Ethan J. Jackson

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Research Interests

Computer Networks. Software Forwarding. Distributed Systems.
Network Function Virtualization. Software Defined Networking.

Education

PhD, Computer Science
University of California, Berkeley.
In progress since August 2015

Bachelor of Science, Computer Science
Carnegie Mellon University.
May 2009.

Honors and Awards

UC Berkeley EECS Excellence Award, *2015*
UC Berkeley EECS Departmental Fellowship, *2015*
NSDI Best Paper Award, *2015*
HotSDN Best Paper Runner-up, *2014*

Publications

The Design and Implementation of Open vSwitch. Ben Pfaff, Justin Pettit, Teemu Koponen, **Ethan J. Jackson**, Andy Zhou, Jarno Rajahalme, Jesse Gross, Alex Wang, Joe Stringer, Pravin Shelar, Keith Amidon, Martín Casado. **NSDI 2015**. *Best Paper.*

Network Virtualization in Multi-tenant Datacenters. Teemu Koponen, Keith Amidon, Peter Balland, Martín Casado, Anupam Chanda, Bryan Fulton, Igor Ganichev, Jesse Gross, Natasha Gude, Paul Ingram, **Ethan J. Jackson**, Andrew Lambeth, Romain Lenglet, Shih-Hao Li, Amar Padmanabhan, Justin Pettit, Ben Pfaff, Rajiv Ramanathan, Scott Shenker, Alan Shieh, Jeremy Stribling, Pankaj Thakkar, Dan Wendlandt, Alexander Yip, Ronghua Zhang.
NSDI 2014.

Flow Caching for High Entropy Packet Fields. Nick Shelly, **Ethan J. Jackson**, Teemu Koponen, Nick McKeown, Jarno Rajahalme. **HotSDN 2014**. *Best Paper Runner-up.*

Patents

Granted

Fault Tolerant Managed Switching Element Architecture.
Ben Pfaff, **Ethan J. Jackson**, Teemu Koponen, Pankaj Thakkar.
#8913483. *Filed 2011.*

Pending

Tracking Prefixes of Values Associated with Different Rules to Generate Flows.
Ethan J. Jackson, Jarno Rajahalme, Nicholas Shelly, Teemu Koponen.
#20150092778. *Filed 2014.*

Generating Flows Using Common Match Techniques.
Nicholas Shelly, **Ethan J. Jackson**, Teemu Koponen.
#20150078385. *Filed 2014.*

Performing a Multi-Stage Lookup to Classify Packets.
Ethan J. Jackson, Jarno Rajahalme.
#20150078386. *Filed 2014.*

Tracking Prefixes of Values Associated with Different Rules to Generate Flows.
Ethan J. Jackson, Jarno Rajahalme.
#20150078384. *Filed 2014.*

Multiple Active L3 Gateways for Logical Networks.
Pankaj Thakkar, **Ethan J. Jackson**, Benjamin Basler.
#20150063364. *Filed 2014.*

High Availability L3 Gateways for Logical Networks.
Pankaj Thakkar, **Ethan J. Jackson**, Benjamin Basler, Joseph Garcia.
#20150063360. *Filed 2014.*

Installing and Managing Flows in a Flow Table Cache.
Ethan J. Jackson.
#20150169457. *Filed 2013.*

Dynamically Adjusting the Number of Flows Allowed in a Flow Table Cache.
Ethan J. Jackson.
#20150169451. *Filed 2013.*

Adjusting Connection Validating Control Signals in Response to Changes in Network Traffic.
Ethan J. Jackson, Keith Amidon, Andy Zhou.
#20150089048, #20150085655. *Filed 2013.*

Dynamically Generating Flows with Wildcard Fields.
Justin Pettit, **Ethan J. Jackson**, Jesse Gross, Andy Zhou.
#20150081833. *Filed 2013.*

Industry Experience

Nicira Inc. / VMware Inc.
September 2010 - September 2015
Staff Engineer

- Core committer of Open vSwitch, the premier OpenFlow switch, with over eight hundred code contributions.
- Architect and developer of high availability solutions for the SDN dataplane including high performance tunnel monitoring, fast failover mechanisms, and middlebox leader election.
- Lead Engineer of the Open vSwitch multi-threaded slow path architecture leading to a *20 times* increase in flow cache size and a *50 times* improvement in cache miss performance.
- Inventor of advanced flow cache management algorithms which dramatically increase Open vSwitch flow cache capacity and efficiency.
- Consulting architect of the Open vSwitch DPDK port resulting in an order of magnitude improvement in packet forwarding performance.
- Mentor of two successful junior engineers and an intern.

Yahoo! Inc.
July 2009 - September 2010
Software Engineer

- Owner of the HTTP routing information manager of Yahoo! Cloud Serving Engine, a distributed system responsible for automatically deploying Yahoo! applications in the cloud.
- Maintainer of the Yahoo! Apache Web Server and the Yahoo! Core C Libraries, critical components of production infrastructure.
- Developer of numerous critical infrastructure enhancements in preparation for IPv6.

Research Experience

University of California, Berkeley
Principal Investigator: Prof. Scott Shenker
May 2014 - Present
Researcher

Primary research focus is on SoftFlow, a framework bringing the programmability of SDN to Network Function Virtualization. Also consulting on a number of projects ranging from high performance software switching, to novel L2 network architectures.

Carnegie Mellon University
May 2006 - May 2009
Research Assistant

Assisted with numerous research projects including a personal cognitive assistant called *RADAR*, a Java API for programming *Nintendo Wii Remotes*, and *Perspectives*, a project designed to improve fundamental vulnerabilities in the Public Key Infrastructure.