

Release Notes for NorthStar Controller

Release 4.2.0
1 November 2018

These release notes accompany Juniper Networks NorthStar Controller Release 4.2.0.

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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 4.2.0 release is fully supported with Junos OS Release 17.2R1 and later.

NorthStar Controller 4.2.0 can be deployed with Junos OS Releases 15.1F6, 16.1R1, and 17.1R1, but the segment routing (SPRING) feature would not be available.

The NorthStar Controller Analytics features require specific Junos OS Releases to be able to obtain LSP and interface statistics. This is a Junos Telemetry Interface (JTI) dependency. We recommend Junos OS Release 15.1F6 or later if you plan to use Analytics.

NorthStar Controller 4.2.0 release can be deployed with Junos OS Releases 14.2R6, 15.1F4, and 15.1R4, but the following features would not be available:

- MD5 authentication for PCEP
- P2MP support
- Admin group support

By default, the NorthStar Controller Release 3.0.0 and later requires that the external Junos VM be Release 17.2 or later. If you are using an older version of Junos OS, you can change the NorthStar configuration to support it, but segment routing support will not be available. See the *Known Behavior* section for the configuration steps.

Other Junos OS releases are not supported.



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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.

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The NorthStar Controller is supported on the following Juniper platforms: M Series, T Series, MX Series, PTX Series, QFX10008, and ACX5000. However support for ACX platform is limited for Segment Routing features. Please contact JTAC for more information.

As of Junos OS Release 17.4R1, NorthStar Controller is also supported on QFX5110, QFX5100, and QFX5200, and on SRX platforms (SRX300, SRX320, SRX340, SRX345, SRX550, SRX550M, SRX1500, SRX4100, SRX4200 devices, and vSRX instances).

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, QFX Series, and ACX Series).

Contents of this Release

Table 1 on page 3 describes the downloadable files.

Table 1: NorthStar Controller 4.2.0 Downloadable Files

File	Description
NorthStar Application	Northstar_Bundle_4_2_0_.tar.gz
NOTE: E-signature also available.	
NorthStar JunosVM	northstar_junosvm_4_2_0.tar.gz
NOTE: E-signature also available.	



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 4.2.0:

- **Bandwidth Sizing Controlled by NorthStar**

NorthStar Controller can now be configured to periodically compute a new planned bandwidth for each bandwidth sizing-enabled LSP based on aggregated LSP traffic statistics. This feature is not to be confused with auto-bandwidth which is done on the router side.

For bandwidth sizing to occur, you must:

- Enable NorthStar analytics

NorthStar supports bandwidth sizing for all LSPs for which it can obtain LSP statistics, so you must enable/use NorthStar analytics, and confirm that NorthStar is receiving traffic from the LSPs.

- Configure LSPs so their bandwidth sizing attribute is set to **yes** (bandwidth sizing enabled). LSPs without this setting are not sized.
- Create and schedule a bandwidth sizing task in the Task Scheduler.

For more information, see the following *NorthStar Controller User Guide* topics:

- *Provision LSPs*

- *Bandwidth Sizing*

- **Fail-Safe Mode**

NorthStar Controller fail-safe mode has been introduced to prevent complete disruption of visibility into the network by NorthStar as a result of the Cassandra database becoming inaccessible. Previously, when connectivity to Cassandra was lost, the web UI and REST API were completely unusable and the user had no visibility into the state of the network. With fail-safe mode, a view-only version of the web UI is accessible via a fail-safe web UI landing page and Admin login credentials. Fail-safe mode works even if there is only one node in the NorthStar cluster that is up and running.

In fail-safe mode:

- A stored snapshot of the network topology can be loaded from the file system.
- The HA agent is able to elect a new active node if necessary. The NorthStar processes on the new active node start in fail-safe mode because Cassandra is not available.
- *Existing* delegated or PCE-initiated LSPs can be rerouted by the PCS in the event of network outages. New LSPs cannot be created and LSPs cannot be deleted in NorthStar. LSPs can still be created on the router and delegated to NorthStar.
- The status of the NorthStar cluster is displayed for all users via a banner in the web UI. The NorthStar health reporting function also reports the status of nodes, even when they are down.

See *NorthStar Controller Fail-Safe Mode* in the *NorthStar Controller User Guide* for more information.

- **Telemetry Data Aggregation**

Telemetry data is now rolled up (aggregated) every hour and retained in Elasticsearch for a user-configurable number of days. The purpose of aggregation is to make longer retention of data more feasible given limited disk space. When you modify retention parameters, keep in mind that there is an impact on your storage resources.

See the following *NorthStar Controller User Guide* topics for more information:

- *NorthStar Analytics Raw and Aggregated Data Retention*
- *Introduction to the Task Scheduler*

- **Resource Optimization for Collector Worker Installation**

When you install the NorthStar application, a default number of collector workers are installed on the NorthStar server, depending on the number of cores in the CPU. This is now regulated differently in order to optimize server resources, but you can change the number by using a provided script (`config_celery_workers.sh`). This also applies when you install slave worker groups for distributed data collection. Each installed worker starts a number of celery processes equal to the number of cores in the CPU plus one.

For more information, see the following *NorthStar Controller Getting Started Guide* topics:

- *Collector Worker Installation Customization*

- *Slave Collector Installation for Distributed Data Collection*

- **Server Sizing Guidance Documentation**

We are now providing server sizing guidance in the NorthStar Controller Getting Started Guide to help customers configure their servers with sufficient memory to effectively support the NorthStar Controller functions. The recommendations are the result of internal testing combined with field data.

Server specifications for various network sizes are included along with special considerations related to JTI analytics in ElasticSearch, storing network events in Cassandra, and slave collector (celery) memory requirements.

For more information, see *NorthStar Controller System Requirements* in the *NorthStar Controller Getting Started Guide*.

- **Documentation for Configuring the Cassandra Database in a Multiple Data Center Environment**

NorthStar Controller uses the Cassandra database to manage database replicas in a NorthStar cluster. The default setup of Cassandra assumes a single data center. In other words, Cassandra knows only the total number of nodes; it knows nothing about the distribution of nodes within data centers.

But in a production environment, it is typical to have multiple data centers with one or more NorthStar nodes in each data center. In that environment, it is preferable for Cassandra to have awareness of the data center topology and to take that into consideration when placing database replicas.

We now provide instructions for configuring Cassandra for use in a multiple data center environment. In NorthStar 4.3.0, these manual instructions will be automated and part of the regular installation procedures for the NorthStar software.

Because Apache Cassandra is an open source software, Cassandra usage, terminology, and best practices are well documented elsewhere, and our documentation focuses specifically on the NorthStar use of Cassandra.

For more information, see *Configuring the Cassandra Database in a Multiple Data Center Environment* in the *NorthStar Controller Getting Started Guide*.

- **NorthStar Multilayer Support Using Open ROADM Interface**

In the past, NorthStar supported the Juniper Networks proNX Service Manager product as a transport controller. At that time, the proNX Service Manager used a TE interface to integrate with NorthStar. The proNX Service Manager (now called proNX Optical Director) no longer uses the TE interface, so NorthStar has added support for the Open ROADM interface in order to continue to integrate with the proNX Optical Director.

For more information, see the following topics in the *NorthStar Controller User Guide*:

- *Multilayer Feature Overview*
- *Configuring the Multilayer Feature*
- *Linking IP and Transport Layers*
- *Managing Transport Domain Data Display Options*

See https://www.juniper.net/documentation/product/en_US/pronx-optical-director for Juniper Networks prONX Optical Director documentation.

Changes in Behavior

The following changes in behavior are introduced with NorthStar Controller Release 4.2.0:

Known Behavior

The following behaviors are known to occur in NorthStar Controller Release 4.2.0:

- Bandwidth sizing is supported only for PCE-initiated and PCC-delegated LSPs, but nothing prevents the user from applying sizing attributes to PCC-controlled LSPs. For PCC-controlled LSPs for which bandwidth sizing is enabled, no sizing will actually occur. In a future release, there will be a block in place to prevent the application of sizing attributes to PCC-controlled LSPs and an error message to that effect will be displayed.
- NorthStar REST API does not return in the REST response the selected routing method:
 - Currently, if a REST API body has routingMethod=Default, the corresponding REST response does not include the routingMethod keyword.
 - NorthStar still computes the ERO properly.
 - In a future NorthStar release, the REST response will properly indicate the selected routingMethod.
- Re-provision LSPs issue:
 - For a Netconf-provisioned P2MP tree, re-provisioning individual sub-LSPs to go around a failed link can fail under the following conditions:
 - The user re-provisions 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 re-provision 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.

- Behaviors related to Netflow Collector:
 - It can happen that during a NorthStar upgrade from NorthStar 4.0 or 4.1 to NorthStar 4.2, 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
```

- The Elasticsearch REST API assumes that LSPs on different routers have different names.
- 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
```

Known Issues

Table 2 on page 7 lists known issues in NorthStar Controller Release 4.2.0. The identifier associated with each entry is the tracking number in the Juniper Networks Problem Report (PR) tracking system.

Table 2: Known Issues in NorthStar Controller 4.2.0

Identifier	Description
1358245	<p>Junos OS Release 18.2 R1 PCEP reporting limitation: The current Junos OS Release 18.2 R1 release reports the SR LSP name only. Any path names (for multiple primary paths or secondary path) are not reported via PCEP. The implications for NorthStar Controller Release 4.1.0 are:</p> <ul style="list-style-type: none"> Only one primary path is supported. Since Junos OS still requires a path name to be specified, when NorthStar sends a provisioning order for NETCONF-based SR LSPs, the primary path name is set to be the same as the SR LSP name. Support for additional primary paths and secondary path could be added for a later NorthStar release, contingent upon support in Junos OS. The user does have the option to disable PCEP and rely on Device Collection configuration parsing to obtain the SR LSP primary path details. The disadvantage of using configuration parsing is that it is a non-real-time pull model, so the Operation Status for the SR LSPs is set as Unknown.

Resolved Issues

Table 3 on page 8 lists resolved issues in NorthStar Controller Release 4.2.0. The identifier associated with each entry is the tracking number in the Juniper Networks Problem Report (PR) tracking system.

Table 3: Resolved Issues in NorthStar Controller 4.2.0

Identifier	Description
1378880	In some circumstances, when the connectivity was lost between the servers, a limited number of NorthStar processes may be restarted in all the servers in a NorthStar cluster including on the standby servers. This behavior did not impact the functionality of the active server. However, in order to minimize the confusion, NorthStar HA agent has been updated to avoid this issue.
1380786	When dealing with very large scale networks, NorthStar Device Profile took up to 30 seconds to 1 minute to load in the Web GUI. Changes have been made to decrease the loading time to a couple of seconds.
1380789	When IPv6 was used to configure the router ID, NorthStar REST API queries reported wrong Segment Routing attributes.
1380830	When routers were added in NorthStar Controllers using REST API (routers not coming from the live network via BGP-LS), a duplicate node index was created.
1382274	When MTU was not consistently configured in the network, PCE server process could stop responding. Protection has been added to mitigate the impact of network misconfiguration.
1382356	When a user updated the MD5 string directly in the Web UI grid cell, versus using the Modify button, PCEP MD5 string for routers was reset in Device Profile. Protection has been added to avoid resetting MD5 key.
1388161	When there was MTU mismatch between servers in NorthStar cluster, a communication issue within the Cassandra cluster could trigger a re-election. Additional protection was added to cope with this misconfiguration.
1389778	Although it is documented to use NorthStar VIP to launch NorthStar Web UI, it was also possible to launch the web UI on backup servers using the server physical IP. Not using VIP to reach NorthStar Web UI is now blocked.

Requesting Technical Support

Technical product support is available through the Juniper Networks Technical Assistance Center (JTAC). If you are a customer with an active J-Care or JNASC 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.

Revision History

1 November 2018—NorthStar Controller Release 4.2.0.

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