SDN Controllers - 2

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Introduction to Floodlight

❖ Floodlight

- A completely open, free, OpenFlow controller developed by Big Switch Network
- Currently supports OpenFlow up to v1.3 (Dec., 2014)

Apache

Research and commercial friendly

Java Jython

Easy to build, run, and develop

Toolchain

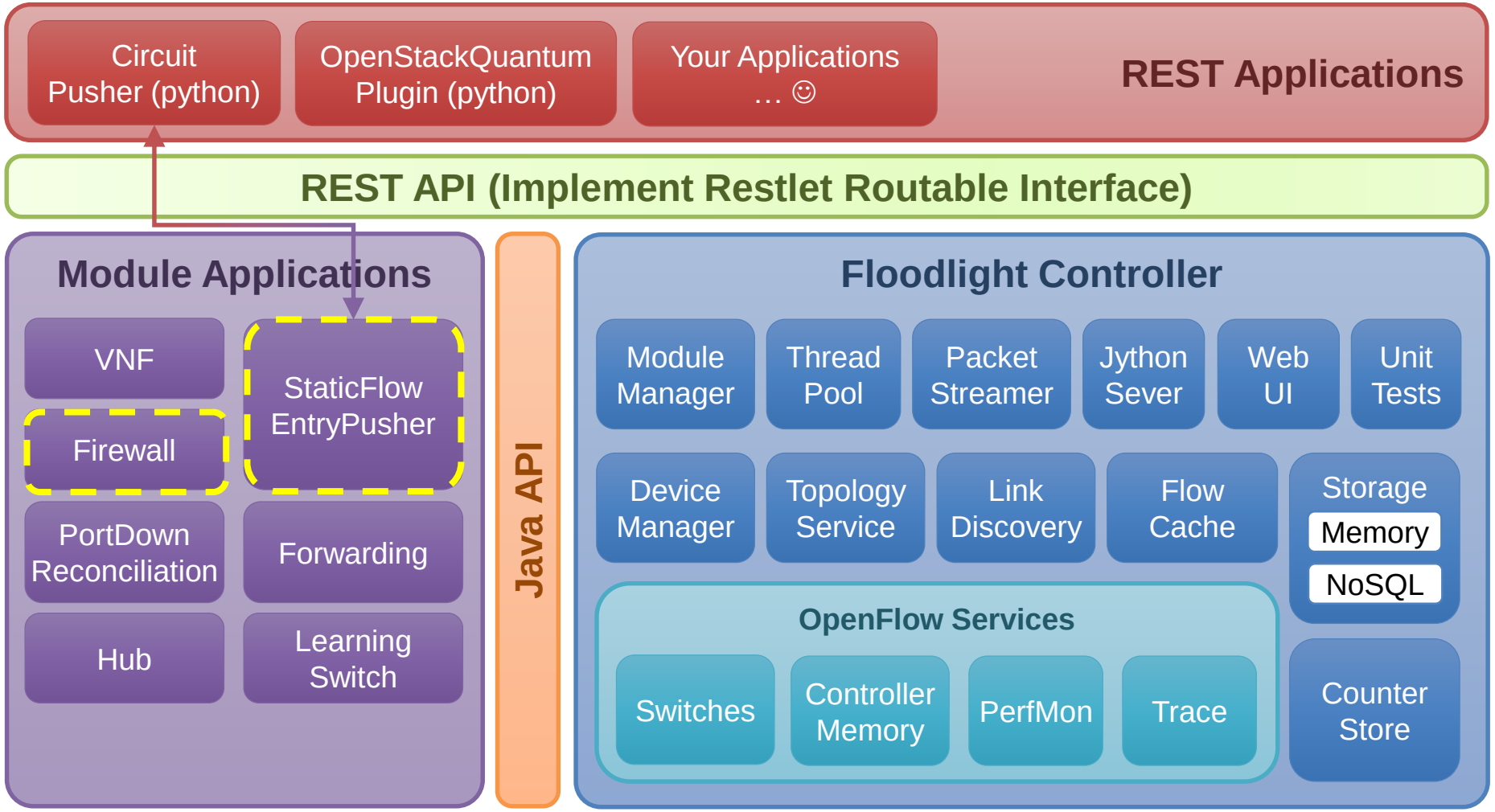
Rich set of build and debugging tools

big switch network OpenFlowHub BROADCASTING OPENFLOW

Community of OpenFlow experts, access to commercial upgrades, and frequent testing

Floodlight Overview (1/3)

❖ Floodlight Architecture



Floodlight Overview (2/3)

❖ Application Modules

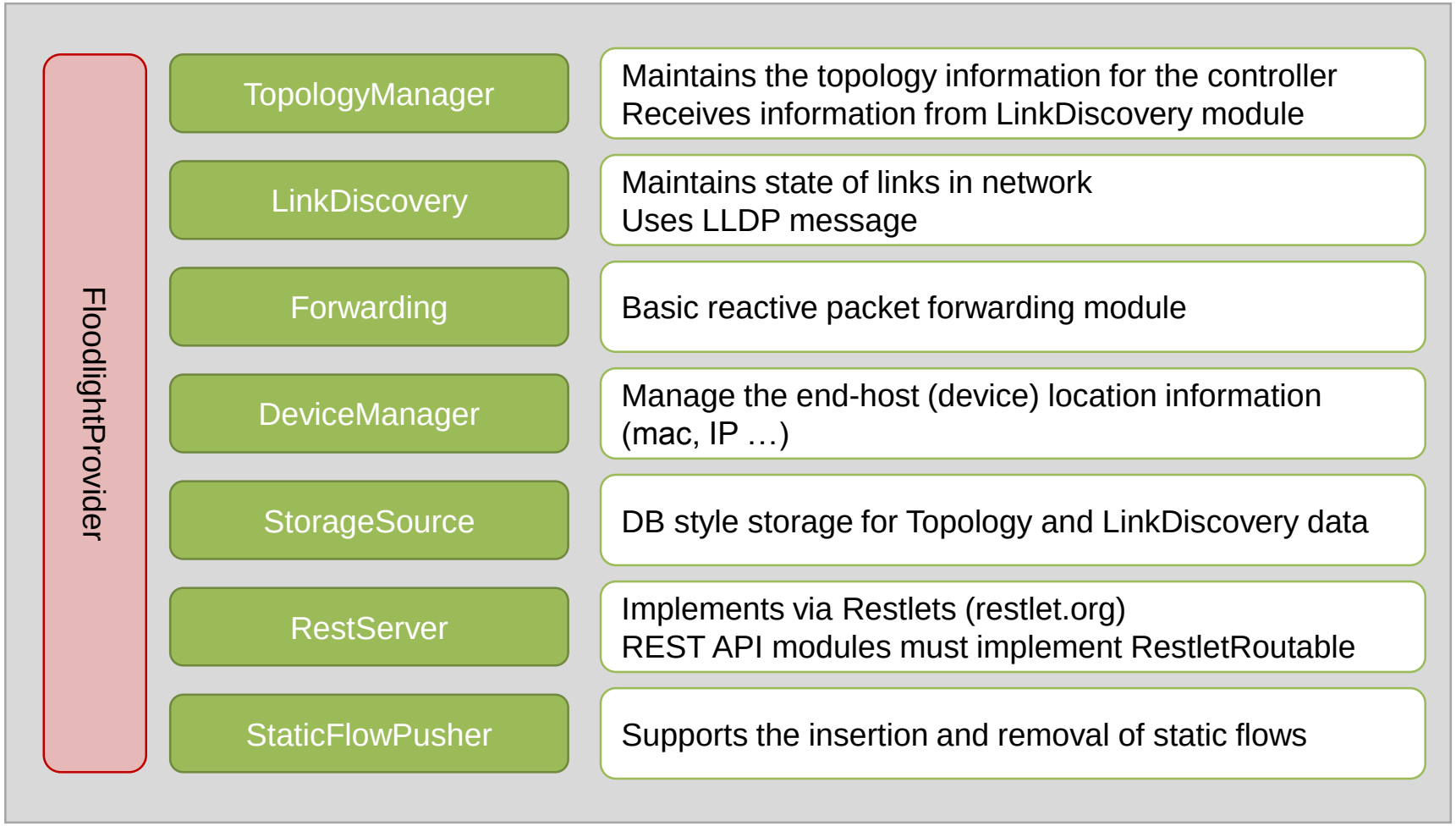
- Forwarding: default reactive packet forwarding application
- Static Flow Entry Pusher
  - Install specific flow entry (match + action) to a specific switch
- Firewall
  - An application to apply ACL rules to allow/deny traffic based on specified match
- Port Down Reconciliation: reconcile flows across a network
- Virtual Network Filter (VNF)
  - Simple MAC-based network isolation application

❖ Core REST APIs

- Static Flow Pusher REST API
  - Allow the user to proactively insert/delete/list the flows to OpenFlow switch
- Firewall REST API
  - Allow the user to insert/delete/list rules for firewall

Floodlight Overview (3/3)

❖ Module Description



Introduction to Ryu

流

Flow

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Oriental Dragion,
A god of water

Introduction to Ryu

Ryu

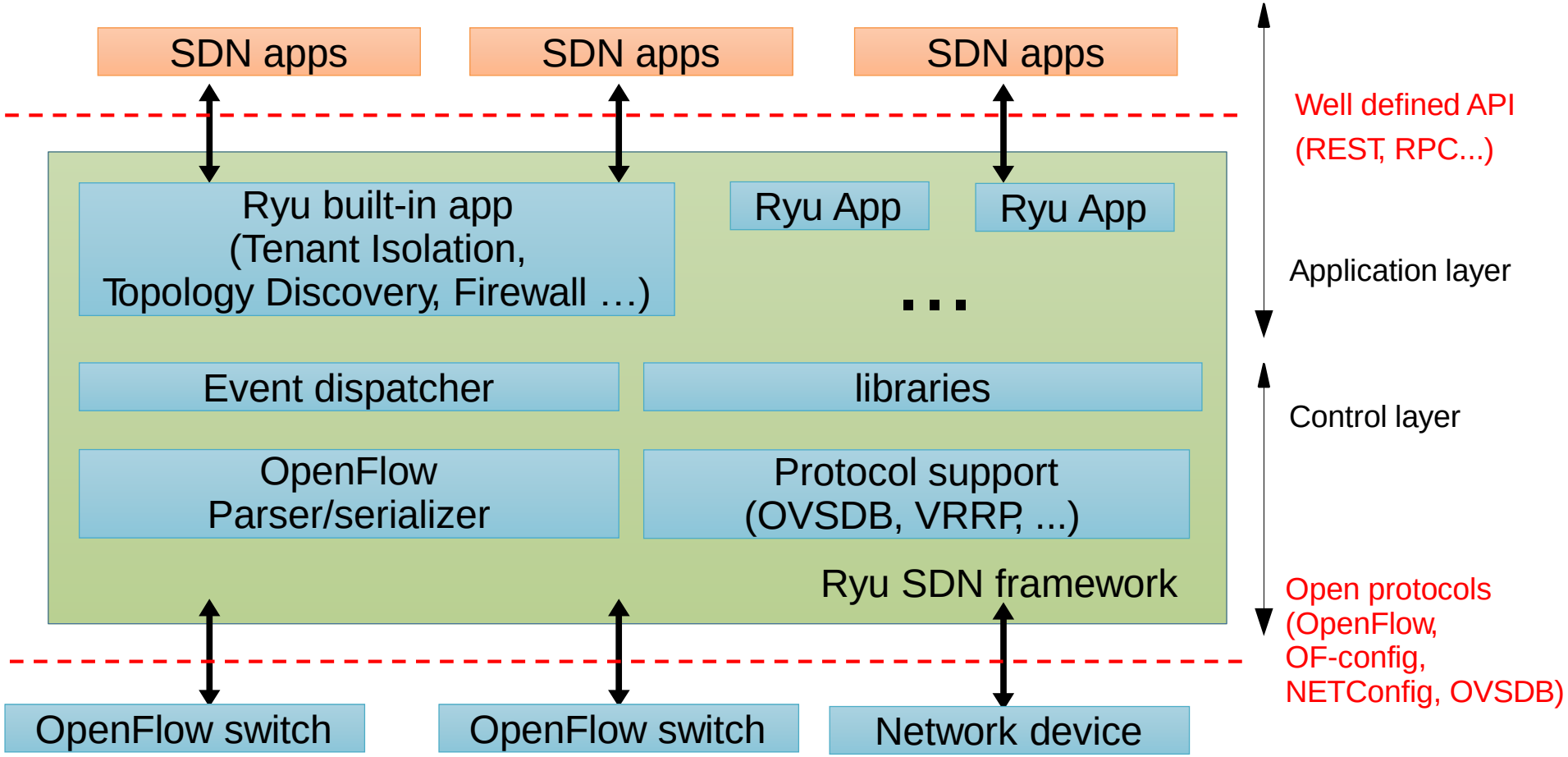
- A platform for building OpenFlow applications
- Manage “flow” control to enable intelligent networking
- Features
  - Generality: vendor-neutral, support open interface
  - Agile: not the all-purpose big monolithic “controller”, but the framework for SDN app dev.
- Supportability
  - OpenFlow protocol
    - OF 1.0, OF 1.2, OF 1.3 and OF-CONFIG 1.1
  - Other protocol: NetCONF, SNMP, OVSDB
  - Apps/libs
    - topology view, firewall, OpenFlow Restful, etc.
  - Integration with other project
    - OpenStack, HA with Zookeeper, IDS with snort
- License: Apache 2.0

Developed & Maintained By

NTT

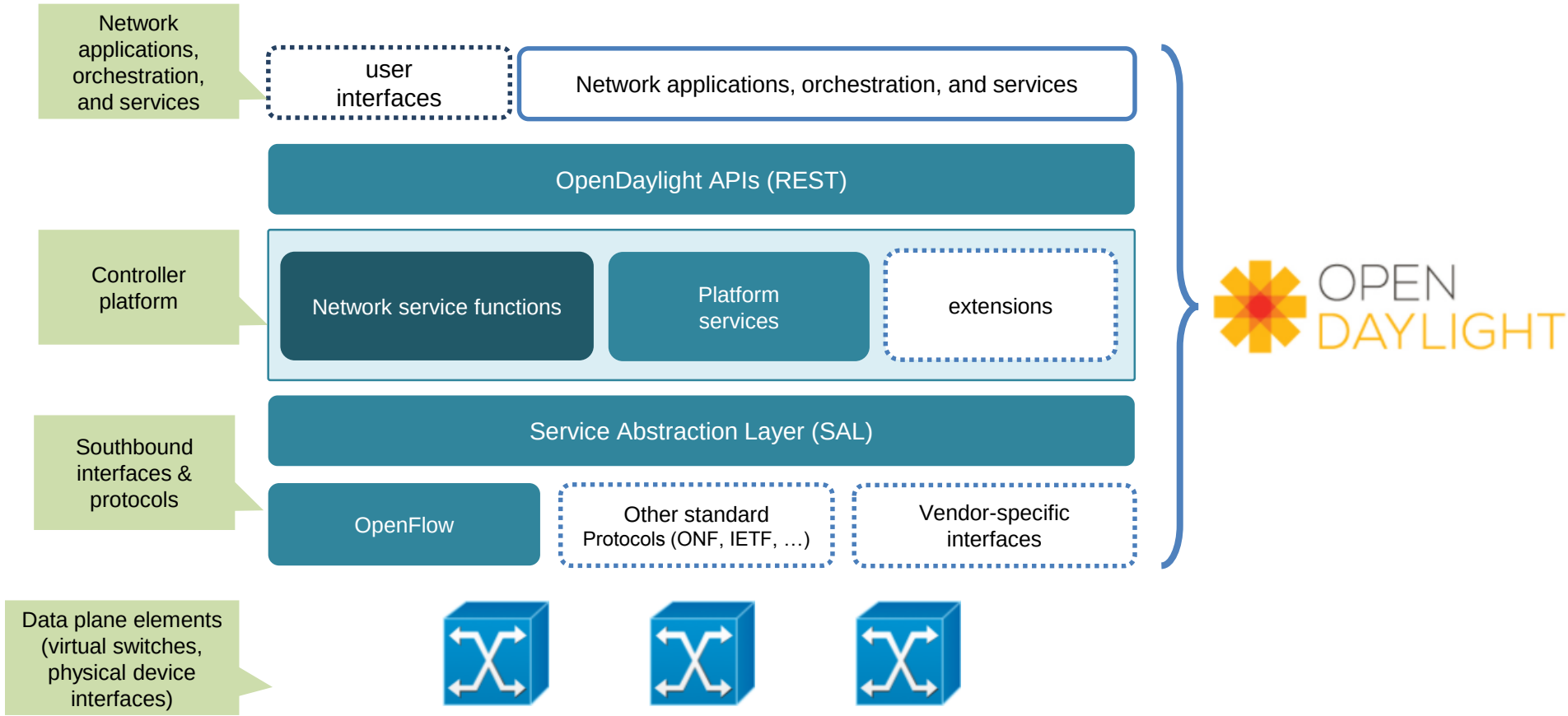
Ryu Architecture

❖ Follow Standard SDN Architecture



OpenDaylight Scope and Projects

❖ Project Framework



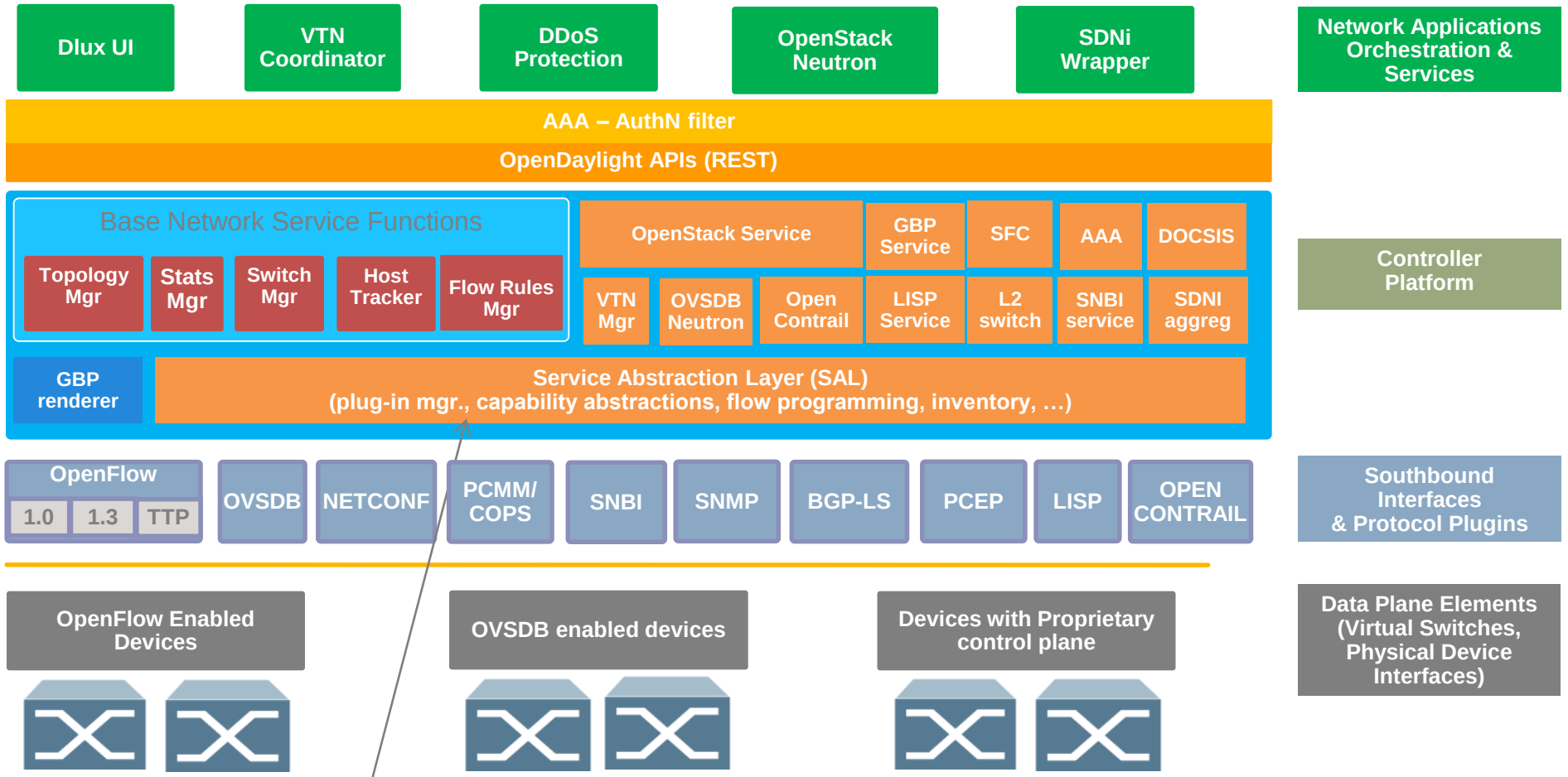
OpenDaylight Scope and Projects

❖ OpenDaylight Projects

- 15 projects currently in bootstrap or incubation

Project	Description	Originator
Controller	Modular, extensible, scalable, and multi-protocol SDN controller based on OSGi	Cisco
YANG Tools	Java-based NETCONF and YANG tooling for OpenDaylight projects	Cisco
OpenFlow Protocol Library	OF 1.3 protocol library implementation	Pantheon
OpenFlow Plugin	Integration of OpenFlow protocol library in controller SAL	Ericsson, IBM, Cisco
Defense4All	DDoS detection and mitigation framework	Radware
OVSDB	OVSDB configuration and management protocol support	Univ. of Kentucky
LISP Flow Mapping	LISP plugin, LISP mapping service	ConteXtream

Helium Architecture

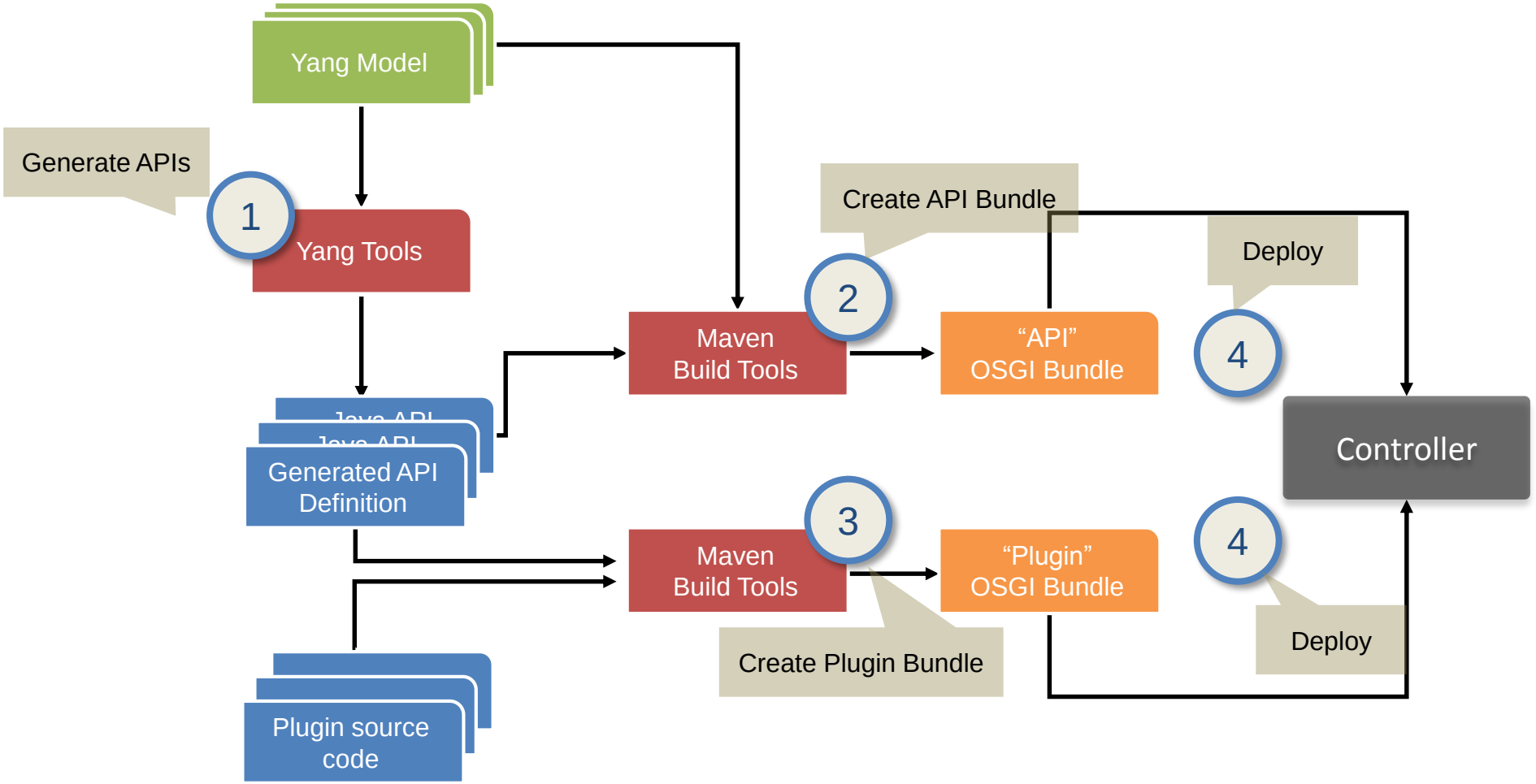


Main difference from other OpenFlow-centric controller platforms

VTN: Virtual Tenant Network
DDoS: Distributed Denial Of Service
LISP: Locator/Identifier Separation Protocol
OVSDB: Open vSwitch DataBase Protocol
BGP: Border Gateway Protocol
PCEP: Path Computation Element Communication Protocol
PCMM: Packet Cable MultiMedia
SNMP: Simple Network Management Protocol

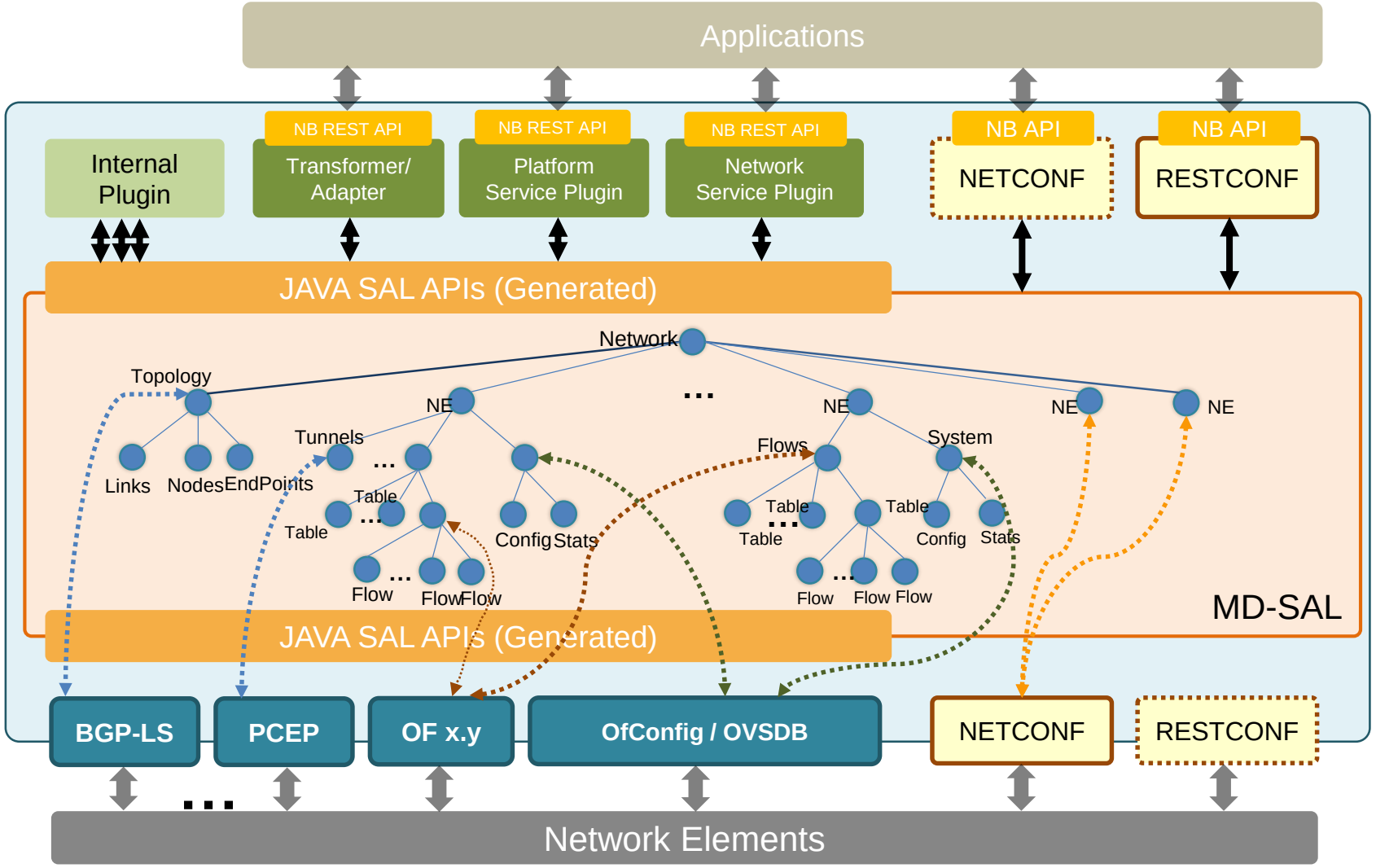
OpenDaylight Controller

❖ Plugin Build Process



Model-Driven SAL

❖ Model-Driven Service Abstraction Layer (SAL)



References

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6. POX: https://github.com/noxrepo/pox
7. Ryu: https://osrg.github.io/ryu/
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