

Junos Space

Product Overview

Junos Space is a comprehensive Network Management Solution that simplifies and automates management of Juniper's switching, routing, and security devices. Junos Space consists of a network management platform for deep element and FCAPS management, plug-n-play management applications for reducing costs and provisioning new services quickly, and a programmable SDK for network customization. With each of these components working cohesively, Junos Space offers a unified network management and orchestration solution to help you more efficiently manage the New Network.

Network Management Challenges for Service Providers and Enterprises

For service providers, the network is the money-maker. Service providers look to their network to create innovative services that solve business problems and demonstrate the added value they can bring to their customers. These services must always be available to ensure end- subscriber satisfaction, and new services need to be offered frequently as demands and technology change in order to obtain additional revenue streams.

For enterprises, the network is both a strategic and critical corporate asset, where costs have to be controlled. Explosive demand for smart devices, social media applications, and mobility-based services has placed unprecedented pressure on network operators who must provide a compelling experience to increasingly demanding, tech savvy consumers. The unrelenting expectations of highly secure and always-on connectivity and service, coupled with the growing use of cloud environments, make the network increasingly complex to manage and secure.

These networks can be extremely difficult to manage. Networks have been device centric, and each new box brought a different interface and exponential complexity. This made networks hard to manage, closed to innovation, and expensive to operate. With more users and devices than ever before, managing, securing, and delivering new services across the network has meant additional costs and complexities.

Juniper addresses these network challenges with Junos Space to help service providers and enterprise customers maximize their network value and scale solutions, all while reducing complexity. Junos Space is a critical component of Juniper's SDN strategy as it provides a centralized management plane for a single source of truth and a common management platform for managing and creating applications to meet your specific needs.

Centralized Network Management

With Junos Space, you can simplify and automate the network, improve network agility, and deliver new services quickly—all from a single console. Junos Space is composed of the following three software elements:

- **Junos Space Network Management Platform** – Provides comprehensive FCAPS and element management of Juniper devices which improves operator efficiencies, providing a programmable interface and exposable APIs that enable the development and integration of 3rd party applications
- **Junos Space Management Applications** – Plug-n-play, domain-specific applications to help you provision new services and optimize workflow tasks across thousands of Juniper devices
- **Junos Space SDK (software development kit)** – A programmable network solution that enables you to leverage the connections and intelligence imbedded in the network to create customized management solutions for your specific needs

Key Component of Juniper's SDN Strategy

Junos Space is a critical component of our SDN strategy as it provides a centralized management plane for a single point-of-contact into the network and a common management platform for managing and creating applications to meet your specific needs. The Junos Space Network Management Platform and the Junos Space Management Applications are all accessible through a northbound Representational State Transfer (REST)-based Application Programming Interface (API). These open APIs provide core building blocks for new innovation, with no need to build solutions from scratch.

They also provide access to all Junos-based devices, serving as a single entry point that abstracts your network to enable you to manage, monitor, control and gather insight across your entire network infrastructure. This enables operators to use their existing Operations/Business Support Systems (OSS/BSS) deployments and tap into the rich functionality of both the Junos Space Network Management Platform and the Management Applications. The programmability, centralization, and customization aspects of Junos Space are important as network providers begin to embrace SDN architectures in their networks.

Automate and Simplify The Network with the Junos Space Network Management Platform

Junos Space Network Management Platform provides comprehensive element management of Juniper devices. No other vendor can manage Juniper devices to the depth and extent of Junos Space. With the Junos Space Network Management Platform, you get broad FCAPS capability, same day support for new devices and Junos releases, a task-specific user interface, and northbound APIs to easily integrate into existing NMS or OSS/BSS deployments.

Junos Space Network Management Platform uses multilayered network abstractions, operator-centric automation schemes, and the simplicity of a point-and-click user interface to help network operators in enterprise and service provider organizations scale their operations, reduce operational complexity, and enable new applications and services to be brought to market quickly.

With this platform, you get a unified approach for managing Juniper infrastructure and designing/deploying new services. Junos Space offers a centralized network management and orchestration solution to manage both network devices and services through a single-pane of glass for real-time visibility. This means one sign on, one user interface, one location to manage routers, switches, and security devices.

Additionally, you scale your network easily with zero-day support of new devices and operating systems with a schema driven data base, without having to upgrade the platform. With Junos Space, you get a highly scalable platform with one cluster (6 nodes running in a fabric configuration) being able to manage the complete network with up to 15,000 devices.

The Junos Space platform is architected from the ground up and is based on a service-oriented architecture (SOA). It uses industry-standard technologies to provide an enhanced user experience, massive application transparent scale, high availability, and feature velocity. The Junos Space platform provides a single abstracted network model across Juniper's networking infrastructure, and it extends this to third parties through standards-based Representational State Transfer (RESTful) APIs. The use of a standards-based Device Management Interface (DMI), an XML schema-driven device access API, zero day support for new devices, and a plug-and-play application environment allows in-service device and software upgrades. Users can access the Junos Space platform functionality using a simple Web 2.0 graphical user interface (GUI), which uses persona-based workflows and progressive disclosure to enable operator-centric and scope-specific visibility and control.

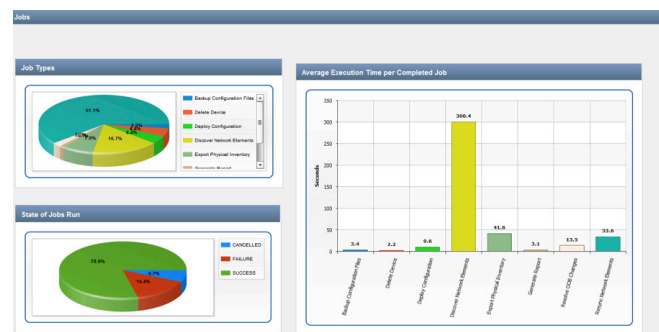


Figure 1: Job Management.

Junos Space Environment

Scalable and Resilient Runtime Environment

Junos Space is implemented as a scalable fabric of physical or virtual appliances that work collaboratively to help optimize network resiliency, availability, and resource utilization. You can expand or contract the fabric by simply adding or deleting nodes; the system will automatically expand. Each node is fully utilized and the nodes work together to provide automated resource management and a base for higher level applications.

The Junos Space Network Management Platform is designed for carrier-grade reliability and availability. The Space fabric provides 1:1 data base redundancy and transparent switchover of UI sessions in case of node failure. And Junos Space is built to be massively scalable. Multiple appliances can be clustered together to form a single management fabric.

The Junos Space Network Management Platform is multi-tenant and enables hot-pluggable application deployment and upgrades. Juniper or third-party applications can be added by downloading them onto the platform, with the system automatically deploying the applications throughout the fabric. One of the unique features of the platform is its DMI, a schema-driven, programmatic interface to allow for easy management of network devices. DMI makes it possible to import the published schema version and map out all configuration and operational commands for a given device, enabling zero day support and future proofing without having to upgrade or patch the platform.

Enhanced User Experience

Junos Space provides a simple to use Web 2.0 GUI that can be accessed through standard Web browsers. The GUI is designed to simplify the way you interact with the system. It is based on a task-oriented paradigm and uses persona-based workflows to help you do your administrative tasks quickly and efficiently.

Embedded Network Infrastructure Automation

The Junos Space Network Management Platform provides centralized, unified, out-of-the-box management for Juniper's networking infrastructure. It also provides full element management functionality for total management of Juniper's routing, switching, and security devices. Network element management functions include:

- **Device discovery:** Provides a wizard-based interface for near real-time device discovery to enable operators to quickly bring network devices under management.
- **Topology:** Allows operators to have a broad, topological view of the network including endpoint devices, link information, bottlenecks and failures, and discovered relationships between network elements such as devices and interconnections for devices under management.
- **Inventory management:** Enables visualization storage and management of hardware inventory, including chassis-related information such as serial numbers, software version, location, and physical subcomponent information such as slots, cards, and ports for all managed devices. Included is automated synchronization between hardware inventory, interface information, and configuration of the device.
- **Software image management:** Provides centralized, network-wide deployment of software images and patches to enable customers to efficiently manage the deployment of Juniper software. Includes the ability to import software images from local or networked file system, flexibly schedule software deployments, deploy software image to one or multiple devices in a single workflow, image verification for accuracy, and use of golden image.
- **Configuration templates:** Enables creation of cookie-cutter, model-based configuration templates to help optimize and scale device configurations. Includes schema-driven GUI for fully customizable configurations, and an audit trail to track configuration changes.
- **Configuration file management:** Enables simplified configuration management that includes import, edit compare, and backup/restore for individual devices or device groups. Provides instant visibility into network configuration and performance correlation, automated configuration deployment scheduling, validation to minimize syntax errors, and entry forms for easy creation of template definitions and bulk modification of configurations.

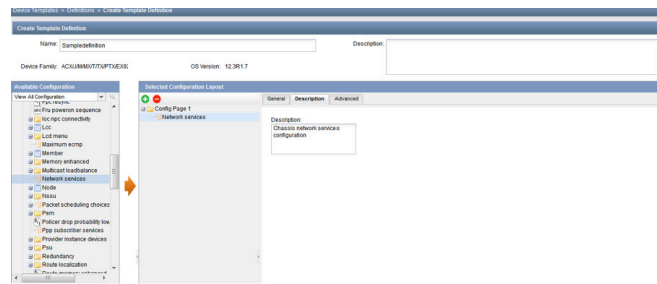
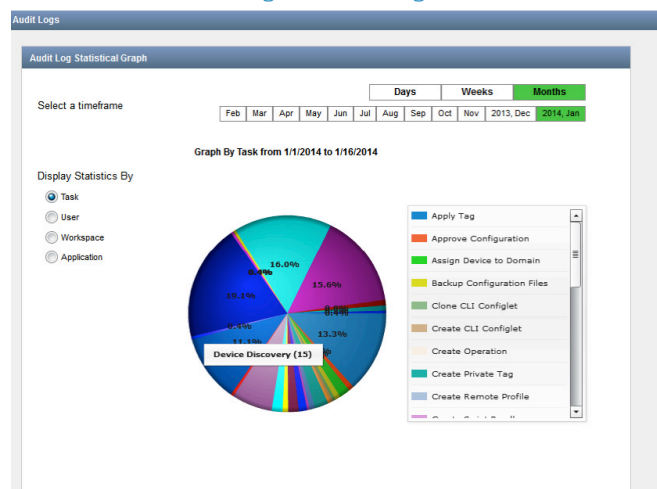


Figure 2: Configuration Templates

- **Configuration editor:** Using a schema-driven GUI, operators can view and edit all attributes of a device's configuration, including being able to work with portions of the configuration.

Figure 3: Audit Log



- **Junos OS script management:** Provides centralized, total management of Junos OS scripts, including import/export, view/edit, version control, deploy/delete, verify execution, and more to allow operators to leverage configuration and diagnostic automation tools provided by the Juniper Networks Junos operating system.
- **Fault and Performance management:** Includes cross-vendor enterprise-grade event and performance management, Powered by OpenNMS, for insight and visibility across all network devices.

These platform functions enable users to control any part of their Juniper network when used in conjunction with multiple add-on applications.

Optimize Network Domain Management with Junos Space Management Applications

Extending the breadth of the solution are multiple Junos Space Management Applications that optimize network management for various domains. These applications, with their easy-to-use interface, enable you to provision new services across thousands of devices and optimize workflow tasks for specific use cases

within the core, edge, data center, campus, security, mobile, and more. The following Junos Space Management Application can easily be added and managed from the Junos Space Network Management Platform:

Junos Space Services Activation Director

Junos Space Services Activation Director ensures error-free service provisioning and monitoring of legacy Carrier-Ethernet and MPLS using a simple interface to design, validate and manage these services. Service providers and enterprises must be able to rapidly provision and offer new MPLS and Carrier Ethernet services across their networks. In order to reduce operational costs and enable quick service rollouts, these network operators need an intelligent provisioning application that facilitates the design, deployment and management of services. Junos Space Services Activation Director is a collection of applications that facilitates automated design and provisioning of L2VPN and L3VPN services, configuration of QoS profiles, validation and monitoring of service performance and management of synchronization.

Key features and benefits include:

- Removal of all possible manual configuration errors
- One centralized location for all L2VPN and L3VPN services
- Reduced mean time to recovery (MTTR) when troubleshooting customer connectivity issues
- Configuration management, health monitoring, discovery, and GUI visualization of synchronization devices
- Facilitates configuration of Quality of Service (QoS) features to provide improved service to certain types of network traffic
- Checking end-to-end path connectivity of control plane and the data plane in order to guarantee SLAs

Junos Space Network Director

Junos Space Network Director is a full lifecycle management tool for unified vision and control of the network wired and wireless infrastructure, users and services. Encompassing both wired and wireless for enterprise customers in both the campus and data center domains, Junos Space Network Director provides a single pane of glass management solution enabling cost-effective delivery of high performance and high availability network services.

Key features and benefits include:

- Operation simplicity help you shift from maintaining to innovating
- Less human error with guided, wizard based tasks
- Fast and simple deployment with profile based approach by logical, location or device grouping
- Optimize network performance with extensive performance and correlated fault management
- Monitor and plan ahead with pervasive visibility into the network

- Top interfaces with enhanced web 2.0 user experience with adoptive content and smart navigation
- Extensive PDF, CSV, HTML reporting to view inventory, usage, capacity, alarms, top talkers.

Junos Space Service Now

Junos Space Service Now is a remote, automated trouble-shooting client that enables Juniper to quickly identify a problem in the customer's network to achieve a 40% increase in Day 1 issue resolution. Used by both enterprises and service providers, Junos Space Service Now creates an incident detection system by performing automated diagnostic data collection on first occurrence of an issue. The information collected from devices, via the Junos Space Network Management Platform, is presented in an easily accessible format that automates and speeds troubleshooting and ultimately the resolution of problems.

Junos Space Service Insight

Junos Space Service Insight helps you reduce network downtime by delivering proactive bug notifications specific to your network configuration, and thorough automated end-of-life/support analysis where you can do complete EOL auditing across 100's of devices in seconds. Used by both enterprises and service providers, Junos Space Service Insight works seamlessly with Junos Space Service Now to deliver targeted bug notifications, identify which network devices could potentially be impacted, and perform impact analyses for EOL/EOS notifications.

Key features and benefits include:

- Proactive bug notification for reduced risk of network device issues to ensure higher network uptime
- End of life impact analysis to reduce the risk of running unsupported hardware or software in networks
- Ability to automate scanning for impact of bug notifications, which saves time in risk assessment and exposure to known issues, improves uptime, and reduces the risk of downtime due to known issues
- User and systems notifications of new bugs and end of life that helps you configure notification policy to alert users or other tools/systems about new proactive bug notifications or end of life notifications received
- Automates key operational tasks of delivering incident prevention, detection, and diagnostics
- Employs the automation capabilities embedded in the Juniper Networks Junos operating system to deliver an early warning system that detects errors in devices and collects required diagnostic data for analysis and troubleshooting
- Provides a uniform solution that can scale to all devices running Junos OS
- Presents information collected in an easily accessible format that automates and speeds troubleshooting and ultimately the resolution of problems

- Simplifies operational processes and increases operational efficiency with the ability to open cases with Juniper Networks
- Technical Assistance Center (JTAC) from the Junos Space Service Now console, and by sending the necessary information to JTAC to quickly and effectively identify and resolve problems
- Provides a centralized platform that stores and tracks detected incidents, maintains the troubleshooting information collected, and tracks the status of associated cases escalated to JTAC
- Saves time by automating time-consuming manual tasks such as asset inventory details

Junos Space Security Director

Junos Space Security Director helps organizations improve the reach, ease, and accuracy of security policy administration with a scalable, GUI based management application. Used by both enterprises and service providers, it helps administrators more quickly and intuitively manage all phases of security policy lifecycle, from policy creation to remediation, through one centralized web-based interface.

Key features and benefits include:

- Fast and easy enforcement of security state across the end-to-end network
- Quick, easy translation of business policies into network configuration with minimal manual intervention
- Rapid deployment of thousands of devices with minimal user intervention and truck rolls
- Setup of thousands of IPsec VPNs in minutes rather than days
- Easy point-and-click interface to enable security architects to design, validate, and deploy security policies consistently across a distributed network
- Patent pending technology called security domains to allow security restrictions to be applied to distributed network resources, reducing configuration errors
- Policy abstraction to enable users to simply drag and drop a policy onto security devices
- Policy locking that reduces configuration errors by preventing simultaneous edits
- Policy versioning for configuration snapshots and rollback capabilities
- Topology view of the network for fully automated visualization and configuration of security devices

Junos Space Content Director

Junos Space Content Director speeds and simplifies deployment and configuration of Junos Content Encore through the network, with a centralized caching management solution that scales to manage hundreds of caches from a single server. Used by service

providers, Junos Content portfolio is a suite of next-generation content caching and delivery products that help deliver web content to subscribers in a manner that is efficient, cost-effective and scalable.

Key features and benefits include:

- Runs on an extensible fabric of physical or virtual appliances to maximize scalability and availability.
- Enables large-scale deployments
- Simplifies management tasks
- Reduces errors by guiding users through valid choices
- Reduces training time and expense

Junos Space Virtual Control

Junos Space Virtual Control helps you ensure smooth operations in virtualized data centers by provisioning, defining, and deploying end-to-end policies on both virtual and physical networks, all from a single location. Using Junos Space Virtual Control, network operators can manage, monitor and control both virtual and physical networks through a single pane of glass, ensuring that network policies are consistently and automatically applied across the infrastructure. This enables error free network operations and simplifies the deployment of value-added services such as virtual machine live migration (e.g., VMware VMotion).

Key features and benefits include:

- Flexibility to adopt an operational model that best fits the organization
- Complete visibility into the current state of the vNetwork
- Automates physical network setup and reduces downtime due to configuration conflicts
- Enables error free and scalable deployment of services such as VMware VMotion, Distributed Resource Scheduler (DRS), high availability, and fault tolerance
- Offers better network security and efficiency, especially in multi-tenant deployments

Building Network Applications with Junos Space SDK

For companies that want to extract value from their network and deliver on solutions that truly work for their business, Junos Space is the platform of choice. You can create and deploy custom management applications using our programmable interface. Junos Space improves network agility by providing a SDK toolkit and APIs both at the platform and application level for a complete customized solution so you can meet the specific needs of your business or internal procedures.

The Junos Space SDK provides a complete rapid application development framework that includes a common infrastructure, a software development kit (SDK) with prebuilt core services and widgets to allow easy user interface prototyping, and standards based APIs for third-party application integration. Using the Juniper Networks Junos Space SDK, users have the option of

developing different classes of applications such as mashups, customized business process workflows, or native applications.

The Junos Space Network Management Platform and its Open APIs provide RESTful access to all Junos-based devices, serving as a single entry point that abstracts your network to enable you to manage, monitor, control and gather insight across your entire network infrastructure.

And, by using Junos Space SDK, you can utilize your investment in existing OSS/BSS solutions to manage, monitor and control the network. Plus, you'll be able to access network data streams and insight to proactively manage, monitor and simplify management of your complex network.

Learn Junos Space with Junosphere

The industry's only virtual networking environment, Junosphere enables network operators to perform network testing, design and training exercises in a risk-free virtual environment that is 90% less expensive than traditional physical labs. By utilizing Junosphere, you can test your Junos Space instance before actually deploying into production. Create and run exact replicas of your network within a cloud based Junos environment!

Features and Benefits

Junos Space Benefits

With the Junos Space customers benefit from:

- Network-wide visibility and control
- Quick scaling of operations and services
- Rapid deployment of switching, routing, and security infrastructure
- Total management of Juniper devices
- Cross-Vendor event and performance management
- Network intelligence for extending core platform capabilities
- Fast problem identification and resolution
- SDK and APIs for customization and integration
- Reduced OpEx

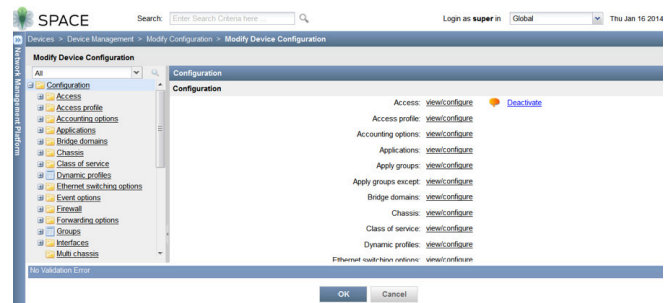


Figure 4: Configuration Editor

Features and Benefits

Features	Feature Description	Benefits
Web 2.0 GUI	<ul style="list-style-type: none"> • Task-oriented GUI to enable users to complete tasks in congruent navigation steps and screen flows without context switches • Persona-oriented system views and workflows • Workflow automations for common tasks • Progressive disclosure for contextual view of the network 	<ul style="list-style-type: none"> • Identity-based navigational flows and a consistent user experience that increase user productivity, eliminate error prone manual operations, and speed up operation cycle times • Lower OpEx due to reduced requirement for highly skilled personnel; reduced training and support costs due to consistent interface and workflow automation
Device Management Interface (DMI)	<ul style="list-style-type: none"> • XML schema and metadata files describing how to manage each release of the device's software 	<ul style="list-style-type: none"> • Zero day device support • Future proofing of network investments
Hot-pluggable/multi-tenant applications	<ul style="list-style-type: none"> • Hosted applications that can be hot-plugged into Junos Space platform via global dashboard • Applications that leverage global platform capabilities but maintain their unique identities 	<ul style="list-style-type: none"> • Rapid deployment of applications and devices • In-service application and device updates to increase uptime and business continuity
Application fabric	<ul style="list-style-type: none"> • Distributed fabric of IP-connected physical or virtual appliances of pre-assembled, near identical full application stacks, including the complete Junos Space software to enable each appliance to provide full management functionality • End users who are able to access management applications through a single, public virtual IP • Fabric that is deployed in active/active cluster configuration 	<ul style="list-style-type: none"> • Instant scale by simply adding or deleting nodes on the fabric • Increased application availability and resilience due to no single point of failure • Resource optimization due to each node being fully utilized and load-balanced with others in the fabric

Features	Feature Description	Benefits
Network operations		
Network discovery and inventory management	<ul style="list-style-type: none"> • Network and device discovery • Near real-time network inventory • Dedicated socket connection to each device • Inventory management for automated collection of inventory data from Juniper devices. • Inventory views of physical and logical inventory of supported devices, allowing users to generate reports and track locations, availability, and deployment of hardware and software • Automated synchronization between hardware inventory, interface information, and device configuration of the device • Multi-target specification (IP address, IP address range, IP subnet, host name) 	<ul style="list-style-type: none"> • Supports Fault, Configuration, Accounting, Performance, Security (FCAPS) network management framework, and provides total management of network elements • Includes autodiscovery for improved asset management and network planning • Enables secure notifications and action for each configuration change • Detailed view of all hardware inventory (power supplies, chassis cards, fans, part numbers, etc.) for all managed devices to enable intelligent cataloging for effective system upgrades and modifications
Topology	<ul style="list-style-type: none"> • Automated discovery of network topology (devices and interconnections) • Tools for visualizing the discovered topology • Tabular view for device-specific details • Topology view for broad network visibility • Semantic zooming for fine-grained device view 	<ul style="list-style-type: none"> • Flexible network visualization options for simplifying network operations
Software image management	<ul style="list-style-type: none"> • Centralized device software installation for all managed devices • Enables device images to be uploaded from local file system, and deployed onto a device or onto multiple devices of the same device family in a single workflow • Image verification for accuracy 	<ul style="list-style-type: none"> • Provides the ability to do remote software upgrades and in-service software upgrades • Enables automated upgrade planning, scheduling, downloading, and monitoring of device images • Reduces errors with the use of a recommended image
Configuration templates	<ul style="list-style-type: none"> • Device configuration templates that provide the ability to design and push any configuration to a device or group of devices • Schema-driven GUI for template creation to enable granular control • Entry forms to create template definitions • Audit log that captures all template deployment operations 	<ul style="list-style-type: none"> • Allows administrators to design, validate, and push configurations to device or device group • Enables deployment of common configuration across multiple devices • Allows operators to manipulate all knobs on a given device
Configuration editor	<ul style="list-style-type: none"> • Configuration editor that provides the ability to view, edit, and delete all aspects of a device's configuration 	<ul style="list-style-type: none"> • Allows operators to quickly view and modify any portion of a device's configuration
Configuration file management	<ul style="list-style-type: none"> • Ability to view a given device's configuration and edit, add, or delete portions of that configuration • Schema-driven • Up-to-date view of device's configuration • Ability to view, edit, version control, compare, back up, and restore network configuration files 	<ul style="list-style-type: none"> • Simplified configuration management to optimize network performance and health • Instant visibility into network configuration and performance correlation • Entry forms to create template definition and bulk modify configurations • Administrators able to compare different configuration versions either for the same or different devices
Junos OS script management	<ul style="list-style-type: none"> • Configuration and management of Junos OS automation scripts, including import/export, view/edit, version control, deploy/delete, and verify script execution 	<ul style="list-style-type: none"> • Centralized management of all Junos OS automation scripts
Full rapid application development framework	<ul style="list-style-type: none"> • Includes a common infrastructure, a tool kit with core services and user interface widgets, and integration APIs 	<ul style="list-style-type: none"> • Comprehensive development environment to rapidly create and monetize applications • Easy integration into operations support systems (OSS) and data center ecosystems • Ability to create mashups for market-specific solutions

Junos Space Virtual Appliance

Juniper Networks Junos Space Virtual Appliance includes the complete Junos Space software package as well as the operating system. It requires users to create a virtual machine in order to deploy the appliance. The recommended specifications for the virtual machine are identical to the specifications of the physical appliance.

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.

Ordering Information

What to Buy

This product adheres to the Juniper Software Advantage pricing model, thus please be advised of the following items that constitute an order:

- Junos Space Platform JS-Platform is offered through the purchase of a perpetual (unlimited term) license. This perpetual software license excludes Juniper Care Software Advantage, which must be purchased separately.
- If your order includes a hardware product/platform, select a hardware license based on your scale and performance requirements. You need to purchase additional software licenses to support the base hardware.

- If you are ordering Junos Space Virtual Appliance, you would be required to procure the necessary hardware separately. For information on supported hypervisor(s) and virtual machine (VM) requirements, please refer to the technical documentation for this product on our website (www.juniper.net) under the support section.

Juniper Networks products are sold directly as well as through Juniper partners and resellers. For more information on the Juniper Software Advantage business model, please visit www.juniper.net/us/en/products-services/network-management/junos-space-platform

For information on how to buy, please visit: www.juniper.net/us/en/how-to-buy

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.

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