

## Henning Schulzrinne

Julian Clarence Levi Professor	work phone:	+1 212 939 7042
Dept. of Computer Science	fax:	+1 212 666 0140
Columbia University	email:	hgs@cs.columbia.edu
New York, NY 10027	WWW:	<a href="http://www.cs.columbia.edu/~hgs">http://www.cs.columbia.edu/~hgs</a>
USA	SIP:	sip:hgs@cs.columbia.edu

### INTERESTS

*Internet multimedia, policy, services, architecture, computer networks and performance evaluation.* Telecommunication policy; Internet telephony, collaboration and media-on-demand; Internet of things; emergency services; signaling and session control; mobile applications; ubiquitous and pervasive computing; network measurements; quality of service; Internet protocols and services; congestion control and adaptive multimedia services; implementations of multi-media and real-time networks; operating system support for high-bandwidth services with real-time constraints; performance analysis of computer networks and systems.

### WORK EXPERIENCE

**Chief Technology Officer**, Federal Communications Commission (FCC), January 2017–August 2017.

**Senior Advisor for Technology**, Federal Communications Commission (FCC), September 2016–December 2016.

**Technology Advisor**, Federal Communications Commission (FCC), September 2014–August 2016.

**Chief Technology Officer**, Federal Communications Commission (FCC), January 2012–August 2014.

**Engineering Fellow**, Federal Communications Commission (FCC), Sept. 2010–May 2011.

**Professor (tenured)**, Dept. of Computer Science and Dept. of Electrical Engineering (joint appointment), Columbia University. August 1996–. Department vice chair, 2002–2003; Department chair, 2004–2009.

**Researcher**, GMD Fokus<sup>1</sup>, Berlin, Germany. March 1994 - July 1996. Multimedia systems, ATM performance issues. Deputy department head; project leader TOMQAT, Multicube, MMTng. Lecturer at Technical University Berlin.

**Consultant**, 1994-1996: design and implementation of an Internet packet audio tool for a WWW-based “Virtual Places” shared environment (Ubique, Israel). Consultant on real-time packet audio (Vocaltec, Israel).

**Postdoc**, Distributed Systems Research Department, AT&T Bell Laboratories, Murray Hill, New Jersey. September 1992 – February 1994: designed and implemented BENE network emulator, research in real-time multimedia and electronic publishing.

**Teaching Assistant**, Dept. of Computer Science, University of Massachusetts, January 1992 – June 1992: co-taught senior-level computer networking course.

**Research Assistant**, Dept. of Computer Science, University of Massachusetts, July 1988 – September 1992: research in congestion control and performance evaluation related

---

<sup>1</sup>GMD - Forschungszentrum Informationstechnik (German National Research Center for Information Technology), Research Institute for Open Communication Systems

to high-speed computer networks. Also assisted in teaching performance evaluation course.

**Research Assistant**, Dept. of Electrical and Computer Engineering, University of Massachusetts at Amherst, January 1988 – July 1988: collaboration with Dr. Wei-Bo Gong in the area of perturbation analysis.

**Teaching Assistant**, Dept. of Electrical and Computer Engineering, University of Massachusetts at Amherst, September 1987 – July 1988: taught discussion section of introductory programming class for engineers (Pascal and Fortran).

**Research Assistant**, Dept. of Electrical and Computer Engineering, University of Cincinnati, March 1985 – August 1987: planning and implementation of speech processing laboratory and networking, tool development, vector quantization research, system administration.

#### EDUCATION

**PhD Electrical Engineering**, Department of Electrical and Computer Engineering at the University of Massachusetts, Amherst, September 1992.

**PhD Thesis:** *Congestion Control and Packet Loss for Real-Time Traffic in High-Speed Networks*. Principal advisors: Jim Kurose, Don Towsley and Christos Cassandras.

**Master of Science**, Department of Electrical and Computer Engineering at the University of Cincinnati, Cincinnati, Ohio; with emphasis on digital signal processing (voice coding, software models). August 1987.

**Master's thesis:** *Multi-Stage Vector Quantization for Speech and Image Coding; The DSP Workbench: Distributed Multiprocess System Simulation*. Experimental and theoretical results for a new method of vector quantization and development of a distributed high-level simulator for signal processing applications. Principal advisor: P. A. Ramamoorthy.

**B.S. Electrical Engineering**, (combined with B.S. Industrial Engineering), Technical University of Darmstadt, Federal Republic of Germany, June 1984.

#### HONORS AND AWARDS

- IEEE Infocom 2018 *Test of Time Paper Award* for “An Analysis of the Skype Peer-to-Peer Internet Telephony Protocol” (with Salman Baset).
- IEEE Internet award, 2016.
- ACM Fellow, 2015.
- WCNC 2015, “Intelligent Content Delivery over Wireless via SDN”, best paper award.
- IEEE Communications Society Internet Technical Committee Distinguished Service Award, 2014.
- Internet Hall of Fame, 2013
- GREE 2013 best paper award (“Wimax in the classroom: Designing a cellular networking hands-on lab”)
- 2011 Internet2 IDEA Award winner for “Do You See What I See” tool (Kyung Hwa Kim, PhD Student)
- Region 1 William Terry Award for Lifetime Distinguished Service to IEEE Region 1 (2010)

- IPTComm 2010 best paper award (“Reliability and Relay Selection in Peer-to-Peer Communication Systems”)
- IMSAA-08 3rd best paper award for *A New SIP Event Package For Group Membership Management in Advanced Communications* (co-authored with Vishal Singh and Piotr Boni)
- VDE ITG Preis 2008 for *Ubiquitous Device Personalization and Use: The Next Generation of IP Multimedia Communications* (co-authored with Ron Shacham, Srisakul Thakolsri and Wolfgang Kellerer)
- IPTCOMM 2008 Best Student Paper Award for *SIP Server Overload Control: Design and Evaluation* (co-authored with Charles Shen)
- CATT lifetime innovation award (Brooklyn Polytech University) (2007)
- Sputnik Innovator Award (2005)
- IEEE Fellow (2006)
- IEEE ComSoc Technical Committee on Computer Communications (TCCC) Outstanding Service Award 2005
- IEEE Senior Member (2004)
- Internet Telephony 2004 Product of the Year
- Mayor’s Award for Excellence in Science and Technology (2004)
- VON Pioneer Award, 2000
- *IEEE Communication Society* Lecturer, 1997
- nominated for ACM Best Dissertation award
- University of Massachusetts Graduate School Fellowship, 1990-1991
- University Summer Research Fellowship 1987
- University Summer Research Fellowship 1985
- German Fulbright Scholarship 1984
- President Electrical Engineering Graduate Student Association 1985/86  
Graduate Outstanding Service award 1986
- German National Scholarship Foundation (“Studienstiftung des deutschen Volkes”)
- Regional finalist German Young Scientists Competition (Jugend forscht)

#### PROFESSIONAL ACTIVITIES

##### Editorial positions:

- Associate Editor, *Computer Communications*, 2009–
- Editor, *Foundations and Trends in Networking*, 2005–.
- Editor, *ACM Transactions on Multimedia Computing, Communications and Applications*, 2005–
- Associate Editor, *ACM/IEEE Transactions on Networking*, 2000–2008
- Associate Editor, *IEEE Transactions on Image Processing*, 1999–2000
- Guest editor for *IEEE Network Magazine* and *IEEE Internet Computing* on Internet Telephony, May/June 1999
- *Journal of Communications and Networks*, editor (1998–2001), division editor (2001–2004)

- *IEEE Communication Surveys*, member editorial board, 1996–2000, 2002–
- *Internet Computing*, Communications Society liaison editor, 1996–1999, editor, 2008–
- *IEEE Communications Magazine*, Internet Technology feature series editor (1996–1998)
- Guest editor for *IEEE Journal on Selected Areas in Communications* on the Global Internet

Technical program committees:

- *P2P* 2008
- *ANCS (Architectures for Networking and Communication Systems)* 2005
- *ACM Multimedia* 2005
- *SIP 2000–2008*
- *Feature Interaction Workshop (FIW)* 2003, 2005
- *International Conference on Distributed Computing Systems (ICDCS)* 2005
- *IEEE International Symposium on a World of Wireless, Mobile and Multimedia Networks (WoWMoM)* 2005, 2006
- *ACM Mobihoc* 2002, 2005
- *IEEE INFOCOM* 1994–1996, 1998, 2000–2004, 2006–2019
- *Network and Operating System Support for Digital Audio and Video (NOSSDAV)*, 1997–2010, 2012–2014
- *IEEE Global Internet* 1996–2000, 2005, 2007
- *Packet Video Workshop*, 1999, 2000
- *ACM/SPIE Multimedia Computing and Networking*, 1998
- *Open Architectures and Network Programming (OPENARCH)* 1998, 1999
- NSF review panel, 1999, 2002, 2003, 2004, 2006, 2007, 2008, 2010, 2011, 2015
- *IEEE Global Internet*, November 1996 (conference technical program vice chair)
- *W3C Real-Time Multimedia Workshop (RTMW)*, October 1996
- *International Conference on Network Protocols (ICNP)*, 1996, 2008
- *Workshop on Integration of IP and ATM*, 1996

Advisory boards and committees:

- National Association of Attorneys General (NAAG) robocall working group, 2018–2019
- North American Numbering Council (NANC), a federal advisory committee (FCC, 2017–2019)
- Computing Community Consortium, Intelligent Infrastructure Task Force (2017–2019)
- Applied Technology Council (ATC) - ATC-126 (*Community Resilience of Lifeline Systems*) project technical committee (2016)
- Steering Committee (member, current chair), *IEEE/ACM Transactions on Networking* (2007–2017)
- ACM publication board technology committee (2015)

- ACM SIGCOMM vice chair (2007–2013)
- Member of the Board, Armstrong Memorial Research Foundation (2009–)
- Internet2 Applications, Middleware and Services Advisory Council (AMSAC) (2008–2012)
- GENI OptIn working group co-chair (2008–2009)
- board of directors, *SIP Forum* (1998–2002)
- Member of Internet Architecture Board (IAB), the technical advisory group of the Internet Society and the architectural oversight body of the IETF (1999–2001)
- Co-chair, *Internet Technical Committee* of the IEEE Communications Society (1994–2000)
- Chair, *IEEE Communications Society Technical Committee on Computer Communications* (1999–2001)
- SIP Bake-Offs, Columbia University (April 1999, August 1999, December 1999)
- IEEE *Infocom* Executive Committee (1995–2000)
- Internet2 Applications, Middleware and Services Advisory Council (AMSAC) 2008–2010
- GENI OptIn working group co-chair, 2008–2009
- IEEE Travel Reduction Task Force, 2009
- member-at-large, Board of Governors, *IEEE Communications Society*, 2002
- board of directors, *SIP Forum*, 1998–2002
- past co-Chair, *Internet Technical Committee* of the IEEE Communications Society
- Chair, *IEEE Communications Society Technical Committee on Computer Communications* (1999–2001)
- member IEEE Electronic Processes Steering Group, 2000

Conference leadership:

- *ACM SIGCOMM 2020* co-organizer
- *Mobiquitous 2018* general co-chair
- *e-Energy 2011* technical program co-chair
- *IEEE COMSNETS 2010* general co-chair
- *IEEE P2P 2009* general co-chair
- *IEEE ICNP 2009* general co-chair
- *IFIP Networking 2009* technical program co-chair
- *IEEE IM 2009* technical program co-chair
- *ACM IPTCOMM 2008* technical program co-chair
- *ACM IPTCOMM 2007* general co-chair
- *CoNext 2007* general co-chair
- *ACM Multimedia 2004* general co-chair
- technical program co-chair Internet Telephony Workshop 2001
- IEEE *Infocom* 2000 technical program co-chair

- *NOSSDAV* technical program co-chair 2001
- IEEE *Infocom* 1998 vice general chair
- Organizer, SIP Bake-Offs, Columbia University (April 1999, August 1999, December 1999)
- IEEE *Infocom* Executive Committee 1995–2000
- *NOSSDAV*, *MobiArch* and *IPTComm* steering committees (current)

Referee for *IEEE Transactions on Networking*, *Springer/ACM Multimedia Systems Journal*, *IEEE Transactions on Communications*, *Computer Networks and ISDN Systems*, *Internet-working*, IEEE *Infocom*, ACM *Sigcomm*, *IC<sup>3</sup>N*, National Science Foundation, and others.

Maintainer and editor of the web-based Network Bibliography.

#### PATENTS

US patent 5,509,074: *Method of protecting electronically published materials using cryptographic protocols* (issued April 1996)

US patent 6,141,788: *Method And Apparatus For Forward Error Correction In Connection In Packet Networks* (October 2000)

US patent 6,446,108: *Method For Network Address Translation* (September 2002)

US patent 6,538,416: *Border Gateway Reservation Protocol for Tree-Based Aggregation of Inter-Domain Reservations* (March 2003)

US patent 6,771,644: *Program insertion in real time IP multicast* (August 2004)

US patent 6,937,597: *Signaling Method For Internet Telephony* (August 2005)

US patent 6,970,909: *Multi-protocol data communication systems supporting wireless telephony and content delivery* (November 2005)

US patent 7,257,201: *System and method for unified messaging in inter/intranet telephony* (August 2007)

US patent 7,266,091: *System and method for conferencing in inter/intranet telephony* (September 2007)

US patent 7,296,091: *System and method for receiving over a network a broadcast from a broadcast source* (November 2007)

US patent 7,319,689: *Method for handling the simultaneous mobility of mobile hosts in infrastructure-based networks* (January 2008)

US patent 7,610,384: *Network telephony appliance and system for inter/intranet telephony* (October 2009)

US patent 7,610,384: *Network telephony appliance and system for inter/intranet telephony* (October 2009)

US patent 7,636,336 *Methods and systems for reducing MAC layer handoff latency in wireless networks* (December 2009)

US patent 8,027,251 *Systems and methods for implementing protocol-aware network firewall* (September 2011)

US patent 8,166,102 *Signaling method for internet telephony* (April 2012)

US patent 8,302,186 *System and method for testing network firewall for denial-of-service (DOS) detection and prevention in signaling channel* (October 2012)

US patent 8,522,344 *Theft of service architectural integrity validation tools for session initiation protocol (SIP)-based systems* (August 2013)

US patent 8,565,384 *Systems, methods, and media for connecting emergency communications* (October 2013)

US patent 8,689,328 *Malicious user agent detection and denial of service (DOS) detection and prevention using fingerprinting* (March 2014)

US patent 8,719,926 *Denial of service detection and prevention using dialog level filtering* (April 2014)

US patent 8,737,220 *Systems for providing feedback to sending entities* (May 2014)

US patent 8,737,351 *Methods and systems for reducing MAC layer handoff latency in wireless networks* (May 2014)

US patent 8,750,242 *Methods, media, and devices for moving a connection from one point of access to another point of access* (June 2014)

US patent 8,804,513 *Methods and systems for controlling SIP overload* (August 2014)

US patent 8,966,619 *Prevention of denial of service (DoS) attacks on session initiation protocol (SIP)-based systems using return routability check filtering* (February 2015)

US patent 8,995,742 *Methods and systems for controlling traffic on a communication network* (March 2015)

US patent 9,036,605 *Methods, media, and devices for moving a connection from one point of access to another point of access* (May 2015)

US patent 9,118,814 *Set-top box peer-assisted video-on-demand* (August 2015)

US patent 9,374,342 *System and method for testing network firewall using fine granularity measurements* (June 2016)

US patent 8,750,242 *Methods, media, and devices for moving a connection from one point of access to another point of access* (July 2016)

US patent 9,473,529 *Prevention of denial of service (DoS) attacks on Session Initiation Protocol (SIP)-based systems using method vulnerability filtering* (October 2016)

US patent 10,039,033 *Systems, methods, and media for implementing call handoff between networks* (July 2018)

## TUTORIALS

Partial listing:

- *IDMS/PROMS*, Coimbra, November 2002;
- *Mobicom* tutorial, Atlanta, September 2002;
- *Sigcomm* tutorial, Stockholm, August 2000;
- *International Conference on Multimedia (ICME)*, July 2000;
- *Networking 2000* tutorial, Paris, May 2000;
- *IEEE Real Time Applications Symposium*, May 2000;
- *VON Developers Conference*, semi-annually since 1999;
- BellSouth (Atlanta), February and March 1998, November 1999;
- *IEEE International Conference on Network Protocols (ICNP)*, October 1999;

- ASSET conference (Dallas, Texas), March 1999;
- CEFRIEL (Milan), May 1999;
- MCI Corp. (Colorado Springs), August 1998;
- EPFL summer school (Lausanne, Switzerland), June 1998;
- 16th Brazilian Symposium on Computer Networks, May 1998;
- IEEE Infocom, March 1998;

## SOFTWARE

**MICE:** Web-based information management for departmental personnel, student, space and financial data;

**CINEMA:** Columbia InterNet Extensible Multimedia Architecture (with Jonathan Lennox, Kundan Singh, and others);

**EDAS:** editor's assistant; conference paper management software used for IEEE ICC, IEEE Globecom, Mobicom, IEEE Infocom, ICNP, NOSSDAV, Packet Video (about 8,000 total), with roughly 770,000 users;

**e\*phone:** Ethernet packet audio device; the first SIP-speaking embedded Internet phone (with Jianqi Yin).

**graph++:** graphing tool with matrix manipulation facilities.

**NeVoT:** network voice terminal, first RTP-capable Internet voice application.

**rtptools:** set of tools for analyzing, recording and playing back RTP packets; used in a number of media-on-demand projects.

**RTP library:** library implementing RTP (with Jonathan Lennox, Jonathan Rosenberg and Dan Rubenstein);

**rtspd:** RTSP multimedia server (with Jonathan Lennox and Kundan Singh).

**sipc:** SIP user agent (Internet telephony agent) (with Xiaotao Wu).

**sipconf:** SIP-based software conferencing server (with Kundan Singh);

**sipd:** First publically available SIP proxy and redirect server (with Jonathan Lennox);

**sipum:** SIP-based unified messaging system (with Kundan Singh);

**simul:** discrete-event simulator emulating SIMAN.

## JOURNAL PUBLICATIONS

- [1] V. Bajpai, A. Brunstrom, A. Feldmann, W. Kellerer, A. Pras, H. Schulzrinne, G. Smaragdakis, M. Wählisch, and K. Wehrle, "The Dagstuhl beginners guide to reproducibility for experimental networking research," *Computer Communications Review*, Jan. 2019.
- [2] H. Schulzrinne, "Network neutrality is about money, not packets (invited paper)," *IEEE Internet Computing*, Vol. 22, November/December 2018.
- [3] H. Schulzrinne, "Networking research – a reflection in the middle years (invited paper)," *Computer Communications*, Oct. 2018.
- [4] S. G. Hong, S. Seo, H. Schulzrinne, and P. Chitrapu, "ICOW: Internet access in public transit systems," *IEEE Communications Magazine*, Vol. 53, pp. 134–141, June 2015.



- [5] M. Berman, P. Demeester, J. W. Lee, K. Nagaraja, M. Zink, D. Colle, D. K. Krishnappa, D. Raychaudhuri, H. Schulzrinne, I. Seskar, and S. Sharma, "Future internets escape the simulator," *Communications ACM*, Vol. 58, pp. 78–89, May 2015.
- [6] E. Piri and H. Schulzrinne, "Scaling network information services to support hetnets and dynamic spectrum access," *Journal of Communications and Networks*, Vol. 16, Apr. 2014.
- [7] S. G. Hong and H. Schulzrinne, "PBS: Signaling architecture for network traffic authorization," *IEEE Communications Magazine*, Vol. 51, pp. 89–96, July 2013.
- [8] O. Boyaci, V. Beltran, and H. Schulzrinne, "Bridging communications and the physical world," *IEEE Internet Computing*, Vol. 16, no. 2, pp. 35–43, 2012.
- [9] D. Touceda, J. Sierra, A. Izquierdo, and H. Schulzrinne, "Survey of attacks and defenses on P2PSIP communications," *IEEE Communications Surveys Tutorials*, Vol. 14, no. 3, pp. 750–783, 2012.
- [10] C. Shen, E. Nahum, H. Schulzrinne, and C. P. Wright, "The impact of TLS on SIP server performance: Measurement and modeling," *IEEE/ACM Transactions on Networking*, Vol. 20, pp. 1217–1230, Aug. 2012.
- [11] J. Kayfetz, H. Schulzrinne, T. Sherwood, and M. Tiwari, "Your desktop or mine: Extending the reach of writing instruction," *Ubiquitous Learning*, Vol. 3, no. 3, 2011.
- [12] E. Brosh, S. A. Baset, V. Misra, D. Rubenstein, and H. Schulzrinne, "The Delay-Friendliness of TCP for Real-Time traffic," *IEEE/ACM Transactions on Networking*, Oct. 2010.
- [13] H. Tschofenig and H. Schulzrinne, "Emergency services for internet multimedia," *The Internet Protocol Journal*, Dec. 2010.
- [14] S. Subramanya, X. Wu, H. Schulzrinne, and S. Buriak, "VoIP-based air traffic controller training," *IEEE Communications Magazine*, Nov. 2009.
- [15] S. Alexander, Y.-H. Cheng, B. Coan, A. Ghetie, V. Kaul, B. Siegell, S. Bellovin, N. Maxemchuk, and H. Schulzrinne, "The dynamic community of interest and its realization in ZODIAC," *IEEE Communications Magazine*, Oct. 2009.
- [16] H. Schulzrinne, "Double submissions: publishing misconduct or just effective dissemination?," *CCR*, July 2009.
- [17] H. Schulzrinne, "Double-blind reviewing: more placebo than miracle cure?," *CCR*, Apr. 2009.
- [18] S. Shin and H. Schulzrinne, "Measurement and analysis of the VoIP capacity in IEEE 802.11 WLAN," *IEEE Transactions on Mobile Computing*, Sept. 2009.
- [19] R. Dantu, S. Fahmy, H. Schulzrinne, and J. Cangussu, "Issues and challenges in securing VoIP," *Computers & Security*, May 2009.
- [20] X. Fu, H. Schulzrinne, H. Tschofenig, C. Dickmann, and D. Hogrefe, "Overhead and performance study of the general internet signaling transport (GIST) protocol," *IEEE/ACM Transactions on Networking*, Feb. 2009.
- [21] D. Chopra, H. Schulzrinne, E. Marocco, and E. Ivov, "Peer-to-peer overlays for real-time communication: security issues and solutions," *IEEE Communications Surveys & Tutorials*, Jan. 2009.
- [22] H. Schulzrinne, "Conferences as organizations: advising, steering and establishing expectations," *ACM SIGCOMM Computer Communication Review*, Jan. 2009.

- [23] G. Camarillo, H. Schulzrinne, S. Loreto, and J. Hautakorpi, "Effect of head of the line blocking on session initiation protocol session establishment delays," *Journal of Communications and Networks*, Feb. 2009.
- [24] S. G. Hong, V. Hilt, and H. Schulzrinne, "Evaluation of control message overhead of DHT-based P2P system," *Bell Labs Technical Journal*, Nov. 2008.
- [25] A. Dutta, D. Famolari, S. Das, Y. Ohba, V. Fajardo, K. Taniuchi, R. Lopez, and H. Schulzrinne, "Media-independent pre-authentication supporting secure interdomain handover optimization," *IEEE Wireless Communications*, Apr. 2008.
- [26] X. Wang and H. Schulzrinne, "Measurement and analysis of LDAP performance," *IEEE/ACM Transactions on Networking*, Feb. 2008.
- [27] K. Arabshian and H. Schulzrinne, "An ontology-based hierarchical Peer-to-Peer global service discovery system," *Journal of Ubiquitous Computing and Intelligence (JUCI)*, Vol. 1, pp. 133–144, Dec. 2007.
- [28] W. Yuen and H. Schulzrinne, "Improving search efficiency using bloom filters in partially connected ad hoc networks: A node-centric analysis," *Computer Communications*, Nov. 2007.
- [29] A. Dutta, S. Das, D. Famolari, Y. Ohba, K. Taniuchi, V. Fajardo, R. M. Lopez, T. Kodama, and H. Schulzrinne, "Seamless proactive handover across heterogeneous access networks," *Wireless Personal Communications*, Nov. 2007.
- [30] R. Shacham, H. Schulzrinne, S. Thakolsri, and W. Kellerer, "Ubiquitous device personalization and use: The next generation of IP multimedia communications," *ACM Transactions on Multimedia Computing, Communications, and Applications*, Aug. 2007.
- [31] R. Dantu, D. Ghosal, and H. Schulzrinne, "Securing voice over IP," *IEEE Network*, Vol. 20, pp. 4–5, Sept. 2006.
- [32] X. Wang and H. Schulzrinne, "Pricing network resources for adaptive applications," *IEEE/ACM Transactions on Networking*, Vol. 14, pp. 506–519, June 2006.
- [33] K. Wong, A. Dutta, H. Schulzrinne, and K. Young, "Simultaneous mobility: analytical framework, theorems, and solutions," *Wireless Communication and Mobile Computing*, June 2006.
- [34] K. Singh and H. Schulzrinne, "Failover, load sharing and server architecture in SIP telephony," *Computer Communications*, Mar. 2007.
- [35] W. Zhao and H. Schulzrinne, "Enhancing service location protocol for efficiency, scalability and advanced discovery," *The Journal of Systems & Software*, Vol. 75, pp. 193–204, Feb. 2005.
- [36] X. Wang and H. Schulzrinne, "Incentive-Compatible adaptation of internet Real-Time multimedia," *IEEE Journal on Selected Areas in Communications*, Vol. 23, pp. 417–436, Feb. 2005.
- [37] W. Kellerer, M. Wagner, W.-T. Balke, and H. Schulzrinne, "Preference-based session management for IP-based mobile multimedia signaling," *European Transactions on Telecommunications*, Vol. 15, pp. 415–427, Aug. 2004.
- [38] L. Amini, A. Shaikh, and H. Schulzrinne, "Issues with inferring internet topological attributes," *Computer Communications*, Vol. 27, pp. 557–567, Apr. 2004.
- [39] P. Mendes, H. Schulzrinne, and E. Monteiro, "How to increase the efficiency of receiver-driven adaptive mechanisms in a new generation of IP networks," *Computer Communications*, Vol. 27, pp. 345–354, Feb. 2004.

- [40] A. Dutta and H. Schulzrinne, "MarconiNet: overlay mobile content distribution network," *IEEE Communications Magazine*, Feb. 2004.
- [41] H. Schulzrinne, X. Wu, S. Sidiroglou, and S. Berger, "Ubiquitous computing in home networks," *IEEE Communications Magazine*, pp. 128–135, Nov. 2003.
- [42] D. Wong, A. Dutta, J. Burns, K. Young, and H. Schulzrinne, "A multilayered mobility management scheme for auto-configured wireless IP networks," *IEEE Wireless Magazine*, Oct. 2003.
- [43] A. Dutta, J. Chennikara-Varghese, W. Chen, O. Altintas, and H. Schulzrinne, "Multicasting streaming media to mobile users," *IEEE Communications Magazine*, Oct. 2003.
- [44] P. Mendes, H. Schulzrinne, and E. Monteiro, "How to increase the efficiency of receiver-driven adaptive mechanisms in a new generation of IP networks," *Computer Communications*, Vol. 26, 2003.
- [45] G. Camarillo, H. Schulzrinne, and R. Kantola, "Evaluation of transport protocols for the session initiation protocol," *IEEE Network*, 2003.
- [46] P. Mendes, H. Schulzrinne, and E. Monteiro, "Session-aware popularity resource allocation for assured differentiated services," *IEEE Communications Magazine*, Sept. 2002.
- [47] J. Brassil and H. Schulzrinne, "Enhancing Internet streaming media with cueing protocols," *IEEE/ACM Transactions on Networking*, Vol. 10, Aug. 2002.
- [48] H. Schulzrinne and K. Arabshian, "Providing emergency services in Internet telephony," *IEEE Internet Computing*, Vol. 6, pp. 39–47, May 2002.
- [49] W. Jiang, J. Lennox, S. Narayanan, H. Schulzrinne, K. Singh, and X. Wu, "Integrating Internet telephony services," *IEEE Internet Computing*, Vol. 6, pp. 64–72, May 2002.
- [50] H. Schulzrinne, "Internet telefonie – mehr als nur ein telefon mit paketvermittlung," *PIK – Praxis der Informationsverarbeitung und Kommunikation*, Vol. 24, Jan. 2001.
- [51] X. Wang and H. Schulzrinne, "An integrated resource negotiation, pricing, and QoS adaptation framework for multimedia applications," *IEEE Journal on Selected Areas in Communications*, Vol. 18, pp. 2514–2529, Dec. 2000.
- [52] H. Schulzrinne and J. Rosenberg, "The session initiation protocol: Internet-centric signaling," *IEEE Communications Magazine*, Vol. 38, Oct. 2000.
- [53] H. Schulzrinne and E. Wedlund, "Application-layer mobility using SIP," *Mobile Computing and Communications Review (MC2R)*, Vol. 4, pp. 47–57, July 2000.
- [54] P. Pan, E. Hahne, and H. Schulzrinne, "The border gateway reservation protocol (BGRP) for tree-based aggregation of inter-domain reservations," *Journal of Communications and Networks*, June 2000.
- [55] X. Wang and H. Schulzrinne, "Comparison of adaptive Internet multimedia applications," *IEICE Transactions on Communications*, June 1999.
- [56] C. A. Polyzois, K. H. Purdy, P. Q. Yang, D. C. Shrader, H. Sinnreich, F. Ménard, and H. Schulzrinne, "From POTS to PANS – a commentary on the evolution to Internet telephony," *IEEE Network*, Vol. 13, pp. 58–64, May/June 1999.
- [57] J. Rosenberg and H. Schulzrinne, "The IETF Internet telephony architecture and protocols," *IEEE Network*, Vol. 13, pp. 18–23, May/June 1999.
- [58] J. Rosenberg, J. Lennox, and H. Schulzrinne, "Programming Internet telephony services," *IEEE Network*, Vol. 13, pp. 42–49, May/June 1999.

- [59] P. Pan and H. Schulzrinne, "YESSIR: a simple reservation mechanism for the Internet," *ACM Computer Communication Review*, Vol. 29, pp. 89–101, Apr. 1999.
- [60] J. Brassil, S. Garg, and H. Schulzrinne, "Program insertion in real-time IP multicasts," *ACM Computer Communication Review*, Vol. 29, pp. 49–68, Apr. 1999.
- [61] H. Schulzrinne and J. Rosenberg, "Internet telephony: Architecture and protocols – an IETF perspective," *Computer Networks and ISDN Systems*, Vol. 31, pp. 237–255, Feb. 1999.
- [62] H. Schulzrinne and J. Rosenberg, "The session initiation protocol: Providing advanced telephony services across the Internet," *Bell Labs Technical Journal*, Vol. 3, pp. 144–160, October-December 1998.
- [63] H. Schulzrinne, "Transatlantische netze," *DFN Mitteilungen*, Vol. 46, pp. 23–24, Mar. 1998.
- [64] D. Sisalem and H. Schulzrinne, "The multimedia Internet terminal (mint)," *Telecommunications Systems*, Vol. 9, pp. 423–444, Sep 1998.
- [65] H. Schulzrinne, "Operating system issues for continuous media," *Multimedia Systems*, Vol. 4, pp. 269–280, Oct. 1996.
- [66] H. Schulzrinne, "World-wide web: Whence, whither, what next?," *IEEE Network*, Vol. 10, pp. 10–17, March/April 1996.
- [67] I. Busse, B. Deffner, and H. Schulzrinne, "Dynamic QoS control of multimedia applications based on RTP," *Computer Communications*, Vol. 19, pp. 49–58, Jan. 1996.
- [68] J. Crowcroft, D. Estrin, H. Schulzrinne, and M. Schwartz, "Guest editorial: The global Internet," *IEEE Journal on Selected Areas in Communications*, Vol. 13, pp. 1366–1369, Oct. 1995.
- [69] H. Schulzrinne, "Conferencing and collaborative computing: Where are we?," *it+ti (Informationstechnik und Technische Informatik)*, Vol. 37, pp. 58–63, Aug. 1995.
- [70] J. P. Sterbenz, H. Schulzrinne, and J. D. Touch, "Report and discussion on the IEEE comsoc TCGN gigabit networking workshop 1995," *IEEE Network*, Vol. 9, pp. 9–21, July/August 1995.
- [71] H. Schulzrinne, "IPv6 – the new Internet protocol," *PIK – Praxis der Informationsverarbeitung und Kommunikation*, Vol. 18, pp. 165–167, July-September 1995.
- [72] A. K. Choudhury, N. F. Maxemchuk, S. Paul, and H. Schulzrinne, "Copyright protection for electronic publishing over computer," *IEEE Network*, Vol. 9, pp. 12–20, May/June 1995.
- [73] Çaglan M. Aras, J. F. Kurose, D. Reeves, and H. Schulzrinne, "Real-time communications in packet-switched networks," *Proceedings of the IEEE*, Vol. 82, pp. 122–139, Jan. 1994.
- [74] W.-B. Gong and H. Schulzrinne, "Application of smoothed perturbation analysis to probabilistic routing," *Mathematics and Computers in Simulation*, Vol. 32, pp. 467–485, 1992.

- [1] A. Dutta and H. Schulzrinne, *Mobility Protocols and Handover Optimization: Design, Evaluation and Application*. Chichester: John Wiley, 2014.
- [2] H. Tschofenig and H. Schulzrinne, *Internet Protocol-based Emergency Services*. Chichester: Wiley, 2013.
- [3] M. Papadopouli and H. Schulzrinne, *Peer-to-Peer Computing for Mobile Networks*. Springer, Jan. 2009.
- [4] D. Sisalem, J. Floroiu, J. Kuthan, U. Abend, and H. Schulzrinne, *SIP Security*. Wiley, May 2009.
- [5] T. Chiba, H. Yokota, A. Idoue, A. Dutta, K. Manousakis, S. Das, and H. Schulzrinne, “Trombone routing mitigation techniques for IMS/MMD networks,” in *IEEE Wireless Communications and Networking Conference 2007 - Networking*, (Hong Kong, Hong Kong), Mar. 2007.
- [6] A. Dutta, H. Schulzrinne, and K. Wong, *Supporting Continuous Services to Roaming Clients*, ch. 17. USA: CRC, 2006.
- [7] H. Schulzrinne, “Internet telephony,” in *Practical Handbook of Internet Computing*, CRC, 2004.
- [8] K. Wong, H.-Y. Wei, A. Dutta, K. Young, and H. Schulzrinne, “IP micro-mobility management using host-based routing,” in *Wireless IP and building the Mobile Internet* (S. Dixit and R. Prasad, eds.), Artech House, 2002.
- [9] H. Schulzrinne, “IP networks,” in *Compressed Video Over Networks* (A. Reibman and M.-T. Sun, eds.), Marcel Dekker, 2001.
- [10] R. Guérin and H. Schulzrinne, “Network quality of service,” in *Grid: Blueprint for a New Computing Infrastructure* (I. Foster and C. Kesselman, eds.), San Francisco, California: Morgan Kaufmann Publishers, 1998.
- [11] H. Schulzrinne, “Operating system issues for continuous multimedia,” in *Handbook of Multimedia Computing* (B. Furht, ed.), pp. 627–648, Boca Raton: CRC Press, 1998.

#### CONFERENCE PUBLICATIONS

- [1] H. Celebi, I. Güvenç, and H. Schulzrinne, “Capacity and energy-efficiency of delayed access scheme for small cell networks,” in *2019 Wireless Telecommunications Symposium (WTS) (WTS 2019)*, (New York City, USA), Apr. 2019.
- [2] P. Karhula, J. Janak, and H. Schulzrinne, “Checkpointing and migration of iot edge functions,” in *Proc. of ACM EdgeSys 2019*, (Dresden, Germany), Mar. 2019.
- [3] A. Singh, S. Murali, L. Rieger, R. Li, S. Hommes, R. State, G. Ormazabal, and H. Schulzrinne, “HANZO: collaborative network defense for connected things,” in *Principles, Systems and Applications of IP Telecommunications 2018 (IPTComm18)*, (Chicago, USA), Oct. 2018.
- [4] V. Gadiraju, A. Panat, R. Poddar, Z. Sherriff, S. Kececi, and H. Schulzrinne, “Who gets broadband when? A panel data analysis of demographic, economic and technological factors explaining U.S. broadband deployment,” in *TPRC46: Research*

*Conference on Communications, Information and Internet Policy*, (Washington, DC), Sept. 2018.

- [5] W. Falcon and H. Schulzrinne, "Predicting floor-level for 911 calls with neural networks and smartphone sensor data," in *Sixth International Conference on Learning Representations*, (Vancouver, Canada), Apr. 2018.
- [6] J. Janak and H. Schulzrinne, "Framework for rapid prototyping of distributed IoT applications powered by WebRTC," in *Proc. of IPTComm 2016*, (Chicago, Illinois), Oct. 2016.
- [7] H. Nam, K. H. Kim, and H. Schulzrinne, "QoE matters more than QoS: why people stop watching cat videos," in *IEEE INFOCOM 2016 - The 35th Annual IEEE International Conference on Computer Communications (INFOCOM 2016)*, (San Francisco, USA), pp. 847–855, Apr. 2016.
- [8] K. H. Kim, J. W. Lee, M. Ben-Ami, H. Nam, J. Janak, and H. Schulzrinne, "Flexible network address mapping for container-based clouds," in *First IEEE Conference on Network Softwarization 2015 (NetSoft 2015)*, (London, United Kingdom), Apr. 2015.
- [9] H. Nam, D. Calin, and H. Schulzrinne, "Intelligent content delivery over wireless via SDN," in *2015 IEEE Wireless Communications and Networking Conference (WCNC)*, (New Orleans, USA), pp. 2203–2208, Mar. 2015.
- [10] M. Varela, P. Zwickl, P. Reichl, M. Xie, and H. Schulzrinne, "Experience level agreements (ELA): the challenges of selling QoE to the user," in *IEEE ICC 2015 - Workshop on Quality of Experience-based Management for Future Internet Applications and Services (QoE-FI) (ICC'15 - Workshops 04)*, (London, United Kingdom), June 2015.
- [11] H. Nam, K. H. Kim, J. Y. Kim, and H. Schulzrinne, "Towards QoE-aware video streaming using SDN," in *Globecom 2014 - Communications Software, Services and Multimedia Symposium (GC14 CSSM)*, (Austin, USA), pp. 1334–1339, Dec. 2014.
- [12] H. Nam, K.-H. Kim, D. Calin, and H. Schulzrinne, "YouSlow: A performance analysis tool for adaptive bitrate video streaming," in *Proc. of SIGCOMM 2014 Posters and Demos*, (Chicago, Illinois), Aug. 2014.
- [13] K. H. Kim, H. Nam, V. Singh, D. Song, and H. Schulzrinne, "DYSWIS: Crowdsourcing a home network diagnosis," in *Proc. of 23rd International Conference on Computer Communications and Networks (ICCCN 2104)*, (Shanghai, China), Aug. 2014.
- [14] H. Nam, K. H. Kim, D. Calin, and H. Schulzrinne, "Towards dynamic network condition-aware video server selection algorithms over wireless networks," in *19th IEEE Symposium on Computers and Communications (IEEE ISCC 2014)*, (Madeira, Portugal), June 2014.
- [15] W. Song, J. W. Lee, B. S. Lee, and H. Schulzrinne, "Finding 9-1-1 callers in tall buildings," in *15th IEEE International Symposium on a World of Wireless, Mobile and Multimedia Networks (IEEE WoWMoM 2014)*, (Sydney, Australia), June 2014.
- [16] H. Nam, K. H. Kim, B. H. Kim, D. Calin, and H. Schulzrinne, "Towards dynamic QoS-aware Over-The-Top video streaming," in *15th IEEE International Symposium on a World of Wireless, Mobile and Multimedia Networks (IEEE WoWMoM 2014)*, (Sydney, Australia), June 2014.
- [17] K. H. Kim, H. Nam, J. H. Park, and H. Schulzrinne, "MoT: a collaborative network troubleshooting platform for the Internet of things," in *IEEE WCNC'14 Track*

- 4 (Services, Applications, and Business) (*IEEE WCNC'14 Track 4: SAB*), (Istanbul, Turkey), pp. 3461–3466, Apr. 2014.
- [18] K. H. Kim, H. Nam, and H. Schulzrinne, “WiSlow: a WiFi network performance troubleshooting tool for end users,” in *IEEE INFOCOM 2014 - IEEE Conference on Computer Communications (INFOCOM'2014)*, (Toronto, Canada), pp. 862–870, Apr. 2014.
- [19] H. Schulzrinne, “Transitioning the public switched telephone network into the 21st century,” in *Proc. of ConTEL (12th International Conference on Telecommunications)*, (Zagreb, Croatia), pp. 3–4, June 2013.
- [20] J. Y. Kim and H. Schulzrinne, “Cloud support for latency-sensitive telephony applications,” in *Proceedings of the 2013 IEEE International Conference on Cloud Computing Technology and Science, CLOUDCOM '13*, (Bristol, UK), pp. 421–426, IEEE Computer Society, Dec. 2013.
- [21] A. Singh, H. Schulzrinne, G. Ormazabal, S. Addepalli, P. Thermos, and Y. Zou, “Unified heterogeneous networking design,” in *Principles, Systems and Applications of IP Telecommunications 2013 (IPTComm 2013)*, (Chicago, Illinois, USA), Oct. 2013.
- [22] H. Nam, B. H. Kim, D. Calin, and H. Schulzrinne, “A mobile video traffic analysis: Badly designed video clients can waste network bandwidth,” in *Globecom 2013 Workshop - Control Techniques for Efficient Multimedia Delivery (GC13 WS - CTEMD)*, (Atlanta, USA), pp. 512–517, Dec. 2013.
- [23] M. Femminella, G. Reali, D. Valocchi, R. Francescangeli, and H. Schulzrinne, “Advanced caching for distributing sensor data through programmable nodes,” in *Proc. of IEEE LANMAN*, (Brussels, Belgium), Apr. 2013.
- [24] K.-H. Kim, H. Nam, and H. Schulzrinne, “WiSlow: A performance troubleshooting tool for Wi-Fi networks,” in *Proc. of NSDI (poster/demo)*, (Lombard, Illinois), Apr. 2013.
- [25] J. Marasevic, J. Janak, H. Schulzrinne, and G. Zussman, “WiMAX in the classroom: Designing a cellular networking hands-on lab,” in *Proc. of 2nd GENI Research and Educational Experiment Workshop (GREE2013)*, (Salt Lake City, Utah), Mar. 2013.
- [26] W. Song, G. Hampel, A. Rana, T. E. Klein, and H. Schulzrinne, “MOSAIC: stateless mobility for HTTP-based applications,” in *IEEE 8th International Conference on Wireless and Mobile Computing, Networking and Communications (WiMob)*, (Barcelona, Spain), pp. 69–76, Oct. 2012.
- [27] S. Srinivasan, A. Singh, D. Batni, J. W. Lee, H. Schulzrinne, V. Hilt, and G. Kunzmann, “CCNxServ: dynamic service scalability in Information-Centric networks,” in *IEEE ICC 2012 - Next-Generation Networking Symposium (ICC'12 NGN)*, (Ottawa, Ontario, Canada), pp. 2632–2637, June 2012.
- [28] E. Maccherani, M. Femminella, J. W. Lee, R. Francescangeli, J. Janak, G. Reali, and H. Schulzrinne, “Extending the netserv autonomic management capabilities using openflow,” in *Network Operations and Management Symposium (NOMS), 2012 IEEE*, (Maui, Hawaii), pp. 582–585, Apr. 2012.
- [29] M. Femminella, R. Francescangeli, G. Reali, and H. Schulzrinne, “Gossip-based signaling dissemination extension for next steps in signaling,” in *Network Operations and Management Symposium (NOMS)*, (Maui, Hawaii), pp. 1022–1028, Apr. 2012.
- [30] A. Moghadam, T. Jebara, and H. Schulzrinne, “A markov routing algorithm for mobile DTNs based on Spatio-Temporal modeling of human movement data,” in *14th*

*ACM International Conference on Modeling, Analysis and Simulation of Wireless and Mobile Systems (MSWiM 2011)*, (Miami Beach, USA), Oct. 2011.

- [31] M. Femminella, R. Francescangeli, G. Reali, J. W. Lee, W. Song, and H. Schulzrinne, "Future internet autonomic management using NetServ," in *Demonstrations of the IEEE Conference on Local Computer Networks (LCN) (LCN-Demos 2011)*, (Bonn, Germany), pp. 1081–1083, Oct. 2011.
- [32] F. M. Roberto, J. Celestino JÃºnior, and H. Schulzrinne, "Using a symmetric game based in volunteer's dilemma to improve vanets multihop broadcast communication," in *22nd IEEE Personal Indoor Mobile Radio Communications (PIMRC'11 - ITN)*, (Toronto, Canada), pp. 777–782, Sept. 2011.
- [33] J. Y. Kim, G. Bond, E. Cheung, T. M. Smith, and H. Schulzrinne, "An evaluation framework for highly available and scalable SIP server clusters," in *Principles, Systems and Applications of IP Telecommunications (IPTComm'11)*, (Chicago, Illinois, USA), Aug. 2011.
- [34] K. Ono and H. Schulzrinne, "Using Cross-Media relations to identify important communication requests: Testing the concept and implementation," in *Principles, Systems and Applications of IP Telecommunications (IPTComm'11)*, (Chicago, Illinois, USA), Aug. 2011.
- [35] J. Y. Kim and H. Schulzrinne, "SipCloud: dynamically scalable SIP proxies in the cloud," in *Principles, Systems and Applications of IP Telecommunications (IPTComm'11)*, (Chicago, Illinois, USA), Aug. 2011.
- [36] O. Boyaci, V. Beltran, and H. Schulzrinne, "Bridging communications and the physical world: Sense everything, control everything," in *Principles, Systems and Applications of IP Telecommunications (IPTComm'11)*, (Chicago, Illinois, USA), Aug. 2011.
- [37] E. Shim, V. Krishnaswamy, and H. Schulzrinne, "Automatic phone number mapping verification for phone number based SIP peering," in *The 8th Annual IEEE Consumer Communications and Networking Conference - Content Distribution and Peer-to-Peer Networks (CCNC'2011 Content Distribution and Peer-to-Peer Networks)*, (Las Vegas, NV, USA), pp. 995–999, Jan. 2011.
- [38] S. Srinivasan, I. Rimac, M. Steiner, V. Hilt, and H. Schulzrinne, "Unveiling the content-centric features of TCP," in *ICC 2011 Next Generation Networking and Internet Symposium (ICC'11 NGNI)*, (Kyoto, Japan), June 2011.
- [39] W. Song, J. W. Lee, and H. Schulzrinne, "Polygon simplification for Location-Based services using population density," in *ICC 2011 - Communication Software, Services and Multimedia Applications Symposium (ICC'11 CSMA)*, (Kyoto, Japan), June 2011.
- [40] J. W. Lee, H. Schulzrinne, W. Kellerer, and Z. Despotovic, "0 to 10k in 20 seconds: Bootstrapping large-scale DHT networks," in *ICC 2011 - Communication Software, Services and Multimedia Applications Symposium (ICC'11 CSMA)*, (Kyoto, Japan), June 2011.
- [41] J. W. Lee, R. Francescangeli, J. Janak, S. Srinivasan, S. A. Baset, H. Schulzrinne, Z. Despotovic, and W. Kellerer, "NetServ: active networking 2.0," in *ICC 2011 Workshop TF1 (T2), Future Network (ICC'11 Workshop TF1 (T2) FutureNet IV)*, (Kyoto, Japan), June 2011.



- [42] S. Komorita, H. Yokota, A. Dutta, C. Makaya, S. Das, D. A. Chee, F. J. Lin, and H. Schulzrinne, "User-transparent reconfiguration method for self-organizing IP multimedia subsystem," in *16th IEEE Symposium on Computers and Communications (IEEE ISCC 2011)*, (Kerkyra (Corfu), Greece), June 2011.
- [43] A. Dutta, B. Lyles, and H. Schulzrinne, "A formal approach to mobility modeling," in *The Third International Conference on COMMunication Systems and NETWORKS (COMSNETS 2011) (COMSNETS 2011)*, (Bangalore, India), Jan. 2011.
- [44] J. Kayfetz, H. Schulzrinne, T. Sherwood, and M. Tiwari, "Your desktop or mine: Extending the reach of writing instruction," in *Ubiquitous Learning International Conference ()*, (Vancouver, Canada), Dec. 2010.
- [45] C. Makaya, A. Dutta, B. Falchuk, D. A. Chee, S. Das, F. J. Lin, M. Ito, S. Komorita, T. Chiba, H. Yokota, and H. Schulzrinne, "Enhanced Next-Generation service overlay networks architecture," in *IEEE International Conference on Internet Multimedia Systems Architecture and Application (IMSAA-10)*, (Bangalore, India), Dec. 2010.
- [46] O. Boyaci, V. Beltran, and H. Schulzrinne, "Bridging communications and the physical world: Sense everything, control everything," in *IEEE Globecom 2010 Workshop on Ubiquitous Computing and Networks (UbiCoNet 2010)*, (Miami, Florida, USA), pp. 1735–1740, Dec. 2010.
- [47] S. G. Hong, H. Schulzrinne, and S. Weiland, "Signaling architecture for network traffic authorization," in *IEEE Globecom 2010 - Communication & Information System Security (GC10 - CIS)*, (Miami, Florida, USA), Dec. 2010.
- [48] C. Shen and H. Schulzrinne, "On TCP-based SIP server overload control," in *Principles, Systems and Applications of IP Telecommunications (IPTComm'10)*, (Munich, Germany), Aug. 2010.
- [49] M. Barnes, L. Miniero, R. Presta, S. P. Romano, and H. Schulzrinne, "CCMP: a novel standard protocol for conference management in the XCON framework," in *Principles, Systems and Applications of IP Telecommunications (IPTComm'10)*, (Munich, Germany), Aug. 2010.
- [50] S. A. Baset and H. Schulzrinne, "Reliability and relay selection in Peer-to-Peer communication systems," in *Principles, Systems and Applications of IP Telecommunications (IPTComm'10)*, (Munich, Germany), Aug. 2010.
- [51] C. Shen, E. Nahum, H. Schulzrinne, and C. P. Wright, "The impact of TLS on SIP server performance," in *Principles, Systems and Applications of IP Telecommunications (IPTComm'10)*, (Munich, Germany), Aug. 2010.
- [52] A. Amirante, S. P. Romano, H. Schulzrinne, and K. H. Kim, "Online Non-Intrusive diagnosis of One-Way RTP faults in VoIP networks using cooperation," in *Principles, Systems and Applications of IP Telecommunications (IPTComm'10)*, (Munich, Germany), Aug. 2010.
- [53] K. Sung, S. Srinivasan, and H. Schulzrinne, "BBS-ONE: bulletin board and forum system for mobile opportunistic networks," in *IEEE WCNIS2010-Wireless Networks (IEEE WCNIS2010-WN)*, (Beijing, China, P.R. China), June 2010.
- [54] K. Andersson, A. G. Forte, and H. Schulzrinne, "Enhanced mobility support for roaming users: Extending the IEEE 802.21 information service," in *8th International Conference on Wired / Wireless Internet Communications (WWIC 2010)*, (Lulea, Sweden), May 2010.

- [55] A. Cooper, H. Schulzrinne, E. Wilde, and D. Mulligan, "Challenges for the Location-Aware web," in *WebSci10: Extending the Frontiers of Society On-Line* (), (Raleigh, North Carolina), Apr. 2010.
- [56] A. Misra and H. Schulzrinne, "Policy-Driven distributed and collaborative demand response in Multi-Domain commercial buildings," in *1st Int'l Conf. on Energy-Efficient Computing and Networking* (), (Passau, Germany), Apr. 2010.
- [57] K. Arabshian, C. Dickmann, and H. Schulzrinne, "Ontology-Based service discovery Front-End interface for GloServ," in *6th European Semantic Web Conference on The Semantic Web: Research and Applications*, (Heraklion, Crete, Greece), May 2009.
- [58] W. Song, J. Y. Kim, H. Schulzrinne, P. Boni, and M. Armstrong, "Using IM and SMS for emergency text communications," in *Principles, Systems and Applications of IP Telecommunications*, (Atlanta, Georgia, USA), July 2009.
- [59] K. Ono and H. Schulzrinne, "Have i met you before? using Cross-Media relations to reduce SPIT," in *Principles, Systems and Applications of IP Telecommunications*, (Atlanta, Georgia, USA), July 2009.
- [60] H. Cui, S. Srinivasan, and H. Schulzrinne, "ONEChat: enabling group chat and messaging in opportunistic networks," in *HotMobile (Poster)* (), (Annapolis, Maryland), Feb. 2010.
- [61] M. Ge, S. Srinivasan, and H. Schulzrinne, "FileXChange: Drag-and-Drop file sharing in opportunistic networks," in *HotMobile (Poster)* (), (Annapolis, Maryland), Feb. 2010.
- [62] O. Boyaci, A. Forte, and H. Schulzrinne, "Performance of Video-Chat applications under congestion," in *Eleventh IEEE International Symposium on Multimedia*, (San Diego, California, USA), Dec. 2009.
- [63] O. Boyaci, A. Forte, S. Baset, and H. Schulzrinne, "vdelay a tool to measure Capture-to-Display latency and frame-rate," in *Eleventh IEEE International Symposium on Multimedia*, (San Diego, California, USA), Dec. 2009.
- [64] O. Boyaci, A. Forte, S. Baset, and H. Schulzrinne, "vdelay: A tool to measure Capture-to-Display latency and frame-rate," in *Eleventh IEEE International Symposium on Multimedia*, (San Diego, California, USA), Dec. 2009.
- [65] A. Dutta, C. Makaya, S. Das, D. Chee, F. Lin, S. Komorita, T. Chiba, H. Yokota, and H. Schulzrinne, "Self organizing IP multimedia subsystem," in *IEEE International Conference on Internet Multimedia Systems Architecture and Application*, (Bangalore, India), Dec. 2009.
- [66] S. Srinivasan, J. Lee, E. Liu, M. Kester, H. Schulzrinne, V. Hilt, S. Seetharaman, and A. Khan, "NetServ: dynamically deploying in-network services," in *2nd ACM Workshop on Re-Architecting the Internet*, (Rome, Italy), Dec. 2009.
- [67] S. G. Hong, S. Srinivasan, and H. Schulzrinne, "Measurements of multicast service discovery in a campus wireless network," in *IEEE Globecom 2009 Communications Quality of Service, Reliability and Performance Modeling Symposium*, (Honolulu, Hawaii, USA), Nov. 2009.
- [68] K. Yasukawa, A. Forte, and H. Schulzrinne, "Distributed delay estimation and call admission control in IEEE 802.11 wireless LANs," in *ICC 2009 Wireless Networking*, (Dresden, Germany, Germany), June 2009.
- [69] A. Moghadam and H. Schulzrinne, "Interest-aware content distribution protocol for mobile disruption-tolerant networks," in *10th IEEE International Symposium on a*

*World of Wireless, Mobile and Multimedia Networks*, (Kos Island, Greece), June 2009.

- [70] M. Tauil, A. Dutta, Y.-H. Cheng, S. Das, D. Baker, M. Yajnik, D. Famolari, Y. Ohba, and V. Fajardo, "Realization of IEEE 802.21 services and preauthentication framework," in *Testbeds and Research Infrastructures for the Development of Networks & Communities and Workshops*, Apr. 2009.
- [71] S. Srinivasan, A. Moghadam, and H. Schulzrinne, "BonAHA: service discovery framework for mobile Ad-Hoc applications," in *2009 IEEE Consumer Communications and Networking Conference - Personal Ad Hoc and Sensor Networks*, (Las Vegas, USA), Jan. 2009.
- [72] A. Dutta, B. Lyles, H. Schulzrinne, and J. Wang, "Systems modeling for IP-Based handoff using timed petri nets," in *42nd Hawaii International Conference on System Sciences*, (Big Island, Hawaii), Jan. 2009.
- [73] J. Lee, H. Schulzrinne, W. Kellerer, and Z. Despotovic, "mDHT: multicast-augmented DHT architecture for high availability and immunity to churn," in *2009 IEEE Consumer Communications and Networking Conference - P2P and Content Delivery*, (Las Vegas, USA), Jan. 2009.
- [74] V. Singh, H. Schulzrinne, and P. Boni, "A new SIP event package for group membership management in advanced communications," in *International Conference on Internet Multimedia Services Architecture and Applications*, (Bangalore, India), Dec. 2008.
- [75] A. Dutta, F. Lin, S. Das, B. Lyles, T. Chiba, H. Yokota, H. Schulzrinne, and D. Chee, "A-IMS architecture analysis and experimental IPv6 testbed," in *The 1st International Conference on IP Multimedia Subsystems Architecture and Applications*, (Bangalore, India), Dec. 2008.
- [76] O. Boyaci and H. Schulzrinne, "BASS application sharing system," in *Tenth IEEE International Symposium on Multimedia*, (Berkeley, California, USA), Dec. 2008.
- [77] T. Okabe and H. Schulzrinne, "Peer-to-Peer SIP features to eliminate a SIP sign-up process," in *IEEE Globecom 2008 Communications Software and Services Symposium*, (New Orleans, LA, USA), Nov. 2008.
- [78] K. Ono and H. Schulzrinne, "The impact of SCTP on server scalability and performance," in *IEEE Globecom 2008 Communications Quality of Service, Reliability, and Performance Modeling Symposium*, (New Orleans, LA, USA), Nov. 2008.
- [79] A. Forte and H. Schulzrinne, "Deployment guidelines for highly congested IEEE 802.11b/g networks," in *LANMAN 2009*, (Chij-Napoca, Transylvania), Sept. 2008.
- [80] A. Moghadam, S. Srinivasan, and H. Schulzrinne, "7DS - a modular platform to develop mobile disruption-tolerant applications," in *International Conference and Exhibition on Next Generation Mobile Applications, Services, and Technologies*, (Cardiff, Wales, United Kingdom), Sept. 2008.
- [81] T. Chiba, H. Yokota, A. Dutta, D. Chee, and H. Schulzrinne, "Performance analysis of next generation mobility protocols for IMS/MMD networks," in *IWCMC 2008 Next Generation Mobile Networks Symposium*, (Chania Crete Island, Greece, Greece), Aug. 2008.
- [82] C. Shen, H. Schulzrinne, and E. Nahum, "SIP server overload control: Design and evaluation," in *Principles, Systems and Applications of IP Telecommunications*, (Heidelberg, Germany), July 2008.

- [83] A. Forte and H. Schulzrinne, "Template-based signaling compression for Push-To-Talk over cellular (PoC)," in *Principles, Systems and Applications of IP Telecommunications*, (Heidelberg, Germany), July 2008.
- [84] G. Ormazabal, H. Schulzrinne, E. Yardeni, and S. Nagpal, "Secure SIP: a scalable prevention mechanism for DoS attacks on SIP based VoIP systems," in *Principles, Systems and Applications of IP Telecommunications*, (Heidelberg, Germany), July 2008.
- [85] K. Ono and H. Schulzrinne, "One server per city: Using TCP for very large SIP servers," in *Principles, Systems and Applications of IP Telecommunications*, (Heidelberg, Germany), July 2008.
- [86] S. Baset, E. Brosh, D. Rubenstein, and H. Schulzrinne, "The delay friendliness of TCP," in *SIGMETRICS 2008—International Conference on Measurement and Modeling of Computer Systems*, (Annapolis, Maryland, USA), June 2008.
- [87] S. Greco Polito and H. Schulzrinne, "SIP and 802.21 for service mobility and proactive authentication," in *Sixth Annual Conference on Communication Networks and Services Research*, (Halifax, Nova Scotia, Canada), May 2008.
- [88] V. Singh, H. Schulzrinne, and K. Miao, "DYSWIS: an architecture for automated diagnosis of networks," in *Network Operations and Management Symposium (NOMS)*, (Salvador, Bahia), Apr. 2008.
- [89] W. Kho, S. Baset, and H. Schulzrinne, "Skype relay calls: Measurements and experiments," in *11th IEEE Global Internet Symposium 2008*, (Phoenix, AZ, USA), Apr. 2008.
- [90] R. Dantu, H. Schulzrinne, and P. Sroufe, "Experiences in building a multi-university testbed for research in multimedia communications," in *IEEE International Conference on Parallel and Distributed (IPDPS)*, (Miami, Florida), Apr. 2008.
- [91] K. Arabshian and H. Schulzrinne, "An ontology-based hierarchical Peer-to-Peer global service discovery system," *Journal of Ubiquitous Computing and Intelligence (JUCI)*, Vol. 1, pp. 133–144, Dec. 2007.
- [92] S. G. Hong, S. Srinivasan, and H. Schulzrinne, "Accelerating service discovery in ad-hoc zero configuration networking," in *IEEE Globecom 2007 Ad-hoc and Sensor Networking Symposium*, (Washington, DC, USA), Nov. 2007.
- [93] A. Dutta, S. Chakravarty, K. Taniuchi, V. Vfajardo, Y. Ohba, D. Famolari, and H. Schulzrinne, "An experimental study of location assisted proactive handover," in *IEEE Globecom 2007 Internet Protocol Symposium*, (Washington, DC, USA), Nov. 2007.
- [94] K. Yasukawa, A. Forte, and H. Schulzrinne, "Distributed delay estimation and call admission control in IEEE 802.11 WLANs," in *15th IEEE International Conference on Network Protocols*, (Beijing, P.R. China), pp. 334–335, Oct. 2007.
- [95] A. Dutta, B. Lyles, H. Schulzrinne, T. Chiba, H. Yokota, and A. Idoue, "Generalized modeling framework for handoff analysis," in *18th International Symposium on Personal Indoor and Mobile Radio Communications (PIMRC)*, Sept. 2007.
- [96] S. Gandhi, V. Singh, and H. Schulzrinne, "Analyzing user behavior in instant messaging," in *The First Annual Conference of ITA*, (Maryland, USA), Sept. 2007.
- [97] R. Lopez, A. Dutta, Y. Ohba, H. Schulzrinne, and A. Skarmeta, "Network-Layer assisted mechanism to optimize authentication delay during handoff in 802.11 networks," in *MobiQuitous*, Aug. 2007.

- [98] S. Greco Polito, H. Schulzrinne, and A. Forte, "Inter-provider AAA and billing of VoIP users with token-based method," in *Global Information Infrastructure Symposium*, July 2007.
- [99] R. Shacham, H. Schulzrinne, W. Kellerer, and S. Thakolsri, "Composition for enhanced SIP presence," in *12th IEEE Symposium on Computers and Communications*, (Aveiro, Portugal), July 2007.
- [100] C. Shen and H. Schulzrinne, "Measurement and evaluation of ENUM server performance," in *ICC 2007 Network Services and Operation Symposium*, (Glasgow, Scotland, United Kingdom), June 2007.
- [101] S. Srinivasan, A. Moghadam, S. G. Hong, and H. Schulzrinne, "7DS - node cooperation and information exchange in mostly disconnected networks," in *ICC 2007 Wireless Adhoc and Sensor Networks Symposium*, (Glasgow, Scotland, United Kingdom), June 2007.
- [102] S. Shin and H. Schulzrinne, "Experimental measurement of the capacity for VoIP traffic in IEEE 802.11 WLANs," in *IEEE INFOCOM 2007*, (Anchorage, Alaska, USA), May 2007.
- [103] T. Chiba, H. Yokota, A. Idoue, A. Dutta, S. Das, F. Lin, and H. Schulzrinne, "Mobility management schemes for heterogeneity support in next generation wireless networks," in *3rd Euro-NGI Conference on Next Generation Internet Networks - Design and Engineering for Heterogeneity*, (Trondheim, Norway), May 2007.
- [104] S. Greco Polito and H. Schulzrinne, "Authentication and authorization method in multi-domain, multi-provider networks," in *3rd Euro-NGI Conference on Next Generation Internet Networks - Design and Engineering for Heterogeneity*, (Trondheim, Norway), May 2007.
- [105] T. Chiba, H. Yokota, A. Idoue, A. Dutta, K. Manousakis, S. Das, and H. Schulzrinne, "Trombone routing mitigation techniques for IMS/MMD networks," in *IEEE Wireless Communications and Networking Conference 2007 - Networking*, (Hong Kong, Hong Kong), Mar. 2007.
- [106] V. Singh, H. Schulzrinne, P. Boni, B. Elman, and D. Kenneson, "Presence aware Location-Based service for managing mobile communications," in *2007 IEEE Consumer Communications and Networking Conference - Enabling Technologies Track*, (Las Vegas, NV, USA), Jan. 2007.
- [107] W. Yuen and H. Schulzrinne, "Improving search efficiency using bloom filters in partially connected ad hoc networks: A Location-Centric analysis," in *IEEE Globecom 2006 - Wireless Ad Hoc and Sensor Networks - towards Anytime Anywhere Internetworking*, Nov. 2006.
- [108] S. Shin, A. Forte, and H. Schulzrinne, "Passive duplicate address detection for the dynamic host configuration protocol (DHCP)," in *IEEE Globecom 2006 - Internet Services and Enabling Technologies*, Nov. 2006.
- [109] S. Patnaik, E. Yardeni, H. Schulzrinne, G. Ormazabal, and D. Helms, "Securing SIP: scalable mechanisms for protecting SIP-Based VoIP systems," in *NANOG (North American Network Operators Group)*, (St. Louis, Missouri), NANOG, Oct. 2006.
- [110] A. Forte, S. Shin, and H. Schulzrinne, "Improving layer 3 handoff delay in IEEE 802.11 wireless networks," in *Wireless Internet Conference (WICON)*, Aug. 2006.
- [111] W. Yuen and H. Schulzrinne, "Performance evaluation of time-based and hop-based TTL schemes in partially connected ad hoc networks," in *ICC 2006 Wireless Ad Hoc and Sensor Networks*, June 2006.

- [112] W. Zhao and H. Schulzrinne, "DotSlash: an automated web hotspot rescue system with on-demand query result caching," in *IEEE International Conference on Automatic Computing (ICAC) (poster session)*, (Dublin, Ireland), June 2006.
- [113] J. Y. Kim, W. Song, and H. Schulzrinne, "An enhanced VoIP emergency services prototype," in *Information Systems for Crisis Response and Management (ISCRAM)*, (Newark, New Jersey), ISCRAM, May 2006.
- [114] A. Dutta, E. van den Berg, D. Famolari, V. Fajardo, Y. Ohba, K. Taniuchi, and H. Schulzrinne, "Dynamic buffering scheme for mobile handoff," in *PIMRC*, (Helsinki), IEEE, IEEE, 2006.
- [115] A. Dutta, S. Das, D. Famolari, Y. Ohba, K. Taniuchi, V. Fajardo, T. Kodama, and H. Schulzrinne, "Secured seamless convergence across heterogeneous access networks," in *World Telecommunication Congress*, (Budapest), IEEE, IEEE, May 2006.
- [116] X. Fu, H. Schulzrinne, H. Tschofenig, C. Dickmann, and D. Hogrefe, "Overhead and performance study of the general internet signaling transport (GIST) protocol," in *IEEE INFOCOM 2006*, (Barcelona, SPAIN), Apr. 2006.
- [117] S. Baset and H. Schulzrinne, "An analysis of the skype Peer-to-Peer internet telephony protocol," in *IEEE INFOCOM 2006*, (Barcelona, SPAIN), Apr. 2006.
- [118] A. Dutta, S. Madhani, W. Chen, O. Altintas, and H. Schulzrinne, "GPS assisted fast-handoff mechanism for real-time communication," in *2006 IEEE Sarnoff Symposium*, (Princeton NJ, USA), Mar. 2006.
- [119] K. Singh and H. Schulzrinne, "Failover and load sharing in SIP telephony," in *International Symposium on Performance Evaluation of Computer and Telecommunication Systems (SPECTS)*, (Philadelphia, PA), July 2005.
- [120] A. Dutta, B. Kim, T. Zhang, S. Baba, K. Taniuchi, Y. Ohba, and H. Schulzrinne, "Experimental analysis of multi interface mobility management with SIP and MIP," in *IEEE Wirelesscom*, IEEE, IEEE, June 2005.
- [121] K. Singh and H. Schulzrinne, "Peer-to-Peer internet telephony using SIP," in *NOSS-DAV 2005*, (Skamania, Washington), June 2005.
- [122] A. Dutta, T. Zhang, S. Madhani, K. Taniuchi, K. Fujimoto, Y. Katsube, Y. Ohba, and H. Schulzrinne, "Secure universal mobility for wireless internet," *Mobile Computing and Communications Review (MC2R)*, 2005.
- [123] A. Dutta, T. Zhang, Y. Ohba, K. Taniuchi, and H. Schulzrinne, "MPA assisted proactive handoff scheme," in *ACM Ubiquitous, SIGMOBILE*, ACM, 2005.
- [124] A. Dutta, J. Burns, R. Jain, K. Wong, K. Young, and H. Schulzrinne, "Implementation and performance evaluation of application layer MIP-LR," in *IEEE Wirelesscom*, IEEE, IEEE, 2005.
- [125] R. Shacham, H. Schulzrinne, S. Thakolsri, and W. Kellerer, "The virtual device: Expanding wireless communication services through service discovery and session mobility," in *IEEE International Conference on Wireless and Mobile Computing, Networking and Communications*, (Montreal, Canada), IEEE, Aug. 2005.
- [126] X. Wu and H. Schulzrinne, "Handling feature interactions in the language for end system services," in *International Conference on Feature Interactions in Telecommunications and Software Systems (ICFI)*, June 2005.
- [127] X. Wu and H. Schulzrinne, "Service learning in internet telephony," in *ICC 2005 Next Generation Networks for Universal Services*, (Seoul, Korea), May 2005.

- [128] T. Kawata, S. Shin, A. Forte, and H. Schulzrinne, "Using dynamic PCF to improve the capacity for VoIP traffic in IEEE 802.11 networks," in *IEEE WCNC*, IEEE, Mar. 2005.
- [129] J. Varghese-Chennikara, A. Dutta, A. Cheng, M. Elaoud, A. McAuley, I. Sebuktekin, D. Wong, H. Schulzrinne, and K. Young, "Integrated technologies for a survivable network," in *IEEE Wireless and Communications and Networking Conference*, (New Orleans, LA, USA), IEEE, IEEE, Mar. 2005.
- [130] X. Wu and H. Schulzrinne, "Location-based services in internet telephony systems," in *IEEE Consumer Communications and Networking Conference*, (Las Vegas, Nevada), Jan. 2005.
- [131] X. Wu and H. Schulzrinne, "sipc, a multi-function SIP user agent," in *7th IFIP/IEEE International Conference, Management of Multimedia Networks and Services (MMNS)*, pp. 269–281, IFIP/IEEE, Springer, Oct. 2004.
- [132] A. Dutta, S. Madhani, W. Chen, O. Altintas, and H. Schulzrinne, "Fast-handoff schemes for application layer mobility management," in *IEEE PIMRC*, IEEE, IEEE, Sept. 2004.
- [133] K. Arabshian and H. Schulzrinne, "GloServ: global service discovery architecture," in *First Annual International Conference on Mobile and Ubiquitous Systems: Networking and Services (MobiQuitous)*, Aug. 2004.
- [134] W. Zhao and H. Schulzrinne, "Building an adaptive distributed web server system on the fly for handling web hotspots," in *ACM Symposium on Principles of Distributed Computing (PODC)*, (St. John's, Newfoundland, Canada), ACM, ACM, July 2004.
- [135] B.-T. Wang and H. Schulzrinne, "A Denial-of-Service-Resistant IP traceback approach," in *The Ninth IEEE Symposium on Computers and Communications*, (Alexandria, Egypt), June 2004.
- [136] B.-T. Wang and H. Schulzrinne, "A robust packet filtering method for high bandwidth aggregates," in *IEEE Canadian Conference on Electrical and Computer Engineering 2004*, (Niagara Falls, Ontario, Canada), May 2004.
- [137] B.-T. Wang and H. Schulzrinne, "An IP traceback mechanism for reflective DoS attacks," in *IEEE Canadian Conference on Electrical and Computer Engineering 2004*, (Niagara Falls, Ontario, Canada), May 2004.
- [138] A. Dutta, P. Agrawal, S. Das, M. Elaoud, D. Famolari, S. Madhani, A. McAuley, and B. Kim, "Realizing mobile wireless internet telephony and streaming multimedia testbed," *Computer Communications*, Vol. 27, pp. 725–738, May 2004.
- [139] L. Amini, A. Shaikh, and H. Schulzrinne, "Effective peering for multi-provider content delivery services," in *IEEE Infocom 2004*, (Hong Kong), Mar. 2004.
- [140] B.-T. Wang and H. Schulzrinne, "Multifunctional ICMP messages for e-services," in *IEEE International Conference on e-Technology, e-Commerce and e-Service*, (Grand Hotel, Taipei, Taiwan), pp. 355–363, IEEE, IEEE, Mar. 2004.
- [141] A. Dutta, S. Das, P. Li, A. McAuley, Y. Ohba, S. Baba, and H. Schulzrinne, "Secured mobile multimedia communication for wireless internet," in *International Conference on Network Sensing and Control*, (Taipei, Taiwan), IEEE, IEEE, Mar. 2004.
- [142] K. Singh, X. Wu, J. Lennox, and H. Schulzrinne, "Comprehensive multi-platform collaboration," in *Multimedia Computing and Networking*, (San Jose, California, USA), SPIE's 16th Annual Symposium, IS&T - The Society for Imaging Science and Technology, and SPIE - The International Society for Optical Engineering, Jan. 2004.

- [143] B.-T. Wang and H. Schulzrinne, "Tracing high bandwidth aggregates," in *IASTED International Conference on Communication, Network, and Information Security (CNIS)*, (New York City, NY, USA), pp. 165–170, IASTED, ACTA Press, Dec. 2003.
- [144] B.-T. Wang and H. Schulzrinne, "Analysis of denial-of-service attacks on denial-of-service defensive measures," in *Globecom 2003 - General Conference*, (San Francisco Marriott, CA), pp. 1339–1343, IEEE, IEEE, Dec. 2003.
- [145] B.-T. Wang and H. Schulzrinne, "Detecting offensive routers: A straightforward approach," in *IEEE International Carnahan Conference on Security Technology (ICCST)*, (Grand Hotel, Taipei, Taiwan), pp. 460–467, IEEE, IEEE, Oct. 2003.
- [146] D. Wong, A. Dutta, H. Schulzrinne, and K. Young, "Managing simultaneous mobility of IP hosts," in *IEEE International Military Communications Conference (MILCOM)*, (Boston, MA, USA), IEEE, IEEE, Oct. 2003.
- [147] X. Fu, H. Schulzrinne, and H. Tschofenig, "Mobility support for next-generation internet signaling protocols," in *VTC 2003 - IP Mobility*, Oct. 2003.
- [148] S. Berger, H. Schulzrinne, S. Sidiroglou, and X. Wu, "Ubiquitous computing using SIP," in *ACM NOSSDAV 2003*, (Monterey, California, USC), pp. 82–89, June 2003.
- [149] X. Wu and H. Schulzrinne, "Programmable end system services using SIP," in *International Conference on Communications*, (Anchorage, Alaska), pp. 789–793, May 2003.
- [150] W. Jiang, K. Koguchi, and H. Schulzrinne, "Qos evaluation of voip end-points," in *ICC 2003 - Communication QoS, Reliability, and Performance Modeling*, May 2003.
- [151] J. Lennox and H. Schulzrinne, "A protocol for reliable decentralized conferencing," in *ACM NOSSDAV 2003*, (Monterey, California, USC), June 2003.
- [152] W. Zhao and H. Schulzrinne, "Predicting the upper bound of web traffic volume using a multiple time scale approach," in *International World Wide Web Conference (WWW) (poster session)*, (Budapest, Hungary), p. 243, May 2003.
- [153] P.-Y. Hsieh, A. Dutta, and H. Schulzrinne, "Application layer mobility proxy for real-time communication," in *World Wireless Congress, 3G Wireless*, (San Francisco), Delson, Delson, May 2003.
- [154] K. Singh, A. Nambi, and H. Schulzrinne, "Integrating voicexml with SIP services.," in *ICC 2003 - Global Services and Infrastructure for Next Generation Networks*, (Anchorage, Alaska), May 2003.
- [155] L. Amini and H. Schulzrinne, "Modeling redirection in geographically diverse server sets," in *WWW*, (Budapest, Hungary), May 2003.
- [156] N. Nakajima, A. Dutta, S. Das, and H. Schulzrinne, "Handoff delay analysis and measurement for SIP based mobility in ipv6," in *ICC 2003 - Personal Communication Systems and Wireless LANs*, May 2003.
- [157] P. Mendes, H. Schulzrinne, and E. Monteiro, "Signaling protocol for session-aware popularity-based resource allocation," in *IFIP/IEEE International Conference on Management of Multimedia Networks and Services*, University of Santa Barbara, Oct. 2002.
- [158] A. Dutta, D. Wong, J. Burns, R. Jain, K. Young, A. McAuley, and H. Schulzrinne, "Realization of integrated mobility management for ad-hoc networks," in *IEEE Milcom*, (Anaheim, California), Oct. 2002.
- [159] L. Amini and H. Schulzrinne, "On probe strategies for dynamic multimedia server selection," in *IEEE Conference on Multimedia and Expo*, IEEE, Aug. 2002.



- [160] L. Amini, A. Shaikh, and H. Schulzrinne, "Issues with inferring Internet topological attributes," in *ITcom Internet Performance and Control of Network Systems*, SPIE, July 2002.
- [161] H. Schulzrinne and K. Arabshian, "Emergency calls and notifications," in *ITCom*, (Boston, Massachusetts), July/August 2002.
- [162] W. Zhao and H. Schulzrinne, "Selective anti-entropy," in *ACM Symposium on Principles of Distributed Computing (PODC)*, (Monterey, California), ACM, ACM, July 2002.
- [163] A. Dutta, O. Altintas, W. Chen, and H. Schulzrinne, "Mobility approaches for all IP wireless networks," in *SCI*, (Orlando, Florida), July 2002.
- [164] P. Koskelainen, H. Schulzrinne, and X. Wu, "A SIP-based conference control framework," in *Proc. International Workshop on Network and Operating System Support for Digital Audio and Video (NOSSDAV)*, (Miami Beach, Florida), pp. 53–61, May 2002.
- [165] W. Jiang and H. Schulzrinne, "Speech recognition performance as an effective perceived quality predictor," in *IWQoS*, (Miami Beach), May 2002.
- [166] P. Mendes, H. Schulzrinne, and E. Monteiro, "Session-aware popularity resource allocation for assured differentiated services," in *Networking*, (Pisa, Italy), May 2002.
- [167] W. Jiang and H. Schulzrinne, "Comparison and optimization of packet loss repair methods on VoIP perceived quality under bursty loss," in *Proc. International Workshop on Network and Operating System Support for Digital Audio and Video (NOSSDAV)*, (Miami Beach, Florida), May 2002.
- [168] A. Dutta, J. Chen, S. Madhani, A. McAuley, N. Nakajima, and H. Schulzrinne, "Implementing a testbed for mobile multimedia," in *Proceedings of the IEEE Conference on Global Communications (GLOBECOM)*, (San Antonio, Texas), Nov. 2001.
- [169] A. Dutta, R. Jain, D. Wong, J. Burns, K. Young, and H. Schulzrinne, "Multilayered mobility management for survivable network," in *Milcom*, (Vienna, Virginia), Nov. 2001.
- [170] M. Papadopouli and H. Schulzrinne, "Effects of power conservation, wireless coverage and cooperation on data dissemination among mobile devices," in *Mobihoc*, (Long Beach, California), Oct. 2001.
- [171] K. Wong, H.-Y. Wei, A. Dutta, K. Young, and H. Schulzrinne, "Performance of IP micro-mobility management scheme using host based routing," in *WPMC*, (Denmark), Aug. 2001.
- [172] P. Pan and H. Schulzrinne, "Processing overhead studies in resource reservation protocols," in *17th International Teletraffic Congress*, (Salvador da Bahia, Brazil), Sept. 2001.
- [173] H. Schulzrinne, "Keynote: Quality of service - 20 years old and ready to get a job?," *Lecture Notes in Computer Science*, Vol. 2092, p. 1, June 2001. International Workshop on Quality of Service (IWQoS).
- [174] A. Dutta and H. Schulzrinne, "A streaming architecture for next generation Internet," in *Conference Record of the International Conference on Communications (ICC)*, (Helsinki), p. 7, June 2001.
- [175] A. Dutta, F. Vakil, J. Chen, M. Tauil, S. Baba, and H. Schulzrinne, "Application layer mobility management scheme for wireless Internet," in *3Gwireless*, (San Francisco), p. 7, May 2001.

- [176] A. Dutta, H. Schulzrinne, W. Chen, and O. Altintas, "Mobility support for wireless streaming multimedia in marconinet," in *IEEE Broadband Wireless Summit, Interop*, (Las Vegas), p. 7, May 2001.
- [177] J. Brassil and H. Schulzrinne, "Enhancing Internet streaming media with cueing protocols," in *Proceedings of the Conference on Computer Communications (IEEE Infocom)*, (Anchorage, Alaska), Apr. 2001.
- [178] X. Wang and H. Schulzrinne, "Pricing network resources for adaptive applications in a differentiated services network," in *Proceedings of the Conference on Computer Communications (IEEE Infocom)*, (Anchorage, Alaska), Apr. 2001.
- [179] W. Zhao, H. Schulzrinne, and E. Guttman, "mSLP - mesh-enhanced service location protocol," in *International Conference on Computer Communication and Network*, (Las Vegas, Nevada), Oct. 2000.
- [180] X. Wang, C. Yu, H. Schulzrinne, P. Stirpe, and W. Wu, "IP multicast faulty recovery in PIM over OSPF," in *International Conference on Network Protocols (ICNP)*, (Osaka, Japan), Nov. 2000.
- [181] M. Papadopouli and H. Schulzrinne, "Seven degrees of separation in mobile ad hoc networks," in *Proceedings of the IEEE Conference on Global Communications (GLOBECOM)*, (San Francisco, California), Nov. 2000.
- [182] W. Jiang and H. Schulzrinne, "Analysis of on-off patterns in VoIP and their effect on voice traffic aggregation," in *International Conference on Computer Communication and Network*, (Las Vegas, Nevada), Oct. 2000.
- [183] M. Papadopouli, H. Schulzrinne, P. Castro, P. Kermani, C. Bisdikian, and M. Naghshineh, "Data gathering and distribution across widely distributed devices," in *SIGCOMM Symposium on Communications Architectures and Protocols*, (Stockholm, Sweden), August/September 2000. student poster session.
- [184] X. Wang and H. Schulzrinne, "Adaptive reservation: A new framework for multimedia adaptation," in *IEEE International Conference on Multimedia and Expo (ICME)*, (New York), July/August 2000.
- [185] D. Sisalem and H. Schulzrinne, "The adaptive load service: An ABR-Like service for the Internet," in *5th IEEE Symposium on Computers and Communications (ISCC)*, (Juan Les Pins, France), July 2000.
- [186] X. Wang, C.-M. Yu, H. Schulzrinne, P. Stirpe, and W. Wu, "IP multicast fault recovery in PIM over OSPF," in *Proceedings of the ACM Sigmetrics Conference on Measurement and Modeling of Computer Systems*, (Santa Clara, California), June 2000.
- [187] X. Wang, H. Schulzrinne, D. Kandlur, and D. Verma, "Measurement and analysis of LDAP performance," in *Proceedings of the ACM Sigmetrics Conference on Measurement and Modeling of Computer Systems*, (Santa Clara, California), June 2000.
- [188] J. Lennox and H. Schulzrinne, "Feature interaction in Internet telephony," in *Feature Interaction in Telecommunications and Software Systems VI*, (Glasgow, United Kingdom), May 2000.
- [189] J. Rosenberg, L. Qiu, and H. Schulzrinne, "Integrating packet FEC into adaptive voice playout buffer algorithms on the Internet," in *Proceedings of the Conference on Computer Communications (IEEE Infocom)*, (Tel Aviv, Israel), Mar. 2000.
- [190] E. Wedlund and H. Schulzrinne, "Mobility support using SIP," in *2nd ACM/IEEE International Conference on Wireless and Mobile Multimedia (WoWMoM)*, (Seattle, Washington), Aug. 1999.

- [191] A. Dutta and H. Schulzrinne, "Marconinet - an architecture for Internet radio and TV networks," in *Proc. International Workshop on Network and Operating System Support for Digital Audio and Video (NOSSDAV)*, (Basking Ridge, New Jersey), pp. 241–245, June 1999.
- [192] M. Papadopouli and H. Schulzrinne, "Connection sharing in an ad hoc wireless network among collaborating hosts," in *Proc. International Workshop on Network and Operating System Support for Digital Audio and Video (NOSSDAV)*, (Basking Ridge, New Jersey), pp. 169–185, June 1999.
- [193] X. Wang and H. Schulzrinne, "RNAP: a resource negotiation and pricing protocol," in *Proc. International Workshop on Network and Operating System Support for Digital Audio and Video (NOSSDAV)*, (Basking Ridge, New Jersey), pp. 77–93, June 1999.
- [194] H. Schulzrinne and J. Rosenberg, "Signaling for Internet telephony," in *International Conference on Network Protocols (ICNP)*, (Austin, Texas), Oct. 1998.
- [195] P. Pan and H. Schulzrinne, "YESSIR: a simple reservation mechanism for the Internet," in *Proc. International Workshop on Network and Operating System Support for Digital Audio and Video (NOSSDAV)*, (Cambridge, England), pp. 141–151, July 1998. also IBM Research Technical Report TC20967.
- [196] H. Schulzrinne and J. Rosenberg, "A comparison of SIP and H.323 for Internet telephony," in *Proc. International Workshop on Network and Operating System Support for Digital Audio and Video (NOSSDAV)*, (Cambridge, England), pp. 83–86, July 1998.
- [197] D. Sisalem and H. Schulzrinne, "The loss-delay adjustment algorithm: A TCP-friendly adaptation scheme," in *Proc. International Workshop on Network and Operating System Support for Digital Audio and Video (NOSSDAV)*, (Cambridge, England), pp. 215–226, July 1998.
- [198] I. Schubert, D. Sisalem, and H. Schulzrinne, "A session floor control scheme," in *International Conference on Telecommunications*, (Chalkidiki, Greece), June 1998.
- [199] D. Sisalem, F. Emanuel, and H. Schulzrinne, "The direct adjustment algorithm: A TCP-Friendly adaptation scheme," 1998. submitted for publication.
- [200] J. Rosenberg and H. Schulzrinne, "Internet telephony gateway location," in *Proceedings of the Conference on Computer Communications (IEEE Infocom)*, (San Francisco, California), pp. 488–496, March/April 1998.
- [201] J. Rosenberg and H. Schulzrinne, "Timer reconsideration for enhanced RTP scalability," in *Proceedings of the Conference on Computer Communications (IEEE Infocom)*, (San Francisco, California), March/April 1998.
- [202] P. Pan and H. Schulzrinne, "Staged refresh timers for RSVP," in *Proceedings of Global Internet*, (Phoenix, Arizona), Nov. 1997. also IBM Research Technical Report TC20966.
- [203] H. Schulzrinne, "A comprehensive multimedia control architecture for the Internet," in *Proc. International Workshop on Network and Operating System Support for Digital Audio and Video (NOSSDAV)*, (St. Louis, Missouri), May 1997.
- [204] H. Schulzrinne, "Re-engineering the telephone system," in *IEEE Singapore International Conference on Networks (SICON)*, (Singapore), Apr. 1997.
- [205] H. Schulzrinne, "Signaling for Internet telephony services," in *Opensig*, (New York, New York), Oct. 1996.

- [206] H. Schulzrinne, "The impact of resource reservation for real-time Internet services," in *National Research Council (NRC) Workshop on Information System Trustworthiness*, (Washington, D.C.), Oct. 1996.
- [207] D. Sisalem and H. Schulzrinne, "Congestion control in TCP: performance of binary congestion notification enhanced TCP compared to reno and tahoe TCP," in *International Conference on Network Protocols (ICNP)*, (Columbus, Ohio), pp. 268–275, Oct. 1996.
- [208] D. Sisalem, H. Schulzrinne, and C. Sieckmeyer, "The network video terminal," in *HPDC Focus Workshop on Multimedia and Collaborative Environments (Fifth IEEE International Symposium on High Performance Distributed Computing)*, (Syracuse, New York), IEEE Computer Society, Aug. 1996.
- [209] H. Schulzrinne, "The world-wide web as the universal interface to the NII," national research council (nrc) background paper, Columbia University, July 1996.
- [210] D. Sisalem and H. Schulzrinne, "Binary congestion notification in TCP," in *Conference Record of the International Conference on Communications (ICC)*, (Dallas, Texas), IEEE, June 1996.
- [211] D. Sisalem and H. Schulzrinne, "Switch mechanisms for the ABR service: A comparison study," in *Telecommunication Distribution Parallelism (TDP)*, (La Londe Les Maures, France), Institut National des Telecommunications, Evry, June 1996.
- [212] H. Schulzrinne, M. Smirnov, R. Roth, and A. M. Wolisz, "IP multicasting over ATM: the multicube approach," in *3rd International Symposium on Interworking - INTERWORKING: High-Speed Networking and Interoperability*, (Nara, Japan), pp. 181–190, IOS Press/Ohmsha, Oct. 1996.
- [213] H. Schulzrinne, "Personal mobility for multimedia services in the Internet," in *European Workshop on Interactive Distributed Multimedia Systems and Services (IDMS)*, (Berlin, Germany), Mar. 1996.
- [214] D. Sisalem and H. Schulzrinne, "End-to-end rate control in ABR," in *1st Workshop on ATM Traffic Management (WATM)*, (Paris, France), pp. 281–287, IFIP WG 6.2, Dec. 1995.
- [215] H. Schulzrinne, "When can we unplug the phone and the radio?," in *Proc. International Workshop on Network and Operating System Support for Digital Audio and Video (NOSSDAV)*, Lecture Notes in Computer Science (LNCS), (Durham, New Hampshire), pp. 183–184, Springer, Apr. 1995.
- [216] H. Schulzrinne, "Internet services: from electronic mail to real-time multimedia," in *KIVS (Kommunikation in Verteilten Systemen)* (K. Franke, U. Hübner, and W. Kalfa, eds.), Informatik aktuell, (Chemnitz, Germany), pp. 21–34, Gesellschaft für Informatik, Springer Verlag, Feb. 1995.
- [217] H. Schulzrinne, "Audio and video over packet networks — issues, architecture and protocols," in *INTEROP*, (Paris, France), Oct. 1994.
- [218] H. Schulzrinne, "Conferencing and collaborative computing," in *Dagstuhl Seminar on Fundamentals and Perspectives of Multimedia Systems*, (Dagstuhl Castle, Germany), July 1994.
- [219] H. Schulzrinne, J. F. Kurose, and D. F. Towsley, "An evaluation of scheduling mechanisms for providing best-effort, real-time communication in wide-area networks," in *Proceedings of the Conference on Computer Communications (IEEE Infocom)*, (Toronto, Canada), June 1994.

- [220] R. Ramjee, J. F. Kurose, D. F. Towsley, and H. Schulzrinne, “Adaptive playout mechanisms for packetized audio applications in wide-area networks,” in *Proceedings of the Conference on Computer Communications (IEEE Infocom)*, (Toronto, Canada), pp. 680–688, IEEE Computer Society Press, Los Alamitos, California, June 1994.
- [221] H. Schulzrinne, J. F. Kurose, and D. F. Towsley, “Loss correlation for queues with bursty input streams,” in *Conference Record of the International Conference on Communications (ICC)*, Vol. 1, (Chicago, Illinois), pp. 0219–0224 (308.4), IEEE, June 1992.
- [222] H. Schulzrinne and J. F. Kurose, “Distribution of the loss period for some queues in continuous and discrete time,” in *Proceedings of the Conference on Computer Communications (IEEE Infocom)*, (Bal Harbour, Florida), pp. 1446–1455 (12C.1), Apr. 1991.
- [223] H. Schulzrinne, J. F. Kurose, and D. F. Towsley, “Congestion control for real-time traffic in high-speed networks,” in *Proceedings of the Conference on Computer Communications (IEEE Infocom)*, Vol. 2, (San Francisco, California), pp. 543–550, June 1990.
- [224] H. Schulz-Rinne, “The DSP workbench: Modeling parallel architectures as concurrent processes,” in *IEEE International Conference on Acoustics, Speech, and Signal Processing 1986*, (Tokyo, Japan), pp. 54.9.1–54.9.4, IEEE, Apr. 1986.

## WORKSHOPS

- [1] A. Y. Ding, Y. Liu, S. Tarkoma, H. Flinck, H. Schulzrinne, and J. Crowcroft, “Vision: Augmenting wifi offloading with an open-source collaborative platform,” in *Proceedings of the 6th International Workshop on Mobile Cloud Computing and Services*, (Paris, France), pp. 44–48, Sept. 2015.
- [2] H. Schulzrinne, K.-H. Kim, H. Nam, V. Singh, and D. Song, “QoE: A micro and macro perspective,” in *NSF/FCC workshop on Tracking Quality of Experience in the Internet*, (Princeton, New Jersey), Oct. 2015.
- [3] A. Y. Ding, J. Korhonen, T. Savolainen, Y. Liu, M. Kojo, S. Tarkoma, and H. Schulzrinne, “Reflections on middlebox detection mechanisms in IPv6 transition,” in *Internet Architecture Board Workshop on Stack Evolution in a Middlebox Internet (IAB SEMI)*, (Zurich, Switzerland), Jan. 2015.
- [4] H. Schulzrinne, “The Internet is a series of tubes,” in *Towards an Affordable Internet Access for Everyone: The Quest for Enabling Universal Service Commitment (Dagstuhl Seminar 14471)* (J. Crowcroft, A. Wolisz, and A. Sathiaselan, eds.), no. 11 in Dagstuhl Reports, pp. 78–137, Dagstuhl, Germany: Schloss Dagstuhl–Leibniz-Zentrum fuer Informatik, 2015.
- [5] A. Mehta, A. Forte, and H. Schulzrinne, “Using conference servers for SIP-based vertical handoff between IP and cellular networks,” in *The 6th ACM International Workshop on Mobility Management and Wireless Access*, (Vancouver, British Columbia, Canada), Oct. 2008.
- [6] S. Shin and H. Schulzrinne, “Call admission control in IEEE 802.11 WLANs using QP-CAT,” in *The 27th IEEE International Conference on Computer Communications*, (Phoenix, Arizona, USA), Apr. 2008.

- [7] J. Lee, H. Schulzrinne, W. Kellerer, and Z. Despotovic, "z2z: Discovering zeroconf services beyond local link," in *Globecom Workshops*, Nov. 2007.
- [8] S. Srinivasan and H. Schulzrinne, "BonSwing: a GUI framework for Ad-Hoc applications using service discovery," in *CoNEXT Student Workshop*, (New York, USA), Dec. 2007.
- [9] J. Lee, H. Schulzrinne, W. Kellerer, and Z. Despotovic, "Bootstrapping large-scale DHT networks," in *CoNEXT Student Workshop*, (New York, USA), Dec. 2007.
- [10] O. Boyaci and H. Schulzrinne, "Application and desktop sharing," in *CoNEXT Student Workshop*, (New York, USA), Dec. 2007.
- [11] V. Janardhan and H. Schulzrinne, "Peer assisted VoD for set-top box based IP network," in *P2P-TV '07: the 2007 workshop on Peer-to-peer streaming and IP-TV*, (Kyoto, Japan), Aug. 2007.
- [12] H. Schulzrinne, H. Tschofenig, A. Newton, and T. Hardie, "LoST: a protocol for mapping geographic locations to public safety answering points," in *The First International Workshop on Next Generation Networks for First Responders and Critical Infrastructure*, (New Orleans, Louisiana, USA), Apr. 2007.
- [13] H. Tschofenig, H. Schulzrinne, A. Newton, and M. Shanmugam, "Protecting First-Level responder resources in an IP-based emergency services architecture," in *The First International Workshop on Next Generation Networks for First Responders and Critical Infrastructure*, (New Orleans, Louisiana, USA), Apr. 2007.
- [14] W. Yuen and H. Schulzrinne, "Localization for intermittently connected ad hoc networks," in *International Workshop on Intermittently Connected Mobile Ad Hoc Networks*, (Hoes Lane, Piscataway, NJ 08854), IEEE, IEEE, Mar. 2007.
- [15] H. Schulzrinne, A. Forte, and S. Shin, "User mobility in IEEE 802.11 networks," in *Proceedings of first ACM/IEEE international workshop on Mobility in the evolving internet architecture*, (San Francisco, California), pp. 7–8, ACM, Dec. 2006.
- [16] M. Cristofano, A. Forte, H. Schulzrinne, and M. Longo, "A generic model for mobility management in beyond third generation networks," in *The First International Workshop on Broadband and Wireless Computing, Communication and Applications*, (Yogyakarta, Indonesia), IIWAS, Dec. 2006.
- [17] S. Patnaik, E. Yardeni, H. Schulzrinne, G. Ormazabal, and D. Helms, "Securing SIP: scalable mechanisms for protecting SIP-Based VoIP systems," in *NANOG (North American Network Operators Group)*, (St. Louis, Missouri), NANOG, Oct. 2006.
- [18] H. Tschofenig, H. Schulzrinne, and A. Newton, "IETF mapping protocol architecture," in *First SDO Emergency Services Coordination Workshop*, (New York, NY, USA), Oct. 2006.
- [19] H. Schulzrinne, J. Polk, M. Linsner, and A. Newton, "IETF GEOPRIV: transmission of location information using DHCP," in *First SDO Emergency Services Coordination Workshop*, (New York, NY, USA), Oct. 2006.
- [20] H. Schulzrinne and H. Tschofenig, "Emergency service identification," in *First SDO Emergency Services Coordination Workshop*, (New York, NY, USA), Oct. 2006.
- [21] H. Tschofenig, H. Schulzrinne, A. Newton, J. Peterson, and A. Mankin, "The IETF geopriv and presence architecture focusing on location privacy," in *W3C Workshop on Languages for Privacy Policy Negotiation and Semantics-Driven Enforcement*, (Ispra, Italy), W3C, Oct. 2006.

- [22] H. Tschofenig, H. Schulzrinne, M. Linsner, J. Polk, and B. Rosen, "IETF ECRIT emergency service architecture," in *First SDO Emergency Services Coordination Workshop*, (New York, NY, USA), Oct. 2006.
- [23] A. Forte, S. Shin, and H. Schulzrinne, "Improving layer 3 handoff delay in IEEE 802.11 wireless networks," in *Wireless Internet Conference (WICON)*, Aug. 2006.
- [24] S. Shin and H. Schulzrinne, "Balancing uplink and downlink delay of VoIP traffic in WLANs using adaptive priority control (APC)," in *Qshine (3rd international conference on Quality of service in heterogeneous wired/wireless networks)*, Aug. 2006.
- [25] K. Arabshian and H. Schulzrinne, "Distributed context-aware agent architecture for global service discovery," in *The Second International Workshop on Semantic Web Technology For Ubiquitous and Mobile Applications (SWUMA '06)*, 2006.
- [26] K. Arabshian, H. Schulzrinne, D. Trossen, and D. Pavel, "GloServ: global service discovery using the OWL web ontology language," in *IEE International Workshop on Intelligent Environments (IE05)*, IEE, June 2005.
- [27] C. Shen, H. Schulzrinne, S.-H. Lee, and J. Bang, "Routing dynamics measurement and detection for next step internet signaling protocol," in *IEEE/IFIP Workshop on End-to-End Monitoring Techniques and Services (E2EMON)*, IEEE/IFIP, May 2005.
- [28] X. Wu, R. Shacham, M. Mintz-Habib, K. Singh, and H. Schulzrinne, "Location-based communication services," in *International Multimedia Conference, Workshop on Effective Telepresence*, pp. 55–56, ACM, Oct. 2004.
- [29] A. Dutta, T. Zhang, S. Madhani, K. Taniuchi, K. Fujimoto, H. Schulzrinne, Y. Ohba, and Y. Katsube, "Secure universal mobility for wireless internet," in *The Second ACM International Workshop on Wireless Mobile Applications and Services on WLAN Hotspots*, (Philadelphia, PA.), Oct. 2004.
- [30] W. Zhao and H. Schulzrinne, "DotSlash: a self-configuring and scalable rescue system for handling web hotspots effectively," in *International Workshop on Web Caching and Content Distribution (WCW)*, (Beijing, China), Oct. 2004.
- [31] S. Shin, H. Schulzrinne, A. Forte, and A. Rawat, "Reducing MAC layer handoff latency in IEEE 802.11 wireless LANs," in *ACM MobiWac (ACM International Workshop on Mobility Management and Wireless Access)*, (Philadelphia, Pennsylvania), ACM, Sept. 2004.
- [32] C. Wieser, M. Laakso, and H. Schulzrinne, "SIP robustness testing for Large-Scale use," in *First International Workshop on Software Quality (SOQA)*, (Erfurt, Germany), Sept. 2004.
- [33] K. Arabshian and H. Schulzrinne, "Glo-Serv: global service discovery architecture," in *MobiQuitous 2004 Services*, (Boston, Massachusetts, USA), Aug. 2004.
- [34] R. Shacham, H. Schulzrinne, W. Kellerer, and S. Thakolsri, "An architecture for location-based service mobility using the SIP event model," in *ACM International Conference on Mobile Systems, Applications and Services (MobiSys), Workshop on Context Awareness*, ACM, June 2004.
- [35] S. Khurana, A. Dutta, P. Gurung, and H. Schulzrinne, "XML based wide area communication with networked appliances," in *2004 IEEE Sarnoff Symposium*, (Princeton, New Jersey), Apr. 2004.
- [36] K. Arabshian and H. Schulzrinne, "A generic event notification system using XML and SIP," in *New York Metro Area Networking Workshop 2003*, (Bern Dibner Library Building, LC400, Polytechnic University, 5 Metrotech Center), Sept. 2003.

- [37] B.-T. Wang and H. Schulzrinne, "A denial-of-service-resistant IP traceback approach," in *New York Metro Area Networking Workshop 2003*, (Bern Dibner Library Building, LC400, Polytechnic University, 5 Metrotech Cente), Sept. 2003.
- [38] W. Jiang and H. Schulzrinne, "A black-box qos measurement methodology for voip end-points," in *New York Metro Area Networking Workshop 2003*, (Bern Dibner Library Building, LC400, Polytechnic University, 5 Metrotech Cente), Sept. 2003.
- [39] K. Arabshian and H. Schulzrinne, "A sip-based medical event monitoring system," in *5th International Workshop on Enterprise Networking and Computing in Healthcare Industry (HealthCom)*, (Santa Monica, CA), June 2003.
- [40] W. Jiang and H. Schulzrinne, "Assessment of voip service availability in the current internet," in *Passive & Active Measurement Workshop*, (San Diego, CA), Apr. 2003.
- [41] P. Mendes, H. Schulzrinne, and E. Monteiro, "A receiver-driven adaptive mechanism based on the popularity of scalable sessions," in *COST 263 International Workshop on Quality of future Internet Services (QofIS)*, ETH Zurich, Oct. 2002.
- [42] A. Dutta, H. Schulzrinne, O. Altintas, S. Das, A. McAuley, and W. Chen, "Marconinet supporting streaming media over localized wireless multicast," in *International Workshop of Mobile E-Commerce*, (Atlanta, Georgia), Sept. 2002.
- [43] H. Schulzrinne and W. Jiang, "Quality of service - applications," in *NSF ITR Quality of Service Workshop*, (Annapolis, Maryland), Mar. 2002.
- [44] H. Schulzrinne, "Interdomain and end-to-end QoS issues," in *NSF ITR Quality of Service Workshop*, (Annapolis, Maryland), Mar. 2002.
- [45] L. Amini and H. Schulzrinne, "Observations from router-level Internet traces," in *DI-MACS Workshop on Internet and WWW Measurement, Mapping and Modeling*, (Piscataway, New Jersey), Feb. 2002.
- [46] K. Koguchi, W. Jiang, and H. Schulzrinne, "QoS measurement of VoIP end-points," in *IEICE Group meeting on Network Systems*, (Matsuyama, Japan), Dec. 2002.
- [47] W. Zhao and H. Schulzrinne, "ARMS - automated replication for meshed servers," in *3rd NMADS (New York Metro Area Distributed Systems) Day*, (New York, NY), Apr. 2001.
- [48] E. Hahne, P. Pan, and H. Schulzrinne, "Scalable resource reservation for Internet QoS," in *DIMACS Workshop on QoS*, (Rutgers University), Feb. 2001.
- [49] W. Jiang, J. Lennox, H. Schulzrinne, and K. Singh, "Towards junking the PBX: deploying IP telephony," in *Proc. International Workshop on Network and Operating System Support for Digital Audio and Video (NOSSDAV)*, (Port Jefferson, New York), June 2001.
- [50] K. Singh, G. Nair, and H. Schulzrinne, "Centralized conferencing using SIP," in *Internet Telephony Workshop*, (New York), Apr. 2001.
- [51] X. Wu and H. Schulzrinne, "Where should services reside in Internet telephony systems?," in *IP Telecom Services Workshop*, (Atlanta, Georgia), pp. 35–40, Sept. 2000.
- [52] K. Singh and H. Schulzrinne, "Unified messaging using SIP and RTSP," in *IP Telecom Services Workshop*, (Atlanta, Georgia), pp. 31–37, Sept. 2000.
- [53] D. Sisalem and H. Schulzrinne, "The direct adjustment algorithm: A TCP-Friendly adaptation scheme," in *Quality of Future Internet Services*, (Berlin, Germany), Sept. 2000.



- [54] X. Wang and H. Schulzrinne, "Performance study of congestion price based adaptive service," in *Proc. International Workshop on Network and Operating System Support for Digital Audio and Video (NOSSDAV)*, (Chapel Hill, North Carolina), pp. 1–10, June 2000.
- [55] W. Jiang and H. Schulzrinne, "Modeling of packet loss and delay and their effect on real-time multimedia service quality," in *Proc. International Workshop on Network and Operating System Support for Digital Audio and Video (NOSSDAV)*, June 2000.
- [56] H. Schulzrinne, "Internet telephony: A second chance," in *IP-Telephony Workshop (IPtel)*, (Berlin, Germany), Apr. 2000.
- [57] K. Singh and H. Schulzrinne, "Interworking between SIP/SDP and H.323," in *IP-Telephony Workshop (IPtel)*, (Berlin, Germany), Apr. 2000.
- [58] T. Eyers and H. Schulzrinne, "Predicting Internet telephony call setup delay," in *IP-Telephony Workshop (IPtel)*, (Berlin, Germany), Apr. 2000.
- [59] J. Lennox and H. Schulzrinne, "The call processing language: User control of internet telephony services," in *Lucent Technologies XML Day*, (Murray Hill, NJ), Feb. 2000.
- [60] H. Schulzrinne, "Feature interaction in Internet telephony," in *Feature Interaction in Telecommunication Networks IV*, (Montreal, Canada), p. 371, June 1997.
- [61] H. Schulzrinne, "Scaling issues for the integrated services Internet," in *DIMACS: Workshop Architecture and Algorithmic Aspects of Communication Networks*, (New Brunswick, New Jersey), Jan. 1997.
- [62] H. Schulzrinne and D. Sisalem, "Interaction of ATM and IP congestion control," in *Workshop on Integration of IP and ATM*, (St. Louis, Missouri), Nov. 1996.
- [63] H. Schulzrinne, "Issues for session invitation protocols," in *Internet Engineering Task Force (IETF) Meeting*, (Montreal, California), June 1996.
- [64] H. Schulzrinne, "Internet telephony – towards the integrated services Internet," in *IEEE Workshop on Internet Telephony*, (Utrecht, The Netherlands), Feb. 1996.
- [65] H. Schulzrinne, J. Brassil, and A. K. Choudhury, "Internet access to IEEE journals: The september trial," in *Documents in Public Networks — Applications and Experiences (Dokumente in öffentlichen Netzen – Anwendungen und Erfahrungen)*, (Darmstadt, Germany), Nov. 1995.
- [66] H. Schulzrinne, "Whither WWW — status, problems, directions," in *WWW für kommerzielle Anwender und kommerzielle Informationsanbieter im Internet (Supercomputer Tutorial)*, (Mannheim, Germany), June 1995.
- [67] I. Busse, B. Deffner, and H. Schulzrinne, "Dynamic QoS control of multimedia applications based on RTP," in *1st International Workshop on High Speed Networks and Open Distributed Platforms*, (St. Petersburg, Russia), June 1995.
- [68] H. Schulzrinne, "ATM: dangerous at any speed?," in *IEEE Gigabit Networking Workshop*, (Boston, Massachusetts), Apr. 1995.
- [69] H. Schulzrinne, "QOS for real-time services: playout delay and application control," in *46th RACE Concertation Meeting (RCM)*, (Brussels, Belgium), Mar. 1995.
- [70] H. Schulzrinne, "Quality of service in integrated networks." TUBKOM Seminar Series, Feb. 1995.
- [71] L. Kleinrock, J. P. Sterbenz, N. F. Maxemchuk, S. S. Lam, P. Steenkiste, and H. Schulzrinne, "The national exchange for networked information systems: A white paper," in *Gigabit Networking Workshop*, (Toronto, Ontario), June 1994.

- [72] H. Schulzrinne, "RTP: the real-time transport protocol," in *MCNC 2nd Packet Video Workshop*, Vol. 2, (Research Triangle Park, North Carolina), Dec. 1992.
- [73] J. F. Kurose, D. F. Towsley, and H. Schulzrinne, "Scheduling policies for supporting real-time traffic in wide-area computer networks," in *Proc. International Workshop on Network and Operating System Support for Digital Audio and Video (NOSSDAV)*, (Berkeley, California), Nov. 1990. TR-90-062.

#### INTERNET RFCs AND DRAFTS

Note: Date shown is that of latest revision, not first version.

- [1] S. Baset, H. Schulzrinne, and E. Shim, "A protocol for implementing various DHT algorithms," Internet Draft draft-baset-sipping-p2pcommon, Internet Engineering Task Force, Oct. 2006. Work in progress.
- [2] G. Camarillo, H. Schulzrinne, and E. Burger, "The source and sink attributes for the session description protocol," Internet Draft draft-camarillo-mmusic-source-sink-01, Internet Engineering Task Force, Aug. 2003. Work in progress.
- [3] A. Forte, S. Shin, and H. Schulzrinne, "Passive duplicate address detection for the dynamic host configuration protocol for IPv4 (DHCPv4)," Internet Draft draft-forte-dhc-passive-dad-01, Internet Engineering Task Force, Mar. 2006. Work in progress.
- [4] X. Fu and M. et. al., "Mobility issues in next steps in signaling (NSIS)," Internet Draft draft-fu-nsis-mobility-01.txt, Internet Engineering Task Force, Oct. 2003. Work in progress.
- [5] H. Schulzrinne, S. Petrack, and T. Taylor, "Definition of events for Channel-Oriented telephony signalling," Internet Draft draft-ietf-avt-rfc2833biscas, IETF, Jan. 2007. Work in progress.
- [6] H. Schulzrinne, S. Petrack, and T. Taylor, "Definition of events for modem, FAX, and text telephony signals," Internet Draft draft-ietf-avt-rfc2833bisdata, IETF, Feb. 2005. Work in progress.
- [7] H. Schulzrinne and R. Marshall, "Requirements for emergency context resolution with internet technologies," Internet Draft draft-ietf-ecrit-requirements-12, Internet Engineering Task Force, Aug. 2006. Work in progress.
- [8] H. Schulzrinne, "A uniform resource name (URN) for services," Internet Draft draft-ietf-ecrit-service-urn, Internet Engineering Task Force, Aug. 2006. Work in progress.
- [9] T. Taylor, H. Tschofenig, H. Schulzrinne, and M. Shanmugam, "Security threats and requirements for emergency call marking and mapping," Internet Draft draft-ietf-ecrit-security-threats-03, Internet Engineering Task Force, July 2006. Work in progress.
- [10] H. Schulzrinne, J. Polk, and H. Tschofenig, "A dynamic host configuration protocol (DHCP) based Location-to-Service translation protocol (LoST) discovery procedure," Internet Draft draft-ietf-ietf-ecrit-dhc-lost-discovery, Internet Engineering Task Force, Mar. 2007. Work in progress.
- [11] H. Tschofenig and H. Schulzrinne, "GEOPRIV layer 7 location configuration protocol; problem statement and requirements," Internet Draft draft-ietf-geopriv-l7-lcp-ps, Internet Engineering Task Force, Jan. 2007. Work in progress.

- [12] H. Schulzrinne and H. Tschofening, "Location types registry," Internet Draft draft-ietf-geopriv-location-types-registry-05, Internet Engineering Task Force, Mar. 2006. Work in progress.
- [13] H. Schulzrinne, H. Tschofening, J. Morris, J. Cuellar, and J. Polk, "Policy rules for disclosure and modification of geographic information," Internet Draft draft-ietf-geopriv-policy-07, Internet Engineering Task Force, Oct. 2005. Work in progress.
- [14] H. Schulzrinne, "Real time streaming protocol (RTSP)," Internet Draft draft-ietf-mmusic-rfc2326bis-05.txt.ps., Internet Engineering Task Force, Oct. 2003. Work in progress.
- [15] H. Schulzrinne and R. Hancock, "GIMPS: general internet messaging protocol for signaling," Internet Draft draft-ietf-nsis-ntlp-11, Internet Engineering Task Force, Aug. 2006. Work in progress.
- [16] H. Schulzrinne, "is-composing indication for instant messaging using the session initiation protocol (SIP)," Internet Draft draft-ietf-simple-iscomposing, Internet Engineering Task Force, Mar. 2004. Work in progress.
- [17] J. Rosenberg, "Guidelines for authors of extensions to the session initiation protocol (SIP)," Internet Draft draft-ietf-sip-guidelines-07, Internet Engineering Task Force, Oct. 2003. Work in progress.
- [18] H. Schulzrinne, "Emergency services URI for the session initiation protocol," Internet Draft draft-ietf-sipping-sos-00, Internet Engineering Task Force, Feb. 2004. Work in progress.
- [19] J. Rosenberg, H. Schulzrinne, and B. Suter, "Wide area network service location," internet draft, Internet Engineering Task Force, Dec. 1997. Work in progress.
- [20] J. Lee and H. Schulzrinne, "SIP URI service discovery using DNS-SD," Internet Draft draft-lee-sip-dns-sd-uri, Internet Engineering Task Force, Feb. 2007. Work in progress.
- [21] J. Lennox, H. Schulzrinne, J. Nieh, and R. Baratto, "Protocols for application and desktop sharing," Internet Draft draft-lennox-avt-app-sharing, IETF, Dec. 2004. Work in progress.
- [22] S. Narayanan, H. Schulzrinne, and A. Kundaje, "A diameter accounting application for the session initiation protocol," internet draft, Internet Engineering Task Force, Aug. 2002. Work in progress.
- [23] P. Pan and H. Schulzrinne, "An evaluation on RSVP transport mechanism," internet draft, Internet Engineering Task Force, Mar. 2003. Work in progress.
- [24] P. Pan, E. Hahne, and H. Schulzrinne, "BGRP: a framework for scalable resource reservation," internet draft, Internet Engineering Task Force, Jan. 2000. Work in progress.
- [25] J. Rosenberg, J. Weinberger, and H. Schulzrinne, "NAT friendly SIP," internet draft, Internet Engineering Task Force, July 2001. Work in progress.
- [26] J. Rosenberg, D. Drew, and H. Schulzrinne, "Getting SIP through firewalls and NATs," internet draft, Internet Engineering Task Force, Feb. 2000. Work in progress.
- [27] H. Schulzrinne *et al.*, "RADIUS accounting for SIP servers," internet draft, Internet Engineering Task Force, Feb. 2002. Work in progress.
- [28] H. Schulzrinne, "Synchronizing Location-to-Service translation (LoST) servers," Internet Draft draft-schulzrinne-ecrit-lost-sync, Internet Engineering Task Force, Nov. 2006. Work in progress.

- [29] H. Schulzrinne, "A location reference event package for the session initiation protocol (SIP)," Internet Draft draft-schulzrinne-geopriv-locationref, Internet Engineering Task Force, Oct. 2006. Work in progress.
- [30] H. Schulzrinne, "RELO: retrieving end system location information," Internet Draft draft-schulzrinne-geopriv-relo, Internet Engineering Task Force, Mar. 2007. Work in progress.
- [31] H. Schulzrinne, "Composing presence information," Internet Draft draft-schulzrinne-simple-composition-00, Internet Engineering Task Force, July 2005. Work in progress.
- [32] H. Schulzrinne, J. Lennox, J. Nieh, and R. Baratto, "Sharing and remote access to applications," Internet Draft draft-schulzrinne-mmusic-sharing, IETF, Sept. 2004. Work in progress.
- [33] H. Schulzrinne, "Requirements for session initiation protocol (SIP)-based emergency calls," internet draft, Internet Engineering Task Force, Feb. 2003. Work in progress.
- [34] H. Schulzrinne and B. Rosen, "Emergency services for internet telephony systems," Internet Draft draft-schulzrinne-sipping-emergency-arch-00, Internet Engineering Task Force, Feb. 2004. Work in progress.
- [35] R. Shacham, H. Schulzrinne, S. Thakolsri, and W. Kellerer, "Session initiation protocol (SIP) session mobility," Internet Draft draft-shacham-sipping-session-mobility, IETF, Feb. 2005. Work in progress.
- [36] C. Shen, H. Schulzrinne, S.-H. Lee, and J. Bang, "Internet routing dynamics and NSIS related considerations," internet draft, IETF, Oct. 2004. Work in progress.
- [37] C. Shen, H. Schulzrinne, S.-H. Lee, and J. Bang, "NSIS operation over IP tunnels," Internet Draft draft-shen-nsis-tunnel-02, Internet Engineering Task Force, Mar. 2006. Work in progress.
- [38] V. Singh, H. Schulzrinne, and H. Tschofenig, "Dynamic feature extensions to the presence information data format location object (PIDF-LO)," Internet Draft draft-singh-geopriv-pidf-lo-dynamic, Internet Engineering Task Force, Feb. 2007. Work in progress.
- [39] K. Singh and H. Schulzrinne, "Data format and interface to an external peer-to-peer network for SIP location service," Internet Draft draft-singh-p2p-sip, Internet Engineering Task Force, Dec. 2006. Work in progress.
- [40] V. Singh, H. Schulzrinne, and P. Boni, "Vehicle info event package," Internet Draft draft-singh-simple-vehicle-info, Internet Engineering Task Force, Mar. 2007. Work in progress.
- [41] K. Singh and H. Schulzrinne, "Interworking between SIP/SDP and H.323," internet draft, Internet Engineering Task Force, May 2000. Work in progress.
- [42] H. Tschofenig, D. Wing, H. Schulzrinne, T. Froment, and G. Dawirs, "Anti-SPIT : A document format for expressing Anti-SPIT authorization policies," Internet Draft draft-tschofenig-sipping-spit-policy, Internet Engineering Task Force, Feb. 2007. Work in progress.
- [43] H. Tschofenig, H. Schulzrinne, D. Wing, J. Rosenberg, and D. Schwartz, "A framework to tackle spam and unwanted communication for internet telephony," Internet Draft draft-tschofenig-sipping-framework-spit-reduction, Internet Engineering Task Force, Jan. 1993.

- [44] H. Tschofenig, G. Dawirs, T. Froment, D. Wing, D. Wing, and H. Schulzrinne, "Requirements for authorization policies to tackle spam and unwanted communication for internet telephony," Internet Draft draft-froment-sipping-spit-requirements, Internet Engineering Task Force, Feb. 2008.
- [45] D. Trossen and H. Schulzrinne, "On-Demand access authorization for SIP event=20 subscriptions," Internet Draft draft-trossen-sipping-ondemand-00, Internet Engineering Task Force, Oct. 2003. Work in progress.
- [46] S. Tsang, "Requirements for networked appliances: Wide-Area access, control, and interworking," internet draft, Internet Engineering Task Force, Sept. 2000. Work in progress.
- [47] S. Tsang, "SIP extensions for communicating with networked appliances," internet draft, Internet Engineering Task Force, Nov. 2000. Work in progress.
- [48] H. Tschofenig and H. Schulzrinne, "RSVP domain of interpretation for ISAKMP," Internet Draft draft-tschofenig-rsvp-doi-01, Internet Engineering Task Force, Oct. 2003. Work in progress.
- [49] X. Wu and H. Schulzrinne, "Location-switch for call processing language (CPL)," internet draft, Internet Engineering Task Force, Feb. 2004. Work in progress.
- [50] X. Wu, H. Schulzrinne, J. Lennox, and J. Rosenberg, "CPL extensions for presence," internet draft, Internet Engineering Task Force, June 2001. Work in progress.
- [51] W. Zhao and H. Schulzrinne, "Locating IP-to-Public switched telephone network (PSTN) telephony gateways via SLP," internet draft, Internet Engineering Task Force, Feb. 2004. Work in progress.
- [52] W. Zhao and H. Schulzrinne, "Enabling global service attributes in the service location protocol," internet draft, Internet Engineering Task Force, Oct. 2005. Work in progress.
- [53] H. Schulzrinne, L. Liess, H. Tschofenig, B. Stark, and A. KÄ¼tt, "Location hiding: Problem statement and requirements," Internet Draft draft-schulzrinne-ecrit-location-hiding-req, Internet Engineering Task Force, Mar. 2008.
- [54] H. Schulzrinne, S. McCann, G. Bajko, and H. Tschofenig, "Extensions to the emergency services architecture for dealing with unauthenticated and unauthorized devices," Internet Draft draft-schulzrinne-ecrit-unauthenticated-access-02, Internet Engineering Task Force, Feb. 2008.
- [55] H. Schulzrinne, "Applications and media information (AMI) extension to the presence information data format," Internet Draft draft-schulzrinne-simple-ami-00, Internet Engineering Task Force, Nov. 2007.
- [56] R. Barnes, M. Lepinski, H. Tschofenig, and H. Schulzrinne, "Security requirements for the geopriv location system," Internet Draft draft-barnes-geopriv-lo-sec-02, Internet Engineering Task Force, Feb. 2008.
- [57] M. Barnes, C. Boulton, and H. Schulzrinne, "Centralized conferencing manipulation protocol," Internet Draft draft-barnes-xcon-ccmp-04, Internet Engineering Task Force, Feb. 2008.
- [58] S. Baset, H. Schulzrinne, and M. Matuszewski, "Peer-to-Peer protocol (P2PP)," Internet Draft draft-baset-p2psip-p2pp, Internet Engineering Task Force, Nov. 2007.
- [59] C. Jennings, B. Lowekamp, E. Rescorla, J. Rosenberg, S. Baset, and H. Schulzrinne, "REsource LOcation and discovery (RELOAD)," Internet Draft draft-bryan-p2psip-reload, Internet Engineering Task Force, Feb. 2008.

- [60] A. Dutta, H. Yokota, T. Chiba, and H. Schulzrinne, "ProxyMIP extension for Inter-MAG route optimization," Internet Draft draft-dutta-netlmm-pmipro-00, Internet Engineering Task Force, Feb. 2008.
- [61] A. Forte and H. Schulzrinne, "Location-to-Service translation protocol (LoST) extensions," Internet Draft draft-forte-ecrit-lost-extensions, Internet Engineering Task Force, Mar. 2008.
- [62] M. Garc a-Mart n, H. Tschofenig, and H. Schulzrinne, "Indirect presence publication with the session initiation protocol (SIP)," Internet Draft draft-garcia-simple-indirect-presence-publish, Internet Engineering Task Force, Feb. 2008.
- [63] V. Hilt, I. Widjaja, and D. Malas, "Session initiation protocol (SIP) overload control," Internet Draft draft-hilt-sipping-overload, Internet Engineering Task Force, Feb. 2008.
- [64] A. Hourri, S. Parameswar, E. Aoki, V. Singh, and H. Schulzrinne, "Scaling requirements for presence in SIP/SIMPLE," Internet Draft draft-hourri-sipping-presence-scaling-requirements, Internet Engineering Task Force, Nov. 2007.
- [65] B. Rosen, H. Schulzrinne, B. Rosen, and A. Newton, "Framework for emergency calling using internet multimedia," Internet Draft draft-ietf-ecrit-framework, Internet Engineering Task Force, Feb. 2008.
- [66] A. Hourri, E. Aoki, S. Parameswar, T. Rang, V. Singh, and H. Schulzrinne, "Presence interdomain scaling analysis for SIP/SIMPLE," Internet Draft draft-ietf-simple-interdomain-scaling-analysis, Internet Engineering Task Force, Feb. 2008.
- [67] A. Hourri, S. Parameswar, E. Aoki, V. Singh, and H. Schulzrinne, "Scaling requirements for presence in SIP/SIMPLE," Internet Draft draft-ietf-sipping-presence-scaling-requirements, Internet Engineering Task Force, Feb. 2008.
- [68] A. Dutta, V. Fajardo, Y. Ohba, K. Taniuchi, and H. Schulzrinne, "A framework of Media-Independent Pre-Authentication (MPA) for inter-domain handover optimization," Internet Draft draft-irtf-mobopts-mpa-framework, Internet Engineering Task Force, Feb. 2008.
- [69] A. Melnikov, H. Schulzrinne, and Q. Sun, "Sieve notification mechanism: SIP MESSAGE," Internet Draft draft-melnikov-sieve-notify-sip-message, Internet Engineering Task Force, Feb. 2008.
- [70] J. Seedorf, S. Niccolini, and H. Schulzrinne, "Spam score for SIP: a proposal for semantics," Internet Draft draft-seedorf-sipping-spam-score-semantics, Internet Engineering Task Force, Feb. 2008.
- [71] H. Tschofenig, J. Ott, H. Schulzrinne, T. Henderson, and G. Camarillo, "Interaction between SIP and HIP," Internet Draft draft-tschofenig-hiprg-host-identities, Internet Engineering Task Force, Feb. 2008.
- [72] B. Rosen, H. Schulzrinne, and H. Tschofenig, "Session initiation protocol (SIP) event package for the common alerting protocol (CAP)," Internet Draft draft-rosen-sipping-cap, Internet Engineering Task Force, May 2008.
- [73] J. Winterbottom, H. Tschofenig, H. Schulzrinne, M. Thomson, and M. Dawson, "An HTTPS location dereferencing protocol using HELD," Internet Draft draft-winterbottom-geopriv-deref-protocol, Internet Engineering Task Force, Nov. 2007.
- [74] D. Wong, A. Dutta, and H. Schulzrinne, "Simultaneous mobility problem statement," Internet Draft draft-wong-mext-simultaneous-ps, Internet Engineering Task Force, Feb. 2008.

- [75] M. García-Martín and H. Schulzrinne, "Notification of general events using the session initiation protocol (SIP) event notification framework," Internet Draft draft-garcia-sipping-general-events, Internet Engineering Task Force, May 2007.
- [76] S. Greco Polito and H. Schulzrinne, "Authentication, authorization, accounting and billing of roaming users using SAML," Internet Draft draft-greco-sipping-roaming, Internet Engineering Task Force, July 2007.
- [77] R. Shacham and H. Schulzrinne, "HTTP header for future correspondence addresses," Internet Draft draft-shacham-http-corr-uris, Internet Engineering Task Force, May 2007.
- [78] H. Tschofenig and H. Schulzrinne, "Emergency services architecture overview: Sharing responsibilities," Internet Draft draft-tschofenig-ecrit-architecture-overview, Internet Engineering Task Force, July 2007.
- [79] H. Tschofenig and H. Schulzrinne, "A GEOPRIV HTTPS using protocol," Internet Draft draft-tschofenig-geopriv-http-using-protocol, Internet Engineering Task Force, July 2007.
- [80] A. Forte and H. Schulzrinne, "Classification of location-based services," Internet Draft draft-forte-ecrit-service-classification, Internet Engineering Task Force, May 2008.
- [81] H. Schulzrinne, S. Casner, R. Frederick, and V. Jacobson, "RTP: a transport protocol for Real-Time applications," RFC 1889, Internet Engineering Task Force, Jan. 1996.
- [82] H. Schulzrinne, "RTP profile for audio and video conferences with minimal control," RFC 1890, Internet Engineering Task Force, Jan. 1996.
- [83] H. Schulzrinne, A. Rao, and R. Lanphier, "Real time streaming protocol (RTSP)," RFC 2326, Internet Engineering Task Force, Apr. 1998.
- [84] H. Lu, M. Krishnaswamy, L. Conroy, S. M. Bellovin, F. Burg, A. DeSimone, K. Tewani, and P. J. Davidson, "Toward the PSTN/Internet Inter-Networking-Pre-PINT implementations," RFC 2458, Internet Engineering Task Force, Nov. 1998.
- [85] M. Handley, H. Schulzrinne, E. M. Schooler, and J. Rosenberg, "SIP: session initiation protocol," RFC 2543, Internet Engineering Task Force, Mar. 1999.
- [86] J. Rosenberg and H. Schulzrinne, "An RTP payload format for generic forward error correction," RFC 2733, Internet Engineering Task Force, Dec. 1999.
- [87] J. Rosenberg and H. Schulzrinne, "Sampling of the group membership in RTP," RFC 2762, Internet Engineering Task Force, Feb. 2000.
- [88] J. Lennox and H. Schulzrinne, "Call processing language framework and requirements," RFC 2824, Internet Engineering Task Force, May 2000.
- [89] H. Schulzrinne and S. Petrack, "RTP payload for DTMF digits, telephony tones and telephony signals," RFC 2833, Internet Engineering Task Force, May 2000.
- [90] J. Rosenberg and H. Schulzrinne, "A framework for telephony routing over IP," RFC 2871, Internet Engineering Task Force, June 2000.
- [91] J. Rosenberg and H. Schulzrinne, "Registration of parityfec MIME types," RFC 3009, Internet Engineering Task Force, Nov. 2000.
- [92] J. Lennox, H. Schulzrinne, and J. Rosenberg, "Common gateway interface for SIP," RFC 3050, Internet Engineering Task Force, Jan. 2001.
- [93] C. E. Perkins, J. Rosenberg, and H. Schulzrinne, "RTP testing strategies," RFC 3158, Internet Engineering Task Force, Aug. 2001.

- [94] J. Rosenberg, H. Schulzrinne, G. Camarillo, A. R. Johnston, J. Peterson, R. Sparks, M. Handley, and E. M. Schooler, "SIP: session initiation protocol," RFC 3261, Internet Engineering Task Force, June 2002.
- [95] J. Rosenberg and H. Schulzrinne, "Reliability of provisional responses in session initiation protocol (SIP)," RFC 3262, Internet Engineering Task Force, June 2002.
- [96] J. Rosenberg and H. Schulzrinne, "Session initiation protocol (SIP): locating SIP servers," RFC 3263, Internet Engineering Task Force, June 2002.
- [97] J. Rosenberg and H. Schulzrinne, "An Offer/Answer model with session description protocol (SDP)," RFC 3264, Internet Engineering Task Force, June 2002.
- [98] H. Schulzrinne and B. Volz, "Dynamic host configuration protocol (DHCPv6) options for session initiation protocol (SIP) servers," RFC 3319, Internet Engineering Task Force, July 2003.
- [99] H. Schulzrinne, D. Oran, and G. Camarillo, "The reason header field for the session initiation protocol (SIP)," RFC 3326, Internet Engineering Task Force, Dec. 2002.
- [100] H. Schulzrinne, "Dynamic host configuration protocol (DHCP-for-IPv4) option for session initiation protocol (SIP) servers," RFC 3361, Internet Engineering Task Force, Aug. 2002.
- [101] G. Camarillo, G. Eriksson, J. Holler, and H. Schulzrinne, "Grouping of media lines in the session description protocol (SDP)," RFC 3388, Internet Engineering Task Force, Dec. 2002.
- [102] W. Zhao, H. Schulzrinne, E. Guttman, C. Bisdikian, and W. Jerome, "Select and sort extensions for the service location protocol (SLP)," RFC 3421, Internet Engineering Task Force, Nov. 2002.
- [103] B. Campbell, J. Rosenberg, and Y. E. E. Liu, eds., "Session initiation protocol (SIP) extension for instant messaging," RFC 3428, Internet Engineering Task Force, Dec. 2002.
- [104] H. Schulzrinne, "Requirements for resource priority mechanisms for the session initiation protocol (SIP)," RFC 3487, Internet Engineering Task Force, Feb. 2003.
- [105] W. Zhao, H. Schulzrinne, and E. Guttman, "Mesh-enhanced service location protocol (mSLP)," RFC 3528, Internet Engineering Task Force, Apr. 2003.
- [106] H. Schulzrinne, S. Casner, R. Frederick, and V. Jacobson, "RTP: a transport protocol for Real-Time applications," RFC 3550, Internet Engineering Task Force, July 2003.
- [107] H. Schulzrinne and S. Casner, "RTP profile for audio and video conferences with minimal control," RFC 3551, Internet Engineering Task Force, July 2003.
- [108] J. Rosenberg and H. Schulzrinne, "An extension to the session initiation protocol (SIP) for symmetric response routing," RFC 3581, Internet Engineering Task Force, Aug. 2003.
- [109] J. Rosenberg, J. Peterson, H. Schulzrinne, and G. Camarillo, "Best current practices for third party call control (3pcc) in the session initiation protocol (SIP)," RFC 3725, Internet Engineering Task Force, Apr. 2004.
- [110] W. Zhao, H. Schulzrinne, E. Guttman, C. Bisdikian, and W. Jerome, "Remote service discovery in the service location protocol (SLP) via DNS SRV," RFC 3832, Internet Engineering Task Force, July 2004.
- [111] J. Rosenberg, P. Kyzivat, and H. Schulzrinne, "Indicating user agent capabilities in the session initiation protocol (SIP)," RFC 3840, Internet Engineering Task Force, Aug. 2004.



- [112] J. Rosenberg, H. Schulzrinne, and P. Kyzivat, "Caller preferences for the session initiation protocol (SIP)," RFC 3841, Internet Engineering Task Force, Aug. 2004.
- [113] J. Lennox, X. Wu, and H. Schulzrinne, "Call processing language (CPL): a language for user control of internet telephony services," RFC 3880, Internet Engineering Task Force, Oct. 2004.
- [114] G. Camarillo and H. Schulzrinne, "Early media and ringing tone generation in the session initiation protocol (SIP)," RFC 3960, Internet Engineering Task Force, Dec. 2004.
- [115] H. Schulzrinne, "The tel URI for telephone numbers," RFC 3966, Internet Engineering Task Force, Dec. 2004.
- [116] H. Schulzrinne, "Indication of message composition for instant messaging," RFC 3994, Internet Engineering Task Force, Jan. 2005.
- [117] G. Camarillo, E. W. Burger, H. Schulzrinne, and A. van Wijk, "Transcoding services invocation in the session initiation protocol (SIP) using third party call control (3pcc)," RFC 4117, Internet Engineering Task Force, June 2005.
- [118] H. Schulzrinne and C. Agboh, "Session initiation protocol (SIP)-H.323 interworking requirements," RFC 4123, Internet Engineering Task Force, July 2005.
- [119] J. Rosenberg, H. Schulzrinne, and G. Camarillo, "The stream control transmission protocol (SCTP) as a transport for the session initiation protocol (SIP)," RFC 4168, Internet Engineering Task Force, Oct. 2005.
- [120] J. Rosenberg, H. Schulzrinne, and R. Mahy, "An INVITE-Initiated dialog event package for the session initiation protocol (SIP)," RFC 4235, Internet Engineering Task Force, Nov. 2005.
- [121] P. Koskelainen, J. Ott, H. Schulzrinne, and X. Wu, "Requirements for floor control protocols," RFC 4376, Internet Engineering Task Force, Feb. 2006.
- [122] H. Schulzrinne and J. Polk, "Communications resource priority for the session initiation protocol (SIP)," RFC 4412, Internet Engineering Task Force, Feb. 2006.
- [123] Y. Nomura, R. Walsh, J.-P. Luoma, H. Asaeda, and H. Schulzrinne, "A framework for the usage of internet media guides (IMGs)," RFC 4435, Internet Engineering Task Force, Apr. 2006.
- [124] Y. Nomura, R. Walsh, J.-P. Luoma, J. Ott, and H. Schulzrinne, "Requirements for internet media guides (IMGs)," RFC 4473, Internet Engineering Task Force, May 2006.
- [125] R. J. Sparks, A. Hawrylyshen, A. Johnston, J. Rosenberg, and H. Schulzrinne, "Session initiation protocol (SIP) torture test messages," RFC 4475, Internet Engineering Task Force, May 2006.
- [126] H. Schulzrinne, V. Gurbani, P. Kyzivat, and J. Rosenberg, "RPID: rich presence extensions to the presence information data format (PIDF)," RFC 4480, Internet Engineering Task Force, July 2006.
- [127] H. Schulzrinne, "Timed presence extensions to the presence information data format (PIDF) to indicate status information for past and future time intervals," RFC 4481, Internet Engineering Task Force, July 2006.
- [128] H. Schulzrinne, "CIPID: contact information for the presence information data format," RFC 4482, Internet Engineering Task Force, July 2006.

- [129] J. Rosenberg and H. Schulzrinne, "Guidelines for authors of extensions to the session initiation protocol (SIP)," RFC 4485, Internet Engineering Task Force, May 2006.
- [130] H. Schulzrinne and H. Tschofenig, "Location types registry," RFC 4589, Internet Engineering Task Force, July 2006.
- [131] H. Schulzrinne, "Dynamic host configuration protocol (DHCPv4 and DHCPv6) option for civic addresses configuration information," rfc, Internet Engineering Task Force, Oct. 2006.
- [132] H. Schulzrinne and T. Taylor, "RTP payload for DTMF digits, telephony tones, and telephony signals," RFC 4733, Internet Engineering Task Force, Dec. 2006.
- [133] H. Schulzrinne and T. Taylor, "Definition of events for modem, fax, and text telephony signals," RFC 4734, Internet Engineering Task Force, Dec. 2006.
- [134] H. Schulzrinne, H. Tschofenig, J. Morris, J. R. Cuellar, J. Polk, and J. Rosenberg, "Common policy: A document format for expressing privacy preferences," RFC 4745, Internet Engineering Task Force, Feb. 2007.
- [135] H. Schulzrinne, "Dynamic host configuration protocol (DHCPv4 and DHCPv6) option for civic addresses configuration information," RFC 4776, Internet Engineering Task Force, Nov. 2006.
- [136] H. Schulzrinne and R. S. Marshall, "Requirements for emergency context resolution with internet technologies," RFC 5012, Internet Engineering Task Force, Jan. 2008.
- [137] H. Schulzrinne, "A uniform resource name (URN) for emergency and other Well-Known services," RFC 5031, Internet Engineering Task Force, Jan. 2008.
- [138] T. Taylor, H. Tschofenig, H. Schulzrinne, and M. Shanmugam, "Security threats and requirements for emergency call marking and mapping," RFC 5069, Internet Engineering Task Force, Jan. 2008.
- [139] T. Hardie, A. L. Newton, H. Schulzrinne, and H. Tschofenig, "LoST: a Location-to-Service translation protocol," RFC 5222, Internet Engineering Task Force, Aug. 2008.
- [140] H. Schulzrinne, J. Polk, and H. Tschofenig, "Discovering Location-to-Service translation (LoST) servers using the dynamic host configuration protocol (DHCP)," RFC 5223, Internet Engineering Task Force, Aug. 2008.
- [141] H. Schulzrinne and T. Taylor, "Definition of events for Channel-Oriented telephony signalling," RFC 5244, Internet Engineering Task Force, June 2008.
- [142] H. Schulzrinne, "Location-to-URL mapping architecture and framework," RFC 5582, Internet Engineering Task Force, Sept. 2009.
- [143] R. Shacham, H. Schulzrinne, S. Thakolsri, and W. Kellerer, "Session initiation protocol (SIP) session mobility," RFC 5631, Internet Engineering Task Force, Oct. 2009.
- [144] H. Tschofenig and H. Schulzrinne, "GEOPRIV layer 7 location configuration protocol: Problem statement and requirements," RFC 5687, Internet Engineering Task Force, Mar. 2010.
- [145] H. Schulzrinne, E. Marocco, and E. Ivov, "Security issues and solutions in Peer-to-Peer systems for realtime communications," RFC 5765, Internet Engineering Task Force, Feb. 2010.
- [146] G. Camarillo and H. Schulzrinne, "The session description protocol (SDP) grouping framework," RFC 5888, Internet Engineering Task Force, June 2010.

- [147] H. Schulzrinne, V. K. Singh, H. Tschofenig, and M. Thomson, "Dynamic extensions to the presence information data format location object (PIDF-LO)," RFC 5962, Internet Engineering Task Force, Sept. 2010.
- [148] H. Schulzrinne and R. E. Hancock, "GIST: general internet signalling transport," RFC 5971, Internet Engineering Task Force, Oct. 2010.
- [149] C. Shen, H. Schulzrinne, S.-H. Lee, and J. H. Bang, "NSIS operation over IP tunnels," RFC 5979, Internet Engineering Task Force, Mar. 2011.
- [150] A. Dutta, V. Fajardo, Y. Ohba, K. Taniuchi, and H. Schulzrinne, "A framework of media-independent pre-authentication (mpa) for inter-domain handover optimization," Request for Comments 6252, Internet Engineering Task Force, June 2011.
- [151] R. Barnes, M. Lepinski, A. Cooper, J. Morris, H. Tschofenig, and H. Schulzrinne, "An architecture for location and location privacy in internet applications," Request for Comments 6280, Internet Engineering Task Force, July 2011.
- [152] B. Rosen, H. Schulzrinne, J. Polk, and A. Newton, "Framework for emergency calling using Internet multimedia," Request for Comments 6443, Internet Engineering Task Force, Dec. 2011.
- [153] A. Forte and H. Schulzrinne, "Location-to-service translation (LoST) protocol extensions," Request for Comments 6451, Internet Engineering Task Force, Dec. 2011.
- [154] M. Barnes, C. Boulton, S. P. Romano, and H. Schulzrinne, "Centralized conferencing manipulation protocol," Request for Comments 6503, Internet Engineering Task Force, Mar. 2012.
- [155] H. Schulzrinne and H. Tschofenig, "Synchronizing service boundaries and <mapping> elements based on the location-to-service translation (LoST) protocol," Request for Comments 6739, Internet Engineering Task Force, Oct. 2012.
- [156] J. Winterbottom, H. Tschofenig, H. Schulzrinne, and M. Thomson, "A location dereference protocol using HTTP-enabled location delivery (HELD)," Request for Comments 6753, Internet Engineering Task Force, Oct. 2012.
- [157] H. Schulzrinne, H. Tschofenig, J. R. Cuellar, J. Polk, J. B. Morris, and M. Thomason, "Geolocation policy: A document format for expressing privacy preferences for location information," Request for Comments 6772, Internet Engineering Task Force, Jan. 2013.
- [158] C. Jennings, B. Lowekamp, E. Rescorla, S. Baset, and H. Schulzrinne, "Resource location and discovery (RELOAD) base protocol," Request for Comments 6940, Internet Engineering Task Force, Jan. 2014.
- [159] H. Schulzrinne, H. Tschofenig, C. Holmberg, and M. Patel, "Public safety answering point (PSAP) callback," Request for Comments 7090, Internet Engineering Task Force, Apr. 2014.
- [160] C. Shen, H. Schulzrinne, and A. Koike, "A session initiation protocol (SIP) load-control event package," Request for Comments 7200, Internet Engineering Task Force, Apr. 2014.
- [161] V. Gurbani, V. Hilt, and H. Schulzrinne, "Session Initiation Protocol (SIP) overload control," Request for Comments 7339, Internet Engineering Task Force, Sept. 2014.
- [162] J. Peterson, H. Schulzrinne, and H. Tschofenig, "Secure telephone identity problem statement and requirements," Request for Comments 7340, Internet Engineering Task Force, Sept. 2014.

- [163] H. Tschofenig, H. Schulzrinne, and B. Aboba, “Trustworthy location,” Request for Comments 7378, Internet Engineering Task Force, Dec. 2014.
- [164] H. Schulzrinne, S. McCann, G. Bajko, H. Tschofenig, and D. Kroeselberg, “Extensions to the emergency services architecture for dealing with unauthenticated and unauthorized devices,” Request for Comments 7406, Internet Engineering Task Force, Dec. 2014.
- [165] H. Schulzrinne, A. Rao, R. Lanphier, M. Westerlund, and M. Stiemerling, “Real-time streaming protocol version 2.0,” Request for Comments 7826, Internet Engineering Task Force, Dec. 2016.
- [166] C. Jennings, B. Lowekamp, E. Rescorla, S. Baset, H. Schulzrinne, and T. Schmidt, “A SIP usage for REsource LOcation And Discovery (RELOAD),” Request for Comments 7904, Internet Engineering Task Force, Oct. 2016.
- [167] H. Schulzrinne, “A SIP response code for unwanted calls,” Request for Comments 8197, Internet Engineering Task Force, July 2017.

#### TECHNICAL REPORTS

- [1] H. Schulzrinne, “The Internet is a series of tubes,” Technical Report cucs-027-14, Department of Computer Science, Columbia University, New York, New York, Nov. 2014.
- [2] H. Nam, K.-H. Kim, D. Calin, and H. Schulzrinne, “Towards dynamic network condition-aware video server selection algorithms over wireless networks,” Technical Report cucs-001-14, Department of Computer Science, Columbia University, New York, New York, Jan. 2014.
- [3] H. Nam, K. H. Kim, B. H. Kim, D. Calin, and H. Schulzrinne, “Towards a dynamic QoS-aware over-the-top video streaming in LTE,” Technical Report cucs-002-14, Department of Computer Science, Columbia University, New York, New York, Jan. 2014.
- [4] A. Singh, G. Ormazabal, S. Addepalli, and H. Schulzrinne, “Heterogeneous access: Survey and design considerations,” Technical Report cucs-028-13, Department of Computer Science, Columbia University, New York, New York, Oct. 2013.
- [5] H. Nam, B. H. Kim, D. Calin, and H. Schulzrinne, “A mobile video traffic analysis: Badly designed video clients can waste network bandwidth,” Technical Report cucs-018-13, Department of Computer Science, Columbia University, New York, New York, July 2013.
- [6] H. Nam, J. Janak, and H. Schulzrinne, “Connecting the physical world with Arduino in SECE,” Technical Report cucs-013-13, Department of Computer Science, Columbia University, New York, New York, May 2013.
- [7] J. Marasevic, J. Janak, H. Schulzrinne, and G. Zussman, “WiMAX in the classroom: Designing a cellular networking hands-on lab,” Technical Report 2013-03-14, Department of Electrical Engineering, Columbia University, New York, New York, Mar. 2013.
- [8] W. Song, J. W. Lee, B. S. Lee, and H. Schulzrinne, “Finding 9-1-1 callers in tall buildings,” Technical Report cucs-001-13, Columbia University, New York, New York, Jan. 2013.

- [9] W. Song, J. W. Lee, B. S. Lee, and H. Schulzrinne, "Improving vertical accuracy of indoor positioning for emergency communication," Technical Report cucs-016-12, Columbia University, New York, New York, Oct. 2012.
- [10] J. W. Lee, R. Francescangeli, W. Song, E. Maccherani, J. Janak, S. Srinivasan, M. S. Kester, S. A. Baset, and H. Schulzrinne, "NetServ: Reviving active networks," Technical Report cucs-001-12, Columbia University, New York, New York, Jan. 2012.
- [11] J. Janak, J. W. Lee, and H. Schulzrinne, "GRAND: Git revisions as named data," Technical Report cucs-047-11, Columbia University, New York, New York, Dec. 2011.
- [12] S. Srinivasan, J. W. Lee, D. Batni, and H. Schulzrinne, "ActiveCDN: Cloud computing meets content delivery networks," Technical Report cucs-045-11, Columbia University, New York, New York, Nov. 2011.
- [13] E. Maccherani, J. W. Lee, M. Femminella, G. Reali, and H. Schulzrinne, "NetServ on OpenFlow 1.0," Technical Report cucs-036-11, Columbia University, New York, New York, Sept. 2011.
- [14] S. Seo, J. Janak, and H. Schulzrinne, "Columbia University WiMAX campus deployment and installation," Technical Report cucs-032-11, Columbia University, New York, New York, June 2011.
- [15] K. H. Kim, V. K. Singh, and H. Schulzrinne, "DYSWIS: collaborative network fault diagnosis - of end-users, by end-users, for end-users," Tech. Rep. cucs-017-11, Columbia University, May 2011.
- [16] J. W. Lee, R. Francescangeli, W. Song, J. Janak, S. Srinivasan, M. Kester, S. A. Baset, E. Liu, H. Schulzrinne, V. Hilt, Z. Despotovic, and W. Kellerer, "NetServ framework design and implementation 1.0," Tech. Rep. cucs-016-11, Columbia University, May 2011.
- [17] A. Srivastava, J. W. Lee, and H. Schulzrinne, "Implementing zeroconf in linphone," Tech. Rep. cucs-011-11, Columbia University, Mar. 2011.
- [18] M. Kester, E. Liu, J. W. Lee, and H. Schulzrinne, "NetServ: early prototype experiences," Tech. Rep. cucs-031-10, Columbia University, Dec. 2010.
- [19] H. Cui, S. Srinivasan, and H. Schulzrinne, "ONEChat: enabling group chat and messaging in opportunistic networks," Tech. Rep. cucs-001-10, Columbia University, Jan. 2010.
- [20] S. G. Hong, H. Schulzrinne, and S. Weiland, "PBS: signaling architecture for network traffic authorization," Tech. Rep. cucs-045-09, Columbia University, Oct. 2009.
- [21] C. Shen and H. Schulzrinne, "On TCP-based SIP server overload control," Tech. Rep. cucs-048-09, Columbia University, Nov. 2009.
- [22] C. Shen, E. Nahum, H. Schulzrinne, and C. Wright, "The impact of TLS on SIP server performance," Tech. Rep. cucs-022-09, Columbia University, May 2009.
- [23] K. Ono and H. Schulzrinne, "Have i met you before? using Cross-Media relations to reduce SPIT," Tech. Rep. cucs-020-09, Columbia University, Apr. 2009.
- [24] S.-G. Hong, S. Srinivasan, and H. Schulzrinne, "Measurements of multicast service discovery in a campus wireless network," Tech. Rep. cucs-050-08, Columbia University, Nov. 2008.
- [25] S. Subramanya, X. Wu, and H. Schulzrinne, "VoIP-based air traffic controller training," Tech. Rep. cucs-043-08, Columbia University, Sept. 2008.

- [26] S. Shin and H. Schulzrinne, "Towards the quality of service for VoIP traffic in IEEE 802.11 wireless networks," Tech. Rep. cucs-035-08, Columbia University, July 2008.
- [27] C. Shen, H. Schulzrinne, and E. Nahum, "SIP server overload control: Design and evaluation," Tech. Rep. cucs-031-08, Columbia University, June 2008.
- [28] A. Forte, S. Shin, and H. Schulzrinne, "IEEE 802.11 in the large: Observations at an IETF meeting," Tech. Rep. cucs-025-08, Columbia University, May 2008.
- [29] E. Brosh, S. Baset, V. Misra, D. Rubenstein, and H. Schulzrinne, "The Delay-Friendliness of TCP," Tech. Rep. cucs-014-08, Columbia University, Mar. 2008.
- [30] S. Abdul Baset, E. Brosh, V. Misra, D. Rubenstein, and H. Schulzrinne, "The Delay-Friendliness of TCP," Tech. Rep. cucs-023-07, Columbia University, June 2007.
- [31] K. Ono and H. Schulzrinne, "The impact of SCTP on server scalability and performance," Tech. Rep. cucs-012-08, Columbia University, Feb. 2008.
- [32] K. Ono and H. Schulzrinne, "One server per city: Using TCP for very large SIP servers," Tech. Rep. cucs-009-08, Columbia University, Feb. 2008.
- [33] K. Arabshian, C. Dickmann, and H. Schulzrinne, "Service composition in a global service discovery system," Tech. Rep. cucs-033-07, Columbia University,, Sept. 2007.
- [34] S. Hong, S. Srinivasan, and H. Schulzrinne, "Accelerating service discovery in Ad-Hoc zero configuration networking," Technical Report cucs-009-07, Columbia University, New York, Feb. 2007.
- [35] A. Forte and H. Schulzrinne, "Cooperation between stations in wireless networks," arXiv report cs.NI/0701046, arXiv, Jan. 2007.
- [36] K. Arabshian and H. Schulzrinne, "Combining ontology queries with text search in service discovery," Tech. Rep. cucs-006-07, Columbia University, New York, NY, Jan. 2007.
- [37] O. Boyaci and H. Schulzrinne, "Measurements of DNS stability," Tech. Rep. cucs-045-06, Columbia University, New York, Dec. 2006.
- [38] A. Forte, S. Shin, and H. Schulzrinne, "IEEE 802.11 in the large: Observations at an IETF meeting," tech. rep., Columbia University, Dec. 2006.
- [39] A. Forte and H. Schulzrinne, "Cooperation between stations in wireless networks," Tech. Rep. cucs-044-06, Columbia University, New York, Dec. 2006.
- [40] V. Singh, H. Schulzrinne, M. Isomaki, and P. Boni, "Presence traffic optimization techniques," Tech. Rep. cucs-041-06, Columbia University, New York, Nov. 2006.
- [41] C. Shen and H. Schulzrinne, "A VoIP privacy mechanism and its application in VoIP peering for voice service provider topology and identity hiding," Tech. Rep. cucs-039-06, Columbia University, New York, Oct. 2006.
- [42] S. Baset and H. Schulzrinne, "A common protocol for implementing various DHT algorithms," Tech. Rep. cucs-040-06, Columbia University, New York, Oct. 2006.
- [43] C. Shen and H. Schulzrinne, "Measurement and evaluation of ENUM server performance," Tech. Rep. cucs-029-06, Columbia University, New York, Sept. 2006.
- [44] S. Shin, A. Forte, and H. Schulzrinne, "Seamless layer-2 handoff using two radios in IEEE 802.11 wireless networks," Tech. Rep. cucs-018-06, Columbia University, Computer Science Department, Apr. 2006.

- [45] A. Forte, S. Shin, and H. Schulzrinne, "Passive duplicate address detection for dynamic host configuration protocol (DHCP)," Tech. Rep. cucs-011-06, Columbia University, Computer Science Department, Mar. 2006.
- [46] K. Singh and H. Schulzrinne, "Using an external DHT as a SIP location service," Technical Report CUCS-007-06, Columbia University, Computer Science Department, New York, NY, Feb. 2006.
- [47] V. Singh and H. Schulzrinne, "A survey of security issues and solutions in presence," Tech. Rep. cucs-019-06, Columbia University, New York, Feb. 2006.
- [48] V. Singh and H. Schulzrinne, "SIMPLEstone - benchmarking presence server performance," Tech. Rep. cucs-023-06, Columbia University, New York, Feb. 2006.
- [49] M. Cristofano, A. Forte, and H. Schulzrinne, "Generic models for mobility management in next generation networks," Tech. Rep. cucs-031-05, Columbia University, Computer Science Department, Aug. 2005.
- [50] K. Arabshian and H. Schulzrinne, "Hybrid hierarchical and Peer-to-Peer ontology-based global service discovery system," Tech. Rep. CUCS-016-05, Columbia University, Apr. 2005.
- [51] C. Shen, H. Schulzrinne, S.-H. Lee, and J. Bang, "Internet routing dynamics and NSIS related considerations," Technical Report CUCS-007-05, Columbia University, New York, Feb. 2005.
- [52] R. Shacham, H. Schulzrinne, S. Thakolsri, and W. Kellerer, "The virtual device: Expanding wireless communication services through service discovery and session mobility," Technical Report CUCS-001-05, Department of Computer Science, Columbia University, New York, NY, Jan. 2005.
- [53] X. Wu and H. Schulzrinne, "End system service examples," Tech. Rep. CUCS-048-04, Columbia University Department of Computer Science, New York, New York, Dec. 2004.
- [54] S. Baset and H. Schulzrinne, "An analysis of the Skype Peer-to-Peer internet telephony protocol," arXiv report cs.NI/0412017, arXiv, Dec. 2004. CUCS-039-04.
- [55] K. Srivastava and H. Schulzrinne, "Preventing spam for SIP-based instant messages and sessions," Technical Report CUCS-042-04, Department of Computer Science, Columbia University, New York, NY, Oct. 2004.
- [56] K. Singh and H. Schulzrinne, "Peer-to-Peer internet telephony using SIP," Tech. Rep. CUCS-044-04, Department of Computer Science, Columbia University, New York, NY, Oct. 2004.
- [57] X. Wu and H. Schulzrinne, "Service learning in internet telephony," technical report, Department of Computer Science, Columbia University, Oct. 2004.
- [58] X. Zhang and H. Schulzrinne, "Voice over TCP and UDP," Technical Report CUCS-033-04, Columbia University Department of Computer Science, Sept. 2004.
- [59] K. Singh and H. Schulzrinne, "Failover and load sharing in SIP telephony," Tech. Rep. CUCS-011-04, Columbia University, Computer Science Department, New York, NY, USA, Mar. 2004.
- [60] X. Wu and H. Schulzrinne, "Feature interactions in internet telephony end systems," tech. rep., Department of Computer Science, Columbia University, Jan. 2004.
- [61] H. Schulzrinne, "9-1-1 calls for voice-over-ip," Ex-parte filing to the Federal Communications Commission cucs-022-03, Department of Computer Science, Columbia University, New York, New York, Aug. 2003.

- [62] C. Wieser, M. Laakso, and H. Schulzrinne, "Security testing of SIP implementations," Technical Report CUCS-024-03, Department of Computer Science, Columbia University, New York, Aug. 2003.
- [63] K. Singh, X. Wu, J. Lennox, and H. Schulzrinne, "Comprehensive multi-platform collaboration," Tech. Rep. CUCS-027-03, Dept. of Computer Science, Columbia University, New York, New York, Dec. 2003.
- [64] K. Singh, W. Jiang, J. Lennox, S. Narayanan, and H. Schulzrinne, "CINEMA: columbia internet extensible multimedia architecture," technical report CUCS-011-02, Department of Computer Science, Columbia University, New York, New York, May 2002.
- [65] H. Schulzrinne and K. Arabshian, "Providing emergency services in Internet telephony," technical report, Department of Computer Science, Columbia University, New York, NY, Apr. 2002.
- [66] P. Mendes, H. Schulzrinne, and E. Monteiro, "Session-aware popularity-based resource allocation across several differentiated service domains," Technical Report CUCS-009-02, Columbia University, Apr. 2002.
- [67] H. Schulzrinne, S. Narayanan, J. Lennox, and M. Doyle, "SIPstone - benchmarking SIP server performance," Technical Report CUCS-005-02, Department of Computer Science, Columbia University, New York, New York, Mar. 2002.
- [68] W. Zhao and H. Schulzrinne, "A flexible and efficient protocol for multi-scope service registry replication," Tech. Rep. CUCS-016-02, Dept. of Computer Science, Columbia University, New York, New York, Mar. 2002.
- [69] G. Camarillo, H. Schulzrinne, and R. Kantola, "Signalling transport protocols," Technical report CUCS-002-02, Dept. of Computer Science, Columbia University, New York, Feb. 2002.
- [70] M. Papadopouli and H. Schulzrinne, "Performance of data dissemination and message relaying in mobile ad hoc networks," Technical Report CUCS-004-02, Dept. of Computer Science, Columbia University, New York, New York, Feb. 2002.
- [71] S. Krishnan and H. Schulzrinne, "On buffered clos switches," Tech. Rep. CUCS-023-02, Dept. of Computer Science, Columbia University, New York, New York, Nov. 2002.
- [72] P. Mendes, H. Schulzrinne, and E. Monteiro, "Multi-layer utilization maximal fairness for multi-rate multimedia sessions," Technical Report CUCS-008-01, Dept. of Computer Science, Columbia University, New York, New York, July 2001.
- [73] M. Papadopouli and H. Schulzrinne, "Performance of data dissemination among mobile devices," technical report CUCS-005-01, Dept. of Computer Science, Columbia University, New York, New York, July 2001.
- [74] P. Pan and H. Schulzrinne, "PF\_IPOPTION: a kernel extension for IP option packet processing," Technical Memorandum 10009669-02TM, Bell Labs, Lucent Technologies, Murray Hill, NJ, June 2000.
- [75] P. Pan and H. Schulzrinne, "Lightweight resource reservation signaling: Design, performance and implementation," Technical Memorandum 10009669-03TM, Bell Labs, Lucent Technologies, Murray Hill, NJ, June 2000.
- [76] D. Rubenstein, J. Lennox, J. Rosenberg, and H. Schulzrinne, "Bell labs/columbia/umass RTP library internal function descriptions," Tech. Rep. 99-76, University of Massachusetts, Amherst, Massachusetts, Nov. 1999.



- [77] W. Jiang and H. Schulzrinne, "QoS measurement of Internet real-time multimedia services," Technical Report CUCS-015-99, Columbia University, New York, New York, Dec. 1999.
- [78] J. Rosenberg, J. Lennox, and H. Schulzrinne, "Programming Internet telephony services," Technical Report CUCS-010-99, Columbia University, New York, New York, Mar. 1999.
- [79] J. Lennox, H. Schulzrinne, and T. L. Porta, "Implementing intelligent network services with the session initiation protocol," Technical Report CUCS-002-99, Columbia University, New York, New York, Jan. 1999.
- [80] H. Schulzrinne and J. Rosenberg, "Signaling for Internet telephony," Technical Report CUCS-005-98, Columbia University, New York, New York, Feb. 1998.
- [81] H. Schulzrinne, B. Deffner, D. Sisalem, and T. Friedman, "Architecture of a teleteaching application for testing resource reservation and adaptive applications in integrated networks," Project Report MMTng M-1, GMD Fokus, Berlin, Germany, Nov. 1995.
- [82] I. Busse, B. Deffner, D. Cochrane, B. Gorman, H. Schulzrinne, P. Demestichas, Y. Manolessos, and K. Kassapakis, "Dynamic QoS management framework for IBC networks (D12)," Deliverable R2116/CRAY/WP2/DS/R/, RACE Project 2116 (TOMQAT), Nov. 1995.
- [83] I. Busse, B. Deffner, H. Schulzrinne, P. Demestichas, Y. Manolessos, K. Kassapakis, G. D. Stamoulis, and G. Seehase, "TOMQAT test system user manual (D11)," Deliverable R2116/TELMAT/WP3/DS/, RACE Project 2116 (TOMQAT), Sept. 1995.
- [84] I. Busse, B. Deffner, H. Schulzrinne, P. Demestichas, Y. Manolessos, K. Kassapakis, G. D. Stamoulis, and G. Seehase, "Preliminary test report and QoS verification document (D9)," Deliverable R2116/TUB/WP3/DS/P/0, RACE Project 2116 (TOMQAT), Aug. 1995.
- [85] I. Busse, B. Deffner, H. Schulzrinne, P. Demestichas, Y. Manolessos, K. Kassapakis, G. D. Stamoulis, and G. Seehase, "Definition of conceptual framework for QoS management (D8)," Deliverable R2116/NTUA/WP2/DS/P/, RACE Project 2116 (TOMQAT), Feb. 1995.
- [86] I. Busse, D. Cochrane, B. Deffner, P. Demestichas, B. Evans, W. Grupp, N. Karatzas, and K. Kassapakis, "Quality module specification (D7)," Deliverable R2116/ISR/WP2/DS/S/0, RACE Project 2116 (TOMQAT), Dec. 1994.
- [87] H. Almus, H. Buschermoehle, I. Busse, B. Deffner, P. H. Georgatsos, W. Grupp, N. Karatzas, and K. Kassapaskis, "Architecture of the TOMQAT system and definition of net infrastructure (D6)," Deliverable R2116/TUB/WP2/DS/P/0, RACE Project 2116 (TOMQAT), Aug. 1994.
- [88] D. Cochrane, P. Demestichas, A. Gehring, P. H. Georgatsos, J. Kawalek, N. Karatzas, K. Kassapakis, and P. Legand, "Requirement analysis and approach to dynamic total quality management (D5)," Deliverable R2116/ICOM/WP2/DS/P/, RACE Project 2116 (TOMQAT), Aug. 1994.
- [89] A. Gehring, J. Kuwalek, P. Legand, Z. Lioupas, Y. Manolessos, K. Nagel, E. Pappachristou, and I. Schieferdecker, "Requirement analysis and approach for dynamic total quality management (D4)," Deliverable R2116/ICOM/WP2/DSR/0, RACE Project 2116 (TOMQAT), June 1994.
- [90] H. Almus, H. Buschermöhle, I. Busse, P. H. Georgatsos, W. Grupp, K. Kassapakis, P. Legand, and Z. Lioupas, "Architecture of the TOMQAT system and definition of

net infrastructure (D3),” Deliverable R2116/GMD/WP2/DS/P/0, RACE Project 2116 (TOMQAT), May 1994.

- [91] L. Kleinrock, J. P. Sterbenz, N. F. Maxemchuk, S. S. Lam, H. Schulzrinne, and P. Steenkiste, “The national exchange for networked information systems: a white paper,” Technical Report CSD-930039, University of California (UCLA), Los Angeles, California, Nov. 1993.
- [92] H. Schulzrinne, “Issues in designing a transport protocol for audio and video conferences and other multiparticipant real-time applications.” expired Internet draft, Oct. 1993.
- [93] A. M. Lapone, N. Maxemchuk, and H. Schulzrinne, “The bell laboratories network emulator,” Technical Memorandum BL0113820-930913-64T, AT&T Bell Laboratories, Murray Hill, New Jersey, Sept. 1993.
- [94] H. Schulzrinne, *Reducing and characterizing packet loss for high-speed computer networks with real-time services*. PhD thesis, University of Massachusetts, Amherst, Massachusetts, May 1993. also: Technical Report 93-54, Department of Computer Science, University of Massachusetts at Amherst.
- [95] H. Schulzrinne, J. F. Kurose, and D. F. Towsley, “Loss correlation for queues with single and multiple input streams,” Technical Report TR 92-53, Department of Computer Science, University of Massachusetts, Amherst, Massachusetts, July 1992.
- [96] H. Schulzrinne, “Voice communication across the internet: A network voice terminal,” Technical Report TR 92-50, Dept. of Computer Science, University of Massachusetts, Amherst, Massachusetts, July 1992.
- [97] H. Schulzrinne, J. F. Kurose, and D. F. Towsley, “Distribution of the loss period for some queues in continuous and discrete time,” Technical Report TR 91-03, Department of Computer and Information Science, University of Massachusetts, Amherst, Massachusetts, July 1991.
- [98] H. Schulzrinne, J. F. Kurose, and D. F. Towsley, “Congestion control for real-time traffic in high-speed networks,” Technical Report TR 89-92, Department of Computer and Information Science, University of Massachusetts, Amherst, Massachusetts, Mar. 1991.
- [99] H. Schulzrinne, “SIMUL simulation system manual.” internal memorandum, Feb. 1989.
- [100] H. Schulz-Rinne, “Multistage vector quantization for speech and image waveform coding; the DSP workbench: Distributed multiprocess system simulation,” Master’s thesis, University of Cincinnati, Cincinnati, Ohio, Aug. 1987.

#### MASTERS THESES SUPERVISED

- [1] R. Bollow, “Video transmission using the available bit rate service,” Master’s thesis, Berlin University of Technology, Berlin, Germany, Jan. 1997.
- [2] C. Zahl, “Aufbau und konfiguration von internet-multimedia-konferenzen über verbindungen niedriger bandbreite (setup and configuration of Internet multimedia conferences using low-bandwidth links),” Master’s thesis, Berlin University of Technology, Berlin, Germany, Feb. 1997. Diplomarbeit.

- [3] F. Oertel, "Integration von ISDN-Teilnehmern in internet-multimedia-konferenzen (integration of ISDN subscribers into Internet multimedia conferences)," Master's thesis, Berlin University of Technology, Berlin, Germany, Feb. 1997. Diplomarbeit.
- [4] C. Zahl, "Entwicklung einer internet-multimedia-telekommunikations-anlage (development of an Internet multimedia telecommunications system)," Studienarbeit, Department of Communication Networks, TU Berlin, Berlin, Germany, Nov. 1995.
- [5] F. Oertel, "Aufbau und konfiguration lokaler multimedia konferenz-umgebungen (setup and configuration of local multimedia conferencing environments)," Studienarbeit, Department of Communication Networks, TU Berlin, Berlin, Germany, Nov. 1995.
- [6] C. Sieckmeyer, "Bewertung von adaptiven ausspielalgorithmen für paketvermittelte audiodaten (evaluation of adaptive playout algorithms for packet audio)," Studienarbeit, Dept. of Electrical Engineering, TU Berlin, Berlin, Germany, Oct. 1995.
- [7] B. Rathke, "Evaluation of a distance-vector based multicast-routing protocol for datagram internetworks," Diplomarbeit, Department of Telecommunications, TU Berlin, Berlin, Germany, Oct. 1995.
- [8] I. Demirel, "Eine SDL-Spezifikation des core based tree (CBT) multicast-routing-protokolls (an SDL specification of the core-based tree (CBT) multicast routing protocol)," Studienarbeit, Dept. of Electrical Engineering, TU Berlin, Berlin, Germany, Sept. 1995.
- [9] D. Sisalem, "Rate based congestion control and its effects on TCP over ATM," Diplomarbeit, School of Engineering, TU Berlin, Berlin, June 1995.
- [10] S. Portner, "Verbindungsverwaltung in hochgeschwindigkeitsnetzen (connection management in high speed networks)," Studienarbeit, Institut für Fernmeldetechnik, TU Berlin, Berlin, Germany, Dec. 1994.

#### PHD THESES SUPERVISED

Jonathan Rosenberg, Xin Wang, Maria Papadopouli, Ping Pan, Wenyu Jiang, Lisa Amini, Jonathan Lennox, Kundan Singh, Santosh Krishnan, Weibin Zhao (2006), Xiaotao Wu (2007), Sangho Shin (2008), Knarig Arabshian (2008), Charles Shen (2010), Ashutosh Dutta (2010), Salman Baset (2010), Omer Boyaci (2011), Se Gi Hong (2011), Arezu Moghadam (2011), Jae Woo Lee (2012), Kumiko Ono (2012), Wonsang Song (2014), Jong Yul Kim (2015), Hyunwoo Nam (2015), Suman Srinivasan (2016), Kyung-Hwa Kim (2017).

#### CURRENT PHD STUDENTS

Jan Janak.

#### NON-US THESIS COMMITTEES

Ralf Ackermann (Technische Universität Darmstadt, July 2003), Paulo Mendes (University of Coimbra, Portugal, January 2004), Cristian Hesselman (University of Twente, Holland, May 2005), Martin Krebs (RWTH Aachen University, May 2010), Ian Marsh (KTH, Sweden, June 2009), Tommy Ou (University of Oulu, Finland, August 2010), Antti Mäkelä (Aalto University, Finland, August 2012), Erkki Harjula (University of Oulu, Finland, June 2016).