Cheng-Chun Tu (William Tu)

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Education

2008 – Current ***Computer Science Department at Stony Brook University, NY***

5th year Ph.D student, Experimental Computer System Lab by Prof. Tzi-cker Chiueh.

2004 – 2006 ***Chalmers University of Technology, Sweden***

Degree: Master of Science in Engineering, Dependable Computer System, GPA: 3.82/5.0

2001 – 2006 ***National Chiao Tung University (NCTU), Taiwan***

Major: Electrical and Control Engineering, Overall GPA: 3.82/4.0, Major GPA: 3.9/4.0

Work Experience

Summer Intern ***Cloud Computing Center for Mobile Applications, ITRI, Taiwan***

2010, 2011, 2012 Ethernet-based SDN, Rack disaggregation, and Cloud-scale data center network architecture.

Research Assistant ***Institute of Information Science, Academia Sinica, Taiwan***

2008 Researched on Network Security and Multimedia Networking. Studied characteristics of game traffic and attack patterns.

Summer Intern ***High Level OS Team, Texas Instrument, Taiwan***

2006 Developed a software-debugging tool for TI's OMAP platform.

Projects

2013 – current (Hypervisor) ***Bare-Metal I/O Virtualization with Comprehensive Direct Interrupt Delivery***

Design and implement a KVM-based direct interrupt delivery system call DID. DID delivers interrupts from SRIOV device, virtual devices and timers to the target VMs directly without incurring any VM exit.

2012 – current (SDN) ***Autonomic Fail-over for a Software-Defined Container Computer Network***

Design and implement the fast fail-over mechanism in ITRI's container computer using in-band control and standard Ethernet switch.

2012 – 2013 (SDN) ***Middlebox Policy Enforcement Using SDN and OpenFlow switch***

Solving today's middlebox (Firewall, Load balancer, WAN optimizer, etc.) management problem by exploiting the benefits of SDN. Developing the middlebox policy enforcement tool on top of OpenFlow controller (POX).

2011 – 2013 ***Multi-Root I/O Virtualization in a PCIe-based Cluster (I/O Disaggregation)***

Understanding the various device virtualization architectures in the state-of-the-art hypervisors. Implementing a direct device sharing system among multiple virtual machines in a PCIe-based cluster.

2010 – 2012 ***Cloud-Scale Data Center Network Architecture, CCMA, ITRI***

Building a scalable, non-blocking, and fault tolerant Ethernet fabric using commodity switches: an all-Layer 2 network architecture supporting fast fail-over and multi-tenancy requirements.

2009 ***Transparent Reliable Multicast***

Implement a layer between IP and Ethernet to achieve automatic detection of TCP common payload and merge data into a multicast packet. Platform: Netfilter, Netlink, IP and TCP stacks in Linux Kernel.

2008 – 2009 ***Automated Network Service Discovery, CA Inc.***
A prototype that combines existing network management tools, capable of discovering layer 2 network topologies as well as network service dependencies among hosts.

2008 – 2009 ***NMIF: Network Management Interface Framework***
A framework, which can be used in developing user, interfaces for general network management tasks in either wired or wireless environment.

Publications

2013 ACM SIGCOMM ***SIMPLE-fying Middlebox Policy Enforcement Using SDN***
Zafar Qazi, Cheng-Chun Tu, Luis Chiang, Rui Miao, Vyas Sekar, and Minlan Yu.

2013 USENIX ICAC ***Autonomic Fail-over for a Software-Defined Container Computer Network***
Chien-Yung Lee, Yu-Wei Lee, Cheng-Chun Tu, Pai-Wei Wang, Yu-Cheng Wang, Chih-Yu Lin and Tzi-cker Chiueh.

Seamless Bootstrapping of a Dynamically Routed Layer-2 Data Center Network
Cheng-Chun Tu, Pai-Wei Wang, and Tzi-cker Chiueh (Under Submission)

2013 ACM/IEEE ISCA ***Secure I/O Device Sharing among Virtual Machines on Multiple Hosts***
Cheng-Chun Tu, Chao-Tang Lee, and Tzi-cker Chiueh

2013 ONS Open Network Summit ***Practical and Incremental Convergence between SDN and Middleboxes***
Zafar Qazi, Cheng-Chun Tu, Luis Chiang, Rui Miao, Vyas Sekar, and Minlan Yu.

2012 IEEE CLOUD ***Peregrine: An All-Layer-2 Container Computer Network***
Tzi-cker Chiueh, Cheng-Chun Tu, Yu-Cheng Wang, Pai-Wei Wang, Kai-Wen Li, and Yu-Ming Huang

2009 IEEE INFOCOM ***OneClick: A Framework for Measuring Network Quality of Experience***
Kuan-Ta Chen, Cheng-Chun Tu, and Wei-Cheng Xiao

2008 ACM SIGCOMM (poster) ***A User-Centric Framework for Comparing Applications Network Robustness***
Hung-Hsuan Chen, Cheng-Chun Tu, and and Kuan-Ta Chen

2008 ACM SIGCOMM (poster) ***OneClick: A Framework for Measuring Network Quality of Experience***
Cheng-Chun Tu, Kuan-Ta Chen, Yu-Chun Chang, and Chin-Laung Lei

Patents

(Under Examination) US, China, and Taiwan ***Secure I/O Device Sharing among Virtual Machines on Multiple Hosts***
Chao-Tang Lee, Cheng-Chun Tu, and Tzi-cker Chiueh

Convert a Layer 2 Network from Spanning Tree Mode to Explicitly Routed Mesh Mode with In-Band Control
Cheng-Chun Tu, Pai-Wai Wang, and Tzi-cker Chiueh

IP Address Reuse for Virtualized Data Centers
Yu-Cheng Wang, Cheng-Chun Tu, and Tzi-cker Chiueh

Routing Algorithm for a Scalable L2 Network Architecture
Tzi-cker Chiueh, Ming-Chao Hsu, and Cheng-Chun Tu

Data Center Network System and Packet Forwarding Method Thereof
Tzi-cker Chiueh, Cheng-Chun Tu, and Ming-Chao Hsu