

Open Hardware and Software for networking

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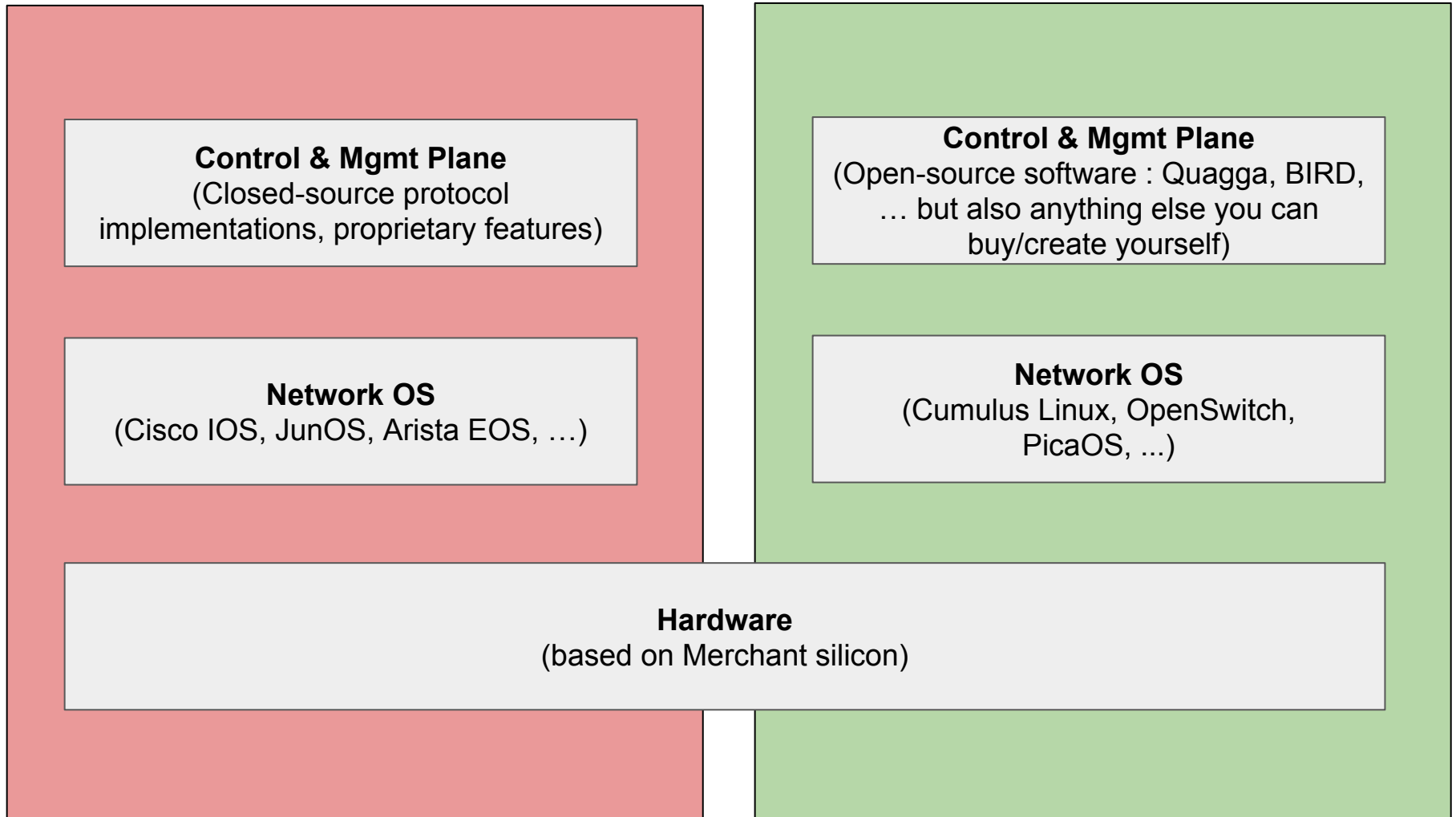
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System and Network
Engineering



Traditional switch vs White-box switch

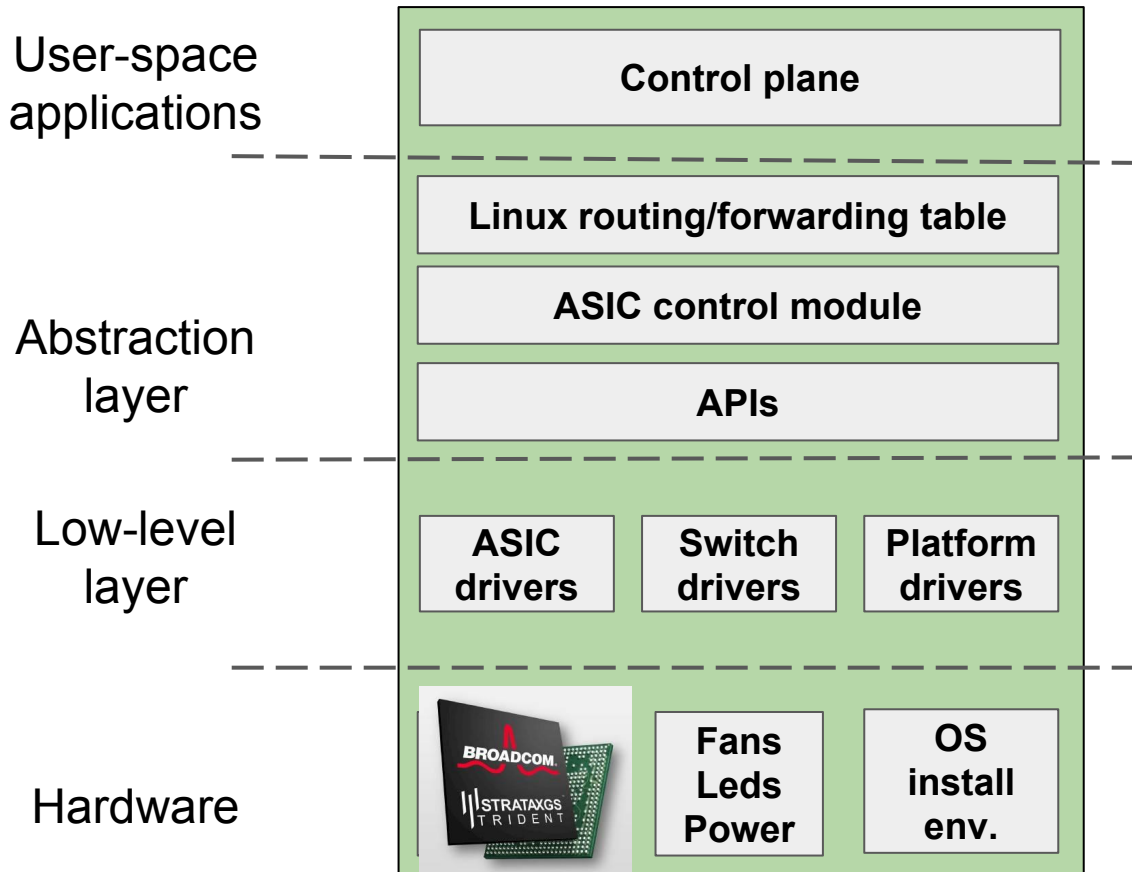


White-box switch --> freedom + flexibility

- Cost reduction
- No vendor lock-in
- Common NOS and software simplify management
- More : <http://packetpushers.net/9-reasons-for-buying-whitebox-switches/>



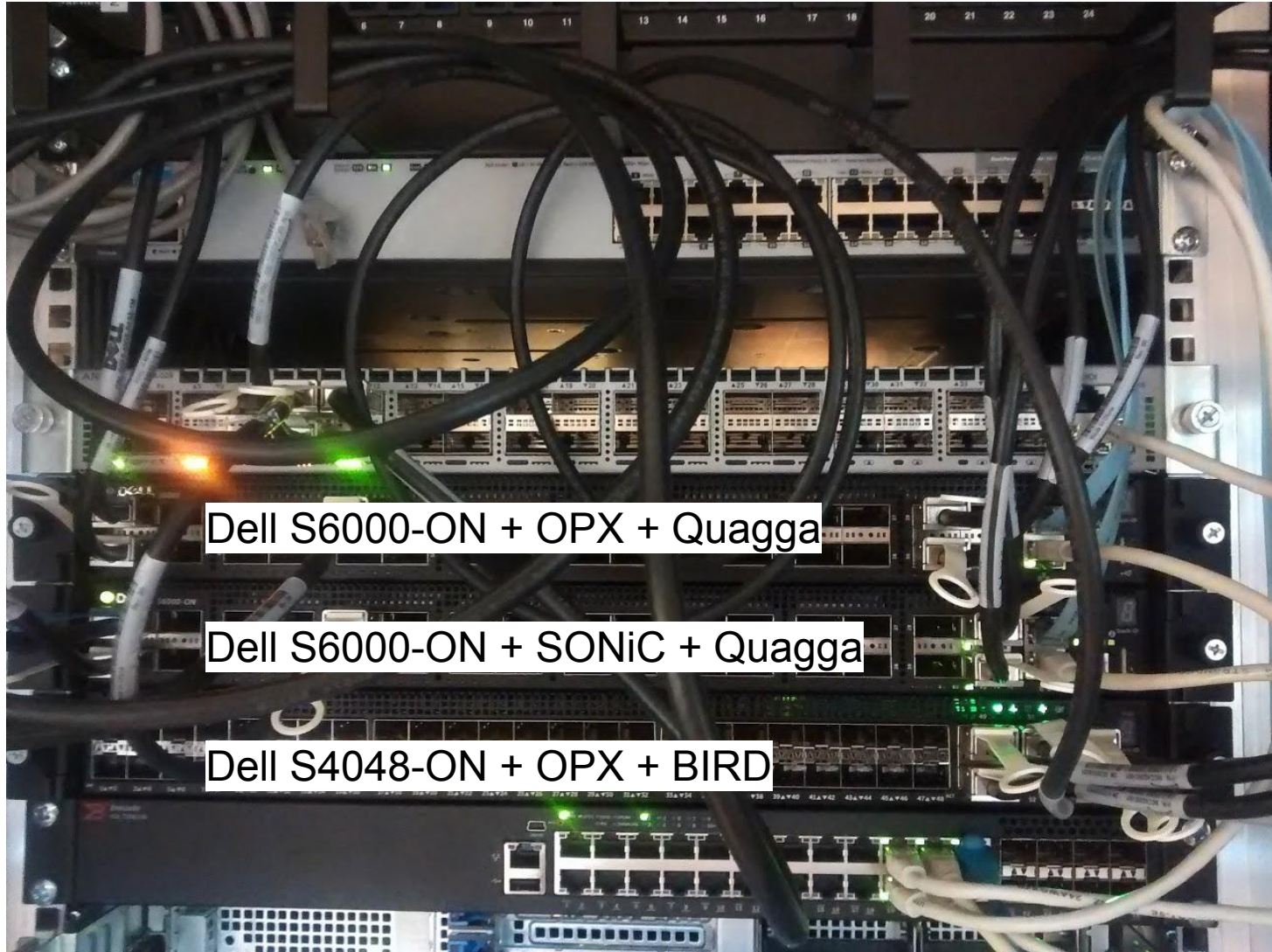
Open networking : components



Research

- Analyze white-box switches ecosystem focusing on open-source solutions
- Assess the feasibility to use them for real networks
 - configuration easiness
 - feature set

Test setup: RoN 2017

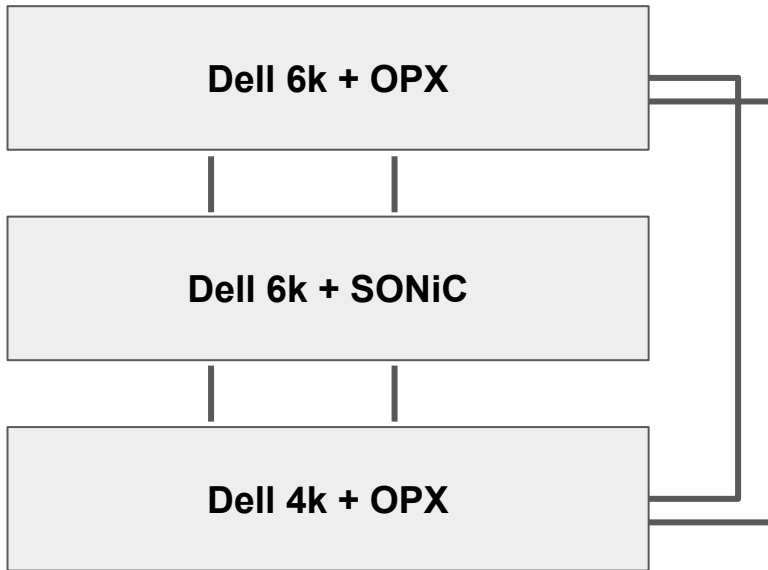


Dell S6000-ON + OPX + Quagga

Dell S6000-ON + SONiC + Quagga

Dell S4048-ON + OPX + BIRD

Test setup: RoN 2017



**Azure
SONiC**

Tests

1. Configuration and management

- CLI/API
- Link Layer Discovery Protocol (LLDP)
- Dynamic Host Configuration Protocol (DHCP) relay

2. Layer 2 (L2)

- Spanning-Tree Protocol (STP)
- VLAN
- Link aggregation (LAG)

3. Layer 3 (L3)

- Open Shortest Path First (OSPF)

RoN 2017 results overview

Feature name	OPX	SONiC
CLI	yes (Linux commands + supplementary commands)	yes (Linux commands + supplementary commands)
API	yes (python interface)	no (not directly exposed)
LLDP	yes	yes
DHCP relay	yes	yes
STP	yes? (linux-bridge)	no
VLAN	yes	no (VLAN access port support only)
LAG	yes	yes
OSPF	yes	yes

Conclusions from 2017

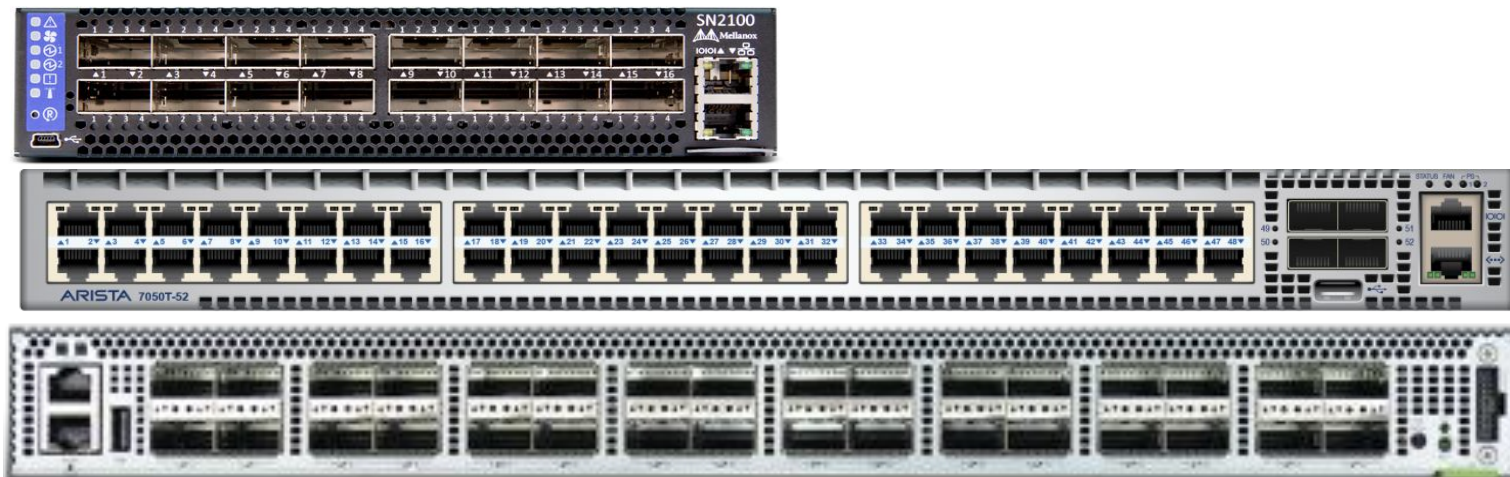
- It is possible to use white-label switching stack which is entirely open-source
 - (well... except NPU vendor blob)
- Not all the “standard” features are there
 - Some are announced to be implemented (depends on the project focus)
- OPX is quite far from “plug-and-play” quality
 - It has the potential to substitute a “regular switch NOS” but requires work integrating all the components
- SONiC is almost ready to use without extra hassle
 - However feature-set is smaller than OPX (because of SONiC’s cloud focus)

Plans for 2018: overview

- Retest with new versions of OPX and SONiC
 - More focus towards SONiC
- Interoperability tests with “locked-in” vendor equipment
- Expand on the test scenarios

Plans for 2018: New HW platforms (UvA & SURFnet)

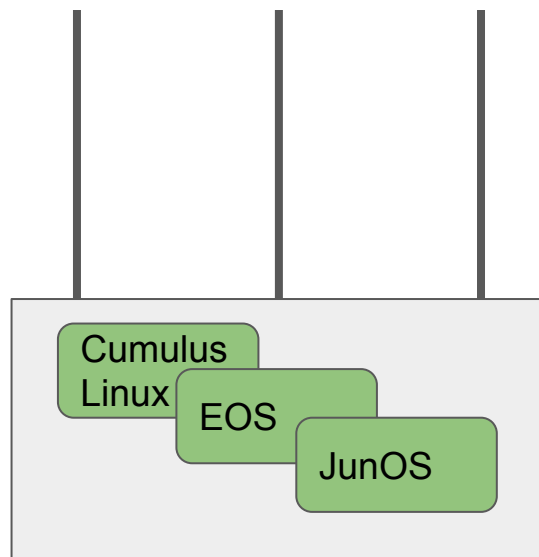
- Arista 7050 (Broadcom NPU)
- Mellanox SN2100 (Mellanox NPU)
- EdgeCore (Barefoot NPU)
- EdgeCore (Broadcom NPU)



Plans for 2018: Interoperability testing

- JunOS
- PicOS
- Cumulus Linux
- Arista OS
- VPP

Plans for 2018: Interoperability testing with semi-virtual topologies (L2/L3 protocols)



VM host

Plans for 2018: Open questions

1. The nature of tests

```
for OPEN_SW in <OPEN_HW>;do
  for MAJOR_VENDOR_SW in <MAJOR_VENDOR_HW>;do
    test_feature_x(OPEN_SW, MAJOR_VENDOR_SW)
  done
done
```

Plans for 2018: Open questions

2. Should we look for some higher level use-case and try to implement it with the open HW we have?

3. Testing against \$MajorVendor VMs is not as comprehensive as the real HW:

- Availability of \$MajorVendor equipment?

4. P4 use case:

- Using the P4 flow detection code developed in RoN 2017