在HA中更换Catalyst 9000的Supervisor模块或堆叠成员

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简介

本文档介绍如何在高可用性(HA)设置中替换Catalyst 9K交换机的管理引擎模块或堆栈成员。

先决条件

要求

Cisco建议您熟悉堆叠、stackwise-virtual(SVL)和捆绑包，以便在Catalyst 9K交换机上安装与引导模式相关的概念。

使用的组件

本文档中的信息基于以下软件和硬件版本：

- C9200
- C9300
- C9400
- C9500
- C9600

注意：有关在其他思科平台上启用这些功能所使用的命令，请参阅相应的配置指南。

本文档中的信息都是基于特定实验室环境中的设备编写的。本文档中使用的所有设备最初均采用原始（默认）配置。如果您的网络处于活动状态，请确保您了解所有命令的潜在影响。

背景信息

本文档包括替换堆叠式交换机类型成员的过程：

- C9200/C9300堆叠成员
- C9500使用SVL
- C9400/C9600机箱管理引擎采用各种操作模式（独立式、双管理引擎、SVL和四管理引擎SVL）。

更换C9300或C9200堆叠的成员

在本示例中，您将替换C9300堆叠的成员。（本示例中的交换机将交换机2用于安装引导模式）。

注意：同一过程可用于替换C9200堆叠成员。



验证更换前

检查当前堆栈状态并准备交换。确保将交换机上的启动变量设置为指向正确的程序包文件（如果启动模式为“安装”）或bin文件（捆绑启动模式）并启用自动启动。

```
cat9K#show boot
----------------------------
Switch 1
----------------------------
Current Boot Variables:
BOOT variable = flash:packages.conf;
Boot Variables on next reload:
BOOT variable = flash:packages.conf;
Manual Boot = no
Enable Break = yes
```

```
Boot Mode = DEVICE
iPXE Timeout = 0
```

注意：如果交换机处于安装引导模式，请验证是否启用了软件自动升级。如果不是，则通过从全局配置模式配置software auto-upgrade enable启用该功能。

```
C9300#show run all | in software auto
no software auto-upgrade source url
software auto-upgrade enable
```

注意：如果堆叠处于捆绑引导模式，则需要在USB盘条或本地TFTP服务器上激活时使用的IOS-XE .bin文件的副本，该服务器可以通过新的交换机/成员通过其带外(OOB)管理端口进行访问。

检查堆栈是以全环方式物理连接的，例如，如果关闭相关交换机成员的电源，则现有堆栈不会拆分而导致堆栈合并。验证后，请继续下一步。

```
Switch#sh switch neighbors
Switch #  Port 1  Port 2
--------  ------  ------
1           2       3
2           3       2
3           1       2
```

注意：如果需要替换活动交换机成员，请对堆栈中的备用交换机执行故障转移，并等待它接管活动角色。如果要替换堆栈的任何其他成员，请跳过此步骤。

```
C9300#redundancy force-switchover

System configuration has been modified. Save? [yes/no]: yes
Building configuration...
Compressed configuration from 11673 bytes to 4403 bytes[OK]Proceed with switchover to standby RP? [conf
```

替换

关闭需要更换的成员交换机的电源，断开电源堆栈和数据堆栈电缆与其的连接。在电源关闭状态下使用新成员替换成员，重新连接数据堆栈电缆并打开电源。

注意：如果新设备运行的软件版本与现有堆栈不同，则需要匹配该版本。例如，现有堆栈运行的是17.3.1，新设备运行的是16.9.3。

如果堆叠处于捆绑引导模式，请在启动时中断到新交换机的ROMMON。借助USB盘或OOB TFTP访问，使用与现有堆叠相同的软件版本手动引导新交换机。

```
Preparing to autoboot. [Press Ctrl-C to interrupt] 3 (interrupted)
rommon 1 >

rommon 2 > boot usbflash0:cat9k_iosxe.17.03.01.SPA.bin
```

如果堆叠处于安装引导模式，则当检测到新成员交换机上存在不兼容的软件版本或引导模式时，必须启动堆叠的当前活动软件自动升级。通常，此阶段不需要手动干预。

注意：在软件自动升级过程中，如果需要microcode_update，此过程可能需要几分钟。请耐心并密切监测这个过程。

```
Logs from Stack Active

Sep 13 07:20:21.261 UTC: %STACKMGR-4-SWITCH_ADDED: Switch 1 R0/0: stack_mgr: Switch 2 has been added to
Sep 13 07:20:22.268 UTC: %STACKMGR-4-SWITCH_ADDED: Switch 1 R0/0: stack_mgr: Switch 2 has been added to
Sep 13 07:20:22.546 UTC: %BOOT-3-BOOTTIME_INCOMPATIBLE_SW_DETECTED: Switch 1 R0/0: issu_stack: Incompat
** snip **

Sep 13 07:47:37.443 UTC: %AUTO_UPGRADE-5-AUTO_UPGRADE_INITIATED: Switch 1 R0/0: auto_upgrade_trigger: A
Sep 13 07:47:37.496 UTC: %AUTO_UPGRADE-5-AUTO_UPGRADE_SEARCH: Switch 1 R0/0: auto_upgrade_trigger: Sear
Sep 13 07:47:37.519 UTC: %AUTO_UPGRADE-5-AUTO_UPGRADE_FOUND: Switch 1 R0/0: auto_upgrade_trigger: Found
Sep 13 07:47:37.538 UTC: %AUTO_UPGRADE-5-AUTO_UPGRADE_START: Switch 1 R0/0: auto_upgrade_trigger: Upgra
Sep 13 07:47:46.769 UTC: %AUTO_UPGRADE_MODULAR-5-SMU_AUTO_UPGRADE_INITIATING: Switch 1 R0/0: auto_upgra
Sep 13 07:47:47.272 UTC: %AUTO_UPGRADE-5-AUTO_UPGRADE_FINISH: Switch 1 R0/0: auto_upgrade_trigger: Fini

** snip **

Sep 13 07:57:18.981 UTC: %REDUNDANCY-5-PEER_MONITOR_EVENT: Active detected a standby insertion (raw-eve
Sep 13 07:57:18.981 UTC: %REDUNDANCY-5-PEER_MONITOR_EVENT: Active detected a standby insertion (raw-eve
Sep 13 07:57:49.863 UTC: %HA_CONFIG_SYNC-6-BULK_CFGSYNC_SUCCEED: Bulk Sync succeeded
Sep 13 07:57:50.865 UTC: %RF-5-RF_TERMINAL_STATE: Terminal state reached for (SSO)
```

验证更换后

完成SSO后，检查交换机的状态。此时，您可以重新连接堆栈电源电缆（如果适用）。

```
C9300#show switch
Switch/Stack Mac Address : 70d3.79be.6c80 - Local Mac Address
Mac persistency wait time: Indefinite
H/W Current
Switch# Role    Mac Address    Priority Version  State
-----------------------------------------------------------------------------------
*1     Active   70d3.79be.6c80   1       V01     Ready
 2     Standby  70d3.7984.8580   2       V01     Ready
!
C9300# show module
Switch Ports  Model     Serial No. MAC address     Hw Ver. Sw Ver.
------ ----- --------- ----------- -------------- ------- --------
1      41    C9300-24U FCW2125L0BH 70d3.79be.6c80   V01    17.03.01
2      41    C9300-24U FCW2125L03W 70d3.7984.8580   V01    17.03.01



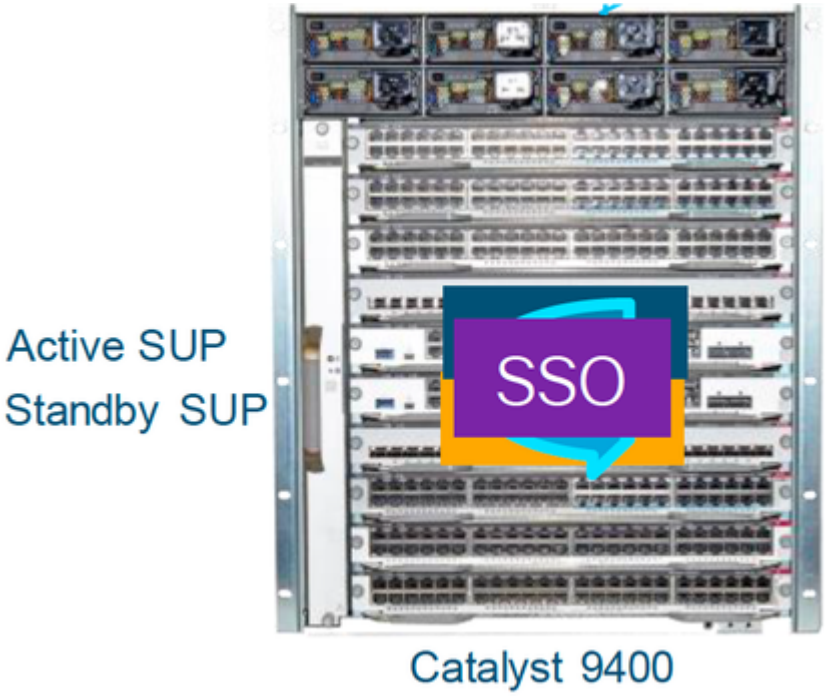

C9300#show redundancy
Redundant System Information :
------------------------------
Available system uptime = 58 minutes
Switchovers system experienced = 0
Standby failures = 0
Last switchover reason = none
Hardware Mode = Duplex
Configured Redundancy Mode = sso
Operating Redundancy Mode = sso
Maintenance Mode = Disabled
Communications = Up

Current Processor Information :
-------------------------------
Active Location = slot 1
Current Software state = ACTIVE
Uptime in current state = 58 minutes
Image Version = Cisco IOS Software [Amsterdam], Catalyst L3 Switch Software (CAT9K_IOSXE), Version 17.3
Technical Support: https://www.cisco.com/c/en/us/support/index.html
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Compiled Fri 07-Aug-20 21:32 by mcpre
BOOT = flash:packages.conf;flash:;
CONFIG_FILE =
Configuration register = 0x102

Peer Processor Information :
----------------------------
Standby Location = slot 2
Current Software state = STANDBY HOT
Uptime in current state = 4 minutes
Image Version = Cisco IOS Software [Amsterdam], Catalyst L3 Switch Software (CAT9K_IOSXE), Version 17.3
Technical Support: https://www.cisco.com/c/en/us/support/index.html
Copyright (c) 1986-2020 by Cisco Systems, Inc.
Compiled Fri 07-Aug-20 21:32 by mcpre
BOOT = flash:packages.conf;flash:;
CONFIG_FILE =
Configuration register = 0x102
```

更换C9400独立机箱的冗余管理引擎

在本示例中，您将更换C9404机箱的活动管理引擎。（本示例中的交换机用于插槽3的安装引导模式。）



验证更换前

检查交换机的引导变量是否设置为指向正确的程序包文件（如果引导模式为“安装”）或bin文件（捆绑包引导模式），并启用自动引导。

注意：如果交换机处于安装引导模式，请验证是否启用了软件自动升级。如果不是，则通过从全局配置模式配置software auto-upgrade enable启用该功能。

```
C9400#show run all | in software auto
no software auto-upgrade source url
software auto-upgrade enable
```

注意：如果主用管理引擎在捆绑包引导模式下运行，请将运行软件文件（.bin文件，运行在主用设备上）的副本保留在USB盘条或本地TFTP服务器中，该服务器可以通过带外(OOB)管理端口从新的Supervisor访问。

如果需要替换活动Supervisor（如本例中的示例），请执行到备用Supervisor的故障转移，并等待它接管活动角色。如果要替换备用Supervisor，请跳过此步骤。

```
C9400#redundancy force-switchover

System configuration has been modified. Save? [yes/no]: yes
Building configuration...
Compressed configuration from 11673 bytes to 4403 bytes[OK]Proceed with switchover to standby RP? [conf
```

替换

从机箱中移除有故障的Supervisor，插入新的机箱，同时插入控制台电缆。

注意：最初，如果两个Supervisor软件版本不同，您需要匹配它们。例如，主用管理引擎可能运行16.9.5和新的/备用管理引擎16.9.4。

如果活动Supervisor在捆绑引导模式下运行，则在新Supervisor启动时将其中断到新Supervisor的ROMMON中。借助USB盘或OOB TFTP访问，使用与活动Supervisor相同的软件版本手动引导Supervisor。

<#root>

```
Preparing to autoboot. [

Press Ctrl-C to interrupt

] 3 (interrupted)
rommon 1 >
rommon 2 >

boot usbflash0:cat9k_iosxe.16.09.05.SPA.bin
```

如果您的活动Supervisor正在安装引导模式下运行，则当前活动Supervisor一旦检测到不兼容的软件版本或新/备用Supervisor上的引导模式，就必须启动自动软件升级。通常，此阶段不需要手动干预。

<#root>

```
*Jun 16 19:50:15.122: %IOSXE_OIR-6-INSSPA: SPA inserted in subslot 3/0
*Jun 16 19:50:42.374: %SPA_OIR-6-ONLINECARD: SPA (C9400-SUP-1) online in subslot 3/0
C9400#
```

```
*Jun 16 19:50:43.376: 3 0 0:Ignore this incremental sync, session not ready
C9400#
*Jun 16 19:52:10.003: %IOSXE_OIR-6-INSCARD: Card (fp) inserted in slot F1
C9400#
*Jun 16 19:51:16.469: %IOSXE-3-PLATFORM: R1/0: kernel: dplr_intrpt: Entered dplr_intrpt_module_init dpl
*Jun 16 19:51:16.472: %IOSXE-3-PLATFORM: R1/0: kernel: chr_mmap: Allocating DMA Reserve Pool ...
*Jun 16 19:52:27.950: %IOSXE_OIR-6-ONLINECARD: Card (rp) online in slot R1
*Jun 16 19:52:28.727: %AUTO_UPGRADE-5-AUTO_UPGRADE_INITIATED: R0/0: auto_upgrade_client:

Auto upgrade initiated for RP 1.


*Jun 16 19:52:28.748: %AUTO_UPGRADE-5-AUTO_UPGRADE_SEARCH: R0/0: auto_upgrade_client: Searching stack f
*Jun 16 19:52:28.760: %AUTO_UPGRADE-5-AUTO_UPGRADE_FOUND: R0/0: auto_upgrade_client:

Found donor RP 0 to auto upgrade RP 1.


*Jun 16 19:52:28.773: %AUTO_UPGRADE-5-AUTO_UPGRADE_START: R0/0: auto_upgrade_client:

Upgrading RP 1 with software from RP 0.



*Jun 16 19:52:39.655: %REDUNDANCY-5-PEER_MONITOR_EVENT: Active detected a standby insertion (raw-event=

*Jun 16 19:52:39.655: %REDUNDANCY-5-PEER_MONITOR_EVENT: Active detected a standby insertion (raw-event=


*Jun 16 19:52:39.642: %AUTO_UPGRADE_MODULAR-5-SMU_AUTO_UPGRADE_INITIATING: R0/0: auto_upgrade_client: In



*Jun 16 19:52:40.832: %AUTO_UPGRADE-5-AUTO_UPGRADE_FINISH: R0/0: auto_upgrade_client: Finished installin



*Jun 16 19:52:40.847: %AUTO_UPGRADE-5-AUTO_UPGRADE_RELOAD: R0/0: auto_upgrade_client: Reloading RP 1 to


*Jun 16 19:52:41.622: %IOSXE_OIR-6-OFFLINECARD: Card (rp) offline in slot R1

** snip **

*Jun 16 19:56:10.356: %REDUNDANCY-5-PEER_MONITOR_EVENT: Active detected a standby insertion (raw-event=

*Jun 16 19:56:10.356: %REDUNDANCY-5-PEER_MONITOR_EVENT: Active detected a standby insertion (raw-event=

** snip **

*Jun 16 19:57:33.582: %HA_CONFIG_SYNC-6-BULK_CFGSYNC_SUCCEED: Bulk Sync succeeded
*Jun 16 19:57:34.623: %RF-5-RF_TERMINAL_STATE:

 Terminal state reached for (SSO)
```

验证更换后

在SSO完成后检查管理引擎的状态

<#root>

C9400#

show module

```
Chassis Type: C9404R
Mod Ports                           Card Type                   Model                 Serial No.
---+--------------------+------------------------------+----------------------+--------------------
2         10                     Supervisor 1 Module           C9400-SUP-1           JAE22100647
3         10                     Supervisor 1 Module           C9400-SUP-1

Mod                    MAC addresses              Hw         Fw              Sw          Status
---+---------------------------------------+---------+--------------+--------------+------------
2         A8B4.56BF.316C to A8B4.56BF.3175       1.0       16.12.1r       16.09.05        ok
3                                                                                         ok
```

<--- Started Syncing

```
Mod   Redundancy Role            Operating Redundancy Mode           Configured Redundancy Mode
---+---------------------+---------------------------------------+-----------------------------------
2          Active                          sso                                 sso
3          Standby                         sso                                 sso

Chassis MAC address range: 44 addresses from a8b4.56bf.3140 to a8b4.56bf.316b
```

<#root>

C9400#

show redundancy

```
Redundant System Information :
------------------------------
Available system uptime = 10 minutes
Switchovers system experienced = 0
Standby failures = 0
Last switchover reason = none
Hardware Mode = Duplex
Configured Redundancy Mode =
```

sso

```
Operating Redundancy Mode =

sso


Maintenance Mode = Disabled
Communications = Up
Current Processor Information :
-------------------------------
Active Location = slot 2
Current Software state = ACTIVE
Uptime in current state = 10 minutes
Image Version = Cisco IOS Software [Fuji], Catalyst L3 Switch Software (CAT9K_IOSXE), Version 16.9.5, R
Technical Support: https://www.cisco.com/c/en/us/support/index.html
Copyright (c) 1986-2019 by Cisco Systems, Inc.
Compiled Thu 22-Aug-19 18:14 by mcpre
BOOT = bootflash:packages.conf;
CONFIG_FILE =
Configuration register = 0x102
Peer Processor Information :
-----------------------------
Standby Location = slot 3
Current Software state =

STANDBY HOT


Uptime in current state =

0 minutes

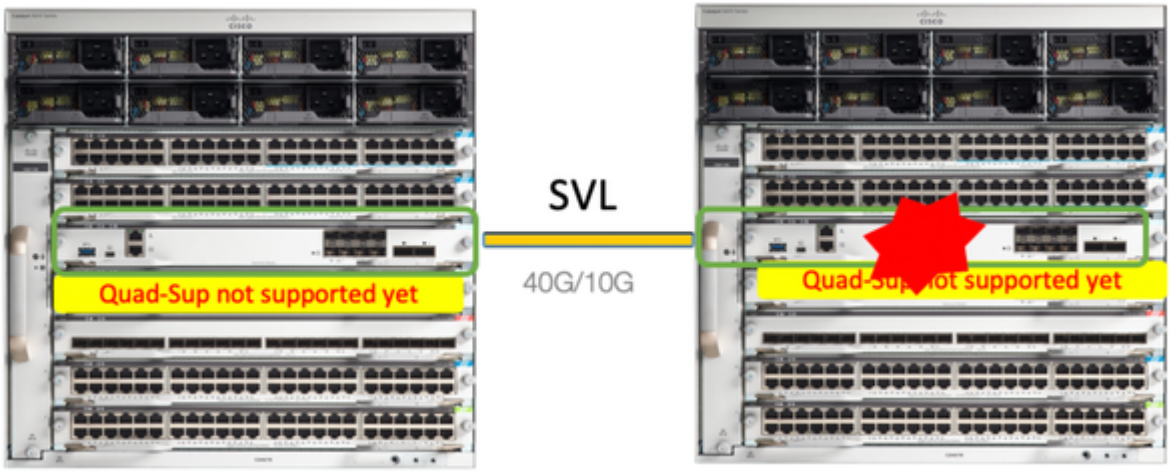

Image Version = Cisco IOS Software [Fuji], Catalyst L3 Switch Software (CAT9K_IOSXE),

Version 16.9.5

, RELEASE SOFTWARE (fc2)
Technical Support: https://www.cisco.com/c/en/us/support/index.html
Copyright (c) 1986-2019 by Cisco Systems, Inc.
Compiled Thu 22-Aug-19 18:14 by mcpre
BOOT = bootflash:packages.conf;
CONFIG_FILE =
Configuration register = 0x102
```

更换C9400双管理引擎StackWise虚拟管理引擎

此示例适用于C9400 Stackwise虚拟设置（每个机箱一个管理引擎），其中机箱–1的管理引擎（活动交换机）已损坏，需要更换。SVL正在安装引导模式下运行。



验证更换前

检查当前与StackWise-Virtual相关的配置和管理引擎的状态。确保交换机上的引导变量已正确设置为指向正确的程序包文件（如果引导模式为“安装”）或bin文件（捆绑引导模式），并且已启用自动引导。

<#root>

9400-3#

show stackwise-virtual

```
Stackwise Virtual Configuration:
--------------------------------
Stackwise Virtual : Enabled
Domain Number : 100
Switch Stackwise Virtual Link Ports
------ ---------------------- ------
1              1               TenGigabitEthernet1/5/0/1
```

<<< switch 1 needs to be replaced here

```
2              1               TenGigabitEthernet2/5/0/1
```

<#root>

9400-3#

show bootvar

```
BOOT variable =

flash:packages.conf

;
Configuration Register is 0x102

MANUAL_BOOT variable = no


BAUD variable = 9600
ENABLE_BREAK variable = yes
BOOTMODE variable does not exist
IPXE_TIMEOUT variable does not exist
CONFIG_FILE variable =
```

注意：如果交换机处于“安装”引导模式，请验证是否启用了软件自动升级。如果不是，则通过从全局配置模式配置“software auto-upgrade enable”启用该功能。

```
<#root>

9400-3#

show run all | in software auto


no software auto-upgrade source url

software auto-upgrade enable
```

注意：如果您的主用Supervisor在捆绑引导模式下运行，请将运行软件文件（.bin文件，您运行在主用模式下）的副本保留在USB存储棒或本地TFTP服务器中，该服务器可以通过新的Supervisor带外(OOB)管理端口进行访问。

如果需要替换主用Supervisor（如示例所示），请执行到备用管理引擎的故障转移，并等待备用管理引擎接管主用角色。如果要替换备用管理引擎，请跳过此步骤。

```
<#root>

9400-1#

redundancy force-switchover
```

```
System configuration has been modified. Save? [yes/no]: yes
Building configuration...
Compressed configuration from 11673 bytes to 4403 bytes[OK]Proceed with switchover to standby RP? [conf
```

替换

关闭需要更换管理引擎的机箱的电源（在我们的示例中，它是chassis-1）。

从相应机箱（需要更换管理引擎）的背板卸下线卡。 无需将线卡完全从机箱中取出，只要线卡未连接到背板即可。这样，当插入新的管理引擎并进行预转移时，连接的远程交换机（多机箱etherchannel）不会将其本地端口置于错误禁用状态（LACP等）。

<#root>

```
9400-3#

show module


Chassis Type: C9410R

Switch Number 1
Mod Ports Card Type Model Serial No.
---+-----+--------------------------------------+--------------+--------------
Mod MAC addresses Hw Fw Sw Status
---+--------------------------------+----+------------+-----------------+--------
Mod  Redundancy Role      Operating Redundancy Mode    Configured Redundancy Mode
---+------------------+------------------------+---------------------------

Switch Number 2
Mod Ports Card Type                                  Model            Serial No.
---+-----+--------------------------------------+--------------+--------------
1    48   48-Port UPOE w/ 24p mGig 24p RJ-45     C9400-LC-48UX   JAE2138067S
2    48   48-Port UPOE 10/100/1000 (RJ-45)       C9400-LC-48U    JAE2141091P
5   10    Supervisor 1 Module                    C9400-SUP-1     JAE2220082A

Mod          MAC addresses             Hw        Fw             Sw            Status
---+--------------------------------+----+------------+-----------------+--------
1   707D.B9CF.6D1C to 707D.B9CF.6D4B 1.0    16.12.2r     16.12.03a           ok
2   6CB2.AE42.2704 to 6CB2.AE42.2733 1.0    16.12.2r     16.12.03a           ok
5   AC3A.675B.E26C to AC3A.675B.E275 1.0    16.12.2r     16.12.03a           ok

Mod  Redundancy Role        Operating Redundancy Mode  Configured Redundancy Mode
---+------------------+------------------------+---------------------------
5    Active                    non-redundant              sso
```

将新的Supervisor插入存在故障Supervisor的同一插槽中，然后接通电源。它必须在单机模式（非SVL）下启动，暂时断开Stackwise虚拟链路。

- 如果主用Supervisor在捆绑包引导模式下运行，则将软件bin文件（与SVL的当前主用Supervisor相同）复制到新备用Supervisor的Bootflash并相应地更改引导字符串。
- 如果您的活动Supervisor正在安装引导模式下运行，则不需要手动软件升级。当新的/备用Supervisor检测到不兼容的软件版本或引导模式时，必须立即由当前主用Supervisor自动升级新Supervisor的软件和引导模式。

使用Stackwise虚拟设置配置新的管理引擎。（您必须使用相同的SVL域号来匹配现有成员。）

```
<#root>

Switch#

conf t

Enter configuration commands, one per line.  End with CNTL/Z.

Switch(config)#

stackwise-virtual


Please reboot the switch for Stackwise Virtual configuration to take effect

Switch(config-stackwise-virtual)#

domain 100

Switch(config-stackwise-virtual)#

exit
```

配置SVL和DAD端口。使用与故障Supervisor上使用的相同端口。

```
<#root>

9400-1(config)#

interface tenGigabitEthernet 5/0/1


9400-1(config-if)#

stackwise-virtual link 1
```

```
WARNING: All the extraneous configurations will be removed for TenGigabitEthernet5/0/1 on reboot
INFO: Upon reboot, the config will be part of running config but not part of start up config.
```

检查SVL配置是否正确应用到新交换机。

<#root>

Switch#show stackwise-virtual

```
Stackwise Virtual Configuration:
--------------------------------
Stackwise Virtual : Disabled
Switch    Stackwise Virtual Link    Ports
------    ----------------------    ------
Stackwise Virtual Configuration After Reboot:
---------------------------------------------
Stackwise Virtual : Enabled
Domain Number :    100
Switch    Stackwise Virtual Link    Ports
------    ----------------------    ------
1        1                      TenGigabitEthernet5/0/1
```

从IOSd CLI检查ROMMON中的SVL设置（在16.12.x或更高版本中可用）

<#root>

9400-1#

show romvar

```
ROMMON variables:
MAC_ADDR="70:0F:6A:DE:54:34"
SWITCH_NUMBER="1"
MODEL_NUM="C9400-SUP-1"
SYSTEM_SERIAL_NUM=""
MOTHERBOARD_SERIAL_NUM="JAE221703NQ"
TEMPLATE="access"
BAUD="9600"
LICENSE_BOOT_LEVEL="network-advantage+dna-advantage,all:MACALLAN-CHASSIS;"
MCP_STARTUP_TRACEFLAGS="00000000:00000000"
CALL_HOME_DEBUG="0000000000000"
D_STACK_DAD=""
CONFIG_FILE=""
BOOTLDR=""
SWITCH_IGNORE_STARTUP_CFG="0"
```

MANUAL_BOOT="no"

```
AUTOREBOOT_RESTORE="0"
ENABLE_BREAK="yes"
RET_2_RTS=""
AUTO_SWITCH_CONSOLE_DISABLE="0"
BOOT="flash:cat9k_iosxe.16.12.03a.SPA.bin;"
D_STACK_DISTR_STACK_LINK2=""
ABNORMAL_RESET_COUNT="1"
ROMMON_AUTOBOOT_ATTEMPT="3"
BSI="0"
RET_2_RCALTS=""
RANDOM_NUM="421133355"

D_STACK_DISTR_STACK_LINK1="Te5/0/1,"



D_STACK_MODE="aggregation"



D_STACK_DOMAIN_NUM="100"
```

保存配置，并关闭新管理引擎所在的机箱电源。

连接两个机箱之间的StackWise-Virtual链路，并且首选断开双活检测链路（如果适用）。

打开机箱电源，通过控制台监控启动过程。

- 如果SVL在捆绑包引导模式下运行，请确保新的Supervisor与Active使用相同的软件版本。否则，请再次进入ROMMON并使用正确的软件版本手动启动。
- 如果SVL以安装引导模式运行，则“软件自动升级”必须负责将正确的软件版本和引导模式推送到新的Supervisor，无需任何手动干预。

<#root>

```
Active supervisor's log



*Sep 12 07:20:25.457: %ILPOWER-6-SET_ILPOWER: Set power allocated to POE to 4420 for slot 0
*Sep 12 07:20:30.621:

%BOOT-3-BOOTTIME_INCOMPATIBLE_SW_DETECTED: Chassis 2 R0/0: issu_stack: Incompatible software detected. D
```

***Sep 12 07:20:40.779: %AUTO_UPGRADE-5-AUTO_UPGRADE_START_CHECK: Chassis 2 R0/0: auto_upgrade_client: Aut**

***Sep 12 07:21:00.978: %AUTO_UPGRADE-5-AUTO_UPGRADE_INITIATED: Chassis 2 R0/0: auto_upgrade_client: Auto**

*Sep 12 07:21:01.031: %AUTO_UPGRADE-5-AUTO_UPGRADE_SEARCH: Chassis 2 R0/0: auto_upgrade_client: Searchi
*Sep 12 07:21:01.053: %AUTO_UPGRADE-5-AUTO_UPGRADE_FOUND: Chassis 2 R0/0: auto_upgrade_client: Found do

***Sep 12 07:21:01.074: %AUTO_UPGRADE-5-AUTO_UPGRADE_START: Chassis 2 R0/0: auto_upgrade_client: Upgrading**

<#root>

Logs from new supervisor's console

```
Waiting for remote chassis to join
########################################
Chassis number is 1
All chassis in the stack have been discovered. Accelerating discovery

Chassis 1 reloading, reason - System requested reload
```

<<< reload is instructed by current active as part of software auto-upgrade

```
Sep 12 07:25:23.306: %PMAN-5-EXITACTION: R0/0: pvp: Process manager is exiting: process exit with reloa
```

所有运行配置都必须从活动Supervisor自动同步到新的Supervisor。等待来自主用管理引擎的这些日志。

```
*Sep 12 07:33:39.803: %HA_CONFIG_SYNC-6-BULK_CFGSYNC_SUCCEED: Bulk Sync succeeded
*Sep 12 07:33:40.837: %RF-5-RF_TERMINAL_STATE: Terminal state reached for (SSO)
```

- 完成SSO后，继续连接双活检测(DAD)链路和新的管理引擎上的其他网络上行链路端口（如果适用）。
- 将线卡推回内部，使其再次连接到背板
- 检验所有线卡是否引导良好，是否通过在线诊断测试并启用其接口，包括端口通道绑定等。

验证更换后

使用以下命令检查StackWise虚拟相关配置和交换机的状态。

```
<#root>
9400-3#

sh redundancy



Redundant System Information :
------------------------------
Available system uptime = 1 hour, 31 minutes
Switchovers system experienced = 0
Standby failures = 0
Last switchover reason = none

Hardware Mode = Duplex
Configured Redundancy Mode = sso

Operating Redundancy Mode = sso



Maintenance Mode = Disabled
Communications = Up

Current Processor Information :
-------------------------------
Active Location = Switch 2
Current Software state = ACTIVE
Uptime in current state = 31 minutes
Image Version = Cisco IOS Software [Gibraltar], Catalyst L3 Switch Software (CAT9K_IOSXE), Version 16.1
Technical Support: https://www.cisco.com/c/en/us/support/index.html
Copyright (c) 1986-2020 by Cisco Systems, Inc.
Compiled Tue 28-Apr-20 09:37 by mcpre
BOOT = flash:packages.conf;
CONFIG_FILE =
Configuration register = 0x102

Peer Processor Information :
----------------------------

Standby Location = Switch 1



Current Software state = STANDBY HOT



Uptime in current state = 4 minutes
Image Version = Cisco IOS Software [Gibraltar], Catalyst L3 Switch Software (CAT9K_IOSXE), Version 16.1
Technical Support: https://www.cisco.com/c/en/us/support/index.html
```

```
Copyright (c) 1986-2020 by Cisco Systems, Inc.
Compiled Tue 28-Apr-20 09:37 by mcpre
BOOT = flash:packages.conf;
CONFIG_FILE =
Configuration register = 0x102
!
```

<#root>

```
9400-3#
```

sh stackwise-virtual

```
Stackwise Virtual Configuration:
--------------------------------
Stackwise Virtual : Enabled
Domain Number : 100
Switch Stackwise Virtual Link Ports
------ --------------------- ------
1          1                   TenGigabitEthernet1/5/0/1
2          1                   TenGigabitEthernet2/5/0/1
```

<#root>

```
9400-3#
```

sh module

```
Chassis Type: C9410R
Switch Number 1

Mod Ports         Card Type                          Model           Serial No.
---+-----+--------------------------------------+--------------+--------------
1    48     48-Port UPOE w/ 24p mGig 24p RJ-45   C9400-LC-48UX  JAE22360153
2    48     48-Port UPOE w/ 24p mGig 24p RJ-45   C9400-LC-48UX  JAE215103V7
5    10     Supervisor 1 Module                  C9400-SUP-1    JAE221703NQ

Mod   MAC addresses                    Hw     Fw           Sw                 Status
---+--------------------------------+----+------------+------------------+--------
1    00B7.71FA.D878 to 00B7.71FA.D8A7 1.0  16.12.2r     16.12.03a
```

ok

```
2    4C77.6DBF.4A94 to 4C77.6DBF.4AC3 1.0  16.12.2r     16.12.03a
```

ok

```
5    AC3A.675B.E9AC to AC3A.675B.E9B5 1.0  16.12.2r     16.12.03a
```

```
ok

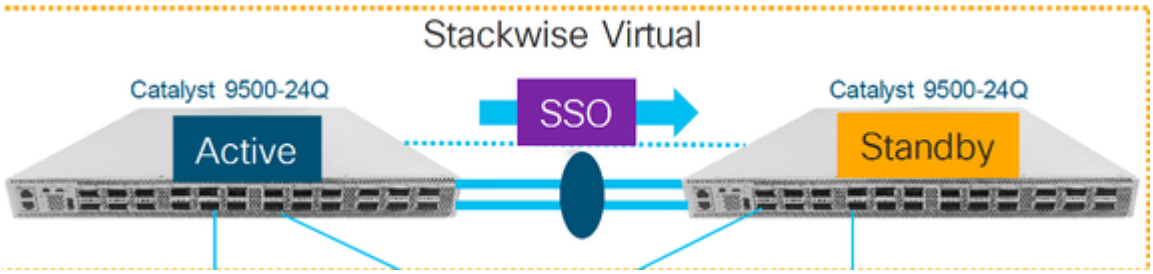

Mod Redundancy Role       Operating Redundancy Mode   Configured Redundancy Mode
---+------------------+-------------------------+--------------------------
5

Standby                   sso

                           sso
**snip**
```

替换C9500 StackWise-Virtual的成员

在本例中，您考虑将C9500 Stackwise虚拟设置中的Switch-1（活动交换机）作为需要更换的故障交换机。SVL在INSTALL引导模式下运行。



验证更换前

检查当前与StackWise-Virtual相关的配置和交换机的状态。确保引导变量设置正确，指向packages.conf，config-register设置为0x2102。

<#root>

```
C9500-1#

show stackwise-virtual


Stackwise Virtual Configuration:
--------------------------------
Stackwise Virtual : Enabled
Domain Number : 100
```

```
Switch Stackwise Virtual Link Ports
------ --------------------- ------
1            1               TwentyFiveGigE1/0/1
                             TwentyFiveGigE1/0/2
2            1               TwentyFiveGigE2/0/1
                             TwentyFiveGigE2/0/2
```

<#root>

C9500-1#

show stackwise-virtual dual-active-detection

```
Dual-Active-Detection Configuration:
-------------------------------------
Switch    Dad port
------    ------------
1       TwentyFiveGigE1/0/3
2       TwentyFiveGigE2/0/3
```

<<<<<<<<<< Ports configured for Dual-Active Detection (DAD)

Note :

Configs of these DAD ports do not show up in running-config

```
!
interface TwentyFiveGigE 1/0/3
end
!
interface TwentyFiveGigE 2/0/3
end
```

C9500-1#show switch

```
Switch/Stack Mac Address : f4db.e619.0480 - Local Mac Address
Mac persistency wait time: Indefinite
H/W Current
Switch# Role      Mac Address    Priority  Version  State
-----------------------------------------------------------------------------
*1     Active    f4db.e619.0480    15       V02     Ready
 2     Standby   f4db.e618.fa80     1       V02     Ready
```

C9500-1#

show redundancy

```
Redundant System Information :
------------------------------
Available system uptime = 4 minutes
Switchovers system experienced = 0
Standby failures = 0
Last switchover reason = none
Hardware Mode = Duplex
Configured Redundancy Mode = sso
Operating Redundancy Mode = sso
Maintenance Mode = Disabled
Communications = Up

Current Processor Information :
------------------------------
Active Location = slot 1
Current Software state = ACTIVE
Uptime in current state = 4 minutes
Image Version = Cisco IOS Software [Gibraltar], Catalyst L3 Switch Software (CAT9K_IOSXE), Version 16.1
Technical Support: https://www.cisco.com/c/en/us/support/index.html
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Compiled Tue 19-Nov-19 10:04 by mcpre

BOOT = flash:packages.conf

;
CONFIG_FILE =

Configuration register = 0x102



Peer Processor Information :
----------------------------
Standby Location = slot 2
Current Software state = STANDBY HOT
Uptime in current state = 1 minute
Image Version = Cisco IOS Software [Gibraltar], Catalyst L3 Switch Software (CAT9K_IOSXE), Version 16.1
Technical Support: https://www.cisco.com/c/en/us/support/index.html
Copyright (c) 1986-2019 by Cisco Systems, Inc.
Compiled Tue 19-Nov-19 10:04 by mcpre

BOOT = flash:packages.conf

;
CONFIG_FILE =

Configuration register = 0x102
```

注意：如果SVL在INSTALL引导模式下运行，请验证是否已启用软件自动升级。如果不是，则通过从全局配置模式配置software auto-upgrade enable来启用该功能。（如果SVL在捆绑引

导模式下运行，请跳过此步骤）。

<#root>

C9500-1#

show run all | in software auto

no software auto-upgrade source url

software auto-upgrade enable

如果需要更换主用交换机，请执行到备用交换机的故障切换，并等待备用交换机接管主用角色。（如果要更换备用设备，请跳过此步骤）。

<#root>

C9500-1#

redundancy force-switchover

System configuration has been modified. Save? [yes/no]: yes
Building configuration...
Compressed configuration from 11673 bytes to 4403 bytes[OK]Proceed with switchover to standby RP? [conf

替换

关闭需要更换的交换机电源。断开该交换机的所有电缆。

<#root>

C9500-1#

show switch

Switch/Stack Mac Address : f4db.e619.0480 - Foreign Mac Address
Mac persistency wait time: Indefinite
H/W Current
Switch# Role Mac Address Priority Version State

```
-----------------------------------------------------------------------------------
 1     Member    0000.0000.0000    0        V02    Removed

<< switch 1 is powered down


*2     Active    f4db.e618.fa80    1        V02    Ready
```

打开新交换机的电源。它必须在单机模式（非SVL）下启动。（如果当前的活动SVL在INSTALL启动模式下运行，请跳过此步骤）

检查新设备上的软件版本。如果它与StackWise-Virtual单元的现有成员不匹配，则将该版本和许可证与SVL的现有成员进行预存放以匹配。(您可以通过TFTP/FTP/SFTP或使用USB接口加载正确的软件版本，并在新单元上匹配软件版本和许可证后，继续执行下一步。

```
<#root>

Cisco IOS XE Software,

Version 16.12.02


Cisco IOS Software [Gibraltar], Catalyst L3 Switch Software (CAT9K_IOSXE), Version 16.12.02, RELEASE SO
Technical Support: https://www.cisco.com/c/en/us/support/index.html
Copyright (c) 1986-2019 by Cisco Systems, Inc.
Compiled Tue 19-Nov-19 10:04 by mcpre
```

注意：如果SVL在INSTALL引导模式下运行并且启用了软件自动升级，则通常SVL的现有活动成员必须能够自动匹配新设备的代码和引导模式。

在新交换机上配置StackWise虚拟。您必须使用相同的SVL域号来匹配现有成员。

```
<#root>

Switch#

conf t

Enter configuration commands, one per line.  End with CNTL/Z.

Switch(config)#

stackwise-virtual


Please reboot the switch for Stackwise Virtual configuration to take effect
```

```
Switch(config-stackwise-virtual)#

domain 100

Switch(config-stackwise-virtual)#

exit
```

配置SVL和DAD端口。使用故障交换机上使用的端口。

<#root>

```
Switch(config)#

int range twe1/0/1-2

Switch(config-if-range)#

stackwise-virtual link 1

WARNING: All the extraneous configurations will be removed for TwentyFiveGigE1/0/1 on reboot
WARNING: All the extraneous configurations will be removed for TwentyFiveGigE1/0/2 on reboot
Switch(config-if-range)#exit

Switch(config)#

int twe1/0/3

Switch(config-if)#

stackwise-virtual dual-active-detectio

n
WARNING: All the extraneous configurations will be removed for TwentyFiveGigE1/0/3 on reboot.
```

检查SVL配置是否正确应用到新交换机。

<#root>

```
Switch#

show stackwise-virtual


Stackwise Virtual Configuration:
--------------------------------
Stackwise Virtual : Disabled
```

```
Switch    Stackwise Virtual Link    Ports
------    ----------------------    ------
Stackwise Virtual Configuration After Reboot:
-------------------------------------------
Stackwise Virtual : Enabled
Domain Number :    100
Switch    Stackwise Virtual Link    Ports
------    ----------------------    ------
1        1                      TwentyFiveGigE1/0/1
                                TwentyFiveGigE1/0/2


Switch#
```

show stackwise-virtual dual-active-detection

```
Dual-Active-Detection Configuration:
------------------------------------
Switch    Dad port
------    ------------
Distributed Stack DAD Configuration After Reboot:
-------------------------------------------------
Switch    Dad port
------    --------
1        TwentyFiveGigE1/0/3
```

保存配置并关闭新交换机的电源。

在现有SVL成员和新设备之间连接StackWise-Virtual链路。希望断开双活检测链路。

打开新设备的电源。如果交换机编号发生冲突，则必须为新设备自动重新编号。

```
Chassis is reloading, reason: Configured Switch num conflicts with peer, Changing local switch number t
Sep 10 22:41:50.738: %PMAN-3-PROCHOLDDOWN: R0/0: The process nif_mgr has been helddown (rc 69)
```

注意：如果新设备正在运行不兼容的软件或引导模式，并且现有SVL成员正在运行INSTALL引导模式，则软件自动升级将启动，使新设备进入INSTALL引导模式，无需手动干预。

```
*Sep 10 22:47:05.996: %AUTO_UPGRADE-5-AUTO_UPGRADE_START_CHECK: Chassis 2 R0/0: auto_upgrade_client: Au
```

所有运行配置都会自动从活动交换机同步到新交换机。无需其他配置。等待活动交换机的这些日志。

```
*Sep 11 01:02:28.974: %HA_CONFIG_SYNC-6-BULK_CFGSYNC_SUCCEED: Bulk Sync succeeded
C9500-1#
*Sep 11 01:02:30.009: %RF-5-RF_TERMINAL_STATE: Terminal state reached for (SSO)
```

继续连接双活检测(DAD)链路和其他网络端口。（SSO完成后）

验证更换后

使用以下命令检查StackWise虚拟相关配置和交换机的状态。

<#root>

```
C9500-1#

show stackwise-virtual

Stackwise Virtual : Enabled
Domain Number : 100
Switch Stackwise Virtual Link    Ports
------ ----------------------    ------
1              1              TwentyFiveGigE1/0/1
                              TwentyFiveGigE1/0/2
2              1              TwentyFiveGigE2/0/1
                              TwentyFiveGigE2/0/2

C9500-1#

show redundancy


Redundant System Information :
------------------------------
Available system uptime = 14 minutes
Switchovers system experienced = 0
Standby failures = 0
Last switchover reason = none

Hardware Mode = Duplex
Configured Redundancy Mode = sso
Operating Redundancy Mode = sso
Maintenance Mode = Disabled
Communications = Up

Current Processor Information :
------------------------------
Active Location = slot 2
Current Software state = ACTIVE
Uptime in current state = 14 minutes
Image Version = Cisco IOS Software [Gibraltar], Catalyst L3 Switch Software (CAT9K_IOSXE), Version 16.1
Technical Support: https://www.cisco.com/c/en/us/support/index.html
Copyright (c) 1986-2019 by Cisco Systems, Inc.
```

```
Compiled Tue 19-Nov-19 10:04 by mcpre
BOOT = flash:packages.conf;
CONFIG_FILE =
Configuration register = 0x102

Peer Processor Information :
-----------------------------
Standby Location =

slot 1


Current Software state =

STANDBY HOT


Uptime in current state = 1 minute
Image Version = Cisco IOS Software [Gibraltar], Catalyst L3 Switch Software (CAT9K_IOSXE), Version 16.1
Technical Support: https://www.cisco.com/c/en/us/support/index.html
Copyright (c) 1986-2019 by Cisco Systems, Inc.
Compiled Tue 19-Nov-19 10:04 by mcpre
BOOT = flash:packages.conf;
CONFIG_FILE =
Configuration register = 0x102
```

更换C9600双管理引擎独立机箱

在本示例中，您正在考虑更换C9606机箱插槽3上的主用管理引擎。（交换机正在安装引导模式下运行。）



验证更换前

检查交换机上的引导变量是否设置正确，指向正确的包文件（如果引导模式为Install）或bin文件(bundle boot mode)，并启用自动引导。

> 注意：如果交换机正在安装引导模式下运行，请验证software auto-upgrade是否已启用。如果不是，则通过从全局配置模式配置software auto-upgrade enable来启用该功能。

<#root>

C9600R-1#

show run all | in software auto

no software auto-upgrade source url

software auto-upgrade enable

> 注意：如果主用管理引擎在捆绑包引导模式下运行，请将运行软件文件（.bin文件，运行在主用设备上）的副本保留在USB盘条或本地TFTP服务器中，该服务器可以通过带外(OOB)管理端口从新的Supervisor访问。

替换

如果需要替换主用管理引擎（如本例中的示例），请执行到备用管理引擎的故障切换，然后等待它接管主用角色。（如果要更换备用Supervisor，请跳过此步骤）。

<#root>

```
C9600R-1#

redundancy force-switchover



System configuration has been modified. Save? [yes/no]: yes
Building configuration...
Compressed configuration from 11673 bytes to 4403 bytes[OK]Proceed with switchover to standby RP? [conf
```

从机箱中移除有故障的Supervisor，插入新的管理引擎并插入控制台电缆。

注意：最初，如果两个Supervisor软件版本不同，您需要匹配它们。例如，主用管理引擎可能运行16.12.4和新的/备用管理引擎16.12.2。

如果活动Supervisor在捆绑引导模式下运行，则在新Supervisor启动时将其中断到新Supervisor的ROMMON中。借助USB盘或OOB TFTP访问，使用与活动Supervisor相同的软件版本手动引导Supervisor。稍后，在新的备用设备加入SSO后，将正在运行的软件复制到其本地bootflash。

<#root>

```
Preparing to autoboot. [Press Ctrl-C to interrupt] 3 (interrupted)
rommon 1 >
rommon 2 >

boot disk0:cat9k_iosxe.16.12.04.SPA.bin
```

如果您的活动Supervisor正在安装引导模式下运行，则当前活动Supervisor一旦检测到不兼容的软件版本或新/备用Supervisor上的引导模式，就必须启动自动软件升级。通常，此阶段不需要手动干预。

<#root>

```
*Sep 12 21:32:04.886: %REDUNDANCY-5-PEER_MONITOR_EVENT: Active detected a standby insertion (raw-event=
*Sep 12 21:32:04.886: %REDUNDANCY-5-PEER_MONITOR_EVENT: Active detected a standby insertion (raw-event=
*Sep 12 21:32:07.773: %REDUNDANCY-2-IPC:

IOS versions do not match.



*Sep 12 21:32:07.823: %SMART_LIC-5-EVAL_START: Entering evaluation period
*Sep 12 21:32:28.980: %AUTO_UPGRADE_MODULAR-5-SMU_AUTO_UPGRADE_INITIATING: R1/0:

auto_upgrade_client: Initiating SMU autoupgrade for RP 0



*Sep 12 21:32:30.867: %AUTO_UPGRADE-5-AUTO_UPGRADE_FINISH: R1/0: auto_upgrade_client:

Finished installing software on RP 0.



*Sep 12 21:32:30.908: %AUTO_UPGRADE-5-AUTO_UPGRADE_RELOAD: R1/0: auto_upgrade_client:

Reloading RP 0 to complete the auto upgrade.



** snip **

*Jun 16 19:56:10.356: %REDUNDANCY-5-PEER_MONITOR_EVENT: Active detected a standby insertion (raw-event=

*Jun 16 19:56:10.356: %REDUNDANCY-5-PEER_MONITOR_EVENT: Active detected a standby insertion (raw-event=

** snip **
*Sep 12 21:36:37.786: %REDUNDANCY-5-PEER_MONITOR_EVENT: Active detected a standby insertion (raw-event=
*Sep 12 21:36:37.786: %REDUNDANCY-5-PEER_MONITOR_EVENT: Active detected a standby insertion (raw-event=
**snip**
*Sep 12 21:39:24.085: %HA_CONFIG_SYNC-6-BULK_CFGSYNC_SUCCEED: Bulk Sync succeeded
*Sep 12 21:39:25.124: %RF-5-RF_TERMINAL_STATE:

Terminal state reached for (SSO)
```

验证更换后

SSO完成后，检查管理引擎的状态。

<#root>

```
C9606R-1#
```

show mod

```
Chassis Type: C9606R

Mod  Ports  Card Type                                  Model        Serial No.
---+-----+------------------------------------------+------------+-------------
1    24    24-Port 40GE/12-Port 100GE                C9600-LC-24C   CAT2313L2WQ
2    48    48-Port 10GE / 25GE                       C9600-LC-48YL  CAT2314L36W
3    0     Supervisor 1 Module                       C9600-SUP-1    CAT2310L5C1
4    0     Supervisor 1 Module                       C9600-SUP-1    CAT2311L4DQ
5    48    48-Port 10GE / 25GE                       C9600-LC-48YL  CAT2310L57N

Mod       MAC addresses                Hw      Fw         Sw               Status
---+--------------------------------+----+------------+-----------------+--------
1   DC8C.37C9.AC00 to DC8C.37C9.AC7F  1.0  17.1.1[FC2]  16.12.04           ok
2   DC8C.37C9.FD00 to DC8C.37C9.FD7F  1.0  17.1.1[FC2]  16.12.04           ok
3   DC8C.3772.C780 to DC8C.3772.C7FF  1.0  17.1.1[FC2]  16.12.04           ok
4   DC8C.3772.E580 to DC8C.3772.E5FF  1.0  17.1.1[FC2]  16.12.04           ok
5   DC8C.3773.0280 to DC8C.3773.02FF  1.0  17.1.1[FC2]  16.12.04           ok

Mod  Redundancy Role      Operating Redundancy Mode Configured Redundancy Mode
---+------------------+-------------------------+---------------------------
3     Standby                     sso                       sso
4     Active                      sso                       sso
Chassis MAC address range: 64 addresses from 6cb2.ae4a.9680 to 6cb2.ae4a.96bf
```

<#root>

```
C9606R-1#
```

show redundancy

```
Redundant System Information :
------------------------------
Available system uptime = 1 day, 11 hours, 32 minutes
Switchovers system experienced = 1
Standby failures = 1
Last switchover reason = user forced
Hardware Mode = Duplex
Configured Redundancy Mode = sso
Operating Redundancy Mode = sso
Maintenance Mode = Disabled
Communications = Up

Current Processor Information :
------------------------------
Active Location = slot 4
Current Software state = ACTIVE
Uptime in current state = 35 minutes
Image Version = Cisco IOS Software [Gibraltar], Catalyst L3 Switch Software (CAT9K_IOSXE), Version 16.1
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2020 by Cisco Systems, Inc.
Compiled Thu 09-Jul-20 21:49 by mcpre
BOOT =
CONFIG_FILE =
```

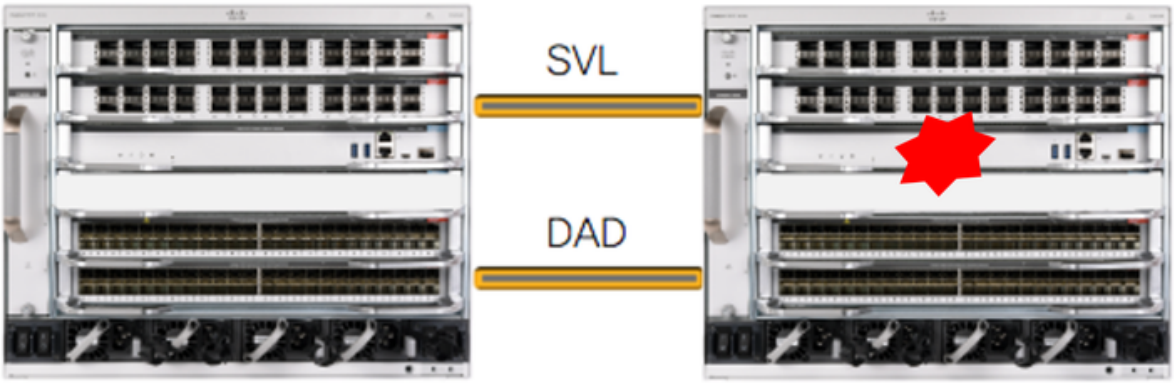
```
Peer Processor Information :
----------------------------
Standby Location = slot 3
Current Software state =
```

STANDBY HOT

```
Uptime in current state = 3 minutes
Image Version = Cisco IOS Software [Gibraltar], Catalyst L3 Switch Software (CAT9K_IOSXE), Version 16.1
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2020 by Cisco Systems, Inc.
Compiled Thu 09-Jul-20 21:49 by mcpre
BOOT =
CONFIG_FILE =
```

更换C9600双管理引擎StackWise虚拟管理引擎

在本例中，您考虑的是C9600 Stackwise虚拟设置（每个机箱一个管理引擎），其中chassis-1的管理引擎（活动交换机）已损坏，需要更换。SVL正在安装引导模式下运行。



验证更换前

检查当前与StackWise-Virtual相关的配置和管理引擎的状态。确保交换机上的引导变量已正确设置为指向正确的程序包文件（如果引导模式为“安装”）或bin文件（捆绑引导模式），并且已启用自动引导。

<#root>

```
C9600_SVL#
```

sh stackwise-virtual

```
Stackwise Virtual Configuration:
--------------------------------
Stackwise Virtual : Enabled
Domain Number : 100

Switch Stackwise Virtual Link Ports
------ --------------------- ------
2           1                FortyGigabitEthernet2/1/0/1
                             FortyGigabitEthernet2/1/0/2
1           1                FortyGigabitEthernet1/1/0/1
```

<< supervisor of SW1 needs to be replaced

```
                             FortyGigabitEthernet1/1/0/2
```

<#root>

C9600_SVL#

show bootvar

```
BOOT variable =
```

bootflash:packages.conf

;

MANUAL_BOOT variable = no

```
BAUD variable = 9600
ENABLE_BREAK variable = yes
BOOTMODE variable does not exist
IPXE_TIMEOUT variable does not exist
CONFIG_FILE variable =
```



注意：如果SVL处于安装引导模式，请验证是否已启用软件自动升级。如果不是，则通过从全局配置模式配置software auto-upgrade enable来启用该功能。

<#root>

C9600_SVL#

show run all | in software auto

```
no software auto-upgrade source url
```

software auto-upgrade enable

如果主用管理引擎在捆绑包引导模式下运行，请将运行软件文件（.bin文件，运行在主用设备上）的副本保留在USB盘条或本地TFTP服务器中，该服务器可以通过带外(OOB)管理端口从新的Supervisor访问。

- 如果需要替换主用Supervisor（如示例所示），请执行到备用管理引擎的故障转移，并等待备用管理引擎接管主用角色。如果要替换备用管理引擎，请跳过此步骤。

<#root>

```
C9600_SVL#
```

redundancy force-switchover

```
System configuration has been modified. Save? [yes/no]: yes
Building configuration...
Compressed configuration from 11673 bytes to 4403 bytes[OK]Proceed with switchover to standby RP? [conf
```

替换

关闭需要更换管理引擎的机箱的电源。在我们的示例中，它是chassis-1。

从各个机箱的背板卸下线卡（需要更换管理引擎），但配置了StackWise虚拟链路(SVL)或双活检测(DAD)链路的线卡除外。对于配置了SVL的线卡，请取消所有连接（包括SVL）的座席。这样，当插入新的管理引擎并进行预转移时，它将与网络的其余部分隔离，不会导致远程交换机连接（多机箱Etherchannel）出现任何问题。

<#root>

```
C9600_SVL#
```

show module

```
Chassis Type: C9606R
```

```
Switch Number 1
Mod  Ports        Card Type                          Model           Serial No.
---+-----+-----------------------------------------+-------------+-------------

Mod     MAC addresses                 Hw      Fw            Sw            Status
---+--------------------------------+----+-----------+-----------------+--------

Mod  Redundancy Role    Operating Redundancy Mode  Configured Redundancy Mode
---+------------------+------------------------+---------------------------

Switch Number 2
Mod Ports           Card Type                          Model         Serial No.
---+-----+-----------------------------------------+-------------+-------------
1    24    24-Port 40GE/12-Port 100GE               C9600-LC-24C   CAT2310L4DW
2    48    48-Port 10GE / 25GE                      C9600-LC-48YL  CAT2310L59S
3    0     Supervisor 1 Module                      C9600-SUP-1    CAT2340L40Q
5    24    24-Port 40GE/12-Port 100GE               C9600-LC-24C   CAT2313L2W1

Mod        MAC addresses               Hw    Fw             Sw               Status
---+--------------------------------+----+-----------+-----------------+--------
1   DC8C.379F.DB80 to DC8C.379F.DBFF  1.0  17.3.1r[FC2]  17.03.01           ok
2   DC8C.3772.FD80 to DC8C.3772.FDFF  1.0  17.3.1r[FC2]  17.03.01           ok
3   7C21.0E5D.0800 to 7C21.0E5D.087F  1.0  17.3.1r[FC2]  17.03.01           ok
5   DC8C.37A0.D180 to DC8C.37A0.D1FF  1.0  17.3.1r[FC2]  17.03.01           ok

Mod    Redundancy Role  Operating Redundancy Mode Configured Redundancy Mode
---+------------------+------------------------+---------------------------
3       Active               non-redundant                sso

Chassis 2 MAC address range: 64 addresses from 2c4f.523b.bd00 to 2c4f.523b.bd3f
```

将新的Supervisor插入存在故障Supervisor的同一插槽中，然后接通电源。它必须在单机模式（非SVL）下启动，暂时保持Stackwise虚拟链路和DAD链路断开连接。

- 如果主用Supervisor在捆绑包引导模式下运行，则将软件bin文件（与SVL的当前主用Supervisor相同）复制到新备用Supervisor的bootflash并相应地更改bootstring。
- 如果您的活动Supervisor正在安装引导模式下运行，则不需要手动软件升级。当新的/备用Supervisor检测到不兼容的软件版本或引导模式时，必须立即由当前主用Supervisor自动升级新Supervisor的软件和引导模式。

使用Stackwise虚拟设置配置新的管理引擎。（您必须使用相同的SVL域号来匹配现有成员）。

<#root>

```
Switch#

conf t

Enter configuration commands, one per line.  End with CNTL/Z.

Switch(config)#

stackwise-virtual
```

```
Please reboot the switch for Stackwise Virtual configuration to take effect
Switch(config-stackwise-virtual)#
```

domain 100

```
Switch(config-stackwise-virtual)#
```

exit

配置SVL和DAD端口。使用故障Supervisor上使用的端口。

<#root>

```
Switch(config)#
```

int range fortyGigabitEthernet 1/0/1 -2

```
Switch(config-if-range)#
```

stackwise-virtual link 1

```
Switch(config)#int range twentyFiveGigE 2/0/25 -26
Switch(config-if-range)#
```

stackwise-virtual dual-active-detection

检查SVL配置是否正确应用到新交换机。

<#root>

```
Switch#
```

show stackwise-virtual

```
Stackwise Virtual Configuration:
--------------------------------
Stackwise Virtual Configuration After Reboot:
---------------------------------------------
Stackwise Virtual : Enabled
```

Domain Number : 100

```
Switch Stackwise Virtual Link  Ports
------ ----------------------  ------
1          1                   FortyGigabitEthernet1/0/1
                               FortyGigabitEthernet1/0/2

Switch#
```

show stackwise-virtual dual-active-detection

```
In dual-active recovery mode: No
Dual-Active-Detection Configuration:
------------------------------------
Switch Dad port Status
------ ------------ ---------
Distributed Stack DAD Configuration After Reboot:
-------------------------------------------------
Switch     Dad port            Status
------      --------          ------
1      TwentyFiveGigE2/0/25   down
       TwentyFiveGigE2/0/26   down
```

如果软件版本为16.12.x或更高版本，则可以从IOSd CLI检查ROMMON中的SVL设置。

<#root>

```
Switch#
```

show romvar

```
ROMMON variables:
BOARDID="38"
ETHER_PORT="2"
PS1="rommon ! >"
MAC_ADDR="7C:21:0E:5D:04:00"
DOPPLER_E_WA="1"
RETRY="0"
MODEL_NUM="C9600-SUP-1"
SYSTEM_SERIAL_NUM="CAT2340L3Y5"
MOTHERBOARD_SERIAL_NUM="CAT2340L3Y5"
TEMPLATE="core"
BAUD="9600"
AUTO_SWITCH_CONSOLE_DISABLE="0"
PSEUDO_OIR_REMOVE_SET="1"
CALL_HOME_DEBUG="0000000000000"
ENABLE_BREAK="yes"
RET_2_RTS=""
CRASHINFO="bootflash:crashinfo_RP_00_00_20200225-024401-UTC"
MCP_STARTUP_TRACEFLAGS="00000000:00000000"
CONFIG_FILE=""
BOOTLDR=""
RECOVERY_RELOAD_DISABLE=""
SWITCH_PRIORITY="1"
SWITCH_NUMBER="1"
SWITCH_IGNORE_STARTUP_CFG="0"
```

```
D_STACK_DISTR_STACK_LINK2=""
MANUAL_BOOT="no"
AUTOREBOOT_RESTORE="0"
ABNORMAL_RESET_COUNT="0"
ROMMON_AUTOBOOT_ATTEMPT="3"
BSI="0"
RET_2_RCALTS=""
RANDOM_NUM="1430571596"
BOOT="bootflash:cat9k_iosxe.16.12.02.SPA.bin;"

D_STACK_DISTR_STACK_LINK1="Fo1/0/1,Fo1/0/2,"



D_STACK_DAD="Twe2/0/25,Twe2/0/26,"



D_STACK_MODE="aggregation"



D_STACK_DOMAIN_NUM="100"
```

保存配置，并关闭新管理引擎所在的机箱电源。

连接两个机箱之间的StackWise-Virtual链路，并且首选断开双活检测链路（如果适用）。

打开机箱电源，通过控制台监控启动过程。

注意：如果您的SVL在捆绑包引导模式下运行，请确保新的Supervisor使用与Active相同的软件版本。否则，请再次进入ROMMON并使用正确的软件版本手动启动。

注意：如果SVL处于“安装”引导模式，请验证是否已启用软件自动升级。如果不是，则通过从全局配置模式配置“software auto-upgrade enable”来启用该功能。

```
<#root>

Active supervisor's log-



*Sep 13 00:59:49.367: %STACKMGR-6-CHASSIS_ADDED: Chassis 1 R0/0: stack_mgr: Chassis 1 has been added to
```

***Sep 13 00:59:51.988: %STACKMGR-6-CHASSIS_ADDED: Chassis 1 R0/0: stack_mgr: Chassis 1 has been added to**

***Sep 13 00:59:52.135: %BOOT-3-BOOTTIME_INCOMPATIBLE_SW_DETECTED: Chassis 2 R0/0: issu_stack: Incompatibl**

***Sep 13 00:59:52.297: %AUTO_UPGRADE-5-AUTO_UPGRADE_START_CHECK: Chassis 2 R0/0: auto_upgrade_client: Aut**

*Sep 13 00:59:53.311: %AUTO_UPGRADE-5-AUTO_UPGRADE_INITIATED: Chassis 2 R0/0: auto_upgrade_client: Auto
*Sep 13 00:59:53.368: %AUTO_UPGRADE-5-AUTO_UPGRADE_SEARCH: Chassis 2 R0/0: auto_upgrade_client: Searchi

***Sep 13 00:59:53.397: %AUTO_UPGRADE-5-AUTO_UPGRADE_FOUND: Chassis 2 R0/0: auto_upgrade_client: Found dor**

***Sep 13 00:59:53.423: %AUTO_UPGRADE-5-AUTO_UPGRADE_START: Chassis 2 R0/0: auto_upgrade_client: Upgrading**

<#root>

```
Logs from new supervisor's console-

Waiting for remote chassis to join
################################################################################
Chassis number is 1
All chassis in the stack have been discovered. Accelerating discovery
Chassis 1 reloading, reason - System requested reload
```

<<< reload is instructed by current active as part of software auto-upgrade

所有运行配置都会自动从主用管理引擎同步到新管理引擎。等待来自主用管理引擎的这些日志。

```
*Sep 13 01:14:18.552: %HA_CONFIG_SYNC-6-BULK_CFGSYNC_SUCCEED: Bulk Sync succeeded
*Sep 13 01:14:18.577: %RF-5-RF_TERMINAL_STATE: Terminal state reached for (SSO)
```

完成SSO后，继续连接双活检测(DAD)链路。

- 将线卡推回内部(用于更换管理引擎的机箱)，使那些线卡重新连接到背板。现在，重新连接电缆。
- 验证所有线卡是否引导良好，通过在线诊断测试并启用其接口，包括端口通道绑定等。

验证更换后

使用以下命令检查StackWise虚拟相关配置和交换机的状态。

<#root>

C9600_SVL#

show redundancy

```
Redundant System Information :
------------------------------
Available system uptime = 1 hour, 27 minutes
Switchovers system experienced = 0
Standby failures = 0
Last switchover reason = none
Hardware Mode = Duplex
Configured Redundancy Mode = sso
Operating Redundancy Mode = sso
Maintenance Mode = Disabled
Communications = Up

Current Processor Information :
-------------------------------
Active Location = Switch 2
Current Software state = ACTIVE
Uptime in current state = 1 hour, 27 minutes
Image Version = Cisco IOS Software [Amsterdam], Catalyst L3 Switch Software (CAT9K_IOSXE), Version 17.3
Technical Support: https://www.cisco.com/c/en/us/support/index.html
Copyright (c) 1986-2020 by Cisco Systems, Inc.
Compiled Fri 07-Aug-20 21:32 by mcpre
BOOT = bootflash:packages.conf;
CONFIG_FILE =

Peer Processor Information :
----------------------------
Standby Location = Switch 1
```

Current Software state = STANDBY HOT

Uptime in current state = 0 minutes

```
Image Version = Cisco IOS Software [Amsterdam], Catalyst L3 Switch Software (CAT9K_IOSXE), Version 17.3
Technical Support: https://www.cisco.com/c/en/us/support/index.html
Copyright (c) 1986-2020 by Cisco Systems, Inc.
Compiled Fri 07-Aug-20 21:32 by mcpre
BOOT = bootflash:packages.conf;
CONFIG_FILE =
```

<#root>

C9600_SVL#

show stackwise-virtual

```
Stackwise Virtual Configuration:
--------------------------------
Stackwise Virtual : Enabled
Domain Number : 100
Switch Stackwise Virtual Link Ports
------ --------------------- ------
1          1                   FortyGigabitEthernet1/1/0/1
                               FortyGigabitEthernet1/1/0/2
2          1                   FortyGigabitEthernet2/1/0/1
                               FortyGigabitEthernet2/1/0/2
```

C9600_SVL#

show stackwise-virtual dual-active-detection

```
In dual-active recovery mode: No
Recovery Reload: Enabled

Dual-Active-Detection Configuration:
------------------------------------
Switch   Dad port             Status
------  ------------          ---------
1      TwentyFiveGigE1/2/0/25  up
       TwentyFiveGigE1/2/0/26  up
2      TwentyFiveGigE2/2/0/25  up
       TwentyFiveGigE2/2/0/26  up
```

<#root>

C9600_SVL#

show module

```
Chassis Type: C9606R

Switch Number 1

Mod Ports       Card Type                              Model       Serial No.
---+-----+--------------------------------------+--------------+--------------
1   24     24-Port 40GE/12-Port 100GE             C9600-LC-24C   CAT2252L0PR
2   48     48-Port 10GE / 25GE                    C9600-LC-48YL  CAT2334L0BA
3   0      Supervisor 1 Module                    C9600-SUP-1    CAT2340L3Y5
5   48     48-Port 10GE / 25GE                    C9600-LC-48YL  CAT2337L509

Mod   MAC addresses                     Hw  Fw              Sw              Status
---+--------------------------------+----+------------+-----------------+--------
1    70B3.175A.8100 to 70B3.175A.817F 1.0  17.3.1r[FC2]  17.03.01            ok
```

```
2    10B3.D652.9900 to 10B3.D652.997F 1.0  17.3.1r[FC2]  17.03.01           ok

3    7C21.0E5D.0400 to 7C21.0E5D.047F 1.0  17.3.1r[FC2]  17.03.01           ok


5    4C71.0D7C.8400 to 4C71.0D7C.847F 1.0  17.3.1r[FC2]  17.03.01           ok

Mod  Redundancy Role     Operating Redundancy Mode  Configured Redundancy Mode
---+------------------+-------------------------+--------------------------
3

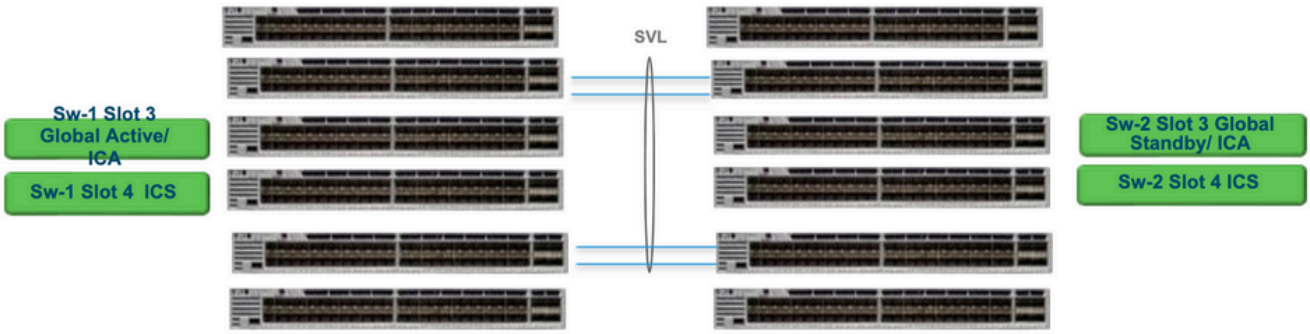
Standby                sso

                        sso

Switch Number 2
**snip**
```

更换C9600四管理引擎StackWise虚拟管理引擎

在本示例中，您考虑采用C9600 Quad Sup Stackwise-Virtual设置（每个机箱有两个管理引擎），管理引擎出现故障并需要更换。SVL在“安装”引导模式下运行。



更换和验证

拔出有故障的Supervisor

- 如果要更换的Supervisor是Global Active Supervisor（图中所示为Sw-1插槽3），请执行故障切换，以便全局备用（上一图中的Sw-2插槽3）接替Active。等待新的全局备用并完成SSO。

（在本例中，Sw-1插槽4将成为新的全局备用插槽）。
- 如果要更换的Supervisor是Global Standby Supervisor（图中所示的Sw-2插槽3），请拔出Supervisor。等待新的全局备用并完成SSO。（在本例中，Sw-2插槽4将成为新的全局备用插槽）
- 如果要更换的Supervisor是ICS Supervisor（图中所示的Sw-1插槽4或Sw-2插槽4），请拔出Supervisor。

插入新的管理引擎

- 如果新的管理引擎运行在17.x代码上，则步骤是直接向前的。只需插入新的管理引擎。如果ICS管理引擎有17.x映像，它们将自动启动，并成为Quad-sup的一部分。即使它运行的17.x代码与生产设置中运行的17.x代码不同，Software Auto-upgrade也会自动在INSTALL模式下使用相同的17.x代码升级ICS管理引擎。
- 如果新的管理引擎运行的是16.x代码，或者您不确定它运行的代码，请尝试将管理引擎插入备用机箱中，并将其升级为17.x代码。如果没有备用机箱需要升级，则必须执行这些步骤。
- 此步骤非常重要。插入ICS管理引擎并使用Ctrl+C将其中断为rommon。如果您未能打入ROMMON并且管理引擎启动了16.x代码，则可能会关闭管理引擎所插入的整个机箱

查找任何与SVL相关的rommon变量。这些变量以D_STACK开头。通常，新的Supervisor没有设置这些变量。

```
D_STACK_DISTR_STACK_LINK2=""
D_STACK_DAD="Fo1/0/13,Fo1/0/15,"
D_STACK_MODE="aggregation"
D_STACK_DOMAIN_NUM="255"
D_STACK_DISTR_STACK_LINK1="Fo1/0/10,Fo1/0/15,Fo1/0/16,Fo1/0/17,Fo1/0/3,Fo1/0/6,"
```

取消设置前面显示的所有变量

<#root>

```
rommon 1 >
```

unset D_STACK_DAD

```
rommon 1 >
```

unset D_STACK_DISTR_STACK_LINK1

```
rommon 1 >
```

unset D_STACK_DOMAIN_NUM

```
rommon 1 >

unset D_STACK_MODE
```

查找变量SWITCH_NUMBER=1。如果交换机编号为2，请将变量设置为1。如果变量已经为1，请继续下一步。

```
<#root>

rommon 1 >

SWITCH_NUMBER=1
```

设置为手动启动Supervisor。

```
<#root>

rommon 1 >

MANUAL_BOOT=YES
```

在17.x代码上使用USB/TFTP以捆绑模式手动启动ICS管理引擎。请勿在rommon中更改引导变量。只需从rommon手动启动。

- 当Supervisor在SVL模式下检测到现有ICS时，它将被重置，以便从独立模式转换到Stackwise虚拟模式。由于禁用了自动引导，它可能会再次回退到rommon模式。

取消设置手动引导以启用自动引导。

```
<#root>

rommon 1 >

unset MANUAL_BOOT
```

使用17.x代码上的USB/TFTP以捆绑模式手动启动ICS管理引擎。请勿在rommon中更改引导变量。只需从rommon手动启动。此步骤以捆绑包模式启动ICS。

注意：软件自动升级旨在自动完成在INSTALL模式下使用17.x代码升级ICS管理引擎并重新加载ICS管理引擎以在RPR中启动。如果禁用自动升级，则还可以从活动Supervisor运行install autoupgrade命令。

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