配置软件

Cluster and storage switches

NetApp
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配置软件

Cisco Nexus 9336C-x2集群交换机的软件安装工作流

要为Cisco Nexus 9336C-FX2交换机安装和配置软件、请执行以下步骤：

1. "准备安装NX-OS软件和RCF"。
2. "安装 NX-OS 软件"。
3. "安装参考配置文件（RCF）"。

首次设置Nexus 9336C-x2交换机后、安装RCF。您也可以使用此操作步骤升级 RCF 版本。

可用的**RC**框架 配置

下表介绍了可用于不同配置的RCF。选择适用于您的配置的RC框架。

有关特定端口和VLAN使用情况的详细信息、请参阅RC框架 中的横幅和重要说明部分。

RC框架 名称	**Description**
2-cluster-ha-Breakout	支持两个ONTAP集群、其中至少包含八个节点、包括使用共享集群+HA端口的节点。
4-Cluster-HA-Breakout	支持四个ONTAP集群、其中至少包含四个节点、包括使用共享集群+HA端口的节点。
1-Cluster-HA	所有端口均配置为40/100GbE。支持端口上的共享集群/HA流量。AFF A320、AFF A250和FAS500f系统需要。此外、所有端口均可用作专用集群端口。
1-Cluster-HA-Breakout	端口配置为4个10GbE分支端口、4个25GbE分支端口(100GbE交换机上的RCF1.6以上)和40/100GbE端口。支持在使用共享集群/HA端口的节点的端口上传输共享集群/HA流量：AFF A320、AFF A250和FAS500f系统。此外、所有端口均可用作专用集群端口。
集群-高可用性-存储	端口配置为40/100GbE用于集群+HA、4x10GbE分支用于集群、4x25GbE分支用于集群+HA、100GbE用于每个存储HA对。
集群	具有4个10GbE端口(分支)和40/100GbE端口的不同分配的两种RC框架。除AFF A320、AFF A250和FAS500f系统外、所有FAS/AFA节点均受支持。
存储	所有端口均配置为使用100GbE NVMe存储连接。

准备安装NX-OS软件和RCF

在安装NX-OS软件和参考配置文件(Reference Configuration File、RCF)之前、请遵循此操作步骤。

关于示例

此操作步骤中的示例使用以下交换机和节点命名：

- 两个 Cisco 交换机的名称分别为 CS1 和 CS2 。
- 节点名称为 cluster1-01 和 cluster1-02 。
- 集群 LIF 名称分别为 cluster1-01 和 cluster1-01 的 cluster1-01_clus1 和 cluster1-01_clus2 以及 cluster1-02 的 cluster1-02_clus1 和 cluster1-02_clus2 。
- `cluster1 ：：： * >` 提示符指示集群的名称。

关于此任务

操作步骤要求同时使用 ONTAP 命令和 Cisco Nexus 9000 系列交换机命令；除非另有说明，否则使用 ONTAP 命令。

步骤

1. 如果在此集群上启用了 AutoSupport ，请通过调用 AutoSupport 消息来禁止自动创建案例： `ssystem node AutoSupport invoke -node * -type all -message MAINT=x h`

   其中 x 是维护时段的持续时间，以小时为单位。

   > AutoSupport 消息会通知技术支持此维护任务，以便在维护窗口期间禁止自动创建案例。

2. 将权限级别更改为高级，在系统提示您继续时输入 * y * ：

   ```
   set -privilege advanced
   ```

   此时将显示高级提示符（`*>`）。

3. 显示每个集群互连交换机的每个节点中配置的集群互连接口数量：

   ```
   network device-discovery show -protocol cdp
   ```

显示示例

```
cluster1::*> network device-discovery show -protocol cdp

Node/       Local  Discovered
Protocol    Port   Device (LLDP: ChassisID)  Interface
Platform
----------- ------ ------------------------- -----------------
--------
cluster1-02/cdp
            e0a    cs1                       Eth1/2            N9K-
C9336C
            e0b    cs2                       Eth1/2            N9K-
C9336C
cluster1-01/cdp
            e0a    cs1                       Eth1/1            N9K-
C9336C
            e0b    cs2                       Eth1/1            N9K-
C9336C

4 entries were displayed.
```

4. 检查每个集群接口的管理或运行状态。

   a. 显示网络端口属性：

```
`network port show -ipspace Cluster`
```

显示示例

```
cluster1::*> network port show -ipspace Cluster

Node: cluster1-02
                                                        Speed(Mbps)
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper
Status
--------- ------------ ---------------- ---- ---- -----------
------
e0a       Cluster      Cluster          up   9000  auto/10000
healthy
e0b       Cluster      Cluster          up   9000  auto/10000
healthy

Node: cluster1-01
                                                        Speed(Mbps)
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper
Status
--------- ------------ ---------------- ---- ---- -----------
------
e0a       Cluster      Cluster          up   9000  auto/10000
healthy
e0b       Cluster      Cluster          up   9000  auto/10000
healthy

4 entries were displayed.
```

b. 显示有关 LIF 的信息：

```
network interface show -vserver cluster
```

显示示例

```
cluster1::*> network interface show -vserver Cluster

            Logical            Status     Network            Current
Current Is
Vserver     Interface          Admin/Oper Address/Mask       Node
Port    Home
----------- ------------------ ---------- ------------------
------------- ------- ----
Cluster
            cluster1-01_clus1  up/up      169.254.209.69/16
cluster1-01   e0a     true
            cluster1-01_clus2  up/up      169.254.49.125/16
cluster1-01   e0b     true
            cluster1-02_clus1  up/up      169.254.47.194/16
cluster1-02   e0a     true
            cluster1-02_clus2  up/up      169.254.19.183/16
cluster1-02   e0b     true

4 entries were displayed.
```

5. 对远程集群 LIF 执行 Ping 操作：

```
cluster ping-cluster -node node-name
```

显示示例

```
cluster1::*> cluster ping-cluster -node cluster1-02
Host is cluster1-02
Getting addresses from network interface table...
Cluster cluster1-01_clus1 169.254.209.69 cluster1-01     e0a
Cluster cluster1-01_clus2 169.254.49.125 cluster1-01     e0b
Cluster cluster1-02_clus1 169.254.47.194 cluster1-02     e0a
Cluster cluster1-02_clus2 169.254.19.183 cluster1-02     e0b
Local = 169.254.47.194 169.254.19.183
Remote = 169.254.209.69 169.254.49.125
Cluster Vserver Id = 4294967293
Ping status:

Basic connectivity succeeds on 4 path(s)
Basic connectivity fails on 0 path(s)

Detected 9000 byte MTU on 4 path(s):
    Local 169.254.19.183 to Remote 169.254.209.69
    Local 169.254.19.183 to Remote 169.254.49.125
    Local 169.254.47.194 to Remote 169.254.209.69
    Local 169.254.47.194 to Remote 169.254.49.125
Larger than PMTU communication succeeds on 4 path(s)
RPC status:
2 paths up, 0 paths down (tcp check)
2 paths up, 0 paths down (udp check)
```

6. 验证是否已在所有集群 LIF 上启用 auto-revert 命令：

```
network interface show - vserver cluster -fields auto-revert
```

显示示例

```
cluster1::*> network interface show -vserver Cluster -fields auto-
revert

          Logical
Vserver   Interface           Auto-revert
--------- --------------------- ------------
Cluster
          cluster1-01_clus1   true
          cluster1-01_clus2   true
          cluster1-02_clus1   true
          cluster1-02_clus2   true
4 entries were displayed.
```

7. 对于 ONTAP 9.8 及更高版本，请使用以下命令启用以太网交换机运行状况监控器日志收集功能以收集交换机相关的日志文件：

   `ssystem switch Ethernet log setup-password`和`ssystem switch Ethernet log enable-Collection`

显示示例

```
cluster1::*> system switch ethernet log setup-password
Enter the switch name: <return>
The switch name entered is not recognized.
Choose from the following list:
cs1
cs2

cluster1::*> system switch ethernet log setup-password

Enter the switch name: cs1
RSA key fingerprint is
e5:8b:c6:dc:e2:18:18:09:36:63:d9:63:dd:03:d9:cc
Do you want to continue? {y|n}::[n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster1::*> system switch ethernet log setup-password

Enter the switch name: cs2
RSA key fingerprint is
57:49:86:a1:b9:80:6a:61:9a:86:8e:3c:e3:b7:1f:b1
Do you want to continue? {y|n}:: [n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster1::*> system  switch ethernet log enable-collection

Do you want to enable cluster log collection for all nodes in the
cluster?
{y|n}: [n] y

Enabling cluster switch log collection.

cluster1::*>
```

如果其中任何一个命令返回错误，请联系 NetApp 支持部门。

8. 对于 ONTAP 9.5P16 ， 9.6P12 和 9.7P10 及更高版本的修补程序，请使用以下命令启用以太网交换机运行状况监控器日志收集功能以收集交换机相关的日志文件：

   `ssystem cluster-switch log setup-password` 和 `ssystem cluster-switch log enable-`

Collection

显示示例

```
cluster1::*> system cluster-switch log setup-password
Enter the switch name: <return>
The switch name entered is not recognized.
Choose from the following list:
cs1
cs2

cluster1::*> system cluster-switch log setup-password

Enter the switch name: cs1
RSA key fingerprint is
e5:8b:c6:dc:e2:18:18:09:36:63:d9:63:dd:03:d9:cc
Do you want to continue? {y|n}::[n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster1::*> system cluster-switch log setup-password

Enter the switch name: cs2
RSA key fingerprint is
57:49:86:a1:b9:80:6a:61:9a:86:8e:3c:e3:b7:1f:b1
Do you want to continue? {y|n}:: [n] y

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster1::*> system cluster-switch log enable-collection

Do you want to enable cluster log collection for all nodes in the
cluster?
{y|n}: [n] y

Enabling cluster switch log collection.

cluster1::*>
```

如果其中任何一个命令返回错误，请联系 NetApp 支持部门。

下一步是什么？

"安装 NX-OS 软件"。

安装 NX-OS 软件

按照此操作步骤 在Nexus 9336C-FX2集群交换机上安装NX-OS软件。

开始之前、请填写中的操作步骤 "准备安装NX-OS和RCF"。

查看要求

您需要的内容

- 交换机配置的当前备份。
- 一个完全正常运行的集群(日志中没有错误或类似问题)。
- "Cisco 以太网交换机页面"。有关支持的ONTAP 和NX-OS版本、请参见交换机兼容性表。
- Cisco网站上提供了适用于Cisco交换机升级和降级过程的相应软件和升级指南。请参见 "Cisco Nexus 9000 系列交换机"。

关于示例

此操作步骤中的示例使用以下交换机和节点命名：

- 两个 Cisco 交换机的名称分别为 CS1 和 CS2 。
- 节点名称包括cluster1-01、cluster1-02、cluster1-03和cluster1-04。
- 集群 LIF 名称包括 cluster1-01_clus1 ， cluster1-01_clus2 ， cluster1-02_clus1 ， cluster1-02_clus2 ， cluster1-03_clus1 ， cluster1-03_clus2 ， cluster1-04_clus1 和 cluster1-04_clus2 。
- `cluster1 ：：： * >` 提示符指示集群的名称。

安装软件

操作步骤要求同时使用 ONTAP 命令和 Cisco Nexus 9000 系列交换机命令；除非另有说明，否则使用 ONTAP 命令。

步骤

1. 将集群交换机连接到管理网络。
2. 使用 ping 命令验证与托管 NX-OS 软件和 RCF 的服务器的连接。

   显示示例

   此示例验证交换机是否可以通过 IP 地址 172.19.2.1 访问服务器：

   ```
   cs2# ping 172.19.2.1
   Pinging 172.19.2.1 with 0 bytes of data:

   Reply From 172.19.2.1: icmp_seq = 0. time= 5910 usec.
   ```

3. 将 NX-OS 软件和 EPLD 映像复制到 Nexus 9336C-x2 交换机。

显示示例

```
cs2# copy sftp: bootflash: vrf management
Enter source filename: /code/nxos.9.3.5.bin
Enter hostname for the sftp server: 172.19.2.1
Enter username: user1

Outbound-ReKey for 172.19.2.1:22
Inbound-ReKey for 172.19.2.1:22
user1@172.19.2.1's password:
sftp> progress
Progress meter enabled
sftp> get   /code/nxos.9.3.5.bin  /bootflash/nxos.9.3.5.bin
/code/nxos.9.3.5.bin  100% 1261MB   9.3MB/s   02:15
sftp> exit
Copy complete, now saving to disk (please wait)...
Copy complete.


cs2# copy sftp: bootflash: vrf management

Enter source filename: /code/n9000-epld.9.3.5.img
Enter hostname for the sftp server: 172.19.2.1
Enter username: user1

Outbound-ReKey for 172.19.2.1:22
Inbound-ReKey for 172.19.2.1:22
user1@172.19.2.1's password:
sftp> progress
Progress meter enabled
sftp> get   /code/n9000-epld.9.3.5.img  /bootflash/n9000-
epld.9.3.5.img
/code/n9000-epld.9.3.5.img  100%  161MB   9.5MB/s   00:16
sftp> exit
Copy complete, now saving to disk (please wait)...
Copy complete.
```

4. 验证正在运行的 NX-OS 软件版本：

s如何使用版本

显示示例

```
cs2# show version
Cisco Nexus Operating System (NX-OS) Software
TAC support: http://www.cisco.com/tac
Copyright (C) 2002-2020, Cisco and/or its affiliates.
All rights reserved.
The copyrights to certain works contained in this software are
owned by other third parties and used and distributed under their
own
licenses, such as open source.  This software is provided "as is,"
and unless
otherwise stated, there is no warranty, express or implied,
including but not
limited to warranties of merchantability and fitness for a
particular purpose.
Certain components of this software are licensed under
the GNU General Public License (GPL) version 2.0 or
GNU General Public License (GPL) version 3.0  or the GNU
Lesser General Public License (LGPL) Version 2.1 or
Lesser General Public License (LGPL) Version 2.0.
A copy of each such license is available at
http://www.opensource.org/licenses/gpl-2.0.php and
http://opensource.org/licenses/gpl-3.0.html and
http://www.opensource.org/licenses/lgpl-2.1.php and
http://www.gnu.org/licenses/old-licenses/library.txt.

Software
  BIOS: version 08.38
  NXOS: version 9.3(4)
  BIOS compile time:  05/29/2020
  NXOS image file is: bootflash:///nxos.9.3.4.bin
  NXOS compile time:  4/28/2020 21:00:00 [04/29/2020 02:28:31]


Hardware
  cisco Nexus9000 C9336C-FX2 Chassis
  Intel(R) Xeon(R) CPU E5-2403 v2 @ 1.80GHz with 8154432 kB of
memory.
  Processor Board ID FOC20291J6K

  Device name: cs2
  bootflash:   53298520 kB
Kernel uptime is 0 day(s), 0 hour(s), 3 minute(s), 42 second(s)
```

```
Last reset at 157524 usecs after Mon Nov  2 18:32:06 2020
  Reason: Reset Requested by CLI command reload
  System version: 9.3(4)
  Service:

plugin
  Core Plugin, Ethernet Plugin

Active Package(s):


cs2#
```

5. 安装 NX-OS 映像。

   安装映像文件会导致每次重新启动交换机时加载该映像文件。

显示示例

```
cs2# install all nxos bootflash:nxos.9.3.5.bin

Installer will perform compatibility check first. Please wait.
Installer is forced disruptive

Verifying image bootflash:/nxos.9.3.5.bin for boot variable "nxos".
[####################] 100% -- SUCCESS

Verifying image type.
[####################] 100% -- SUCCESS

Preparing "nxos" version info using image bootflash:/nxos.9.3.5.bin.
[####################] 100% -- SUCCESS

Preparing "bios" version info using image bootflash:/nxos.9.3.5.bin.
[####################] 100% -- SUCCESS

Performing module support checks.
[####################] 100% -- SUCCESS

Notifying services about system upgrade.
[####################] 100% -- SUCCESS



Compatibility check is done:
Module  bootable       Impact     Install-type  Reason
------  --------  --------------- ------------  ------
  1       yes      disruptive         reset     default upgrade is
not hitless



Images will be upgraded according to following table:

Module   Image    Running-Version(pri:alt                  New-
Version         Upg-Required
------- --------- ----------------------------------------
------------------- ------------
  1      nxos     9.3(4)                                   9.3(5)
yes
  1      bios     v08.37(01/28/2020):v08.23(09/23/2015)
v08.38(05/29/2020)      yes
```

```
Switch will be reloaded for disruptive upgrade.

Do you want to continue with the installation (y/n)? [n] y

Install is in progress, please wait.

Performing runtime checks.
[####################] 100% -- SUCCESS

Setting boot variables.
[####################] 100% -- SUCCESS

Performing configuration copy.
[####################] 100% -- SUCCESS

Module 1: Refreshing compact flash and upgrading
bios/loader/bootrom.
Warning: please do not remove or power off the module at this time.
[####################] 100% -- SUCCESS

Finishing the upgrade, switch will reboot in 10 seconds.
```

6. 在交换机重新启动后验证 NX-OS 软件的新版本：

   s如何使用版本

显示示例

```
cs2# show version

Cisco Nexus Operating System (NX-OS) Software
TAC support: http://www.cisco.com/tac
Copyright (C) 2002-2020, Cisco and/or its affiliates.
All rights reserved.
The copyrights to certain works contained in this software are
owned by other third parties and used and distributed under their
own
licenses, such as open source.  This software is provided "as is,"
and unless
otherwise stated, there is no warranty, express or implied,
including but not
limited to warranties of merchantability and fitness for a
particular purpose.
Certain components of this software are licensed under
the GNU General Public License (GPL) version 2.0 or
GNU General Public License (GPL) version 3.0  or the GNU
Lesser General Public License (LGPL) Version 2.1 or
Lesser General Public License (LGPL) Version 2.0.
A copy of each such license is available at
http://www.opensource.org/licenses/gpl-2.0.php and
http://opensource.org/licenses/gpl-3.0.html and
http://www.opensource.org/licenses/lgpl-2.1.php and
http://www.gnu.org/licenses/old-licenses/library.txt.

Software
  BIOS: version 05.33
  NXOS: version 9.3(5)
  BIOS compile time:  09/08/2018
  NXOS image file is: bootflash:///nxos.9.3.5.bin
  NXOS compile time:  11/4/2018 21:00:00 [11/05/2018 06:11:06]


Hardware
  cisco Nexus9000 C9336C-FX2 Chassis
  Intel(R) Xeon(R) CPU E5-2403 v2 @ 1.80GHz with 8154432 kB of
memory.
  Processor Board ID FOC20291J6K

  Device name: cs2
  bootflash:   53298520 kB
Kernel uptime is 0 day(s), 0 hour(s), 3 minute(s), 42 second(s)
```

```
Last reset at 277524 usecs after Mon Nov  2 22:45:12 2020
  Reason: Reset due to upgrade
  System version: 9.3(4)
  Service:

plugin
  Core Plugin, Ethernet Plugin

Active Package(s):
```

7. 升级 EPLD 映像并重新启动交换机。

显示示例

```
cs2# show version module 1 epld

EPLD Device                      Version
---------------------------------------
MI   FPGA                         0x7
IO   FPGA                         0x17
MI   FPGA2                        0x2
GEM  FPGA                         0x2
GEM  FPGA                         0x2
GEM  FPGA                         0x2
GEM  FPGA                         0x2

cs2# install epld bootflash:n9000-epld.9.3.5.img module 1
Compatibility check:
Module        Type         Upgradable        Impact   Reason
------  ------------------ ----------------- --------- -----
     1         SUP         Yes       disruptive  Module Upgradable

Retrieving EPLD versions.... Please wait.
Images will be upgraded according to following table:
Module  Type   EPLD              Running-Version   New-Version  Upg-
Required
------- ------ ----------------- ----------------- ------------
------------
     1  SUP    MI FPGA           0x07              0x07         No
     1  SUP    IO FPGA           0x17              0x19         Yes
     1  SUP    MI FPGA2          0x02              0x02         No
The above modules require upgrade.
The switch will be reloaded at the end of the upgrade
Do you want to continue (y/n) ?  [n] y

Proceeding to upgrade Modules.

Starting Module 1 EPLD Upgrade

Module 1 : IO FPGA [Programming] : 100.00% (     64 of      64
sectors)
Module 1 EPLD upgrade is successful.
Module   Type  Upgrade-Result
-------- ----- --------------
     1   SUP   Success

EPLDs upgraded.

Module 1 EPLD upgrade is successful.
```

8. 交换机重新启动后，重新登录并验证是否已成功加载新版本的 EPLD 。

显示示例

```
cs2# show version module 1 epld

EPLD Device                      Version
---------------------------------------
MI    FPGA                        0x7
IO    FPGA                        0x19
MI    FPGA2                       0x2
GEM   FPGA                        0x2
GEM   FPGA                        0x2
GEM   FPGA                        0x2
GEM   FPGA                        0x2
```

9. 重复步骤1至8、在交换机CS1上安装NX-OS软件。

下一步是什么?

"安装参考配置文件（RCF）"。

安装参考配置文件（RCF）

首次设置Nexus 9336C-x2交换机后、您可以安装参考配置文件(Reference Configuration File、RCF)。您也可以使用此操作步骤升级 RCF 版本。

开始之前、请填写中的操作步骤 "准备安装NX-OS和RCF"。

有关可用RC框架 配置的详细信息、请参见 "软件安装工作流"。

查看要求

您需要的内容

- 交换机配置的当前备份。
- 一个完全正常运行的集群(日志中没有错误或类似问题)。
- 当前RCF文件。
- 安装RCF时需要与交换机建立控制台连接。

建议的文档

- "Cisco 以太网交换机页面" 有关支持的ONTAP 和RCF版本、请参见交换机兼容性表。请注意、RCF中的命令语法与NX-OS版本中的命令语法之间可能存在命令依赖关系。
- "Cisco Nexus 3000 系列交换机"。有关Cisco交换机升级和降级过程的完整文档、请参见Cisco网站上提供的相应软件和升级指南。

安装RCF

关于示例

此操作步骤中的示例使用以下交换机和节点命名：

- 两个 Cisco 交换机的名称分别为 CS1 和 CS2 。
- 节点名称包括cluster1-01、cluster1-02、cluster1-03和cluster1-04。
- 集群 LIF 名称包括 cluster1-01_clus1 ， cluster1-01_clus2 ， cluster1-02_clus1 ， cluster1-02_clus2 ， cluster1-03_clus1 ， cluster1-03_clus2 ， cluster1-04_clus1 和 cluster1-04_clus2 。
- `cluster1 ::: * >` 提示符指示集群的名称。

此操作步骤中的示例使用两个节点。这些节点使用两个 10GbE 集群互连端口 e0a 和 e0b 。请参见 "Hardware Universe" 验证平台上的集群端口是否正确。

> 根据不同版本的 ONTAP ，命令输出可能会有所不同。

关于此任务

操作步骤要求同时使用 ONTAP 命令和 Cisco Nexus 9000 系列交换机命令；除非另有说明，否则使用 ONTAP 命令。

在此操作步骤 期间、不需要可操作的交换机间链路(ISL)。这是设计上的原因、因为RCF版本更改可能会暂时影响ISL连接。为了确保集群无中断运行、以下操作步骤 会在对目标交换机执行步骤时将所有集群LIF迁移到运行中的配对交换机。

> 在安装新的交换机软件版本和 RCF 之前，您必须擦除交换机设置并执行基本配置。您必须使用串行控制台连接到交换机。此任务将重置管理网络的配置。

第**1**步：准备安装

1. 显示连接到集群交换机的每个节点上的集群端口：

```
network device-discovery show
```

显示示例

```
cluster1::*> network device-discovery show
Node/       Local  Discovered
Protocol    Port   Device (LLDP: ChassisID)  Interface
Platform
----------- ------ ------------------------- ----------------
--------
cluster1-01/cdp
            e0a    cs1                       Ethernet1/7       N9K-
C9336C
            e0d    cs2                       Ethernet1/7       N9K-
C9336C
cluster1-02/cdp
            e0a    cs1                       Ethernet1/8       N9K-
C9336C
            e0d    cs2                       Ethernet1/8       N9K-
C9336C
cluster1-03/cdp
            e0a    cs1                       Ethernet1/1/1     N9K-
C9336C
            e0b    cs2                       Ethernet1/1/1     N9K-
C9336C
cluster1-04/cdp
            e0a    cs1                       Ethernet1/1/2     N9K-
C9336C
            e0b    cs2                       Ethernet1/1/2     N9K-
C9336C
cluster1::*>
```

2. 检查每个集群端口的管理和运行状态。

   a. 验证所有集群端口是否均为*已启动*且运行状况良好：

   ```
   network port show -role cluster
   ```

显示示例

```
cluster1::*> network port show -role cluster

Node: cluster1-01

Ignore
                                                      Speed(Mbps)
Health   Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper
Status   Status
--------- ------------ ---------------- ---- ---- -----------
-------- ------
e0a       Cluster      Cluster          up   9000  auto/100000
healthy false
e0d       Cluster      Cluster          up   9000  auto/100000
healthy false

Node: cluster1-02

Ignore
                                                      Speed(Mbps)
Health   Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper
Status   Status
--------- ------------ ---------------- ---- ---- -----------
-------- ------
e0a       Cluster      Cluster          up   9000  auto/100000
healthy false
e0d       Cluster      Cluster          up   9000  auto/100000
healthy false
8 entries were displayed.

Node: cluster1-03

   Ignore
                                                      Speed(Mbps)
Health   Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper
Status   Status
--------- ------------ ---------------- ---- ---- -----------
-------- ------
e0a       Cluster      Cluster          up   9000  auto/10000
healthy  false
e0b       Cluster      Cluster          up   9000  auto/10000
healthy  false
```

```
Node: cluster1-04

Ignore
                                                          Speed(Mbps)
Health   Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper
Status   Status
--------- ------------ ---------------- ---- ---- -----------
-------- ------
e0a       Cluster      Cluster          up   9000  auto/10000
healthy  false
e0b       Cluster      Cluster          up   9000  auto/10000
healthy  false
cluster1::*>
```

b. 验证所有集群接口（LIF）是否均位于主端口上：

```
network interface show -role cluster
```

显示示例

```
cluster1::*> network interface show -role cluster
            Logical            Status     Network
Current      Current Is
Vserver     Interface          Admin/Oper Address/Mask      Node
Port    Home
----------- ------------------ ---------- -----------------
------------ ------- ----
Cluster
            cluster1-01_clus1  up/up     169.254.3.4/23
cluster1-01  e0a     true
            cluster1-01_clus2  up/up     169.254.3.5/23
cluster1-01  e0d     true
            cluster1-02_clus1  up/up     169.254.3.8/23
cluster1-02  e0a     true
            cluster1-02_clus2  up/up     169.254.3.9/23
cluster1-02  e0d     true
            cluster1-03_clus1  up/up     169.254.1.3/23
cluster1-03  e0a     true
            cluster1-03_clus2  up/up     169.254.1.1/23
cluster1-03  e0b     true
            cluster1-04_clus1  up/up     169.254.1.6/23
cluster1-04  e0a     true
            cluster1-04_clus2  up/up     169.254.1.7/23
cluster1-04  e0b     true
8 entries were displayed.
cluster1::*>
```

c. 验证集群是否同时显示两个集群交换机的信息：

```
ssystem cluster-switch show -is-monitoring-enableed-Operational true
```

显示示例

```
cluster1::*> system cluster-switch show -is-monitoring-enabled
-operational true
Switch                      Type               Address
Model
--------------------------- ------------------ ----------------
-----
cs1                         cluster-network    10.233.205.90    N9K-
C9336C
     Serial Number: FOCXXXXXXGD
      Is Monitored: true
            Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                    9.3(5)
    Version Source: CDP

cs2                         cluster-network    10.233.205.91    N9K-
C9336C
     Serial Number: FOCXXXXXXGS
      Is Monitored: true
            Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS) Software,
Version
                    9.3(5)
    Version Source: CDP
cluster1::*>
```

3. 在集群 LIF 上禁用自动还原。

显示示例

```
cluster1::*> network interface modify -vserver Cluster -lif * -auto
-revert false
```

第**2**步：配置端口

1. 在集群交换机 CS2 上，关闭连接到节点集群端口的端口。

显示示例

```
cs2(config)# interface eth1/1/1-2,eth1/7-8
cs2(config-if-range)# shutdown
```

2. 验证集群 LIF 是否已迁移到集群交换机 CS1 上托管的端口。这可能需要几秒钟的时间。

```
network interface show -role cluster
```

显示示例

```
cluster1::*> network interface show -role cluster
            Logical           Status     Network            Current
Current Is
Vserver     Interface         Admin/Oper Address/Mask       Node
Port    Home
----------- ----------------- ---------- ------------------
------------- ------- ----
Cluster
            cluster1-01_clus1 up/up      169.254.3.4/23
cluster1-01   e0a     true
            cluster1-01_clus2 up/up      169.254.3.5/23
cluster1-01   e0a     false
            cluster1-02_clus1 up/up      169.254.3.8/23
cluster1-02   e0a     true
            cluster1-02_clus2 up/up      169.254.3.9/23
cluster1-02   e0a     false
            cluster1-03_clus1 up/up      169.254.1.3/23
cluster1-03   e0a     true
            cluster1-03_clus2 up/up      169.254.1.1/23
cluster1-03   e0a     false
            cluster1-04_clus1 up/up      169.254.1.6/23
cluster1-04   e0a     true
            cluster1-04_clus2 up/up      169.254.1.7/23
cluster1-04   e0a     false
8 entries were displayed.
cluster1::*>
```

3. 验证集群是否运行正常：

```
cluster show
```

显示示例

```
cluster1::*> cluster show
Node                  Health  Eligibility   Epsilon
--------------------- ------- ------------  -------
cluster1-01           true    true          false
cluster1-02           true    true          false
cluster1-03           true    true          true
cluster1-04           true    true          false
4 entries were displayed.
cluster1::*>
```

4. 如果尚未保存当前交换机配置的副本、请将以下命令的输出复制到文本文件中：

```
show running-config
```

5. 清理交换机 CS2 上的配置并执行基本设置。

> 更新或应用新 RCF 时，必须擦除交换机设置并执行基本配置。您必须连接到交换机串行控制台端口才能重新设置交换机。

a. 清理配置：

显示示例

```
(cs2)# write erase

Warning: This command will erase the startup-configuration.

Do you wish to proceed anyway? (y/n)  [n]  y
```

b. 重新启动交换机：

显示示例

```
(cs2)# reload

Are you sure you would like to reset the system? (y/n) y
```

6. 使用以下传输协议之一将 RCF 复制到交换机 CS2 的启动闪存： FTP ， TFTP ， SFTP 或 SCP 。有关

Cisco 命令的详细信息，请参见中的相应指南 "《 Cisco Nexus 9000 系列 NX-OS 命令参考》" 指南。

显示示例

此示例显示了使用 TFTP 将 RCF 复制到交换机 CS2 上的 bootflash 。

```
cs2# copy tftp: bootflash: vrf management
Enter source filename: Nexus_9336C_RCF_v1.6-Cluster-HA-Breakout.txt
Enter hostname for the tftp server: 172.22.201.50
Trying to connect to tftp server......Connection to Server
Established.
TFTP get operation was successful
Copy complete, now saving to disk (please wait)...
```

7. 将先前下载的 RCF 应用于 bootflash 。

   有关 Cisco 命令的详细信息，请参见中的相应指南 "《 Cisco Nexus 9000 系列 NX-OS 命令参考》" 指南。

   显示示例

   此示例显示了正在交换机 CS2 上安装的 RCF 文件 `Nexus 9336C_RCF_v1.6-Cluster-HA-Breakout 。 txt` 。

```
cs2# copy Nexus_9336C_RCF_v1.6-Cluster-HA-Breakout.txt running-
config echo-commands
```

8. 检查 `show banner motd` 命令的横幅输出。您必须阅读并遵循这些说明，以确保交换机的配置和操作正确。

显示示例

```
cs2# show banner motd

*********************************************************************
**********
* NetApp Reference Configuration File (RCF)
*
* Switch   : Nexus N9K-C9336C-FX2
* Filename : Nexus_9336C_RCF_v1.6-Cluster-HA-Breakout.txt
* Date     : 10-23-2020
* Version  : v1.6
*
* Port Usage:
* Ports  1- 3: Breakout mode (4x10G) Intra-Cluster Ports, int
e1/1/1-4, e1/2/1-4
, e1/3/1-4
* Ports  4- 6: Breakout mode (4x25G) Intra-Cluster/HA Ports, int
e1/4/1-4, e1/5/
1-4, e1/6/1-4
* Ports  7-34: 40/100GbE Intra-Cluster/HA Ports, int e1/7-34
* Ports 35-36: Intra-Cluster ISL Ports, int e1/35-36
*
* Dynamic breakout commands:
* 10G: interface breakout module 1 port <range> map 10g-4x
* 25G: interface breakout module 1 port <range> map 25g-4x
*
* Undo breakout commands and return interfaces to 40/100G
configuration in confi
g mode:
* no interface breakout module 1 port <range> map 10g-4x
* no interface breakout module 1 port <range> map 25g-4x
* interface Ethernet <interfaces taken out of breakout mode>
* inherit port-profile 40-100G
* priority-flow-control mode auto
* service-policy input HA
* exit
*
*********************************************************************
**********
```

9. 验证 RCF 文件是否为正确的较新版本：

   s如何运行配置

在检查输出以确认您的 RCF 正确无误时，请确保以下信息正确无误：

- RCF 横幅
- 节点和端口设置
- 自定义

  输出因站点配置而异。检查端口设置，并参阅发行说明，了解您安装的 RCF 的任何特定更改。

10. 验证 RCF 版本和交换机设置是否正确后，将 running-config 文件复制到 startup-config 文件。

    有关 Cisco 命令的详细信息，请参见中的相应指南 "《 Cisco Nexus 9000 系列 NX-OS 命令参考》" 指南。

    显示示例

    ```
    cs2# copy running-config startup-config
    [#########################################] 100% Copy complete
    ```

11. 重新启动交换机 CS2 。在交换机重新启动时，您可以忽略节点上报告的 "`cluster ports down` " 事件。

    显示示例

    ```
    cs2# reload
    This command will reboot the system. (y/n)?  [n] y
    ```

12. 验证集群上集群端口的运行状况。

    a. 验证集群中所有节点上的 e0d 端口是否均已启动且运行正常：

       ```
       network port show -role cluster
       ```

显示示例

```
cluster1::*> network port show -role cluster

Node: cluster1-01

Ignore
                                                      Speed(Mbps) Health
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
--------- ------------ ---------------- ---- ---- -----------
-------- ------
e0a       Cluster      Cluster          up   9000  auto/10000
healthy  false
e0b       Cluster      Cluster          up   9000  auto/10000
healthy  false

Node: cluster1-02

Ignore
                                                      Speed(Mbps) Health
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
--------- ------------ ---------------- ---- ---- -----------
-------- ------
e0a       Cluster      Cluster          up   9000  auto/10000
healthy  false
e0b       Cluster      Cluster          up   9000  auto/10000
healthy  false

Node: cluster1-03

Ignore
                                                      Speed(Mbps) Health
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
--------- ------------ ---------------- ---- ---- -----------
-------- ------
e0a       Cluster      Cluster          up   9000  auto/100000
healthy false
e0d       Cluster      Cluster          up   9000  auto/100000
healthy false
```

```
Node: cluster1-04

Ignore
                                                        Speed(Mbps) Health
Health
Port      IPspace      Broadcast Domain Link MTU  Admin/Oper  Status
Status
--------- ------------ ---------------- ---- ---- -----------
-------- ------
e0a       Cluster      Cluster          up   9000  auto/100000
healthy false
e0d       Cluster      Cluster          up   9000  auto/100000
healthy false
8 entries were displayed.
```

a. 从集群验证交换机运行状况（此操作可能不会显示交换机 CS2 ，因为 LIF 不驻留在 e0d 上）。

显示示例

```
cluster1::*> network device-discovery show -protocol cdp
Node/       Local  Discovered
Protocol    Port   Device (LLDP: ChassisID)  Interface
Platform
----------- ------ ------------------------- -----------------
--------
cluster1-01/cdp
            e0a    cs1                       Ethernet1/7
N9K-C9336C
            e0d    cs2                       Ethernet1/7
N9K-C9336C
cluster01-2/cdp
            e0a    cs1                       Ethernet1/8
N9K-C9336C
            e0d    cs2                       Ethernet1/8
N9K-C9336C
cluster01-3/cdp
            e0a    cs1                       Ethernet1/1/1
N9K-C9336C
            e0b    cs2                       Ethernet1/1/1
N9K-C9336C
cluster1-04/cdp
            e0a    cs1                       Ethernet1/1/2
N9K-C9336C
            e0b    cs2                       Ethernet1/1/2
N9K-C9336C

cluster1::*> system cluster-switch show -is-monitoring-enabled
-operational true
Switch                      Type               Address
Model
--------------------------- ------------------ ----------------
-----
cs1                         cluster-network    10.233.205.90
NX9-C9336C
     Serial Number: FOCXXXXXXGD
      Is Monitored: true
            Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version
                    9.3(5)
    Version Source: CDP

cs2                         cluster-network    10.233.205.91
```

```
NX9-C9336C
     Serial Number: FOCXXXXXXGS
      Is Monitored: true
            Reason: None
  Software Version: Cisco Nexus Operating System (NX-OS)
Software, Version
                    9.3(5)
    Version Source: CDP

2 entries were displayed.
```

根据先前加载在 CS1 交换机控制台上的 RCF 版本，您可能会在该交换机控制台上看到以下输出。

```
2020 Nov 17 16:07:18 cs1 %$ VDC-1 %$ %STP-2-UNBLOCK_CONSIST_PORT:
Unblocking port port-channel1 on VLAN0092. Port consistency
restored.
2020 Nov 17 16:07:23 cs1 %$ VDC-1 %$ %STP-2-BLOCK_PVID_PEER:
Blocking port-channel1 on VLAN0001. Inconsistent peer vlan.
2020 Nov 17 16:07:23 cs1 %$ VDC-1 %$ %STP-2-BLOCK_PVID_LOCAL:
Blocking port-channel1 on VLAN0092. Inconsistent local vlan.
```

13. 在集群交换机 CS1 上，关闭连接到节点集群端口的端口。

显示示例

以下示例使用接口示例输出：

```
cs1(config)# interface eth1/1/1-2,eth1/7-8
cs1(config-if-range)# shutdown
```

14. 验证集群 LIF 是否已迁移到交换机 CS2 上托管的端口。这可能需要几秒钟的时间。

```
network interface show -role cluster
```

显示示例

```
cluster1::*> network interface show -role cluster
            Logical            Status     Network            Current
Current Is
Vserver     Interface          Admin/Oper Address/Mask       Node
Port    Home
----------- ------------------ ---------- ------------------
------------------- ------- ----
Cluster
            cluster1-01_clus1  up/up      169.254.3.4/23
cluster1-01         e0d     false
            cluster1-01_clus2  up/up      169.254.3.5/23
cluster1-01         e0d     true
            cluster1-02_clus1  up/up      169.254.3.8/23
cluster1-02         e0d     false
            cluster1-02_clus2  up/up      169.254.3.9/23
cluster1-02         e0d     true
            cluster1-03_clus1  up/up      169.254.1.3/23
cluster1-03         e0b     false
            cluster1-03_clus2  up/up      169.254.1.1/23
cluster1-03         e0b     true
            cluster1-04_clus1  up/up      169.254.1.6/23
cluster1-04         e0b     false
            cluster1-04_clus2  up/up      169.254.1.7/23
cluster1-04         e0b     true
8 entries were displayed.
cluster1::*>
```

15. 验证集群是否运行正常：

```
cluster show
```

显示示例

```
cluster1::*> cluster show
Node                  Health   Eligibility   Epsilon
-------------------- -------- ------------- -------
cluster1-01           true     true          false
cluster1-02           true     true          false
cluster1-03           true     true          true
cluster1-04           true     true          false
4 entries were displayed.
cluster1::*>
```

16. 对交换机CS1重复步骤4至11。
17. 在集群 LIF 上启用自动还原。

显示示例

```
cluster1::*> network interface modify -vserver Cluster -lif * -auto
-revert True
```

18. 重新启动交换机 CS1 。执行此操作可触发集群 LIF 还原到其主端口。在交换机重新启动时，您可以忽略节点上报告的 "`cluster ports down` " 事件。

显示示例

```
cs1# reload
This command will reboot the system. (y/n)?  [n] y
```

第3步：验证配置

1. 验证连接到集群端口的交换机端口是否为*已启动*。

```
show interface brief
```

显示示例

```
cs1# show interface brief | grep up
.
.
Eth1/1/1      1       eth  access up      none
10G(D) --
Eth1/1/2      1       eth  access up      none
10G(D) --
Eth1/7        1       eth  trunk  up      none
100G(D) --
Eth1/8        1       eth  trunk  up      none
100G(D) --
.
.
```

2. 验证所需节点是否仍处于连接状态：

s如何使用 `cdp` 邻居

显示示例

```
cs1# show cdp neighbors

Capability Codes: R - Router, T - Trans-Bridge, B - Source-Route-
Bridge
                  S - Switch, H - Host, I - IGMP, r - Repeater,
                  V - VoIP-Phone, D - Remotely-Managed-Device,
                  s - Supports-STP-Dispute

Device-ID          Local Intrfce  Hldtme Capability  Platform
Port ID
node1              Eth1/1         133    H           FAS2980
e0a
node2              Eth1/2         133    H           FAS2980
e0a
cs2                Eth1/35        175    R S I s     N9K-C9336C
Eth1/35
cs2                Eth1/36        175    R S I s     N9K-C9336C
Eth1/36

Total entries displayed: 4
```

3. 使用以下命令验证集群节点是否位于正确的集群VLAN中：

```
show vlan brief

show interface trunk
```

显示示例

```
cs1# show vlan brief

VLAN Name                             Status    Ports
---- -------------------------------- ---------
-------------------------------
1    default                          active    Po1, Eth1/1, Eth1/2,
Eth1/3
                                               Eth1/4, Eth1/5,
Eth1/6, Eth1/7
                                               Eth1/8, Eth1/35,
Eth1/36
                                               Eth1/9/1, Eth1/9/2,
Eth1/9/3
                                               Eth1/9/4, Eth1/10/1,
Eth1/10/2
                                               Eth1/10/3, Eth1/10/4
17   VLAN0017                         active    Eth1/1, Eth1/2,
Eth1/3, Eth1/4
                                               Eth1/5, Eth1/6,
Eth1/7, Eth1/8
                                               Eth1/9/1, Eth1/9/2,
Eth1/9/3
                                               Eth1/9/4, Eth1/10/1,
Eth1/10/2
                                               Eth1/10/3, Eth1/10/4
18   VLAN0018                         active    Eth1/1, Eth1/2,
Eth1/3, Eth1/4
                                               Eth1/5, Eth1/6,
Eth1/7, Eth1/8
                                               Eth1/9/1, Eth1/9/2,
Eth1/9/3
                                               Eth1/9/4, Eth1/10/1,
Eth1/10/2
                                               Eth1/10/3, Eth1/10/4
31   VLAN0031                         active    Eth1/11, Eth1/12,
Eth1/13
                                               Eth1/14, Eth1/15,
Eth1/16
                                               Eth1/17, Eth1/18,
Eth1/19
                                               Eth1/20, Eth1/21,
Eth1/22
32   VLAN0032                         active    Eth1/23, Eth1/24,
```

```
Eth1/25
                                                    Eth1/26, Eth1/27,
Eth1/28
                                                    Eth1/29, Eth1/30,
Eth1/31
                                                    Eth1/32, Eth1/33,
Eth1/34
33   VLAN0033                          active    Eth1/11, Eth1/12,
Eth1/13
                                                    Eth1/14, Eth1/15,
Eth1/16
                                                    Eth1/17, Eth1/18,
Eth1/19
                                                    Eth1/20, Eth1/21,
Eth1/22
34   VLAN0034                          active    Eth1/23, Eth1/24,
Eth1/25
                                                    Eth1/26, Eth1/27,
Eth1/28
                                                    Eth1/29, Eth1/30,
Eth1/31
                                                    Eth1/32, Eth1/33,
Eth1/34

cs1# show interface trunk

-----------------------------------------------------
Port          Native  Status        Port
              Vlan                  Channel
-----------------------------------------------------
Eth1/1        1       trunking      --
Eth1/2        1       trunking      --
Eth1/3        1       trunking      --
Eth1/4        1       trunking      --
Eth1/5        1       trunking      --
Eth1/6        1       trunking      --
Eth1/7        1       trunking      --
Eth1/8        1       trunking      --
Eth1/9/1      1       trunking      --
Eth1/9/2      1       trunking      --
Eth1/9/3      1       trunking      --
Eth1/9/4      1       trunking      --
Eth1/10/1     1       trunking      --
Eth1/10/2     1       trunking      --
Eth1/10/3     1       trunking      --
Eth1/10/4     1       trunking      --
```

```
Eth1/11       33      trunking      --
Eth1/12       33      trunking      --
Eth1/13       33      trunking      --
Eth1/14       33      trunking      --
Eth1/15       33      trunking      --
Eth1/16       33      trunking      --
Eth1/17       33      trunking      --
Eth1/18       33      trunking      --
Eth1/19       33      trunking      --
Eth1/20       33      trunking      --
Eth1/21       33      trunking      --
Eth1/22       33      trunking      --
Eth1/23       34      trunking      --
Eth1/24       34      trunking      --
Eth1/25       34      trunking      --
Eth1/26       34      trunking      --
Eth1/27       34      trunking      --
Eth1/28       34      trunking      --
Eth1/29       34      trunking      --
Eth1/30       34      trunking      --
Eth1/31       34      trunking      --
Eth1/32       34      trunking      --
Eth1/33       34      trunking      --
Eth1/34       34      trunking      --
Eth1/35       1       trnk-bndl     Po1
Eth1/36       1       trnk-bndl     Po1
Po1           1       trunking      --

-------------------------------------------------------
Port          Vlans Allowed on Trunk
-------------------------------------------------------
Eth1/1        1,17-18
Eth1/2        1,17-18
Eth1/3        1,17-18
Eth1/4        1,17-18
Eth1/5        1,17-18
Eth1/6        1,17-18
Eth1/7        1,17-18
Eth1/8        1,17-18
Eth1/9/1      1,17-18
Eth1/9/2      1,17-18
Eth1/9/3      1,17-18
Eth1/9/4      1,17-18
Eth1/10/1     1,17-18
Eth1/10/2     1,17-18
Eth1/10/3     1,17-18
```

```
Eth1/10/4      1,17-18
Eth1/11        31,33
Eth1/12        31,33
Eth1/13        31,33
Eth1/14        31,33
Eth1/15        31,33
Eth1/16        31,33
Eth1/17        31,33
Eth1/18        31,33
Eth1/19        31,33
Eth1/20        31,33
Eth1/21        31,33
Eth1/22        31,33
Eth1/23        32,34
Eth1/24        32,34
Eth1/25        32,34
Eth1/26        32,34
Eth1/27        32,34
Eth1/28        32,34
Eth1/29        32,34
Eth1/30        32,34
Eth1/31        32,34
Eth1/32        32,34
Eth1/33        32,34
Eth1/34        32,34
Eth1/35        1
Eth1/36        1
Po1            1
..
..
..
..
..
```

有关特定端口和VLAN使用情况的详细信息、请参阅RC框架 中的横幅和重要说明部分。

4. 验证 CS1 和 CS2 之间的 ISL 是否正常运行：

   s如何执行端口通道摘要

显示示例

```
cs1# show port-channel summary
Flags:  D - Down        P - Up in port-channel (members)
        I - Individual  H - Hot-standby (LACP only)
        s - Suspended   r - Module-removed
        b - BFD Session Wait
        S - Switched    R - Routed
        U - Up (port-channel)
        p - Up in delay-lacp mode (member)
        M - Not in use. Min-links not met
--------------------------------------------------------------------
------------
Group Port-       Type     Protocol  Member Ports      Channel
--------------------------------------------------------------------
------------
1     Po1(SU)     Eth      LACP      Eth1/35(P)        Eth1/36(P)
cs1#
```

5. 验证集群 LIF 是否已还原到其主端口：

```
network interface show -role cluster
```

显示示例

```
cluster1::*> network interface show -role cluster
            Logical            Status     Network            Current
Current Is
Vserver     Interface          Admin/Oper Address/Mask       Node
Port    Home
----------- ------------------ ---------- ------------------
------------------- ------- ----
Cluster
            cluster1-01_clus1  up/up      169.254.3.4/23
cluster1-01         e0d     true
            cluster1-01_clus2  up/up      169.254.3.5/23
cluster1-01         e0d     true
            cluster1-02_clus1  up/up      169.254.3.8/23
cluster1-02         e0d     true
            cluster1-02_clus2  up/up      169.254.3.9/23
cluster1-02         e0d     true
            cluster1-03_clus1  up/up      169.254.1.3/23
cluster1-03         e0b     true
            cluster1-03_clus2  up/up      169.254.1.1/23
cluster1-03         e0b     true
            cluster1-04_clus1  up/up      169.254.1.6/23
cluster1-04         e0b     true
            cluster1-04_clus2  up/up      169.254.1.7/23
cluster1-04         e0b     true
8 entries were displayed.
cluster1::*>
```

6. 验证集群是否运行正常：

```
cluster show
```

显示示例

```
cluster1::*> cluster show
Node                  Health  Eligibility   Epsilon
--------------------- ------- ------------- -------
cluster1-01           true    true          false
cluster1-02           true    true          false
cluster1-03           true    true          true
cluster1-04           true    true          false
4 entries were displayed.
cluster1::*>
```

7. 对远程集群接口执行 Ping 操作以验证连接：

```
cluster ping-cluster -node local
```

显示示例

```
cluster1::*> cluster ping-cluster -node local
Host is cluster1-03
Getting addresses from network interface table...
Cluster cluster1-03_clus1 169.254.1.3 cluster1-03 e0a
Cluster cluster1-03_clus2 169.254.1.1 cluster1-03 e0b
Cluster cluster1-04_clus1 169.254.1.6 cluster1-04 e0a
Cluster cluster1-04_clus2 169.254.1.7 cluster1-04 e0b
Cluster cluster1-01_clus1 169.254.3.4 cluster1-01 e0a
Cluster cluster1-01_clus2 169.254.3.5 cluster1-01 e0d
Cluster cluster1-02_clus1 169.254.3.8 cluster1-02 e0a
Cluster cluster1-02_clus2 169.254.3.9 cluster1-02 e0d
Local = 169.254.1.3 169.254.1.1
Remote = 169.254.1.6 169.254.1.7 169.254.3.4 169.254.3.5 169.254.3.8
169.254.3.9
Cluster Vserver Id = 4294967293
Ping status:
............
Basic connectivity succeeds on 12 path(s)
Basic connectivity fails on 0 path(s)
................................................
Detected 9000 byte MTU on 12 path(s):
    Local 169.254.1.3 to Remote 169.254.1.6
    Local 169.254.1.3 to Remote 169.254.1.7
    Local 169.254.1.3 to Remote 169.254.3.4
    Local 169.254.1.3 to Remote 169.254.3.5
    Local 169.254.1.3 to Remote 169.254.3.8
    Local 169.254.1.3 to Remote 169.254.3.9
    Local 169.254.1.1 to Remote 169.254.1.6
    Local 169.254.1.1 to Remote 169.254.1.7
    Local 169.254.1.1 to Remote 169.254.3.4
    Local 169.254.1.1 to Remote 169.254.3.5
    Local 169.254.1.1 to Remote 169.254.3.8
    Local 169.254.1.1 to Remote 169.254.3.9
Larger than PMTU communication succeeds on 12 path(s)
RPC status:
6 paths up, 0 paths down (tcp check)
6 paths up, 0 paths down (udp check)
```

在Cisco 9334C-适用于所有集群交换机的交换机上启用SSH

如果您使用集群交换机运行状况监控器(Cluster Switch Health Monitor、CSHM)和日志收

集功能、则必须生成SSH密钥、然后在集群交换机上启用SSH。

步骤

1. 验证SSH是否已禁用：

   ```
   show ip ssh
   ```

   显示示例

   ```
   (switch)# show ip ssh

   SSH Configuration

   Administrative Mode: ........................... Disabled
   SSH Port: ...................................... 22
   Protocol Level: ............................... Version 2
   SSH Sessions Currently Active: ................ 0
   Max SSH Sessions Allowed: ..................... 5
   SSH Timeout (mins): ........................... 5
   Keys Present: ................................. DSA(1024) RSA(1024)
   ECDSA(521)
   Key Generation In Progress: ................... None
   SSH Public Key Authentication Mode: ........... Disabled
   SCP server Administrative Mode: ............... Disabled
   ```

2. 生成 SSH 密钥：

   ```
   crypto key generate
   ```

显示示例

```
(switch)# config

(switch) (Config)# crypto key generate rsa

Do you want to overwrite the existing RSA keys? (y/n): y


(switch) (Config)# crypto key generate dsa

Do you want to overwrite the existing DSA keys? (y/n): y


(switch) (Config)# crypto key generate ecdsa 521

Do you want to overwrite the existing ECDSA keys? (y/n): y

(switch) (Config)# aaa authorization commands "noCmdAuthList" none
(switch) (Config)# exit
(switch)# ip ssh server enable
(switch)# ip scp server enable
(switch)# ip ssh pubkey-auth
(switch)# write mem

This operation may take a few minutes.
Management interfaces will not be available during this time.
Are you sure you want to save? (y/n) y

Config file 'startup-config' created successfully.

Configuration Saved!
```

3. 重新启动交换机：

   `re`负载

4. 验证是否已启用 SSH：

   `show ip ssh`

显示示例

```
(switch)# show ip ssh

SSH Configuration

Administrative Mode: ........................ Enabled
SSH Port: ................................... 22
Protocol Level: ............................. Version 2
SSH Sessions Currently Active: ............... 0
Max SSH Sessions Allowed: ................... 5
SSH Timeout (mins): ......................... 5
Keys Present: ............................... DSA(1024) RSA(1024)
ECDSA(521)
Key Generation In Progress: ................. None
SSH Public Key Authentication Mode: ......... Enabled
SCP server Administrative Mode: ............ Enabled
```

下一步是什么?

"启用日志收集"。

以太网交换机运行状况监控日志收集

您可以使用日志收集功能在ONTAP 中收集与交换机相关的日志文件。 以太网交换机运行状况监控器(CSHM)负责确保集群和存储网络交换机的运行状况、并收集交换机日志以进行调试。此操作步骤将引导您完成设置和开始从交换机收集详细的*Support*日志的过程，并开始每小时收集由AutoSupport收集的*定期*数据。

开始之前

- 验证是否已使用9335C-查 验机集群交换机*CLI*设置您的环境。
- 必须为交换机启用交换机运行状况监控。通过确保进行验证 `Is Monitored:` 字段在的输出中设置为*TRUE* `system switch ethernet show` 命令：

步骤

1. 为以太网交换机运行状况监控器日志收集功能创建密码：

   s系统交换机以太网日志设置密码

显示示例

```
cluster1::*> system switch ethernet log setup-password
Enter the switch name: <return>
The switch name entered is not recognized.
Choose from the following list:
cs1
cs2

cluster1::*> system switch ethernet log setup-password

Enter the switch name: cs1
Would you like to specify a user other than admin for log
collection? {y|n}: n

Enter the password: <enter switch password>
Enter the password again: <enter switch password>

cluster1::*> system switch ethernet log setup-password

Enter the switch name: cs2
Would you like to specify a user other than admin for log
collection? {y|n}: n

Enter the password: <enter switch password>
Enter the password again: <enter switch password>
```

2. 要开始收集日志、请运行以下命令、将device替换为上一命令中使用的交换机。这将开始两种类型的日志收集：详细的*Support*日志和每小时收集*定期*数据。

   `system switch ethernet log modify -device <switch-name> -log-request true`

显示示例

```
cluster1::*> system switch ethernet log modify -device cs1 -log
-request true

Do you want to modify the cluster switch log collection
configuration? {y|n}: [n] y

Enabling cluster switch log collection.

cluster1::*> system switch ethernet log modify -device cs2 -log
-request true

Do you want to modify the cluster switch log collection
configuration? {y|n}: [n] y

Enabling cluster switch log collection.
```

等待10分钟、然后检查日志收集是否完成：

```
system switch ethernet log show
```

> 如果其中任一命令返回错误或日志收集未完成、请联系NetApp支持部门。

故障排除

如果遇到日志收集功能报告的以下任一错误状态(在的输出中可见) `system switch ethernet log show`)、请尝试相应的调试步骤：

日志收集错误状态	分辨率
RSA密钥不存在	重新生成ONTAP SSH密钥。请联系NetApp支持部门。
交换机密码错误	验证凭据、测试SSH连接并重新生成ONTAP SSH密钥。查看交换机文档或联系NetApp支持部门以获取相关说明。
对于**FIPS**，ECDSA密钥不存在	如果启用了FIPS模式、则需要在重试之前在交换机上生成ECDSA密钥。
已找到已有日志	删除交换机上先前的日志收集文件。
交换机转储日志错误	确保交换机用户具有日志收集权限。请参阅上述前提条件。

配置SNMPv3

按照此操作步骤配置SNMPv3、此SNMPv3支持以太网交换机运行状况监控(CSHM)。

关于此任务

以下命令可在Cisco 9334c-适用于 所有交换机的SNMPv3交换机上配置SNMPv3用户名：

- 对于*no authentication (无身份验证)*： `snmp-server user SNMPv3_USER NoAuth`
- 对于*MD5/SHA身份验证*： `snmp-server user SNMPv3_USER auth [md5|sha] AUTH-PASSWORD`
- 对于采用AES/DES加密的*MD5/SHA身份验证*： `snmp-server user SNMPv3_USER AuthEncrypt auth [md5|sha] AUTH-PASSWORD priv aes-128 PRIV-PASSWORD`

以下命令会在ONTAP 端配置SNMPv3用户名：`cluster1：：：*> security login create -user-or -group-name SNMPv3用户-application snmp -authentication-method USM -remote-switch -ipaddress address`

以下命令将使用CSHM建立SNMPv3用户名： `cluster1::*> system switch ethernet modify -device DEVICE -snmp-version SNMPv3 -community-or-username SNMPv3_USER`

步骤

1. 在交换机上设置SNMPv3用户以使用身份验证和加密：

   ```
   show snmp user
   ```

显示示例

```
(sw1)(Config)# snmp-server user SNMPv3User auth md5 <auth_password>
priv aes-128 <priv_password>

(sw1)(Config)# show snmp user

-----------------------------------------------------------------------
---------
                              SNMP USERS
-----------------------------------------------------------------------
---------

User              Auth            Priv(enforce)   Groups
acl_filter
----------------- --------------- --------------- ---------------
-----------
admin             md5             des(no)         network-admin
SNMPv3User        md5             aes-128(no)     network-operator

-----------------------------------------------------------------------
---------
     NOTIFICATION TARGET USERS (configured  for sending V3 Inform)
-----------------------------------------------------------------------
---------

User              Auth                Priv
----------------- ------------------ ------------

(sw1)(Config)#
```

2. 在ONTAP 端设置SNMPv3用户：

```
security login create -user-or-group-name <username> -application snmp
-authentication-method usm -remote-switch-ipaddress 10.231.80.212
```

显示示例

```
cluster1::*> system switch ethernet modify -device "sw1
(b8:59:9f:09:7c:22)" -is-monitoring-enabled-admin true

cluster1::*> security login create -user-or-group-name <username>
-application snmp -authentication-method usm -remote-switch
-ipaddress 10.231.80.212

Enter the authoritative entity's EngineID [remote EngineID]:

Which authentication protocol do you want to choose (none, md5, sha,
sha2-256)
[none]: md5

Enter the authentication protocol password (minimum 8 characters
long):

Enter the authentication protocol password again:

Which privacy protocol do you want to choose (none, des, aes128)
[none]: aes128

Enter privacy protocol password (minimum 8 characters long):
Enter privacy protocol password again:
```

3. 将CSHM配置为使用新SNMPv3用户进行监控：

```
system switch ethernet show-all -device "sw1" -instance
```

显示示例

```
cluster1::*> system switch ethernet show-all -device "sw1" -instance

                                   Device Name: sw1
                                    IP Address: 10.231.80.212
                                  SNMP Version: SNMPv2c
                                 Is Discovered: true
   SNMPv2c Community String or SNMPv3 Username: cshm1!
                                  Model Number: N9K-C9336C-FX2
                                Switch Network: cluster-network
                              Software Version: Cisco Nexus
Operating System (NX-OS) Software, Version 9.3(7)
                      Reason For Not Monitoring: None  <---- displays
when SNMP settings are valid
                       Source Of Switch Version: CDP/ISDP
                                 Is Monitored ?: true
                   Serial Number of the Device: QTFCU3826001C
                                   RCF Version: v1.8X2 for
Cluster/HA/RDMA

cluster1::*>
cluster1::*> system switch ethernet modify -device "sw1" -snmp
-version SNMPv3 -community-or-username <username>
cluster1::*>
```

4. 确认要使用新创建的SNMPv3用户查询的序列号与CSHM轮询周期完成后上一步中详述的序列号相同。

   ```
   system switch ethernet polling-interval show
   ```

显示示例

```
cluster1::*> system switch ethernet polling-interval show
         Polling Interval (in minutes): 5

cluster1::*> system switch ethernet show-all -device "sw1" -instance

                                     Device Name: sw1
                                      IP Address: 10.231.80.212
                                    SNMP Version: SNMPv3
                                   Is Discovered: true
   SNMPv2c Community String or SNMPv3 Username: SNMPv3User
                                    Model Number: N9K-C9336C-FX2
                                  Switch Network: cluster-network
                               Software Version: Cisco Nexus
Operating System (NX-OS) Software, Version 9.3(7)
                       Reason For Not Monitoring: None  <---- displays
when SNMP settings are valid
                        Source Of Switch Version: CDP/ISDP
                                  Is Monitored ?: true
                    Serial Number of the Device: QTFCU3826001C
                                     RCF Version: v1.8X2 for
Cluster/HA/RDMA

cluster1::*>
```