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**Lewis**

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(54) **SYSTEM AND METHOD FOR BYPASSING DATA FROM EGRESS FACILITIES**

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(58) **Field of Classification Search**  
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(56) **References Cited**

U.S. PATENT DOCUMENTS

4,100,377 A 7/1978 Flanagan  
4,238,851 A 12/1980 Takahashi et al.  
(Continued)

FOREIGN PATENT DOCUMENTS

CA 2270931 5/1998  
EP 0789470 A2 8/1997  
(Continued)

OTHER PUBLICATIONS

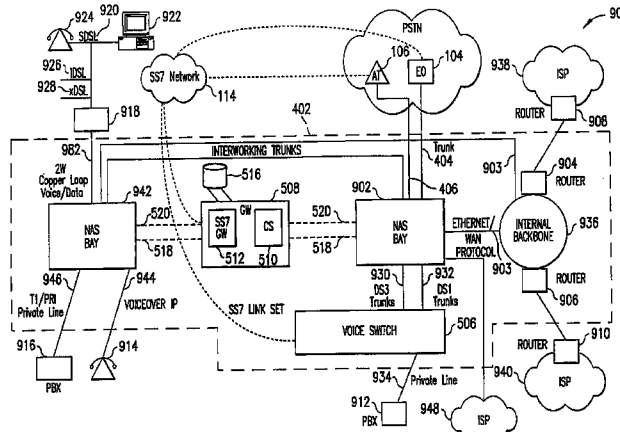
Adax Advanced Protocol Controllers APC-EIX—EISAbus (visited Mar. 7, 1997) <<http://www.adax.com/products/apc/eix.htm>>.  
(Continued)

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(57) **ABSTRACT**

An open architecture platform bypasses data from the facilities of a telecommunications carrier, e.g. an incumbent local exchange carrier, by distinguishing between voice and data traffic, and handling voice and data traffic separately. An SS7 gateway receives and transmits SS7 signaling messages with the platform. When signaling for a call arrives, the SS7 gateway informs a control server on the platform. The control server manages the platform resources, including the SS7 gateway, tandem network access servers (NASs) and modem NASs. A tandem NAS receives the call over bearer channels. The control server determines whether the incoming call is voice traffic or data traffic, by the dialed number, and instructs the tandem NAS how to handle the call. Voiced traffic is transmitted to a switch for transmission from the platform. Data traffic is terminated at a modem NAS, where it is converted into a form suitable for a data network, such as a private data network or an Internet services provider (ISP). The converted data is sent by routers to the data network. The data network need not convert the data, as the function has already been provided by the platform. In lieu of a conversion, the modems can create a tunnel (a virtual private network) between a remote server and the data network.

**2 Claims, 24 Drawing Sheets**



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(56)

**References Cited**

U.S. PATENT DOCUMENTS

4,291,200	A	9/1981	Smith	5,383,183	A	1/1995	Yoshida
4,569,041	A	2/1986	Takeuchi et al.	5,384,840	A	1/1995	Blatchford et al.
4,608,685	A	8/1986	Jain et al.	5,390,184	A	2/1995	Morris
4,630,260	A	12/1986	Toy et al.	5,396,491	A	3/1995	Newman
4,630,262	A	12/1986	Callens et al.	5,420,858	A	5/1995	Marshall et al.
4,661,947	A	4/1987	Lea et al.	5,422,882	A	6/1995	Hiller et al.
4,674,082	A	6/1987	Flanagin et al.	5,423,003	A	6/1995	Berteau
4,679,190	A	7/1987	Dias et al.	5,426,636	A	6/1995	Hiller et al.
4,679,191	A	7/1987	Nelson et al.	5,428,607	A	6/1995	Hiller et al.
4,707,831	A	11/1987	Weir et al.	5,428,616	A	6/1995	Field et al.
4,715,026	A	12/1987	Eberspaecher	5,430,719	A	7/1995	Weisser
4,723,238	A	2/1988	Isreal et al.	5,434,913	A	7/1995	Tung et al.
4,757,497	A	7/1988	Beierle et al.	5,436,898	A	7/1995	Bowen et al.
4,761,779	A	8/1988	Nara et al.	5,438,614	A	8/1995	Rozman et al.
4,771,425	A	9/1988	Baran et al.	5,444,707	A	8/1995	Cerna et al.
4,782,485	A	11/1988	Gollub	5,444,709	A	8/1995	Riddle
4,815,071	A	3/1989	Shimizu	5,452,289	A	9/1995	Sharma et al.
4,819,228	A	4/1989	Baran et al.	5,453,986	A	9/1995	Davis et al.
4,862,451	A	8/1989	Closs et al.	5,457,684	A	10/1995	Bharucha et al.
4,866,704	A	9/1989	Bergman	5,463,616	A	10/1995	Kruse et al.
4,872,159	A	10/1989	Hemmady et al.	5,471,470	A	11/1995	Sharma et al.
4,872,160	A	10/1989	Hemmady et al.	5,479,411	A	12/1995	Klein
4,885,739	A	12/1989	Read et al.	5,485,457	A	1/1996	Aramaki
4,903,261	A	2/1990	Baran et al.	5,521,914	A	5/1996	Mavraganis et al.
4,926,416	A	5/1990	Weik	5,526,353	A	6/1996	Henley et al.
4,932,022	A	6/1990	Keeney et al.	5,528,675	A	6/1996	Chen
4,933,931	A	6/1990	Kokubo	5,537,403	A	7/1996	Cloonan et al.
4,953,158	A	8/1990	Schreur	5,541,917	A	7/1996	Farris
4,958,341	A	9/1990	Hemmady et al.	5,544,161	A	8/1996	Bigham
4,962,497	A	10/1990	Ferenc et al.	5,544,163	A	8/1996	Madonna
4,969,184	A	11/1990	Gordon et al.	5,544,164	A	8/1996	Baran
4,970,721	A	11/1990	Aczel et al.	5,544,168	A	8/1996	Jeffrey et al.
4,975,695	A	12/1990	Almond et al.	5,553,063	A	9/1996	Dickson
4,996,685	A	2/1991	Farese et al.	5,568,475	A	10/1996	Doshi et al.
5,008,929	A	4/1991	Olsen et al.	5,568,786	A	10/1996	Lynch et al.
5,014,266	A	5/1991	Bales et al.	5,570,355	A	10/1996	Dail et al.
5,018,136	A	5/1991	Gollub	5,572,583	A	11/1996	Wheeler, Jr. et al.
5,020,058	A	5/1991	Holden et al.	5,577,038	A	11/1996	Miyahara
5,022,071	A	6/1991	Mozer et al.	5,577,041	A	11/1996	Sharma et al.
5,048,081	A	9/1991	Gavaras et al.	5,579,308	A	11/1996	Humpleman
5,051,983	A	9/1991	Kammerl	5,590,181	A	12/1996	Hogan et al.
5,093,827	A	3/1992	Franklin et al.	5,592,477	A	1/1997	Farris et al.
5,115,431	A	5/1992	Williams et al.	5,592,538	A	1/1997	Kosowsky et al.
5,150,357	A	9/1992	Hopner et al.	5,594,732	A	1/1997	Bell et al.
5,157,662	A	10/1992	Tadamura et al.	5,600,643	A	2/1997	Robrock, II et al.
5,197,067	A	3/1993	Fujimoto et al.	5,600,649	A	2/1997	Sharma et al.
5,208,806	A	5/1993	Hasegawa	5,602,991	A	2/1997	Berteau
5,218,602	A	6/1993	Grant et al.	5,604,737	A	2/1997	Iwami et al.
5,231,633	A	7/1993	Hluchyj et al.	5,608,786	A	3/1997	Gordon
5,241,588	A	8/1993	Babson et al.	5,613,069	A	3/1997	Walker
5,247,571	A	9/1993	Kay et al.	H1641	H	4/1997	Sharman
5,268,900	A	12/1993	Hluchyj et al.	5,621,727	A	4/1997	Vaudreuil
5,274,635	A	12/1993	Rahman et al.	5,625,677	A	4/1997	Feiertag et al.
5,291,489	A	3/1994	Morgan et al.	5,631,897	A	5/1997	Pacheco et al.
5,301,189	A	4/1994	Schmidt et al.	5,640,446	A	6/1997	Everett et al.
5,305,308	A	4/1994	English et al.	5,650,999	A	7/1997	Dickson
5,327,421	A	7/1994	Hiller et al.	5,654,957	A	8/1997	Koyama
5,327,428	A	7/1994	Van As et al.	5,659,541	A	8/1997	Chan
5,341,374	A	8/1994	Lewen et al.	5,659,542	A	8/1997	Bell et al.
5,351,276	A	9/1994	Doll, Jr. et al.	5,680,437	A	10/1997	Segal
5,351,286	A	9/1994	Nici	5,684,799	A	11/1997	Bigham et al.
5,353,283	A	10/1994	Tsuchiya	5,689,553	A	11/1997	Ahuja et al.
5,359,598	A	10/1994	Stegall et al.	5,692,126	A	11/1997	Templeton et al.
5,365,521	A	11/1994	Ohnishi et al.	5,701,301	A	12/1997	Weisser, Jr. et al.
5,379,293	A	1/1995	Kanno et al.	5,706,286	A	1/1998	Reiman et al.
				5,710,769	A	1/1998	Anderson et al.
				5,712,903	A	1/1998	Bartholomew et al.
				5,712,908	A	1/1998	Brinkman et al.
				5,724,412	A	3/1998	Srinivasan
				5,726,984	A	3/1998	Kubler et al.
				5,729,544	A	3/1998	Lev et al.
				5,732,078	A	3/1998	Arango
				5,737,320	A	4/1998	Madonna
				5,737,331	A	4/1998	Hoppal et al.
				5,737,333	A	4/1998	Civanlar et al.
				5,740,164	A	4/1998	Liron
				5,740,231	A	4/1998	Cohn et al.

(56)

References Cited

U.S. PATENT DOCUMENTS

5,751,968 A 5/1998 Cohen  
 5,754,641 A 5/1998 Voit et al.  
 5,764,628 A 6/1998 Davis et al.  
 5,764,736 A 6/1998 Shachar et al.  
 5,764,750 A 6/1998 Chau et al.  
 5,764,756 A 6/1998 Onweller  
 5,768,346 A 6/1998 Spruijt  
 5,777,991 A 7/1998 Adachi et al.  
 5,790,538 A 8/1998 Sugar  
 5,793,762 A 8/1998 Penners et al.  
 5,793,771 A 8/1998 Darland et al.  
 5,799,154 A 8/1998 Kuriyan  
 5,805,587 A 9/1998 Norris et al.  
 5,805,588 A 9/1998 Petersen  
 5,809,022 A 9/1998 Byers et al.  
 5,809,121 A 9/1998 Elliott et al.  
 5,809,128 A 9/1998 McMullin  
 5,812,534 A 9/1998 Davis et al.  
 5,812,952 A 9/1998 On et al.  
 5,815,505 A 9/1998 Mills  
 5,818,912 A 10/1998 Hammond  
 5,825,771 A 10/1998 Cohen et al.  
 5,828,468 A 10/1998 Lee et al.  
 5,828,666 A 10/1998 Focsaneanu et al.  
 5,838,665 A 11/1998 Kahn et al.  
 5,867,494 A 2/1999 Krishnaswamy et al.  
 5,867,495 A 2/1999 Elliott et al.  
 5,881,030 A 3/1999 Iwasaki  
 5,881,060 A 3/1999 Morrow et al.  
 5,881,131 A 3/1999 Farris et al.  
 5,889,774 A 3/1999 Mirashrafi et al.  
 5,915,008 A 6/1999 Dulman  
 5,922,047 A 7/1999 Newlin et al.  
 5,933,490 A 8/1999 White et al.  
 5,954,799 A 9/1999 Goheen et al.  
 5,963,551 A 10/1999 Minko  
 5,999,525 A 12/1999 Krishnaswamy et al.  
 6,009,469 A 12/1999 Mattaway et al.  
 6,026,083 A 2/2000 Albrow et al.  
 6,031,896 A 2/2000 Gardell et al.  
 6,035,020 A 3/2000 Weinstein et al.  
 6,049,602 A 4/2000 Foladare et al.  
 6,061,502 A 5/2000 Ho et al.  
 6,070,192 A 5/2000 Holt et al.  
 6,072,780 A 6/2000 Johnson, Jr. et al.  
 6,075,784 A \* 6/2000 Frankel et al. .... 370/356  
 6,084,873 A 7/2000 Russell et al.  
 6,084,956 A 7/2000 Turner et al.  
 6,091,722 A 7/2000 Russell et al.  
 6,112,084 A 8/2000 Sicher et al.  
 6,125,113 A \* 9/2000 Farris et al. .... 370/389  
 6,128,304 A 10/2000 Gardell et al.  
 6,134,235 A 10/2000 Goldman et al.  
 6,169,796 B1 1/2001 Bauer et al.  
 6,181,703 B1 1/2001 Christie et al.  
 6,208,657 B1 3/2001 Dendi et al.  
 6,243,373 B1 6/2001 Turock  
 6,266,328 B1 7/2001 Johnson, Jr. et al.  
 6,278,707 B1 8/2001 MacMillan et al.  
 6,298,062 B1 10/2001 Gardell et al.  
 6,324,173 B1 11/2001 Deschaine et al.  
 6,324,183 B1 11/2001 Miller et al.  
 6,327,258 B1 12/2001 Deschaine et al.  
 6,339,594 B1 1/2002 Civanlar et al.  
 6,389,014 B1 \* 5/2002 Song ..... 370/376  
 6,415,024 B1 7/2002 Dunn et al.  
 6,442,169 B1 \* 8/2002 Lewis ..... 370/401  
 6,457,043 B1 9/2002 Kwak et al.  
 6,459,697 B1 10/2002 Neyman  
 6,480,474 B2 11/2002 Johnson, Jr. et al.  
 6,614,781 B1 \* 9/2003 Elliott et al. .... 370/352  
 6,661,779 B2 12/2003 Johnson, Jr. et al.  
 6,707,797 B1 3/2004 Gardell et al.

7,116,656 B1 10/2006 Gardell et al.  
 7,145,898 B1 12/2006 Elliott  
 7,336,649 B1 2/2008 Huang  
 7,564,840 B2 \* 7/2009 Elliott et al. .... 370/356  
 7,720,081 B2 5/2010 Lewis  
 8,085,761 B2 \* 12/2011 Elliott et al. .... 370/356  
 8,089,958 B2 \* 1/2012 Elliott et al. .... 370/356  
 8,416,769 B2 4/2013 Lewis  
 2001/0040885 A1 11/2001 Jonas et al.  
 2003/0198216 A1 \* 10/2003 Lewis ..... 370/352  
 2007/0038753 A1 2/2007 Jorgensen  
 2007/0073805 A1 3/2007 Jorgensen  
 2008/0025294 A1 \* 1/2008 Elliott et al. .... 370/356  
 2010/0296508 A1 11/2010 Lewis

FOREIGN PATENT DOCUMENTS

EP 0794650 A2 9/1997  
 EP 0797373 A2 9/1997  
 EP 0824298 A2 2/1998  
 EP 0829995 A2 3/1998  
 EP 0841831 A2 5/1998  
 EP 0847176 A2 6/1998  
 EP 0851653 A2 7/1998  
 EP 0853411 A3 7/1998  
 EP 0866596 A2 9/1998  
 EP 0872998 A1 10/1998  
 GB 2315190 A 1/1998  
 JP 01051453 A2 2/1989  
 JP 01023067 B4 4/1989  
 JP 10164135 A2 6/1998  
 JP 10164257 A2 6/1998  
 WF WO 96/08935 A1 3/1996  
 WO WO 96/15598 A1 5/1996  
 WO WO 97/01423 A1 1/1997  
 WO WO 97/14234 A2 4/1997  
 WO WO 97/14238 A1 4/1997  
 WO WO-97/14244 4/1997  
 WO WO 97/16007 A1 5/1997  
 WO WO 97/22216 A1 6/1997  
 WO WO 97/23078 A1 6/1997  
 WO WO-97/27692 A1 7/1997  
 WO WO-97/28628 A1 8/1997  
 WO WO-97/29581 A1 8/1997  
 WO WO-97/31492 A1 8/1997  
 WO WO-97/33412 A1 9/1997  
 WO WO-97/38511 A2 10/1997  
 WO WO-97/38551 10/1997  
 WO WO-97/39560 A1 10/1997  
 WO WO-97/46073 A2 12/1997  
 WO WO-97/47118 A1 12/1997  
 WO WO-97/50217 A1 12/1997  
 WO WO-97/50271 12/1997  
 WO WO-97/50277 A2 12/1997  
 WO WO-98/04989 2/1998  
 WO WO-98/11704 3/1998  
 WO WO-98/12860 3/1998  
 WO WO-98/13974 4/1998  
 WO WO-98/18238 4/1998  
 WO WO-98/18289 4/1998  
 WO WO-98/19425 5/1998  
 WO WO-98/19445 5/1998  
 WO WO-98/20701 5/1998  
 WO WO-98/23067 5/1998  
 WO WO-98/23080 5/1998  
 WO WO-98/26543 6/1998  
 WO WO-98/28885 7/1998  
 WO WO-98/30007 7/1998  
 WO WO-98/30008 7/1998  
 WO WO-98/34391 8/1998  
 WO WO-98/34399 8/1998  
 WO WO-98/36543 8/1998  
 WO WO-98/37665 8/1998  
 WO WO-98/37688 A2 8/1998  
 WO WO-98/39897 9/1998

(56)

## References Cited

## FOREIGN PATENT DOCUMENTS

WO	WO-98/42146	9/1998
WO	WO-98/47256	10/1998
WO	WO-98/51063	11/1998

## OTHER PUBLICATIONS

*The Adax Sbus Advanced Protocol Controllers APC-SBX—SBus* (visited Mar. 7, 1997) <<http://www.adax.com/products/apc/sbx.htm>>.

“A Fundamental Shift in Telephony Networks”, *Selsius Systems Inc.*, Version 1.0, Mar. 1998, 28 pages.

“About Delta Three (visited Oct. 29, 1998)”, <[http://www.deltathree.com/company/company\\_body1.asp](http://www.deltathree.com/company/company_body1.asp)>, 2 pages.

“About VIP Calling (visited Oct. 29, 1998)”, <<http://www.vipcalling.com/about.html>>, 1 pg.

“Ascend DSLTNT Product Information”, (*Ascend Communications, Inc. 1997*).

“Ascend IDSL Product Information”, (*Ascend Communications, Inc. 1996*).

“Ascend Product Overview: MultiVoice for the MAX-Release 1.0”, *Ascend Communications, Inc.*, Copyright 1998, 18 pages.

“Ascend RADSL Product Information”, (*Ascend Communications, Inc. 1997*).

“Ascend SDSL Product Information”, (*Ascend Communications, Inc. 1997*).

“AT&T Products and Services (Copyright 1998)”, <[http://www.at-tjens.co.jp/products/phone/phone\\_e.html](http://www.at-tjens.co.jp/products/phone/phone_e.html)>, 2 pages.

“Cascade sweeps the Internet market, creating a new Internet infrastructure core for the world’s largest commercial Internet providers”, *Business Wire* PSINet, UUNET and NETCOM select Cascade B-STDx9000 switches to overcome the scalability, capacity, Quality of Service and management concerns of exploding Internet growth, Oct. 30, 1995, 5 pages.

“Company Develops Telephone/Internet Gateway for International Callers”, *Advanced Intelligent Network News* Oct. 18, 1995, 2 pages.

“Defense Switched Network Technology and Experiments Program”, *Annual Report to the Defense Communications Agency*, Oct. 1, 1981-Sep. 30, 1982 Massachusetts Institute of Technology Lincoln Laboratory, Lexington Massachusetts Apr. 5, 1983, 43 pgs.

“Defense Switched Network Technology and Experiments Program”, *Annual Report to the Defense Communications Agency*, Oct. 1, 1981-Sep. 30, 1982 Massachusetts Institute of Technology Lincoln Laboratory, Lexington Massachusetts Feb. 29, 1984, 31 pgs.

“Dialog File 347 (JAP10) English Language Patent Abstract for JP 10-23067”, Jan. 23, 1998, 1 page.

“Dialog File 347 (JAP10) English Language Patent Abstract for JP 10-51453”, Feb. 20, 1998, 1 page.

“Dialog File 347 (JAP10) English Language Patent Abstract for JP10-164135”, Jun. 19, 1998, 1 page.

“Dialog File 347 (JAP10) English Language Patent Abstract for JP10-164257”, Jun. 19, 1998, 1 page.

“DSC Signs Agreement With Unisys for Intelligent Network Measurement and Monitoring Systems”, <<http://www.dsccc.com/pr071597.htm>> Jul. 15, 1997.

“Electronic mail message from ‘srctran’ to ‘prd’ regarding ‘Internet and telephones review document’”, 1995, 10 pages.

“GeoProbe: The Service Provider’s Competitive Advantage”, (*Inet, Inc. 1997*).

“Global Carrier Services-Overview (Copyright 1996, 1997)”, <<http://www.alphanet.net/combine.cgi?content=gcs/gcs>>, 4 pages.

“How VIP Calling Works (visited Oct. 29, 1998)”, <<http://www.vipcalling.com/how.html>>, 1 page.

“IDT Connects Internet Phone Calls to the PSTN”, *Network Briefing* Nov. 3, 1995, 2 pages.

“IMTC Voice Over IP Forum Technical Committee”, *IMTC Voice Over IP Forum Service Interoperability Implementation Agreement*, Draft 0.91, vol. P97-008 Jan. 13, 1997, pp. 1-70.

“Internet Telephone Companies Racing to Market”, *Voice Technology & Services News* Oct. 3, 1995, 4 pgs.

“Internet Telephony (visited Oct. 29, 1998)”, <[http://www.deltathree.com/company/company\\_body7.asp](http://www.deltathree.com/company/company_body7.asp)>, 3 pages.

“Lucent Technologies and VocalTec Demonstrate Industry’s First Interoperable Internet Telephony Gateways over IIXC Network (Sep. 14, 1998)”, <[http://www.vocaltec.com/about/press/pr\\_lucent091498.htm](http://www.vocaltec.com/about/press/pr_lucent091498.htm)>, Sep. 14, 1998, 3 pages.

“MicroLegend Internet Telephony Tutorial”, <<http://www.microlegend.com/what-it.htm>> (last updated May 16, 1998), 2 pages.

“MicroLegend MS7 SS7 Mediation System”, (*Hewlett-Packard Company 1995*).

“Net2Phone Products Information (Copyright 1998)”, <<http://www.net2phone.com/2/english/geninfo.html>>, 2 pages.

“Network Secure Communication”, *A Research Program in Computer Technology, Annual Technical Report*, May 1974-Jun. 1975 University of Southern California / Information Sciences Institute, 4676 Admiralty Way, Marina del Rey, California 90291, pp. 53-65.

“Network Secure Communication”, *A Research Program in Computer Technology, 1977 Annual Technical Report*, Jul. 1976-Jun. 1977 University of Southern California / Information Sciences Institute, 4676 Admiralty Way, Marina del Rey, California 90291, pp. 41-55.

“Network Secure Communication”, *A Research Program in Computer Technology, 1978 Annual Technical Report*, Jul. 1977-Sep. 1978 University of Southern California / Information Sciences Institute, 4676 Admiralty Way, Marina del Rey, California 90291, pp. 47-64.

“Network Secure Communication”, *A Research Program in Computer Technology, Annual Technical Report, Jun. 1975-Jun. 1976* University of Southern California / Information Sciences Institute, 4676 Admiralty Way, Marina del Rey, California 90291, pp. 53-69.

“Network Secure Communication”, *A Research Program in Computer Technology, 1979 Annual Technical Report, Oct. 1978-Sep. 1979* University of Southern California / Information Sciences Institute, 4676 Admiralty Way, Marina del Rey, California 90291, pp. 53-70.

“Network Secure Communication / Wideband Communication”, *A Research Program in Computer Technology, 1980 Annual Technical Report vol. I, Oct. 1979-Sep. 1980* University of Southern California / Information Sciences Institute, 4676 Admiralty Way, Marina del Rey, California 90291, pp. 65-78.

“Network Secure Speech”, *A Research Program in the Field of Computer Technology, Annual Technical Report, May 1973-May 1974* University of Southern California / Information Sciences Institute, 4676 Admiralty Way, Marina del Rey, California 90291, pp. 83-87.

“Network Speech Systems Technology Program”, *Annual Report to the Defense Communications Agency, Oct. 1, 1980-Sep. 30, 1981* Massachusetts Institute of Technology Lincoln Laboratory, Lexington Massachusetts Feb. 4, 1982, 73 pgs.

“New Telecommunications Protocols Published”, <[http://www.I3.com/press\\_releases](http://www.I3.com/press_releases)>. Aug. 5, 1998.

“New Vendor Alliance Targets Frame Relay Over ISDN”, *ISDN News, vol. 8, Issue 6* Mar. 14, 1995, 3 pages.

“NextGen Telcos-By pulver.com”, <<http://www.pulver.com/nextgen/>> (Copyright 1997), 4 pgs.

“Phone Via Internet—and Forget the Computer (visited Oct. 29 1998)”, <<http://www.poptel.com/newpop/eng/pages/press/heraldtrib.html>>, 4 pgs.

“Press Release-AlphaNet telecom Achieves a New Traffic Milestone and Provides a Status Update on its Telecommunications Business”, <<http://www.alphanet.net/combine.cgi?content=pr981023>>, Oct. 23, 1998, 2 pages.

“Products (EXICOM) (Copyright 1998)”, <<http://www.exicon.com/products.html>>, 2 pgs.

“RealNetworks RealVideo 10 Technical Overview, Version 1.0”, *RealVideo 10 Technical Summary*, Copyright © 2003 RealNetworks, Inc., pp. 1-12.

“Selsius System—Home of the IP PBX”, (last modified Jul. 16, 1998) <<http://www.selsius.com>>.

“Spectra: The Multi-Protocol Analyzer”, (*Inet, Inc. 1997*).



(56)

## References Cited

## OTHER PUBLICATIONS

*Issues: 626, 627, 628, 629, 630, 631, 632, 633, 634* Sep. 2, 1990, pp. 140-277.

"Telecom Digest", (634 continued), *Issues: 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 649, 648, (650 ended)*. Sep. 11, 1990, pp. 278-396.

"Telecom Digest", vol. 10, *Issues: 601, 602, 604, 603, 605, 606, E-Series, Dial Tone Monopoly, Issues: 607, 608, 609, 612, Epsom mail part 1, Epsom mail part 2, Blocking, Issues: 610, 611, 613, 614, 615, PBX Blocking part 2* Aug. 28, 1990, pp. 1-139.

"TeleMatrix (Copyright 1997)", <<http://www.telematrix.co.jp/iphone.html>>, 2 pages.

"The Adax Advanced Protocol Controllers APC-PCX—PCBus", (visited Mar. 7, 1997) <<http://www.adax.com/products/>>.

"The Adax Advanced Protocol Controllers APC-VMEX VMEbus", (visited Mar. 7, 1997) <<http://www.adax.com/products/>>.

"The Global Gateway Group Press (Copyright 1997)", <<http://www.gcubed.com/g.3press.htm>>, 7 pages.

"Too much of a Good Thing?", <<http://www.bellcore.com/BC.dynjava?GoodThingEAGeneral-ExchangeArticle>> 1996.

"Trillium SS7 Product Group Signaling Connection Control Part (SCCP) Portable Software 1000030", (visited Mar. 14, 1997) <<http://www.trillium.com/1078030.html>>.

"Trillium.TM. SS7 Product Group ISDN User Part (ISUP) Portable Software 1000029", <http://www.trillium.com/1078029.html> Mar. 14, 1997.

"Trillium™ SS7 Product Group Telephone User Part (TUP) Portable Software 1000042", (visited Mar. 14, 1997) <<http://www.trillium.com/1078042.html>>.

"VIP Calling First Internet Telephony Company to Deploy DS-3 (Mar. 30, 1998)", <[http://www.vipcalling.com/PR\\_VIP-DS30330.html](http://www.vipcalling.com/PR_VIP-DS30330.html)>, 2 pages.

"VocalTec Ensemble Architect—VocalTec Internet Phone Lite", (visited Oct. 26, 1998) <[http://www.vocaltec.com/products/veaiplite/iplite\\_overview.htm](http://www.vocaltec.com/products/veaiplite/iplite_overview.htm)>, 2 pages.

"VocalTec Ensemble Architect—VocalTec Gatekeeper", (visited Oct. 26, 1998) <[http://www.vocaltec.com/products/vgk/vgk\\_overview.htm](http://www.vocaltec.com/products/vgk/vgk_overview.htm)>, 2 pages.

"VocalTec Ensemble Architect—VocalTec Network Manager", (visited Oct. 26, 1998) <[http://www.vocaltec.com/products/vnm/vnm\\_overview.htm](http://www.vocaltec.com/products/vnm/vnm_overview.htm)>, 2 pages.

"VocalTec Ensemble Architect—VocalTec Telephony Gateway Series 120", (visited Oct. 26, 1998) <[http://www.vocaltec.com/products/vtg/vtg\\_overview.htm](http://www.vocaltec.com/products/vtg/vtg_overview.htm)>, 1 page.

"VocalTec Introduces Full Duplex in Revolutionary Internet Phone", *PR Newswire* Jun. 5, 1995, 2 pgs.

"Voice Over IP (VOIP)", <<http://www.netrix.com/whatsnew/voip.htm>> (Copyright 1998), 2 pages.

"Voice Over Packet (VOP) White Paper (Copyright 1997)", <[http://www.telogy.com/our\\_products/golden\\_gateway/VOPwhite.html](http://www.telogy.com/our_products/golden_gateway/VOPwhite.html)>, 12 pages.

"Voice/Fax Over IP: Internet, Intranet, and Extranet: Technology Overview", *MICOM Communications Corporation* (white paper downloaded from [www.micom.com](http://www.micom.com)), 52 pages.

"What is IP Telephony? (Copyright 1998)", <<http://www.networkstelephony.com/whatisiptelephony.html>>, 2 pages.

"Wideband Communication", *A Research Program in Computer Technology, 1982 Annual Technical Report*, Jul. 1981-Jun. 1982 University of Southern California / Information Sciences Institute, 4676 Admiralty Way, Marina del Rey, California 90291, pp. 77-89.

"Wideband Communications", *A Research Program in Computer Technology, 1983 Annual Technical Report*, Jul. 1982-Jun. 1983 University of Southern California / Information Sciences Institute, 4676 Admiralty Way, Marina del Rey, California 90291, pp. 59-72.

"Wideband Communications", *A Research Program in Computer Technology, 1984 Annual Technical Report*, Jul. 1983-Jun. 1984 Uni-

An, Kristi et al., "XCOM Technologies Creates Carrier-Class Data Network with Ascend Products", Nov. 18, 1997.

Aras, C. M. et al., "Real-Time Communication in Packet-Switched Networks", *Proceedings of the IEEE*, vol. 82, No. 1 Jan. 1994, pp. 122-139.

Atai, A. et al., "Architectural Solutions to Internet Congestion Based on SS7 and Intelligent Network Capabilities", *Copyright 1997, Bellcore*, 18 pages.

Black, David H., "PLC-1: A TASI System for Small Trunk Groups", *IEEE Transactions on Communications* vol. Com-30, No. 4, Apr. 4, 1982, pp. 786-791.

Casares-Giner, Vicente "On the Cutoff Fraction Distribution for TASI Systems with FIFO Discipline", *IEEE Transactions on Communications* vol. 45, No. 11 Nov. 1997, pp. 1367-1370.

Casner, et al., "Digital Voice Conferencing—Packet-Voice Conferencing", Del Zoppo, Annette, Producer and Director; Dugger, Clark, Cinematography; ISI NSC Project—Advanced Research Projects Agency under Contract No. DAHC-15-72 C-0308, Jan. 1978, CD-Rom, 5 min 17 sec.

Casner, Stephen et al., "First IETF Internet Audiocast", *ACM SIGCOMM Computer Communication Review*, pp. 92-97.

Cohen, Danny "A Network Voice Protocol NVP-IP", USC/USC/Information Sciences Institute, 4676 Admiralty Way, Marina del Rey, California 90291 Apr. 1, 1981, 72 pages.

Cohen, Danny "A Protocol for Packet Switching Voice Communication", USC/Information Sciences Institute, 4676 Admiralty Way, Marina del Rey, California 90291, Computer Network Protocols © university de liege, 1978, 9 pages.

Cohen, Danny "A Voice Message System", USC/Information Sciences Institute, 4676 Admiralty Way, Marina del Rey, California 90291, Computer Message Systems, Ottawa, Canada Apr. 6-8, 1981, pp. 17-28.

Cohen, Danny "Flow Control for Real-Time Communication", USC/Information Sciences Institute, 4676 Admiralty Way, Marina del Rey, California 90291, pp. 41-47.

Cohen, Danny "Issues in Transnet Packetized Voice Communication", Computer Science Department, Caltech, Pasadena, California 91125 and USC/Information Sciences Institute, 4676 Admiralty Way, Marina del Rey, California 90291, pp. 6-10.

Cohen, Danny et al., "On Protocol Multiplexing", *IEEE Information Science Institute, University of Southern California*, 1979, pp. 75-81.

Cohen, Danny et al., "Packet Communication on Online Speech", USC/Information Sciences Institute, Marina del Rey, California 90291, National Computer Conference 1981, pp. 169-176.

Cohen, Danny "Real-Time Packet Video Over Satellite Channels", *ACM USC/Information Sciences Institute, 4676 Admiralty Way, Marina del Rey, California 90291* 1983, pp. 40-47.

Cohen, Dan "Specifications for the Network Voice Protocol", *ISI/RR 75-39 USC/Information Sciences Institute, 4676 Admiralty Way, Marina del Rey, California 90291* Mar. 1976, 34 pages.

Cohen, Danny "Specifications for the Network Voice Protocol (NVP) and Appendix 1: The Definition of Tables-Set-#1 (for LPC) and Appendix 2: Implementation Recommendations", *NWG/RFC 741 Internet*. cited by other Jan. 1976, 1-35 pgs.

Cole, R. "Dialing in the WB Network", *W-Note 26 Information Sciences Institute, University of Southern California* Apr. 20, 1981, pp. 1-19.

Cox, Richard V. "Multiple User Variable Rate Coding for TASI and Packet Transmission Systems", *IEEE Transactions on Communications* vol. Com-28, No. 3, Mar. 1980, pp. 334-344.

Danny, Cohen "Real-time Packet Video Over Satellite Channels", *ACM; 1983 ACM*, pp. 40-47.

Detreville, J. D. et al., "A Distributed Experimental Communications System", *IEEE Press Chapter 31, Advances in Local Area Networks*, (Kummerle et al. eds.) 1987, pp. 533-542.

Dix, F. R. et al., "Access to a Public Switched Multi-Megabit Data Service Offering", Bell Communications Research, Inc., Red Bank, NJ 07701, pp. 46-61.

Dorgelo, A. J. et al., "Variable Length Coding for Increasing Traffic

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