

# Ethan J. Jackson

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## RESEARCH INTERESTS

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

## EDUCATION

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### 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

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UC Berkeley EECS Excellence Award, *2015*

UC Berkeley EECS Departmental Fellowship, *2015*

NSDI Best Paper Award, *2015*

HotSDN Best Paper Runner-up, *2014*

## PUBLICATIONS

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Taking an AXE to L2 Spanning Trees. James McCauley, Alice Sheng, **Ethan J. Jackson**, Barath Raghavan, Sylvia Ratnasamy, Scott Shenker. **HotNets 2015.**

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

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### 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

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**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

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### **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.