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Journey to the West: Integrating Cisco IOS-XR with OCP Technologies

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Journey to the West


- An extended account of the original “Journey to the West (India)” by Xuanzang in the 6th Century AD

- Led to **Neo-Confucianism** a creative reinterpretation of the traditional Confucian core to meet new intellectual and spiritual expectations, intrinsically shaping the Chinese culture for years to come.
IOS-XR’s “Journey to the West”: Incremental Disaggregation
Disaggregating the Software Layers:

Management
- CLI, XML, SNMP, SYSLOG

Network Protocol Stack
- Software Infrastructure, OS, BSP

3rd Party Agent + Telemetry
- CLI, Netconf, SNMP, Syslog, SSH

Applications / Protocol Stack
- BGP, ISIS, OSPF, LDP, SR, L2 Protocols

Service Adaptation
- RIB, Label Manager, BFD, Interface and more

Software Infra + System OS + BSP

HW/Data Plane
- NPU ASIC, CPU, Fans, Sensors, Optics, etc.
Disaggregating the HW from the SW:
Disaggregating the stack, one use case at a time
The Road to HW-SW Disaggregation for IOS-XR
Integration Architecture:
Decision Stages: Selecting the Hardware

The Network integrator may choose the Hardware based on:

- Port Density
- ASIC and Platform capabilities

Typically, being OCP compliant will plug the platform into the ecosystem: with platform modules pushed to the ONL (Open Network Linux) git repo: ([https://github.com/opencomputeproject/OpenNetworkLinux](https://github.com/opencomputeproject/OpenNetworkLinux)) for example.
Decision Stages: Integrating with the Platform

• Typically Platform capabilities are exposed through modules published in the ONL git repo (https://github.com/opencomputeproject/OpenNetworkLinux)

• These modules usually get integrated as kernel modules into the NOS.

• The capabilities can be exposed to the higher layers of the stack either through
  • ONLP (Open Network Linux Platform) Abstraction layers (See https://opennetlinux.org/docs/porting)
  • Directly hooking the NOS abstraction layers with the kernel /sys/fs paths exposed by the modules.
Decision Stages: Integrating with the ASIC

• The ASIC SDK comes from the ASIC vendor. This may be licensed (either by the integrator or Software vendor).

• The ASIC SDK may also be exposed as an Open API: For example, Broadcom provides an Open API on top of their SDK called OpenNSL for integration with a Hardware Abstraction Layer (HAL) in the NOS.
Decision Stages: Creating an Installer image

- Currently the OCP ecosystem utilizes ONIE as the image installation/bootloader paradigm.

- The required IOS-XR image is packaged up into an ONIE compatible installer image.

- Whitebox devices can then download and install IOS-XR image via a DHCP server.
Cisco and the OCP
Working with the OCP Community: 
Leveraging the current ecosystem

- Currently IOS-XR Leverages the Vendor Modules published in the ONL Git repo (https://github.com/opencomputeproject/OpenNetworkLinux)

- The Vendor module capabilities are directly integrated into IOS-XR through /sys/fs paths.

- The ONLP "write" capabilities such as handling fan speeds based on temperature sensor data (specific to platform) are leveraged.

- Great Documentation for individual projects such as ONIE, ONLP.
Supported Hardware?

- We are working on Platform enablement on a case-by-case basis.
- Selection of Hardware is an important decision stage driven by Customers (operators and/or Network Integrators)
- As part of this process, currently enabled platforms by End of 2018:
  - Edgecore AS5916-XKS: OCP-ACCEPTED™
  - Edgecore AS7816-64X: OCP-ACCEPTED™
- More integrations planned based on customer requirements
Can we Play with IOS-XR on OCP-ACCEPTED hardware already?

- Limited availability (LA) of IOS-XR on supported third-party hardware for select customers towards the end of 2018.
- If you’d like to be involved, get in touch with your nearest friendly Cisco Systems Engineer (SE)/ Account Manager (AM)
- General Availability (GA) of IOS-XR on supported third-party hardware around Mid-2019
- For any other questions, requirement discussions, contact us at: xrwb-external@cisco.com
Demo time!
Working with the OCP Community: Our Learnings

- **Enhancements to optics drivers** - especially in supporting newer optics, some minor API enhancements
- **Events from ONLP** : Currently everything is based on polling
- **Uniformity in platform data from BMC** : varies across vendors
- **Test scripts for ONLP**?
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