SDN Controllers

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Different SDN Controllers

- NOX
- POX
- Ryu
- Floodlight
- OpenDayLight (enterprise-class, large scale)

NOX

- First-generation Openflow controller
  - open-source, stable, widely used, stopped developing and supporting

- Two flavors
  - "Classic": C++/ Python
  - new NOX: C++ only, fast, clean

POX

- "Younger sibling" of NOX
  - Pythonic OpenFlow interface
  - codes are easy to read, poor documentation
  - default controller of mininet

- Support OpenFlow 1.0, 1.2, 1.3 and Nicira
  - also support OpenStack
  - somehow I can not visit the official site of NOX and POX (http://www.noxrepo.org/pox/about-pox/)

Ryu

- Python
  - easy to learn, easy to read source code
  - good encapsulation
  - has some developing example
  - active mailing list

- Support OpenFlow 1.0, 1.2, 1.3 and Nicira
  - also support OpenStack

Floodlight

- Java
  - good documentation and modularity
  - good performance
  - enterprise-class
- Has been used in practice (OpenStack)
- Support OpenFlow 1.0
  - can handle OpenFlow and non-OpenFlow mixed network

	POX	Ryu	Trema	FloodLight	OpenDaylight
Interfaces	SB (OpenFlow)	SB (OpenFlow) +SB Management (OVSDB JSON)	SB (OpenFlow)	SB (OpenFlow) NB (Java & REST)	SB (OpenFlow & Others SB Protocols) NB (REST & Java RPC)
Virtualization	Mininet & Open vSwitch	Mininet & Open vSwitch	Built-in Emulation Virtual Tool	Mininet & Open vSwitch	Mininet & Open vSwitch
GUI	Yes	Yes (Initial Phase)	No	Web UI (Using REST)	Yes
REST API	No	Yes (For SB Interface only)	No	Yes	Yes
Productivity	Medium	Medium	High	Medium	Medium
Open Source	Yes	Yes	Yes	Yes	Yes
Documentation	Poor	Medium	Medium	Good	Medium
Language Support	Python	Python-Specific + Message Passing Reference	C/Ruby	Java + Any language that uses REST	Java
Modularity	Medium	Medium	Medium	High	High
Platform Support	Linux, Mac OS, and Windows	Most Supported on Linux	Linux Only	Linux, Mac & Windows	Linux
TLS Support	Yes	Yes	Yes	Yes	Yes
Age	1 year	1 year	2 years	2 years	2 Month
OpenFlow Support	OF v1.0	OF v1.0 v2.0 v3.0 & Nicira Extensions	OF v1.0	OF v1.0	OF v1.0
OpenStack Networking (Quantum)	NO	Strong	Weak	Medium	Medium

APIs

- All these controllers have event handler, support almost all kinds of packets and protocols.

- Floodlight has APIs for firewalls and ACL.
  - it also has REST APIs to access some static data.
  - for now, its API documentation cannot be visited…

Summary

- Ryu vs. POX: Ryu has better documentation and better open-source society

- Ryu vs. Floodlight
  - Python or Java? (Familiar with Java, can read Python but rarely write in it)