

Management in the Big Data & IoT Era: A Report on APNOMS 2012

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1 Introduction

APNOMS (Asia Pacific Network Operations and Management Symposium) has been a premier conference on network operations and management in the Asia Pacific region. The symposium has been organizing the researchers' congregation

This paper presents a report on APNOMS 2012, which was held September 25–27, 2012 in the COEX Convention Center, Seoul, Korea. The theme of APNOMS 2012 was “Management in the Big Data & IoT Era” (IoT: Internet of Things).

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since 1997 in order to exchange knowledge and ideas. The 14th APNOMS (<http://www.apnoms.org/2012/>) was held on 25–27 September 2012, at the COEX Convention Center, Seoul, Korea. APNOMS 2012 was sponsored by the KICS Committee on Korean Network Operations and Management (KNOM) and IEICE Technical Committee on Information Communication Management (ICM). The symposium was supported by the CNOM, TeleManagement Forum, NIPA, KT, Kyung Hee University, Korea Be Inspired, Korea Tourism Organization and Seoul Metropolitan Government. As in the previous APNOMS symposia [1–12], APNOMS 2012 was a great success and attracted many researchers, policy makers, practitioners, service providers, and vendors from 13 different countries.

The major goal of this symposium was to expose, to examine and to debate the contemporary issues, such as network control and operations for handling large volume of data. The theme of APNOMS 2012 was “Management in the Big Data & IoT Era”. Day-by-day, data dissemination rates are increasing significantly with ever increasing information flow to starved users. Thus, controlling, managing and trafficking of networks are getting complex and vulnerable. It is the demand of time to concentrate the researchers’ attention in these areas in order to retain the network reliability and efficiency. Keeping in mind the challenges of dealing with big data, APNOMS 2012 provides higher priority in the following areas: challenges of big data dealing, traffic and resource management, automatic network management and cloud computing management.

APNOMS 2012 included keynote presentation sessions, special sessions, tutorials, technical paper presentation sessions, poster paper sessions, innovation sessions and exhibition sessions. The symposium also included an interactive distinguished expert panel session (DEP). Synopses of each event are given in the following sections. The summarized events show the entire scenario of APNOMS 2012 and recent trends of research on network management for big data dealing.

2 Keynote Presentation

There were four keynote speakers in APNOMS 2012. Keynote speakers shared their innovative ideas in the Symposium. Mr. Atsushi Kitai (Executive Manager, NTT group), delivered a speech on “New Directions in TeleManagement Forum for Digital Services and Related Activities of NTT Group”. His speech focused on development of a common management framework for various kinds of digital service providers. Dr. David G. Belanger (AT&T Labs Chief Scientist) delivered his speech on “It’s All About the Data”. He summarized the problems and solutions for large scale and real time information mining. Dr. Dongmyun Lee (Executive Vice President, KT) expressed his ideas on “Collaborative value creation in the IOT world”. Finally Professor Atsuhiko Goto (Institute of Information Security) gave a speech on “Inter-Cloud Computing and Networking for Secure Social Infrastructure”. The speech concluded that inter-cloud computing and networking are essential for big data handling.

3 Special Sessions

APNOMS 2012 included three special sessions where eleven distinguished speakers were invited. All the speakers delivered their views and experiences on contemporary issues on network management problems and solutions. Session 1, session 2 and session 3 were chaired by Dr. Yu-Huang Chu (CHT, Taiwan), Dr. Noriaki Kamiyama (NTT, Japan) and Dr. Taesang Choi (ETRI, Korea) respectively.

Session 1 focused on Management of Machine to Machine (M2M) Networks. Jae-Oh Lee (Korea University of Technology and Education, Korea) gave a talk on “IP Multimedia Subsystem (IMS) Based M2M Service Delivery and Management”. Yuuichi Teranishi (NICT/Osaka University, Japan) expressed his views on “Wide-area Sensor Network Managements on Future network”. Chi-Sheng Shih (National Taiwan University, Taiwan) gave a talk on “WuKong: Self-managed Machine-to-Machine Networks”. The last presenter of session 1, Hisanori Izumi (NEC, Japan), expressed his views on “Trend of M2M and NEC’s CONNEXIVE solution”. He introduced the development background of the current M2M services, future prospects for M2M services, technologies related to M2M and their approach towards future M2M services.

Session 2 focused on Network Technology for Recovery and Prevention in Disaster. Hideaki Sone (Tohoku University, Japan) gave a talk on “Recovery of Campus ICT Infrastructure after the Great East Japan Earthquake”. Toshiya Masuzawa (NTT, Japan) expressed his views on “Restoration Status for Damage Caused by the Great East Japan Earthquake and Future Responses”. Yu-Huang Chu (Chunghwa Telecommunication Lab, Taiwan) gave his talk on “Highly Flexible and Reliable Cloud Computing Network to Prevent Disaster”. Seong Jong Choi (University of Seoul, Korea) gave his talk on “Public Alert and Warning System in Korea”. The key focuses of the session were emergency management frameworks, information and communication technologies and standards for disaster recovery.

Session 3 focused on Management of Big Data. This session was the most agile and interactive among the special sessions in terms of questions and answers. So much Q&A time was spent on discussing what Big Data management means. Kure-Chel Lee (ETRI, Korea) gave a talk on “Understanding Big Data”. Toru Kobayashi (NTT, Japan) expressed his views on “Data mining techniques for large scale log analysis”. HwaSeob Joseph Yun (KT, Korea) gave a talk on “Social Analytics from Big Data”.

4 Tutorials

Four tutorial sessions were included in the APNOMS 2012. Each presenter focused on different recent hot topics and attracted much audience attention; thus, the sessions were more interactive in terms of questions and answers. Youjip Won (Hanyang University, Seoul, Korea) presented his tutorial on “Data Deduplication issues in Modern Big Data Management”. Chi-Sheng Shih (National Taiwan University, Taiwan) gave his tutorial on “Requirement and Trend on Information Delivery in Mega Disaster Management”. Yuichi Ohsita (Osaka University, Japan)

gave his tutorial on “Trends in Research on Data Center Networks”. Tae-Sang Choi (ETRI, Korea) presented his tutorial on “SDN-based Cloud and Inter-CDN Network and Service Management”.

5 Technical Paper and Poster Sessions

The main part of APNOMS 2012 included eight technical sessions and three poster sessions. One hundred nineteen high quality papers were submitted for technical sessions and poster sessions from different countries. Thirty-two high quality papers were selected as full papers for technical sessions and thirty-four papers were selected as short papers for poster sessions. The acceptance rates were 26 and 29 % respectively. For each paper, we provided at least three independent reviews, most of which were offered by TPC members and some others by a few external reviewers.

The selected papers covered a wide range of important and timely subjects in network management areas. The eight technical sessions covered: Application and Cloud Computing Management, Energy and Content Management, Management in New Environment, Mobile Network Management, Network Control and Operation, Network Management System, Traffic Management, and Wireless Network Management. Each session was evaluated by questionnaire. According to the questionnaire, the technical session on “Network Control and Operations” was rated the best session in terms of importance and popularity. The following interesting papers were presented in this session: “A light-weight periodic data collection approach of TR-069 managed CPEs”, “Distributed GMPLS Optical Control in Translucent Wavelength Convertible WDM Networks”, “A Novel Navigation System Using Augmented Reality Technology for Distribution Work at Optical Connector Panels”, and “A Cooperative MAC Providing Alternate Path for the Poor Link”.

Each poster session presented important and interesting topics, thus the interested visitors asked many questions to learn more information and to make the sessions enjoyable. The Technical Session and Poster Session papers are published and indexed by IEEE Xplore. The session chair and co-chairs evaluated and selected the top three papers presented in the technical session for the “Best Paper Award”. The titles of winner papers are “Implementation of Virtual Network Management System with SLA on NetFPGA”, “Distributed GMPLS Optical Control in Translucent Wavelength Convertible WDM Networks” and “Application Traffic Identification Based on Remote Subnet Grouping”.

6 Innovation Sessions

Three innovation sessions were included in APNOMS 2012. Seventeen papers were presented in three sessions and published in the APNOMS CD-ROM proceedings. These sessions were organized on the continuing research, work-in-progress, innovative ideas, practical solutions, experimental studies, and various topics of

interest to the community. The sessions paid attention on the following issues: Cloud Computing and Service Management, Network Control and Operation, and Traffic and Resource Management.

7 Exhibitions

Nine exhibition booths were prepared for the Exhibitions of APNOMS 2012. Each exhibition attracted many visitors who eagerly asked many questions to learn more information. KT exhibited its project titled “KT NMS [all-in-One]”, where 22 Legacy NMSs (17 Wireds and 5 Wirelesses) have been integrated into a single system. KT also showed another project titled “BEMS (Building Energy Management System)”. Chunghwa Telecom exhibited their project titled “A Software Tool of Proactive Detecting, Quarantining, and Terminating Resource Leakage in Java EE Application Environments”. The KAIST-CDNi Consortium showed its project on “Contents Delivery Networks Interconnection (CDNi)”. NICT exhibited its project on “Wide-area Sensor Network Platform on Virtual Wireless Access Point”. FUJITSU showed a project on “Telecom network management solutions” which demonstrated how to make it easier to manage the network and how to lower the operating cost. MA Co. Ltd. exhibited its project on “Network Modeling & Simulation, Advanced Application Performance Management (APM)”, which showed how to support real time network monitoring. Fountain Springs showed its project on “Smart Grid Solution (AMI: Advanced Metering Infrastructure, MDMS: Meter Data Management System)”, which provided end-to-end AMI, EMS (Energy Management System), MDMS and M2M solutions for smart grids. Last, but not least, TCINET exhibited “COMS (Cabling Operation & Management System)”, which showed its intelligent real-time network cabling and monitoring system.

8 Distinguish Experts Panel

APNOMS 2012 ended with a distinguished experts panel (DEP) with contributors from different countries. The session was chaired by Prof. Ki-hyung Kim (Ajou university, Korea) and included four eminent panelists: Dr. Minoru Etoh (NTT DoCoMo, Japan), Dr. Dongmyun Lee (Executive Vice President, Advanced Institute of Technology KT, Korea), David G. Belanger (Chief Scientist, AT&T Labs, USA) and Prof. Atsuhiko Goto (Institute of Information security). They participated in memorable discussion on the symposium’s main theme “Management in the Big Data & IoT Era”. The major discussion issues were problems on large scale data mining, real time information mining, security and reliability, traffic handling, bandwidth allocation etc. Some auspicious debate was aroused regarding the solutions of the problems. Significant numbers of audience attendees also participated in the debate; and, that made the session more fruitful. Based on the debate and discussion, the panelists decided that researchers should pay more

attention in the following areas in the future: service and application based network management, and network control and operation for big data.

9 Conclusions

APNOMS 2012 paid attention to several interesting and important issues such as big data handling, cloud data management, disaster management, and network management, control and operation. Thus, the symposium was very successful. It was a good gathering of eminent and prospective researchers. We hope that prospective researchers benefitted significantly because each session provided the direction of new scopes of works. It was well attended and a questionnaire indicated that audiences and visitors responded well to the entire program. In particular, the responses on the technical program were very positive. Researchers have been inspired due to the mixed participatory environment such as participation of eminent and prospective researchers from industry and academia. As a whole, the entire symposium atmosphere was collaborative, interactive and friendly. We hope that a large number of good papers will be submitted in future.

The keynote and DEP presentations as well as the pictures taken at the symposium are all available in the symposium website: <http://www.apnoms.org/2012/>. We expect that APNOMS 2013 will be even more successful and will be held in September 25–27, 2013 at Hiroshima, Japan. For more information, please visit <http://www.apnoms.org/2013/>.

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Hongtaek Ju is a professor in the Dept. of Computer Engineering, Keimyung University, Daegu, Korea. He received a Ph.D. degree from POSTECH, Korea in 2002 and an M.S. degree from POSTECH, Korea in 1991. He graduated from KAIST in 1989. He has worked on various research projects on network and systems management and his research interests include network management architecture, traffic monitoring and security management. Prof. Ju is a member of IEEE Communication Society, KICS (Korea Institute of Communication Society), KISS (Korea Information Society) and KIPS (Korea Information Processing Society). He has served as an Organization Committee member of APNOMS from 2005 and NOMS (2010, 2012). He also has worked as a TPC member of APNOMS, NOMS and IM since 2006. He is an associated editor of *KNOM Review* and *International Journal of Network Management*.

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Makoto Takano is a General Manager at the Research and Development Planning Department, NTT Corporation in Japan. From April 1986, when he joined NTT Electrical Communication Laboratories, he was mainly engaged in the research and development of PABX, ATM-LAN, and network management systems, especially in research of the application of control theory to the control of communication networks. After he moved to NTT-West in 1999, he was responsible for strategic planning and development of various operation support systems and network systems mainly for IP related telecommunication services. Currently, at NTT, he is directing a number of service produce activities. He received the B.E., M.E. and Ph.D. degrees in system engineering from Kobe University, Hyogo Japan, in 1984, 1986, and 1994, respectively. He is a member of IEEE, IEICE and chair of IEICE Technical Committee on Information and Communication Management.

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