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Shribman et al.

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(54) **SYSTEM PROVIDING FASTER AND MORE EFFICIENT DATA COMMUNICATION**

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(52) **U.S. Cl.**

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(58) **Field of Classification Search**

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(56) **References Cited**

U.S. PATENT DOCUMENTS

3,922,494 A 11/1975 Cooper et al.

4,937,781 A 6/1990 Lee et al.

(Continued)

FOREIGN PATENT DOCUMENTS

CN 101075242 A 11/2007

CN 101179389 A 5/2008

(Continued)

OTHER PUBLICATIONS

Third-party submission under 37 CFR 1.290 filed on Jul. 23, 2019 and entered in U.S. Appl. No. 16/140,749.

(Continued)

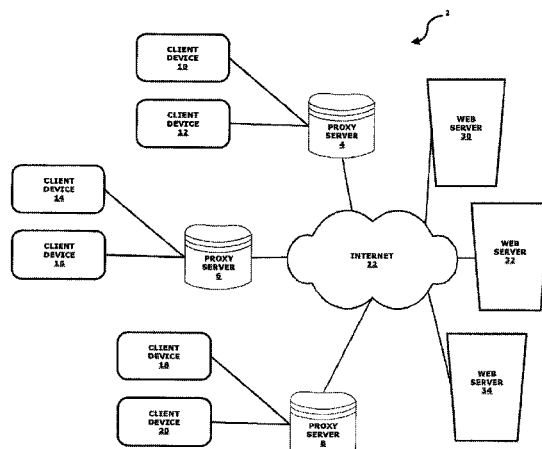
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(57) **ABSTRACT**

A system designed for increasing network communication speed for users, while lowering network congestion for content owners and ISPs. The system employs network elements including an acceleration server, clients, agents, and peers, where communication requests generated by applications are intercepted by the client on the same machine. The IP address of the server in the communication request is transmitted to the acceleration server, which provides a list of agents to use for this IP address. The communication request is sent to the agents. One or more of the agents respond with a list of peers that have previously seen some or all of the content which is the response to this request (after checking whether this data is still valid). The client then downloads the data from these peers in parts and in parallel, thereby speeding up the Web transfer, releasing congestion from the Web by fetching the information from multiple sources, and relieving traffic from Web servers by offloading the data transfers from them to nearby peers.

24 Claims, 15 Drawing Sheets



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(56) **References Cited**

U.S. PATENT DOCUMENTS

5,519,693 A 5/1996 Galuszka
 5,577,243 A 11/1996 Sherwood et al.
 5,758,195 A 5/1998 Balmer
 6,061,278 A 5/2000 Kato et al.
 6,154,782 A 11/2000 Kawaguchi
 6,173,330 B1 9/2001 Guo et al.
 6,466,470 B1 10/2002 Chang
 6,519,693 B1 2/2003 Debey
 6,868,453 B1 3/2005 Watanabe
 6,895,011 B1 5/2005 Lassers
 7,120,666 B2 10/2006 McCanne et al.
 7,203,741 B2 4/2007 Marco et al.
 7,234,059 B1 6/2007 Beaver
 7,558,942 B1 7/2009 Chen et al.
 7,673,048 B1 3/2010 O'Toole
 7,742,485 B2 6/2010 Zhang
 7,751,628 B1 7/2010 Reisman
 7,783,777 B1 8/2010 Pabla
 7,788,378 B2 8/2010 Rao
 7,818,430 B2 10/2010 Zuckerman
 7,831,720 B1 11/2010 Nouredine
 7,865,585 B2* 1/2011 Samuels H04L 67/28
 709/217
 7,890,547 B2 2/2011 Hotti
 7,970,835 B2 6/2011 St. Jacques
 8,135,912 B2 3/2012 Shribman et al.
 8,171,101 B2 5/2012 Gladwin et al.
 8,479,251 B2 7/2013 Feinleib et al.
 8,499,059 B2 7/2013 Stoyanov
 8,595,786 B2 11/2013 Choi
 8,639,630 B2 1/2014 Fomenko et al.
 8,769,035 B2 1/2014 Resch et al.
 8,719,430 B2 5/2014 Van Ackere
 8,719,505 B2 6/2014 Shribman et al.
 8,832,179 B2 9/2014 Owen et al.
 8,838,811 B2 9/2014 Chen
 9,201,808 B2 1/2015 Shribman et al.
 9,015,335 B1* 4/2015 Gigliotti G06F 16/40
 709/231
 9,177,157 B2 11/2015 Binder
 9,253,164 B2 2/2016 Gouge
 9,990,295 B2 6/2018 Shribman et al.
 2001/0033583 A1 10/2001 Rabenko et al.
 2001/0054020 A1* 12/2001 Barth G06Q 10/02
 705/37
 2002/0007413 A1 1/2002 Garcia-Luna-Aceves et al.
 2002/0065930 A1 5/2002 Rhodes
 2002/0069241 A1 6/2002 Narlikar et al.
 2002/0091760 A1 7/2002 Rozen

2002/0133621 A1 9/2002 Marco et al.
 2003/0009518 A1 1/2003 Harrow et al.
 2003/0009583 A1 1/2003 Chan et al.
 2003/0074403 A1 4/2003 Harrow et al.
 2003/0097408 A1 5/2003 Kageyama
 2003/0115364 A1 6/2003 Shu et al.
 2003/0174648 A1 9/2003 Wang et al.
 2003/0200307 A1 10/2003 Raju et al.
 2003/0204602 A1 10/2003 Hudson
 2003/0210694 A1 11/2003 Jayaraman et al.
 2003/0229718 A1 12/2003 Tock
 2003/0229785 A1 12/2003 Daseke
 2004/0088646 A1 5/2004 Yeager et al.
 2004/0107242 A1 6/2004 Vert et al.
 2004/0254907 A1 12/2004 Crow et al.
 2004/0264506 A1 12/2004 Furukawa
 2005/0015552 A1 1/2005 So et al.
 2005/0022236 A1 1/2005 Ito et al.
 2005/0027782 A1 2/2005 Jalan
 2005/0097441 A1 5/2005 Herbach
 2005/0228964 A1 10/2005 Sechrest et al.
 2006/0036755 A1 2/2006 Abdullah
 2006/0039352 A1 2/2006 Karstens
 2006/0047844 A1 3/2006 Deng
 2006/0212542 A1* 9/2006 Fang H04L 67/104
 709/219
 2006/0212584 A1* 9/2006 Yu H04L 67/104
 709/227
 2006/0224687 A1 10/2006 Popkin
 2006/0259728 A1 11/2006 Chandrasekaran et al.
 2007/0050522 A1 3/2007 Grove
 2007/0073878 A1 3/2007 Issa
 2007/0100839 A1 5/2007 Kim
 2007/0142036 A1 6/2007 Wikman
 2007/0156855 A1 7/2007 Johnson
 2007/0174246 A1 7/2007 Sigurdsson
 2007/0226810 A1 9/2007 Hotti
 2007/0239655 A1 10/2007 Agetsuma et al.
 2008/0008089 A1 1/2008 Bornstein et al.
 2008/0025506 A1 1/2008 Muraoka
 2008/0109446 A1 5/2008 Wang
 2008/0125123 A1 5/2008 Dorenbosch et al.
 2008/0222291 A1 9/2008 Weller
 2008/0235391 A1 9/2008 Painter et al.
 2008/0086730 A1 10/2008 Vertes
 2008/0256175 A1 10/2008 Lee
 2009/0010426 A1 1/2009 Redmond
 2009/0037529 A1 2/2009 Armon-Kest
 2009/0182843 A1 7/2009 Hluchyj
 2009/0216887 A1 8/2009 Hertle
 2009/0217122 A1 8/2009 Yokokawa et al.
 2009/0232003 A1 9/2009 Vasseur
 2009/0248793 A1 10/2009 Jacobsson
 2009/0279559 A1 11/2009 Wong et al.
 2009/0292816 A1 11/2009 Etchegoyen
 2009/0319502 A1 12/2009 Chalouhi et al.
 2010/0066808 A1 3/2010 Tucker et al.
 2010/0085977 A1 4/2010 Khalid et al.
 2010/0094970 A1 4/2010 Zuckerman et al.
 2010/0115063 A1 6/2010 Gladwin et al.
 2010/0154044 A1 6/2010 Manku
 2010/0235438 A1 9/2010 Narayanan
 2010/0262650 A1 10/2010 Chauhan
 2010/0293555 A1 11/2010 Vepsalainen
 2010/0329270 A1 12/2010 Asati et al.
 2011/0035503 A1* 2/2011 Zaid H04L 63/0407
 709/228
 2011/0066924 A1 3/2011 Dorso
 2011/0087733 A1 4/2011 Shribman
 2011/0128911 A1 6/2011 Shaheen
 2011/0264809 A1 10/2011 Koster
 2011/0314347 A1 12/2011 Nakano et al.
 2012/0099566 A1 4/2012 Laine et al.
 2012/0124173 A1 5/2012 De et al.
 2012/0124239 A1 5/2012 Shribman
 2012/0164980 A1 6/2012 Van Phan
 2012/0166582 A1 6/2012 Binder

(56)

References Cited

U.S. PATENT DOCUMENTS

2012/0254456	A1	10/2012	Visharam
2013/0007232	A1	1/2013	Wang
2013/0007253	A1	1/2013	Li
2013/0064370	A1	3/2013	Gouge
2013/0080575	A1	3/2013	Prince
2013/0157699	A1	6/2013	Talwar
2013/0166768	A1	6/2013	Gouache et al.
2013/0171964	A1	7/2013	Bhatia
2013/0201316	A1	8/2013	Binder et al.
2013/0219458	A1	8/2013	Ramanathan
2013/0272519	A1	10/2013	Huang
2013/0304796	A1	11/2013	Jackowski
2013/0326607	A1	12/2013	Feng
2014/0082260	A1	3/2014	Oh et al.
2014/0189802	A1	7/2014	Montgomery
2014/0301334	A1	10/2014	Labranche et al.
2014/0359081	A1	12/2014	Van Deventer
2014/0376403	A1	12/2014	Shao
2015/0033001	A1	1/2015	Ivanov
2015/0067819	A1	3/2015	Shribman
2015/0189401	A1	7/2015	Yi
2015/0206176	A1	7/2015	Toval
2015/0206197	A1	7/2015	Toval
2015/0341812	A1	11/2015	Dion
2015/0358648	A1	12/2015	Limberg
2016/0021430	A1	1/2016	LaBosco et al.
2016/0105530	A1	4/2016	Shribman
2017/0221092	A1	8/2017	Toval

FOREIGN PATENT DOCUMENTS

EP	0948176	A2	10/1999
EP	2597869	A1	5/2013
EP	2597869	A1	5/2015
EP	2922275	B1	3/2016
JP	2007280388		10/2007
KR	1020090097034		9/2009
RU	2343536	C2	10/2009
WO	2000/018078	A1	3/2000
WO	2004094980		11/2004
WO	2010090562	A1	8/2010
WO	2010090562	A1	12/2010
WO	2011068784	A1	9/2011
WO	2015034752	A1	3/2015

OTHER PUBLICATIONS

Third-party submission under 37 CFR 1.290 filed on Jul. 23, 2019 and entered in U.S. Appl. No. 16/140,785.

Third-party submission under 37 CFR 1.290 filed on Jul. 23, 2019 and entered in U.S. Appl. No. 16/214,433.

Third-party submission under 37 CFR 1.290 filed on Jul. 23, 2019 and entered in U.S. Appl. No. 16/214,451.

Third-party submission under 37 CFR 1.290 filed on Jul. 23, 2019 and entered in U.S. Appl. No. 16/214,476.

Third-party submission under 37 CFR 1.290 filed on Jul. 23, 2019 and entered in U.S. Appl. No. 16/214,496.

Third-party submission under 37 CFR 1.290 filed on Jul. 23, 2019 and entered in U.S. Appl. No. 16/292,363.

Third-party submission under 37 CFR 1.290 filed on Jul. 22, 2019 and entered in U.S. Appl. No. 16/292,364.

Third-party submission under 37 CFR 1.290 filed on Jul. 23, 2019 and entered in U.S. Appl. No. 16/292,374.

Third-party submission under 37 CFR 1.290 filed on Jul. 23, 2019 and entered in U.S. Appl. No. 16/292,382.

Third-party submission under 37 CFR 1.290 filed on Jul. 25, 2019 and entered in U.S. Appl. No. 16/365,250.

Third-party submission under 37 CFR 1.290 filed on Jul. 25, 2019 and entered in U.S. Appl. No. 16/365,315.

“Slice Embedding Solutions for Distributed Service Architectures”—Esposito et al., Boston University, Feb. 12, 2011 <http://www.cs.bu.edu>.

“Keep Alive”—Imperva, 2019 <https://www.imperva.com/learn/performance/keep-alive> (2019) (3 pages).

Third party observation filed on Jun. 21, 2019 in PCT Application No. PCT/IL2018/050910 (7 pages).

IETF named: IPy6 Tunnel Broker, Apr. 1999—First uploaded document submitted with third party observation dated Jun. 21, 2019 (13 pages).

RFC 3053 (Jan. 2001) named: IPv6 Tunnel Broker—Secod uploaded document submitted with third party observation dated Jun. 21, 2019 (13 pages).

International Search Report issued in PCT Application No. PCT/US2010/051881 dated Dec. 9, 2010.

Supplementary European Search Report issued in EP Application No. 10822724 dated Apr. 24, 2013.

R. Fielding et al, RFC 2616: Hypertext Transfer Protocol—HTTP/1.1, Jun. 1999, retrieved from the Internet <http://rnf-editor.org> [retrieved Apr. 15, 2002] (114 pages).

“On the Leakage of Personally Identifiable Information via Online Social Networks”—Wills et al, AT&T, Apr. 2009 <http://www2.research.att.com/~bala/papers/wosn09.pdf>.

Notice of Preliminary Rejection in KR Application No. 10-2012-7011711 dated Jul. 15, 2016.

Kei Suzuki, a study on Cooperative Peer Selection Method in P2P Video Delivery, vol. 109, No. 37, IEICE Technical Report, The Institute of Electronics, Information and Communication Engineers, May 14, 2009.

Reed et al, “Anonymous Connections and Onion Routing”, Naval Research Laboratory, Mar. 1998 <https://www.onion-router.net/Publications/JSAC-1998.pdf> (Year: 1998).

Michael J. Freedman, Princeton University, “Experiences with CoralCDN: a five-year operational view”, Proceeding NSDI’10 Proceedings of the 7th USENIX conference on Networked systems design and implementation San Jose, California—Apr. 28-30, 2010 (17 pages).

“The BitTorrent Protocol Specification”, Website: https://web.archive.org/web/20120513011037/http://www.bittorrent.org/beps/bep_0003.html describing BitTorrent dated Jan. 10, 2008 downloaded using web archive on Aug. 16, 2019 (6 pages).

“BitTorrent”, Website: <https://en.wikipedia.org/w/index.php?title=BitTorrent&oldid=530466721> describing BitTorrent dated Dec. 30, 2012 downloaded using Wikipedia on Aug. 16, 2019 (9 pages).

“VIP Socks/VPN Service”, Website: <http://vip72.com:80/?drgn=1> describing VIP72 proxy service dated Jan. 2010 downloaded using VIP Technologies webpage on Aug. 16, 2019 (3 pages).

“Welcome to Easy Hide IP”, Website: <https://web.archive.org/web/20130702093456/http://www.easy-hide-ip.com:80/describing> Easy Hide IP dated Jun. 26, 2007 downloaded using web archive on Aug. 16, 2019 (2 pages).

“You make it fun; we’ll make it run”, Website: <https://web.archive.org/web/20130726050810/https://www.coralcdn.org> describing CoralCDN dated Jan. 25, 2005 downloaded using web archive on Aug. 16, 2019 (2 pages).

“Net Transport”, Website: <http://www.xi-soft.com/default.htm> describing Net Transport Overview dated 2005 downloaded using Net Transport webpage on Aug. 16, 2019 (2 pages).

Net Transport—Develop History, Website: <http://www.xi-soft.com/download.htm> describing Net Transport Download dated 2005 downloaded using Net Transport webpage on Aug. 16, 2019 (10 pages).

Net Transport FAQ, Website: <http://www.xi-soft.com/faq.htm> describing Net Transport FAQ dated 2005 downloaded using Net Transport webpage on Aug. 16, 2019 (4 pages).

Net Transport News, Website: <http://www.xi-soft.com/news.htm> describing Net Transport News dated 2005 downloaded using Net Transport webpage on Aug. 16, 2019 (5 pages).

Screen captures from YouTube video clip entitled “nVpn.net | Double your Safety and use Socks5 + nVpn” 38 pages, last accessed Nov. 20, 2018 <<https://www.youtube.com/watch?v=L0Hct2kSnn4>>.

Screen captures from YouTube video clip entitled “Andromeda” 47

(56)

References Cited

OTHER PUBLICATIONS

SpyEye, <https://www.symantec.com/security-center/writeup/2010-020216-0135-9>; <http://securesql.info/riskyclouds/spyeye-user-manual>; known as of at least 2010 (13 pages).

Screen captures from YouTube video clip entitle “Change Your Country IP Address & Location with Easy Hide IP Software” 9 pages, publicly known and available as of at least 2011, <<https://www.youtube.com/watch?v=ulwkf1sOfdA> and <https://www.youtube.com/watch?v=iFEMT-o9DTc>>.

CoralCDN (“CoralCDN”), <https://pdos.csail.mit.edu/6.824/papers/freedman-coral.pdf> (14 Pages).

European Search Report for EP 14182547.1, dated Jul. 30, 2015.

R. Fielding et al, RFC 2616: Hypertext Transfer Protocol—HTTP/1.1, Jun. 1999, retrieved from the Internet <http://rfc-editor.org> [retrieved Apr. 15, 2002].

“Slice Embedding Solutions for Distributed Service Architectures”—Esposito et al., Boston University, Computer Science Dept., Oct. 2011 <http://www.cs.bu.edu/techreports/pdf/2011-025-slice-embedding.pdf>.

International Search Report of PCT/US2010/034072 dated Jul. 1, 2010.

YouTube video clip entitled “nVpn.net | Double your Safety and use Socks5 + nVpn” <<https://www.youtube.com/watch?v=L0Hct2kSnn4>>.

YouTube video clip entitled “Andromeda” <<https://www.youtube.com/watch?v=yRRYpFLbKNU>>.

YouTube video clip entitled “Change Your Country IP Address & Location with Easy Hide IP Software” <<https://www.youtube.com/watch?v=ulwkf1sOfdA> and <https://www.youtube.com/watch?v=iFEMT-b9DTc>>.

* cited by examiner

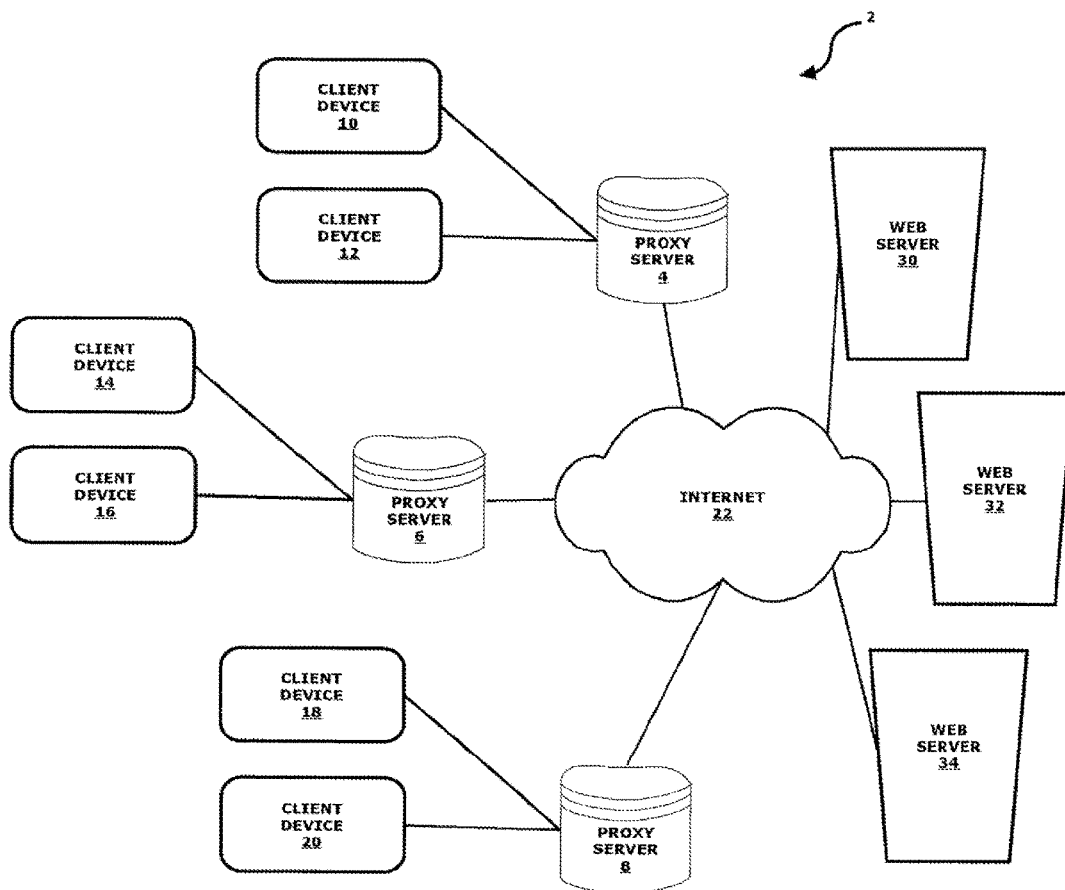


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