



OpenSwitch (OPX) NOS



OpenSwitch (OPX) Network Operating System
Your way to build composable networks...



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We need a NOS to run multi-vendor switches and port our applications

Should I keep choosing OEMs again?

Expensive, non-customizable, app porting is vendor-dependent...hmmm

What about disaggregated NOS' like Cumulus, Pica8, Big Switch?

These are great, but they come with license fees and are not really open...

Wait...I've heard about OpenSwitch (OPX) NOS – open, portable, extensible



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Open and Premium
NetApps choice

Portability

Free Open OPX Network
Operating System Base

Integratability

Diversified White Box
Hardware



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OUR VISION

Production-Ready Grade
Feature-Rich Robust NOS
Extensible Control Planes

OUR DELIVERY

OPX NOS as an Open Code
Composable System Design
A Reliable Turnkey Solution

OUR MISSION

Create Live Community
Support Eco-System of
Operators/Vendors/ODM

 THE **LINUX** FOUNDATION

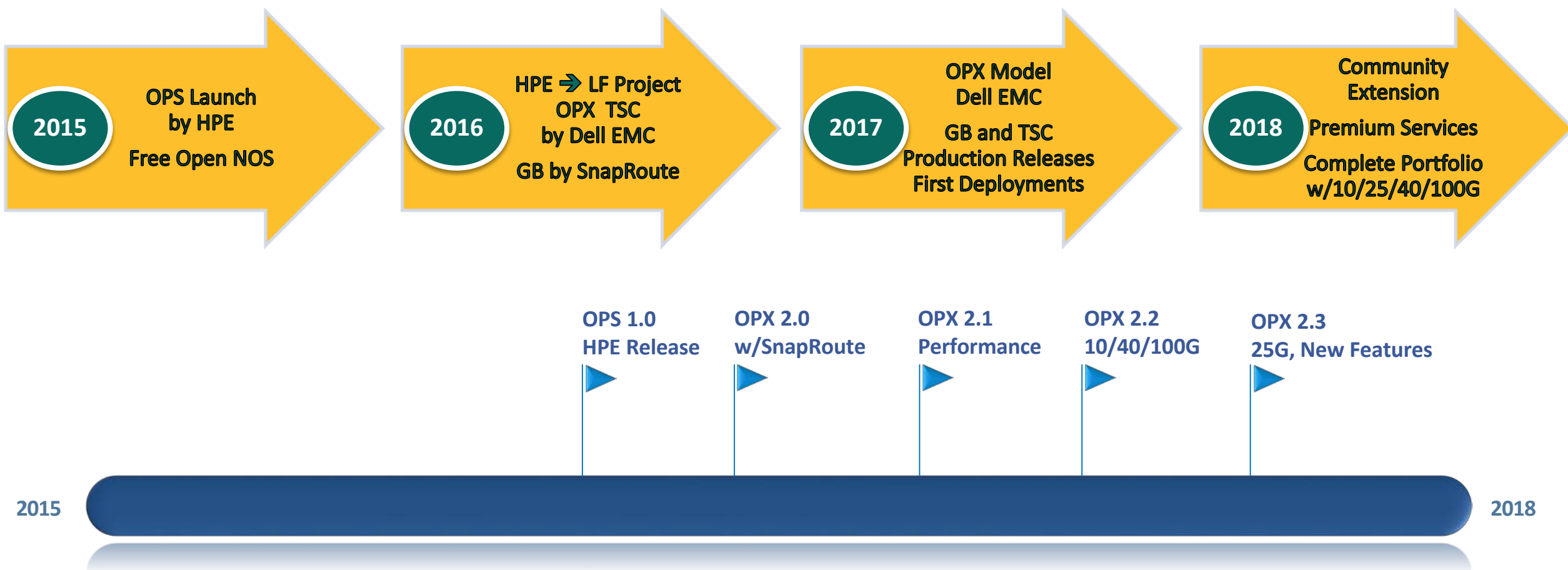




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Historical Perspective

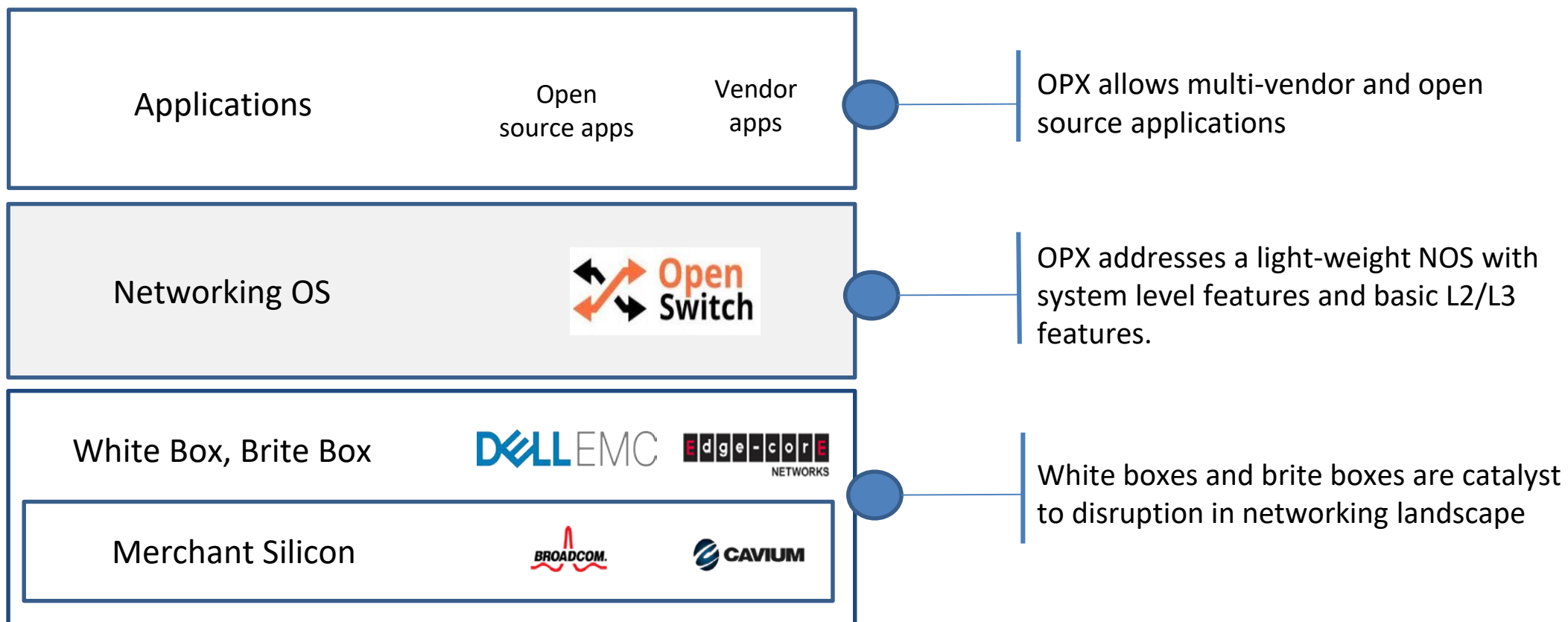




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OPX Ecosystem





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OPX Value Proposition – Operators



Composable network – TCO savings

- Disaggregation to decouple SW and HW refreshment cycles
- Deploy free NOS Base + Premium services per place-in-network needs
- Cost effective model to scale out and scale up



Network agility and features velocity – DevOps savings

- Open source to allow solutions customizations
- Extensible to support new platforms
- Portable to integrate new applications



Network reliability and stability

- Based on field-deployed SW and HW
- Field-proven commercial and open source protocols

OPX Value Proposition – Vendors



Business model to monetize the investment

- *Hardware vendors* – increase SAM through OPX ecosystem
- *Software vendors* – commercialize on Premium services
- *Integrators* – professional services are always in need...



Access to a large customer base

- Via developed marketing and sales funnel



Develop partnerships with industry leaders

- Innovate collaborative solutions integrating with the market leader products



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Business model:

vague relations
between operator
needs and ecosystem
members monetization

Leadership:

not strong enough,
insufficient expertise
/investment

Market demand:

customer base is not
diversified enough for
the product or solution



Business model:

Alignment that makes
commercial sense to
operators and the
ecosystem members

Leadership:

strong direction by the
industry leader with the
relevant expertise

Market demand:

strong need for the
solution among broad
customer base



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Open-source software – benefits and concerns

Major benefits of open-source software

- Community contribution to unleash innovations at a faster pace
- Easy integration and customization
- No vendor lock-in and no CAPEX

Major concerns

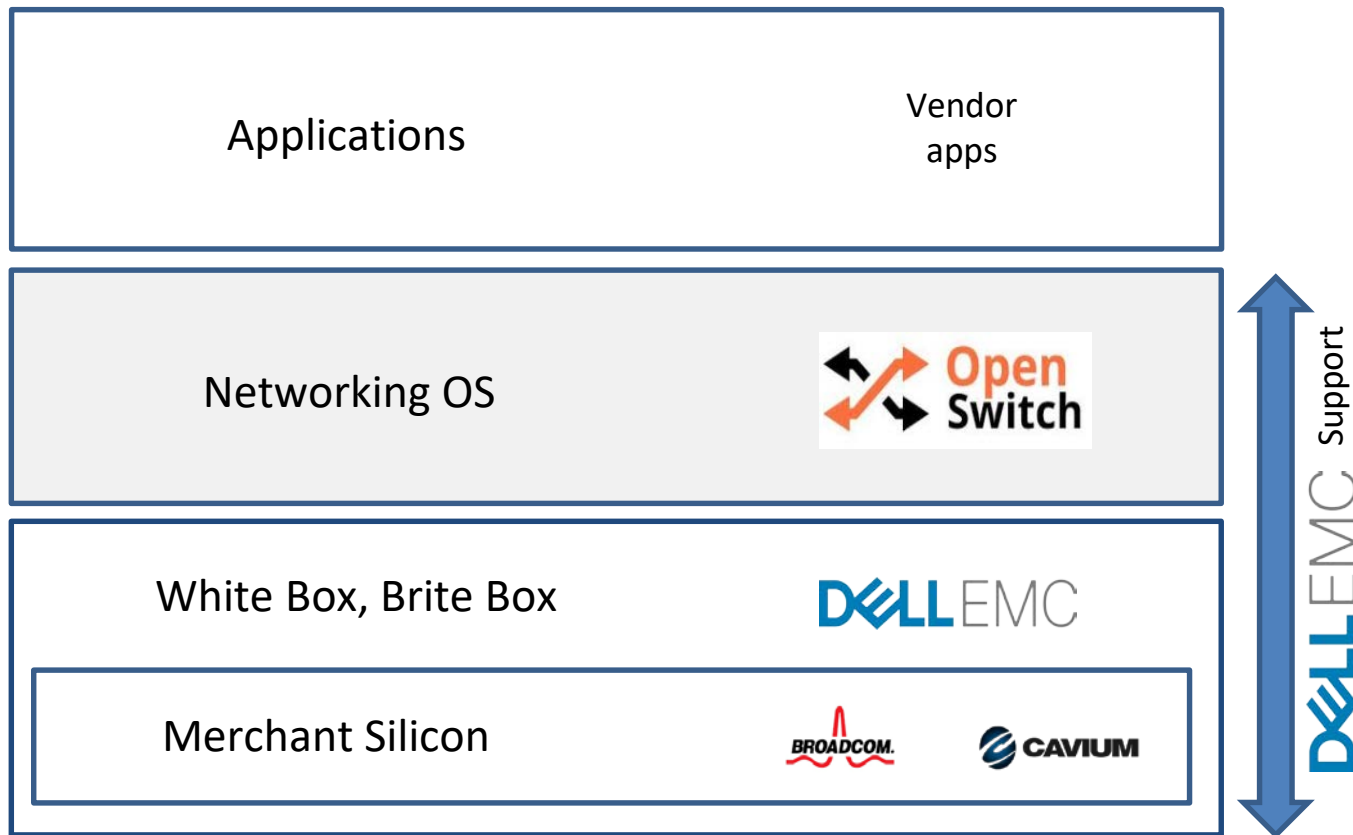
- *Who will support it for production deployment?*
- *Do we have enough investment and collaterals to make it a viable option?*
- *What are the hidden cost?*
- *What are the perceived risks?*



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OPX is different and poised to succeed



Why OPX brings confidence?

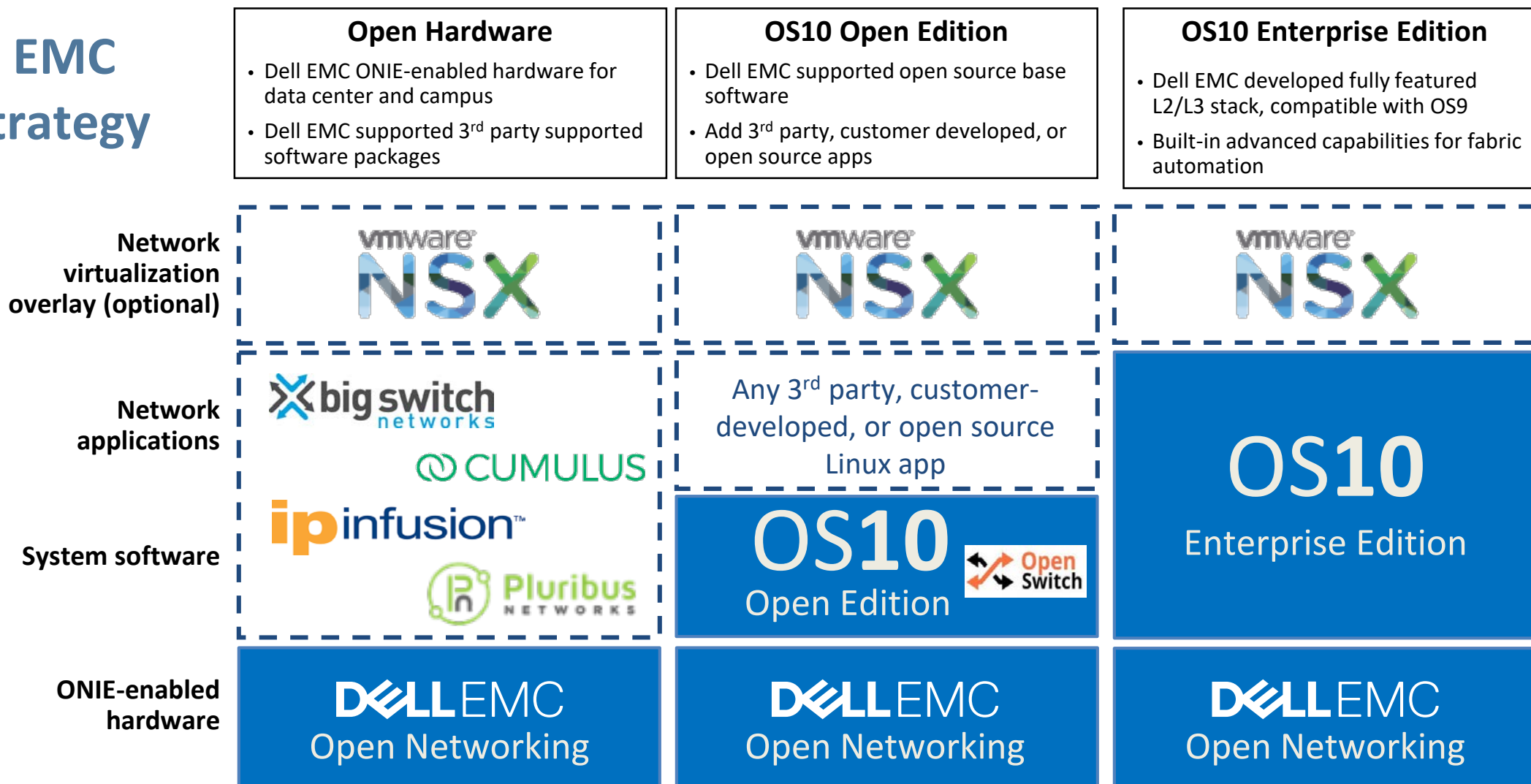
- ✓ Dell EMC offers support for OPX on Dell EMC switches
- ✓ OPX is a cornerstone in Dell EMC Open Networking strategy. OPX supported on Dell EMC Networking's mainstream switches.
- ✓ As Dell EMC Networking innovates new features for its NOS (OS10), more features will be contributed back to OPX community



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Dell EMC ON Strategy





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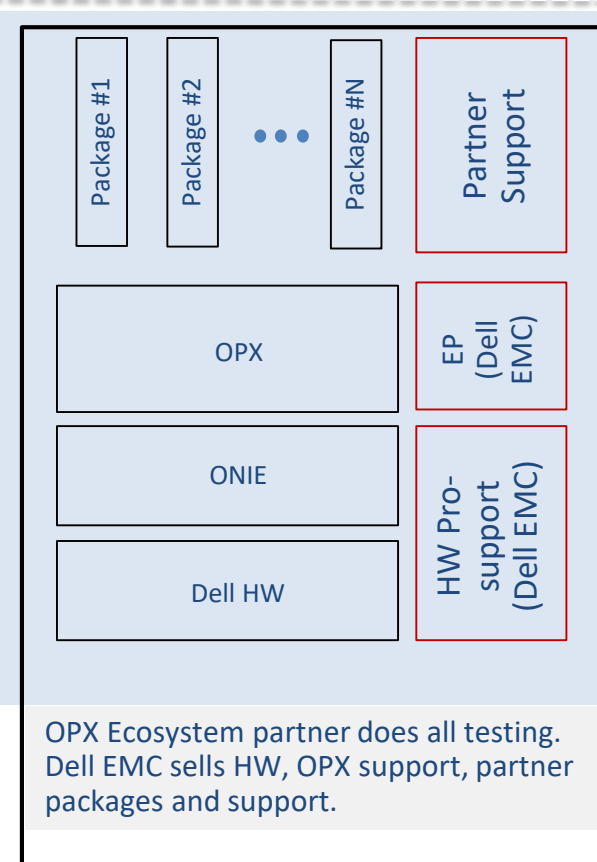
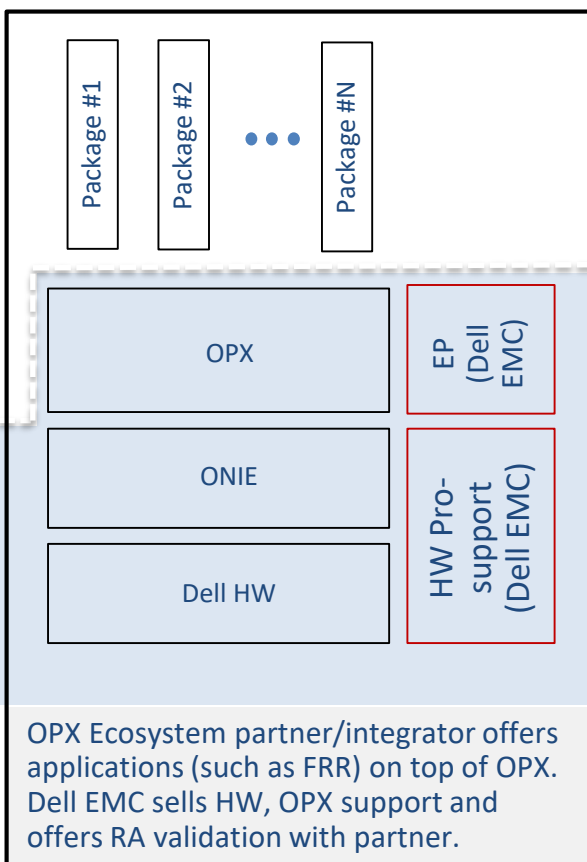
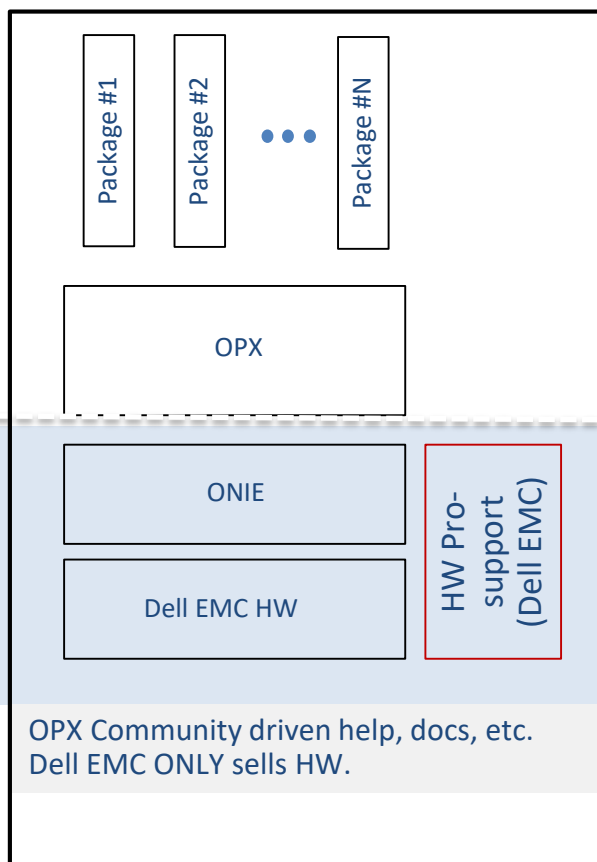
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1 Open Source Base

2 Open Source Validated

3 Open Source Commercial

User Managed



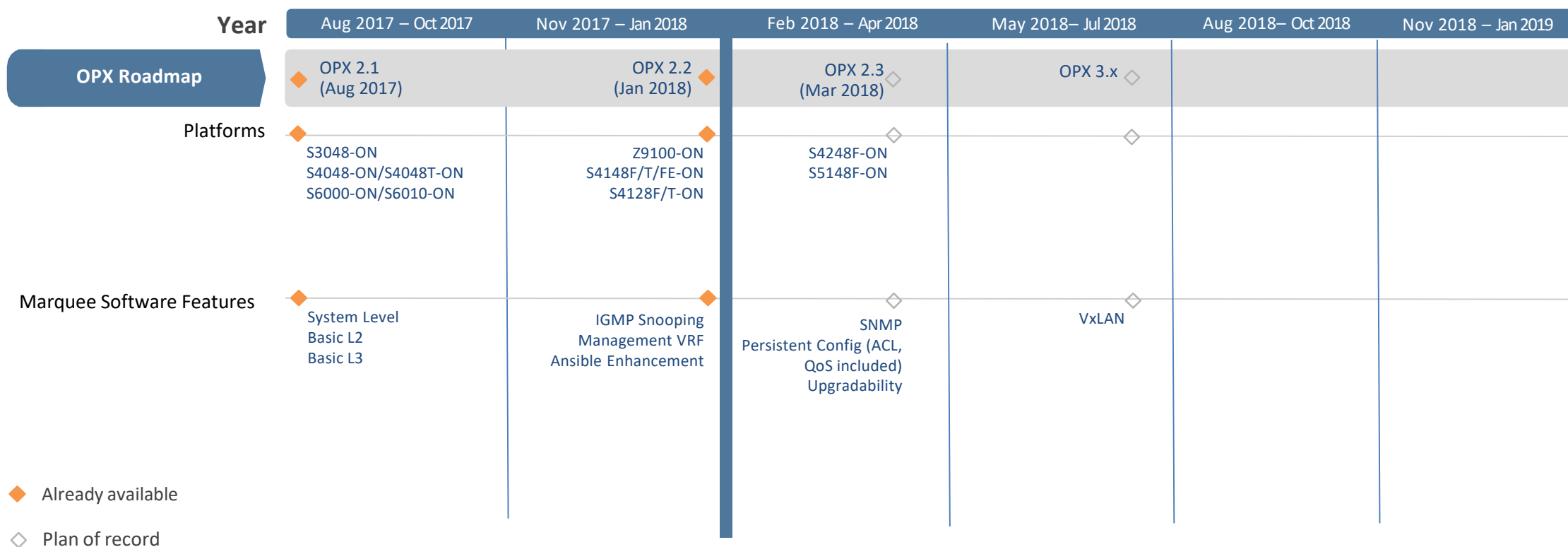
Dell EMC sells the components highlighted



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OPX Roadmap





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OPX 2.2 Features

Hardware	System Level		L2 Basic	L2 Multicast	L3 Basic	VRF
Dell EMC support <ul style="list-style-type: none">• Z9100-ON• S6010-ON• S6000-ON• S5148-ON• S4148T-ON• S4148FE-ON• S4148F-ON• S4128T-ON• S4128F-ON• S4048T-ON• S4048-ON• S3048-ON Edgecore <ul style="list-style-type: none">• AS7512-32X	<ul style="list-style-type: none">• Linux Debian 8.7 QoS <ul style="list-style-type: none">• CoPP• Ingress policing,• Egress shaping Traffic monitoring <ul style="list-style-type: none">• SPAN, RSPAN• SFLOW <ul style="list-style-type: none">• NTPv4 API support <ul style="list-style-type: none">• REST• Python• C/C++• YANG	Application support <ul style="list-style-type: none">• Ansible enhancement• SSH• FTP• NTPv4• Syslog Security <ul style="list-style-type: none">• AAA• PAM• Radius• TACACS+	<ul style="list-style-type: none">• LLDP• LAG• LACP• 802.1p/q• PVST• STP <ul style="list-style-type: none">• MAC learning <ul style="list-style-type: none">• MAC ACL• ACL custom fields	<ul style="list-style-type: none">• IGMP snooping	<ul style="list-style-type: none">• IPv4/v6• Linux stack <ul style="list-style-type: none">• ICMP• ARP• DHCP• DNS• DSCP• ECMP <ul style="list-style-type: none">• Switch virtual interface <ul style="list-style-type: none">• ACL IPv4/v6• ACL custom fields	<ul style="list-style-type: none">• Mgmt VRF



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Example Applications Running on OPX

Free Range Routing (FRRouting) – IP routing protocol suite for Linux that provides protocol daemons for BGP, OSPF, etc.



Inocybe – Open Networking solution using OpenDayLight as a CPS interface



hsflowd – sflow daemon adapted by InMon to get data from the NPU via CPS



Webmin – web-based system configuration tool on OPX



Broadview – software suite to offer programmable access to Broadcom switch internals



Looking Glass – system monitoring tool that displays platform info using information from kernel *and* CPS



Cavium telemetry – software suite to offer telemetry for Cavium switch internals





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Web openswitch.net

Contribute github.com/open-switch

Email ops-dev@lists.openswitch.net

Chat chat.openswitch.net

Docs github.com/open-switch/opx-docs/wiki

