

## **JOON-MYUNG KANG**

Hewlett Packard Labs. 1501 Page Mill Rd. Palo Alto, CA, 94304, USA

### **EDUCATION**

Ph.D., Computer Science and Engineering, POSTECH, South Korea, February 2011

B.Sc., Computer Science and Engineering, POSTECH, South Korea, February 2005

### **RESEARCH INTERESTS**

Network and System Management including Software-Defined Infrastructure and Networking, Cloud Data Center, Internet of Things, Network Function Virtualization

### **AWARDS**

Best Paper Award in TridentCom 2014 (May 2014)

Award of the Canadian Post-Doctoral Research Fellowship, 36,500 CAD/year (2011)

National Research Scholarship from the Korea government, 12,000K KRW/year (2009)

Best Paper Award in APNOMS 2011 (September 2011)

Best Paper Award in CNS'11 (April 2011)

### **PROFESSIONAL EXPERIENCE**

Senior Research Engineer at Hewlett Packard Labs, Palo Alto, CA (May 2016–Present)

- Network policy graph abstraction and troubleshooting for cloud/SDN/NFV
- Label management for intent-driven networking (OpenStack, OpenDaylight, ONF)
- Policy management for IoT (HPE IoT systems)
- Dynamic Distributed Cloudified NFV solutions (HPE NFV system)

Research Engineer at Hewlett Packard Labs, Palo Alto, CA (November 2013–May 2016)

- Cloud network controller for guaranteeing performance in data center (OpenStack)
- Network policy graph abstraction for software defined networking (OpenStack and OpenDaylight)

Postdoctoral Fellow at University of Toronto (September 2011–November 2013)

- Design and Development of control and management system for converged heterogeneous resources in Software Defined Infrastructure
- Experience with integration of OpenStack and Openflow controllers

Postdoctoral Fellow at POSTECH, South Korea (March 2011–September 2011)

- Development of autonomic network management system for IP networks and mobile networks
- Mobile device management and network management
- Network simulator for heterogeneous mobile networks

Software Engineer at Alticast Corporation (January 2000–January 2004)

- Development of embedded middleware, web browser, testbed, and services for interactive TV.

Ph.D. Student at POSTECH, South Korea (March 2005–February 2011)

- Mobile device and network management system (SNMP, NetCONF, WebServices, XML, PLC)

Visiting Student at The University of Texas at Austin (October 2008–September 2009)

- Software product line, software testing

Visiting Student at University of Toronto (January 2006–February 2006)

- Autonomic mobile terminal management

## PROFESSIONAL ACTIVITIES

- Guest editor, International Journal of Network Management (IJNM), 2016
- Technical Program Committee Co-Chair of NetSoft 2016
- Technical Program Committee of APNOMS 2013, APNOMS 2015, NetSoft 2016, APNOMS 2016
- Guest reviewer, IEEE Transactions on Network and Service Management (TNSM)
- Guest reviewer, International Journal of Network Management (IJNM)
- Guest reviewer, Elsevier Computer Network
- Guest reviewer, IEEE Communications Letter
- Guest reviewer, Journal of Communications and Networks
- Guest reviewer, EURASIP Journal on Wireless Communications and Networking
- Guest reviewer, British Journal of Applied Science & Technology
- Local Chair of KNOM 2011

## SOFTWARE DEVELOPMENT PROJECTS

### **Label Management Service for Intent-driven Networking – Hewlett Packard Labs**

Developed a label management service (LMS) for constructing label namespace by capturing cloud data for enabling intent-driven networking (OpenStack Neutron extension) (Python and Django).

### **Bandwidth performance guarantee in multi-tenant data center – HP Labs**

Developed a network controller for guaranteeing minimum and maximum bandwidth for multi-tenants running on OpenStack (Neutron extension) (Python, C++, and Django).

### **Network policy abstraction – HP Labs**

Developed a frontend and backend for specifying network policy using graph model written in Python and Javascript for OpenStack and Opendaylight project.

### **Smart Applications on Virtual Infrastructure (SAVI) – University of Toronto**

Developed control and management systems for Software Defined Infrastructure using Python, Java, Web services, OpenStack, and Openflow.

### **Development of Semantic Recommender System for IPTV VOD (funded by KT) – POSTECH**

Developed a semantic-based recommender system for IPTV VoD using Java, Spring framework, and Ontology

### **Highly Manageable Network and Service Architecture for Next Generation (funded by ETRI) – POSTECH**

Developed a cognitive network management system for Smart Network in Korea Telecom using Java, Spring framework, Ontology, and SNMP

### **Self-Organizing Network Expert System (funded by Samsung) – POSTECH**

Developed a policy language and compiler for converting business level SLA, system administrators command, and device instance level commands using Java and ANTLR.

### **Network Management System for SNMP-based Military Strategy (funded by Samsung Thales) – POSTECH**

Developed an SNMP-based network management system for navy ships networks using Java EE, JBoss, JSP, and SNMP.

**Embedded Software Technology for Network Convergence Mobile Platforms – POSTECH**

Developed a management system for mobile devices based on OMA-DM standards using Java, C++, and OMA-DM.

**Implementation of Manager for Broadband Power Line Communication Network Management System (funded by KEPRI) – POSTECH**

Developed a network management system for broadband power line communication networks using Java EE, JSP, and SNMP.

**Security Injection System for the nuclear power plant – POSTECH**

Developed a security injection system for the nuclear power plant using C++, Visual Studio, MFC, QT, mailslot

**SmartBox 2.0 for Satellite DTV – Alticast Corporation**

Developed MHP-compliant Set-Top-Box middleware using Java, C, and JNI for Korea, Czech Republic, and China broadcasting services.

**AltiFusion – Alticast Corporation**

Developed MHP applications test software using Java, C, and JNI.

**AltiBrowser – Alticast Corporation**

Developed MHP 1.1 compliant embedded web browser for DTV using Java, DOM, and XML.

**Interactive services for DTV – Alticast Corporation**

Developed many Interactive DTV service using Java

**Implementation of a Hacking Simulator to Linux and Windows NT (funded by KT) – POSTECH**

Developed a hacking simulator using known hacking scripts for Solaris, Linux, and Windows NT using C and Perl.

## PUBLICATIONS

### A. International Journal Papers

1. Chaithan Prakash, Jeongkeun Lee, Yoshio Turner, **Joon-Myung Kang**, Aditya Akella, Sujata Banerjee, Charles Clark, Yadi Ma, Puneet Sharma, Ying Zhang. PGA: Using Graphs to Express and Automatically Reconcile Network Policies. *Computer Communication Review* 45(5): 29-42 (2015)
2. Jeongkeun Lee, **Joon-Myung Kang**, Chaithan Prakash, Yoshio Turner, Aditya Akella, Charles Clark, Yadi Ma, Puneet Sharma, Ying Zhang. Network Policy Whiteboarding and Composition. *Computer Communication Review* 45(5): 373-374 (2015)
3. Sin-seok Seo, **Joon-Myung Kang (Corresponding Author)**, Alberto Leon-Garcia, Yoonseon Han, and James Won-Ki Hong. Context Data Collection and Provision Harnessing Content-Centric Networking Paradigm. *International Journal of Network Management (IJNM)*, vol. 24, issue 1, pp. 48-69, 2014. (SCIE)
4. Sungsu Kim, **Joon-Myung Kang (Corresponding Author)**, Sin-seok Seo, and James Won-Ki Hong.  
A Cognitive Model based Approach for Autonomic Fault Management in Openflow Networks. *International Journal of Network Management (IJNM)*, vol. 23, issue 6, pp. 383-401, 2013. (SCIE)

5. Taesang Choi, Taeho Lee, Nodir Kodirov, Jaegi Lee, Doyeon, Kim, **Joon-Myung Kang**, Sungsu Kim, John Strassner, and James Won-Ki Hong. HiMang: Highly Manageable Network and Service Architecture for Next Generation. *Journal of Communications and Networks (JCN)*, vol. 13, no. 6, pp. 552-566, 2011. (SCI)
6. **Joon-Myung Kang**, Sin-seok Seo, and James Won-Ki Hong. Personalized Battery Lifetime Prediction for Mobile Devices based on Usage Patterns. *Journal of Computing Science and Engineering (JCSE)*, vol. 5, no. 4, pp. 338-345, 2011.
7. **Joon-Myung Kang**, John Strassner, Sin-seok Seo, James Won-Ki Hong. Autonomic Personalized Handover Decisions for Mobile Services in Heterogeneous Wireless Networks. *Computer Networks*, vol. 55, issue 7, May 16, 2011, pp. 1520-1532. (SCIE)
8. Chang-Keun Park, **Joon-Myung Kang (Corresponding Author)**, James Won-Ki Hong, Mi-Jung Choi, Yong-hun Lim, Seongho Ju, and Moon-suk Choi. Development and Testing of an SNMP-based Integrated Management System for Heterogeneous Power Line Communication Networks. *International Journal of Network Management (IJNM)*, Vol. 20, Issue 1, January/February 2010, pp. 35-55. (SCIE)
9. **Joon-Myung Kang**, Hong-Teak Ju, Mi-Jung Choi, James Won-Ki Hong, and Jun-Gu Kim. OMA-DM Based Remote Software Fault Management of Mobile Devices. *International Journal of Network Management (IJNM)*, Vol. 19, Issue 6, November/December 2009, pp. 491-511. (SCIE)
10. Jae-Jo Lee, Choong Seon Hong, **Joon-Myung Kang (Corresponding Author)**, and James Won-Ki Hong. Power line communication network trial and management in Korea. *International Journal of Network Management (IJNM)*, Vol. 13, Issue 6, November/December 2006, pp. 443-457.

#### B. International Conference Papers

1. **Joon-Myung Kang**, Jeongkeun Lee, Vasudevan Nagendra, and Sujata Banerjee LMS: Label Management Service for Intent-driven Cloud Management *2017 IFIP/IEEE International Symposium on Integrated Network Management (IM 2017)*, Lisbon, Portugal, May 8-11, 2017 (Accepted to appear)
2. Brendan Tschaen, Ying Zhang, Theophilus Benson, Sujata Banerjee, Jeongkeun Lee, **Joon-Myung Kang**. SFC-Checker: Checking the Correct Forwarding Behavior of Service Function Chaining. *2016 IEEE Conference on Network Function Virtualization and Software Defined Networks (NFV-SDN)*, November 2016 (Accepted to appear)
3. **Joon-Myung Kang**, Hadi Bannazadeh, Alberto Leon-Garcia. SDIGraph: Graph-based Management for Converged Heterogeneous Resources in SDI. *2nd IEEE Conference on Network Softwarization (NetSoft 2016)*, Seoul, Korea, 6-10, 2016, pp. 88-92.
4. Chaithan Prakash, Jeongkeun Lee, Yoshio Turner, **Joon-Myung Kang**, Aditya Akella, Sujata Banerjee, Charles Clark, Yadi Ma, Puneet Sharma, Ying Zhang. PGA: Using graphs to express and automatically reconcile network policies *ACM SIGCOMM 2015*, London, UK, August 17-21, 2015, pp. 29-42.
5. Jeongkeun Lee, **Joon-Myung Kang**, Chaithan Prakash, Sujata Banerjee, Yoshio Turner, Aditya Akella, Charles Clark, Yadi Ma, Puneet Sharma, Ying Zhang. Network Policy Whiteboarding and Composition. *ACM SIGCOMM 2015*, London, UK, 2015, pp. 373-374.
6. Jeongkeun Lee, Yoshio Turner, Myungjin Lee, Lucian Popa, Sujata Banerjee, **Joon-Myung Kang**, Puneet Sharma. Application-Driven Bandwidth Guarantees in Datacenters. *ACM SIGCOMM 2014*, Chicago, Illinois, August 17-22, 2014, pp. 467-478.
7. **Joon-Myung Kang**, Thomas Lin, Hadi Bannazadeh, and Alberto Leon-Garcia. Software Defined Infrastructure and the SAVI Testbed. *9th International Conference on Testbeds and Research Infrastructures for the Development of Networks & Communities (TRIDENTCOM 2014)*, Guangzhou, People's Republic of China, May 5-7, 2014 (Best Paper Award).

8. Mohammad Faraji, **Joon-Myung Kang**, Hadi Bannazadeh, and Alberto Leon-Garcia. Identity Access Management for Multi-tier Cloud Infrastructures *IEEE/IFIP Network Operations and Management Symposium (NOMS 2014)*, Krakow, Poland, May 5-9, 2014.
9. Thomas Lin, Joon-Myung Kang, Hadi Bannazadeh, and Alberto Leon-Garcia. Enabling SDN Applications on Software-Defined Infrastructure. *IEEE/IFIP Network Operations and Management Symposium (NOMS 2014)*, Krakow, Poland, May 5-9, 2014.
10. Yoonseon Han, **Joon-Myung Kang**, Sin-seok Seo, James Won-Ki Hong. An Energy Efficient User Context Collection Method for Smartphones *15th Asia-Pacific Network Operations and Management Symposium (APNOMS 2013)*, Hiroshima, Japan, September 25-27, 2013.
11. Sin-seok Seo, **Joon-Myung Kang**, Yoonseon Han, James Won-Ki Hong. Analysis and Performance Evaluation of Data Transport Methods in Content-Centric Networking *15th Asia-Pacific Network Operations and Management Symposium (APNOMS 2013)*, Hiroshima, Japan, September 25-27, 2013.
12. **Joon-Myung Kang**, Hadi Bannazadeh, Hesam Rahimi, Thomas Lin, Mohammad Faraji, and Alberto Leon-Garcia. Software-Defined Infrastructure and the Future Central Office *IEEE International Conference on Communications 2013: IEEE ICC'13 - 2nd Workshop on Clouds, Networks and Data Centers - A holistic approach towards an integrated service provider infrastructure (CNDC 2013)*, Budapest, Hungary, June 9-13, 2013.
13. Sin-seok Seo, **Joon-Myung Kang**, Alberto Leon-Garcia, Yoonseon Han, and James Won-Ki Hong. Secure and Efficient Context Data Collection using Content-Centric Networking *IEEE International Conference on Communications 2013: IEEE ICC'13 - 3rd IEEE International Workshop on Smart Communication Protocols and Algorithms (SCPA 2013)*, Budapest, Hungary, June 9-13, 2013.
14. **Joon-Myung Kang**, Hadi Bannazadeh, and Alberto Leon-Garcia. SAVI Testbed: Control and Management of Converged Virtual ICT Resources *IFIP/IEEE International Symposium on Integrated Network Management (IM 2013)*, Ghent, Belgium, May 27-31, 2013.
15. Sungsu Kim, Sin-seok Seo, **Joon-Myung Kang**, and James Won-Ki Hong. Autonomic Fault Management based on Cognitive Control Loops *IFIP/IEEE International Workshop on Management of the Future Internet (ManFI 2012)*, Maui, Hawaii, USA, 16-20 April 2012, pp. 1104-1110.
16. **Joon-Myung Kang**, Sin-seok Seo, and James Won-Ki Hong. Usage Pattern Analysis of Smartphones. *13th Asia-Pacific Network Operations and Management Symposium (APNOMS 2011)*, Taiwan, Taipei, Sep. 21-23, 2011, pp. 1-8 (Best Paper Award)
17. **Joon-Myung Kang** and James Won-Ki Hong. Autonomic Management for Personalized Handover Decisions in Heterogeneous Wireless Networks. *5th International Conference on Autonomous Infrastructure, Management and Security (AIMS 2011)*, PhD student workshop, Nancy, France, June 13-17, 2011.
18. Sin-seok Seo, Arum Kwon, **Joon-Myung Kang**, John Strassner, and James Won-Ki Hong. PYP: Design and Implementation of a Context-Aware Configuration Manager for Smartphones *1st International Workshop on Smart Mobile Applications (SmartApps'11)*, San Francisco, CA, USA, June 12-15, 2011.
19. **Joon-Myung Kang**, Sin-seok Seo, John Strassner, James Won-Ki Hong. HMNTool-Suite: Tool Support for Mobility Management of Mobile Devices in Heterogeneous Mobile Networks *14th Communications and Networking Simulation Symposium (CNS'11)*, Boston, MA, USA, April 4-7, 2011. (Best Paper Award)
20. Sin-seok Seo, Arum Kwon, **Joon-Myung Kang**, and James Won-Ki Hong. OSLAM: Towards Ontology-based SLA Management for IPTV Services *IFIP/IEEE International Workshop on Management of the Future Internet (ManFI 2011)*, Dublin, Ireland, May. 2011.

21. Sin-seok Seo, **Joon-Myung Kang**, Nazim Agoulmine, John Strassner, and James Won-Ki Hong. FAST: A Fuzzy-based Adaptive Scheduling Technique for IEEE 802.16 Networks. *IFIP/IEEE International Symposium on Integrated Network Management (IM 2011)*, Dublin, Ireland, May. 2011.
22. Arum Kwon, **Joon-Myung Kang**, Sin-seok Seo, Sung-Su Kim, Jae Yoon Chung, John Strassner and Jame Won-Ki Hong. The Design of a Quality of Experience Model for Providing High Quality Multimedia Services *The 5th IEEE International Workshop on Modelling Autonomic Communication Environments (MACE 2010)* Niagara Falls, Canada, Oct. 2010, pp. 24-36.
23. **Joon-Myung Kang**, Chang-Keun Park, Sin-Seok Seo, Mi-Jung Choi, and Jame Won-Ki Hong. User-Centric Prediction for Battery Lifetime of Mobile Devices. *11th Asia-Pacific Network Operations and Management Symposium (APNOMS 2008)*, LNCS 5297, Beijing, China, Oct. 2008, pp. 531-534.
24. Chang-Keun Park, **Joon-Myung Kang**, Mi-Jung Choi, James Won-Ki Hong, Yong-Hun Lim, and Seong-Ho Ju. Definition of Common PLC MIB and Design of MIB Mapper for Multi-vendor PLC Network Management, *IEEE International Symposium on Power Line Communications and its Applications (ISPLC 2008)*, Jeju Island, Korea, April 2-4, 2008, pp. 152-157.
25. Chang-Keun Park, **Joon-Myung Kang**, Mi-Jung Choi, James Won-Ki Hong, Yong-Hun Lim, and Munseok Choi. An Integrated Network Management System for Multi-Vendor Power Line Communication Networks. *The International Conference on Information Networking 2008 (ICOIN 2008)*, Busan, Korea, January 23-25, 2008.
26. **Joon-Myung Kang**, Hong-Teak Ju, Mi-Jung Choi, and James Won-Ki Hong. OMA DM Based Remote RF Signal Monitoring of Mobile Devices for QoS Improvement. *10th IFIP/IEEE International Conference on Management of Multimedia and Mobile Networks and Services (MMNS 2007)*, LNCS 4787, San Jose, CA, USA, Oct. 2007, pp. 76-87.
27. **Joon-Myung Kang**, Hong-Teak Ju, Mi-Jung Choi, and James Won-Ki Hong. OMA DM Based Remote Software Debugging of Mobile Devices. *10th Asia-Pacific Network Operations and Management Symposium (APNOMS 2007)*, LNCS 4773, Sapporo, Hokkaido, Japan, Oct. 2007, pp. 51-61.
28. **Joon-Myung Kang**, Chang-Keun Park, Eun-Hee Kim, James Won-Ki Hong, Yong-Hun Lim, Sungho Ju, Moonsuk Choi, Bum-Seok Lee, and Dukhwa Hyun. Design and Implementation of Network Management System for Power Line Communication Network. *IEEE International Symposium on Power Line Communications and its Applications (ISPLC 2007)*, Pisa, Italy, Mar., 2007, pp. 23-28.
29. **Joon-Myung Kang**, Hong-Teak Ju, and James Won-Ki Hong. Towards Autonomic Handover Decision Management in 4G Networks. *9th IFIP/IEEE International Conference on Management of Multimedia and Mobile Networks and Services (MMNS 2006)*, LNCS 4267, Dublin, Ireland, Oct., 2006, pp. 145-157 (SCIE)

## REFERENCES

Available upon request