

Release Notes for NorthStar Controller/Planner

Release 5.0.0
7 September 2020

These release notes accompany Juniper Networks NorthStar Controller/Planner Release 5.0.0.

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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 5.0.0 release is fully supported (all features) with Junos OS Release 19.2R1 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
Bandwidth sizing and container LSPs for SR-TE LSPs	19.2R1 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 5.0.0 Downloadable Files

File	Description
NorthStar Application NOTE: E-signature also available.	Northstar_Bundle_5_0_0.tar.gz
NorthStar JunosVM NOTE: E-signature also available.	northstar_junosvm_5_0_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 5.0.0:

Create Multiple LSPs with Identical Design Parameters

In the Provision LSP window of the NorthStar Controller web UI, **Count** and **Delimiter** fields have been added to the Advanced tab to enable creation of multiple parallel LSPs between two endpoints. These LSPs share the same design parameters as specified in the Provision LSP window Design tab.

When you create multiple LSPs using this feature, NorthStar names the LSPs using the Name you entered in the Properties tab and appending the delimiter value plus a unique numerical value beginning with 1 (myLSP_1, myLSP_2, for example).

NOTE: The Delimiter field is only available when the count value is greater than one.

This is different from using Provision Multiple LSPs where the Design parameters are configured separately for each LSP created.

For more information, see *Provision LSPs* in the *NorthStar Controller User Guide* for more information.

Support for IS-IS Overload Bit

When a device has the overload bit set, it might be at risk of going down. Putting such devices under maintenance and routing traffic around them until the issue is resolved is a preventive measure. Rather than manually monitoring for the overload bit, NorthStar supports automatically creating and completing maintenance events for devices that have the overload bit set. NorthStar discovers the overload bit setting via either NTAD or BMP.

NOTE: Not all Junos OS releases set the overload bit properly when sending node advertisement to NorthStar. The Junos VM bundled with NorthStar Release 5.0 does not support setting the overload bit. If you want to use this feature with NorthStar Release 5.0 and the bundled JunosVM, you can use BMP instead of NTAD.

The automation is accomplished by way of a Network Maintenance task you set up in the Task Scheduler (**Administration > Task Scheduler**). The task runs periodically, creating and completing maintenance events as necessary, for nodes with the overload bit set.

For more information, see *Maintenance Events* in the *NorthStar Controller User Guide* for more information.

NorthStar Web Planner Enhancements

The NorthStar Planner web UI continues to evolve, taking on more functionality previously available only in the Java Client UI. This list highlights the enhancements for the 5.0 release:

- Demands can be viewed in the network information table. This is a new tab, added to the Nodes, Links, Tunnels, and Interfaces tabs that were previously available.
- The Network Browser options are now Sessions, My Networks, Shared, and Archives. The differences between these types of networks and how you can interact with them is described in the *NorthStar Planner Web UI Guide*.

- From the top menu bar, you can now load network spec files, switch between Tunnel Layer and Layer 3, and update the network (the update network icon changes color when your view of the network is no longer current).
- An Import Network Wizard is now available to create networks.
- Filtering options in the network information table are enhanced.
- Simulation is performed on whichever layer (Tunnel Layer or Layer 3) you selected from the top menu bar.

For more information about these enhancements and all web Planner functionality, see the *NorthStar Planner Web UI Guide*.

Support for Cisco Model Driven Telemetry

NorthStar Controller supports Cisco Model Driven Telemetry (MDT) as an alternative to SNMP collection of interface and LSP traffic data for Cisco devices. SNMP collection is relatively slow (polling intervals greater than five minutes) and costly. NorthStar's MDT Collector performs network monitoring by continuously processing telemetry streams from the Cisco devices in the network.

MDT must be configured on the IOS-XR devices for which you intend to collect data. In the NorthStar web UI Task Scheduler, you can exclude MDT-supported devices from SNMP-based collection. You should not have both SNMP collection and MDT enabled for the same devices.

For more information, see *Support for Cisco Model Driven Telemetry* in the *NorthStar Controller User Guide* for more information.

Container LSPs Now Available in the Web UI

A container LSP is a logical grouping of sub-LSPs that share the properties defined in the container. Container LSPs provide automatic adding or removing of sub-LSPs based on traffic statistics. This mitigates the difficulty of finding a single path large enough to accommodate a large bandwidth reservation.

In NorthStar Release 4.3, container LSP functionality was added to the REST API. In that release, the only task that was done in the web UI was to create the container normalization task in the NorthStar Controller UI Task Scheduler. 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.

In NorthStar Release 5.0.0, you can also create container LSPs in the web UI, as well as view container LSPs, LSP traffic, and sub-LSPs in the network information table.

For more information, see *Bandwidth Management* in the *NorthStar Controller User Guide*.

Network Cleanup Task

You can run a task from the Task Scheduler (**Administration** > **Task Scheduler**) to clean up the network. Automating this process by scheduling the cleanup task to run periodically can be especially time-saving in large networks. The following options are available:

- Purge links that are down
- Purge links with user attributes that are down (having user attributes would otherwise protect them from removal)
- Purge nodes that are down

See *Network Cleanup Task* in the *NorthStar Controller User Guide* for more information.

PCEP Version to Support RFC 8231/8281

When you configure a device profile, NorthStar automatically creates a corresponding entry in the **pcc_version.config** file in **/opt/pccs/db/config/** on the NorthStar server. The entry it creates reflects the PCEP version you configured in the device profile (in the General tab)—either non-RFC or RFC-compliant.

The RFC-Compliant option in the device profile sets the **pcc_version** to 2. A **pcc_version** setting of 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: You must be using Junos OS Release 19.x or later to run NorthStar in RFC 8231/8281 compliant mode.

See *Device Profile and Connectivity Testing* in the *NorthStar Controller User Guide* for more information.

SR Auto-Bandwidth

NorthStar now supports bandwidth sizing and container LSPs for SR-TE LSPs, with the following limitations:

- Since the controller needs to calculate the aggregate LSP utilization of all auto bandwidth LSPs, this feature is supported only on LSP types that provide telemetry statistics. At this time, only PCE-initiated SR-TE LSPs are supported, requiring JUNOS version 19.2 and later.
- Only a global adjustment period and aggregation function is supported. Per-LSP adjustment period and/or aggregation function is not supported.
- LSPs provisioned via NETCONF that are not delegated to the controller require a config commit to modify LSP attributes. Currently, NorthStar doesn't perform such changes without user approval and, therefore, managing these kinds of LSPs is not supported. Whenever NorthStar adds support for automatic modification of NETCONF/PCC-controlled LSPs, this feature will be re-qualified for that scenario.

There is additional configuration required on the router to enable collection of segment routing data:

```
set services analytics sensor sr-te-tunnels server-name ns
set services analytics sensor sr-te-tunnels export-name ns
set services analytics sensor sr-te-tunnels resource
/junos/services/segment-routing/traffic-engineering/tunnel/ingress/usage/
```

For more information about bandwidth management, see *Bandwidth Management* in the *NorthStar Controller User Guide*.

REST API Enhancements

For more information about these enhancements, see the NorthStar Controller REST API documentation.

• Re-Provisioning P2MP LSP

The NorthStar REST API functionality has been enhanced to include the ability to reprovision P2MP LSPs. Upon request, the P2MP tree is reprovisioned using the same path as calculated by NorthStar.

Reprovisioning of NETCONF-configured SR LSPs based on network events is not supported at this time. Also, any P2MP optimization criteria from P2MP diverse tree design are not recomputed.

• P2MP Tree Design Supports PCEP Provisioning

Prior to this release, you could use a single NorthStar REST API call to perform diverse P2MP tree designs using the P2MP Tree Design algorithm via NETCONF. With this release, that functionality has been extended to PCEP as well.

The pair of P2MP trees can be designed where leaves are site diverse, and sub-LSPs from the two trees are SRLG, node, or link diverse. You can specify the two P2MP trees and the diversity level, and NorthStar performs the design and provisions the trees, all with one REST API call.

• P2MP Tree Design REST API Supports a “minimumDiversityLevel” Option

With this option, the tree would be designed and provisioned only when the specified “minimumDiversityLevel” constraint is achieved. The option could be configured directly on the LSP or as part of the top level P2MP LSP optimization request.

- **Configure LSP Delegation Capability**

The ability to delegate and undelegate LSPs via the REST API has been enhanced so the API now supports both PCEP and NETCONF for these functions.

Changes in Behavior

The following changes in behavior are introduced with NorthStar Controller Release 5.0.0.

- If you are upgrading to NorthStar 5.0 from a NorthStar release earlier than 4.3 *and you are not using analytics*, you can upgrade using the procedure described in *Installing the NorthStar Controller 5.0.0*.

If you *are* using NorthStar analytics, you must manually upgrade to NorthStar 5.0 using the procedure described *Upgrading from Pre-4.3 NorthStar with Analytics*.

- You can no longer provision a NETCONF LSP with bandwidth sizing. In the Provision LSP window, this means that if the provisioning method has been set as NETCONF, the Bandwidth Sizing field on the Advanced tab is disabled.

Known Behavior

The following behaviors are known to occur in NorthStar Controller Release 5.0.0:

- **Important:** It is currently necessary to remove any lingering NorthStar RPM packages before performing a fresh installation of NorthStar Release 5.0.0. This will be unnecessary in future releases.
- 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:
 - 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.
- Automatic rerouting of NETCONF-provisioned LSPs (including NETCONF-provisioned SR LSPs) due to a failure in the network is not supported.
- 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, 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 10](#) lists known issues in NorthStar Controller Release 5.0.0. If an identifier is reported, it is the assigned identifier in the GNATS problem report tracking system.

Table 3: Known Issues in NorthStar Controller 5.0.0

Identifier	Description
1421093	Junos OS: A user can configure a template in the router and map that template to an external controller. The 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 can trigger deletion of the PCE-initiated LSPs (only LSPs which are using that particular template). Later, the LSPs are re-provisioned by the external controller.
1446941	Before performing a fresh install of NorthStar Release 5.0.0, you must use the ./uninstall_all.sh script to uninstall any older versions of NorthStar on the device.
1452486	PRPD does not remove prefixes (prefixes that have mapping) that were withdrawn by PCCs.
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.

Table 3: Known Issues in NorthStar Controller 5.0.0 (continued)

Identifier	Description
NA	The Bandwidth Sizing task (Administration > Task Scheduler) is not able to collect the counters for LSPs on IOS-XR devices, so the bandwidth for these LSPs is not resized.
NA	For IOS-XR devices, you must run device collection before doing any LSP delegation. This applies to LSPs that were manually created using the router CLI.
NA	Changing a demand's LSP binding directly from one LSP to another in one operation (without setting it to unbound first, then to the new LSP), the colored route insertion fails. NorthStar behaves as if it has the new LSP binding and colored route, but in reality the old colored route corresponding to the old binding is in the network. If you need to change the LSP binding of a demand with an existing binding, do it in two steps. First, clear the LSP Binding, and then set the LSP binding to the new LSP. This applies both to changing an LSP binding using the UI, and using REST API calls.
NA	NETCONF network information table update: when you delete an interface, the interface list is not updated in the Interface tab of the network information table.
NA	NETCONF SR-LSP bandwidth is displaying non-zero when adding an SR-LSP with a specific bandwidth.
NA	PRPD does not update Top N Prefixes properly.
NA	Normally, the web UI automatically switches to safe mode, and allows the admin user to log in when the Cassandra database is down. In this release, the automatic switch does not work. The workaround is to restart web server when you cannot log in to the web UI during a Cassandra failure.
NA	NorthStar Planner Desktop: There is no validation on the NorthStar Planner Destop when a license upload is attempted.
NA	The privateForwardingAdjacency (a pair of binding SID SR LSPs from A->Z and Z->A) logical link could be marked as down after the TopoServer process is restarted. The current workaround is to run a Device Collection task in the Task Scheduler, which would restore the correct status to the privateForwardingAdjacency logical link. This issue will be addressed in the next release.

Resolved Issues

Table 4 on page 12 lists resolved issues in NorthStar Controller Release 5.0.0. If an identifier is reported, it is the assigned identifier in the GNATS problem report tracking system.

Table 4: Resolved Issues in NorthStar Controller 5.0.0

Identifier	Description
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.
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.
NA	The binding SID SR LSP name 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.

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

7 September 2020—Add Change in Behavior regarding the unavailability of the Bandwidth Sizing field when Provisioning Method NETCONF is selected (LSP provisioning).

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

8 August 2019—NorthStar Controller Release 5.0.0.

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