



Cisco Nexus Data Broker Embedded Deployment Guide, Release 3.2

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Americas Headquarters

Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
<http://www.cisco.com>
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 527-0883

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CONTENTS

CHAPTER 1

Cisco Nexus Data Broker Embedded Overview 1

About Cisco Nexus Data Broker Embedded 1

Supported Web Browsers 3

Prerequisites for Cisco Nexus Series Switches 3

Cisco Nexus Data Broker Software Release Filename Matrix 5

CHAPTER 2

Deploying Cisco Nexus Data Broker Embedded for OpenFlow 7

Obtaining the Cisco Nexus Data Broker Embedded Software for OpenFlow 7

Upgrading to Release 3.2.0 8

Installing and Activating the Cisco Nexus Data Broker Embedded Software for OpenFlow 9

Configuring the Cisco Plug-in for OpenFlow 11

Logging in to the Cisco Nexus Data Broker GUI 12

CHAPTER 3

Deploying Cisco Nexus Data Broker Embedded for NX-API 13

Obtaining the Cisco Nexus Data Broker Embedded Software for NX-API 13

Installing and Activating the Cisco Nexus Data Broker Embedded Software for NX-API

Mode 14

Logging in to the Cisco Nexus Data Broker GUI 15



Cisco Nexus Data Broker Embedded Overview

This chapter contains the following sections:

- [About Cisco Nexus Data Broker Embedded, page 1](#)
- [Supported Web Browsers, page 3](#)
- [Prerequisites for Cisco Nexus Series Switches, page 3](#)
- [Cisco Nexus Data Broker Software Release Filename Matrix, page 5](#)

About Cisco Nexus Data Broker Embedded

Visibility into application traffic has traditionally been important for infrastructure operations to maintain security, troubleshooting, and compliance mechanisms, and to perform resource planning. With the technological advances and growth in cloud-based applications, it has become imperative to gain increased visibility into the network traffic. Traditional approaches to gain visibility into network traffic are expensive and rigid, making it difficult to do in large-scale deployments.

Cisco Nexus Data Broker Embedded with Cisco Nexus Switches provides a software-defined, programmable solution to aggregate copies of network traffic using Switched Port Analyzer (SPAN) or network Test Access Points (TAP) for monitoring and visibility. As opposed to traditional network taps and monitoring solutions, this packet-brokering approach offers a simple, scalable and cost-effective solution that is well suited for customers who need to monitor higher-volume and business-critical traffic for efficient use of security, compliance, and application performance monitoring tools.

The Cisco Nexus Data Broker Embedded option provides the flexibility for you to run the Cisco Nexus Data Broker software directly on a Cisco Nexus 3000, 3100, 3200, 3500, or 9000 Series switch in a single-switch deployment. This is suitable for smaller, co-located facilities where customers need only a single Cisco Nexus 3000, 3100, 3200, 3500, or 9000 Series switch for TAP/SPAN aggregation, because it eliminates the requirement to have a separate virtual machine for the Cisco Nexus Data Broker application.

If Cisco Nexus Data Broker does not work after reloading of the device in Embedded mode, you have to run the `ndb_launcher.py` script from the `ndb` directory in the GitHub repository. Before launching the script, ensure that the Cisco Nexus Data Broker is in activated mode. If it is in the deactivated mode, the script does not execute. You can use `show virtual-service list CLI` command to display the status of Cisco Nexus Data Broker. Use `python bootflash:ndb_launcher.py -v ndb` command to execute the script.

When the Python script is run, it creates a file in the virtual machine that is known as the interfaces file. It contains the details of the interfaces and the management IP address and it updates the **launcher.sh** file. The **embndb** folder is created by the Python script.

The Cisco Nexus Data Broker Embedded solution supports the following:

- Support for the OpenFlow mode or the NX-API mode of operation.



Note The OpenFlow mode and the NX-API mode are supported on both Cisco Nexus 3000 Series and Cisco Nexus 9000 Series switches. Cisco Nexus 9500 supports only NX-API mode of deployment. Cisco Nexus 3500 supports only Openflow mode of deployment.

You can enable only one mode, either OpenFlow or NX-API mode, at a time.

In order to start or stop the Cisco Nexus Data Broker application in embedded mode, you should activate or de-activate the **ofa** file. Do not use **./runxnc.sh** as it is not the right way to start the application.



Note Starting with Cisco Nexus 3000 Release 7.x, the NX-API configuration is supported on the following Cisco Nexus 3100 Series switches:

- Cisco Nexus 3172 switches
 - Cisco Nexus 3132 switches
 - Cisco Nexus 3164 switches
 - Cisco Nexus 31128 switches
 - Cisco Nexus 3232 switches
 - Cisco Nexus 3264 switches
-

- Support for Layer-7 filtering for the HTTP traffic using the HTTP methods.
- Support for VLAN and MPLS tag stripping.
- The ability to aggregate traffic from multiple TAP or SPAN ports connected to a single switch.
- Support for Q-in-Q to tag input source TAP and SPAN ports.
- Symmetric hashing or symmetric load balancing.
- Rules for matching monitoring traffic based on Layer 1 through Layer 4 information.
- The ability to replicate and forward traffic to multiple monitoring tools.
- Timestamp tagging using the Precision Time Protocol.
- Packet truncation beyond a specified number of bytes to discard payload.
- Security features, such as role-based access control (RBAC), and integration with an external Active Directory using RADIUS or TACACS for authentication and authorization.
- End-to-end path visibility and both port and flow level statistics for troubleshooting.
- Robust Representational State Transfer (REST) API and web-based GUI for all functions.

Supported Web Browsers

The following web browsers are supported for Cisco Nexus Data Broker Embedded:

- Firefox 18.x and later versions
- Chrome 24.x and later versions



Note

JavaScript 1.5 or a later version must be enabled in your browser.

Prerequisites for Cisco Nexus Series Switches

Cisco Nexus Data Broker is supported on Cisco Nexus 3000, 3100, 3200, 3500, and 9000 series switches. Before you deploy the software, you must do the following:

- Ensure that you have administrative rights to log in to the switch.
- Verify that the management interface of the switch (mgmt0) has an IP address configured by running the switch# **show running-config interface mgmt0** command.
- Add the VLAN range in the database that is to be used in Cisco Nexus Data Broker for tap aggregation and inline monitoring redirection to support VLAN filtering. For example, the syntax is **vlan <range of VLAN IDs>**. For example, the VLAN range is <1-3967>.

For running the OpenFlow and NX-API mode on the Cisco Nexus Series switches, see the following pre-requisites.

Device Models	OpenFlow Mode	NX-API Mode
Cisco Nexus 3000 Series switches	Enter the # hardware profile openflow command at the prompt.	With Cisco Nexus 3000 Series switches, only Openflow mode is supported.

Device Models	OpenFlow Mode	NX-API Mode
Cisco Nexus 3164Q switches	The OpenFlow mode is not supported on the Nexus 3164Q switches.	Enter the following commands at the prompt: <ul style="list-style-type: none"> • # hardware profile tcam region qos 0 • # hardware profile tcam region racl 0 • # hardware profile tcam region vacl 0 • # hardware profile tcam region ifacl 1024 double-wide • # hardware access-list tcam region mac-ifacl 512
Cisco Nexus 3172 Series switches	Enter the # hardware profile openflow command at the prompt.	Use the hardware profile mode tap-aggregation [l2drop] CLI command to enable tap aggregation and to reserve entries in the interface table that are needed for VLAN tagging. The l2drop option drops non-IP traffic ingress on tap interfaces.
Cisco Nexus 3200 Series switches	Enter the hardware access-list tcam region openflow 256 command at the prompt.	Enter the following commands at the prompt: <ul style="list-style-type: none"> • # hardware access-list tcam region e-racl 0 • # hardware access-list tcam region span 0 • # hardware access-list tcam region redirect 0 • # hardware access-list tcam region vpc-convergence 0 • # hardware access-list tcam region racl-lite 256 • # hardware access-list tcam region l3qos-intra-lite 0 • # hardware access-list tcam region ifacl 256 double-wide • # hardware access-list tcam region mac-ifacl 512

Device Models	OpenFlow Mode	NX-API Mode
Cisco Nexus 9300 Series switches	<p>Enter the hardware access-list tcam region openflow 512 double-wide command at the prompt to configure the MAC filters.</p> <p>For other scenarios, enter the hardware access-list tcam region openflow 512 command.</p>	<p>Enter the following commands at the prompt:</p> <ul style="list-style-type: none"> • # hardware access-list tcam region qos 0 • # hardware access-list tcam region vacl 0 • # hardware access-list tcam region racl 0 • # hardware access-list tcam region redirect 0 • # hardware access-list tcam region vpc-convergence 0 • # hardware access-list tcam region ifacl 1024 double-wide • # hardware access-list tcam region mac-ifacl 512
Cisco Nexus 9200 and 9300-EX switches	The OpenFlow mode is not supported on the 9200 and 9300-EX switches.	<p>Enter the following commands at the prompt:</p> <ul style="list-style-type: none"> • # hardware access-list tcam region ing-racl 256 • # hardware access-list tcam region ing-l3-vlan-qos 256 • # hardware access-list tcam region egr-racl 256 • # hardware access-list tcam region ing-ifacl 1024

Cisco Nexus Data Broker Software Release Filename Matrix

See the Cisco Nexus Data Broker software release filename matrix for more information on the software images:

Mode of Deployment	OpenFlow	NX-API	N3K	N3500	N9K	File Name
Embedded	N	Y	Y	N	Y	ndb1000-sw-app-emb-nxapi-3.2.0-k9.zip
Embedded	Y	N	Y	Y	N	ndb1000-sw-app-emb-3.2.0-ofa_ mmemb-1.1.5-r3-n3000-SPA-k9.zip
Embedded	Y	N	Y	N	Y	ndb1000-sw-app-emb-3.2.0-ofa_ mmemb-2.1.4-r2-nxos-SPA-k9.zip



Deploying Cisco Nexus Data Broker Embedded for OpenFlow

This chapter contains the following sections:

- [Obtaining the Cisco Nexus Data Broker Embedded Software for OpenFlow](#), page 7
- [Upgrading to Release 3.2.0](#), page 8
- [Installing and Activating the Cisco Nexus Data Broker Embedded Software for OpenFlow](#), page 9
- [Configuring the Cisco Plug-in for OpenFlow](#), page 11
- [Logging in to the Cisco Nexus Data Broker GUI](#), page 12

Obtaining the Cisco Nexus Data Broker Embedded Software for OpenFlow

- Step 1** In a web browser, navigate to Cisco.com.
- Step 2** Under **Support**, click **All Downloads**.
- Step 3** In the center pane, click **Cloud and Systems Management**.
- Step 4** If prompted, enter your Cisco.com username and password to log in.
- Step 5** In the right pane, click **Network Controllers and Applications**, and then click **Cisco Nexus Data Broker**.
- Step 6** Download and extract the **Cisco Nexus Data Broker Release 3.2.0** application bundle zip file. The application bundle zip file contains the following:
- The Cisco Nexus Data Broker Software Application package, for example, **ndb1000-sw-app-emb-k9-3.2.0.ova**
 - The Cisco Plug-in for OpenFlow package, **ofa_mmemb-2.1.4-r2-nxos-SPA-k9.ova**
-

What to Do Next

Install the software on a Cisco Nexus 3000, 3100, 3200, 3500, or 9000 Series switch.

Upgrading to Release 3.2.0

This process involves using the GUI to download the configuration, perform the upgrade, and then upload the configuration.

Step 1 Navigate to the **System** tab under **Administration**.
The **System Administration** window is displayed.

Step 2 Click **Download Configuration**.
It downloads the configuration in a zip file format. The name of the zip file is **configuration_startup.zip**.

Step 3 Download the configuration in Cisco NDB 3.0 or Cisco NDB 3.1.

Step 4 Deactivate Cisco NDB and uninstall Cisco NDB using the following steps:

Step 5 **configure terminal**

Example:

```
device# configure terminal
```

Step 6 **virtual-service virtual-services-name**

Example:

```
device(config)# virtual-service <virtual-services-name>
```

Step 7 **no activate**

Example:

```
device(config-virt-serv)# no activate
```

Step 8 **no virtual-service <virtual-services-name>**

Example:

```
device(config)# no virtual-service <virtual-services-name>
```

Step 9 **end**

Example:

```
device(config-virt-serv)# end
```

Step 10 **virtual-service uninstall name virtual-services-name**

Example:

```
# virtual-service uninstall name <virtual-services-name>
```

Step 11 **copy running-config startup-config**

Example:

```
# copy running-config startup-config
```

Step 12 Install and activate Cisco NDB 3.2 using the following steps:

Step 13 **virtual-service install name <virtual-services-name> package bootflash: ndb1000-sw-app-emb-k9-3.2.0.ova**

Step 14 **show virtual-service list**

Use the show command to check the status of the virtual service installation. After the status of the virtual service becomes listed as **Installed**, run the following commands to activate the service.

Step 15 **configure terminal**

Step 16 device(config)# **virtual-service <virtual-services-name>**

Step 17 device(config)# **activate**

Step 18 device(config)# **end**

Step 19 device(config)# **copy running-config startup-config**

Step 20 Run the **ndb_launcher.py** script from the **ndb** directory in the GitHub repository at <https://github.com/datacenter/nexus9000/blob/master/nexusdatabroker/NDBActivator1.0.py> using the **python bootflash:ndb_launcher.py -v ndb** command.

Example:

```
device# configure terminal
device(config)# virtual-service <virtual-services-name>
device(config)# no activate
device(config)# show virtual-service list (Wait until deactivated complete)
device(config)# activate
device(config)# show virtual-service list (Wait until activated complete)
device(config)# end
device(config)# copy running-config startup-config
```

Step 21 Upload Cisco NDB 3.0 or 3.1 configuration that is downloaded in step 1 in the Cisco NDB user interface (UI).

Installing and Activating the Cisco Nexus Data Broker Embedded Software for OpenFlow

Before You Begin



Note

You cannot install a new version of the Cisco Nexus Data Broker Embedded if you already have an existing Cisco Monitor Manager Embedded application installed and active.

Before you begin installing a new version of the Cisco Nexus Data Broker Embedded, you must:

- Deactivate your current Cisco Monitor Manager Embedded OVA file.
- Uninstall the Cisco Monitor Manager Embedded OVA file.

**Important**

Ensure that you have at least 1 GB of available space in the bootflash. The **ofa_mmemb-2.1.4-r2-nxos-SPA-k9.ova** and **ndb1000-sw-app-emb-k9-3.2.0.ova** file require a total of 850 MB of space in the bootflash for the decompression and installation processes.

DETAILED STEPS

	Command or Action	Purpose
Step 1	switch# copy [<i>scp: ftp: http:</i>] //download_dir ofa_mmemb-2.1.4-r2-nxos-SPA-k9.ova bootflash:vrf management	Copies the Cisco Plug-in for OpenFlow package from the directory where you downloaded it to the switch.
Step 2	switch# copy [<i>scp: ftp: http:</i>] //download_dir ndb1000-sw-app-emb-k9-3.2.0.ova bootflash:vrf management	Copies the Cisco Nexus Data Broker Embedded package from the directory where you downloaded it to the switch.
Step 3	switch# show virtual-service list	Monitors the status of the copy processes.
Step 4	switch# virtual-service install name ofa_ndbemb package bootflash:ofa_mmemb-2.1.4-r2-nxos-SPA-k9.ova	Installs the Cisco Plug-in for OpenFlow package on the switch.
Step 5	switch# virtual-service install name ndb_emb package bootflash:ndb1000-sw-app-emb-k9-3.2.0.ova	Installs the Cisco Nexus Data Broker Embedded package on the switch.
Step 6	switch# show virtual-service list	Monitors the status of the installations. Note Do not continue until both OVA files have been successfully installed.
Step 7	switch# configure terminal	Enters global configuration mode on the switch.
Step 8	switch (config)# virtual-service ofa_ndbemb	Starts the virtual service for the Cisco Plug-in for OpenFlow package and enters virtual service configuration mode on the switch.
Step 9	switch(config-virt-serv)# activate	Activates the Cisco Plug-in for OpenFlow package.
Step 10	switch(config-virt-serv)# exit	Returns to global configuration mode.
Step 11	switch(config)# virtual-service ndb_emb	Starts the virtual service for the Cisco Nexus Data Broker Embedded package and enters virtual service configuration mode on the switch.
Step 12	switch(config-virt-serv)# activate	Activates the Cisco Nexus Data Broker Embedded package.
Step 13	switch(config-virt-serv)# exit	Exits virtual service configuration mode on the switch.
Step 14	switch(config)# show virtual-service list	Monitors the status of the package activations.

Configuring the Cisco Plug-in for OpenFlow

The Cisco Plug-in for OpenFlow needs to be connected to the Cisco Nexus Data Broker locally running on the Cisco Nexus 3000, 3100, 3200, 3500, or 9000 Series switch.



Note The steps in this procedure continue the steps that were completed in the previous section.

Before You Begin

Install and activate the Cisco Nexus Data Broker package and the Cisco Plug-in for OpenFlow package.

Enter the following pre-requisite command **hardware profile openflow** for the Cisco Nexus 3000 and 3100 Series switches. Enter the following pre-requisite command **hardware profile forwarding-mode openflow-hybrid** for the Cisco Nexus 3500 Series switches.

Step 1 Enter the configuration mode on the switch.

configure terminal

Step 2 Enter the Cisco Plug-in for OpenFlow configuration mode on the switch.

switch(config)# **openflow**

Step 3 Choose the switch to which you want to connect.

switch(config-ofa)# **switch** *switch_num*

Caution Set the *switch_num* to **1**. This is the default value. Only expert users should set the *switch_num* number to any value other than 1.

Step 4 Choose the pipeline to which you want to connect.

switch(config-ofa-switch)# **pipeline** *pipeline_num*

Caution Set the *pipeline_num* to **201** for Cisco Nexus 3000, 3100, 3200, and 9300 Series switches. This is the default value. Only expert users should set the *pipeline_num* number to any value other than 201.

Set the *pipeline_num* to **203** for Cisco Nexus 3500 Series switches. This is the default value. Only expert users should set the *pipeline_num* number to any value other than 203.

Step 5 Configure the controller address using vrf management.

switch(config-ofa-switch)# **controller ipv4** *management_interface_address* **port** *port_num* **vrf management security none**

Note

- The controller ipv4 address should match the management interface (mgmt0) address.

- By default, the Cisco Plug-in for OpenFlow listens on port 6653.

Step 6 Assign ports to the Cisco Plug-in for OpenFlow.

switch(config-ofa-switch)# **of-port interface** *ethernet_port_num*

Example:

switch(config-ofa-switch)# **of-port interface** ethernet1/10

Step 7 Exit from the current configuration command mode and return to EXEC mode.

```
switch(config-ofa-switch)# end
```

- Step 8** Verify that the Cisco Plug-in for OpenFlow is connected to the Cisco Nexus Data Broker.
switch# **show openflow switch** *switch_num* **controllers**

See the [Cisco Plug-in for OpenFlow Configuration Guide 1.3](#)

Logging in to the Cisco Nexus Data Broker GUI

The default HTTPS web link for the Cisco Nexus Data Broker GUI is
`https://Nexus_Switch_Management_IP:8443/monitor`



Note You must manually specify the https:// protocol in your web browser. The controller must also be configured for HTTPS.

- Step 1** In your web browser, enter the Cisco Nexus Data Broker web link, for example,
`https://Nexus_Switch_Management_IP:8443/monitor`.

- Step 2** On the launch page, do the following:
- Enter your username and password.
The default username and password is admin/admin.
 - Click **Log In**.
-

What to Do Next

See the *Cisco Nexus Data Broker Configuration Guide* for the procedures that you need to configure Cisco Nexus Data Broker.



Deploying Cisco Nexus Data Broker Embedded for NX-API

This chapter contains the following sections:

- [Obtaining the Cisco Nexus Data Broker Embedded Software for NX-API](#), page 13
- [Installing and Activating the Cisco Nexus Data Broker Embedded Software for NX-API Mode](#), page 14
- [Logging in to the Cisco Nexus Data Broker GUI](#), page 15

Obtaining the Cisco Nexus Data Broker Embedded Software for NX-API

- Step 1** In a web browser, navigate to [Cisco.com](https://www.cisco.com).
- Step 2** In the center pane, click **Cloud and Systems Management**.
- Step 3** If prompted, enter your Cisco.com username and password to log in.
- Step 4** In the right pane, click **Network Controllers and Applications**, and then click **Cisco Nexus Data Broker**.
- Step 5** Download and extract the **Cisco Nexus Data Broker Software Application** bundle. The application bundle zip file contains the following:
- The Cisco Nexus Data Broker Embedded package, **ndb1000-sw-app-emb-k9-3.2.0.ova**
-

What to Do Next

Install the software on a Cisco Nexus 3000, 3100, 3200, 3500, or 9000 Series switch.

Installing and Activating the Cisco Nexus Data Broker Embedded Software for NX-API Mode

Before You Begin



Note

You cannot install a new version of the Cisco Nexus Data Broker Embedded if you already have an existing Cisco Nexus Data Broker Embedded application installed and active.

Before you begin installing a new version of the Cisco Nexus Data Broker Embedded, you must:

- Deactivate your current Cisco Monitor Manager Embedded OVA file.
- Uninstall the Cisco Monitor Manager Embedded OVA file.



Important

Ensure that you have sufficient space available in the bootflash. The **ndb1000-sw-app-emb-k9-3.2.0.ova** file require a total of ~55 MB of space in the bootflash for the decompression and installation processes.

DETAILED STEPS

	Command or Action	Purpose
Step 1	switch# copy [<i>scp: ftp: http:</i>]//download_dir ndb1000-sw-app-emb-k9-3.2.0.ova bootflash:vrf management	Copies the Cisco Nexus Data Broker Embedded package from the directory where you downloaded it to the switch.
Step 2	switch# show virtual-service list	Monitors the status of the copy processes.
Step 3	switch# virtual-service install name ndb_emb package bootflash:ndb1000-sw-app-emb-k9-3.2.0.ova	Installs the Cisco Nexus Data Broker Embedded package on the switch.
Step 4	switch# show virtual-service list	Monitors the status of the installations. Note Do not continue until both OVA files have been successfully installed.
Step 5	switch# configure terminal	Enters global configuration mode on the switch.
Step 6	switch(config)# virtual-service ndb_emb	Starts the virtual service for the Cisco Nexus Data Broker Embedded package and enters virtual service configuration mode on the switch.
Step 7	switch(config-virt-serv)# activate	Activates the Cisco Nexus Data Broker Embedded package.
Step 8	switch(config-virt-serv)# exit	Exits virtual service configuration mode on the switch.
Step 9	switch(config)# show virtual-service list	Monitors the status of the package activations.

Logging in to the Cisco Nexus Data Broker GUI

The default HTTPS web link for the Cisco Nexus Data Broker GUI is
`https://Nexus_Switch_Management_IP:8443/monitor`

**Note**

You must manually specify the `https://` protocol in your web browser. The controller must also be configured for HTTPS.

Step 1 In your web browser, enter the Cisco Nexus Data Broker web link, for example,
`https://Nexus_Switch_Management_IP:8443/monitor`.

Step 2 On the launch page, do the following:

- a) Enter your username and password.
The default username and password is admin/admin.
- b) Click **Log In**.

What to Do Next

See the *Cisco Nexus Data Broker Configuration Guide* for the procedures that you need to configure Cisco Nexus Data Broker.

