Jong Yul Kim

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Research Interests

Critical infrastructure on the Internet (e.g. Next Generation 9-1-1),
Scalability and availability of SIP services,
Reliability of distributed systems,
Validation of network protocols.

Professional Preparation

Ph.D. candidate in Computer Science — Columbia University
Advisor: Henning Schulzrinne

M.S. in Computer Science, 2006 — Columbia University

B.S. in Computer Science and Engineering, 2005 — Seoul National University, Korea

Research Experience

Summer Intern — AT&T Labs Research

2010 — **Scalability and high availability for SIP servlet containers.**
The project aim was to explore scalability and high availability techniques for container-based SIP servers. Specific tasks included working with the research team to set up the experimental systems, comparing and evaluating the architecture, and writing up the results for publication at peer-reviewed conference.

Graduate Research Assistant — Columbia University

2010 ~ 2011 — **Dynamically scalable SIP proxy clusters.**
We explore the possibility of deploying a scalable SIP proxy cluster on a cloud platform. A highly scalable architecture is presented, along with challenges and solutions to scale different tiers in the architecture.

2010 — **Availability of Network Application Systems.**
Passed Ph.D. candidacy exam on February 3.

2009 **Enabling IM and SMS for emergency calls.**
As more people use IM and SMS for daily communications, it becomes another potential way for the public to ask for help or report an emergency. We looked at ways that these media can be integrated with the proposed emergency SIP infrastructure. We found that SIP methods such as SIP MESSAGE, which does not establish an end-to-end session, resembles the behavior of SMS and that there needs to be a way to send these messages to the same call taker consistently. We proposed and tested a timer-based state keeping mechanism in the proxies. This method works for IM too. More information is available in [1]. We're trying to standardize this approach [4].

2007 ~ 2008 **USDOT NG9-1-1 Proof-of-concept system.**
We took part in designing and implementing a proof-of-concept NG9-1-1 system for USDOT. An interesting part of the project was to figure out how SIP can be used in a complex system. We found out that we can use SIP-CGI for failover routing to another PSAP, subscribe/notify for call overflow management, and publish/notify for call taker status management. We also improved the back-to-back user agent called psapd, which implements call management and distribution within a PSAP. A demo was presented at ACM SIGCOMM 2008. See [3].

2005 ~ 2007 **Next Generation 9-1-1 development.**
Initially started as a summer student project, work on Next Generation 9-1-1 continued primarily as a development project. We modified the existing prototype and implemented many features required by the National Emergency Number Association for 9-1-1 systems such as location determination, delivery, and display, location-based routing, language-based call distribution, conferencing, and a few extra non-requirements such as interactive voice response in case of "flash crowd" calls about the same incident. Some of the results were published in [2].

Work Experience

Programmer Great Human Software, Korea

2000 ~ 2003 **Development of web collaboration server for call centers.**
Developed a server to facilitate web collaboration between caller and call takers, and managed its testing, customization, and deployment in five call centers including banks and insurance companies.

Teaching Experience

Instructor

Spring 2010*	W4140	Networking Laboratory	Columbia University
Fall 2009*	W1003	Introduction to CS and Programming in C	Columbia University
Spring 2009	W4140	Networking Laboratory	Columbia University

* : appointed as preceptor

Teaching Assistant

Spring 2008	W4140	Networking Laboratory	Columbia University
Fall 2007	W4119	Computer Networks	Columbia University

Honors and Awards

2001 IR52 Jang Young Shil Award Minister of Science and Technology, Korea
For taking part in development of NAT traversing Voice over IP solution

Refereed Publications

[1] Wonsang Song, Jong Yul Kim, Henning Schulzrinne, Piotr Boni, Michael Armstrong. Using IM and SMS for Emergency Text Communications. In *Principles, Systems, and Applications of IP Telecommunications (IPTComm '09)*, July 2009, Atlanta, GA.

[2] Jong Yul Kim, Wonsang Song, Henning Schulzrinne. An Enhanced VoIP Emergency Services Prototype. In *Information Systems for Crisis Response and Management (ISCRAM '06)*. May 2006. Newark, NJ.

Conference Demo Sessions

[3] Jong Yul Kim, Wonsang Song, Henning Schulzrinne. The Next Generation 9-1-1 Proof-Of-Concept System. ACM SIGCOMM '08. August 2008. Seattle, WA.

Other Publications

Internet Drafts

[4] Jong Yul Kim, Wonsang Song, Henning Schulzrinne, Piotr Boni, Michael Armstrong. Emergency Text Messaging using SIP MESSAGE. draft-kim-ecrit-text-00 (work-in-progress), November 2009.