Effectively learning network operating systems and protocols requires a considerable amount of hands-on training and practical application. Yet, owning and operating labs for the purposes of education is an expensive proposition—with the need to purchase, operate and maintain an array of networking equipment.

Juniper Networks Junosphere ™ Classroom is a unique service offered from the Junosphere cloud that enables you to cost effectively educate students, employees, or partners on the principles and operation of Juniper Networks ® Junos ® operating system, routing protocols, and networking in general. You will be able to give full, hands-on access to state-of-the-art commercial networking technology, without the expense of building or maintaining your own physical lab. Junosphere Classroom offers a range of flexible, on demand or onetime payment options that enable you to rapidly scale resources and costs up or down based on needs.

Junosphere Classroom is based on Junosphere, a cloud-based environment that enables the creation and modeling of virtual networks using Junos OS. Junosphere leverages a new family of virtual routers—Juniper Networks VJX Series—which run the same Junos OS that powers Juniper networking, switching, and security platforms. Offered as a range of software-based services, Junosphere enables customers, partners, and educational institutions to experiment, model, and educate—leveraging the flexibility, cost efficiency, and simplicity of a cloud-based delivery model.

Junosphere Classroom is available as a standalone service, and as a component of Juniper Networks Academic Alliance (JNAA) and Juniper Networks Authorized Educations Partner (JNAEP) programs, which provide outstanding prepackaged curriculum and resources. The JNAA program offers the courseware, lab guides, and technical support colleges and universities need to successfully deliver Juniper Networks Enterprise Routing courses to their students. The JNAEP program provides authorized training organizations a comprehensive curriculum of courses and the supporting infrastructure to deliver technical training to networking professionals. Together the JNAA and JNAEP programs combined with Junosphere Classroom, provide you with all of the tools necessary to successfully and cost effectively deliver technical networking courses at your institution or business.
Architecture and Key Components

Junosphere Classroom is based on Junosphere, a cloud-based environment that enables flexible network modeling and creation using virtual routers and network elements. Junosphere resources are hosted in Juniper’s data centers—built using Juniper’s networking and security technology—and accessible via an Internet connection. Junosphere’s unique cloud-based delivery model lets you quickly and easily access virtual network resources for the purposes of planning, modeling, or education—without requiring dedicated lab resources.

Access to the Junosphere environment is provided through a Web interface supported by popular Web browsers. Juniper Networks SA Series SSL VPN Appliances provide secure, market-leading, authenticated connectivity without requiring specialized client software or configuration changes. Junosphere Classroom offers a first-rate virtual learning environment requiring no more than a PC with an Internet connection to give students access to the very latest in networking technologies. Because of the cloud-based delivery, Junosphere Classroom is also ideal for remote learning—students can gain hands-on experience and secure access to Junosphere Classroom from any location with Internet access.

As part of the Junosphere Classroom service, you have access to multiple types and instances of virtual machines—the logical and functional equivalent of physical network elements. The most important of these virtual machines are the VJX Series, a family of virtual Junos OS-based routers that run only within the Junosphere environment and are the foundation of the Junosphere Classroom service. The VJX Series is a new type of Juniper router in all respects—command-line interfaces (CLIs), control plane behavior, and protocol operation.

While the VJX Series is critical to Junosphere Classroom, the service can also support other select virtual machine images—such as CentOS and potentially partner software products like test/traffic generators, and network engineering software—as required to enable the close modeling of a real network environment.

Junosphere Classroom includes virtual instances of Juniper Networks Junos® Space, Juniper’s network application platform. Junos Space provides an intuitive, web-based GUI for network management automation. In the context of Junosphere, Junos Space can be used to provision, monitor, and configure the VJX Series within your virtual network. Providing trainees with access to Junos Space exposes them to cutting edge tools that prepare them for the next generation of configuration and provisioning applications.

Additionally, Junosphere Classroom includes a number of prebuilt network topologies that enable you and your students to get up and running quickly, and to transition rapidly between different scenarios without the manual operations and delay associated with reconfiguring physical elements.

The virtual networking resources of Junosphere Classroom interoperate directly with physical networking labs when purchased with Junosphere Connector, an optional feature. In this way, Junosphere Classroom can become a virtual extension of any existing physical lab infrastructure you may already have—enabling a broader and more realistic range of interoperability, scalability, and convergence testing than may be possible with a physical lab alone.

Junosphere Connector enables the extension and interconnection of physical labs—including the physical labs of partner institutions. The ability to connect multiple topologies comprised of both physical and virtual resources is a powerful tool for collaboration, research, and experimentation. Universities can perform collaborative, large-scale experiments more readily and cost effectively with the latest routing protocols, control plane applications, or other technologies.
Features and Benefits

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
<th>Benefit</th>
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| Software as a service (SaaS) delivery model | Cloud-based service eliminates physical lab equipment and provides access to a broad range of cutting-edge technology. | • Reduce capital and operational expenses  
• Get green dividend by reducing power and cooling requirements |
| Efficient scale | Cost advantage of virtual machines enables larger scale networking resources. | • Reduce student-to-equipment ratio  
• Build more accurate networks and topologies |
| Demand-based cost structure | Access to the cloud is purchased based on usage time and virtual machine instances. | • Rapidly and quickly scale up or down  
• Pay only for what you need and use |
| Real-world operating environments | Junosphere Classroom gives students access to the same full featured Junos OS running in thousands of commercial networks. | • Provide real hands on experience with latest networking technology  
• Accurately replicate commercial networks |
| Secure, web-based access | Access to the cloud is via any Web browser using Juniper’s market-leading SSL technology. | • Offer more access options—anytime access to live and self study  
• Extend geographic reach with remote learning classes |
| Prepackaged topologies and course curricula | Junosphere Classroom includes defined network topologies; Academic Alliance program offers optional course material. | • Easily offer new classes and courses  
• Generate more revenue |
| Flexibility and agility | Virtual resources can be modified, ordered, and implemented much more quickly than physical networks. | • Quickly adapt or introduce new courses |
| Interoperability and integration | Junosphere Connector enables your virtual resources to interoperate with real-world networks. | • Enjoy enhanced collaboration opportunities  
• Enable broader set of experiments and modeling exercises for students |

Specifications

Junosphere Classroom is accessed via standard Web browsers. Compatible platforms are listed in the table below.

Table 1. Junosphere Classroom User Interface and Compatible Platforms

<table>
<thead>
<tr>
<th>Platform</th>
<th>Operating System</th>
<th>Browsers and Java Environment</th>
</tr>
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</table>
| Windows | • Vista with Service Pack 1 or 2 on 32-bit or 64-bit platforms  
• Windows 7 on 32-bit or 64-bit platforms  
• XP Professional SP3 on 32-bit or 64-bit platforms  
• XP Home Edition SP3 | • Internet Explorer 8.0 *  
• Internet Explorer 7.0 *  
• Firefox 3.0 and above  
• Sun JRE 6 and above |
| Mac | • Mac OS X 10.6, 32-bit and 64-bit  
• Mac OS X 10.5.x, 32-bit and 64-bit  
• XP Professional SP3 on 32-bit or 64-bit platforms  
• XP Home Edition SP3 | • Safari 3.0 and above  
• Sun JRE 6 and above |
| Linux | • OpenSuse 10.0 and 11.x, 32-bit only  
• Ubuntu 9.10 and 10.x, 32-bit only  
• Red Hat Enterprise Linux 5, 32-bit only | • Firefox 3.0 and above  
• Sun JRE 6 and above |

*Wherever applicable

Recommended Client Hardware

- CPU: 1 GHz or above is recommended for Windows; 1 GHz G4 or Intel processor is recommended for MAC.
- Memory: 256 MB of available RAM.
- Color quality: For best results, use 16-bit (8, 16, 24, and 32-bit are also supported).
- Monitor resolutions: 1024 x 768 pixels is recommended (up to 2048 x 2048 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 Classroom is ordered based on the number of virtual machines desired for a specified period of time. For more virtual machines, order multiple instances of the part numbers listed below. For example, if you wish to create a virtual network consisting of 20 routers, available for a day, order 2 x JUS-CLASS-10VM-1.

<table>
<thead>
<tr>
<th>Model Number</th>
<th>Description</th>
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<tbody>
<tr>
<td>JUS-CLASS-10VM-1</td>
<td>Access to 10 Classroom virtual machines for one day each (includes images and tools).</td>
</tr>
<tr>
<td>JUS-CLASS-10VM-30</td>
<td>Access to 10 Classroom virtual machines for 30 days each (includes images and tools).</td>
</tr>
<tr>
<td>JUS-CONNECT-1</td>
<td>This provides the ability to connect and transfer data at the rate of 1 Mbps to the virtual network topology for one day.</td>
</tr>
<tr>
<td>JUS-CONNECT-30</td>
<td>This provides the ability to connect and transfer data at the rate of 1 Mbps to the virtual network topology for 30 days.</td>
</tr>
</tbody>
</table>

Please contact your Juniper Networks account representative to place orders for Junosphere Classroom. For more information on Juniper Networks Academic Alliances or Authorized Education Partner or to join these programs, please visit: [www.juniper.net/education](http://www.juniper.net/education).

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).

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To purchase Juniper Networks solutions, please contact your Juniper Networks representative at 1-866-298-6428 or authorized reseller.

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