

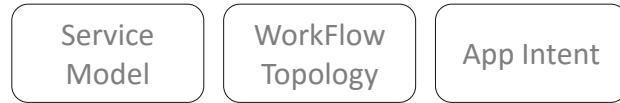


# SDN Controller/ Orchestration/ FastDataStacks

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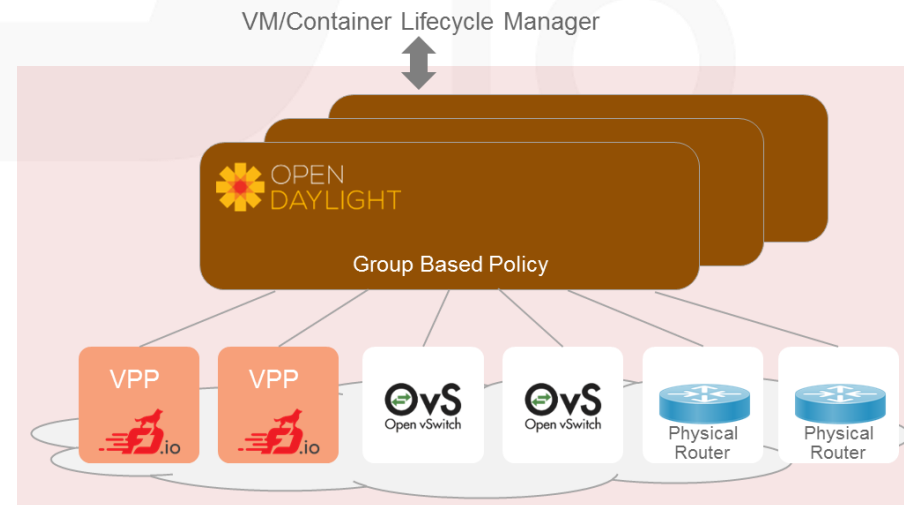
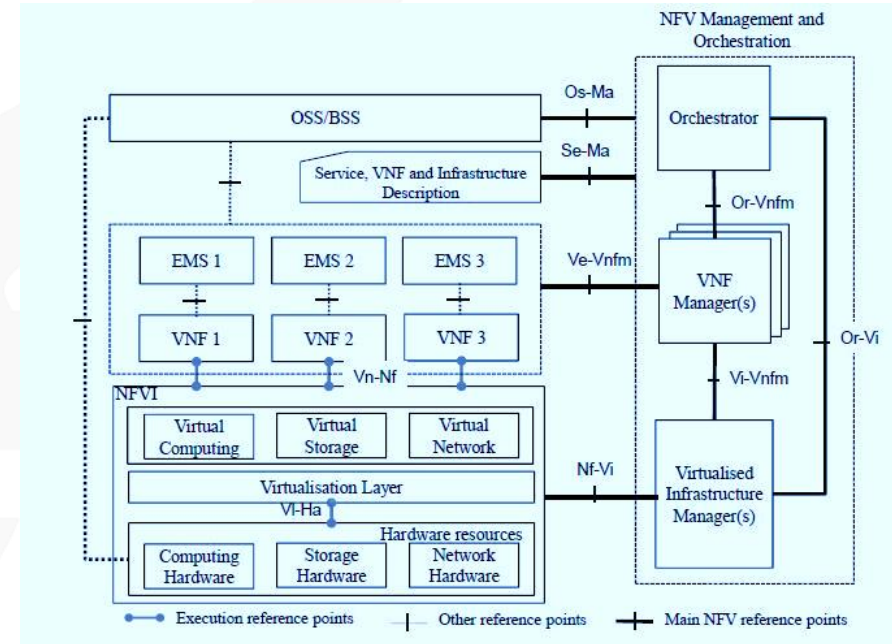
# Building Blocks



Service/WF Life Cycle Manager

Virtual Machine/Container Life Cycle Manager

Network Controller Forwarder – Switch/Router



# What are these

- ETSI Defines an overall architecture and components for designing NFV solutions
- OPNFV is building a solution to realize the ETSI NFV Architecture
- ODL is building a controller to enable multiple entities to work with underlying infrastructure
- So where does that leave forwarding?

# Controllers

- NFV is intended to be deployable in data centers and smaller facilities
- In all of these, one needs to coordinate a lot of elements to deliver an NFV solution
- There are a range of pieces used for that coordination
  - Element and Network Management
  - Orchestration
  - SDN Controllers

# NFV and SDN controllers

- SDN controllers provide means to work with the network
- This includes both real hardware forwarders, and many flavors of software forwarders
- In order to create the needed state to operate NFVi
  - This can include both Overlay and Underlay technologies
  - Which may be separate or combined

# About those forwarders

- Any facility will have hardware that provides interconnect
  - Sorry, it appears very unlikely we will use plain PCs for all forwarding
- At the same time, NFV and SDN technologies require many specialized pieces of forwarding
  - Which may be delivered in hardware or software
- And we likely need to create overlay forwarding logic on demand, for tenants and other interesting cases

# Fast Data I/O - Software

- We need the ability to create fast, flexible, extensible, user space packet handling
- It has to be able to take advantage of performance features
  - For example, DPDK
  - And CPU capabilities such as Single-Instruction Multiple-Data
  - And very efficient cache interaction



# FD.IO - Uses

- If we have that software forwarder...
- We can create virtual switches for tenants wherever they are need
- We can create scalable software based specialized software forwarders
  - NAT, Firewall, Service Chaining NSH SFF
- And we can enable high performance applications
  - Content Transcoding, DPI, Charging, ...







# FastDataStacks

VPP as part of NFV Solution Stacks

# Foundational Assets For NFV Infrastructure

A stack is only as good as its foundation

- Virtual Forwarder
  - Feature rich, high performance, highly scale virtual switch-router
  - Leverages hardware accelerators
  - Runs in user space
  - Modular and easy extensible
- Forwarder Diversity: Hardware and Software
  - Virtual Domains link and interact with physical domains
- Domains and Policy
  - Connectivity should reflect business logic instead of physical L2/L3 constructs

Service  
Model

WorkFlow  
Topology

App Intent

Service/WF Life Cycle Manager

Virtual Machine/Container  
Life Cycle Manager

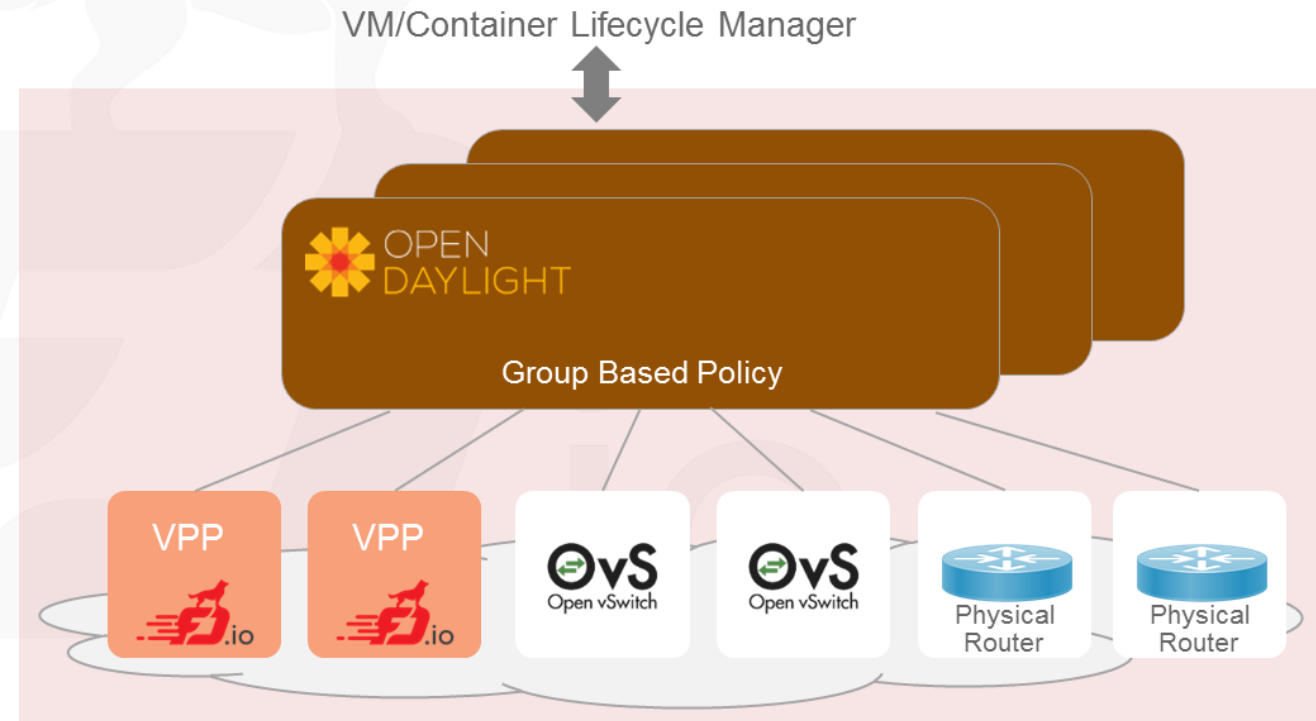
Network Controller  
Forwarder – Switch/Router



# Networking Foundation for NFV Infrastructure

## Choices

- VPP
  - Highly scalable, high performance, extensible virtual forwarder
- OpenDaylight
  - Extensible controller platform
  - Group Based Policy to separate business logic from network constructs
  - Support for a diverse set of network devices
  - Clustering for HA



# Evolving The OPNFV Scenario Set

- OPNFV performs system integration as an open community effort:
  - Create Components (in lock-step with Upstream Communities)
  - Compose / Deploy / Test
  - Iterate (in a distributed, multi-vendor CI/CD system)
- OPNFV scenarios in the Brahmaputra release were focused on OVS as virtual forwarder
- Create a new stack which significantly evolves networking for NFV: Introduce Scenarios with VPP for OPNFV Colorado

Category	Components in OPNFV
Install Tools	Apex, Compass, Fuel, Juju
VM Control	OpenStack
Network Control	OpenDaylight, ONOS, OpenContrail
Hypervisor	KVM, KVM4NFV
Forwarder	OVS, OVS-DPDK + VPP

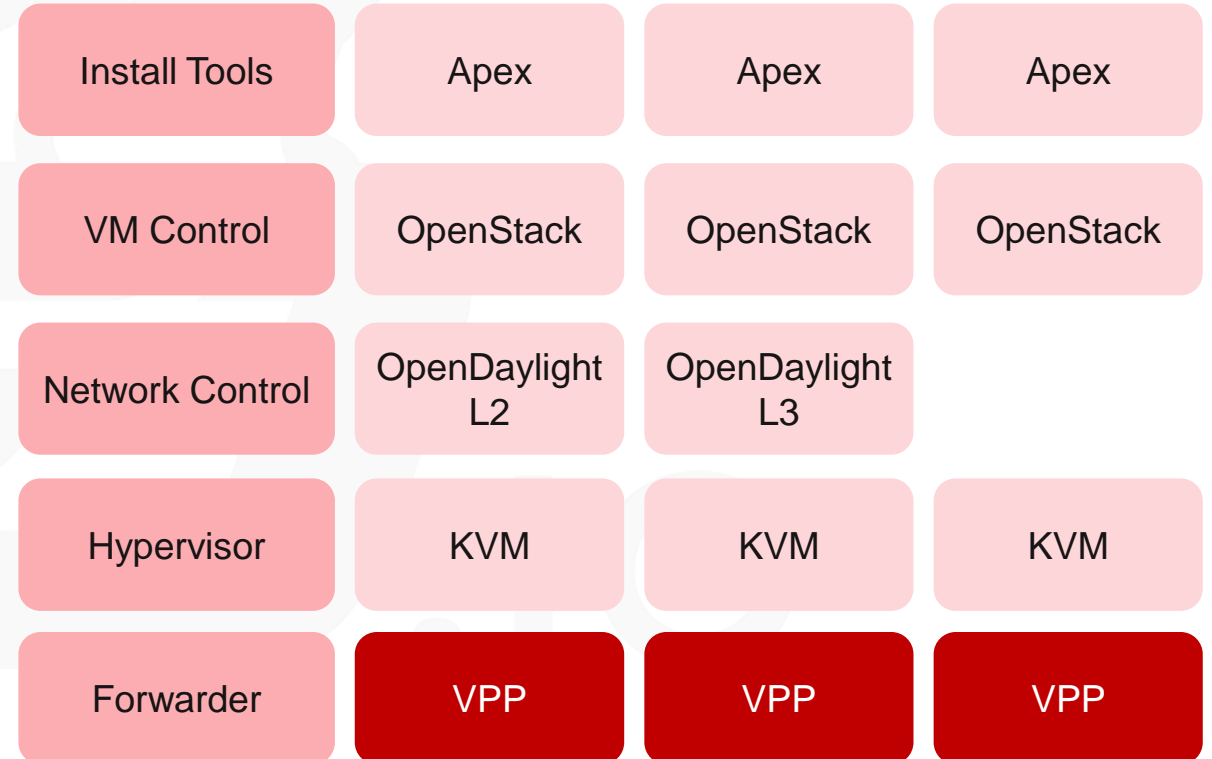
# OPNFV FastDataStacks (FDS)



- Integrate VPP into existing OPNFV scenarios
- Initial scenarios
  - OpenStack – ODL (Layer2) – VPP
  - OpenStack – ODL (Layer3) – VPP
  - OpenStack – VPP
  - ...
- Diverse set of contributors:



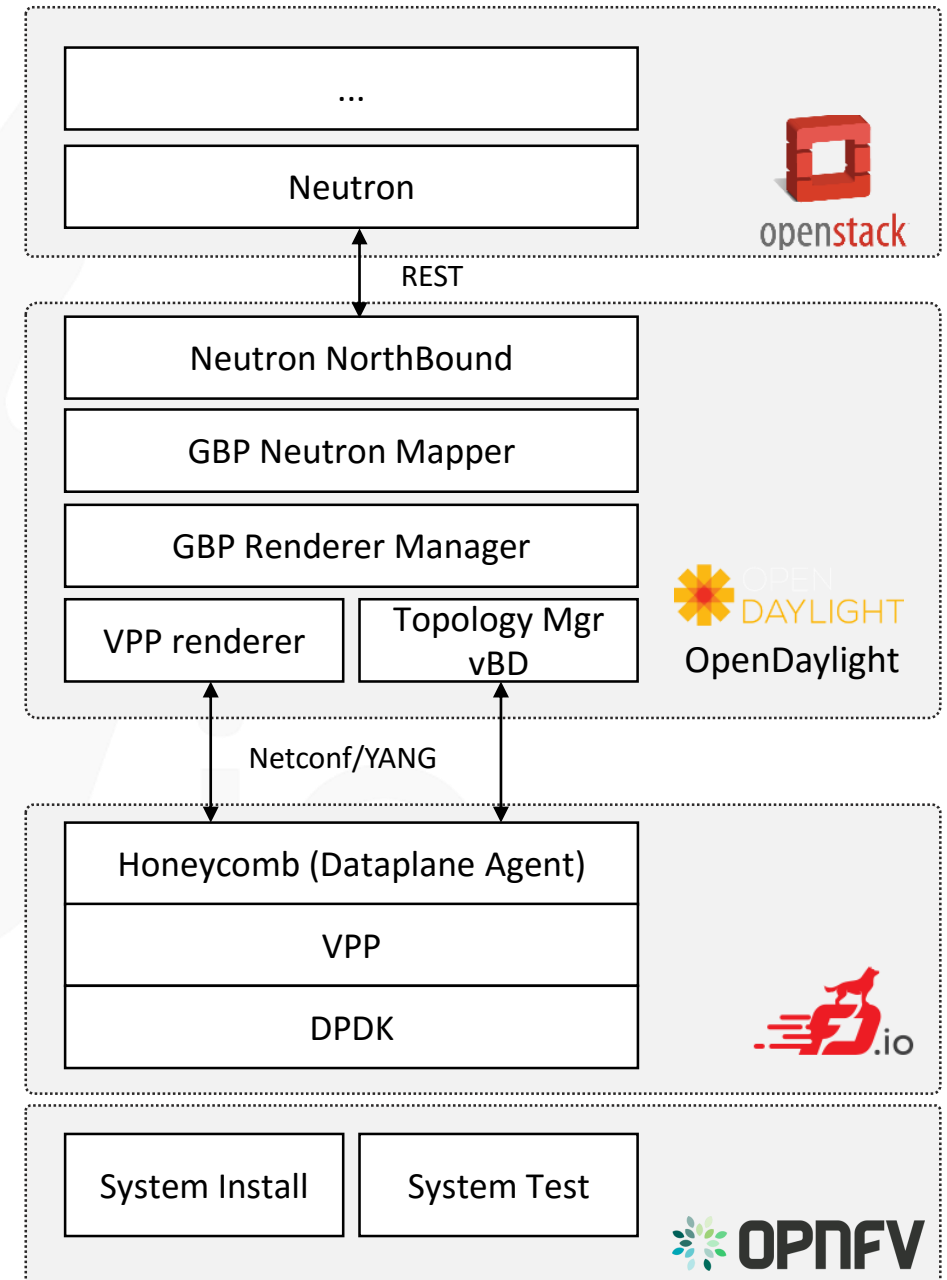
- <https://wiki.opnfv.org/display/fds>



# FDS Development

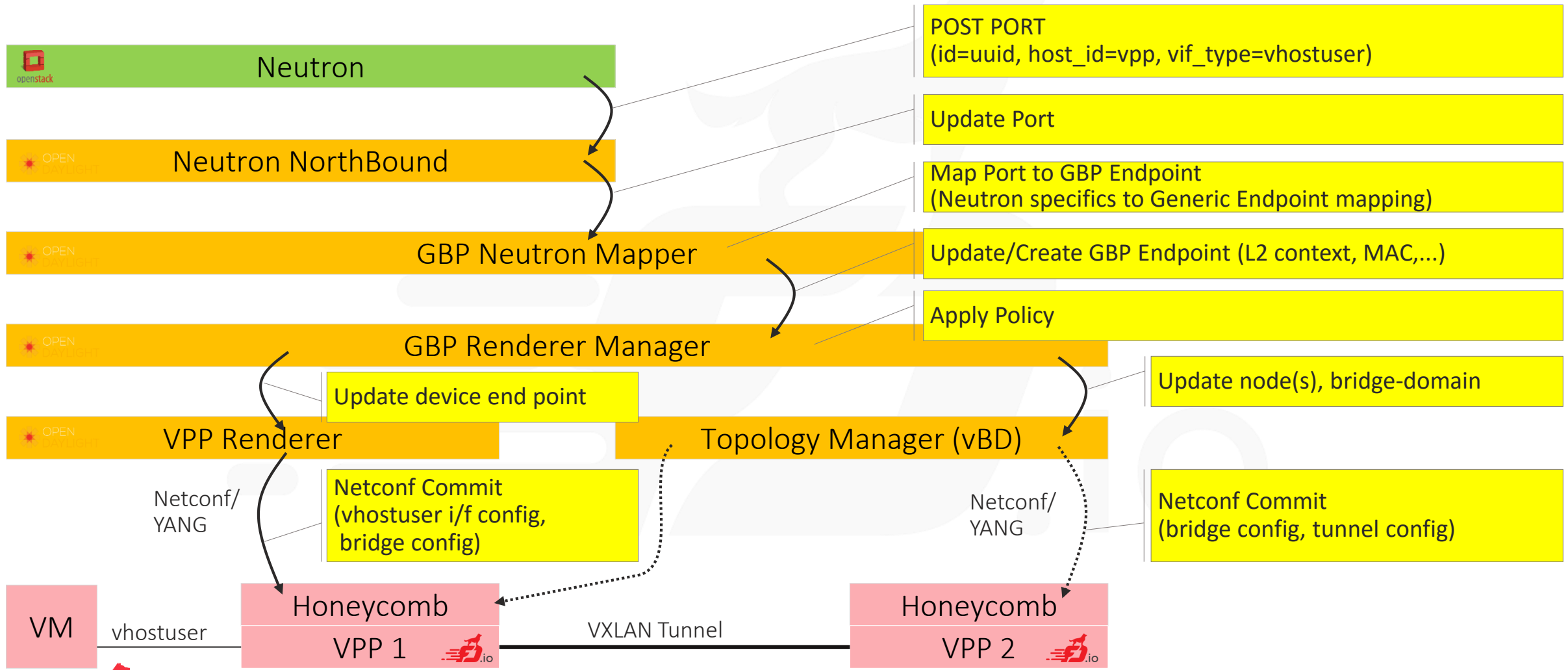
Component development, Systems Integration, Testing

- **OpenDaylight**
  - GBP Neutron Mapper
  - GBP Renderer Manager enhancements
  - VPP Renderer
  - Virtual Bridge Domain Mgr / Topology Manager
- **FD.io**
  - HoneyComb – Enhancements
  - VPP – Enhancements
  - CSIT – VPP component tests
- **OPNFV**
  - Installer: Integration of VPP into APEX
  - System Test: FuncTest and Yardstick system test application to FDS



See also:  
FDS Architecture: <https://wiki.opnfv.org/display/fds/OpenStack-ODL-VPP+integration+design+and+architecture>

# Example: Creating a Neutron vhostuser port on VPP



# FDS Project Schedule – Near Term

## July 2016: CiscoLive Las Vegas

- Base O/S-ODL-VPP stack  
(Infra complete: Neutron – GBP Mapper – GBP Renderer – Topology Mgr – Honeycomb – VPP)
  - Automatic Install
  - Basic system-level testing
  - Basic L2 Networking (no NAT/floating IPs, no Security Groups)
  - Overlays: VXLAN, VLAN

## September 2016: OPNFV Colorado Release

- O/S-ODL-VPP stack  
(Infra complete: Neutron – GBP Mapper – GBP Renderer – Topology Mgr – Honeycomb – VPP)
  - Automatic Install
  - Ongoing OPNFV system-level testing (FuncTest, Yardstick testsuites) – part of OPNFV CI/CD pipeline
  - Complete L2-L3 Networking (NAT/floating IPs, Security Groups)
  - HA
  - Overlays: VXLAN, VLAN, NSH

