



Junos Space

Virtual Appliance Installation Guide

Release 1.0

Juniper Networks, Inc.

1194 North Mathilda Avenue
Sunnyvale, California 94089
USA

408-745-2000

www.juniper.net

Published: 2009-11-24

This product includes the Envoy SNMP Engine, developed by Epilogue Technology, an Integrated Systems Company. Copyright © 1986-1997, Epilogue Technology Corporation. All rights reserved. This program and its documentation were developed at private expense, and no part of them is in the public domain.

This product includes memory allocation software developed by Mark Moraes, copyright © 1988, 1989, 1993, University of Toronto.

This product includes FreeBSD software developed by the University of California, Berkeley, and its contributors. All of the documentation and software included in the 4.4BSD and 4.4BSD-Lite Releases is copyrighted by the Regents of the University of California. Copyright © 1979, 1980, 1983, 1986, 1988, 1989, 1991, 1992, 1993, 1994. The Regents of the University of California. All rights reserved.

GateD software copyright © 1995, the Regents of the University. All rights reserved. Gate Daemon was originated and developed through release 3.0 by Cornell University and its collaborators. Gated is based on Kirton's EGP, UC Berkeley's routing daemon (routed), and DCN's HELLO routing protocol. Development of Gated has been supported in part by the National Science Foundation. Portions of the GateD software copyright © 1988, Regents of the University of California. All rights reserved. Portions of the GateD software copyright © 1991, D. L. S. Associates.

This product includes software developed by Maker Communications, Inc., copyright © 1996, 1997, Maker Communications, Inc.

Junos Space Virtual Appliance Installation Guide

Release 1.0

Copyright © 2009, Juniper Networks, Inc.

All rights reserved. Printed in USA.

Writing: Brian Deutscher

Editing: Stella Hackel

Cover Design:

Revision History

24 November 2009—Revision 2, Junos Space Release 1.0

The information in this document is current as of the date listed in the revision history.

END USER LICENSE AGREEMENT

READ THIS END USER LICENSE AGREEMENT ("AGREEMENT") BEFORE DOWNLOADING, INSTALLING, OR USING THE SOFTWARE. BY DOWNLOADING, INSTALLING, OR USING THE SOFTWARE OR OTHERWISE EXPRESSING YOUR AGREEMENT TO THE TERMS CONTAINED HEREIN, YOU (AS CUSTOMER OR IF YOU ARE NOT THE CUSTOMER, AS A REPRESENTATIVE/AGENT AUTHORIZED TO BIND THE CUSTOMER) CONSENT TO BE BOUND BY THIS AGREEMENT. IF YOU DO NOT OR CANNOT AGREE TO THE TERMS CONTAINED HEREIN, THEN (A) DO NOT DOWNLOAD, INSTALL, OR USE THE SOFTWARE, AND (B) YOU MAY CONTACT JUNIPER NETWORKS REGARDING LICENSE TERMS.

1. **The Parties.** The parties to this Agreement are (i) Juniper Networks, Inc. (if the Customer's principal office is located in the Americas) or Juniper Networks (Cayman) Limited (if the Customer's principal office is located outside the Americas) (such applicable entity being referred to herein as "Juniper"), and (ii) the person or organization that originally purchased from Juniper or an authorized Juniper reseller the applicable license(s) for use of the Software ("Customer") (collectively, the "Parties").

2. **The Software.** In this Agreement, "Software" means the program modules and features of the Juniper or Juniper-supplied software, for which Customer has paid the applicable license or support fees to Juniper or an authorized Juniper reseller, or which was embedded by Juniper in equipment which Customer purchased from Juniper or an authorized Juniper reseller. "Software" also includes updates, upgrades and new releases of such software. "Embedded Software" means Software which Juniper has embedded in or loaded onto the Juniper equipment and any updates, upgrades, additions or replacements which are subsequently embedded in or loaded onto the equipment.

3. **License Grant.** Subject to payment of the applicable fees and the limitations and restrictions set forth herein, Juniper grants to Customer a non-exclusive and non-transferable license, without right to sublicense, to use the Software, in executable form only, subject to the following use restrictions:

- a. Customer shall use Embedded Software solely as embedded in, and for execution on, Juniper equipment originally purchased by Customer from Juniper or an authorized Juniper reseller.
- b. Customer shall use the Software on a single hardware chassis having a single processing unit, or as many chassis or processing units for which Customer has paid the applicable license fees; provided, however, with respect to the Steel-Belted Radius or Odyssey Access Client software only, Customer shall use such Software on a single computer containing a single physical random access memory space and containing any number of processors. Use of the Steel-Belted Radius or IMS AAA software on multiple computers or virtual machines (e.g., Solaris zones) requires multiple licenses, regardless of whether such computers or virtualizations are physically contained on a single chassis.
- c. Product purchase documents, paper or electronic user documentation, and/or the particular licenses purchased by Customer may specify limits to Customer's use of the Software. Such limits may restrict use to a maximum number of seats, registered endpoints, concurrent users, sessions, calls, connections, subscribers, clusters, nodes, realms, devices, links, ports or transactions, or require the purchase of separate licenses to use particular features, functionalities, services, applications, operations, or capabilities, or provide throughput, performance, configuration, bandwidth, interface, processing, temporal, or geographical limits. In addition, such limits may restrict the use of the Software to managing certain kinds of networks or require the Software to be used only in conjunction with other specific Software. Customer's use of the Software shall be subject to all such limitations and purchase of all applicable licenses.
- d. For any trial copy of the Software, Customer's right to use the Software expires 30 days after download, installation or use of the Software. Customer may operate the Software after the 30-day trial period only if Customer pays for a license to do so. Customer may not extend or create an additional trial period by re-installing the Software after the 30-day trial period.
- e. The Global Enterprise Edition of the Steel-Belted Radius software may be used by Customer only to manage access to Customer's enterprise network. Specifically, service provider customers are expressly prohibited from using the Global Enterprise Edition of the Steel-Belted Radius software to support any commercial network access services.

The foregoing license is not transferable or assignable by Customer. No license is granted herein to any user who did not originally purchase the applicable license(s) for the Software from Juniper or an authorized Juniper reseller.

4. **Use Prohibitions.** Notwithstanding the foregoing, the license provided herein does not permit the Customer to, and Customer agrees not to and shall not: (a) modify, unbundle, reverse engineer, or create derivative works based on the Software; (b) make unauthorized copies of the Software (except as necessary for backup purposes); (c) rent, sell, transfer, or grant any rights in and to any copy of the Software, in any form, to any third party; (d) remove any proprietary notices, labels, or marks on or in any copy of the Software or any product in which the Software is embedded; (e) distribute any copy of the Software to any third party, including as may be embedded in Juniper equipment sold in the secondhand market; (f) use any 'locked' or key-restricted feature, function, service, application, operation, or capability without first purchasing the applicable license(s) and obtaining a valid key from Juniper, even if such feature, function, service, application, operation, or capability is enabled without a key; (g) distribute any key for the Software provided by Juniper to any third party; (h) use the Software in any manner that extends or is broader than the uses purchased by Customer from Juniper or an authorized Juniper reseller; (i) use Embedded Software on non-Juniper equipment; (j) use Embedded Software (or make it available for use) on Juniper equipment that the Customer did not originally purchase from Juniper or an authorized Juniper reseller; (k) disclose the results of testing or benchmarking of the Software to any third party without the prior written consent of Juniper; or (l) use the Software in any manner other than as expressly provided herein.

5. **Audit.** Customer shall maintain accurate records as necessary to verify compliance with this Agreement. Upon request by Juniper, Customer shall furnish such records to Juniper and certify its compliance with this Agreement.

6. **Confidentiality.** The Parties agree that aspects of the Software and associated documentation are the confidential property of Juniper. As such, Customer shall exercise all reasonable commercial efforts to maintain the Software and associated documentation in confidence, which at a minimum includes restricting access to the Software to Customer employees and contractors having a need to use the Software for Customer's internal business purposes.

7. **Ownership.** Juniper and Juniper's licensors, respectively, retain ownership of all right, title, and interest (including copyright) in and to the Software, associated documentation, and all copies of the Software. Nothing in this Agreement constitutes a transfer or conveyance of any right, title, or interest in the Software or associated documentation, or a sale of the Software, associated documentation, or copies of the Software.

8. **Warranty, Limitation of Liability, Disclaimer of Warranty.** The warranty applicable to the Software shall be as set forth in the warranty statement that accompanies the Software (the "Warranty Statement"). Nothing in this Agreement shall give rise to any obligation to support the Software. Support services may be purchased separately. Any such support shall be governed by a separate, written support services agreement. TO THE MAXIMUM EXTENT PERMITTED BY LAW, JUNIPER SHALL NOT BE LIABLE FOR ANY LOST PROFITS, LOSS OF DATA, OR COSTS OR PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES, OR FOR ANY SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES ARISING OUT OF THIS AGREEMENT, THE SOFTWARE, OR ANY JUNIPER OR JUNIPER-SUPPLIED SOFTWARE. IN NO EVENT SHALL JUNIPER BE LIABLE FOR DAMAGES ARISING FROM UNAUTHORIZED OR IMPROPER USE OF ANY JUNIPER OR JUNIPER-SUPPLIED SOFTWARE, EXCEPT AS EXPRESSLY PROVIDED IN THE WARRANTY STATEMENT TO THE EXTENT PERMITTED BY LAW, JUNIPER DISCLAIMS ANY AND ALL WARRANTIES IN AND TO THE SOFTWARE (WHETHER EXPRESS, IMPLIED, STATUTORY, OR OTHERWISE), INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT. IN NO EVENT DOES JUNIPER WARRANT THAT THE SOFTWARE, OR ANY EQUIPMENT OR NETWORK RUNNING THE SOFTWARE, WILL OPERATE WITHOUT ERROR OR INTERRUPTION, OR WILL BE FREE OF VULNERABILITY TO INTRUSION OR ATTACK. In no event shall Juniper's or its suppliers' or licensors' liability to Customer, whether in contract, tort (including negligence), breach of warranty, or otherwise, exceed the price paid by Customer for the Software that gave rise to the claim, or if the Software is embedded in another Juniper product, the price paid by Customer for such other product. Customer acknowledges and agrees that Juniper has set its prices and entered into this Agreement in reliance upon the disclaimers of warranty and the limitations of liability set forth herein, that the same reflect an allocation of risk between the Parties (including the risk that a contract remedy may fail of its essential purpose and cause consequential loss), and that the same form an essential basis of the bargain between the Parties.

9. **Termination.** Any breach of this Agreement or failure by Customer to pay any applicable fees due shall result in automatic termination of the license granted herein. Upon such termination, Customer shall destroy or return to Juniper all copies of the Software and related documentation in Customer's possession or control.

10. **Taxes.** All license fees payable under this agreement are exclusive of tax. Customer shall be responsible for paying Taxes arising from the purchase of the license, or importation or use of the Software. If applicable, valid exemption documentation for each taxing jurisdiction shall be provided to Juniper prior to invoicing, and Customer shall promptly notify Juniper if their exemption is revoked or modified. All payments made by Customer shall be net of any applicable withholding tax. Customer will provide reasonable assistance to Juniper in connection with such withholding taxes by promptly: providing Juniper with valid tax receipts and other required documentation showing Customer's payment of any withholding taxes; completing appropriate applications that would reduce the amount of withholding tax to be paid; and notifying and assisting Juniper in any audit or tax proceeding related to transactions hereunder. Customer shall comply with all applicable tax laws and regulations, and Customer will promptly pay or reimburse Juniper for all costs and damages related to any liability incurred by Juniper as a result of Customer's non-compliance or delay with its responsibilities herein. Customer's obligations under this Section shall survive termination or expiration of this Agreement.

11. **Export.** Customer agrees to comply with all applicable export laws and restrictions and regulations of any United States and any applicable foreign agency or authority, and not to export or re-export the Software or any direct product thereof in violation of any such restrictions, laws or regulations, or without all necessary approvals. Customer shall be liable for any such violations. The version of the Software supplied to Customer may contain encryption or other capabilities restricting Customer's ability to export the Software without an export license.

12. **Commercial Computer Software.** The Software is "commercial computer software" and is provided with restricted rights. Use, duplication, or disclosure by the United States government is subject to restrictions set forth in this Agreement and as provided in DFARS 227.7201 through 227.7202-4, FAR 12.212, FAR 27.405(b)(2), FAR 52.227-19, or FAR 52.227-14(ALT III) as applicable.

13. **Interface Information.** To the extent required by applicable law, and at Customer's written request, Juniper shall provide Customer with the interface information needed to achieve interoperability between the Software and another independently created program, on payment of applicable fee, if any. Customer shall observe strict obligations of confidentiality with respect to such information and shall use such information in compliance with any applicable terms and conditions upon which Juniper makes such information available.

14. **Third Party Software.** Any licensor of Juniper whose software is embedded in the Software and any supplier of Juniper whose products or technology are embedded in (or services are accessed by) the Software shall be a third party beneficiary with respect to this Agreement, and such licensor or vendor shall have the right to enforce this Agreement in its own name as if it were Juniper. In addition, certain third party software may be provided with the Software and is subject to the accompanying license(s), if any, of its respective owner(s). To the extent portions of the Software are distributed under and subject to open source licenses obligating Juniper to make the source code for such portions publicly available (such as the GNU General Public License ("GPL") or the GNU Library General Public License ("LGPL")), Juniper will make such source code portions (including Juniper modifications, as appropriate) available upon request for a period of up to three years from the date of distribution. Such request can be made in writing to Juniper Networks, Inc., 1194 N. Mathilda Ave., Sunnyvale, CA 94089, ATTN: General Counsel. You may obtain a copy of the GPL at <http://www.gnu.org/licenses/gpl.html>, and a copy of the LGPL at <http://www.gnu.org/licenses/lgpl.html>.

15. **Miscellaneous.** This Agreement shall be governed by the laws of the State of California without reference to its conflicts of laws principles. The provisions of the U.N. Convention for the International Sale of Goods shall not apply to this Agreement. For any disputes arising under this Agreement, the Parties hereby consent to the personal and exclusive jurisdiction of, and venue in, the state and federal courts within Santa Clara County, California. This Agreement constitutes the entire and sole agreement between Juniper and the Customer with respect to the Software, and supersedes all prior and contemporaneous

agreements relating to the Software, whether oral or written (including any inconsistent terms contained in a purchase order), except that the terms of a separate written agreement executed by an authorized Juniper representative and Customer shall govern to the extent such terms are inconsistent or conflict with terms contained herein. No modification to this Agreement nor any waiver of any rights hereunder shall be effective unless expressly assented to in writing by the party to be charged. If any portion of this Agreement is held invalid, the Parties agree that such invalidity shall not affect the validity of the remainder of this Agreement. This Agreement and associated documentation has been written in the English language, and the Parties agree that the English version will govern. (For Canada: Les parties aux présentes confirment leur volonté que cette convention de même que tous les documents y compris tout avis qui s'y rattache, soient rédigés en langue anglaise. (Translation: The parties confirm that this Agreement and all related documentation is and will be in the English language)).

Table of Contents

Part 1	Overview	
Chapter 1	Installation Overview	3
	Junos Space Virtual Appliance Overview	3
	Understanding How Nodes Are Connected in a Fabric	3
	Virtual Appliance Deployment	4
	Recommendations for Deploying Virtual Appliances on the VMware ESX Server	4
	Configuring an NTP Time Source For Each Virtual Appliance	5
	Fabric Management Overview	5
	Single Node Functionality	6
	Multinode Functionality	6
Part 2	Installation and Configuration	
Chapter 2	Deploying a Virtual Appliance	11
	Deploying a Junos Space Virtual Appliance	11
	Installing the VMware ESX Server	12
	Extracting Files from the Junos Space Virtual Appliance Package	12
	Converting a Virtual Appliance to a Virtual Machine by Using the VMware Converter	13
	Increasing RAM and Virtual Processors (CPU) for a Junos Space Virtual Appliance	18
	Adding Disk Resources for a Junos Space Virtual Appliance	21
Chapter 3	Configuring a Virtual Appliance	27
	Configuring Basic Settings for a Junos Space Virtual Appliance	27
	Configuring an Appliance that is the First Node in a Cluster or that Will Not Be Added to an Existing Cluster	27
	Configuring an Appliance to Add to an Existing Cluster	31

Part 3	Accessing the Junos Space User Interface	
Chapter 4	Logging In	37
	Logging In to the Junos Space User Interface as Super Administrator	37
Chapter 5	Adding a Node	39
	Adding a Node to an Existing Fabric	39
Part 4	License Key Management	
Chapter 6	Junos Space License Key Files	43
	Generating and Uploading the Junos Space License Key File	43
	Generating the License Key File	43
	Uploading the License Key File Contents	43

Part 1

Overview

- Installation Overview on page 3

Chapter 1

Installation Overview

- Junos Space Virtual Appliance Overview on page 3
- Fabric Management Overview on page 5

Junos Space Virtual Appliance Overview

The Junos Space Virtual Appliance consists of preconfigured Junos Space software with a built-in operating system and application stack that is easy to deploy, manage, and maintain.

The Junos Space Virtual Appliance includes the same software and all the functionality available in a Junos Space physical appliance. However, you must deploy the Virtual Appliance on the VMware ESX Server, which provides a CPU, hard disk, RAM, and a network controller, but requires installation of an operating system and applications to become fully functional.

Just as you can install additional physical appliances to create a fabric to provide scalability and availability, you can deploy multiple virtual appliances to create a fabric that provides the same scalability and high availability as a fabric of physical appliances.

You can create a fabric of Junos Space JA1500 appliances, Junos Space virtual appliances, or a hybrid fabric of both physical and virtual appliances.

Understanding How Nodes Are Connected in a Fabric

Each Junos Space appliance (physical or virtual) that you install and configure is represented as a single node in the fabric. You can add nodes without disrupting the services that are running on the fabric. When you install and configure the first appliance, Junos Space automatically creates a fabric with one node. For each additional appliance you install and configure, you must add a node to logically represent the appliance in the fabric. You add nodes to the fabric from the **Administration** workspace in the Junos Space user interface. Each node that you add to the fabric increases the resource pool for the node functions to meet the scalability and availability requirements of your network. By default, Junos Space automatically enables node functionality across the nodes in the fabric to distribute workload. The nodes in the fabric work together to provide a virtualized resource pool for each of the node functions: load balancer, database, and application logic.

In a fabric comprising two or more nodes, Junos Space provides failover when a node functioning as the active server (load balancer server or database server) goes

down. By default, Junos Space marks a particular node down and routes failover requests to the node that Junos Space designates as standby server. Junos Space uses a heartbeat mechanism to check whether the nodes in the fabric are running. When a node functioning as the active server fails (the appliance crashes or stops sending heartbeats), the node functioning as the standby server takes over all resources that were managed by the node functioning as active server.

To add, manage, and monitor the nodes in the fabric, a Junos Space user connects to a single Web IP address. The IP address of first (active) node and second (standby) node, and the Web (virtual) IP address must all be in the same subnet. The Web IP needs to work on both the first and second node in the fabric. When both nodes are in same subnet, and the first (active) node goes down, the second (standby) node becomes the active node and packets continue to be directed from the router, to the Junos Space Web IP, and then to the second node, because both nodes are in same subnet. However, if the second (standby) node is configured in a different subnet than the first (active) node, and the first node goes down, the second node becomes the active node, but because the Web IP now points to the different subnet of the second node, all packets originally destined for first node won't be received by the second node.

Virtual Appliance Deployment

The Junos Space Virtual Appliance is stored in the Open Virtualization Format (OVF) 1.0 and is packaged as an *.ovf file, which is a tar file that contains all the files of the Junos Space Virtual Appliance. OVF is not a bootable format, and you must deploy each Junos Space Virtual Appliance to a hosted ESX server before you can run the Junos Space Virtual Appliance.

For release 1.0 and later, to deploy a Junos Space Virtual Appliance on a VMware ESX server, version 3.5. or higher, you use the VMware vCenter Converter, version 4.0.1 to convert the Junos Space Virtual Appliance to a virtual machine. After the Junos Space Virtual Appliance is converted to a virtual machine, you use the VMware Infrastructure Client that is connected to the VMware ESX Server to deploy the Junos Space Virtual Appliance on the ESX Server.

Recommendations for Deploying Virtual Appliances on the VMware ESX Server

The CPU, RAM, and disk space provided by the VMware ESX server must meet or exceed the documented CPU, RAM, and disk space requirements for deploying a Junos Space Virtual Appliance. In addition, Juniper recommends that, for a multi-node fabric, you deploy the first and second Virtual Appliance on separate VMware ESX servers to ensure failover support.

The distributed Junos Space Virtual Appliance files are created with 5 GB of disk space, and you add an additional 40GB of disk resources when you first deploy the Virtual Appliance to a VMware ESX server. In many cases, the 45 GB of disk space will be sufficient; however, if the percent of Junos Space disk resources used on a node reaches 80 % capacity, Juniper recommends that you add another 40 GB of disk space to your virtual appliance. You can monitor the disk space usage for nodes in the Fabric Monitor inventory panel in the Junos Space user interface.

Configuring an NTP Time Source For Each Virtual Appliance

To ensure consistent behavior among all nodes in a multi-node fabric, each node's time must be synchronized with every other node in the fabric. When you configure each Junos Space Virtual Appliance with an NTP server, you ensure that, if the first node (which is used to synchronize time for all nodes in the fabric) goes down, all other nodes in the fabric remain synchronized. In addition, all nodes in a fabric must use the same external NTP source that you configure for the first appliance.



NOTE: By default, Junos Space translates time so that the time displayed in the user interface corresponds to Junos Space server time, but the time is mapped to the local time zone of your client computer.

The default system clock for each virtual appliance that you deploy is not of the highest precision. To ensure time remains synchronized across all nodes in the fabric in the event of failover, Juniper strongly recommends that you use the following guidelines:

- Add an NTP server to the first virtual appliance during initial set up.
- For each additional appliance, add the same NTP server that you specified for the first appliance.

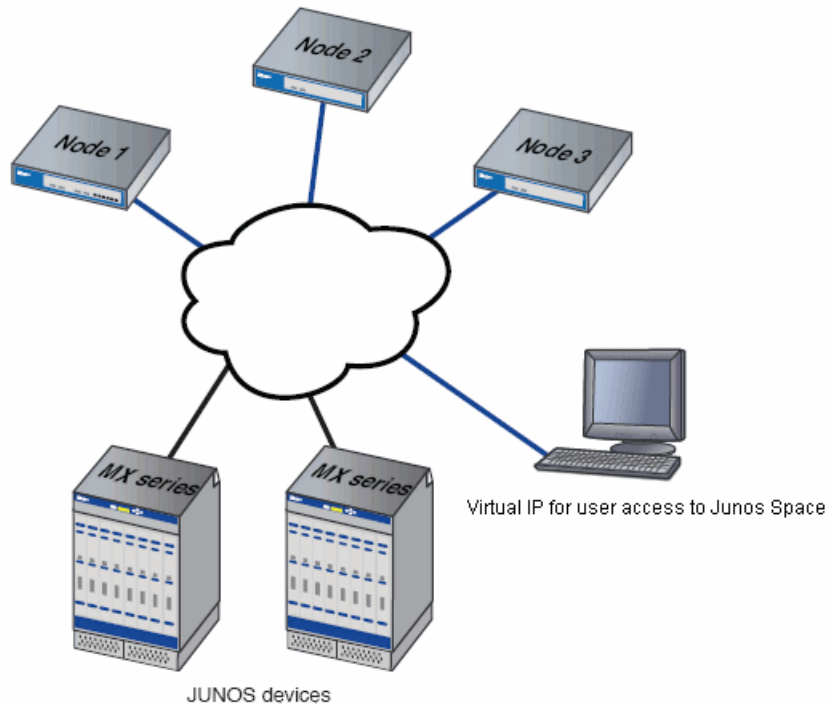


NOTE: You must add the NTP server before you add the appliance/node to the fabric from the user interface.

- Do not under any circumstances change the time zone for any node.

Fabric Management Overview

A Junos Space fabric comprises one or more IP-connected nodes. A *node* is a logical object that represents a single JA1500 Junos Space Appliance or Junos Space Virtual Appliance, its operating system, and the Junos Space software that runs on the operating system. Each Junos Space appliance (physical or virtual) that you install and configure is represented as a single node in the fabric. You can add nodes without disrupting the services that are running on the fabric. When you add nodes to the fabric, you can manage and monitor the nodes from the Administration workspace. To add, manage, and monitor nodes in the fabric, a fabric administrator connects to a single virtual IP address, as shown in the illustration.



Single Node Functionality

When the fabric comprises a single appliance, all devices in the managed network connect to the appliance. When you install and configure the first appliance, Junos Space automatically creates a fabric with one node. By default, a fabric that consists of a single node provides complete Junos Space management functionality, with the following *node functions* enabled for the node:

- Load Balancer— for processing HTTP requests from remote browsers and NBI clients
- Database— for processing database requests (create, read, update, and delete operations)
- Application Logic— for processing back-end business logic (Junos Space service requests) and DML workload (device connectivity, device events, and logging)



NOTE: A fabric that comprises a single node provides no workload balancing and no backup if the appliance goes down.

Multinode Functionality

As your network expands with new devices, services, and users, you can add Junos Space appliances to handle the increased workload. When you install and configure the first appliance, Junos Space automatically creates a fabric with one node. For

each additional appliance you install and configure, you must add a node to logically represent the appliance in the fabric. Each node that you add to the fabric increases the resource pool for the node functions to meet the scalability and availability requirements of your network. By default, Junos Space automatically enables node functionality across the nodes in the fabric to distribute workload. The nodes in the fabric work together to provide a virtualized resource pool for each of the node functions: load balancer, database, and application logic.

The Junos Space node functions distribute workload across operating nodes according to the following load-distribution rules:

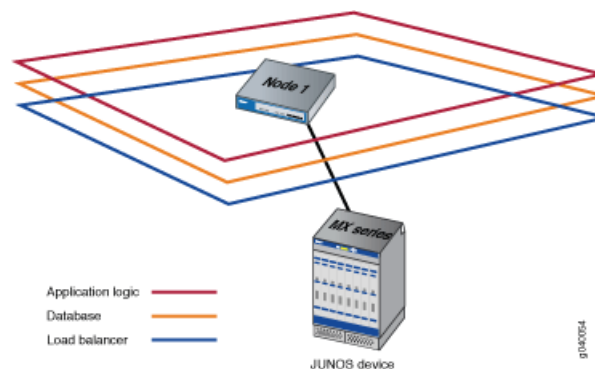
- **Load Balancer**— When a node that functions as the active load balancer server is down, all HTTP requests are automatically routed to the standby load balancer server that is running on a separate node.
- **Database**— When a node that functions as the active database server is down, all database requests (create, read, update, and delete) are routed to the node that functions as the standby database server.
- **Application Logic (DML and business logic)**— Device connections and user requests are distributed among the nodes, and device-related operations are routed to the node to which the device is connected.

Junos Space uses the following algorithm to ensure that the number of devices connected to a node does not exceed the threshold limit for each node:

$$\text{Threshold Limit} = \left[\frac{\text{(number of devices in database)}}{\text{(number of nodes running)}} \right] + 2$$

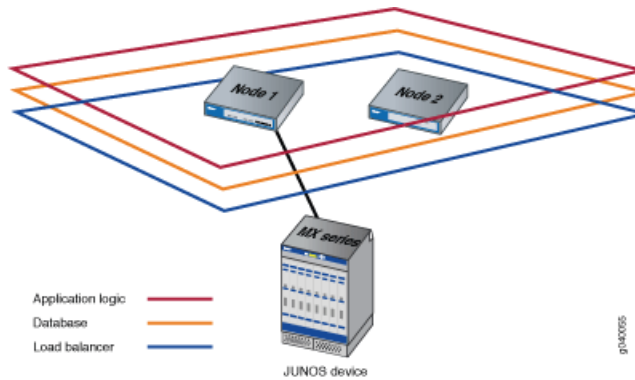
The following workflow describes how the node functions are enabled across the fabric as nodes are added:

- **First node up:** The load balancer, database, and application logic functions are enabled on the node. Each node function provides both scalability and high availability. The following illustration shows all functions enabled on fabric comprising one node.

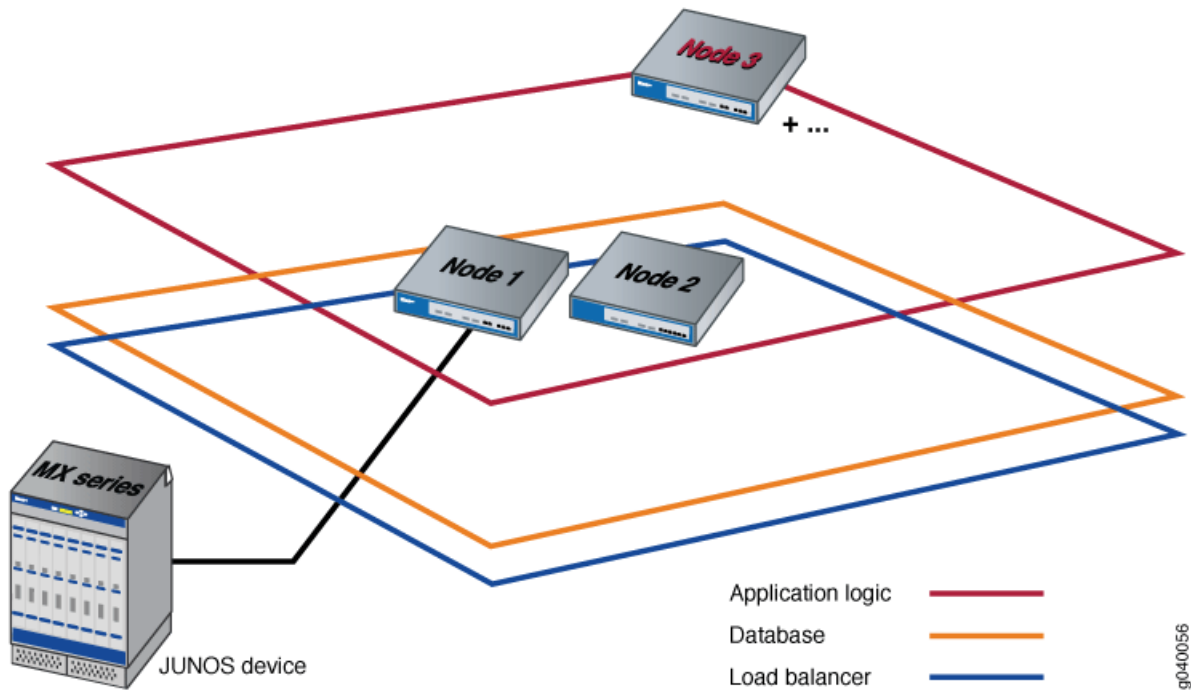


- **Add second node:** When a second node is added to the fabric, the first node functions as the active load balancer server and active database server, and the second node functions as the standby load balancer server and standby database server. The load balancer and application logic node functions provide scalability and high availability. The database node function on the second node provides

high availability only. The following illustration shows the functions enabled on a fabric comprising two nodes.



- Add third node: Only the application logic functionality is enabled on the third node to provide equal distribution of device connections and user requests across all nodes, and route device-related operations to the node to which the device is connected. The application logic functionality provides both scalability and high availability. The following illustration shows the functions enabled on a fabric comprising three nodes.



NOTE: For the third node and each subsequent node added to the fabric, only the application logic functionality is enabled.

Part 2

Installation and Configuration

- Deploying a Virtual Appliance on page 11
- Configuring a Virtual Appliance on page 27

Chapter 2

Deploying a Virtual Appliance

- Deploying a Junos Space Virtual Appliance on page 11

Deploying a Junos Space Virtual Appliance

You use the VMware vCenter Converter to deploy one or more Junos Space Virtual Appliances on a VMware ESX server.

The Junos Space Virtual Appliance requires a VMware ESX server, version 3.5 or later, that can support a virtual machine with the following configuration:

- 64-bit quad processor with at least 2.66 GHz
- 8 GB memory



NOTE: The ESX host server must be configured to support the creation/operation of a virtual machine allocated with 8 GB memory. If the ESX server does not support the 8 GB memory requirement for creating and running a virtual machine, you will not be able to successfully deploy the Junos Space Virtual Appliance. The Junos Space OVF file is initially configured with 4 GB memory; however, during the configuration of the virtual appliance you must increase memory to 8 GB.

- One RJ-45 10/100/1000 Network Interface Connector
- 45 GB hard disk (5 GB initial disk resources + 40 GB disk resources to be added)

This topic includes the following tasks:

1. Installing the VMware ESX Server on page 12
2. Extracting Files from the Junos Space Virtual Appliance Package on page 12
3. Converting a Virtual Appliance to a Virtual Machine by Using the VMware Converter on page 13
4. Increasing RAM and Virtual Processors (CPU) for a Junos Space Virtual Appliance on page 18
5. Adding Disk Resources for a Junos Space Virtual Appliance on page 21

Installing the VMware ESX Server

To download the installation package for the VMware ESX server, go to <http://www.vmware.com/download/vi/>.

To view installation instructions for the VMware ESX server, go to http://www.vmware.com/support/pubs/vi_pubs.html.



NOTE: You install the VMware Infrastructure client when you install the VMware ESX server.

Extracting Files from the Junos Space Virtual Appliance Package

The Junos Space Virtual Appliance is created in the Open Virtualization Format (OVF) 1.0. The Junos Space package, named *.tar.gz, contains the OVF file and corresponding disk files.

To extract files from the Junos Space Virtual Appliance package:

1. Create a directory for the extracted Junos Space package files; for example, from a Linux computer, use the following command:

```
mkdir Space
```

2. Use an extraction utility to extract all compressed files from the space-1.0R1.x.tar.gz package into the directory you created, for example:

```
tar xvf space-1.0R1.x.tar.gz /Space
```

A new directory named space-1.0R1.x is created.

3. Verify that the Junos Space package files have been extracted to the new directory, for example:

```
cd Space/space-1.0R1.x  
ls
```

The space-1.0R1.x directory includes the files described in Table 1 on page 12.

Table 1: Files in the space-1.0R1.x Directory

File Name	Description
space-1.0R1.x.mf	The manifest file.
space-1.0R1.x.ovf	The virtual appliance source file that is required to convert the virtual appliance to a virtual machine.
space-1.0R1.x-disk1.vmdk	The virtual disk file— a virtual partition with data and installed operating system (Microsoft Windows, Linux, Mac OS X, and so forth) that VMware uses to run as a virtual machine under the host operating system.

Converting a Virtual Appliance to a Virtual Machine by Using the VMware Converter

To deploy a Junos Space Virtual Appliance to an ESX server, you use the VMware vCenter Converter Standalone application, version 4.01. You convert the Junos Space Virtual Appliance (source) to a VMware Infrastructure virtual machine (destination) to deploy the virtual appliance on a VMware ESX Server.



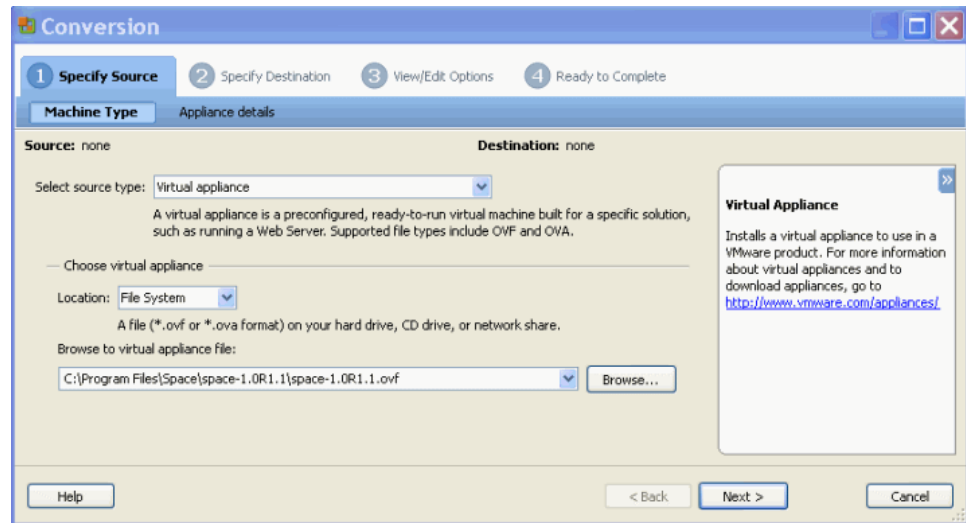
NOTE: Refer to the VMware vCenter Converter Standalone User's Guide at http://www.vmware.com/pdf/converter_standalone_guide401.pdf for complete information on converting your Junos Space Virtual Appliance. For instructions on installing the VMware Converter Standalone, see Chapter 3, "Installing and Uninstalling VMware vCenter Converter Standalone" in the User's Guide. For complete information about converting a Junos Space Virtual Appliance to a VMware Infrastructure virtual machine, see Chapter 4, "Converting Machines" in the User's Guide.

The following procedure describes the basic steps required to convert a Junos Space Virtual Appliance to a virtual machine.

To convert a Junos Space Virtual Appliance to a virtual machine:

1. Start the VMware vCenter Converter Standalone application.
The Conversion wizard is displayed.
2. Click **Convert Machine** from the application menu.
The Specify Source page is displayed.
3. Select **Virtual appliance** from the **Select source type** drop-down menu.
4. From the **Location** drop-down menu, select the location of the source **space-1.0R1.x.ovf** file.
 - If the file is on your hard drive or a network location, select **File System**.
 - If the file is on a Web server, select **URL** and enter the URL in the **Enter the web location** field.
5. Browse to the **space-1.0R1.x.ovf** file.

The following illustration shows the Specify Source/Machine Type page.



6. Click Next.

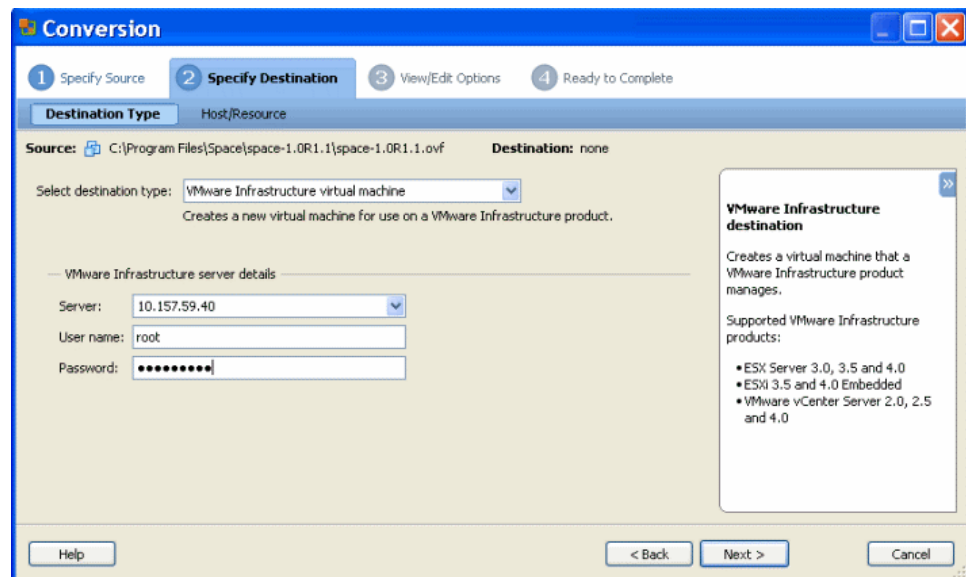
The Appliance details page displays the download size.

7. Click Next.

The Specify Destination/Destination Type page is displayed.

8. Select **VMware Infrastructure virtual machine** in the Select destination type drop-down menu.
9. Select the VMware server from the Server drop-down menu, or enter the IP address or host name for the server.
10. Enter the User name and Password for the VMware server.

The following illustration shows the Specify Destination/Destination Type page.



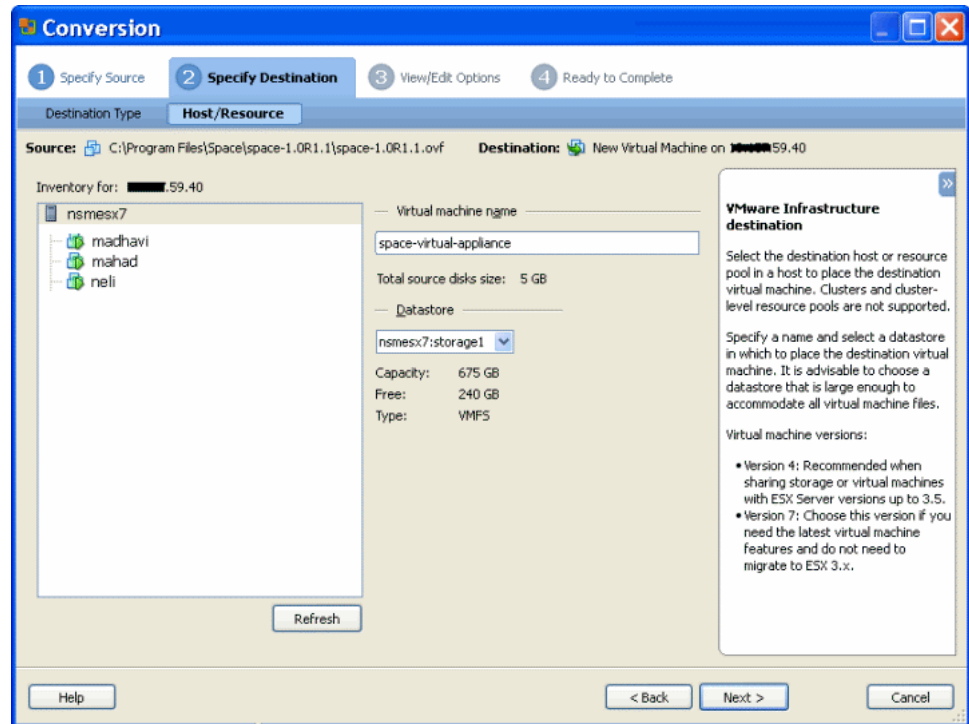
11. Click Next.

The Host/Resource page is displayed.

12. Enter a name for the virtual machine.
13. Select a datastore from the drop-down menu.

The datastore capacity appears under the drop-down menu. Choose a datastore that can accommodate all files of the source virtual machine. The source size is displayed above the selected datastore.

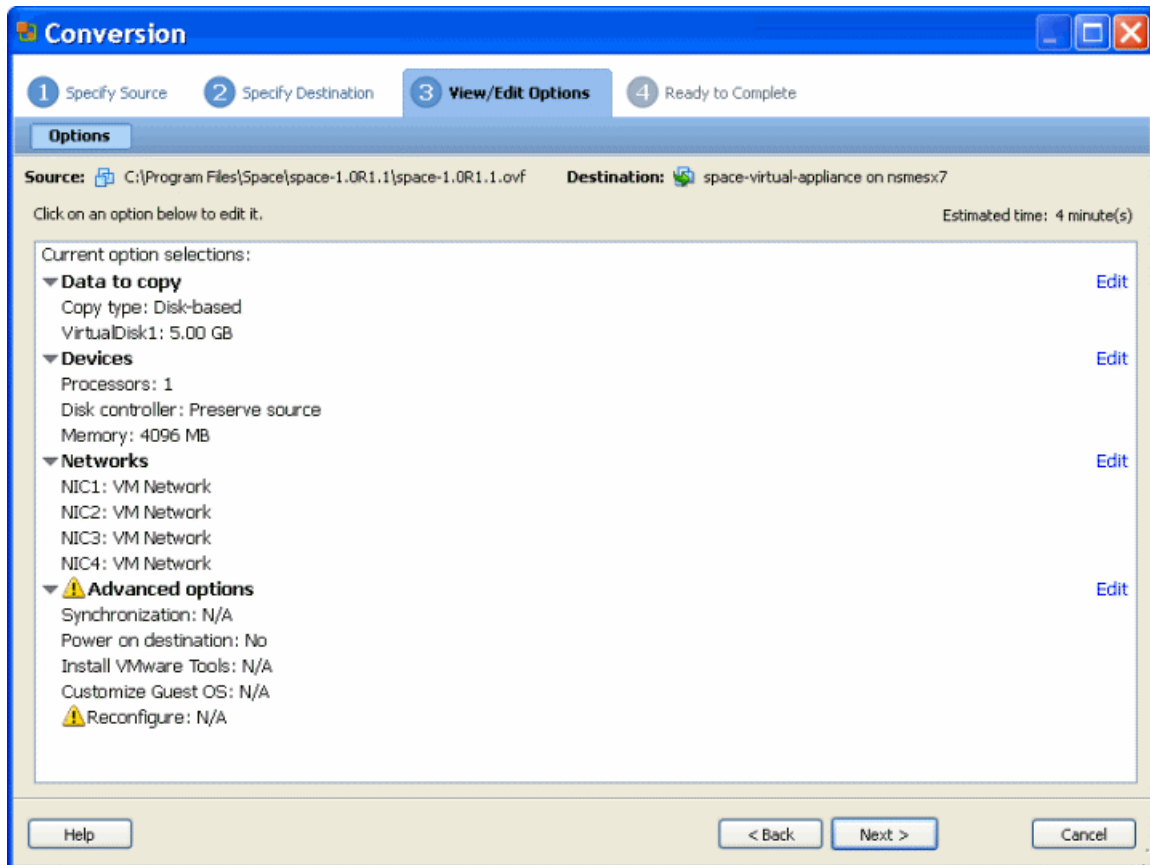
The following illustration shows the Specify Destination/Host/ Resource page.



14. Click **Next** to create a virtual machine to run on an ESX server host that vCenter Server or a standalone ESX host manages.

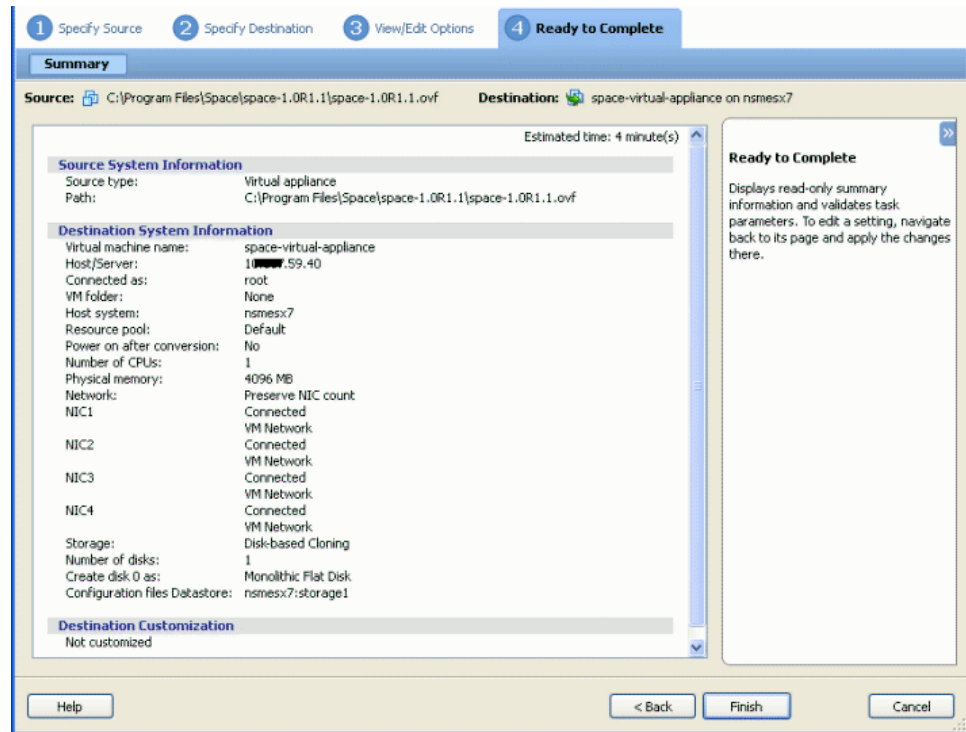
The View/Edit Options page is displayed.

15. Optional: You can make more precise settings to the virtual machine conversion task from the View/Edit Options page. The following illustration shows the configuration options that are available from the View/Edit Options page.



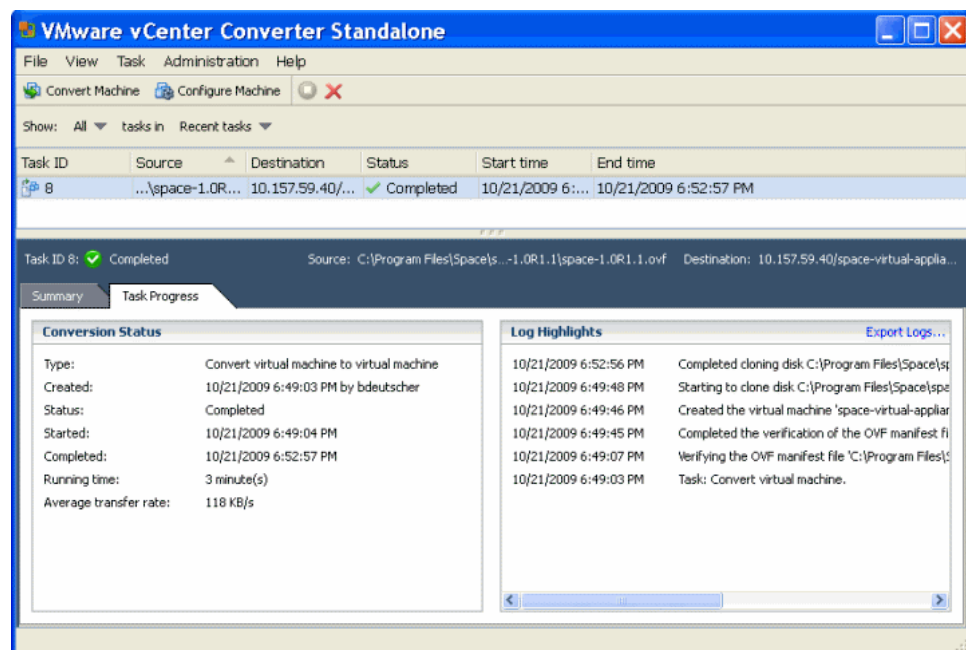
16. Click Next.

The Ready to Complete page is displayed, as shown in the following example.



17. Verify that the virtual machine conversion configuration shown in the Ready to Complete page is complete and accurate. Then click **Finish** to convert the Junos Space Virtual Appliance to a virtual machine.

When the virtual machine conversion finishes, the VMware Converter Standalone displays the status. In the following illustration, the Status column displays "Completed", which indicates the conversion was successful.

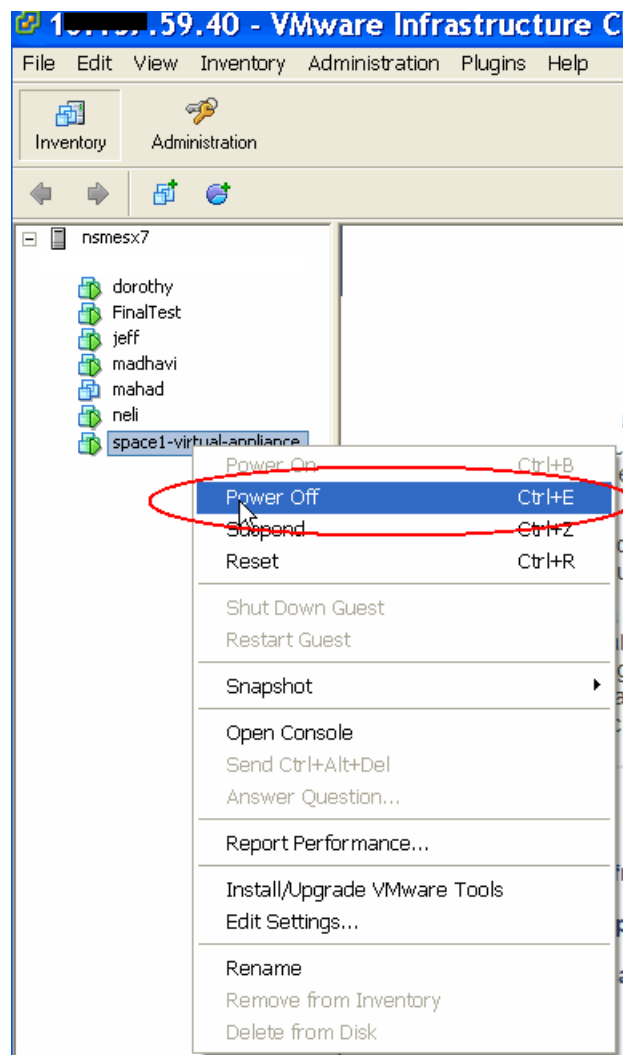


Increasing RAM and Virtual Processors (CPU) for a Junos Space Virtual Appliance

The distributed Junos Space Virtual Appliance files are created with 4 GB of RAM and one virtual processor (CPU). To support Junos Space functionality, after deploying the Junos Space Virtual Appliance to the VMware ESX server, you must increase RAM and add virtual processors for the Junos Space Virtual Appliance.

To increase RAM and add virtual processors for the Junos Space Virtual Appliance:

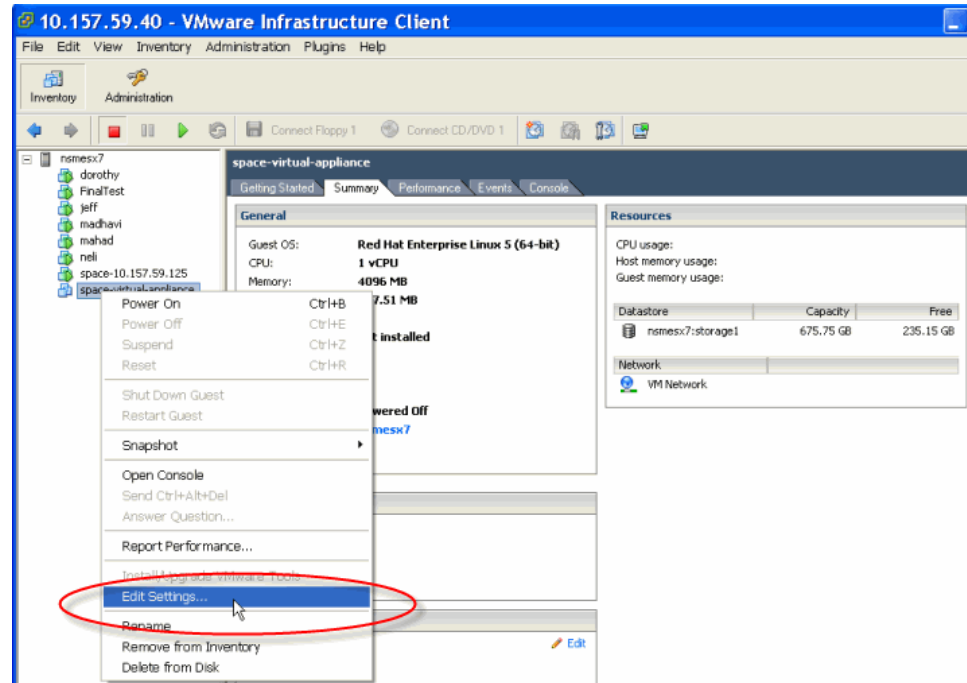
1. Launch the VMware Infrastructure client that is connected to the ESX Server where the Junos Space Virtual Appliance is deployed.
2. Select the Junos Space Virtual Appliance from the inventory view.
3. If the Junos Space Virtual Appliance is powered on, you must power off the appliance to configure RAM and increase the number of virtual processors (CPUs). To power off the Virtual Appliance, right-click on the Junos Space Virtual Appliance icon, and select **Power Off**, as shown in the following illustration.



4. Select the **Summary** tab to view the Junos Space virtual machine settings for CPU and memory.

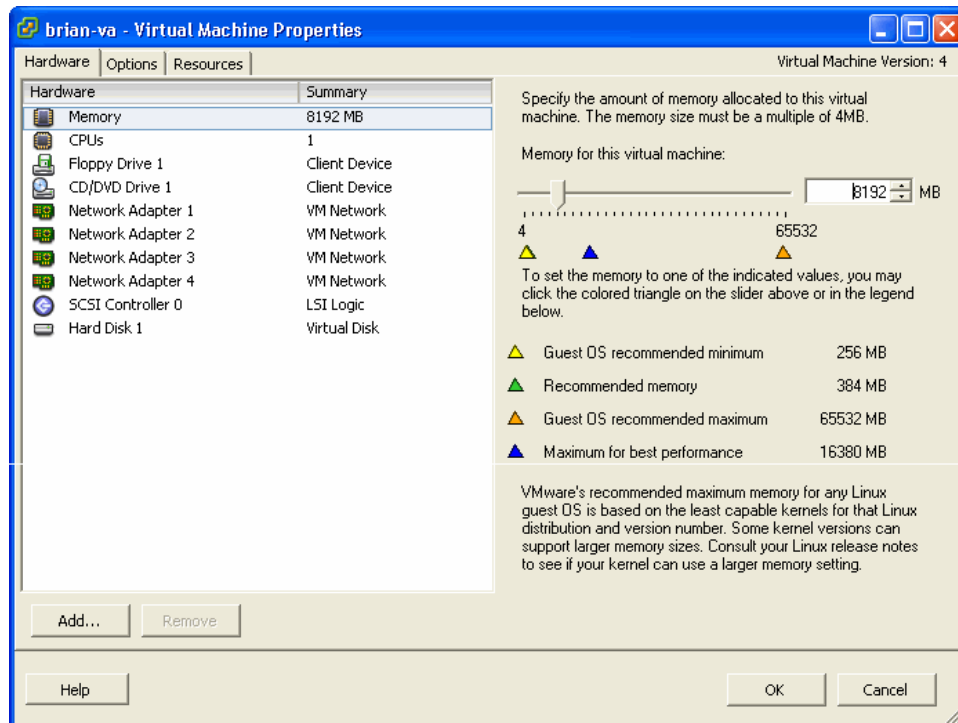
The default CPU setting is 1. The default memory setting is 4096 MB.

5. Right-click on the Junos Space Virtual Appliance icon, and select **Edit Settings** from the drop down menu, as shown in the following illustration.

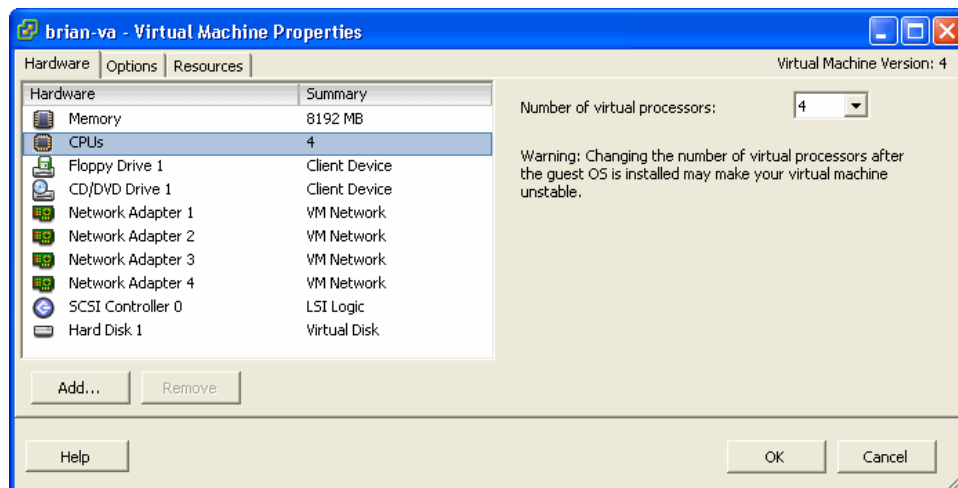


The Virtual Machine Properties dialog box is displayed.

6. Select the **Hardware** tab.
7. Select **Memory**.
8. Drag the slider to increase memory to 8192 MB, as shown in the following illustration.



9. Click OK.
10. Right-click on the Junos Space Virtual Appliance icon, and select **Edit Settings** from the drop down menu.
11. From the **Hardware** tab, and select **CPU**.
12. Set the value for **Number of virtual processors** field to **4**, as shown in the following illustration.



13. Click OK.

The number of virtual processors (CPU) for your Junos Space Virtual Appliance is increased to 4.

Adding Disk Resources for a Junos Space Virtual Appliance

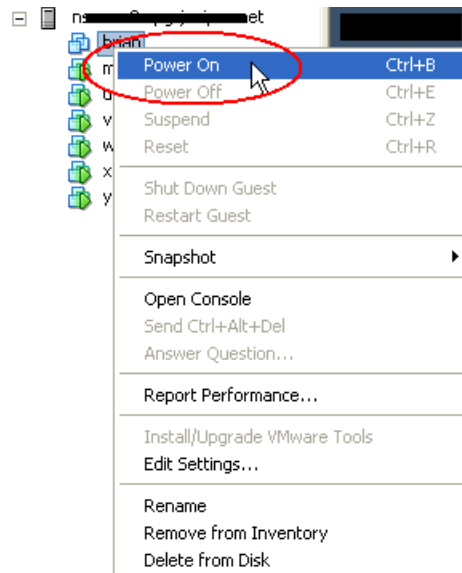
The distributed Junos Space Virtual Appliance files are created with 5 GB of disk space. To support Junos Space functionality, after deploying the Junos Space Virtual Appliance to the VMware ESX server, you must add disk resources for the Junos Space Virtual Appliance.



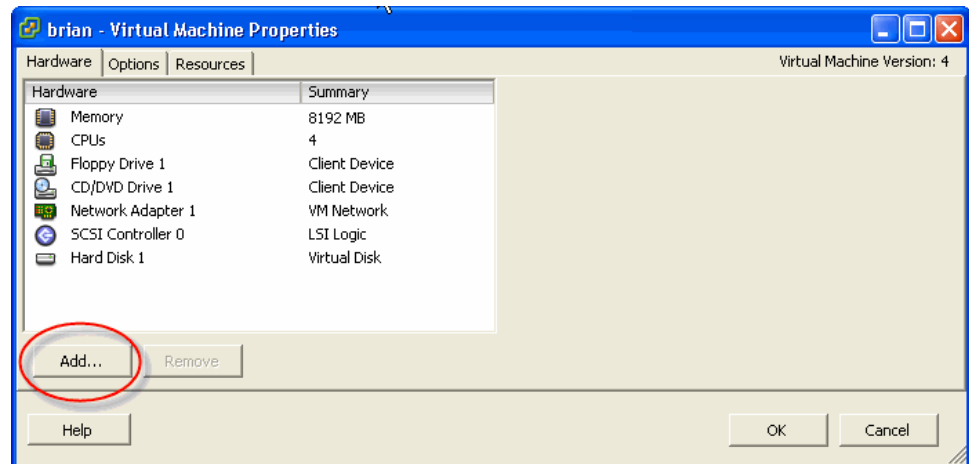
NOTE: You must *add* a disk resource to increase disk space for a Junos Space Virtual Appliance. You cannot resize the existing disk by assigning a new size.

To add disk resources for the Junos Space Virtual Appliance:

1. In the VMware Infrastructure client, right-click on the Junos Space Virtual Appliance icon, and select **Power On**, as shown in the illustration. The Junos Space Virtual Appliance must be powered on to add disk resources.

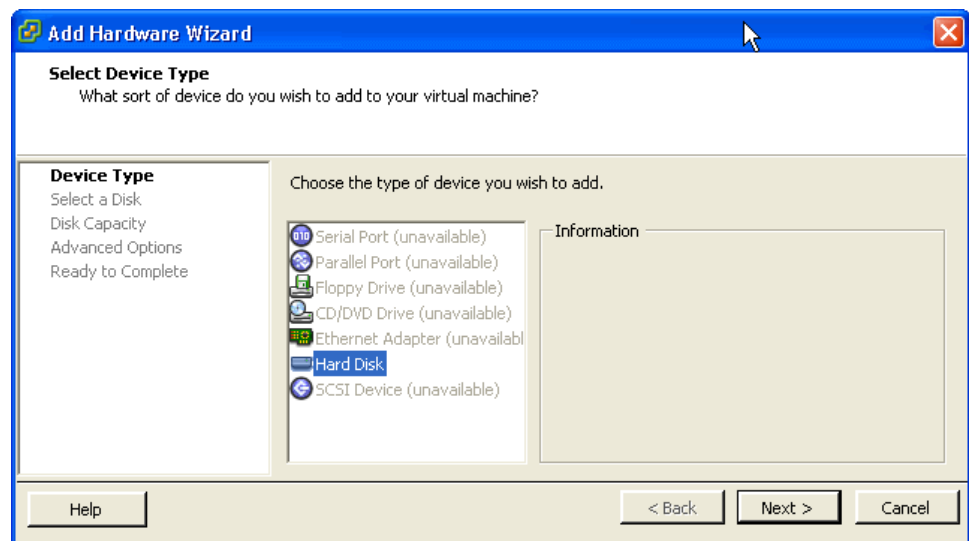


2. In the VMware Infrastructure client, right-click on the Junos Space Virtual Appliance icon, and select **Edit Settings** from the drop down menu.
The Virtual Machine Properties window is displayed.
3. Select the Hardware tab, and click **Add**, as shown in the following illustration.



The Select Device Type window is displayed.

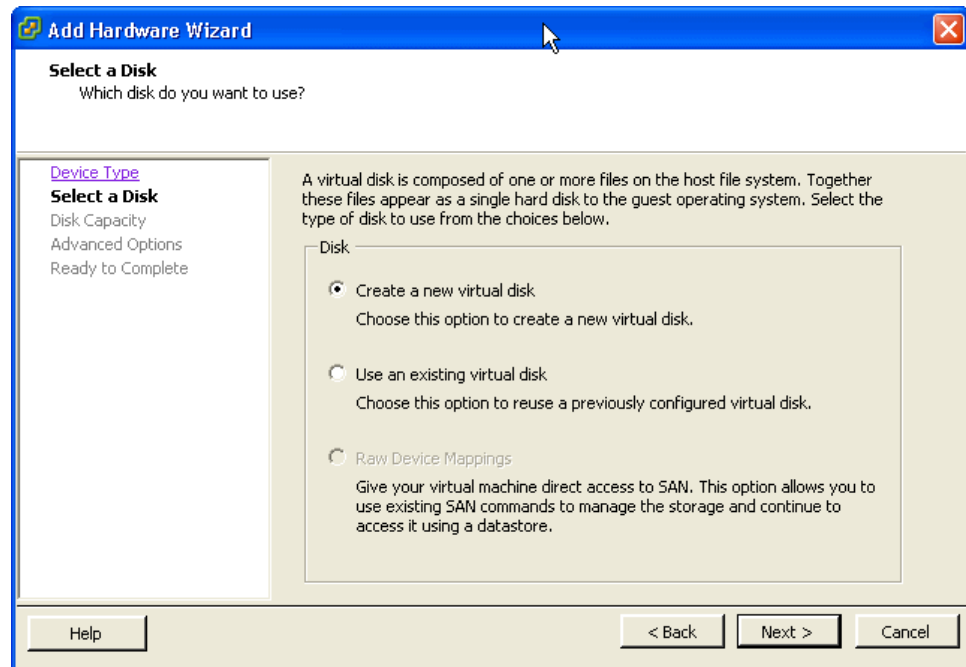
4. Select **Hard Disk**, as shown in the following illustration.



5. Click **Next**.

The Select a Disk window is displayed.

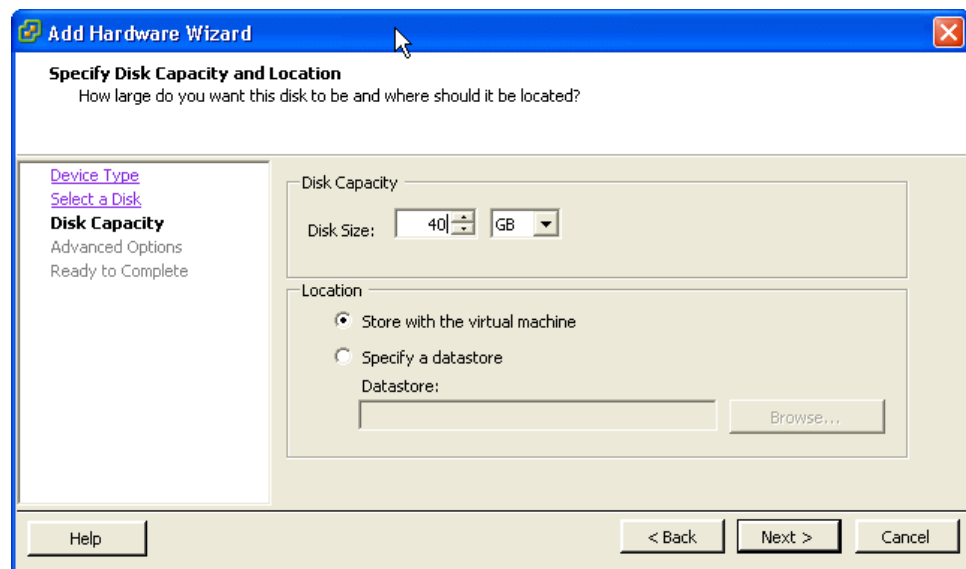
6. Select **Create a new Virtual disk**, as shown in the following illustration.



7. Click Next.

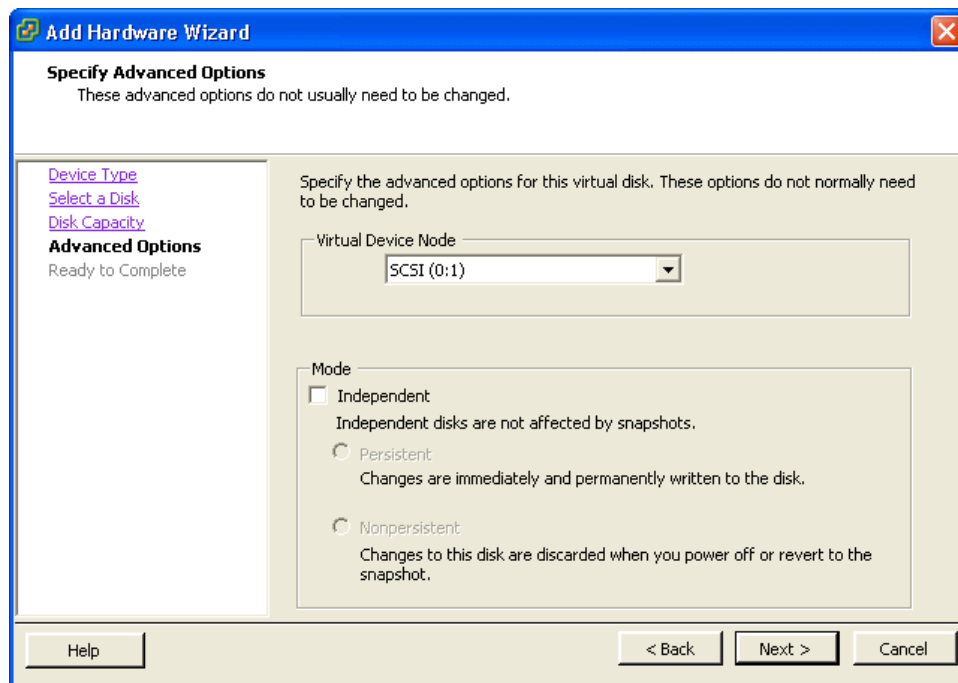
The Specify Disk Capacity and Location window is displayed.

8. Set the Disk Size field to **40 GB**, as shown in the following illustration. The Location option should remain at the default setting “Store with the virtual machine.”



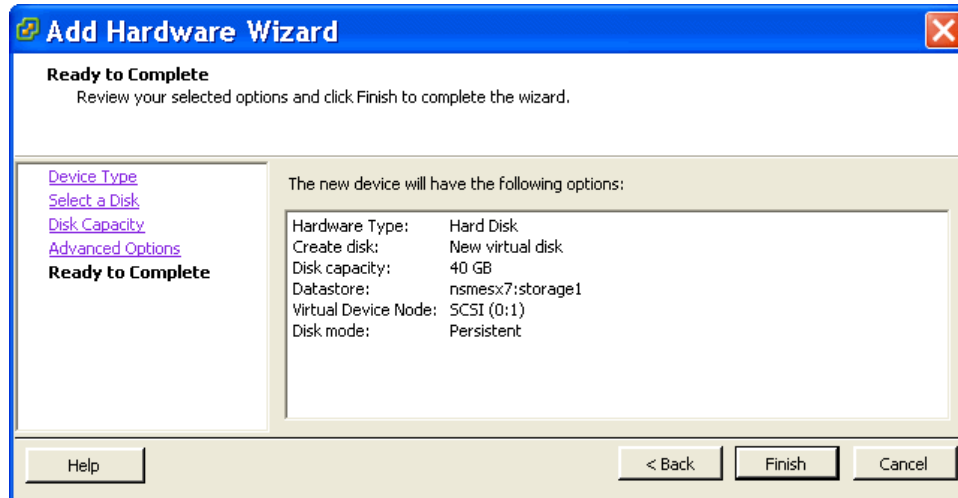
9. Click Next.

The Specify Advanced Options window is displayed.



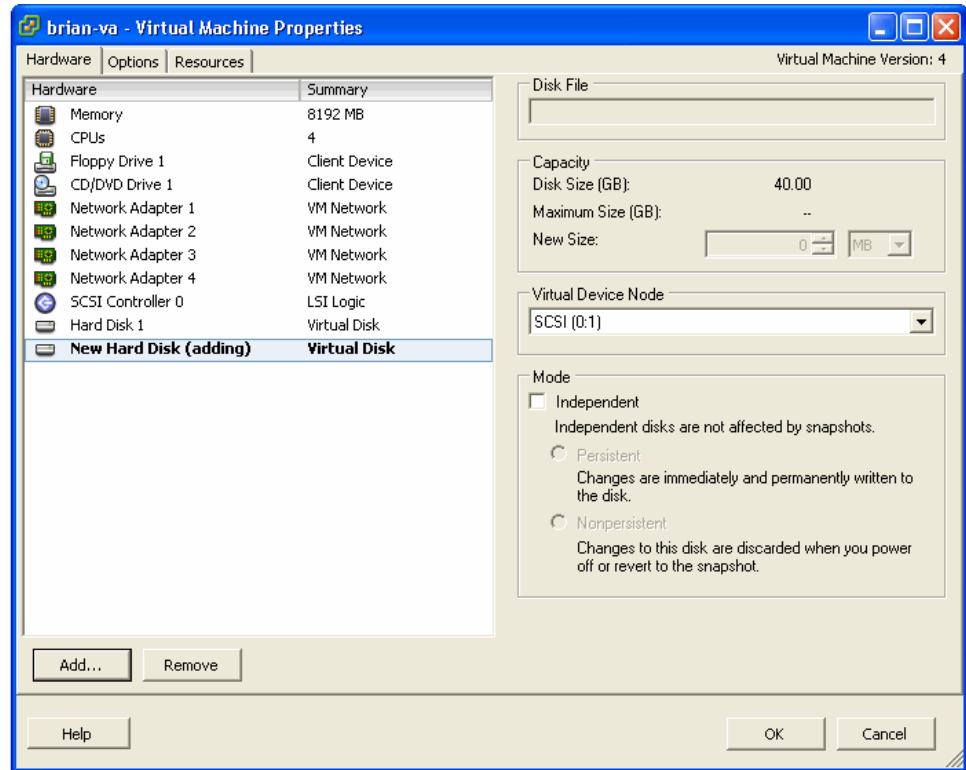
10. Leave the default settings unchanged, as shown above, and click **Next**.

The Ready to Complete window is displayed.



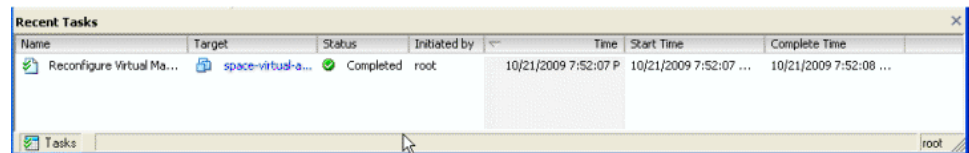
11. Review your selected options, and click **Finish**.

The Virtual Machine Properties window displays the new virtual disk in the Hardware list.



12. Click OK to create the new virtual disk.

A status bar shows progress at the bottom of the window, as shown in the following illustration.



NOTE: After the new virtual disk is created, the Junos Space node must be scanned to detect the additional disk space that you added. To initiate the scan for additional disk space, you select the “Expand VM Drive Size” option in the Junos Space Settings Menu, immediately after you configure basic settings for your Junos Space Virtual Appliance.

The next step is to configure basic settings for your deployed Junos Space Virtual Appliance. To configure basic settings for the appliance, you access the console in the VMware Infrastructure Client.

To deploy another Junos Space Virtual Appliance, you complete the all the preceding steps (and configure basic settings) for each Junos Space Virtual Appliance that you want to create.

Chapter 3

Configuring a Virtual Appliance

- Configuring Basic Settings for a Junos Space Virtual Appliance on page 27

Configuring Basic Settings for a Junos Space Virtual Appliance

After you deploy a Junos Space Virtual Appliance to a VMware ESX server, you must enter basic network and machine information to make your Junos Space Virtual Appliance accessible to the network. You must also increase the Virtual Appliance drive space.

To configure a deployed Junos Space Virtual Appliance, the VMware Infrastructure client must be connected to the VMware ESX server on which the virtual appliance is running.

This topic includes the following tasks:

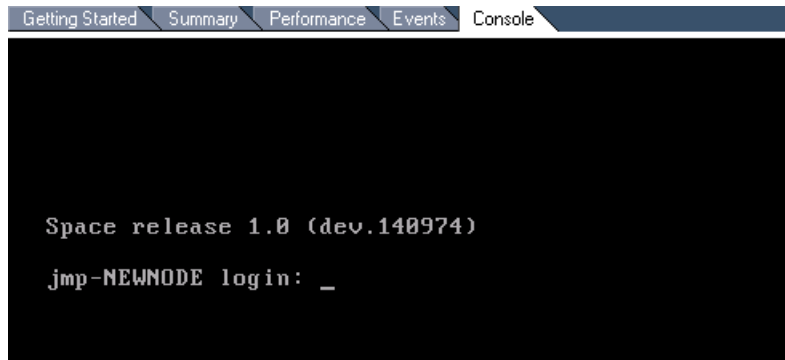
- Configuring an Appliance that is the First Node in a Cluster or that Will Not Be Added to an Existing Cluster on page 27
- Configuring an Appliance to Add to an Existing Cluster on page 31

Configuring an Appliance that is the First Node in a Cluster or that Will Not Be Added to an Existing Cluster

To configure the settings of a Junos Space appliance that is the first node in a cluster or that will not be added to an existing cluster:

1. Power on the Junos Space Virtual Appliance:
 - a. From the VMware Infrastructure Client, right-click on the Junos Space Virtual Appliance and select **Power On** from the drop-down menu.
 - b. Select the Console tab.

The VMware Infrastructure Client console screen displays the Junos Space login prompt, as shown in the following illustration.



```

Getting Started Summary Performance Events Console
Space release 1.0 (dev.140974)
jmp-NEWNODE login: _

```

2. At the Junos Space login prompt, enter **admin** as your default login name and press Enter.
3. Enter **abc123** as your default password and press Enter.
Junos Space prompts you to change your default password.
4. Enter the default password again.
5. Enter a new password.
Passwords should include both alpha and numeric characters and be at least 6 characters in length. All passwords are case-sensitive.
6. Reenter your new password.
7. Enter a new IP address for interface **eth0**.



NOTE: The first and second appliance or Virtual Appliance that you configure in a cluster (fabric) must be in the same subnet.

8. Enter a new subnet mask for interface **eth0**.
9. Enter the default gateway as a dotted decimal IP address.
10. Enter the nameserver address in dotted decimal notation for interface **eth0**.
11. Enter Device Management IP interface information:
If you want to configure a separate interface for device management:
 - Enter **y** when prompted to configure a separate interface for device management.
 - Enter a new IP address for interface **eth3**.
 - Enter a new subnet mask for interface **eth3**.
 If you do not want to configure a separate interface for device management, enter **n** when prompted.
12. Enter **n** when prompted “Will this Junos Space system be added to an existing cluster?”
13. Enter the IP address for Web access.



NOTE: The IP address for Web access must be in the same subnet as the IP address for interface `eth0` but must be a different IP address.

14. Add an NTP server to synchronize the node with an external NTP source. For example, you can specify ntp.juniper.net as the external NTP server.
15. Enter the display name for this node.
This is the logical node name that Junos Space displays for the first node in a Junos Space cluster.
16. Enter a password for the cluster maintenance mode administrator.



NOTE: This is the password that a maintenance mode administrator must specify to access maintenance mode and shutdown all Junos Space nodes in the fabric. When in maintenance mode, an administrator can troubleshoot the Junos Space system or perform database restore operations.

17. Reenter the password for cluster maintenance mode.

The Settings Summary is displayed, as shown in the following example.

```

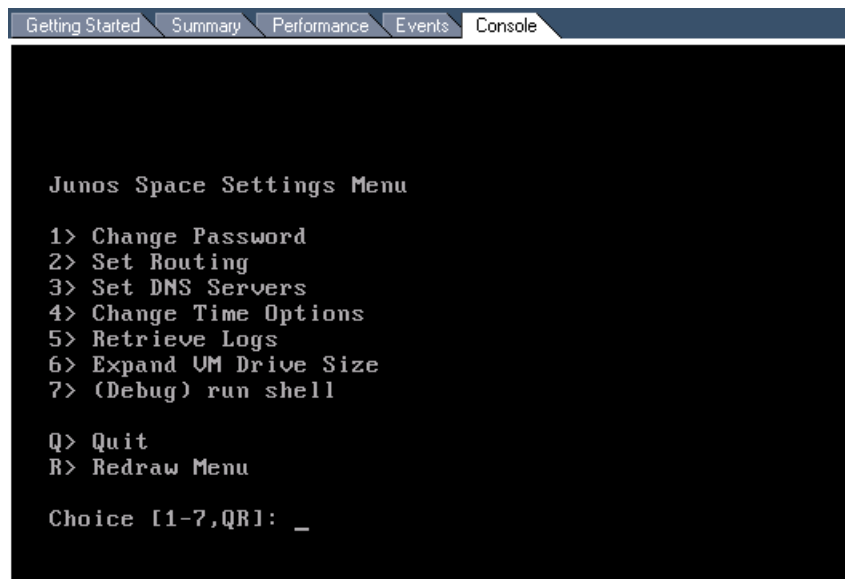
Getting Started Summary Performance Events Console
Settings Summary:
1> IP Change: eth0 is 10.1 1.59.221 / 255.255.224.0
2> Default Gateway = 10.1 1.32.1 on eth0
3> DNS add: 10.1.15.191.252
4> Create as first node or standalone
5> Web IP address is 10.1 1.59.222
6> NTP add: ntp.juniper.net
7> Node display name is "space1"
8> Password for Junos Space maintenance mode is set.

A> Apply settings
C> Change settings
Q> Quit and set up later
R> Redraw Menu

Choice [ACQR]: _
  
```

18. Confirm that the information in the Settings Summary is correct:
 - If all summary information is correct, enter **A** to apply the settings.
 - If any summary information is not correct, enter **C** to change the settings.
When you enter **C**, you will be prompted to reenter all the basic configuration information that you have configured up to this point.

When you enter **A** to apply the settings, the Junos Space Settings Menu is displayed, as shown in the following illustration.



```

Getting Started Summary Performance Events Console

Junos Space Settings Menu

1> Change Password
2> Set Routing
3> Set DNS Servers
4> Change Time Options
5> Retrieve Logs
6> Expand VM Drive Size
7> (Debug) run shell

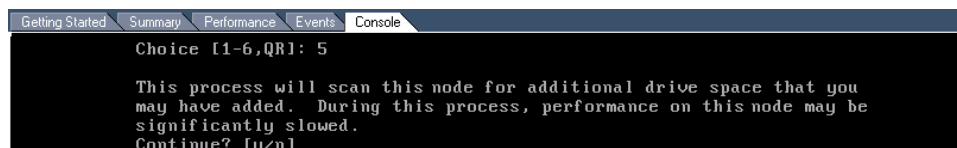
Q> Quit
R> Redraw Menu

Choice [1-7,QR]: _

```

19. Enter 6 to Expand VM drive size.

Junos Space displays the prompt to expand VM (virtual appliance) drive size, as shown in the following illustration.



```

Getting Started Summary Performance Events Console

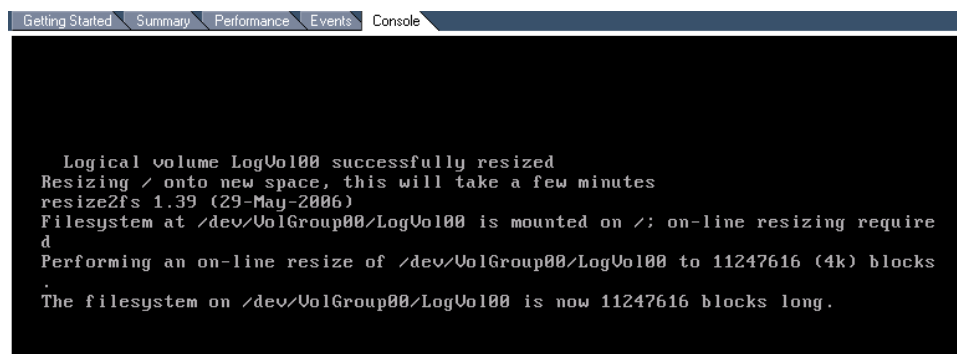
Choice [1-6,QR]: 5

This process will scan this node for additional drive space that you
may have added. During this process, performance on this node may be
significantly slowed.
Continue? [y/n] _

```

20. Enter **y** to start a scan for the 40 GB of additional drive space that you added when you deployed the Virtual Appliance.
21. Enter the admin password when prompted.

Junos Space starts a scan for the 40 GB of additional drive space that you added when you deployed the Virtual Appliance. When the scan completes, Junos Space displays the results to verify that the file system size was increased to include the new logical volume. The following example shows the results of a scan for additional drive space.



```

Getting Started Summary Performance Events Console

Logical volume LogVol100 successfully resized
Resizing / onto new space, this will take a few minutes
resize2fs 1.39 (29-May-2006)
Filesystem at /dev/VolGroup00/LogVol100 is mounted on /; on-line resizing require
d
Performing an on-line resize of /dev/VolGroup00/LogVol100 to 11247616 (4k) blocks
The filesystem on /dev/VolGroup00/LogVol100 is now 11247616 blocks long.

```

The configuration of the Junos Space Virtual Appliance is now complete.

The Junos Space Settings Menu is displayed.

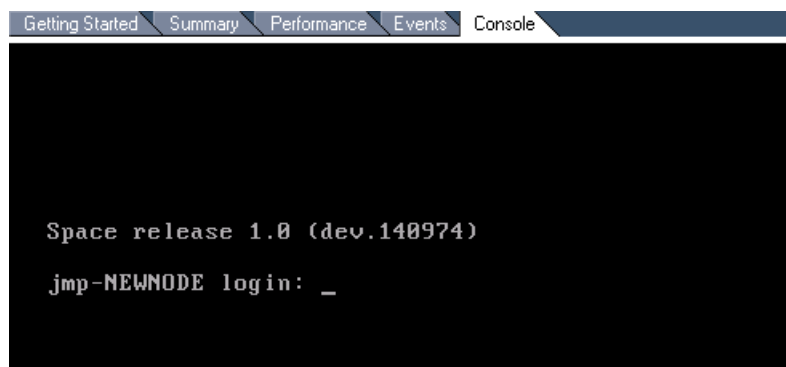
22. Enter **Q** to exit the Junos Space Settings Menu.

Configuring an Appliance to Add to an Existing Cluster

To configure the basic settings of a Junos Space appliance that will be added to an existing cluster:

1. Power on the Junos Space Virtual Appliance:
 - a. From the VMware Infrastructure Client, right-click on the Junos Space Virtual Appliance and select **Power On** from the drop-down menu.
 - b. Select the Console tab and then click inside the console display screen.

The VMware Infrastructure Client console screen displays the Junos Space login prompt, as shown in the following illustration.



2. At the Junos Space login prompt, enter **admin** as your default login name and press Enter.
3. Enter **abc123** as your default password and press Enter.
Junos Space prompts you to change your default password.
4. Enter the default password again.
5. Enter a new password.
All passwords are case-sensitive.
6. Reenter your new password.
7. Enter a new IP address for interface **eth0**.



NOTE: The first and second appliance or Virtual Appliance that you configure in a cluster (fabric) must be in the same subnet.

8. Enter a new subnet mask for interface **eth0**.
9. Enter the default gateway as a dotted decimal IP address.
10. Enter the nameserver address in dotted decimal notation for interface **eth0**.

11. Enter Device Management IP interface information:

If you want to configure a separate interface for device management:

- Enter **y** when prompted to configure a separate interface for device management.
- Enter a new IP address for interface **eth3**.
- Enter a new subnet mask for interface **eth3**.

If you do not want to configure a separate interface for device management, enter **n** when prompted.

12. Enter **y** when prompted “Will this Junos Space system be added to an existing cluster?”

The Settings Summary is displayed, as shown in the following example.

```

Getting Started Summary Performance Events Console

Settings Summary:

1> IP Change: eth0 is 10.157.59.221 / 255.255.224.0
2> Default Gateway = 10.157.32.1 on eth0
3> DNS add: 10.155.191.252
4> Node to be added to existing cluster

A> Apply settings
C> Change settings
Q> Quit and set up later
R> Redraw Menu

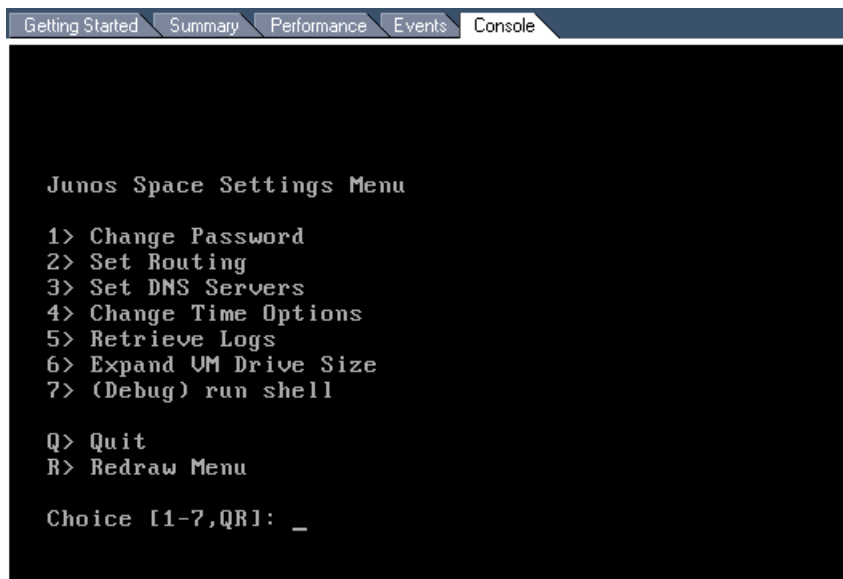
Choice [ACQR]: _
  
```

13. Confirm that the information in the Settings Summary is correct:

- If all summary information is correct, enter **A** to apply the settings.
- If any summary information is not correct, enter **C** to change the settings.

When you enter **C**, you will be prompted to reenter all the basic configuration information that you have configured up to this point.

When you enter **A** to apply the settings, the Junos Space Settings Menu is displayed, as shown in the following illustration.



```

Getting Started Summary Performance Events Console

Junos Space Settings Menu

1> Change Password
2> Set Routing
3> Set DNS Servers
4> Change Time Options
5> Retrieve Logs
6> Expand VM Drive Size
7> (Debug) run shell

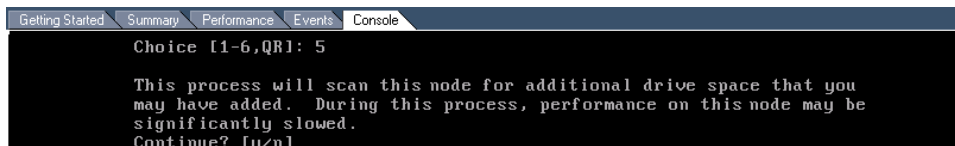
Q> Quit
R> Redraw Menu

Choice [1-7,QR]: _

```

14. Enter 6 to Expand VM drive size.

Junos Space displays the prompt to expand VM (virtual appliance) drive size, as shown in the following illustration.



```

Getting Started Summary Performance Events Console

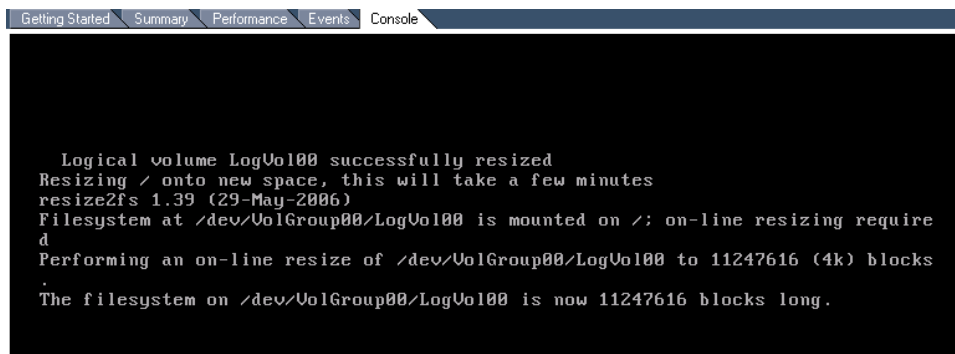
Choice [1-6,QR]: 5

This process will scan this node for additional drive space that you
may have added. During this process, performance on this node may be
significantly slowed.
Continue? [y/n] _

```

15. Enter **y** to start a scan for the 40 GB of additional drive space that you added when you deployed the Virtual Appliance.
16. Enter the admin password when prompted.

Junos Space starts a scan for the 40 GB of additional drive space that you added when you deployed the Virtual Appliance. When the scan completes, Junos Space displays the results to verify that the file system size was increased to include the new logical volume. The following example shows the results of a scan for additional drive space.



```

Getting Started Summary Performance Events Console

Logical volume LogVol100 successfully resized
Resizing / onto new space, this will take a few minutes
resize2fs 1.39 (29-May-2006)
Filesystem at /dev/VolGroup00/LogVol100 is mounted on /; on-line resizing require
d
Performing an on-line resize of /dev/VolGroup00/LogVol100 to 11247616 (4k) blocks
.
The filesystem on /dev/VolGroup00/LogVol100 is now 11247616 blocks long.

```

When the scan for additional drive space completes, the Junos Space Settings Menu is displayed.

17. Specify an external NTP source for the Virtual Appliance.
 - a. Enter 4 to Change Time Options.
 - b. Enter 2 to add an NTP server.
 - c. Specify an NTP server, using the same external NTP source that you configured for the first node in the cluster.



NOTE: Juniper strongly recommends that you configure an external NTP source for each node in the cluster, and that each node in the cluster (fabric) is configured with the same NTP server that is configured on the first node.



NOTE: Juniper also strongly recommends that you do not, under any circumstances, change the time zone for any node.

- d. Enter A to apply the settings and add the NTP server.
18. Enter Q to exit the Junos Space Settings Menu.
19. To add the node to the fabric, you must add the node in the Junos Space user interface, as described in “Adding a Node to an Existing Fabric” on page 39, but first you must log in to the Junos Space user interface.

Part 3

Accessing the Junos Space User Interface

- Logging In on page 37
- Adding a Node on page 39

Chapter 4

Logging In

- Logging In to the Junos Space User Interface as Super Administrator on page 37

Logging In to the Junos Space User Interface as Super Administrator

You connect to a Junos Space appliance from your Web browser. Internet Explorer version 7 and Mozilla Firefox version 3.0 or later Web browsers are supported.



NOTE: Before you can log into the system, your browser must have the Flash 10 plug-in installed.


To access and log in to an appliance, follow these steps:

1. In the address field of your browser window, type the URL of your appliance, for example:

`https://<1.1.1.1>/mainui/`

Where `<1.1.1.1>` is the Web (virtual) IP address for access to Junos Space.

2. Press Enter. The Junos Space log in screen is displayed.

A screenshot of the Junos Space login interface. It features a dark blue background. On the left, the labels 'Username:' and 'Password:' are in white. To the right of each label is a white text input field. Below the password field is a blue button with the text 'Log In' in white.

3. Type your username and password. The default username is **super**; the password is **juniper123**. See Changing User Passwords for information about how to change your user password.

You can now use the Junos Space user interface to add users, add nodes to the fabric, discover devices, provision services, and so forth.

Chapter 5

Adding a Node

- Adding a Node to an Existing Fabric on page 39

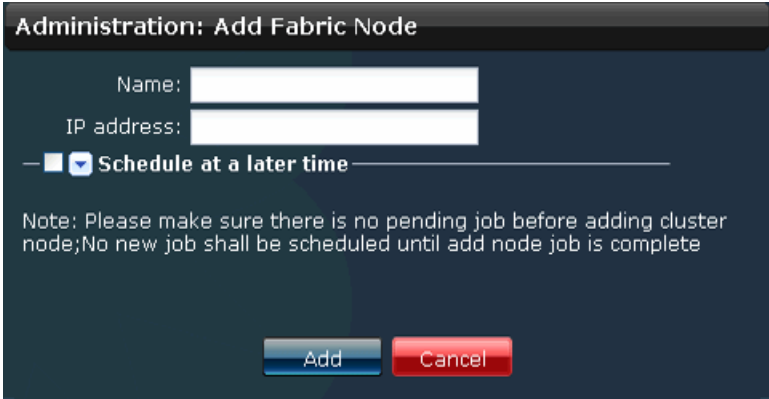
Adding a Node to an Existing Fabric

Junos Space automatically adds the first node to the fabric and uses the logical node name that you assign to the JA1500 Junos Space Appliance or Junos Space Virtual Appliance when you configure the node in a fabric. For each additional JA1500 Junos Space Appliance or Junos Space Virtual Appliance that you install, you must add the node in Junos Space to represent the appliance in the fabric.

To add a node to the Junos Space fabric:

1. From the task ribbon, select the **Administration** workspace.
2. From the task ribbon, select the **Manage Fabric** icon.
3. From the task ribbon, select the **Add Fabric Node** task.

The Add Fabric Node screen is displayed.



Administration: Add Fabric Node

Name:

IP address:

☒ **Schedule at a later time**

Note: Please make sure there is no pending job before adding cluster node; No new job shall be scheduled until add node job is complete

4. In the Name field, enter a name for the node.
5. In the IP address field, enter the IP address of the Junos Space Virtual Appliance.



NOTE: This is the IP address for interface **eth0** that you specified during the basic configuration of the Virtual Appliance.

6. Schedule the Add Fabric Node operation:

- Clear the **Schedule at a later time** check box (the default) to initiate the add node operation when you complete 7 of this procedure.
- Select the **Schedule at a later time** check box to specify a later start date and time for the add node operation.



NOTE: The selected time in the scheduler corresponds to Junos Space server time but is mapped to the local time zone of the client computer.

7. Click **Add** to add the node to the fabric.

The node is added to the fabric and is displayed in the Junos Space user interface and database. When you add a node, the node functions are automatically assigned by Junos Space. By default, the first and second nodes added to a fabric perform all the following functions:

- Database— for processing database requests (create, read, update, and delete operations)
- Load Balancer— for processing HTTP requests from remote browsers and NBI clients
- Application Logic— for processing back-end business logic (Junos Space service requests), and DML workload (device connectivity, device events, and logging)

By default, the third node, and all subsequent nodes, added to a fabric perform only the Application Logic function.

After you add the node to the fabric from the user interface, the configuration of the Junos Space Virtual Appliance is complete.

Part 4

License Key Management

- Junos Space License Key Files on page 43

Chapter 6

Junos Space License Key Files

- Generating and Uploading the Junos Space License Key File on page 43

Generating and Uploading the Junos Space License Key File

Juniper Networks uses a license management system to manage the deployment of the Junos Space product. Junos Space includes physical or virtual network appliances, device management connection points, connections, and higher level applications, such as Ethernet Activator. The base product includes appliances, device connection points, and connections.

The system administrator must upload a license key file in the Administration Manage Licenses user interface to license the Junos Space product and activate the configuration ordered.

This procedure includes the following topics:

1. Generating the License Key File on page 43
2. Uploading the License Key File Contents on page 43

Generating the License Key File

If you order Junos Space, Juniper Networks sends an e-mail with an authorization code that includes a resource guide describing how to obtain a license key.

If you order a Junos Space Virtual Appliance, you also receive an e-mail with a serial number and instructions on how to go to the Juniper Networks license management system to apply that serial number.

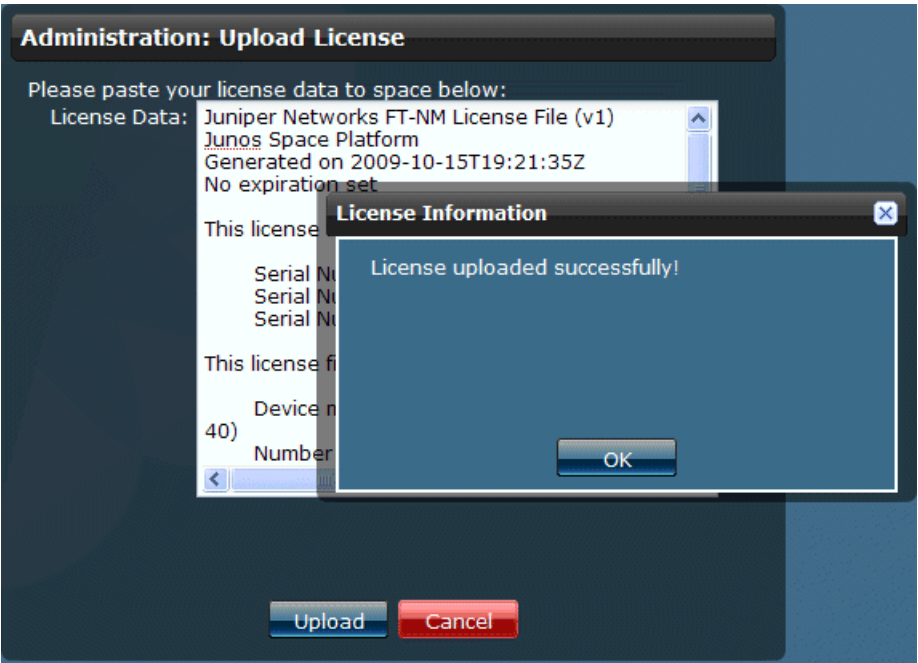
Uploading the License Key File Contents

To upload the license key file, follow these steps:

1. Open the Juniper Networks Authorization Codes e-mail you received and follow the directions.
2. Open the license key text file attached to the e-mail and copy all the contents.
3. In Junos Space Application Chooser, click the Network Application Platform application icon.

4. In the task ribbon, click the **Administration** workspace icon. The Administration dashboard appears.
5. In the task ribbon, click the **Manage Licenses** task icon. The Manage Licenses inventory page appears.
6. In the task ribbon, click the **Upload License** icon. The Upload License page appears.
7. Paste the contents of the license key text file in the License Data text field using the Web browser Edit > Paste command.

8. Click **Upload**. The license key data is uploaded in Junos Space database. The license uploaded successfully message appears.



9. Click OK. The license appears on the Manage Licenses inventory page.



