Chapter 3

Installing a Different JUNOS Software Version on a Router

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.

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

This chapter discusses the following topics:

Confirming that Current Configuration Is Compatible with the Candidate Software

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

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

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

Upgrading All Software Packages

To upgrade all software packages, follow these steps:

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

2. Copy stored files on the router to another file system. The upgrade process using the jinstall package removes stored files, except juniper.conf and SSH files on the router.

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 the local server.

   To download the software packages, 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.

NOTE: We recommend that you upgrade all software packages using an out-of-band connection from the console, because in-band connections are lost during the upgrade process.

4. 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 backup copy of the software are identical.

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

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

6. Install the new software package, as shown below, where *package-name* is the full URL to the file. *release-number* 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-7.***x-jinstall-package-name*-**signed.tgz**
   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...
```

7. 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
```

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 doesn't install properly, you must install from the removable media. See "Reinstalling the JUNOS Software From Removable Media" on page 39.

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.

8. Log in and verify the version of software running after the router reboots. Issue the show version command.

9. 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 9.

10. 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.

Upgrading Individual Software Packages

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.

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.

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
   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.

Installing the JUNOS Software on Routers with Redundant Routing Engines

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
   ```

6. Install the JUNOS software on the backup Routing Engine. See "Upgrading All Software Packages" on page 27.

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

   Notice that the host name changed, because you are now connected to the other Routing Engine.

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 backuup 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, then switchover to the other Routing Engine to change the role.

   ```
   {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, on which you just installed the software, become the master Routing Engine. The old master Routing Engine becomes the backup.

9. Install the new software version on the new backup Routing Engine which has become the master.

   ```
   {backup}
   user @host-re0> request system software add
   /var/tmp/jinstall-8.xxx.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 proceeding 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.