

Juniper Unite Cloud-Enabled Enterprise Reference Architecture

Achieving agility by simplifying and securing the enterprise network

Challenge

The enterprise network is no longer just a business necessity. To truly enhance employee productivity, corporations must transform their enterprise networks into agile, secure services platforms that are accessible by users anywhere, anytime.

Solution

Juniper's Unite Cloud-Enabled Enterprise is a comprehensive reference architecture that lets business organizations build a secure, high-performance campus/branch network.

Benefits

- Simplifies infrastructure deployment, management, and operations while accelerating service bring-up
- Secures the enterprise with a suite of solutions that defend everything from the infrastructure to cloud-based services and feeds
- Integrates partner offerings for WLAN and other key third-party components, providing cohesive, best-in-class options for customers
- Implements Software-Defined WAN (SD-WAN) with application-aware routing, utilizing various network links appropriate for business applications



The cloud is central to the transformation of the enterprise. From public to private to hybrid, enterprises are adopting cloud technologies as their primary operating model, making campus and branch networks the critical on-ramp to cloud-based applications deployed in private clouds, on-premise data centers, or hosted in remote locations.

Network virtualization is also transforming enterprise IT, offering a springboard to the flexibility and agility of the cloud. With virtualization, networks can evolve into new deployment and management paradigms, with enterprise campus and branch networks reaping the benefits of centralized visibility and control.

The Challenge

The widespread adoption of mobile networking and social media is increasing reliance on cloud-driven applications, which need to be delivered to multiple locations and devices. When combined with BYOD, Internet of Things (IoT), and the increasing sophistication and variability of threats, it's clear that everything connected to or transmitting through the network is a potential security risk.

Large public cloud players, and even some private cloud players, have sparked a network transformation with innovations like SDN, Network Functions Virtualization (NFV), automation, analytics, and proactive network assurance designed to create an agile network infrastructure that makes IT a competitive advantage. Enterprise network transformation is about reducing CapEx and OpEx, freeing up budget to invest in revenue-generating applications that streamline the business, while creating a network foundation that effectively leverages these technology and productivity enablers.

Unfortunately, the majority of today's campus and branch networks are manual systems comprised of layers of switches and VLANs, with multiple management points requiring different tools and adding operational complexity. Multiple layers and flavors of security solutions, ranging from load balancers to firewalls, add even more to this complexity. Because these layers of products must be administered manually, the potential for configuration errors that disrupt services or open security gaps increases, making it riskier and more challenging than ever to operate and manage the distributed enterprise.

A cloud-enabled enterprise network, on the other hand, enables rapid deployment of new services across all locations and increases employee productivity. Providing a common, converged network spanning distributed locations, a cloud-enabled enterprise can recognize and support a diverse set of wired and wireless devices, applications, people, and things, seamlessly and securely connecting them to services. Cloud-enabled enterprise networks make the IT department a "service provider" for its company's distributed locations, enabling the delivery of reliable, scalable, and secure connectivity that links telecommuters, remote locations, and corporate offices to a common system.

Juniper Networks delivers a comprehensive cloud-enabled enterprise solution that leverages technology utilized by service providers and mega cloud providers to deliver high-scale services capabilities for enterprise IT departments. Using innovations derived from building the world’s largest cloud-based networks and applying them to the enterprise, Juniper delivers a simplified, programmable network platform that can be easily customized and replicated across branches, campuses, and on-premises data centers, allowing businesses to deploy their own private or public clouds. Furthermore, based on years of experience helping the world’s largest service and cloud providers design, test, and build their mission-critical infrastructures, Juniper has gained the expertise and knowledge required to evaluate, plan, and build enterprise application- and content-aware networks empowered by SD-WAN, from assessments to full turn-key deployment.

The Juniper Networks Unite Cloud-Enabled Enterprise

The Juniper Networks Unite Cloud-Enabled Enterprise is based on a three-pronged approach: simplifying the infrastructure; securing the network; and delivering an open, converged framework that ensures best-in-class deployments. Based on Juniper switching and security solutions—including unified threat management, next-generation firewalls, and malware detection and eradication tools, as well as best-of-breed WLAN, UCC and network solutions through an Open Convergence Framework—Juniper Unite offers all the essentials an expanding business needs to support their operations today while preparing them to embrace the future.

Simplify the Infrastructure

By collapsing core, distribution, and access layers into a single logical platform that can be managed from a central location, Juniper removes operational headaches while providing network agility. A single, easy-to-manage platform lets IT organizations expand access port functionality, protect the edge, and centralize configuration, provisioning, management, policy, and visibility. It all works regardless of the deployment model: physical or virtual; public or private cloud; or traditional IT. Based on Juniper switching, security, and network services solutions—including unified threat management, next-generation firewalls, and malware detection and eradication tools—Juniper Unite offers all the essential components an expanding business needs to support their operations today while preparing them to embrace the future.

Juniper accomplishes this consolidation with Juniper Networks® Junos® Fusion Enterprise, an innovative architecture that lets customers build an agile enterprise network that treats access switches as extension ports of the core switch—effectively making multiple switches appear as a single, logical device. Junos Fusion Enterprise utilizes automated configurations to simplify operations and management; it also supports both stacked and mesh topologies, allowing both end-user access and private cloud or IT data center environments to be consolidated into a single logical system.

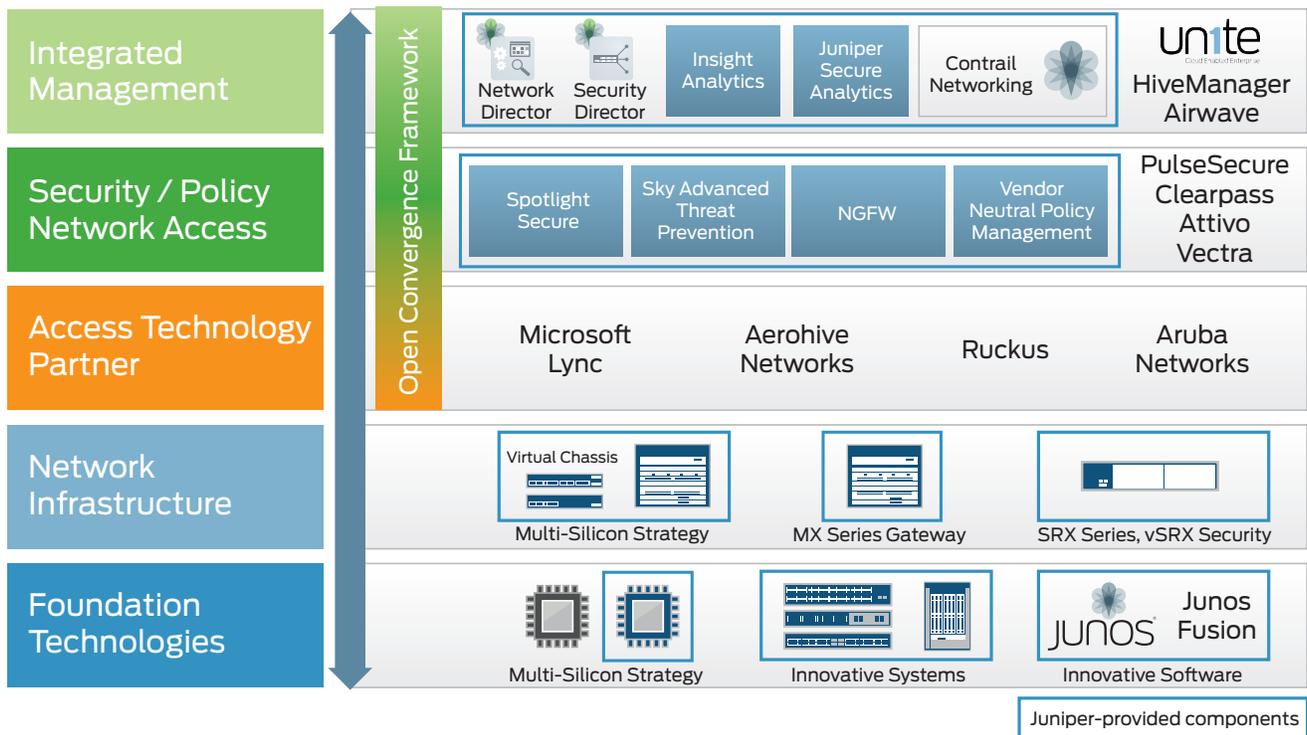


Figure 1: The Juniper Networks Unite Cloud-Enabled Enterprise Reference Architecture

Additionally, Juniper's network services platform helps enterprises reduce the number of appliances deployed at their branch locations by consolidating them into one easy-to-manage device, right-sized to deliver multiple services simultaneously. A zero-touch provisioning (ZTP) feature enables enterprises to instantiate their branches in just minutes, rather than days.

Securing the Enterprise

The Juniper Unite Cloud-Enabled Enterprise also provides comprehensive security and control with Juniper Networks SRX Series Services Gateways and the Junos Space Network Director and Junos Space Security Director applications, which provide network performance monitoring and capacity planning as well as centralized security policy management and control. The SRX Series platforms, which offer secure routing (VPN) and next-generation firewall capabilities, are essential to providing a secure foundation for campus and branch enterprise network deployments.

While there are many ways to detect and isolate intruders and bad actors, technology that requires the replication of the exact environment for the intruder is inferior to other solutions. Creating such an environment—including the creation of virtual machines (VMs) and mirroring the operating system and applications where the intruder exists—is not only challenging, it doesn't scale well. Simply maintaining such an ecosystem of software compatibility in order to isolate intruders becomes a project in and of itself.

A much more effective way to detect and isolate attackers is to immediately segment out intruders or bad actors by quarantining them in a sandbox area. Such technology currently exists, and it is much easier to use existing network capabilities than to create yet another layer of complexity and operational headaches. Juniper provides this visibility and centralized network policy control using an open policy enforcement platform to stop threats faster and more effectively, both from a cost and an efficiency perspective.

Juniper Networks Spotlight Secure gathers comprehensive, up-to-date threat and security intelligence and instantly communicates it to Security Director, which in turn sends the information to all SRX Series platforms in the network. Additionally, Juniper Networks Sky Advanced Threat Prevention delivers cloud-based protection and prevents malware from infecting the network by "detonating" downloads in a cloud sandbox, allowing SRX Series devices to identify and block any malicious threats.

Juniper's Unite Cloud-Enabled Enterprise, complemented by Juniper's branch solution, enables these comprehensive security services and applications to be delivered to all locations dynamically while maintaining consistent security policies everywhere.

Open Converged Framework

Juniper's Unite Cloud-Enabled Enterprise helps organizations deploy more agile and high-capacity networks that serve greater numbers of users and support an ever-increasing variety of devices with fewer resources and limited budgets. This comprehensive cloud-based solution is designed to accommodate the emerging IT environment, providing access to corporate resources anywhere, anytime.

By partnering with best-in-class wireless LAN (WLAN), unified communications (UC), network access control (NAC), and security vendors through its Open Converged Framework (OCF), Juniper ensures easy access to business resources from any device, in any environment, by offering a consistent user experience and a network that is easy to deploy, operate, and manage—without locking customers into proprietary solutions when converging or upgrading their enterprise network.

For wireless access, Juniper's OCF includes leading WLAN vendors such as Aruba Networks, Ruckus Wireless, and Aerohive Networks, allowing customers to choose between 802.11n or move to more advanced technologies such as 802.11ac and a variety of other management and integration options.

Also, by integrating with collaboration tools such as Microsoft Lync, Juniper helps users work together in real time, sharing and collaborating anywhere, anytime, over a reliable network infrastructure.

Features and Benefits

- **Manageability:** Broad support for unified device, network, and security management tools helps lower TCO.
- **Single, consistent Junos OS across the product line:** Unlike other vendors, Juniper Networks EX Series Ethernet Switches, NFX Series Network Services Platforms, and SRX Series Services Gateways run the same Juniper Networks Junos operating system, ensuring easy management and consistent operations.
- **Seamless connectivity:** EX Series switches allow always-on access for any application. Various interface types are supported, including 1GbE and 10GbE copper and fiber. Converged networks are supported for data, voice, and video, along with anytime/anywhere access through integration with Juniper Networks' Open Converged Framework.
- **Advanced, open, and scalable network security:** Security Director, combined with Juniper's Sky Advanced Threat Prevention solution and SRX Series Services Gateways, offers a comprehensive enterprise security solution, including a full range of firewall protection for everything from the smallest branch to the largest service provider. Advanced protection such as unified threat management (UTM), next-generation firewall, and threat intelligence services work to keep both data and network safe. The

ability to accept open feeds from Juniper as well as outside sources allows customers to fine-tune their security for the most efficient network protection available across all locations. Both physical and virtual firewalls can be centrally managed, ensuring policies are dynamically and consistently updated, applied and enforced everywhere across the enterprise.

- **Broad range of switches for every need:** The EX Series switches support everything from access to aggregation to core deployments.
- **Architectural advantages:** Junos Fusion offers a simple, reliable, and flexible solution for building corporate networks, supported by the EX9200, EX4300, EX3400, EX2300 and EX2300-C Ethernet Switches.
- **Application and content aware routing:** The SRX Series Services Gateways with SD-WAN capability intelligently choose routes from among various network links while preserving quality of service (QoS).
- **Third-party network services:** The NFX Series Network Services Platform, combined with virtualization technology, eliminates the need for multiple appliances by consolidating services into a single, easy to manage device, right-sized to simultaneously deliver multiple services from Juniper, Juniper's technology alliance partners, and custom enterprise applications.

Solution Components

The Juniper Networks Unite Cloud-Enabled Enterprise is built on:

- Reliable, high-performance, and automation-ready EX Series Ethernet Switches, NFX Series Network Services Platforms, and SRX Series Services Gateways.
- Modern user interfaces focused on the user experience, delivering single pane-of-glass management with Junos Space Network Director and Junos Space Security Director, which integrate with Juniper Networks Secure Analytics to enable dynamic workflow execution.
- An Open Converged Framework with published APIs, allowing customers to choose best-in-class technologies that address all technology needs for their campus and branches from UC, WLAN access technology, and third-party security feeds.
- VMs, created and automated with Contrail Service Orchestration, to deliver full life-cycle management including the installation, deployment, and management of virtualized network services and applications.

- A full suite of Juniper Professional Services and Support Services from Juniper certified partners, providing assistance to customers for every phase of the solution life cycle, from planning and assessments through testing and validation to full turn-key project management and Day Two operational support.

Enterprise Infrastructure

The Juniper Unite Cloud-Enabled Enterprise solution begins with the high-performance EX Series Ethernet Switches, featuring the Juniper Networks EX4300, EX3400, EX2300 and EX2300-C Ethernet switches for access, the EX4600 Ethernet Switch for high-speed access or distribution, and the EX9200 Ethernet Switch for programmable core switching.

The EX Series switches offer a number of unique features, including Virtual Chassis technology, multichassis link aggregation (MC-LAG), Junos Space Service Insight technology, and unified in-service software upgrade (unified ISSU) in both modular and fixed platforms.

The EX Series has also assumed a new level of manageability and scalability with Junos Fusion Enterprise by enabling customers to manage the entire enterprise campus and branch—including hundreds of switches and thousands of ports—as a single, logical device.

Customers can use the Junos Fusion Enterprise technology to collapse multiple networks into one, creating a large virtual system for the entire campus and branch network that behaves and operates as a single switch. Organizations can deploy multiple Junos Fusion clusters throughout the enterprise network, each capable of scaling to support thousands of user ports across satellite devices. Junos Fusion Enterprise leverages the open 802.1BR standard to create an enterprise campus network fabric composed of EX Series Ethernet Switches.

In a Junos Fusion Enterprise deployment, EX9200 switches serve as aggregation devices to provide the core service, while EX4300, EX3400, EX2300 and EX2300-C switches serve as satellite access devices. Juniper Networks QFX5100 Switches are also supported in a leaf topology, offering the unique ability to manage campus, branch, and data center from a single, logical management plane, creating virtual network segmentation.

The EX Series switches support a number of network automation and plug-and-play operational features, including operations and event scripts, automatic rollback, and Python scripting, as well as integration with Chef and Puppet. Juniper also offers an [EX Quickstart service](#), which provides design review and validation; low-level EX Series design, configuration, and implementation planning; and cutover support and information transfer to help new customers transition to a Juniper Unite Cloud-Enabled Enterprise.

Junos Space Network Director is an intelligent, automated network management tool that enables network administrators to see, analyze, and control their entire enterprise network—physical and virtual; wired and wireless; data center, campus, and branch—through a single pane of glass. Using Network Director, administrators can manage and synchronize both physical and virtual environments in the data center, ensuring that network policies follow workloads as they move from server to server or from virtual machine to virtual machine. In the campus and branch, Network Director automates routine and repetitive management tasks such as network provisioning and troubleshooting, dramatically improving operational efficiency and reliability across all locations.

Juniper Unite brings agility to the campus and branch via the NFX Series Network Services Platform. Featuring ZTP, the NFX Series lets enterprises quickly turn-up remote locations without having IT expertise at each site. The network services and applications running on the NFX Series can be instantiated and managed by the CSO from a central location, making service and application updates simple and dynamic.

Running a vSRX service on the NFX Series platform, Juniper Unite helps existing legacy communication services easily migrate to SD-WAN-based intelligent connectivity with full-featured Junos capabilities.

Enterprise Security

Juniper Unite offers a comprehensive solution for building secure networks that protect the cloud-enabled enterprise. Junos Space Security Director provides global application-level visibility and policy management across a portfolio of scalable SRX Series Services Gateways. The SRX Series platforms provide a foundation for implementing a wide array of protections, including high-performance UTM services, next-generation firewall services, and dynamic threat defense and intelligence. SRX Series gateways also offer multiple deployment options, including appliance, chassis-based, and virtual models, all offering the same full feature capability. These building blocks, when combined with Juniper's threat defense and intelligence portfolio, provide a foundational platform for open policy enforcement:

- **Security Director** provides security policy management through an intuitive, centralized, web-based interface that offers enforcement across emerging and traditional risk vectors. Security Director offers extensive security scale, granular policy control, and policy breadth across the network.
- **Spotlight Secure Advanced Threat Intelligence** aggregates threat feeds from multiple sources to deliver open, consolidated, actionable intelligence to SRX Series firewalls across the organization. These sources include Juniper and third-party threat feeds, as well as threat detection technologies that the customer can deploy. Administrators

can define enforcement policies from all feeds via Security Director, which provides a single, centralized management point. These components, combined with the SRX Series firewalls, provide the foundation for the Platform for Open Policy Enforcement.

- **Sky Advanced Threat Prevention** is a cloud-based service that quarantines potentially malicious traffic or redirects it to be sanitized, preventing the proliferation of malware.

Summary—Simplified and Secure Enterprise Network

As more businesses move to the cloud to solve their data management and access problems, they have a critical need for solutions that can help them bridge the gap between their existing environment and their vision of a more agile and flexible network.

Enter the Juniper Unite Cloud-Enabled Enterprise—a common, unified network that supports a diverse set of devices, applications, people, and things to provide reliable, scalable, secure, and highly available access to resources, whether they reside in the cloud, the data center, or the WAN.

Juniper Networks delivers a broad portfolio of reliable, simple, and smart switching, security, and management solutions that deliver the cloud-enabled enterprise network that businesses demand, seamlessly connecting people, devices, machines, and things in distributed enterprise environments. These solutions provide:

- Simplified infrastructure that is scalable and resilient enough to keep up with the demands of users and cloud applications, as well as a management interface that provides zero touch provisioning and visibility into network operations, reducing costs associated with today's brittle and complex enterprise networks.
- Comprehensive enterprise security that scales to any number of locations to deliver consistent, uniform services and policies, providing visibility into the network and the ability to defend against threats in real time via a multitude of sensors and third-party feeds across all locations.
- An Open Converged Framework with APIs that integrate with best-in-class technologies such as WLAN, unified communications, or security feeds, as well as offer automation and orchestration capabilities for the future.
- Juniper- and partner-delivered services and support that help customers build flexible and cost-effective campus and branch networks empowered by SD-WAN, from planning and assessments all the way through building and operating a Juniper Unite Cloud-Enabled Enterprise solution.

Next Steps

For more information about Juniper Unite Cloud-Enabled Enterprise, please contact your Juniper representative, or go to www.juniper.net.

.About Juniper Networks

Juniper Networks is in the business of network innovation. From devices to data centers, from consumers to cloud providers, Juniper Networks delivers the software, silicon and systems that transform the experience and economics of networking. The company serves customers and partners worldwide. Additional information can be found at www.juniper.net.

Corporate and Sales Headquarters

Juniper Networks, Inc.
1133 Innovation Way
Sunnyvale, CA 94089 USA
Phone: 888.JUNIPER (888.586.4737)
or +1.408.745.2000
Fax: +1.408.745.2100
www.juniper.net

APAC and EMEA Headquarters

Juniper Networks International B.V.
Boeing Avenue 240
1119 PZ Schiphol-Rijk
Amsterdam, The Netherlands
Phone: +31.0.207.125.700
Fax: +31.0.207.125.701

Copyright 2016 Juniper Networks, Inc. All rights reserved. Juniper Networks, the Juniper Networks logo, Junos and QFabric are registered trademarks of Juniper Networks, Inc. in the United States and other countries. All other trademarks, service marks, registered marks, or registered service marks are the property of their respective owners. Juniper Networks assumes no responsibility for any inaccuracies in this document. Juniper Networks reserves the right to change, modify, transfer, or otherwise revise this publication without notice.

