Software-Defined Networking and the Floodlight OpenFlow Controller

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Big Switch / Symantec Overview

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Big Switch Networks

Big Switch Networks is a market leader in Open Software-Defined Networking

Highlights:

- World leader in virtualization and networking technology
- Architecture used by the Top 10 leading international and high-tech companies
- Open source projects including Floodlight, Indigo, OFTest, etc.

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Symantec

Symantec is a global leader in providing security, storage, and systems management solutions.

Highlights:

- #391 on the Fortune 500 list
- Over 20,000 employees worldwide
- FY12: $6.7B in revenue
- Global infrastructure operations

What is OpenFlow?

Controller <-> Switch communication

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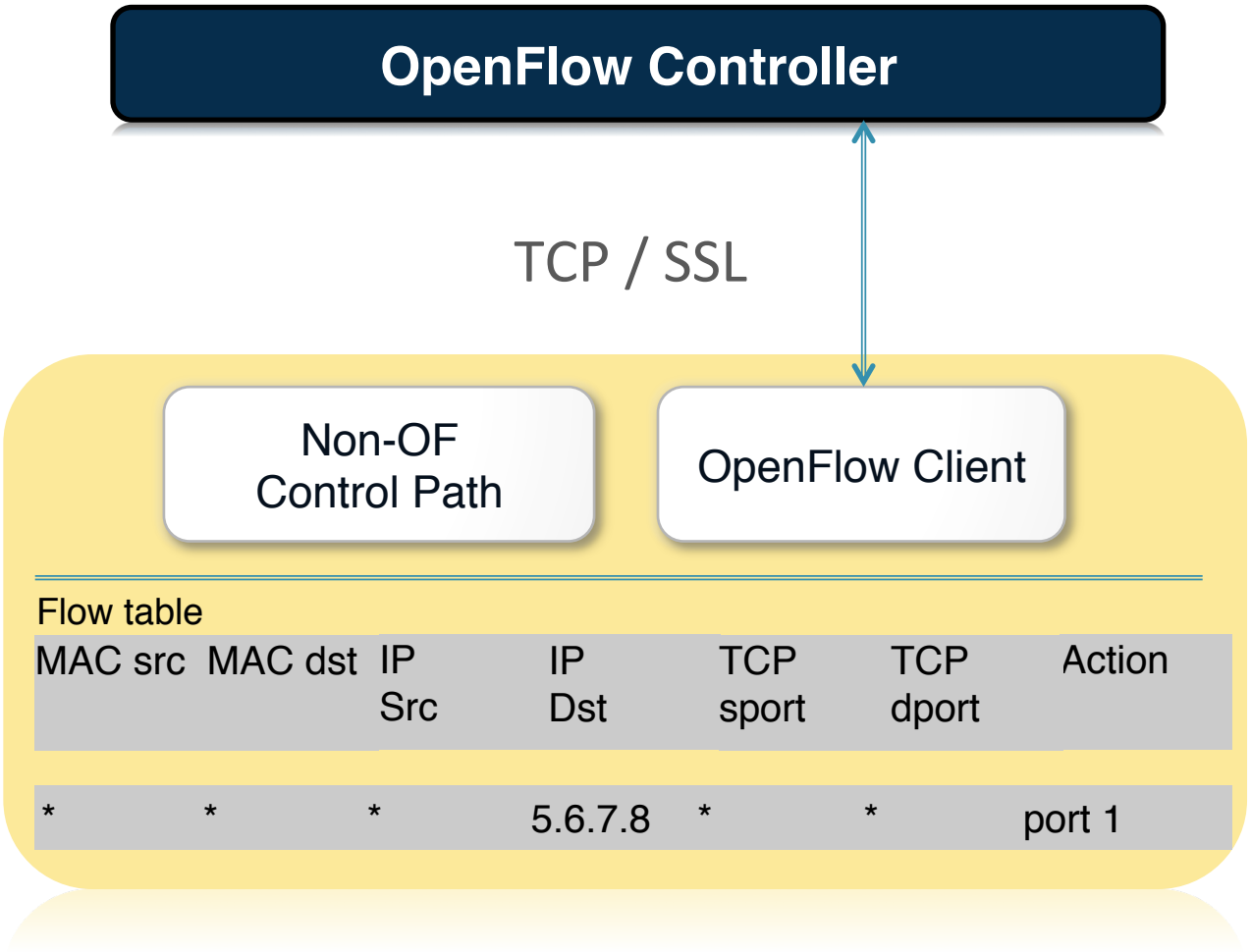
- ***Remote API for control of packet forwarding***
- Based on Ethernet Switch with:
  - OF software client
  - Hardware flow table
- Control channel between switch and controller
- Open and standardized protocol



Open Software-Defined Networking

Being open and vendor agnostic is critical to success

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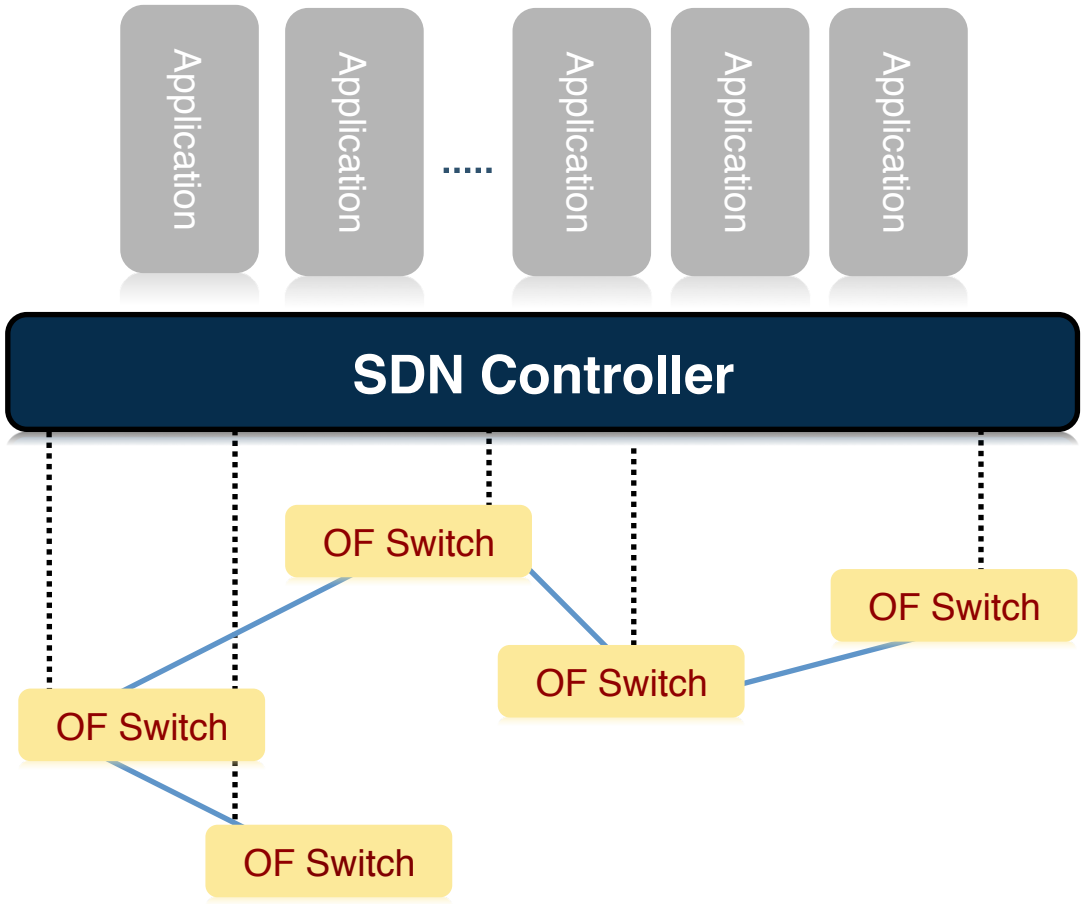

1) Open APIs

2) Open source

3) Open Protocols

Software-Defined Networking decouples data, control, and application planes, creating a programmable network

Introducing Floodlight

An Apache licensed OpenFlow Controller

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- Developer friendly Apache license
- Easy to use, extensible Java development environment
- Enterprise grade - Core engine used and supported by Big Switch Networks (running in production today)
- Supports a broad range of physical and virtual OpenFlow switches
- OF 1.0 compliant today – future OF versions on the way

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Real World Examples

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1

Programmable Patch Panel that can be accessed through an iPhone application.

Programmable Patch Panel

2

Support for the Quantum Virtual Networking Module, exposing virtual networks to OpenStack.

openstack™

OpenStack Virtual Networks

3

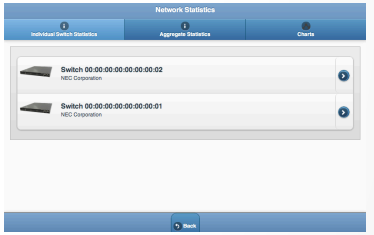
First SDN-capable deep packet inspection working with Floodlight

ARMOUR

OpenFlow Security

4

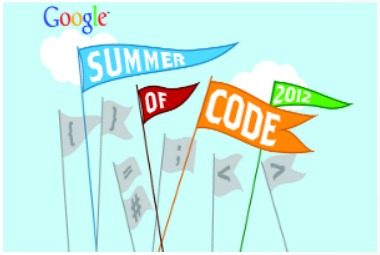
iPad interface showing switches, topoplogy, devices, and managing static flows



iPad Interface

5

Projects include Firewall, Load Balancer, and Flowvisor integration



Google Summer of Code

Floodlight Users and Contributors

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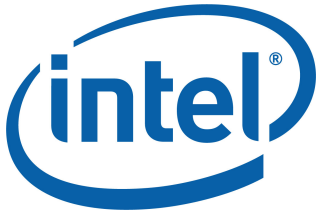

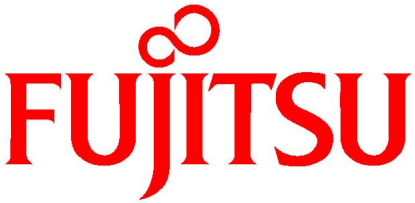

Floodlight Adopters:

- University research
- Networking vendors
- Users
- Developers / startups

Building Floodlight

Fast…and easy…

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Download from Github

$ git clone git://github.com/floodlight/floodlight.git

$ sudo apt-get install build-essential default-jdk ant python-dev

$ cd floodlight; ant

$ java –jar target/floodlight.jar

Get the VM (including mininet)

$ wget http://floodlight.openflowhub.org/files/floodlight-vm.zip

(login as “floodlight” user, no password)

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Floodlight Switch Compatibility

A snapshot from Interop

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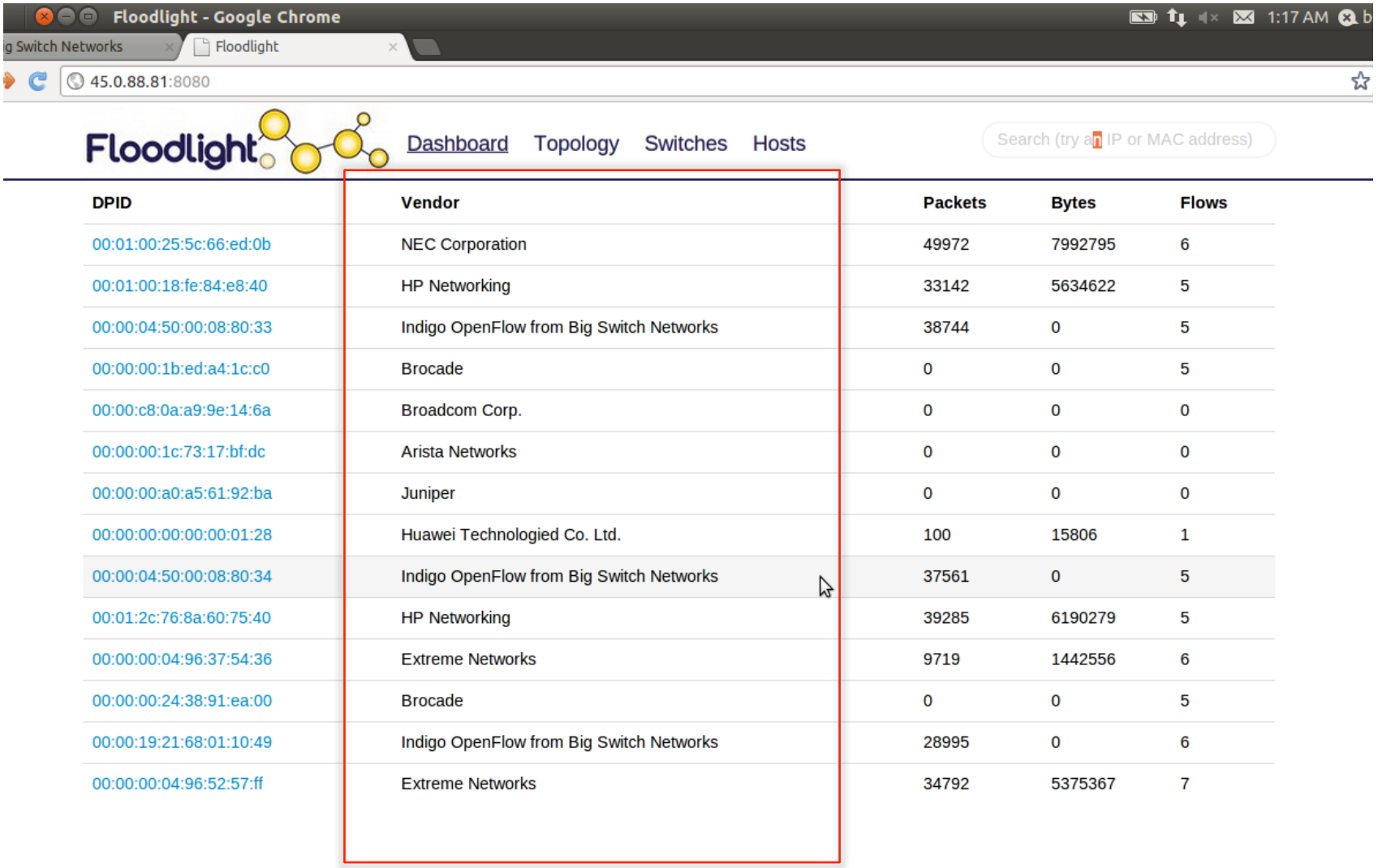

DPID	Vendor	Packets	Bytes	Flows
00:01:00:25:5c:66:ed:0b	NEC Corporation	49972	7992795	6
00:01:00:18:fe:84:e8:40	HP Networking	33142	5634622	5
00:00:04:50:00:08:80:33	Indigo OpenFlow from Big Switch Networks	38744	0	5
00:00:00:1b:ed:a4:1c:c0	Brocade	0	0	5
00:00:c8:0a:a9:9e:14:6a	Broadcom Corp.	0	0	0
00:00:00:1c:73:17:bf:dc	Arista Networks	0	0	0
00:00:00:a0:a5:61:92:ba	Juniper	0	0	0
00:00:00:00:00:00:01:28	Huawei Technologied Co. Ltd.	100	15806	1
00:00:04:50:00:08:80:34	Indigo OpenFlow from Big Switch Networks	37561	0	5
00:01:2c:76:8a:60:75:40	HP Networking	39285	6190279	5
00:00:00:04:96:37:54:36	Extreme Networks	9719	1442556	6
00:00:00:24:38:91:ea:00	Brocade	0	0	5
00:00:19:21:68:01:10:49	Indigo OpenFlow from Big Switch Networks	28995	0	6
00:00:00:04:96:52:57:ff	Extreme Networks	34792	5375367	7

Floodlight Roadmap

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Recently launched:

- Module system
- Ubuntu PPA's
- Quantum / OpenStack
- Web UI
- Performance improvements

Roadmap:

- OpenFlow 1.x support
- Command line interface
- Persistent storage
- Python / Jython support
- Firewall, Load balancer apps
- Web UI 2.0
- Stable northbound APIs
- Better Documentation

Interested in Learning More?

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- Check out the website
  - http://floodlight.openflowhub.org
- Join the mailing list:
  - http://groups.google.com/a/openflowhub.org/group/floodlight-dev/topics
  - Or just email floodlight-dev@openflowhub.org
- Get the code:
  - http://floodlight.openflowhub.org/download