

Release Notes for NorthStar Controller/Planner

Release 4.3.0
11 May 2020

These release notes accompany Juniper Networks NorthStar Controller/Planner Release 4.3.0.

Contents	Introduction 2
	Contents of this Release 3
	New Features 3
	PCEP-Provisioned P2MP Groups 3
	EPE 4
	NorthStar Planner Web UI, Phase 1 5
	Container LSP 6
	BGP Monitoring Protocol 6
	Changes in Behavior 6
	Known Behavior 8
	Known Issues 11
	Resolved Issues 12
	Requesting Technical Support 13
	Self-Help Online Tools and Resources 13
	Creating a Service Request with JTAC 14
	Revision History 14

Introduction

The Juniper Networks NorthStar Controller is an SDN controller that enables granular visibility and control of IP/MPLS flows in large service provider and enterprise networks. Network operators can use the NorthStar Controller to optimize their network infrastructure through proactive monitoring, planning, and explicit routing of large traffic loads dynamically based on user-defined constraints.

The NorthStar Controller 4.3.0 release is fully supported (all features) with Junos OS Release 18.4R2 and later. [Table 1 on page 2](#) lists feature-specific Junos OS requirements.

Table 1: Feature-Specific Junos OS Requirements

NorthStar Feature	Compatible Junos OS Releases
Analytics	15.1F6 and later
Segment Routing (SPRING), MD5 authentication for PCEP, P2MP, Admin groups	17.2R1 and later
PCEP-Provisioned P2MP Groups	18.3R2 and later
EPE	18.4R2 and later

NOTE: The Path Computation Element Protocol (PCEP) configuration on the PCC routers does not persist across upgrades when the SDN package is not part of the installation binary. Before upgrading the Junos OS image to this release, save the existing configuration to a file by using the **save** command. After you upgrade the Junos OS image on each PCC router, use the **load override** command to restore the PCEP configuration.

The NorthStar Controller is supported on the following Juniper platforms: M Series, T Series, MX Series, PTX Series, and QFX10008. As of Junos OS Release 17.4R1, NorthStar Controller is also supported on QFX5110, QFX5100, and QFX5200. Please contact JTAC for more information.

Junos OS supports Internet draft draft-crabbe-pce-pce-initiated-lsp-03 for the stateful PCE-initiated LSP implementation (M Series, MX Series, PTX Series, T Series, and QFX Series).

Contents of this Release

Table 2 on page 3 describes the downloadable files.

Table 2: NorthStar Controller 4.3.0 Downloadable Files

File	Description
NorthStar Application NOTE: E-signature also available.	Northstar_Bundle_4_3_0.tar.gz
NorthStar JunosVM NOTE: E-signature also available.	northstar_junosvm_4_3_0.tar.gz

NOTE: VMDK installation is also supported, but the files needed for this type of installation are not available on the NorthStar software download page. Please request the files from your account team or NorthStar Product Line Manager.

New Features

The following new features are introduced in NorthStar Release 4.3.0:

PCEP-Provisioned P2MP Groups

P2MP groups can now be provisioned using PCEP (as an alternative to NETCONF), which offers two key advantages:

- Real-time reporting
- Automatic rerouting of sub-LSPs around points of failure

NOTE: This feature requires that you use Junos OS Release 18.3R2 or later. See the **Known Behavior** section for known behaviors and limitations related to this feature in NorthStar Controller Release 4.3.0.

The following functionality is supported in this release:

- Add PCEP P2MP groups
- Delete PCEP P2MP groups
- Modify the following PCEP P2MP group attributes:
 - Bandwidth
 - Setup
 - Hold
- Remove sub-LSPs via the Tunnel tab of the network information table
- Automatically reroute sub-LSPs around points of failure
- Use the Modify P2MP Group window to add or remove sub-LSPs, or modify certain parameters (bandwidth, setup priority, hold priority)

For PCEP-provisioning, configure the following Junos OS statements on the router:

```
set protocols pcep pce pce-id p2mp-lsp-report-capability
```

```
set protocols pcep pce pce-id p2mp-lsp-update-capability
```

```
set protocols pcep pce pce-id p2mp-lsp-init-capability
```

For more information, see *Provision and Manage P2MP Groups* in the *NorthStar Controller User Guide*.

EPE

Egress Peer Engineering (EPE) allows users to steer egress traffic to peers external to the local network, by way of egress ASBRs. NorthStar Controller uses BGP-LS and the SIDs to the external EPE peers to learn the topology. Segment Routing is used for the transport LSPs.

In NorthStar 4.3, only manual steering of traffic is supported. NorthStar uses netflowd to create the per-prefix aggregation of traffic demands. Netflowd processes the traffic data and periodically identifies the Top N demands which, based on congestion, are the best candidates for steering. These demands are displayed in the network information table, Demand tab.

Traffic steering involves creating a colored SRTE LSP and then mapping that LSP to traffic demands via PRPD.

NorthStar EPE functionality requires the following:

- The Junos OS Release must be 18.4R2 or later.
- Netflow must be configured on the router.
- For NorthStar Controller, the following must be enabled:
 - NETCONF
 - PRPD client
 - Netflow processes must be running on NorthStar

For more information, see *NorthStar Egress Peer Engineering* in the *NorthStar Controller User Guide*.

NorthStar Planner Web UI, Phase 1

We are introducing a web UI for NorthStar Planner that will, in time, be full-featured. For this release, we are providing both the existing Java client based Planner and Phase 1 of the web UI Planner. NorthStar Planner is not a standalone application and must be used together with NorthStar Controller.

Launch the web Planner from the NorthStar landing page by selecting **Planner** from the drop-down menu. The Java client based Planner is also available from the landing page by selecting **Planner Desktop**.

The Web UI Planner Phase 1 provides the following features:

- **Network Browser** where the user can view saved and archived networks and select one to open. The Network Browser view is opened by default when the Planner is launched.

Archived networks are generated in the NorthStar Controller and saved, after which, they are available in the NorthStar Planner under the Archived Networks tab.
- **Topology** view for the open network, with an interactive topology map, network information table, and left pane display options.
- **Dashboard** view which currently contains only the Devices widget. The Devices widget shows the relative number of devices of each type included in the network.
- **Failure Simulation** tool which allows you to run failure analysis using path provisioning that simulates the hardware's implementation of bandwidth allocation and demand routing on the existing topology.

Using this tool, you can design a simulation that uses a single, double, or triple exhaustive failure combination, using network element types of your choice.

- **Report Manager** which provides both configuration and simulation reports. Configuration reports are available after running device collection tasks in the NorthStar Controller. Simulation reports are available after running a simulation in NorthStar Planner.

For full documentation of the web Planner, see the *NorthStar Planner Web UI User Guide*.

Container LSP

A new task type, Container Normalization Task, is available in the NorthStar Controller UI Task Scheduler to enable periodic container LSP normalization. The task computes aggregated bandwidth for each container LSP and sends it to the NorthStar Path Computation Server (PCS). The PCS determines whether it needs to add or remove sub-LSPs belonging to the container LSP, based on its new aggregated bandwidth.

Other than requiring this task in the NorthStar UI, the container LSP feature is only accessible through the REST API.

For information about the container LSP feature, see the NorthStar REST API documentation.

BGP Monitoring Protocol

BGP Monitoring Protocol (BMP) is available in NorthStar 4.3 as an alternative to NTAD for topology acquisition. BMP is a standard protocol which is also supported by other vendors allowing NorthStar to connect directly to a third party router. The third party router needs to support BGP-LS and BMP, and receive topology via BGP-LS. It may or may not be configured as a route reflector. NorthStar can obtain the topology information from the BGP-LS data through BMP.

When using BMP, only traffic engineering entries (from the TED) are available. NTAD also provides IGP entries if the router is peering with the IGP area. Topology data learned via IGP is not available through BMP.

See *Configuring Topology Acquisition* for information on enabling BMP.

Changes in Behavior

The following changes in behavior are introduced with NorthStar Controller Release 4.3.0.

- Netflow Aggregation Parameter Values Have Changed

Between NorthStar Controller Release 4.2.0 and 4.3.0, the possible values for the `netflow_aggregate_by_prefix` parameter changed. If you are upgrading to Release 4.3, you must edit the parameter in the `/opt/northstar/data/northstar.cfg` file to reflect a valid Release 4.3.0 value.

To edit the value, perform the following steps:

1. SSH to the NorthStar server.
2. Using a text editor such as `vi`, edit the `netflow_aggregate_by_prefix=` statement in the `/opt/northstar/data/northstar.cfg` file as follows:
 - If you had the value set to **1** in NorthStar Controller Release 4.2.0, change the value to **always**.
 - If you had the value set to **0** in NorthStar Controller Release 4.2.0, change the value to **disabled**.
3. Manually restart the netflowd process:

```
[root@northstar]# supervisorctl restart analytics:netflowd
```

- There is a change in the CentOS and Red Hat Enterprise Linux minimal ISO starting with version 7.0. We still recommend you use the minimal ISO, but if you use CentOS or Red Hat 7.x, install the following utilities as well:

```
yum -y install net-tools
yum -y install bridge-utils
```

It is no longer necessary to install `psmisc`, as it was in NorthStar 4.2.0.

- If you are upgrading to NorthStar 4.3 from a previous NorthStar version *and you are not using analytics*, you can upgrade using the procedure described in *Installing the NorthStar Controller 4.3.0*.

If you *are* using NorthStar analytics, you must manually upgrade to NorthStar 4.3 using the procedure described *Upgrading to NorthStar 4.3 from a Previous Version with Analytics*.

- The behavior of delay base rerouting has changed. It no longer relies on link delay to trigger the violation checking. Instead, PCS periodically calculates the LSP delay and reroutes if the delay exceeds the maximum delay of the LSP. The global parameter for delay increase threshold has been removed. The threshold in the modify link window is still visible, but it is not recommended that you use it. It will be removed in a future release.
- If you are running Junos OS Release 19.x or later (releases that are RFC 8231/8281 compliant) you have two options for ensuring compatibility with NorthStar:
 1. **Run in RFC 8231 Mode:** Create/edit the `pcc_version.config` file on the NorthStar server to include the IP addresses of all PCCs in the topology.

For each IP address, specify **2** as the PCC version. PCC version 2 sets IANA code points for Association, S2LS Objects, and P2MP-IPv4-Lsp-Identifier TLV. This also makes the system compliant with RFC 8231/8281.

NOTE: The IP address should be the PCC IP used to establish the PCEP session. This is the IP address the PCC uses as the local IP address and is the same as appears in the PCC_IP field in the web UI device profile for the device.

The **pcc_version.config** file is located in **/opt/pcs/db/config/**. The syntax of the configuration is **ver=ip_address:pcc_version**.

For example:

```
[root@northstar]# cat /opt/pcs/db/config/pcc_version.config
ver=192.0.2.100:2
ver=192.0.2.200:2
ver=192.0.2.215:2
```

NOTE: To ensure the changes take effect, either update the **pcc_version.config** file before launching NorthStar, or run **supervisorctl restart northstar:pceserver**.

2. **Run in Compatibility Mode** (if you do not want to use RFC 8231/8281 compliance and IANA code points for Association, S2LS Objects, and P2MP-IPv4-Lsp-Identifier TLV): On each of the routers, configure the following statements:

```
set protocols pcep object-class association-old-value
set protocols pcep object-class s2ls-old-value
set protocols pcep tlv-type p2mp-ipv4-lsp-identifier-old-value
set protocols pcep stateful-draft-07-compliant
```

Known Behavior

The following behaviors are known to occur in NorthStar Controller Release 4.3.0:

- Behaviors Related to P2MP Functionality:
 - You cannot have PCEP-provisioned and NETCONF-provisioned P2MP groups with the same name:

- If you do, the NETCONF-provisioned group takes precedence and the PCEP-provisioned group fails.
- The Tunnel tab of the network information table displays additional entries, for sub-LSPs of the P2MP group that fails. The Controller Status column for these entries indicates “Can’t modify PCC-controlled lsp”, and the Op Status column indicates “Unknown”. In a future NorthStar release, these extra entries will not be created. Instead, the user will be blocked from creating PCEP-provisioned and NETCONF-provisioned P2MP groups with the same name.
- NorthStar automatically reroutes PCEP P2MP groups around a network element failure. After the failed element comes back up, the group might not be automatically restored to the original path, even if the user chooses to optimize LSP paths. In a future NorthStar release, the concept of what constitutes an optimal P2MP group will be addressed.
- Behaviors and limitations related to PCEP-provisioned P2MP Groups:
 - See the description of this feature in New Features for a list of functionality supported in this release. No other functionality is supported at this time.
 - This feature requires that you use Junos OS Release 18.3R2 or later, in which the following Junos OS PRs have been fixed:
 - Junos OS PR 1412649

The fix for this PR enables you to define a separate template for P2MP (separate from the one used for P2P), one that does not allow “adaptive” to be configured. To define the new template, configure the following statements on the head end PE of the PCE-initiated P2MP LSP:

```
set protocols mpls lsp-external-controller pccd label-switched-path-template
pccd_default_template
set protocols mpls label-switched-path pccd_default_template template
set protocols mpls label-switched-path pccd_default_template adaptive
set protocols mpls lsp-external-controller pccd label-switched-path-p2mp-template
pccd_p2mp_default_template
set protocols mpls label-switched-path pccd_p2mp_default_template template
set protocols mpls label-switched-path pccd_p2mp_default_template p2mp
```

- Junos OS PR 1412490

The fix for this PR ensures that deletion of P2MP PCEP branches is properly reported.
- Junos OS PR 1358245 (not specific to P2MP).

The fix for this PR ensures that segment routing (SR) path names are properly reported in Junos OS Release 18.3R2.
- When viewing P2MP groups in the network information table, be aware that the refresh button at the bottom of the table periodically turns orange to prompt you for a refresh. When you click the refresh button, the web UI client retrieves the latest P2MP sub-LSP status from the NorthStar server.
- Re-provision LSPs issue for NETCONF P2MP:

- For a NETCONF-provisioned P2MP tree, reprovisioning individual sub-LSPs to go around a failed link can fail under the following conditions:
 - The user reprovisions sub-LSPs separately.
 - The user has a mixture of sub-LSPs with a user-specified strict path and paths computed by NorthStar.
- The workflow is to reprovision all sub-LSPs of a tree together; NorthStar computes sub-LSPs of a tree as a whole, not individually.
- Behaviors and limitations related to NETCONF Provisioning of LSPs and Binding SID Support:
 - Automatic rerouting of NETCONF-provisioned LSPs (including NETCONF-provisioned SR LSPs) due to a failure in the network is not supported.
 - The Preview Path button in the Provision LSP window may return a “Cannot find a path!” error message when in fact a path was found and the SR LSP was successfully provisioned. The error message occurs for certain scenarios such as when an SR LSP makes use of a binding SID SR LSP (privateForwardingAdjacency).
- During PCE initiated LSP, some Cisco routers configured with IOS-XR version can return an error code for an unknown reason. Currently NorthStar Application only reports “NS_ERR_GENERIC” when this issue happens. It is planned to improve this behavior and report the exact error code (e.g. PCEP Error Type = 24 error value = 2) in future releases.
- In rare case, you might get an empty result in the network information table, Service tab for both summary and detailed information, for example, after a system upgrade. If this happens, you can resolve it by restarting the web process:

```
supervisorctl restart infra:web
```

- Netflow Collector: It can happen that during a NorthStar upgrade from NorthStar 4.x to NorthStar 4.3, netflowd cannot be started. If netflowd fails to start, run the following command on the system hosting the netflowd collector:

```
sudo -u pcs /opt/northstar/thirdparty/python/bin/pip -q install --upgrade --no-deps
--force-reinstall /opt/pcs/lib/python/*.whl
```

After running the command, restart the Netflow process:

```
supervisorctl restart netflow:netflowd
```

Known Issues

Table 3 on page 11 lists known issues in NorthStar Controller Release 4.3.0. The identifier associated with each entry is the tracking number in the Juniper Networks Problem Report (PR) tracking system.

Table 3: Known Issues in NorthStar Controller 4.3.0

Identifier	Description
NA	NorthStar web UI Planner: Network spec files will be overwritten if an existing network name exists when using Save or Save As. A warning dialog appears if an existing name is found using Save As.
NA	NorthStar web UI Planner: If a user leaves the browser open without activity for a period of time, the session may get disconnected and not be able to fully resume later. As a result, some UI operations may not response properly. The workaround is to use the close network menu option and reopen the network.
NA	The binding SID SR LSP name specified in NorthStar 4.3.0 release must not contain the "-" character. For example, "bsid-between-P3-ASBR12" would be an invalid name where as "bsid_between_P3_ASBR12" would be valid. This issue will be fixed in a future release.
NA	<p>When a user modifies device interface IP addresses resulting in ISIS adjacency or OSPF neighbor migration, there could be additional links created in NorthStar due to transient states being advertised into NorthStar.</p> <p>For example, suppose an ISIS adjacency is formed between interface IP address of 10.11.11.1 and 10.11.11.2, and the user modifies the device interface IP addresses to 10.11.11.5 and 10.11.11.6. In NorthStar, there might be three links displayed, each representing the ISIS adjacency:</p> <ul style="list-style-type: none"> • The original adjacency of 10.11.11.1 and 10.11.11.2 in DOWN state • The transient adjacency of 10.11.11.5 and 10.11.11.2 in DOWN state • The new adjacency of 10.11.11.5 and 10.11.11.6 in UP state <p>The original and transient adjacencies are harmless to NorthStar path computation, as they are in DOWN state. The user can manually delete them to clean up the topology view.</p>
NA	When deleting a NETCONF-provisioned P2MP sub-LSP using the Modify P2MP Group window, the following error is displayed: "Invalid Request : Cannot read property '_TYPE' of null". The sub-LSP is successfully deleted, regardless of this error. You reach the Modify P2MP Group window by selecting a group on the P2MP Group tab of the network information table and clicking the Modify button at the bottom of the table. You delete a sub-LSP by removing a Node Z from the Node Z list.

Table 3: Known Issues in NorthStar Controller 4.3.0 (*continued*)

Identifier	Description
1421093	Junos OS: A user can configure template in the router and map that template with an external controller. Router inherits the required configuration from the template and then provisions the external controller initiated LSP. Unbinding the template from the external controller or changing template configuration might trigger deletion of the PCE initiated LSPs (only LSPs which are using that particular template). Later, the LSPs are re-provisioned by external controller.
1419356	Junos OS: An RPD core is observed when a user deactivates a template configuration.
1420702	Junos OS: PCE-initiated P2MP LSP goes through a make-before-break when the user modifies the template configuration in the router—even if that template is not mapped to an external controller.
1421106	Junos OS: When a PCE initiated P2MP LSP is created, the LSP is not created with the template bandwidth. The user has to deactivate and activate the template bandwidth, causing the LSP to be recreated with the configured template bandwidth.

Resolved Issues

[Table 4 on page 12](#) lists resolved issues in NorthStar Controller Release 4.3.0. The identifier associated with each entry is the tracking number in the Juniper Networks Problem Report (PR) tracking system.

Table 4: Resolved Issues in NorthStar Controller 4.3.0

Identifier	Description
1391693	After an interruption due to network issues, node hostnames were missing and LSP provisioning from the NorthStar UI failed.
1415782	LSPs were rerouted based on incorrect interface utilization information.
1392301	Duplicated inter-AS nodes and inter-AS links were down.
1392985	LSPs were not being refreshed properly via the NorthStar UI, and tunnels were slow to refresh and display on Tunnel tab of the network information table.
1396404	Requests to provision LSPs through the inter-AS were being rejected.
1414695	Database initialization failed during the upgrade.

Table 4: Resolved Issues in NorthStar Controller 4.3.0 (continued)

Identifier	Description
1418521	PCServer abrupt restart.
1397168	Link latency collection tasks skipped nodes due to a name change.
1420684	LSP hourly traffic graph showed incorrect values.
1403786	Many LSPs showed OP Status as “Unknown” in network information table Tunnel tab.
1421180	Duplicate ASBR nodes in the network model caused NorthStar to reprovision LSPs that transit via the ASBR node.
1423613	After executing Reset Network Model, the inter-AS link state was reported as down when it was actually up. This caused unnecessary path changes since there was no failure.

Requesting Technical Support

Technical product support is available through the Juniper Networks Technical Assistance Center (JTAC). If you are a customer with an active Juniper Care or Partner Support Services support contract, or are covered under warranty, and need post-sales technical support, you can access our tools and resources online or open a case with JTAC.

- JTAC policies—For a complete understanding of our JTAC procedures and policies, review the *JTAC User Guide* located at <https://www.juniper.net/us/en/local/pdf/resource-guides/7100059-en.pdf>.
- Product warranties—For product warranty information, visit <https://www.juniper.net/support/warranty/>.
- JTAC hours of operation—The JTAC centers have resources available 24 hours a day, 7 days a week, 365 days a year.

Self-Help Online Tools and Resources

For quick and easy problem resolution, Juniper Networks has designed an online self-service portal called the Customer Support Center (CSC) that provides you with the following features:

- Find CSC offerings: <https://www.juniper.net/customers/support/>
- Search for known bugs: <https://prsearch.juniper.net/>

- Find product documentation: <https://www.juniper.net/documentation/>
- Find solutions and answer questions using our Knowledge Base: <https://kb.juniper.net/>
- Download the latest versions of software and review release notes:
<https://www.juniper.net/customers/csc/software/>
- Search technical bulletins for relevant hardware and software notifications:
<https://kb.juniper.net/InfoCenter/>
- Join and participate in the Juniper Networks Community Forum:
<https://www.juniper.net/company/communities/>
- Create a service request online: <https://myjuniper.juniper.net>

To verify service entitlement by product serial number, use our Serial Number Entitlement (SNE) Tool:
<https://entitlementsearch.juniper.net/entitlementsearch/>

Creating a Service Request with JTAC

You can create a service request with JTAC on the Web or by telephone.

- Visit <https://myjuniper.juniper.net>.
- Call 1-888-314-JTAC (1-888-314-5822 toll-free in the USA, Canada, and Mexico).

For international or direct-dial options in countries without toll-free numbers, see
<https://support.juniper.net/support/requesting-support/>.

Revision History

11 May 2020—Changed name to Controller/Planner to more clearly indicate the release notes document covers both.

5 April 2019—NorthStar Controller Release 4.3.0.

Juniper Networks, the Juniper Networks logo, Juniper, and Junos are registered trademarks of Juniper Networks, Inc. in the United States and other countries. All other trademarks, service marks, registered marks, or registered service marks are the property of their respective owners.

Juniper Networks assumes no responsibility for any inaccuracies in this document. Juniper Networks reserves the right to change, modify, transfer, or otherwise revise this publication without notice.