

Chapter 7

Upgrade JUNOS Software

As new features become available or as software problems are fixed, you might periodically upgrade the router software. (See Table 21.)

Table 21: Checklist for Upgrading JUNOS Software

Upgrade JUNOS Software Tasks	Command or Action
Before You Upgrade JUNOS Software on page 58	
1. Log the Software Version Information on page 59	show version save <i>filename</i>
2. Log the Hardware Version Information on page 60	show chassis hardware save <i>filename</i>
3. Log the Active Configuration on page 61	show configuration save <i>filename</i>
4. Log the Interfaces on the Router on page 61	show interface terse save <i>filename</i>
5. Log the BGP, IS-IS, and OSPF Adjacency Information on page 62	show bgp summary save <i>filename</i> show isis adjacency brief save <i>filename</i> show ospf neighbor brief save <i>filename</i>
6. Log the System Storage Information on page 63	show system storage save <i>filename</i>
7. Back Up the Currently Running and Active File System on page 63	request system snapshot
8. Download JUNOS Software on page 64	http://www.juniper.net/support
Upgrade JUNOS Software on page 69	
1. Copy JUNOS Software to the Router on page 69	file copy ftp:// <i>username</i> : <i>prompt</i> @ftp. <i>hostname</i> .net/ <i>jbundle-package-name</i> /var/tmp/ <i>jbundle-package-name</i>
2. Add New Software on page 69	request system software add/var/tmp/ <i>jbundle-package-name</i>
3. Start the New Software on page 70	request system reboot
After You Upgrade JUNOS Internet Software on page 71	
1. Compare Information Logged Before and After the Upgrade on page 71	show version save <i>filename</i> show chassis hardware save <i>filename</i> show configuration save <i>filename</i> show interface terse save <i>filename</i> show bgp summary save <i>filename</i> show isis adjacency brief save <i>filename</i> show ospf neighbor brief save <i>filename</i> show system storage save <i>filename</i>
2. Back Up the New Software on page 71	request system snapshot

Before You Upgrade JUNOS Software

Purpose Before you upgrade the JUNOS software, it is important to log information about the existing system so that after the upgrade you can compare the same information to verify that all components are installed and working as expected. Also, during the process of logging information, you might find an existing problem that you did not know about and might have thought was caused by the upgrade.

Steps to Take To log important information about your system, follow these steps:

1. Log the Software Version Information on page 59
2. Log the Hardware Version Information on page 60
3. Log the Active Configuration on page 61
4. Log the Interfaces on the Router on page 61
5. Log the BGP, IS-IS, and OSPF Adjacency Information on page 62
6. Log the System Storage Information on page 63
7. Back Up the Currently Running and Active File System on page 63
8. Download JUNOS Software on page 64

In all the logging steps, you can use your terminal program to save the output from the commands, or use the **save** command to redirect the output to an external file.

To save the output to a file on another machine, use the following JUNOS command-line interface (CLI) operational mode command:

```
user@host> command | save filename
```

By default, the file is placed in your home directory on the router. To redirect the output to a file on another machine, change the filename to include the path to that machine and file. For information about how you can specify the filename, see the *JUNOS System Basics and Services Command Reference*.

The following example stores the output of the **show version** command in a file:

```
user@host> show version | save filename  
Wrote 1143 lines of output to 'filename'
```

Step 1: Log the Software Version Information

Action To log the JUNOS software version information, use the following JUNOS CLI operational mode command:

```
user@host> show version | save filename
```

Sample Output user@host> show version | save test
Wrote 39 lines of output to 'test'

```
user@host> show version
Hostname: my-router.net
Model: m10
JUNOS Base OS boot [5.0R5]
JUNOS Base OS Software Suite [5.0R5]
JUNOS Kernel Software Suite [5.0R5]
JUNOS Routing Software Suite [5.0R5]
JUNOS Packet Forwarding Engine Support [5.0R5]
JUNOS Crypto Software Suite [5.0R5]
JUNOS Online Documentation [5.0R5]
KERNEL 5.0R5 #0 built by builder on 2002-03-02 05:10:28 UTC
MGD release 5.0R5 built by builder on 2002-03-02 04:45:32 UTC
CLI release 5.0R5 built by builder on 2002-03-02 04:44:22 UTC
CHASSISD release 5.0R5 built by builder on 2002-03-02 04:43:37 UTC
DCD release 5.0R5 built by builder on 2002-03-02 04:42:47 UTC
RPD release 5.0R5 built by builder on 2002-03-02 04:46:17 UTC
SNMPD release 5.0R5 built by builder on 2002-03-02 04:52:26 UTC
MIB2D release 5.0R5 built by builder on 2002-03-02 04:45:37 UTC
APSD release 5.0R5 built by builder on 2002-03-02 04:43:31 UTC
VRRPD release 5.0R5 built by builder on 2002-03-02 04:52:34 UTC
ALARMD release 5.0R5 built by builder on 2002-03-02 04:43:24 UTC
PFED release 5.0R5 built by builder on 2002-03-02 04:46:06 UTC
CRAFTD release 5.0R5 built by builder on 2002-03-02 04:44:30 UTC
SAMPLED release 5.0R5 built by builder on 2002-03-02 04:52:20 UTC
ILMID release 5.0R5 built by builder on 2002-03-02 04:45:21 UTC
BPRELAYD release 5.0R5 built by builder on 2002-03-02 04:42:41 UTC
RMOPD release 5.0R5 built by builder on 2002-03-02 04:46:11 UTC
jkernel-dd release 5.0R5 built by builder on 2002-03-02 04:41:07 UTC
jroute-dd release 5.0R5 built by builder on 2002-03-02 04:41:21 UTC
jdocs-dd release 5.0R5 built by builder on 2002-03-02 04:39:11 UTC
```

What It Means The sample output shows the hostname, router model, and the different JUNOS software packages, processes, and documents.

Step 2: Log the Hardware Version Information

Action To log the router chassis hardware version information, use the following JUNOS CLI operational mode command:

```
user@host> show chassis hardware | save filename
```

Sample Output The output for the M-series routers varies depending on the chassis components of each router. All routers have a chassis, midplanes or backplanes, power supplies, and Flexible PIC Concentrators (FPCs). Refer to the hardware guides for information about the different chassis components.

```
user@host> show chassis hardware | save test
Wrote 43 lines of output to 'test'
```

```
user@host> show chassis hardware
```

Item	Version	Part number	Serial number	Description
Chassis			101	M160
Midplane	REV 02	710-001245	S/N AB4107	
FPM CMB	REV 01	710-001642	S/N AA2911	
FPM Display	REV 01	710-001647	S/N AA2999	
CIP	REV 02	710-001593	S/N AA9563	
PEM 0	Rev 01	740-001243	S/N KJ35769	DC
PEM 1	Rev 01	740-001243	S/N KJ35765	DC
PCG 0	REV 01	710-001568	S/N AA9794	
PCG 1	REV 01	710-001568	S/N AA9804	
Host 1			da000004f8d57001	teknor
MCS 1	REV 03	710-001226	S/N AA9777	
SFM 0 SPP	REV 04	710-001228	S/N AA2975	
SFM 0 SPR	REV 02	710-001224	S/N AA9838	Internet Processor I
SFM 1 SPP	REV 04	710-001228	S/N AA2860	
SFM 1 SPR	REV 01	710-001224	S/N AB0139	Internet Processor I
FPC 0	REV 03	710-001255	S/N AA9806	FPC Type 1
CPU	REV 02	710-001217	S/N AA9590	
PIC 1	REV 05	750-000616	S/N AA1527	1x OC-12 ATM, MM
PIC 2	REV 05	750-000616	S/N AA1535	1x OC-12 ATM, MM
PIC 3	REV 01	750-000616	S/N AA1519	1x OC-12 ATM, MM
FPC 1	REV 02	710-001611	S/N AA9523	FPC Type 2
CPU	REV 02	710-001217	S/N AA9571	
PIC 0	REV 03	750-001900	S/N AA9626	1x STM-16 SDH, SMIR
PIC 1	REV 01	710-002381	S/N AD3633	2x G/E, 1000 BASE-SX
FPC 2				FPC Type OC192
CPU	REV 03	710-001217	S/N AB3329	
PIC 0	REV 01			1x OC-192 SM SR-2

What It Means The sample output shows the hardware inventory for an M160 router with a chassis serial number of 101. For each component, the output shows the version number, part number, serial number, and description.

Step 3: Log the Active Configuration

Action To log the active configuration on the router, use the following JUNOS CLI operational mode command:

```
user@host> show configuration | save filename
```

Sample Output user@host> show configuration | save test
Wrote 4076 lines of output to 'test'

```
user@host> show configuration
system {
  host-name lab8;
  domain-name juniper.net;
  backup-router 10.1.1.254;
  time-zone America/Los_Angeles;
  default-address-selection;
  dump-on-panic;
  name-server {
    [...Output truncated...]
```

What It Means The sample output shows the configuration currently running on the router, which is the last committed configuration.

Step 4: Log the Interfaces on the Router

Action To log the interfaces on the router, use the following JUNOS CLI operational mode command:

```
user@host> show interface terse | save filename
```

Sample Output user@host> show interface terse | save test
Wrote 81 lines of output to 'test'

```
user@host> show interface terse
Interface      Admin Link Proto Local Remote
at-1/3/0       up    up
at-1/3/0.0     up    up    inet  1.0.0.1    --> 1.0.0.2
               iso
fxp0           up    up
fxp0.0         up    up    inet  10.168.5.59/24
gre            down  up
ipip           down  up
lo0            up    up
lo0.0          up    up    inet  127.0.0.1    --> 0/0
               iso
47.0005.80ff.f800.0000.0108.0001.1921.6800.5059.00
so-1/2/0       up    down
so-1/2/1       down  down
so-1/2/2       down  down
so-1/2/3       down  down
so-2/0/0       up    up
so-2/0/0.0     up    up    inet  1.2.3.4      --> 1.2.3.5
               iso
[...Output truncated...]
```

What It Means The sample output shows summary information about the physical and logical interfaces on the router.

Step 5: Log the BGP, IS-IS, and OSPF Adjacency Information

Purpose The following commands log useful information about the Border Gateway Protocol (BGP), Intermediate System-to-Intermediate System (IS-IS), and Open Shortest Path First (OSPF) protocols. If you have other protocols installed, such as Multiprotocol Label Switching (MPLS), Resource Reservation Protocol (RSVP), or Protocol Independent Multicast (PIM), you also might log summary information for them.

Action To log protocol peer information, use the following JUNOS CLI operational mode commands:

```
user@host> show bgp summary | save filename
user@host> show isis adjacency brief | save filename
user@host> show ospf neighbor brief | save filename
```

Sample Output 1 user@host> show bgp summary | save test
Wrote 45 lines of output to 'test'

```
user@host> show bgp summary
Groups: 1 Peers: 1 Down peers: 0
Table          Tot Paths  Act Paths Suppressed    History Damp State   Pending
inet.0          4          4          0          0          0          0
Peer           AS         InPkt   OutPkt   OutQ   Flaps Last Up/Dwn
State|#Active/Received/Damped...
9.9.3.1         2         2627    2628     0     0   21:50:12 4/4/0
0/0/0
```

Sample Output 2 user@host> show isis adjacency brief | save test
Wrote 10 lines of output to 'test'

```
user@host> show isis adjacency brief
IS-IS adjacency database:
Interface System L State Hold (secs) SNPA
so-1/0/0.0 1921.6800.5067 2 Up 13
so-1/1/0.0 1921.6800.5067 2 Up 25
so-1/2/0.0 1921.6800.5067 2 Up 20
so-1/3/0.0 1921.6800.5067 2 Up 19
so-2/0/0.0 1921.6800.5066 2 Up 19
so-2/1/0.0 1921.6800.5066 2 Up 17
so-2/2/0.0 1921.6800.5066 2 Up 20
so-2/3/0.0 1921.6800.5066 2 Up 20
so-5/0/0.0 ranier 2 Up 17
```

Sample Output 3 user@host> show ospf neighbor brief | save test
Wrote 10 lines of output to 'test'

```
user@host> show ospf neighbor brief
Address      Intf      State      ID          Pri  Dead
10.168.254.225 fxp3.0    2Way       10.250.240.32 128  36
10.168.254.230 fxp3.0    Full       10.250.240.8  128  38
10.168.254.229 fxp3.0    Full       10.250.240.35 128  33
10.1.1.129      fxp2.0    Full       10.250.240.12 128  37
10.1.1.131      fxp2.0    Full       10.250.240.11 128  38
10.1.2.1        fxp1.0    Full       10.250.240.9  128  32
10.1.2.81       fxp0.0    Full       10.250.240.10 128  33
```

What It Means Sample output 1 displays summary information about BGP and its neighbors. Sample output 2 displays information about IS-IS neighbors. Sample output 3 displays information about all OSPF neighbors.

Step 6: Log the System Storage Information

Action To log system storage statistics for the amount of free disk space in the router's file system, use the following JUNOS CLI operational mode command:

```
user@host> show system storage | save filename
```

Sample Output user@host> show system storage | save test
Wrote 14 lines of output to 'test'

```
user@host> show system storage
Filesystem 1K-blocks    Used    Avail Capacity  Mounted on
/dev/ad0s1a    65687    26700    33733    44%      /
devfs           16         16         0    100%    /dev/
/dev/vn1       9310     9310         0    100%    /packages/mnt/jbase
/dev/vn2       8442     8442         0    100%    /packages/mnt/jkernel-5.0R5.1
/dev/vn3      11486    11486         0    100%    /packages/mnt/jpfe-5.0R5.1
/dev/vn4       5742     5742         0    100%    /packages/mnt/jroute-5.0R5.1
/dev/vn5       1488     1488         0    100%    /packages/mnt/jcrypto-5.0R5.1
/dev/vn6        792         792         0    100%    /packages/mnt/jdocs-5.0R5.1
mfs:2373    1015815         3    934547         0%    /tmp
/dev/ad0s1e    25263         11    23231         0%    /config
procfs         4          4         0    100%    /proc
/dev/ad1s1f   9825963   1811085   7228801    20%    /var
```

What It Means The sample output shows statistics about the amount of free disk space in the router's file system. Values are displayed in 1024-byte (1-KB) blocks.

Step 7: Back Up the Currently Running and Active File System

Action To back up the currently running and active file system so that you can recover to a known, stable environment in case there is a problem during the upgrade, use the following JUNOS CLI operational mode command:

```
user@host> request system snapshot
```

Sample Output user@host> request system snapshot
umount: /altroot: not currently mounted
Copying / to /altroot.. (this may take a few minutes)
umount: /altconfig: not currently mounted
Copying /config to /altconfig.. (this may take a few minutes)

The following filesystems were archived: / /config

What It Means The root file system is backed up to /altroot, and /config is backed up to /altconfig. The root and /config file systems are on the router's internal flash drive, and the /altroot and /altconfig file systems are on the router's hard drive.



NOTE: After you issue the `request system snapshot` command, you cannot return to the previous version of the software because the running and backup copies of the software are identical.

Step 8: Download JUNOS Software



NOTE: To download the JUNOS software packages, you must have a service contract and an access account. Try to download the software packages a few days before you intend to install them, as you may need to verify your service contract and access account. If you need help obtaining an account, contact your Juniper Networks sales representative or send an e-mail to logistics@juniper.net.

Action To download the software packages from the Juniper Networks Support Web site, follow these steps:

1. Enter the following site address:

<http://www.juniper.net/support>

The following screen appears.

2. In Login to Support Center, enter your login and password.

The customer support center screen appears.

3. From Download Software, select the M- & T-series link. The Software Download screen appears.

4. From Available Releases, click the software release you want.

The Software to Download screen appears.

5. Click the software bundle you want to download. The Save As screen appears.

6. Click Save to download the software packages. Download the software packages to a server, not to the router.

What It Means Each JUNOS software release consists of the following software packages:

- **jbase**—Additions to the operating system
- **jkernel**—Operating system package
- **jroute**—Software that runs on the Routing Engine
- **jpfe**—Software that runs on the Packet Forwarding Engine
- **jdocs**—Documentation for the software
- **jcrypto**—Security software (in domestic software only)

The packages are also grouped together in a bundle, called **jbundle**. Normally, you use the bundle to upgrade all of the software packages at the same time.



NOTE: If you are upgrading to Release 5.0 from Release 4.x or downgrading from Release 5.0 to Release 4.x, use the **jinstall** package. Otherwise, use the **jbundle** package to upgrade to a new release.

Downgrading from Release 5.0 to Release 4.x can be a two-step process. For more information, see *JUNOS Internet Software System Basics Configuration Guide*.

You also can upgrade the software packages individually but this is not recommended. When upgrading to a new release, you must install the entire bundle; do not upgrade packages individually unless instructed to do so by the Juniper Networks Technical Assistance Center (JTAC).

Two sets of JUNOS software packages are provided: one for customers in the United States and Canada, and another for worldwide customers. The worldwide version does not include any capabilities that provide encryption of data leaving the router. Otherwise, the two packages are identical.

Upgrade JUNOS Software

Purpose As new features become available or as software problems are fixed, you might periodically upgrade the router software.

Steps To Take To upgrade JUNOS software, follow these steps:

1. Copy JUNOS Software to the Router on page 69
2. Add New Software on page 69
3. Start the New Software on page 70

Step 1: Copy JUNOS Software to the Router

Action Copy the software packages from the server to the router. We recommend that you copy them to the `/var/tmp` directory, which is on the rotating medium (hard disk) and is a large file system. Use the following CLI command:

```
user@host> file copy
ftp://username:prompt@ftp.hostname.net/jbundle-package-name
/var/tmp/jbundle-package-name
```

Step 2: Add New Software

Action To add new software packages, use the following JUNOS CLI operational mode command:

```
user@host> request system software add /var/tmp/jbundle-package-name
```

package-name is the full URL to the file and *release-number* is the major software release number; for example, 4.2R1. Before the new software is added, the existing software is automatically deleted.



NOTE: Even though you are adding the new software, the changes do not take effect until the router has completed rebooting.

Sample Output

```
user@host> request system software add /var/tmp/jinstall-5.2R2.3-domestic.tgz
Installing package '/var/tmp/jinstall-5.2R2.3-domestic.tgz'
Auto-deleting old jroute...
Auto-deleting old jdocs...
Auto-deleting old jpfe...
Auto-deleting old jkernel...
Adding JUNOS base software 5.2R2.3
Adding jkernel...
Adding jpfe...
Adding jdocs...
Adding jroute...
NOTICE: uncommitted changes have been saved in
/var/db/config/juniper.conf.pre-install
Saving package file in /var/sw/pkg/jinstall-5.2R2.3-domestic.tgz
```

Step 3: Start the New Software

Purpose After you have added new software packages, you must reboot the router for the new software to take effect.

Action To reboot the router to complete the upgrade, use the following JUNOS CLI operational mode command:

```
user@host> request system reboot
```

After You Upgrade JUNOS Internet Software

Steps To Take To verify that the new version of JUNOS software is running as expected after the upgrade, follow these steps:

1. Compare Information Logged Before and After the Upgrade on page 71
2. Back Up the New Software on page 71

Step 1: Compare Information Logged Before and After the Upgrade

Purpose Compare the operation of the system before and after the upgrade to ensure that everything is working as expected.

Action To obtain system information, use the following JUNOS CLI operational mode commands:

```
user@host> show version
user@host> show chassis hardware
user@host> show configuration
user@host> show interface terse
user@host> show bgp summary
user@host> show isis adjacency brief
user@host> show ospf neighbor brief
user@host> show system storage
```

Compare the information from these commands with the information you logged before the upgrade.

Step 2: Back Up the New Software

Purpose After a week or so, when you are satisfied that the new software is running successfully, we recommend that you back up the upgraded software.

Action To back up the upgraded software, use the following JUNOS CLI operational mode command:

```
user@host> request system snapshot
```

Sample Output The root file system is backed up to /altroot, and /config is backed up to /altconfig. The root and /config file systems are on the router's internal flash drive, and the /altroot and /altconfig file systems are on the router's hard drive.



NOTE: After you issue the `request system snapshot` command, you cannot return to the previous version of the software because the running and backup copies of the software are identical.
