

專 題 演 講

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Talk Title : Network Cloudification: Turning Communications into Computing with

SDN-NFV and 5G-MEC

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 network cloudification or Software Defined Networking (SDN) and Network Function Virtualization (NFV), is to centralize and virtualize networking into the clouds or data centers. SDN deployment started from data centers and now expands to the model of “networking as a service” (NaaS) offered by the operators. With central office re-architected as a data center (CORD) and mobile edge computing (MEC), operators could offer NaaS to enterprise, residential, mobile subscribers and IoTs. By virtualizing the control-plane software and parts of data-plane hardware of routers, switches, and appliances to the controller and its application servers, SDN-NFV reduces the capital expenditure (CAPEX) and operational expenditure (OPEX) because the devices become simpler and hence cheaper and number of administrators could be reduced, and also enables fast service orchestration. We argue why, when, and where SDN and NFV would prevail, and then illustrate how to make it happen. We shall introduce the key technology components, including OpenFlow, service chaining (SC), NFV, Network Service Header (NSH), CORD, and 5G-MEC, and then review the current status on standardization, development, deployment, and research.

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 in Taipei 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 700 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 has served or is serving on the Editorial Boards of IEEE Transactions on Computers, IEEE Computer (Associate Editor-in-Chief), 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 Communications. 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.