

Bojie Li

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2nd year Ph.D. student • Joint Ph.D. program with USTC and MSRA

Education

University of Science and Technology of China

Ph.D. in Computer Science

Joint Ph.D. program with Microsoft Research. Advisor: Kun Tan in Wireless and Networking group.

HEFEI, ANHUI, CHINA

Sept. '14 – present

University of Science and Technology of China

B.S. in Computer Science (School of Gifted Young)

HEFEI, ANHUI, CHINA

Sept. '10 – June '14

Research Interests

Data center networking: Network function virtualization.

Reconfigurable hardware: High level synthesis, Heterogeneous computing.

Publications

ClickNP: Highly Flexible and High-performance Network Processing with Reconfigurable Hardware

Bojie Li, Kun Tan, Layong (Larry) Luo, Yanqing Peng, Renqian Luo, Ningyi Xu, Yongqiang Xiong and Peng Cheng

Proceedings of the 2016 ACM conference on SIGCOMM (SIGCOMM'16) (to appear)

Fast and Cautious: Leveraging Multi-path Diversity for Transport Loss Recovery in Data Centers

Guo Chen, Yuanwei Lu, Yuan Meng, Bojie Li, Kun Tan, Dan Pei, Peng Cheng, Layong (Larry) Luo, Yongqiang Xiong, Xiaoliang Wang and Youjian Zhao

Proceedings of the 2016 USENIX Annual Technical Conference (ATC'16) (to appear)

Research Experience (selected)

ClickNP Packet Processing Platform on FPGA

MICROSOFT RESEARCH ASIA

SIGCOMM'16, first author, instructed by Kun Tan

July '15 – Jan. '16

- The first FPGA-accelerated platform for general network functions, written completely in high-level language and achieving 40 Gbps line rate as well as $< 2\mu\text{s}$ latency at any packet size.
- Support high throughput (25Gbps) and low latency ($1\mu\text{s}$) joint CPU-FPGA processing.
- Implement the ClickNP tool-chain, which can integrate with various commercial HLS tools.
- Work with two senior undergraduates to design and implement 100 elements and 5 network functions.

Fault-tolerant Switch Software Architecture

MICROSOFT RESEARCH ASIA

B.S. dissertation, instructed by Kun Tan

July '13 – May '14

- Design and implementation of a fault-tolerant switch software architecture allowing any component to fail or upgrade without interrupting data plane.
- The control plane will automatically recover within 1 minute after the failed component restarts.
- Designed a daemon (SyncD) to virtualize lookup tables in programmable switching chip and resolve rule conflicts among clients.

Engineering Experience (selected)

USTC Freeshell

UNIV. OF SCIENCE AND TECH. OF CHINA

Founder and main developer

Jan. '13 – July '14

- Container-based IaaS service based on OpenVZ virtualization, supporting various Linux distributions.
- Support migration, IPv4 & IPv6, NAT, port mapping and HTTP(S) proxy.
- Support ~2,000 active containers with merely 7 compute nodes, 1 storage node, 1 controller node and 2 network nodes. Optimize NFS and leverage local disk cache to improve storage efficiency.
- The first IaaS service in USTC, have ~1,500 users. 7K lines of PHP and 1K lines of bash code.

LUG VPN

UNIV. OF SCIENCE AND TECH. OF CHINA

Founder and main developer

Jul. '13 – July '14

- Geolocation DNS-based policy routing, load balancing and failure recovery.
- Access points and exit gateways in 6 ISPs, connected via GRE tunnels in star topology.
- ~1K active users, ~10K active flows and ~500 Mbps traffic in peak periods.

Embedding Backdoor in an Open Source Compiler

UNIV. OF SCIENCE AND TECH. OF CHINA

Course project of Hacker Reverse Engineering Technology

Sept. '12 – Jan. '13

- Implement Ken Thompson's Turing Award lecture *Reflections of Trusting Trust* on **tcc** compiler.
- Inserts backdoor to matches **sulogin** source code to insert login backdoor. The compiler backdoor bootstraps by matching its own source code.

Real-time Disk File System

UNIV. OF SCIENCE AND TECH. OF CHINA

Course project of Principles and Design of Operating Systems

Mar. '12 – June '12

- Improve block device scheduling algorithm and process scheduler for RTLinux-3.2 to enforce strict priority and eliminate disruptions from non-real-time tasks.
- Guarantee response time and throughput for real-time tasks with burst, random, streaming or pipeline I/O modes.

Selected Awards

Microsoft Young Fellowship Scholarship

Aug. '13

Best Creativity Award, Robogame 2011, USTC

Oct. '11

First Prize (rank 10th), China Mathematical Olympiad in Hebei province

Oct. '09

Bronze Medal (rank 69th), National Olympiad in Informatics

Jul. '09

First Prize (rank 2nd), National Olympiad in Informatics in Hebei province

Nov. '08

Skills

Programming: C, OpenCL, Python, Verilog, Bash.

Web development: JavaScript, HTML, CSS, PHP, Node.js, Flask.

Linux: Kernel development, Network management, Server operations and monitoring.

Gitlab: <https://git.ustclug.org/u/boj>