The 15th Asia-Pacific Network Operations and Management Symposium

# APNOMS2013

"Integrated Management of Network Virtualization"

**Final Program**

## 25-27 September 2013
International Conference Center Hiroshima

http://www.apnoms.org/2013/

August 28, 2013

To all APNOMS 2013 participants

Dear participant:

I would like to express my sincere gratitude on the occasion of the APNOMS 2013, and offer a heartfelt welcome to each and every participant who has come to Hiroshima.

As you may know, Hiroshima City is familiar worldwide as a place of peace. Peace Memorial Park, home of Hiroshima's symbol – the UNESCO world heritage site of the Atomic Bomb Dome, draws many visitors from around the world, and there is no end in sight to the offerings of flowers and paper cranes at the Cenotaph for the A-bomb Victims and the Children's Peace Monument. Holding this symposium in such a city will undoubtedly help the event to deliver a strong impression to the world, in terms of the transmission of the symposium's outcome, etc.

Hiroshima originated around 400 years ago as a castle town, and has developed as one of the pivotal cities for industry, economics, and administration in western Japan. Six rivers flow through the city, which is blessed with a warm climate and rich nature. The riverside scenery, seen from tour boats and open cafes, changes with the four seasons, and the beautiful waterfront views of the "City of Water Hiroshima" delight citizens and tourists alike.

I do hope every one of you will take the time to experience Hiroshima's rich nature and city landscape, food culture, and traditional arts, so that you may feel the full satisfaction of Hiroshima's particular type of hospitality, and share the wish for peace that is Hiroshima's lasting hope. I would be glad if everyone could feel that they would like to come back to Hiroshima again someday.

In closing, I extend my best wishes for the success and further development of APNOMS 2013, as well as for everyone's health and good luck in their endeavors.

Sincerely yours,

MATSUI Kazumi
Mayor
The City of Hiroshima

This sheet of paper is made from recycled paper cranes dedicated at the Children's Peace Monument in Peace Memorial Park.

# Contents

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# Welcome to APNOMS2013

The 15th Asia-Pacific Network Operations and Management Symposium

"Integrated Management of Network Virtualization"

25 - 27 September 2013, Hiroshima, Japan

Sponsored by       IEICE ICM, KICS KNOM
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APNOMS (Asia Pacific Network Operations and Management Symposium) has been a premier conference on network operations and management in the Asia Pacific region. APNOMS 2013 is sponsored by IEICE Technical Committee on Information Communication Management (ICM) and the KICS Committee on Korean Network Operations and Management (KNOM). APNOMS meets every year, typically during September and boasts a rich history of successes. It includes a full three-day program of keynotes, tutorials, technical sessions, innovation sessions, panel discussions, poster sessions, and exhibits that focus on managing networks that span the computing and telecommunications areas.

APNOMS 2013 is the 15th in the series, following the successful APNOMS'97 (Seoul), APNOMS'98 (Sendai), APNOMS'99 (Kyongju), APNOMS 2000 (Nara), APNOMS 2001 (Sydney), APNOMS 2002 (Jeju), APNOMS 2003 (Fukuoka), APNOMS 2005 (Okinawa), APNOMS 2006 (Busan), APNOMS 2007 (Sapporo), APNOMS 2008 (Beijing), APNOMS 2009 (Jeju), APNOMS 2011 (Taipei) and APNOMS 2012 (Seoul).

We sincerely hope that APNOMS2013 will mark another great success in APNOMS history, through mutually beneficial information exchange, and in-person communications among participants.

Finally, we would like to express our sincere thanks to all participants as well as the committee members of this symposium for their great effort to the success of APNOMS2013.

General Chair:   Makoto Takano, Ph.D. NTT-AT, Japan
Vice Co-Chairs:  Young-Woo Lee, Ph.D. KT, Korea
                 Sanwei Sun, Ph.D. CHT, Taiwan
                 Toshio Tonouchi, Ph.D. NEC, Japan

# Welcome message from TPC

This 15th APNOMS will continue to facilitate research discussion in a wide variety of network management subjects. Based on experience from previous APNOMS events, the conference attracts papers both in traditional management research as well as in recent advances in the area.

This year, we focus on the network virtualization technology and have fixed the symposium theme "Integrated Management of Network Virtualization". But, this does NOT mean that we exclude other topics.

APNOMS is happy to create sessions discussing practical research in network management, trials, case studies, and simulations. We are looking forward to seeing you in Hiroshima!

TPC Co-Chairs: Kazuhiko Kinoshita, Prof. Osaka Univ., Japan
Yoonhee Kim, Prof. Sookmyung Women's Univ., Korea
Teh-Sheng Huang, Ph.D. CHT, Taiwan

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| Jeu-Yih Jeng(Chunghwa Telecom Labs) | Rocky K. C. Chang(Department of Computing, The Hong Kong Polytechnic University) | |

# Program at a Glance

| Wednesday 25 September 2013 | | | |
|---|---|---|---|
| | Hall "Himawari" | Room "Dahlia 2" | Room "Dahlia 1" |
| 09:00 - 10:30 | **Tutorial 1**<br>Self-Localization<br>Dr. Yu-Chee Tseng | **Tutorial 2**<br>Practical measurement methodologies for locating routing failure events<br>Dr. Masafumi Watari | - |
| 10:30 - 10:45 | - | - | Coffee Break |
| 10:45 - 12:15 | **Tutorial 3**<br>A Tutorial on Smartphone Networking Technologies<br>Dr. Yongseok Park | **Tutorial 4**<br>StarBED: Wired and Wireless Network Emulation on a Large-scale Testbed<br>Dr. Razvan Beuran | - |
| 12:15 - 13:15 | Lunch | | |
| 13:15 - 13:55 | **Welcome Address:**<br>General Chair<br>**Keynote Speech 1:**<br>Mr. Yasuyoshi Katayama | - | - |
| 13:55 - 14:25 | - | - | **Poster Session 1 & Coffee Break** |
| 14:25 - 16:05 | **Technical Session 1** | **Technical Session 2** | - |
| 16:05 - 16:35 | - | - | **Poster Session 1 & Coffee Break** |
| 16:35 - 18:15 | **Technical Session 3** | **Innovation Session 1** | - |

Note: The "Exhibition Preparation" cell spans rows 10:30–13:15 and "Exhibition Demos" spans rows 13:55–18:15 in the rightmost column.

| Thursday 26 September 2013 | | | |
|---|---|---|---|
| | Hall "Himawari" | Room "Dahlia 2" | Room "Dahlia 1" |
| 09:00 - 10:00 | **Keynote Speech 2 :** Mr. Nik Willetts **Keynote Speech 3 :** Dr. Yuan-Kuang Tu | - | - |
| 10:00 - 10:30 | - | - | **Poster Session 2 & Coffee Break** |
| 10:30 - 12:10 | **Technical Session 4** | **Technical Session 5** | - |
| 12:10 - 13:10 | Lunch | | |
| 13:10 - 14:50 | **Technical Session 6** | **Special Session 1** | - |
| 14:50 - 15:20 | - | - | **Poster Session 2 & Coffee Break** |
| 15:20 - 17:00 | **Technical Session 7** | **Innovation Session 2** | - |
| 17:20 - 18:20 | - | - | - |
| 19:00 - 21:00 | **Symposium Banquet @ Rihga Royal Hotel Hiroshima** | | |

Note: The "Exhibition Demos" cell spans the 10:00–17:00 rows in the Room "Dahlia 1" column, and "Exhibition Tour (for all attendees)" appears in the 17:20–18:20 row of the Room "Dahlia 1" column.

# APNOMS2013

| Friday 27 September 2013 | | | |
|---|---|---|---|
| | Hall "Himawari" | Room "Dahlia 2" | Room "Dahlia 1" |
| 09:00 - 10:00 | **Keynote Speech 4 :** Dr. Doug Zuckerman **Keynote Speech 5 :** Dr. James W. Hong | - | - |
| 10:00 - 10:30 | - | - | **Poster Session 3 & Coffee Break** |
| 10:30 - 12:10 | **Technical Session 8** | **Special Session 2** | - |
| 12:10 - 13:10 | Lunch | | **Exhibition Demos** |
| 13:10 - 14:50 | **Technical Session 9** | **Innovation Session 3** | - |
| 14:50 - 15:20 | - | - | **Poster Session 3 & Coffee Break** |
| 15:20 - 17:20 | **Distinguished Expert Panel** | - | - |
| 17:20 - 17:35 | **Best Paper Award and Closing Remark** | - | - |

In addition to the above technical program, several committee meetings are held during APNOMS2013:

- APNOMS2013 Pre OC meeting: Tuesday 17:00 - 18:00 (Room: Kaiun-1)
- IEICE ICM Technical committee Meeting: Thursday 12:15 - 13:10 (Room:between Dahlia 1 and Dahlia 2)
- IEICE ICM and TMF Joint meeting: Thursday 13:30 - 14:30 (Room: between Dahlia 1 and Dahlia 2)
- KT and TMF Joint meeting: Thursday 15:00 - 16:00 (Room: between Dahlia 1 and Dahlia 2)
- CHT and TMF Joint meeing: Thursday 16:00 - 17:00 (Room: between Dahlia 1 and Dahlia 2)
- APNOMS2013 Wrap up OC meeting: Friday 17:40 - 18:00 (Room: Himawari)

# Keynotes

**Keynote 1: 25 September 13:25-13:55**

## Trend of Telecommunications service in Japan

### Yasuyoshi Katayama, Representative Director and Senior Executive Vice President NTT

Yasuyoshi Katayama joined Nippon Telegraph and Telephone Public Corporation in April 1976.

In June 2004, he became a Senior Vice President and Executive Manager of the Fundamental Services Department, Fundamental Services Promotion Headquarters, and an Executive Manager of the Plant Planning Department of NTT West.

In July 2006, he became a Senior Vice President and General Manager of Networks of NTT West.

In June 2008, he became a Senior Vice President, Director of the Technology Planning Department and Director of the Next Generation Network Office, Technology Planning Department of NTT.

In June 2009, he became an Executive Vice President, Director of the Technology Planning Department and in June 2012, he was elected to his current position of Senior Executive Vice President of NTT.

**Keynote 2: 26 September 9:00-9:30**

## Open Digital: The Digital Services Opportunity Explored

### Nik Willetts, Chief Strategy Officer, TM Forum

Nik Willetts is Chief Strategy Officer for TM Forum.

In this capacity, Nik is responsible for driving the Forum's success and value-delivery across a broad range of competencies, including TM Forum's unique Digital Services Initiative which focuses on helping service providers overcome the challenges of managing complex digital services and enabling an open, vibrant digital economy.

Nik is a frequent speaker and moderator at TM Forum's conferences and events.

Most recently, Global Telecoms Business named him to their Top 40 under 40 as one of the most exciting young leaders in the communications industry for 2013.

**Keynote 3: 26 September 9:30-10:00**

## The Opportunity of SDN from Operator's Perspective

### Yuan-Kuang Tu, President of Northern Taiwan Business Group of Chunghwa Telecom (CHT)

Dr. Yuan-Kuang Tu serves as the President of Northern Taiwan Business Group of Chunghwa Telecom (CHT), in charge of the fixed-line telephony, broadband, and IPTV services.

He joined Telecommunication Laboratories (TL) in 1981, engaged in various R&D and project management positions.

He served as Vice President of TL, Senior Managing Director of the Corporate Planning Department of CHT, and President of TL.

Dr. Tu received his B.S., M.S. and Ph. D degrees in Electrical Engineering from National Taiwan University in 1977, 1979, and 1988, respectively.

His professional fields include photonics, optical communications, access networks, broadband networks, and network evolution architectures.

He served as the General Co-Chair for APNOMS 2011.

**Keynote 4: 27 September 9:00-9:30**

## Cloud Computing and the IEEE

### Doug Zuckerman, Applied Communication Sciences (Telcordia)

Douglas N. Zuckerman received his B.S., M.S. and Eng.Sc.D degrees in Electrical Engineering from Columbia University (USA) in 1969, 1971 and 1976, and is an IEEE Life Fellow.

His over 30 years of experience, mainly at Bell Labs and Telcordia Technologies, span the operations, management and engineering of emerging network technologies and services. He is currently on the IEEE Board of Directors as the Division III (Communications Technology) Director. He was the IEEE Communications Society President in 2008-9.

His technical career included long-haul millimeter waveguide studies (before fiber), satellite systems engineering, maintenance engineering for the world's first digital transmission networks, business services operations planning, and most recently IP-centric optical network interoperability. He was an early contributor to TMN standards and had chaired the Optical Internetworking Forum's OAM&P Working Group.

For over 25 years, Doug's leadership across ComSoc's technical committees, conferences, publications, chapters and Society governance has maintained focus on member interests worldwide, especially making relevant technical information widely and quickly available on line and in conferences, and encouraging more member interaction in the technical committees. He co-founded technical committees on Network Operations & Management and Enterprise Networking, as well as the IEEE Network Operations & Management Symposium (NOMS).

His sustained contributions were recognized through the Salah Aidarous Memorial Award, the Society's Donald McLellan Meritorious Service Award, its Conference Achievement Award and the IEEE Third Millennium Medal.

**Keynote 5: 27 September 9:30-10:00**

## Towards Mobile Video Traffic Bandwidth Optimization

### James W. Hong, Chief Technology Officer and Senior Executive Vice President for KT (Korea Telecom)

James Won-Ki Hong is currently the Chief Technology Officer and Senior Executive Vice President for KT (Korea Telecom), the largest telecommunications company in Korea since March 2012, where he is responsible for leading the R&D effort of KT and its subsidiary companies.

He is Chairman of National Intelligence Communication Enterprise Association, and Chairman of ICT Standardization Committee in Korea.

His interests include network innovation, such as software-defined networking (SDN) and network function virtualization (NFV), cloud computing, mobile services, IPTV, ICT convergence technologies (e.g., Smart Home, Smart Energy, Healthcare), and next generation technologies such as big data analytics and intelligence.

Before taking the role of CTO at KT, he had worked at POSTECH for 17 years as a professor including Head of Dept. of Computer Science and Engineering, Dean of Graduate School for Information Technology, Director of POSTECH Information Research Labs (PIRL) and Head of the Division of IT Convergence Engineering. He was also co-founder and CTO of Netstech, a Palo Alto, USA-based startup developing network integrated ultra-dense, blade servers from 2000 to 2002.

Over the past 20 years, James has been an active volunteer in various committees in IEEE, ComSoc, and KICS.

He has served as Steering Committee Chair of IEEE NOMS, IM and APNOMS, as well as Chair of CNOM (ComSoc Committee on Network Operations and Management) and KNOM. He has also been serving as EiC of Wiley's International Journal of Network Management (IJNM) and ComSoc Technology News (CTN) as well as an editorial member of the IEEE Transactions on Network and Service Management (TNSM), Elsevier's Journal of Network and Systems Management (JNSM) and Journal of Communications and Networks (JCN).

James received his HBSc and MSc degrees in Computer Science from the University of Western Ontario, Canada in 1983 and 1985, respectively, and the Ph.D degree in Computer Science from the University of Waterloo, Canada in 1991.

# Distinguished Experts Panel

**DEP Session: Friday, Sept. 27, 2013, 15:20~17:20**

| Panel Chair | Shingo Ata (Osaka City University, Japan) |
| --- | --- |

Shingo Ata received M.E. and Ph.D. degrees in Informatics and Mathematical Science from Osaka University in 1998 and 2000, respectively. From 2003 to 2006, he was a Lecturer of Graduate School of Enginnering at Osaka City University, and was an Associate Professor from 2006 to 2013. Currently he is a Professor of Graduate School of Engineering at Osaka City University. His research works include networking architecture, design of communication protocols, and performance modeling on communication networks. He is a member of IEEE and IEICE.

| Panelist | Doug Zuckerman (Applied Communication Sciences (Telcordia)) |
| --- | --- |

Douglas N. Zuckerman received his B.S., M.S. and Eng.Sc.D degrees in Electrical Engineering from Columbia University (USA) in 1969, 1971 and 1976, and is an IEEE Life Fellow.

His over 30 years of experience, mainly at Bell Labs and Telcordia Technologies, span the operations, management and engineering of emerging network technologies and services. He is currently on the IEEE Board of Directors as the Division III (Communications Technology) Director. He was the IEEE Communications Society President in 2008-9.

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For over 25 years, Doug's leadership across ComSoc's technical committees, conferences, publications, chapters and Society governance has maintained focus on member interests worldwide, especially making relevant technical information widely and quickly available on line and in conferences, and encouraging more member interaction in the technical committees. He co-founded technical committees on Network Operations & Management and Enterprise Networking, as well as the IEEE Network Operations & Management Symposium (NOMS).

His sustained contributions were recognized through the Salah Aidarous Memorial Award, the Society's Donald McLellan Meritorious Service Award, its Conference Achievement Award and the IEEE Third Millennium Medal.

| Panelist | Prof. Akihiro Nakao (The University of Tokyo) |
| --- | --- |

Dr. Akihiro NAKAO received B.S.(1991) in Physics, M.E.(1994) in Information Engineering from the University of Tokyo.

He was at IBM Yamato Laboratory / at Tokyo Research Laboratory / at IBM Texas Austin from 1994 till 2005.

He received M.S.(2001) and Ph.D.(2005) in Computer Science from Princeton University.

He has been teaching as an Associate Professor in Applied Computer Science, at Interfaculty Initiative in Information Studies, Graduate School of Interdisciplinary Information Studies, the University of Tokyo since 2005.

| Panelist | Dr. Byung-Deok Chung (KT AIT) |
|---|---|

Dr. Byung-Deok Chung is a vice president and the head of Smart Green Technology Department in KT AIT Convergence R&D Lab.

He is currently in charge of researching and developing the services, operations and management for a variety of energy and city related projects such as Smart Grid, Micro-Energy Grid and Smart Green City.

Since he joined KT in 1987, He has been involved in leading projects on development of large-scale Operations Support System(OSS) and solving many network and service operations issues with realization of optimal processes and support systems.

He was in charge of developing the operations and management systems for PSTN, transmission networks, Broadband Convergence Networks (BCN), Wibro networks, customer networks and home networks.

Especially, he managed the development project of NeOSS(New Operations Support System) to improve telecommunication operations process for business agility.

With NeOSS, KT was selected for the TM Forum Excellence Award titled "Best Practices Award Service Provider" in 2007.

He is now leading Energy-related Projects based on network operations and management, so as to link ICT to energy related-industries.

His research interests include Business Process Management (BPM), network/services operations & management and Smart Energy Management Systems(x-EMS) for Smart Green Home, Building, Complex and City.

| Panelist | Dr. Yu-Huang Chu(CHT) |
|---|---|

Yu-Huang Chu, Ph.D., is a project manager in the broadband network department of Telecommunication Laboratories, Chunghwa Telecom Co., Ltd.

He is responsible for SDN and IP application services networking and planning teams.

He has been involved in planning and constructing commercial multimedia on demand service networks and cloud computing data center. He specializes in researching and implementing IP and Triple-Play services.

As key accomplishment, he has successfully deployed Cloud computing Data Center, Broadband IP/MPLS network, NGN network, IPTV network. His current major work is planning smart and secure network. He's interest topics include SDN, Open flow, LISP, and Content Centric Network.

# *Special Sessions*

## Special Session 1: Heavy Traffic Control and Management
Chair : Taesang Choi (ETRI, Korea)
Date : 26 September 13:10-14:50

### Dynamic Traffic Control for Mobile and Broadband Networks from an Operator's Perspective
Mr. James(Jian-Zhi). Lyu, Network Operations Department of Chunghwa Telecom Laboratories, Taiwan

James (Jian-Zhi) Lyu received the M.S. degree in Information Engineering and Computer Science from the Feng-Chia University in 1999.

He joined CHT in 2000 and has worked on the service quality management, such as xDSL, FTTx, IPVPN, and Wi-Fi, for several years.

He is an active member of TMForum TIP working group.

In 2006, he joined the program of CHT/TL NGOSS Evolution, which successfully transformed and consolidated BSS/OSSs based on the TMF NGOSS frameworks.

He is now leading a team of network and customer services quality assurance, and developing the CQM system which can help users be aware of the latest status of service and take appropriate actions immediately.

His current research interests include Service quality management, Dynamic bandwidth management, Database tuning, System Developing and etc.

### Traffic Analytics for Heavy Traffic Control
Dr. Kohei Shiomoto, NTT, Japan

Kohei Shiomoto is Senior Manager of Communication & Traffic Service Quality Project, NTT Network Technology Laboratories, NTT, Tokyo, Japan.

He joined the Nippon Telegraph and Telephone Corporation (NTT), Tokyo, Japan in April 1989. He has been engaged in R&D of high-speed networking including ATM, IP, (G)MPLS, and IP+Optical networking in NTT labs. From August 1996 to September 1997 he was a visiting scholar at Washington University in St. Louis, MO, USA. From April 2006 to June 2011, he lead the IP Optical Networking Research Group in NTT Network Service Systems Laboratories.

He is active in standardization of GMPLS in the IETF.

Since July 2011, he has been leading the traffic engineering research group in NTT Service Integration Laboratories. Since July 2012, he has been leading Communication & Traffic Service Quality Project of NTT Network Technology Laboratories, NTT, Tokyo, Japan.

He received the B.E., M.E., and Ph.D degrees in information and computer sciences from Osaka University, Osaka in 1987 1989, and 1998, respectively.

He is a Fellow of IEICE, a member of IEEE, and ACM.

### Heavy Traffic Control and Resource Management for Carrier Networks
Dr. Peter(Choongul) Park, KT, Korea

Peter Park is Senior Researcher of Cloud Storage & Network Control Project, kt Infra Laboratory, Korea.

He joined kt Advanced Institute of Technology in February 2002 and has been engaged in R&D of OSS Projects developing Access NMS, Device Management, OSGi based Home Service Management, Smart Network Management in kt. Since 2011, he has participated in developing ITU-T Smart Ubiquitous Network (SUN) related recommendations as an editor, and completed his work on recommendations of Y.3041(SUN-overview) and Y.3042(Traffic Resource Control and Management Functions).

His current interest is Cloud Storage and Network, specifically developing open stack extension including swift, quantum.

He received his Bachelor's degree in Computer Engineering from Pusan National University in 2001, Mater's degree and Ph.D from Chungnam National University 2008 and 2013, respectively.

## Special Session 2: Software-Defined Network Management
Chair : Yuji Nomura (Fujitsu Laboratories, Japan)
Date : 27 September 10:30-12:10

### Software-Defined Networking (SDN) and Network Functions Virtualization (NFV) and Beyond
Prof. Akihiro Nakao, The University of Tokyo, Japan

Dr. Akihiro NAKAO received B.S.(1991) in Physics, M.E.(1994) in Information Engineering from the University of Tokyo.

He was at IBM Yamato Laboratory / at Tokyo Research Laboratory / at IBM Texas Austin from 1994 till 2005.

He received M.S.(2001) and Ph.D.(2005) in Computer Science from Princeton University.

He has been teaching as an Associate Professor in Applied Computer Science, at Interfaculty Initiative in Information Studies, Graduate School of Interdisciplinary Information Studies, the University of Tokyo since 2005.

### SDN architecture and service trend
Dr. Yu-Huang Chu, Chunghwa Telecommunication Labs, Taiwan

Yu-Huang Chu, Ph.D., is a project manager in the broadband network department of Telecommunication Laboratories, Chunghwa Telecom Co., Ltd.

He is responsible for SDN and IP application services networking and planning teams.

He has been involved in planning and constructing commercial multimedia on demand service networks and cloud computing data center.

He specializes in researching and implementing IP and Triple-Play services.

As key accomplishment, he has successfully deployed Cloud computing Data Center, Broadband IP/MPLS network, NGN network, IPTV network.

His current major work is planning smart and secure network. He's interest topics include SDN, Open flow, LISP, and Content Centric Network.

### The Implementation of Fat-Tree Routing Algorithm through OpenFlow
Mr. Taeyeol Jeong, POSTECH, Korea

Taeyeol Jeong received the M.S. degree in Computer Science and Engineering from Pohang University of Science and Technology (POSTECH), Korea and he is currently a research staff & Ph.D. candidate in Distributed Processing and Network Management (DPNM) Laboratory, POSTECH.

He has been involved in designing and developing traffic engineering mechanisms for large-scale commercial data centers.

Recently, he has worked on the implementation of linear programming based traffic engineering, energy-aware traffic engineering and failure recovery mechanisms for SDN-enabled data centers.

His research interests include Traffic Engineering, SDN, Traffic Measurement and Content Centric Networking.

# Tutorials

**Tutorial 1: Wednesday, Sept, 25, 2013, 09:00~10:30, Hall "Himawari"**
Chair: Kiyohito Yoshihara (KDDI R&D Laboratories, Japan)

**Self-Localization**

Dr. Yu-Chee Tseng (National Chiao Tung University, Taiwan)

Indoor localization systems have attracted a lot of attention recently. Most works use wireless signals from existing infrastructures to track users' locations.

In this talk, we will discuss a new direction called "self-localization" by exploiting the ambient landmarks inside buildings, such stairs, elevators, embedded M2M, NFC, etc., to facilitate localization.

A self-localization system should be "self-content" in that it has little dependency on extra infrastructures and its sensor data fusion is "self-adaptive" in that it can adaptively choose the best data fusion algorithm for use based on external sensor inputs. We will then discuss 6 scenarios that have these "self" or "near-self" properties.

The first example discusses how to localize an object in a multi-floor environment with ambient landmarks. The second example discusses how to use body trajectory to improve location accuracy. The third example discusses how to use ambient cameras to localize vehicles on the roads. The fourth example further discusses vehicle tracking on the roads. The fifth example talks about Mobile Augmented Reality, a location-based service. The last one discusses using visible light as medium for localization.

These examples conclude that "self-localization" is very promising.

**Tutorial 2: Wednesday, Sept. 25, 2013, 09:00 ~10:30, Room "Dahlia 2"**
Chair: Hongtaek Ju (Keimyung University, Korea)

**Practical measurement methodologies for locating routing failure events**

Dr. Masafumi Watari (KDDI R&D Laboratories Inc., Japan)

This tutorial provides an introduction into practical measurement methodologies for network operations and management in intra-domain routing and inter-domain routing. The first part of the tutorial discusses methodologies for locating routing failures in ISPs.

The first methodology enables the identification of router and link failures based on passive measurement of OSPF LSA messages.

The second methodology enables the identification of congested segments based on active measurements of probe packets. The second part of the tutorial discusses a methodology for locating routing failures that occur between ISPs based on passive measurement of BGP update messages and discuss its accuracy.

Finally, the tutorial provides brief introduction into new routing work on ICN and its standardization efforts in the IETF.

**Tutorial 3: Wednesday, Sept, 25, 2013, 10:45~12:15, Hall "Himawari"**

Chair: Kiyohito Yoshihara (KDDI R&D Laboratories, Japan)

**A Tutorial on Smartphone Networking Technologies**

Dr. Yongseok Park (DMC R&D Center, Samsung Electronics, Korea)

In this talk, we will consider various networking technologies for today's smartphones. Connection management deals with selection of best network connections.

It consists of LTE/Wi-Fi connection setup, monitoring the status of the connections, and handover to another connection.

Link management provides fast discovery and easy pairing between neighboring devices. Traffic management monitors and controls traffic transmitted from/to smartphones, for the purpose of QoS, power saving, and network signaling reduction.

It may involve load-balancing of traffic flows across multiple network interfaces.

As accessories such as smart glasses and watches emerge, p2p protocols and ad-hoc networking are getting a lot of attention.

In this talk, we will present industry trends and technology advances in academics, and discuss challenges and research directions.

**Tutorial 4: Wednesday, Sept. 25, 2013, 10:45 ~12:15, Room "Dahlia 2"**

Chair: Hongtaek Ju (Keimyung University, Korea)

**StarBED: Wired and Wireless Network Emulation on a Large-scale Testbed**

Dr. Razvan Beuran (National Institute of Information and Communications Technology, Japan)

In this tutorial I shall first introduce the StarBED network testbed of the National Institute of Information and Communications Technology, Hokuriku StarBED Research Center, located in Ishikawa, Japan.

Then I shall present the main mechanisms for wired and wireless network emulation that are available on StarBED, including tools such as SpringOS and QOMET.

The second part of the tutorial will use a wireless network emulation case study to provide more details about all the steps that are necessary in order to perform such experiments on StarBED.

The talk will end with some practical information regarding the procedurethat must be followed by external parties in order to use StarBED.

# Technical Sessions

**Technical Session 1: 14:25-16:05, Wednesday 25 September 2013**

Contents-Oriented/Data-Centric Networks

Chair: Mi-Jung Choi (Kangwon National University, Korea)

| No | Title and Authors |
|---|---|
| TS1-1 | Routing Information Management for Content Oriented Networks Using Bloom Filters<br>Kenji Komatsu, Takuya Asaka (Tokyo Metropolitan University) |
| TS1-2 | Maximum Entropy Based Randomized Routing in Data-Centric Networks<br>Kenji Leibnitz, Tetsuya Shimokawa, Ferdinand Peper (NICT), Masayuki Murata (Osaka University) |
| TS1-3 | Analysis of peer cluster layers selection criteria for P2P contents distribution systems<br>Kazunori Ueda, Jun-ichi Akase, Takuya Okubo (Kochi University of Technology) |
| TS1-4 | Reception Cycle-aware Resource Block Allocation for Real Time Video Traffic in 3GPP LTE System<br>Chin Li, Jen-Yi Pan, Ming Hung Hsu (National Chung Cheng University) |

**Technical Session 2: 14:25-16:05, Wednesday 25 September 2013**

Fault Management

Chair: Teh-Sheng Huang (Chunghwa Telecom, Taiwan)

| No | Title and Authors |
|---|---|
| TS2-1 | Resource Relation Map based Fault Diagnosis and Fault Tolerance Methods for Home Network Environments<br>Jeu Young Kim, Ji Hyun Lee, Jiyeon Son, Jun Hee Park (ETRI) |
| TS2-2 | Topology-Aware Remapping to Survive Virtual Networks against Substrate Node Failures<br>Ailing Xiao, Ying Wang, Meng Luoming, Xuesong Qiu, Wenjing Li (Beijing University of Posts and Telecommunications) |
| TS2-3 | A Cell Outage Compensation Scheme based on Immune Algorithm in LTE Networks<br>Zhengxin Jiang, Yu Peng, Yulin Su, Wenjing Li, Xuesong Qiu (Beijing University of Posts and Telecommunications) |
| TS2-4 | Deployment Scheduling of Contingency Cellular Network for Disaster Relief Operations<br>Jyh-Shyan Huang (Chunghwa Telecom Laboratories), Yan-Song Wang, Yao-Nan Lien (National Chengchi University) |

**Technical Session 3: 16:35-18:15, Wednesday 25 September 2013**

QoS/SLA Management

Chair: Kazuhiko Kinoshita (Osaka University, Japan)

| No | Title and Authors |
|---|---|
| TS3-1 | Distributed Connection Admission Control Integrated with Pricing for QoS Provisioning and Revenue Maximization in Wireless Random Access Networks<br>Bo Gu, Cheng Zhang (Waseda University), Kyoko Yamori (Asahi University), Yoshiaki Tanaka (Waseda University) |
| TS3-2 | An Energy Efficient User Context Collection Method for Smartphones<br>Yoonseon Han (POSTECH), Joon-Myung Kang (University of Toronto), Sin-seok Seo (POSTECH), Ahmed Mehaoua (Paris Descartes University), James Hong (POSTECH) |
| TS3-3 | Time-Dependent Pricing for Revenue Maximization of Network Service Providers Considering Users Preference<br>Cheng Zhang, Bo Gu (Waseda University), Kyoko Yamori (Asahi University), Sugang Xu, Yoshiaki Tanaka (Waseda University) |
| TS3-4 | Efficiently Scheduling Cloud Resources for Peak or Urgent Events in Telecom System<br>Chia-Chun Shih, Chao Wen Huang (Chunghwa Telecom Laboratories) |

**Technical Session 4: 10:30-12:10, Thursday 26 September 2013**

Future Network Design

Chair: Yu-Huang Chu (Chunghwa Telecom Labs., Taiwan)

| No | Title and Authors |
|---|---|
| TS4-1 | Managing Distributed Storage System through Network Redesign<br>Tahani Hussain (Kuwait Institute for Scientific Research), Sami Habib, PaulvannaNayaki Marimuthu (Kuwait University) |
| TS4-2 | Designing Temporally and Spatially Integrated Social Mobility Models for Wireless Network Researches<br>Zhenwei Ding, Ryoichi Shinkuma, Tatsuro Takahashi (Kyoto University) |
| TS4-3 | Transformation of PSTN to Next Generation Network<br>Sheng Wang Yu, Chung-Shih Tang, Kuo Sheng Lo (Chunghwa Telecom Laboratories) |
| TS4-4 | Psychic: An Autonomic Inference Engine for M2M-IoT-Management in Future Internet<br>Rossi Kamal, Chi Hwang, Jowha Lee, Seung Moon, Choong Seon Hong (Kyung Hee University), Mi-Jung Choi (Kangwon National University) |

**Technical Session 5: 10:30-12:10, Thursday 26 September 2013**

Traffic Management

Chair: Jun Ogawa (Fujitsu, Japan)

| No | Title and Authors |
|---|---|
| TS5-1 | Correlation Analysis between Inference Accuracy and Inference Parameters for Stateless Firewall Policy<br>Hyeonwoo Kim, Wooguil Pak, Hongtaek Ju (Keimyung University) |
| TS5-2 | Performance Improvement of the Payload Signature based Traffic Classification System using application traffic temporal locality<br>Jun-Sang Park, Sung-Ho Yoon, Myung-Sup Kim (Korea University) |
| TS5-3 | Application Traffic Classification using Statistic Signature<br>HyunMin An, JaeHyun Ham, Myung-Sup Kim (Korea University) |
| TS5-4 | Traffic Modeling for IP enabled Public Safety Network<br>Tuyatsetseg Badarch (Northeastern University, on leave from National University of Mongolia), Otgonbayar Bataa (Mongolian University of Science and Technology, School of Information and Communications Technology) |

**Technical Session 6: 13:10-14:50, Thursday 26 September 2013**

Wireless Multi-hop Networks

Chair: Kwang-Hui Lee (Changwon National University, Korea)

| No | Title and Authors |
|---|---|
| TS6-1 | An Efficient and Reliable MAC for Vehicular Ad Hoc Networks<br>Duc Dang (Kyung Hee University), Ngoc Hanh Dang (Ho Chi Minh City University of Technology), Cuong T. Do, Choong Seon Hong (Kyung Hee University) |
| TS6-2 | An Improvement of OLSR Using Fuzzy Logic Based MPR selection<br>Narangerel Dashbyamba, Celimuge Wu, Satoshi Ohzahata, Toshihiko Kato (University of Electro-Communications) |
| TS6-3 | Smart Grid Technology - The case of the first town in Sejong<br>Daekyo Jung, Sungmin Rue, Yoonkee Kim (KT), Byungdeok Chung (KT Technology Laboratory) |
| TS6-4 | Application of Synchronized Multi-Hop Protocol to Time-Variable Multi-Rate and Multi-Hop Wireless Network<br>Xinru Yao, Yasushi Wakahara (University of Tokyo) |

**Technical Session 7: 15:20-17:00, Thursday 26 September 2013**

Wireless Networks

Chair: Yen-Wen Chen (National Central University, Taiwan)

| No | Title and Authors |
|---|---|
| TS7-1 | Dynamic Cooperating Set Planning for Coordinated Multi-Point (CoMP) in LTE/LTE-Advanced Systems<br>Po-Min Hsu, Jen-Jee Chen (National University of Tainan), Jia-Ming Liang (National Chiao-Tung University) |
| TS7-2 | Cognitive Rate Adaptation for High Throughput IEEE 802.11n WLANs<br>Shinnazar Seytnazarov, Young-Tak Kim (Yeungnam University) |
| TS7-3 | Resource Allocation with Multiple Channel Width in Cognitive Cellular Networks<br>Lu Wang, Zhong Zhou, Wei Wu (Beihang University) |
| TS7-4 | Comparisons of Power-saving Efficiency for QoS Traffics in LTE Network by Burst Scheduling<br>Yen-Wen Chen (National Central University), Meng-Hsien Lin (Chung-Hwa Telecom.), Yung-Ta Su, Y. S. Su (National Central University) |

**Technical Session 8: 10:30-12:10, Friday 27 September 2013**

Cloud Management

Chair: Yoonhee Kim (Sookmyung Women's University, Korea)

| No | Title and Authors |
|---|---|
| TS8-1 | A SLA driven VM Auto-Scaling Method in Hybrid Cloud Environment<br>Hyejeong Kang, Jung In Koh, Yoonhee Kim (Sookmyung Women's University), Jaegyoon Hahm (KISTI) |
| TS8-2 | A Workload Prediction-Based Multi-VM Provisioning Mechanism in Cloud Computing<br>Shengming Li, Ying Wang, Xuesong Qiu, Deyuan Wang, Lijun Wang (Beijing University of Posts and Telecommunications) |
| TS8-3 | Bandwidth Guaranteed Method to Relocate Virtual Machines for Edge Cloud Architecture<br>Konomi Mochizuki, Hirofumi Yamazaki, Akira Misawa (NTT) |
| TS8-4 | Graph Clustering based Provisioning Algorithm for Optimal Inter-Cloud Service Brokering<br>Taesang Choi, Younghwa Kim, Sunhee Yang (ETRI) |

**Technical Session 9: 13:10-14:50, Friday 27 September 2013**

Network Virtualization

Chair: Hiroshi Matsuura (NTT, Japan)

| No | Title and Authors |
|---|---|
| TS9-1 | Load Distribution of an OpenFlow Controller for Role-based Network Access Control<br>Takayuki Sasaki, Yoichi Hatano, Kentaro Sonoda, Yoichiro Morita, Hideyuki Shimonishi, Toshihiko Okamura (NEC) |
| TS9-2 | Method for visualizing information from large-scale carrier networks<br>Naoki Tateishi, Mitsuho Tahara, Naoyuki Tanji, Hikaru Seshake (NTT) |
| TS9-3 | Implementation of a Novel Management Development Platform for Virtual Networks<br>Wenyu Shen, Kenji Minato, Yukio Tsukishima, Katsuhiro Shimano (NTT) |
| TS9-4 | OSS Data Integration using Virtual Database<br>Naoki Take, Manabu Nishio, Hikaru Seshake (NTT) |

# Poster Sessions

**Poster Sessions 1: Wednesday 25 September 2013**

Chair:Takuya Asaka (Tokyo Metropolitan University, Japan)

| No | Title and Authors |
|---|---|
| P1-1 | The Design of Integrated Mobile SNS Gateway Structure<br>Shinho Lee, Insik Jung, Hyeonwoo Kim, Hongtaek Ju (Keimyung University, Korea) |
| P1-2 | Virtual Network Embedding through Multiple Topological Characteristics<br>Min Feng, Jianxin Liao, Jingyu Wang, Sude Qing, Qi Qi (Beijing University of Posts and Telecommunications, China) |
| P1-3 | A Shortest Path Based Automatic Composition Method of Semantic Web Services<br>Jie Yang, Wang Zhili, Kan Chen (Beijing University of Posts and Telecommunications, China) |
| P1-4 | A New Digital Convergence Technique in BSS - A Case Study of Integrated Telecom Order System<br>Chiao-Yi Wang, Chun-Chen Chang, Chih-Ying Liu, Ginn-Feng Liu (Chunghwa Telecom Laboratories, Taiwan) |
| P1-5 | IDS for Detecting Malicious Non-Executable Files Using Dynamic Analysis<br>Ahmad Bazzi, Yoshikuni Onozato (Gunma University, Japan) |
| P1-6 | An Efficient Method to Maintain the Header Signature for Internet Traffic Identification<br>Sung-Ho Yoon, Myung-Sup Kim (Korea University, Korea) |
| P1-7 | Towards Automatic Signature Generation for Identification of HTTP-based Applications<br>Hwan-Hee Kim, Mi-Jung Choi (Kangwon National University, Korea) |
| P1-8 | A Novel Network-Centric Infrastructure for Social Networking Services using a Messaging Network<br>Takafumi Hayashi, Hideyuki Fukuhara, Yasuhiro Abe, Masayuki Hisada, Jiro Yamazaki, Hajime Tokura (University of Aizu, Japan) |
| P1-9 | Experiments with Practical On-Demand Multi-Core Packet Capture<br>Marat Zhanikeev (Kyushu Institute of Technology, Japan) |
| P1-10 | An IPv6-Enabled Software-Defined Networking Architecture<br>Chia-Wei Tseng (Chungwha Telecom Laboratories, Taiwan), Yao-Tsung Yang (Chungwa Telecom / National Central University, Taiwan), Li-Der Chou (National Central University, Taiwan) |
| P1-11 | A Sever-assisted Provisioning Method for Machine-to-Machine Gateway<br>Masaharu Hattori, Hikaru Yagi, Kiyohito Yoshihara (KDDI R&D Laboratories Inc., Japan) |
| P1-12 | The Improvement of Auto-Scaling Mechanism for Distributed Database a case study for MongoDB<br>Chao Wen Huang, Chia-Chun Shih (Chunghwa Telecom Laboratories, Taiwan), Wan-Hsun Hu (CHT-TL, Taiwan), Bo Ting Lin, Chien-Wei Cheng (Chunghwa Telcom Laboratories, Taiwan) |
| P1-13 | A Successful Application of Big Data Storage Techniques Implemented to Criminal Investigation for Telecom<br>Ju-Chi Tseng, Hsin-Cheng Tseng, Chih-Wei Liu, Chia-Chun Shih, Kuo-Yu Tseng, Cheng-Yu Chou (Chunghwa Telcom Laboratories, Taiwan) |
| P1-14 | A No-reference Hybrid Objective QoE Evaluation for MPEG-4 Encoded Video<br>Fan Liu, Yang Geng, Jichun Liu, Wenjing Li, Xuesong Qiu (Beijing University of Posts and Telecommunications, China) |
| P1-15 | Error Analysis of An Estimation Method Using RTT for Available Bandwidth of A Bottleneck Link<br>Masaharu Imai (Network Value Components Ltd., Japan), Takayuki Ozawa, Yoshio Sugizaki, Koichi Asatani (Kogakuin University, Japan) |

**Poster Sessions 2: Tuesday 26 September 2013**

Chair: Takuya Asaka (Tokyo Metropolitan University, Japan)

| No | Title and Authors |
|---|---|
| P2-1 | Hierarchical Resource Management System on Network Virtualization Platform for Reduction of Virtual Network Embedding Calculation<br>Yohei Katayama, Kazuhisa Yamada, Katsuhiro Shimano (NTT, Japan), Akihiro Nakao (The University of Tokyo, Japan) |
| P2-2 | Self-organizing Energy-Saving Mechanism with Base Stations Cooperation for Heterogeneous Cellular Networks<br>Zi fan Li, Yu Peng, Wenjing Li, Xuesong Qiu (Beijing University of Posts and Telecommunications, China) |
| P2-3 | Services Paths Planning for Electric Power Communication Network Based on Improved Ant Colony Optimization<br>Qian Han, Qi Feng, Yulin Su, Qi Li, Xuesong Qiu (Beijing University of Posts and Telecommunication, China) |
| P2-4 | Virtual machine placement algorithms to minimize physical machine count<br>Satoru Ohta (Toyama Prefectural University) |
| P2-5 | Calibration of DNS Delegation Misleading<br>Zheng Wang (China Organizational Name Administration Center) |
| P2-6 | Integrating Legacy Forwarding Environment to OpenFlow/SDN Control Plane<br>Fernando Farias, Joao Julio Salvatti, Pedro Victor, Antonio Abelem (Universidade Federal do Para, Brazil) |
| P2-7 | A Ripple Form RSRP Based Algorithm for Load Balancing in Downlink LTE Self-Optimizing Network<br>Fanqin Zhou, Lei Feng, Peng Yu, Wenjing Li (Beijing University of Posts and Telecommunications, China) |
| P2-8 | Control Scenario based Energy Savings Scheme on SG-BEMS<br>BongGyu Koo, Byungdeok Chung, ChiYoung Jang, Kyung-Gyu Park (KT, Korea) |
| P2-9 | Analysis and Performance Evaluation of Data Transport Methods in Content-Centric Networking<br>Sin-seok Seo (POSTECH, Korea), Joon-Myung Kang (University of Toronto, Canada), Yoonseon Han, James Hong (POSTECH, Korea) |
| P2-10 | Impact Analysis of the ONE Adapter on the Business of IP/MPLS and Transport Service Providers<br>Mohammad Hassan Ahmad Osmani, Jorn Altmann (Seoul National University, Korea) |
| P2-11 | Randomized Interconnection Networks in Clouds<br>Hung-Chang Hsiao (National Cheng Kung University), Yu-Chang Chao, Cheng-Lung Chu (Industrial Technology Research Institute, Taiwan) |
| P2-12 | Processing Speed Improvement of Traffic Classification based on Payload Signature Hierarchy<br>Jihyeok Choi, Myung-Sup Kim (Korea University, Korea) |
| P2-13 | Multi-Cloud Service Fulfillment Architecture for Enabling Digital Rain Forest<br>Dah-Sheng Lee, Wei-Te Sung, (Chunghwa Telecom Laboratories, Taiwan), Shuang-Mei Wang (Chunghwa Telecom, Taiwan), Jin-Yuan Shun (CHT-TL, Taiwan) |
| P2-14 | Topology Construction Method for Multi-overlay Sensor Networks<br>Kajimoto Shuhei, Takuya Asaka (Tokyo Metropolitan University, Japan) |
| P2-15 | A Cost-effective Approach to evaluating Security Vulnerability Scanner<br>Yuan-Hsin Tung (ChungHwa Telecom, Taiwan), Shian-Shyong Tseng (Asia University, Taiwan), Jen-Feng Shih, Hwai-Ling Shan (Chunghwa Telecom Laboratories, Taiwan) |
| P2-16 | A Best Practice of Enterprise Information Integration Platform in Telecom Industry<br>JuTing Teng (CHT-TL, Taiwan) |
| P2-17 | Effectiveness of Performance Flag Selection for Enhancing the Tor Circuit<br>Kale Girry, Satoshi Ohzahata, Celimuge Wu, Toshihiko Kato (The University of Electro-Communications, Japan) |

**Poster Sessions 3: Friday 27 September 2013**

Chair: Takuya Asaka (Tokyo Metropolitan University, Japan)

| No | Title and Authors |
|---|---|
| P3-1 | Design and Develop an OpenFlow Testbed within Virtualized Architecture<br>Pang-wei Tsai, Yu-ting Lai, Pei-wen Cheng, Mon-Yen Luo, Chu-Sing Yang (National Cheng Kung University, Taiwan) |
| P3-2 | A MAC address base authentication system applicable to campus-scale network<br>Yoshiaki Watanabe (Saga University, Japan) |
| P3-3 | Pricing Reserved and On-Demand Schemes of Cloud Computing Based on Option Pricing Model<br>Deyuan Wang, Ying Wang, Jichun Liu, Ke Xiao, Wenjing Li, Xuesong Qiu (Beijing University of Posts and Telecommunications, China) |
| P3-4 | End-to-End Path Loss Inference Algorithm with Network Tomography<br>Xiangyu Cao, Ying Wang, Xuesong Qiu, Meng Luoming (Beijing University of Posts and Telecommunications, China) |
| P3-5 | Theil-Equilibrium based Cooperation Mechanism for Multi-Services in Ubiquitous Stub Environments<br>Nan Mu, LanLan Rui, Shaoyong Guo, Xuesong Qiu, (Beijing University of Posts and Telecommunications, China) |
| P3-6 | NA-LAR : NAV Based Load Aware Routing Protocol for Wireless Mesh Networks<br>Insoo Lee, DoHyeun Kim, SeungHo Lee, ChiYoung Jang (KT, Korea) |
| P3-7 | A Dynamic Network Access Control Mechanism for Virtual Desktop Environment<br>Jhih-Yan Lin, Chu-Chuan Lee, Chao-Chun Yen, Shih-Chun Hsu, Cheng-Hung Hsieh, Chun-Hao Lin (Chunghwa Telecom Laboratories, Taiwan) |
| P3-8 | A M2M Horizontal Services Platform Implementation over IP Multimedia Subsystem (IMS)<br>Jhon Villarreal Padilla, Jae-Oh Lee, Jung Ho Kim (Korea University of Technology and Education, Korea) |
| P3-9 | Fast Overlapping Algebraic Traceback<br>Dung Ngo, Choong Seon Hong (Kyung Hee University, Korea) |
| P3-10 | A risk recommendation approach for information security risk assessment<br>Ya-chi Chu, Yu-Chih Wei, Wen-Hsuan Chang (Chunghwa Telecom Laboratories, Taiwan) |
| P3-11 | Service rate test mechanism and management of broadband access network<br>Wen-Che Yang, Jhih-Dao Jhan, Dong-Yie Chen, Kuo-Hsiang Lai, Rong-Ruey Lee (Chunghwa Telecom Laboratories, Taiwan) |
| P3-12 | A Distributed Energy Saving Mechanism in Wireless Access Network<br>Yulin Su, Yu Peng, Zhengxin Jiang, Wenjing Li, Xuesong Qiu (Beijing University of Posts and Telecommunications, China) |
| P3-13 | A Prototype of Service Platform Uniting Network Control in Multiple OpenFlow Domains<br>Yuya Inoue, Yusuke Hirota, Kazuhiko Kinoshita (Osaka University, Japan), Hideki Tode (Osaka Prefecture University, Japan), Koso Murakami (Osaka University, Japan) |
| P3-14 | A Design of Energy-efficient Resource Sharing Overlay Network in Mobile Cloud Computing<br>Wei Liu, Ryoichi Shinkuma, Tatsuro Takahashi (Kyoto University, Japan) |
| P3-15 | Short Message Service for Internet-Mobile Platform<br>Yingrong Sung, Jui-Feng Sung (National Chiao Tung University, China) |
| P3-16 | Application Layer Network Measurement for Usage-based Pricing in SDN<br>Hamid Farhadi, Akihiro Nakao (The University of Tokyo, Japan) |
| P3-17 | A Tiering Architecture for Integrated Network Management System<br>Seongbok Baik (KT Network Laboratory, Korea) |

# Innovation Sessions

**Innovation Session 1: 16:35-17:55, Wednesday 25 September 2013**

Data Center and Service Management

Chair: Kiyohito Yoshihara (KDDI R&D Laboratories, Japan)

| No | Title and Authors |
| --- | --- |
| I1-1 | An Integrated Methodology for Data Center Centralized Management<br>Teng Che-Chun, Yueh-Hsien Lin, Kai-Sheng Hsu (Chunghwa Telecom, Taiwan) |
| I1-2 | Management Functions for Green Data Centers<br>Jaebong Lee (KT, Korea) |
| I1-3 | Discussion in On-Demand Service Provisioning for Future Carrier Network<br>Hiroyuki Kubo (Hitachi, Japan) |
| I1-4 | Media Delivery Architecture on Cloud and Cost Effectiveness Analysis<br>Ki-Man Choi, Yoo-Hee Cho, Kisang Ok, Kitae Jeon (KT, Korea) |

**Innovation Session 2: 15:20-17:00, Thursday 26 September 2013**

Traffic and Service Management

Chair: Kazunori Ueda (Kochi University of Technology, Japan)

| No | Title and Authors |
| --- | --- |
| I2-1 | Congestion-aware Dynamic Sender Switching in HTTP Adaptive Bitrate Video Streaming System<br>Eiji Takahashi, Takahiro Shiroshima (NEC, Japan) |
| I2-2 | An Adaptive Packet Discard Method for P2P Traffic Localization<br>Koki Mizutani, Yuki Shinozaki, Hiep Hoang, Takumi Miyoshi (Shibaura Institute of Technology, Japan) |
| I2-3 | Effect of Group-of-Picture Size to Quality of Experience on P2PTV<br>Huong Pham, Takumi Miyoshi (Shibaura Institute of Technology, Japan) |
| I2-4 | An Application for QoE Measurement of Mobile Communication Speed<br>Homare Kawashima, Takumi Miyoshi (Shibaura Institute of Technology, Japan) |
| I2-5 | Urban traffic Prediction in the Scope of Intelligent Transport System<br>Zilu Liang, Yasushi Wakahara (The University of Tokyo, Japan) |

**Innovation Session 3: 13:10-14:50, Friday 27 September 2013**

Network Management

Chair: Eiji Takahashi (NEC, Japan)

| No | Title and Authors |
| --- | --- |
| I3-1 | Deployment of OSCARS Service in KREONET<br>JiHoon Hong (University of Jeju, Korea), Tae-wan Ko, Dong Seok Jang, Wang-Cheol Song (Jeju National University, Korea), Buseong Cho, Seunghae Kim (KISTI, Korea) |
| I3-2 | Order Execution Method of Element Management Systems for Managing Sub-networks<br>Yoshifumi Kato, Kimura Tatsuyuki, Yousuke Ohno (NTT, Japan) |
| I3-3 | A Labor force Perspective of Service Availability Upgrade in Optical Networks<br>Hung-Yi Chang (National Kaohsiung First University of Science and Technology, Taiwan), Pi-Chung Wang (National Chung Hsing University, Taiwan), Yu-An Chen (National Kaohsiung First University of Science and Technology, Taiwan) |
| I3-4 | A Study of Evaluating the Impacts of Cascading Failures in Telecommunications Networks<br>Hara Kazuki, Masahiro Hayashi (Tokyo City University, Japan) |
| I3-5 | Gossip-based Fault Localization for MPLS based Cloud Infrastructure Networks<br>Osamu Watanabe (Cisco Systems G.K., Japan), Keiichi Koyanagi (Waseda University, Japan) |

# Exhibitions

**E1. Chunghwa Telecom : Smart Bandwidth Management on Mobile and Broadband Networks**
**Booth number : 4**

Chunghwa Telecom (CHT) Smart Bandwidth Management (CSBM) provides a policy-based and technology neutral approach to improve network resource utilization, maximize ROI (Return on Investment) and enhance customer experience. By leveraging advantages of existing OSSs (Operation Support System) in resource and service layer, CSBM periodically collects traffic flow data, updates alarm message, analyzes latest network status, compares with service information, CSBM then reallocates network resource based on pre-assigned policies. For mobile networks of CHT, traffic congestions will be alerted in 5 minute, and bandwidth of related circuits will be increased in the next 5-minute cycle. For broadband networks which provide internet access to more than 6 million households in Taiwan, CSBM reduces network redistribution process time by 83%~95%. CSBM is a software based methodology that can work literally for different networks and technologies. With the introduction of new technologies, like PTN, OTN, MPLS…etc., CSBM also adapts itself to a broader range of new networks and copes up with the ever changing network evolution trend.

**E2. Insoft Inc. : FTMS (Fiber Termination Monitoring System)**
**Booth number : 5**

FTMS(Fiber Termination Monitoring System) is the result of Insoft Inc. laboratory and now on the beta test. It will provide inventory, fault, line number sheet, cable location edit, customer(ONT), and QR-code based asset management features for optical cables and all related equipment. It will create fault information by analyzing short circuit, extension and deterioration data of optical cables based on the distances of optical cables and various loss values measured through OTDR. It also analyzes fault/event information of equipment to enable real-time fault monitoring of optical cables through OTDR.

**E3. NTT : Visualized Intuitive recognition system by 4-dimensions**
**Booth number : 2 and 3**

In order to provide network services with high quality and high reliability, we must understand network status factors such as failures and use trends and then take necessary action to cope with them as quickly and accurately as possible. With this in mind we have developed VIRD, a 4-dimensional (3D and replay) visualization system that enables us to visualize a huge amount of information collected from network. With VIRD, the network status can be accurately grasped at a glance.

**E4. NTT : Operational efficiency technology on client terminals**
**Booth number : 6 and 7**

Operational efficiency technology on client terminals improves the present operation environment and leads to create better business environment under existing OSS (Operation Support System). "Data Bridge" is a system for easily transferring data between PCs on different policies. For one terminal, another terminal looks like a virtual printer for outputting data; conversely a virtual CD drive for receiving data. This system transfers only data acceptable to the policies. "Annotation tool" provides additional information that operators should manipulate by showing direct information for navigation on the user interface of OSS. This helps operators to manipulate OSS without any special skills. These are the general-purpose technologies which are more adaptable to various operating scenes without changing server-side systems and client terminals.
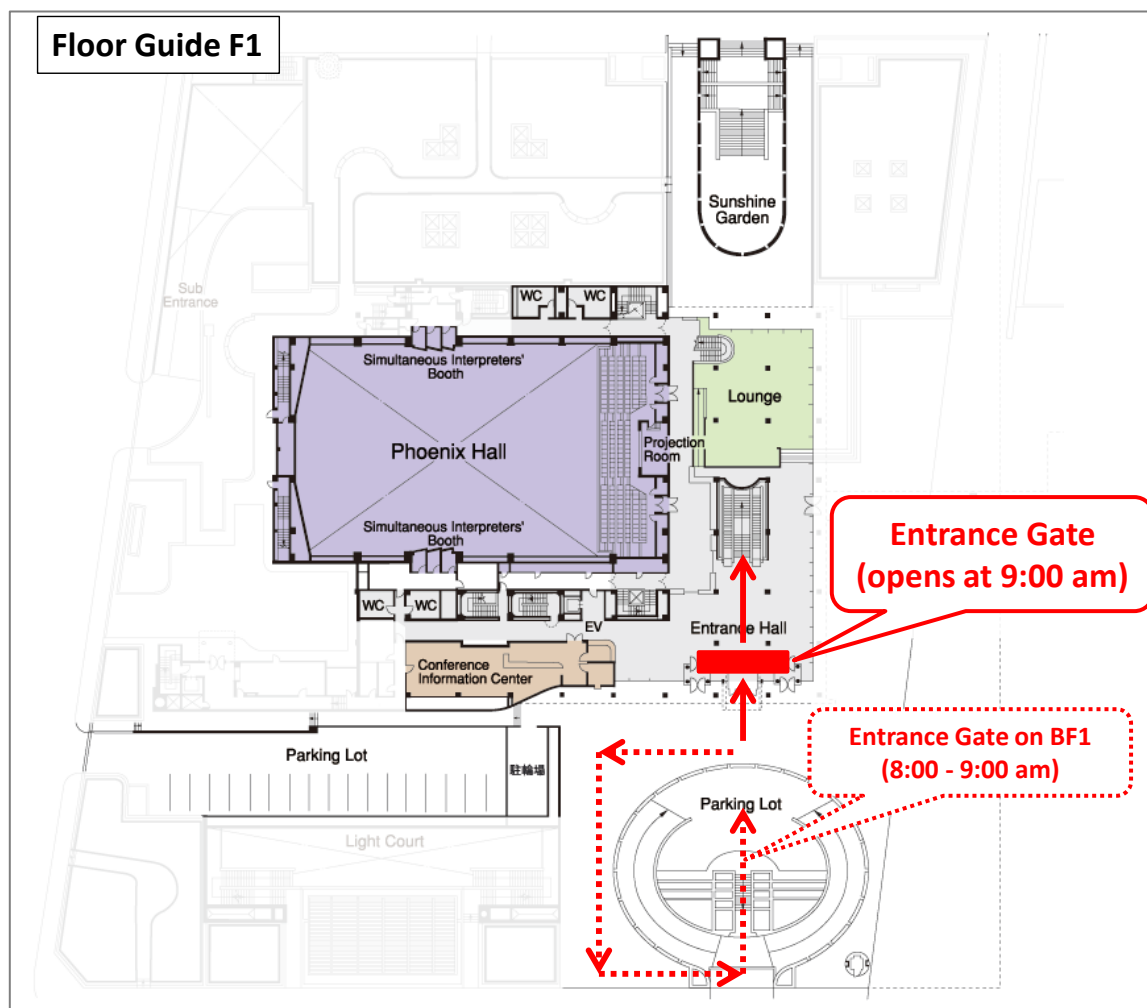
# Venue Information

- APNOMS will be held at International Conference Center HIROSHIMA, JAPAN.
  - ✓ Please see Homepage of "**International Conference Center HIROSHIMA**".
  - ✓ BF2 of "International Conference Center Hiroshima" is used in APNOMS 2013.
  - ✓ Notice: The main gate on the first floor will open at 9:00 am every day, so that particpants should enter from another entrance gate on BF1 (see the below) from 8:00 to 9:00 am.
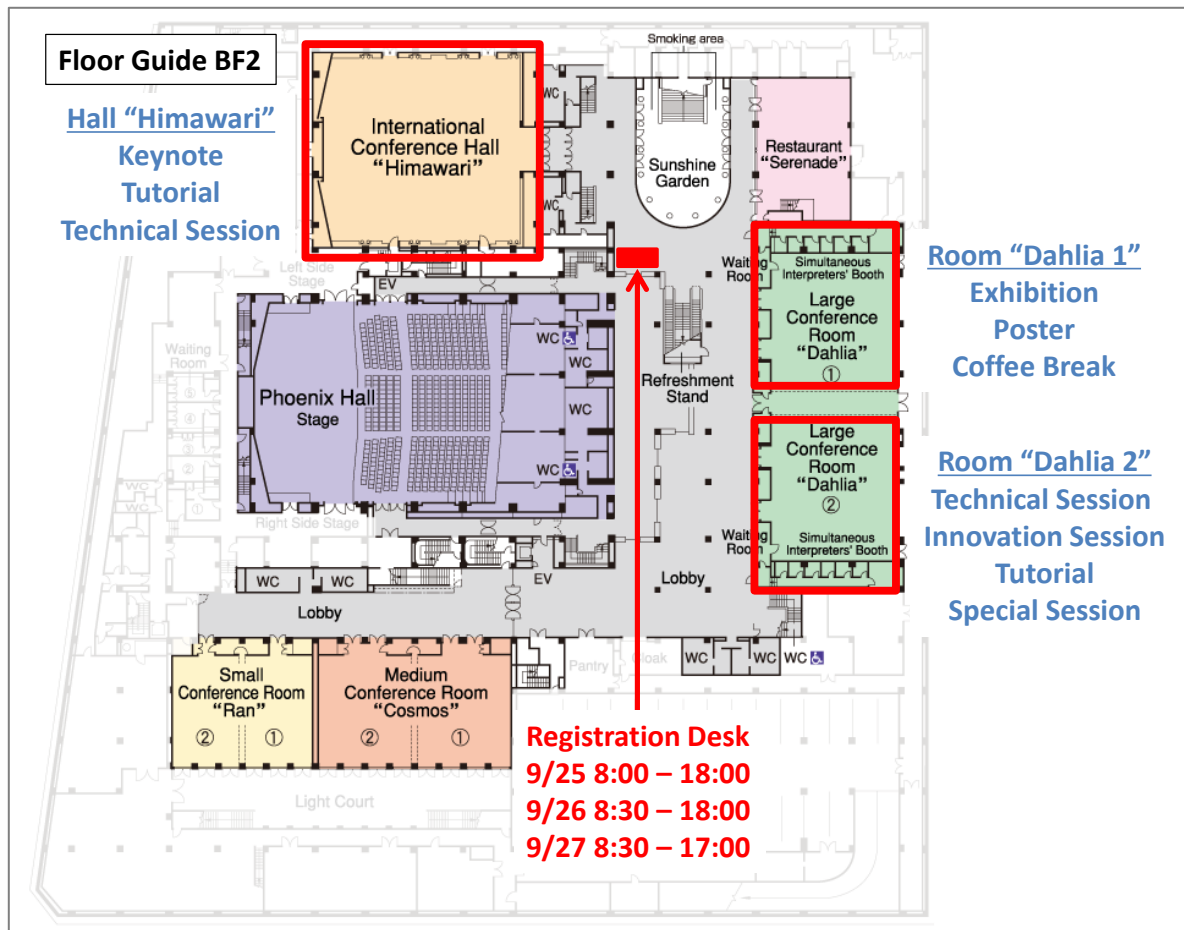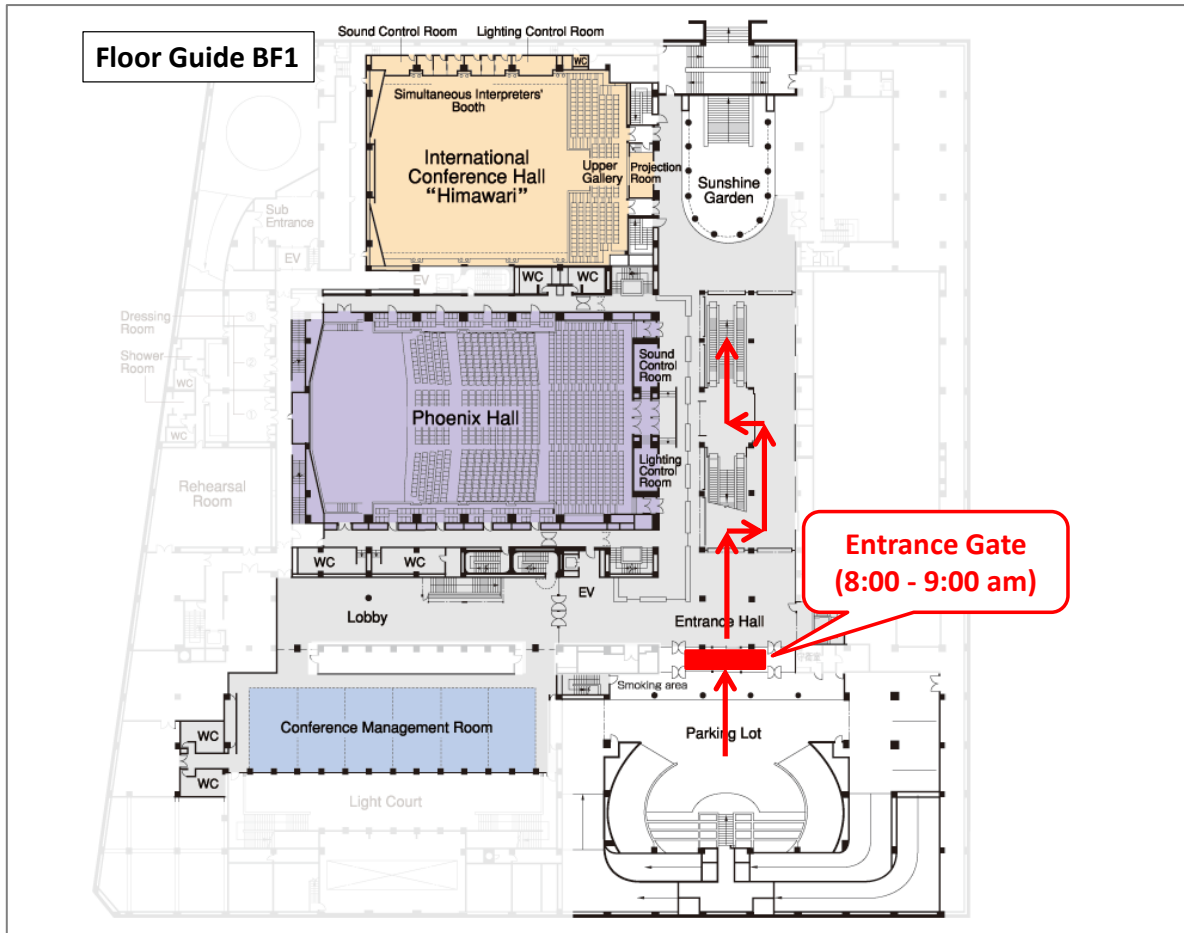
> **International Conference Center HIROSHIMA**
>
> 1-5,nakajima-cho,Naka-ku,Hiroshima,Japan
>
> TEL:＋81-82-242-7777
>
> http://www.pcf.city.hiroshima.jp/icch/english.html



**Floor Guide F1**

Entrance Gate (opens at 9:00 am)

Entrance Gate on BF1 (8:00 - 9:00 am)

Floor Guide BF1

Entrance Gate
(8:00 - 9:00 am)



Floor Guide BF2

Hall "Himawari"
Keynote
Tutorial
Technical Session

Room "Dahlia 1"
Exhibition
Poster
Coffee Break

Room "Dahlia 2"
Technical Session
Innovation Session
Tutorial
Special Session

Registration Desk
9/25 8:00 – 18:00
9/26 8:30 – 18:00
9/27 8:30 – 17:00

# Registration

## Registration Fees

| Attendee/Type | Early-Bird/Presenters (by Aug. 18th, 2013) | Advance (by Sep. 6th, 2013) | Regular/Onsite (after Sep. 6th, 2013) |
|---|---|---|---|
| Full | 30,000 JPY | 35,000 JPY | 40,000 JPY |
| Students | 5,000 JPY | 10,000 JPY | 15,000 JPY |
| Students(auditing only) | Free of charge | | |
| Exhibitor | 10,000 JPY | 15,000 JPY | 20,000 JPY |
| Extra Lunch Ticket | 3,000 JPY | 3,000 JPY | Not Available |
| Extra Banquet Ticket | 7,000 JPY | 7,000 JPY | Not Available |
| Extra Proceedings | 3,500 JPY | 3,500 JPY | Not Available |

- **Full** registration fee includes proceedings, admissions to tutorial sessions, all technical sessions(*), banquet, three lunches and coffee breaks.

- **Student** registration fee includes the same as full registration.

- **Student(auditing only)** registration includes admissions to tutorial sessions, all technical sessions(*).

- **Exhibitor** registration fee includes banquet, three lunches and coffee breaks.

- Registration fees will **be charged in Japanese YEN (JPY) only** according to local financial regulations.

*: technical sessions, innovation sessions, poster sessions, special sessions, keynote sessions and DEP session.

### [Especially For Authors]
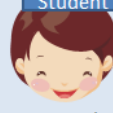
- **For each of all accepted papers, at least one author including students must register by the Early-Bird due date at the Full rate (=Authors Registration)** in order to guarantee their papers to be published in the symposium proceedings, IEICE I-Scover and IEEE Xplore.
  **One full rate payment is necessary and only valid for one paper, not applicable for multiple papers.**

- **For Authors Registration**, JEMS Paper number (e.g. 110000) must be provided.

- **A paper must be presented at the conference site**.  Online presentation (e.g. Skype) is not permitted without an unavoidable reason such as a natural disaster.



One full rate payment is necessary and only valid for one paper, not applicable for multiple papers.
(In case below, Mr. X's FULL Registration is NOT valid for paper 000002.)

# General Information

## About Hiroshima



Hiroshima has been a center of trade and culture since the beginning of Japan's recorded history. Hiroshima is home to two UNESCO World Heritage sites: (1) A-Bomb Dome in Hiroshima, one of the few remnants of prewar Hiroshima following the atomic bombing in 1945; (2) Itsukushima Shrine in Miyajima, famed for filling with water and appearing to "float" during high tide. Other attraction in Hiroshima includes Hiroshima Peace Memorial Park Museum, Hiroshima Castle, and Shukkei-en Japanese historic gardens.

Please see Hiroshima Navigator site, which is Hiroshima Tourism Site, to get more detailed information on Hiroshima.

Hiroshima Navigater: http://www.hiroshima-navi.or.jp/en/

## Local Transportation (Hiroshima Electric Railway (streetcar))



Hiroshima has very convenient public transportation systems. Visitors can take streetcars, buses, or taxis to anywhere they want. Streetcars are the most convenient way to get around in the central of Hiroshima and not expensive.

- Streetcar information site (HIRODEN company)
  http://www.hiroden.co.jp/train/rosenzu/streetcar_map.htm

- Street car route map (PDF)
  http://www.hiroden.co.jp/train/rosenzu/map/english1.pdf

- Travel information (How to transfer and Travel time etc...) (PDF)
  http://www.hiroden.co.jp/train/rosenzu/map/english2.pdf

## Local Food



Surrounded by sea and mountains, Hiroshima offers a variety of delicious foods, including oysters and other seafood from the Seto Inland Sea, which is rich in nutrients. Enjoy Hiroshima's delicacies of the season. Be sure you do not miss Hiroshima-style Okonomiyaki when you come to Hiroshima. The tasty sauce is nice, but the art of cooking it is something you just have to see.

Another popular food is Momiji manju. Momiji manju, Hiroshima's most popular souvenir, is a small, maple-leaf-shaped cake filled with mashed sweet bean paste. Although there are various theories as to why it came to be made in the maple-leaf shape, this cake has a history of more than 100-years.

# Tour Information
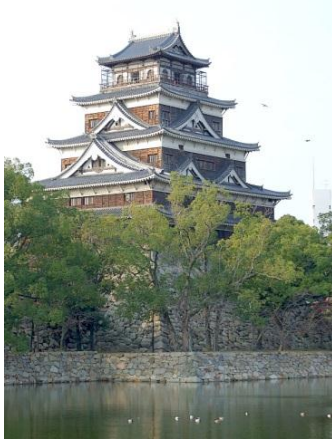
### 1. Hiroshima Castle



Terumoto Mori, a powerful feudal lord whose domain once covered much of the Chugoku Region, began construction on Hiroshima Castle in the year Tensho 17 (1589), choosing for it a location with convenient access to both water and land transportation. At that time, large-scale construction work commenced on the castle structures, including its stone walls and fences, towers and keep, as well as the surrounding castle town. Although Mori would later be demoted by the Tokugawa Shogunate after the Battle of Sekigahara, Hiroshima Castle continued to be maintained throughout the Edo Period by successive feudal lords, from Masanori Fukushima to Nagaakira Asano, whose clan would control the castle, and with it the domain, for twelve generations.

### 2. Shukkeien



Shukkeien was created in the year Genna 6 (1620) by Shigeyasu Ueda, a high-ranking retainer in the service of the Asano Clan who was also a renowned master of tea ceremony, to serve as a villa for Asano feudal lords. The garden's interior, said to have been modeled on the world-famous scenic beauty of China's West Lake, was named "Shukkeien" (meaning "condensed scenery garden") for condensing into a single garden the scenery of a mountain river, the feel of Kyoto and the essence of a place deep in the mountains. Several islands, large and small, rise out of the pond, called "Takueichi", that was created in the center of the garden and the clever arrangement of ravines, bridges and arbors allows visitors to enjoy taking a stroll around them.

Fee: 250 yen. Opening hour 9:00-17:00.

### 3. A-bomb Dome



In December 1996 at UNESCO's 20th World Heritage Committee Convention in Merida, the Atomic Bomb Dome was listed as a World Heritage site being a building that communicates the total devastation caused by nuclear weapons.

The Atomic Bomb Dome was constructed in 1915 as a facility for the display and sale of commercial products within Hiroshima prefecture and was the location for the Hiroshima prefecture art exhibition and other such events. When it was established, it was called that "Hiroshima prefecture Industrial Products Display Hall". Following that it was renamed the "Hiroshima Prefectural Commercial Products Exhibition Hall" and finally in 1933 was named the "Hiroshima Prefectural Industrial Promotion Hall."

**4. Itsukushima Shrine**

it is said that Itsukushima Shrine, one of the Three Scenic Views of Japan, was established by Saeki-no-Kuramoto. In the late Heian Period, the current shrine building was constructed in its present form, as a shrine on the sea, with the assistance of Taira-no-Kiyomori. The conception of a shrine whose grounds include the sea, with its form ever changing with the ebb and flow of the tides, is like nothing else in the world. In December of the year Heisei 8 (1996), Itsukushima Shrine was registered as a World Heritage Site. Looking out over the Inland Sea before it and crowned to its rear by Mt. Misen, a sacred mountain where the gods are believed to have descended to earth, Itsukushima Shrine strikes a harmony between natural and man-made beauty.

Please see Miyajima tourism site if you want to get more information on Itsukushima Shrine.

- Miyajima Tourist Association
  http://www.miyajima.or.jp/english/index.html
- Official Website of Miyajima Tourism
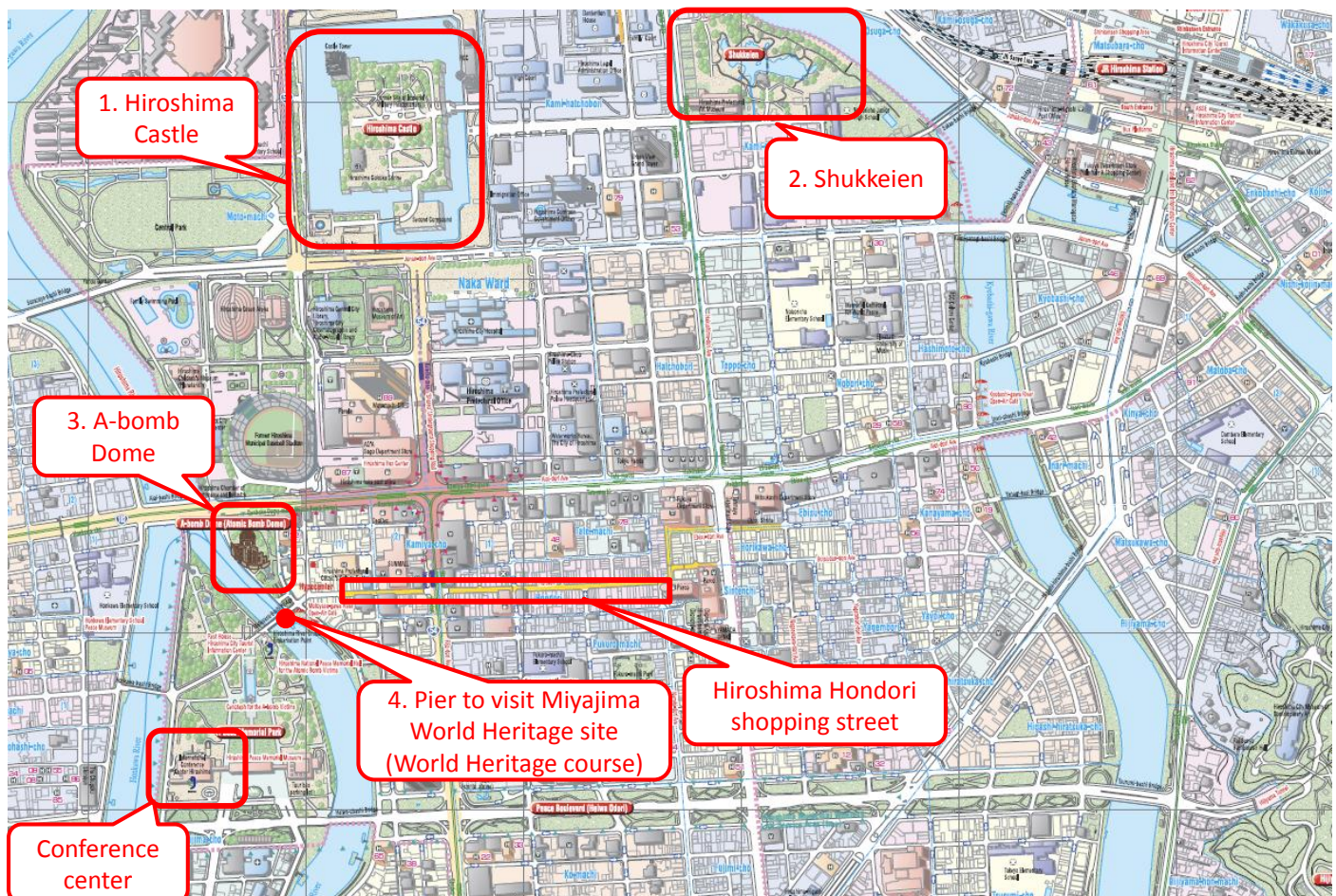  http://visit-miyajima-japan.com/flash/english/welcome.html

***How to access to Itsukushima Shrine***

Visitors can take a boat to visit Miyajima World Heritage site from this pier. Please see "World Heritage Course" site to get more detailed information and check the fare and timetables.

Miyajima World Heritage site:
http://www.aqua-net-h.co.jp/modules/english_page/index.php?content_id=3

## Hiroshima City Map for Tour information



1. Hiroshima Castle
2. Shukkeien
3. A-bomb Dome
4. Pier to visit Miyajima World Heritage site (World Heritage course)
Hiroshima Hondori shopping street
Conference center

# Lunch & Symposium Banquet

## Lunch

Lunches will be provided to attendees[*] during the symposium.
We will serve a lunch box for 3 days. Final arrangement of lunch will be announced at registration desk.
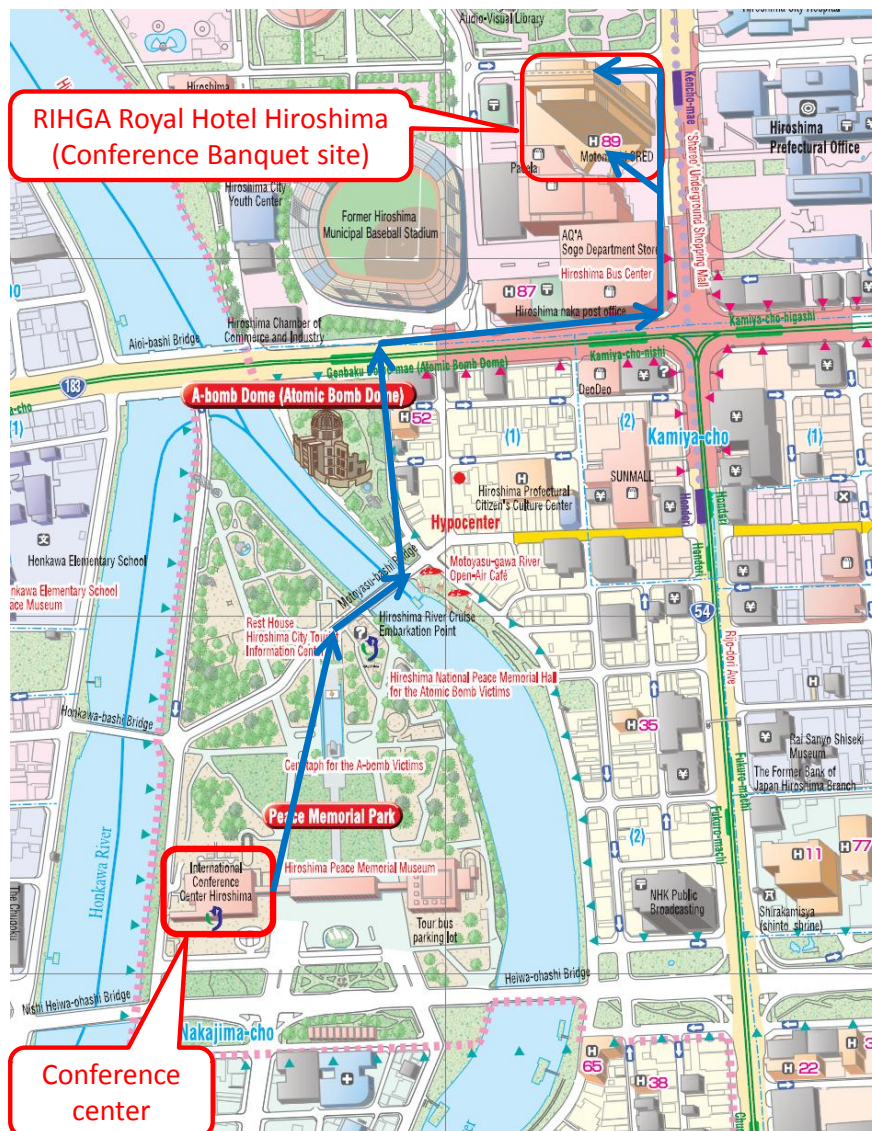
  * Except Student (auditing only) Registration.

## Symposium Banquet

- 7:00 – 9:00 p.m., Thursday, September 26, 2013
- Royal Hall (3) on the 4th floor in RIHGA Royal Hotel Hiroshima.

All attendees[*] are welcome to the symposium banquet. Just relax and enjoy the excellent entertainment program, delicious cuisine and drink.

  * Except Student (auditing only) Registration.

**How to get Banquet Hall**



RIHGA Royal Hotel Hiroshima (Conference Banquet site)

Conference center

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