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**Report**  
*Edited by Paul Brusil*

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## **Management of Convergence Networks and Services: A Report on APNOMS 2006**

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### **1. INTRODUCTION**

The 9th Asia-Pacific Network Operations and Management Symposium (APNOMS 2006, <http://www.apnoms.org/2006>) was held on September 27–29, 2006 in Busan, Korea. APNOMS 2006 was organized by KICS KNOM (Korean Institute of Communication Sciences, Korean Network Operations and Management Committee) and IEICE TM (Institute of Electronics, Information and Communication Engineers, Telecommunication Management) Committee with support from IEEE CNOM (Committee on Network Operations and Management), IEEE APB (Asia Pacific Board), IEEE ComSoc Japan Chapter and TMF (TeleManagement Forum). APNOMS 2006 has continued to play an important role for exchanging and discussing all aspects of telecommunications management among academic and telecommunication industry at large in the Asia-Pacific region. As in the previous APNOMS symposia [1–8], APNOMS 2006 was a great success, attracting over 300 researchers, practitioners, service providers, vendors from 14 countries.

The theme of this symposium was “Management of Convergence Networks and Services.” Recently, various convergences in wired and wireless networks, and convergence of telecommunications and broadcastings are taking place for ubiquitous multimedia service provisioning. For example, broadband IP/MPLS wired networks are converged with IEEE 802.11e wireless LAN, IEEE 802.16 Wireless MAN, 3G/4G wireless cellular networks, and direct multimedia broadcast

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(DMB) networks. For efficient support of service provisioning for ubiquitous multimedia services on the broadband convergence networks, well-designed and implemented network operations and management functions with QoS-guaranteed traffic engineering are essential. With this background, this symposium focused on the theme of management of convergence networks and services.

As synopsized below, the APNOMS 2006 program included tutorials, keynote presentations, technical paper and poster sessions, special sessions, exhibition sessions and a distinguished experts panel.

### **1.1. Tutorials**

The symposium started with four tutorials covering the latest hot topics. Tohru Asami (University of Tokyo, Japan) gave a tutorial on “Prosperous De Facto Communication Technologies outside Academic Societies.” Eun Kyoung Paik (Advanced Technology Lab., KT, Korea) gave a tutorial on “IP Mobility: Trend and Perspectives.” Sanku Jo (KT, Korea) gave a tutorial on “Web2.0: a Window to the Future.” Takashi Egawa (NEC, Japan) gave a tutorial on “Standardization Activities of NGN.” They attracted many participants and generated discussions on the issues of managing those technologies and services.

### **1.2. Keynote Presentations**

Five keynote speakers shared their visions at the symposium. Yoon-Hak Bang (Network Technology Lab., KT, Korea), delivered a speech on “Future Direction of Network and Service Management” and emphasized that the operators and customers must be the focus on the development of operations and management systems. Ed Pinnes (Telcordia Technologies, USA), gave a speech on “Are You Delivering Quality Service?” and stressed the importance of delivering high quality service to satisfy customers. Yoichi Maeda (NTT Advanced Technology, Japan), gave a speech on “Standardization Trends for the Next-Generation Network (NGN) and its Transport Networks” and introduced various ITU-T’s standardization activities on NGN. Dave Milham (BT, UK), gave a speech on “OSS: Evolution or Revolution” and emphasized that both evolutions and revolutions are needed in operation support systems for the success of telcos. He also introduced the latest TMF’s activities. Finally, Yan Baoping (Chinese Academy of Sciences, China) delivered a speech on “Issues for Network Management based on Bandwidth on Demand” and introduced various networks and applications in China and how they are being managed.

### **1.3. Technical Paper and Poster Sessions**

The main body of the Symposium consisted of 10 technical sessions, one short paper session, and two poster sessions. From a total of 287 paper submissions to

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the technical session, 50 were selected as full papers with oral presentations in the 10 technical sessions and 25 were selected as short papers with poster-style presentations. Also, from a total of 26 submissions for poster sessions, 10 were selected for the poster sessions. Accepted papers and posters represented the latest results of research and development in the operations and management of convergence networks and services, covering research areas including: Management of Ad-Hoc and Sensor Networks, Network Measurements and Monitoring, Mobility Management, QoS Management, Management Architectures and Models, Security Management, E2E QoS and Application Management, Management Experience, NGN Management and IP-based Network Management. It is the new trend that many papers focused on the management of broadband wireless access networks and QoS-guaranteed service provisioning.

### **1.4. Special Sessions**

Two special sessions were held on the second day and the third day of the symposium. Eight representatives of various countries from Asia-Pacific discussed “Broadband Converged Network and Service Management Technologies” and “Next Generation Mobile and Broadband Network Management Technologies.” Jae-Hyoung Yoo, (KT, Korea) and Kazumitsu Maki, (Fujitsu, Japan) were the organizers of these sessions and the speakers presented their views, experiences, and future expectations. Dennis Nam (Microsoft, Korea) gave a talk on “SOA Strategies on the Fixed/Mobile Convergence.” and stressed the effectiveness of SOA for the near future converged network and service management. Wataru Tsurumaki (NTT, Japan) gave a speech on “Introduction to PON NE Management Functions and Operation Interfaces,” and introduced the GE-PON management information model and its NMS interface developed at NTT Japan. Shuang-Mei Wang (Chung Hwa Telecom, Taiwan) gave a talk on “UFO (Universal Fulfillment Organizer) Leads CHT to NGOSS,” and was emphatic about the necessity of evolutionary strategy to achieve one-stop services fulfillment of various services. Jinhyoun Youn (KT, Korea) gave a speech on “A Broadband Network Management Practice: KT Internet,” and introduced various Internet management systems at KT. Koichi Asatani (Kogakuin University, Japan) gave a talk on “Next Generation Network and QoS” and explained the complexity of NGN QoS management and introduced the related standard activities. Jongtae Song (ETRI, Korea) gave a talk on “BcN: A Future Networking Vision from Korea” and explained the direction of BcN implementation in Korea. Kohei Iseda (Fujitsu Laboratories, Japan) gave a talk on “Management of WiMAX” and explained the management and control architecture of WiMax network and services. Sangkun Chun (Samsung Electronics, Korea) gave a talk on “Introduction of WiBro (Mobile WiMax) Network Management”, and introduced Wibro business model and characteristics and requirements of Wibro network management functions.

## **1.5. Exhibitions**

The exhibition program provided an opportunity for vendors and service providers to exhibit their latest OSS technologies, tools, platforms, products and systems. This program also provided an excellent environment for operators, researchers and academics to interact with vendors. Eleven companies including KT Network Technology Lab., Daou Tech, HP, KSTEC, Tmax Soft, Sun Microsystems Korea, ETRI, IBM, ForHuman, EzNetSoft, and NTT Comware participated in the exhibition program.

## **1.6. Distinguished Experts Panel**

APNOMS 2006 ended with a very exciting distinguished experts panel (DEP) on the symposium's theme of "Management of Convergence Networks and Services." Chaired by Geng-Sheng Kuo (NCCU, Taiwan), four panelists, David Strand (Lucent Technologies, USA), Nobuo Fujii (NTT Advanced Technology Corporation, Japan), Donghoun Shin (KT, Korea), and Dave Milham (BT, UK), discussed and debated a large range of issues on the APNOMS 2006 theme. These issues included fault management, accounting management, performance management, service platform in home networking, FMC, IMS, and Web2.0. The audience also participated in the discussion and debated actively throughout the panel. Through the discussions and debates, the panelists and audience offered different views on future important issues towards the ultimate goal of management of convergence networks and services. The most important topic which all panelists would like to emphasize was IP Multimedia Subsystem (IMS) standardized by 3GPP for the 3G and beyond. On the other hand, the emergence of Voice over IP (VoIP) was also pointed out. The relationship between telecommunications-based services and Internet-based services did attract attention in the panel.

## **1.7. APNOMS 2006 Epilogue**

In APNOMS 2006, the technical session papers were published in LNCS (Lecture Note in Computer Science) 4238 by Springer Verlag for the first time. Also, a CD-ROM of the proceedings has been published and includes all technical session papers, poster session papers, and presentation materials of keynote speeches, and special sessions.

APNOMS 2006 was a very successful symposium. It was well attended and the feedback on all aspects of the symposium organization, in particular, on the technical program was very positive. It contributed to the growth of APNOMS into a very important international symposium. The audience's feedback reinforced the positive aspects of the symposium: a good mixed participation from both the industry and academia in technical contributions; the tradition of special sessions

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focusing on experiences and lessons learned by different countries in this region; excellent venue and social events; and the overall collaborative, interactive and friendly atmosphere of the symposium.

The keynote and DEP presentations as well as the pictures taken at the symposium are all available from the symposium website: <http://www.apnoms.org/2006>. APNOMS 2007 will be held October 10-12, 2007 in Hokkaido, Japan. For more information, please visit <http://www.apnoms.org/2007>.

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