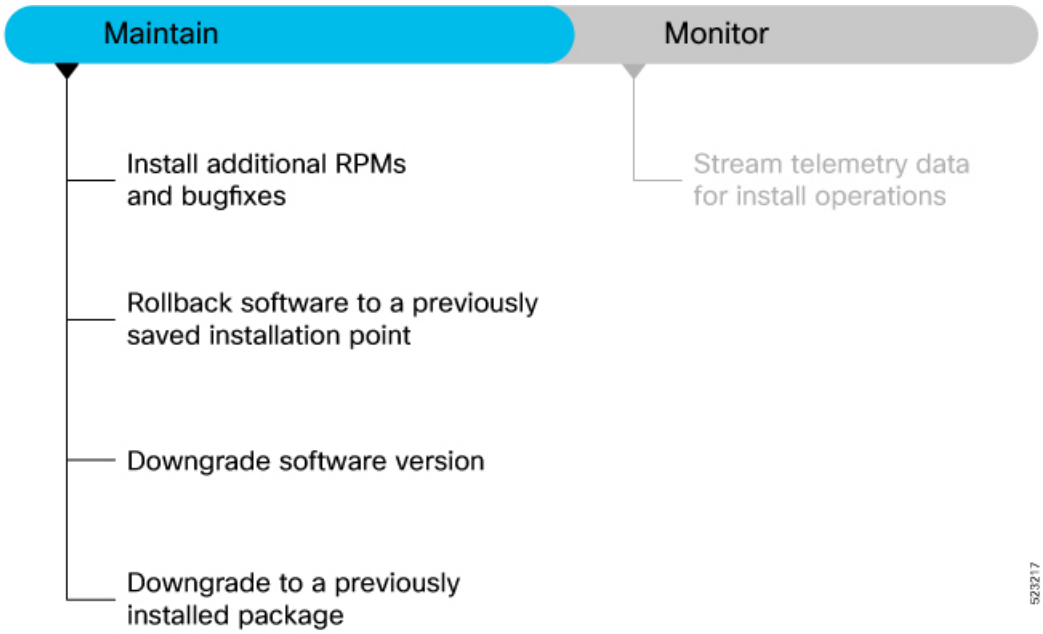
Cisco NCS 1010 software maintenance

Use this reference to review manage the router.

Use the procedures in this section to maintain the router at optimum conditions and monitor the install operation by streaming telemetry data.

- The following workflow shows the tasks involved in managing the software:
- ***Figure 1: Workflow to Manintain and Monitor the Software Installation***



- This section contains the following topics:

Install additional RPMs and bug fixes

Use this task to install additional RPMs and bug fixes.

You can install individual optional packages when new features are added or software problems are fixed.

Before you begin

When you upgrade the Cisco IOS XR software, you can also install or remove optional feature packages (RPMs or bug fixes) *before* applying the changes in the NCS 1010. You can perform this operation while an atomic change is already in progress. However, all packaging operations before this command are discarded.

You can install the packages from a remote repository or copy the files to the NCS 1010. If you are using a remote repository, ensure you have created and configured an external repository to store the packages.

Download the specific additional RPMs and latest bug fix RPMs as tarballs to the repository. If the bug fix has dependencies, we recommend that you create a bug fix tarball that contains all dependencies.The *README* file in the tarball provides relevant information about the bug fix and identifies any dependencies – for example, whether other bug fix RPMs may be required for a complete fix.

Follow these steps to install additional RPMs and bug fixes.

Procedure

Step 1 Complete the install RPMs using command line interface task.

For details, see install RPMs using command line interface.

Step 2 Complete the install RPMs using YANG data model task.

For details, see install RPMs using YANG data model.

Install RPMs using command line interface

Use this task to install RPMs using command line interface.

Optional RPMs and bug fixes are available as TAR files on the

Software Download

page. Starting with Cisco IOS XR Release 24.3.1, you are no longer required to manually extract the RPMs from the TAR file; you can install the bug fix RPM directly from the TAR file.

Before you begin

Follow these steps to install RPMs using command line interface.

Procedure

Step 1 Check the available packages in the repository.

Example:

```
RP/0/RP0/CPU0:ios#show install available

Trying to access repositories...
Package        Architecture        Version            Repository
xr-8000-core    x86_64             7.8.1              remote-repo
xr-core         x86_64             7.8.1              remote-repo
```

Step 2 Install the packages (additional RPMs or bug fixes).

Example:

```
RP/0/RP0/CPU0:ios#install source full-path-to-rpm [all]

RP/0/RP0/CPU0:ios#install source full-path-to-rpm all sync

RP/0/RP0/CPU0:ios#install source http://203.0.113.1;vrf1/repoinfra/install_RPMs.tar

RP/0/RP0/CPU0:ios#install package add <pkg1>
              <pkg2>
              <pkgn>


RP/0/RP0/CPU0:ios#install package upgrade <pkg1>
              <pkg2>
              <pkgn>


RP/0/RP0/CPU0:ios#install apply [reload | restart]

RP/0/RP0/CPU0:ios#show install history last transaction verbose
2023-01-25 05:45:37 UTC    Transaction 87 started
2023-01-25 05:45:37 UTC      Atomic change 87.1 started
2023-01-25 05:45:37 UTC      Packaging operation 87.1.1 started
2023-01-25 05:45:37 UTC    Transaction 87 complete

Least impactful apply method: process restart
```

- **Option 1:** Install RPMs without control over reload operation.

  Note
  This option is not applicable when you downgrade or remove RPMs.

  You can either specify a tarfile (with bug fixes or optional packages), or a repository containing the RPMs. Use this command:

  Specify the **all** keyword if you want to install optional packages. Exclude the **all** keyword if you want to upgrade the packages that are currently installed on the system.

  The *full-path-to-rpm* can be one of the following locations based on where you have saved the files.

  - Local path—files located in or under `/var/xr/disk1/`, `/harddisk:/` or `/misc/disk1/`
  - Remote repository or tar file—`ftp://<server>[;<named-vrf>]/<remote_path>`, `https://<server>[;<named-vrf>]/<remote_path>` or `http://<server>[;<named-vrf>]/<remote_path>`

    If you want to add new packages from this source, you must use the **all** keyword:

Note
If the remote repository is reachable through a named VRF, you must mention the named VRF in the above commands. For example,

where **vrf1** is the named VRF through which the remote repository is accessible.

The operation adds the RPMs and applies the change via `reload` or `restart` operation, whichever is least impactful based on the update.

- **Option 2:** Install RPMs with control over reload operation.

Note
This option is applicable when you downgrade, remove or rollback RPMs.

a. Install RPMs by providing the RPM name, Cisco bug fix ID (example, CSCab12345) or add packages from a specified source. Use the **install package add** command if you want to add new optional packages, else use the **install package upgrade** command.

Or

b. Apply the changes.

You can use the `reload` or `restart` options based on the change that is installed. To determine whether a `reload` or `restart` is required, check the output of **show install request** or **show install history last transaction verbose** command. The output indicates the required actions.

Step 3 Check the status of the install operation.

Example:

```
RP/0/RP0/CPU0:ios#show install request
User request: No user requests found
State:        Success
Current activity:    No install operation in progress

The following actions are available:

    install package add
    install package remove
    install package upgrade
    install package downgrade
    install package replace
    install package rollback
    install replace
    install rollback
    install source
```

Note
Include the keyword

```
noprompt
```

in the commands to enable the system to bypass your permission to reload the NCS 1010.

Step 4 Verify the image and packages are activated successfully.

Example:

```
RP/0/RP0/CPU0:ios# show install request
User request: install package add xr-mcast
Operation ID: 87.1.1
State: Success
```

Step 5 Commit the transaction.

Example:

```
RP/0/RP0/CPU0:ios#install commit
```

Note
The **install commit** command must be executed immediately after software upgrades or SMU installations and before applying any new configuration changes or powering off the device to prevent loss of changes upon reboot.

Install RPMs using YANG data model

Use this task to install RPMs using YANG data model.

Use

```
Cisco-IOS-XR-install-augmented-act.yang
```

data model to install the RPMs or bug fixes.

Before you begin

Follow these steps to install RPMs using YANG data model.

Procedure

Invoke the **install-package-replace** RPC on the data model.

Example:

```
<install-package-replace>
  <source-type>remote</source-type>
  <source>remote-repo</source>
  <file>rpm-file-name</file>
</install-package-replace>
```

```
<install-package-upgrade xmlns=http://cisco.com/ns/yang/Cisco-IOS-XR-install-augmented-act>
  <source-type>ftp</source-type>
  <source>203.0.113.1;vrf1/repoinfra/install_RPMs.tar</source>
</install-package-upgrade>
```

If the install operation lists the repository reachable through a VRF, you must add the VRF name for the operation to be successful.

Downgrade software version

Use this task to downgrade software version.

Downgrade the current software version to a previous software release in case of an upgrade failure or based on requirement.

Note When downgrading the software image from release 24.4.x to an earlier version, we recommend to manually downgrade the line card firmware as well to prevent any impact on various functionalities.

Before you begin

Check the FPD status and ensure that all the FPDs are in `CURRENT` state.

```
RP/0/RP0/CPU0:ios#show hw-module location all fpd
```

If the FPDs are not in `CURRENT` state, upgrade the FPDs.

```
RP/0/RP0/CPU0:ios#upgrade hw-module location all fpd all
```

After all the FPDs are upgraded, reload the NCS 1010.

```
RP/0/RP0/CPU0:ios#reload location all
Proceed with reload? [confirm]
```

After the NCS 1010 reloads, check that all the FPDs are in

```
CURRENT
```

state.

Follow these steps to downgrade software version.

Procedure

Step 1 Determine the supported target versions to downgrade from the current version.

Example:

```
RP/0/RP0/CPU0:ios#show install upgrade-matrix
```

View the hardware or software limitations, and bridging SMUs required for the version downgrade. For more information about checking compatibility between the current and target versions, see

Downgrading Packages:

Customers can also downgrade user-specified packages (for example, xr-telnet). This is separate from downgrading the entire XR version, but an ISO for an earlier version of XR is used instead of a newer ISO.

Step 2 Back up the file system of the current version for recovery purposes.

Example:

Copy the running configuration to the harddisk: directory on the NCS 1010:

```
RP/0/RP0/CPU0:ios#copy running-config harddisk:/running_config-<mmddyyyy>
```

Copy the running configuration to a remote server:

```
RP/0/RP0/CPU0:ios#scp harddisk:/ running_config user@<ip-address>:<location>
```

Step 3 Download the target version from the Software Download Center.

Step 4 You can either install from the remote repository or copy the ISO image file to the /harddisk: of the NCS 1010.

Example:

```
RP/0/RP0/CPU0:ios#scp root@<ip-address>:/<dir>/1010-x64-release.iso harddisk:
```

Step 5 Verify that the MD5 checksum of the copied target file matches with the MD5 value of the source on the Software Download Center.

Example:

```
RP/0/RP0/CPU0:ios#show md5 file /harddisk:/1010-x64-<target-version>.iso
```

Step 6 Install the base image to downgrade the system.

Example:

```
RP/0/RP0/CPU0:ios#install replace /harddisk:/1010-x64-release.iso
```

The image is installed, the changes are applied through a reload or a restart of the system, and commits the changes. However, you do not have control over the timing of the reload or restart —these occur as soon as the package operation completes and the system is ready.

```
RP/0/RP0/CPU0:ios#install package replace /harddisk:/1010-x64-release.iso
```

```
RP/0/RP0/CPU0:ios#install apply [reload | restart]
```

- **Option 1:** Install ISO without control over reload timing.

  If you want to control when your system reloads (management of a network outage), we recommend that you schedule a downgrade window and perform an **install replace** operation, letting the system reload without intervention.

- **Option 2:** Install ISO with control over reload timing.

  a. Install the image.

  b. Apply the changes.

  You can use either the `reload` or `restart` options based on the file that is installed. To determine whether a `reload` or `restart` is required, check the output of **show install request** command. The output indicates the required actions.

Step 7 After the base image is downgraded, install the additional packages. For more information, see Install additional RPMs and bug fixes, on page 2.

During an install operation, if the system reboots unexpectedly or an apply by reload results in the system failing to boot, it automatically recovers to its software state before the current transaction.

Downgrade to a previously installed package

Use this task to downgrade to a previously installed package.

You can downgrade a package to a previously installed version. By default, the subsequent previous version (version previous to the current version) is installed. Also, you can downgrade the software to a specific version of interest. To remove a bug fix RPM from the installed packages, downgrade the package to a version where the fix was not applied.

Note While downgrading, you can choose any previous version, including the base version of the RPM. However, when downgrading a bug fix RPMs, ensure that you also consider all dependencies of the current version.

Bug fix RPM is an upgrade to the existing package. The action of removing a bug fix RPM either removes the entire feature, or fails if the package is mandatory.

You can use the **show install fixes deactivate** command to view information related to removing a bug fix. This command provides information such as the package changes, other bug fixes that get deactivate, instructions for adding packages missing for the bug fix removal to be successful, command for removing the bug fix, and any recommendations, if applicable. See the following example:

Note You can specify any number of DDTS seperated by a space in the **show install fixes deactivate** command. For example, to know the recommendations for removing bug fix for ABC123, DEF456, and GHI789, you can use **show install fixes deactivate ABC123 DEF456 GHI789** command.

The following example shows the package `xr-telnet-24.3.1v1.0.1` is downgraded to `xr-telnet-24.3.1v1.0.0`. The path to source can be a local location or a configured repository.

Before you begin

Ensure you have access to the previously installed package and its source.

Follow these steps to downgrade to a previously installed package.

Procedure

Step 1 Downgrade the package using one of the following options:

Example:

```
RP/0/RP0/CPU0:ios#install package downgrade xr-telnet

RP/0/RP0/CPU0:ios#install apply [reload | restart]

RP/0/RP0/CPU0:ios#install source <path-to-source> xr-telnet-24.3.1v1.0.0

<install>
 <packages>
   <packagename>xr-telnet-24.3.1v1.0.0
```

```
            xr-telnet-24.0.11v1.0.0
            xr-telnet-24.4.1v1.0.0
</packagename>
 </packages>
   <source>file://<path-to-source>/</source>
</install>
```

- Downgrade the package where the fix was applied. When multiple older versions of the package are present in the configured repositories, the immediate previous version of the package is installed. Use caution when using this command as the current version of the package is removed completely.

  Apply the changes.

  Note
  To identify whether to reload the NCS 1010 or restart the affected processes as part of the apply operation, use either **show install history last transaction verbose** command or **show install request** command.

- Install a specific earlier version of the optional package. The changes are applied automatically.

  Note
  An automatic change may trigger a reload of the NCS 1010 depending on the package being downgraded.

- Use `install` RPC on the `Cisco-IOS-XR-install-act.yang` data model. Here is an example usage with a local repository:

  The package version `xr-telnet-24.3.1v1.0.1 xr-telnet-24.0.11v1.0.1 xr-telnet-24.3.1v1.0.1` is downgraded to `xr-telnet-24.3.1v1.0.0 xr-telnet-24.0.11v1.0.0 xr-telnet-24.4.1v1.0.0`.

Step 2 Commit the operation.

Example:

```
RP/0/RP0/CPU0:ios#install commit
```

Note
The **install commit** command must be executed immediately after software upgrades or SMU installations and before applying any new configuration changes or powering off the device to prevent loss of changes upon reboot.

Telemetry sensor paths for install operations

Use this reference to review stream telemetry data for install operations.

The following information supports stream telemetry data for install operations:

- To stream telemetry data that is related to software installation, you must create subscriptions to the sensor paths in the YANG data models. See *Obtain Data Models for Install Operation* for the list of supported data models. For information about establishing a telemetry session and creating subscriptions, see the

Stream Telemetry Data About	Description	YANG Path
Summary of active packages	Data is streamed after a successful **apply** operation. An active package is the software currently running on the system.	`Cisco-IOS-XR-install-oper: install/packages/active/summary`
Summary of committed packages	Data is streamed after a successful **commit** operation. A package that is committed remains active following a system reload.	`Cisco-IOS-XR-install-oper: install/packages/committed/summary`
Status of the last request operation	Data is streamed when starting a new request and also when entering an `idle` state. If the operation has failed, this includes error messages along with recovery state.	`Cisco-IOS-XR-install-oper: install/request`
Image version and GISO label	Data is streamed after a successful **apply** operation.	`Cisco-IOS-XR-install-oper: install/version`
Packaging information	Data is streamed at the start and end of a packaging operation.	`Cisco-IOS-XR-install-augmented-oper: install/history/latest-packaging-operation`
Atomic information	Data is streamed at the start and end of **apply** operation.	`Cisco-IOS-XR-install-augmented-oper: install/history/latest-atomic-change`
Transaction information	Data is streamed at the start, in progress, and end of a **commit** operation. **Note** After a transactional rollback, some of the data such as summary of active packages, image version can change. However, telemetry events are not sent after the reload operation.	`Cisco-IOS-XR-install-augmented-oper: install/history/latest-transaction`