



Cisco® Nexus Switches

Cluster Switch Setup Guide for Cisco® Switches

For Cisco switches

July 2019 | 215-06775_A0_UR009
doccomments@netapp.com

Contents

Switches supported by ONTAP	4
Setting up the switches	6
Required cluster configuration information	9
Installing the Cluster Switch Health Monitor (CSHM) configuration file for 92300YC switches	11
Required documentation	13
Considerations for using Smart Call Home	16
Sample and blank cabling worksheets	17
Cisco Nexus 92300YC cabling worksheet	17
Cisco Nexus 3232C cabling worksheet	21
Cisco Nexus 3132Q-V cabling worksheet	24
Cisco Nexus 5596UP and 5596T cabling worksheet	26
Cisco Catalyst 2960 cabling worksheet for management switches	29
Copyright	32
Trademark	33
How to send comments about documentation and receive update notifications	34
Index	35

Switches supported by ONTAP

If you want to build ONTAP clusters with more than two nodes, you need two supported cluster network switches. You can use additional management switches, which are optional.

The following Cisco cluster network switches are supported:

- **Nexus 92300YC**

You can install the Cisco Nexus 92300YC switch (X190003/R) in a NetApp system cabinet or third-party cabinet with the standard brackets that are included with the switch.

The following table lists the part number and description for the 92300YC switch, fans, and power supplies:

Part number	Description
190003	Cisco 92300YC, CLSW, 48Pt10/25GB, 18Pt100G, PTSX (PTSX = Port Side Exhaust)
190003R	Cisco 92300YC, CLSW, 48Pt10/25GB, 18Pt100G, PSIN (PSIN = Port Side Intake)
X-NXA-FAN-35CFM-B	Fan, Cisco N9K port side intake airflow
X-NXA-FAN-35CFM-F	Fan, Cisco N9K port side exhaust airflow
X-NXA-PAC-650W-B	Power supply, Cisco 650W - port side intake
X-NXA-PAC-650W-F	Power supply, Cisco 650W - port side exhaust

Cisco Nexus 92300YC switch airflow details:

- Port-side exhaust airflow (standard air) —Cool air enters the chassis through the fan and power supply modules in the cold aisle and exhausts through the port end of the chassis in the hot aisle. Port-side exhaust airflow with blue coloring.
 - Port-side intake airflow (reverse air) —Cool air enters the chassis through the port end in the cold aisle and exhausts through the fan and power supply modules in the hot aisle. Port-side intake airflow with burgundy coloring.
- **Nexus 3232C**
You can install the Cisco Nexus 3232C switch (X190100) NetApp system cabinet with the custom brackets that come with the switch, or you can install it in a rack with the standard brackets that are also included with the switch.
 - **Nexus 3132Q-V**
You can install the Cisco Nexus 3132Q-V switch (X190001) in a NetApp system cabinet or third-party cabinet with the standard brackets that are included with the switch.

The following cluster and management switches are no longer available from NetApp, but will be supported by Cisco for a limited time:

- **Nexus 5596UP/5596T**

You can install the Cisco Nexus 5596UP switch (X1967-R6) or 5596T (X1989-R6) in a NetApp system cabinet with the custom brackets that come with the switch, or you can install it in a rack with the standard brackets that are also included with the switch.

The Nexus 5596UP switch also supports one or two 16-port expansion modules (X1988-R6).

The Nexus 5596T switch is only supported as a cluster interconnect switch for the FAS2520 and is intended to be used for performing nondisruptive hardware upgrades.

- Cisco Catalyst 2960 switch (X1965-R5)
End of Availability

Setting up the switches

If you do not already have the required configuration information and documentation, you need to gather that information before setting up your cluster and management network switches.

Before you begin

- You must have access to an HTTP, FTP or TFTP server at the installation site to download the applicable NX-OS and reference configuration file (RCF) releases.
- You must have the required cluster network and management network switch documentation. See [Required documentation](#) on page 13 for more information.
- You must have the required controller documentation and ONTAP documentation. [NetApp Documentation: Product Library A-Z](#)
- You must have the applicable licenses, network and configuration information, and cables.
- You must have the completed cabling worksheets.

Note: Due to the complexity that can result from illustrating layers of cabling, this guide does not provide cabling graphics. This guide does provide sample worksheets with recommended port assignments and blank worksheets that you can use to set up your cluster.

Note: For more information refer to the *Hardware Universe*.

[Hardware Universe](#)

About this task

All Cisco cluster network and management network switches arrive with the standard Cisco factory-default configuration. These switches also have the current version of the NX-OS software but do not have the RCFs loaded.

Attention: You must download the applicable NetApp cluster network and management network RCFs from the NetApp Support Site at mysupport.netapp.com for the switches that you receive.

mysupport.netapp.com

In addition, you might need to install the required configuration file to support the Cluster Switch Health Monitor (CSHM) for the 92300YC cluster switches. See [Installing the Cluster Switch Health Monitor \(CSHM\) configuration file for 92300YC switches](#) on page 11 for details.

Steps

1. Rack the cluster network and management network switches and controllers.

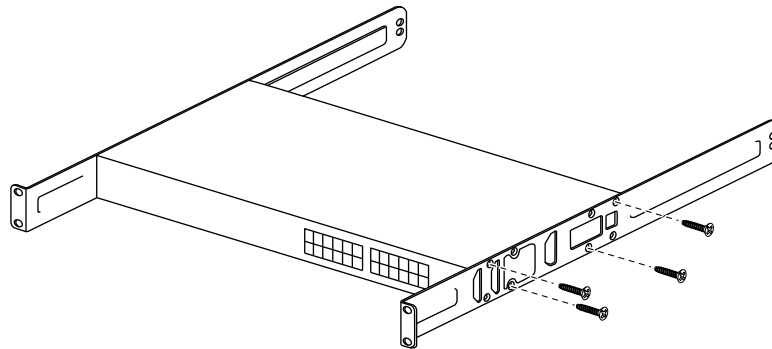
If you are installing your...	Then...
Cisco Nexus 3232C in a NetApp system cabinet	See the <i>Installing a Cisco Nexus 3232C cluster switch and pass-through panel in a NetApp cabinet</i> flyer for instructions to install the switch in a NetApp cabinet.
Cisco Nexus 3132Q-V in a NetApp system cabinet	See the <i>Installing a Cisco Nexus 3132Q-V cluster switch and pass-through panel in a NetApp cabinet</i> flyer for instructions to install the switch in a NetApp cabinet.
Equipment in a Telco rack	See the procedures provided in the switch hardware installation guides and the NetApp installation and setup instructions.

If you are installing your...	Then...
Cisco Nexus 5596UP/5596T in a NetApp system cabinet	See the <i>Installing a Cisco Nexus 5596 cluster switch and pass-through panel in a NetApp cabinet</i> flyer for instructions to install the switch in a NetApp cabinet.
Management switches (Cisco Catalyst 2960) in a NetApp system cabinet	Complete steps 2a through 2d.

2. To install the Catalyst 2960 in a NetApp system cabinet, follow these steps:

a. Attach the longer custom brackets on either side of the switch.

It is recommended that you use four screws per side. The following illustration shows the brackets being attached to the switch:

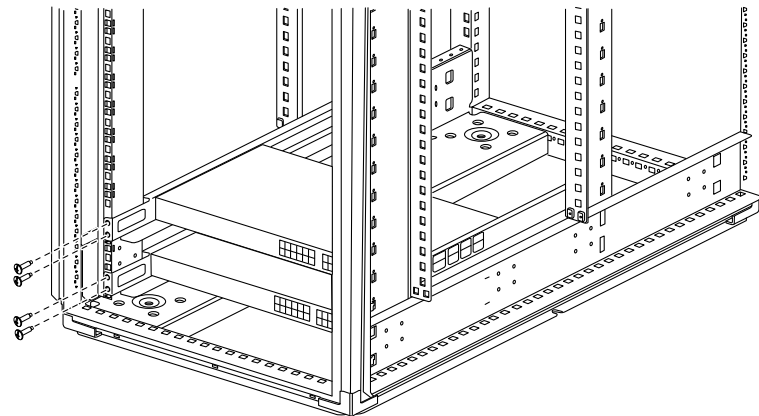


b. Attach the brackets to install a second management switch as shown in the illustration.

c. Attach one of the bracketed switches to the bottom rail (first U) of the cabinet and reserve 1U of space above the switch for routing the Ethernet cables.

d. Attach the remaining bracketed switch to the rail at the third U of the cabinet and reserve 1U of space above the switch for routing the Ethernet cables.

The following illustration shows the switches being attached to the cabinet:



3. Cable the cluster network and management network switches to the controllers using the completed cabling worksheets.

4. Power on the cluster network and management network switches and controllers.

5. Perform an initial configuration of the cluster network switches based on information provided in [Required configuration information](#) on page 9.

6. Verify the configuration choices you made in the display that appears at the end of the setup, and make sure that you save the configuration.

7. Check the version on the cluster network switches, and if necessary, download the NetApp-supported version of the software to the switches.

If you download the NetApp-supported version of the software, then you must also download the *NetApp Cluster Network Switch Reference Configuration File* and merge it with the configuration you saved in Step 6. You can download the file and the instructions from the [Cisco Ethernet Switch](#) description page.

8. Perform an initial configuration of the management network switches based on information provided in the *Getting Started Guide for the Catalyst 2960 24- and 48-Port Switches*.
9. Check the software version on the management network switches and, if necessary, download the NetApp-supported version of the software to the switches. If you have your own management switches, refer to [Cisco site](#).

If you download the NetApp-supported version of the software, then you must also download the *NetApp Management Network Switch Reference Configuration File* and merge it with the configuration you saved in Step 6. You can download the file and instructions from the [Cisco Ethernet Switch](#) description page.

Related concepts

[Required cluster configuration information](#) on page 9

[Required documentation](#) on page 13

Related references

[Sample and blank cabling worksheets](#) on page 17

Required cluster configuration information

To configure your cluster, you need the appropriate number and type of cables and cable connectors for your switches. Depending on the type of switch you are initially configuring, you need to connect to the switch console port with the included console cable; you also need to provide specific network information.

Required network information for all switches

You need the following network information for all switch configurations:

- IP subnet for management network traffic
- Host names and IP addresses for each of the storage system controllers and all applicable switches
- Most storage system controllers are managed through the e0M interface by connecting to the Ethernet service port (wrench icon). On AFF A800 and AFF A700 systems, the e0M interface uses a dedicated Ethernet port.

Refer to the *Hardware Universe* for latest information.

[Hardware Universe](#)

Required network information for Cisco Nexus 92300YC, 3232C, 3132Q-V, and 5596UP/5596T switches

For the Cisco Nexus 92300YC, 3232C, 3132Q-V, and 5596UP/5596T switches, you need to provide applicable responses to the following initial setup questions when you first boot the switch. Your site's security policy defines the responses and services to enable.

- Abort Auto Provisioning and continue with normal setup? (yes/no)
Respond with **yes**. The default is **no**.
- Do you want to enforce secure password standard? (yes/no)
Respond with **yes**. The default is **yes**.
- Enter the password for admin:
The default password is "admin"; you must create a new, strong password. A weak password can be rejected.
- Would you like to enter the basic configuration dialog? (yes/no)
Respond with **yes** at the initial configuration of the switch.
- Create another login account? (yes/no)
Your answer depends on your site's policies on alternate administrators. The default is **no**.
- Configure read-only SNMP community string? (yes/no)
Respond with **no**. The default is **no**.
- Configure read-write SNMP community string? (yes/no)
Respond with **no**. The default is **no**.
- Enter the switch name.
The switch name is limited to 63 alphanumeric characters.
- Continue with Out-of-band (mgmt0) management configuration? (yes/no)
Respond with **yes** (the default) at that prompt. At the `mgmt0 IPv4 address:` prompt, enter your IP address: `ip_address`.

- Configure the default-gateway? (yes/no)
Respond with **yes**. At the IPv4 address of the default-gateway: prompt, enter your *default_gateway*.
- Configure advanced IP options? (yes/no)
Respond with **no**. The default is **no**.
- Enable the telnet service? (yes/no)
Respond with **no**. The default is **no**.
- Enabled SSH service? (yes/no)
Respond with **yes**. The default is **yes**.

Note: SSHv2 is recommended for enhanced security.

- Enter the type of SSH key you want to generate (*dsa/rsa/rsa1*). The default is **rsa**.
- Enter the number of key bits (*1024-2048*).
- Configure the NTP server? (yes/no)
Respond with **no**. The default is **no**.
- Configure default interface layer (L3/L2):
Respond with **L2**. The default is **L2**.
- Configure default switch port interface state (shut/noshut):
Respond with **noshut**. The default is **noshut**.
- Configure CoPP system profile (strict/moderate/lenient/dense):
Respond with **strict**. The default is **strict**.
- Would you like to edit the configuration? (yes/no)
You should see the new configuration at this point. Review and make any necessary changes to the configuration you just entered. Respond with **no** at the prompt if you are satisfied with the configuration. Respond with **yes** if you want to edit your configuration settings.
- Use this configuration and save it? (yes/no)
Respond with **yes** to save the configuration. This automatically updates the kickstart and system images.

Note: If you do not save the configuration at this stage, none of the changes will be in effect the next time you reboot the switch.

For more information about the initial configuration of your switch, see the following guides:

[Cisco Nexus 3000 Series Hardware Installation Guide](#)

[Cisco Nexus 5000 Series Hardware Installation Guide](#)

[Cisco Nexus 92300YC Installation and Upgrade Guides](#)

Required network information for Cisco Catalyst 2960 switches

Prior to setup, you must identify any Spanning Tree or Physical Ethernet topologies. If your management network uses multiple spanning tree (MST), do not connect both the management network switches to your management network. Contact technical support for instructions to modify the NetApp reference configuration file (RCF) for your environment. Failure to do so might result in a looped Ethernet network, which degrades the performance to the point of denying access to the nodes' management ports and might potentially impact other network devices.

Note: By default, the cluster setup provides for one node-management logical interface (LIF) per node, which resides on a single port on a node and uses a single port on a switch. It is not redundant.

The 2960 switch is no longer available and might not be supported. This switch has now reached its software End-of-life (EOL).

For more information, refer to the [Cisco Catalyst 2960 Series Switches](#) page.

[Cisco Catalyst 2960 Series Switches](#)

For Cisco Catalyst 2960 switches, you must provide applicable responses to the following initial setup questions upon first boot of the switch:

- Would you like to terminate auto install? (yes/no)
You must enter **no** at the initial configuration of the switch.
- Would you like to enter the initial configuration dialog? (yes/no)
You must enter **yes** at the initial configuration of the switch.
- Would you like to enter basic management setup? (yes/no)
You must enter **yes** at the initial configuration of the switch.
- Enter host name (switch).
- Enter enable secret.
- Enter enable password.
- Enter virtual terminal password.
- Configure SNMP Network Management.
- Enter the interface name used to connect to the management network from the above interface summary.
If you provided an interface name, then Configure IP on this interface?
- Would you like to enable as a cluster command switch? (yes/no)

After completing the initial startup process, you must set an IP address. For example, to set the IP address 10.99.200.1/24 on the `vlan1` interface, enter these commands:

```
mgtswl> enable
mgtswl# conf t (configure terminal)
```

Enter the following configuration commands as shown, and then press Ctrl-Z:

```
mgtswl(config)# interface vlan1
mgtswl(config-if)#ip address 10.99.200.1 255.255.255.0
mgtswl(config-if)#no shutdown
mgtswl(config-if)#end
mgtswl# copy running-config startup-config
startup-config
```

Installing the Cluster Switch Health Monitor (CSHM) configuration file for 92300YC switches

You can use this procedure to install the applicable configuration file for cluster switch health monitoring of Nexus 92300YC cluster switches.

Before you begin

Before you setup the switch health monitor for 92300YC cluster switches, you must ensure that the ONTAP cluster is up and running.

Steps

1. Download the cluster switch health monitor configuration zip file based on the corresponding ONTAP release version. This file is available from the [NetApp Software download](#) page.
 - a. On the Software download page, select **Switch Health Monitor Configuration Files**
 - b. Select Platform = **ONTAP** and click **Go!**
 - c. On the Switch Health Monitor Configuration Files for ONTAP page, click **View & Download**
 - d. On the Switch Health Monitor Configuration Files for ONTAP - Description page, click **Download** for the applicable cluster switch model, for example: **Cisco Nexus 92300YC**
 - e. On the End User License Agreement page, click **Accept**
 - f. On the Switch Health Monitor Configuration Files for ONTAP - Download page, select the applicable configuration file, for example, **Cisco_Nexus_92300YC.zip**
2. Upload the applicable zip file to your internal web server where the IP address is X.X.X.X.

Example

For an internal web server IP address of 192.168.2.20 and assuming a /usr/download directory exists, you can upload your zip file to your web server using scp:

```
% scp Cisco_Nexus_92300YC.zip admin@192.168.2.20:/usr/download/
Cisco_Nexus_92300YC.zip
```

3. Access the advanced mode setting from one of the ONTAP systems in the cluster, using the command `set-privilege advanced`:

Example

```
cluster1::> set -privilege advanced
```

4. Run the switch health monitor configure command `system cluster-switch configure-health-monitor -node * -package-url X.X.X.X/location_to_download_zip_file`:

Example

```
cluster1::> system cluster-switch configure-health-monitor -node * -
package-url 192.168.2.20/usr/download/Cisco_Nexus_92300YC.zip
```

5. Verify that the command output contains the text string "downloaded package processed successfully". If an error occurs, contact NetApp support.
6. Run the command `system cluster-switch show` on the ONTAP system and ensure that the cluster switches are discovered with the monitored field set to "True".

Example

```
cluster1::> system cluster-switch show
```

Note: If at any time you revert to an earlier version of ONTAP, you will need to install the CSHM configuration file again to enable switch health monitoring of 92300YC cluster switches.

Required documentation

You need specific switch and controller documentation to set up your ONTAP cluster.

Required documentation for cluster network switches

To set up the Cisco Nexus 92300YC switches, you need the following documentation from the [Cisco Nexus 9000 Series Switches Support](#) page:

Document title	Description
<i>Nexus 9000 Series Hardware Installation Guide</i>	Provides detailed information about site requirements, switch hardware details, and installation options.
<i>Cisco Nexus 9000 Series Switch Software Configuration Guides</i> (choose the guide for the NX-OS release installed on your switches)	Provides initial switch configuration information that you need before you can configure the switch for ONTAP operation.
<i>Cisco Nexus 9000 Series NX-OS Software Upgrade and Downgrade Guide</i> (choose the guide for the NX-OS release installed on your switches)	Provides information on how to downgrade the switch to ONTAP supported switch software, if necessary.
<i>Cisco Nexus 9000 Series NX-OS Command Reference Master Index</i>	Provides links to the various command references provided by Cisco.
<i>Cisco Nexus 9000 MIBs Reference</i>	Describes the Management Information Base (MIB) files for the Nexus 9000 switches.
<i>Nexus 9000 Series NX-OS System Message Reference</i>	Describes the system messages for Cisco Nexus 9000 series switches, those that are informational, and others that might help diagnose problems with links, internal hardware, or the system software.
<i>Cisco Nexus 9000 Series NX-OS Release Notes</i> (choose the notes for the NX-OS release installed on your switches)	Describes the features, bugs, and limitations for the Cisco Nexus 9000 Series.
Regulatory Compliance and Safety Information for Cisco Nexus 9000 Series	Provides international agency compliance, safety, and statutory information for the Nexus 9000 series switches.

To set up the Cisco Nexus 3232C and 3132Q-V switches, you need the following documentation from the [Cisco Nexus 3000 Series Switches Support](#) page:

Document title	Description
<i>Nexus 3000 Series Hardware Installation Guide</i>	Provides detailed information about site requirements, switch hardware details, and installation options.
<i>Cisco Nexus 3000 Series Switch Software Configuration Guides</i> (choose the guide for the NX-OS release installed on your switches)	Provides initial switch configuration information that you need before you can configure the switch for ONTAP operation.

Document title	Description
<i>Cisco Nexus 3000 Series NX-OS Software Upgrade and Downgrade Guide</i> (choose the guide for the NX-OS release installed on your switches)	Provides information on how to downgrade the switch to ONTAP supported switch software, if necessary.
<i>Cisco Nexus 3000 Series NX-OS Command Reference Master Index</i>	Provides links to the various command references provided by Cisco.
<i>Cisco Nexus 3000 MIBs Reference</i>	Describes the Management Information Base (MIB) files for the Nexus 3000 switches.
<i>Nexus 3000 Series NX-OS System Message Reference</i>	Describes the system messages for Cisco Nexus 3000 series switches, those that are informational, and others that might help diagnose problems with links, internal hardware, or the system software.
<i>Cisco Nexus 3000 Series NX-OS Release Notes</i> (choose the notes for the NX-OS release installed on your switches)	Describes the features, bugs, and limitations for the Cisco Nexus 3000 Series.
Regulatory, Compliance, and Safety Information for the Cisco Nexus 6000, Cisco Nexus 5000 Series, Cisco Nexus 3000 Series, and Cisco Nexus 2000 Series	Provides international agency compliance, safety, and statutory information for the Nexus 3000 series switches.

To set up the Cisco Nexus 5596 switch, you need the following documents from [Cisco Nexus 5000 Series Switches Support](#) page:

Document title	Description
<i>Nexus 5000 Series Hardware Installation Guide</i>	Provides detailed information about site requirements, switch hardware details, and installation options.
<i>Cisco Nexus 5000 Series Switch Software Configuration Guide</i> (choose the guide for the software you are using)	Provides initial switch configuration information that you need before you can configure the switch for ONTAP operation.
<i>Cisco Nexus 5000 Series NX-OS Software Upgrade and Downgrade Guide</i>	Provides information about how to downgrade the switch to the supported ONTAP switch software, if necessary.
<i>Cisco Nexus 5000 Series NX-OS Command Reference Master Index</i>	Provides an alphabetical list of all the commands supported for a specific NX-OS release.
<i>Cisco Nexus 5000 and Nexus 2000 MIBs Reference</i>	Describes the Management Information Base (MIB) files for the Nexus 5000 switches.
<i>Nexus 5000 Series NX-OS System Message Reference</i>	Describes troubleshooting information.
<i>Regulatory, Compliance, and Safety Information for the Cisco Nexus 6000 Series, Cisco Nexus 5000 Series, Cisco Nexus 3000 Series, and Cisco Nexus 2000 Series</i>	Provides international agency compliance, safety, and statutory information for the Nexus 5000 series switches.

Required documentation for management network switches

To set up a Cisco Catalyst 2960 switch, you need the following documents from the [Cisco Catalyst 2960 Series Switches Support](#) page: If you have other Cisco management switches, refer to the [Cisco site](#) to get the necessary documents.

Note: The 2960 switch has now reached its [software EOL](#).

Document title	Description
Catalyst 2960 Switch Hardware Installation Guide	Provides detailed information about site requirements, switch hardware details, and installation options.
Getting Started Guide for the Catalyst 2960 24- and 48-Port Switches	Provides initial switch configuration information that you need before you can configure the switch for ONTAP operation.
Catalyst 2960 Switch Command Reference (choose the reference for the software you are using)	Provides an alphabetical list of all the commands supported for a specific IOS release.
Catalyst 2960 Switch System Message Guide	Describes troubleshooting information.
Regulatory Compliance and Safety Information for the Catalyst 2960 and 2960-S Switches	Provides international agency compliance, safety, and statutory information for the Catalyst 2960 switches.

Required documentation for supported ONTAP systems

To set up an ONTAP system, you need the following documents for your version of the operating system from the [ONTAP library](#).

Name	Description
Controller-specific Installation and Setup Instructions	Describes how to install NetApp hardware.
ONTAP documentation	Provides detailed information about all aspects of the ONTAP releases.
Hardware Universe	Provides NetApp hardware configuration and compatibility information.

Rail kit and cabinet documentation

To install a Cisco switch in a NetApp cabinet, see the following hardware documentation:

Name	Description
42U System Cabinet, Deep Guide	Describes the FRUs associated with the 42U system cabinet, and provides maintenance and FRU replacement instructions.
Installing a Cisco Nexus 3232C cluster switch and pass-through panel in a NetApp cabinet	Describes how to install a Cisco Nexus 3232C switch in a four-post NetApp cabinet.
Installing a Cisco Nexus 3132Q-V switch and pass-through panel in a NetApp Cabinet	Describes how to install a Cisco Nexus 3132Q-V switch in a four-post NetApp cabinet.
Installing a Cisco Nexus 5596 switch and pass-through panel in a NetApp Cabinet	Describes how to install a Cisco Nexus 5596 switch in a NetApp cabinet.

Considerations for using Smart Call Home

Smart Call Home monitors the hardware and software components on your network, to generate an email-based notification of critical system conditions. When an event occurs on your device, Smart Call Home raises an alert to all the recipients that are configured in your destination profile.

You must configure a cluster network switch to communicate using email with the Smart Call Home system. You can optionally set up your cluster network switch to take advantage of Cisco's embedded Smart Call Home support feature.

Before you can use Smart Call Home feature, you need to be aware of the following considerations:

- An email server must be in place.
- The switch must have IP connectivity to the email server.
- The contact name (SNMP server contact), phone number, and street address information must be configured.
- This is required to determine the origin of messages received.
- A CCO ID must be associated with an appropriate Cisco SMARTnet Service contract for your company.
- Cisco SMARTnet Service must be in place for the device to be registered.

The Cisco support site contains information about the commands to configure Smart Call Home.

[*Cisco support site*](#)

Sample and blank cabling worksheets

The sample cabling worksheets provide examples of recommended port assignments from the switches to the controllers. The blank worksheets provide a template that you can use in setting up your cluster.

Cisco Nexus 92300YC cabling worksheet

If you want to document the supported platforms, you must complete the blank cabling worksheet by using the completed sample cabling worksheet as a guide.

Sample cabling worksheet

The sample port definition on each pair of switches is as follows:

Cluster switch A		Cluster switch B	
Switch port	Node and port usage	Switch port	Node and port usage
1	10/25 GbE node	1	10/25 GbE node
2	10/25 GbE node	2	10/25 GbE node
3	10/25 GbE node	3	10/25 GbE node
4	10/25 GbE node	4	10/25 GbE node
5	10/25 GbE node	5	10/25 GbE node
6	10/25 GbE node	6	10/25 GbE node
7	10/25 GbE node	7	10/25 GbE node
8	10/25 GbE node	8	10/25 GbE node
9	10/25 GbE node	9	10/25 GbE node
10	10/25 GbE node	10	10/25 GbE node
11	10/25 GbE node	11	10/25 GbE node
12	10/25 GbE node	12	10/25 GbE node
13	10/25 GbE node	13	10/25 GbE node
14	10/25 GbE node	14	10/25 GbE node
15	10/25 GbE node	15	10/25 GbE node
16	10/25 GbE node	16	10/25 GbE node
17	10/25 GbE node	17	10/25 GbE node
18	10/25 GbE node	18	10/25 GbE node
19	10/25 GbE node	19	10/25 GbE node
20	10/25 GbE node	20	10/25 GbE node
21	10/25 GbE node	21	10/25 GbE node
22	10/25 GbE node	22	10/25 GbE node
23	10/25 GbE node	23	10/25 GbE node

Cluster switch A		Cluster switch B	
Switch port	Node and port usage	Switch port	Node and port usage
24	10/25 GbE node	24	10/25 GbE node
25	10/25 GbE node	25	10/25 GbE node
26	10/25 GbE node	26	10/25 GbE node
27	10/25 GbE node	27	10/25 GbE node
28	10/25 GbE node	28	10/25 GbE node
29	10/25 GbE node	29	10/25 GbE node
30	10/25 GbE node	30	10/25 GbE node
31	10/25 GbE node	31	10/25 GbE node
32	10/25 GbE node	32	10/25 GbE node
33	10/25 GbE node	33	10/25 GbE node
34	10/25 GbE node	34	10/25 GbE node
35	10/25 GbE node	35	10/25 GbE node
36	10/25 GbE node	36	10/25 GbE node
37	10/25 GbE node	37	10/25 GbE node
38	10/25 GbE node	38	10/25 GbE node
39	10/25 GbE node	39	10/25 GbE node
40	10/25 GbE node	40	10/25 GbE node
41	10/25 GbE node	41	10/25 GbE node
42	10/25 GbE node	42	10/25 GbE node
43	10/25 GbE node	43	10/25 GbE node
44	10/25 GbE node	44	10/25 GbE node
45	10/25 GbE node	45	10/25 GbE node
46	10/25 GbE node	46	10/25 GbE node
47	10/25 GbE node	47	10/25 GbE node
48	10/25 GbE node	48	10/25 GbE node
49	40/100 GbE node	49	40/100 GbE node
50	40/100 GbE node	50	40/100 GbE node
51	40/100 GbE node	51	40/100 GbE node
52	40/100 GbE node	52	40/100 GbE node
53	40/100 GbE node	53	40/100 GbE node
54	40/100 GbE node	54	40/100 GbE node
55	40/100 GbE node	55	40/100 GbE node
56	40/100 GbE node	56	40/100 GbE node
57	40/100 GbE node	57	40/100 GbE node

Cluster switch A		Cluster switch B	
Switch port	Node and port usage	Switch port	Node and port usage
58	40/100 GbE node	58	40/100 GbE node
59	40/100 GbE node	59	40/100 GbE node
60	40/100 GbE node	60	40/100 GbE node
61	40/100 GbE node	61	40/100 GbE node
62	40/100 GbE node	62	40/100 GbE node
63	40/100 GbE node	63	40/100 GbE node
64	40/100 GbE node	64	40/100 GbE node
65	100 GbE ISL to switch B port 65	65	100 GbE ISL to switch A port 65
66	100 GbE ISL to switch B port 66	66	100 GbE ISL to switch A port 65

Blank cabling worksheet

You can use the blank cabling worksheet to document the platforms that are supported as nodes in a cluster. The *Supported Cluster Connections* section of the *Hardware Universe* defines the cluster ports used by the platform.

Cluster switch A		Cluster switch B	
Switch port	Node/port usage	Switch port	Node/port usage
1		1	
2		2	
3		3	
4		4	
5		5	
6		6	
7		7	
8		8	
9		9	
10		10	
11		11	
12		12	
13		13	
14		14	
15		15	
16		16	
17		17	
18		18	

Cluster switch A		Cluster switch B	
Switch port	Node/port usage	Switch port	Node/port usage
19		19	
20		20	
21		21	
22		22	
23		23	
24		24	
25		25	
26		26	
27		27	
28		28	
29		29	
30		30	
31		31	
32		32	
33		33	
34		34	
35		35	
36		36	
37		37	
38		38	
39		39	
40		40	
41		41	
42		42	
43		43	
44		44	
45		45	
46		46	
47		47	
48		48	
49		49	
50		50	
51		51	
52		52	

Cluster switch A		Cluster switch B	
Switch port	Node/port usage	Switch port	Node/port usage
53		53	
54		54	
55		55	
56		56	
57		57	
58		58	
59		59	
60		60	
61		61	
62		62	
63		63	
64		64	
65	ISL to switch B port 65	65	ISL to switch A port 65
66	ISL to switch B port 66	66	ISL to switch A port 66

Cisco Nexus 3232C cabling worksheet

If you want to document the supported platforms, you must complete the blank cabling worksheet by using the completed sample cabling worksheet as a guide. Each switch can be configured as a single 100GbE, 40GbE port or 4 x 10GbE ports.

Sample cabling worksheet

The sample port definition on each pair of switches is as follows:

Cluster switch A		Cluster switch B	
Switch port	Node and port usage	Switch port	Node and port usage
1	4x10G/40G/100G node	1	4x10G/40G/100G node
2	4x10G/40G/100G node	2	4x10G/40G/100G node
3	4x10G/40G/100G node	3	4x10G/40G/100G node
4	4x10G/40G/100G node	4	4x10G/40G/100G node
5	4x10G/40G/100G node	5	4x10G/40G/100G node
6	4x10G/40G/ 100Gnode	6	4x10G/40G/100Gnode

Cluster switch A		Cluster switch B	
Switch port	Node and port usage	Switch port	Node and port usage
7	4x10G/40G/100G node	7	4x10G/40G/100G node
8	4x10G/40G/100G node	8	4x10G/40G/100G node
9	4x10G/40G/100G node	9	4x10G/40G/100G node
10	4x10G/40G/100G node	10	4x10G/40G/100G node
11	4x10G/40G/100G node	11	4x10G/40G/100G node
12	4x10G/40G/100G node	12	4x10G/40G/100G node
13	4x10G/40G/100G node	13	4x10G/40G/100G node
14	4x10G/40G/100G node	14	4x10G/40G/100G node
15	4x10G/40G/100G node	15	4x10G/40G/100G node
16	4x10G/40G/100G node	16	4x10G/40G/100G node
17	4x10G/40G/100G node	17	4x10G/40G/100G node
18	4x10G/40G/100G node	18	4x10G/40G/100G node
19	40G/100G node 19	19	40G/100G node 19
20	40G/100G node 20	20	40G/100G node 20
21	40G/100G node 21	21	40G/100G node 21
22	40G/100G node 22	22	40G/100G node 22
23	40G/100G node 23	23	40G/100G node 23
24	40G/100G node 24	24	40G/100G node 24
25 through 30	Reserved	25 through 30	Reserved
31	100G ISL to switch B port 31	31	100G ISL to switch A port 31
32	100G ISL to switch B port 32	32	100G ISL to switch A port 32

Blank cabling worksheet

You can use the blank cabling worksheet to document the platforms that are supported as nodes in a cluster. The *Supported Cluster Connections* section of the *Hardware Universe* defines the cluster ports used by the platform.

Cluster switch A		Cluster switch B	
Switch port	Node/port usage	Switch port	Node/port usage
1		1	
2		2	
3		3	
4		4	
5		5	
6		6	
7		7	
8		8	
9		9	
10		10	
11		11	
12		12	
13		13	
14		14	
15		15	
16		16	
17		17	
18		18	
19		19	
20		20	
21		21	
22		22	
23		23	
24		24	
25 through 30	Reserved	25 through 30	Reserved
31	100G ISL to switch B port 31	31	100G ISL to switch A port 31
32	100G ISL to switch B port 32	32	100G ISL to switch A port 32

Cisco Nexus 3132Q-V cabling worksheet

If you want to document the supported platforms, you must complete the blank cabling worksheet by using the completed sample cabling worksheet as a guide. Each switch can be configured as a single 40GbE port or 4 x 10GbE ports.

Sample cabling worksheet

The sample port definition on each pair of switches is as follows:

Cluster switch A		Cluster switch B	
Switch port	Node and port usage	Switch port	Node and port usage
1	4x10G/40G node	1	4x10G/40G node
2	4x10G/40G node	2	4x10G/40G node
3	4x10G/40G node	3	4x10G/40G node
4	4x10G/40G node	4	4x10G/40G node
5	4x10G/40G node	5	4x10G/40G node
6	4x10G/40G node	6	4x10G/40G node
7	4x10G/40G node	7	4x10G/40G node
8	4x10G/40G node	8	4x10G/40G node
9	4x10G/40G node	9	4x10G/40G node
10	4x10G/40G node	10	4x10G/40G node
11	4x10G/40G node	11	4x10G/40G node
12	4x10G/40G node	12	4x10G/40G node
13	4x10G/40G node	13	4x10G/40G node
14	4x10G/40G node	14	4x10G/40G node
15	4x10G/40G node	15	4x10G/40G node
16	4x10G/40G node	16	4x10G/40G node
17	4x10G/40G node	17	4x10G/40G node
18	4x10G/40G node	18	4x10G/40G node
19	40G node 19	19	40G node 19
20	40G node 20	20	40G node 20
21	40G node 21	21	40G node 21
22	40G node 22	22	40G node 22
23	40G node 23	23	40G node 23
24	40G node 24	24	40G node 24
25 through 30	Reserved	25 through 30	Reserved
31	40G ISL to switch B port 31	31	40G ISL to switch A port 31

Cluster switch A		Cluster switch B	
Switch port	Node and port usage	Switch port	Node and port usage
32	40G ISL to switch B port 32	32	40G ISL to switch A port 32

Blank cabling worksheet

You can use the blank cabling worksheet to document the platforms that are supported as nodes in a cluster. The *Supported Cluster Connections* section of the *Hardware Universe* defines the cluster ports used by the platform.

Cluster switch A		Cluster switch B	
Switch port	Node/port usage	Switch port	Node/port usage
1		1	
2		2	
3		3	
4		4	
5		5	
6		6	
7		7	
8		8	
9		9	
10		10	
11		11	
12		12	
13		13	
14		14	
15		15	
16		16	
17		17	
18		18	
19		19	
20		20	
21		21	
22		22	
23		23	
24		24	
25 through 30	Reserved	25 through 30	Reserved
31	40G ISL to switch B port 31	31	40G ISL to switch A port 31

Cluster switch A		Cluster switch B	
Switch port	Node/port usage	Switch port	Node/port usage
32	40G ISL to switch B port 32	32	40G ISL to switch A port 32

Cisco Nexus 5596UP and 5596T cabling worksheet

If you want to document the supported platforms, you must complete the blank cabling worksheet by using the completed sample cabling worksheet as a guide.

Some platforms support more than one 10GbE cluster port connection per cluster interconnect switch. To support additional cluster connections, you can use ports 25 through 40, as well as ports 49 through 80 when expansion modules are installed.

Sample cabling worksheet

The sample port definition on each pair of switches is as follows:

Cluster switch A		Cluster switch B	
Switch port	Node and port usage	Switch port	Node and port usage
1	Node port 1	1	Node port 1
2	Node port 2	2	Node port 2
3	Node port 3	3	Node port 3
4	Node port 4	4	Node port 4
5	Node port 5	5	Node port 5
6	Node port 6	6	Node port 6
7	Node port 7	7	Node port 7
8	Node port 8	8	Node port 8
9	Node port 9	9	Node port 9
10	Node port 10	10	Node port 10
11	Node port 11	11	Node port 11
12	Node port 12	12	Node port 12
13	Node port 13	13	Node port 13
14	Node port 14	14	Node port 14
15	Node port 15	15	Node port 15
16	Node port 16	16	Node port 16
17	Node port 17	17	Node port 17
18	Node port 18	18	Node port 18
19	Node port 19	19	Node port 19
20	Node port 20	20	Node port 20
21	Node port 21	21	Node port 21
22	Node port 22	22	Node port 22

Cluster switch A		Cluster switch B	
Switch port	Node and port usage	Switch port	Node and port usage
23	Node port 23	23	Node port 23
24	Node port 24	24	Node port 24
25 through 40	Reserved	25 through 40	Reserved
41	ISL to switch B port 41	41	ISL to switch A port 41
42	ISL to switch B port 42	42	ISL to switch A port 42
43	ISL to switch B port 43	43	ISL to switch A port 43
44	ISL to switch B port 44	44	ISL to switch A port 44
45	ISL to switch B port 45	45	ISL to switch A port 45
46	ISL to switch B port 46	46	ISL to switch A port 46
47	ISL to switch B port 47	47	ISL to switch A port 47
48	ISL to switch B port 48	48	ISL to switch A port 48

Blank cabling worksheet

You can use the blank cabling worksheet to document the platforms that are supported as nodes in a cluster. The *Supported Cluster Connections* section of the *Hardware Universe* defines the cluster ports used by the platform.

Note: Switch ports 1 through 24 function as 10 GbE ports. Switch ports 41 through 48 are reserved for Inter-Switch Links (ISLs).

Cluster switch A		Cluster switch B	
Switch port	Node/port usage	Switch port	Node/port usage
1		1	
2		2	
3		3	
4		4	
5		5	
6		6	
7		7	
8		8	
9		9	
10		10	

Cluster switch A		Cluster switch B	
Switch port	Node/port usage	Switch port	Node/port usage
11		11	
12		12	
13		13	
14		14	
15		15	
16		16	
17		17	
18		18	
19		19	
20		20	
21		21	
22		22	
23		23	
24		24	
25 through 40	Reserved	25 through 40	Reserved
41	ISL to switch B port 41	41	ISL to switch A port 41
42	ISL to switch B port 42	42	ISL to switch A port 42
43	ISL to switch B port 43	43	ISL to switch A port 43
44	ISL to switch B port 44	44	ISL to switch A port 44
45	ISL to switch B port 45	45	ISL to switch A port 45
46	ISL to switch B port 46	46	ISL to switch A port 46
47	ISL to switch B port 47	47	ISL to switch A port 47
48	ISL to switch B port 48	48	ISL to switch A port 48

Cisco Catalyst 2960 cabling worksheet for management switches

If you are using management switches, use the completed sample cabling worksheets as a guide to record information on the blank cabling worksheet that is provided.

Sample cabling worksheet

Except for AFF A800 and AFF A700 systems controllers do not require port assignments for the BMC. If you are using cluster switches with such platforms, the port usage is defined as *Reserved*.

The sample port definition on each pair of switches is as follows:

Management switch A			Management switch B		
Switch port	Node/port usage		Switch port	Node/port usage	
	AFF A800/ AFF A700	All other systems		AFF A800/ AFF A700	All other systems
1	Node 1 management	Node 1 management	1	Node 2 management	Node 2 management
2	Node 3 management	Node 3 management	2	Node 4 management	Node 4 management
3	Node 5 management	Node 5 management	3	Node 6 management	Node 6 management
4	Node 7 management	Node 7 management	4	Node 8 management	Node 8 management
5	Node 9 management	Node 9 management	5	Node 10 management	Node 10 management
6	Node 11 management	Node 11 management	6	Node 12 management	Node 12 management
7	Node 13 management	Node 13 management	7	Node 14 management	Node 14 management
8	Node 15 management	Node 15 management	8	Node 16 management	Node 16 management
9	Node 17 management	Node 17 management	9	Node 18 management	Node 18 management
10	Node 19 management	Node 19 management	10	Node 20 management	Node 20 management
11	Node 21 management	Node 21 management	11	Node 22 management	Node 22 management
12	Node 2 BMC	Node 23 management	12	Node 2 BMC	Node 24 management
13	Node 4 BMC	Reserved	13	Node 4 BMC	Reserved
14	Node 6 BMC	Reserved	14	Node 6 BMC	Reserved
15	Node 8 BMC	Reserved	15	Node 8 BMC	Reserved
16	Node 10 BMC	Reserved	16	Node 10 BMC	Reserved

Management switch A			Management switch B		
Switch port	Node/port usage		Switch port	Node/port usage	
	AFF A800/ AFF A700	All other systems		AFF A800/ AFF A700	All other systems
17	Node 12 BMC	Reserved	17	Node 12 BMC	Reserved
18	Node 14 BMC	Reserved	18	Node 14 BMC	Reserved
19	Node 16 BMC	Reserved	19	Node 16 BMC	Reserved
20	Node 18 BMC	Reserved	20	Node 18 BMC	Reserved
21	Node 20 BMC	Reserved	21	Node 20 BMC	Reserved
22	Node 22 BMC	Reserved	22	Node 22 BMC	Reserved
23	Reserved	Reserved	23	Reserved	Reserved
24	Cluster switch A management port		24	Cluster switch B management port	
GbE1	To customer LAN		GbE1	To customer LAN	
GbE2	ISL to management switch B		GbE2	ISL to management switch A	

Blank cabling worksheet

You can use the blank cabling worksheet to document the platforms that are supported as nodes in a cluster. The Ethernet port usage section of the *Hardware Universe* defines the management port for supported platforms as nodes in a cluster.

Management switch A		Management switch B	
Switch port	Node/port usage	Switch port	Node/port usage
1		1	
2		2	
3		3	
4		4	
5		5	
6		6	
7		7	
8		8	
9		9	
10		10	
11		11	
12		12	
13		13	
14		14	
15		15	
16		16	
17		17	

Management switch A		Management switch B	
Switch port	Node/port usage	Switch port	Node/port usage
18		18	
19		19	
20		20	
21		21	
22		22	
23	Reserved	23	Reserved
24	Cluster switch A management port	24	Cluster switch B management port
GbE1	To customer LAN	GbE1	To customer LAN
GbE2	ISL to management switch B	GbE2	ISL to management switch A

Copyright

Copyright © 2019 NetApp, Inc. All rights reserved. Printed in the U.S.

No part of this document covered by copyright may be reproduced in any form or by any means—graphic, electronic, or mechanical, including photocopying, recording, taping, or storage in an electronic retrieval system—without prior written permission of the copyright owner.

Software derived from copyrighted NetApp material is subject to the following license and disclaimer:

THIS SOFTWARE IS PROVIDED BY NETAPP "AS IS" AND WITHOUT ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WHICH ARE HEREBY DISCLAIMED. IN NO EVENT SHALL NETAPP BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

NetApp reserves the right to change any products described herein at any time, and without notice. NetApp assumes no responsibility or liability arising from the use of products described herein, except as expressly agreed to in writing by NetApp. The use or purchase of this product does not convey a license under any patent rights, trademark rights, or any other intellectual property rights of NetApp.

The product described in this manual may be protected by one or more U.S. patents, foreign patents, or pending applications.

Data contained herein pertains to a commercial item (as defined in FAR 2.101) and is proprietary to NetApp, Inc. The U.S. Government has a non-exclusive, non-transferrable, non-sublicensable, worldwide, limited irrevocable license to use the Data only in connection with and in support of the U.S. Government contract under which the Data was delivered. Except as provided herein, the Data may not be used, disclosed, reproduced, modified, performed, or displayed without the prior written approval of NetApp, Inc. United States Government license rights for the Department of Defense are limited to those rights identified in DFARS clause 252.227-7015(b).

Trademark

NETAPP, the NETAPP logo, and the marks listed on the NetApp Trademarks page are trademarks of NetApp, Inc. Other company and product names may be trademarks of their respective owners.

<http://www.netapp.com/us/legal/netapptmlist.aspx>

How to send comments about documentation and receive update notifications

You can help us to improve the quality of our documentation by sending us your feedback. You can receive automatic notification when production-level (GA/FCS) documentation is initially released or important changes are made to existing production-level documents.

If you have suggestions for improving this document, send us your comments by email.

[*doccomments@netapp.com*](mailto:doccomments@netapp.com)

To help us direct your comments to the correct division, include in the subject line the product name, version, and operating system.

If you want to be notified automatically when production-level documentation is released or important changes are made to existing production-level documents, follow Twitter account @NetAppDoc.

You can also contact us in the following ways:

- NetApp, Inc., 1395 Crossman Ave., Sunnyvale, CA 94089 U.S.
- Telephone: +1 (408) 822-6000
- Fax: +1 (408) 822-4501
- Support telephone: +1 (888) 463-8277

Index

3132Q-V

sample cabling worksheet [24](#)

3232C

sample cabling worksheet [21](#)

C

cabling

Catalyst 2960 blank worksheet for management switches [29](#)

Catalyst 2960 sample worksheet for management switches [29](#)

Nexus 3132Q-V blank worksheet [24](#)

Nexus 3132Q-V sample worksheet [24](#)

Nexus 3232C blank worksheet [21](#)

Nexus 3232C sample worksheet [21](#)

Nexus 5596 blank worksheet [17, 26](#)

Nexus 5596 sample worksheet [17, 26](#)

Catalyst 2960

blank cabling worksheet for management switches [29](#)

sample cabling worksheet for management switches [29](#)

Cisco cluster network switches

supported [4](#)

Cisco switches

required documentation, to set up your ONTAP switch configuration [13](#)

setting up [6](#)

cluster network switches

supported [4](#)

cluster networks

configuration requirements [9](#)

comments

how to send feedback about documentation [34](#)

configurations

required information for cluster [9](#)

configuring

requirements for Smart Call Home feature [16](#)

considerations

for using Smart Call Home [16](#)

when configuring Smart Call Home feature [16](#)

controller documentation

to set up your ONTAP switch configuration [13](#)

CSHM

installing, configuring [11](#)

D

documentation

how to receive automatic notification of changes to [34](#)

how to send feedback about [34](#)

F

feedback

how to send comments about documentation [34](#)

I

information

how to send feedback about improving documentation [34](#)

initial setup

CSHM file [11](#)

M

management network switches

supported [4](#)

management networks

cluster configuration requirements [9](#)

monitors

hardware and software components, Smart Call

Home considerations [16](#)

N

Nexus 3132Q-V

blank cabling worksheet [24](#)

Nexus 3232C

blank cabling worksheet [21](#)

Nexus 5596

blank cabling worksheet [17, 26](#)

sample cabling worksheet [17, 26](#)

notifying

critical system conditions, Smart Call Home

considerations [16](#)

O

ONTAP switch configuration

switch and controller documentation to setup [13](#)

R

requirements

cluster configuration [9](#)

S

setup

switches [6](#)

Smart call Home

considerations for using [16](#)

suggestions

how to send feedback about documentation [34](#)

supported switches

cluster network and management [4](#)

switch types

required cluster configuration information [9](#)

switches

required cluster configuration information,

depending on the type [9](#)

setting up [6](#)

supported cluster network [4](#)

supported management network [4](#)

T

Twitter

how to receive automatic notification of documentation changes [34](#)

W

worksheets

Catalyst 2960 blank cabling for management switches [29](#)

Catalyst 2960 sample cabling for management switches [29](#)

Nexus 3132Q-V blank cabling [24](#)

Nexus 3132Q-V sample cabling [24](#)

Nexus 3232C blank cabling [21](#)

Nexus 3232C sample cabling [21](#)

Nexus 5596 blank cabling [17](#), [26](#)

Nexus 5596 sample cabling [17](#), [26](#)