JUNOS OS FOR WHITE BOX DATA CENTER SWITCHES

Product Overview

Junos OS for white box platforms is a standalone operating system that provides standards-based network protocols such as IS-IS and BGP, overlay technologies such as VXLAN with EVPN control plane, and full automation capabilities with Ansible, Chef, and Puppet for third-party OCP-compliant data center switches—all packaged into a single image.

Product Description

As cloud computing becomes more pervasive, service providers, cloud operators, and enterprises alike are seeking to deploy more scalable, agile, and automated data center architectures that employ standards-based network protocols and standards-compliant hardware.

A subset of these customers is considering Open Compute Project (OCP)-compliant Ethernet switches as the building blocks for their data center networks. To support the data center fabric buildout, customers expect these switches—commonly referred to as "white boxes"—to include a robust, feature-rich network operating system, leading to a disaggregated consumption model where the hardware and software are sourced by different vendors.

The disaggregated Juniper Networks® Junos® operating system, available as licensed software for deployment on third-party OCP-compliant platforms, decouples the OS from Juniper switches. As a result, it can run independently on OCP-compliant hardware, giving customers the ability to run a robust, field-proven, and market-leading OS on whatever white box switches they choose.

Similar to the reliable, high-performance Junos OS that powers Juniper Networks QFX Series Switches for the data center, Junos OS for white box data center switches supports a wide range of architectures such as L3 IP fabric, IP fabric with Ethernet VPN Virtual Extensible LAN (EVPN VXLAN) overlay, and spine-and-leaf deployments. This flexibility enables users to adapt and evolve their architecture as requirements change over time.

Key Junos OS features that enhance the functionality and capabilities of OCP-compliant white box switches include:

- Software modularity, with process modules running independently in their own protected memory space and with the ability to do process restarts
- Uninterrupted routing and forwarding, with features such as nonstop active routing (NSR) and nonstop bridging (NSB)
- Commit and rollback functionality that ensures error-free network configurations
- A powerful set of scripts for on-box problem detection, reporting, and resolution

Architecture and Key Components

For a network operating system to run effectively on third-party white box switches, it must integrate with the platform drivers from the switch vendor, Packet Forwarding Engine (PFE) drivers from the switch ASIC vendor, and optics drivers from optics vendors. All of this requires a deep level of collaboration across many different suppliers. The Junos OS architecture has evolved over time so that drivers for platform-dependent and platform-independent components are separated from the control and management planes, allowing easy integration with third-party switches.

Platform-dependent drivers, for components such as power supplies, fans, LEDs, optics, and the PFE, are completely decoupled from Junos OS, running natively on the host operating system. This allows Junos OS to integrate with third-party switches while retaining the same control and management plane features across both Juniper hardware and white box switches (see Figure 1).

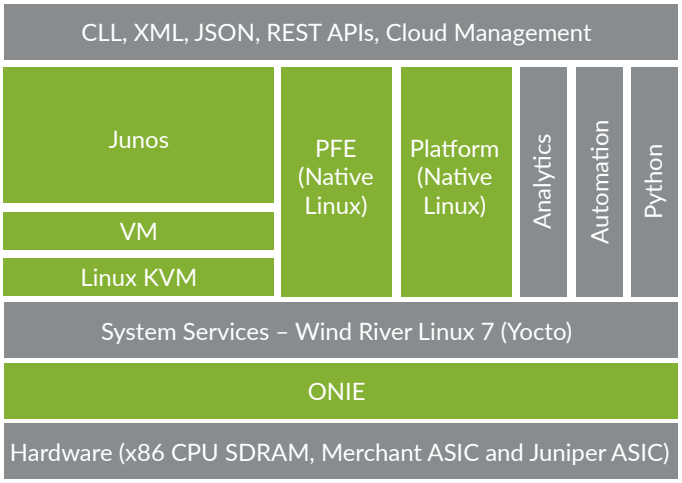

Figure 1: Junos OS software architecture

In order to load Junos OS onto third-party white box switches from outside of the switch, such as from an external Dynamic Host Configuration Protocol (DHCP) server, the underlying switch must be capable of supporting Open Network Install Environment (ONIE) as mandated by the OCP standards. Once the ONIE-compliant white box switch is identified, a collaborative approach is required which entails integrating the drivers with a handshake between the Junos operating system control plane to enable Junos OS on that device (see Figure 2).

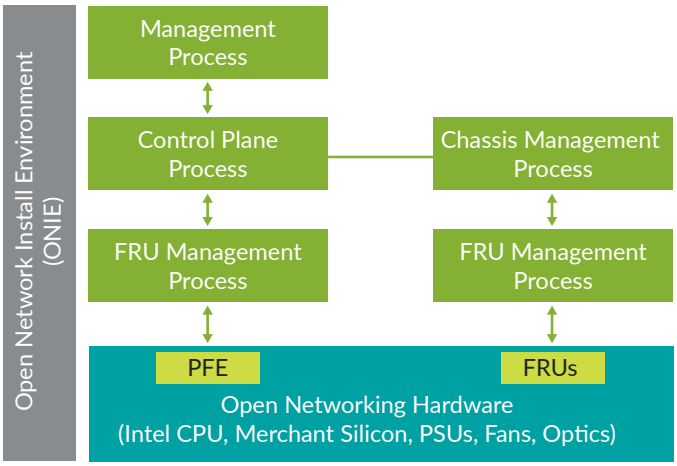

Figure 2: Junos OS for white box data center switches integration approach

Given the dependencies on drivers from white box switch and switch ASIC vendors, Juniper maintains a list of white box switches that support Junos OS (see Table 1). The hardware compatibility list is always growing as new white box switches with different switch ASICs are integrated with Junos OS.

Table 1: Junos for White Box Hardware Compatibility List

Hardware Switch	Hardware Class	White Box Switch Vendor	Junos Software License
AS7816-64X	Class 2	Accton Edgecore	JUNOS-FP-C2 JUNOS-PFL-C2 JUNOS-AFL-C2

Junos OS for White Box Software License

The software features supported on the Junos OS for white box data center switches are separated into three tiers: Foundation, Premium, and Advanced.

- Foundation software features include basic Layer 2 switching, basic Layer 3 routing, multicast, automation, programmability, Zero Touch Provisioning (ZTP), and basic monitoring. To enable these features, customers must purchase the JUNOS-FP-Cx license for the corresponding white box switches listed in Table 1, generate unique license keys, and install them on the switch.
- Premium software features include BGP, IS-IS, and EVPN VXLAN to explicitly address the needs of enterprise customers. To enable these features, customers must purchase the JUNOS-PFL-Cx license for the corresponding white box switches listed in Table 1, generate unique license keys, and install them on the switch.

- Advanced software features include all Premium license functionality, plus MPLS[1] to explicitly address the needs of data center interconnect and edge use cases. To enable these features, customers must purchase the JUNOS-AFL-Cx license for the corresponding white box switch listed in Table 1, generate unique license keys, and install them on the switch.

The Premium and Advanced software licenses are offered as perpetual and subscription licenses. Please see the Ordering Information section for license SKU descriptions.

Juniper Networks Services and Support

Juniper Networks is the leader in performance-enabling services that are designed to accelerate, extend, and optimize your high-performance network. Our services allow you to maximize operational efficiency while reducing costs and minimizing risk, achieving a faster time to value for your network. Juniper Networks ensures operational excellence by optimizing the network to maintain required levels of performance, reliability, and availability. For more details, please visit www.juniper.net/us/en/products-services.

Junos OS for White Box Data Center Switches Ordering Information

Features-based licenses are available for each of the white box switches listed in the Hardware Compatibility List shown above. Note: The product perpetual licenses listed below are orderable, while the product subscription licenses are planned for future availability. The support SKUs are offered on a subscription basis only.

Product Number	Description
JUNOS-FP-C2	Junos OS Foundation package for ONIE-compliant Class 2 hardware. Includes L2 switching, L3 routing, multicast, ZTP, basic monitoring (SPAN, mirroring).
JUNOS-PFL-C2	Junos OS Premium feature for ONIE-compliant Class 2 hardware. Includes IS-IS, BGP, EVPN, and VXLAN overlay.
JUNOS-AFL-C2	Junos OS Advanced feature1 for ONIE-compliant Class 2 hardware. Includes premium features, MPLS, L2VPN, L3VPN, and L2CCT1.
SVC-SWA-JNS-FP-C2	Juniper Care Software Advantage Support for JUNOS-FP-C2
SVC-SWA-JNS-PFL-C2	Juniper Care Software Advantage Support for JUNOS-PFL-C2
SVC-SWA-JNS-AFL-C2	Juniper Care Software Advantage Support for JUNOS-AFL-C2

About Juniper Networks

Juniper Networks brings simplicity to networking with products, solutions and services that connect the world. Through engineering innovation, we remove the constraints and complexities of networking in the cloud era to solve the toughest challenges our customers and partners face daily. At Juniper Networks, we believe that the network is a resource for sharing knowledge and human advancement that changes the world. We are committed to imagining groundbreaking ways to deliver automated, scalable and secure networks to move at the speed of business.

[1]The Advanced feature set including MPLS, L2VPN, L3VPN, and L2CCT is targeted for future availability.

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