

Overview and Initial Setup of Cisco
NDFC
SAN, Release 12.1.3

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New and Changed Information

The following table provides an overview of the significant changes up to this current release. The table does not provide an exhaustive list of all changes or of the new features up to this release.

Release Version	Feature	Description
NDFC release 12.1.3	Reorganized content	Content within this document was originally provided in the <i>Cisco NDFC-Fabric Controller Configuration Guide</i> or the <i>Cisco NDFC-SAN Controller Configuration Guide</i> . Beginning with release 12.1.3, this content is now provided solely in this document and is no longer provided in those documents.

Overview

The following topics give overview information on the Nexus Dashboard Fabric Controller.

Know your Web UI

When you launch the Cisco Nexus Dashboard Fabric Controller Web UI for the first time, the **Feature Management** window opens. After you choose a deployment type, the left pane displays menu relevant to the personality.

The top pane displays the following UI elements:

- **Home** icon - Click to view One view on the Nexus Dashboard setup.
- **Nexus Dashboard** - Click to view One view on the Nexus Dashboard setup.
- **Help** - Click on **Help** to see a drop-down list with the following options:
 - **About Nexus Dashboard** - Displays the version of the Cisco Nexus Dashboard on which Cisco Nexus Dashboard Fabric Controller is deployed.
 - **Welcome Screen** - Displays What's New information. You can choose to see this page every time you launch the Web UI.
 - **Help Center** - Click to view the Help Center page. You can access various product documents from this page.

Scroll to the end of the page to view the services installed on Nexus Dashboard. Click on the Service to view **Help Center**.

- **User Role** - Displays the role of the user who is currently logged in, for example, **admin**. Click on the username to see a drop-down list with the following options:
 - **User Preferences** - Allows you to view the Welcome screen on every login.
 - **Change Password** - Allows you to change the password for the current logged-in user.

If you are a network administrator user, you can modify the passwords of other users.

- **Logout** - Allows you to terminate the Web UI and return to the login screen.
- **Cisco Nexus Dashboard Fabric Controller Persona** - Specifies the deployment persona - **Fabric Controller** or **SAN Controller** or **Fabric discovery**.
- **View Alarms** - Click the bell icon to view the **Alarms**. You can also view this page from **Operations > Event Analytics > Alarms** from the left pane.
- **Help** icon - Click to view help pages or information about Cisco NDFC.
 - Select **Help** to view the context-sensitive help for the UI page.
 - Select **About NDFC** to view the version number and copyright information.

General icons on UI:

- **Hamburger** icon - Click on **Hamburger** icon adjacent to product name on home screen to minimize the menu items on home screen or to view menu items in details.
- **Refresh** icon - Click refresh icon to refresh and load screen.

Dashboard

The intent of the **Dashboard** is to enable network and storage administrators to focus on particular areas of concern around the health and performance of data center switching. This information is provided as 24-hour snapshots.

The functional view of SAN Controller Dashboard consists of several dynamic dashlets that display information in the context of the selected scope by default.

The various scopes that are available on the Cisco Nexus Dashboard Fabric Controller Web UI are described in the following topics.

Overview

To navigate to Cisco Nexus Dashboard Fabric Controller SAN Controller Dashboard, on the left navigation menu, click **Dashboard**. The **Overview** tab displays several dashlets that helps you monitor the health of your network. The Dashboard also displays the **SAN Insights** tab if you have enabled the feature in **Feature Management** page. The **SAN Insights** tab also provides a set of health-related dashlets that lets you monitor the fabrics and the switches.

The following are the dashlets that appear on the **Overview** tab:

Dashlet	Description
Fabrics	<p>Displays details of Fabrics such as name, state, and health status of the fabric.</p> <p>To view more information about the fabric, click the fabric name (link) to open the Fabric slide-in pane. Click the Launch icon. Alternatively, double-click the fabric name.</p> <p>The Fabric Overview window appears.</p>
Event Analytics	<p>Displays alarms and events with Critical, Major, Minor, and Warning severity.</p> <p>Click the severity level to view more information about the severity of events and alarms in the Event Analytics window.</p>
Links	<p>Displays a diagram of Inter-Switch Link (ISL) and NPV Links for transmitting and receiving in the data center. Click the sectors on the pie chart to view more information in the SAN Links window.</p>

<p>Switches</p>	<p>Switch Health - Displays the switch's health status in the form of a chart with colors and health condition names with total number of switches in the brackets.</p> <p>The colors and what they indicate are described in the following list:</p> <ul style="list-style-type: none"> ▪ Green: Indicates that the element is in good health and functioning as intended. ▪ Yellow: Indicates that the element is in warning state and requires attention to prevent any further problems. ▪ Red: Indicates that the element is in critical state and requires immediate attention. ▪ Gray: Indicates lack of information to identify the element or the element has been discovered. <p>Switch Status - Displays the status of the switch.</p> <p>Switch Release Versions - Displays the switch release versions.</p> <p>Switch Models - Displays the models of switches.</p> <p>Click the sectors on the pie chart, the severity, status, versions, or the models to view more information in the Switches window.</p>
<p>Modules</p>	<p>Displays the switches on which the modules are discovered, the models name and the count.</p>
<p>Performance Collector</p>	<p>Displays the performance collection information.</p> <p>Click Start collector to start the performance collection information.</p> <p>Click Stop collector to stop performance collection information.</p>
<p>Port Usage</p>	<p>Displays the ports inventory summary information.</p>
<p>Top Congested Devices</p>	<p>Displays data for top congested end devices. Each entry shows the switch interface to which the end device is connected to, the name of the switch the device is connected to, and average Tx wait duration in percentage for which a switch port could not transmit a frame due to slow drain.</p>
<p>Top Congested ISLs</p>	<p>Displays data for top congested Inter Switch Links (ISLs). Each entry shows the name of the ISL interface, the name of the switch the ISL port is connected to, the average Tx and Rx link utilization and the average Tx wait duration in percentage.</p>
<p>Top ISL</p>	<p>Displays data for top 10 performing ISLs. Each entry shows device name, specifies the average of Rx traffic and Tx traffic in percentage.</p> <p>Click the chart icon next to the device name to view more details.</p>

Top SAN End Ports	<p>Displays the performance data for the top ten performing SAN host and storage ports. Each entry shows the current receive and transmit percentage, with a graph depicting the percentage of time each trunk spent exceeding the currently configured thresholds.</p> <p>Click the chart icon next to the device name to view more details.</p>
TOP FICON End Ports	<p>Displays data for top 10 performing FICON host and control unit ports. Each entry shows port traffic of switch interface, specifies the device to which the FICON port is connected, specifies the average of Rx traffic and Tx traffic, and exceeded percentage value.</p> <p>Click the chart icon next to the device name to view more details.</p>
TOP FCIP ISL	<p>Displays data for top 10 performing FCIP ISLs. Each entry shows device name, specifies the average of Rx traffic and Tx traffic, and exceeded percentage value.</p> <p>Click the chart icon to view more details.</p>
TOP Optics	<p>Displays data for top 10 optics. You can sort optics by hottest SPFs, coldest SPFs, lowest Rx Power, and lowest Tx Power.</p> <p>Click the chart icon next to the switch interfaces view more details.</p>
TOP CPU/Temperature	<p>Displays the data for top CPU and temperature details of switches.</p> <p>Click the chart icon next to the switch to view more details.</p>
TOP Error End Discard	<p>Displays the top error packets that are discarded for the selected interface.</p> <p>Click the chart icon to view more details.</p>

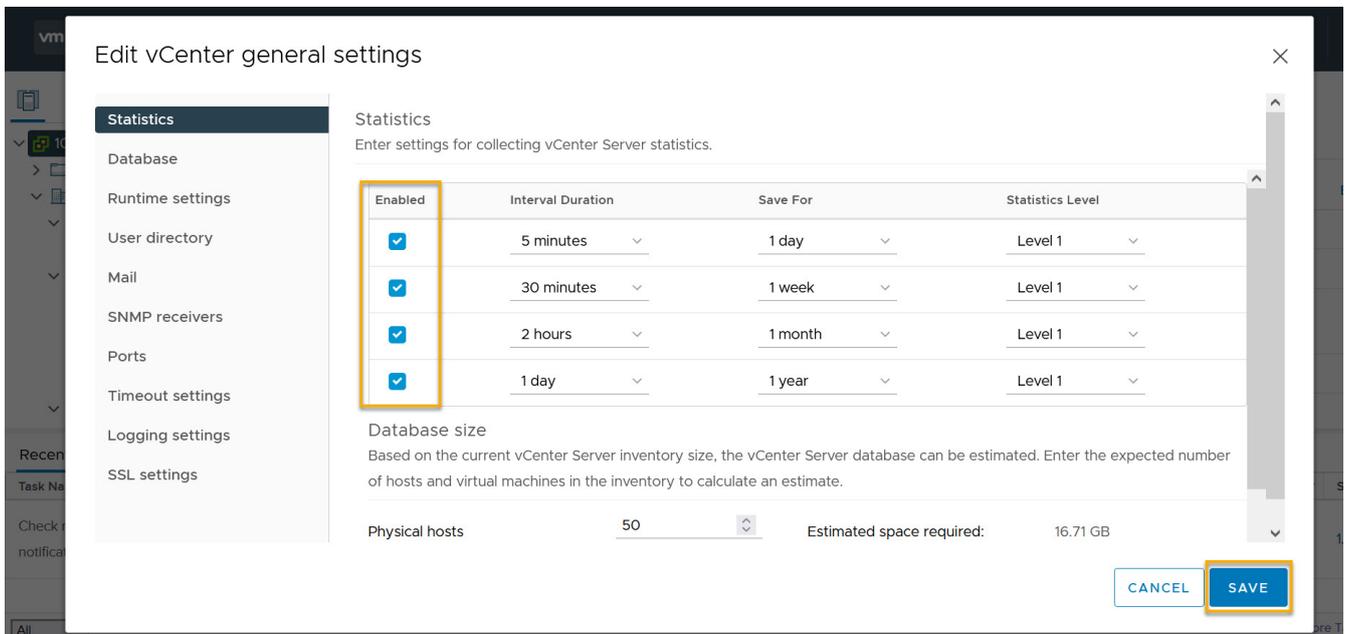
Viewing CPU & Memory and Disk I/O Charts

Before you begin:

To view VM charts for **CPU & Memory** and **Disk I/O**, and VM Flow, you must edit vCenter settings on the vSphere vCenter and enable statistics manually.

To enable statistics manually on the vSphere vCenter, perform the following steps:

1. Login to vSphere vCenter. (Click on the appropriate **Host**.)
2. Click **Configure > EDIT**. The **Edit vCenter general settings** screen appears.
3. On **Statistics** tab, check all the check boxes and click **SAVE**.



To view the SAN host enclosures from the NDFC SAN Controller Web UI, perform the following steps:

1. Choose **SAN > Hosts**.

The list of hosts in the Enclosures table is displayed.

2. Click the host name.

The **Host** slide-in pane displays general information.

3. Click on **#VMs** to view the required virtual machine (VM) details.

The **SAN Host VM Screen** is displayed.

The SAN Host VM Screen consists of two panels.

Enclosures - It consists of host name and its network attributes such as operating system, IP Address, MAC Address, number of CPU, Memory size, Read/Write value, Status of host, Data storage, and port value.

Select an Enclosure to view:

- **CPU & Memory** - Graph plotted displays percentage corresponding to time.
- **Disk I/O** - Graph plotted displays kilobyte/sec corresponding to time.
- **VM Flow** - This screen displays Initiator, Target, and Namespace/LUN of selected host.

Click information (i) icon to view related Initiator-Target flow in **SAN Insights Metrics Custom Graphing** window.

Hosts

To view a list of SAN hosts and their relevant details from the SAN Controller Web UI, perform the following steps:

1. In Nexus Dashboard Fabric Controller, navigate to **SAN > Hosts**.

The **Hosts** page displays a list of available host devices, their network attributes and the associated Virtual Machines (VMs).

To view all the hosts or only the hosts with failed links, toggle the setting between **Show All Hosts** and **Show Only Hosts with Down Paths**. Additionally, you can filter the enclosures based on a search criteria that you specify in the **Filter by attributes** field.

The following table describes the fields that appear on the **Hosts** page.

Field	Description
Enclosure Name	Displays the name of the host device. The icon next to the host name displays the type of discovery. It displays if the enclosure is from a vCenter or storage or FC discovery.
Up/Total Paths	Displays the total available paths versus the used path details for all the devices in the selected enclosure.
Type	Indicates if a host or storage is discovered through fabric discovery or vCenter discovery.
Total VMs	Displays the total number of VMs.
Peak Tx(%)	Displays the maximum transmitting speed in percentage.
Peak Rx(%)	Displays the maximum receiving speed in percentage.
CRC	Specifies Cyclic Redundancy Check (CRC) errors.
Corrected FEC	Displays the number of corrected Forward Error Correction (FEC) errors.
Uncorrected FEC	Displays the number of FEC errors that are not corrected.
ITW	Displays the number of Invalid Transmission Words (ITW) detected by the port.
Last Update Time	Specifies the date and time at which the host device was last updated.
IP Address	Displays the IP address of the device.
Protocol	Specifies if the host is streaming SCSI protocol traffic or NVMe protocol traffic. This column displays data only for the Hosts for which data is streamed to NDFC using SAN Insights.

2. Click on a host name displayed under the **Enclosure Name** column.

The Host enclosure slide-out pane appears.

3. Click the **Launch** icon to view detailed information related to that particular host.

The **Host Overview** page appears. The tabs and their fields in the screen are explained in the following sections.

- o [Summary](#)
- o [SAN Insights](#)
- o [Event Analytics](#)

- Congestion Analysis
- Zoning
- Optics
- DIRL
- FDMI
- RDP
- VM

Summary

The **Summary** tab of the **Host Overview** page displays information about the selected host device, its status and path information between various hosts enclosures.

Host Information	
Name	Name of the host device.
MAC Address	Displays the MAC address of the host device.
WWNs	Specifies the number of WorldWideNames (WWNs).
IP Address	Displays the IP address of the host device.
Protocol	Specifies if the transmission protocol is SCSI or NVMe.
OS Version	Specifies the operating system of the host device.
FCIDs	Specifies the associated FCID.
Host Status	
Up/Total Paths	Displays the total number of paths available versus the number of paths used by the host devices.
Alarms	Displays the number of alarms generated, if any.
VM Usage	Displays the number of VMs in use.
Events	Displays the number of events that are generated for the host device.
Paths	
Device Alias	Specifies the device alias for the host device.
Status	Specifies the status of the host device.
Fabric	Displays the name of the SAN fabric.
Switch Interface	Specifies the interface on the switch that is connected with the end device.
Rx (Mbps)	Displays the average and the maximum speed in bytes/sec while receiving data.
Tx (Mbps)	Displays the average and the maximum speed while transmitting data/
PWWN	Specifies the assigned port WWN for the host.
Updated Time	Specifies the date and time at which the host device was last updated.

Topology	Provides an end-to-end topology layout and path information between host enclosures and storage enclosures. You can hover on the device icons to see a tool tip that displays details about the device. Click on the green circle icon on the sides of the switch to display the Interface Details and Performance Chart for the interface. It displays details about the interface and a performance chart that depicts the traffic details through the interface.
Custom Graphing	<p>Displays metrics on ECT/DAL/read/write times, active I/Os, aborts, failures etc. You can view the metrics based on two protocols, SCSI and NVMe. By default, the SCSI protocol is selected. The data is displayed for a maximum of 7 days. The refresh interval for Custom Graphing page is 5 minutes. Click on the Play icon to refresh every 5 minutes automatically.</p> <p>The Custom Graphing area has two tabs - Graph and Table. This is a freestyle dashboard where you can select multiple metrics and real-time data for the selected metrics is displayed in a multiline graph format and the data table displays the corresponding raw data. The data is configured to refresh every 5 minutes.</p> <p>You can also add multiple graphs for comparison by clicking on the Add Graph the top right. You can add up to 3 graphs at a time. The Auto Refresh option is disabled by default. You must click the Play icon to enable the auto refresh.</p> <p>Click the Download button to download the table in .csv format. The download option is enabled only if the selected host has SAN insights feature enabled. Hover the mouse on the information (i)icon on the Initiator column. Click the icon that displays Show Flow VMs to open the Flow VMs window. You can view the VM names and IP addresses for the selected host.</p>

SAN Insights

The **SAN Insights** tab of the **Host Overview** page displays the Initiator-Target (IT) pairs, topology, average and total ECT/DAL/IOPS/throughput/read/write times, VM details and the switch interface for the selected host. You can view total read/write IOPS/throughput value for the selected host enclosure.

Field	Description
Initiator Target Pairs	This table lists all the initiator-target pairs for the selected host. The flow table shows the details of all the metrics on ECT/DAL/ IOPS/ Throughput/read/write times, Source Alias, SID, Destination Alias, DID, and the fabric along with their 1-hour average and baseline information.

Field	Description
Topology	Provides an end-to-end topology layout and path information between the host enclosures. On the View card, from the Select Layout drop-down list, you can choose one of the following layouts: <ul style="list-style-type: none"> • Hierarchical • Hierarchical Left-Right (default view) • Circular • Random
FROM: TO:	Displays details of all the metrics on ECT/DAL/read/write times, active I/Os, IOPs and throughput along with their 1-hour average and baseline information.
-	The middle table in the bottom row displays VM name and IP address for the IT pair selected in the Initiator Target Pairs table.
Switch Interface	Click on the interface icon (green circle) on the topology view to view details for the selected interface on the host device.

Event Analytics

The **Event Analytics** tab displays all the alarms that are raised and cleared and also the events that are generated for the host devices.

Congestion Analysis

Congestion Analysis enables you to view slow drain statistics for the hosts. You can monitor the slow drain issue within any duration. You can view the data in a chart format and export the data for analysis. You can also view the topology that provides a high-level view of Tx wait, drops, credit loss recovery, over utilization, and port monitoring events.

Zoning

Displays the zones under which the host device is present. Use the Show Topology icon to the left of the zone name to view the zone topology. It displays hosts and storage devices pertaining to the zone and connected to a switch.

Optics

Displays temperature, current, receiving/transmitting power and voltage data for the optics connected to the switch.

DIRL

Displays the data collected from Dynamic Ingress Rate Limiting (DIRL) analysis for all the interfaces in the current fabric. You can view the latest DIRL data for all the configured fabrics. To get the latest DIRL data for a given fabric, select the fabric from the **Fabric** drop-down list and click **Get latest DIRL data**.

FDMI

Fabric-Device Management Interface (FDMI) retrieves management information about the attached Fibre Channel Host Bus Adapters (HBAs) and host operating systems. The FDMI table displays details about the link status, vendor, serial number, model, firmware version, and driver version.

RDP

Read Diagnostics Parameters (RDP) displays diagnostic data from the switch and the connected end devices which can be used in analyzing and troubleshooting link issues. Displays data from the `show rdp fcid [fcid_id] vsan [vsan_id]` command. To view sensor related information for a particular enclosure, click the link available under the **Sensors** column in the table.



Not all switches support the RDP command. The switch can poll for diagnostic information from the end devices using a polling interval.

VM

Displays details about the virtual machines that are configured on the host device. It also displays VM charts for CPU & Memory and Disk I/O, and VM Flow for the selected virtual machine.

Topology

UI Navigation - Click **Topology**.

The **Topology** window displays color-encoded nodes and links that correspond to various network elements, including switches, links, fabric extenders, port-channel configurations, virtual port-channels, and more. Use this window to perform the following tasks:

- To view more information about each of these elements, hover your cursor over the corresponding element.
- To view your navigation in the topology, view the breadcrumb at the top.
- When you click the device or the element, a slide-in pane appears from the right that displays more information about the device or the element. To view more information in the topology, double-click a node to open the node topology. For example, to view the fabric topology and its components in the **Topology** window, double-click the fabric node and then double-click an element that you want to view such as a host, a multicast group or a multicast flow, as applicable to the fabric type, and view the respective topology.
- If you want to view the fabric summary for the fabrics, click the fabric node. From the **Fabric Summary** slide-in pane, open the **Fabric Overview** window. Alternatively, you can right-click a fabric and choose **Detailed View** to open the **Fabric Overview** window. For more information about the fabric overview window, see [Fabric Overview](#).
- Similarly, you can click on a switch to display the configured switch name, IP address, switch model, and other summary information such as status, serial number, health, last-pollled CPU utilization, and last-pollled memory utilization in the **Switch** slide-in pane. To view more information, click the **Launch** icon to open the **Switch Overview** window. For more information about switch overview window, see [Switch Overview](#).

SAN switches have only two roles, Core Router and Edge Router.

- Choose an action from the **Actions** drop-down list to perform various actions based on the element you select in the topology.
- To perform actions on the elements in the topology, other than the ones listed in the actions drop-down list, right-click the element. This opens the appropriate windows and allows you to perform tasks based on the elements. For example, if you right-click a fabric, you can perform tasks such as various configurations, delete the fabric, backup and restore, and many more.

Searching Topology

Use a combination of search attributes and search criteria in the search bar for an effective search. As you enter a combination of search attribute and search criteria in the search bar, the corresponding devices are highlighted in the topology.

You can apply the search criteria such as equals (=), does not equal (!=), contains (**contains**), and does not contain (**!contains**).

The search attribute that you can use for SAN fabric is fabric name.

When a device is displayed on the topology, double-click it to navigate further into the topology. For example, when the fabric that you searched is displayed on the topology, double-click on the fabric

(cloud icon) to navigate inside its topology. Furthermore, after the fabric is displayed on the topology, you can continue to search based on a combination of a criteria and various search attributes such as switch name, IP address, model, serial, software version, and up time.



Certain levels of the topology allow filters only, that is, filters take the place of Search. The topology listing for these levels display a limited number of entities.

Viewing Topology

To pan, click and hold anywhere in the whitespace and drag the cursor up, down, left, or right. To drag switches, click, hold, and move the cursor around the whitespace region of the topology.

In case of multiple selection of switch, you must release the modifier keys (cmd/ctrl) before releasing mouse drag to end the switch selection.

You can view the following information of the devices and links in the **View** pane:

- Layout options - You can zoom in, zoom out, or adjust the layout to fit the screen. You can also refresh the topology or save any changes to the topology. For more information, see [Zooming\Panning\Dragging](#).
- Select Layout drop-down list - Choose the layout for your topology from this drop-down list, and click **Save Topology Layout** in the layout options. For more information, see [Layouts](#).
- Status - The status of every device or link is represented by different colors. You can view the configurational status and operational status as well for LAN topologies. For more information, see [Status](#).

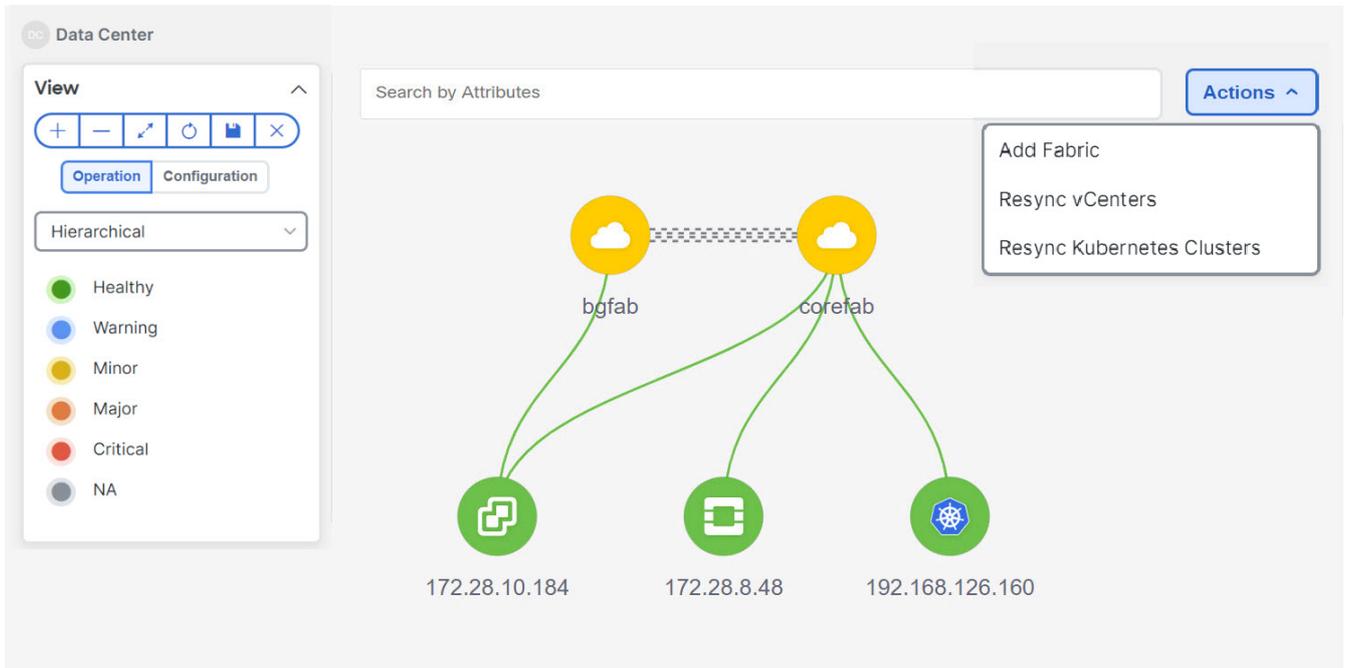
Topology for a node is displayed at multiple scope. Each scope is shown in the hierarchical order. The scope hierarchy is shown as breadcrumbs and can be navigated to required scope. Scopes are as follows:

- Data Center
- Cluster (vCenter)
- Resource List (DVS, Compute, and VM)
- Resource



- In the **Topology** window, FEX appears in gray (**Unknown** or **NA**) because Operation and Configuration status is not calculated for FEX.
- After moving a cable from one port to another port, the old fabric link is retained in the **Topology** window, and it is shown in the red color indicating that the link is down. Right-click on the link and delete it if the removal was intentional. A manual Rediscover of the switch will also delete and re-learn all links to that switch.

When a Multi-Site Domain (MSD) fabric is deployed with the child fabrics, to view multi-site topology, double-click on a fabric node, and then choose MSD scope or double click on the gray MSD node to view the MSD topology.



Viewing Elements in SAN Topology

UI Navigation - Click **Topology**.

This section provides information about various elements or entities displayed in the **Topology** window for SAN fabrics.

VSAN

In the **Topology** window, double-click on the fabric to view the fabric topology. A SAN fabric contains VSAN node and switches. The VSAN node has a number displayed in brackets, which indicates the number of VSANs in the fabric. Double-click on the VSAN node to view the individual VSANs in the VSAN node topology.

The VSAN topology displays zones and switches connected to the VSAN. Double-click on a VSAN to open the VSAN topology and view the zones and switches. However, the switches must have the VSAN configured and have links with VSAN membership.

Zone

Double-click on the VSAN node, VSAN zone is displayed. The switches in that VSAN and a Zones node show the number of zones. Double click on that zones node, which displays individual zone nodes. Double click on zone node display switches in that zone and its connectivity (ISL) with end devices that are a member of the selected zone.

Hosts and Storage

The zone topology displays hosts and storage devices pertaining to the zone and connected to a switch. In the **Topology** window, double-click on a zone to view hosts and storage devices.

Alternatively, to view the switch topology, you can directly click on a switch in the fabric topology. The switch topology displays the hosts and storage devices connected to the switch.

Hosts

Click on the host device to view more information about the host in the slide-in pane. From the slide-in pane, you can open the host dashboard. Alternatively, you can right-click on the host device and click **Detailed View** to open the host dashboard.

Storage

Click on the storage device to view more information about storage in the slide-in pane. From the slide-in pane, you can open the storage dashboard. Alternatively, you can right-click on the storage device and click **Detailed View** to open the storage dashboard.

Links

In the switch topology, click on the link that connects two devices, for example, the switch and the storage to open the **Link** slide-in pane. This pane displays the details related to the last polling of the performance data. However, you must have configured performance monitoring for the fabric in **Performance Data Collection Settings**. This allows the Nexus Dashboard Fabric Controller to collect the traffic information and the aggregated information is displayed along with a graph showing traffic utilization. The Nexus Dashboard Fabric Controller updates the last poll metric every 5 minutes for all the ports, links, and so on for all the switches in the fabric. If the date and time displayed in this pane is current, then the last poll metric details are up to date. The details provided in this slide-in pane are as follows:

- General information such as link capacity, VSAN, and status.
- Information about the traffic for the last 24 hours with details such as average, maximum, and minimum Rx and Tx in Bytes.
- The last poll metrics such as Time, Rx, and Tx can be viewed in a graph on the **Graph** tab and in a table format on the **Table** tab. Note that the table is paginated.

Zooming\Panning\Dragging

You can zoom in and zoom out using the controls that are provided at the bottom left of the windows or by using your mouse's wheel.

To pan, click and hold anywhere in the whitespace and drag the cursor up, down, left, or right.

To drag switches, click, hold, and move the cursor around the whitespace region of the topology.

Layouts

The topology supports different layouts along with a **Save Layout** option that remembers how you positioned your topology.

- **Hierarchical** and **Hierarchical Left-Right** - Provide an architectural view of your topology. Various switch roles can be defined that will draw the nodes on how you configure your CLOS topology.



When running a large-scale setup, being able to easily view all your switches on a leaf-tier can become difficult. To mitigate this, Nexus Dashboard Fabric Controller splits your leaf-tier every 16 switches.

- **Circular** and **Tiered-Circular** - Draw nodes in a circular or concentric circular pattern.

- **Random** - Nodes are placed randomly on the window. Nexus Dashboard Fabric Controller tries to make a guess and intelligently place nodes that belong together in close proximity.
- **Custom saved layout** - Nodes can be dragged around according to your preference. After you position as required, click **Save** to retain the positions. The next time you come to the topology, Nexus Dashboard Fabric Controller will draw the nodes based on your last saved layout positions.

Before a layout is chosen, Nexus Dashboard Fabric Controller checks if a custom layout is applied. If a custom layout is applied, Nexus Dashboard Fabric Controller uses it. If a custom layout is not applied, Nexus Dashboard Fabric Controller checks if switches exist at different tiers, and chooses the Hierarchical layout or the Hierarchical Left-Right layout. Force-directed layout is chosen if all the other layouts fail.

Status

The color coding of each node and link corresponds to its state. The operational colors and what they indicate are described in the following list:

- Green - Indicates that the element is in good health and functioning as intended.
- Blue - Indicates that the element is in a warning state and requires attention to prevent any further problems.
- Yellow - Indicates that the element has minor issues.
- Orange - Indicates that the element has major issues and requires attention to prevent any further problems.
- Red - Indicates that the element is in critical state and requires immediate attention.
- Gray: Indicates lack of information to identify the element or the element has been discovered.

The configurational colors and what they indicate are described in the following list:

- Green - Indicates that the element is element is In-Sync with the intended configuration.
- Blue - Indicates that the element has pending deployments.
- Yellow - Indicates that active deployments are in-progress.
- Red - Indicates that the element is Out-of-Sync with the intended configuration.
- Gray: Indicates lack of information or no support for Configuration Sync calculation.



+ **In the Topology window, FEX appears in gray (Unknown or n/a) because Operation and Configuration status is not calculated for FEX.**

After moving a cable from one port to another port, the old fabric link is retained in the **Topology** window, and it is shown in the red color indicating that the link is down. Right-click on the link and delete it if the removal was intentional. A manual Rediscover of the switch will also delete and re-learn all links to that switch.

Initial Setup

The following topics provide initial setup information for the SAN operational mode in the Cisco Nexus Dashboard Fabric Controller.

Server Settings

You can set the parameters that are populated as default values.

To set the parameters of the Nexus Dashboard Fabric Controller server from the Cisco Nexus Dashboard Fabric Controller Web UI, perform the following steps:

1. Choose **Settings > Server Settings**.

Server settings are classified under different tabs,

2. Modify the settings based on the requirement.
3. Click **Save** to apply the new modified settings.

Each microservice of enabled features has other tabs and properties other than listed below. Each field has short description. If there is error during configuring any features, corresponding tab is highlighted in red, and **Save** button is disabled till the errors are resolved. Comprehensive checks are performed in NDFC server by the microservices, if there are any errors is displayed on NDFC UI. Server settings supported for 'all-or-none' to save properties and it doesn't support partial updates.



You can modify required properties in server settings without support of Cisco TAC.



If Nexus Dashboard is rebooted, NDFC services are down for some time.

Feature Management

In Cisco DCNM Release 11.x, you must choose the install mode while installing the DCNM. From Release 12.0.1a, Cisco Nexus Dashboard Fabric Controller allows you to install the service on the Nexus Dashboard. After you launch the Nexus Dashboard Fabric Controller UI, you will see three different Install modes on the Feature Management page.

Nexus Dashboard Fabric Controller 12 allows you to dynamically enable the feature set and scale applications. Choose **Settings > Feature Management** to choose the installer type and enable or disable few features on the selected deployment.

When you launch Nexus Dashboard Fabric Controller for the first time from Cisco Nexus Dashboard, the Feature Management screen appears. You can perform only Backup and Restore operations before you choose the feature set.

On the Feature Management page, you can choose one of the following install modes:

- Fabric Discovery
- Fabric Controller
- SAN Controller

After you select a Feature Set, from the next login, Dashboard page opens when you launch Cisco Nexus Dashboard Fabric Controller from Nexus Dashboard.

Choosing Feature Set

When you launch Cisco Nexus Dashboard Fabric Controller 12 for the first time, none of the feature set is enabled. During this state, you can perform Backup and Restore to restore the DCNM 11.5(x) data on Nexus Dashboard Fabric Controller 12. Nexus Dashboard Fabric Controller will read the data from the backup file and select the installer type accordingly.

To deploy feature-set from Cisco Nexus Dashboard Fabric Controller Web UI perform the following steps:

1. Choose **Settings > Feature Management**.
2. Select a persona to view the default set of features.

For information about the features available in Cisco NDFC personas, see [Features with each Operational Mode](#).

3. In the table below, select the check box against the feature name available with the feature set.
4. Click **Apply**.

The feature-set will be deployed. The selected applications will be enabled. A message appears that the feature set is installed, and you must refresh to take effect.

5. Refresh the browser to deploy Nexus Dashboard Fabric Controller with the selected feature set and applications.

The left pane shows the features supported specifically with the deployed feature set.

Features with each Operational Mode

SAN Controller

FICON

Enables the switch to communicate with IBM z Systems Mainframes that utilize the ANSI FC-SB Single-Byte Command Code Sets Mapping Protocol for Fibre Channel fabrics. When enabled, NDFC provides details about the FICON interfaces on the switches such as the interface details, the device to which the FICON port is connected and information about data transmitted or received through the interface at different intervals. See the section "Viewing FC FICON Ports" in [Add Interfaces for SAN Operational Mode](#) for more information about FICON interfaces.

Performance Monitoring

Enable this feature to monitor performance of fabrics in NDFC. See the section "Configuring Performance" in [Understanding SAN Fabrics](#) for more information.

SAN Insights

The SAN Insights feature enables you to configure, monitor, and view the flow analytics in fabrics. SAN Insights features of SAN Controller enable you to visualize the health-related indicators in the interface so that you can quickly identify issues in fabrics. See [SAN Insights](#) for more information.



Before you install or upgrade to SAN Controller Release 12.1.1e, ensure that you configure persistent IP address on Cisco Nexus Dashboard.

VMM Visualizer

Enable this feature to configure network visualization of Virtual Machines on fabrics. See [Virtual Infrastructure Manager](#) for more information.



SAN Insights and VMM Visualizer features are not enabled after restore. You must choose check boxes on **Settings > Feature Management** and click **Save** to enable these features after restore.

Changing across Feature-Set

Nexus Dashboard Fabric Controller 12 allows you to switch from one feature set to another. Choose **Settings > Feature Management**. Select the desired feature set and applications in the table below. Click **Save & Continue**. Refresh the browser to begin using Cisco Nexus Dashboard Fabric Controller with the new feature set and applications.

There are a few features/applications supported with specific deployments. When you change the feature set, some of these features are not supported in the new deployment. The following table provides details about the pre-requisites and criteria based on which you can change the feature set.

Table 1. Supported Switching between deployments

From/To	Fabric Discovery	Fabric Controller	SAN Controller
Fabric Discovery	-	Only monitor mode fabric is supported in Fabric Discovery deployment. When you change the feature set, the fabric can be used in the Fabric Controller deployment.	Not supported
Fabric Controller	You must delete the existing fabrics before changing the fabric set.	If you're changing from Easy Fabric to IPFM fabric application, you must delete the exiting fabrics.	Not supported
SAN Controller	Not supported	Not supported	-

SAN Credentials Management

Choose **Settings > SAN Credentials Management** to display the SNMP access details to the fabric seed switch. If the user has validated the access to all the fabrics, the SNMP credentials for all the seed switches of the fabrics is displayed.

The switch credentials window for the Cisco Nexus Dashboard Fabric Controller has the following fields:

Field	Description
Seed Switch	IP address of the switch.

Field	Description
Username	Specifies the username of the Cisco Nexus Dashboard Fabric Controller user.
Password	Displays the encrypted form of the switch SNMP user.
SNMPv3/SSH	Specifies if the SNMP protocol is validated or not.
The default value is false .	Auth/Privacy
Specifies the Authentication protocol.	The default value is NOT_SET .
Status	Displays the status of the switch.

Before the Cisco Nexus Dashboard Fabric Controller user configures the fabric using SNMP, the user must furnish and validate SNMP credentials on the seed switch of the fabric. If the user does not provide valid credentials for the fabric seed switch, the Switch Credentials table shows the default values for SNMPv3/SSH and AuthPrivacy fields.

The following table describes the action items, in the **Actions** menu drop-down list, that appear on **Settings > SAN Credentials Management**.

Action Item	Description
Edit	Select a row from the table and choose Edit to update the switch credentials information.
Clear	Clears the switch credentials.
Validate	Revalidates the switch credentials.

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