

# JUNOSPHERE CLOUD

## Product Overview

Juniper Networks Junosphere Cloud is a software-based service that allows networking professionals to perform network testing, design, and training exercises in a risk-free virtual environment that uses real network operating systems. Junosphere Cloud allows you to closely replicate physical networks consisting of Junos OS-based devices and ecosystem tools without the cost, complexity, or limitations of a physical lab. Junosphere Cloud provides the following benefits:

- Flexibility—rapidly and dynamically change configurations and network designs
- Scale—create networks of hundreds of nodes
- Realism—run the same Junos OS found on Juniper hardware systems
- Cost—reduce total cost of ownership by as much as 90%<sup>1</sup>

<sup>1</sup>ACG Research

## Product Description

Networking professionals across all industries share a common requirement for access to networking labs. Access to a lab environment where you can perform network testing, design, and training exercises independent of the production network is key to keeping your network running efficiently, planning new design implementations, and training or educating employees.

Yet due to the costs to acquire and operate lab equipment, many network labs are undersized and overutilized—if you are fortunate enough to be able to access a lab at all. Even in the largest organizations, capital and operational costs prevent network labs from achieving the same level of scale as the production network, making it difficult to accurately test new software releases, features, and upgrade procedures.

Juniper Networks® Junosphere™ Cloud is Juniper's unique solution to overcoming these challenges. Junosphere Cloud provides a cost-effective and flexible environment where you can create and run networks in a virtual environment. These networks can be used for the same exercises you perform today in your physical lab and more, including network design, modeling, troubleshooting, testing, and training.

Accessed on demand and hosted entirely in Juniper-operated datacenters, Junosphere Cloud requires no hardware—instead you only need a Web browser to access your networking lab. Networks created in Junosphere Cloud run the same Juniper Networks Junos® operating system that powers Juniper hardware systems, ensuring that results you see in Junosphere Cloud are consistent with real-world network behavior. And, because Junosphere provides complete design flexibility and nearly unlimited scale, it also enables you to perform network exercises and model scenarios that simply wouldn't be feasible in a physical networking lab.

By moving your network testing, design, and training activities to the cloud, Junosphere Cloud can both help save costs and enhance capabilities. ACG Research estimates that, when compared to a physical networking lab, Junosphere Cloud can reduce total cost of ownership (TCO) by as much as 90%. Project times are estimated to improve by 30%—which translates into increased productivity and more work done.

## Architecture and Key Components

Junosphere Cloud is a commercial-grade software-as-a-service (SaaS) offering, with always-on availability, and it is fully supported by Juniper Networks Technical Assistance Center (JTAC). Junosphere Cloud resources are hosted in dedicated data centers owned and operated by Juniper Networks, and they leverage the latest in virtualization technologies. The components that make up Junosphere Cloud are described below.

## Junosphere User Interface

Access to the Junosphere environment is provided via a Web UI supported by popular Web browsers, available at **www.junosphere.net** (purchase required to obtain username and password).

The Junosphere user interface provides tools to manage your Junosphere accounts and resources, plan and design topologies, and run and access networks. The user interface provides visibility into your company's available Junosphere time, and allows reservations to be made in real time or in advance. Within the user interface, you can save network topology files to public or private libraries for future use or to share with others in your organization. Users can select which of these topology files they would like to launch and run. Once a topology has been launched, the routers or other virtual machines within that network can be configured and accessed exactly as if they were a real router, using tools such as the Junos OS command-line interface (CLI) or Juniper Networks Junos Space.

## Topology Wizard

A key feature of the Junosphere UI is a graphical network design tool referred to as Topology Wizard. The Topology Wizard makes it easy to create new topologies from scratch with a simple drag-and-drop design. The Topology Wizard also enables customized configurations to be preloaded to each virtual router as the network is built out.

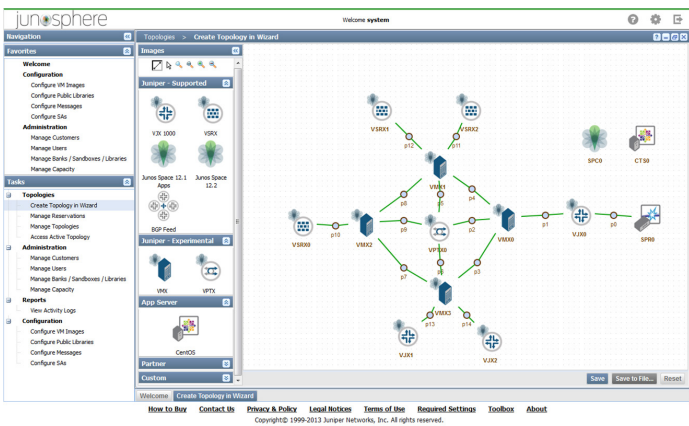


Figure 1: Junosphere Cloud's Topology Wizard makes it easy to custom design your own network topologies.

## Virtual Machine Manager

Virtual Machine Manager (VMM) is the Juniper developed hypervisor super layer that is key to enabling Junosphere Cloud. Unlike traditional cloud environments, Junosphere was built as a virtual networking environment, and networking environments have different requirements than traditional cloud architectures that focus on compute or storage tasks. The VMM enables connectivity between nodes to forward packets in a manner consistent with physical networks.

## Junos Network Elements

Junosphere Cloud gives you access to virtual machines running the same Junos operating system deployed on Juniper's physical routing devices. These virtual routers deliver the software functionality of Juniper routers such as CLIs, control plane behavior, protocol operation, and most forwarding functions. Junosphere provides virtual routers that support Junos OS routing and security functionalities. The environment is constantly being broadened to replicate an expanded set of features from specific Juniper router platforms. For a complete list of supported images, please refer to **www.juniper.net/junosphere**.

## Junos Space

Junos Space network element management applications can be used within the Junosphere Cloud environment to provision, monitor, and configure Junos OS network elements within the virtual network you create. By providing trainees with access to Junos Space, Junosphere exposes them to next-generation network orchestration tools.

## Junosphere Connector

Junosphere Connector is an optional capability that allows the virtual networking resources of Junosphere to interoperate directly with a physical network. It creates a complementary and efficient virtual extension of an existing physical lab, allowing customers to create large-scale networks that support multivendor environments and enable interoperability, scalability, and convergence testing at realistic scale. The ability to connect multiple physical and virtual topologies is a powerful tool for modeling carrier-class networks and assessing the impact of topology changes, upgrade and downgrade procedures, or new network and service buildouts.

## Ecosystem Partner Applications

To provide a complete modeling environment, Junosphere Cloud supports an ecosystem of products and applications from key partners. For a complete listing of applications included within Junosphere Cloud, please visit **www.juniper.net/junosphere**.

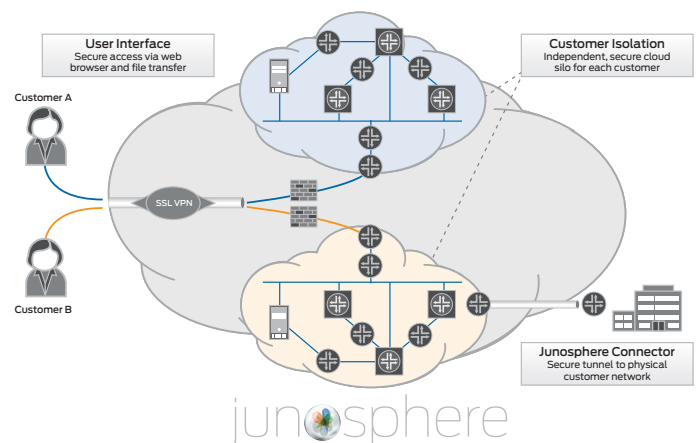


Figure 2: Junosphere Cloud architecture and components

## Junosphere Cloud Services

Junosphere Cloud is offered as a service available with flexible, pay-as-you-go based purchasing options, or as a simple Annual Plan for more frequent Junosphere users. The on-demand Junosphere services are offered a-la-carte as Junosphere Lab and Classroom, for their respective user communities.

The Junosphere Annual Pass facilitates budget planning by providing always-on Junosphere capacity for an entire year. Operators have maximum control of capacity pools assigned to diverse teams and projects. The bank administrator can customize the minimum guaranteed capacity for each sandbox to ensure

baseline availability, and also the maximum utilization of VM Units in each sandbox to prevent unauthorized abuse of consumption.

The flexible capacity allocation system available with the Annual Plan maximizes the usage of available VM Units shifting capacity from inactive sandboxes to those which experience temporary spikes of demand. These allocation algorithms ensure best usage of the capacity pool at every moment providing excellent granularity management.

Additionally, all the Annual Passes provide a la carte overflow capacity. The 50 and 100 Annual Passes also include unlimited connector capacity.

## Features and Benefits

Table 1. Junosphere Features and Benefits Summary

Feature	Feature Description	Benefit
Commercial SaaS platform	Junosphere Cloud delivers the confidence that comes with a service that is available 24/7/365 and fully backed by JTAC.	<ul style="list-style-type: none"><li>Increased confidence in your results.</li><li>Maximum uptime and availability.</li></ul>
Efficient scale	Cost advantage of virtual machines enables larger scale networking resources.	<ul style="list-style-type: none"><li>Reduce student-to-equipment ratio.</li><li>Build more accurate networks and topologies.</li></ul>
Flexible cost structure	Range of subscription based annual plans and on-demand payment options enable you optimize costs for your unique requirements.	<ul style="list-style-type: none"><li>Rapidly and quickly scale up or down with demand-based capacity.</li><li>Annual Plans provide convenience and benefits for heavy Junosphere users.</li></ul>
Real operating systems	Junosphere Cloud gives you access to the same full featured Junos OS running in thousands of commercial networks—not a simulation.	<ul style="list-style-type: none"><li>Provide real hands-on experience with the latest networking technology.</li><li>Accurately replicate commercial networks.</li></ul>
Flexible network design options	Junosphere Cloud offers a variety of options for network topology design, including importing from a live network, a graphical design wizard, and text-based configurations.	<ul style="list-style-type: none"><li>Quickly and easily get started on Junosphere.</li><li>Try new designs and make modifications with total flexibility.</li></ul>
Flexibility and agility	Virtual resources can be modified, ordered, and implemented much more quickly than on physical networks.	<ul style="list-style-type: none"><li>Quickly adapt and perform varied design and testing exercises.</li><li>Speed project time by as much as 30%.</li></ul>
Interoperability and integration	Junosphere Connector enables your virtual resources to interoperate with real-world networks.	<ul style="list-style-type: none"><li>Enjoy enhanced collaboration opportunities.</li><li>Enable broader set of experiments and modeling exercises for students.</li></ul>
Complete lab ecosystem	Junosphere Cloud provides access to a variety of partner tools, in addition to Junos OS network elements	<ul style="list-style-type: none"><li>Planning and analysis tools give you the same visibility into Junosphere network you get in the real world.</li><li>Performance testing applications enable you to stress test your Junosphere networks.</li></ul>

## Specifications

Table 2. User Interface Compatible Platforms

Platform	Operating System	Browsers and Java Environment
Windows	<ul style="list-style-type: none"><li>Vista with Service Pack 1 or 2 on 32-bit or 64-bit platforms</li><li>Windows 7 on 32-bit or 64-bit platforms</li><li>XP Professional SP3 on 32-bit or 64-bit platforms</li><li>XP Home Edition SP3</li></ul>	<ul style="list-style-type: none"><li>Internet Explorer 9 and up</li><li>Firefox 19 and up</li><li>Java 7 update 21</li></ul>
Mac	<ul style="list-style-type: none"><li>Mac OS X 10.6, 32-bit and 64-bit</li><li>Mac OS X 10.5.x, 32-bit and 64-bit</li></ul>	<ul style="list-style-type: none"><li>FireFox 19 and up</li><li>Java 7 update 21</li></ul>
Linux	<ul style="list-style-type: none"><li>openSUSE 10.x and 11.x, 32-bit only</li><li>Ubuntu 9.10 and 10.x, 32-bit only</li><li>Red Hat Enterprise Linux 5, 32-bit only</li></ul>	<ul style="list-style-type: none"><li>Firefox 19 and up</li><li>Java 7 update 21</li></ul>

## Client Hardware Recommendations

- CPU: 1 GHz or higher is recommended for Windows; for Mac, 1 GHz G4 or Intel processor is recommended.
- Memory: Minimum of 256 MB of available RAM is recommended.
- Color quality: For best results, use 16-bit (8-bit, 24-bit, and 32-bit are also supported).
- Monitor resolutions: 1,024 x 768 pixels is recommended; up to 2,048 x 2,048 pixels is supported.

## 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](http://www.juniper.net/us/en/products-services).

## Ordering Information

Junosphere offers a range of flexible purchase options, ranging from always available Annual Plans to Regular Capacity which can be purchased as needed. Both the Annual Plans and the Regular Capacity are based on the concept of a virtual machine unit (VM unit). A single VM unit allows you to run the basic images available within Junosphere for a period of 24 hours. More advanced images may require using more than one VM unit.

Annual Plans provide guaranteed access to the purchased virtual machines available in 10, 50 and 100 Unit increments every day for 1 year and are ideal for large organizations and heavy Junosphere users. Additional overflow capacity is also included and can be used when requirements exceed the guaranteed access number of VMs. Annual Plans also include unlimited Junosphere Connectors to allow for connectivity between the virtual and a physical environment. This plan maximizes the efficiency of capacity usage by enabling capacity to be shifted from idle sandboxes to those which need it at any given time. The Annual Plan capacity can be flexibly distributed among different groups.

Regular Capacity provides a pay-per-use option where once purchased in this manner, VM units are consumed only when you launch and run an active network topology. For example, launching a five node network and allowing it to run for two days (48 hours) would consume 10 VM units. Designing networks using the Topology Wizard does not consume any VM units, and can be done independent of running an active topology.

Model Number	Description
JUS-ANNUAL-PASS-10	Junosphere Annual Plan providing 10 VM Units available at any time, and 200 VM Units of "overflow" capacity
JUS-ANNUAL-PASS-50	Junosphere Annual Plan providing 50 VM Units available at any time, 1000 VM Units of "overflow" capacity, and unlimited Connectors
JUS-ANNUAL-PASS-100	Junosphere Annual Plan providing 100 VM Units available at any time, 2000 VM Units of "overflow" capacity, and unlimited Connectors
JUS-LAB-10VM-1	10 Junosphere Lab VM units
JUS-LAB-10VM-30	300 Junosphere Lab VM units
JUS-CLASS-10VM-1	10 Junosphere Classroom VM units
JUS-CLASS-10VM-30	300 Junosphere Classroom VM units
JUS-CONNECT-1	Ability to connect virtual and physical lab network environments, and transfer data at the rate of 1 Mbps to the virtual network topology for one day
JUS-CONNECT-30	Ability to connect virtual and physical lab network environments, and transfer data at the rate of 1 Mbps to the virtual network topology for 30 days

## 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](http://www.juniper.net).

### Corporate and Sales Headquarters

Juniper Networks, Inc.  
1194 North Mathilda Avenue  
Sunnyvale, CA 94089 USA  
Phone: 888.JUNIPER (888.586.4737)  
or 408.745.2000  
Fax: 408.745.2100  
[www.juniper.net](http://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

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