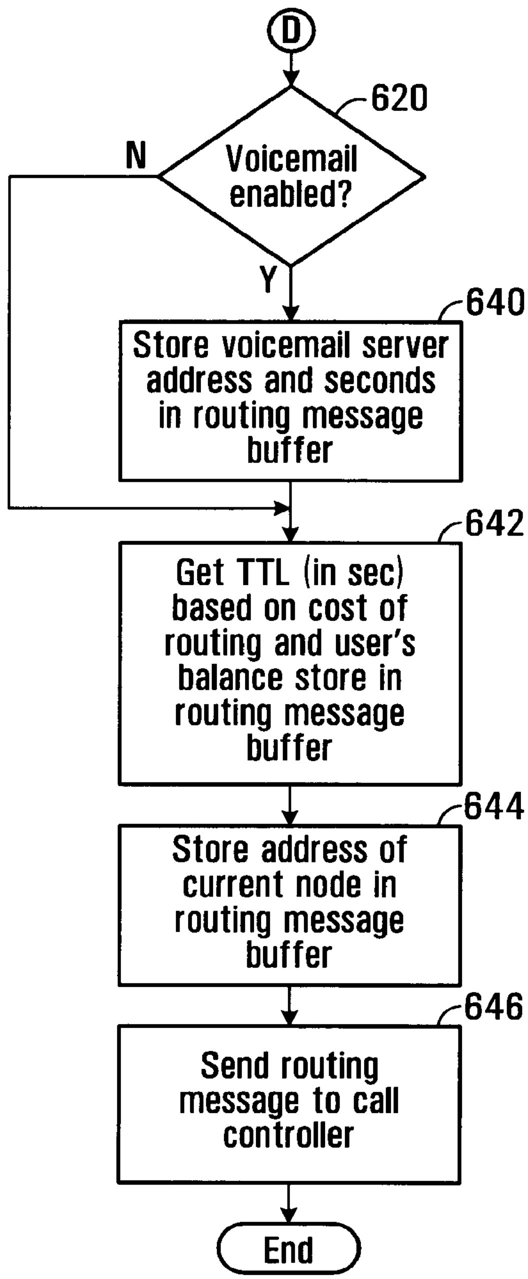

D
620
Voicemail enabled?
N
Y
640
Store voicemail server address and seconds in routing message buffer
642
Get TTL (in sec) based on cost of routing and user's balance store in routing message buffer
644
Store address of current node in routing message buffer
646
Send routing message to call controller
End

FIG. 8C

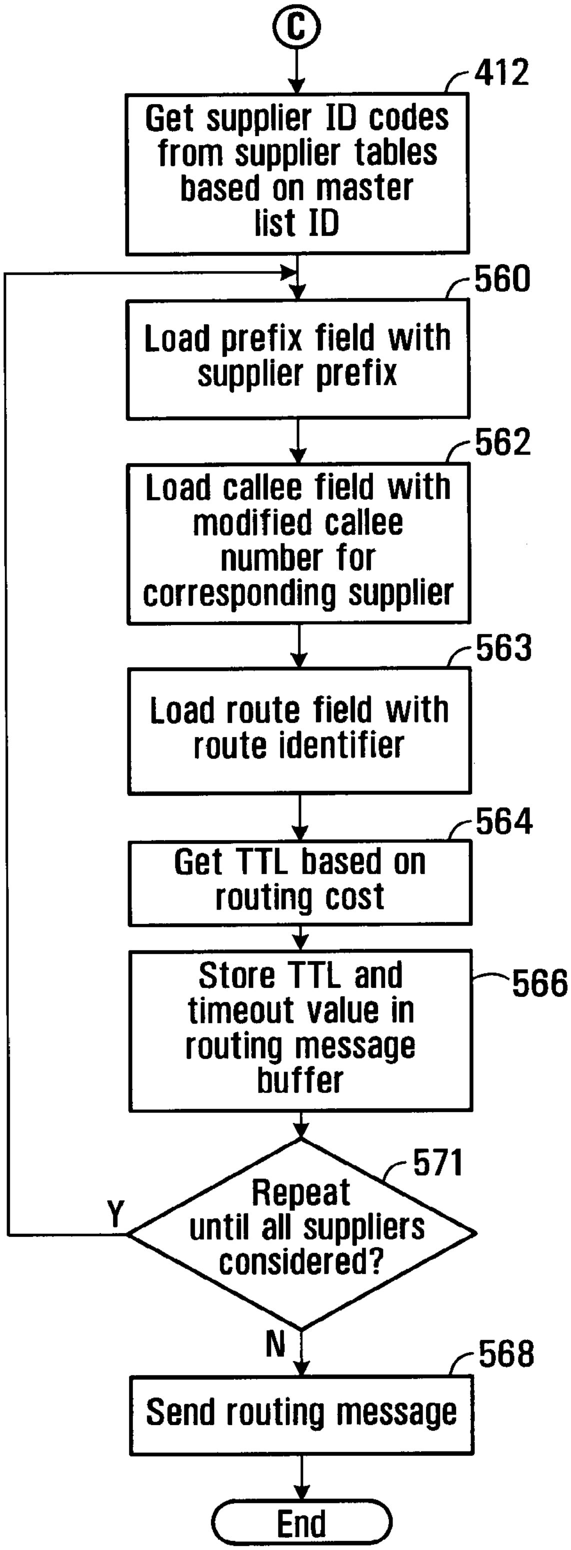

C
412
Get supplier ID codes from supplier tables based on master list ID
560
Load prefix field with supplier prefix
562
Load callee field with modified callee number for corresponding supplier
563
Load route field with route identifier
564
Get TTL based on routing cost
566
Store TTL and timeout value in routing message buffer
571
Repeat until all suppliers considered?
Y
N
568
Send routing message
End

FIG. 8D

253

Dialing Profile for a User

258 Username	Assigned on Subscription
260 Domain	Domain Associated with User
262 NDD	1
264 IDD	011
266 Country Code	1
267 Local Area Codes	604;778
268 Caller Minimum Local Length	10
270 Caller Maximum Local Length	10
273 Reseller	Retailer
275 Maximum # of concurrent calls	Assigned on Subscription
277 Current # of concurrent calls	Assigned on Subscription

FIG. 9

Dialing Profile for Caller (Vancouver Subscriber)

276

61 284 63 70 74

258 Username	2001 1050 8667
260 Domain	sp.yvr.digifonica.com 282
262 NDD	1
264 IDD	011
266 Country Code	1
267 Local Area Codes	604;778 (Vancouver)
268 Caller Minimum Local Length	10
270 Caller Maximum Local Length	10
273 Reseller	Klondike
275 Maximum # of concurrent calls	5
277 Current # of concurrent calls	0

286 288 290

FIG. 10

Callee Profile for Calgary Subscriber

Username	2001 1050 2222
Domain	sp.yvr.digifonica.com
NDD	1
IDD	011
Country Code	1
Local Area Codes	403 (Calgary)
Caller Minimum Local Length	7
Caller Maximum Local Length	10
Reseller	Deerfoot
Maximum # of concurrent calls	5
Current # of concurrent calls	0

FIG. 11

Callee Profile for London Subscriber

Username	4401 1062 4444
Domain	sp.lhr.digifonica.com
NDD	0
IDD	00
Country Code	44
Local Area Codes	20 (London)
Caller Minimum Local Length	10
Caller Maximum Local Length	11
Reseller	Marble Arch
Maximum # of concurrent calls	5
Current # of concurrent calls	0

FIG. 12

278

DID Bank Table Record Format

281	Username	System subscriber
272	User Domain	Host name of supernode
274	DID	E164#

FIG. 13

300

61

DID Bank Table Record for Calgary Subscriber

281	Username	2001 1050 2222
272	User Domain	Sp.yvr.digifonica.com
274	DID	1 604 867 5309

283 285 287 289

FIG. 14

352

Routing Message Format

354	Supplier Prefix (optional)	Code identifying supplier traffic
356	Delimiter (optional)	Symbol separating fields
358	Callee	PSTN compatible number or Digifonica number
360	Route	Domain name or IP address
362	Time to Live(TTL)	In seconds
364	Other	TBD

FIG. 15

366

Example of Routing Message - Different Node

$\underbrace{\text{4401106244444}}_{359}\text{@}\underbrace{\text{sp.lhr.digifonica.com}}_{361}\text{;}\underbrace{\text{ttl=9999}}_{363}$

FIG. 16

370

Prefix to Supernode Table Record Format

372	Prefix	First n digits of callee identifier
374	Supernode Address	IP address or fully qualified domain name

FIG. 17

Prefix to Supernode Table Record for Calgary Subscriber

Prefix	20
Supernode Address	sp.yvr.digifonica.com

FIG. 18

Master List Record Format

500	ml_id	Alphanumeric
502	Dialing code	Number Sequence
504	Country code	The country code is the national prefix to be used when dialing TO a particular country FROM another country.
506	Nat Sign #(Area Code)	Number Sequence
508	Min Length	Numeric
510	Max Length	Numeric
512	NDD	The NDD prefix is the access code used to make a call **WITHIN** that country from one city to another (when calling another city in the same vicinity, this may not be necessary).
514	IDD	The **IDD prefix** is the international prefix needed to dial a call **FROM** the country listed **TO** another country.
516	Buffer rate	Safe change rate above the highest rate charged by suppliers

FIG. 19

Example: Master List Record with Populated Fields

ml_id	1019
Dialing code	1604
Country code	1
Nat Sign #(Area Code)	604
Min Length	7
Max Length	7
NDD	1
IDD	011
Buffer rate	$0.009/min

FIG. 20

Suppliers List Record Format

540	Sup_id	Name code
542	MI_id	Numeric code
544	Prefix (optional)	String identifying supplier's traffic #
546	Specific Route	IP address
548	NDD/IDD rewrite	
550	Rate	Cost per second to Digifonica to use this route
551	Timeout	Maximum time to wait for a response when requesting this gateway

FIG. 21

Telus Supplier Record

Sup_id	2010 (Telus)
MI_id	1019
Prefix (optional)	4973#
Specific Route	72.64.39.58
NDD/IDD rewrite	011
Rate	$0.02/min
Timeout	20

FIG. 22

Shaw Supplier Record

Sup_id	2011 (Shaw)
MI_id	1019
Prefix (optional)	4974#
Specific Route	73.65.40.59
NDD/IDD rewrite	011
Rate	$0.025/min
Timeout	30

FIG. 23

Sprint Supplier Record

Sup_id	2012 (Sprint)
MI_id	1019
Prefix (optional)	4975#
Specific Route	74.66.41.60
NDD/IDD rewrite	011
Rate	$0.03/min
Timeout	40

FIG. 24

Routing Message Buffer for Gateway Call

4973#0116048675309@72.64.39.58;ttl=3600;to=20 570
4974#0116048675309@73.65.40.59;ttl=3600;to=30 572
4975#0116048675309@74.66.41.60;ttl=3600;to=40 574

FIG. 25

Call Block Table Record Format

604	Username	Digifonica #
606	Block Pattern	PSTN compatible or Digifonica #

FIG. 26

Call Block Table Record for Calgary Callee

604	Username of Callee	2001 1050 2222
606	Block Pattern	2001 1050 8664

FIG. 27

Call Forwarding Table Record Format for Callee

614	Username of Callee	Digifonica #
616	Destination Number	Digifonica #
618	Sequence Number	Integer indicating order to try this

FIG. 28

Call Forwarding Table Record for Calgary Callee

614	Username of Callee	2001 1050 2222
616	Destination Number	2001 1055 2223
618	Sequence Number	1

FIG. 29

Voicemail Table Record Format

624	Username of Callee	Digifonica #
626	Vm Server	domain name
628	Seconds to Voicemail	time to wait before engaging voicemail
630	Enabled	yes/no

FIG. 30

Voicemail Table Record for Calgary Callee

Username of Callee	2001 1050 2222
Vm Server	vm.yvr.digifonica.com
Seconds to Voicemail	20
Enabled	1

FIG. 31

Routing Message Buffer - Same Node

650	200110502222@sp.yvr.digifonica.com;ttl=3600
652	200110552223@sp.yvr.digifonica.com;ttl=3600
654	vm.yvr.digifonica.com;20;ttl=60
656	sp.yvr.digifonica.com

FIG. 32

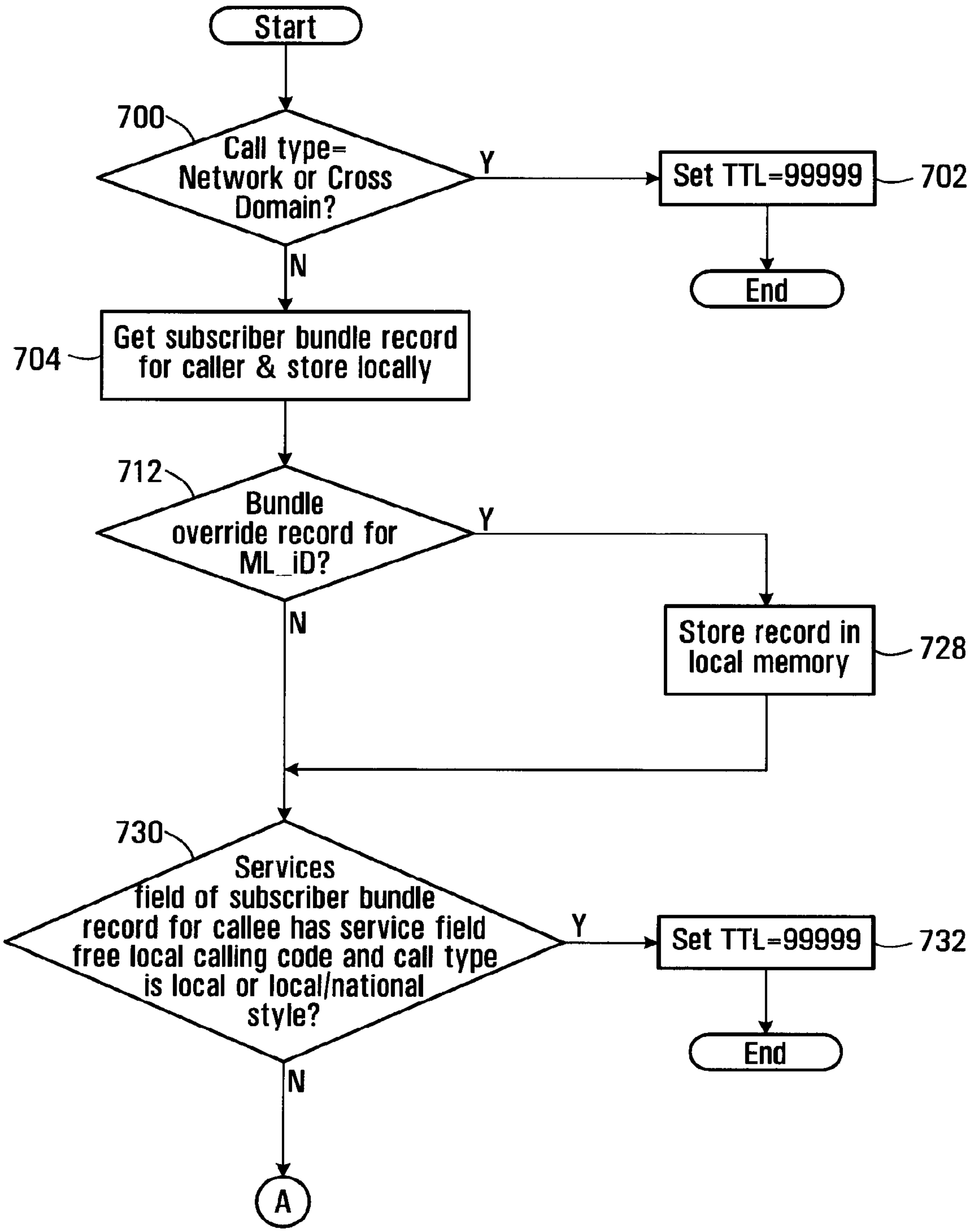

Start
700
Call type= Network or Cross Domain?
Y
Set TTL=99999
702
End
N
704
Get subscriber bundle record for caller & store locally
712
Bundle override record for ML_iD?
Y
Store record in local memory
728
N
730
Services field of subscriber bundle record for callee has service field free local calling code and call type is local or local/national style?
Y
Set TTL=99999
732
End
N
A

FIG. 33A

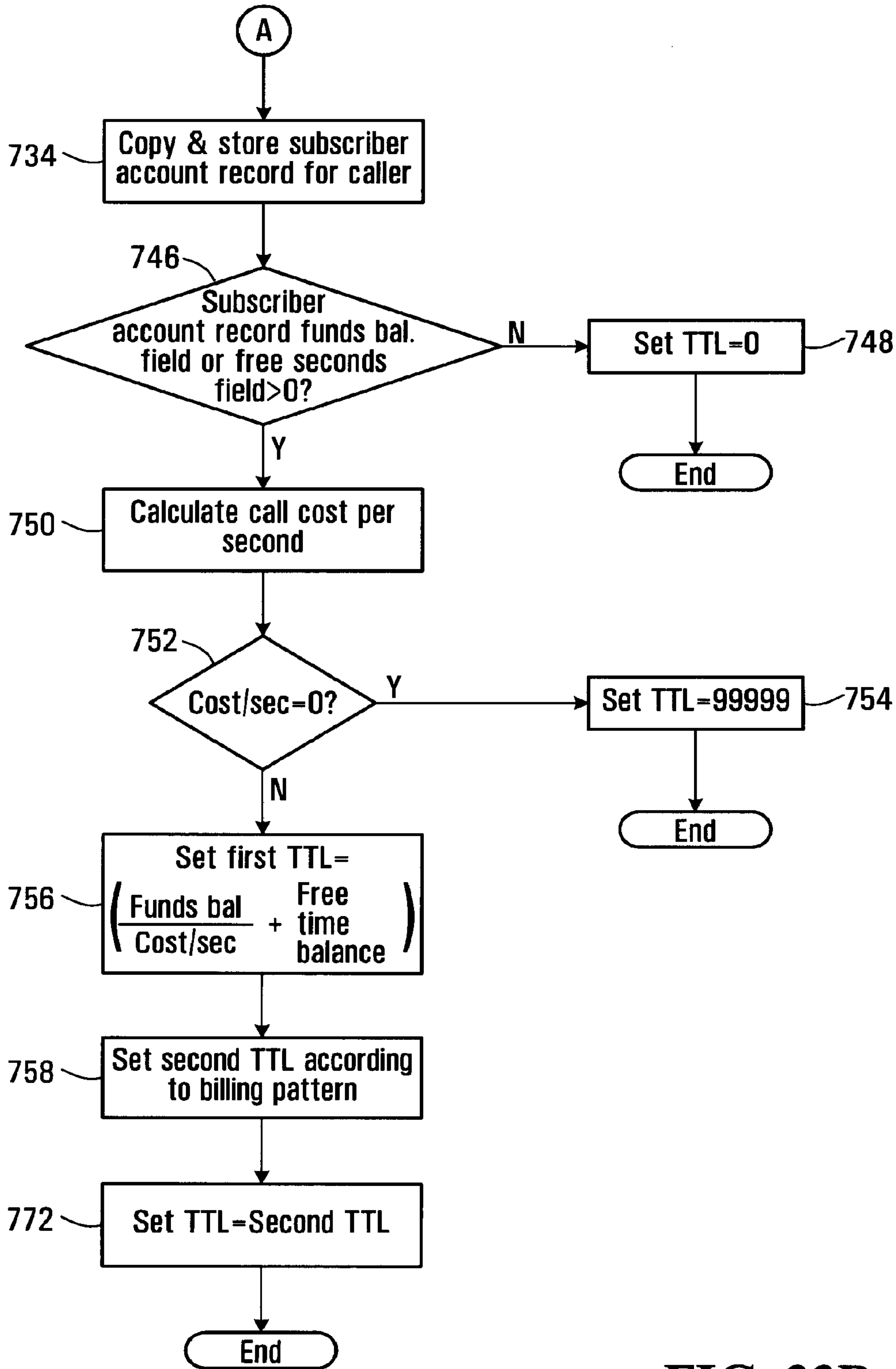

A
734
Copy & store subscriber account record for caller
746
Subscriber account record funds bal. field or free seconds field>0?
N
Set TTL=0
748
End
Y
750
Calculate call cost per second
752
Cost/sec=0?
Y
Set TTL=99999
754
End
N
756
Set first TTL=
Funds bal / Cost/sec + Free time balance
758
Set second TTL according to billing pattern
772
Set TTL=Second TTL
End

FIG. 33B

706

Subscriber Bundle Table Record

708	Username	Subscriber username
710	Services	Codes identifying service features (e.g. Free local calling; call blocking, voicemail)

FIG. 34

Subscriber Bundle Record for Vancouver Caller

708	Username	2001 1050 8667
710	Services	10; 14; 16

FIG. 35

714

Bundle Override Table Record

716	ML_Id	Master list ID code
718	Override type	Fixed; percent; cents
720	Override value	real number representing value of override type
722	Inc1	first level of charging (minimum # of seconds) charge
724	Inc2	second level of charging

FIG. 36

726

Bundle Override Record for Located ML_iD

716	ML_Id	1019
718	Override type	percent
720	Override value	10.0
722	Inc1	30 seconds
724	Inc2	6 seconds

FIG. 37

736

Subscriber Account Table Record

738	Username	Subscriber username
740	Funds balance	real number representing $ value of credit
742	Free time balance	integer representing # of free seconds

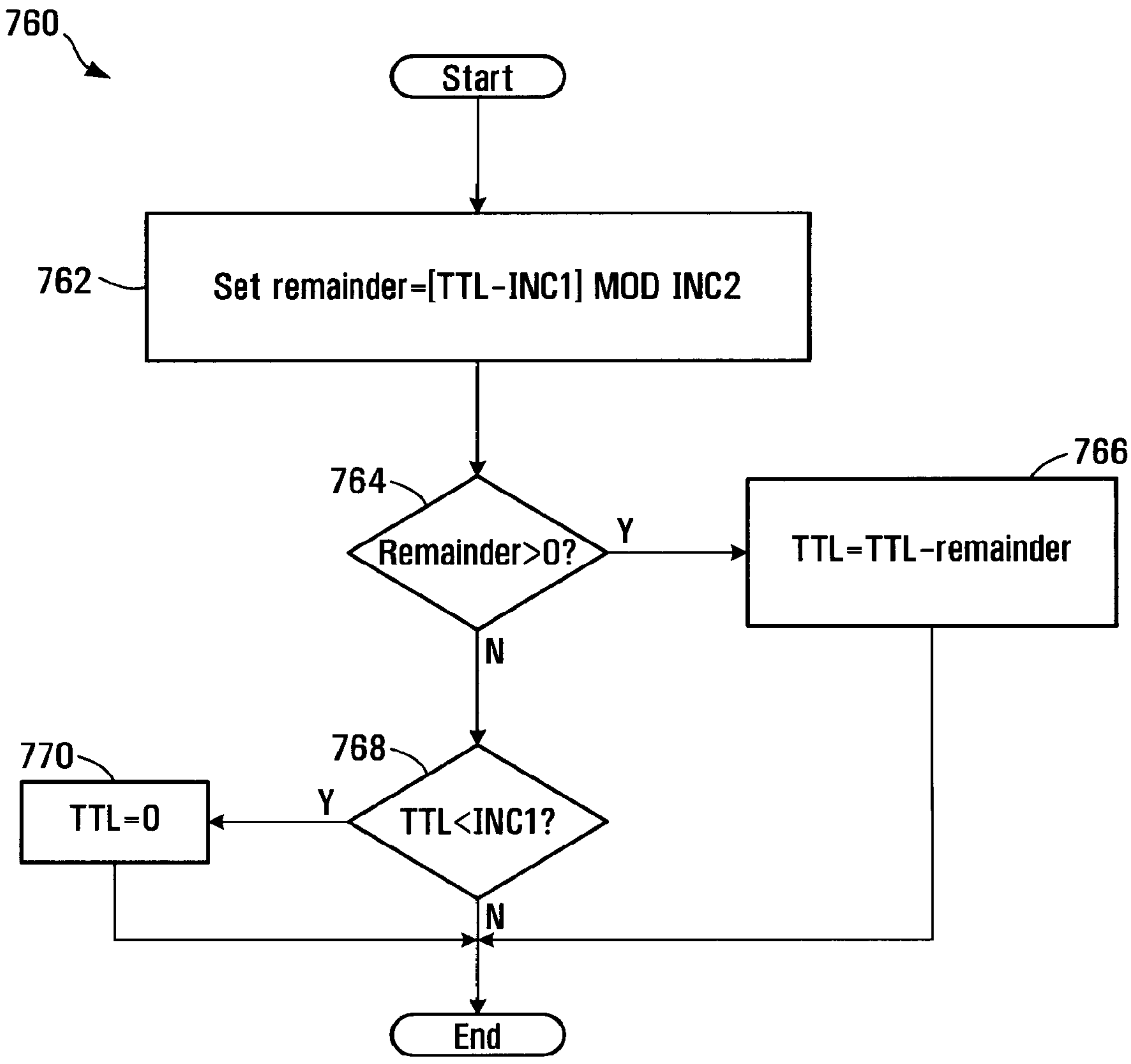
FIG. 38

744

Subscriber Account Record for Vancouver Caller

738	Username	2001 1050 8667
740	Funds balance	$10.00
742	Free time balance	100

FIG. 39



760
Start
762
Set remainder=[TTL-INC1] MOD INC2
764
Remainder>0?
Y
766
TTL=TTL-remainder
N
768
TTL<INC1?
Y
770
TTL=0
N
End

FIG. 40

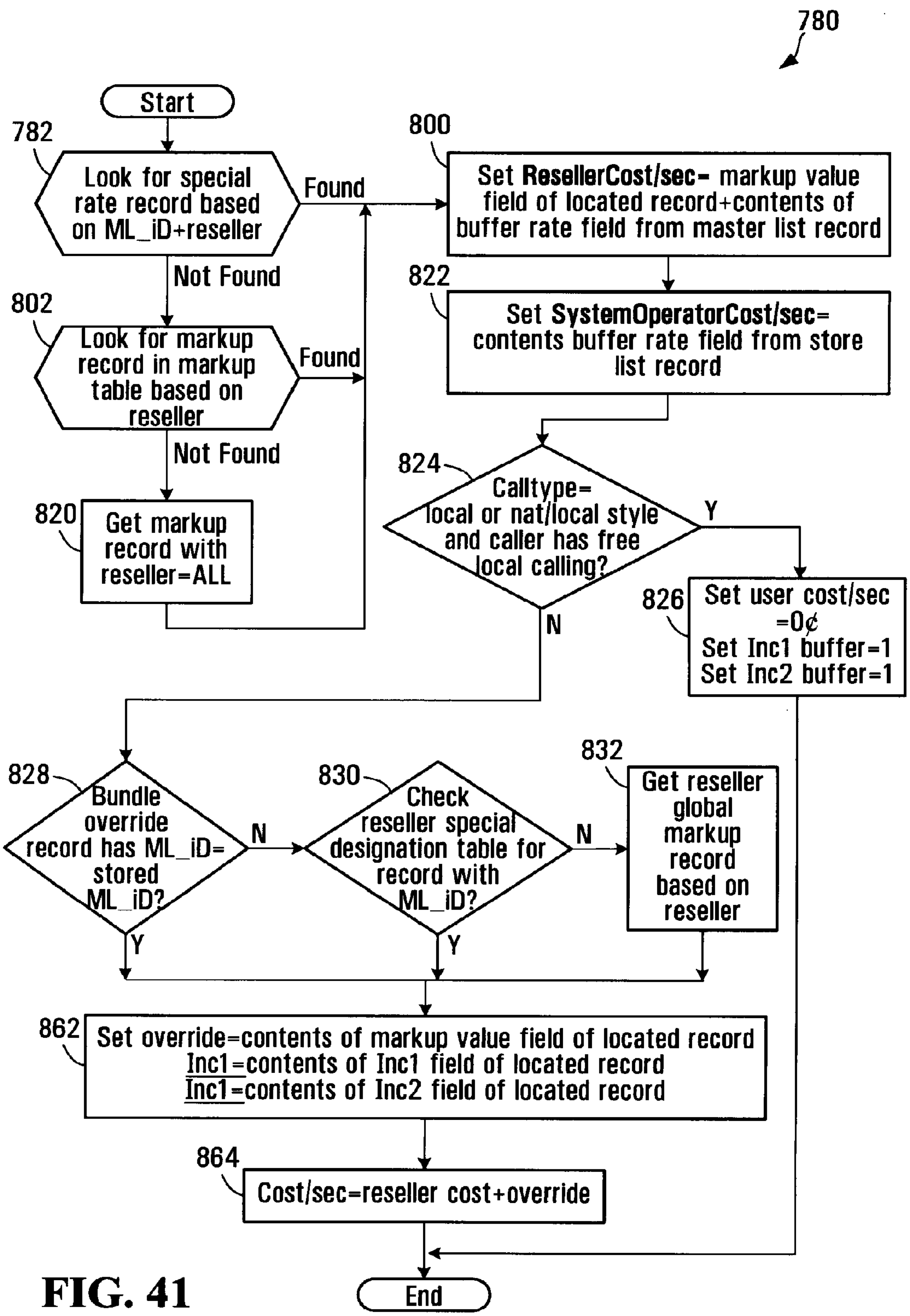

780
Start
782
Look for special rate record based on ML_iD+reseller
Found
800
Set ResellerCost/sec= markup value field of located record+contents of buffer rate field from master list record
Not Found
802
Look for markup record in markup table based on reseller
Found
822
Set SystemOperatorCost/sec= contents buffer rate field from store list record
Not Found
820
Get markup record with reseller=ALL
824
Calltype= local or nat/local style and caller has free local calling?
Y
N
826
Set user cost/sec =0¢ Set Inc1 buffer=1 Set Inc2 buffer=1
828
Bundle override record has ML_iD= stored ML_iD?
N
Y
830
Check reseller special designation table for record with ML_iD?
N
Y
832
Get reseller global markup record based on reseller
862
Set override=contents of markup value field of located record
Inc1=contents of Inc1 field of located record
Inc1=contents of Inc2 field of located record
864
Cost/sec=reseller cost+override
End

FIG. 41

784

System Operator Special Rates Table Record

786	Reseller	retailer id
788	ML_Id	master list id
790	Markup Table	fixed; percent; cents
792	Markup Value	real number representing value of markup type
794	Inc1	first level of charging (minimum # of seconds) charge
796	Inc2	second level of charging

FIG. 42

798

System Operator Special Rates Table Record for Klondike

786	Reseller	Klondike
788	ML_Id	1019
790	Markup Table	cents
792	Markup Value	$0.001
794	Inc1	30
796	Inc2	6

FIG. 43

804

System Operator Markup Table Record

806	**Reseller**	reseller id code
808	**Markup Table**	fixed; percent; cents
810	**Markup Value**	real number representing value of markup type
812	**Inc1**	first level of charging (minimum # of seconds) charge
814	**Inc2**	second level of charging

FIG. 44

System Operator Markup Table Record for the Reseller Klondike

806	**Reseller**	Klondike
808	**Markup Table**	cents
810	**Markup Value**	$0.01
812	**Inc1**	30
814	**Inc2**	6

FIG. 45

System Operator Markup Table Record

806	**Reseller**	all
808	**Markup Table**	percent
810	**Markup Value**	1.0
812	**Inc1**	30
814	**Inc2**	6

FIG. 46

832

Reseller Special Destinations Table Record

834	**Reseller**	reseller id code
836	**ML_id**	Master List ID code
838	**Markup Table**	fixed; percent; cents
840	**Markup Value**	real number representing value of markup type
842	**Inc1**	first level of charging (minimum # of seconds) charge
844	**Inc2**	second level of charging

FIG. 47

846

Reseller Special Destinations Table Record for the Reseller Klondike

834	**Reseller**	Klondike
836	**ML_id**	1019
838	**Markup Table**	percent
840	**Markup Value**	5%
842	**Inc1**	30
844	**Inc2**	6

FIG. 48

848

Reseller Global Markup Table Record

850	**Reseller**	reseller id code
852	**Markup Table**	fixed; percent; cents
854	**Markup Value**	real number representing value of markup type
856	**Inc1**	first level of charging (minimum # of seconds) charge
858	**Inc2**	second level of charging

FIG. 49

860

Reseller Global Markup Table Record for the Reseller Klondike

850	**Reseller**	Klondike
852	**Markup Table**	percent
854	**Markup Value**	10%
856	**Inc1**	30
858	**Inc2**	6

FIG. 50

900

SIP Bye Message

902	**Caller**	Username
904	**Callee**	PSTN compatible # or Username
906	**Call ID**	unique call identifier (hexadecimal string@IP))

FIG. 51

908

SIP Bye Message

902	**Caller**	2001 1050 8667
904	**Callee**	2001 1050 2222
906	**Call ID**	FA10@192.168.0.20

FIG. 52

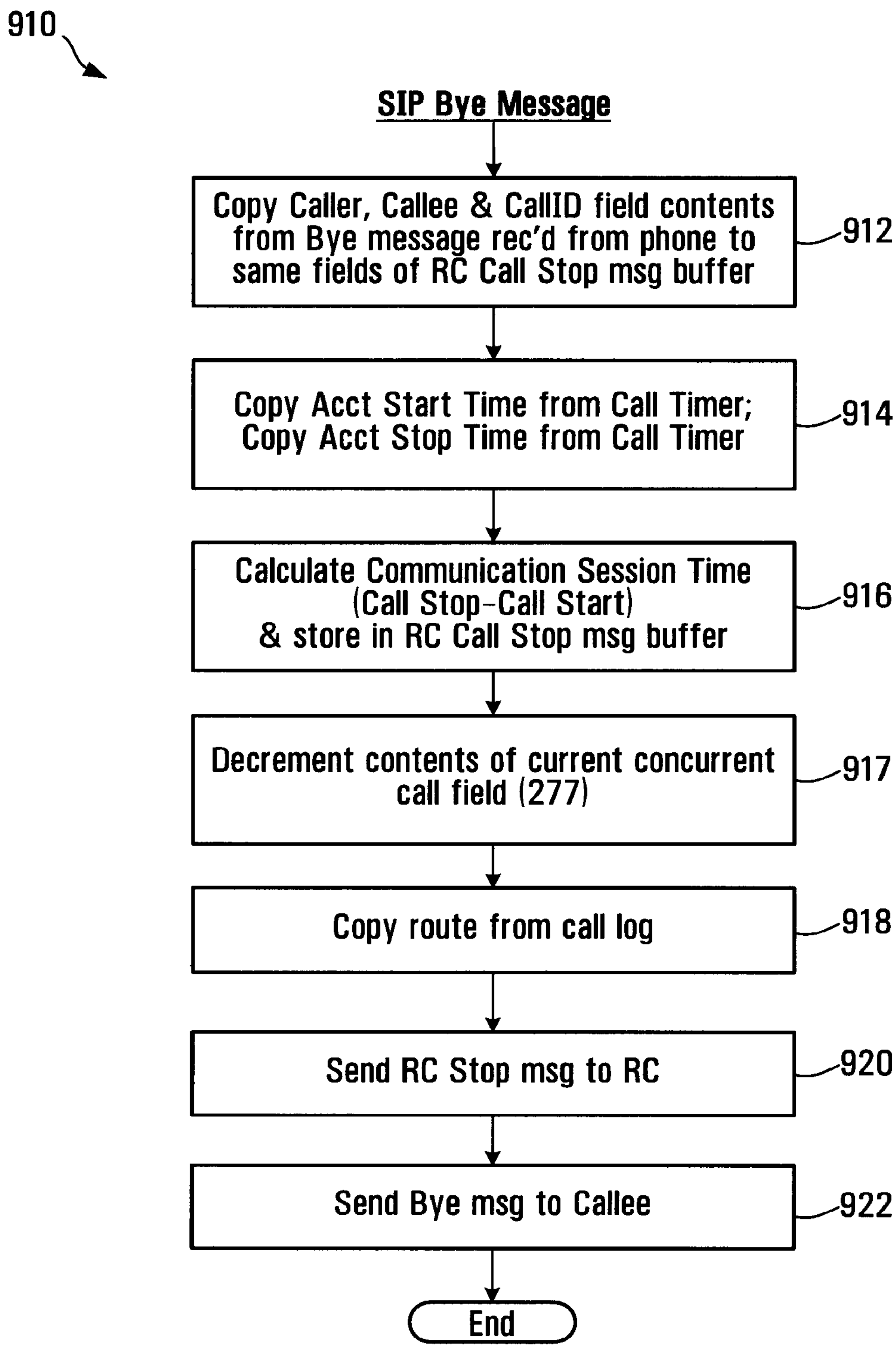

910
SIP Bye Message
Copy Caller, Callee & CallID field contents from Bye message rec'd from phone to same fields of RC Call Stop msg buffer
912
Copy Acct Start Time from Call Timer; Copy Acct Stop Time from Call Timer
914
Calculate Communication Session Time (Call Stop-Call Start) & store in RC Call Stop msg buffer
916
Decrement contents of current concurrent call field (277)
917
Copy route from call log
918
Send RC Stop msg to RC
920
Send Bye msg to Callee
922
End

FIG. 53

1000

RC Call Stop Message

1002	Caller	Username
1004	Callee	PSTN compatible # or Username
1006	Call ID	unique call identifier (hexadecimal string@IP)
1008	Acct Start Time	start time of call
1010	Acct Stop Time	time the call ended
1012	Acct Session Time	start time-stop time (in seconds)
1014	Route	IP address for the communications link that was established

FIG. 54

1020

RC Call Stop Message for Calgary Callee

1002	Caller	2001 1050 8667
1004	Callee	2001 1050 2222
1006	Call ID	FA10@192.168.0.20
1008	Acct Start Time	2006-12-30 12:12:12
1010	Acct Stop Time	2006-12-30 12:12:14
1012	Acct Session Time	2
1014	Route	72.64.39.58

FIG. 55

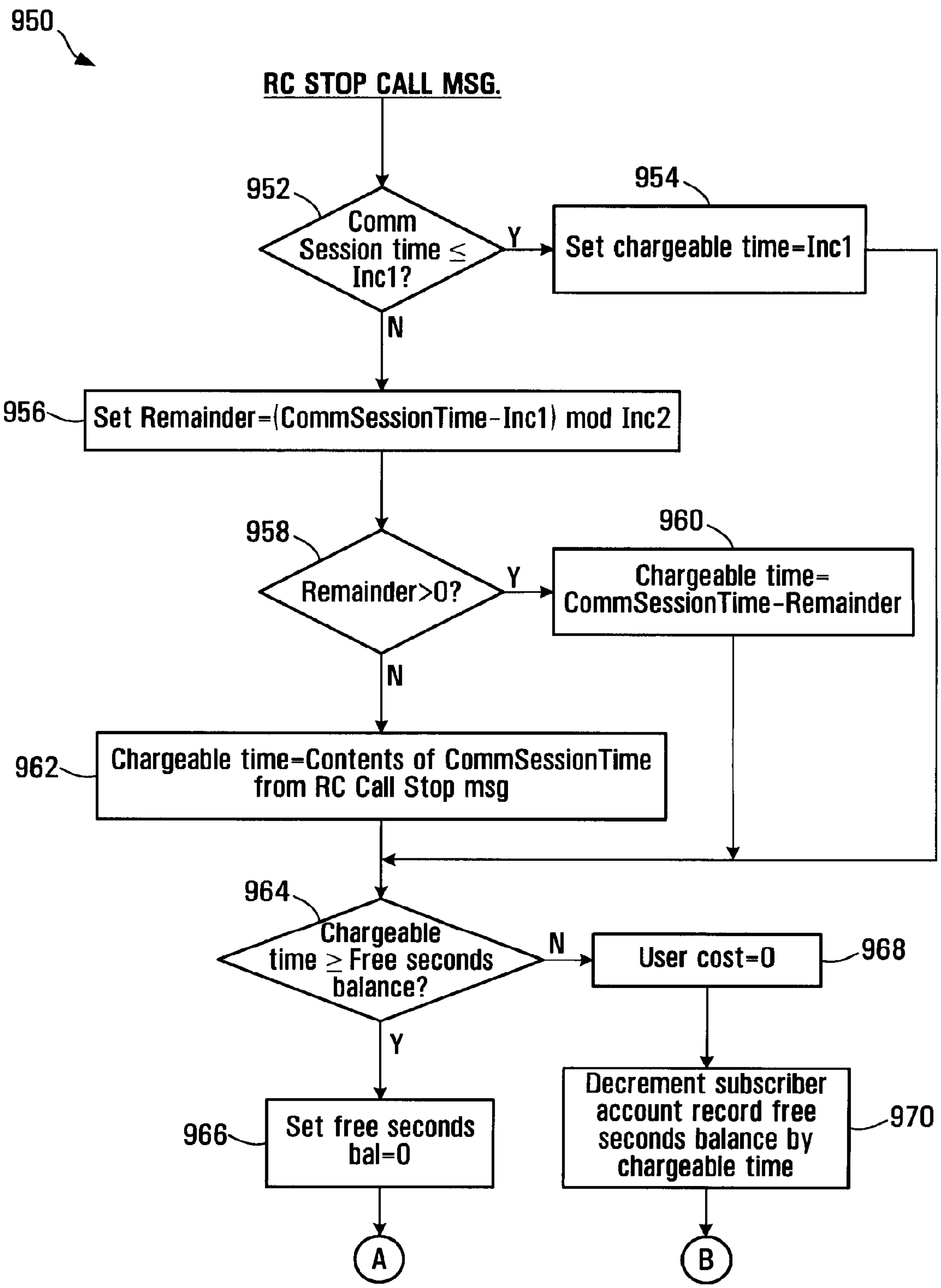

950
RC STOP CALL MSG.
952
Comm Session time ≤ Inc1?
Y
954
Set chargeable time=Inc1
N
956
Set Remainder=(CommSessionTime-Inc1) mod Inc2
958
Remainder>0?
Y
960
Chargeable time= CommSessionTime-Remainder
N
962
Chargeable time=Contents of CommSessionTime from RC Call Stop msg
964
Chargeable time ≥ Free seconds balance?
N
User cost=0
968
Y
966
Set free seconds bal=0
Decrement subscriber account record free seconds balance by chargeable time
970
A
B

FIG. 56A

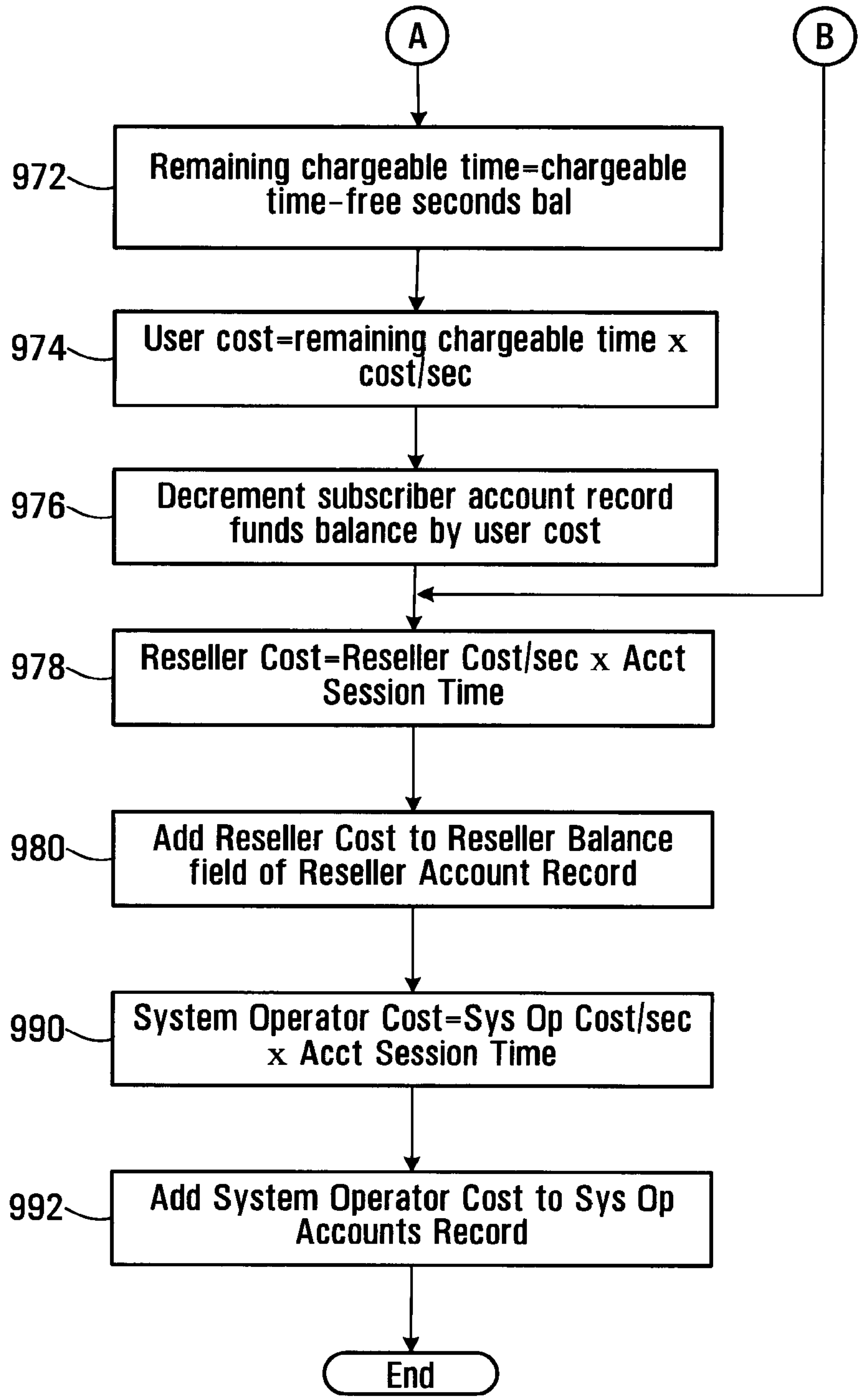

A
B
972
Remaining chargeable time=chargeable time-free seconds bal
974
User cost=remaining chargeable time x cost/sec
976
Decrement subscriber account record funds balance by user cost
978
Reseller Cost=Reseller Cost/sec x Acct Session Time
980
Add Reseller Cost to Reseller Balance field of Reseller Account Record
990
System Operator Cost=Sys Op Cost/sec x Acct Session Time
992
Add System Operator Cost to Sys Op Accounts Record
End

FIG. 56B

982

Reseller Accounts Table Record

984 Reseller ID reseller id code
986 Reseller balance accumulated balance of charges

FIG. 57

988

Reseller Accounts Table Record for Klondike

984 Reseller ID Klondike
986 Reseller balance $100.02

FIG. 58

994

System Operator Accounts Table Record

996 System Operator balance accumulated balance of charges

FIG. 59

System Operator Accounts Record for this System Operator

996 System Operator balance $1000.02

FIG. 60

PRODUCING ROUTING MESSAGES FOR VOICE OVER IP COMMUNICATIONS

CROSS REFERENCE TO RELATED APPLICATIONS

This application is a continuation of U.S. application Ser. No. 12/513,147, filed Mar. 1, 2010, which is a national phase entry of PCT/CA2007/001956, filed Nov. 1, 2007, which claims priority to U.S. Provisional Application No. 60/856,212, filed Nov. 2, 2006, all of which are incorporated in their entirety.

BACKGROUND OF THE INVENTION

1. Field of Invention

This invention relates to voice over IP communications and methods and apparatus for routing and billing.

2. Description of Related Art

Internet protocol (IP) telephones are typically personal computer (PC) based telephones connected within an IP network, such as the public Internet or a private network of a large organization. These IP telephones have installed "voice-over-IP" (VoIP) software enabling them to make and receive voice calls and send and receive information in data and video formats.

IP telephony switches installed within the IP network enable voice calls to be made within or between IP networks, and between an IP network and a switched circuit network (SCN), such as the public switched telephone network (PSTN). If the IP switch supports the Signaling System 7 (SS7) protocol, the IP telephone can also access PSTN databases.

The PSTN network typically includes complex network nodes that contain all information about a local calling service area including user authentication and call routing. The PSTN network typically aggregates all information and traffic into a single location or node, processes it locally and then passes it on to other network nodes, as necessary, by maintaining route tables at the node. PSTN nodes are redundant by design and thus provide reliable service, but if a node should fail due to an earthquake or other natural disaster, significant, if not complete service outages can occur, with no other nodes being able to take up the load.

Existing VoIP systems do not allow for high availability and resiliency in delivering Voice Over IP based Session Initiation Protocol (SIP) Protocol service over a geographically dispersed area such as a city, region or continent. Most resiliency originates from the provision of IP based telephone services to one location or a small number of locations such as a single office or network of branch offices.

SUMMARY OF THE INVENTION

In accordance with one aspect of the invention, there is provided a process for operating a call routing controller to facilitate communication between callers and callees in a system comprising a plurality of nodes with which callers and callees are associated. The process involves, in response to initiation of a call by a calling subscriber, receiving a caller identifier and a callee identifier. The process also involves using call classification criteria associated with the caller identifier to classify the call as a public network call or a private network call. The process further involves producing a routing message identifying an address, on the private network, associated with the callee when the call is classified as a private network call. The process also involves producing a

routing message identifying a gateway to the public network when the call is classified as a public network call.

The process may involve receiving a request to establish a call, from a call controller in communication with a caller identified by the callee identifier.

Using the call classification criteria may involve searching a database to locate a record identifying calling attributes associated with a caller identified by the caller identifier.

Locating a record may involve locating a caller dialing profile comprising a username associated with the caller, a domain associated with the caller, and at least one calling attribute.

Using the call classification criteria may involve comparing calling attributes associated with the caller dialing profile with aspects of the callee identifier.

Comparing may involve determining whether the callee identifier includes a portion that matches an IDD associated with the caller dialing profile.

Comparing may involve determining whether the callee identifier includes a portion that matches an NDD associated with the caller dialing profile.

Comparing may involve determining whether the callee identifier includes a portion that matches an area code associated with the caller dialing profile.

Comparing may involve determining whether the callee identifier has a length within a range specified in the caller dialing profile.

The process may involve formatting the callee identifier into a pre-defined digit format to produce a re-formatted callee identifier.

Formatting may involve removing an international dialing digit from the callee identifier, when the callee identifier begins with a digit matching an international dialing digit specified by the caller dialing profile associated with the caller.

Formatting may involve removing a national dialing digit from the callee identifier and prepending a caller country code to the callee identifier when the callee identifier begins with a national dialing digit.

Formatting may involve prepending a caller country code to the callee identifier when the callee identifier begins with digits identifying an area code specified by the caller dialing profile.

Formatting may involve prepending a caller country code and an area code to the callee identifier when the callee identifier has a length that matches a caller dialing number format specified by the caller dialing profile and only one area code is specified as being associated with the caller in the caller dialing profile.

The process may involve classifying the call as a private network call when the re-formatted callee identifier identifies a subscriber to the private network.

The process may involve determining whether the callee identifier complies with a pre-defined username format and if so, classifying the call as a private network call.

The process may involve causing a database of records to be searched to locate a direct in dial (DID) bank table record associating a public telephone number with the reformatted callee identifier and if the DID bank table record is found, classifying the call as a private network call and if a DID bank table record is not found, classifying the call as a public network call.

Producing the routing message identifying a node on the private network may involve setting a callee identifier in response to a username associated with the DID bank table record.

Producing the routing message may involve determining whether a node associated with the reformatted callee identifier is the same as a node associated the caller identifier.

Determining whether a node associated with the reformatted callee identifier is the same as a node associated the caller identifier may involve determining whether a prefix of the re-formatted callee identifier matches a corresponding prefix of a username associated with the caller dialing profile.

When the node associated with the caller is not the same as the node associated with the callee, the process involves producing a routing message including the caller identifier, the reformatted callee identifier and an identification of a private network node associated with the callee and communicating the routing message to a call controller.

When the node associated with the caller is the same as the node associated with the callee, the process involves determining whether to perform at least one of the following: forward the call to another party, block the call and direct the caller to a voicemail server associated with the callee.

Producing the routing message may involve producing a routing message having an identification of at least one of the callee identifier, an identification of a party to whom the call should be forwarded and an identification of a voicemail server associated with the callee.

Producing a routing message identifying a gateway to the public network may involve searching a database of route records associating route identifiers with dialing codes to find a route record having a dialing code having a number pattern matching at least a portion of the reformatted callee identifier.

The process may involve communicating the routing message to a call controller.

The process may involve searching a database of supplier records associating supplier identifiers with the route identifiers to locate at least one supplier record associated with the route identifier associated with the route record having a dialing code having a number pattern matching at least a portion of the reformatted callee identifier.

The process may involve loading a routing message buffer with the reformatted callee identifier and an identification of specific routes associated respective ones of the supplier records associated with the route record and loading the routing message buffer with a time value and a timeout value.

The process may involve communicating a routing message involving the contents of the routing message buffer to a call controller.

The process may involve causing the dialing profile to include a maximum concurrent call value and a concurrent call count value and causing the concurrent call count value to be incremented when the user associated with the dialing profile initiates a call and causing the concurrent call count value to be decremented when a call with the user associated with the dialing profile is ended.

In accordance with another aspect of the invention, there is provided a call routing apparatus for facilitating communications between callers and callees in a system comprising a plurality of nodes with which callers and callees are associated. The apparatus includes receiving provisions for receiving a caller identifier and a callee identifier, in response to initiation of a call by a calling subscriber. The apparatus also includes classifying provisions for classifying the call as a private network cal or a public network call according to call classification criteria associated with the caller identifier. The apparatus further includes provisions for producing a routing message identifying an address, on the private network, associated with the callee when the call is classified as a private network call. The apparatus also includes provisions for producing a routing message identifying a gateway to the public network when the call is classified as a public network call.

The receiving provisions may be operably configured to receive a request to establish a call, from a call controller in communication with a caller identified by the callee identifier.

The apparatus may further include searching provisions for searching a database including records associating calling attributes with subscribers to the private network to locate a record identifying calling attributes associated with a caller identified by the caller identifier.

The records may include dialing profiles each including a username associated with the subscriber, an identification of a domain associated with the subscriber, and an identification of at least one calling attribute associated with the subscriber.

The call classification provisions may be operably configured to compare calling attributes associated with the caller dialing profile with aspects of the callee identifier.

The calling attributes may include an international dialing digit and call classification provisions may be operably configured to determine whether the callee identifier includes a portion that matches an IDD associated with the caller dialing profile.

The calling attributes may include an national dialing digit and the call classification provisions may be operably configured to determine whether the callee identifier includes a portion that matches an NDD associated with the caller dialing profile.

The calling attributes may include an area code and the call classification provisions may be operably configured to determine whether the callee identifier includes a portion that matches an area code associated with the caller dialing profile.

The calling attribute may include a number length range and the call classification provisions may be operably configured to determine whether the callee identifier has a length within a number length range specified in the caller dialing profile.

The apparatus may further include formatting provisions for formatting the callee identifier into a pre-defined digit format to produce a re-formatted callee identifier.

The formatting provisions may be operably configured to remove an international dialing digit from the callee identifier, when the callee identifier begins with a digit matching an international dialing digit specified by the caller dialing profile associated with the caller.

The formatting provisions may be operably configured to remove a national dialing digit from the callee identifier and prepend a caller country code to the callee identifier when the callee identifier begins with a national dialing digit.

The formatting provisions may be operably configured to prepend a caller country code to the callee identifier when the callee identifier begins with digits identifying an area code specified by the caller dialing profile.

The formatting provisions may be operably configured to prepend a caller country code and area code to the callee identifier when the callee identifier has a length that matches a caller dialing number format specified by the caller dialing profile and only one area code is specified as being associated with the caller in the caller dialing profile.

The classifying provisions may be operably configured to classify the call as a private network call when the re-formatted callee identifier identifies a subscriber to the private network.

The classifying provisions may be operably configured to classify the call as a private network call when the callee identifier complies with a pre-defined username format.

The apparatus may further include searching provisions for searching a database of records to locate a direct in dial (DID) bank table record associating a public telephone number with the reformatted callee identifier and the classifying provisions may be operably configured to classify the call as a private network call when the DID bank table record is found and to classify the call as a public network call when a DID bank table record is not found

The private network routing message producing provisions may be operably configured to produce a routing message having a callee identifier set according to a username associated with the DID bank table record.

The private network routing message producing provisions may be operably configured to determine whether a node associated with the reformatted callee identifier is the same as a node associated the caller identifier.

The private network routing provisions may include provisions for determining whether a prefix of the re-formatted callee identifier matches a corresponding prefix of a username associated with the caller dialing profile.

The private network routing message producing provisions may be operably configured to produce a routing message including the caller identifier, the reformatted callee identifier and an identification of a private network node associated with the callee and to communicate the routing message to a call controller.

The private network routing message producing provisions may be operably configured to perform at least one of the following forward the call to another party, block the call and direct the caller to a voicemail server associated with the callee, when the node associated with the caller is the same as the node associated with the callee.

The provisions for producing the private network routing message may be operably configured to produce a routing message having an identification of at least one of the callee identifier, an identification of a party to whom the call should be forwarded and an identification of a voicemail server associated with the callee.

The apparatus further includes provisions for communicating the routing message to a call controller.

The provisions for producing a public network routing message identifying a gateway to the public network may include provisions for searching a database of route records associating route identifiers with dialing codes to find a route record having a dialing code having a number pattern matching at least a portion of the reformatted callee identifier.

The apparatus further includes provisions for searching a database of supplier records associating supplier identifiers with the route identifiers to locate at least one supplier record associated with the route identifier associated with the route record having a dialing code having a number pattern matching at least a portion of the reformatted callee identifier.

The apparatus further includes a routing message buffer and provisions for loading the routing message buffer with the reformatted callee identifier and an identification of specific routes associated respective ones of the supplier records associated with the route record and loading the routing message buffer with a time value and a timeout value.

The apparatus further includes provisions for communicating a routing message including the contents of the routing message buffer to a call controller.

The apparatus further includes means for causing said dialing profile to include a maximum concurrent call value and a concurrent call count value and for causing said concurrent call count value to be incremented when the user associated with said dialing profile initiates a call and for causing said concurrent call count value to be decremented when a call with said user associated with said dialing profile is ended.

In accordance with another aspect of the invention, there is provided a data structure for access by an apparatus for producing a routing message for use by a call routing controller in a communications system. The data structure includes dialing profile records comprising fields for associating with respective subscribers to the system, a subscriber user name, direct-in-dial records comprising fields for associating with respective subscriber usernames, a user domain and a direct-in-dial number, prefix to node records comprising fields for associating with at least a portion of the respective subscriber usernames, a node address of a node in the system, whereby a subscriber name can be used to find a user domain, at least a portion of the a subscriber name can be used to find a node with which the subscriber identified by the subscriber name is associated, and a user domain and subscriber name can be located in response to a direct-in-dial number.

In accordance with another aspect of the invention, there is provided a data structure for access by an apparatus for producing a routing message for use by a call routing controller in a communications system. The data structure includes master list records comprising fields for associating a dialing code with respective master list identifiers and supplier list records linked to master list records by the master list identifiers, said supplier list records comprising fields for associating with a communications services supplier, a supplier id, a master list id, a route identifier and a billing rate code, whereby communications services suppliers are associated with dialing codes, such that dialing codes can be used to locate suppliers capable of providing a communications link associated with a given dialing code.

In accordance with another aspect of the invention, there is provided a method for determining a time to permit a communication session to be conducted. The method involves calculating a cost per unit time, calculating a first time value as a sum of a free time attributed to a participant in the communication session and the quotient of a funds balance held by the participant to the cost per unit time value and producing a second time value in response to the first time value and a billing pattern associated with the participant, the billing pattern including first and second billing intervals and the second time value being the time to permit a communication session to be conducted.

Calculating the first time value may involve retrieving a record associated with the participant and obtaining from the record at least one of the free time and the funds balance.

Producing the second time value may involve producing a remainder value representing a portion of the second billing interval remaining after dividing the second billing interval into a difference between the first time value and the first billing interval.

Producing the second time value may involve setting a difference between the first time value and the remainder as the second time value.

The method may further involve setting the second time value to zero when the remainder is greater than zero and the first time value is less than the free time associated with the participant.

Calculating the cost per unit time may involve locating a record in a database, the record comprising a markup type indicator, a markup value and a billing pattern and setting a reseller rate equal to the sum of the markup value and the buffer rate.

Locating the record in a database may involve locating at least one of a record associated with a reseller and a route associated with the reseller, a record associated with the reseller and a default reseller markup record.

Calculating the cost per unit time value further may involve locating at least one of an override record specifying a route cost per unit time amount associated with a route associated with the communication session, a reseller record associated with a reseller of the communications session, the reseller record specifying a reseller cost per unit time associated with the reseller for the communication session, a default operator markup record specifying a default cost per unit time.

The method may further involve setting as the cost per unit time the sum of the reseller rate and at least one of the route cost per unit time, the reseller cost per unit time and the default cost per unit time.

The method may further involve receiving a communication session time representing a duration of the communication session and incrementing a reseller balance by the product of the reseller rate and the communication session time.

The method may further involve receiving a communication session time representing a duration of the communication session and incrementing a system operator balance by a product of the buffer rate and the communication session time.

In accordance with another aspect of the invention, there is provided an apparatus for determining a time to permit a communication session to be conducted. The apparatus includes a processor circuit, a computer readable medium coupled to the processor circuit and encoded with instructions for directing the processor circuit to calculate a cost per unit time for the communication session, calculate a first time value as a sum of a free time attributed to a participant in the communication session and the quotient of a funds balance held by the participant to the cost per unit time value and produce a second time value in response to the first time value and a billing pattern associated with the participant, the billing pattern including first and second billing intervals and the second time value being the time to permit a communication session to be conducted.

The instructions may include instructions for directing the processor circuit to retrieve a record associated with the participant and obtain from the record at least one of the free time and the funds balance.

The instructions may include instructions for directing the processor circuit to produce the second time value by producing a remainder value representing a portion of the second billing interval remaining after dividing the second billing interval into a difference between the first time value and the first billing interval.

The instructions may include instructions for directing the processor circuit to produce the second time value comprises setting a difference between the first time value and the remainder as the second time value.

The instructions may include instructions for directing the processor circuit to set the second time value to zero when the remainder is greater than zero and the first time value is less than the free time associated with the participant.

The instructions for directing the processor circuit to calculate the cost per unit time may include instructions for directing the processor circuit to locate a record in a database, the record comprising a markup type indicator, a markup value and a billing pattern and set a reseller rate equal to the sum of the markup value and the buffer rate.

The instructions for directing the processor circuit to locate the record in a database may include instructions for directing the processor circuit to locate at least one of a record associated with a reseller and a route associated with the reseller, a record associated with the reseller, and a default reseller markup record. The instructions for directing the processor circuit to calculate the cost per unit time value may further include instructions for directing the processor circuit to locate at least one of an override record specifying a route cost per unit time amount associated with a route associated with the communication session, a reseller record associated with a reseller of the communications session, the reseller record specifying a reseller cost per unit time associated with the reseller for the communication session, a default operator markup record specifying a default cost per unit time.

The instructions may include instructions for directing the processor circuit to set as the cost per unit time the sum of the reseller rate and at least one of the route cost per unit time, the reseller cost per unit time and the default cost per unit time.

The instructions may include instructions for directing the processor circuit to receive a communication session time representing a duration of the communication session and increment a reseller balance by the product of the reseller rate and the communication session time.

The instructions may include instructions for directing the processor circuit to receive a communication session time representing a duration of the communication session and increment a system operator balance by a product of the buffer rate and the communication session time.

In accordance with another aspect of the invention, there is provided a process for attributing charges for communications services. The process involves determining a first chargeable time in response to a communication session time and a pre-defined billing pattern, determining a user cost value in response to the first chargeable time and a free time value associated with a user of the communications services, changing an account balance associated with the user in response to a user cost per unit time. The process may further involve changing an account balance associated with a reseller of the communications services in response to a reseller cost per unit time and the communication session time and changing an account balance associated with an operator of the communications services in response to an operator cost per unit time and the communication session time.

Determining the first chargeable time may involve locating at least one of an override record specifying a route cost per unit time and billing pattern associated with a route associated with the communication session, a reseller record associated with a reseller of the communications session, the reseller record specifying a reseller cost per unit time and billing pattern associated with the reseller for the communication session and a default record specifying a default cost per unit time and billing pattern and setting as the pre-defined billing pattern the billing pattern of the record located. The billing pattern of the record located may involve a first billing interval and a second billing interval.

Determining the first chargeable time may involve setting the first chargeable time equal to the first billing interval when the communication session time is less than or equal to the first billing interval.

Determining the first chargeable time may involve producing a remainder value representing a portion of the second billing interval remaining after dividing the second billing interval into a difference between communication session time and the first interval when the communication session time is greater than the communication session time and setting the first chargeable time to a difference between the communication session time and the remainder when the remainder is greater than zero and setting the first chargeable time to the communication session time when the remainder is not greater than zero.

The process may further involve determining a second chargeable time in response to the first chargeable time and the free time value associated with the user of the communications services when the first chargeable time is greater than or equal to the free time value associated with the user of the communications services.

Determining the second chargeable time may involve setting the second chargeable time to a difference between the first chargeable time.

The process may further involve resetting the free time value associated with the user to zero when the first chargeable time is greater than or equal to the free time value associated with the user of the communications services.

Changing an account balance associated with the user may involve calculating a user cost value in response to the second chargeable time and the user cost per unit time.

The process may further involve changing a user free cost balance in response to the user cost value.

The process may further involve setting the user cost to zero when the first chargeable time is less than the free time value associated with the user.

The process may further involve changing a user free time balance in response to the first chargeable time.

In accordance with another aspect of the invention, there is provided an apparatus for attributing charges for communications services. The apparatus includes a processor circuit, a computer readable medium in communication with the processor circuit and encoded with instructions for directing the processor circuit to determine a first chargeable time in response to a communication session time and a pre-defined billing pattern, determine a user cost value in response to the first chargeable time and a free time value associated with a user of the communications services, change an account balance associated with the user in response to a user cost per unit time.

The instructions may further include instructions for changing an account balance associated with a reseller of the communications services in response to a reseller cost per unit time and the communication session time and changing an account balance associated with an operator of the communications services in response to an operator cost per unit time and the communication session time.

The instructions for directing the processor circuit to determine the first chargeable time may further include instructions for causing the processor circuit to communicate with a database to locate at least one of an override record specifying a route cost per unit time and billing pattern associated with a route associated with the communication session, a reseller record associated with a reseller of the communications session, the reseller record specifying a reseller cost per unit time and billing pattern associated with the reseller for the communication session and a default record specifying a default cost per unit time and billing pattern and instructions for setting as the pre-defined billing pattern the billing pattern of the record located. The billing pattern of the record located may include a first billing interval and a second billing interval.

The instructions for causing the processor circuit to determine the first chargeable time may include instructions for directing the processor circuit to set the first chargeable time equal to the first billing interval when the communication session time is less than or equal to the first billing interval.

The instructions for causing the processor circuit to determine the first chargeable time may include instructions for producing a remainder value representing a portion of the second billing interval remaining after dividing the second billing interval into a difference between communication session time and the first interval when the communication session time is greater than the communication session time and instructions for causing the processor circuit to set the first chargeable time to a difference between the communication session time and the remainder when the remainder is greater than zero and instructions for causing the processor circuit to set the first chargeable time to the communication session time when the remainder is not greater than zero.

The instructions may further include instructions for causing the processor circuit to determine a second chargeable time in response to the first chargeable time and the free time value associated with the user of the communications services when the first chargeable time is greater than or equal to the free time value associated with the user of the communications services.

The instructions for causing the processor circuit to determine the second chargeable time may include instructions for causing the processor circuit to set the second chargeable time to a difference between the first chargeable time.

The instructions may further include instructions for causing the processor circuit to reset the free time value associated with the user to zero when the first chargeable time is greater than or equal to the free time value associated with the user of the communications services.

The instructions for causing the processor circuit to change an account balance associated with the user may include instructions for causing the processor circuit to calculate a user cost value in response to the second chargeable time and the user cost per unit time.

The instructions may further include instructions for causing the processor circuit to change a user free cost balance in response to the user cost value.

The instructions may further include instructions for causing the processor circuit to set the user cost to zero when the first chargeable time is less than the free time value associated with the user.

The instructions may further include instructions for causing the processor circuit to change a user free time balance in response to the first chargeable time.

In accordance with another aspect of the invention, there is provided a computer readable medium encoded with codes for directing a processor circuit to execute one or more of the methods described above and/or variants thereof.

Other aspects and features of the present invention will become apparent to those ordinarily skilled in the art upon review of the following description of specific embodiments of the invention in conjunction with the accompanying figures.

BRIEF DESCRIPTION OF THE DRAWINGS

In drawings which illustrate embodiments of the invention,

FIG. **1** is a block diagram of a system according to a first embodiment of the invention;

FIG. **2** is a block diagram of a caller telephone according to the first embodiment of the invention;

FIG. **3** is a schematic representation of a SIP invite message transmitted between the caller telephone and a controller shown in FIG. **1**;

FIG. **4** is a block diagram of a call controller shown in FIG. **1**;

FIG. **5** is a flowchart of a process executed by the call controller shown in FIG. **1**;

FIG. **6** is a schematic representation of a routing, billing and rating (RC) request message produced by the call controller shown in FIG. **1**;

FIG. **7** is a block diagram of a processor circuit of a routing, billing, rating element of the system shown in FIG. **1**;

FIGS. **8**A-**8**D is a flowchart of a RC request message handler executed by the RC. processor circuit shown in FIG. **7**;

FIG. **9** is a tabular representation of a dialing profile stored in a database accessible by the RC shown in FIG. **1**;

FIG. **10** is a tabular representation of a dialing profile for a caller using the caller telephone shown in FIG. **1**;

FIG. **11** is a tabular representation of a callee profile for a callee located in Calgary;

FIG. **12** is a tabular representation of a callee profile for a callee located in London;

FIG. **13** is a tabular representation of a Direct-in-Dial (DID) bank table record stored in the database shown in FIG. **1**;

FIG. **14** is a tabular representation of an exemplary DID bank table record for the Calgary callee referenced in FIG. **11**;

FIG. **15** is a tabular representation of a routing message transmitted from the RC to the call controller shown in FIG. **1**;

FIG. **16** is a schematic representation of a routing message buffer holding a routing message for routing a call to the Calgary callee referenced in FIG. **11**;

FIG. **17** is a tabular representation of a prefix to supernode table record stored in the database shown in FIG. **1**;

FIG. **18** is a tabular representation of a prefix to supernode table record that would be used for the Calgary callee referenced in FIG. **11**;

FIG. **19** is a tabular representation of a master list record stored in a master list table in the database shown in FIG. **1**;

FIG. **20** is a tabular representation of a populated master list record;

FIG. **21** is a tabular representation of a suppliers list record stored in the database shown in FIG. **1**;

FIG. **22** is a tabular representation of a specific supplier list record for a first supplier;

FIG. **23** is a tabular representation of a specific supplier list record for a second supplier;

FIG. **24** is a tabular representation of a specific supplier list record for a third supplier;

FIG. **25** is a schematic representation of a routing message, held in a routing message buffer, identifying to the controller a plurality of possible suppliers that may carry the call;

FIG. **26** is a tabular representation of a call block table record;

FIG. **27** is a tabular representation of a call block table record for the Calgary callee;

FIG. **28** is a tabular representation of a call forwarding table record;

FIG. **29** is a tabular representation of a call forwarding table record specific for the Calgary callee;

FIG. **30** is a tabular representation of a voicemail table record specifying voicemail parameters to enable the caller to leave a voicemail message for the callee;

FIG. **31** is a tabular representation of a voicemail table record specific to the Calgary callee;

FIG. **32** is a schematic representation of an exemplary routing message, held in a routing message buffer, indicating call forwarding numbers and a voicemail server identifier;

FIGS. **33**A and **33**B are respective portions of a flowchart of a process executed by the RC processor for determining a time to live value;

FIG. **34** is a tabular representation of a subscriber bundle table record;

FIG. **35** is a tabular representation of a subscriber bundle record for the Vancouver caller;

FIG. **36** is a tabular representation of a bundle override table record;

FIG. **37** is a tabular representation of bundle override record for a located master list ID;

FIG. **38** is a tabular representation of a subscriber account table record;

FIG. **39** is a tabular representation of a subscriber account record for the Vancouver caller;

FIG. **40** is a flowchart of a process for producing a second time value executed by the RC processor circuit shown in FIG. **7**;

FIG. **41** is a flowchart for calculating a call cost per unit time;

FIG. **42** is a tabular representation of a system operator special rates table record;

FIG. **43** is a tabular representation of a system operator special rates table record for a reseller named Klondike;

FIG. **44** is a tabular representation of a system operator mark-up table record;

FIG. **45** is a tabular representation of a system operator mark-up table record for the reseller Klondike;

FIG. **46** is a tabular representation of a default system operator mark-up table record;

FIG. **47** is a tabular representation of a reseller special destinations table record;

FIG. **48** is a tabular representation of a reseller special destinations table record for the reseller Klondike;

FIG. **49** is a tabular representation of a reseller global mark-up table record;

FIG. **50** is a tabular representation of a reseller global mark-up table record for the reseller Klondike;

FIG. **51** is a tabular representation of a SIP bye message transmitted from either of the telephones shown in FIG. **1** to the call controller;

FIG. **52** is a tabular representation of a SIP bye message sent to the controller from the Calgary callee;

FIG. **53** is a flowchart of a process executed by the call controller for producing a RC stop message in response to receipt of a SIP bye message;

FIG. **54** is a tabular representation of an exemplary RC call stop message;

FIG. **55** is a tabular representation of an RC call stop message for the Calgary callee;

FIGS. **56**A and **56**B are respective portions of a flowchart of a RC call stop message handling routine executed by the RC shown in FIG. **1**;

FIG. **57** is a tabular representation of a reseller accounts table record;

FIG. **58** is a tabular representation of a reseller accounts table record for the reseller Klondike;

FIG. **59** is a tabular representation of a system operator accounts table record; and

FIG. **60** is a tabular representation of a system operator accounts record for the system operator described herein.

DETAILED DESCRIPTION

Referring to FIG. **1**, a system for making voice over IP telephone/videophone calls is shown generally at **10**. The system includes a first super node shown generally at **11** and a second super node shown generally at **21**. The first super node **11** is located in geographical area, such as Vancouver, B.C., Canada for example and the second super node **21** is located in London, England, for example. Different super nodes may be located in different geographical regions throughout the world to provide telephone/videophone service to subscribers in respective regions. These super nodes may be in communication with each other by high speed/high data throughput links including optical fiber, satellite and/or cable links, forming a backbone to the system. These super nodes may alternatively or, in addition, be in communication with each other through conventional internet services.

In the embodiment shown, the Vancouver supernode **11** provides telephone/videophone service to western Canadian customers from Vancouver Island to Ontario. Another node (not shown) may be located in Eastern Canada to provide services to subscribers in that area.

Other nodes of the type shown may also be employed within the geographical area serviced by a supernode, to provide for call load sharing, for example within a region of the geographical area serviced by the supernode. However, in general, all nodes are similar and have the properties described below in connection with the Vancouver supernode **11**.

In this embodiment, the Vancouver supernode includes a call controller (C) **14**, a routing controller (RC) **16**, a database **18** and a voicemail server **19** and a media relay **9**. Each of these may be implemented as separate modules on a common computer system or by separate computers, for example. The voicemail server **19** need not be included in the node and can be provided by an outside service provider.

Subscribers such as a subscriber in Vancouver and a subscriber in Calgary communicate with the Vancouver supernode using their own internet service providers which route internet traffic from these subscribers over the internet shown generally at **13** in FIG. **1**. To these subscribers the Vancouver supernode is accessible at a pre-determined internet protocol (IP) address or a fully qualified domain name that can be accessed in the usual way through a subscriber's internet service provider. The subscriber in Vancouver uses a telephone **12** that is capable of communicating with the Vancouver supernode **11** using Session Initiation Protocol (SIP) messages and the Calgary subscriber uses a similar telephone **15**, in Calgary AB.

It should be noted that throughout the description of the embodiments of this invention, the IP/UDP addresses of all elements such as the caller and callee telephones, call controller, media relay, and any others, will be assumed to be valid IP/UDP addresses directly accessible via the Internet or a private IP network, for example, depending on the specific implementation of the system. As such, it will be assumed, for example, that the caller and callee telephones will have IP/UDP addresses directly accessible by the call controllers and the media relays on their respective supernodes, and those addresses will not be obscured by Network Address Translation (NAT) or similar mechanisms. In other words, the IP/UDP information contained in SIP messages (for example the SIP Invite message or the RC Request message which will be described below) will match the IP/UDP addresses of the IP packets carrying these SIP messages.

It will be appreciated that in many situations, the IP addresses assigned to various elements of the system may be in a private IP address space, and thus not directly accessible from other elements. Furthermore, it will also be appreciated that NAT is commonly used to share a "public" IP address between multiple devices, for example between home PCs and IP telephones sharing a single Internet connection. For example, a home PC may be assigned an IP address such as 192.168.0.101 and a Voice over IP telephone may be assigned an IP address of 192.168.0.103. These addresses are located in so called "non-routable" (IP) address space and cannot be accessed directly from the Internet. In order for these devices to communicate with other computers located on the Internet, these IP addresses have to be converted into a "public" IP address, for example 24.10.10.123 assigned by the Internet Service Provider to the subscriber, by a device performing NAT, typically a home router. In addition to translating the IP addresses, NAT typically also translates UDP port numbers, for example an audio path originating at a VoIP telephone and using a UDP port 12378 at its private IP address, may have be translated to a UDP port 23465 associated with the public IP address of the NAT device. In other words, when a packet originating from the above VoIP telephone arrives at an Internet-based supernode, the source IP/UDP address contained in the IP packet header will be 24.10.10.1:23465, whereas the source IP/UDP address information contained in the SIP message inside this IP packet will be 192.168.0.103:12378. The mismatch in the IP/UDP addresses may cause a problem for SIP-based VoIP systems because, for example, a supernode will attempt to send messages to a private address of a telephone but the messages will never get there.

Referring to FIG. **1**, in an attempt to make a call by the Vancouver telephone/videophone **12** to the Calgary telephone/videophone **15**, the Vancouver telephone/videophone sends a SIP invite message to the Vancouver supernode **11** and in response, the call controller **14** sends an RC request message to the RC **16** which makes various enquiries of the database **18** to produce a routing message which is sent back to the call controller **14**. The call controller **14** then communicates with the media relay **9** to cause a communications link including an audio path and a videophone (if a videopath call) to be established through the media relay to the same node, a different node or to a communications supplier gateway as shown generally at **20** to carry audio, and where applicable, video traffic to the call recipient or callee.

Generally, the RC **16** executes a process to facilitate communication between callers and callees. The process involves, in response to initiation of a call by a calling subscriber, receiving a callee identifier from the calling subscriber, using call classification criteria associated with the calling subscriber to classify the call as a public network call or a private network call and producing a routing message identifying an address on the private network, associated with the callee when the call is classified as a private network call and producing a routing message identifying a gateway to the public network when the call is classified as a public network call.

Subscriber Telephone

In greater detail, referring to FIG. **2**, in this embodiment, the telephone/videophone **12** includes a processor circuit shown generally at **30** comprising a microprocessor **32**, program memory **34**, an input/output (I/O) port **36**, parameter memory **38** and temporary memory **40**. The program memory **34**, I/O port **36**, parameter memory **38** and temporary memory **40** are all in communication with the microprocessor **32**. The I/O port **36** has a dial input **42** for receiving a dialed telephone/videophone number from a keypad, for example, or from a voice recognition unit or from pre-stored telephone/videophone numbers stored in the parameter memory **38**, for example. For simplicity, in FIG. **2** a box labelled dialing functions **44** represents any device capable of informing the microprocessor **32** of a callee identifier, e.g., a callee telephone/videophone number.

The processor **32** stores the callee identifier in a dialed number buffer **45**. In this case, assume the dialed number is 2001 1050 2222 and that it is a number associated with the Calgary subscriber. The I/O port **36** also has a handset interface **46** for receiving and producing signals from and to a handset that the user may place to his ear. This interface **46** may include a BLUETOOTH™ wireless interface, a wired interface or speaker phone, for example. The handset acts as a termination point for an audio path (not shown) which will be appreciated later. The I/O port **36** also has an internet connection **48** which is preferably a high speed internet connection and is operable to connect the telephone/videophone to an internet service provider. The internet connection **48** also acts as a part of the voice path, as will be appreciated later. It will be appreciated that where the subscriber device is a videophone, a separate video path is established in the same way an audio path is established. For simplicity, the following description refers to a telephone call, but it is to be understood that a videophone call is handled similarly, with the call controller causing the media relay to facilitate both an audio path and a video path instead of only an audio path.

The parameter memory **38** has a username field **50**, a password field **52** an IP address field **53** and a SIP proxy address field **54**, for example. The user name field **50** is operable to hold a user name, which in this case is 2001 1050 8667. The user name is assigned upon subscription or registration into the system and, in this embodiment, includes a twelve digit number having a continent code **61**, a country code **63**, a dealer code **70** and a unique number code **74**. The continent code **61** is comprised of the first or left-most digit of the user name in this embodiment. The country code **63** is comprised of the next three digits. The dealer code **70** is comprised of the next four digits and the unique number code **74** is comprised of the last four digits. The password field **52** holds a password of up to 512 characters, in this example. The IP address field **53** stores an IP address of the telephone, which for this explanation is 192.168.0.20. The SIP proxy address field **54** holds an IP protocol compatible proxy address which may be provided to the telephone through the internet connection **48** as part of a registration procedure.

The program memory **34** stores blocks of codes for directing the processor **32** to carry out the functions of the telephone, one of which includes a firewall block **56** which provides firewall functions to the telephone, to prevent access by unauthorized persons to the microprocessor **32** and memories **34**, **38** and **40** through the internet connection **48**. The program memory **34** also stores codes **57** for establishing a call ID. The call ID codes **57** direct the processor **32** to produce a call identifier having a format comprising a hexadecimal string at an IP address, the IP address being the IP address of the telephone. Thus, an exemplary call identifier might be FF10@192.168.0.20.

Generally, in response to picking up the handset interface **46** and activating a dialing function **44**, the microprocessor **32** produces and sends a SIP invite message as shown in FIG. **3**, to the routing controller **16** shown in FIG. **1**. This SIP invite message is essentially to initiate a call by a calling subscriber.

Referring to FIG. **3**, the SIP invite message includes a caller ID field **60**, a callee identifier field **62**, a digest parameters field **64**, a call ID field **65** an IP address field **67** and a caller UDP port field **69**. In this embodiment, the caller ID field **60** includes the user name 2001 10508667 that is the Vancouver user name stored in the user name field **50** of the parameter memory **38** in the telephone **12** shown in FIG. **2**. In addition, referring back to FIG. **3**, the callee identifier field **62** includes a callee identifier which in this embodiment is the user name 2001 1050 2222 that is the dialed number of the Calgary subscriber stored in the dialed number buffer **45** shown in FIG. **2**. The digest parameters field **64** includes digest parameters and the call ID field **65** includes a code comprising a generated prefix code (FF10) and a suffix which is the Internet Protocol (IP) address of the telephone **12** stored in the IP address field **53** of the telephone. The IP address field **67** holds the IP address assigned to the telephone, in this embodiment 192.168.0.20, and the caller UDP port field **69** includes a UDP port identifier identifying a UDP port at which the audio path will be terminated at the caller's telephone.

Call Controller

Referring to FIG. **4**, a call controller circuit of the call controller **14** (FIG. **1**) is shown in greater detail at **100**. The call controller circuit **100** includes a microprocessor **102**, program memory **104** and an I/O port **106**. The circuit **100** may include a plurality of microprocessors, a plurality of program memories and a plurality of I/O ports to be able to handle a large volume of calls. However, for simplicity, the call controller circuit **100** will be described as having only one microprocessor **102**, program memory **104** and I/O port **106**, it being understood that there may be more.

Generally, the I/O port **106** includes an input **108** for receiving messages such as the SIP invite message shown in FIG. **3**, from the telephone shown in FIG. **2**. The I/O port **106** also has an RC request message output **110** for transmitting an RC request message to the RC **16** of FIG. **1**, an RC message input **112** for receiving routing messages from the RC **16**, a gateway output **114** for transmitting messages to one of the gateways **20** shown in FIG. **1** to advise the gateway to establish an audio path, for example, and a gateway input **116** for receiving messages from the gateway. The I/O port **106** further includes a SIP output **118** for transmitting messages to the telephone **12** to advise the telephone of the IP addresses of the gateways which will establish the audio path. The I/O port **106** further includes a voicemail server input and output **117**, **119** respectively for communicating with the voicemail server **19** shown in FIG. **1**.

While certain inputs and outputs have been shown as separate, it will be appreciated that some may be a single IP address and IP port. For example, the messages sent to the RC **16** and received from the RC **16** may be transmitted and received on the same single IP port.

The program memory **104** includes blocks of code for directing the microprocessor **102** to carry out various functions of the call controller **14**. For example, these blocks of code include a first block **120** for causing the call controller circuit **100** to execute a SIP invite to RC request process to produce an RC request message in response to a received SIP invite message. In addition, there is a routing message to gateway message block **122** which causes the call controller circuit **100** to produce a gateway query message in response to a received routing message from the RC **16**.

Referring to FIG. **5**, the SIP invite to RC request process is shown in more detail at **120**. On receipt of a SIP invite message of the type shown in FIG. **3**, block **122** of FIG. **5** directs the call controller circuit **100** of FIG. **4** to authenticate the user. This may be done, for example, by prompting the user for a password, by sending a message back to the telephone **12** which is interpreted at the telephone as a request for a password entry or the password may automatically be sent to the call controller **14** from the telephone, in response to the message. The call controller **14** may then make enquiries of databases to which it has access, to determine whether or not the user's password matches a password stored in the database. Various functions may be used to pass encryption keys or hash codes back and forth to ensure that the transmittal of passwords is secure.

Should the authentication process fail, the call controller circuit **100** is directed to an error handling routine **124** which causes messages to be displayed at the telephone **12** to indicate there was an authentication problem. If the authentication procedure is passed, block **121** directs the call controller circuit **100** to determine whether or not the contents of the caller ID field **60** of the SIP invite message received from the telephone is an IP address. If it is an IP address, then block **123** directs the call controller circuit **100** to set the contents of a type field variable maintained by the microprocessor **102** to a code representing that the call type is a third party invite. If at block **121** the caller ID field contents do not identify an IP address, then block **125** directs the microprocessor to set the contents of the type field to a code indicating that the call is being made by a system subscriber. Then, block **126** directs the call controller circuit to read the call identifier **65** provided in the SIP invite message from the telephone **12**, and at block **128** the processor is directed to produce an RC request message that includes that call ID. Block **129** then directs the call controller circuit **100** to send the RC request to the RC **16**.

Referring to FIG. **6**, an RC request message is shown generally at **150** and includes a caller field **152**, a callee field **154**, a digest field **156**, a call ID field **158** and a type field **160**. The caller, callee, digest call ID fields **152**, **154**, **156** and **158** contain copies of the caller, callee, digest parameters and call ID fields **60**, **62**, **64** and **65** of the SIP invite message shown in FIG. **3**. The type field **160** contains the type code established at blocks **123** or **125** of FIG. **5** to indicate whether the call is from a third party or system subscriber, respectively. The caller identifier field may include a PSTN number or a system subscriber username as shown, for example.

Routing Controller (RC)

Referring to FIG. **7**, the RC **16** is shown in greater detail and includes an RC processor circuit shown generally at **200**. The RC processor circuit **200** includes a processor **202**, program memory **204**, a table memory **206**, buffer memory **207**, and an I/O port **208**, all in communication with the processor **202**. (As earlier indicated, there may be a plurality of processor circuits (**202**), memories (**204**), etc.)

The buffer memory **207** includes a caller id buffer **209** and a callee id buffer **211**.

The I/O port **208** includes a database request port **210** through which a request to the database (**18** shown in FIG. **1**) can be made and includes a database response port **212** for receiving a reply from the database **18**. The I/O port **208** further includes an RC request message input **214** for receiving the RC request message from the call controller (**14** shown in FIG. **1**) and includes a routing message output **216** for sending a routing message back to the call controller **14**. The I/O port **208** thus acts to receive caller identifier and a callee identifier contained in the RC request message from the call controller, the RC request message being received in response to initiation of a call by a calling subscriber.

The program memory **204** includes blocks of codes for directing the processor **202** to carry out various functions of the RC (**16**). One of these blocks includes an RC request message handler **250** which directs the RC to produce a routing message in response to a received RC request message. The RC request message handler process is shown in greater detail at **250** in FIGS. **8**A through **8**D.

RC Request Message Handler

Referring to FIG. **8**A, the RC request message handler begins with a first block **252** that directs the RC processor circuit (**200**) to store the contents of the RC request message (**150**) in buffers in the buffer memory **207** of FIG. **7**, one of which includes the caller ID buffer **209** of FIG. **7** for separately storing the contents of the callee field **154** of the RC request message. Block **254** then directs the RC processor circuit to use the contents of the caller field **152** in the RC request message shown in FIG. **6**, to locate and retrieve from the database **18** a record associating calling attributes with the calling subscriber. The located record may be referred to as a dialing profile for the caller. The retrieved dialing profile may then be stored in the buffer memory **207**, for example.

Referring to FIG. **9**, an exemplary data structure for a dialing profile is shown generally at **253** and includes a user name field **258**, a domain field **260**, and calling attributes comprising a national dialing digits (NDD) field **262**, an international dialing digits (IDD) field **264**, a country code field **266**, a local area codes field **267**, a caller minimum local length field **268**, a caller maximum local length field **270**, a reseller field **273**, a maximum number of concurrent calls field **275** and a current number of concurrent calls field **277**. Effectively the dialing profile is a record identifying calling attributes of the caller identified by the caller identifier. More generally, dialing profiles represent calling attributes of respective subscribers.

An exemplary caller profile for the Vancouver subscriber is shown generally at **276** in FIG. **10** and indicates that the user name field **258** includes the user name (2001 1050 8667) that has been assigned to the subscriber and is stored in the user name field **50** in the telephone as shown in FIG. **2**.

Referring back to FIG. **10**, the domain field **260** includes a domain name as shown at **282**, including a node type identifier **284**, a location code identifier **286**, a system provider identifier **288** and a domain portion **290**. The domain field **260** effectively identifies a domain or node associated with the user identified by the contents of the user name field **258**.

In this embodiment, the node type identifier **284** includes the code “sp” identifying a supernode and the location identifier **286** identifies the supernode as being in Vancouver (YVR). The system provider identifier **288** identifies the company supplying the service and the domain portion **290** identifies the “com” domain.

The national dialed digit field **262** in this embodiment includes the digit “1” and, in general, includes a number specified by the International Telecommunications Union (ITU) Telecommunications Standardization Sector (ITU-T) E.164 Recommendation which assigns national dialing digits to countries.

The international dialing digit field **264** includes a code also assigned according to the ITU-T according to the country or location of the user.

The country code field **266** also includes the digit “1” and, in general, includes a number assigned according to the ITU-T to represent the country in which the user is located.

The local area codes field **267** includes a list of area codes that have been assigned by the ITU-T to the geographical area in which the subscriber is located. The caller minimum and maximum local number length fields **268** and **270** hold numbers representing minimum and maximum local number lengths permitted in the area code(s) specified by the contents of the local area codes field **267**. The reseller field **273** is optional and holds a code identifying a retailer of the services, in this embodiment “Klondike”. The maximum number of concurrent calls field **275** holds a code identifying the maximum number of concurrent calls that the user is entitled to cause to concurrently exist. This permits more than one call to occur concurrently while all calls for the user are billed to the same account. The current number of concurrent calls field **277** is initially 0 and is incremented each time a concurrent call associated with the user is initiated and is decremented when a concurrent call is terminated.

The area codes associated with the user are the area codes associated with the location code identifier **286** of the contents of the domain field **260**.

A dialing profile of the type shown in FIG. **9** is produced whenever a user registers with the system or agrees to become a subscriber to the system. Thus, for example, a user wishing to subscribe to the system may contact an office maintained by a system operator and personnel in the office may ask the user certain questions about his location and service preferences, whereupon tables can be used to provide office personnel with appropriate information to be entered into the user name **258**, domain **260**, NDD **262**, IDD **264**, country code **266**, local area codes **267**, caller minimum and maximum local length fields **268** and **270** reseller field **273** and concurrent call fields **275** and **277** to establish a dialing profile for the user.

Referring to FIGS. **11** and **12**, callee dialing profiles for users in Calgary and London, respectively for example, are shown.

In addition to creating dialing profiles when a user registers with the system, a direct-in-dial (DID) record of the type shown at **278** in FIG. **13** is added to a direct-in-dial bank table in the database (**18** in FIG. **1**) to associate the username and a host name of the supernode with which the user is associated, with an E.164 number associated with the user on the PSTN network.

An exemplary DID table record entry for the Calgary callee is shown generally at **300** in FIG. **14**. The user name field **281** and user domain field **272** are analogous to the user name and user domain fields **258** and **260** of the caller dialing profile shown in FIG. **10**. The contents of the DID field **274** include a E.164 public telephone number including a country code **283**, an area code **285**, an exchange code **287** and a number **289**. If the user has multiple telephone numbers, then multiple records of the type shown at **300** would be included in the DID bank table, each having the same user name and user domain, but different DID field **274** contents reflecting the different telephone numbers associated with that user.

In addition to creating dialing profiles as shown in FIG. **9** and DID records as shown in FIG. **13** when a user registers with the system, call blocking records of the type shown in FIG. **26**, call forwarding records of the type shown in FIG. **28** and voicemail records of the type shown in FIG. **30** may be added to the database **18** when a new subscriber is added to the system.

Referring back to FIG. **8**A, after retrieving a dialing profile for the caller, such as shown at **276** in FIG. **10**, the RC processor circuit **200** is directed to block **256** which directs the processor circuit (**200**) to determine whether the contents of the concurrent call field **277** are less then the contents of the maximum concurrent call field **275** of the dialing profile for the caller and, if so, block **271** directs the processor circuit to increment the contents of the concurrent call field **277**. If the contents of concurrent call field **277** are equal to or greater than the contents of the maximum concurrent call field **275**, block **259** directs the processor circuit **200** to send an error message back to the call controller (**14**) to cause the call controller to notify the caller that the maximum number of concurrent calls has been reached and no further calls can exist concurrently, including the presently requested call.

Assuming block **256** allows the call to proceed, the RC processor circuit **200** is directed to perform certain checks on the callee identifier provided by the contents of the callee field **154** in FIG. **6**, of the RC request message **150**. These checks are shown in greater detail in FIG. **8**B.

Referring to FIG. **8**B, the processor (**202** in FIG. **7**) is directed to a first block **257** that causes it to determine whether a digit pattern of the callee identifier (**154**) provided in the RC request message (**150**) includes a pattern that matches the contents of the international dialing digits (IDD) field **264** in the caller profile shown in FIG. **10**. If so, then block **259** directs the processor (**202**) to set a call type code identifier variable maintained by the processor to indicate that the call is an international call and block **261** directs the processor to produce a reformatted callee identifier by reformatting the callee identifier into a predefined digit format. In this embodiment, this is done by removing the pattern of digits matching the IDD field contents **264** of the caller dialing profile to effectively shorten the callee identifier. Then, block **263** directs the processor **202** to determine whether or not the callee identifier has a length which meets criteria establishing it as a number compliant with the E.164 Standard set by the ITU. If the length does not meet this criteria, block **265** directs the processor **202** to send back to the call controller (**14**) a message indicating the length is not correct. The process is then ended. At the call controller **14**, routines (not shown) stored in the program memory **104** may direct the processor (**102** of FIG. **4**) to respond to the incorrect length message by transmitting a message back to the telephone (**12** shown in FIG. **1**) to indicate that an invalid number has been dialed.

Still referring to FIG. **8**B, if the length of the amended callee identifier meets the criteria set forth at block **263**, block **269** directs the processor (**202** of FIG. **7**) to make a database request to determine whether or not the amended callee identifier is found in a record in the direct-in-dial bank (DID) table. Referring back to FIG. **8**B, at block **269**, if the processor **202** receives a response from the database indicating that the reformatted callee identifier produced at block **261** is found in a record in the DID bank table, then the callee is a subscriber to the system and the call is classified as a private network call by directing the processor to block **279** which directs the processor to copy the contents of the corresponding user name field (**281** in FIG. **14**) from the callee DID bank table record (**300** in FIG. **14**) into the callee ID buffer (**211** in FIG. **7**). Thus, the processor **202** locates a subscriber user name associated with the reformatted callee identifier. The processor **202** is then directed to point B in FIG. **8**A.

Subscriber to Subscriber Calls Between Different Nodes

Referring to FIG. **8**A, block **280** directs the processor (**202** of FIG. **7**) to execute a process to determine whether or not the node associated with the reformatted callee identifier is the same node that is associated with the caller identifier. To do this, the processor **202** determines whether or not a prefix (e.g., continent code **61**) of the callee name held in the callee ID buffer (**211** in FIG. **7**), is the same as the corresponding prefix of the caller name held in the username field **258** of the caller dialing profile shown in FIG. **10**. If the corresponding prefixes are not the same, block **302** in FIG. **8**A directs the processor (**202** in FIG. **7**) to set a call type flag in the buffer memory (**207** in FIG. **7**) to indicate the call is a cross-domain call. Then, block **350** of FIG. **8**A directs the processor (**202** of FIG. **7**) to produce a routing message identifying an address on the private network with which the callee identified by the contents of the callee ID buffer is associated and to set a time to live for the call at a maximum value of 99999, for example.

Thus the routing message includes a caller identifier, a call identifier set according to a username associated with the located DID bank table record and includes an identifier of a node on the private network with which the callee is associated.

The node in the system with which the callee is associated is determined by using the callee identifier to address a supernode table having records of the type as shown at **370** in FIG. **17**. Each record **370** has a prefix field **372** and a supernode address field **374**. The prefix field **372** includes the first n digits of the callee identifier. In this embodiment n=2. The supernode address field **374** holds a code representing the IP address or a fully qualified domain name of the node associated with the code stored in the callee identifier prefix field

372. Referring to FIG. **18**, for example, if the prefix is 20, the supernode address associated with that prefix is sp.yvr.digifonica.com.

Referring to FIG. **15**, a generic routing message is shown generally at **352** and includes an optional supplier prefix field **354**, and optional delimiter field **356**, a callee user name field **358**, at least one route field **360**, a time to live field **362** and other fields **364**. The optional supplier prefix field **354** holds a code for identifying supplier traffic. The optional delimiter field **356** holds a symbol that delimits the supplier prefix code from the callee user name field **358**. In this embodiment, the symbol is a number sign (#). The route field **360** holds a domain name or IP address of a gateway or node that is to carry the call, and the time to live field **362** holds a value representing the number of seconds the call is permitted to be active, based on subscriber available minutes and other billing parameters.

Referring to FIG. **8**A and FIG. **16**, an example of a routing message produced by the processor at block **350** for a caller associated with a different node than the caller is shown generally at **366** and includes only a callee field **359**, a route field **361** and a time to live field **362**.

Referring to FIG. **8**A, having produced a routing message as shown in FIG. **16**, block **381** directs the processor (**202** of FIG. **7**) to send the routing message shown in FIG. **16** to the call controller **14** shown in FIG. **1**.

Referring back to FIG. **8**B, if at block **257**, the callee identifier stored in the callee id buffer (**211** in FIG. **7**) does not begin with an international dialing digit, block **380** directs the processor (**202**) to determine whether or not the callee identifier begins with the same national dial digit code as assigned to the caller. To do this, the processor (**202**) is directed to refer to the retrieved caller dialing profile as shown in FIG. **10**. In FIG. **10**, the national dialing digit code **262** is the number 1. Thus, if the callee identifier begins with the number 1, then the processor (**202**) is directed to block **382** in FIG. **8**B.

Block **382** directs the processor (**202** of FIG. **7**) to examine the callee identifier to determine whether or not the digits following the NDD digit identify an area code that is the same as any of the area codes identified in the local area codes field **267** of the caller dialing profile **276** shown in FIG. **10**. If not, block **384** of FIG. **8**B directs the processor **202** to set the call type flag to indicate that the call is a national call. If the digits following the NDD digit identify an area code that is the same as a local area code associated with the caller as indicated by the caller dialing profile, block **386** directs the processor **202** to set the call type flag to indicate a local call, national style. After executing blocks **384** or **386**, block **388** directs the processor **202** to format the callee identifier into a pre-defined digit format to produce a re-formatted callee identifier by removing the national dialed digit and prepending a caller country code identified by the country code field **266** of the caller dialing profile shown in FIG. **10**. The processor (**202**) is then directed to block **263** of FIG. **8**B to perform other processing as already described above.

If at block **380**, the callee identifier does not begin with a national dialed digit, block **390** directs the processor (**202**) to determine whether the callee identifier begins with digits that identify the same area code as the caller. Again, the reference for this is the retrieved caller dialing profile shown in FIG. **10**. The processor (**202**) determines whether or not the first few digits of the callee identifier identify an area code corresponding to the local area code field **267** of the retrieved caller dialing profile. If so, then block **392** directs the processor **202** to set the call type flag to indicate that the call is a local call and block **394** directs the processor (**202**) to format the callee identifier into a pre-defined digit format to produce a reformatted callee identifier by prepending the caller country code to the callee identifier, the caller country code being determined from the country code field **266** of the retrieved caller dialing profile shown in FIG. **10**. The processor (**202**) is then directed to block **263** for further processing as described above.

Referring back to FIG. **8**B, at block **390**, the callee identifier does not start with the same area code as the caller, block **396** directs the processor (**202** of FIG. **7**) to determine whether the number of digits in the callee identifier, i.e. the length of the callee identifier, is within the range of digits indicated by the caller minimum local number length field **268** and the caller maximum local number length field **270** of the retrieved caller dialing profile shown in FIG. **10**. If so, then block **398** directs the processor (**202**) to set the call type flag to indicate a local call and block **400** directs the processor (**202**) to format the callee identifier into a pre-defined digit format to produce a reformatted callee identifier by prepending to the callee identifier the caller country code (as indicated by the country code field **266** of the retrieved caller dialing profile shown in FIG. **10**) followed by the caller area code (as indicated by the local area code field **267** of the caller profile shown in FIG. **10**). The processor (**202**) is then directed to block **263** of FIG. **8**B for further processing as described above.

Referring back to FIG. **8**B, if at block **396**, the callee identifier has a length that does not fall within the range specified by the caller minimum local number length field (**268** in FIG. **10**) and the caller maximum local number length field (**270** in FIG. **10**), block **402** directs the processor **202** of FIG. **7** to determine whether or not the callee identifier identifies a valid user name. To do this, the processor **202** searches through the database (**18** of FIG. **10** of dialing profiles to find a dialing profile having user name field contents (**258** in FIG. **10**) that match the callee identifier. If no match is found, block **404** directs the processor (**202**) to send an error message back to the call controller (**14**). If at block **402**, a dialing profile having a user name field **258** that matches the callee identifier is found, block **406** directs the processor **202** to set the call type flag to indicate that the call is a private network call and then the processor is directed to block **280** of FIG. **8**A. Thus, the call is classified as a private network call when the callee identifier identifies a subscriber to the private network.

From FIG. **8**B, it will be appreciated that there are certain groups of blocks of codes that direct the processor **202** in FIG. **7** to determine whether the callee identifier has certain features such as an international dialing digit, a national dialing digit, an area code and a length that meet certain criteria, and cause the processor **202** to reformat the callee identifier stored in the callee id buffer **211**, as necessary into a predetermined target format including only a country code, area code, and a normal telephone number, for example, to cause the callee identifier to be compatible with the E.164 number plan standard in this embodiment. This enables block **269** in FIG. **8**B to have a consistent format of callee identifiers for use in searching through the DID bank table records of the type shown in FIG. **13** to determine how to route calls for subscriber to subscriber calls on the same system. Effectively, therefore blocks **257**, **380**, **390**, **396** and **402** establish call classification criteria for classifying the call as a public network call or a private network call. Block **269** classifies the call, depending on whether or not the formatted callee identifier has a DID bank table record and this depends on how the call classification criteria are met and block **402** directs the processor **202** of FIG. **7** to classify the call as a private network call when the callee identifier complies with a predefined format, i.e. is a valid user name and identifies a subscriber to the private network, after the callee identifier has been subjected to the classification criteria of blocks **257**, **380**, **390** and **396**.

Subscriber to Non-Subscriber Calls

Not all calls will be subscriber to subscriber calls and this will be detected by the processor **202** of FIG. **7** when it executes block **269** in FIG. **8**B, and does not find a DID bank table record that is associated with the callee, in the DID bank table. When this occurs, the call is classified as a public network call by directing the processor **202** to block **408** of FIG. **8**B which causes it to set the contents of the callee id buffer **211** of FIG. **7** equal to the newly formatted callee identifier, i.e., a number compatible with the E.164 standard. Then, block **410** of FIG. **8**B directs the processor (**202**) to search a database of route or master list records associating route identifiers with dialing codes shown in FIG. **19** to locate a router having a dialing code having a number pattern matching at least a portion of the reformatted callee identifier.

Referring to FIG. **19**, a data structure for a master list or route list record is shown. Each master list record includes a master list ID field **500**, a dialing code field **502**, a country code field **504**, a national sign number field **506**, a minimum length field **508**, a maximum length field **510**, a national dialed digit field **512**, an international dialed digit field **514** and a buffer rate field **516**.

The master list ID field **500** holds a unique code such as 1019, for example, identifying the record. The dialing code field **502** holds a predetermined number pattern that the processor **202** of FIG. **7** uses at block **410** in FIG. **8**B to find the master list record having a dialing code matching the first few digits of the amended callee identifier stored in the callee id buffer **211**. The country code field **504** holds a number representing the country code associated with the record and the national sign number field **506** holds a number representing the area code associated with the record. (It will be observed that the dialing code is a combination of the contents of the country code field **504** and the national sign number field **506**.) The minimum length field **508** holds a number representing the minimum length of digits associated with the record and the maximum length field **51** holds a number representing the maximum number of digits in a number with which the record may be compared. The national dialed digit (NDD) field **512** holds a number representing an access code used to make a call within the country specified by the country code, and the international dialed digit (IDD) field **514** holds a number representing the international prefix needed to dial a call from the country indicated by the country code.

Thus, for example, a master list record may have a format as shown in FIG. **20** with exemplary field contents as shown.

Referring back to FIG. **8**B, using the country code and area code portions of the reformatted callee identifier stored in the callee id buffer **211**, block **410** directs the processor **202** of FIG. **7** to find a master list record such as the one shown in FIG. **20** having a dialing code that matches the country code (1) and area code (604) of the callee identifier. Thus, in this example, the processor (**202**) would find a master list record having an ID field containing the number 1019. This number may be referred to as a route ID. Thus, a route ID number is found in the master list record associated with a predetermined number pattern in the reformatted callee identifier.

After executing block **410** in FIG. **8**B, the process continues as shown in FIG. **8**D. Referring to FIG. **8**D, block **412** directs the processor **202** of FIG. **7** to use the route ID number to search a database of supplier records associating supplier identifiers with route identifiers to locate at least one supplier record associated with the route identifier to identify at least one supplier operable to supply a communications link for the route.

Referring to FIG. **21**, a data structure for a supplier list record is shown. Supplier list records include a supplier ID field **540**, a master list ID field **542**, an optional prefix field **544**, a specific route identifier field **546**, a NDD/IDD rewrite field **548**, a rate field **550**, and a timeout field **551**. The supplier ID field **540** holds a code identifying the name of the supplier and the master list ID field **542** holds a code for associating the supplier record with a master list record. The prefix field **544** holds a string used to identify the supplier traffic and the specific route identifier field **546** holds an IP address of a gateway operated by the supplier indicated by the supplier ID field **540**. The NDD/IDD rewrite field **548** holds a code representing a rewritten value of the NDD/IDD associated with this route for this supplier, and the rate field **550** holds a code indicating the cost per second to the system operator to use the route provided by the gateway specified by the contents of the route identifier field **546**. The timeout field **551** holds a code indicating a time that the call controller should wait for a response from the associated gateway before giving up and trying the next gateway. This time value may be in seconds, for example. Exemplary supplier records are shown in FIGS. **22**, **23** and **24** for the exemplary suppliers shown at **20** in FIG. **1**, namely Telus, Shaw and Sprint.

Referring back to FIG. **8**D, at block **412** the processor **202** finds all supplier records that identify the master list ID found at block **410** of FIG. **8**B.

Referring back to FIG. **8**D, block **560** directs the processor **202** of FIG. **7** to begin to produce a routing message of the type shown in FIG. **15**. To do this, the processor **202** loads a routing message buffer as shown in FIG. **25** with a supplier prefix of the least costly supplier where the least costly supplier is determined from the rate fields **550** of FIG. **21** of the records associated with respective suppliers.

Referring to FIGS. **22-24**, in the embodiment shown, the supplier "Telus" has the lowest number in the rate field **550** and therefore the prefix **4973** associated with that supplier is loaded into the routing message buffer shown in FIG. **25** first.

Block **562** in FIG. **8**D directs the processor to delimit the prefix **4973** by the number sign (#) and to next load the reformatted callee identifier into the routing message buffer shown in FIG. **25**. At block **563** of FIG. **8**D, the contents of the route identifier field **546** of FIG. **21** of the record associated with the supplier "Telus" are added by the processor **202** of FIG. **7** to the routing message buffer shown in FIG. **25** after an @ sign delimiter, and then block **564** in FIG. **8**D directs the processor to get a time to live value, which in one embodiment may be 3600 seconds, for example. Block **566** then directs the processor **202** to load this time to live value and the timeout value (**551**) in FIG. **21** in the routing message buffer of FIG. **25**. Accordingly, a first part of the routing message for the Telus gateway is shown generally at **570** in FIG. **25**.

Referring back to FIG. **8**D, block **571** directs the processor **202** back to block **560** and causes it to repeat blocks **560**, **562**, **563**, **564** and **566** for each successive supplier until the routing message buffer is loaded with information pertaining to each supplier identified by the processor at block **412**. Thus, a second portion of the routing message as shown at **572** in FIG. **25** relates to the second supplier identified by the record shown in FIG. **23**. Referring back to FIG. **25**, a third portion of the routing message as shown at **574** and is associated with a third supplier as indicated by the supplier record shown in FIG. **24**.

Consequently, referring to FIG. **25**, the routing message buffer holds a routing message identifying a plurality of different suppliers able to provide gateways to the public telephone network (i.e. specific routes) to establish at least part of a communication link through which the caller may contact the callee. In this embodiment, each of the suppliers is identified, in succession, according to rate. Other criteria for determining the order in which suppliers are listed in the routing message may include preferred supplier priorities which may be established based on service agreements, for example.

Referring back to FIG. **8**D, block **568** directs the processor **202** of FIG. **7** to send the routing message shown in FIG. **25** to the call controller **14** in FIG. **1**.

Subscriber to Subscriber Calls Within the Same Node

Referring back to FIG. **8**A, if at block **280**, the callee identifier received in the RC request message has a prefix that identifies the same node as that associated with the caller, block **600** directs the processor **202** to use the callee identifier in the callee id buffer **211** to locate and retrieve a dialing profile for the callee. The dialing profile may be of the type shown in FIG. **11** or **12**, for example. Block **602** of FIG. **8**A then directs the processor **202** of FIG. **7** to get call block, call forward and voicemail records from the database **18** of FIG. **1** based on the user name identified in the callee dialing profile retrieved by the processor at block **600**. Call block, call forward and voicemail records may be as shown in FIGS. **26**, **27**, **28** and **30** for example.

Referring to FIG. **26**, the call block records include a user name field **604** and a block pattern field **606**. The user name field holds a user name corresponding to the user name in the user name field (**258** in FIG. **10**) of the callee profile and the block pattern field **606** holds one or more E.164-compatible numbers or user names identifying PSTN numbers or system subscribers from whom the subscriber identified in the user name field **604** does not wish to receive calls.

Referring to FIG. **8**A and FIG. **27**, block **608** directs the processor **202** of FIG. **7** to determine whether or not the caller identifier received in the RC request message matches a block pattern stored in the block pattern field **606** of the call block record associated with the callee identified by the contents of the user name field **604** in FIG. **26**. If the caller identifier matches a block pattern, block **610** directs the processor to send a drop call or non-completion message to the call controller (**14**) and the process is ended. If the caller identifier does not match a block pattern associated with the callee, block **609** directs the processor to store the username and domain of the callee, as determined from the callee dialing profile, and a time to live value in the routing message buffer as shown at **650** in FIG. **32**. Referring back to FIG. **8**A, block **612** then directs the processor **202** to determine whether or not call forwarding is required.

Referring to FIG. **28**, the call forwarding records include a user name field **614**, a destination number field **616**, and a sequence number field **618**. The user name field **614** stores a code representing a user with which the record is associated. The destination number field **616** holds a user name representing a number to which the current call should be forwarded, and the sequence number field **618** holds an integer number indicating the order in which the user name associated with the corresponding destination number field **616** should be attempted for call forwarding. The call forwarding table may have a plurality of records for a given user. The processor **202** of FIG. **7** uses the contents of the sequence number field **618** to place the records for a given user in order. As will be appreciated below, this enables the call forwarding numbers to be tried in an ordered sequence.

Referring to FIG. **8**A and FIG. **29**, if at block **612**, the call forwarding record for the callee identified by the callee identifier contains no contents in the destination number field **616** and accordingly no contents in the sequence number field **618**, there are no call forwarding entries for this callee, and the processor **202** is directed to block **620** in FIG. **8**C. If there are entries in the call forwarding table **27**, block **622** in FIG. **8**A directs the processor **202** to search the dialing profile table to find a dialing profile record as shown in FIG. **9**, for the user identified by the destination number field **616** of the call forward record shown in FIG. **28**. The processor **202** of FIG. **7** is further directed to store the username and domain for that user and a time to live value in the routing message buffer as shown at **652** in FIG. **32**, to produce a routing message as illustrated. This process is repeated for each call forwarding record associated with the callee identified by the callee id buffer **211** in FIG. **7** to add to the routing message buffer all call forwarding usernames and domains associated with the callee.

Referring back to FIG. **8**A, if at block **612** there are no call forwarding records, then at block **620** in FIG. **8**C the processor **202** is directed to determine whether or not the user identified by the callee identifier has paid for voicemail service. This is done by checking to see whether or not a flag is set in a voicemail record of the type shown in FIG. **30** in a voicemail table stored in the database **18** shown in FIG. **1**.

Referring to FIG. **30**, voicemail records in this embodiment may include a user name field **624**, a voicemail server field **626**, a seconds to voicemail field **628** and an enable field **630**. The user name field **624** stores the user name of the callee. The voicemail server field **626** holds a code identifying a domain name of a voicemail server associated with the user identified by the user name field **624**. The seconds to voicemail field **628** holds a code identifying the time to wait before engaging voicemail, and the enable field **630** holds a code representing whether or not voicemail is enabled for the user. Referring back to FIG. **8**C, at block **620** if the processor **202** of FIG. **7** finds a voicemail record as shown in FIG. **30** having user name field **624** contents matching the callee identifier, the processor is directed to examine the contents of the enabled field **630** to determine whether or not voicemail is enabled. If voicemail is enabled, then block **640** in FIG. **8**C directs the processor **202** to FIG. **7** to store the contents of the voicemail server field **626** and the contents of the seconds to voicemail field **628** in the routing message buffer, as shown at **654** in FIG. **32**. Block **642** then directs the processor **202** to get time to live values for each path specified by the routing message according to the cost of routing and the user's balance. These time to live values are then appended to corresponding paths already stored in the routing message buffer.

Referring back to FIG. **8**C, block **644** then directs the processor **202** of FIG. **7** to store the IP address of the current node in the routing message buffer as shown at **656** in FIG. **32**. Block **646** then directs the processor **202** to send the routing message shown in FIG. **32** to the call controller **14** in FIG. **1**. Thus in the embodiment described the routing controller will produce a routing message that will cause at least one of the following: forward the call to another party, block the call and direct the caller to a voicemail server.

Referring back to FIG. **1**, the routing message whether of the type shown in FIG. **16**, **25** or **32**, is received at the call controller **14** and the call controller interprets the receipt of the routing message as a request to establish a call.

Referring to FIG. **4**, the program memory **104** of the call controller **14** includes a routing to gateway routine depicted generally at **122**.

Where a routing message of the type shown in FIG. **32** is received by the call controller **14**, the routing to gateway routine **122** shown in FIG. **4** may direct the processor **102** cause a message to be sent back through the internet **13** shown in FIG. **1** to the callee telephone **15**, knowing the IP address of the callee telephone **15** from the user name.

Alternatively, if the routing message is of the type shown in FIG. **16**, which identifies a domain associated with another node in the system, the call controller may send a SIP invite message along the high speed backbone **17** connected to the other node. The other node functions as explained above, in response to receipt of a SIP invite message.

If the routing message is of the type shown in FIG. **25** where there are a plurality of gateway suppliers available, the call controller sends a SIP invite message to the first supplier, in this case Telus, using a dedicated line or an internet connection to determine whether or not Telus is able to handle the call. If the Telus gateway returns a message indicating it is not able to handle the call, the call controller **14** then proceeds to send a SIP invite message to the next supplier, in this case Shaw. The process is repeated until one of the suppliers responds indicating that it is available to carry the call. Once a supplier responds indicating that it is able to carry the call, the supplier sends back to the call controller **14** an IP address for a gateway provided by the supplier through which the call or audio path of the call will be carried. This IP address is sent in a message from the call controller **14** to the media relay **9** which responds with a message indicating an IP address to which the caller telephone should send its audio/video, traffic and an IP address to which the gateway should send its audio/video for the call. The call controller conveys the IP address at which the media relay expects to receive audio/video from the caller telephone, to the caller telephone **12** in a message. The caller telephone replies to the call controller with an IP address at which it would like to receive audio/video and the call controller conveys that IP address to the media relay. The call may then be conducted between the caller and callee through the media relay and gateway.

Referring back to FIG. **1**, if the call controller **14** receives a routing message of the type shown in FIG. **32**, and which has at least one call forwarding number and/or a voicemail number, the call controller attempts to establish a call to the callee telephone **15** by seeking from the callee telephone a message indicating an IP address to which the media relay should send audio/video. If no such message is received from the callee telephone, no call is established. If no call is established within a pre-determined time, the call controller **14** attempts to establish a call with the next user identified in the call routing message in the same manner. This process is repeated until all call forwarding possibilities have been exhausted, in which case the call controller communicates with the voicemail server **19** identified in the routing message to obtain an IP address to which the media relay should send audio/video and the remainder of the process mentioned above for establishing IP addresses at the media relay **9** and the caller telephone is carried out to establish audio/video paths to allowing the caller to leave a voicemail message with the voicemail server.

When an audio/video path through the media relay is established, a call timer maintained by the call controller **14** logs the start date and time of the call and logs the call ID and an identification of the route (i.e., audio/video path IP address) for later use in billing.

Time to Live

Referring to FIGS. **33**A and **33**B, a process for determining a time to live value for any of blocks **642** in FIG. **8**C, **350** in FIG. **8**A or **564** in FIG. **8**D above is described. The process is executed by the processor **202** shown in FIG. **7**. Generally, the process involves calculating a cost per unit time, calculating a first time value as a sum of a free time attributed to a participant in the communication session and the quotient of a funds balance held by the participant to the cost per unit time value and producing a second time value in response to the first time value and a billing pattern associated with the participant, the billing pattern including first and second billing intervals and the second time value being the time to permit a communication session to be conducted.

Referring to FIG. **33**A, in this embodiment, the process begins with a first block **700** that directs the RC processor to determine whether or not the call type set at block **302** in FIG. **8**A indicates the call is a network or cross-domain call. If the call is a network or cross-domain call, block **702** of FIG. **33**A directs the RC processor to set the time to live equal to 99999 and the process is ended. Thus, the network or cross-domain call type has a long time to live. If at block **700** the call type is determined not to be a network or cross-domain type, block **704** directs the RC processor to get a subscriber bundle table record from the database **18** in FIG. **1** and store it locally in the subscriber bundle record buffer at the RC **14**.

Referring to FIG. **34**, a subscriber bundle table record is shown generally at **706**. The record includes a user name field **708** and a services field **710**. The user name field **708** holds a code identifying the subscriber user name and the services field **710** holds codes identifying service features assigned to the subscriber, such as free local calling, call blocking and voicemail, for example.

FIG. **35** shows an exemplary subscriber bundle record for the Vancouver caller. In this record the user name field **708** is loaded with the user name 2001 1050 8667 and the services field **710** is loaded with codes **10**, **14** and **16** corresponding to free local calling, call blocking and voicemail, respectively. Thus, user 2001 1050 8667 has free local calling, call blocking and voicemail features.

Referring back to FIG. **33**A, after having loaded a subscriber bundle record into the subscriber bundle record buffer, block **712** directs the RC processor to search the database (**18**) determine whether or not there is a bundle override table record for the master list ID value that was determined at block **410** in FIG. **8**B. An exemplary bundle override table record is shown at **714** in FIG. **36**. The bundle table record includes a master list ID field **716**, an override type field **718**, an override value field **720** a first interval field **722** and a second interval field **724**. The master list ID field **716** holds a master list ID code. The override type field **718** holds an override type code indicating a fixed, percent or cent amount to indicate the amount by which a fee will be increased. The override value field **720** holds a real number representing the value of the override type. The first interval field **722** holds a value indicating the minimum number of seconds for a first level of charging and the second interval field **724** holds a number representing a second level of charging.

Referring to FIG. **37**, a bundle override record for the located master list ID code is shown generally at **726** and includes a master list ID field **716** holding the code 1019 which was the code located in block **410** of FIG. **8**B. The override type field **718** includes a code indicating the override type is a percentage value and the override value field **720** holds the value 10.0 indicating that the override will be 10.0% of the charged value. The first interval field **722** holds a value representing 30 seconds and the second interval field **724** holds a value representing 6 seconds. The 30 second value in the first interval field **722** indicates that charges for the route will be made at a first rate for 30 seconds and thereafter the charges will be made at a different rate in increments of 6 seconds, as indicated by the contents of the second interval field **724**.

Referring back to FIG. **33**A, if at block **712** the processor finds a bundle override record of the type shown in FIG. **37**, block **728** directs the processor to store the bundle override record in local memory. In the embodiment shown, the bundle override record shown in FIG. **37** is stored in the bundle override record buffer at the RC as shown in FIG. **7**. Still referring to FIG. **33**A, block **730** then directs the RC processor to determine whether or not the subscriber bundle table record **706** in FIG. **35** has a services field including a code identifying that the user is entitled to free local calling and also directs the processor to determine whether or not the call type is not a cross domain cell, i.e. it is a local or local/national style. If both of these conditions are satisfied, block **732** directs the processor to set the time to live equal to 99999, giving the user a long period of time for the call. The process is then ended. If the conditions associated with block **730** are not satisfied, block **734** of FIG. **33**B directs the RC processor to retrieve a subscriber account record associated with a participant in the call. This is done by copying and storing in the subscriber account record buffer a subscriber account record for the caller.

Referring to FIG. **38**, an exemplary subscriber account table record is shown generally at **736**. The record includes a user name field **738**, a funds balance field **740** and a free time field **742**. The user name field **738** holds a subscriber user name, the funds balance field **740** holds a real number representing the dollar value of credit available to the subscriber and the free time field **742** holds an integer representing the number of free seconds that the user is entitled to.

An exemplary subscriber account record for the Vancouver caller is shown generally at **744** in FIG. **39**, wherein the user name field **738** holds the user name 2001 1050 8667, the funds balance field **740** holds the value $10.00, and the free time field **742** holds the value 100. The funds balance field holding the value of $10.00 indicates the user has $10.00 worth of credit and the free time field having the value of 100 indicates that the user has a balance of 100 free seconds of call time.

Referring back to FIG. **33**B, after copying and storing the subscriber account record shown in FIG. **39** from the database to the subscriber account record buffer RC, block **746** directs the processor to determine whether or not the subscriber account record funds balance field **740** or free time field **742** are greater than zero. If they are not greater than zero, block **748** directs the processor to set the time to live equal to zero and the process is ended. The RC then sends a message back to the call controller to cause the call controller to deny the call to the caller. If the conditions associated with block **746** are satisfied, block **750** directs the processor to calculate the call cost per unit time. A procedure for calculating the call cost per unit time is described below in connection with FIG. **41**.

Assuming the procedure for calculating the cost per second returns a number representing the call cost per second, block **752** directs the processor **202** in FIG. **7** to determine whether or not the cost per second is equal to zero. If so, block **754** directs the processor to set the time to live to 99999 to give the caller a very long length of call and the process is ended.

If at block **752** the call cost per second is not equal to zero, block **756** directs the processor **202** in FIG. **7** to calculate a first time to live value as a sum of a free time attributed to the participant in the communication session and the quotient of the funds balance held by the participant to the cost per unit time value. To do this, the processor **202** of FIG. **7** is directed to set a first time value or temporary time to live value equal to the sum of the free time provided in the free time field **742** of the subscriber account record shown in FIG. **39** and the quotient of the contents of the funds balance field **740** in the subscriber account record for the call shown in FIG. **39** and the cost per second determined at block **750** of FIG. **33**B. Thus, for example, if at block **750** the cost per second is determined to be three cents per second and the funds balance field holds the value $10.00, the quotient of the funds balance and cost per second is 333 seconds and this is added to the contents of the free time field **742**, which is 100, resulting in a time to live of 433 seconds.

Block **758** then directs the RC processor to produce a second time value in response to the first time value and the billing pattern associated with the participant as established by the bundle override record shown in FIG. **37**. This process is shown in greater detail at **760** in FIG. **40** and generally involves producing a remainder value representing a portion of the second billing interval remaining after dividing the second billing interval into a difference between the first time value and the first billing interval.

Referring to FIG. **40**, the process for producing the second time value begins with a first block **762** that directs the processor **202** in FIG. **7** to set a remainder value equal to the difference between the time to live value calculated at block **756** in FIG. **33**B and the contents of the first interval field **722** of the record shown in FIG. **37**, multiplied by the modulus of the contents of the second interval field **724** of FIG. **37**. Thus, in the example given, the difference between the time to live field and the first interval field is 433 minus 30, which is 403 and therefore the remainder produced by the mod of 403 divided by 6 is 0.17. Block **764** then directs the processor to determine whether or not this remainder value is greater than zero and, if so, block **766** directs the processor to subtract the remainder from the first time value and set the difference as the second time value. To do this the processor is directed to set the time to live value equal to the current time to live of 403 minus the remainder of 1, i.e., 402 seconds. The processor is then returned back to block **758** of FIG. **33**B.

Referring back to FIG. **40**, if at block **764** the remainder is not greater than zero, block **768** directs the processor **202** of FIG. **7** to determine whether or not the time to live is less than the contents of the first interval field **722** in the record shown in FIG. **37**. If so, then block **770** of FIG. **40** directs the processor to set the time to live equal to zero. Thus, the second time value is set to zero when the remainder is greater than zero and the first time value is less than the free time associated with the participant in the call. If at block **768** the conditions of that block are not satisfied, the processor returns the first time to live value as the second time to live value.

Thus, referring to FIG. **33**B, after having produced a second time to live value, block **772** directs the processor to set the time to live value for use in blocks **342**, **350** or **564**.

Cost Per Second

Referring back to FIG. **33**B, at block **750** it was explained that a call cost per unit time is calculated. The following explains how that call cost per unit time value is calculated.

Referring to FIG. **41**, a process for calculating a cost per unit time is shown generally at **780**. The process is executed by the processor **202** in FIG. **7** and generally involves locating a record in a database, the record comprising a markup type indicator, a markup value and a billing pattern and setting a reseller rate equal to the sum of the markup value and the buffer rate, locating at least one of an override record specifying a route cost per unit time amount associated with a route associated with the communication session, a reseller record associated with a reseller of the communications session, the reseller record specifying a reseller cost per unit time associated with the reseller for the communication session and a default operator markup record specifying a default cost per unit time and setting as the cost per unit time the sum of the reseller rate and at least one of the route cost per unit time, the reseller cost per unit time and the default cost per unit time.

The process begins with a first set of blocks **782**, **802** and **820** which direct the processor **202** in FIG. **7** to locate at least one of a record associated with a reseller and a route associated with the reseller, a record associated with the reseller, and a default reseller mark-up record. Block **782**, in particular, directs the processor to address the database **18** to look for a record associated with a reseller and a route with the reseller by looking for a special rate record based on the master list ID established at block **410** in FIG. **8**C.

Referring to FIG. **42**, a system operator special rate table record is shown generally at **784**. The record includes a reseller field **786**, a master list ID field **788**, a mark-up type field **790**, a mark-up value field **792**, a first interval field **794** and a second interval field **796**. The reseller field **786** holds a reseller ID code and the master list ID field **788** holds a master list ID code. The mark-up type field **790** holds a mark-up type such as fixed percent or cents and the mark-up value field **792** holds a real number representing the value corresponding to the mark-up type. The first interval field **794** holds a number representing a first level of charging and the second interval field **796** holds a number representing a second level of charging.

An exemplary system operator special rate table for a reseller known as "Klondike" is shown at **798** in FIG. **43**. In this record, the reseller field **786** holds a code indicating the retailer ID is Klondike, the master list ID field **788** holds the code **1019** to associate the record with the master list ID code **1019**. The mark-up type field **790** holds a code indicating the mark-up type is cents and the mark-up value field **792** holds a mark-up value indicating 1/10 of one cent. The first interval field **794** holds the value 30 and the second interval field **796** holds the value 6, these two fields indicating that the operator allows 30 seconds for free and then billing is done in increments of 6 seconds after that.

Referring back to FIG. **41**, if at block **782** a record such as the one shown in FIG. **43** is located in the system operator special rates table, the processor is directed to block **800** in FIG. **41**. If such a record is not found in the system operator special rates table, block **802** directs the processor to address the database **18** to look in a system operator mark-up table for a mark-up record associated with the reseller.

Referring to FIG. **44**, an exemplary system operator mark-up table record is shown generally at **804**. The record includes a reseller field **806**, a mark-up type field **808**, a mark-up value field **810**, a first interval field **812** and a second interval field **814**. The reseller mark-up type, mark-up value, first interval and second interval fields are as described in connection with the fields by the same names in the system operator special rates table shown in FIG. **42**.

FIG. **45** provides an exemplary system operator mark-up table record for the reseller known as Klondike and therefore the reseller field **806** holds the value "Klondike", the mark-up type field **808** holds the value cents, the markup value field holds the value 0.01, the first interval field **812** holds the value 30 and the second interval field **814** holds the value 6. This indicates that the reseller "Klondike" charges by the cent at a rate of one cent per minute. The first 30 seconds of the call are free and billing is charged at the rate of one cent per minute in increments of 6 seconds.

FIG. **46** provides an exemplary system operator mark-up table record for cases where no specific system operator mark-up table record exists for a particular reseller, i.e., a default reseller mark-up record. This record is similar to the record shown in FIG. **45** and the reseller field **806** holds the value "all", the mark-up type field **808** is loaded with a code indicating mark-up is based on a percentage, the mark-up value field **810** holds the percentage by which the cost is marked up, and the first and second interval fields **812** and **814** identify first and second billing levels.

Referring back to FIG. **41**, if at block **802** a specific mark-up record for the reseller identified at block **782** is not located, block **820** directs the processor to get the mark-up record shown in FIG. **46**, having the "all" code in the reseller field **806**. The processor is then directed to block **800**.

Referring back to FIG. **41**, at block **800**, the processor **202** of FIG. **7** is directed to set a reseller rate equal to the sum of the mark-up value of the record located by blocks **782**, **802** or **820** and the buffer rate specified by the contents of the buffer rate field **516** of the master list record shown in FIG. **20**. To do this, the RC processor sets a variable entitled "reseller cost per second" to a value equal to the sum of the contents of the mark-up value field (**792**, **810**) of the associated record, plus the contents of the buffer rate field (**516**) from the master list record associated with the master list ID. Then, block **822** directs the processor to set a system operator cost per second variable equal to the contents of the buffer rate field (**516**) from the master list record. Block **824** then directs the processor to determine whether the call type flag indicates the call is local or national/local style and whether the caller has free local calling. If both these conditions are met, then block **826** sets the user cost per second variable equal to zero and sets two increment variables equal to one, for use in later processing. The cost per second has thus be calculated and the process shown in FIG. **41** is ended.

If at block **824** the conditions of that block are not met, the processor **202** of FIG. **7** is directed to locate at least one of a bundle override table record specifying a route cost per unit time associated with a route associated with the communication session, a reseller special destinations table record associated with a reseller of the communications session, the reseller record specifying a reseller cost per unit time associated with the reseller for the communication session and a default reseller global markup record specifying a default cost per unit time.

To do this block **828** directs the processor **202** of FIG. **7** to determine whether or not the bundle override record **726** in FIG. **37** located at block **712** in FIG. **33**A has a master list ID equal to the stored master list ID that was determined at block **410** in FIG. **8**B. If not, block **830** directs the processor to find a reseller special destinations table record in a reseller special destinations table in the database (**18**), having a master list ID code equal to the master list ID code of the master list ID that was determined at block **410** in FIG. **8**B. An exemplary reseller special destinations table record is shown in FIG. **47** at **832**. The reseller special destinations table record includes a reseller field **834**, a master list ID field **836**, a mark-up type field **838**, a mark-up value field **840**, a first interval field **842** and a second interval field **844**. This record has the same format as the system operator special rates table record shown in FIG. **42**, but is stored in a different table to allow for different mark-up types and values and time intervals to be set according to resellers' preferences. Thus, for example, an exemplary reseller special destinations table record for the reseller "Klondike" is shown at **846** in FIG. **48**. The reseller field **834** holds a value indicating the reseller as the reseller "Klondike" and the master list ID field holds the code **1019**. The markup type field **838** holds a code indicating the mark-up type is percent and the mark-up value field **840** holds a number representing the mark-up value as 5%. The first and second interval fields identify different billing levels used as described earlier.

Referring back to FIG. **41**, the record shown in FIG. **48** may be located at block **830**, for example. If at block **830** such a record is not found, then block **832** directs the processor to get a default operator global mark-up record based on the reseller ID.

Referring to FIG. **49**, an exemplary default reseller global mark-up table record is shown generally at **848**. This record includes a reseller field **850**, a mark-up type field **852**, a mark-up value field **854**, a first interval field **856** and a second interval field **858**. The reseller field **850** holds a code identifying the reseller. The mark-up type field **852**, the mark-up value field **854** and the first and second interval fields **856** and **858** are of the same type as described in connection with fields of the same name in FIG. **47**, for example. The contents of the fields of this record **860** may be set according to system operator preferences, for example.

Referring to FIG. **50**, an exemplary reseller global mark-up table record is shown generally at **860**. In this record, the reseller field **850** holds a code indicating the reseller is "Klondike", the mark-up type field **852** holds a code indicating the mark-up type is percent, the mark-up value field **854** holds a value representing 10% as the mark-up value, the first interval field **856** holds the value 30 and the second interval field **858** holds the values 30 and 6 respectively to indicate the first 30 seconds are free and billing is to be done in 6 second increments after that.

Referring back to FIG. **41**, should the processor get to block **832**, the reseller global mark-up table record as shown in FIG. **50** is retrieved from the database and stored locally at the RC. As seen in FIG. **41**, it will be appreciated that if the conditions are met in blocks **828** or **830**, or if the processor executes block **832**, the processor is then directed to block **862** which causes it to set an override value equal to the contents of the mark-up value field of the located record, to set the first increment variable equal to the contents of the first interval field of the located record and to set the second increment variable equal to the contents of the second interval field of the located record. (The increment variables were alternatively set to specific values at block **826** in FIG. **41**.)

It will be appreciated that the located record could be a bundle override record of the type shown in FIG. **37** or the located record could be a reseller special destination record of the type shown in FIG. **48** or the record could be a reseller global mark-up table record of the type shown in FIG. **50**. After the override and first and second increment variables have been set at block **862**, the processor **202** if FIG. **7** is directed to set as the cost per unit time the sum of the reseller rate and at least one of the route cost per unit time, the reseller cost per unit time and the default cost per unit time, depending on which record was located. To do this, block **864** directs the processor to set the cost per unit time equal to the sum of the reseller cost set at block **800** in FIG. **41**, plus the contents of the override variable calculated in block **862** in FIG. **41**. The cost per unit time has thus been calculated and it is this cost per unit time that is used in block **752** of FIG. **33**B, for example.

Terminating the Call

In the event that either the caller or the callee terminates a call, the telephone of the terminating party sends a SIP bye message to the controller **14**. An exemplary SIP bye message is shown at **900** in FIG. **51** and includes a caller field **902**, a callee field **904** and a call ID field **906**. The caller field **902** holds a twelve digit user name, the callee field **904** holds a PSTN compatible number or user name, and the call ID field **906** holds a unique call identifier field of the type shown in the call ID field **65** of the SIP invite message shown in FIG. **3**.

Thus, for example, referring to FIG. **52**, a SIP bye message for the Calgary callee is shown generally at **908** and the caller field **902** holds a user name identifying the caller, in this case 2001 1050 8667, the callee field **904** holds a user name identifying the Calgary callee, in this case 2001 1050 2222, and the call ID field **906** holds the code FA10@192.168.0.20, which is the call ID for the call.

The SIP bye message shown in FIG. **52** is received at the call controller **14** and the call controller executes a process as shown generally at **910** in FIG. **53**. The process includes a first block **912** that directs the call controller processor **202** of FIG. **7** to copy the caller, callee and call ID field contents from the SIP bye message received from the terminating party to corresponding fields of an RC stop message buffer (not shown). Block **914** then directs the processor to copy the call start time from the call timer and to obtain a call stop time from the call timer. Block **916** then directs the call controller to calculate a communication session time by determining the difference in time between the call start time and the call stop time. This session time is then stored in a corresponding field of the RC call stop message buffer. Block **917** then directs the processor to decrement the contents of the current concurrent call field **277** of the dialing profile for the caller as shown in FIG. **10**, to indicate that there is one less concurrent call in progress. A copy of the amended dialing profile for the caller is then stored in the database **18** of FIG. **1**. Block **918** then directs the processor to copy the route from the call log. An RC call stop message produced as described above is shown generally at **1000** in FIG. **54**. An RC call stop message specifically associated with the call made to the Calgary callee is shown generally at **1020** in FIG. **55**.

Referring to FIG. **54**, the RC stop call message includes a caller field **1002**, callee field **1004**, a call ID field **1006**, an account start time field **1008**, an account stop time field **1010**, a communication session time **1012** and a route field **1014**. The caller field **1002** holds a username, the callee field **1004** holds a PSTN-compatible number or system number, the call ID field **1006** hold the unique call identifier received from the SIP invite message shown in FIG. **3**, the account start time field **1008** holds the date and start time of the call, the account stop time field **1010** holds the date and time the call ended, the communication session time field **1012** holds a value representing the difference between the start time and the stop time, in seconds, and the route field **1014** holds the IP address for the communications link that was established.

Referring to FIG. **55**, an exemplary RC stop call message for the Calgary callee is shown generally at **1020**. In this example the caller field **1002** holds the user name 2001 1050 8667 identifying the Vancouver-based caller and the callee field **1004** holds the user name 2001 1050 2222 identifying the Calgary callee. The contents of the call ID field **1006** are FA10 @192.168.0.20. The contents of the account start time field **1008** are 2006-12-30 12:12:12 and the contents of the account stop time field are 2006-12-30 12:12:14. The contents of the communication session time field **1012** are 2 to indicate 2 seconds call duration and the contents of the route field are 72.64.39.58.

Referring back to FIG. **53**, after having produced an RC call stop message, block **920** directs the processor **202** in FIG. **7** to send the RC stop message compiled in the RC call stop message buffer to the RC **16** of FIG. **1**. Block **922** directs the call controller **14** to send a "bye" message back to the party that did not terminate the call.

The RC **16** of FIG. **1** receives the call stop message and an RC call stop message process is invoked at the RC, the process being shown at **950** in FIGS. **56**A, **56**B and **56**C. Referring to FIG. **56**A, the RC stop message process **950** begins with a first block **952** that directs the processor **202** in FIG. **7** to determine whether or not the communication session time is less than or equal to the first increment value set by the cost calculation routine shown in FIG. **41**, specifically blocks **826** or **862** thereof. If this condition is met, then block **954** of FIG. **56**A directs the RC processor to set a chargeable time variable equal to the first increment value set at block **826** or **862** of FIG. **41**. If at block **952** of FIG. **56**A the condition is not met, block **956** directs the RC processor to set a remainder variable equal to the difference between the communication session time and the first increment value mod the second increment value produced at block **826** or **862** of FIG. **41**. Then, the processor is directed to block **958** of FIG. **56**A which directs it to determine whether or not the remainder is greater than zero. If so, block **960** directs the RC processor to set the chargeable time variable equal to the difference between the communication session time and the remainder value. If at block **958** the remainder is not greater than zero, block **962** directs the RC processor to set the chargeable time variable equal to the contents of the communication session time from the RC stop message. The processor is then directed to block **964**. In addition, after executing block **954** or block **960**, the processor is directed to block **964**.

Block **964** directs the processor **202** of FIG. **7** to determine whether or not the chargeable time variable is greater than or equal to the free time balance as determined from the free time field **742** of the subscriber account record shown in FIG. **39**. If this condition is satisfied, block **966** of FIG. **56**A directs the processor to set the free time field **742** in the record shown in FIG. **39**, to zero. If the chargeable time variable is not greater than or equal to the free time balance, block **968** directs the RC processor to set a user cost variable to zero and Block **970** then decrements the free time field **742** of the subscriber account record for the caller by the chargeable time amount determined by block **954**, **960** or **962**.

If at Block **964** the processor **202** of FIG. **7** was directed to Block **966** which causes the free time field (**742** of FIG. **39**) to be set to zero, referring to FIG. **56**B, Block **972** directs the processor to set a remaining chargeable time variable equal to the difference between the chargeable time and the contents of the free time field (**742** of FIG. **39**). Block **974** then directs the processor to set the user cost variable equal to the product of the remaining chargeable time and the cost per second calculated at Block **750** in FIG. **33**B. Block **976** then directs the processor to decrement the funds balance field (**740**) of the subscriber account record shown in FIG. **39** by the contents of the user cost variable calculated at Block **974**.

After completing Block **976** or after completing Block **970** in FIG. **56**A, block **978** of FIG. **56**B directs the processor **202** of FIG. **7** to calculate a reseller cost variable as the product of the reseller rate as indicated in the mark-up value field **810** of the system operator mark-up table record shown in FIG. **45** and the communication session time determined at Block **916** in FIG. **53**. Then, Block **980** of FIG. **56**B directs the processor to add the reseller cost to the reseller balance field **986** of a reseller account record of the type shown in FIG. **57** at **982**.

The reseller account record includes a reseller ID field **984** and the aforementioned reseller balance field **986**. The reseller ID field **984** holds a reseller ID code, and the reseller balance field **986** holds an accumulated balance of charges.

Referring to FIG. **58**, a specific reseller accounts record for the reseller "Klondike" is shown generally at **988**. In this record the reseller ID field **984** holds a code representing the reseller "Klondike" and the reseller balance field **986** holds a balance of $100.02. Thus, the contents of the reseller balance field **986** in FIG. **58** are incremented by the reseller cost calculated at block **978** of FIG. **56**B.

Still referring to FIG. **56**B, after adding the reseller cost to the reseller balance field as indicated by Block **980**, Block **990** directs the processor to **202** of FIG. **7** calculate a system operator cost as the product of the system operator cost per second, as set at block **822** in FIG. **41**, and the communication session time as determined at Block **916** in FIG. **53**. Block **992** then directs the processor to add the system operator cost value calculated at Block **990** to a system operator accounts table record of the type shown at **994** in FIG. **59**. This record includes a system operator balance field **996** holding an accumulated charges balance. Referring to FIG. **60** in the embodiment described, the system operator balance field **996** may hold the value $1,000.02 for example, and to this value the system operator cost calculated at Block **990** is added when the processor executes Block **992** of FIG. **56**B.

Ultimately, the final reseller balance **986** in FIG. **58** holds a number representing an amount owed to the reseller by the system operator and the system operator balance **996** of FIG. **59** holds a number representing an amount of profit for the system operator.

While specific embodiments of the invention have been described and illustrated, such embodiments should be considered illustrative of the invention only and not as limiting the invention as construed in accordance with the accompanying claims.

What is claimed is:

1. A process for producing a routing message for routing communications between a caller and a callee in a communication system, the process comprising:

using a caller identifier associated with the caller to locate a caller dialing profile comprising a plurality of calling attributes associated with the caller;

when at least one of said calling attributes and at least a portion of a callee identifier associated with the callee meet private network classification criteria, producing a private network routing message for receipt by a call controller, said private network routing message identifying an address, on the private network, associated with the callee; and

when at least one of said calling attributes and at least a portion of said callee identifier meet a public network classification criterion, producing a public network routing message for receipt by the call controller, said public network routing message identifying a gateway to the public network.

2. The process of claim **1**, wherein said private network classification criteria include:

a) said callee identifier does not begin with the same digit pattern as an international dialing digit (IDD) attribute of said callee identifier; and

b) said callee identifier does not begin with the same digit pattern as a national dialing digit (NDD) attribute of said callee identifier; and

c) said callee identifier does not begin with the same area code as an area code of said caller; and

d) said callee identifier does not have a length that is within a range of caller local number lengths; and

e) said callee identifier is a valid username.

3. The process of claim **2**, further comprising identifying the call as a cross-domain call on the private network when said callee identifier identifies a callee that is not associated with the same network node as said caller.

4. The process of claim **2**, further comprising:

locating a callee dialing profile for the callee when said callee identifier identifies a callee that is associated with the same network node as said caller; and retrieving call handling information associated with the callee, where said call handing information is available, said call handing information including at least one of call blocking information, call forwarding information, and voicemail information.

5. The process of claim **4**, further comprising, where said call handling information including said call blocking information is available, blocking the call when said call blocking information identifies the caller as a caller from whom calls are to be blocked from being established with the callee.

6. The process of claim **4**, further comprising, where said call handling information including said call forwarding information is available, causing said call forwarding information to be included in said private network routing message.

7. The process of claim **4**, further comprising, where said call handling information including said voicemail information is available, causing said voicemail information to be included in said private network routing message.

8. The process of claim **1**, further comprising associating at least one direct inward dial (DID) record with at least one subscriber to said communication system, each of said at least one direct inward dial records comprising a field storing a direct inward dial number associated with said at least one subscriber.

9. The process of claim **8**, wherein said public network classification criteria include:

a) said callee identifier begins with the same digit pattern as an international dialing digit (IDD) attribute of said callee identifier; and

b) a reformatted callee identifier produced by removing the IDD attribute from said callee identifier has no DID bank table record.

10. The process of claim **8**, wherein said public network classification criteria include:

a) said callee identifier begins with the same digit pattern as a national dialing digit (NDD) attribute of said callee identifier; and

b) a reformatted callee identifier produced by removing the NDD attribute from said callee identifier and including a caller country code has no DID bank table record.

11. The process of claim **8**, wherein said public network classification criteria include:

a) said callee identifier begins with the same area code as an area code of said caller; and

b) a reformatted callee identifier produced by reformatting the callee identifier to include a caller country code has no DID bank table record.

12. The process of claim **8**, wherein said public network classification criteria include:

a) said callee identifier has a length that is within a range of caller local number lengths; and

b) a reformatted callee identifier produced by reformatting the callee identifier to include a caller country code and area code has no DID bank table record.

13. The process of claim **1**, wherein said plurality of calling attributes includes at least one of an international dialing digits identifier, a national dialing digits identifier, a country code identifier, a local area codes identifier, a caller minimum local length identifier, a caller maximum local length identifier, a reseller identifier, and a maximum number of concurrent calls identifier.

14. The process of claim **8**, wherein said DID record comprises a user name field, a user domain field and a DID number field.

15. The process of claim **1**, further comprising maintaining a list of public network route suppliers and when said public network classification criterion is met identifying at least one of said public network route suppliers that satisfies public network routing selection criteria.

16. The process of claim **15**, wherein said producing said public network routing message comprises producing a public network routing message identifying said at least one public network route supplier that satisfies said public network routing selection criteria.

17. The process of claim **16**, wherein producing said public network routing message comprises causing said public network routing message to include a gateway supplier identifier identifying a gateway supplier able to establish a communications link in a route through which communications between the caller and callee are to be conducted.

18. The process of claim **17**, further comprising causing said public network routing message to include a time value and a timeout value.

19. The process of claim **17**, wherein causing said public network routing message to include said gateway supplier identifier comprises causing said public network routing message to include a plurality of gateway supplier identifiers identifying a plurality of gateway suppliers able to supply respective communication links through which communications between the caller and callee can be conducted.

20. The process of claim **19**, further comprising causing said public network routing message to include priority information identifying a priority in which gateway suppliers associated with said gateway identifiers are to be considered for selection of a communication link through which communications between the caller and callee can be conducted.

21. The process of claim **19**, wherein causing said public network routing message to include priority information includes arranging said gateway supplier identifiers in said public network routing message in order of rate, where rate is determined from rate fields of respective said gateway supplier records.

22. The process of claim **21**, wherein arranging said gateway supplier identifiers in order of rate comprises arranging said gateway supplier identifiers in order of increasing rate.

23. The process of claim **17**, further comprising arranging said gateway supplier identifiers in an order based on at least one provision in a service agreement.

24. The process of claim **1**, further comprising causing the private network routing message or the public network routing message to be communicated to a call controller to effect routing of the call.

25. A non-transitory computer readable medium encoded with codes for directing a processor to execute the method of claim **1**.

26. A call routing controller apparatus for producing a routing message for routing communications between a caller and a callee in a communication system, the apparatus comprising:

at least one processor operably configured to:

use a caller identifier associated with the caller to locate a caller dialing profile comprising a plurality of calling attributes associated with the caller;

when at least one of said calling attributes and at least a portion of a callee identifier associated with the callee meet private network classification criteria, produce a private network routing message for receipt by a call controller, said private network routing message identifying an address, on the private network, associated with the callee; and

when at least one of said calling attributes and at least a portion of said callee identifier meet a public network classification criterion, produce a public network routing message for receipt by the call controller, said public network routing message identifying a gateway to the public network.

27. The apparatus of claim **26**, wherein said private network classification criteria include:

a) said callee identifier does not begin with the same digit pattern as an international dialing digit (IDD) attribute of said callee identifier; and

b) said callee identifier does not begin with the same digit pattern as a national dialing digit (NDD) attribute of said callee identifier; and

c) said callee identifier does not begin with the same area code as an area code of said caller; and

d) said callee identifier does not have a length that is within a range of caller local number lengths; and

e) said callee identifier is a valid username.

28. The apparatus of claim **27**, wherein said at least one processor is further operably configured to identify the call as a cross-domain call on the private network when said callee identifier identifies a callee that is not associated with the same network node as said caller.

29. The apparatus of claim **27**, wherein said at least one processor is further configured to:

access the database of caller dialing profiles to locate a callee dialing profile for the callee when said callee identifier identifies a callee that is associated with the same network node as said caller; and

retrieve call handling information associated with the callee, where said call handing information is available, said call handing information including at least one of call blocking information, call forwarding information, and voicemail information.

30. The apparatus of claim **29**, wherein said at least one processor is further operably configured to determine whether said call handling information including said call blocking information is available and to block the call when said call blocking information identifies the caller as a caller from whom calls are to be blocked.

31. The apparatus of claim **29**, wherein said at least one processor is further operably configured to determine whether said call handling information including said call forwarding information is available and to cause said call forwarding information to be included in said private network routing message.

32. The apparatus of claim **29**, wherein said at least one processor is further operably configured to determine whether said call handling information including said voicemail information is available and to cause said voicemail information to be included in said private network routing message.

33. The apparatus of claim **26**, wherein said at least one processor is further operably configured to access a database of direct inward dial records each associating at least one direct inward dial number with at least one subscriber to said communication system.

34. The apparatus of claim **33**, wherein said public network classification criteria include:

a) said callee identifier begins with the same digit pattern as an international dialing digit (IDD) attribute of said callee identifier; and

b) a reformatted callee identifier produced by removing the IDD attribute from said callee identifier has no DID record.

35. The apparatus of claim **33**, wherein said public network classification criteria include:

a) said callee identifier begins with the same digit pattern as a national dialing digit (NDD) attribute of said callee identifier; and

b) a reformatted callee identifier produced by removing the NDD attribute from said callee identifier and including a caller country code has no DID record.

36. The apparatus of claim **33**, wherein said public network classification criteria include:

a) said callee identifier begins with the same area code as an area code of said caller; and

b) a reformatted callee identifier produced by reformatting the callee identifier to include a caller country code has no DID record.

37. The apparatus of claim **33**, wherein said public network classification criteria include:

a) said callee identifier has a length that is within a range of caller local number lengths; and

b) a reformatted callee identifier produced by reformatting the callee identifier to include a caller country code and area code has no DID record.

38. The apparatus of claim **26**, wherein said plurality of calling attributes includes at least one of an international dialing digits identifier, a national dialing digits identifier, a country code identifier, a local area codes identifier, a caller minimum local length identifier, a caller maximum local length identifier, a reseller identifier, and a maximum number of concurrent calls identifier.

39. The apparatus of claim **33**, wherein said DID record comprises a user name field, a user domain field and a DID number field.

40. The apparatus of claim **26**, wherein said at least one processor is further operably configured to access a list of public network route suppliers when said public network classification criterion is met and to identify at least one of said public network route suppliers that satisfies public network routing selection criteria.

41. The apparatus of claim **40**, wherein said at least one processor is further operably configured to produce a public network routing message identifying said at least one public network route supplier that satisfies said public network routing selection criteria.

42. The apparatus of claim **41**, wherein said at least one processor is operably configured to cause said public network routing message to include a gateway supplier identifier identifying a gateway supplier able to establish a communications link in a route through which communications between the caller and callee can be conducted.

43. The apparatus of claim **42**, wherein said at least one processor is operably configured to cause said public network routing message to include a time value and a timeout value.

44. The apparatus of claim **42**, wherein said at least one processor is operably configured to cause said public network routing message to include a plurality of gateway supplier identifiers identifying a plurality of gateway suppliers able to supply respective communication links through which communications between the caller and callee can be conducted.

45. The apparatus of claim **44**, wherein said at least one processor is operably configured to cause said public network routing message to include priority information identifying a priority in which gateway suppliers associated with said gateway identifiers are to be considered for selection of a communication link through which communications between the caller and callee can be conducted.

46. The apparatus of claim **44**, wherein said at least one processor is operably configured to arrange said gateway supplier identifiers in said public network routing message in order of rate, where rate is determined from rate fields of respective said gateway supplier records.

47. The apparatus of claim **46**, wherein said at least one processor is operably configured to arrange said gateway supplier identifiers in order of increasing rate.

48. The apparatus of claim **42**, wherein said at least one processor is operably configured to arrange said gateway supplier identifiers in an order based on at least one provision in a service agreement.

49. The apparatus of claim **26**, wherein said at least one processor is further operably configured to cause the private network routing message or the public network routing message to be communicated to a call controller to effect routing of the call.

50. A call routing controller apparatus for producing a routing message for routing communications between a caller and a callee in a communication system, the apparatus comprising:

means for using a caller identifier associated with the caller to locate a caller dialing profile comprising a plurality of calling attributes associated with the caller; and

means for, when at least one of said calling attributes and at least a portion of a callee identifier associated with the callee meet private network classification criteria, producing a private network routing message for receipt by a call controller, said private network routing message identifying an address, on the private network, associated with the callee; and

means for, when at least one of said calling attributes and at least a portion of said callee identifier meet a public network classification criterion, producing a public network routing message for receipt by the call controller, said public network routing message identifying a gateway to the public network.

51. The apparatus of claim **50**, wherein said private network classification criteria include:

a) said callee identifier does not begin with the same digit pattern as an international dialing digit (IDD) attribute of said callee identifier; and

b) said callee identifier does not begin with the same digit pattern as a national dialing digit (NDD) attribute of said callee identifier; and

c) said callee identifier does not begin with the same area code as an area code of said caller; and

d) said callee identifier does not have a length that is within a range of caller local number lengths; and

e) said callee identifier is a valid username.

52. The apparatus of claim **51**, further comprising means for identifying the call as a cross-domain call on the private network when said callee identifier identifies a callee that is not associated with the same network node as said caller.

53. The apparatus of claim **51**, further comprising:

means for accessing the database of caller dialing profiles to locate a callee dialing profile for the callee when said callee identifier identifies a callee that is associated with the same network node as said caller; and

means for retrieving call handling information associated with the callee, where said call handing information is available, said call handing information including at least one of call blocking information, call forwarding information, and voicemail information.

54. The apparatus of claim **53**, further comprising, where said call handling information including said call blocking information is available, means for blocking the call being established with the callee when said call blocking information identifies the caller as a caller from whom calls are to be blocked.

55. The apparatus of claim **53**, further comprising, means for causing said call forwarding information to be included in said private network routing message, where said call handling information including said call forwarding information is available.

56. The apparatus of claim **53**, further comprising, where said call handling information including said voicemail information is available, means for causing said voicemail information to be included in said private network routing message.

57. The apparatus of claim **50**, further comprising means for accessing a database of direct inward dial records each associating at least one direct inward dial number with at least one subscriber to said communication system.

58. The apparatus of claim **57**, wherein said public network classification criteria include:

a) said callee identifier begins with the same digit pattern as an international dialing digit (IDD) attribute of said callee identifier; and

b) a reformatted callee identifier produced by removing the IDD attribute from said callee identifier has no DID record.

59. The apparatus of claim **57**, wherein said public network classification criteria include:

a) said callee identifier begins with the same digit pattern as a national dialing digit (NDD) attribute of said callee identifier; and

b) a reformatted callee identifier produced by removing the NDD attribute from said callee identifier and including a caller country code has no DID record.

60. The apparatus of claim **57**, wherein said public network classification criteria include:

a) said callee identifier begins with the same area code as an area code of said caller; and

b) a reformatted callee identifier produced by reformatting the callee identifier to include a caller country code has no DID record.

61. The apparatus of claim **57**, wherein said public network classification criteria include:

a) said callee identifier has a length that is within a range of caller local number lengths; and

b) a reformatted callee identifier produced by reformatting the callee identifier to include a caller country code and area code has no DID record.

62. The apparatus of claim **50**, wherein said plurality of calling attributes includes at least one of an international dialing digits identifier, a national dialing digits identifier, a country code identifier, a local area codes identifier, a caller minimum local length identifier, a caller maximum local length identifier, a reseller identifier, and a maximum number of concurrent calls identifier.

63. The apparatus of claim **57**, wherein said DID record comprises a user name field, a user domain field and a DID number field.

64. The apparatus of claim **50**, further comprising means for accessing a list of public network route suppliers when said public network classification criterion is met and means for identifying at least one of said public network route suppliers that satisfies public network routing selection criteria.

65. The apparatus of claim **64**, wherein said means for producing said public network routing message comprises means for producing a public network routing message identifying said at least one public network route supplier that satisfies said public network routing selection criteria.

66. The apparatus of claim **65**, wherein said means for producing said public network routing message comprises means for causing said public network routing message to include a gateway supplier identifier identifying a gateway supplier able to establish a communications link in a route through which communications between the caller and callee can be conducted.

67. The apparatus of claim **66**, further comprising means for causing said public network routing message to include a time value and a timeout value.

68. The apparatus of claim **66**, wherein said means for causing said public network routing message to include said gateway supplier identifier comprises means for causing said public network routing message to include a plurality of gateway supplier identifiers identifying a plurality of gateway suppliers able to supply respective communication links through which communications between the caller and callee can be conducted.

69. The apparatus of claim **68**, further comprising means for causing said public network routing message to include priority information identifying a priority in which gateway suppliers associated with said gateway identifiers are to be considered for selection of a communication link through which communications between the caller and callee can be conducted.

70. The apparatus of claim **68**, wherein said means for causing said public network routing message to include priority information includes means for arranging said gateway supplier identifiers in said public network routing message in order of rate, where rate is determined from rate fields of respective said gateway supplier records.

71. The apparatus of claim **70**, wherein said means for arranging said gateway supplier identifiers in order of rate comprises means for arranging said gateway supplier identifiers in order of increasing rate.

72. The apparatus of claim **66**, further comprising means for arranging said gateway supplier identifiers in an order based on at least one provision in a service agreement.

73. The apparatus of claim **50**, further comprising means for causing the private network routing message or the public network routing message to be communicated to a call controller to effect routing of the call.

74. A method of routing communications in a packet switched network in which a first participant identifier is associated with a first participant and a second participant identifier is associated with a second participant in a communication, the method comprising:

after the first participant has accessed the packet switched network to initiate the communication, using the first participant identifier to locate a first participant profile comprising a plurality of attributes associated with the first participant;

when at least one of the first participant attributes and at least a portion of the second participant identifier meet a first network classification criterion, producing a first network routing message for receipt by a controller, the first network routing message identifying an address in a first portion of the packet switched network, the address being associated with the second participant, the first portion being controlled by an entity; and

when at least one of the first participant attributes and at least a portion of the second participant identifier meet a second network classification criterion, producing a second network routing message for receipt by the controller, the second network routing message identifying an address in a second portion of the packet switched network, the second portion not controlled by the entity.

75. The method of claim **74**, wherein the packet switched network comprises the Internet.

76. The method of claim **74**, wherein the first participant identifier comprises a first participant telephone number or username.

77. The method of claim **74**, wherein the second participant identifier comprises a second participant telephone number or username.

78. The method of claim **74**, wherein the communication comprises a voice-over-IP communication.

79. The method of claim **74**, wherein the packet switched network is accessed via an Internet service provider.

80. The method of claim **74**, wherein the first participant profile further comprises a username and a domain associated with first participant.

81. The method of claim **74**, wherein the attributes comprise at least one of an international dialing digit (IDD), a national dialing digit (NDD), an area code, a country code and a number length range.

82. The method of claim **74**, wherein the first network classification criterion is satisfied when the first participant identifier does not begin with the same international dialing digit (IDD) digit pattern as the second participant identifier.

83. The method of claim **74**, wherein the first network classification criterion is satisfied when an address associated with the first participant and the address associated with the second participant are both in the first portion of the packet switched network.

84. The method of claim **74**, wherein the address in the first portion is accessible through the first participant's Internet service provider.

85. The method of claim **74**, wherein the first portion comprises one or more supernodes.

86. The method of claim **74**, further comprising storing in a database a direct inward dial (DID) record associated with at least one of the first participant and the second participant.

87. The method of claim **86**, wherein the stored DID record for the second participant comprises a username, a user domain and a record number.

88. The method of claim **74**, wherein the entity is an entity supplying communication services for the first portion.

89. The method of claim **74**, wherein the second network classification criterion is satisfied when access to the second participant requires routing through a portion of the packet switched network operated by a communication service supplier.

90. The method of claim **86**, wherein the second network classification criterion is satisfied when the second participant identifier is not associated with a stored DID record in the database.

91. The method of claim **86**, wherein the second network classification criterion is satisfied when:

the second participant identifier begins with the same international dialing digit (IDD) digit pattern as the first participant identifier; and

the second participant identifier, without considering the IDD digit pattern, has no stored DID record in the database.

92. The method of claim **74**, wherein the address in the second portion of the packet switched network comprises an address accessed by a communication service supplier.

93. The method of claim **74**, wherein producing the second network routing message identifying the address in the second portion comprises searching a database of route records associating route identifiers with dialing codes, in an attempt to find a route record having a dialing code with a number pattern matching at least a portion of second participant identifier.

94. A system for routing communications in a packet switched network in which a first participant in a communication has an associated first participant identifier and a second participant in the communication has an associated second participant identifier, the system comprising:

a controller comprising:

a processor operably configured to access a memory, wherein the processor is configured to:

after the first participant has accessed the packet switched network to initiate the communication, locate a first participant profile in the memory using the first participant identifier, the first participant profile comprising a plurality of attributes associated with the first participant;

produce a first network routing message when at least one of the first participant attributes and at least a portion of the second participant identifier meet a first network classification criterion, the first network routing message identifying an address in a first portion of the packet switched network, the address being associated with the second participant, the first portion being controlled by an entity; and

produce a second network routing message when at least one of the first participant attributes and at least a portion of the second participant identifier meet a second network classification criterion, the second network routing message identifying an address in a second portion of the packet switched network, the second portion not controlled by the entity.

95. The system of claim **94**, wherein the communication comprises a voice-over-IP communication.

96. The system of claim **94**, wherein the packet switched network is accessed via an Internet service provider.

97. The system of claim **94**, wherein the first network classification criterion is satisfied when the first participant

identifier does not begin with the same international dialing digit (IDD) digit pattern as the second participant identifier.

98. The system of claim **94**, wherein the second network classification criterion is satisfied when access to the second participant requires routing through a portion of the packet switched network operated by a communication service supplier.

99. A non-transitory computer readable medium comprising instructions that when executed cause a processor to perform a method of routing communications in a packet switched network in which a first participant identifier is associated with a first participant and a second participant identifier is associated with a second participant in a communication, the method comprising:

after the first participant has accessed the packet switched network to initiate the communication, using the first participant identifier to locate a first participant profile comprising a plurality of attributes associated with the first participant;

when at least one of the first participant attributes and at least a portion of the second participant identifier meet a first network classification criterion, producing a first network routing message for receipt by a controller, the first network routing message identifying an address in a first portion of the packet switched network, the address being associated with the second participant, the first portion being controlled by an entity; and

when at least one of the first participant attributes and at least a portion of the second participant identifier meet a second network classification criterion, producing a second network routing message for receipt by the controller, the second network routing message identifying an address in a second portion of the packet switched network, the second portion not controlled by the entity.

* * * * *

EXHIBIT 4

UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

SAN JOSE DIVISION

VOIP-PAL.COM, INC., Plaintiff, v. APPLE INC, Defendant.	Case No. 18-CV-06217-LHK **ORDER GRANTING CONSOLIDATED MOTIONS TO DISMISS**
VOIP-PAL.COM, INC., Plaintiff, v. AT&T CORP, Defendant.	Case No. 18-CV-06177-LHK
VOIP-PAL.COM, INC., Plaintiff, v. TWITTER INC., Defendant.	Case No. 18-CV-04523-LHK

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VOIP-PAL.COM, INC.,

Plaintiff,

v.

VERIZON WIRELESS SERVICES, LLC, *et al.*,

Defendant.

Case No. 18-CV-06054-LHK

Plaintiff Voip-Pal.Com, Inc. filed 4 related patent infringement suits against Defendants Apple Inc. ("Apple"), AT&T Corp. ("AT&T"), Twitter Inc. ("Twitter"), and Cellco Partnership d/b/a/ Verizon Wireless Services, LLC ("Verizon") (collectively, "Defendants"). Plaintiff alleges that Apple, AT&T, and Verizon (but not Twitter) infringe various claims of U.S. Patent No. 8,542,815 ("the '815 Patent") to Perreault et al. Plaintiff also alleges that all Defendants infringe various claims of U.S. Patent No. 9,179,005 ("the '005 Patent") to Perreault et al. In all 4 related cases, each Defendant filed an omnibus motion to dismiss, thus resulting in 4 omnibus motions to dismiss. However, the briefing on the omnibus motions to dismiss, Plaintiff's oppositions, and Defendants' replies is identical in all 4 cases. Thus, for ease of reference and unless otherwise specified, the Court refers to documents filed in the Twitter litigation, Case No. 18-CV-04523-LHK.

Before the Court is Defendants' consolidated motions to dismiss, which contend that the asserted claims of the patents-in-suit fail to recite patent-eligible subject matter under 35 U.S.C. § 101. ECF No. 71 ("Mot."). Having considered the submissions of the parties, the relevant law, and the record in this case, the Court GRANTS Defendants' consolidated motions to dismiss the asserted claims of the '815 Patent and the '005 Patent.

I. BACKGROUND

A. Factual Background

1. The Parties

Plaintiff is a Nevada corporation with its principal place of business in Bellevue, Washington. ECF No. 65 at ¶ 5. Plaintiff "owns a portfolio of [Voice over Internet Protocol] patents and patent applications." *Id.* at ¶ 1.

Defendant Twitter is a California corporation with its principal place of business in San Francisco, California. *Id.* at ¶ 6. Twitter uses and sells "messaging services using messaging application software and/or equipment, servers and/or gateways that route messages to computing devices such as smartphones, tablet computers, and personal computers." *Id.* at ¶ 23.

Defendant Apple is a California corporation with its principal place of business in Cupertino, California. Case No. 18-CV-06217-LHK, ECF No. 11 at ¶ 7. Apple "provides, supports and/or operates messaging technology, including iMessage, an instant messaging service supported by Apple's Messages application and computer infrastructure that allows smartphone and desktop users to send messages including text, images, video and audio to other users." *Id.* at ¶ 15.

Defendant AT&T is a Delaware corporation with its principal place of business in Bedminster, New Jersey. Case No. 18-CV-06177-LHK, ECF No. 59 at ¶ 2. AT&T "supports and operates a messaging platform . . . [that] allows smartphone users to send messages including text, images, video and audio to others." *Id.* at ¶ 40. AT&T also offers Voice over Internet Protocol products and services "utilizing equipment at the customer or business premises and a collection of servers and gateways." *Id.* at ¶ 41. Moreover, AT&T "supports a Wi-Fi based calling platform . . . [that] allows a mobile device to initiate a communication such as a call or text message between a caller, or a first participant, and a callee, or a second participant, using an AT&T assisted voice over IP ("VoIP") system." *Id.* at ¶ 42.

Defendant Verizon is a Delaware corporation with its principal place of business in Basking Ridge, New Jersey. Case No. 18-CV-06054-LHK, ECF No. 119 at ¶ 2. Verizon "supports and operates a messaging platform . . . [that] allows smartphone users to send messages including text, images, video and audio to others." *Id.* at ¶ 40. Verizon also offers Voice over Internet Protocol products and services "utilizing equipment at the customer or business premises and a collection of servers and gateways." *Id.* at ¶ 41. Moreover, Verizon "supports a Wi-Fi based calling platform . . . [that] allows a mobile device to initiate a communication such as a call or a

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text message between a caller, or a first participant, and a callee, or a second participant, using a [Verizon] assisted voice over IP ("VoIP") system." *Id.* at ¶ 42.

2. The Patents

The '815 Patent and the '005 Patent (collectively, the "Patents") are both titled "Producing Routing Messages for Voice over IP Communications." '815 Patent at front page; '005 Patent at front page. The '815 Patent was filed on November 1, 2007 and was issued on September 24, 2013. The '005 Patent was filed on August 13, 2013 and was issued on November 3, 2015. The '815 Patent and the '005 Patent share the same specification.

Defendants posit that the asserted claims of the Patents fall within two categories: "multi-network claims" and "single-network claims." Mot. at 2. Defendants argue that asserted claims 1, 7, 12, 27, 28, 72, 73, 92, and 111 of the '815 Patent and claims 49 and 73 of the '005 Patent are multi-network claims. *Id.* at 2, 2 n.2. Moreover, Defendants argue that asserted claims 74, 75, 77, 78, 83, 84, 94, 96, and 99 of the '005 Patent are single-network claims. *Id.* at 2, 2 n.3. The differences between the multi-network claims and the single-network claims will be explained below, but for present purposes, the Court finds Defendants' differentiation of the claims into 2 groups useful, and adopts Defendants' groupings.

In addition, Defendants identify claim 1 of the '815 Patent as representative of the multi-network claims, an identification that Plaintiff does not dispute. Defendants identify claim 74 of the '005 Patent as representative of the single-network claims, an identification that Plaintiff also does not dispute. Thus, the Court will adopt the parties' identification of representative claims. Claim 1 of the '815 Patent shall be representative of the multi-network claims, and claim 74 of the '005 Patent shall be representative of the single-network claims.

In general, the asserted claims of the Patents relate to the process of routing calls (either voice or video) between a caller and a callee, in which calls are classified as either public network calls or private network calls.[1] '815 Patent at 1:50-54. More specifically, the process of routing the

[1] The Patents refer to "callee" to mean the recipient of a call. The Court adopts the Patents' term of art and will use "callee" to refer to a call recipient.

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call involves a computer "super node" routing a call based on "identifiers" associated with both the caller and the callee. *Id.* at 1:54-56. Such identifiers might include what are essentially, in layman's terms, the phone numbers of the caller and callee. *Id.* at 2:17-25.

A super node contains a call routing controller, which controls communication between a caller and a callee. 3:47-52. A caller sends a request to establish a call to the call routing controller. 1:54-56. The request includes the callee's identifier. *Id.* The call routing controller then compares the callee identifier with attributes of the caller identifier. *Id.* at 2:8-25. Based on the comparison between the callee identifier and the caller identifier, the call routing controller determines whether the callee is a subscriber to a private network. *Id.* at 2:45-47, 2:65-3:2. If the callee is a subscriber to a private network, then the call routing controller produces a routing message so that the call is directed to the callee's private network super node. *Id.* at 1:59-62, 14:24-34. If the callee is not a subscriber to a private network, then the call routing controller produces a routing message directing the call through a gateway to a public network. *Id.* at 1:62-

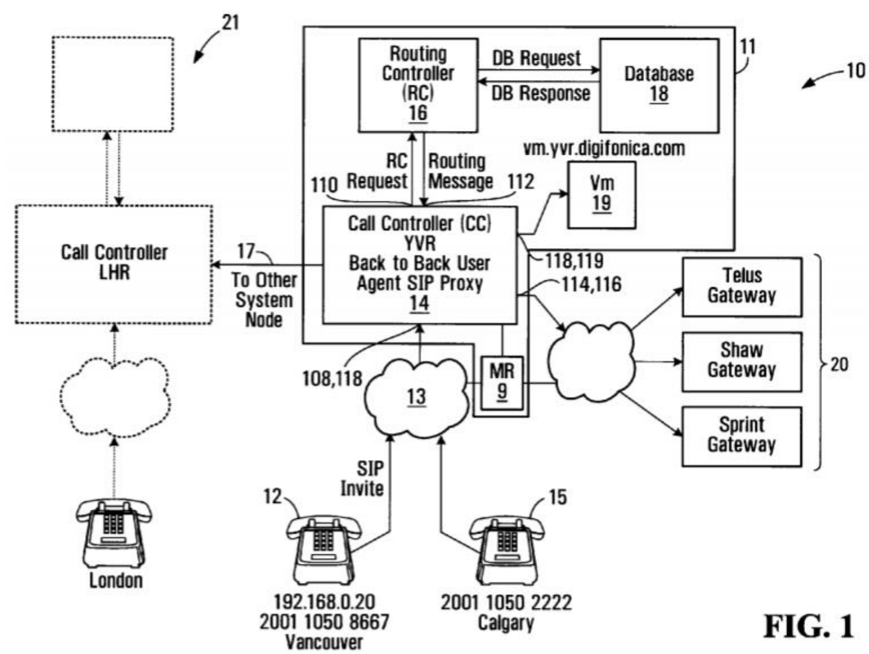

FIG. 1

64.

Figure 1 is helpful to understanding the invention. "[A] system for making voice over IP telephone/videophone calls is shown generally at [item] 10." *Id.* at 12:50-51. Item 11 is a super

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node located, for example, in Vancouver, Canada. *Id.* at 12:53-55. The Vancouver super node includes a call controller (item 14), a routing controller (item 16), a database (item 18), a voicemail server (item 19), and a media relay (item 9). *Id.* at 13:10-13. Users of the system such as a Vancouver user (item 12) and a Calgary user (item 15) communicate with the Vancouver super node using the internet (item 13). *Id.* at 13:17-21. It is important to note that the super node is implemented via a computer. According to the specification, it "may be implemented as separate modules on a *common computer system* or by separate computers, for example." *Id.* at 13:13-14

Assume that the Vancouver user (item 12) is attempting to call the Calgary user (item 15). The caller (item 12) will send a message to the Vancouver super node (item 10) and in response, the call controller (item 14) sends a call routing controller request to the routing controller (item 16). *Id.* at 14:10-18. The routing controller (item 16) then queries the database (item 18), and then produces a routing message which is sent back to the call controller (item 14). *Id.* The call controller (item 14) communicates with the media relay (item 9) to create a communications link with the callee (item 15) through the media relay (item 9) "of the same node, a different node or to a communications supplier gateway" (item 20). *Id.* at 14:17-23.

As aforementioned, Plaintiff asserts the multi-network claims,[2] of which claim 1 of the '815 Patent is representative. Moreover, Plaintiff asserts the single-network claims,[3] of which claim 74 of the '005 Patent is representative.

Claim 1 of the '815 Patent recites:

1. A process for operating a call routing controller to facilitate communication between callers and callees in a system comprising a plurality of nodes with which callers and callees are associated, the process comprising:

in response to initiation of a call by a calling subscriber, receiving a caller identifier and a callee identifier;

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[2] Claims 1, 7, 12, 27, 28, 72, 73, 92, and 111 of the '815 Patent and claims 49 and 73 of the '005 Patent.

[3] Claims 74, 75, 77, 78, 83, 84, 94, 96, and 99 of the '005 Patent.

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locating a caller dialing profile comprising a username associated with the caller and a plurality of calling attributes associated with the caller;

determining a match when at least one of said calling attributes matches a portion of said callee identifier;

classifying the call as a public network call when said match meets public network classification criteria and classifying the call as a private network call when said match meets private network classification criteria;

when the call is classified as a private network call, producing a private network routing message for receipt by a call controller, said private network routing message identifying an address, on the private network, associated with the callee;

when the call is classified as a public network call, producing a public network routing message for receipt by the call controller, said public network routing message identifying a gateway to the public network.

Id. at 36:14-38.

Claim 74 of the '005 Patent recites:

74. A method of routing communications in a packet switched network in which a first participant identifier is associated with a first participant and a second participant identifier is associated with a second participant in a communication, the method comprising:

after the first participant has accessed the packet switched network to initiate the communication, using the first participant identifier to locate a first participant profile comprising a plurality of attributes associated with the first participant;

when at least one of the first participant attributes and at least a portion of the second participant identifier meet a first network classification criterion, producing a first network routing message identifying an address in a first portion of the packet switched network, the address being associated with the second participant, the first portion being controlled by an entity; and

when at least one of the first participant attributes and at least a portion of the second participant identifier meet a second network classification criterion, producing a second network

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routing message for receipt by the controller, the second network routing message identifying an address in a second portion of the packet switched network, the second portion not controlled by the entity.

'005 Patent at 43:41-65.

As aforementioned, the parties have divided the asserted claims into two categories: the multi-network claims, and the single network claims. The difference between the two types of claims lies within the claims' preambles. For instance, claim 1 of the '815 Patent, which is representative of the multi-network claims, discloses a "call routing controller to facilitate communication between callers and callees in a system comprising *a plurality of nodes*." '815 Patent at 36:14-16 (emphasis added). Thus, claim 1 requires a call routed through a plurality of nodes, which is why it is a *multi-network* claim; each node comprises a different network. On the other hand, claim 74 of the '005 Patent, which is representative of the single-network claims, discloses "routing communications in *a* packet switched network." '005 Patent at 43:41-42 (emphasis added). Thus, claim 74 of the '008 Patent refers to routing communications through a single packet switched network, as opposed to multiple nodes (i.e. networks) like in claim 1 of the '815 Patent.

B. Procedural History

Plaintiff has filed suit against Twitter, Apple, Verizon, and AT&T. The parties filed identical omnibus motions to dismiss, oppositions, and replies in all 4 cases. In addition, there are various *inter partes* review proceedings before the Patent Trial and Appeal Board concerning the patents-in-suit. The Court first discusses the IPR proceedings, then the district court suits against Twitter, Apple, Verizon, and AT&T.

1. The IPR Proceedings

On June 15, 2016, Apple petitioned for *inter partes* review ("IPR") of the '005 Patent in proceeding number IPR2016-01198, and for IPR of the '815 Patent in proceeding number IPR2016-01201. Both of Apple's IPR petitions were granted. On the other hand, AT&T also filed 3 IPR petitions with the PTAB, which denied institution of AT&T's petitions. ECF No. 77 at 4 n.4. Verizon and Twitter do not appear to have filed IPRs of the ’005 and ’815 Patents. *Id.*

On November 20, 2017, the PTAB in Apple’s IPRs issued final written decisions rejecting Apple’s obviousness arguments and upholding the validity of the ’005 and the ’815 Patents. *See* IPR2016-01198, Paper 53; IPR2016-01201, Paper 54. However, during the pendency of both of Apple’s IPR proceedings, Plaintiff’s former chief operating officer and chairman sent unauthorized *ex parte* communications to the PTAB. IPR2016-01198, Paper 70 at 3. In light of these *ex parte* communications, on December 21, 2018, the PTAB sanctioned Plaintiff by allowing a new panel of the PTAB to reconsider the final written decisions on the ’005 and the ’815 Patents on rehearing. *Id.* at 15. The reconsideration proceedings are currently pending.

2. The Twitter Litigation

On October 6, 2016, Plaintiff first filed suit against Twitter in the District of Nevada. ECF No. 1. On January 31, 2017, the District of Nevada granted the parties’ stipulation to stay the Twitter case pending the outcome of the IPR proceedings instituted by Apple challenging the validity of the ’815 and ’005 Patents. ECF No. 12. On January 26, 2018, the parties submitted a joint status report representing that the Patent Trial and Appeal Board (“PTAB”) had issued final written decisions in Apple’s IPR proceedings upholding the validity of the Patents. ECF No. 13. The parties requested that the stay of the case be lifted. On February 27, 2018, the District of Nevada lifted the stay. ECF No. 25.

On February 28, 2018, Twitter moved to change venue to the Northern District of California. ECF No. 27. On July 23, 2018, the District of Nevada granted Twitter’s motion for change of venue to the Northern District of California. ECF No. 41.

On November 15, 2018, this Court entered an order consolidating the Twitter action with the separately-filed Apple, AT&T, and Verizon actions (discussed below) for pretrial purposes. ECF No. 64. Also on November 15, 2018, Plaintiff filed a first amended complaint against Twitter. ECF No. 65.

3. The Apple Litigation

On February 9, 2016, Plaintiff first filed suit against Apple in the District of Nevada. Case

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No. 18-CV-06217-LHK, ECF No. 1. On April 6, 2016, Plaintiff filed an amended complaint against Apple. *Id.*, ECF No. 6. The Apple litigation was also stayed pending resolution of the IPR proceedings. *Id.*, ECF No. 27. On October 5, 2018, the District of Nevada granted Apple and Plaintiff's stipulation to transfer the case to the Northern District of California. *Id.*, ECF No. 46.

4. The Verizon and AT&T Litigation

On February 10, 2016, Plaintiff first filed suit against both Verizon and AT&T in the same case in the District of Nevada. Case No. 18-CV-06177-LHK, ECF No. 1. On April 6, 2016, Plaintiff filed an amended complaint. *Id.*, ECF No. 2. On May 5, 2016, Plaintiff filed a second amended complaint. *Id.*, ECF No. 3. On July 29, 2016, the District of Nevada granted a stipulation to stay the Verizon and AT&T case pending the IPR proceedings. Case No. 18-CV-06054-LHK, ECF No. 31. On June 25, 2018, the District of Nevada granted an unopposed motion severing AT&T from the Verizon suit. Case No. 18-CV-06177-LHK, ECF No. 4. On October 4, 2018, the District of Nevada granted AT&T and Plaintiff's stipulation to transfer the case to the Northern District of California. *Id.*, ECF No. 21. On November 15, 2018, Plaintiff filed a third amended complaint asserting the Patents against only AT&T, with the Verizon suit proceeding separately. *Id.*, ECF No. 59.

After AT&T was severed from the Verizon suit, the Verizon suit proceeded separately. On October 1, 2018, the District of Nevada granted Plaintiff and Verizon's stipulation to transfer the case to the Northern District of California. Case No. 18-CV-06054-LHK, ECF No. 89. On November 15, 2018, Plaintiff filed a third amended complaint asserting the Patents against only Verizon, with the AT&T suit proceeding separately. *Id.*, ECF No. 119.

5. The Consolidated Motions to Dismiss

On January 10, 2019, Defendants, asserting that the patents-in-suit are directed to unpatentable subject matter under 35 U.S.C. § 101, filed identical consolidated motions to dismiss Plaintiff's complaints. ECF No. 71 ("Mot."); Case No. 18-CV-06217-LHK, ECF No. 75; Case No. 18-CV-06177-LHK, ECF No. 63; Case No. 18-CV-06054-LHK, ECF No. 123.

On February 7, 2019, Plaintiff filed identical oppositions. ECF No. 77; Case No. 18-CV-

06217-LHK, ECF No. 81; Case No. 18-CV-06177-LHK, ECF No. 68; Case No. 18-CV-06054-LHK, ECF No. 127. On February 12, 2019, Plaintiff filed identical corrected oppositions. ECF No. 77 ("Opp."); Case No. 18-CV-06217-LHK, ECF No. 83; Case No. 18-CV-06177-LHK, ECF No. 69; Case No. 18-CV-06054-LHK, ECF No. 128.[4]

On February 28, 2019, Defendants filed identical consolidated replies. ECF No. 78 ("Reply"); Case No. 18-CV-06217, ECF No. 84; Case No. 18-CV-06177-LHK, ECF No. 70; Case No. 18-CV-06054-LHK, ECF No. 129.

On March 13, 2019, Plaintiff filed identical administration motions for leave to file a sur-reply. ECF No. 79; Case No. 18-CV-06217-LHK, ECF No. 91; Case No. 18-CV-06177-LHK, ECF No. 71; 18-CV-06054-LHK, ECF No. 130. According to Civil Local Rule 7-3(d), once a reply has been filed, "no additional memoranda, papers or letters may be filed without prior Court approval." The Court finds that the issues have been sufficiently briefed without needing to rely on a sur-reply. Thus, the administrative motions for leave to file a sur-reply are DENIED.

II. LEGAL STANDARD

A. Motion to Dismiss Under Federal Rule of Civil Procedure 12(b)(6)

Pursuant to Federal Rule of Civil Procedure 12(b)(6), a defendant may move to dismiss an action for failure to allege "enough facts to state a claim to relief that is plausible on its face." *Bell Atl. Corp. v. Twombly*, 550 U.S. 544, 570 (2007). "A claim has facial plausibility when the plaintiff pleads factual content that allows the court to draw the reasonable inference that the defendant is liable for the misconduct alleged. The plausibility standard is not akin to a 'probability requirement,' but it asks for more than a sheer possibility that a defendant has acted

[4] As an exhibit to the opposition, Plaintiff attached the Declaration of William Mangione-Smith, an expert, in support of Plaintiff's response to Apple's IPR petition. ECF No. 76-5 ("Mangione-Smith Declaration"). Plaintiff does not request judicial notice of the Mangione-Smith Declaration. The Court will not consider the Mangione-Smith Declaration as part of its analysis because the Declaration is extrinsic to the complaints and Patents. *See, e.g.*, *Evolutionary Intelligence, LLC v. Sprint Nextel Corp.*, 137 F. Supp. 3d 1157, 1163 n.5 (N.D. Cal. 2015), *aff'd*, 677 Fed. App'x 679 (Fed. Cir. 2017) ("On such [Rule 12] motions, the court may only consider the complaint, documents incorporated by reference in the complaint, and judicially noticed facts. Accordingly, because the Taylor declaration meets none of these criteria, the court does not consider it.").

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unlawfully." *Ashcroft v. Iqbal*, 556 U.S. 662, 678 (2009) (citation omitted).

For purposes of ruling on a Rule 12(b)(6) motion, the Court "accept[s] factual allegations in the complaint as true and construe[s] the pleadings in the light most favorable to the nonmoving party." *Manzarek v. St. Paul Fire & Marine Ins. Co.*, 519 F.3d 1025, 1031 (9th Cir. 2008). Nonetheless, the Court is not required to "'assume the truth of legal conclusions merely because they are cast in the form of factual allegations.'" *Fayer v. Vaughn*, 649 F.3d 1061, 1064 (9th Cir. 2011) (quoting *W. Mining Council v. Watt*, 643 F.2d 618, 624 (9th Cir. 1981)). Mere "conclusory allegations of law and unwarranted inferences are insufficient to defeat a motion to dismiss." *Adams v. Johnson*, 355 F.3d 1179, 1183 (9th Cir. 2004). Furthermore, "'[a] plaintiff may plead [him]self out of court'" if he "plead[s] facts which establish that he cannot prevail on his . . . claim." *Weisbuch v. County of Los Angeles*, 119 F.3d 778, 783 n.1 (9th Cir. 1997) (quoting *Warzon v. Drew*, 60 F.3d 1234, 1239 (7th Cir. 1995)).

B. Motion to Dismiss for Patent Eligibility Challenges Under 35 U.S.C. § 101

Defendant's motion argues that the patents-in-suit fail to claim patent-eligible subject matter under 35 U.S.C. § 101 in light of the U.S. Supreme Court's decision in *Alice Corp. Pty. Ltd. v. CLS Bank International*, 134 S. Ct. 2347 (2014). The ultimate question whether a claim recites patent-eligible subject matter under § 101 is a question of law. *Intellectual Ventures I LLC v. Capital One Fin. Corp.*, 850 F.3d 1332, 1338 (Fed. Cir. 2017) ("Patent eligibility under § 101 is an issue of law[.]"); *In re Roslin Inst. (Edinburgh)*, 750 F.3d 1333, 1335 (Fed. Cir. 2014) (same). However, the Federal Circuit has identified that there are certain factual questions underlying the § 101 analysis. *See Berkheimer v. HP Inc.*, 881 F.3d 1360, 1368-69 (Fed. Cir. 2018). Accordingly, a district court may resolve the issue of patent eligibility under § 101 by way of a motion to dismiss. *See, e.g.*, *Secured Mail Sols. LLC v. Universal Wilde, Inc.*, 873 F.3d 905, 912 (Fed. Cir. 2017) (affirming determination of ineligibility made on 12(b)(6) motion); *Content Extraction & Transmission LLC v. Wells Fargo Bank, Nat'l Ass'n*, 776 F.3d 1343, 1345 (Fed. Cir. 2014) (same).

Although claim construction is often desirable, and may sometimes be necessary, to

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resolve whether a patent claim is directed to patent-eligible subject matter, the Federal Circuit has explained that "claim construction is not an inviolable prerequisite to a validity determination under § 101." *Bancorp Servs., L.L.C. v. Sun Life Assurance Co. of Can. (U.S.)*, 687 F.3d 1266, 1273 (Fed. Cir. 2012). Where the court has a "full understanding of the basic character of the claimed subject matter," the question of patent eligibility may properly be resolved on the pleadings. *Content Extraction*, 776 F.3d at 1349; *see also Genetic Techs. Ltd. v. Bristol-Myers Squibb Co.*, 72 F. Supp. 3d 521, 539 (D. Del. 2014), *aff'd sub nom. Genetic Techs. Ltd. v. Merial L.L.C.*, 818 F.3d 1369 (Fed. Cir. 2016).

C. Substantive Legal Standards Applicable Under 35 U.S.C. § 101

1. Patent-Eligible Subject Matter Under 35 U.S.C. § 101

Section 101 of Title 35 of the United States Code "defines the subject matter that may be patented under the Patent Act." *Bilski v. Kappos*, 561 U.S. 593, 601 (2010). Under § 101, the scope of patentable subject matter encompasses "any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof." *Id.* (quoting 35 U.S.C. § 101). These categories are broad, but they are not limitless. Section 101 "contains an important implicit exception: Laws of nature, natural phenomena, and abstract ideas are not patentable." *Alice*, 134 S. Ct. at 2354 (citation omitted). These three categories of subject matter are excepted from patent-eligibility because "they are the basic tools of scientific and technological work," which are "free to all men and reserved exclusively to none." *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 71 (2012) (citations omitted). The U.S. Supreme Court has explained that allowing patent claims for such purported inventions would "tend to impede innovation more than it would tend to promote it," thereby thwarting the primary object of the patent laws. *Id.* However, the U.S. Supreme Court has also cautioned that "[a]t some level, all inventions embody, use, reflect, rest upon, or apply laws of nature, natural phenomena, or abstract ideas." *Alice*, 134 S. Ct. at 2354 (alteration, internal quotation marks, and citation omitted). Accordingly, courts must "tread carefully in construing this exclusionary principle lest it swallow all of patent law." *Id.*

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In *Alice*, the leading case on patent-eligible subject matter under § 101, the U.S. Supreme Court refined the "framework for distinguishing patents that claim laws of nature, natural phenomena, and abstract ideas from those that claim patent-eligible applications of those concepts" originally set forth in *Mayo*, 566 U.S. at 77. *Alice*, 134 S. Ct. at 2355. This analysis, generally known as the "*Alice*" framework, proceeds in two steps as follows:

> First, we determine whether the claims at issue are directed to one of those patent-ineligible concepts. If so, we then ask, "[w]hat else is there in the claims before us?" To answer that question, we consider the elements of each claim both individually and "as an ordered combination" to determine whether the additional elements "transform the nature of the claim" into a patent-eligible application. We have described step two of this analysis as a search for an "'inventive concept'"—*i.e.*, an element or combination of elements that is "sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the [ineligible concept] itself."

Id. (alterations in original) (citations omitted); *see also In re TLI Commc'ns LLC Patent Litig.*, 823 F.3d 607, 611 (Fed. Cir. 2016) (describing "the now familiar two-part test described by the [U.S.] Supreme Court in *Alice*").

2. *Alice* Step One—Identification of Claims Directed to an Abstract Idea

Neither the U.S. Supreme Court nor the Federal Circuit has set forth a bright-line test separating abstract ideas from concepts that are sufficiently concrete so as to require no further inquiry under the first step of the *Alice* framework. *See, e.g.*, *Alice*, 134 S. Ct. at 2357 (noting that "[the U.S. Supreme Court] need not labor to delimit the precise contours of the 'abstract ideas' category in this case"); *DDR Holdings, LLC v. Hotels.com, L.P.*, 773 F.3d 1245, 1256 (Fed. Cir. 2014) (observing that the U.S. Supreme Court did not "delimit the precise contours of the 'abstract ideas' category" in *Alice* (citation omitted)). As a result, in evaluating whether particular claims are directed to patent-ineligible abstract ideas, courts have generally begun by "compar[ing] claims at issue to those claims already found to be directed to an abstract idea in previous cases." *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1334 (Fed. Cir. 2016).

Two of the U.S. Supreme Court's leading cases concerning the "abstract idea" exception involved claims held to be abstract because they were drawn to longstanding, fundamental

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economic practices. *See Alice*, 134 S. Ct. at 2356 (claims "drawn to the concept of intermediated settlement, *i.e.*, the use of a third party to mitigate settlement risk" were directed to a patent-ineligible abstract idea); *Bilski*, 561 U.S. at 611-12 (claims drawn to "the basic concept of hedging, or protecting against risk" were directed to a patent-ineligible abstract idea because "[h]edging is a fundamental economic practice long prevalent in our system of commerce and taught in any introductory finance class" (citation omitted)).

Similarly, the U.S. Supreme Court has recognized that information itself is intangible. *See Microsoft Corp. v. AT & T Corp.*, 550 U.S. 437, 451 n.12 (2007). Accordingly, the Federal Circuit has generally found claims abstract where they are directed to some combination of acquiring information, analyzing information, and/or displaying the results of that analysis. *See FairWarning IP, LLC v. Iatric Sys., Inc.*, 839 F.3d 1089, 1094-95 (Fed. Cir. 2016) (claims "directed to collecting and analyzing information to detect misuse and notifying a user when misuse is detected" were drawn to a patent-ineligible abstract idea); *Elec. Power Grp., LLC v. Alstom S.A.*, 830 F.3d 1350, 1354 (Fed. Cir. 2016) (claims directed to an abstract idea because "[t]he advance they purport to make is a process of gathering and analyzing information of a specified content, then displaying the results, and not any particular assertedly inventive technology for performing those functions"); *In re TLI Commc'ns LLC*, 823 F.3d at 611 (claims were "directed to the abstract idea of classifying and storing digital images in an organized manner"); *see also Elec. Power Grp.*, 830 F.3d at 1353-54 (collecting cases).

However, the determination of whether other types of computer-implemented claims are abstract has proven more "elusive." *See, e.g.*, *Internet Patents Corp. v. Active Network, Inc.*, 790 F.3d 1343, 1345 (Fed. Cir. 2015) ("[P]recision has been elusive in defining an all-purpose boundary between the abstract and the concrete[.]"). As a result, in addition to comparing claims to prior U.S. Supreme Court and Federal Circuit precedents, courts considering computer-implemented inventions have taken varied approaches to determining whether particular claims are directed to an abstract idea.

For example, courts have considered whether the claims "purport to improve the

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functioning of the computer itself," *Alice*, 134 S. Ct. at 2359, which may suggest that the claims are not abstract, or instead whether "computers are invoked merely as a tool" to carry out an abstract process, *Enfish*, 822 F.3d at 1336; *see also id.* at 1335 ("[S]ome improvements in computer-related technology when appropriately claimed are undoubtedly not abstract, such as a chip architecture, an LED display, and the like. Nor do we think that claims directed to software, as opposed to hardware, are inherently abstract[.]"). The Federal Circuit has followed this approach to find claims patent-eligible in several cases. *See Visual Memory LLC v. NVIDIA Corp.*, 867 F.3d 1253, 1259–60 (Fed. Cir. 2017) (claims directed to an improved memory system were not abstract because they "focus[ed] on a 'specific asserted improvement in computer capabilities'—the use of programmable operational characteristics that are configurable based on the type of processor" (quoting *Enfish*, 822 F.3d at 1336)); *McRO, Inc. v. Bandai Namco Games Am. Inc.*, 837 F.3d 1299, 1314 (Fed. Cir. 2016) (claims directed to automating part of a preexisting method for 3-D facial expression animation were not abstract because they "focused on a specific asserted improvement in computer animation, i.e., the automatic use of rules of a particular type"); *Enfish*, 822 F.3d at 1335–36 (claims directed to a specific type of self-referential table in a computer database were not abstract because they focused "on the specific asserted improvement in computer capabilities (i.e., the self-referential table for a computer database)").

Similarly, the Federal Circuit has found that claims directed to a "new and useful technique" for performing a particular task were not abstract. *See Thales Visionix Inc. v. United States*, 850 F.3d 1343, 1349 (Fed. Cir. 2017) (holding that "claims directed to a new and useful technique for using sensors to more efficiently track an object on a moving platform" were not abstract); *Rapid Litig. Mgmt. Ltd. v. CellzDirect, Inc.*, 827 F.3d 1042, 1048, 1050 (Fed. Cir. 2016) (holding that claims directed to "a new and useful laboratory technique for preserving hepatocytes," a type of liver cell, were not abstract); *see also Diamond v. Diehr*, 450 U.S. 175, 187 (1981) (holding that claims for a method to cure rubber that employed a formula to calculate the optimal cure time were not abstract).

Another helpful tool used by courts in the abstract idea inquiry is consideration of whether the claims have an analogy to the brick-and-mortar world, such that they cover a "fundamental . . . practice long prevalent in our system." *Alice*, 134 S. Ct. at 2356; *see, e.g.*, *Intellectual Ventures I LLC v. Symantec Corp.*, 838 F.3d 1307, 1317 (Fed. Cir. 2016) (finding an email processing software program to be abstract through comparison to a "brick-and-mortar" post office); *Intellectual Ventures I LLC v. Symantec Corp.*, 100 F. Supp. 3d 371, 383 (D. Del. 2015) ("Another helpful way of assessing whether the claims of the patent are directed to an abstract idea is to consider if all of the steps of the claim could be performed by human beings in a non-computerized 'brick and mortar' context." (citing *buySAFE, Inc. v. Google, Inc.*, 765 F.3d 1350, 1353 (Fed. Cir. 2014)).

Courts will also (or alternatively, as the facts require) consider a related question of whether the claims are, in essence, directed to a mental process or a process that could be done with pencil and paper. *See Synopsys, Inc. v. Mentor Graphics Corp.*, 839 F.3d 1138, 1147 (Fed. Cir. 2016) (claims for translating a functional description of a logic circuit into a hardware component description of the logic circuit were patent-ineligible because the "method can be performed mentally or with pencil and paper"); *CyberSource Corp. v. Retail Decisions, Inc.*, 654 F.3d 1366, 1372 (Fed. Cir. 2011) (claim for verifying the validity of a credit card transaction over the Internet was patent-ineligible because the "steps can be performed in the human mind, or by a human using a pen and paper"); *see also, e.g.*, *Mortg. Grader, Inc. v. First Choice Loan Servs. Inc.*, 811 F.3d 1314, 1324 (Fed. Cir. 2016) (claims for computer-implemented system to enable borrowers to shop for loan packages anonymously were abstract where "[t]he series of steps covered by the asserted claims . . . could all be performed by humans without a computer").[5]

Regardless of the particular analysis that is best suited to the specific facts at issue in a case, however, the Federal Circuit has emphasized that "the first step of the [*Alice*] inquiry is a

[5] One court has noted that, like all tools of analysis, the "pencil and paper" analogy must not be unthinkingly applied. *See Cal. Inst. of Tech. v. Hughes Commc'ns Inc.*, 59 F. Supp. 3d 974, 995 (C.D. Cal. 2014) (viewing pencil-and-paper test as a "stand-in for another concern: that humans engaged in the same activity long before the invention of computers," and concluding that test was unhelpful where "error correction codes were not conventional activity that humans engaged in before computers").

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meaningful one, i.e., . . . a substantial class of claims are *not* directed to a patent-ineligible concept." *Enfish*, 822 F.3d at 1335. The court's task is thus not to determine whether claims merely involve an abstract idea at some level, *see id.*, but rather to examine the claims "in their entirety to ascertain whether their character as a whole is directed to excluded subject matter," *Internet Patents*, 790 F.3d at 1346.

3. *Alice* Step Two—Evaluation of Abstract Claims for an Inventive Concept

A claim drawn to an abstract idea is not necessarily invalid if the claim's limitations—considered individually or as an ordered combination—serve to "transform the claims into a patent-eligible application." *Content Extraction*, 776 F.3d at 1348. Thus, the second step of the *Alice* analysis (the search for an "inventive concept") asks whether the claim contains an element or combination of elements that "ensure[s] that the patent in practice amounts to significantly more than a patent upon the [abstract idea] itself." 134 S. Ct. at 2355 (citation omitted).

The U.S. Supreme Court has made clear that transforming an abstract idea to a patent-eligible application of the idea requires more than simply reciting the idea followed by "apply it." *Id.* at 2357 (quoting *Mayo*, 566 U.S. at 72). In that regard, the Federal Circuit has repeatedly held that "[f]or the role of a computer in a computer-implemented invention to be deemed meaningful in the context of this analysis, it must involve more than performance of 'well-understood, routine, [and] conventional activities previously known to the industry.'" *Content Extraction*, 776 F.3d at 1347-48 (alteration in original) (quoting *Alice*, 134 S. Ct. at 2359); *see also Mortg. Grader*, 811 F.3d at 1324-25 (holding that "generic computer components such as an 'interface,' 'network,' and 'database' . . . do not satisfy the inventive concept requirement"); *Bancorp Servs.*, 687 F.3d at 1278 ("To salvage an otherwise patent-ineligible process, a computer must be integral to the claimed invention, facilitating the process in a way that a person making calculations or computations could not.").

Likewise, "[i]t is well-settled that mere recitation of concrete, tangible components is insufficient to confer patent eligibility to an otherwise abstract idea" where those components simply perform their "well-understood, routine, conventional" functions. *In re TLI Commc'ns*

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LLC, 823 F.3d at 613 (citation omitted); *see also id.* (ruling that "telephone unit," "server," "image analysis unit," and "control unit" limitations were insufficient to satisfy *Alice* step two where claims were drawn to abstract idea of classifying and storing digital images in an organized manner). "The question of whether a claim element or combination of elements is well-understood, routine and conventional to a skilled artisan in the relevant field is a question of fact" that "must be proven by clear and convincing evidence." *Berkheimer*, 881 F.3d at 1368. This inquiry "goes beyond what was simply known in the prior art." *Id.* at 1369.

In addition, the U.S. Supreme Court explained in *Bilski* that "limiting an abstract idea to one field of use or adding token postsolution components [does] not make the concept patentable." 561 U.S. at 612 (citing *Parker v. Flook*, 437 U.S. 584 (1978)); *see also Alice*, 134 S. Ct. at 2358 (same). The Federal Circuit has similarly stated that attempts "to limit the use of the abstract idea to a particular technological environment" are insufficient to render an abstract idea patent-eligible. *Ultramercial, Inc. v. Hulu, LLC*, 772 F.3d 709, 716 (Fed. Cir. 2014) (internal quotation marks and citation omitted); *see also Intellectual Ventures I LLC v. Capital One Bank (USA)*, 792 F.3d 1363, 1366 (Fed. Cir. 2015) ("An abstract idea does not become nonabstract by limiting the invention to a particular field of use or technological environment, such as the Internet.").

In addition, a "non-conventional and non-generic arrangement of known, conventional pieces" can amount to an inventive concept. *BASCOM Glob. Internet Servs., Inc. v. AT&T Mobility LLC*, 827 F.3d 1341, 1350 (Fed. Cir. 2016). For example, in *BASCOM*, the Federal Circuit addressed a claim for Internet content filtering performed at "a specific location, remote from the end-users, with customizable filtering features specific to each end user." *Id.* Because this "specific location" was different from the location where Internet content filtering was traditionally performed, the Federal Circuit concluded this was a "non-conventional and non-generic arrangement of known, conventional pieces" that provided an inventive concept. *Id.* As another example, in *Amdocs (Israel) Ltd. v. Openet Telecom, Inc.*, the Federal Circuit held that claims relating to solutions for managing accounting and billing data over large, disparate networks recited an inventive concept because they contained "specific enhancing limitation[s]

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that necessarily incorporate[d] the invention's distributed architecture." 841 F.3d 1288, 1301 (Fed. Cir. 2016), *cert. denied*, 138 S. Ct. 469 (Nov. 27, 2017). The use of a "distributed architecture," which stored accounting data information near the source of the information in the disparate networks, transformed the claims into patentable subject matter. *Id.*

4. Preemption

In addition to these principles, courts sometimes find it helpful to assess claims against the policy rationale for § 101. The U.S. Supreme Court has recognized that the "concern that undergirds [the] § 101 jurisprudence" is preemption. *Alice*, 134 S. Ct. at 2358. Thus, courts have readily concluded that a claim is not patent-eligible when the claim is so abstract that it preempts "use of [the claimed] approach in all fields" and "would effectively grant a monopoly over an abstract idea." *Bilski*, 561 U.S. at 612. However, the inverse is not true: "[w]hile preemption may signal patent ineligible subject matter, the absence of complete preemption does not demonstrate patent eligibility." *FairWarning*, 839 F.3d at 1098 (alteration in original) (citation omitted).

III. DISCUSSION

Defendant's motion to dismiss contends that the asserted claims of the patents-in-suit fall within the patent-ineligible "abstract ideas" exception to § 101. The Court applies the *Alice* framework described above to these claims. However, the Court need not individually analyze every claim if certain claims are representative. *See generally Alice*, 134 S. Ct. at 2359-60 (finding claims to be patent-ineligible based on analysis of one representative claim). The parties have agreed that claim 1 of the '815 Patent is representative of the multi-network claims, and claim 74 of the '005 Patent is representative of the single-network claims.

First, the Court turns to the substantive *Alice* analysis of claim 1 of the '815 Patent, then to the substantive *Alice* analysis of claim 74 of the '005 Patent. Lastly, the Court discusses whether there are any factual allegations that preclude resolution of the instant motion under Federal Rule of Civil Procedure 12.

A. *Alice* Step One for Claim 1 of the '815 Patent—Whether the Claim is Directed to an Abstract Idea

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Defendants argue that the asserted claims are directed to an abstract idea because: "(1) they are written in a form free of specific tangible implementation and merely invoke computers as a tool; (2) they are similar to claims found directed to abstract ideas in precedent from the Federal Circuit and district courts; (3) they are directed to functions that could be performed in the human mind or with pen and paper; (4) they are akin to long-standing human activity (switchboard operations; and (5) they are not directed to improving the functioning of a computer itself." Mot. at 12. Plaintiff responds by arguing that "the asserted claims are not directed to an abstract idea, but are instead generally directed to an improved call routing technology enabling better interoperability of communication networks by, *inter alia*, evaluating a callee identifier provided by a caller in conjunction with caller-specific 'attributes.'" Opp. at 2. The Court agrees with Defendants.

Step one of the *Alice* framework directs the Court to assess "whether the claims at issue are directed to [an abstract idea]." *Alice*, 134 S. Ct. at 2355. The step one inquiry "applies a stage-one filter to claims, considered in light of the specification, based on whether 'their character as a whole is directed to excluded subject matter.'" *Enfish*, 822 F.3d at 1335 (citation omitted). Thus, the Court conducts its step one inquiry by first identifying what the "character as a whole" of claim 1 of the '815 Patent is "directed to," and then discussing whether this is an abstract idea. In distilling the character of a claim, the Court is careful not to express the claim's focus at an unduly "high level of abstraction . . . untethered from the language of the claims," but rather at a level consonant with the level of generality or abstraction expressed in the claims themselves. *Enfish*, 822 F.3d at 1337; *see also Thales Visionix*, 850 F.3d at 1347 ("We must therefore ensure at step one that we articulate what the claims are directed to with enough specificity to ensure the step one inquiry is meaningful.").

The Court finds that claim 1 of the '815 Patent is directed to the abstract idea of routing a call based on characteristics of the caller and callee. Put in plain language, claim 1 discloses: (1) "receiving a caller identifier and a callee identifier" after a call is initiated; (2) "locating a caller dialing profile"; (3) matching the information in the "caller dialing profile" with information in the

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callee identifier; and (4) classifying the call either as a "public network call" or a "private network call" based on "classification criteria" and producing the appropriate public network or private network routing message to be received by a call controller. '815 Patent at 36:14-38. Claim 1 is abstract because first, it only discloses generalized steps to carry out generic functions, and second, because there are long-standing practices analogous to the claimed steps.

1. Claim 1 Discloses Generalized Steps to Carry Out Generic Functions

The Federal Circuit has recognized that "[g]eneralized steps to be performed on a computer using conventional computer activity are abstract." *RecogniCorp, LLC v. Nintendo Co., Ltd.*, 855 F.3d 1322, 1326 (Fed. Cir. 2017) (internal quotation marks omitted). For instance, the Federal Circuit found that a patent claim for taking digital images using a telephone, storing the images, then transmitting the images to a server which receives the images failed step one of *Alice*. *TLI Comm'cns*, 823 F.3d at 610, 612. In explaining why the patent claim failed step one of *Alice*, the *TLI* court wrote:

> Contrary to TLI's arguments on appeal, the claims here are not directed to a specific improvement to computer functionality. Rather, they are directed to the use of conventional or generic technology in a nascent but well-known environment . . . . The specification does not describe a new telephone, a new server, or a new physical combination of the two. The specification fails to provide any technical details for the tangible components, but instead predominantly describes the system and methods in purely functional terms. For example, the "telephone unit" of the claims is described as having "the standard features of a telephone unit" . . . . Likewise, the server is described simply in terms of performing generic computer functions such as storing, receiving, and extracting data.

Id. In essence, the *TLI* court found that because the *TLI* patent failed to provide technical details for the components, but instead described the system and methods "in purely functional terms," functions that were generic to a computer, the *TLI* patent claim failed step one of *Alice*. *Id.*

Here, claim 1 is akin to the *TLI* patent claim. Claim 1 describes the purported invention in broad, generic, functional terms but fails to identify *how* those ends are achieved, with the specification being no clearer.

There is no doubt that the "caller identifier" and the "callee identifier" are generic. Indeed,

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the specification concedes that the invention did not invent the "caller identifier" or the "callee identifier." Specifically, the specification discloses that "[t]he caller identifier field may include a [publicly switched telephone network] number or a system subscriber username." '815 Patent at 17:13-15. Moreover, as examples of callee identifiers, the specification identifies "a callee telephone/videophone number." *Id.* at 14:49-50. Essentially, the caller and callee identifiers consist of either a telephone number or a username. Neither a telephone number nor a username can be considered unique to the '815 Patent, as the specification admits.

Claim 1 proceeds to claim "locating a caller dialing profile." *Id.* at 36:20-23. However, the claim itself vaguely defines caller dialing profile as "comprising a username associated with the caller and a plurality of calling attributes associated with the caller." *Id.* The specification makes clear that the '815 Patent did not invent the caller dialing profile, but rather, the caller dialing profile is comprised of various identificatory attributes of subscribers that are left undefined in the claim and specification. *See, e.g., id.* at 18:1-4 ("Effectively the dialing profile is a record identifying calling attributes of the caller identified by the caller identifier. More generally, dialing profiles represent *calling attributes of respective subscribers*" (emphasis added).).

After "locating a caller dialing profile," claim 1 proceeds to claim matching the information in the caller dialing profile with information in the callee identifier. *Id.* at 36:23-25. As discussed above, the callee identifier is essentially "a callee telephone/videophone number," *id.* at 14:49-50, which the '815 Patent did not invent. The specification makes clear that this matching process is not unique to the Patent either, especially as the '815 Patent did not invent the callee identifier or any of the information associated with the matching process, such as an area code. *See, e.g., id.* at 2:8-10 ("Using the call classification criteria may involve comparing calling attributes associated with the caller dialing profile with aspects of the callee identifier."); *id.* at 2:17-19 ("Comparing may involve determining whether the callee identifier includes a portion that matches an area code associated with the caller dialing profile."); *id.* at 2:20-22 ("Comparing may involve determining whether the callee identifier has a length within a range specified in the caller dialing profile.").

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Finally, the call is either classified as a "public network call" or a "private network call" based on undefined "classification criteria," and the appropriate public network or private network routing message is sent to the call controller. *Id.* at 36:26-38. In essence, this step in claim 1 discloses classifying a call based on these "classification criteria," then sending a message based on that analysis. According to the specification, this process is as generically-implemented on a computer as the previously-described steps: "The process involves, in response to initiation of a call by a calling subscriber, receiving a callee identifier from the calling subscriber, using call classification criteria associated with the calling subscriber to classify the call as a public network call or a private network call and producing a routing message . . . ." *Id.* at 14:25-30; *see also id.* at 2:45-47 ("The process may involve classifying the call as a private network call when the re-formatted callee identifier identifies a subscriber to the private network."); *id.* at 2:48-50 ("The process may involve determining whether the callee identifier complies with a pre-defined username format and if so, classifying the call as a private network call."); *id.* at 2:51-57 ("The process may involve causing a database of records to be searched to locate a direct in dial (DID) bank table record associating a public telephone number with the reformatted callee identifier . . . and if a DID bank table record is not found, classifying the call as a public network call.").

Claim 1 is similar to other claims that courts have found to be abstract. In *West View Research, LLC v. Audi AG*, the Federal Circuit held that claims that "do not go beyond receiving or collecting data queries, analyzing the data query, retrieving and processing the information constituting a response to the initial data query, and generating a visual or audio response to the initial data query" were directed to the abstract idea of collecting and analyzing information. 685 F. App'x 923, 926 (Fed. Cir. 2017). Claim 1 is akin to the *West View Research* court's holding that "retrieving and processing the information constituting a response to the initial data query" was abstract. *Id.* Here, the initial data query involves locating the caller dialing profile and matching information in the dialing profile with callee information. Then, based on the matching information, a call is classified as a public network or a private network call and a routing message is generated in response, like how in *West View Research* the information "constituting a response to the initial data query" led to "retrieving and processing the information" (i.e., matching information in the dialing profile with callee information) and then "generating a . . . response" (i.e., a routing message). *Id.*

Moreover, the claim does not provide for any specific implementation of the abstract idea. The claim does not specify, for instance, the content of the caller and callee identifiers, the technology that matches information in the caller dialing profile with information in the callee identifier, what network classification criteria are used to classify the call as a public network or a private network call, or how the classification is implemented. *See Clarilogic, Inc. v. FormFree Holdings Corp.*, 681 Fed. App'x 950, 954 (Fed. Cir. 2017) ("But a method for collection, analysis, and generation of information reports, *where the claims are not limited to how the collected information is analyzed or reformed*, is the height of abstraction" (emphasis added).). Rather, the claim recites a generalized solution in broad, functional language—namely, "locating," "determining," and "classifying," a call based on a caller identifier and a callee identifier. *See Electric Power Grp.*, 830 F.3d at 1353-54 ("collecting," "gathering," "analyzing," and "presenting" information are "within the realm of abstract ideas"); *Content Extraction*, 776 F.3d at 1347 (affirming that "the claims of the asserted patents are drawn to the abstract idea of 1) collecting data, 2) recognizing certain data within the collected set, and 3) storing that recognized data in memory). Otherwise stated, the claim "recite[s] the *what* of the invention, but none of the *how* that is necessary to turn the abstract ideas into a patent-eligible application." *TDE Petroleum Data Sols., Inc. v. AKM Enter., Inc.*, 657 Fed. App'x 991, 993 (Fed. Cir. 2016), *cert. denied*, 137 S. Ct. 1230.

Plaintiff argues that claim 1 does more than simply describe a function or outcome without describing how to achieve these results in a non-abstract way. Opp. at 11. Plaintiff then cites the specification to argue that the call controller sets up a call based on a routing message. *Id.* For instance, Plaintiff argues that the "'*routing message*' that sets up the '*call controller*' is based on a classification of a call destination, which, in turn, was identified by a caller-*specific* evaluation of the '*callee identifier*' (*i.e.*, based on '*attributes'* associated with the initiating caller in their

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'*dialing profile*.'). *Id.* (emphasis in original).

Plaintiff's argument is unconvincing. *Alice*'s step one inquiry must focus on the *claim language*. *See, e.g.*, *Accenture Global Servs., GmbH v. Guidewire Software, Inc.*, 728 F.3d 1336, 1345 (Fed. Cir. 2013) ("[T]he important inquiry for a § 101 analysis is to look to the claim."); *CMG Fin. Servs., Inc. v. Pac. Tr. Bank, F.S.B.*, 50 F. Supp. 3d 1306, 1326 (C.D. Cal. 2014) ("None of the elements in these Claims limit the level of their inherent abstraction."), *aff'd*, 616 Fed. App'x 420 (Fed. Cir. 2015). Here, the claim language is written in vague, functional terms—"locating," "determining," and "classifying," a call based on a caller identifier and a callee identifier—to then send a routing message. Moreover, as Defendants point out, "claim 1 fails to specify ***how*** attributes are compared to a callee identifier, ***what*** criteria matter, or ***how*** a routing message may be used to 'set up' a call controller or 'identif[y] network infrastructure for a given call." Reply at 3-4 (emphasis in original). Therefore, Defendants' reliance on *Two-Way Media Ltd. v. Comcast Cable Commc'ns, LLC* is entirely appropriate. 874 F.3d 1329 (Fed. Cir. 2017). In *Two-Way Media*, the Federal Circuit found as abstract a claim requiring "the functional results of 'converting, 'routing,' 'controlling,' 'monitoring,' and 'accumulating records'" because the claim did "not sufficiently describe how to achieve these results in a non-abstract way." *Id.* at 1337. Analogously, claim 1 discloses "locating a caller dialing profile" without describing how the caller dialing profile is located; "determining a match" without specifying any kind of structure or non-functional language to describe how a match is determined and compared to the callee identifier; and "classifying a call" without identifying how the call is classified. All the steps recited in claim 1 are generic and are not novel to the '815 Patent, as discussed above, and nothing in the claim language limits the claim in such a way that the claim becomes non-abstract.

2. Long-Standing Practices are Analogous to Claim 1

More evidence of the claim's abstract nature lies in the *Parus Holdings, Inc. v. Sallie Mae Bank* court's decision. 137 F. Supp. 3d 660 (D. Del. 2015), *aff'd*, 677 Fed. App'x 682 (Fed. Cir. 2017). In *Parus Holdings*, the claim in question called "for using a 'computer and telecommunications network for receiving, sending and managing information from a subscriber

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to the network and from the network to a subscriber.'" *Id.* at 672. Here, claim 1 similarly calls for using a computer and telecommunications network for sending information from a subscriber to the network (and ultimately, the callee) by: *receiving* information related to the caller and callee (i.e., the caller identifier and the callee identifier); *managing* that information by locating a caller dialing profile and matching the information in the caller dialing profile with information in the callee identifier; and finally, classifying the call either as a "public network call" or a "private network call" and *sending* a routing message to the computer and telecommunications network. The *Parus Holdings* court found the claim in question to be abstract because the patent claim had "pre-Internet analogs" that could be performed by humans, such as a personal assistant directing calls. *Id.*

The *Parus Holdings* court is not alone in holding that such call routing patent claims could be performed by humans. Likewise, in *Telinit Techs., LLC v. Alteva, Inc.*, the court found as abstract a claim requiring: "(1) receiving a data network request; (2) identifying a telephone number associated with that request; (3) signaling a switch to make a call; (4) monitoring the call; and (5) providing a user with notifications if there is a change in the status of the call." 2015 WL 5578604, at *16-17 (E.D. Tex. Sept. 21, 2015). The *Telinit* court found that this "is precisely the function of a telephone operator." *Id.* Here, claim 1 similarly calls for the computer or telecommunications network to *receive* a data network request for a call by *identifying* a caller identifier and a callee identifier, locating a dialing profile and matching part of the callee's identifier to the dialing profile, then *signaling* the network via a routing message after the call is classified as a private network or a public network call.

Plaintiff attacks the analogy to a switchboard operator, arguing that unlike in claim 1, "switchboard routing used only the callee identifier (*i.e.*, telephone number) to identify, and route to, the destination (*i.e.*, callee) and did not need information about the caller." Opp. at 16. But even Plaintiff concedes that "telephone operators might have used a *caller*'s identity to properly attribute toll charges, or to record the caller's number for a call back in case the connection was lost." *Id.* (emphasis added). Thus, Plaintiff's own concession renders Plaintiff's argument

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impotent.[6]

Plaintiff also argues that "Defendants' assertion that the claims are directed to an abstract idea is even less plausible for means-plus-function claims such as the apparatus in Claim 28 of the '815 Patent." Opp. at 14. Plaintiff admits that "Claim 28 is similar to Claim 1," though there are differences in how each claim is interpreted because claim 28 is a means-plus-function claim. *Id.* In brief, a means-plus-function claim is limited "to the means specified in the written description and equivalents thereof." *O.I. Corp. v. Tekmar Co.*, 115 F.3d 1576, 1583 (Fed. Cir. 1997). Thus, courts look to limitations imposed in the specification to interpret a means-plus-function claim.

Claim 28 of the '815 Patent recites:

28. A call routing apparatus for facilitating communications between callers and callees in a system comprising a plurality of nodes with which callers and callees are associated, the apparatus comprising:

receiving means for receiving a caller identifier and a callee identifier, in response to initiation of a call by a calling subscriber;

means for locating a caller dialing profile comprising a username associated with the caller and a plurality of calling attributes associated with the caller;

means for determining a match when at least one of said calling attributes matches at least a portion of said callee identifier;

means for classifying the call as a public network call when said match meets public

[6] Defendants request judicial notice of a YouTube video about 1940s telephone technology. Reply at 9 n.3. The Court may take judicial notice of matters that are either "generally known within the trial court's territorial jurisdiction" or "can be accurately and readily determined from sources whose accuracy cannot reasonably be questioned." Fed. R. Evid. 201(b). However, to the extent any facts in materials subject to judicial notice are subject to reasonable dispute, the Court will not take judicial notice of those facts. *Lee v. City of Los Angeles*, 250 F.3d 668, 689 (9th Cir. 2001), *overruled on other grounds by Galbraith v. Cty. of Santa Clara*, 307 F.3d 1119 (9th Cir. 2002). The Court finds that the contents of the YouTube video are unverified and unsubstantiated, and are therefore subject to reasonable dispute. Thus, the Court DENIES Defendants' request for judicial notice. *See, e.g., Point Ruston, LLC v. Pac. Northwest Regional Council of the United Bhd. Of Carpenters and Joiners of Am.*, 658 F. Supp. 2d 1266, 1279 (W.D. Wash. 2009) (declining to take judicial notice of YouTube video because "there are questions of authenticity regarding this proposed evidence, and there appears to be a reasonable dispute concerning the substance of the evidence").

network classification criteria;

means for classifying a call as a private network call when said match meets private network classification criteria;

means for producing a private network routing message for receipt by a call controller, when the call is classified as a private network call, said private network routing message identifying an address, on the private network, associated with the callee; and

means for producing a public network routing message for receipt by a call controller, when the call is classified as a public network call, said public network routing message identifying a gateway to the public network.

’815 Patent at 38:53-39:12.

Plaintiff argues that claim 28 corresponds to the algorithms depicted in Figures 8A to 8D. Opp. at 14. The algorithms depicted in Figures 8A to 8D are carried out by the routing controller, discussed above. ’815 Patent at 17:43-44 (“The [routing controller] message handler process is shown in greater detail . . . in FIGS 8A through 8D.”). However, the routing controller is implemented via generic computer means. As the specification admits, the routing controller “may be implemented as separate modules on a *common computer system* or by separate computers, for example.” *Id.* at 13:13-14 (emphasis added). The specification lacks any additional detail as to whether these are specialized computers containing the routing controller. The routing controller circuit itself also contains only generic computer components: a processor, different types of memory, and an [input/output] port.” *Id.* at 17:19-21. *See, e.g.*, *SRI Int’l, Inc. v. Cisco Sys., Inc.*, __F.3d__, 2019 WL 1271160, at *13 (Fed. Cir. Mar. 20, 2019) (“[T]he claims only rely on generic computer components, including a computer, memory, processor, and mass storage device.”); *Accenture*, 728 F.3d at 1343 (describing an input/output adapter as a “generic computer component[]”). Moreover, as Plaintiff even admits, “Claim 28 is similar to Claim 1.” Opp. at 14. The claim language of claim 28 is a near-verbatim copy of the claim language of claim 1. Above, the Court discussed at length why claim 1’s limitations are generic. Thus, the same logic applies to claim 28. Consequently, the algorithmic structure disclosed in Figures 8A to 8D of the ’815 Patent

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do not actually transform claim 28's limitations into a non-abstract idea. Moreover, claim 1 is still representative of means-plus-function claim 28, an argument that Plaintiff does not challenge.

In sum, the Court finds that claim 1 of the '815 Patent is directed to an abstract idea. The Court next analyzes *Alice* step two.

B. *Alice* Step Two for Claim 1 of the '815 Patent—Whether the Claim Contains an Inventive Concept

Defendants argue that the limitations of Claim 1 are generic computer implementations of the abstract idea, and are thus unpatentable. Mot. at 21. On the other hand, Plaintiff argues that claim 1 recites "a specially programmed routing controller to provide call placement and routing in an individually customizable manner for each caller," which was unconventional at the time of the invention. Opp. at 18.

"In step two of the *Alice* inquiry, [the Court] search[es] for an 'inventive concept sufficient to transform the nature of the claim into a patent-eligible application." *RecogniCorp*, 855 F.3d at 1327 (quoting *McRO*, 837 F.3d at 1312) (internal quotation marks omitted)). "To save the patent at step two, an inventive concept must be evident in the claims." *Id.* This inventive concept "must be significantly more than the abstract idea itself," *BASCOM*, 827 F.3d at 1349; "must be more than well-understood, routine, conventional activity," *Affinity Labs of Texas, LLC v. DIRECTV, LLC*, 838 F.3d 1253, 1262 (Fed. Cir. 2016); "and cannot simply be an instruction to implement or apply the abstract idea on a computer." *BASCOM*, 827 F.3d at 1349. For example, it may be found in an "inventive set of components or methods," "inventive programming," or an inventive approach in "how the desired result is achieved." *Elec. Power Grp.*, 830 F.3d at 1355. "If a claim's only 'inventive concept' is the application of an abstract idea using conventional and well-understood techniques, the claim has not been transformed into a patent-eligible application of an abstract idea." *BSG Tech LLC v. Buyseasons, Inc.*, 899 F.3d 1281, 1290-91 (Fed. Cir. 2018).

The Court finds that none of the claim's elements, assessed individually, provides an inventive concept. Claim 1 discloses: (1) "receiving a caller identifier and a callee identifier" after a call is initiated; (2) "locating a caller dialing profile"; (3) matching the information in the "caller

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dialing profile" with information in the callee identifier; and (4) classifying the call either as a "public network call" or a "private network call" based on "classification criteria" and producing the appropriate public network or private network routing message to be received by a call controller. '815 Patent at 36:14-38.

As discussed above, none of claim 1's elements are unique to the '815 Patent. In fact, the patent specification confirms that the '815 Patent did not invent the limitations found in claim 1.

For instance, the specification concedes that the invention did not invent the "caller identifier" or the "callee identifier." The specification discloses that "[t]he caller identifier field may include a [publicly switched telephone network] number or a system subscriber username." *Id.* at 17:13-15. Moreover, as examples of callee identifiers, the specification identifies "a callee telephone/videophone number." *Id.* at 14:49-50. Essentially, the caller and callee identifiers consist of either a telephone number or a username, neither of which is unique to the '815 Patent.

In addition, "locating a caller dialing profile" does not provide an inventive concept either. The specification makes clear that the '815 Patent did not invent the caller dialing profile, but rather, the caller dialing profile is comprised of various identificatory attributes of subscribers that are left undefined in the claim and specification. *See, e.g.*, *id.* at 18:1-4 ("Effectively the dialing profile is a record identifying calling attributes of the caller identified by the caller identifier. More generally, dialing profiles represent *calling attributes of respective subscribers*" (emphasis added).). Also, case law has held that locating information is not an inventive concept. In *CyberSource Corp. v. Retail Decisions, Inc.*, the Federal Circuit held that a step requiring "*obtaining information* . . . can be performed by a human who simply reads records of . . . transactions from a preexisting database." 654 F.3d 1366, 1372 (Fed. Cir. 2011) (emphasis added).

Additionally, matching the information in the "caller dialing profile" with information in the callee identifier is likewise generic, as discussed above. The callee identifier is essentially "a callee telephone/videophone number." '815 Patent at 14:49-50. The specification makes clear that this matching process is not unique to the Patent either, especially as the '815 Patent did not invent the callee identifier or the process of matching the caller dialing profile with the callee identifier.

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See, e.g., *id.* at 2:8-10 ("Using the call classification criteria may involve comparing calling attributes associated with the caller dialing profile with aspects of the callee identifier."); *id.* at 2:17-19 ("Comparing may involve determining whether the callee identifier includes a portion that matches an area code associated with the caller dialing profile."); *id.* at 2:20-22 ("Comparing may involve determining whether the callee identifier has a length within a range specified in the caller dialing profile.").

Moreover, case law has held that the process of matching information does not provide an inventive concept. In *Intellectual Ventures I LLC v. Symantec Corp.*, the method claim in question called for receiving data, *determining whether the received data matched certain characteristics*, and outputting data based on the determining step. 838 F.3d 1307, 1313 (Fed. Cir. 2016). The Federal Circuit found that none of these steps provided an inventive concept because the claim performs "generic computer functions." *Id.* at 1315.

Furthermore, classifying the call either as a "public network call" or a "private network call" based on "classification criteria" and producing the appropriate public network or private network routing message to be received by a call controller does not provide an inventive concept either. Importantly, this process is performed on a generic computer, upon which the claimed step does not improve. The specification discloses that the super node, which includes the routing controller, "may be implemented as separate modules on a common computer system or by separate computers." '815 Patent at 13:10-14. Case law confirms that the process does not provide an inventive concept. In *Accenture*, the claim in question applied a set of rules to a database of tasks. *Accenture*, 728 F.3d at 1345. The *Accenture* court found the claim to be "generalized software components arranged to implement an abstract concept on a computer." *Id.* Here, the classification criteria provide the set of rules, as described in *Accenture*, which is applied to the task of classifying and routing a call. As for the process of sending a routing message, the Federal Circuit has held that "receiv[ing] and send[ing] information over a network . . . is not even arguably inventive." *buySAFE*, 765 F.3d at 1355.

Thus, none of claim 1's elements, assessed individually, provides an inventive concept.

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Moreover, the ordered combination of these elements also does not yield an inventive concept. In *BASCOM*, the Federal Circuit held that "an inventive concept can be found in the non-conventional and non-generic arrangement of known, conventional pieces." 827 F.3d at 1350. However, the arrangement of claim 1's elements are conventional, as evidenced by *Two-Way Media*.

In *Two-Way Media*, the claim in question was directed to "first processing the data, then routing it, [and] controlling it . . . ." 874 F.3d at 1339. This was done in the context of "transmitting message packets over a communications network." *Id.* at 1334. Here, claim 1 discloses a similar structure to the *Two-Way Media* claim. First, data is *processed* by "locating a caller dialing profile" after a call is initiated and the caller identifier and callee identifier is received, and then the information in the "caller dialing profile" is matched with information in the callee identifier. Then, data is *routed* by classifying the call as either a public network call or a private network call. Lastly, the data is *controlled* by sending the appropriate routing message to the network controller in order to control where the call goes. The *Two-Way Media* court invalidated the claim, called the ordering of claim elements a "conventional ordering of steps . . . with conventional technology to achieve its desired result." *Id.* Thus, claim 1's elements are also a conventional ordering of steps.

Plaintiff cites to *DDR Holdings*, a case Plaintiff claims is analogous, for the proposition that "claims [that] solve problems <u>necessarily rooted in</u> network <u>technology</u> . . . are eligible" for a patent. Opp. at 23 (citing *DDR Holdings*, 773 F.3d at 1257, 1259) (emphasis in original). However, *DDR Holdings* is distinguishable from the instant case because the *DDR Holdings* patent claims "specify how interactions with the Internet are manipulated to yield a desired result—a result that overrides the routine and conventional sequence of events ordinarily triggered by the click of a hyperlink." *DDR Holdings*, 773 F.3d at 1258. Here, we have the situation where generic aspects of computing—routing a call using a generic call controller—are performed using generic elements the '815 Patent did not invent—caller and callee identifiers, a dialing profile, and classification criteria. Neither the '815 Patent specification nor claims provide any details on how

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interactions with the internet are manipulated to yield a desired result, like in *DDR Holdings*. Thus, claim 1 is much more analogous to the claim in *Two-Way Media*, in which the claim in question in a telecommunications patent was described and implemented in purely generic terms.

Therefore, claim 1 of the '815 Patent does not contain an inventive concept. The Court finds that at *Alice* step one, claim 1 of the '815 Patent is directed to an abstract idea. At *Alice* step two, there is no inventive concept sufficient to save the claim. Thus, the Court concludes that the multi-network claims—claims 1, 7, 12, 27, 28, 72, 73, 92, and 111 of the '815 Patent and claims 49 and 73 of the '005 Patent—of which claim 1 of the '815 Patent is representative, are patent-ineligible under § 101. Defendants' motion to dismiss the multi-network claims is therefore GRANTED.

C. *Alice* Step One for Claim 74 of the '005 Patent—Whether the Claim is Directed to an Abstract Idea

The arguments in Defendants' motion to dismiss and Plaintiff's opposition are identical as to both claim 1 of the '815 Patent and claim 74 of the '005 Patent. In fact, in Defendants' motion and Plaintiff's opposition, the § 101 analysis of claim 1 of the '815 Patent and claim 74 of the '005 Patent is combined.

Defendants argue that the asserted claims are directed to an abstract idea because: "(1) they are written in a form free of specific tangible implementation and merely invoke computers as a tool; (2) they are similar to claims found directed to abstract ideas in precedent from the Federal Circuit and district courts; (3) they are directed to functions that could be performed in the human mind or with pen and paper; (4) they are akin to long-standing human activity (switchboard operations; and (5) they are not directed to improving the functioning of a computer itself." Mot. at 12. Plaintiff argues that "the asserted claims are not directed to an abstract idea, but are instead generally directed to an improved call routing technology enabling better interoperability of communication networks by, *inter alia*, evaluating a callee identifier provided by a caller in conjunction with caller-specific 'attributes.'" Opp. at 2. The Court agrees with Defendants.

Step one of the *Alice* framework directs the Court to assess "whether the claims at issue are directed to [an abstract idea].” *Alice*, 134 S. Ct. at 2355. The step one inquiry “applies a stage-one filter to claims, considered in light of the specification, based on whether ‘their character as a whole is directed to excluded subject matter.’” *Enfish*, 822 F.3d at 1335 (citation omitted). Thus, the Court conducts its step one inquiry by first identifying what the “character as a whole” of claim 1 of the ’815 Patent is “directed to,” and then discussing whether this is an abstract idea. In distilling the character of a claim, the Court is careful not to express the claim’s focus at an unduly “high level of abstraction . . . untethered from the language of claims,” but rather at a level consonant with the level of generality or abstraction expressed in the claims themselves. *Enfish*, 822 F.3d at 1337; *see also Thales Visionix*, 850 F.3d at 1347 (“We must therefore ensure at step one that we articulate what the claims are directed to with enough specificity to ensure the step one inquiry is meaningful.”).

Like for claim 1 of the ’815 Patent, the Court finds that claim 74 of the ’005 Patent is directed to the abstract idea of routing a call based on characteristics of the caller and callee. Put in plain language, claim 74 discloses: (1) using a “participant identifier” to locate a “first participant profile” comprising of “attributes associated with the first participant,” who starts a communication with a second participant; (2) sending a “first network routing message” that identifies an address in a first portion of the network for receipt by a controller when some information about the first participant and a portion of a “second participant identifier” meet a criterion; and (3) sending a “second network routing message” that identifies an address in a second portion of the network for receipt by a controller when some information about the first participant and a portion of the “second participant identifier” meet a second criterion. ’005 Patent at 43:41-65. In essence, claim 74 of the ’005 Patent is essentially the same as claim 1 of the ’815 Patent, but with two routing messages being sent as opposed to just the one routing message being sent in claim 1 of the ’815 Patent. For this reason, claim 74 of the ’005 Patent suffers from the same defects as claim 1 of the ’815 Patent. Claim 74 is abstract because first, it only discloses generalized steps to carry out generic functions, and second, because there are long-standing practices analogous to the claimed steps.

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1. Claim 74 Discloses Generalized Steps to Carry Out Generic Functions

For instance, as discussed above, the *TLI* court found that because the *TLI* patent failed to provide technical details for components, but instead described the system and methods "in purely functional terms," functions that were generic to a computer, the *TLI* patent claim failed step one of *Alice*. *TLI*, 823 F.3d at 612. Here, claim 74 of the '005 Patent describes the methods in purely functional terms with functions generic to a computer. Thus, claim 74 is directed to an abstract idea.

The idea of using a "participant identifier" to locate a "first participant profile" comprising of "attributes associated with the first participant," who starts a communication with a second participant is purely functional language that is generic to a computer. The phrase "participant identifier" is not found in the '005 Patent specification. However, "participant identifier" is akin to the aforementioned caller identifier and callee identifier in claim 1 of the '815 Patent because the participant identifier functions in the same way as the caller and callee identifiers. For instance, in claim 1 of the '815 Patent, a portion of the callee identifier is used to match various attributes associated with a caller, and a routing message is sent out based on the match. '815 Patent at 36:23-25. Likewise, in claim 74 of the '005 Patent, a portion of the second participant identifier is used in conjunction with various attributes associated with a first participant, and a routing message is sent out based on whether a portion of the second participant identifier and the attributes associated with a first participant meet a classification criterion. '005 Patent at 43:51-58. Moreover, both claims refer to the use of "identifiers," which is defined in the specification as caller and callee identifiers.

Thus, "participant identifier" is defined in the specification as "a [publicly switched telephone network] number or a system subscriber username." *Id.* at 17:23-24. The specification additionally identifies an identifier as "telephone/videophone number." *Id.* at 14:48-49. Essentially, an identifier consists of either a telephone number or a username. A telephone number or a username can hardly be considered unique to the '005 Patent, as the specification admits and as common sense dictates.

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Likewise, the "first participant profile" of claim 74 is equally as generic. The specification never uses the phrase "participant profile," but the Court finds participant profile equivalent to the dialing profile discussed above in relation to the '815 Patent because the participant profile functions in the same way as the dialing profile. The participant profile comprises "a plurality of attributes associated with the . . . participant," *id.* at 43:48-50, much like how a caller dialing profile comprises "a plurality of calling attributes associated with the caller," '815 Patent at 36:20-22. The specification makes clear that the '005 Patent did not invent the participant profile, but rather, the participant profile is comprised of various identificatory attributes of subscribers that are left undefined in the claim and specification. *See, e.g.*, '005 Patent at 18:10-13 ("Effectively the dialing profile is a record identifying calling attributes of the caller identified by the caller identifier. More generally, dialing profiles represent *calling attributes of respective subscribers*" (emphasis added).).

Then, claim 74 proceeds to claim, without further detail, starting a communication between a first participant and a second participant. *Id.* at 43:46-47. The process of initiating a communication is described in the specification as using a generic computer with a routing controller to connect two parties. The specification discloses that the super node, which includes the routing controller that routes communications, "may be implemented as separate modules on a common computer system or by separate computers, for example." *Id.* at 13:21-22.

In the next step of claim 74, claim 74 claims sending a "first network routing message" that identifies an address in a first portion of the network for receipt by a controller when some information about the first participant and a portion of a "second participant identifier" meet a criterion. As discussed above, a routing message is sent by the routing controller, a component of the super node, which is comprised of generic computers. Therefore, the process of sending a network routing message is generic. For instance, a claim that recited steps "by which data was obtained . . . and *transmitted by a telephone* . . . and sent over a channel to different destinations" was held to represent "nothing more than a disembodied concept of data sorting and storage." *Morales v. Square, Inc.*, 75 F. Supp. 716, 725 (W.D. Tex. 2014), *aff'd*, 621 Fed. App'x 660 (Fed.

Cir. 2015) (citing *CyberFone Sys., LLC v. Cellco P'ship*, 885 F. Supp. 2d 710, 719 (D. Del. 2012)). Moreover, the claim does not define what "criterion" must be met for the first network routing message to be sent. Claim 74 thereby repeats the same mistake as claim 1 of the '815 Patent in that claim 74 recites steps in very vague terms. As the Federal Circuit has held, "[g]eneralized steps to be performed on a computer using conventional computer activity are abstract." *RecogniCorp*, 855 F.3d at 1326.

The final step of claim 74 claims sending a "second network routing message" that identifies an address in a second portion of the network for receipt by a controller when some information about the first participant and a portion of the "second participant identifier" meet a second criterion. This final step is near-identical to the above-described step, the differences being that a "second network routing message" is sent when another criterion is met by information about the first participant and a portion of a "second participant identifier." As the Court has discussed at length, the process of sending a network routing message is not unique to the Patent, and is implemented using generic computers.

2. Long-Standing Practices are Analogous to Claim 74

As claim 74 is quite similar to claim 1 of the '815 Patent, *Parus Holdings* again confirms the claim's abstract nature. 137 F. Supp. 3d 660. In *Parus Holdings*, the claim in question called "for using a 'computer and telecommunications network for receiving, sending and managing information from a subscriber to the network and from the network to a subscriber.'" *Id.* at 672. Here, claim 74 similarly calls for using a computer and telecommunications network for sending information from a subscriber to the network (and ultimately, the second participant) by: *receiving* a first participant profile comprising of attributes associated with the first participant, who starts a communication with a second participant; and then *sending* two network routing messages for receipt by a controller after some information about the first participant and a portion of a second participant identifier meet a criterion. The *Parus Holdings* court found the claim in question to be abstract because the patent claim had "pre-Internet analogs" that could be performed by humans, such as a personal assistant directing calls. *Id.*

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The *Parus Holdings* court is not alone in holding that such call routing patent claims could be performed by humans. Likewise, in *Telinit*, the court found as abstract a claim requiring: "(1) receiving a data network request; (2) identifying a telephone number associated with that request; (3) signaling a switch to make a call; (4) monitoring the call; and (5) providing a user with notifications if there is a change in the status of the call." 2015 WL 5578604, at *16-17. The *Telinit* court found that this "is precisely the function of a telephone operator." *Id.* Here, claim 74 similarly calls for the computer or telecommunications network to *receive* a first participant profile comprising of attributes associated with the first participant, who starts a communication with a second participant; *identify* whether information about the first participant and a portion of a second participant identifier meet a criterion; and then *signal* the controller by sending network routing messages.

Therefore, the Court finds that claim 74 of the '005 Patent is directed to an abstract idea.

D. *Alice* Step Two for Claim 74 of the '005 Patent—Whether the Claim Contains an Inventive Concept

Defendants argue that claim 74 contains "only well-known, routine, and conventional functionality that does not amount to significantly more than the abstract idea itself." Mot. at 20. Plaintiff responds by arguing that the claim recites "a specially programmed routing controller to provide call placement and routing in an individually customizable manner for each caller," a controller that was unconventional at the time of the invention. Opp. at 18.

As aforementioned, in "step two of the *Alice* inquiry, [the Court] search[es] for an 'inventive concept sufficient to transform the nature of the claim into a patent-eligible application." *RecogniCorp*, 855 F.3d at 1327 (quoting *McRO*, 837 F.3d at 1312) (internal quotation marks omitted)). "To save the patent at step two, an inventive concept must be evident in the claims." *Id.* This inventive concept "must be significantly more than the abstract idea itself," *BASCOM*, 827 F.3d at 1349; "must be more than well-understood, routine, conventional activity," *Affinity Labs of Texas*, 838 F.3d at 1262; "and cannot simply be an instruction to implement or apply the abstract idea on a computer." *BASCOM*, 827 F.3d at 1349. For example, it may be found in an "inventive set of components or methods," "inventive programming," or an inventive approach in "how the desired result is achieved." *Elec. Power Grp.*, 830 F.3d at 1355. "If a claim's only 'inventive concept' is the application of an abstract idea using conventional and well-understood techniques, the claim has not been transformed into a patent-eligible application of an abstract idea." *BSG Tech LLC*, 899 F.3d at 1290-91.

The Court finds that none of the claim's elements, assessed individually, provides an inventive concept. Claim 74 recites: (1) using a "participant identifier" to locate a "first participant profile" comprising of "attributes associated with the first participant," who starts a communication with a second participant; (2) sending a "first network routing message" that identifies an address in a first portion of the network for receipt by a controller when some information about the first participant and a portion of a "second participant identifier" meet a criterion; and (3) sending a "second network routing message" that identifies an address in a second portion of the network for receipt by a controller when some information about the first participant and a portion of the "second participant identifier" meet a second criterion. '005 Patent at 43:41-65.

As discussed above, none of claim 74's elements are unique to the '005 Patent. In fact, the patent specification confirms that the '005 Patent did not invent the limitations found in claim 1.

First, using a "participant identifier" to locate a "first participant profile" comprising of "attributes associated with the first participant," who starts a communication with a second participant is not an inventive concept. For instance, "participant identifier" is defined in the specification as "a [publicly switched telephone network] number or a system subscriber username." *Id.* at 17:23-24. The specification additionally identifies an identifier as "telephone/videophone number." *Id.* at 14:48-49. At bottom, an identifier consists of either a telephone number or a username. Use of a telephone number or a username, which are not unique to the '005 Patent, can hardly be considered inventive enough to lift claim 74 out of abstractness. Moreover, the specification makes clear that the '005 Patent did not invent the participant profile, but rather, the participant profile is comprised of various identificatory attributes of subscribers left undefined by the claim and specification. *See, e.g.*, *Id.* at 18:10-13 ("Effectively the dialing profile is a record identifying calling attributes of the caller identified by the caller identifier. More generally, dialing profiles represent calling attributes of respective subscribers."). In addition, the concept of locating information using the participant identifier is not an inventive concept. In *CyberSource Corp.*, the Federal Circuit held that a step requiring "*obtaining information* . . . can be performed by a human who simply reads records of . . . transactions from a preexisting database." 654 F.3d at 1372.

Moreover, sending a "network routing message" that identifies an address in a portion of the network for receipt by a controller when some information about the first participant and a portion of a "second participant identifier" meet a criterion is also not inventive. This process is analogous to a claim found in *Intellectual Ventures I*. In *Intellectual Ventures I*, the claim in question called for determining whether the received data matched certain characteristics and outputting data based on the determining step. 838 F.3d at 1313. The Federal Circuit held that the steps provided did not provide an inventive concept because the claim performs "generic computer functions." *Id.* at 1315. Here, whether information about the first participant and a portion of the second participant identifier meet a criterion is the same as the *Intellectual Venture I*'s determination of whether data matched certain characteristics. In claim 74, the determination is made by deciding, based on information about the first participant and a portion of the second participant identifier, whether a criterion is met. Then, claim 74 discloses sending a network routing message when the determining step has concluded. This is analogous to the *Intellectual Venture I*'s step of outputting data based on the determining step, as claim 74's routing message is sent after the determination of whether the criterion is met. Moreover, as for the process of sending a routing message, the Federal Circuit has held that "receiv[ing] and send[ing] information over a network . . . is not even arguably inventive." *buySAFE*, 765 F.3d at 1355.

Thus, none of claim 74's elements, assessed individually, provides an inventive concept. Furthermore, the ordered combination of these elements also does not yield an inventive concept. In *BASCOM*, the Federal Circuit held that "an inventive concept can be found in the non-conventional and non-generic arrangement of known, conventional pieces." 827 F.3d at 1350. However, the arrangement of claim 74's elements are conventional, as evidenced by *Two-Way Media*.

In *Two-Way Media*, the claim in question was directed to "first processing the data, then routing it, [and] controlling it . . . ." 874 F.3d at 1339. This was done in the context of "transmitting message packets over a communications network." *Id.* at 1334. The *Two-Way Media* court invalidated the claim, called the ordering of claim elements a "conventional ordering of steps . . . with conventional technology to achieve its desired result." *Id.* Here, claim 74 is analogous to the *Two-Way Media* claim. First, data is *processed* by locating a first participant profile comprising of attributes associated with the first participant, these attributes being used in conjunction with a second participant identifier to see if a criterion is met. Then, telephonic communications data is *routed* and *controlled* when network routing messages for receipt by a controller are produced.

Therefore, claim 74 of the '005 Patent does not contain an inventive concept. The Court finds that at *Alice* step one, claim 74 of the '005 Patent is directed to an abstract idea. At *Alice* step two, there is no inventive concept sufficient to save the claim. Thus, the Court concludes that the single-network claims—claims 74, 75, 77, 78, 83, 84, 94, 96, and 99 of the '005 Patent—of which claim 74 of the '005 Patent is representative, are patent-ineligible under § 101. Defendants' motion to dismiss the single-network claims is therefore GRANTED.

E. Whether there Exist Factual Questions that Preclude Resolution of the Instant Motion under Rule 12

Plaintiff's opposition cites disclosures in the complaints that Plaintiffs argue preclude resolution of the instant motion under Rule 12. Opp. at 7. In particular, Plaintiff's opposition mentions two specific features—user-specific calling and transparent routing—disclosed by the complaints that purportedly demonstrate that the asserted claims are not directed to abstract ideas.

First, Plaintiff argues that claim 1 discloses "user-specific calling," which precludes a finding of abstractness because in user-specific calling, "[d]ifferent callers with differently

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configured attributes could dial the *same* string of digits to reach *different* destinations because the meaning of the callee identifier is different based on each caller's attributes.*"* Opp. at 7-8 (emphasis in original). Plaintiff cites the '815 Patent specification to show that user-specific calling exists because the Patent describes "calling attributes associated with the caller" to evaluate a "callee identifier" to identify the callee. *Id.* at 7 (citing '815 Patent at 36:15-23). Moreover, Plaintiff states that "[u]ser-specific call placement provides benefits such as the ability to support local [public switched telephone network] styles (or even unconventional styles) of calling no matter where in the world a caller is located." *Id.* at 8.

However, the '815 Patent's *claim language* contains no mention of these alleged benefits of user-specific calling, such as supporting local public switched telephone network telephone number styles or unconventional styles of calling regardless of where a caller is located. After all, *Alice*'s step one inquiry must focus on the *claim language*. *See, e.g.*, *Accenture*, 728 F.3d at 1345 ("[T]he important inquiry for a § 101 analysis is to look to the claim."); *CMG Fin. Servs., Inc.*, 50 F. Supp. 3d 1306, 1326 ("None of the elements in these Claims limit the level of their inherent abstraction."), *aff'd*, 616 Fed. App'x 420 (Fed. Cir. 2015). Also, the patent specification fails to disclose user-specific calling. Regardless, even if the specification disclosed user-specific calling, as the Federal Circuit has held, "details from the specification cannot save a claim directed to an abstract idea that recites generic computer parts." *Synopsys, Inc.*, 839 F.3d at 1149.

Second, Plaintiff also argues that the asserted claims disclose "transparent routing," rendering the claims non-abstract. Opp. at 8. Plaintiff asserts that the "improved call routing controller, system and method of the claim invention also enables using a caller's attributes to evaluate a callee identifier against network routing criteria to cause a call to *automatically* be routed over system network . . . or another network interconnected to the system network via a gateway . . . *transparently to the user*—without the user manually specifying the network to use for routing by the user's manner of placing the call (*e.g.*, by dialing a prefix of "9" to make a [public switched telephone network] call)." *Id.*

However, as aforementioned, *Alice*'s step one inquiry must focus on the claim language.

See, e.g., *Accenture*, 728 F.3d at 1345 ("[T]he important inquiry for a § 101 analysis is to look to the claim."). Like with user-specific calling, the concepts embodied by transparent routing appear nowhere in the claims. As Defendants correctly point out, the "claims do not recite any limitation regarding what the caller specifies, or does not specify, to place a call, nor do the claims refer to a caller making a [public switched telephone network] call without dialing the prefix '9.'" Reply at 6.

At bottom, under Federal Circuit law, "[w]hether a claim recites patent eligible subject matter is a question of law which . . . has in many cases been resolved on motions to dismiss or summary judgment." *Berkheimer v. HP Inc.*, 881 F.3d 1360, 1368 (Fed. Cir. 2018).[7] "As our cases demonstrate, not every § 101 determination contains genuine disputes over the underlying facts material to the § 101 inquiry." *Id.* "In some cases, when improvements in the specification are *captured in the claims*, whether an element or combination of elements is well-understood becomes a question of fact." *Symantec Corp. v. Zscaler, Inc.*, 2018 WL 3539269, at *2 (N.D. Cal. July 23, 2018) (citing *Berkheimer*, 881 F.3d at 1368-69) (emphasis added). Here, however, attorney argument in the complaint cannot save the claims because the purported improvements have not been captured in the claim language.

IV. CONCLUSION

For the foregoing reasons, the Court finds that the asserted multi-network claims (claims 1, 7, 12, 27, 28, 72, 73, 92, and 111 of the '815 Patent and claims 49 and 73 of the '005 Patent) and the asserted single-network claims (claims 74, 75, 77, 78, 83, 84, 94, 96, and 99 of the '005 Patent) are directed to unpatentable subject matter and are thus invalid under 35 U.S.C. § 101. The Court therefore GRANTS Defendants' omnibus motions to dismiss.

IT IS SO ORDERED.

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[7] For this reason, the Court rejects Plaintiff's alternative argument that the motion is premature. Opp. at 25. The asserted claims contain only generic elements, as confirmed by the Patents' specification. Thus, dismissal at this stage of litigation is entirely appropriate. The Court need not consider additional evidence to come to its conclusion.

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Dated: March 25, 2019

Lucy H. Koh

LUCY H. KOH
United States District Judge

United States District Court
Northern District of California

EXHIBIT 5

December 14, 2021
VoIP-Pal Provides the Current Schedule for Litigation of Their Patent Infringement Lawsuits in the Western District of Texas

December 7, 2021
VoIP-Pal Provides a Legal Update on Current Litigation in the Western District of Texas

December 2, 2021
VoIP-Pal Files Two New Patent Infringement Lawsuits Against New Defendants Samsung and Huawei Asserting its Mobile Gateway Patents in U.S. District Court for the Western District of Texas, Waco Division

About Us | Our Technology | Our Team | Investor Relations | Legal Action | News & Interviews

Voip-Pal Files Patent Infringement Lawsuits Against Facebook/WhatsApp, Google, Amazon and Apple in the United States District Court for the Western District of Texas Waco Division

The Company is weighing its next moves following the recent Appeals Court decision

April 8, 2020 – Voip-Pal.com Inc. ("Voip-Pal", "Company") (OTCQB: VPLM) has filed four patent infringement lawsuits in the U.S. District Court for the Western District of Texas, Waco Division against the following defendants:

- Facebook Inc. and WhatsApp Inc.; Civil Action No. 20-cv-267
- Google LLC; Civil Action No. 20-cv-269
- Amazon.com Inc. et al.; Civil Action No. 20-cv-272
- Apple Inc.; Civil Action No. 20-cv-275

The four complaints allege infringement by the defendants of Voip-Pal's United States Patent No. 10,218,606, entitled "Producing Routing Messages For Voice Over IP Communications." These actions concern the defendants' use of Voip-Pal's proprietary technology to provide user-customizable access to route calls in a distributed private network using public phone numbers to identify users.

The Company also announced they are currently assessing their options and planning their next moves following the March 16, 2020 decision by the United States Court of Appeals for the Federal Circuit, affirming the Northern District of California's dismissal of VoIP-Pal's Case Nos. 18-CV-06177-LHK, 18-cv-06217-LHK, C, 18-cv-04523-LHK, and 18-cv-06054-LHK under 35 U.S.C. § 101. The Federal Circuit invoked Rule 36 and provided no comment or explanation for why it declined to address various District Court errors as alleged by Voip-Pal.

The Federal Circuit has been criticized for its frequent practice of invoking Rule 36 to summarily dismiss cases without issuing any opinion. Recently, Emil Malak, CEO of Voip-Pal, in his January 4, 2020 op-ed entitled "A Plea for Clarity and a New Approach on Section 101 in 2020" for IP Watchdog discussed the problems with the Federal Circuit's § 101 jurisprudence.

Emil Malak, CEO of Voip-Pal, stated, "While the appellate court's decision to affirm the district court without giving any reasons was disappointing, we are undeterred in our fight to assert our intellectual property rights. Our legal team is assessing our next moves regarding this Alice decision and we expect to announce our intentions soon. I can tell you; we are not finished."

"Our patent portfolio began with five core patents and to date has expanded to 23 patents in the United States alone, not counting our many foreign patents. We remain firm in our resolve to achieve monetization for our shareholders and will continue to see this fight through until a successful resolution is reached. Patience is a virtue."

Next Article

EXHIBIT 6

IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION

VOIP-PAL.COM, INC. Plaintiff, v. APPLE, INC., Defendant.	CIVIL ACTION NO. 6:21-cv-670 JURY TRIAL DEMANDED

ORIGINAL COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff VoIP-Pal.com, Inc. ("VoIP-Pal"), for its Complaint against Defendant Apple, Inc. ("Apple"), alleges as follows:

THE PARTIES

1. Plaintiff VoIP-Pal is a Nevada corporation with its principal place of business located at 7215 Bosque Boulevard, Waco, Texas 76710. VoIP-Pal is registered to do business in the State of Texas.

2. On information and belief, Defendant Apple is a California corporation with physical addresses in this District at 12545 Riata Vista Circle, Austin, Texas 78727; 12801 Delcour Drive, Austin, Texas 78727; and 3121 Palm 4 Way, Austin, Texas 78758. Apple may be served with process through its registered agent, the CT Corp System, at 1999 Bryan St., Ste. 900 Dallas, Texas 75201-3136. Apple is registered to do business in the State of Texas and has been since at least May 16, 1980.

3. On information and belief, Apple regularly conducts and transacts business in the State of Texas, throughout the United States, and within this District, and as set forth below, has

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committed and continues to commit, tortious acts of infringement within and outside the State of Texas and within this District.

JURISDICTION AND VENUE

4. This action is a civil action for patent infringement arising under the patent laws of the United States, Title 35, United States Code ("U.S.C.") §1 et seq., including 35 U.S.C. §§ 271 and 281-285. This Court has exclusive subject matter jurisdiction over this case for patent infringement under 28 U.S.C. §§ 1331 and 1338.

5. This Court has personal jurisdiction over Apple by virtue of its systematic and continuous contacts with this jurisdiction, as alleged herein, as well as because the injury to VoIP-Pal occurred in the State of Texas and the claim for relief possessed by VoIP-Pal against Apple for that injury arose in the State of Texas. On information and belief, Apple has purposely availed itself of the privileges of conducting business within the State of Texas, such business including but not limited to: (i) at least a portion of the infringements alleged herein; (ii) purposefully and voluntarily placing one or more infringing products or services into the stream of commerce with the expectation that they will be purchased by consumers in this forum; or (iii) regularly transacting or soliciting business, engaging in other persistent courses of conduct, or deriving or attempting to derive substantial revenue and financial benefits from goods and services provided to individuals residing in the State of Texas and in this District. Thus, Apple is subject to this Court's specific and general personal jurisdiction under due process and the Texas Long Arm Statute.

6. Personal jurisdiction also exists specifically over Apple because Apple, directly or through subsidiaries or intermediaries (including customers, distributors, retailers, and others), subsidiaries, alter egos, and/or agents – ships, distributes, offers for sale, licenses, sells, imports, advertises, or markets in the State of Texas and in this District, one or more products or services

that infringe the patents-in-suit, as described particularly below. Apple has purposefully and voluntarily placed one or more of its infringing products and/or services, as described below, into the stream of commerce with the awareness and/or intent that these products and/or services will be purchased or used by consumers in this District. Apple has knowingly and purposefully shipped infringing products into and within this District through an established distribution channel. These infringing products have been and continue to be purchased and used by consumers in this District.

7. VoIP-Pal's claim for relief for patent infringement arises directly from the activities of Apple in this District.

8. On information and belief, Apple, directly and/or through its customers has transacted business in this District and has committed acts of patent infringement in this District. By virtue of its offices in this District, Apple has a regular and established place of business in this District. Thus, venue is proper in this District under 28 U.S.C. §§ 1391 and 1400(b).

BACKGROUND OF THE TECHNOLOGY AND THE PATENTS-IN-SUIT

9. United States Patent No. 8,630,234 (the "'234 patent") entitled "Mobile Gateway" was duly and legally issued by the United States Patent and Trademark Office on January 14, 2014 after full and fair examination. A copy of the '234 patent is attached hereto as Exhibit 1.

10. United States Patent No. 10,880,721 (the "'721 patent") entitled "Mobile Gateway" was duly and legally issued by the United States Patent and Trademark Office on December 29, 2020 after full and fair examination. A copy of the '721 patent is attached hereto as Exhibit 2.

11. The '234 and '721 patents are referred to in this Complaint as the "Patents-in-Suit".

12. VoIP-Pal is the sole owner and assignee of the entire right title and interest in the Patents-in-Suit and has the right to sue and recover damages for any current or past infringement of the Patents-in-Suit.

13. The inventions of the Patents-in-Suit originated from breakthrough work and development in the internet protocol communications field.

14. VoIP-Pal has provided significant improvements to communications technology by the invention of novel methods, processes and apparatuses that facilitate communications across and between internet protocol based communication systems and other networks, such as internally controlled systems and external networks (e.g., across private networks and between private networks and public networks), including providing access to and routing through internet protocol based communication systems.

15. The earliest telephone systems to receive public use within the United States involved a telephone directly connected to a human operator. A portion of the phone rested on a mechanical hook such that the operator was signaled when the portion was lifted from the hook. A caller would then say the name of the person they wished to call to the operator. If the callee was connected to the same telephone switch board the operator would physically pull out a cable associated with the caller's phone and plug the cable into a socket associated with the callee's telephone. If the callee was associated with a different switchboard, and thus out of reach of the operator, a second operator would be involved to bridge the gap to the appropriate switchboard. While initially very effective compared to no telephone service, this structure quickly proved error prone (operators would connect the wrong party) and limiting to the number of possible telephones because of the physical limits of switchboards and cable to be pulled. This basic system corresponds to the introduction of a Plain Old Telephone Service ("POTS") connection to the

operator. In these configurations, there was a dedicated, point-to-point electrical connection between the caller and the callee.

16. Rotary dialing eventually was introduced, beginning at around the turn of the 20th century, where a rotary disk was marked with numbers from zero to nine. A caller would spin the wheel and a mechanical device in the telephone would cause a sequence of electrical pulses to be sent to the network corresponding to the digit dialed, for example, four pulses would be sent for the number four. Rather than speaking to a human operator, an electric device would count the pulses and begin to route a call once an appropriate and valid sequence of digits was dialed by the caller. This advancement improved reliability of call routing and reduced the time required to initiate a call. But, even so, there was a dedicated, point-to-point electrical connection between the caller and the callee. As multiple companies entered the market of telephone service and the number of customers increased, an issue emerged where a caller would be a customer of one telephone company and the callee would be a customer of another. The solution that emerged to this problem was to introduce trunk lines connecting one company to another.

17. Eventually, as the number of companies continued to increase and telephone services spread over much larger geographic areas, the notion of a Public Switched Telephone Network ("PSTN") emerged. The term derives from the notion, at least in part, that the dedicated wires used to connect the caller and callee were "circuit-switched" to connect the two parties. The PSTN developed gradually into the middle of the 20th century, still built around the notion of rotary dialing and POTS connections to the individual telephones. These calls involved analog communications over circuit-switched electrical connections. A circuit-switched network involves assigning dedicated resources, such as switch settings and specific wires, to establish a link from

the caller to the callee. While the call is ongoing, these resources cannot be used for any other communications.

18. The next important advancement for consumer telephone service, introduced broadly during the second half of the 20th century, was the introduction of push-button telephones. With such telephones the rotary dial was replaced by a matrix of buttons, each labeled with a digit from zero through nine along with the additions of '*' and '#'. The underlying signaling technology was called dual-tone multiple-frequency ("DTMF") and involves two different audible tones being sent simultaneously from the telephone into the telephone network. A receiver within the network decoded these tones and formed them into a sequence of digits indicating the number of the callee.

19. Around this same time a scheme for international telephone addressing was introduced, with a numeric protocol for identifying one country from another and providing country-specific routing within the destination country. The E.164 standard now documents how a caller anywhere in the world, for example, in Ann Arbor, Michigan, can identify a telephone number at any other location, such as Avignon, France. While many of these advances, such as DTMF dialing and automated international routing, may have been originally introduced via *ad hoc* methods, eventually they required multiple parties (companies and governments) to agree on protocols to enable wide-spread reliable use and inter-operability among different telephone communications networks. Even with all these advances, the systems still relied on circuit-switched technology that dedicated resources between the caller and the callee for the duration of a call. The move to take human operators out of the loop, with the introduction of rotary dialing, combined with the fast increase in demand for telephone services throughout the 20th century, resulted in the development of automated telephone switches. These devices comprised a set of

input ports, each dedicated to, and associated with a specific caller, and output ports, each capable of being associated with a callee. A small local telephone system may have had a single switch while a larger service would use a large number of switches that were connected to each other. A switch from a local service provider would be connected to a trunk line which then connected to an input switch of another service provider. These switches originally supported analog voice calls initiated via rotary dialing and dedicating input and output ports as well as physical wires for each circuit-switched call.

20. Eventually analog voice services were replaced within the network with digital voice. Digital voice is communicated using a sequence of chunks (or packets) of data. This advancement allowed physical resources to be shared among multiple calls over short bursts of time. For example, a physical wire can move a packet for one call at a specific instance in time and then move a packet for a totally different call subsequently, only to later return to transfer a new packet for the original call. This advance is called packet-switched communications and provided an important increase in network reliability and efficiency while driving down the cost. However, in most situations throughout the 20th century (and often still today), the connection to the end user's physical telephone is analog. While network switches operate via digital circuitry, and often comprise programmable processors executing software, they tend to be dedicated special-purpose devices. The conversion between analog and digital encoding is typically done at the point where the PSTN network switch connects to the POTS handset, for example, at a device called a Class-5 telephone switch, which connects the customer POTS handset to the PSTN network of a service provider's central office.

21. The Internet became important to consumers, via broad deployment, during the late 1980's and early 1990's. Eventually available bandwidth and reliability increased to the point

where pioneers began to experiment with techniques to carry voice communications over the Internet. These early efforts began to focus on techniques called Voice Over Internet Protocol (VOIP) and session initiation protocol (SIP). VOIP provided a consistent set of protocols and mechanisms for moving digital voice packets between two callers using the Internet rather than existing PSTN networks. SIP provided a mechanism for establishing and terminating communication sessions such as calls between users of a VOIP service. For example, a callee could register with a VOIP service so that an identifier (such as their name, email address or a nickname) could be associated with the computer to which they are logged in. Eventually VOIP services increased to provide interoperability with the existing PSTN services. For example, the company Skype began to allow a user to call a PSTN number using a feature marketed as “Skype out”. However, the user was required to explicitly classify the call as a PSTN call by specifying a real physical telephone number. In this case the VOIP system had to include a gateway to bridge from the VOIP network to the PSTN network in order to route to the physical telephone. Calls that used a proprietary non-PSTN user identifier such as an email or nickname remained within the VOIP network and were not routed to the PSTN network to a POTS telephone.

22. The advent of digital cellular networks in the 1990’s allowed customers to physically move their mobile phones from one location to another and enabled convenient mobile calling. However, despite the increasing popularity of the Internet and the development of Internet-based VOIP services such as Skype, mobile phone users were forced to use conventional calling processes to place calls over the then-existing mobile phone and PSTN communication infrastructure. Also, mobile phone users often had to pay roaming charges for calls if they were not located in their home area or incurred significant costs to place long-distance calls if the called party was not local. One technique developed for avoiding the long distance charges charged by

mobile telephone service providers was to use a calling card to place a call to a local telephone number or to a less-expensive phone number (such as a toll-free number), but this technique was cumbersome and complex as it required the user to dial a special set of numbers or codes. However, the Patents-in-Suit disclose and claim a distinct manner of mobile call routing.

23. Digifonica, a wholly owned subsidiary of patent owner VoIP-Pal, starting in 2004 eventually came to employ over a dozen top professionals (e.g., software developers, system administrators, QA/test analysts) including three Ph.D.'s with engineering backgrounds, to develop innovative software solutions for communications. Digifonica spent over $15,000,000 researching, developing, and testing a communication solution capable of seamlessly integrating a private voice-over-IP ("VoIP") communication network with an external network (i.e., the "public switched telephone network" or "PSTN"), by bridging the disparate protocols, destination identifiers and addressing schemes used in the two networks. Furthermore, Digifonica's system optimized the choice of communication infrastructure to be used for any given call based on the location of the caller and/or callee. Digifonica's system chose the optimal infrastructure to route both calls placed over cellular and PSTN networks or placed via internet protocol networks. By the mid-2000's, Digifonica had successfully tested intra- and inter-network communications (i.e., communications within the private Digifonica system and between the Digifonica system and the PSTN) by implementing high-capacity communication nodes across three geographic regions, including actual working communication nodes in Vancouver (Canada) and London (UK). Digifonica's R&D efforts led to a number of patent grants, including the Patents-in-Suit.

24. The Patents-in-Suit describe novel systems, apparatuses and methods for providing an access code to roaming mobile communication devices such as smartphones, to enable access

to suitable communication routing infrastructure, wherein the selection of the communication channel for a call can be optimized based on the calling device's current location.

OVERVIEW OF THE ACCUSED INSTRUMENTALITIES

25. Each of the instrumentalities described in this Complaint made, used, sold, offered for sale, and/or imported by Apple comprises systems, devices and computer-executable program code relating to and supporting communications using devices, computers, servers, systems and methods used by, operated by and performed by Apple.

26. Apple manufacturers, supports, and operates a communications platform (the "Apple Calling System") that includes an Apple server infrastructure and Apple desktop computers, laptops, tablets, smartphones and mobile devices, and software applications running on such devices. The Apple server infrastructure relays data packets between users' registered devices.

27. In the Apple Calling System, users of the desktop computers, laptops, tablets, smartphones, and mobile devices can send messages including text, images, video, and audio using the software applications running on such devices, to other users which may be another Apple subscriber or a non-subscriber. Apple iMessage is a messaging service for iOS and iPadOS devices, Apple Watch, and Mac computers. iMessage supports text and attachments such as photos, contacts, locations, links, and attachments directly on to a message. Messages appear on all of a user's registered devices so that a conversation can be continued from any of the user's devices. iMessage makes extensive use of the Apple Push Notification service (APNs). When a user turns on iMessage on a device, the device generates encryption and signing pairs of keys for use with the APNs. The private keys are saved in the device's keychain and only available after

first unlock. The public keys are sent to the Apple Identity Service (IDS), where they are associated with the user's phone number or email address, along with the device's APNs address.

28. Users start a new iMessage conversation by entering an address or name. If they enter a phone number or email address, the device contacts the Apple Identity Service (IDS) to retrieve the public keys and APNs addresses for all of the devices associated with the addressee. If the user enters a name, the device first uses the user's Contacts app to gather the phone numbers and email addresses associated with that name and then gets the public keys and APNs addresses from IDS.

29. In the Apple Calling System, users of the desktop computers, laptops, tablets, smartphones, and mobile devices can also make voice and video calls using the software applications running on such devices. Apple FaceTime is Apple's video and audio calling service. Like iMessage, FaceTime also makes extensive use of the Apple Push Notification service (APNs). FaceTime uses the APNs to establish an initial connection to an Apple user's registered devices. The initial FaceTime connection is made through the Apple server infrastructure, which can also be used to carry a FaceTime call if necessary. For example, a user's Apple mobile telephone uses APNs notifications and Session Traversal Utilities for NAT (STUN) messages over a relayed connection through the Apple server infrastructure in order to verify identity certificates and establish a shared secret for each session associated with the FaceTime call. The shared secret is used to derive session keys for media channels streamed using the Secure Real-time Transport Protocol (SRTP). After initial connection and security setup, FaceTime can relay the FaceTime call through the Apple server infrastructure or use STUN and Internet Connectivity Establishment (ICE) to establish a peer-to-peer connection between devices, if possible.

30. The Apple Calling System enables mobile telephone or device roaming. The Apple Calling System produces an access code identifying a communication channel useable by the mobile telephone or device to initiate a call to a callee using the channel. In the Apple Calling System, the access code is based on a location identifier and/or based on a location pre-associated with the mobile telephone or device.

31. The Apple Calling System is referred to in this Complaint as the Accused Instrumentalities.

COUNT 1
INFRINGEMENT OF U. S. PATENT NO. 8,630,234

32. Paragraphs 1 through 31 are incorporated by reference as if fully stated in this Count.

33. Apple, either alone or in conjunction with others, has infringed and continues to infringe, both directly and indirectly, one or more claims of the ’234 patent, including at least exemplary claim 20, under 35 U.S.C. § 271, either literally and/or under the doctrine of equivalents, by making, using, offering to sell, selling, and/or importing into the United States at least certain methods, apparatuses, products and services used for communication, including, without limitation, the Accused Instrumentalities.

34. For example, Apple infringes exemplary claim 20 of the ’234 patent by making, using, offering to sell, selling, and/or importing into the United States at least the Accused Instrumentalities as detailed in Exhibit 3 to this Complaint.

35. On information and belief, Apple has had knowledge of the ’234 patent since at least January 14, 2014 when the ’234 patent issued. After acquiring that knowledge, Apple infringed the ’234 patent and in doing so, it knew, or should have known, that its conduct amounted to infringement of the ’234 patent. Since the issuance of the ’234 patent, the parties have engaged

in numerous communications regarding VoIP-Pal's patent portfolio, including the '234 patent. VoIP-Pal explained the value of its patent portfolio to Apple and offered to license its patents in good faith. Apple reviewed VoIP-Pal's patent portfolio and advised VoIP-Pal that it was not interested in taking a license. Apple, however, failed to provide VoIP-Pal any basis as to why it does not need license despite being subjectively aware of the risk that its conduct constituted infringement.

36. Alternatively, Apple has had knowledge of the '234 patent since at least November 13, 2015 based on a letter that VoIP-Pal sent Apple notifying Apple of the '234 patent. After acquiring that knowledge, Apple infringed the '234 patent and in doing so, it knew, or should have known, that its conduct amounted to infringement of the '234 patent. Since that time, Apple and VoIP-Pal have engaged in numerous communications regarding VoIP-Pal's patent portfolio, including the '234 patent. The parties have been engaged in multiple litigations and/or post-issuance proceedings before the Patent Trial and Appeal Board regarding VoIP-Pal's patents since February 9, 2016. The parties have also engaged in multiple settlement discussions concerning VoIP-Pal's patent portfolio, including the '234 patent. Through these actions, Apple has acquired intimate knowledge of VoIP-Pal's patent portfolio and its infringement of that portfolio.

37. Alternatively, Apple has had knowledge of the '234 patent and its infringement of the '234 patent based at least on the filing of this Complaint.

38. Despite its knowledge and notice of the '234 patent as of at least the filing of this Complaint, Apple has continued to make, use, sell, offer to sell, and/or import the Accused Instrumentalities in the United States in a manner that infringes the '234 patent. Apple knew or should have known that its actions constituted infringement of the '234 patent. Upon information and belief, Apple has failed to take adequate steps to avoid infringing the '234 patent, despite

having been on notice of and lacking permission to practice the ’234 patent. Upon information and belief, Apple will continue to reap significant revenues and savings based on its infringement of the ’234 patent. Accordingly, Apple’s infringement has been and continues to be willful.

39. Apple has induced infringement, and continues to induce infringement, of one or more claims of the ’234 patent under 35 U.S.C. § 271(b). Apple actively, knowingly, and intentionally induced, and continues to actively, knowingly and intentionally induce infringement of the ’234 patent by: making, using, offering for sale, selling, importing, or otherwise making available and/or supplying the Accused Instrumentalities; with the knowledge and specific intent that third parties will use the Accused Instrumentalities supplied by Apple to infringe the ’234 patent; and with the knowledge and specific intent to encourage and facilitate third party infringement through the dissemination of the Accused Instrumentalities and/or the creation and dissemination of promotional and marketing materials, supporting materials, instructions, product manuals, and/or technical information related to the Accused Instrumentalities.

40. Apple specifically intended and was aware that the ordinary and customary use of the Accused Instrumentalities would infringe the ’234 patent. For example, Apple makes, offers for sale, sells, uses, imports, makes available, and/or provides the Accused Instrumentalities, which, when used in their ordinary and customary manner as intended by Apple, infringe one or more claims of the ’234 patent, including at least exemplary claim 20. Upon information and belief, Apple further provides product manuals and other technical information that cause Apple customers and other third parties to use and to operate the Accused Instrumentalities for their ordinary and customary use. Apple customers and other third parties have directly infringed the ’234 patent, including at least exemplary claim 20, through the normal and customary use of the Accused Instrumentalities. By providing network infrastructure, network services, and device

configurations for enabling the Accused Instrumentalities, and instruction and training to customers and other third parties on how to use the Accused Instrumentalities in an infringing manner, Apple specifically intended to induce infringement of the ’234 patent, including at least exemplary claim 20. Apple accordingly has induced and continues to induce Apple customers and other users of the Accused Instrumentalities in their ordinary and customary way to infringe the ’234 patent, knowing, or at least being willful blind to the fact, that such use constitutes infringement of the ’234 patent.

41. Apple has contributed and continues to contribute to the infringement by others, including its customers, of the ’234 patent under 35 U.S.C. § 271(c) by, among other things, making, using, selling, offering for sale within the United States and/or importing into the United States the Accused Instrumentalities for use in practicing the patented inventions of the ’234 patent, knowing that the Accused Instrumentalities and components are especially made or adapted for use in infringement of the ’234 patent, embody a material part of the inventions claimed in the ’234 patent, and are not staple articles of commerce suitable for substantial non-infringing use. Apple’s customers directly infringe the ’234 patent by using the Accused Instrumentalities.

42. VoIP-Pal has been and continues to be damaged by Apple’s infringement of the ’234 patent.

43. Apple’s conduct in infringing the ’234 patent renders this case exceptional within the meaning of 35 U.S.C. § 285.

COUNT 2
INFRINGEMENT OF U. S. PATENT NO. 10,880,721

44. Paragraphs 1 through 43 are incorporated by reference as if fully stated in this Count.

45. Apple, either alone or in conjunction with others, has infringed and continues to infringe, both directly and indirectly, one or more claims of the ’721 patent, including at least exemplary claim 38, under 35 U.S.C. § 271, either literally and/or under the doctrine of equivalents, by making, using, offering to sell, selling, and/or importing into the United States at least certain methods, apparatuses, products and services used for communication, including, without limitation, the Accused Instrumentalities.

46. For example, Apple infringes exemplary claim 38 of the ’721 patent by making, using, offering to sell, selling, and/or importing into the United States at least the Accused Instrumentalities as detailed in Exhibit 4 to this Complaint.

47. On information and belief, Apple has had knowledge of the application that led to the ’721 patent since at least November 13, 2015 based on a letter that VoIP-Pal sent Apple notifying Apple of the application that led to the ’721 patent. After acquiring that knowledge, Apple infringed the ’721 patent and in doing so, it knew, or should have known, that its conduct amounted to infringement of the ’721 patent. Since that time, the parties have engaged in numerous communications regarding VoIP-Pal’s patent portfolio, including the application that led to the ’721 patent. VoIP-Pal explained the value of its patent portfolio to Apple and offered to license its patents in good faith. Apple reviewed VoIP-Pal’s patent portfolio and advised VoIP-Pal that it was not interested in taking a license. Apple, however, failed to provide VoIP-Pal any basis as to why it does not need license despite being subjectively aware of the risk that its conduct constituted infringement.

48. On information and belief, Apple has had knowledge of the ’721 patent since at least December 29, 2020 when the ’721 patent issued. After acquiring that knowledge, Apple infringed the ’721 patent and in doing so, it knew, or should have known, that its conduct amounted

to infringement of the ’721 patent. Since the issuance of the ’721 patent, Apple and VoIP-Pal have engaged in numerous communications regarding VoIP-Pal’s patent portfolio, including the ’721 patent. The parties have been engaged in multiple litigations and/or post-issuance proceedings before the Patent Trial and Appeal Board regarding VoIP-Pal’s patents since February 9, 2016. The parties have also engaged in multiple settlement discussions concerning VoIP-Pal’s patent portfolio, including the ’721 patent. Through these actions, Apple has acquired intimate knowledge of VoIP-Pal’s patent portfolio and its infringement of that portfolio.

49. Alternatively, Apple has had knowledge of Apple has had knowledge of its infringement of the ’721 patent based at least on the filing of this Complaint.

50. Despite its knowledge and notice of the ’721 patent as of at least the filing of this Complaint, Apple has continued to make, use, sell, offer to sell, and/or import the Accused Instrumentalities in the United States in a manner that infringes the ’721 patent. Apple knew or should have known that its actions constituted infringement of the ’721 patent. Upon information and belief, Apple has failed to take adequate steps to avoid infringing the ’721 patent, despite having been on notice of and lacking permission to practice the ’721 patent. Upon information and belief, Apple will continue to reap significant revenues and savings based on its infringement of the ’721 patent. Accordingly, Apple’s infringement has been and continues to be willful.

51. Apple has induced infringement, and continues to induce infringement, of one or more claims of the ’721 patent under 35 U.S.C. § 271(b). Apple actively, knowingly, and intentionally induced, and continues to actively, knowingly and intentionally induce infringement of the ’721 patent by: making, offering for sale, selling, importing, and/or otherwise making available and/or supplying the Accused Instrumentalities; with the knowledge and specific intent that third parties will use the Accused Instrumentalities supplied by Apple to infringe the ’721

patent; and with the knowledge and specific intent to encourage and facilitate third party infringement through the dissemination of the Accused Instrumentalities and/or the creation and dissemination of promotional and marketing materials, supporting materials, instructions, product manuals, and/or technical information related to the Accused Instrumentalities.

52. Apple specifically intended and was aware that the ordinary and customary use of the Accused Instrumentalities would infringe the ’721 patent. For example, Apple makes, sells, offers for sale, uses, imports, makes available, and/or provides the Accused Instrumentalities, which, when used in their ordinary and customary manner as intended by Apple, infringe one or more claims of the ’721 patent, including at least exemplary claim 38. Upon information and belief, Apple further provides product manuals and other technical information that cause Apple customers and other third parties to use and to operate the Accused Instrumentalities for their ordinary and customary use. Apple customers and other third parties have directly infringed the ’721 patent, including at least exemplary claim 38, through the normal and customary use of the Accused Instrumentalities. By providing network infrastructure, network services, and device configurations for enabling the Accused Instrumentalities, and instruction and training to customers and other third parties on how to use the Accused Instrumentalities in an infringing manner, Apple specifically intended to induce infringement of the ’721 patent, including at least exemplary claim 38. Apple accordingly has induced and continues to induce Apple customers and other users of the Accused Instrumentalities in their ordinary and customary way to infringe the ’721 patent, knowing, or at least being willful blind to the fact, that such use constitutes infringement of the ’721 patent.

53. Apple has contributed and continues to contribute to the infringement by others, including its customers, of the ’721 patent under 35 U.S.C. § 271(c) by, among other things,

making, using, selling, offering for sale within the United States and/or importing into the United States the Accused Instrumentalities for use in practicing the patented inventions of the ’721 patent, knowing that the Accused Instrumentalities and components are especially made or adapted for use in infringement of the ’721 patent, embody a material part of the inventions claimed in the ’721 patent, and are not staple articles of commerce suitable for substantial non-infringing use. Apple’s customers directly infringe the ’721 patent by using the Accused Instrumentalities.

54. VoIP-Pal has been and continues to be damaged by Apple’s infringement of the ’721 patent.

55. Apple’s conduct in infringing the ’721 patent renders this case exceptional within the meaning of 35 U.S.C. § 285.

DEMAND FOR JURY TRIAL

Under Rule 38 of the Federal Rules of Civil Procedure and Local Rule 38(a), VoIP-Pal demands a trial by jury on all issues so triable.

PRAYER FOR RELIEF

WHEREFORE, VoIP-Pal prays for the following relief:

a) A judgment and order that Apple has directly infringed (either literally or under the doctrine of equivalents) and/or induced the infringement of the patents-in-suit;

b) A judgment and order permanently enjoining Apple, its respective officers, directors, agents, servants, employees, attorneys, licensees, successors, and assigns and any other person(s) in active concert or participation with Apple from directly infringing the patents-in-suit for the full term of the patents-in-suit;

c) A judgement that the infringement of the patents-in-suit by Apple has been willful;

d) A judgment and order requiring Apple to pay VoIP-Pal an award of damages under 35 U.S.C. § 284, adequate to compensate VoIP-Pal for Apple's past infringement, but in no event less than a reasonable royalty, including enhanced damages as provided by 35 U.S.C. § 284, and supplemental damages for any continuing post-verdict infringement up until entry of the final judgment with an accounting, as needed, as well as damages for any continuing or future infringement up to and including the date that Apple is finally and permanently enjoined from further infringement;

e) A judgment and order requiring that in the event a permanent injunction preventing future acts of infringement is not granted, that VoIP-Pal be awarded a compulsory ongoing licensing fee;

f) A judgment and order that this action be found an exceptional case pursuant to 35 U.S.C. § 285, entitling VoIP-Pal to an award of all costs of this action, including attorneys' fees and interest;

g) A judgment and order requiring Apple to pay VoIP-Pal the costs of this action;

h) A judgment and order requiring Apple to pay VoIP-Pal pre-judgment and post-judgment interest on the damages award; and

i) Such other and further relief as the Court deems just and equitable.

Dated: June 25, 2021

Respectfully submitted,

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EXHIBIT 7

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UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

SAN JOSE DIVISION

TWITTER, INC., a Delaware corporation, Plaintiff, v. VOIP-PAL.COM, INC., a Nevada corporation, Defendant.	No. 20-cv-2397-LHK **FIRST AMENDED COMPLAINT FOR DECLARATORY JUDGMENT**

I. INTRODUCTION

1. This First Amended Complaint for declaratory judgment of noninfringement ("Declaratory Judgment Complaint") arises from a real and immediate controversy between plaintiff Twitter, Inc. ("Twitter"), and defendant VoIP-Pal.com Inc. ("VoIP-Pal"), as to whether Twitter infringes any claims of U.S. Patent 10,218,606 ("the '606 patent"; Exhibit 1), entitled, "Producing Routing Messages For Voice Over IP Communications," and whether the '606 patent is valid.

2. The '606 patent is a member of a family that includes six other patents that VoIP-Pal has asserted in prior lawsuits in this Court against Twitter, Apple, AT&T, Verizon Wireless, and Amazon ("first and second wave actions"). The '606 patent shares a common specification with the six previously-asserted patents. All six of the previously-asserted patents were found to be invalid under 35 U.S.C. § 101 for claiming ineligible subject matter, including U.S. Patent 9,179,005 ("the '005 patent"; Exhibit 2), which was asserted against Twitter.

3. During April 2-7, 2020, VoIP-Pal filed new lawsuits in the Western District of Texas asserting the '606 patent against Facebook, WhatsApp, Google, Amazon, and Apple. The claims of the '606 patent asserted in those new lawsuits are very similar to the claims of one or more of the patents that VoIP-Pal previously asserted in the first and second wave actions and were found to be invalid by this Court.

4. On April 8, 2020, VoIP-Pal issued a press release stating that VoIP-Pal is considering taking further action and is not finished taking action in the wake of a recent decision by the Court of Appeals for the Federal Circuit in favor of Twitter, Apple, AT&T, and Verizon that affirmed this Court's judgment that two of VoIP-Pal's previously-asserted patents are invalid under 35 U.S.C. § 101.

5. On April 24, 2020, VoIP-Pal filed new lawsuits in the Western District of Texas asserting the '606 patent against AT&T and Verizon Wireless. (VoIP-Pal's lawsuits against Facebook, WhatsApp, Google, Amazon, Apple, AT&T, and Verizon Wireless are referred to herein as "the Texas lawsuits.")

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6. The claims of the ’606 patent asserted in those new lawsuits are very similar to the claims of one or more of the patents that VoIP-Pal previously asserted in the first and second wave actions and were found to be invalid by this Court, including the ’005 patent, which was asserted against Twitter (Exhibits 2 and 10). The Federal Circuit has affirmed this Court’s judgment of invalidity for the two patents asserted in the first wave lawsuits, including the ‘005 patent, which was asserted against Twitter. VoIP-Pal’s appeal of this Court’s judgment of invalidity for the four patents asserted in the second wave lawsuits is pending.

7. Twitter believes that it does not infringe and has not infringed any claims of the ’606 patent, and that the claims of the ’606 patent are invalid.

8. VoIP-Pal’s actions have created a real and immediate controversy between VoIP-Pal and Twitter as to whether Twitter’s products and/or services infringe any claims of the ’606 patent, and whether the ’606 patent is valid. The facts and allegations recited herein show that there is a real, immediate, and justiciable controversy concerning these issues.

II. PARTIES

9. Plaintiff Twitter is a company incorporated under the laws of Delaware, with headquarters at 1355 Market Street, Suite 900, San Francisco, California.

10. Twitter operates a global Internet platform for public self-expression and conversation in real time. People with a Twitter account can post “Tweets”— messages of 280 characters or less, sometimes with pictures or video, and those messages can be read by other people using the Twitter platform. They may, in turn, “Retweet” those messages to their own followers. Users can include “hashtagged” keywords (indicated by a “#”) in their Tweets to facilitate searching for messages on the same topic. People who use Twitter can also send direct messages to other users that can contain images and video. Each day, people post hundreds of millions of Tweets, engaging in public conversation on virtually every conceivable topic.

11. Based on information and belief, including VoIP-Pal’s complaints in the Texas lawsuits, defendant VoIP-Pal is a company incorporated under the laws of Nevada, with its principal place of business at 10900 NE 4th Street, Suite 2300, Bellevue, Washington 98004.

12. Based on information and belief, including VoIP-Pal's complaints in the Texas lawsuits, VoIP-Pal is the owner of the '606 patent.

III. JURISDICTION AND VENUE

13. This Declaratory Judgment Complaint includes a count for declaratory relief under the patent laws of the United States, 35 U.S.C. §§ 1, *et seq.*

14. Twitter seeks declaratory relief under 28 U.S.C. §§ 2201 and 2202.

15. This Court has subject matter jurisdiction over the claims alleged in this action under 28 U.S.C. §§ 1331, 1332, 1338, 2201, and 2202 because this Court has exclusive jurisdiction over declaratory judgment claims arising under the patent laws of the United States pursuant to 28 U.S.C. §§ 1331, 1338, 2201, and 2202. Jurisdiction is also proper under 28 U.S.C. § 1332 because Twitter and VoIP-Pal are citizens of different states, and the value of the controversy exceeds $75,000.

16. This Court can provide the declaratory relief sought in this Declaratory Judgment Complaint because an actual case and controversy exists between the parties within the scope of this Court's jurisdiction pursuant to 28 U.S.C. § 2201. An actual case and controversy exists at least because VoIP-Pal previously filed lawsuits against Twitter and other defendants alleging infringement of the '005 patent and other related patents; the '606 patent is a member of a family that includes six other patents that VoIP-Pal previously asserted in the first and second wave actions and shares a common specification with those six patents; the claims of the '005 patent that were previously asserted in litigation against Twitter are very similar to claims of the '606 patent that VoIP-Pal is now asserting in the Texas lawsuits—including against Amazon, Apple, AT&T, and Verizon Wireless, which were previously sued by VoIP-Pal. All six patents previously asserted by VoIP-Pal were held invalid under 35 U.S.C. § 101 by this Court, and—based on the substantial similarities between those invalid claims and the claims of the '606 patent—the '606 patent is invalid for at least the same reasons. Furthermore, VoIP-Pal's public statements to the effect that it is considering taking further action and is not finished taking action in the wake of recent decision by the Federal Circuit affirming the judgment that the claims of the

’005 patent that VoIP-Pal previously asserted against Twitter are invalid; and Twitter does not infringe and has not infringed any claims of the ’606 patent.

17. On June 4, 2020, counsel for Twitter asked counsel for VoIP-Pal whether VoIP-Pal would be willing to grant Twitter a covenant not to sue based on the ’606 patent. On June 11, 2020, counsel for VoIP-Pal declined to discuss a covenant not to sue, responding as follows: “VoIP-Pal's position is that Twitter's declaratory judgment complaint lacked subject matter jurisdiction at the time it was filed and therefore should be dismissed. Accordingly, VoIP-Pal does not believe that a covenant not to sue needs to be discussed under the present circumstances. This response should not be construed as a refusal to grant a covenant not to sue.” To date, VoIP-Pal has declined to give Twitter a covenant not to sue based on the ’606 patent.

18. This Court has personal jurisdiction over VoIP-Pal because VoIP-Pal has engaged in actions in this District that form the basis of Twitter’s claims against VoIP-Pal—namely, prosecuting a prior patent infringement lawsuit involving the ’005 patent against Twitter in this District, voluntarily transferring to this District the first wave actions against Apple, AT&T, and Verizon, and filing the second wave actions against Apple and Amazon in this District. VoIP-Pal’s actions have created a real, live, immediate, and justiciable case or controversy between VoIP-Pal and Twitter.

19. As a result of VoIP-Pal’s conduct described above, VoIP-Pal has consciously and purposely directed allegations of infringement of the ’606 patent at Twitter, a company that resides and operates in this District.

20. In doing so, VoIP-Pal has established sufficient minimum contacts with the Northern District of California such that VoIP-Pal is subject to specific personal jurisdiction in the Northern District of California for this action. Further, the exercise of personal jurisdiction based on those repeated and highly-pertinent contacts does not offend traditional notions of fairness and substantial justice.

21. Venue is proper in this District under 28 U.S.C. §§ 1391 and 1400, including because, under Ninth and Federal Circuit law, venue in declaratory judgment actions for noninfringement of patents is determined under the general venue statute, 28 U.S.C. § 1391.

22. Under 28 U.S.C. § 1391(b)(1), venue is proper in any judicial district where a defendant resides. An entity with the capacity to sue and be sued, such as VoIP-Pal, is deemed to reside, if a defendant, in any judicial district in which such defendant is subject to the court's personal jurisdiction with respect to the civil action in question under 28 U.S.C. § 1391(c).

23. As discussed above, VoIP-Pal is subject to personal jurisdiction with respect to this action in the Northern District of California, and thus, for the purposes of this action, VoIP-Pal resides in the Northern District of California and venue is proper under 28 U.S.C. § 1391.

IV. Factual Background

A. VoIP-Pal's Prior Lawsuits (First And Second Wave Actions)

24. In 2016, VoIP-Pal filed lawsuits in the District of Nevada against Twitter, Apple, AT&T, and Verizon Wireless, alleging infringement of two patents, U.S. Patents 8,542,815 and 9,179,005 (the "'815 patent" and "'005 patent," respectively). Between August and November of 2018, all four of those actions were transferred to this Court and consolidated for pretrial purposes: Twitter (Case No. 5:18-cv-04523-LHK), Verizon Wireless (Case No. 18-cv-06054-LHK), AT&T (Case No. 3:18-cv-06177-LHK), and Apple (Case No. 3:18-cv-06217-LHK) (collectively, the "first wave actions").

25. Twitter and the other defendants in the first wave actions filed a motion to dismiss under Fed. R. Civ. P. 12(b)(6) that the asserted claims of the '815 and '005 patents are invalid under 35 U.S.C. § 101. On March 25, 2019, this Court granted the motion to dismiss and found all asserted claims of the '815 and '005 patents to be invalid (Exhibit 10). VoIP-Pal appealed. On March 16, 2020, the Federal Circuit affirmed this Court's judgment of invalidity.

26. In October and November 2018, VoIP-Pal filed two additional lawsuits against Apple (Case No. 5:18-cv-06216-LHK) and Amazon (Case No. 5:18-cv-07020-LHK) (collectively, the "second wave actions"). In those lawsuits, VoIP-Pal alleged infringement of four patents, U.S. Patents 9,537,762; 9,813,330; 9,826,002; and 9,948,549. Those four patents are in the same family as and share a common specification with the two patents that were asserted in the first wave actions.

27. In the second wave actions, Apple and Amazon filed a motion to dismiss under Fed. R. Civ. P. 12(b)(6) that the asserted claims of the four asserted patents are invalid under 35 U.S.C. § 101. On November 19, 2019, this Court granted the motion to dismiss and found all asserted claims of the patents in the second wave actions to be invalid. VoIP-Pal has filed an appeal, which is pending.

B. VoIP-Pal's New Texas Lawsuits And Press Release

28. During April 2-7, 2020, VoIP-Pal filed four new lawsuits in the Western District of Texas, Waco Division, against defendants Facebook and WhatsApp (Civil Action No. 20-cv-267) and Google (Civil Action No. 20-cv-269) and previously-sued defendants Amazon (Civil Action No. 20-cv-272), and Apple (Civil Action No. 20-cv-275). On April 24, 2020, VoIP-Pal filed new lawsuits in the Western District of Texas asserting the '606 patent against AT&T (Civil Action No. 20-cv-325) and Verizon Wireless (Civil Action No. 20-cv-327). (Voip-Pal's lawsuits against Facebook, WhatsApp, Google, Amazon, Apple, AT&T, and Verizon Wireless are referred to herein as "the Texas lawsuits"; complaints attached as Exhibits 3-8.)

29. In the Texas lawsuits, VoIP-Pal alleges infringement of U.S. Patent 10,218,606 (the "'606 patent"; Exhibit 1), which is entitled, "Producing Routing Messages For Voice Over IP Communications," and, on its face, issued on February 26, 2019.

30. The '606 patent is in the same family as and shares a common specification with the six patents that VoIP-Pal asserted in the first and second wave actions and were found to be invalid by this Court.

31. The complaints in the Texas lawsuits identify claims 1, 8, 15, and 19 of the '606 patent as examples of claims that are infringed by one or more defendants in the Texas lawsuits (Exhibits 3-8). These exemplary claims of the '606 patent are very similar to claims of the '005 patent that VoIP-Pal asserted against Twitter, Apple, AT&T, and Verizon in the first wave actions (for example, claim 74 of the '005 patent) and were held to be invalid.

32. VoIP-Pal's infringement allegations in the Texas lawsuits are similar to VoIP-Pal's infringement allegations in the first wave and second wave actions (including against many of the same prior defendants), and are directed to accused instrumentalities that are similar to

Twitter's products and services (for example, communications involving text, images, and videos).

33. Twitter believes that it does not infringe and has not infringed any claims of the '606 patent and that the claims of the '606 patent are invalid.

34. On April 8, 2020, VoIP-Pal issued a press release that announced the filing of the Texas lawsuits (Exhibit 9 and https://www.voip-pal.com/voip-pal-new-patent-lawsuits-april-). The press release also mentioned the Federal Circuit's affirmance of this Court's judgment of invalidity in the first wave lawsuits against Twitter, Apple, AT&T, and Verizon. The press release states that, in the wake of the Federal Circuit decision, VoIP-Pal is considering taking further action and "planning their next moves." VoIP-Pal's CEO is quoted as saying, "Our legal team is assessing our next moves regarding this Alice decision and we expect to announce our intentions soon. ***I can tell you; we are not finished***," and "We remain firm in our resolve to achieve monetization for our shareholders and will continue to see this fight through until a successful resolution is reached. Patience is a virtue." (Exhibit 9 (emphasis added).)

FIRST CLAIM FOR RELIEF
(DECLARATORY JUDGMENT OF NON-INFRINGEMENT OF THE '606 PATENT BY TWITTER)

35. The facts and allegations contained in the preceding paragraphs are incorporated by reference herein.

36. In view of the facts and allegations set forth above, there is an actual, justiciable, substantial, and immediate controversy between Twitter, on the one hand, and VoIP-Pal, on the other, regarding whether Twitter's products and services infringe any claims of the '606 patent.

37. For example, an actual case and controversy exists at least because VoIP-Pal previously filed lawsuits against Twitter and other defendants alleging infringement of the '005 patent and other related patents in the first and second wave actions; the '606 patent is a member of a family that includes six other patents that VoIP-Pal previously asserted in the first and second wave actions and shares a common specification with those six patents; the claims of the '005 patent that were previously asserted in litigation against Twitter are very similar to claims of the '606 patent that VoIP-Pal is now asserting in the new Texas lawsuits—including against Amazon,

Apple, AT&T, and Verizon Wireless, which were previously sued by VoIP-Pal; VoIP-Pal's public statements to the effect that it is considering taking further action and is not finished taking action in the wake of recent decision by the Federal Circuit affirming the judgment that the claims of the '005 patent that VoIP-Pal previously asserted against Twitter are invalid; Twitter has asked VoIP-Pal for a covenant not to sue for the '606 patent, but VoIP-Pal has declined to give Twitter a covenant not to sue; and Twitter believes that it does not infringe and has not infringed any claims of the '606 patent.

38. Twitter does not infringe and has not infringed any claims of the '606 patent because, for example, no Twitter product or service meets or embodies the limitation of "processing the new second participant identifier, using the at least one processor, to determine whether the second network element is the same as the first network element," "when the second network element is determined to be the same as the first network element, producing a routing message identifying a first network address associated with the first network element," and "when the second network element is determined not to be the same as the first network element, producing a routing message identifying a second network address associated with the second network element."

39. In view of the foregoing, there is an actual, justiciable, substantial, and immediate controversy between Twitter, on the one hand, and VoIP-Pal, on the other, regarding whether Twitter's products and services infringe any claims of the '606 patent.

40. Twitter is entitled to a judgment declaring that no Twitter products or services infringe the '606 patent.

SECOND CLAIM FOR RELIEF
(DECLARATORY JUDGMENT OF INVALIDITY OF THE '606 PATENT BY TWITTER)

41. The facts and allegations contained in the preceding paragraphs are incorporated by reference herein.

42. In view of the facts and allegations set forth above, there is an actual, justiciable, substantial, and immediate controversy between Twitter, on the one hand, and VoIP-Pal, on the other, regarding whether any claim of the '606 patent is valid.

43. The ’606 patent, which on its face issued on February 26, 2019, during the pendency of VoIP-Pal’s lawsuit against Twitter in this Court, is in the same family as and shares a common specification with the ’005 patent that VoIP-Pal asserted in earlier litigation against Twitter. This Court held that the asserted claims of the ’005 patent and five other related patents were all invalid under 35 U.S.C. § 101.

44. Like those already-invalidated claims, the claims of the ’606 patent are invalid under 35 U.S.C. § 101. For example, the claims of the ’606 patent (including claim 15) are directed to the abstract idea of routing a communication based on characteristics of the participants—an idea that this Court held was abstract in analyzing VoIP-Pal’s previously-asserted patents, including representative claim 74 of the ’005 patent that was asserted against Twitter. (*See* Exhibit 10 at 34-39 (finding claim 74 of the ’005 patent to be directed to the abstract idea of “routing a call based on the characteristics of a caller and callee”).) Furthermore, consistent with this Court’s earlier judgments concerning related patents, none of the claims of the ’606 patent recites an inventive concept when their elements are considered either individually or as an ordered combination. (*See* Exhibit 10 at 39-42 (finding that claim 74 of the ’005 patent does not contain an inventive concept).) For example, the claims of the ’606 patent (including claim 15) recite generic computer components (like a “packet switched communication system,” a “processor,” and a “database”) that the specification admits were not invented by VoIP-Pal and that operate in their expected manner.

45. In view of the foregoing, there is an actual, justiciable, substantial, and immediate controversy between Twitter, on the one hand, and VoIP-Pal, on the other, regarding whether any claim of the ’606 patent is valid.

46. Twitter is entitled to judgment declaring that the claims of the ’606 patent are invalid at least under 35 U.S.C. § 101.

PRAYER FOR RELIEF

Twitter respectfully requests that this Court enter judgment against VoIP-Pal as follows:

A. A declaration that the Twitter products and services do not infringe any claims of the ’606 patent;

B. A declaration that the claims of the ’606 patent are invalid;

C. For attorney’s fees and costs;

D. Such other and further relief as this Court or a jury may deem just and proper.

DATED: June 26, 2020

PERKINS COIE LLP

By: */s/ Gene Lee*
Sarah Fowler
Amisha Manek
Gene Lee
Thomas Matthew

Attorneys for Plaintiff Twitter, Inc.

EXHIBIT 8

UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

SAN JOSE DIVISION

TWITTER, INC., Plaintiff, v. VOIP-PAL.COM, INC., Defendant.	Case No. 20-CV-02397-LHK **ORDER DENYING MOTION TO DISMISS** Re: Dkt. No. 31

Plaintiff Twitter, Inc. ("Plaintiff") sues Defendant VoIP-Pal.com, Inc. ("Defendant") for a declaration of non-infringement and invalidity of U.S. Patent No. 10,218,606 ("the '606 patent"). Before the Court is Defendant's motion to dismiss Plaintiff's complaint. Having considered the parties' submissions, the relevant law, and the record in this case, the Court DENIES Defendant's motion to dismiss.

I. BACKGROUND

This case represents the latest chapter in a long dispute between the parties regarding whether Plaintiff infringes Defendant's patents, which relate to a system for routing internet-protocol communications. Below, the Court discusses in turn: (1) the parties; (2) Defendant's first set of lawsuits against Plaintiff, Apple, AT&T, and Verizon, originally filed in the District of

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Nevada in 2016 ("the 2016 cases"); (3) Defendant's second set of lawsuits against Apple and Amazon, originally filed in the District of Nevada in 2018 ("the 2018 cases"); (4) Defendant's most recent lawsuits against Apple, AT&T, Verizon, Amazon, Facebook, and Google, filed in the Western District of Texas in April of 2020 ("the Texas cases"); and (5) the instant case, which was filed by Plaintiff in this Court in April of 2020.

A. The Parties

Plaintiff Twitter is a Delaware corporation with its principal place of business in San Francisco, California. ECF No. 1 ¶ 7. Twitter "operates a global Internet platform for public self-expression and conversation in real time." *Id.* ¶ 8. Twitter uses and sells "messaging services using messaging application software and/or equipment, servers and/or gateways that route messages to computing devices such as smartphones, tablet computers, and personal computers." *VoIP-Pal.Com, Inc. v. Apple Inc.*, 375 F. Supp. 3d 1110, 1117 (N.D. Cal. 2019) (quotation omitted).

Defendant VoIP-Pal is a Nevada corporation with its principal place of business in Bellevue, Washington. ECF No. 1 ¶ 8. Defendant owns a portfolio of patents relating to Internet Protocol based communication. *VoIP-Pal.Com, Inc. v. Apple Inc.*, 411 F. Supp. 3d 926, 930 (N.D. Cal. 2019).

B. The 2016 Cases

On February 9, 2016, Defendant sued Apple in the District of Nevada for infringement of U.S. Patent Nos. 8,542,815 ("the '815 patent"), and 9,179,005 ("the '005 patent"), both of which relate to a system for routing calls between a caller and a callee over Internet Protocol. *VoIP-Pal.Com*, 375 F. Supp. 3d at 1118, 1122. The following day, Defendant sued Verizon and AT&T in the District of Nevada for infringement of the same patents. *Id.* On October 6, 2016, Defendant sued Plaintiff in the District of Nevada for infringement of the same patents. *Id.* at 1121. The District of Nevada stayed the cases pending *inter partes* review. *Id.*

After the stays were lifted, on February 28, 2018, Plaintiff moved to change venue to the Northern District of California. *VoIP-Pal.Com, Inc. v. Twitter, Inc.*, Case No. 16-CV-02338, 2018 WL 3543031, at *1 (D. Nev. July 23, 2018). On July 23, 2018, the District of Nevada granted

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Plaintiff's motion for change of venue. *Id.* On October 1, 2018, the District of Nevada granted Verizon and Defendant's stipulation to transfer the case. *VoIP-Pal.Com*, 375 F. Supp. 3d at 1121. On October 4, 2018, the District of Nevada granted a similar stipulation by AT&T and Defendant. *Id.* The following day, the District of Nevada granted a similar stipulation by Apple and Defendant. *Id.* As a result, all four cases were transferred to this Court, where they were consolidated.

On March 25, 2019, this Court granted Apple, AT&T, Verizon, and Plaintiff's consolidated motion to dismiss all four cases. *Id.* at 1117. In a 45-page order, the Court concluded that the '815 and '005 patents were unpatentable under 35 U.S.C. § 101. *Id.* at 1138, 1144. On March 16, 2020, the Federal Circuit affirmed this Court's decision. *VoIP-Pal.Com, Inc. v. Apple, Inc.*, 798 F. App'x 644, 645 (Fed. Cir. 2020). On May 18, 2020, the Federal Circuit denied Defendant's petition for panel or en banc rehearing. *VoIP-Pal.Com, Inc. v. Twitter*, Case No. 2019-1808, ECF No. 99.

C. The 2018 Cases

On May 24, 2018, Defendant sued Apple in the District of Nevada for infringement of four more patents: U.S. Patent Nos. 9,537,762 ("the '762 patent"); 9,813,330 ("the '330 patent"); 9,826,002 ("the '002 patent"); and 9,948,549 ("the '549 patent"). *VoIP-Pal.Com*, 411 F. Supp. 3d at 934. Like the two patents that were the subject of the 2016 Cases, these four patents relate to a system for routing communications over Internet Protocol. *Id.* at 931. On June 15, 2018, Defendant sued Amazon in the District of Nevada for infringement of the same patents. *Id.* The lawsuits against Apple and Amazon were transferred from the District of Nevada to this Court, where they were consolidated and related to the 2016 cases. *Id.*

On November 1, 2019, this Court granted Apple and Amazon's consolidated motion to dismiss both cases with prejudice. *Id.* at 930. Just as with the 2016 Cases, the Court concluded, in a 68-page order, that the four patents were unpatentable under 35 U.S.C. § 101. *Id.* at 941. On November 3, 2020, the Federal Circuit affirmed this Court's decision. *VoIP-Pal.Com, Inc. v. Apple, Inc.*, 828 F. App'x 717, 717 (Fed. Cir. 2020). If Defendant chooses to petition for rehearing, the petition is due on December 17, 2020. *See* Order, *VoIP-Pal.Com, Inc. v. Apple, Inc.*, Case No. 2020-1241 (Fed. Cir. Nov. 9, 2020). If Defendant chooses to petition the United States Supreme Court for a writ of certiorari, Defendant's petition is due on April 3, 2021. *See* Order, March 19, 2020 (ordering that "the deadline to file any petition for a writ of certiorari due on or after the date of this order is extended to 150 days from the date of the lower court judgment").

D. The Texas Cases

In April of 2020, Defendant sued Apple, AT&T, Verizon, Amazon, Facebook, and Google in the Waco Division of the Western District of Texas for infringement of the '606 patent. *VoIP-Pal.Com, Inc. v. Facebook, Inc.*, Case No. 20-CV-00267-ADA, ECF No. 1 (W.D. Tex. Apr. 2, 2020); *VoIP-Pal.Com, Inc. v. Google LLC*, Case No. 20-CV-00269-ADA, ECF No. 1 (W.D. Tex. Apr. 3, 2020); *VoIP-Pal.Com, Inc. v. Amazon.Com, Inc.*., Case No. 20-CV-00272-ADA, ECF No. 1 (W.D. Tex. Apr. 6, 2020); *VoIP-Pal.Com, Inc. v. Apple Inc.*, Case No. 20-CV-00275-ADA, ECF No. 1 (W.D. Tex. Apr. 7, 2020); *VoIP-Pal.Com, Inc. v. AT&T Inc.*, Case No. 20-CV-00325-ADA, ECF No. 1 (W.D. Tex. Apr. 24, 2020); *VoIP-Pal.Com, Inc. v. Verizon Comms., Inc.*, Case No. 20-CV-00275-ADA, ECF No. 1 (W.D. Tex. Apr. 24, 2020). Like the six patents that were the subjects of the 2016 and 2018 Cases, the '606 patent relates to a system for routing communications over Internet Protocol. Specifically, the '606 patent shares a common specification, title, parent application, inventors, and owner with Defendants' six other patents that were examined by this Court in the 2016 and 2018 cases. *Compare* ECF No. 1-1 *with VoIP-Pal.Com*, *Inc. v. Apple Inc.*, Case No. 18-CV-06217-LHK, ECF No. 1-2.

On September 29, 2020, Judge Alan Albright of the Western District of Texas stayed the six cases pending before him until this Court enters an order on the instant motion to dismiss and the consolidated motion to dismiss in three related declaratory judgment actions, *Apple, Inc. v. VoIP-Pal.com, Inc.*, Case No. 20-CV-02460-LHK; AT&T, Inc. v. *VoIP-Pal.com, Inc.*, Case No. 20-CV-02995-LHK; and *Cellco Partnership, Inc.* v. *VoIP-Pal.com, Inc.*, Case No. 20-CV-03092-LHK. *See VoIP-Pal.Com, Inc. v. Facebook, Inc.*, Case No. 20-CV-00267-ADA, ECF No. 47 (W.D. Tex. Apr. 2, 2020).

E. The Instant Case

On April 8, 2020, six days after Defendant started filing lawsuits in the Western District of Texas that alleged infringement of the ’606 patent, Plaintiff sued Defendant for a declaration of non-infringement of the ’606 patent in the Northern District of California. ECF No. 1. On April 21, 2020, this Court granted Plaintiff’s motion to relate its declaratory judgment action to the 2016 case against Plaintiff. ECF No. 14.

Shortly after Plaintiff filed the instant case, the other three defendants in the 2016 cases (Apple, AT&T, and Verizon) also filed declaratory judgment actions in the Northern District of California for a declaration of non-infringement and invalidity of the ’606 patent. Case No. 20-CV-02460-LHK, ECF No. 1; Case No. 20-CV-02995-LHK, ECF No. 1; Case No. 20-CV-03092-LHK, ECF No. 1. On April 14, 2020, Apple amended its complaint to also seek a declaration of non-infringement and invalidity of the ’872 patent. Case No. 20-CV-02460, ECF No. 10. The Court then related Apple, AT&T, and Verizon’s cases to Defendant’s 2016 cases against them, just as the Court had done in the instant case. Case No. 20-CV-02460-LHK, ECF No. 18; Case No. 20-CV-02995-LHK, ECF No. 23; Case No. 20-CV-03092-LHK, ECF No. 18.

On May 26, 2020, this Court related the instant case to the Apple, AT&T, and Verizon cases. ECF No. 24. On June 4, 2020, this Court consolidated the motion to dismiss briefing for the Apple, AT&T, and Verizon cases but ordered that the motion to dismiss in the instant case be briefed separately. ECF No. 26.

On July 10, 2020, Defendant filed a consolidated motion to dismiss the Apple, AT&T, and Verizon cases. Case No. 20-CV-02460-LHK, ECF No. 32. On December 11, 2020, this Court denied Defendant’s consolidated motion to dismiss. Case No. 20-CV-02460-LHK, ECF No. 60. The Court concluded that there was personal jurisdiction over Defendant because Defendant had purposefully directed its enforcement activities towards the forum state by litigating six lawsuits in this district. *Id.* at 17–20. The Court also concluded that it would be reasonable and fair to assert personal jurisdiction over Defendant. *Id.* at 20–23. Because the Court found that there was personal jurisdiction over Defendant, the Court found that venue was proper in this district. *Id.* at

23. Finally, the Court concluded that there was subject matter jurisdiction over Apple's claim of non-infringement and invalidity of the '872 patent because Defendant had engaged in an affirmative act sufficient to confer jurisdiction— Defendant's prior litigation against Apple and Defendant's statement that Defendant would continue to litigate until Defendant achieved monetization for Defendant's shareholders. *Id.* at 25–26.

On June 26, 2020, Plaintiff filed an amended complaint. ECF No. 29. Like Plaintiff's original complaint, the amended complaint sought a declaration of non-infringement of the '606 patent. *Id.* ¶¶ 35–40. However, the amended complaint also sought a declaration of invalidity of the '606 patent. *Id.* ¶¶ 41–46. In addition, the amended complaint included additional facts that had arisen since Plaintiff filed its original complaint, including: (1) Defendant filing lawsuits asserting infringement of the '606 patent against AT&T and Verizon in the Western District of Texas; and (2) Plaintiff asking Defendant whether Defendant would be willing to grant Plaintiff a covenant not to sue based on the '606 patent. *Id.* ¶¶ 5, 16–17.

On July 10, 2020, Defendant filed a motion to dismiss the instant case. ECF No. 31 ("Mot."). On July 31, 2020, Plaintiff filed an opposition. ECF No. 36 ("Opp'n"). On August 14, 2020, Defendant filed a reply. ECF No. 37 ("Reply).

II. LEGAL STANDARD

A. Motion to Dismiss Under Rule 12(b)(1)

A defendant may move to dismiss for lack of subject matter jurisdiction pursuant to Rule 12(b)(1) of the Federal Rules of Civil Procedure. While lack of statutory standing requires dismissal for failure to state a claim under Rule 12(b)(6), lack of Article III standing requires dismissal for want of subject matter jurisdiction under Rule 12(b)(1). *See Maya v. Centex Corp.*, 658 F.3d 1060, 1067 (9th Cir. 2011).

"A Rule 12(b)(1) jurisdictional attack may be facial or factual." *Safe Air for Everyone v. Meyer*, 373 F.3d 1035, 1039 (9th Cir. 2004). "In a facial attack, the challenger asserts that the allegations contained in a complaint are insufficient on their face to invoke federal jurisdiction." *Id.* The Court "resolves a facial attack as it would a motion to dismiss under Rule 12(b)(6):

Accepting the plaintiff's allegations as true and drawing all reasonable inferences in the plaintiff's favor, the court determines whether the allegations are sufficient as a legal matter to invoke the court's jurisdiction." *Leite v. Crane Co.*, 749 F.3d 1117, 1121 (9th Cir. 2014). "[I]n a factual attack," on the other hand, "the challenger disputes the truth of the allegations that, by themselves, would otherwise invoke federal jurisdiction." *Safe Air for Everyone*, 373 F.3d at 1039. "In resolving a factual attack on jurisdiction," the Court "may review evidence beyond the complaint without converting the motion to dismiss into a motion for summary judgment." *Id.* The Court "need not presume the truthfulness of the plaintiff's allegations" in deciding a factual attack. *Id.*

Once the defendant has moved to dismiss for lack of subject matter jurisdiction under Rule 12(b)(1), the plaintiff bears the burden of establishing the Court's jurisdiction. *See Chandler v. State Farm Mut. Auto Ins. Co.*, 598 F.3d 1115, 1122 (9th Cir. 2010).

B. Motion to Dismiss Under Rule 12(b)(2)

In a motion challenging personal jurisdiction under Federal Rule of Civil Procedure 12(b)(2), the plaintiff, as the party seeking to invoke the jurisdiction of the federal court, has the burden of establishing that jurisdiction exists. *See In re Boon Global Ltd.*, 923 F.3d 643, 650 (9th Cir. 2019). "Where, as here, the defendant's motion is based on written materials rather than an evidentiary hearing, 'the plaintiff need only make a prima facie showing of jurisdictional facts to withstand the motion to dismiss.'" *Ranza v. Nike, Inc.*, 793 F.3d 1059, 1068 (9th Cir. 2015) (quoting *CollegeSource, Inc. v. AcademyOne, Inc.*, 653 F.3d 1066, 1073 (9th Cir. 2011)).

However, this standard "is not toothless," and the party asserting jurisdiction "cannot simply rest on the bare allegations of its complaint." *In re Boon Global Ltd.*, 923 F.3d at 650 (quoting *Schwarzenegger v. Fred Martin Motor Co.*, 374 F.3d 797, 800 (9th Cir. 2004)). Thus, courts may consider declarations and other evidence outside the pleadings to determine whether it has personal jurisdiction. *See id.* At this stage of the proceeding, "uncontroverted allegations in plaintiff's complaint must be taken as true, and '[c]onflicts between parties over statements contained in affidavits must be resolved in the plaintiff's favor.'" *Id.* (quoting *Schwarzenegger*, 374 F.3d at 800). On the other hand, courts "may not assume the truth of allegations in a pleading which are contradicted by affidavit." *Mavrix Photo, Inc. v. Brand Techs., Inc.*, 647 F.3d 1218, 1223 (9th Cir. 2011).

C. Motion to Dismiss Under Rule 12(b)(3)

Under Federal Rule of Civil Procedure 12(b)(3), a defendant may move to dismiss a complaint for improper venue. Once the defendant has challenged the propriety of venue in a given court, the plaintiff bears the burden of showing that venue is proper. *Piedmont Label Co. v. Sun Garden Packing Co.*, 598 F.2d 491, 496 (9th Cir. 1979). When considering a motion to dismiss for improper venue, a court may consider facts outside of the pleadings. *Murphy v. Schneider National, Inc.*, 362 F.3d 1133, 1138 (9th Cir. 2004).

Pursuant to 28 U.S.C. § 1406(a), if the court determines that venue is improper, the court must either dismiss the action or, if it is in the interests of justice, transfer the case to a district or division in which it could have been brought. Whether to dismiss for improper venue, or alternatively to transfer venue to a proper court, is a matter within the sound discretion of the district court. *See King v. Russell*, 963 F.2d 1301, 1304 (9th Cir. 1992).

D. Leave to Amend

If the Court determines that a complaint should be dismissed, it must then decide whether to grant leave to amend. Under Rule 15(a) of the Federal Rules of Civil Procedure, leave to amend "shall be freely given when justice so requires," bearing in mind "the underlying purpose of Rule 15 to facilitate decisions on the merits, rather than on the pleadings or technicalities." *Lopez v. Smith*, 203 F.3d 1122, 1127 (9th Cir. 2000) (en banc) (alterations and internal quotation marks omitted). When dismissing a complaint for failure to state a claim, "a district court should grant leave to amend even if no request to amend the pleading was made, unless it determines that the pleading could not possibly be cured by the allegation of other facts." *Id.* at 1130 (internal quotation marks omitted). Accordingly, leave to amend generally shall be denied only if allowing amendment would unduly prejudice the opposing party, cause undue delay, or be futile, or if the moving party has acted in bad faith. *Leadsinger, Inc. v. BMG Music Publ'g*, 512 F.3d 522, 532 (9th Cir. 2008).

III. DISCUSSION

Defendant moves to dismiss the instant case for three reasons: (1) this Court lacks subject matter jurisdiction over the instant case; (2) this Court lacks personal jurisdiction over Defendant; and (3) venue is improper. Mot. at 4–10. The Court addresses each argument in turn.

A. Subject Matter Jurisdiction

Defendant first argues that this Court lacks subject matter jurisdiction over the instant case. Mot. at 4–7. Defendant's argument stems from the fact that Defendant has not yet sued Plaintiff for infringement of the '606 patent.

Generally, dismissal for lack of subject matter jurisdiction under Federal Rule of Civil Procedure 12(b)(1) "is a procedural question not unique to patent law," and is therefore governed by regional circuit law. *Toxgon Corp. v. BNFL, Inc.*, 312 F.3d 1379, 1380 (Fed. Cir. 2002). However, "[w]hether an actual case or controversy exists so that a district court may entertain an action for declaratory judgment of non-infringement and/or invalidity is governed by Federal Circuit law." *3M Co v. Avery Dennison Corp.*, 673 F.3d 1372, 1377 (Fed. Cir. 2012).

The Declaratory Judgment Act states that, "[i]n the case of actual controversy within its jurisdiction, . . . any court of the United States, upon the filing of an appropriate pleading, may declare the rights and other legal relations of any interested party in seeking such declaration." 28 U.S.C. § 2201(a). The phrase "actual controversy" refers to "cases" and "controversies" that are justiciable under Article III of the Constitution. *Assoc. for Molecular Pathology v. U.S. Patent & Trademark Office*, 689 F.3d 1303, 1318 (Fed. Cir. 2012), *rev'd in part on other grounds by Assoc. for Molecular Pathology v. Myriad Genetics, Inc.*, 569 U.S. 576 (2013). Thus, without a case or controversy, there cannot be a claim for declaratory relief. *ActiveVideo Networks*, 975 F. Supp. at 1086.

The Court has subject matter jurisdiction in a declaratory judgment action when "the facts alleged, under all the circumstances, show that there is a substantial controversy, between parties having adverse legal interests, of sufficient immediacy and reality to warrant the issuance of a declaratory judgment." *MedImmune, Inc. v. Genentech, Inc.*, 549 U.S. 118, 127 (2007). Under the "all the circumstances" test, courts have "unique and substantial discretion in deciding whether to declare the rights of litigants." *Id.* at 136.

In case law following *MedImmune*, the Federal Circuit has explained that, in the context of patent disputes, an actual controversy requires "an injury in fact traceable to the patentee," which requires "both (1) an affirmative act by the patentee related to the enforcement of his patent rights and (2) meaningful preparation to conduct potentially infringing activity." *Assoc. for Molecular Pathology*, 689 F.3d at 1318. In the instant case, the parties do not dispute the second factor because Apple already markets the products and services at issue. Opp'n at 18.

In order to meet the affirmative act requirement, "more is required than 'a communication from a patent owner to another party, merely identifying its patent and the other's product line.' [But] [h]ow much more is required is determined on a case-by-case analysis." *3M*, 673 F.3d at 1378–79. In *Cepheid v. Roche Molecular Systems, Inc.*, another court in this district listed factors that the Federal Circuit and Supreme Court have generally considered in determining whether the patentee has taken an affirmative act: (1) the strength of threatening language in communications between the parties; (2) the depth and extent of infringement analysis conducted by the patent holder; (3) whether the patent holder imposed a deadline to respond; (4) any prior litigation between the parties; (5) the patent holder's history of enforcing the patent at issue; (6) whether the patent holder's threats have induced the alleged infringer to change its behavior; (7) the number of times the patent holder has contacted the alleged infringer; (8) whether the patent holder is a holding company with no income other than enforcing patent rights; (9) whether the patent holder refused to give assurance it will not enforce the patent; (10) whether the patent holder has identified a specific patent and specific infringing products; (11) the extent of the patent holder's familiarity with the product prior to suit; (12) the length of time that transpired after the patent holder asserted infringement; and (13) whether communications initiated by the plaintiff appear as an attempt to create a controversy. *ActiveVideo*, 975 F. Supp. 2d at 1087–88 (citing *Cepheid v. Roche Molecular Systems, Inc.*, Case No C-12-4411 EMC, 2013 WL 184125, at *6 (N.D. Cal. Jan. 17, 2013)).

Before determining whether Defendant has engaged in an affirmative act sufficient to confer jurisdiction over Plaintiff's declaratory judgment claims, the Court addresses what complaint should be used to make this assessment. As explained above, Plaintiff filed its original complaint on April 8, 2020 and an amended complaint on June 26, 2020. Although the original complaint sought a declaration of non-infringement of the '606 patent, the amended complaint sought a declaration of non-infringement and invalidity of the '606 patent. ECF No. 29 ¶¶ 35–46. In addition, the amended complaint included additional facts that had arisen since Plaintiff filed its original complaint, including: (1) Defendant filing lawsuits asserting infringement of the '606 patent against AT&T and Verizon in the Western District of Texas; and (2) Plaintiff asking Defendant whether Defendant would be willing to grant Plaintiff a covenant not to sue based on the '606 patent. *Id.* ¶¶ 16–17.

Defendant argues that subject matter jurisdiction must be assessed at the time that Plaintiff filed its original complaint. However, "when a plaintiff files a complaint in federal court and then voluntarily amends the complaint, courts look to the amended complaint to determine jurisdiction." *Rockwell Int'l Corp. v. United States*, 549 U.S. 457, 473–74 (2007). In the instant case, Plaintiff voluntarily amended its complaint to add additional facts that transpired since the filing of the original complaint. Accordingly, the Court uses Plaintiff's amended complaint to determine whether Defendant engaged in an affirmative act sufficient to confer jurisdiction over Plaintiff's declaratory judgment claims.

Analyzing "all the circumstances," the Court concludes that Defendant engaged in an affirmative act sufficient to confer jurisdiction over Plaintiff's declaratory judgment claims. *MedImmune, Inc.*, 549 U.S. at 127. The Court comes to this conclusion based primarily on Defendant's prior litigation against Plaintiff; Defendant's current '606 patent litigation against all the other defendants in the 2016 cases; and Defendant's statements about its intentions with respect to asserting its patent rights.

The Federal Circuit has repeatedly held that prior litigation on related patents can be an affirmative act that supports subject matter jurisdiction over a declaratory judgment claim. *See*

Arkema, 706 F.3d at 1358 (concluding that prior litigation was a "sufficient affirmative act on the part of the patentee for declaratory judgment purposes"); *Danisco*, 744 F.3d 1331 ("[A] history of patent litigation between the same parties involving related technologies, products, and patents is another circumstance to be considered, which may weigh in favor of the existence of subject matter jurisdiction."); *Teva Pharm. USA, Inc. v. Novartis Pharm. Corp.*, 482 F.3d 1330, 1344 (Fed. Cir. 2007) ("[R]elated litigation involving the same technology and the same parties is relevant in determining whether a justiciable declaratory judgment controversy exists on other related patents.").

The Court concludes that Defendant's prior litigation weighs heavily in favor of a finding that Defendant has engaged in an affirmative act related to the enforcement of its patent rights. Specifically, Defendant previously filed lawsuits in 2016 against Plaintiff, Apple, AT&T, and Verizon for infringement of patents that share a common specification, title, parent application, inventors, and owner with the '606 patent. Defendant also filed lawsuits in 2018 against Apple and Amazon for infringement of patents that share a common specification, title, parent application, inventors, and owner with the '606 patent. Defendant then sued Apple, AT&T, and Verizon—all the defendants in the 2016 cases except for Plaintiff—for infringement of the '606 patent. The Court concludes that, under these circumstances, Plaintiff did not need to wait for Defendant to sue Plaintiff for infringement of the '606 patent.

Furthermore, Defendant has publicly stated that it will continue to assert its patent rights until it is successful. In an April 8, 2020 press release, which was issued after the dismissal of Defendant's first lawsuit was affirmed by the Federal Circuit and immediately after Defendant filed its most recent lawsuits, Defendant's CEO stated:

> [W]e are undeterred in our fight to assert our intellectual property rights. . . . I can tell you; we are not finished . . . We remain firm in our resolve to achieve monetization for our shareholders and will continue to see this fight through until a successful resolution is reached.

ECF No. 1-7; ECF No. 29-7. Although the Court does not find this statement sufficient to demonstrate an affirmative act on its own, the statement provides helpful context as to

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Defendant's intentions with respect to asserting its patent rights.[1]

Assessing "all the circumstances," the Court concludes that Defendant has engaged in an affirmative act related to the enforcement of its patent rights based on Defendant's extensive history of litigation and Defendant's statement that Defendant would continue to litigate until Defendant achieved monetization for Defendant's shareholders. *See Monolithic Power Sys.*, No. C 07-2363 CW, 2007 WL 2318924, at *3 (N.D. Cal. Aug. 13, 2007) ("[T]he assertion of rights, evidenced through a prior lawsuit between the same parties regarding the same technology . . . and solidified through the express press release statement indicating an intent to sue alleged patent infringers, presents enough evidence to establish the case or controversy required for declaratory judgment jurisdiction."). Thus, the Court has subject matter jurisdiction over Plaintiff's claim for a declaration of non-infringement and invalidity of the '606 patent.[2]

B. Personal Jurisdiction

Defendant next moves to dismiss the instant case because the Court lacks personal jurisdiction over Defendant in this district, where Plaintiff is headquartered. Mot. at 7–9. Defendant made the same argument in the three declaratory judgment actions that were filed by

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[1] In addition, the Court finds relevant context in the discussions between the parties since the filing of the instant case. After the instant case was filed, Plaintiff asked Defendant whether Defendant would be willing to grant Plaintiff a covenant not to sue based on the '606 patent. Defendant responded as follows:

> VoIP-Pal's position is that Twitter's declaratory judgment complaint lacked subject matter jurisdiction at the time it was filed and therefore should be dismissed. Accordingly, VoIP-Pal does not believe that a covenant not to sue needs to be discussed under the present circumstances. This response should not be construed as a refusal to grant a covenant not to sue.

ECF No. 29 ¶ 17.

[2] In the motion to dismiss, Defendant emphasizes that Defendant has not made a specific threat to Plaintiff regarding the '606 patent. Mot. at 6. However, at a case management conference in the 2016 cases, in which Plaintiff was a defendant, Defendant represented to this Court that Defendant did not then intend to file additional lawsuits. Case No. 18-CV-04563, ECF No. 68 (The Court: "Are we just going to keep getting more continuations and then are you going to assert those four continuations against the other Defendants here?" Counsel: "Your Honor, at this time there's no intention to assert any of the other patents against any of the other defendants. I can't promise you that that would never change, but that is not the current intent."). Despite these representations, Defendant chose to file additional lawsuits against all of the defendants in the 2016 cases, except for Plaintiff.

Apple, AT&T, and Verizon. Case No. 20-CV-02460, ECF No. 32 at 15–17. The Court concluded that personal jurisdiction existed over Defendant in those three cases. ECF No. 60 at 14–23. The Court comes to the same conclusion in the instant case.

The Court applies Federal Circuit law to the question of whether the Court has personal jurisdiction over Plaintiff's non-infringement claims because "the jurisdictional issue is 'intimately involved with the substance of the patent laws.'" *Avocent Huntsville Corp. v. Aten Int'l Co.*, 552 F.3d 1324, 1328 (Fed. Cir. 2008) (quoting *Akro Corp. v. Luker*, 45 F.3d 1541, 1543 (Fed. Cir. 1995)). "Determining whether personal jurisdiction exists over an out-of-state defendant involves two inquiries: whether a forum state's long-arm statute permits service of process, and whether the assertion of personal jurisdiction would violate due process." *Avocent*, 552 F.3d at 1329 (quoting *Inamed Corp. v. Kuzmak*, 249 F.3d 1356, 1359 (Fed. Cir. 2001)).

California's long arm statute, Cal. Civ. Proc. Code § 410.10, is co-extensive with federal due process requirements, and therefore the jurisdictional analyses under California law and federal due process merge into one. *See* Cal. Civ. Proc. Code § 410.10 ("[A] court of this state may exercise jurisdiction on any basis not inconsistent with the Constitution of this state or of the United States."); *Mavrix Photo, Inc. v. Brand Techs., Inc.*, 647 F.3d 1218, 1223 (9th Cir. 2011) ("California's long-arm statute . . . is coextensive with federal due process requirements, so the jurisdictional analyses under state law and federal due process are the same.").

For a court to exercise personal jurisdiction over a defendant consistent with due process, that defendant must have "certain minimum contacts" with the relevant forum "such that the maintenance of the suit does not offend 'traditional notions of fair play and substantial justice.'" *Int'l Shoe Co. v. Washington*, 326 U.S. 310, 316 (1945) (quoting *Milliken v. Meyer*, 311 U.S. 457, 463 (1940)).

A court may exercise either general or specific jurisdiction over a defendant. *Avocent.*, 552 F.3d at 1330. "To be subject to general jurisdiction, a defendant business entity must maintain 'continuous and systematic general business contacts' with the forum, even when the cause of action has no relation to those contacts." *Synthes (U.S.A.) v. G.M. Dos Reis Jr. Ind. Com. de*

Equip. Medico, 563 F.3d 1285, 1297 (Fed. Cir. 2009) (quotation omitted). In the instant case, Plaintiff does not argue that Defendant is subject to general jurisdiction in this forum. Accordingly, the Court considers whether the Court has specific jurisdiction over Defendant.

Specific jurisdiction is appropriate when a suit "aris[es] out of or relate[s] to the defendant's contacts with the forum." *Helicopteros Nacionales de Colombia, S.A. v. Hall*, 466 U.S. 408, 414 n. 8 (1984). To determine whether a court can exercise specific jurisdiction consistent with due process, the Federal Circuit considers: "(1) whether the defendant 'purposefully directed' its activities at residents of the forum; (2) whether the claim 'arises out of or relates to' the defendant's activities with the forum; and (3) whether assertion of personal jurisdiction is 'reasonable and fair.'" *Xilinx, Inc. v. Papst Licensing GmbH & Co. KG*, 848 F.3d 1346, 1353 (Fed. Cir. 2017) (quoting *Inamed Corp. v. Kuzmak*, 249 F.3d 1356, 1360 (Fed. Cir. 2001)). "The first two factors correspond with the minimum contacts prong of the [International Shoe] analysis, and the third factor corresponds with the 'fair play and substantial justice' prong of the analysis." *Inamed*, 249 F.3d at 1360. The Court initially considers the first two factors. The Court then considers the third factor.

1. Whether the Defendant Purposefully Directed Its Activities at Residents of the Forum, and Whether the Claim Arises Out of or Relates to Those Activities

The first two factors require the Court to determine whether the defendant purposefully directed its activities at residents of the forum, and whether the claim arises out of or relates to those activities. *Xilinx*, 848 F.3d at 1353. With respect to the first factor, "it is essential in each case that there be some act by which the defendant purposefully avails itself of the privilege of conducting activities within the forum State, thus invoking the benefits and protections of its laws." *Id.* (quoting *Hanson v. Denckla*, 357 U.S. 235, 253 (1958)). As to the second factor, "the court must determine whether 'the suit aris[es] out of or relate[s] to the defendant's contacts with the forum.'" *Id.* (quoting *Goodyear Dunlop Tires Operations, S.A. v. Brown*, 564 U.S. 915, 923–24 (2011)).

The plaintiff has the burden of establishing these two factors. *Elecs. for Imaging v. Coyle*, 340 F.3d 1344, 1350 (Fed. Cir. 2003). "Without discovery and a record on jurisdiction, [the Court] must resolve all factual disputes in the plaintiff's favor." *Nuance Comms., Inc. v. Abbyy Software House*, 626 F.3d 1222, 1231 (Fed. Cir. 2010). "[W]here the plaintiff's factual allegations are not directly controverted, [they] are taken as true for purposes of determining jurisdiction." *Id.* (quoting *Akro*, 45 F.3d at 1543). "To survive a motion to dismiss in the absence of jurisdictional discovery, plaintiffs need only make a prima facie showing of jurisdiction." *Id.*

When the plaintiff is bringing a declaratory judgment for non-infringement, the claim "arises out of or relates to the activities of the defendant patentee in enforcing the patent or patents in suit." *Avocent*, 552 F.3d at 1332. "The relevant inquiry for specific personal jurisdiction then becomes to what extent has the defendant patentee 'purposefully directed [such enforcement activities] at residents of the forum,' and the extent to which the declaratory judgment claim 'arises out of or relates to those activities.'" *Id.* (quoting *Breckenridge Pharm., Inc. v. Metabolite Labs*, 444 F.3d 1356, 1363 (Fed. Cir. 2006)). "A declaratory judgment claim arises out of the patentee's contacts with the forum state only if those contacts 'relate in some material way to the enforcement or the defense of the patent.'" *Maxchief Invs. Ltd. v. Wok & Pan, Ind., Inc.*, 909 F.3d 1134, 1138 (Fed. Cir. 2018) (quoting *Avocent*, 552 F.3d at 1336).

Under Federal Circuit law, "ordinary cease-and-desist notices sent by a patentee to an alleged infringing party in a different state are not sufficient to subject the patentee to specific jurisdiction in that state." *Radio Sys. Corp. v. Accession, Inc.*, 638 F.3d 785, 789 (Fed. Cir. 2011). "The crux of the due process inquiry should focus first on whether the defendant has had contact with parties in the forum state beyond the sending of cease and desist letters." *Breckenridge*, 444 F.3d at 1366. Indeed, "certain other patent enforcement actions, taken in conjunction with the issuance of cease-and-desist letters, are sufficient to support specific jurisdiction." *Id.* "Examples of these 'other activities' include initiating judicial or extrajudicial patent enforcement within the forum, or entering into an exclusive license agreement or other undertaking which imposes enforcement obligations with a party residing or regularly doing business in the forum." *Avocent*, 552 F.3d at 1334. These activities need not be directed towards parties in the lawsuit. *Id.*

In the instant case, the Court concludes that Defendant has purposefully directed its enforcement activities towards the forum state, including Plaintiff, which is headquartered in this district, by: (1) litigating the 2016 and 2018 cases, which included six lawsuits on claims of infringement of patents in the same family, in the Northern District of California; (2) stipulating to transfer five of those six lawsuits to this district; (3) never contesting personal jurisdiction in the Northern District of California in those six lawsuits; (4) engaging multiple California law firms in its infringement lawsuits; and (5) meeting with Apple in the Northern District of California in 2016 regarding claims of infringement of patents in the same family. The Court first considers Defendant's litigation efforts in this district and then considers Defendant's meetings with Apple.

First, the fact that a defendant "has engaged in judicial patent enforcement (with respect to the patents at issue or a related patent)" in the same district can support personal jurisdiction. *ActiveVideo Networks, Inc. v. TransVideo Elecs., Ltd.*, 975 F. Supp. 2d 1083, 1097–98 (N.D. Cal. 2013); *see also Avocent*, 552 F.3d at 1338–39 (noting that a lawsuit in the same forum on the same patent "is a significant contact with the forum materially related to the enforcement of the relevant patent"). For example, another court in this district found that a defendant had purposefully directed its activities to the forum by litigating six cases in this district "regarding the very same or related patents." *Id.* at 1096–97. Furthermore, the District of New Jersey found that a defendant had purposefully directed its activities to the forum by suing other defendants in that district for patent infringement. *Pro Sports Inc. v. West*, 639 F. Supp. 2d 475, 481 (D.N.J. 2009). In addition, the District of Maryland concluded that personal jurisdiction existed when a defendant had filed "a prior suit against [the plaintiff in the district] with respect to related patents." *Neuralstem, Inc. v. StemCells, Inc.*, 573 F. Supp. 2d 888, 898 (D. Md. 2008).[3]

[3] In *Xilinx*, the Federal Circuit stated: "We have considered forum-related activities of the patentee with respect to the patents in suit that do not necessarily relate to the particular controversy, such as exclusive licensing, though at the same time we have (appropriately) rejected the existence of contacts concerning other patents as being pertinent to the minimum contacts analysis." *Xilinx*, 848 F.3d at 1353. However, *Xilinx* itself did not raise the question of whether courts can consider litigation involving other patents. Moreover, this statement is not specific to litigation involving related patents, like the patents at issue here.

Accordingly, Defendant's act of litigating the 2016 and 2018 cases, which included six lawsuits regarding related patents, in this district demonstrates that Defendant has purposefully directed its enforcement activities towards the forum state. Defendant points out that, unlike in *ActiveVideo*, *Pro Sports*, and *Neuralstem*, Defendant did not file its infringement lawsuits in this district—rather, Defendant filed in Nevada and opposed Plaintiff's motion to transfer to this district. However, Defendant stipulated to transfer its infringement lawsuits against Apple, Verizon, and AT&T to this district. Defendant then litigated those cases in this district without contesting personal jurisdiction.

Furthermore, even if Defendant had not stipulated to transfer five of its lawsuits to this district, Defendant still would have purposefully availed itself of the courts in California because Defendant continued to prosecute its six lawsuits in this district. In *Kyocera Communications v. Potter Voice Technologies*, the district court relied on this same reasoning. Case No. 13-CV-0766-H, 2013 WL 2456032, at *3 (S.D. Cal. June 5, 2013). In that case, the defendant had initially brought suit in Colorado and opposed transfer to California. *Id.* The district court nonetheless concluded that the defendant had purposefully availed itself of the California courts because the defendant had continued prosecuting the lawsuit in California. *Id.* The instant cases more strongly support a finding of personal jurisdiction because Defendant stipulated to transfer five of its lawsuits to this district. Accordingly, the Court concludes that Defendant's infringement litigation, involving substantially similar technology and accused products as well as six patents from the same family that share a common specification, title, parent application, inventors, and owner as the patents at issue here, demonstrates that Defendant purposefully directed its enforcement activities towards this district.

In addition, the Court notes that Defendant has engaged California lawyers for the 2016 and 2018 cases, as well as the instant cases. Courts have found that defendants purposefully directed their enforcement activities to the forum state by hiring lawyers from that state to prosecute their infringement actions. *See, e.g.*, *Elecs. for* Imaging, 340 F..3d at 1351 (concluding that the defendant purposefully directed its activities to California by hiring a California lawyer);

Kyocera, 2013 WL 2456032, at *3 (concluding that the defendant had purposefully directed its enforcement activities to California because the defendant was suing California residents for infringement and had "retained counsel in California for that lawsuit"). The Court comes to the same conclusion in the instant case.

Furthermore, beyond its lawsuits in this district, Defendant has made efforts to enforce its family of patents in this district. For example, Defendant's representative met with Apple in Sunnyvale, California, located in this district, regarding Apple's potential infringement of Defendant's patents. Case No. 20-CV-02460, ECF No. 43-40 ¶ 2. "As the Supreme Court has explained, 'physical entry into the State—either by the defendant in person or through an agent, goods, mail, or some other means—is certainly a relevant contact." *Xilinx*, 848 F.3d at 1354 (quoting *Walden v. Fiore*, 571 U.S. 277, 285 (2014)); *see also Synthes (U.S.A.) v. G.M. Dos Reis Jr. Ind. Com. de Equip. Medico*, 563 F.3d 1285, 1297–98 (Fed. Cir. 2009) (concluding that a defendant's representatives' entrance into the forum to attend a trade show with products that allegedly infringed the plaintiff's patents constituted a relevant contact for the purposes of personal jurisdiction). So too here.[4]

In sum, the Court concludes that Defendant has undertaken substantial enforcement activities in California, including prosecuting their six lawsuits for infringement of patents from the same family, retaining counsel in California to prosecute their lawsuits, and meeting with Apple in California regarding infringement of patents from the same family. "Far from being random, fortuitous, or attenuated . . . the totality of these contacts sufficiently make out [Plaintiffs'] case that [Defendant], by 'engag[ing] in significant in significant activities in

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[4] In addition to its meeting with Apple, Defendant likely investigated its infringement claims against Plaintiff and Apple, both of whom have their headquarters and reside in this district, and that investigation would have also constituted purposefully directing enforcement activities at the forum. *See PharmaNet, Inc. v. DataSci Ltd. Liability Co.*, Case No. 08-2965, 2009 WL 396180, at *13 (D.N.J. 2009) (concluding that there was personal jurisdiction because "it is likely that Defendant took steps to investigate and compile its case against [a company in the forum] prior to the suit's filing in order to comply with it[s] obligations under Federal Rule of Civil Procedure 11(b)).

California . . . purposefully directed [its] activities to California." *Elecs. for Imaging*, 340 F.3d at 1351.

Finally, the claim at issue in the instant cases arises out of or relates to these activities because the activities described above relate to enforcement of patents from the same family. *Avocent*, 552 F.3d at 1330. Although Defendant points out that not all these activities relate to the enforcement of the patents at issue in this case, the Court points out that courts have found personal jurisdiction even where the enforcement activities were tied to related patents. *ActiveVideo*, 975 F. Supp. 2d at 1097–98 (concluding that there was personal jurisdiction over the defendant based on the defendant's previous infringement lawsuits in the district with respect to the patents at issue or a related patent); *NeuralStem*, 573 F. Supp. 2d at 898 (finding that there was personal jurisdiction over the defendant because the defendant voluntarily filed infringement cases in the district with respect to highly related patents). The patent in the instant case shares a common specification, title, parent application, inventors, and owner with Defendants' six patents in the 2016 and 2018 cases before this Court. Moreover, the 2016 and 2018 and instant case share substantially similar technology and accused products. Accordingly, the Court concludes that Plaintiff has made a prima facie showing on the first two factors, as required for specific jurisdiction.

2. Whether Assertion of Personal Jurisdiction is Reasonable and Fair

The Court next considers whether the assertion of personal jurisdiction is reasonable and fair. The reasonableness inquiry "is not limited to the specific facts giving rise to, or relating to, the particular litigation." *Xilinx*, 848 F.3d at 1355. For the reasonableness inquiry, the burden is on the defendant, who must "present a compelling case that the presence of some other considerations would render jurisdiction unreasonable under the five-factor test articulated by the Supreme Court in *Burger King* [*Corporation v. Rudewicz*, 471 U.S. 462, 475–77 (1985)]." *Breckenridge*, 444 F.3d 1356, 1363 (Fed. Cir. 2006). The five factors outlined in *Burger King* include: (1) the burden on the defendant; (2) the forum State's interest in adjudicating the dispute; (3) the plaintiff's interest in obtaining convenient and effective relief; (4) the interstate judicial system's interest in obtaining the most efficient resolution of controversies; and (5) the shared interest of the several States in furthering fundamental substantive social policies. *Avocent*, 552 F.3d at 1331 (citing *Burger King*, 471 U.S. at 475–77). The Court addresses each factor in turn.

First, Defendant would incur a minimal burden of litigating in this district. Defendant is based in Washington, and several of its executives are located near the West Coast, in Washington and Utah. ECF No. 1 ¶ 9; Case No. 20-CV-02460, ECF No. 43-36. Accordingly, only minimal travel is required to get to Northern California.

Moreover, the Federal Circuit has repeatedly concluded that a defendant's previous lawsuits in a forum demonstrates that the defendant would not face an undue burden in litigating there. *See Xilinx*, 848 F.3d at 1357–58 (explaining that "[t]he lack of significant burden on [the defendant] is also evidenced by [the defendant's] prior litigations in California itself," including seven patent infringement lawsuits there); *Acorda Therapeutics Inc. v. Mylan Pharma. Inc*, 817 F.3d 755, 764 (Fed. Cir. 2016) (concluding that the burden on defendant "will be at most modest, as [the defendant] . . . has litigated many . . . lawsuits" in the forum); *Viam Corp. v. Iowa Exp.-Imp. Trading Co.*, 84 F.3d 424, (Fed. Cir. 1996) (concluding that litigation in California was not unduly burdensome because the defendant had filed previous lawsuits in California). In the instant case, Defendant has prosecuted six lawsuits in this district. Thus, the Court concludes that litigating the instant case would not be unduly burdensome.

The Federal Circuit has also concluded that litigation in a forum would not be unduly burdensome when the defendant has traveled to that forum. *See Xilinx*, 848 F.3d at 1357 (finding that a defendant corporation based in Germany would have a minimal burden of litigating in California because the defendant's representatives had traveled to California). Defendant's representative previously traveled to California. Accordingly, the Court concludes that Defendant would incur a minimal burden by litigating in this district, so the first factor does not weigh against a finding of personal jurisdiction.

As to the second factor, "California has a substantial interest in protecting its residents from unwarranted claims of patent infringement." *Elecs. for Imaging*, 340 F.3d at 1352. Plaintiff

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has its principal place of business in California. Thus, the second factor weighs in favor of personal jurisdiction.

On the third factor, Plaintiff also has "an undisputed interest in protecting itself from patent infringement." *Id*. Plaintiff, which has its principal place of business in California, "indisputably has an interest in protecting itself from patent infringement by obtaining relief 'from a nearby federal court' in its home forum." *Xilinx*, 848 F.3d at 1356. Thus, the third factor weighs in favor of personal jurisdiction.

On the fourth factor, the most efficient resolution of the instant cases would be possible in this district. This Court has already presided over six cases alleging infringement of Defendant's patents from the same family and written 113 pages of opinions analyzing Defendant's patents, which were subsequently affirmed by the Federal Circuit. *See VoIP-Pal.Com*, 375 F. Supp. 3d at 1110, *aff'd*, 798 F. App'x at 645; *VoIP-Pal.Com, Inc*, 411 F. Supp. 3d at 926, *aff'd*, 828 F. App'x at 717. Thus, the most efficient resolution of the instant case would be for it to be heard in this Court, and the fourth factor weighs for personal jurisdiction.

Finally, on the fifth factor, "[t]here does not appear to be any conflict between the interests of California and any other state, because 'the same body of federal patent law would govern the patent invalidity claim irrespective of the forum.'" *Xilinx*, 848 F.3d at 1356 (quoting *Elecs. for Imaging*, 340 F.3d at 1352). Thus, the fifth factor does not weigh against a finding of personal jurisdiction.

In sum , Defendant "fail[s] to convince [this Court] that this is one of the 'rare' situations in which sufficient minimum contacts exist but where the exercise of jurisdiction would be unreasonable." *Elecs for Imaging*, 340 F.3d at 1352. Accordingly, the Court concludes that it has personal jurisdiction over Defendant in the instant case.

C. Venue

Finally, Defendant argues that venue is improper. Mot. at 9–10. As with the personal jurisdiction argument, Defendant made this argument in the three declaratory judgment cases that were filed by Apple, AT&T, and Verizon. Case No. 20-CV-02460, ECF No. 32 at 17–18. The

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Court concluded that venue was proper in those three cases. ECF No. 60 at 23. The Court comes to the same conclusion in the instant case.

Venue in declaratory judgment actions for non-infringement of a patent is governed by the general venue statute, 28 U.S.C. § 1391. Under § 1391(b)(1), venue is proper in any judicial district where a defendant resides. *Id.* § 1391(b)(1). Under § 1391(c)(2), for purposes of venue, a corporate defendant "reside[s] . . . in any judicial district in which such defendant is subject to the court's personal jurisdiction with respect to the civil action in question." *Id.* § 1391(c)(2). Because the Court has personal jurisdiction over Defendant in the instant cases, venue is also proper in this district.

IV. CONCLUSION

For the foregoing reasons, the Court DENIES Defendant's motion to dismiss Plaintiff's complaint.

IT IS SO ORDERED.

Dated: December 14, 2020

Lucy H. Koh

LUCY H. KOH
United States District Judge

United States District Court
Northern District of California

EXHIBIT 9

UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

SAN JOSE DIVISION

APPLE INC., Plaintiff, v. VOIP-PAL.COM, INC., Defendant.	Case No. 20-CV-02460-LHK **ORDER DENYING MOTION TO DISMISS** Re: Dkt. No. 75

Plaintiff Apple Inc. ("Apple") sues Defendant VoIP-Pal.com, Inc. ("Defendant") for a declaration of non-infringement and invalidity of U.S. Patent No. 10,218,606 ("the '606 patent") and U.S. Patent No. 9,935,872 ("the '872 patent"). Before the Court is Defendant's motion to dismiss Apple's amended complaint, ECF No. 75. Having considered the parties' submissions, the relevant law, and the record in this case, the Court DENIES Defendant's motion to dismiss.

I. BACKGROUND

The instant case is one chapter in a long dispute between the parties regarding whether Apple infringes Defendant's patents, which relate to a system for routing internet-protocol communications. Below, the Court discusses in turn: (1) the parties; (2) Defendant's first set of lawsuits against Apple, AT&T, Verizon, and Twitter, originally filed in the District of Nevada in 2016 ("the 2016 cases"); (3) Defendant's second set of lawsuits against Apple and Amazon, originally filed in the District of Nevada in 2018 ("the 2018 cases"); (4) Defendant's third set of lawsuits against Apple, AT&T, Verizon, Amazon, Facebook, and Google, filed in the Western District of Texas in April of 2020 ("the 2020 Texas cases"); (5) Defendant's fourth set of lawsuits against Apple, AT&T, Verizon, Amazon, Facebook, Google, and T-Mobile, filed in the Western District of Texas in June of 2021 ("the 2021 Texas cases"); and (6) the instant case, which was filed by Apple in April of 2020.

A. The Parties

Plaintiff Apple is a California corporation with its principal place of business in Cupertino, California. ECF No. 1 ¶ 7. Apple "designs, manufactures, and markets mobile communication and media devices and personal computers, and sells a variety of related software, services, accessories, networking solutions, and third-party digital content and applications." *Id.* Apple "provides, supports, and/or operates messaging technology, including iMessage, an instant messaging service supported by Apple's Messages application and computer infrastructure that allows smartphone and desktop users to send messages including text, images, video and audio to other users." *VoIP-Pal.Com, Inc. v. Apple Inc.*, 375 F. Supp. 3d 1110, 1117 (N.D. Cal. 2019) (quotation omitted). Defendant VoIP-Pal is a Nevada corporation with its principal place of business in Waco, Texas. ECF No. 1 ¶ 8; ECF No. 90 at 1. Defendant owns a portfolio of patents relating to Internet Protocol based communication. *VoIP-Pal.Com, Inc. v. Apple Inc.*, 411 F. Supp. 3d 926, 930 (N.D. Cal. 2019).

B. The 2016 Cases

In 2016, Defendant filed the following cases against Apple, Verizon, AT&T, and Twitter in the District of Nevada for infringement of U.S. Patent Nos. 8,542,815 ("the '815 patent"), and 9,179,005 ("the '005 patent"), both of which relate to a system for routing calls between a caller and a callee over Internet Protocol:

- *VoIP-Pal.Com, Inc. v. Apple Inc.*, Case No. 18-CV-06217-LHK
- *VoIP-Pal.Com, Inc. v. Twitter, Inc.*, Case No. 18-CV-04523-LHK

- *VoIP-Pal.Com, Inc. v. Verizon Wireless Servs. LLC*, Case No. 18-CV-06054-LHK
- *VoIP-Pal.Com, Inc. v. AT&T Corp.*, Case No. 18-CV-06177-LHK

The District of Nevada stayed the cases pending *inter partes* review. *Id.* After the stays were lifted, on February 28, 2018, Twitter moved to change venue to the Northern District of California. *VoIP-Pal.Com, Inc. v. Twitter, Inc.*, Case No. 16-CV-02338, 2018 WL 3543031, at *1 (D. Nev. July 23, 2018). On July 23, 2018, the District of Nevada granted Twitter's motion for change of venue to the Northern District of California. *Id.* On October 1, 2018, the District of Nevada granted Verizon and Defendant's stipulation to transfer the case to the Northern District of California. *VoIP-Pal.Com*, 375 F. Supp. 3d at 1121. On October 4, 2018, the District of Nevada granted AT&T and Defendant's stipulation to transfer the case to the Northern District of California. *Id.* The following day, the District of Nevada granted Apple and Defendant's stipulation to transfer the case to the Northern District of California. *Id.* As a result, all four cases were transferred to the Northern District of California and assigned to this Court, where they were consolidated.

On March 25, 2019, this Court granted Apple, AT&T, Verizon, and Twitter's consolidated motion to dismiss all four cases. *Id.* at 1117. In a 45-page order, the Court concluded that the '815 and '005 patents were unpatentable under 35 U.S.C. § 101. *Id.* at 1138, 1144. On March 16, 2020, the Federal Circuit affirmed this Court's decision. *VoIP-Pal.Com, Inc. v. Apple, Inc.*, 798 F. App'x 644, 645 (Fed. Cir. 2020). On May 18, 2020, the Federal Circuit denied Defendant's petition for panel or en banc rehearing. *VoIP-Pal.Com, Inc. v. Twitter*, Case No. 2019-1808, ECF No. 99.

C. The 2018 Cases

In 2018, Defendant filed the following cases against Apple and Amazon in the District of Nevada for infringement of U.S. Patent Nos. 9,537,762 ("the '762 patent"); 9,813,330 ("the '330 patent"); 9,826,002 ("the '002 patent"); and 9,948,549 ("the '549 patent"), which relate to a system for routing communications over Internet Protocol:

- *VoIP-Pal.Com, Inc. v. Apple Inc.*, Case No. 18-CV-06216-LHK

- *VoIP-Pal.Com, Inc. v. Amazon.com, Inc.*, Case No. 18-CV-07020-LHK

The lawsuits against Apple and Amazon were transferred from the District of Nevada to this Court, where they were consolidated and related to the 2016 cases. *Id.*

On November 1, 2019, this Court granted Apple and Amazon's consolidated motion to dismiss both cases with prejudice. *Id.* at 930. As in the 2016 Cases, the Court concluded, in a 68-page order, that the four patents were unpatentable under 35 U.S.C. § 101. *Id.* at 941. On November 3, 2020, the Federal Circuit affirmed this Court's decision. *VoIP-Pal.Com, Inc. v. Apple, Inc.*, 828 F. App'x 717, 717 (Fed. Cir. 2020).

D. The 2020 Texas Cases

In April of 2020, Defendant filed the following cases against Apple, AT&T, Verizon, Amazon, Facebook, and Google in the Waco Division of the Western District of Texas for infringement of the '606 patent:

- *VoIP-Pal.Com, Inc. v. Apple Inc.*, Case No. 20-CV-00275-ADA (W.D. Tex. Apr. 7, 2020)
- *VoIP-Pal.Com, Inc. v. Facebook, Inc.*, Case No. 20-CV-00267-ADA (W.D. Tex. Apr. 2, 2020)
- *VoIP-Pal.Com, Inc. v. Google LLC*, Case No. 20-CV-00269-ADA (W.D. Tex. Apr. 3, 2020)
- *VoIP-Pal.Com, Inc. v. Amazon.Com, Inc..*, Case No. 20-CV-00272-ADA (W.D. Tex. Apr. 6, 2020)
- *VoIP-Pal.Com, Inc. v. AT&T Inc.*, Case No. 20-CV-00325-ADA (W.D. Tex. Apr. 24, 2020)
- *VoIP-Pal.Com, Inc. v. Verizon Comms., Inc.*, Case No. 20-CV-00327-ADA (W.D. Tex. Apr. 24, 2020).

Like the six patents that were the subjects of the 2016 and 2018 Cases, the '606 patent relates to a system for routing communications over Internet Protocol. Specifically, the '606 patent shares a common specification, title, parent application, inventors, and owner with Defendants' six other patents that were examined by this Court in the 2016 and 2018 cases. *Compare* ECF No. 1-1 *with VoIP-Pal.Com, Inc. v. Apple Inc.*, Case No. 18-CV-06217-LHK, ECF No. 1-2.

In July 2020, all six defendants moved for a stay pending the Northern District of California's determination of jurisdiction over the instant cases or for transfer to the Northern District of California. *See VoIP-Pal.Com, Inc. v. Facebook*, Case No. 20-CV-00267-ADA, ECF No. 26; *VoIP-Pal.Com, Inc. v. Google LLC*, Case No. 20-CV-00269- ADA, ECF No. 18; *VoIP-Pal.Com, Inc. v. Amazon.Com, Inc.*, Case No. 20-CV-00272-ADA, ECF No. 26; *VoIP-Pal.Com, Inc. v. Apple Inc.*, Case No. 20-CV00275-ADA, ECF No. 17; *VoIP-Pal.Com, Inc. v. AT&T, Inc.*, Case No. 20-CV-00325-ADA, ECF No. 22; *VoIP-Pal.Com, Inc. v. Verizon Comms., Inc.*, Case No. 20-CV-00327-ADA, ECF No. 17. Specifically, on July 9, 2020, Apple filed a motion to stay, or in the alternative to transfer the case against Apple. *VoIP-Pal.Com, Inc. v. Apple Inc.*, Case No. 20-CV-00275-ADA, ECF No. 17. On September 29, 2020, United States District Judge Alan Albright of the Western District of Texas stayed the six cases pending before him, including the case against Apple. *See VoIP-Pal.Com, Inc. v. Apple Inc.*, Case No. 20-CV-00275-ADA, ECF No. 43.

On March 24, 2021, following the Federal Circuit's denial of Defendant's petition for a writ of mandamus, which the Court will discuss later, Defendant voluntarily dismissed Defendant's 2020 case against Apple in the Western District of Texas. *VoIP-Pal.Com, Inc. v. Apple Inc.*, Case No. 20-CV-00275-ADA, ECF No. 49. On the same day, Defendant consented to AT&T's motion to dismiss the 2020 case in the Western District of Texas. *VoIP-Pal.Com, Inc. v. AT&T Inc.*, Case No. 20-CV-00325-ADA, ECF No. 51. That same day, Defendant consented to Verizon's motion to dismiss Defendant's 2020 case against Verizon in the Western District of Texas. *VoIP-Pal.Com, Inc. v. Verizon Comms., Inc.*, Case No. 20-CV-00327-ADA, ECF No. 47. On March 25, 2021, Judge Albright granted AT&T's motion to dismiss the 2020 case without prejudice. *VoIP-Pal.Com, Inc. v. AT&T Inc.*, Case No. 20-CV-00325-ADA, ECF No. 53. On April 1, 2021, Judge Albright granted Verizon's motion to dismiss Defendant's 2020 case against Verizon without prejudice. *VoIP-Pal.Com, Inc. v. Verizon Comms., Inc.*, Case No. 20-CV-00327-ADA, ECF No. 49.

On March 24, 2021, Defendant filed a notice of related cases in its 2020 cases against Amazon, Facebook, and Google, which informed the Western District of Texas court of the instant motion to dismiss and stated the following: "VoIP-Pal believes that the [instant motion to dismiss] resolve[s] or will soon resolve all pending actions involving the '606 patent between VoIP-Pal and Apple, AT&T, and Verizon, who are the only parties in the above-identified cases that (1) have co-pending declaratory judgment actions in the Northern District of California and (2) are asserting first-filed status based on those actions. Additionally, because VoIP-Pal's covenant not to sue in the Twitter case resolves or will soon resolve that action, there will soon be no pending cases in the Northern District of California involving the '606 patent. As such, VoIP-Pal's WDTX cases against Amazon, Google, and Facebook will soon be the only pending cases in any court involving the '606 patent." *VoIP-Pal.Com, Inc. v. Facebook, Inc.*, Case No. 20-CV-00267-ADA, ECF No. 49.

Amazon, Facebook, and Google's motions for transfer to the Northern District of California, which were filed in the Western District of Texas in July 2020, remain pending and stayed. *See VoIP-Pal.Com, Inc. v. Facebook, Inc.*, Case No. 20-CV-00267-ADA, ECF No. 26; *VoIP-Pal.Com, Inc. v. Google LLC*, Case No. 20-CV-00269- ADA, ECF No. 18; *VoIP-Pal.Com, Inc. v. Amazon.Com, Inc.*, Case No. 20-CV-00272-ADA, ECF No. 26. Moreover, Defendant's 2020 cases against Amazon, Facebook, and Google remain pending in the Western District of Texas and have been stayed since September 29, 2020. *See VoIP-Pal.Com, Inc. v. Facebook, Inc.*, Case No. 20-CV-00267-ADA, ECF No. 38.

E. The 2021 Texas Cases

On June 25, 2021, Defendant filed the following lawsuits against Apple, AT&T, Verizon, Amazon, Facebook, Google and T-Mobile in the Waco Division of the Western District of Texas for infringement of United States Patent Nos. 8,630,234 ("the '234 patent") and 10,880,721 ("the '721 patent"):

- *VoIP-Pal.Com, Inc. v. Apple Inc.*, Case No. 21-CV-00670-ADA (W.D. Tex. June 25, 2021)

- *VoIP-Pal.Com, Inc. v. Facebook, Inc.*, Case No. 21-CV-00665-ADA (W.D. Tex. June 25, 2021)
- *VoIP-Pal.Com, Inc. v. Google LLC*, Case No. 21-CV-00667-ADA (W.D. Tex. June 25, 2021)
- *VoIP-Pal.Com, Inc. v. Amazon.Com, Inc..*, Case No. 21-CV-00668-ADA (W.D. Tex. June 25, 2021)
- *VoIP-Pal.Com, Inc. v. AT&T Inc.*, Case No. 21-CV-00671-ADA (W.D. Tex. June 25, 2021)
- *VoIP-Pal.Com, Inc. v. Verizon Comms., Inc.*, Case No. 21-CV-00672-ADA (W.D. Tex. June 25, 2021)
- *VoIP-Pal.Com, Inc. v. T-Mobile US, Inc.*, Case No. 21-CV-00674-ADA (W.D. Tex. June 25, 2021).

The ’234 patent and the ’721 patent concern the same technology as the patents involved in the 2016 cases, the 2018 cases, the 2020 Texas cases, and the instant case. Moreover, the 2021 cases involve the same accused products as the 2016 cases, the 2020 Texas cases, and the instant case.

On June 30, 2021, AT&T sued Defendant in this district for a declaration of non-infringement and invalidity of the ’234 patent and the ’721 patent. *See* Case No. 21-CV-05078, ECF No. 1 (N.D. Cal. June 30, 2021). On July 1, 2021, Apple sued Defendant in this district for a declaration of non-infringement and invalidity of the ’234 patent and the ’721 patent. *See* Case No. 21-CV-05110, ECF No. 1 (N.D. Cal. July 1, 2021).

F. The Instant Case

On April 10, 2020, after Defendant filed the 2020 Texas cases, Apple sued Defendant for a declaration of non-infringement and invalidity of the ’606 patent. ECF No. 1. On April 14, 2020, Apple amended its complaint to also seek a declaration of non-infringement and invalidity of the ’872 patent. ECF No. 10. Like the ’606 patent, the ’872 patent shares a common specification, title, parent application, inventors, and owner with Defendants’ six other patents that were examined by this Court in the 2016 and 2018 cases. *Compare* ECF No. 10-2 with *VoIP-Pal.Com,* *Inc. v. Apple Inc.*, Case No. 18-CV-06217-LHK, ECF No. 1-2.

In April and May 2020, AT&T, Verizon, and Twitter filed similar lawsuits against Defendant. *See* Case No. 20-CV-2995-LHK, ECF No. 1 ("the AT&T case"); Case No. 20-CV-03092-LHK, ECF No. 1 ("the Verizon case"); Case No. 20-CV-02397-LHK, ECF No. 1 ("the Twitter case").

On April 27, 2020, this Court granted Apple's motion to relate its declaratory judgment action to the 2016 case against Apple. ECF No. 18. On May 26, 2020, this Court related the instant case to the AT&T, Verizon, and Twitter cases. ECF No. 24.

On July 10, 2020, Defendant filed a consolidated motion to dismiss the instant case, the AT&T case, and the Verizon case. ECF No. 32. On December 11, 2020, the Court denied Defendant's motion to dismiss. ECF No. 60. The Court declined to apply the first-to-file rule in favor of the 2020 Texas cases, which were filed days before the instant case, because the Court concluded that it would be more efficient for this Court, which had already ruled on the patentability of Defendant's six other patents, to resolve the instant case. *Id.* at 9–14. The Court also concluded that the Court had personal jurisdiction over the instant case because Defendant had purposefully directed its enforcement activities towards the forum state. *Id.* at 14–23.

On January 13, 2021, Defendant filed a petition for a writ of mandamus in the Federal Circuit, where Defendant contended that this Court had abused its discretion in declining to apply the first-to-file rule. ECF No. 63. That same day, Defendant filed a motion to stay the instant case pending resolution of Defendant's petition for a writ of mandamus. ECF No. 65. On January 14, 2021, this Court granted Defendant's motion to stay the instant case over Apple, AT&T, and Twitter's objections. ECF No. 66.

On February 19, 2021, the Federal Circuit denied Defendant's petition for a writ of mandamus. *In re VoIP-Pal.Com, Inc.*, 845 F. App'x 940 (Fed. Cir. 2021). The Federal Circuit concluded that this Court did not clearly abuse its discretion in declining to apply the first-to-file rule. *Id.* at 941. The Federal Circuit held that "the conclusion that it would be far less efficient for the Western District of Texas to resolve these cases based on the Northern District of California's familiarity with the overlapping issues is particularity well supported" because the patents in the current cases and prior cases all shared a common specification, title, parent application, and inventors; the current cases and prior cases involved similar technology and accused products; and the Court had previously written a total of 113 pages on the validity of the patents. *Id.* at 942.

On February 25, 2021, following the Federal Circuit's decision on Defendant's petition for a writ of mandamus, this Court set another case schedule. ECF No. 69. The Court set a March 24, 2021 deadline for disclosure of asserted claims and infringement contentions. *Id.*

On March 24, 2021, instead of serving asserted claims and infringement contentions, Defendant filed the instant motion to dismiss. ECF No. 75 ("Mot."). The instant motion to dismiss granted Apple the following covenant not to sue:

> VoIP-Pal unconditionally and irrevocably covenants not to sue Apple for infringement of any claim of the '606 and '872 patents based on the products and/or services that Apple is currently making, using, selling, offering for sale, or importing, including, but not limited to, the products and/or services Apple states in the FAC do not infringe the patents-in-suit, at any time before the date of this covenant.

Mot. at 3.

On April 21, 2021, Apple filed an opposition. ECF No. 80 ("Opp'n").

On May 5, 2021, Defendant filed a reply. ECF No. 82 ("Reply"). Defendant's reply changed the covenant not to sue to the following:

> VoIP-Pal.com, Inc. unconditionally and irrevocably covenants not to sue Apple Inc., now or in the future, for infringement of any claim of U.S. Patent Nos. 9,935,872 and 10,218,606 based on any products and services that Apple Inc. is currently making, using, selling, offering for sale, or importing as of the date of this covenant or any products and services that Apple Inc. made, used, sold, offered for sale, or imported at any time before the date of this covenant.

Reply at 1.

II. LEGAL STANDARD

A. Motion to Dismiss Under Rule 12(b)(1)

A defendant may move to dismiss for lack of subject matter jurisdiction pursuant to Rule 12(b)(1) of the Federal Rules of Civil Procedure. While lack of statutory standing requires dismissal for failure to state a claim under Rule 12(b)(6), lack of Article III standing requires dismissal for want of subject matter jurisdiction under Rule 12(b)(1). *See Maya v. Centex Corp.*, 658 F.3d 1060, 1067 (9th Cir. 2011).

"A Rule 12(b)(1) jurisdictional attack may be facial or factual." *Safe Air for Everyone v. Meyer*, 373 F.3d 1035, 1039 (9th Cir. 2004). "In a facial attack, the challenger asserts that the allegations contained in a complaint are insufficient on their face to invoke federal jurisdiction." *Id.* The court "resolves a facial attack as it would a motion to dismiss under Rule 12(b)(6): Accepting the plaintiff's allegations as true and drawing all reasonable inferences in the plaintiff's favor, the court determines whether the allegations are sufficient as a legal matter to invoke the court's jurisdiction." *Leite v. Crane Co.*, 749 F.3d 1117, 1121 (9th Cir. 2014). "[I]n a factual attack," on the other hand, "the challenger disputes the truth of the allegations that, by themselves, would otherwise invoke federal jurisdiction." *Safe Air for Everyone*, 373 F.3d at 1039. "In resolving a factual attack on jurisdiction," the court "may review evidence beyond the complaint without converting the motion to dismiss into a motion for summary judgment." *Id.* The court "need not presume the truthfulness of the plaintiff's allegations" in deciding a factual attack. *Id.*

Once the defendant has moved to dismiss for lack of subject matter jurisdiction under Rule 12(b)(1), the plaintiff bears the burden of establishing the court's jurisdiction. *See Chandler v. State Farm Mut. Auto Ins. Co.*, 598 F.3d 1115, 1122 (9th Cir. 2010).

B. Leave to Amend

If the Court determines that a complaint should be dismissed, it must then decide whether to grant leave to amend. Under Rule 15(a) of the Federal Rules of Civil Procedure, leave to amend "shall be freely given when justice so requires," bearing in mind "the underlying purpose of Rule 15 to facilitate decisions on the merits, rather than on the pleadings or technicalities." *Lopez v. Smith*, 203 F.3d 1122, 1127 (9th Cir. 2000) (en banc) (alterations and internal quotation marks omitted). When dismissing a complaint for failure to state a claim, "a district court should grant leave to amend even if no request to amend the pleading was made, unless it determines that the pleading could not possibly be cured by the allegation of other facts." *Id.* at 1130 (internal

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quotation marks omitted). Accordingly, leave to amend generally shall be denied only if allowing amendment would unduly prejudice the opposing party, cause undue delay, or be futile, or if the moving party has acted in bad faith. *Leadsinger, Inc. v. BMG Music Publ'g*, 512 F.3d 522, 532 (9th Cir. 2008).

III. DISCUSSION

In the instant motion to dismiss, Defendant contends that the Court lacks subject matter jurisdiction over the instant case because Defendant granted Apple a covenant not to sue. Mot. at 3–4. For the reasons below, the Court concludes that the Court retains subject matter jurisdiction over the instant case.

"A declaratory judgment counterclaim, according to the relevant procedural provision, may be brought to resolve an 'actual controversy' between 'interested' parties." *Super Sack Mfg. Corp. v. Chase Packaging Corp.*, 57 F.3d 1054, 1057 (Fed. Cir. 1995) (quoting 28 U.S.C. § 2201(a)). "The existence of a sufficiently concrete dispute between the parties remains, however, a jurisdictional predicate to the vitality of such an action." *Id.* The "actual controversy must be extant at all stages of review, not merely at the time the complaint is filed." *Preiser v. Newkirk*, 422 U.S. 395, 401 (1975). The burden is on the plaintiff "to establish that jurisdiction over its declaratory judgment action existed at, and has continued since, the time the [complaint] was filed." *International Med. Prosthetics Research Assocs. v. Gore Enter. Holdings, Inc.*, 787 F.2d 572, 575 (Fed. Cir. 1986). "Whether an actual case or controversy exists so that a district court may entertain an action for declaratory judgment of non-infringement and/or invalidity is governed by Federal Circuit law." *3M Co. v. Avery Dennison Corp.*, 673 F.3d 1372, 1377 (Fed. Cir. 2012) (quotation omitted).

The court has subject matter jurisdiction in a declaratory judgment action when "the facts alleged, under all the circumstances, show that there is a substantial controversy, between parties having adverse legal interests, of sufficient immediacy and reality to warrant the issuance of a declaratory judgment." *MedImmune, Inc. v. Genentech, Inc.*, 549 U.S. 118, 127 (2007) (quotation omitted); *see also Cat Tech LLC v. TubeMaster, Inc.*, 528 F.3d 871, 883 (Fed. Cir. 2008) (stating

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that, in determining whether subject matter jurisdiction exists in a declaratory judgment action, "'all the circumstances' must be considered") (quoting *MedImmune*, 549 U.S. at 127). Under the "all the circumstances" test, courts have "unique and substantial discretion in deciding whether to declare the rights of litigants." *MedImmune*, 549 U.S. at 136 (quotation omitted).

The Federal Circuit has recognized that "a patentee defending against an action for a declaratory judgment of invalidity can divest the trial court of jurisdiction over the case by filing a covenant not to assert the patent at issue against the putative infringer with respect to any of its past, present, or future acts, even when a reissue application covering the same claimed subject matter is then pending." *Super Sack Mfg. Corp.*, 57 F.3d at 1058 (citing *Spectronics Corp. v. H.B. Fuller Co., Inc.*, 940 F.2d 631, 636–38 (Fed. Cir. 1991)). However, a covenant not to sue does not always divest a court of jurisdiction. *See ArcelorMittal v. AK Steel Corp.*, 856 F.3d 1365, 1370 (Fed. Cir. 2017) (recognizing that a covenant not to sue "sometimes" deprives a court of subject matter jurisdiction); *see also Enplas Display Device Corp. v. Seoul Semiconductor Co., Ltd.*, 2015 WL 7874323, at *3 (N.D. Cal. Dec. 3, 2015) ("[A] covenant not to sue does not always divest the trial court of jurisdiction over the case."). "Although a patentee's grant of a covenant not to sue a potential infringer can sometimes deprive a court of subject matter jurisdiction, the patentee bears the formidable burden of showing that it could not reasonably be expected to resume its enforcement activities against the covenanted, accused infringer." *ArcelorMittal*, 856 F.3d at 1370 (internal quotation marks and citations omitted).

In assessing the impact of a covenant not to sue on subject matter jurisdiction in a declaratory judgment action, courts consider all the circumstances. *See MedImmune*, 549 U.S. at 127 (stating that the court has subject matter jurisdiction when "the facts alleged, under all the circumstances, show that there is a substantial controversy"). Accordingly, the Federal Circuit has concluded that a covenant not to sue was not sufficient to divest the court of subject matter jurisdiction when the patentee had already brought infringement lawsuits or taken significant steps towards such lawsuits. *See Revolution Eyewear, Inc. v. Aspex Eyewear, Inc.*, 556 F.3d 1294, 1299 (Fed. Cir. 2009) (concluding that the court retained subject matter jurisdiction despite a covenant not to sue because "[t]hese parties are already in infringement litigation initiated by the patentee [and] the case has been pending since 2003"); *SanDisk Corp. v. STMicroelectronics, Inc.*, 480 F.3d 1372, 1382–83 (Fed. Cir. 2007) ("We decline to hold that [ST's representative's] statement that ST would not sue SanDisk eliminates the justiciable controversy created by ST's actions, because ST has engaged in a course of conduct that shows a preparedness and willingness to enforce its patent rights"); *see also ActiveVideo Networks, Inc. v. TransVideo Elecs., Inc.*, 975 F. Supp. 2d 1083, 1097–98 (N.D. Cal. 2013) (listing factors that the Federal Circuit has considered in determining whether a patentee has taken an affirmative act to support declaratory judgment jurisdiction, including any prior litigation between the parties).

In assessing the impact of a covenant not to sue on subject matter jurisdiction in a declaratory judgment action, courts must consider what is covered by the covenant not to sue. *See Revolution Eyewear, Inc*, 556 F.3d at 1297 ("Whether a covenant not to sue will divest the trial court of jurisdiction depends on what is covered by the covenant"). "A useful question to ask in determining whether an actual controversy exists is what, if any, cause of action the declaratory judgment defendant may have against the declaratory judgment plaintiff." *Benitec Australia, Ltd. v. Nucleonics, Inc.*, 495 F.3d 1340, 1344 (Fed. Cir. 2007).

For example, in *Revolution Eyewear, Inc. v. Aspex Eyewear, Inc.*, the Federal Circuit considered whether a covenant not to sue divested the court of jurisdiction. 556 F.3d at 1297. In that case, the patentee, Revolution, initiated infringement litigation against Aspex, and Aspex made declaratory judgment counterclaims. *Id.* at 1295. Four years into the litigation, after a summary judgment of invalidity (which was later reversed by the Federal Circuit) and on the eve of trial on the question of enforceability, Revolution issued a covenant not to sue, which stated: "Revolution . . . hereby unconditionally covenant[s] not to sue Aspex for patent infringement under the '913 patent based upon any activities and/or products made, used, or sold on or before the dismissal of this action." *Id.* at 1296, 1299. The Federal Circuit held that Revolution's covenant not to sue was insufficient to eliminate jurisdiction over Aspex's counterclaims. *Id.* at 1300. The Federal Circuit relied on the lengthy history of infringement litigation between the parties and emphasized that the covenant not to sue was issued "on the eve of trial." *See id.* at 1299 ("These parties are already in infringement litigation initiated by the patentee, the case has been pending since 2003, and already has produced a summary judgment of invalidity (which was later vacated by this court); the patentee filed its covenant in 2007, after four years of litigation, on the eve of trial of the question of enforceability.") (internal citation omitted).[1]

Similarly, this Court concludes that, considering all the circumstances, a substantial controversy remains. Defendant has been litigating patent enforcement actions against Apple since 2016, when Defendant sued Apple for infringing two patents. *VoIP-Pal.Com*, 375 F. Supp. 3d at 1122. Then, in 2018, Defendant sued Apple for infringing four patents. *VoIP-Pal.Com, Inc.*, 411 F. Supp. 3d at 931. This Court invalidated Defendant's six patents, and this Court's rulings were affirmed by the Federal Circuit. *See VoIP-Pal.Com, Inc.*, 375 F. Supp. 3d at 1110, *aff'd*, 798 F. App'x 644 (Fed. Cir. 2020); *VoIP-Pal.Com, Inc.*, 411 F. Supp. 3d at 926, *aff'd*, 828 F. App'x 717 (Fed. Cir. 2020).

After the Federal Circuit affirmed the first of this Court's rulings invalidating Defendant's patents, Defendant's CEO stated: "[w]e are undeterred in our fight to assert our intellectual property rights . . . I can tell you, we are not finished . . . We remain firm in our resolve to achieve monetization for our shareholders and will continue to see this fight through until a successful resolution is reached." ECF No. 60 at 26.

In 2019, at a case management conference in the 2016 cases, Defendant represented to this Court that Defendant did not then intend to file additional lawsuits against Apple. ECF No. 60 at 27 n.5 (The Court: "Are we just going to keep getting more continuations and then are you going to assert those four continuations against the other Defendants here?" Counsel: "Your Honor, at this time there's no intention to assert any of the other patents against any of the other defendants. I can't promise you that that would never change, but that is not the current intent.").

[1] The Federal Circuit further concluded that jurisdiction existed because "Revolution's covenant did not extend to future sales of the same product as was previously sold." *Revolution Eyewear, Inc.*, 556 F.3d at 1298, 1300.

However, in April 2020, Defendant sued Apple, AT&T, and several other parties in the Waco Division of the Western District of Texas for infringement of the '606 patent. *See VoIP-Pal.Com, Inc. v. Apple Inc.*, Case No. 20-CV-00275-ADA, ECF No. 1 (W.D. Tex. Apr. 7, 2020). Three days later, Apple filed the instant case for a declaratory judgment of non-infringement and invalidity of the '606 patent in this district. ECF No. 1.

In an attempt to change venue from this district to the Western District of Texas, Defendant moved to dismiss the instant case and contended that the first-to-file rule favored the infringement cases pending in the Western District of Texas. ECF No. 32.[2] After this Court denied Defendant's motion to dismiss, Defendant filed a petition for a writ of mandamus with the Federal Circuit and contended that this Court had abused its discretion in declining to apply the first-to-file rule in favor of the infringement cases pending in the Western District of Texas. ECF No. 63. The Federal Circuit then denied Defendant's petition for a writ of mandamus and concluded that this Court did not clearly abuse its discretion in declining to apply the first-to-file rule. *In re VoIP-Pal.Com, Inc.*, 845 F. App'x at 941. The Federal Circuit held that "the conclusion that it would be far less efficient for the Western District of Texas to resolve these cases based on the Northern District of California's familiarity with the overlapping issues is particularity well supported" because the patents in the current cases and prior cases all shared a common specification, title, parent application, and inventors; the current cases and prior cases involved similar technology and accused products; and the Court had previously written a total of 113 pages on the validity of the patents. *Id.* at 942.

After the Federal Circuit denied Defendant's petition for a writ of mandamus, this Court set a March 24, 2021 deadline for Defendant to serve asserted claims and infringement contentions. ECF No. 69. Rather than complying with that deadline, Defendant filed a motion to dismiss which included a covenant not to sue (hereinafter "the Motion to Dismiss Covenant Not to

[2] In Twitter's lawsuit for a declaration of non-infringement and invalidity of the '872 patent, Twitter alleges that, on December 2, 2020, Defendant offered to pay Twitter $250,000 for Twitter to dismiss Twitter's lawsuit for a declaration of non-infringement and invalidity of the '606 patent, which is pending before this Court. *See* Case No. 21-CV-02769-LHK, ECF No. 1 ¶ 44.

Sue”). Mot. at 3. The Motion to Dismiss Covenant Not to Sue is attorney argument and is signed by Defendant’s counsel. Defendant voluntarily dismissed its action in the Western District of Texas without prejudice to refiling in the future in a likely attempt to moot the controversy in the instant case. *See VoIP-Pal.Com, Inc. v. Apple Inc.*, Case No. 20-CV-00275-ADA, ECF No. 49.

In Defendant’s reply, Defendant changed the text of the covenant not to sue so that it explicitly covered past products (hereinafter “Reply Brief Covenant Not to Sue”). Reply at 1. The Reply Brief Covenant Not to Sue is attorney argument and is signed by Defendant’s counsel.

On June 25, 2021, three months after Defendant’s Motion to Dismiss Covenant Not to Sue and one month after Defendant’s Reply Brief Covenant Not to Sue, Defendant filed another lawsuit against Apple in the Waco Division of the Western District of Texas. *See VoIP-Pal.Com, Inc. v. Apple Inc.*, Case No. 21-CV-00670-ADA, ECF No. 1 (W.D. Tex. June 25, 2021). Defendant’s new lawsuit involves patents with similar technology and the same accused Apple products. Defendant’s history of litigation against Apple and the litigation circumstances under which Defendant granted the Motion to Dismiss Covenant Not to Sue and the Reply Brief Covenant Not to Sue thus suggest that, rather than not wanting to litigate against Apple, Defendant merely does not want to litigate against Apple in this district.

As further evidence that Defendant does not want to litigate the ’606 patent in this Court, Defendant has represented to the Western District of Texas that Defendant’s aim in filing a motion to dismiss with a covenant not to sue is to resolve the declaratory judgment actions pending in this district so that Defendant can litigate the ’606 patent in its preferred forum, the Western District of Texas. On March 24, 2021, Defendant filed a notice of related cases in its 2020 cases against Amazon, Facebook, and Google, which informed the Western District of Texas of the instant motion to dismiss and stated the following: “VoIP-Pal believes that the [instant motion to dismiss] resolve[s] or will soon resolve all pending actions involving the ’606 patent between VoIP-Pal and Apple, AT&T, and Verizon, who are the only parties in the above-identified cases that (1) have co-pending declaratory judgment actions in the Northern District of California and (2) are asserting first-filed status based on those actions. Additionally, because VoIP-Pal’s covenant not to sue in the Twitter case resolves or will soon resolve that action, there will soon be no pending cases in the Northern District of California involving the '606 patent. As such, VoIP-Pal's WDTX cases against Amazon, Google, and Facebook will soon be the only pending cases in any court involving the '606 patent." *VoIP-Pal.Com, Inc. v. Facebook, Inc.*, Case No. 20-CV-00267-ADA, ECF No. 49.

Amazon, Facebook, and Google's motions for transfer to the Northern District of California, which were filed in the Western District of Texas in July 2020, remain pending and stayed. *See VoIP-Pal.Com, Inc. v. Facebook, Inc.*, Case No. 20-CV-00267-ADA, ECF No. 26; *VoIP-Pal.Com, Inc. v. Google LLC*, Case No. 20-CV-00269- ADA, ECF No. 18; *VoIP-Pal.Com, Inc. v. Amazon.Com, Inc.*, Case No. 20-CV-00272-ADA, ECF No. 26. Moreover, Defendant's 2020 cases against Amazon, Facebook, and Google remain pending in the Western District of Texas and have been stayed since September 29, 2020. *See VoIP-Pal.Com, Inc. v. Facebook, Inc.*, Case No. 20-CV-00267-ADA, ECF No. 38.

Based on Defendant's history of litigation against Apple and the litigation circumstances under which Defendant granted the Motion to Dismiss Covenant Not to Sue and the Reply Brief Covenant Not to Sue, the Court retains subject matter jurisdiction in the instant case. Indeed, the Federal Circuit has found declaratory judgment jurisdiction in similar circumstances despite the existence of a covenant not to sue. *See Revolution Eyewear, Inc.*, 556 F.3d at 1299 (concluding that the court retained subject matter jurisdiction despite a covenant not to sue because "[t]hese parties are already in infringement litigation initiated by the patentee, the case has been pending since 2003, and already has produced a summary judgment of invalidity . . .. the patentee filed its covenant in 2007, after four years of litigation, on the eve of trial of the question of enforceability"); *see also SanDisk Corp.*, 480 F.3d at 1382–83 ("We decline to hold that [ST's representative's] statement that ST would not sue SanDisk eliminates the justiciable controversy created by ST's actions, because ST has engaged in a course of conduct that shows a preparedness and willingness to enforce its patent rights despite [ST's representative's] statement").

Furthermore, examining the text of the Reply Brief Covenant Not to Sue, the parties remain adverse because at a minimum the Reply Brief Covenant Not to Sue does not include Apple's customers. *See* Reply at 1. The omission of Apple's customers is particularly significant because Defendant asserted in Defendant's 2020 lawsuit in the Waco Division of the Western District of Texas that Apple's customers infringed the '606 patent. *See VoIP-Pal.Com, Inc. v. Apple Inc.*, Case No. 20-CV-00275-ADA, ECF No. 1 ¶ 51 (asserting that "Apple customers and other third parties have directly infringed the '606 patent, including at least exemplary claims 8 and 15"). Accordingly, the Reply Brief Covenant Not to Sue does not divest the Court of subject matter jurisdiction over the instant case. *See ArchelorMittal*, 856 F.3d at 1370 (concluding that subject matter jurisdiction existed because "[a]t no time before the court entered summary judgment did ArchelorMittal unconditionally assure Defendants and their customers that it would never assert [the asserted patent's] claims 24 and 25 against them"); *Sandisk Corp. v. Mobile Media Ideas LLC*, 2011 WL 1990662, at *3 (N.D. Cal. May 23, 2011) ("Until MMI expressly covenants not to sue SanDisk's customers for infringement of any of the patents-in-suit based upon past or current versions of SanDisk's media player products, this case will not be dismissed."); *see generally Arris Grp., Inc. v. British Telecomm. PLC*, 639 F.3d 1368, 1378 (Fed. Cir. 2011) (stating that, "where a patent holder accuses customers of direct infringement based on the sale or use of a supplier's equipment, the supplier has standing to commence a declaratory judgment action if (a) the supplier is obligated to indemnify its customers from infringement liability, or (b) there is a controversy between the patentee and the supplier as to the supplier's liability for induced or contributory infringement based on the alleged acts of direct infringement by its customers").

In sum, considering all the circumstances, neither Defendant's Motion to Dismiss Covenant Not to Sue nor Defendant's Reply Brief Covenant Not to Sue divest this Court of subject matter jurisdiction. Defendant has a significant history of litigation against Apple, including four infringement lawsuits, the last of which was filed one month after the Reply Brief Covenant Not to Sue and three months after the Motion to Dismiss Covenant Not to Sue. Defendant did not grant the Motion to Dismiss Covenant Not to Sue until five years into its litigation against Apple, on the same day that Defendant was required to serve asserted claims and infringement contentions and in an apparent attempt to avoid a ruling from this Court on the ’606 patent. Since Defendant issued the Motion to Dismiss Covenant Not to Sue and the Reply Brief Covenant Not to Sue, Defendant has sued Apple for infringement of patents with similar technology based on the same accused products in Waco, Texas. Moreover, neither the Motion to Dismiss Covenant Not to Sue nor the Reply Brief Covenant Not to Sue includes Apple’s customers, whom Defendant accused of infringing the ’606 patent in Defendant’s infringement lawsuit in Waco, Texas. Under all these circumstances, Defendant has not met its “formidable burden of showing that it could not reasonably be expected to resume its enforcement activities against the covenanted, accused infringer.” *ArcelorMittal*, 856 F.3d at 1370. Accordingly, the Court DENIES Defendant’s motion to dismiss on the grounds that the Court lacks subject matter jurisdiction over the instant case.

IV. CONCLUSION

For the foregoing reasons, the Court DENIES Defendant’s motion to dismiss.

IT IS SO ORDERED.

Dated: August 26, 2021

Lucy H. Koh

LUCY H. KOH
United States District Judge

EXHIBIT 10

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UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

SAN JOSE DIVISION

TWITTER, INC., a Delaware corporation, Plaintiff, v. VOIP-PAL.COM, INC., a Nevada corporation, Defendant.	No. 21-cv-2769 **COMPLAINT FOR DECLARATORY JUDGMENT**

I. Introduction

1. This Complaint for declaratory judgment of noninfringement ("Declaratory Judgment Complaint") arises from a real, substantial, immediate, and justiciable controversy between plaintiff Twitter, Inc. ("Twitter"), and defendant VoIP-Pal.com Inc. ("VoIP-Pal"), as to whether Twitter infringes any claims of U.S. Patent 9,935,872 ("the '872 patent"; Exhibit 1), which is entitled, "Producing Routing Messages For Voice Over IP Communications." This action is related to prior litigations between VoIP-Pal and Twitter that began in 2016.

2. The '872 patent is a continuation patent from a patent family that includes six other patents that VoIP-Pal asserted in prior lawsuits against Twitter, Apple, AT&T, Verizon, and Amazon that VoIP-Pal filed in 2016 and 2018 in the District of Nevada. Those actions were later transferred to this Court ("the 2016 and 2018 Cases"). The '872 patent shares a common specification with the six previously-asserted patents. All six of the previously-asserted patents were found to be invalid under 35 U.S.C. § 101 for claiming ineligible subject matter, including U.S. Patent 9,179,005 ("the '005 patent"; Exhibit 2) and U.S. Patent 8,542,815 ("the '815 patent"), which VoIP-Pal asserted in the 2016 Case against Twitter. *E.g.*, *VoIP-Pal.com, Inc. v. Twitter, Inc.*, Case No. 18-cv-04523-LHK, ECF No. 82 (Mar. 25, 2019).

3. In April 2020, VoIP-Pal filed lawsuits in the Western District of Texas asserting U.S. Patent 10,218,606 ("the '606 patent"; Exhibit 3) against Facebook, WhatsApp, Google, Amazon, Apple, AT&T, and Verizon ("the Texas lawsuits"). The '606 patent is a continuation of the '872 patent and is a member of the same family of patents asserted in the 2016 and 2018 Cases, and shares a common specification with the six patents asserted in the 2016 and 2018 Cases and the '872 patent. The claims of the '606 patent asserted in those new lawsuits are very similar to the claims of the patents that VoIP-Pal previously asserted in the 2016 and 2018 Cases and were found to be invalid by this Court.

4. On April 8, 2020, VoIP-Pal issued a press release stating that VoIP-Pal is considering taking further action and is not finished taking action in the wake of a recent decision by the Court of Appeals for the Federal Circuit in favor of Twitter, Apple, AT&T, and Verizon

that affirmed this Court's judgment in the 2016 Cases that two of VoIP-Pal's previously-asserted patents are invalid under 35 U.S.C. § 101 (Exhibit 4).

5. On April 8, 2020, after seeing VoIP-Pal's lawsuits in Texas against Facebook, WhatsApp, Google, Amazon, and Apple and VoIP-Pal's press release, Twitter filed an action for declaratory judgment of noninfringement of the '606 patent against VoIP-Pal in this Court (Case No. 20-cv-02397). Soon thereafter, Apple, AT&T, and Verizon filed similar declaratory judgment actions against VoIP-Pal based on the '606 patent. On April 14, 2020, Apple filed a first amended complaint that added claims for declaratory judgment of noninfringement and invalidity for the '872 patent.

6. In June 2020, counsel for Twitter asked counsel for VoIP-Pal whether VoIP-Pal would be willing to grant Twitter a covenant not to sue for the '606 patent, but VoIP-Pal declined to discuss a covenant not to sue. On June 26, 2020, Twitter filed a first amended complaint that added a claim for a declaratory judgment of invalidity of the '606 patent.

7. In July 2020, VoIP-Pal filed motions to dismiss Twitter's, Apple's, AT&T's and Verizon's declaratory judgment complaints in this Court for lack of subject matter jurisdiction, lack of personal jurisdiction, and improper venue. In December 2020, the Court denied VoIP-Pal's motions to dismiss. *E.g.*, *Twitter, Inc. v. VoIP-Pal.com, Inc.*, Case No. 20-cv-02397, ECF No. 50 (Dec. 14, 2020) (Exhibit 5); *Apple Inc. v. VoIP-Pal.com, Inc.*, Case No. 20-cv-02460, ECF No. 60 (Dec. 11, 2020) (Exhibit 6).

8. Between December 2020 and April 2021, VoIP-Pal and Twitter had multiple communications about possible resolution of Twitter's declaratory judgment action against the '606 patent and a possible broader resolution that includes VoIP-Pal's other patents, including the '872 patent. Those communications have not resulted in a resolution of the dispute between VoIP-Pal and Twitter concerning VoIP-Pal's patents.

9. On March 24, 2021, VoIP-Pal filed another motion to dismiss the declaratory judgment actions filed by Twitter, Apple, AT&T, and Verizon—this time based on a limited covenant not to sue for infringement of the '606 patent. *E.g.*, *Twitter*, Case No. 20-cv-02397, ECF No. 62 (Mar. 21, 2021). That limited covenant not to sue was insufficient to eliminate

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subject matter jurisdiction for Twitter's declaratory judgment claims for the reasons explained in Twitter's opposition to that motion. *Id.*, ECF No. 66 (Apr. 7, 2021). In response to Twitter's opposition, on April 9, 2021, VoIP-Pal offered a broader covenant not to sue based on the '606 patent and asked Twitter to stipulate to dismissal of Twitter's declaratory judgment action.

10. On April 12, 2021, Twitter responded in part that, at a minimum, any covenant not to sue to resolve Twitter's declaratory judgment action against the '606 patent should also include the '872 patent. Twitter also stated that it expects VoIP-Pal to sue Twitter in the future and that even a broader covenant that includes the '606 and '872 patents would not be sufficient to resolve the broader dispute between Twitter and VoIP-Pal concerning VoIP-Pal's patent portfolio. On April 13, 2021, VoIP-Pal responded that its broader covenant not to sue was intended to address only the issues raised by Twitter in opposition to VoIP-Pal's motion to dismiss and declined to extend the covenant to include the '872 patent or other VoIP-Pal patents.

11. Twitter's and VoIP-Pal's dispute concerning the '872 patent is related to VoIP-Pal's 2016 Case against Twitter and Twitter's declaratory judgment action involving the '606 patent. The claims of the '872 patent are very similar to the claims of the six patents that VoIP-Pal previously asserted in the 2016 and 2018 Cases and were found to be invalid by this Court, including the '005 patent, which was asserted against Twitter (Exhibits 1 and 2). The Federal Circuit affirmed this Court's judgment of invalidity for those six patents, including the '005 patent, which was asserted against Twitter. The claims of the '872 patent are also very similar to the claims of the '606 patent (Exhibits 1 and 3), which is the subject of the pending Texas lawsuits and the declaratory judgment actions filed by Twitter, Apple, AT&T, and Verizon in this Court. Apple has filed a claim for declaratory judgment of noninfringement and invalidity for the '872 patent, and this Court has found that subject matter jurisdiction exists for that claim.

12. Twitter believes that it does not infringe and has not infringed any claims of the '872 patent. VoIP-Pal has offered to Twitter a license for its patents in the family that includes the '606 and '872 patents but on terms that are unreasonable and unacceptable to Twitter.

13. VoIP-Pal's actions have created a real, substantial, and immediate controversy between VoIP-Pal and Twitter as to whether Twitter's products and/or services infringe any

claims of the '872 patent. The facts and allegations recited herein show that there is a real, substantial, immediate, and justiciable controversy concerning these issues.

II. Parties

14. Plaintiff Twitter is a company incorporated under the laws of Delaware, with headquarters at 1355 Market Street, Suite 900, San Francisco, California.

15. Twitter operates a global Internet platform for public self-expression and conversation in real time. People with a Twitter account can post "Tweets"—messages of 280 characters or less, sometimes with pictures or video, and those messages can be read by other people using the Twitter platform. They may, in turn, "Retweet" those messages to their own followers. Users can include "hashtagged" keywords (indicated by a "#") in their Tweets to facilitate searching for messages on the same topic. People who use Twitter can also send direct messages to other users that can contain images and video. Each day, people post hundreds of millions of Tweets, engaging in public conversation on virtually every conceivable topic. Twitter's products and services are provided through the Twitter platform.

16. Based on information and belief, defendant VoIP-Pal is a company incorporated under the laws of Nevada and recently relocated its principal place of business from Bellevue, Washington, to 7215 Bosque Blvd, Suite 102, Waco, Texas 76710. *See* https://www.voip-pal.com/contact-us; Exhibit 7.

17. Based on information and belief, VoIP-Pal is the owner of the '872 patent.

III. Jurisdiction And Venue

18. This Declaratory Judgment Complaint includes a count for declaratory relief under the patent laws of the United States, 35 U.S.C. §§ 1, *et seq.*

19. Twitter seeks declaratory relief under 28 U.S.C. §§ 2201 and 2202.

20. This Court has subject matter jurisdiction over the claims alleged in this action under 28 U.S.C. §§ 1331, 1332, 1338, 2201, and 2202 because this Court has exclusive jurisdiction over declaratory judgment claims arising under the patent laws of the United States pursuant to 28 U.S.C. §§ 1331, 1338, 2201, and 2202. Jurisdiction is also proper under 28 U.S.C.

§ 1332 because Twitter and VoIP-Pal are citizens of different states, and the value of the controversy exceeds $75,000.

21. This Court can provide the declaratory relief sought in this Declaratory Judgment Complaint because an actual case and controversy exists between the parties within the scope of this Court's jurisdiction pursuant to 28 U.S.C. § 2201. An actual case and controversy exists at least because:

- VoIP-Pal previously filed lawsuits against Twitter and other defendants in the 2016 and 2018 Cases alleging infringement of six patents in the same family as the '606 and '872 patents;
- VoIP-Pal is asserting the '606 patent in the Texas lawsuits against Facebook, Google, Amazon, Apple, AT&T, and Verizon;
- Twitter, AT&T, and Verizon have filed actions in this Court seeking declaratory judgment of noninfringement and invalidity of the '606 patent, and Apple has filed an action in this Court seeking declaratory judgment of noninfringement and invalidity of the '606 and '872 patents;
- the '872 patent shares a common specification with VoIP-Pal's six patents asserted in the 2016 and 2018 Cases and the '606 patent;
- this Court denied VoIP-Pal's motions to dismiss Twitter's, Apple's, AT&T's, and Verizon's declaratory judgment lawsuits against the '606 patent for lack of subject matter jurisdiction, personal jurisdiction, and improper venue and also denied VoIP-Pal's motion to dismiss Apple's declaratory judgment claims against the '872 patent for lack of subject matter jurisdiction;
- the claims of the '872 patent are very similar to the claims of the six patents that VoIP-Pal previously asserted in the 2016 and 2018 Cases (including the '005 patent that VoIP-Pal asserted against Twitter), and the claims of the '606 patent;
- all six patents previously asserted by VoIP-Pal in the 2016 and 2018 Cases were held invalid under 35 U.S.C. § 101 by this Court, and—based on the substantial similarities

between those invalid claims and the claims of the ’606 and ’872 patents—the ’606 and ’872 patents are invalid for at least the same reasons;

- In April 2020, VoIP-Pal filed lawsuits in Texas against prior defendants Amazon, Apple, AT&T, and Verizon for infringement of the ’606 patent;
- On April 8, 2020, VoIP-Pal made public statements to the effect that it is considering taking further action and is not finished taking action in the wake of the Federal Circuit’s decision in April 2020 affirming the judgment that the claims of the two patents that VoIP-Pal asserted in the 2016 Cases against Twitter and others are invalid;
- VoIP-Pal’s infringement allegations in the Texas lawsuits are similar to VoIP-Pal’s infringement allegations in the 2016 and 2018 Cases (including against many of the same prior defendants) and are directed to accused instrumentalities that are similar to Twitter’s products and services—for example, communications involving text, images, and videos;
- Twitter has told VoIP-Pal that Twitter expects to be sued in the future by VoIP-Pal for patent infringement, and VoIP-Pal has not denied Twitter’s stated expectation;
- Twitter has requested a covenant not to sue or a license that includes the ’872 patent, but, to date, VoIP-Pal and Twitter have not been able to agree on the terms of a covenant not to sue or a license for the ’872 patent;
- VoIP-Pal has offered to Twitter a license for its patents in the family that includes the ’606 and ’872 patents but on terms that are unreasonable and unacceptable to Twitter; and
- Twitter does not infringe and has not infringed any claims of the ’872 patent.

22. This Court has personal jurisdiction over VoIP-Pal because VoIP-Pal has engaged in actions in this District that form the basis of Twitter’s claim against VoIP-Pal—namely, prosecuting a prior patent infringement lawsuit involving the ’005 patent against Twitter in this District, voluntarily transferring from Nevada to this District the 2016 Cases against Apple, AT&T, and Verizon and the 2018 Cases against Apple and Amazon. VoIP-Pal also has retained counsel located in California to prosecute its patent portfolio and to represent VoIP-Pal in the

2016 and 2018 Cases, the Texas lawsuits, and the declaratory judgment actions filed by Twitter, Apple, AT&T, and Verizon in this Court, including Lewis Hudnell of the Hudnell Law Group in Mountain View, California. On information and belief, on or about April 20, 2016, VoIP-Pal representative Ray Leon met with representatives of Apple in the Northern District of California in connection with VoIP-Pal's patent enforcement campaign. VoIP-Pal moved to dismiss Twitter's, Apple's, AT&T's, and Verizon's declaratory judgment actions in this Court against the '606 patent and Apple's declaratory judgment claims against the '872 patent for lack of personal jurisdiction, but the Court denied VoIP-Pal's motions and found personal jurisdiction over VoIP-Pal to exist.

23. As a result of VoIP-Pal's actions described above, there is a real, substantial, live, immediate, and justiciable case or controversy concerning the '872 patent between VoIP-Pal and Twitter, a company that resides and operates in this District. As a result of VoIP-Pal's actions described above, VoIP-Pal has established sufficient minimum contacts with the Northern District of California such that VoIP-Pal is subject to specific personal jurisdiction in the Northern District of California for this action. Further, the exercise of personal jurisdiction based on those repeated and highly-pertinent contacts does not offend traditional notions of fair play and substantial justice.

24. Venue is proper in this District under 28 U.S.C. §§ 1391 and 1400, including because, under Ninth and Federal Circuit law, venue in declaratory judgment actions for noninfringement of patents is determined under the general venue statute, 28 U.S.C. § 1391.

25. Under 28 U.S.C. § 1391(b)(1), venue is proper in any judicial district where a defendant resides. An entity with the capacity to sue and be sued, such as VoIP-Pal, is deemed to reside, if a defendant, in any judicial district in which such defendant is subject to the court's personal jurisdiction with respect to the civil action in question under 28 U.S.C. § 1391(c).

26. As discussed above, VoIP-Pal is subject to personal jurisdiction with respect to this action in the Northern District of California, and thus, for the purposes of this action, VoIP-Pal resides in the Northern District of California and venue is proper under 28 U.S.C. § 1391.

IV. Factual Background

A. VoIP-Pal's Prior Lawsuits (2016 and 2018 Cases)

27. In 2016, VoIP-Pal filed lawsuits in the District of Nevada against Twitter, Apple, AT&T, and Verizon, alleging infringement of the '815 and '005 patents. Between August and November of 2018, all four of those actions were transferred to this Court and consolidated for pretrial purposes: Twitter (Case No. 5:18-cv-04523-LHK), Verizon (Case No. 18-cv-06054-LHK), AT&T (Case No. 3:18-cv-06177-LHK), and Apple (Case No. 3:18-cv-06217-LHK) (collectively, the 2016 Cases).

28. In the 2016 Cases, Twitter, Apple, AT&T, and Verizon filed a motion to dismiss under Fed. R. Civ. P. 12(b)(6) that the asserted claims of the '815 and '005 patents are invalid under 35 U.S.C. § 101. On March 25, 2019, this Court granted the motion to dismiss and found all asserted claims of the '815 and '005 patents to be invalid (Exhibit 8). VoIP-Pal appealed. On March 16, 2020, the Federal Circuit affirmed this Court's judgment of invalidity.

29. In May and June 2018, VoIP-Pal filed two additional lawsuits against Apple and Amazon in the District of Nevada (collectively, "the 2018 Cases"), alleging infringement of four patents, U.S. Patents 9,537,762; 9,813,330; 9,826,002; and 9,948,549. Those four patents are in the same family as, and share a common specification with, the '815 and '005 patents that were asserted in the 2016 Cases. The asserted claims of the four patents in the 2018 Cases are very similar to the asserted claims of the two patents in the 2016 Cases.

30. In October and November 2018, VoIP-Pal voluntarily agreed to transfer to this Court the 2018 Cases against Apple (Case No. 5:18-cv-06216-LHK) and Amazon (Case No. 5:18-cv-07020-LHK).

31. In the 2018 Cases, Apple and Amazon filed a motion to dismiss under Fed. R. Civ. P. 12(b)(6) that the asserted claims of the four asserted patents are invalid under 35 U.S.C. § 101. On November 1, 2019, this Court granted Apple's and Amazon's motion to dismiss and found all asserted claims of the patents in the 2018 Cases to be invalid (Exhibit 9). VoIP-Pal appealed. On November 3, 2020, the Federal Circuit affirmed this Court's judgment of invalidity.

B. VoIP-Pal's Texas Lawsuits And Press Release, And Twitter's, Apple's, AT&T's, And Verizon's Declaratory Judgment Actions In This Court

32. During April 2-7, 2020, VoIP-Pal filed four new lawsuits in the Western District of Texas, Waco Division, asserting the '606 patent against defendants Facebook and WhatsApp (Case No. 20-cv-267), Google (Case No. 20-cv-269), and previously-sued defendants Amazon (Case No. 20-cv-272) and Apple (Case No. 20-cv-275). On April 24, 2020, VoIP-Pal filed new lawsuits in the Western District of Texas asserting the '606 patent against AT&T (Case No. 20-cv-325) and Verizon Wireless (Case No. 20-cv-327).

33. The '606 patent is entitled, "Producing Routing Messages For Voice Over IP Communications," and, on its face, issued on February 26, 2019 (Exhibit 3). The '606 patent is in the same family as and shares a common specification with the six patents that VoIP-Pal asserted in the 2016 and 2018 Cases and were found to be invalid by this Court and also is a continuation of the '872 patent. During prosecution of the '606 and '872 patents, the named inventors terminally disclaimed the terms of those patents in view of one or more of VoIP-Pal's patents asserted in the 2018 Cases.

34. The claims of the '606 patent that VoIP-Pal asserts in the Texas lawsuits are very similar to claims of the six patents that VoIP-Pal asserted against Twitter, Apple, AT&T, and Verizon in the 2016 and 2018 Cases (for example, claim 74 of the '005 patent) and were held to be invalid.

35. VoIP-Pal's infringement allegations in the Texas lawsuits are similar to VoIP-Pal's infringement allegations in the 2016 and 2018 Cases (including against many of the same prior defendants) and are directed to accused instrumentalities that are similar to Twitter's products and services (for example, communications involving text, images, and videos).

36. On April 8, 2020, VoIP-Pal issued a press release that announced the filing of the Texas lawsuits against Facebook, WhatsApp, Google, Amazon, and Apple (Exhibit 4 and https://www.voip-pal.com/voip-pal-new-patent-lawsuits-april-). The press release also mentioned the Federal Circuit's affirmance of this Court's judgment of invalidity in the 2016 Cases against Twitter, Apple, AT&T, and Verizon. The press release states that, in the wake of the Federal

Circuit decision, VoIP-Pal is considering taking further action and "planning their next moves." VoIP-Pal's CEO is quoted as saying, "Our legal team is assessing our next moves regarding this Alice decision and we expect to announce our intentions soon. ***I can tell you; we are not finished***," and "We remain firm in our resolve to achieve monetization for our shareholders and will continue to see this fight through until a successful resolution is reached. Patience is a virtue." (Exhibit 4 (emphasis added).)

37. As a result of the events described above, on April 8, 2020, Twitter filed an action for declaratory judgment of noninfringement of the '606 patent against VoIP-Pal in this Court (Case No. 20-cv-02397). On June 26, 2020, Twitter filed a first amended complaint that added a claim for a declaratory judgment of invalidity of the '606 patent.

38. On April 10, 2020, Apple filed an action for declaratory judgment of noninfringement and invalidity of the '606 patent against VoIP-Pal in this Court (Case No. 20-cv-02460). On April 14, 2020, Apple filed a first amended complaint that added claims for declaratory judgment of noninfringement and invalidity of the '872 patent.

39. On April 24, 2020, VoIP-Pal filed lawsuits in the Western District of Texas asserting the '606 patent against AT&T and Verizon.

40. On April 30, 2020, AT&T filed an action for declaratory judgment of noninfringement and invalidity of the '606 patent against VoIP-Pal in this Court (Case No. 20-cv-02995).

41. On May 5, 2020, Verizon filed an action for declaratory judgment of noninfringement and invalidity of the '606 patent against VoIP-Pal in this Court (Case No. 20-cv-03092).

42. On June 4, 2020, counsel for Twitter asked counsel for VoIP-Pal whether VoIP-Pal would be willing to grant Twitter a covenant not to sue based on the '606 patent. On June 11, 2020, counsel for VoIP-Pal declined to discuss a covenant not to sue.

43. On July 10, 2020, VoIP-Pal filed motions to dismiss Twitter's, AT&T's, and Verizon's declaratory judgment actions against the '606 patent and Apple's declaratory judgment action against the '606 and '872 patents for lack of subject matter jurisdiction, lack of personal

jurisdiction, and improper venue. In December 2020, this Court denied VoIP-Pal's motions to dismiss, finding that subject matter jurisdiction and personal jurisdiction exist and that venue is proper. *E.g.*, *Twitter, Inc. v. VoIP-Pal.com, Inc.*, Case No. 20-cv-02397, ECF No. 50 (Dec. 14, 2020) (Exhibit 5); *Apple Inc. v. VoIP-Pal.com, Inc.*, Case No. 20-cv-02460, ECF No. 60 (Dec. 11, 2020) (Exhibit 6).

44. On December 2, 2020, counsel for Twitter and VoIP-Pal had a telephone call in which VoIP-Pal offered to pay Twitter $250,000 for Twitter to dismiss its declaratory judgment action against the '606 patent. Twitter informed VoIP-Pal that Twitter is not interested in a piecemeal settlement in view of VoIP-Pal's other patents, including the '872 patent, which was the subject of declaratory judgment claims advanced by Apple, and the likelihood that VoIP-Pal would sue Twitter again in the future. Twitter's counsel asked if VoIP-Pal would be willing to discuss a global settlement by which VoIP-Pal would agree not to sue Twitter on any of its patents. VoIP-Pal's counsel declined to discuss such a global settlement.

45. On January 4, 2021, counsel for Twitter corresponded with counsel for VoIP-Pal to state that, in view of VoIP-Pal's litigation history and patent portfolio, Twitter is not interested in pursuing a piecemeal resolution that would resolve only the current action and to note that VoIP-Pal declined to discuss a broader resolution that would include the '872 patent.

46. On January 11, 2021, counsel for Twitter and VoIP-Pal had a telephone call in which VoIP-Pal proposed to enter into a settlement for the '606 patent and "all family members" (which includes the '872 patent), for a payment by Twitter of $1 million. On January 15, 2021, Twitter declined VoIP-Pal's offer based in part on the belief that the '606 and '872 patents and other patents in the same family are invalid under 35 U.S.C. § 101.

47. On March 24, 2021, VoIP-Pal filed additional motions to dismiss Twitter's, AT&T's, and Verizon's declaratory judgment actions against the '606 patent and Apple's declaratory judgment action against the '606 and '872 patents—this time based on covenants not to sue that VoIP-Pal granted in the motions. *E.g.*, *Twitter*, Case No. 20-cv-02397, ECF No. 62 (Mar. 21, 2021). That covenant was insufficient to eliminate subject matter jurisdiction for reasons explained in Twitter's opposition. *Id.*, ECF No. 66 (Apr. 7, 2021). In response, on

April 9, 2021, VoIP-Pal offered a broader covenant not to sue based on the ’606 patent and asked Twitter to stipulate to dismissal of Twitter’s declaratory judgment action.

48. On April 12, 2021, Twitter responded in part that, at a minimum, a covenant not to sue to resolve Twitter’s declaratory judgment action against the ’606 patent should also include the ’872 patent in view of Twitter’s and Voip-Pal’s prior discussions about the ’872 patent, VoIP-Pal’s initial refusal to discuss a global resolution that includes the ’872 patent, Apple’s existing declaratory judgment claims against the ’872 patent and the fact that Twitter can file the same declaratory judgment claims against the 872 patent, and VoIP-Pal’s unreasonable settlement demands. Twitter also stated that it expects VoIP-Pal to sue Twitter in the future and that even a broader covenant that includes the ’606 and ’872 patents would not be sufficient to resolve the broader dispute between Twitter and VoIP-Pal based on VoIP-Pal’s patent portfolio. VoIP-Pal responded by declining to discuss at that time a covenant not to sue for more than the ’606 patent.

49. Twitter’s and VoIP-Pal’s dispute concerning the ’872 patent is related to the prior litigations between VoIP-Pal and Twitter that began in 2016. The claims of the ’872 patent are very similar to the claims of the six patents that VoIP-Pal previously asserted in the 2016 and 2018 Cases and were found to be invalid by this Court. For example, claim 1 of the ’872 patent is very similar to claim 74 of the ’005 patent, which was previously asserted against Twitter, Apple, AT&T, and Verizon in the 2016 Cases. Both claims define methods of routing communications between devices of first and second participants in an Internet-connected network (’872 patent) or a packet switched network (’005 patent), using “identifiers” of the participants. The participants are associated with first and second “network elements” (’872 patent) or “portions” of the network that are controlled or not controlled by an “entity” (’005 patent). The first participant identifier is used to locate a first participant “profile” that includes a plurality of “attributes” associated with the first participant. At least one of the attributes are (1) processed to determine whether the communication to the second participant is allowed to proceed, and, if so, to produce a routing message that identifies an Internet address associated with a first or second network element to establish communication with the second participant device (’872 patent), or

(2) compared to a "criterion" to produce a routing message that identifies an address in a first or second portion of the packet switched network.

50. The '606 patent is a continuation of the '872 patent. During prosecution of the '606 and '872 patents, the named inventors terminally disclaimed the terms of those patents in view of one or more of VoIP-Pal's patents asserted in the 2018 Cases. The claims of the '872 patent are very similar to the claims of the '606 patent (Exhibits 1 and 3), which is the subject of the pending Texas lawsuits and the declaratory judgment actions filed by Twitter, Apple, AT&T, and Verizon in this Court. For example, claim 1 of the '872 patent is very similar to claims 1, 8, 15, and 19 of the '606 patent, which are exemplary asserted claims identified by VoIP-Pal in the Texas lawsuits.

51. Twitter believes that it does not infringe and has not infringed any claims of the '872 patent.

INTRADISTRICT ASSIGNMENT

52. For purposes of intradistrict assignment under Civil Local Rules 3-2(c) and 3-5(b), this Intellectual Property Action will be assigned on a district-wide basis. Twitter believes that the case should be assigned to the Honorable Lucy H. Koh, who presided over the prior lawsuits between VoIP-Pal and Twitter, Apple, AT&T, Verizon, and Amazon. *E.g.*, *VoIP-Pal.com, Inc. v. Twitter, Inc.*, Case No. 18-cv-04523-LHK; *Twitter, Inc. v. VoIP-Pal.com, Inc.*, Case No. 20-cv-02397.

FIRST CLAIM FOR RELIEF
(DECLARATORY JUDGMENT OF NONINFRINGEMENT OF THE '872 PATENT BY TWITTER)

53. The facts and allegations contained in the preceding paragraphs are incorporated by reference herein.

54. In view of the facts and allegations set forth above, there is an actual, substantial, immediate, and justiciable controversy between Twitter and VoIP-Pal regarding whether Twitter's products and services infringe any claims of the '872 patent.

55. For example, an actual case and controversy exists at least because:

- VoIP-Pal previously filed lawsuits against Twitter and other defendants in the 2016 and 2018 Cases alleging infringement of six patents in the same family as the '606 and '872 patents;
- VoIP-Pal is asserting the '606 patent in the Texas lawsuits against Facebook, Google, Amazon, Apple, AT&T, and Verizon;
- Twitter, AT&T, and Verizon have filed actions in this Court seeking declaratory judgment of noninfringement and invalidity of the '606 patent, and Apple has filed an action in this Court seeking declaratory judgment of noninfringement and invalidity of the '606 and '872 patents;
- the '872 patent shares a common specification with VoIP-Pal's six patents asserted in the 2016 and 2018 Cases and the '606 patent;
- this Court denied VoIP-Pal's motions to dismiss Twitter's, Apple's, AT&T's, and Verizon's declaratory judgment lawsuits against the '606 patent for lack of subject matter jurisdiction, personal jurisdiction, and improper venue and also denied VoIP-Pal's motion to dismiss Apple's declaratory judgment claims against the '872 patent for lack of subject matter jurisdiction;
- the claims of the '872 patent are very similar to the claims of the six patents that VoIP-Pal previously asserted in the 2016 and 2018 Cases (including the '005 patent that VoIP-Pal asserted against Twitter), and the claims of the '606 patent;
- all six patents previously asserted by VoIP-Pal in the 2016 and 2018 Cases were held invalid under 35 U.S.C. § 101 by this Court, and—based on the substantial similarities between those invalid claims and the claims of the '606 and '872 patents—the '606 and '872 patents are invalid for at least the same reasons;
- In April 2020, VoIP-Pal filed lawsuits in Texas against prior defendants Amazon, Apple, AT&T, and Verizon for infringement of the '606 patent;
- On April 8, 2020, VoIP-Pal made public statements to the effect that it is considering taking further action and is not finished taking action in the wake of the Federal

Circuit's decision in April 2020 affirming the judgment that the claims of the two patents that VoIP-Pal asserted in the 2016 Cases against Twitter and others are invalid;

- VoIP-Pal's infringement allegations in the Texas lawsuits are similar to VoIP-Pal's infringement allegations in the 2016 and 2018 Cases (including against many of the same prior defendants) and are directed to accused instrumentalities that are similar to Twitter's products and services—for example, communications involving text, images, and videos;
- Twitter has told VoIP-Pal that Twitter expects to be sued in the future by VoIP-Pal for patent infringement, and VoIP-Pal has not denied Twitter's stated expectation;
- Twitter has requested a covenant not to sue or a license that includes the '872 patent, but, to date, VoIP-Pal and Twitter have not been able to agree on the terms of a covenant not to sue or a license for the '872 patent;
- VoIP-Pal has offered to Twitter a license for its patents in the family that includes the '606 and '872 patents but on terms that are unreasonable and unacceptable to Twitter; and
- Twitter does not infringe and has not infringed any claims of the '872 patent.

56. Twitter does not infringe and has not infringed any claims of the '872 patent because, for example, no Twitter product or service meets or embodies the limitation of "processing the second participant identifier based on at least one of the plurality of first participant attributes located using the first participant identifier, using the at least one processor, to determine whether the second network element is the same as the first network element," "when the second network element is determined to be the same as the first network element, producing a routing message identifying a first Internet address associated with the first network element," and "when the second network element is determined not to be the same as the first network element, producing a routing message identifying a second Internet address associated with the second network element."

57. In view of the foregoing, there is an actual, substantial, immediate, and justiciable controversy between Twitter and VoIP-Pal regarding whether Twitter's products and services infringe any claims of the '872 patent.

58. Twitter is entitled to a judgment declaring that no Twitter products or services infringe the '872 patent.

PRAYER FOR RELIEF

Twitter respectfully requests that this Court enter judgment against VoIP-Pal as follows:

A. A declaration that the Twitter products and services do not infringe any claims of the '872 patent;

B. For attorney's fees and costs;

C. Such other and further relief as this Court or a jury may deem just and proper.

DATED: April 16, 2021

PERKINS COIE LLP

By: *<u>/s/ Amisha Manek</u>*
Sarah Fowler
Amisha Manek
Gene Lee
Thomas Matthew

Attorneys for Plaintiff Twitter, Inc.

EXHIBIT 11

UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

SAN JOSE DIVISION

TWITTER, INC.,

Plaintiff,

v.

VOIP-PAL.COM, INC.,

Defendant.

Case No. 21-CV-02769-LHK

ORDER DENYING MOTION TO DISMISS

Re: Dkt. No. 25

Plaintiff Twitter, Inc. ("Twitter") brings the instant case against Defendant VoIP-Pal.com, Inc. ("Defendant") seeking a declaratory judgment that Twitter's products do not infringe U.S. Patent No. 9,935,872 ("the '872 patent"). ECF No. 1 ("Compl."). Defendant moves to dismiss the instant case for lack of subject matter jurisdiction, lack of personal jurisdiction, and improper venue. ECF No. 25. Having considered the parties' submissions, the relevant law, and the record in this case, the Court DENIES Defendant's motion to dismiss.

I. BACKGROUND

Over the past five years, Defendant has litigated numerous cases involving a family of patents that relate to methods and systems for communicating over an internet protocol ("IP") network. *See VoIP-Pal.Com, Inc. v. Apple Inc.*, 375 F. Supp. 3d 1110, 1118 (N.D. Cal. 2019).

Defendant has asserted at least eight patents in this family against various telecommunications and internet companies, including Twitter. In turn, several companies, including Twitter, have filed actions against Defendant seeking declaratory judgments that those companies' products do not infringe Defendant's IP network patents and that those patents are invalid.

The '872 patent is part of the same patent family. Accordingly, the instant case is the most recent dispute between the parties about whether Twitter has infringed one of Defendant's IP network patents. Below, the Court describes in turn: (1) the parties; (2) the '872 patent and Defendant's patent family; (3) the previous cases involving Defendant's patent family; and (4) the procedural history of the instant case.

A. The Parties

Twitter is a Delaware corporation with its principal place of business in San Francisco, California. Compl. ¶ 14. Twitter "operates a global Internet platform for public self-expression and conversation in real time." *Id.* ¶ 15. "Twitter uses and sells messaging services using messaging application software and/or equipment, servers and/or gateways that route messages to computing devices such as smartphones, tablet computers, and personal computers." *Twitter, Inc. v. VoIP-Pal.Com, Inc.*, No. 20-CV-02397-LHK, 2021 WL 3861446, at *1 (N.D. Cal. Aug. 30, 2021) (internal quotation omitted).

Defendant is a Nevada corporation with its principal place of business in Waco, Texas. Compl. ¶ 16. Defendants own a family of patents related to communications over IP networks. *See VoIP-Pal.Com*, 375 F. Supp. 3d at 1118.

B. The '872 Patent and Defendant's Patent Family

The '872 patent is titled "Producing Routing Messages for Voice Over IP Communications." The '872 patent describes and claims "methods and apparatus[es] for routing and billing" communications over an IP network. *See* '872 patent, col. 1:20–29; *see, e.g.*, *id.*, col. 37:28–38:10 (claiming a "method for routing a communication in a communication system between an Internet-connected first participant device associated with a first participant and an Internet-connected second participant device associated with a second participant"). The

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application for the ’872 patent was filed on October 11, 2017, and the ’872 patent issued on April 3, 2018.

The ’872 patent is directly related to at least seven other patents that Defendant owns. Specifically, the ’872 patent issued from a continuation of U.S. Patent Application No. 15/396,344 (“the ’344 application”), which is now U.S. Patent No. 9,813,330 (“the ’330 patent”). U.S. Patent Nos. 9,948,549 (“the ’549 patent”) and 9,826,002 (“the ’002 patent”) also issued from continuations of the ’344 application. In turn, the ’344 application was a continuation of the application that became U.S. Patent No. 9,537,762 (“the ’762 patent”), which issued from a continuation of the application that became U.S. Patent No. 9,179,005 (“the ’005 patent”), which issued from a continuation of the application that became U.S. Patent No. 8,542,815 (“the ’815 patent”). Finally, the ’872 patent is the parent of U.S. Patent No. 10,218,606 (“the ’606 patent”).

Thus, these eight patents have the same title, identical figures, nearly identical specifications, and similar claims.

C. Previous Related Cases

1. The 2016 Cases Involving the ’815 and ’005 Patents

In 2016, Defendant filed four actions in the District of Nevada asserting that Twitter, Apple Inc. (“Apple”), AT&T Corp. (“AT&T”), and Verizon Wireless Services, LLC (“Verizon) infringed claims of the ’815 and ’005 patents. *See VoIP-Pal.Com*, 375 F. Supp. 3d at 1121–22. Because Apple filed petitions for inter partes reviews challenging the patentability of the asserted claims, the District of Nevada stayed all four cases. *Id.* After the Patent Trial and Appeal Board (“PTAB”) of the U.S. Patent and Trademark Office (“PTO”) rejected Apple’s challenges, the District of Nevada lifted the stays. *Id.*

On February 28, 2018, Twitter moved to transfer Defendant’s action against Twitter to the Northern District of California. *VoIP-Pal.Com, Inc. v. Twitter, Inc.*, Case No. 16-CV-02338, 2018 WL 3543031, at *1 (D. Nev. July 23, 2018). On July 23, 2018, the District of Nevada granted Twitter’s motion and transferred the case. *Id.*

In October 2018, Defendant stipulated to transfer its actions against Apple, AT&T, and

Verizon to the Northern District of California as well. *VoIP-Pal.Com*, 375 F. Supp. 3d at 1121. As a result, all four cases were transferred and assigned to this Court.

In November 2018, this Court entered an order consolidating all four cases. *Id.* at 1122.

On March 25, 2019, this Court granted Twitter, Apple, AT&T, and Verizon's consolidated motion to dismiss all four cases. *Id.* at 1117. In a 45-page order, the Court concluded that the asserted claims of the '815 and '005 patents were unpatentable under 35 U.S.C. § 101. *Id.* at 1138, 1144.

On March 16, 2020, the Federal Circuit affirmed this Court's decision. *VoIP-Pal.Com, Inc. v. Apple, Inc.*, 798 F. App'x 644, 645 (Fed. Cir. 2020).

On April 8, 2020, Defendant issued a press release which stated that Defendant was "undeterred in [its] fight to assert [its] intellectual property rights" and that Defendant "remain[ed] firm in [its] resolve to achieve monetization for [its] shareholders." *See* Compl. ¶ 4; ECF No. 1-4 at 2–3.

On April 15, 2020, Defendant filed a petition with the Federal Circuit requesting panel or en banc rehearing of its appeal. *VoIP-Pal.Com, Inc. v. Twitter*, Case No. 19-1808, ECF No. 89 (Fed. Cir. May 18, 2020). On May 18, 2020, the Federal Circuit denied Defendant's petition. *Id.*, ECF No. 99.

2. The 2018 Cases Involving the '762, '330, '002, and '569 Patents

In 2018, Defendant filed two actions in the District of Nevada asserting that Apple and Amazon.Com, Inc. ("Amazon") had infringed claims of the '762, '330, '002, and '549 patents. *See VoIP-Pal.Com, Inc. v. Apple Inc.*, 411 F. Supp. 3d 926, 934 (N.D. Cal. 2019). After both cases were transferred and assigned to this Court, this Court consolidated the two cases. *Id.*

On November 1, 2019, this Court granted Apple and Amazon's consolidated motion to dismiss both cases. *Id.* at 930. In a 68-page order, the Court concluded that the asserted claims of the '762, '330, '002, and '549 patents were unpatentable under 35 U.S.C. § 101. *Id.* at 941.

On November 3, 2020, the Federal Circuit affirmed this Court's decision. *VoIP-Pal.Com, Inc. v. Apple, Inc.*, 828 F. App'x 717, 717 (Fed. Cir. 2020). On December 17, 2020, Defendant filed a petition with the Federal Circuit requesting panel or en banc rehearing of its appeal. *VoIP-Pal.com, Inc. v. Apple, Inc.*, Case No. 20-1241, ECF No. 52 (Fed. Cir. Jan. 26, 2021). On January 26, 2021, the Federal Circuit denied Defendant's petition. *Id.*, ECF No. 53.

On June 25, 2021, Defendant filed a petition for a writ of certiorari asking the United States Supreme Court to review the Federal Circuit's decision. *See VoIP-Pal.com, Inc. v. Apple, Inc.*, Case No. 20-1809 (U.S. Oct. 4, 2021). On October 4, 2021, the Supreme Court denied Defendant's petition. *See id.*, 2021 WL 4507874, at *1.

3. The 2020 Cases Involving the '606 and '872 Patents

On April 2, 2020, Defendant filed an action in the Waco Division of the Western District of Texas asserting that Facebook, Inc. ("Facebook") infringed claims of the '606 patent. *VoIP-Pal.Com, Inc. v. Facebook, Inc.*, Case No. 20-CV-00267-ADA, ECF No. 1 (W.D. Tex. Apr. 2, 2020).

Between April 3, 2020 and April 7, 2020, Defendant filed actions in the Waco Division of the Western District of Texas asserting the '606 patent against Google LLC ("Google"), Amazon, and Apple. *See VoIP-Pal.Com, Inc. v. Google LLC*, Case No. 20-CV-00269-ADA, ECF No. 1 (W.D. Tex. Apr. 3, 2020); *VoIP-Pal.Com, Inc. v. Amazon.Com, Inc.*., Case No. 20-CV-00272-ADA, ECF No. 1 (W.D. Tex. Apr. 6, 2020); *VoIP-Pal.Com, Inc. v. Apple Inc.*, Case No. 20-CV-00275-ADA, ECF No. 1 (W.D. Tex. Apr. 7, 2020).

On April 10, 2020, Apple filed an action in the Northern District of California seeking a declaratory judgment that Apple's products do not infringe the '606 and '872 patents and that certain claims of those patents are invalid. *Id.*

On April 24, 2020, Defendant filed actions in the Waco Division of the Western District of Texas asserting the '606 patent against AT&T and Verizon. *See VoIP-Pal.Com, Inc. v. AT&T Inc.*, Case No. 20-CV-00325-ADA, ECF No. 1 (W.D. Tex. Apr. 24, 2020); *VoIP-Pal.Com, Inc. v. Verizon Comms., Inc.*, Case No. 20-CV-00327-ADA, ECF No. 1 (W.D. Tex. Apr. 24, 2020).

On April 30, 2020, AT&T filed an action in the Northern District of California seeking a declaratory judgment that AT&T's products do not infringe the '606 patent. *Id.*

On May 5, 2020, Verizon filed an action in the Northern District of California seeking a declaratory judgment that Verizon's products do not infringe the '606 patent. *Id.*

On July 8, 2020, AT&T moved to stay Defendant's action in the Western District of Texas. *VoIP-Pal.Com, Inc. v. AT&T, Inc.*, Case No. 20-CV-00325-ADA, ECF No. 22 (W.D. Tex. July 8, 2020). Specifically, AT&T argued that, because this Court previously had adjudicated cases involving Defendant's related patents, the Western District of Texas should stay Defendant's action in favor of AT&T's action in this Court. *Id.* at 1. On July 9, 2020, Apple and Verizon filed similar motions. *See VoIP-Pal.Com, Inc. v. Apple Inc.*, Case No. 20-CV-00275-ADA, ECF No. 17 (W.D. Tex. Jul. 9, 2020); *VoIP-Pal.Com, Inc. v. Verizon Comms., Inc.*, Case No. 20-CV-00327-ADA, ECF No. 17 (W.D. Tex. Jul. 9, 2020).

After Defendant sued Apple, Amazon, Facebook, and Google in the Waco Division of the Western District of Texas, Twitter, on April 8, 2020, filed an action in the Northern District of California seeking a declaratory judgment that Twitter's products do not infringe the '606 patent. *See Twitter*, 2021 WL 3861446, at *4. On June 26, 2020, Twitter filed a First Amended Complaint which challenged the validity of certain claims of the '606 patent. *Id.* at *5.

On July 10, 2020, Defendant filed a motion to dismiss Twitter's action in the Northern District of California for lack of subject matter jurisdiction, lack of personal jurisdiction, and improper venue. *Twitter, Inc. v. VoIP-Pal.com, Inc.*, No. 20-CV-02397-LHK, 2020 WL 7342733, at *5 (N.D. Cal. Dec. 14, 2020).

Also on July 10, 2020, Defendant filed a consolidated motion to dismiss Apple's, AT&T's, and Verizon's actions in the Northern District of California. *Apple Inc. v. VoIP-Pal.com, Inc.*, 506 F. Supp. 3d 947, 957 (N.D. Cal. 2020). With respect to Apple's, AT&T's, and Verizon's claims relating to the '606 patent, Defendant argued that the Court should "decline to exercise jurisdiction under the first-to-file rule," that the Court lacked personal jurisdiction, and that venue was improper. *Id.* Additionally, Defendant argued that Apple's claims relating to the '872 patent should be dismissed for lack of subject matter jurisdiction. *Id.*

After Defendant moved to dismiss the Northern District of California actions, each of

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Google, Amazon, and Facebook moved to stay its respective case in the Western District of Texas pending the resolution of Defendant's motions in the Northern District of California. *See VoIP-Pal.Com, Inc. v. Google LLC*, Case No. 20-CV-00269- ADA, ECF No. 18 (W.D. Tex. Jul. 10, 2020); *VoIP-Pal.Com, Inc. v. Amazon.Com, Inc.*, Case No. 20-CV-00272-ADA, ECF No. 26 (W.D. Tex. Jul. 15, 2020); *VoIP-Pal.Com, Inc. v. Facebook*, Case No. 20-CV-00267-ADA, ECF No. 26 (W.D. Tex. Jul. 29, 2020).

On September 29, 2020, the Western District of Texas stayed all six cases that were pending before it. *See VoIP-Pal.Com, Inc. v. Apple Inc.*, Case No. 20-CV-00275-ADA, ECF No. 43 (W.D. Tex. Sept. 29, 2020).

On December 11, 2020, this Court denied Defendant's motion to dismiss Apple's, AT&T's, and Verizon's actions alleging noninfringement and invalidity of claims of the '606 and '872 patents. *Apple*, 506 F. Supp. 3d at 969. Because the Court had already ruled on the patentability of six of Defendant's related patents, the Court declined to apply the first-to-file rule. *Id.* at 958–59. Additionally, because Defendant had purposefully directed its patent enforcement activities at California, the Court found that personal jurisdiction existed. *Id.* at 964–65. For the same reason, the Court concluded that venue was proper. *Id.* at 966. Finally, the Court concluded that the Court had subject matter jurisdiction over Apple's claims relating to the '872 patent. *Id.* at 968–69. The Court explained that Defendant had created an active controversy with respect to the '872 patent by enforcing related patents against Apple. *Id.*

On December 14, 2020, the Court denied Defendant's motion to dismiss Twitter's action alleging noninfringement and invalidity of claims of the '606 patent. *Twitter*, 2020 WL 7342733, at *5. Because Defendant had previously enforced related patents against Twitter, there was an active controversy between the parties with respect to the '606 patent. *Id.* at *7–8. Additionally, because Defendant had purposefully directed its patent enforcement activities at California, the Court found that personal jurisdiction existed. *Id.* at *10. For the same reason, the Court concluded that venue was proper. *Id.* at *13.

Defendant subsequently filed a petition for a writ of mandamus in the Federal Circuit regarding this Court's declination to apply the first-to-file rule to Apple's, AT&T's, and Verizon's actions. *In re VoIP-Pal.Com, Inc.*, 845 F. App'x 940 (Fed. Cir. 2021).

On February 19, 2021, the Federal Circuit denied Defendant's petition. *Id.* The Federal Circuit held that "the conclusion that it would be far less efficient for the Western District of Texas to resolve these cases based on the Northern District of California's familiarity with the overlapping issues is particularly well supported" because all the relevant patents were related and because all the cases involved "similar technology and accused products." *Id.* at 942.

On March 24, 2021, Defendant filed renewed motions to dismiss Twitter's, Apple's, AT&T's, and Verizon's actions in the Northern District of California and, in each motion, provided a covenant not to sue for infringement of the '606 patent. *See Twitter*, 2021 WL 3861446, at *6; *Apple Inc. v. VoIP-Pal.Com, Inc.*, No. 20-CV-02460-LHK, 2021 WL 3810263, at *5 (N.D. Cal. Aug. 26, 2021); *AT&T Corp. v. VoIP-Pal.Com, Inc.*, No. 20-CV-02995-LHK, 2021 WL 3773611, at *5 (N.D. Cal. Aug. 25, 2021). Defendant also provided Apple with a covenant not to sue for infringement of the '872 patent. *Apple*, 2021 WL 3810263, at *5.

The same day, Defendant voluntarily dismissed its actions against Apple, AT&T, and Verizon in the Western District of Texas. *See VoIP-Pal.Com, Inc. v. Apple Inc.*, Case No. 20-CV-00275-ADA, ECF No. 49 (W.D. Tex. Mar. 24, 2021); *VoIP-Pal.Com, Inc. v. AT&T Inc.*, Case No. 20-CV-00325-ADA, ECF No. 51 (W.D. Tex. Mar. 24, 2021); *VoIP-Pal.Com, Inc. v. Verizon Comms., Inc.*, Case No. 20-CV-00327-ADA, ECF No. 47 (W.D. Tex. Mar. 24, 2021).

Additionally, Defendant filed a notice in the Western District of Texas stating that Defendant's motions to dismiss the Northern District of California actions and Defendant's voluntary dismissal of the Western District of Texas actions against Apple, AT&T, and Verizon would "resolve all pending actions involving the '606 patent between [Defendant] and Apple, AT&T, and Verizon." *VoIP-Pal.Com, Inc. v. Facebook, Inc.*, Case No. 20-CV-00267-ADA, ECF No. 45 at 3 (W.D. Tex. Mar. 24, 2021). Accordingly, Defendant stated, "Defendant's cases against Amazon, Google, and Facebook will soon be the only pending cases in any court involving the '606 patent." *Id.* Defendant's actions in the Western District of Texas against Amazon,

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Facebook, and Google remain pending and have been stayed since September 29, 2020. *VoIP-Pal.Com, Inc. v. Facebook, Inc.*, Case No. 20-CV-00267-ADA, ECF No. 49 (W.D. Tex. Sept. 29, 2021).

On August 25, 2021, this Court denied Defendant's renewed motion to dismiss AT&T's action alleging noninfringement and invalidity of the '606 patent. *See AT&T*, 2021 WL 3773611, at *11. Although Defendant had granted AT&T a covenant not to sue, that covenant did not cover AT&T's customers. *Id.* at *10. The Court found that this fact weighed against dismissal because, in Defendant's action against AT&T in the Western District of Texas, Defendant had alleged "that AT&T's customers infringed the '606 patent" and that AT&T induced this infringement. *Id.* Additionally, the Court found it significant that Defendant had asserted seven directly related patents against AT&T in three different actions. *Id.* at *7–*8. Taken together, the Court explained, "Defendant's history of litigation against AT&T and the litigation circumstances under which Defendant granted the [covenant not to sue]" created an active controversy between Defendant and AT&T regarding the '606 patent. *Id.* at *10. On August 26, 2021, the Court denied Defendant's motion to dismiss Apple's action for similar reasons. *Apple*, 2021 WL 3810263, at *10–11.

On August 30, 2021, the Court granted Defendant's motion to dismiss Twitter's action alleging noninfringement and invalidity of the '606 patent. *Twitter*, 2021 WL 3861446, at *10. The Court explained that, unlike Apple and AT&T, Defendant had never enforced the '606 patent against Twitter. *Id.* at *9. Accordingly, the "Court conclude[d] that Defendant's covenant not to sue divest[ed] the Court of subject matter jurisdiction" over Twitter's action. *Id.* at *10.

D. Procedural History of the Instant Case

On April 16, 2021, Twitter filed a complaint seeking a declaratory judgment that the '872 patent is not infringed by Twitter's products. *See* Compl. ¶ 53–58. The instant case initially was assigned to U.S. District Judge James Donato. ECF No. 13.

On April 26, 2021, Twitter filed a motion requesting that the instant case be designated as related to *VoIP-Pal.com, Inc. v. Twitter, Inc.*, Case No. 18-cv-04523-LHK and *Twitter, Inc. v.*

VoIP-Pal.com, Inc., Case No. 20-cv-02397-LHK, both of which were pending before this Court. ECF No. 14 at 2. On May 17, 2021, the Court granted Twitter's motion to relate. ECF No. 18. The same day, the instant case was reassigned to the Court. ECF No. 19.

On June 21, 2021, Defendant moved to dismiss the instant case. ECF No. 25 ("Mot."). Defendant offered three grounds for dismissal: (1) the Court lacks subject matter jurisdiction over Twitter's action; (2) the Court does not have personal jurisdiction over Defendant; and (3) venue is improper. *See id.* at 8–9, 13, 19. On July 20, 2021, Twitter filed an opposition to Defendant's motion to dismiss. ECF No. 31 ("Opp."). On August 3, 2021, Defendant filed a reply in support of its motion to dismiss. ECF No. 35 ("Reply").

II. LEGAL STANDARD

A. Motion to Dismiss Under Rule 12(b)(1)

A defendant may move to dismiss for lack of subject matter jurisdiction pursuant to Rule 12(b)(1) of the Federal Rules of Civil Procedure. Whereas lack of statutory standing requires dismissal for failure to state a claim under Rule 12(b)(6), lack of Article III standing requires dismissal for want of subject matter jurisdiction under Rule 12(b)(1). *See Maya v. Centex Corp.*, 658 F.3d 1060, 1067 (9th Cir. 2011).

"A Rule 12(b)(1) jurisdictional attack may be facial or factual." *Safe Air for Everyone v. Meyer*, 373 F.3d 1035, 1039 (9th Cir. 2004). "In a facial attack, the challenger asserts that the allegations contained in a complaint are insufficient on their face to invoke federal jurisdiction." *Id.* The Court "resolves a facial attack as it would a motion to dismiss under Rule 12(b)(6): Accepting the plaintiff's allegations as true and drawing all reasonable inferences in the plaintiff's favor, the court determines whether the allegations are sufficient as a legal matter to invoke the court's jurisdiction." *Leite v. Crane Co.*, 749 F.3d 1117, 1121 (9th Cir. 2014). "[I]n a factual attack," on the other hand, "the challenger disputes the truth of the allegations that, by themselves, would otherwise invoke federal jurisdiction." *Safe Air for Everyone*, 373 F.3d at 1039. "In resolving a factual attack on jurisdiction," the Court "may review evidence beyond the complaint without converting the motion to dismiss into a motion for summary judgment." *Id.* The Court "need not presume the truthfulness of the plaintiff's allegations" in deciding a factual attack. *Id.*

Once the defendant has moved to dismiss for lack of subject matter jurisdiction under Rule 12(b)(1), the plaintiff bears the burden of establishing the Court's jurisdiction. *See Chandler v. State Farm Mut. Auto Ins. Co.*, 598 F.3d 1115, 1122 (9th Cir. 2010).

B. Motion to Dismiss Under Rule 12(b)(2)

In a motion challenging personal jurisdiction under Federal Rule of Civil Procedure 12(b)(2), the plaintiff, as the party seeking to invoke the jurisdiction of the federal court, has the burden of establishing that jurisdiction exists. *See In re Boon Global Ltd.*, 923 F.3d 643, 650 (9th Cir. 2019). "Where, as here, the defendant's motion is based on written materials rather than an evidentiary hearing, 'the plaintiff need only make a prima facie showing of jurisdictional facts to withstand the motion to dismiss.'" *Ranza v. Nike, Inc.*, 793 F.3d 1059, 1068 (9th Cir. 2015) (quoting *CollegeSource, Inc. v. AcademyOne, Inc.*, 653 F.3d 1066, 1073 (9th Cir. 2011)).

However, this standard "is not toothless," and the party asserting jurisdiction "cannot simply rest on the bare allegations of its complaint." *In re Boon Global Ltd.*, 923 F.3d at 650 (quoting *Schwarzenegger v. Fred Martin Motor Co.*, 374 F.3d 797, 800 (9th Cir. 2004)). Thus, courts may consider declarations and other evidence outside the pleadings to determine whether it has personal jurisdiction. *See id.* At this stage of the proceeding, "uncontroverted allegations in plaintiff's complaint must be taken as true, and '[c]onflicts between parties over statements contained in affidavits must be resolved in the plaintiff's favor.'" *Id.* (quoting *Schwarzenegger*, 374 F.3d at 800). On the other hand, courts "may not assume the truth of allegations in a pleading which are contradicted by affidavit." *Mavrix Photo, Inc. v. Brand Techs., Inc.*, 647 F.3d 1218, 1223 (9th Cir. 2011).

C. Motion to Dismiss Under Rule 12(b)(3)

Under Federal Rule of Civil Procedure 12(b)(3), a defendant may move to dismiss a complaint for improper venue. Once the defendant has challenged the propriety of venue in a given court, the plaintiff bears the burden of showing that venue is proper. *Piedmont Label Co. v. Sun Garden Packing Co.*, 598 F.2d 491, 496 (9th Cir. 1979). When considering a motion to dismiss for improper venue, a court may consider facts outside of the pleadings. *Murphy v. Schneider National, Inc.*, 362 F.3d 1133, 1138 (9th Cir. 2004).

Pursuant to 28 U.S.C. § 1406(a), if the court determines that venue is improper, the court must either dismiss the action or, if it is in the interests of justice, transfer the case to a district or division in which it could have been brought. Whether to dismiss for improper venue, or alternatively to transfer venue to a proper court, is a matter within the sound discretion of the district court. *See King v. Russell*, 963 F.2d 1301, 1304 (9th Cir. 1992).

D. Leave to Amend

If the Court determines that a complaint should be dismissed, it must then decide whether to grant leave to amend. Under Rule 15(a) of the Federal Rules of Civil Procedure, leave to amend "shall be freely given when justice so requires," bearing in mind "the underlying purpose of Rule 15 to facilitate decisions on the merits, rather than on the pleadings or technicalities." *Lopez v. Smith*, 203 F.3d 1122, 1127 (9th Cir. 2000) (en banc) (alterations and internal quotation marks omitted). When dismissing a complaint for failure to state a claim, "a district court should grant leave to amend even if no request to amend the pleading was made, unless it determines that the pleading could not possibly be cured by the allegation of other facts." *Id.* at 1130 (internal quotation marks omitted). Accordingly, leave to amend generally shall be denied only if allowing amendment would unduly prejudice the opposing party, cause undue delay, or be futile, or if the moving party has acted in bad faith. *Leadsinger, Inc. v. BMG Music Publ'g*, 512 F.3d 522, 532 (9th Cir. 2008).

III. DISCUSSION

Defendant moves to dismiss Twitter's declaratory judgment action on three grounds. First, Defendant argues that the Court lacks subject matter jurisdiction over Twitter's action. Mot. at 8–13. Second, Defendant argues that the Court lacks personal jurisdiction over Defendant. *Id.* at 13–19. Third, Defendant argues that the Northern District of California is not a proper venue for the action. *Id.* at 19–20. The Court addresses each argument in turn.

A. The Court Has Subject Matter Jurisdiction Over the Instant Case

Defendant argues that the Court lacks subject matter jurisdiction because Twitter has not plausibly alleged that there is an "actual controversy" between the parties sufficient to establish jurisdiction under the Declaratory Judgment Act. Mot. at 8. For the reasons below, the Court rejects Defendant's argument.

In general, whether a court has subject matter jurisdiction "is a procedural question not unique to patent law" and thus is governed by regional circuit law. *Toxgon Corp. v. BNFL, Inc.*, 312 F.3d 1379, 1380 (Fed. Cir. 2002). However, "[w]hether an actual case or controversy exists so that a district court may entertain an action for declaratory judgment of non-infringement and/or invalidity is governed by Federal Circuit law." *3M Co v. Avery Dennison Corp.*, 673 F.3d 1372, 1377 (Fed. Cir. 2012).

The Declaratory Judgment Act provides that, "[i]n the case of actual controversy within its jurisdiction, . . . any court of the United States, upon the filing of an appropriate pleading, may declare the rights and other legal relations of any interested party in seeking such declaration." 28 U.S.C. § 2201(a). "[T]he phrase 'case of actual controversy' in the Act refers to the type of 'Cases' and 'Controversies' that are justiciable under Article III." *MedImmune, Inc. v. Genentech, Inc.*, 549 U.S. 118, 127 (2007). Thus, to bring a claim under the Declaratory Judgment Act, a plaintiff must establish that there is a live case or controversy between the parties. *ActiveVideo Networks, Inc. v. TransVideo Elecs., Ltd.*, 975 F. Supp. 2d 1083, 1086 (N.D. Cal. 2013).

To satisfy this requirement, Twitter must show that Defendant has taken affirmative acts which indicate Defendant's intent to enforce the '827 patent against Twitter. In general, a plaintiff satisfies the case or controversy requirement if "the facts alleged, under all the circumstances, show that there is a substantial controversy, between parties having adverse legal interests, of sufficient immediacy and reality to warrant the issuance of a declaratory judgment." *MedImmune*, 549 U.S. at 127. The Federal Circuit has explained that, in the context of an action seeking a declaration of patent rights, a plaintiff meets the *MedImmune* standard if the plaintiff plausibly alleges "both (1) an affirmative act by the patentee related to the enforcement of his patent rights and (2) meaningful preparation to conduct potentially infringing activity." *Assoc. for Molecular*

Pathology, 689 F.3d at 1318. In the instant case, "there is no dispute as to the second factor because Twitter's products and services at issue are already used in the marketplace." Opp. at 6.

This test gives the Court a significant amount of discretion and allows the Court to look at a variety of factors. Because the Court must evaluate "all the circumstances," the Court has "unique and substantial discretion in deciding whether to declare the rights of litigants." *MedImmune*, 549 U.S. at 136. Indeed, although "more is required than 'a communication from a patent owner to another party, merely identifying its patent and the other's product line,'" "[h]ow much more is required is determined on a case-by-case analysis." *3M*, 673 F.3d at 1378–79. In recognition of this broad, case-by-case approach, courts in the Northern District of California have previously stated that there are at least thirteen factors which can be relevant: (1) the strength of threatening language in communications between the parties; (2) the depth and extent of infringement analysis conducted by the patent holder; (3) whether the patent holder imposed a deadline to respond; (4) any prior litigation between the parties; (5) the patent holder's history of enforcing the patent at issue; (6) whether the patent holder's threats have induced the alleged infringer to change its behavior; (7) the number of times the patent holder has contacted the alleged infringer; (8) whether the patent holder is a holding company with no income other than enforcing patent rights; (9) whether the patent holder refused to give assurance it will not enforce the patent; (10) whether the patent holder has identified a specific patent and specific infringing products; (11) the extent of the patent holder's familiarity with the product prior to suit; (12) the length of time that transpired after the patent holder asserted infringement; and (13) whether communications initiated by the plaintiff appear as an attempt to create a controversy. *ActiveVideo*, 975 F. Supp. 2d at 1087–88 (citing *Cepheid v. Roche Molecular Systems, Inc.*, Case No C-12-4411 EMC, 2013 WL 184125, at *6 (N.D. Cal. Jan. 17, 2013)).

Despite the wide variety of factors that may be relevant, the Federal Circuit has held that, if the defendant previously has asserted patents against the plaintiff, the plaintiff typically may seek a declaration regarding related patents. In *Arkema Inc. v. Honeywell Intern., Inc.*, 706 F.3d 1351 (2013), the Federal Circuit considered whether Arkema Inc. could seek a declaratory judgment that a certain product did not infringe two U.S. patents owned by Honeywell International, Inc. *Id.* at 1354. Before Arkema had filed its declaratory judgment action, Honeywell had asserted two related U.S. patents and a European patent covering similar technologies against Arkema's sale of the product in question. *Id.* at 1355. The Federal Circuit held that the case presented a "quintessential example of a situation in which declaratory relief is warranted" because Honeywell's previous assertion of related patents "made it clear that [Honeywell] will protect its patent rights against" Arkema's sale of the product. *Id.* at 1357. In a subsequent case, the Federal Circuit reiterated that "a history of patent litigation between the same parties involving related technologies, products, and patents is another circumstance to be considered, which may weigh in favor of the existence of subject matter jurisdiction." *Danisco U.S. Inc. v. Novozymes A/S*, 744 F.3d 1325 (Fed. Cir. 2014).

Given this precedent, Defendant's previous actions asserting the '815 and '005 patents against Twitter strongly support Twitter's claim that there is an active controversy regarding the '872 patent. The '872 patent is a direct descendant of the '815 and '005 patents. The three patents have the same title, identical figures, nearly identical specifications, and similar claims. In 2016, Defendant filed an action against Twitter alleging that the same Twitter products that are the subject of the instant case infringed the '815 and '005 patents. *See VoIP-Pal.Com*, 375 F. Supp. 3d at 1121–22; Compl. ¶ 21. Defendant pursued those infringement claims until May 2020, at which point the Federal Circuit rejected Defendant's request to have the en banc Federal Circuit adjudicate the validity of the '815 and '005 patents. *VoIP-Pal.Com, Inc. v. Twitter*, Case No. 19-1808, ECF No. 99 (Fed. Cir. May 18, 2020). Indeed, a month before the Federal Circuit denied Defendant's en banc petition, Defendant stated in a press release that it was "undeterred in [its] fight to assert [its] intellectual property rights" and that Defendant "remain[ed] firm in [its] resolve to achieve monetization for [its] shareholders." ECF No. 1-4 at 2–3. By aggressively asserting patents against the Twitter products that are the subject of the instant case, Defendant "made it clear that it will protect its patent rights against" those products. *Arkema*, 706 F.3d at 1357. Accordingly, as the Court explained with respect to Twitter's similar action regarding the '606

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patent, “Defendant’s prior litigation weighs heavily in favor of a finding that Defendant has engaged in an affirmative act related to the enforcement of its patent rights.” *Twitter*, 2020 WL 7342733, at *7.

The Court is not convinced by Defendant’s argument that Defendant’s previous actions against Twitter happened too long ago to be relevant. Defendant contends that, because Defendant “has not sued Twitter in *five years* and that action closed over two years ago,” any prior litigation between the parties is too old to create an actual controversy with respect to the ’872 patent. Mot. at 9–10 (emphasis in original). The premise of Defendant’s argument is not accurate. As discussed, Defendant’s previous action against Twitter did not terminate until May 2020, when the Federal Circuit rejected Defendant’s petition for en banc rehearing. *See VoIP-Pal.Com, Inc. v. Twitter*, Case No. 19-1808, ECF No. 99 (Fed. Cir. May 18, 2020). Moreover, although the Court agrees that Twitter’s claim would be stronger if Defendant’s actions against Twitter still were pending, Defendant has provided no authority which suggests that the Court cannot take those actions into account. Indeed, the relevant authority suggests the opposite. The Federal Circuit has explained that the “*history* of patent litigation between the same parties” supports declaratory judgment jurisdiction. *Danisco*, 744 F.3d at 1331 (emphasis added). Similarly, other courts in the Northern District of California have stated that “*prior* litigation between the parties” supports jurisdiction. *ActiveVideo*, 975 F. Supp. 2d at 1087–88 (emphasis added). Given these clear statements about the relevance of “histor[ic]” and “prior” litigation, the termination of Defendant’s previous actions asserting the ’005 and ’815 patents against Twitter does not make those actions less relevant.

Additionally, Defendant’s recent actions against other telecommunications and internet companies, some of which remain pending, bolster Twitter’s claim. The ’872 patent is directly related to the ’762, ’330, ’002, ’549, and ’606 patents. Those six patents have the same title, identical figures, nearly identical specifications, and similar claims. In 2018, Defendant asserted claims of the ’762, ’330, ’002, and ’549 patents against Amazon and Apple. *See VoIP-Pal.Com, Inc. v. Apple Inc.*, 411 F. Supp. 3d 926, 934 (N.D. Cal. 2019). After this Court concluded that the

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asserted claims were unpatentable, Defendant appealed to the Federal Circuit. *VoIP-Pal.Com, Inc. v. Apple, Inc.*, 828 F. App'x 717, 717 (Fed. Cir. 2020). On November 3, 2020, the Federal Circuit affirmed this Court's decision. *Id.* Undeterred, Defendant litigated the patentability of those claims all the way to the United States Supreme Court. *See VoIP-Pal.com, Inc. v. Apple, Inc.*, Case No. 20-1809 (U.S. Oct. 4, 2021). It was not until October 4, 2021 that the Supreme Court denied Defendant's petition for a writ of certiorari and terminated Defendant's actions asserting the '762, '330, '002, and '549 patents. *See id.*, 2021 WL 4507874, at *1.

Meanwhile, in April 2020, Defendant asserted the '606 patent against Apple, AT&T, Verizon, Amazon, Facebook, and Google. *See VoIP-Pal.Com, Inc. v. Apple Inc.*, Case No. 20-CV-00275-ADA, ECF No. 1 (W.D. Tex. Apr. 7, 2020); *VoIP-Pal.Com, Inc. v. AT&T Inc.*, Case No. 20-CV-00325-ADA, ECF No. 1 (W.D. Tex. Apr. 24, 2020); *VoIP-Pal.Com, Inc. v. Verizon Comms., Inc.*, Case No. 20-CV-00327-ADA, ECF No. 1 (W.D. Tex. Apr. 24, 2020); *VoIP-Pal.Com, Inc. v. Amazon.Com, Inc.*., Case No. 20-CV-00272-ADA, ECF No. 1 (W.D. Tex. Apr. 6, 2020); *VoIP-Pal.Com, Inc. v. Facebook, Inc.*, Case No. 20-CV-00267-ADA, ECF No. 1 (W.D. Tex. Apr. 2, 2020); *VoIP-Pal.Com, Inc. v. Google LLC*, Case No. 20-CV-00269-ADA, ECF No. 1 (W.D. Tex. Apr. 3, 2020). Defendant's actions against Amazon, Facebook, and Google remain pending. *VoIP-Pal.Com, Inc. v. Facebook, Inc.*, Case No. 20-CV-00267-ADA, ECF No. 49 (W.D. Tex. Sept. 29, 2021).

Although the Court does not find Defendant's 2018 and 2020 actions against other telecommunications and internet companies sufficient to demonstrate a live controversy between Defendant and Twitter on their own, these actions show that Defendant has repeatedly, aggressively, and recently enforced the patent family to which the '872 patent belongs. All these actions were pending when Twitter filed its Complaint in the instant case and three of these actions are still pending. Accordingly, these actions bolster Twitter's claim that there is a substantial risk Defendant will enforce the '872 patent against Twitter in the future.

Finally, although Defendant relies heavily on the Federal Circuit's decision in *Cisco Sys., Inc. v. Alberta Telecommunications Rsch. Ctr*, 538 Fed. Appx. 894 (Fed. Cir. 2013), that decision does not provide Defendant with any support. Defendant points out that Defendant "has not accused Twitter of infringing the '872 patent and . . has not refused to grant Twitter a covenant not to sue on the '872 patent." Reply at 3–4. Citing *Cisco*, Defendant contends that the "Federal Circuit has recognized that both of these facts distinguish the instant circumstances from *Arkema*." Reply at 4. However, in *Cisco*, the defendant's counsel expressly stated that the defendant had "no basis for suing [the plaintiff] either for direct or indirect infringement." *Cisco*, 538 Fed. Appx. at 897. Additionally, the defendant "ha[d] expressly offered to give [the plaintiff] a covenant not to sue." *Id.* at 898. In the instant case, Defendant has neither stated that Twitter does not infringe the '872 patent nor offered Twitter a covenant not to sue on the '872 patent. The mere fact that Defendant has neither affirmatively accused Twitter of infringement nor refused Twitter's request for a covenant not to sue does not divest the Court of jurisdiction over Twitter's action.

Assessing "all the circumstances," the Court concludes that Defendant has engaged in affirmative acts which indicate Defendant's intent to enforce the '827 patent against Twitter. *See Monolithic Power Sys.*, No. C 07-2363 CW, 2007 WL 2318924, at *3 (N.D. Cal. Aug. 13, 2007) ("[T]he assertion of rights, evidenced through a prior lawsuit between the same parties regarding the same technology . . . and solidified through the express press release statement indicating an intent to sue alleged patent infringers, presents enough evidence to establish the case or controversy required for declaratory judgment jurisdiction."). Thus, the Court has subject matter jurisdiction over Twitter's action seeking a declaratory judgment that the '827 patent is not infringed by Twitter's products.

B. The Court Has Specific Personal Jurisdiction Over Defendant

Defendant argues that the Court lacks personal jurisdiction because Defendant has never enforced the '872 patent in California, Mot. at 14–17, and because Twitter's claim does not arise out of Defendant's contacts with California, *id.* at 17–18. Additionally, Defendant argues that asserting personal jurisdiction is "not reasonable and fair." *Id.* at 18–19. For the reasons below, the Court rejects these arguments.

Because the issue of personal jurisdiction in a patent action "is 'intimately involved with the substance of the patent laws,'" the Court applies Federal Circuit law to assess Defendant's arguments. *Avocent Huntsville Corp. v. Aten Int'l Co.*, 552 F.3d 1324, 1328 (Fed. Cir. 2008) (quoting *Akro Corp. v. Luker*, 45 F.3d 1541, 1543 (Fed. Cir. 1995)).

"Determining whether personal jurisdiction exists over an out-of-state defendant involves two inquiries: whether a forum state's long-arm statute permits service of process, and whether the assertion of personal jurisdiction would violate due process." *Avocent*, 552 F.3d at 1329 (quoting *Inamed Corp. v. Kuzmak*, 249 F.3d 1356, 1359 (Fed. Cir. 2001)). However, because "California's long-arm statute . . . is coextensive with federal due process requirements, . . . the jurisdictional analyses under state law and federal due process are the same." *Mavrix Photo, Inc. v. Brand Techs., Inc.*, 647 F.3d 1218, 1223 (9th Cir. 2011); *see also* Cal. Civ. Proc. Code § 410.10 ("[A] court of this state may exercise jurisdiction on any basis not inconsistent with the Constitution of this state or of the United States."). For a court to exercise personal jurisdiction over a defendant consistent with due process, that defendant must have "certain minimum contacts" with the relevant forum "such that the maintenance of the suit does not offend 'traditional notions of fair play and substantial justice.'" *Int'l Shoe Co. v. Washington*, 326 U.S. 310, 316 (1945) (quoting *Milliken v. Meyer*, 311 U.S. 457, 463 (1940)).

A court may exercise either general or specific jurisdiction over a defendant. *Avocent.*, 552 F.3d at 1330. "To be subject to general jurisdiction, a defendant business entity must maintain 'continuous and systematic general business contacts' with the forum, even when the cause of action has no relation to those contacts." *Synthes (U.S.A.) v. G.M. Dos Reis Jr. Ind. Com. de Equip. Medico*, 563 F.3d 1285, 1297 (Fed. Cir. 2009) (quotation omitted). By contrast, specific jurisdiction is appropriate when a suit "aris[es] out of or relate[s] to the defendant's contacts with the forum." *Helicopteros Nacionales de Colombia, S.A. v. Hall*, 466 U.S. 408, 414 n. 8 (1984). To determine whether a court can exercise specific jurisdiction consistent with due process, the court must consider: "(1) whether the defendant 'purposefully directed' its activities at residents of the forum; (2) whether the claim 'arises out of or relates to' the defendant's activities with the forum; and (3) whether assertion of personal jurisdiction is 'reasonable and fair.'" *Xilinx, Inc. v.*

Papst Licensing GmbH & Co. KG, 848 F.3d 1346, 1353 (Fed. Cir. 2017) (quoting *Inamed Corp. v. Kuzmak*, 249 F.3d 1356, 1360 (Fed. Cir. 2001)). "The first two factors correspond with the minimum contacts prong of the [International Shoe] analysis, and the third factor corresponds with the 'fair play and substantial justice' prong of the analysis." *Inamed*, 249 F.3d at 1360.

Twitter alleges that the Court has specific jurisdiction over Defendant. Compl. ¶ 22. Thus, the Court first considers whether Twitter has adequately alleged that Defendant "purposefully directed" activities at California and whether Twitter's claim arises out of those activities. The Court then assesses whether personal jurisdiction is "reasonable and fair."

1. Defendant Has Purposefully Directed Patent Enforcement Activities at California Residents and Twitter's Claim Arises Out of Those Activities

The Court first must determine whether Defendant has "purposefully directed" activities at California and whether Twitter's claim "arises out of or relates to" those activities. *Xilinx*, 848 F.3d at 1353. The burden of establishing these factors is on Twitter. *Elecs. for Imaging v. Coyle*, 340 F.3d 1344, 1350 (Fed. Cir. 2003).

Because Twitter's declaratory judgment action "arises out of or relates to the activities of [Defendant] in enforcing the patent . . . in suit," "the relevant inquiry for specific personal jurisdiction" is "to what extent [Defendant] 'purposefully directed [such enforcement activities] at residents of the forum,' and the extent to which the declaratory judgment claim 'arises out of or relates to those activities.'" *Avocent*, 552 F.3d at 1332 (quoting *Breckenridge Pharm., Inc. v. Metabolite Labs*, 444 F.3d 1356, 1363 (Fed. Cir. 2006)). "A declaratory judgment claim arises out of the patentee's contacts with the forum state only if those contacts 'relate in some material way to the enforcement or the defense of the patent.'" *Maxchief Invs. Ltd. v. Wok & Pan, Ind., Inc.*, 909 F.3d 1134, 1138 (Fed. Cir. 2018) (quoting *Avocent*, 552 F.3d at 1336).

A defendant's previous assertion of patents in the forum easily qualifies as an enforcement activity that is "purposefully directed" at the forum. *See ActiveVideo*, 975 F. Supp. 2d at 1097–98 (holding that the defendant was subject to personal jurisdiction because the "defendant ha[d] engaged in judicial patent enforcement (with respect to the patents at issue or a related patent)" in

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the forum); *see also Avocent*, 552 F.3d at 1338–39 (noting that a lawsuit in the same forum on the same patent "is a significant contact with the forum materially related to the enforcement of the relevant patent"). For example, in *ActiveVideo*, another court in the Northern District of California determined that a defendant had purposefully directed enforcement activities at the forum by litigating six cases in the Northern District of California "regarding the very same or related patents." 975 F. Supp. 2d at 1096–97. Courts outside the Ninth Circuit have reached similar results. *See, e.g.*, *Pro Sports Inc. v. West*, 639 F. Supp. 2d 475, 481 (D.N.J. 2009) (finding that a defendant had purposefully directed patent enforcement activities at the forum by bringing patent infringement actions against other parties in the forum); *Neuralstem, Inc. v. StemCells, Inc.*, 573 F. Supp. 2d 888, 898 (D. Md. 2008) (concluding that the court had personal jurisdiction over a defendant who had filed "a prior suit against [in the district] with respect to related patents").

Thus, Twitter's allegations that Defendant has asserted patents related to the '872 patent in this Court establish that Defendant has purposefully directed patent enforcement activities at the forum. Specifically, Twitter alleges that Defendant previously asserted the '815 and '005 patents against Twitter in this Court and that Defendant voluntarily transferred actions asserting the '815, '005, '762, '330, '002, and '549 patents against Apple, AT&T, Verizon, and Amazon to this Court. Compl. ¶ 22; *see also VoIP-Pal.Com*, 375 F. Supp. 3d at 1121–22 (describing Defendant's actions asserting the '815 and '005 patents in this Court); *VoIP-Pal.Com*, 411 F. Supp. at 934 (N.D. Cal. 2019) (describing Defendant's actions asserting the '762, '330, '002, and '549 patents in this Court). Under the relevant precedent, these allegations are more than sufficient to show that Defendant directed patent enforcement activities at the forum.

Although Defendant contends that these actions are irrelevant because Defendant originally filed them in Nevada, the Court previously has rejected this argument. Defendant contends that Defendant "never purposely directed its activities to this forum because [Defendant] filed the 2016/2018 cases in the District of Nevada, not in the NDCAL." Mot. at 15. However, as the Court previously explained, Defendant purposefully availed itself of California's judicial resources by "stipulat[ing] to transfer its infringement lawsuits against Apple, Verizon, and AT&T

to this district." *Apple*, 506 F. Supp. 3d at 963. For purposes of personal jurisdiction, voluntarily transferring an action to a court is no different than filing the action in the court to begin with. *Id.* Moreover, Defendant "purposefully availed itself of the courts in California because Defendant continued to prosecute its lawsuits in this district." *Id.* Because Defendant has provided no reason for the Court to revisit this decision, the Court declines to do so.

Indeed, the Federal Circuit endorsed the reasoning behind this Court's previous decision. In *In re VoIP-Pal.Com, Inc.*, 845 Fed. Appx. 940, 942 (Fed. Cir. 2021), the Federal Circuit considered whether this Court erred by refusing to dismiss Apple's, Verizon's, and AT&T's actions against Defendant in the Northern District of California based on the "first-to-file rule." The Federal Circuit affirmed this Court's decision to retain jurisdiction over those actions and expressly noted that "the conclusion that it would be far less efficient for the Western District of Texas to resolve these cases based on the Northern District of California's familiarity with the overlapping issues is particularly well supported." *Id.* Thus, the Federal Circuit agreed with this Court's conclusion that Defendant's prior patent actions in this district created a substantial connection with this district.

Two additional contacts with California bolster Plaintiff's claim that Defendant has directed patent enforcement activities at the forum. "As the Supreme Court has explained, 'physical entry into the State—either by the defendant in person or through an agent, goods, mail, or some other means—is certainly a relevant contact." *Xilinx*, 848 F.3d at 1354 (quoting *Walden v. Fiore*, 571 U.S. 277, 285 (2014)); *see also Synthes (U.S.A.) v. G.M. Dos Reis Jr. Ind. Com. de Equip. Medico*, 563 F.3d 1285, 1297–98 (Fed. Cir. 2009) (concluding that a defendant's representatives' entrance into the forum to attend a trade show with products that allegedly infringed the plaintiff's patents constituted a relevant contact for the purposes of personal jurisdiction). Twitter alleges that Defendant has employed at least two agents who have worked in this district to enforce Defendant's patents. First, Twitter points out that Defendant has retained a law firm located in Mountain View, California to litigate all of Defendant's patent cases, including the cases in this district. Compl. ¶ 22. Second, Twitter alleges that, "on or about April 20, 2016, [Defendant's] representative Ray Leon met with representatives of Apple in the Northern District of California in connection with [Defendant's] patent enforcement campaign." *Id.* Although the Court does not find these contacts sufficient to create personal jurisdiction over Defendant on their own, these contacts bolster the contacts created by Defendant's ten patent infringement actions in this Court.

Having determined that Defendant has purposefully directed patent enforcement activities at the forum, there is no question that Twitter's claim arises out of these activities. The primary basis for Twitter's claim that the Court has subject matter jurisdiction over the instant case is Defendant's action asserting the '815 and '005 patents against Twitter in this Court. *See* Compl. ¶ 22; pp. XX, *supra*. Similarly, although Defendant's actions in this Court asserting the '762, '330, '002, and '549 patents do not create subject matter jurisdiction on their own, these actions bolster Twitter's claim that there is an actual controversy between the parties. *See* pp. XX, *supra*. Accordingly, Twitter's claim arises directly out of Defendant's patent enforcement activities in this District. *See ActiveVideo*, 975 F. Supp. 2d at 1097–98 (concluding that there was personal jurisdiction over the defendant based on the defendant's previous infringement lawsuits in the district with respect to the patents at issue or a related patent).

Thus, the Court concludes that Defendant has purposefully directed patent enforcement activities at the forum and that Twitter's claim arises out of those activities.

2. Asserting Personal Jurisdiction over Defendant is Reasonable and Fair

The Court also must determine whether asserting personal jurisdiction over Defendant is "reasonable and fair." *Xilinx*, 848 F.3d at 1353. The burden of establishing that jurisdiction is not reasonable and fair is on Defendant, who must "present a compelling case that the presence of some other considerations would render jurisdiction unreasonable under the five-factor test articulated by the Supreme Court in *Burger King* [*Corporation v. Rudewicz*, 471 U.S. 462, 475–77 (1985)]." *Breckenridge*, 444 F.3d 1356, 1363 (Fed. Cir. 2006). The five factors outlined in *Burger King* are: (1) the burden on the defendant; (2) the forum State's interest in adjudicating the dispute; (3) the plaintiff's interest in obtaining convenient and effective relief; (4) the interstate judicial system's interest in obtaining the most efficient resolution; and (5) the shared interest of the several States in furthering fundamental substantive social policies. *Avocent*, 552 F.3d at 1331 (citing *Burger King*, 471 U.S. at 475–77). The Court addresses each factor in turn.

First, litigating in this District imposes a minimal burden on Defendant. The Federal Circuit has explained that a defendant's previous lawsuits in a forum demonstrate that litigating in that forum does not place an undue burden on the defendant. *See Xilinx*, 848 F.3d at 1357–58 (explaining that "[t]he lack of significant burden on [the defendant] is also evidenced by [the defendant's] prior litigations in California itself," including seven patent infringement lawsuits there); *Acorda Therapeutics Inc. v. Mylan Pharma. Inc*, 817 F.3d 755, 764 (Fed. Cir. 2016) (concluding that the burden on defendant "will be at most modest, as [the defendant] . . . has litigated many . . . lawsuits" in the forum); *Viam Corp. v. Iowa Exp.-Imp. Trading Co.*, 84 F.3d 424, (Fed. Cir. 1996) (concluding that litigation in California was not unduly burdensome because the defendant had filed previous lawsuits in California). Thus, because Defendant has litigated at least ten cases in this district related to the relevant family of patents, litigating the instant case in this district will not impose an undue burden on Defendant.

Second, California has an interest in having California courts adjudicate this dispute. In general, "California has a substantial interest in protecting its residents from unwarranted claims of patent infringement." *Elecs. for Imaging*, 340 F.3d at 1352. Thus, because Twitter has its principal place of business in California, Compl. ¶ 14, California has an interest in having California courts adjudicate the instant case.

Third, litigating the instant case in California will further Twitter's interest in obtaining convenient and effective relief. Plaintiff, which has its principal place of business in California, Compl. ¶ 14, "indisputably has an interest in protecting itself from patent infringement by obtaining relief 'from a nearby federal court' in its home forum." *Xilinx*, 848 F.3d at 1356.

Fourth, litigating the instant case in this Court will allow for the most efficient resolution of the parties' dispute. This Court already has issued substantive decisions in six cases alleging infringement of Defendant's related patents, all of which were affirmed by the Federal Circuit. *See*

VoIP-Pal.Com, 375 F. Supp. 3d at 1110, *aff'd*, 798 F. App'x at 645; *VoIP-Pal.Com, Inc*, 411 F. Supp. 3d at 926, *aff'd*, 828 F. App'x at 717.

Finally, "[t]here does not appear to be any conflict between the interests of California and any other state, because 'the same body of federal patent law would govern the patent invalidity claim irrespective of the forum.'" *Xilinx*, 848 F.3d at 1356 (quoting *Elecs. for Imaging*, 340 F.3d at 1352). Thus, the fifth factor does not weigh against a finding of personal jurisdiction.

In sum, Defendant has "failed to convince [this Court] that this is one of the 'rare' situations in which sufficient minimum contacts exist but where the exercise of jurisdiction would be unreasonable." *Elecs for Imaging*, 340 F.3d at 1352. Accordingly, the Court concludes that it has personal jurisdiction over Defendant.

C. Venue Is Proper in the Instant Case

Finally, Defendant argues that venue is improper. Mot. at 19. However, under the general federal venue statute, which governs actions for declaratory judgments of noninfringement, venue is proper in any judicial district where a defendant resides. *Id.* § 1391(b)(1). A corporate defendant "reside[s] . . . in any judicial district in which such defendant is subject to the court's personal jurisdiction with respect to the civil action in question." *Id.* § 1391(c)(2). Moreover, Twitter's principal place of business is in California and specifically in this district. Compl. ¶ 14. Thus, because the Court has personal jurisdiction over Defendant in the instant case, venue is proper in this district.

IV. CONCLUSION

For the foregoing reasons, the Court DENIES Defendant's motion to dismiss Twitter's complaint.

IT IS SO ORDERED.

Dated: November 2, 2021

Lucy H. Koh

LUCY H. KOH
United States District Judge

United States District Court
Northern District of California

EXHIBIT 12

Claim 38 of U.S. 10,880,721	**Claim 74 of U.S. 9,179,005** (*previously found invalid under § 101*)
38. A wireless apparatus comprising: a processor circuit comprising at least one processor; a network interface in communication with the processor circuit; and a non-transitory computer readable medium having computer executable codes stored thereon for directing the processor circuit to: receive from a user of the wireless apparatus a destination node identifier associated with a destination node with which the user wishes to communicate; transmit an access code request message to an access server, the access code request message including the destination node identifier and a location identifier identifying a geographical location of the wireless apparatus;	74. A method of routing communications in a packet switched network in which a first participant identifier is associated with a first participant and a second participant identifier is associated with a second participant in a communication, the method comprising: after the first participant has accessed the packet switched network to initiate the communication, using the first participant identifier to locate a first participant profile comprising a plurality of attributes associated with the first participant;
receive an access code reply message from the access server in response to the access code request message, the access code reply message including an access code based on the location identifier in the access code request message, the access code identifying a communications channel on a gateway through which communications between the wireless apparatus and the destination node can be conducted, the access code being distinct from the destination node identifier; and initiate communications from the wireless apparatus, via the network interface, using the access code based on the location identifier, to establish communications between the wireless apparatus and the destination node through the communications channel identified by the access code.	when at least one of the first participant attributes and at least a portion of the second participant identifier meet a [first/second] network classification criterion, producing a [first/second] network routing message for receipt by [a/the] controller, the [first/second] network routing message identifying an address in a [first/second] portion of the packet switched network, the address being associated with the second participant, the first portion [being/not] controlled by [an/the] entity.