IEEE ComSoc Distinguished Lecture Tour – Indonesia, Nov. 23-28, 2014

Ying-Dar Lin, IEEE Fellow
National Chiao Tung University, TAIWAN

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DLT Planning and Itinerary

This DLT (Distinguished Lecture Tour) was an invited trip with three talks in an Indonesian conference, International Conference on Information Technology Systems and Innovation (ICITSI), in Bandung and Bali on November 24-26. My host was Prof. Ir. Suhardi in School of Electrical Engineering and Informatics, Institute of Technology Bandung (ITB). ITB is one of the three top universities in Indonesia. I knew Prof. Suhardi years ago when he visited Industrial Technology Research Institute (ITRI) in Hsinchu, Taiwan. I gave a two-day tutorial in ITRI then. On the first day of this conference, I gave a keynote speech on "Software Defined Networking: Turning Appliances to Apps" in a decent century-old wooden auditorium hall in ITB. In the second talk in that afternoon, I gave a more detailed talk on "Software Defined Networking: A Development-Driven Tutorial", in parallel with sessions of paper presentations. On the second day, parts of the conference participants, mostly faculty members and Ph.D. students, flew to Bali to continue the conference agenda in a beach resort hotel. On the third day, the program continues with my third talk on "Some Research Experiences to Share", followed by parallel sessions of paper presentations. During the conference, I had the chance to have intensive discussion with some faculty members and students to understand Indonesia better. The discussion with Prof. Suhardi, regarding how to help operators in Indonesia to adopt the SDN solutions, deserved further follow-up. The discussion with Prof. Trio Adiono was interesting. He has been working hard to build the IT and IC industries in Indonesia. His TEDx talk on "Not only made in Indonesia, but also made by Indonesian" showed his enthusiasm.

Three Lectures and Q&A

The keynote speech was a 40-min talk to an audience of about 100 attendees. I argued why, where, and when for SDN. As the second wave of cloud computing happening to networking, SDN shall turn network appliances to apps. Just like the smartphone industry with app stores, SDN shall have app stores hosting a growing array of apps for various network functions. Since there might not be a dominant supplier, all vendors or developers have the chance on this reorganized market. As Indonesia is building their own IT industry with a focus on media content production, a natural evolution path could be towards app development. My second talk, with about 60 attendees, is an in-depth tutorial for developers on SDN standardization, development, and testing resources. For the first two talks, most questions were on how big and how fast the changes would happen, and how operators could adopt the SDN solutions.

My third talk to about 50 attendees is more interactive to share my research experiences. I described how development triggered my research. To me, research is the non-trivial part identified in the development process. It was always development first and research next for my footprint on wired/wireless networks, QoS, deep packet inspection, traffic forensics, embedded benchmarking, and software defined networking, with three side products – a textbook (Computer Networks: An Open Source Approach), a startup, and a test lab (Network Benchmarking Lab, NBL). I also shared my viewpoints that (1) a new problem with an old solution has more contribution than an old problem with a new solution, (2) looking for research topics through literature survey might lead to similar problems with minor impact, (3) collaboration leads to better quality and progress, (4) even papers published in top conferences or journals might not have high impact eventually, (5) impact of research should be measured in multiple dimensions including citations, licensing, downloads, and startups, etc. Most questions were on the required disciplines to do better research, and how to facilitate collaboration. To me, it takes a capability set of analysis, organization, and creativity. Though creativity is by default most critical, but often lack of organization skills kills a research effort.

Keynote speech in a decent century-old auditorium

Left: A tutorial talk in a seminar room
Right: me, Prof. Arry Arman, Prof. Suhardi, Vice Dean Jaka Sembiring, another speaker Prof. Yong Xiang (Deakin University, Australia)


Left: The third talk in Bali
Right: Prof. Arry Arman, Prof. Intan Mutiaz, Prof. Trio Adiono, me

Appendix:

Talk Title: **Software Defined Networking: Turning Appliances to Apps**

Abstract:
The first wave of cloud computing was to centralize and virtualize servers into the clouds, with a phenomenal result. The emerging second wave, named Software Defined Networking (SDN), is to centralize and virtualize networking, especially its control, into the clouds. SDN deployment started from data centers and now expands to the model of "networking as a service" (NaaS) offered by the operators to enterprise and residential subscribers. By centralizing the control-plane software of routers and switches to the controller, and its applications, and controlling the data-plane of these devices remotely, SDN reduces the capital expenditure (CAPEX) and operational expenditure (OPEX) because the devices become simpler and hence cheaper and number of administrators could be reduced. SDN also enables fast service orchestration because the data plane is highly programmable from the remote control plane at controllers and applications. However, as we detach control plane from where data plane resides, new protocols shall be introduced between control plane and data plane, as the southbound API between controllers and devices and the northbound API between controllers and applications. As we further extend the control plane from controllers to applications such as Service Chaining (SC) and

data plane from devices to Network Function Virtualization (NFV), newer mechanisms and APIs need to be added to these APIs. We argue why, when, and where SDN would prevail, and then illustrate how to make it happen.

Autobiography:

YING-DAR LIN is a Distinguished Professor of Computer Science at National Chiao Tung University (NCTU) in Taiwan. He received his Ph.D. in Computer Science from UCLA in 1993. He served as the CEO of Telecom Technology Center during 2010-2011 and a visiting scholar at Cisco Systems in San Jose during 2007–2008. Since 2002, he has been the founder and director of Network Benchmarking Lab (NBL, www.nbl.org.tw), which reviews network products with real traffic. NBL recently became an approved test lab of the Open Networking Foundation (ONF). He also cofounded L7 Networks Inc. in 2002, which was later acquired by D-Link Corp. His research interests include design, analysis, implementation, and benchmarking of network protocols and algorithms, quality of services, network security, deep packet inspection, wireless communications, embedded hardware/software co-design, and recently software defined networking. His work on “multi-hop cellular” was the first along this line, and has been cited over 650 times and standardized into IEEE 802.11s, IEEE 802.15.5, WiMAX IEEE 802.16j, and 3GPP LTE-Advanced. He is an IEEE Fellow (class of 2013), an IEEE Distinguished Lecturer (2014&2015), and a Research Associate of ONF. He is currently on the Editorial Boards of *IEEE Transactions on Computers, IEEE Computer, IEEE Network, IEEE Communications Magazine - Network Testing Series, IEEE Wireless Communications, IEEE Communications Surveys and Tutorials, IEEE Communications Letters, Computer Communications, Computer Networks, Journal of Network and Computer Applications, and IEICE Transactions on Information and Systems.* He has guest edited several Special Issues in IEEE journals and magazines, and co-chaired symposia at IEEE Globecom’13 and IEEE ICC’15. He published a textbook, *Computer Networks: An Open Source Approach* (www.mhhe.com/lin), with Ren-Hung Hwang and Fred Baker (McGraw-Hill, 2011). It is the first text that interleaves open source implementation examples with protocol design descriptions to bridge the gap between design and implementation.