

## Chapter 3

# Installing a Different JUNOS Software Version

This chapter describes how to install a different JUNOS software version on a routing platform—for example, to upgrade from JUNOS 7.6 to JUNOS 8.0.

For information about upgrading from JUNOS 5.x or later to 7.x or later, see the Knowledge Base Asset # 24602 on the Juniper Networks Support Web site at <http://www.juniper.net/support>.



**NOTE:** Downgrading by more than three releases may not be straightforward. In particular, if your routing platform is running JUNOS Release 7.5, you can downgrade directly to Release 7.2, but you cannot downgrade directly to Release 7.1. As a workaround, you can first downgrade to Release 7.2 and then downgrade to Release 7.1. See the release notes for each software release for details.

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For information about JUNOS software media and packages, see “JUNOS Software Media and Packages” on page 1.

This chapter discusses the following topics:

Before installing a different JUNOS software version:

- Confirming That the Current Configuration Is Compatible with the Candidate Software on page 28
- Verifying PIC Combinations on page 28
- Determining Which JUNOS Software Version Is Running on page 29

To install a different JUNOS software version, do one or more of the following:

- Upgrading All Software Packages on page 29
- Upgrading Individual Software Packages on page 33
- Installing the JUNOS Software on Routers with Redundant Routing Engines on page 34

## Confirming That the Current Configuration Is Compatible with the Candidate Software

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When you upgrade or downgrade JUNOS software, we recommend that you include the `validate` option with the `request system software add` command to check that the candidate software is compatible with the current configuration. By default, when you add a package with a different release number, the validation check is done automatically. For more information about the `request system software add` command, see the *JUNOS System Basics and Services Command Reference*.

## Verifying PIC Combinations

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On Juniper Networks routing platforms, you can typically install any combination of Physical Interface Cards (PICs) on a single Enhanced Flexible PIC Concentrator (FPC) or in two PIC slots served by a single Layer 2/Layer 3 Packet Processing application-specific integrated circuit (ASIC).

Newer JUNOS services for some PICs can require significant Internet Processor ASIC memory, and some configuration rules limit certain combinations of PICs if they are installed on some platforms.

During software installation, the configuration checker in the installation program checks the router's PICs. If any configuration rules affect your PIC combinations, the installation process stops and displays a message similar to the following:

```
The combination of PICS in FPC slot 3 is not supported with this release
PIC slot 0 -
PIC slot 1 - 1x OC-12 ATM-II IQ
PIC slot 2 - 1x G/E IQ, 1000 BASE
PIC slot 3 - 1x Link Service (4)
If you continue the installation, one or more PICs on
FPC slot 3 might appear to be online but
cannot be enabled and cannot pass traffic with this release of JUNOS.
See the Release Notes for more information.

WARNING: This installation attempt will be aborted. If you
WARNING: wish to force the installation despite these warnings
WARNING: you may use the 'force' option on the command line.
pkg_add: package /var/tmp/jbundle-7.6R1.x-domestic-signed.tgz fails
requirements - not installed
```

The configuration checker has the following limitations:

- If a PIC is offline when you upgrade the router with new software, the configuration checker cannot detect PIC combinations affected by configuration rules and cannot warn about them.
- If you specify the `force` option when you upgrade the JUNOS software, the configuration checker warns about the affected PIC combination and the software installation continues. However, after rebooting, one or more PICs might fail to initialize.
- The configuration checker looks for combinations of three affected PICs. If an Enhanced FPC contains four affected PICs, the script generates multiple warnings.

If you install a PIC into a router already running JUNOS software, you can identify the presence of affected PIC combinations from messages in the system logging (syslog) file:

```
Feb 6 17:57:40 CE1 feb BCHIP 0: uCode overflow - needs 129 inst space to
load b3_atm2_LSI_decode for stream 12
Feb 6 17:57:41 CE1 chassisd[2314]: CHASSISD_IFDEV_DETACH_PIC:
ifdev_detach_pic(0/3)
Feb 6 17:57:41 CE1 feb BCHIP 0: binding b3_atm2_LSI_decode to stream 12
failed
Feb 6 17:57:41 CE1 feb PFE: can not bind B3 ucode prog b3_atm2_LSI_decode to
FPC 0: stream 12
```

For more information about checking for unsupported PIC combinations, see the corresponding PIC guide for your router, the *JUNOS Release Notes*, and *Technical Support Bulletin PSN-2004-12-002, PIC Combination Notes Summary* on the Juniper Networks Support Web site at <http://www.juniper.net/support/>.

## Determining Which JUNOS Software Version Is Running

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To determine which packages are running on the router and to get information about these packages, use the `show version` operational mode command at the top level of the command-line interface (CLI).

## Upgrading All Software Packages

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To upgrade all software packages, use the `jinstall` package. Follow these steps:

1. Connect to the router console port using an out-of-band connection.

Use an out-of-band connection from the console, because in-band connections are lost during the upgrade process.

2. Back up the currently running and active file system so that you can recover to a known, stable environment in case something goes wrong with the upgrade. The upgrade process using the `jinstall` package removes stored files on the router, except `juniper.conf` and SSH files. To copy the files to the router's hard disk, use the following command:

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

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 flash disk, and the `/altroot` and `/altconfig` file systems are on the router's hard disk.



**NOTE:** After you issue the `request system snapshot` command, the router's flash and hard disks are identical. You can return to the previous version of the software only by booting the router from removable media.

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3. Download the `jinstall` software package from the Juniper Networks Support Web site, <http://www.juniper.net/support/>. Choose the Canada and U.S., Worldwide, or JUNOS-FIPS edition. Place the package on a local server.

To download the `jinstall` package, you must have a service contract and an access account. If you do not have an access account, complete the registration form at the Juniper Networks Web site:

<https://www.juniper.net/registration/Register.jsp>.

4. Copy the `jinstall` package to the router. We recommend that you copy it to the `/var/tmp` directory, which is a large file system on the hard disk.

```
user@host> file copy ftp://username:prompt@ftp.hostname.net/
filename /var/tmp/filename
```

5. Install the new software package, as shown below, where *package-name* is the full filename. *8.x* is the major software release number; for example, 8.0R1. For more information about the `request system software add validate` command, see the *JUNOS System Basics and Services Command Reference*.

```
user@host> request system software add
/var/tmp/jinstall-8.x-jinstall-package-name-signed.tgz validate
Checking compatibility with configuration Initializing...
Using jbase-8.x-package-name
Using /var/tmp/jinstall-8.x-package-name.signed.tgz
Verified jinstall-8.x-package-name.tgz signed by
PackageDevelopment_0 Using
/var/validate/tmp/jinstall-signed/jinstall-8.x-package-name.tgz
Using /var/validate/tmp/jinstall/jbundle-8.x-package-name.tgz
Checking jbundle requirements on /
Using /var/validate/tmp/jbundle/jbase-8.x-package-name.tgz
Using /var/validate/tmp/jbundle/jkernel-8.x-package-name.tgz
Using /var/validate/tmp/jbundle/jcrypto-8.x-package-name.tgz
Using /var/validate/tmp/jbundle/jpfe-8.x-package-name.tgz
Using /var/validate/tmp/jbundle/jdocs-8.x-package-name.tgz
Using /var/validate/tmp/jbundle/jroute-8.x-package-name.tgz
Validating against /config/juniper.conf.gz
mgd: commit complete
Validation succeeded
Installing package
'/var/tmp/jinstall-8.x-package-name-signed.tgz'...
Verified jinstall-8.x-package-name-signed.tgz signed by
PackageDevelopment_0
Pre-checking requirements for jinstall...
Auto-deleting old jinstall...
Deleting saved config files...
Deleting bootstrap installer...
Adding jinstall...

WARNING: This package will load JUNOS 8.x software.
WARNING: It will save JUNOS configuration files, and SSH keys
WARNING: (if configured), but erase all other files and information
WARNING: stored on this machine. It will attempt to preserve dumps
WARNING: and log files, but this can not be guaranteed. This is the
WARNING: pre-installation stage and all the software is loaded when
WARNING: you reboot the system.
Saving the config files...
Installing the bootstrap installer...
```

```
WARNING: A REBOOT IS REQUIRED TO LOAD THIS SOFTWARE CORRECTLY.
WARNING: Use the 'request system reboot' command when software
```

```
WARNING: installation is complete. To abort the installation, do not reboot
WARNING: your system, instead use the 'request system software delete
WARNING: jinstall' command as soon as this operation completes.
```

```
Saving package file in
/var/sw/pkg/jinstall-8.x-package-name-signed.tgz...
Saving state for rollback...
```

6. Reboot the router to start the new software:

```
user@host> request system reboot
Reboot the system? [yes,no] (no) yes
Shutdown NOW!
Reboot consistency check bypassed - jinstall 8.xR1.12 will complete
installation upon reboot

*** FINAL System shutdown message from user@host-re0 ***
System going down IMMEDIATELY
```




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**NOTE:** You must reboot to load the JUNOS software. To reboot, issue the **request system reboot** command when you are finished installing the software.

- To abort the installation, do not reboot your system; instead, finish the installation, then issue the **request system software delete jinstall** command. This is your last chance to stop the installation.
  - If JUNOS software does not install properly, you must install from the removable media. See “Reinstalling the JUNOS Software From Removable Media” on page 41.
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All the software is loaded when you reboot the system. Installation can take between 5 and 10 minutes. The router then reboots from the boot device on which the software was just installed. When the reboot is complete, the router displays the login prompt.

While the software is being upgraded, the Routing Engine on which you are performing the installation is not routing traffic.

7. Log in and verify the version of software running after the router reboots. Issue the **show version** command.
8. Add the optional **jweb** package using the **request system software add** command if you have already downloaded and copied it to the **/var/temp** directory. For more information about the **jweb** package, see “J-Web Package” on page 11.
9. After you have upgraded or downgraded the software and are satisfied that the new software is successfully running, issue the **request system snapshot** command to back up the new software.

The **request system snapshot** command causes the root file system to be backed up to **/altroot**, and **/config** to be backed up to **/altconfig**. The root and **/config** file systems are on the router’s flash disk, and the **/altroot** and **/altconfig** file systems are on the router’s hard disk.



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

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## Upgrading Individual Software Packages

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To upgrade an individual JUNOS software package, follow these steps:

1. Download the software package(s) you need from the Juniper Networks Support Web site, <http://www.juniper.net/support/>. Choose either Canada and U.S. Version or Worldwide Version.

To download the software package(s), you must have a service contract and an access account. If you need help obtaining an account, complete the registration form at the Juniper Networks Web site: <https://www.juniper.net/registration/Register.jsp>.



**NOTE:** We recommend that you upgrade all individual software packages using an out-of-band connection from the console or `fxp0` interface, because in-band connections can be lost during the upgrade process.

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2. Back up the currently running and active file system so that you can recover to a known, stable environment in case something goes wrong with the upgrade:

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

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 flash disk, and the `/altroot` and `/altconfig` file systems are on the router's hard disk.



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

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3. If you are copying multiple software packages to the router, copy them to the `/var/tmp` directory on the hard disk.

```
user@host> file copy ftp://username:prompt@ftp.hostname.net/  
filename /var/tmp/filename
```

4. Add the new software package:

```
user@host> request system software add  
/var/tmp/package-name-signed.tgz validate  
Checking available free disk space...11200k available, 6076k suggested.
```

`package-name` is the full URL to the file.

The system might display the following message:

```
pkg_delete: couldn't entirely delete package
```

This message indicates that someone manually deleted or changed an item that was in a package. You do not need to take any action; the package is still properly deleted.

If you are upgrading more than one package at the same time, add `jbase` first. If you are using this procedure to upgrade all packages at once, add them in the following order:

```
user@host> request system software add /var/tmp/jbase-release-signed.tgz
user@host> request system software add
/var/tmp/jkernel-release-signed.tgz
user@host> request system software add /var/tmp/jpfe-release-signed.tgz
user@host> request system software add /var/tmp/jdocs-release-signed.tgz
user@host> request system software add /var/tmp/jweb-release-signed.tgz
user@host> request system software add
/var/tmp/jroute-release-signed.tgz
user@host> request system software add
/var/tmp/jcrypto-release-signed.tgz
```

5. Reboot the router to start the new software:

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

6. After you have upgraded or downgraded the software and are satisfied that the new software is successfully running, issue the `request system snapshot` command to back up the new software.

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

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 flash disk, and the `/altroot` and `/altconfig` file systems are on the router's hard disk.



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

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## Installing the JUNOS Software on Routers with Redundant Routing Engines

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If the router has two Routing Engines, perform a JUNOS software installation on each Routing Engine separately to avoid disrupting network operation.

Install the new JUNOS software release on the backup Routing Engine while keeping the currently running software version on the master Routing Engine.

After making sure that the new software version is running correctly on the backup Routing Engine, switch over to the newly installed Routing Engine to activate the new software. Finally, install the new software on the new backup Routing Engine.

To install a new version of JUNOS software on a router with redundant Routing Engines, follow these steps:

1. Log in to the master Routing Engine.
2. Enter the JUNOS software configuration mode:

```
{master}
user@host-re0> configure
```

3. Disable Routing Engine redundancy.

```
{master} [edit]
user@host-re0# delete chassis redundancy
```

4. Save the configuration change on both Routing Engines.

```
{master} [edit]
user@host-re0# commit synchronize and-quit
```

5. Log in to the backup Routing Engine:

```
{backup}
user@host-re0> request routing-engine login other routing-engine
```

Notice that the host name changes, because you are now connected to the backup Routing Engine.

6. Install the JUNOS software on the backup Routing Engine. See “Upgrading All Software Packages” on page 29.

```
{backup}
user@host-re1> request system software add validate
/var/tmp/jinstall-8.x-domestic-signed.tgz reboot
```

7. The installation process reboots the router, activates the installation environment, and performs the installation without intervention. When the installation is complete, the backup Routing Engine reboots. During this time, you are logged out of the backup Routing Engine and returned to the master. You will not be able to log back in to the backup Routing Engine until the installation is complete. Use the `request routing-engine login other-routing-engine` command to periodically (every minute) determine whether the installation is complete.
8. Log out of the backup Routing Engine (re1), then switch over to the master Routing Engine (re0):

```
{backup}
user@host-re1> quit
{master}
user@host-re0> request chassis routing-engine master switch
{backup}
user@host-re0>
```

This command causes the backup Routing Engine (re1), on which you just installed the software, to switch to become the master Routing Engine. The master Routing Engine (re0) becomes the backup.

9. Install the new software version on the new backup Routing Engine (re1):

```
{backup}
user @host-re0> request system software add validate
/var/tmp/jinstall-8.x-domestic-signed.tgz reboot
```

10. When the Routing Engine reboots, you are logged out of the router. Log back in after a few minutes and restore the immediately preceding redundancy configuration that existed before you deleted it in Step 3.

```
{backup}
user@host-re0> configure
[edit]
user@host-re0# rollback 1
```

11. Save the configuration change on both Routing Engines

```
[edit]
user@host-re0> commit synchronize and-quit
```

12. After you have installed the new software and are satisfied that the new software is successfully running, issue the `request system snapshot` command to back up the new software on both master and backup Routing Engines.

```
{master}
user@host-re0> request system snapshot
{master}
user@host-re0> request routing-engine login other routing-engine
{backup}
user@host-re1> request system snapshot
{backup}
user@host-re1> quit
```

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 flash disk, and the `/altroot` and `/altconfig` file systems are on the router's hard disk.



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

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