P4 AND OPENSWITCH

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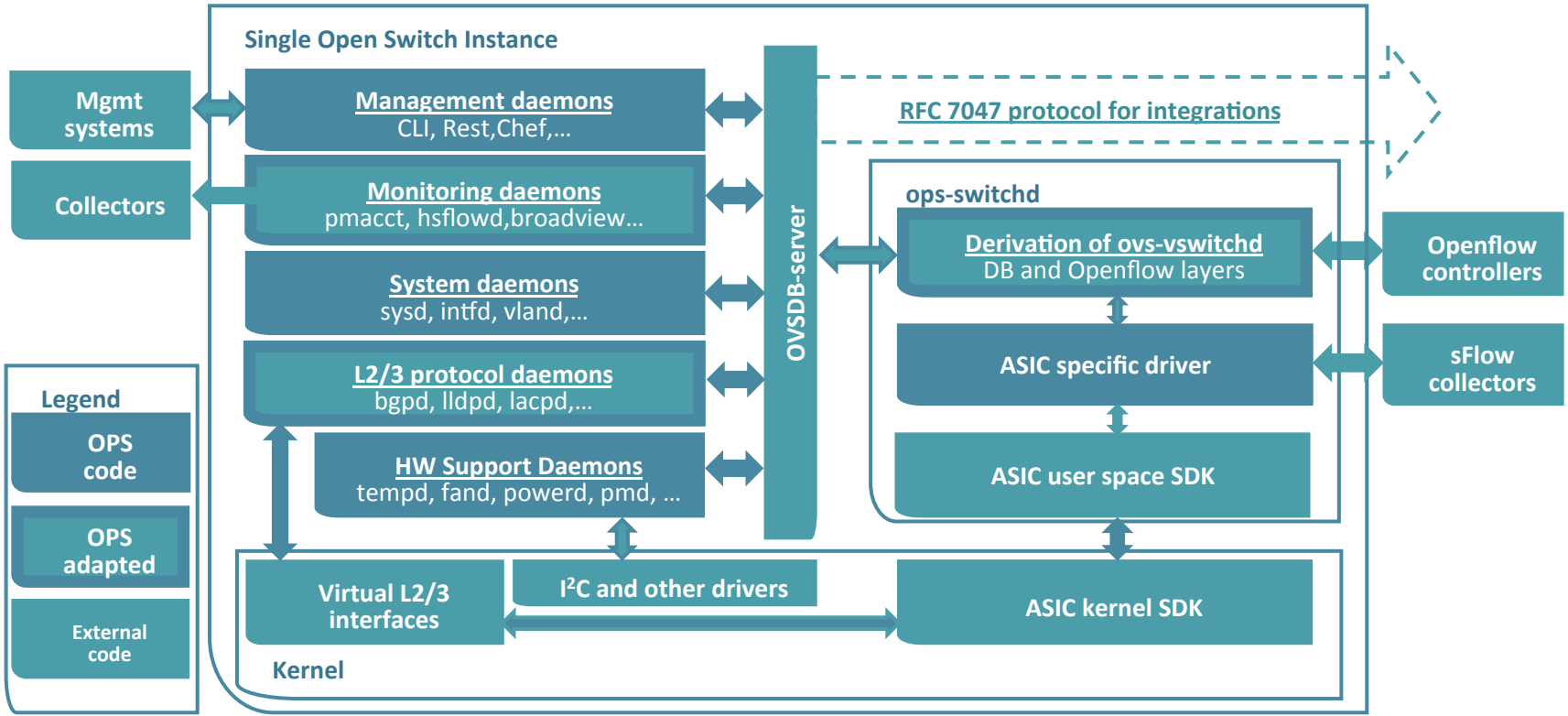
AGENDA

- OpenSwitch Introduction
- Need for simulator and how it fits with OpenSwitch
- Why P4 Switch Simulator
- P4 supported features, WIP, future roadmap
- Q&A

OPENSWITCH INTRODUCTION

- **Linux based, community driven, open source NOS**
  - Contributions from HPE, Broadcom, Barefoot, Cavium, Mellanox
- **Architecture principles**
  - Modularity, high availability, portability, extensibility
- **Supported platforms**
  - Accton hardware platforms (Trident II, Trident II Plus, Tomahawk, Xpliant)
  - Docker and OVA based virtual platforms
- **Infrastructure**
  - Yocto, Gerrit, Zuul, Jenkins

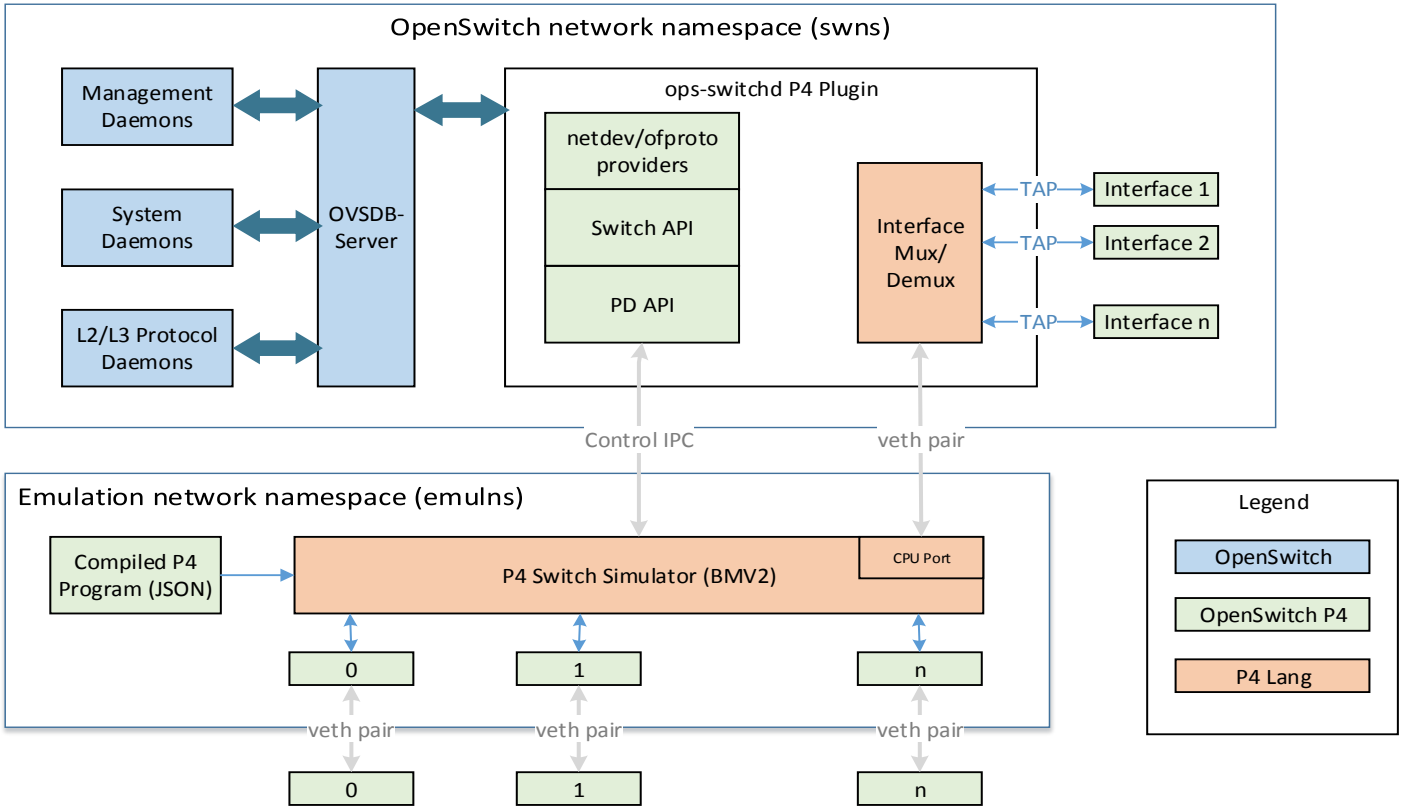
OPENSWITCH ARCHITECTURAL VIEW



NEED FOR SWITCH SIMULATOR

- **Virtual platforms**
  - Advantages
    - Speeds up development process
    - Scale up testing, parallel CIT on commits (currently averaging ~50 commits per day, ~700 test variations, ~30K tests per day)
    - Complex testing topology (multiple TOR topology), quick setup time
    - Cost effective
  - Absence of switching hardware
    - Need a switch simulator which fills the gap

OPENSWITCH ON P4 SIMULATOR



P4 FOR OPS SIMULATION PLATFORM

In the beginning, we tried using OpenVSwitch as ASIC emulator. Limitations:

- L3 not fully supported in OpenVswitch
- Features such as sFlow became complicated to design
- Some important features such as QoS, Control Plane Policing cannot be implemented.

P4 Software switch (Behavioral model) solves all of this and more.

- P4 defined dataplane pipeline
- Same pipeline on simulation and P4 capable devices
- Very similar to hardware platforms
- Open source
- Development doesn’t need hardware and software is ready before availability of hardware platforms

P4 FOR OPS – CURRENT STATUS

- Contributions from Barefoot along with HPE
- Effort started early January 2016
- Feature development effort for OPS on P4: ops-switchd-p4switch-plugin, the “Platform dependent” layer
- All other platform independent components of OpenSwitch OS are already in place for existing features.
- Close to feature parity with current Hardware release
- https://git.openswitch.net/cgit/openswitch/ops-switchd-p4switch-plugin/

P4 FOR OPS – FUTURE SCOPE

- Within 3-4 months, close to feature parity has been achieved for P4 platform.
- P4 platform should eventually be ahead of the game.
- Innovations and new features
- For P4 developer, OPS provides a fully featured network OS

FEATURE LIST

- Features currently supported: VLANs, LAGs, Layer3 Routing, SVI, L3 loopback interfaces, ECMP, Control Plane protocols (BGP, OSPF, LLDP, LACP, DHCP)
- Work in progress: L3 subinterface, sFlow
- Future effort: QoS, ACL, Control plane policing, OpenFlow, Mirroring, STP, Layer 3 statistics (IPv4/IPv6), VxLAN, MPLS and other tunneling protocols.

P4 AND OPS – CALL FOR CONTRIBUTIONS

- New features across stack:
  - switch.p4, switch_api
  - New daemon
  - OVSDB schema
  - switchd, plugin (calling into switch_api)

- Also get involved in current design discussions @ http://lists.openswitch.net/cgi-bin/mailman/listinfo/ops-dev

RESOURCES

P4 (http://p4.org/)

- **Code:**
  - https://github.com/p4lang
- **P4 Simulator:**
  - https://github.com/p4lang/behavioral-model/tree/ops
- **Switch.p4:**
  - https://github.com/p4lang/switch/tree/ops
- **P4 compiler for simulation:**
  - https://github.com/p4lang/p4c-bm/tree/ops

OpenSwitch (http://openswitch.net)

- **Code:**
  - https://git.openswitch.net
- **P4 Plugin:**
  - https://git.openswitch.net/openswitch/ops-switchd-p4switch-plugin
- **Weekly IRC Webchat (Wednesdays 10AM PST):**
  - http://webchat.freenode.net/?channels=#openswitch
- **Mailing Lists:**
  - dev@lists.openswitch.net
  - infra@lists.openswitch.net

Q&A

Please visit OpenSwitch-P4 demonstration to see OpenSwitch NOS running on P4 Switch Simulator

THANK YOU