

In-Service Software Upgrade (ISSU)在Catalyst 3850 , Catalyst 9000 series switches

目录

[简介](#)

[什么是ISSU](#)

[支持的平台和版本支持矩阵](#)

[在ISSU前的前提](#)

1. [检查当前代码版本](#)
2. [检查boot模式](#)
3. [检查是否有在闪存的满足的可利用的内存](#)
4. [检查交换机是否在SSO模式](#)
5. [检查自动引导是否启用](#)
6. [检查当前ISSU并且安装状态。](#)
7. [复制将升级/降级的新的镜像。](#)

[ISSU workflow-实际升级](#)

[1 STEP工作流程](#)

[3 STEP工作流程](#)

[发表物ISSU清单](#)

[在ISSU失败的操作](#)

1. [中止ISSU](#)
2. [Cleaning ISSU状态](#)

简介

本文目标将帮助了解在Catalyst 9000和Catalyst 3850 series switches的执行的ISSU涉及的步骤。

什么是ISSU

In-Service Software Upgrade (ISSU)是升级镜像对在设备的另一镜像的进程，当网络继续转发数据包时。ISSU帮助网络管理员避免一个网络中断，当执行软件升级。镜像在Install模式升级，每个包单个升级。

支持ISSU在所有Catalyst 3850和Catalyst 9000 series支持Stackwise虚拟并且Catalyst 9400/有双重Supervisor的9600个独立机箱。

虚拟的Stackwise (SVL)包括一起连接形成一台虚拟交换机的两交换机。SVL支持在职软件升级。

ISSU支持升级、降级和重算。

支持的平台和版本支持矩阵

在继续进行ISSU前，请检查平台是否实际上支持ISSU。并且，如果ISSU支持在当前代码和目标代

码之间，请验证。在支持的平台和ISSU兼容性矩阵的模式详细信息可以是[在版本之间的](#)被找到的此处- [ISSU支持](#)

在ISSU前的前提

Note:在本文的示例根据Cisco Catalyst 9500 switches配置如Stackwise虚拟。步骤是可适用的对Cat9400/Cat9600独立机箱用双重Supervisor引擎&也Catalyst 3850/Catalyst 9000设备的configuerd如Stackwise虚拟。

1. 检查当前代码版本

```
C9500#show version | in IOS XE
Cisco IOS XE Software, Version 16.09.02
```

2. 检查boot模式

支持ISSU，只有当在虚拟的Stackwise的交换机是的两个在Install模式启动。

```
C9500#show ver | in INSTALL
*   1 50   C9500-40X           16.9.2           CAT9K_IOSXE      INSTALL
   2 50   C9500-40X           16.9.2           CAT9K_IOSXE      INSTALL On Catalyst 9400,
```

the above output is not available. Check if the switch booted from packages.conf file

```
C9400#show version | in System image System image file is "flash:packages.conf"
```

如果机箱是启动在套件模式，ISSU不支持。您将看到错误类似下面，如果设法运行ISSU，当交换机在套件模式运行。

```
*Nov 13 14:55:57.338: %INSTALL-5-INSTALL_START_INFO: Chassis 1 R1/0: install_engine: Started
install one-shot ISSU flash:cat9k_iosxe.16.09.02.SPA.bininstall_add_activate_commit: Adding ISSU
ERROR: install_add_activate_commit: One-Shot ISSU operation is not supported in bundle boot mode
FAILED: install_add_activate_commit exit(1) Tue Nov 13 14:56:03 UTC 2018
```

3. 检查是否有在闪存的满足的可利用的内存

```
C9500#dir flash: | in free
11353194496 bytes total (8565174272 bytes free)
```

```
C9500#dir stby-flash: | in free
11353980928 bytes total (8566865920 bytes free)
```

保证您有空间至少1GB在展开的闪存一新的镜像。使用“install remove非激活”命令，在没有足够的空间的情况下整理旧有安装文件。

4. 检查交换机是否在SSO模式

```
C9500#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 = 30 minutes
      Image Version = Cisco IOS Software [Fuji], Catalyst L3 Switch Software
(CAT9K_IOSXE), Version 16.9.2, RELEASE SOFTWARE (fc4)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2018 by Cisco Systems, Inc.
Compiled Mon 05-Nov-18 19:32 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 = 26 minutes
      Image Version = Cisco IOS Software [Fuji], Catalyst L3 Switch Software
(CAT9K_IOSXE), Version 16.9.2, RELEASE SOFTWARE (fc4)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2018 by Cisco Systems, Inc.
Compiled Mon 05-Nov-18 19:32 by mcpre
      BOOT = flash:packages.conf;
      CONFIG_FILE =
      Configuration register = 0x102
```

5. 检查自动引导是否启用

```
C9500#show boot system
```

```
-----
Switch 1
```

```
-----
Current Boot Variables:
```

```
BOOT variable = flash:packages.conf;
```

```
Boot Variables on next reload:
```

```
BOOT variable = flash:packages.conf;
```

```
Manual Boot = no <<<<< Manual Boot should be set to "no"
```

```
Enable Break = no
```

```
Boot Mode = DEVICE
```

```
iPXE Timeout = 0
```

```
-----
Switch 2
```

```
-----
Current Boot Variables:
```

```
BOOT variable = flash:packages.conf;
```

Boot Variables on next reload:
BOOT variable = flash:packages.conf;
Manual Boot = no
Enable Break = no
Boot Mode = DEVICE
iPXE Timeout = 0

如果自动引导没有启用，这可以更改作为如下：

```
C9500(config)#no boot manual
```

6. 检查当前ISSU并且安装状态。

NOTE:此STEP是非常重要的

```
C9500#show issu state detail
```

```
--- Starting local lock acquisition on switch 1 ---  
Finished local lock acquisition on switch 1
```

**No ISSU operation is in progress <<<<<<<< If see anything else, abort ISSU before proceeding.
Check below on how to manually abort ISSU.**

```
C9500#show install summary
```

```
[ Switch 1 2 ] Installed Package(s) Information:
```

```
State (St): I - Inactive, U - Activated & Uncommitted,  
          C - Activated & Committed, D - Deactivated & Uncommitted
```

```
-----  
Type  St  Filename/Version  
-----
```

```
IMG   C   16.9.2.0.2433  <<<<<<<< State should be Activated & Committed for current version  
alone. If not clear install state before proceeding. Check below on how to clear install state.  
-----
```

```
Auto abort timer: inactive  
-----
```

7. 复制将升级/降级的新的镜像。

仅复制镜像对活动机箱(请装箱Stackwise)是满足的或激活的Supervisor (请装箱Cat9400双重SUP)。

```
C9500#copy tftp: bootflash:
```

```
Address or name of remote host []? X.X.X.X
```

```
Source filename []? cat9k_iosxe.16.09.02.SPA.bin
```

```
Destination filename [cat9k_iosxe.16.09.02.SPA.bin]?
```

ISSU workflow-实际升级

一旦所有前提验证，您能proceed与实际升级使用其中一个下面方法：

- 1 STEP工作流程(仅一个步骤，并且不支持滚动回到)
- 3 STEP工作流程(包括3个步骤，并且支持重算装箱失败)

1 STEP工作流程

- 此 workflow 在优化只包括一个步骤并且帮助。

NOTE:当升级自动地，做您不能滚动回到。继续对3 STEP 工作流程，如果查找滚动回到。

```
// Below example has SW-2 as Active and Sw-1 as Standby before starting ISSU
```

```
C9500#install add file flash:cat9k_iosxe.16.09.02.SPA.bin activate issu commit
```

```
install_add_activate_commit: START Fri Feb 8 10:07:51 jst 2019
```

```
*Feb 8 10:07:52.456 jst: %INSTALL-5-INSTALL_START_INFO: Switch 2 R0/0: install_engine: Started  
install one-shot ISSU flash:cat9k_iosxe.16.09.02.SPA.bininstall_add_activate_commit: Adding ISSU
```

```
--- Starting initial file syncing ---
```

```
[2]: Copying flash:cat9k_iosxe.16.09.02.SPA.bin from switch 2 to switch 1
```

```
[1]: Finished copying to switch 1
```

```
Info: Finished copying flash:cat9k_iosxe.16.09.02.SPA.bin to the selected switch(es)
```

```
Finished initial file syncing
```

```
--- Starting Add ---
```

```
Performing Add on all members
```

```
[1] Add package(s) on switch 1
```

```
[1] Finished Add on switch 1
```

```
[2] Add package(s) on switch 2
```

```
[2] Finished Add on switch 2
```

```
Checking status of Add on [1 2]
```

```
Add: Passed on [1 2]
```

```
Finished Add
```

```
install_add_activate_commit: Activating ISSU
```

```
NOTE: Going to start Oneshot ISSU install process
```

```
STAGE 0: Initial System Level Sanity Check before starting ISSU
```

```
=====
```

```
--- Verifying install_issu supported ---
```

```
--- Verifying standby is in Standby Hot state ---
```

```
--- Verifying booted from the valid media ---
```

```
--- Verifying AutoBoot mode is enabled ---
```

```
Finished Initial System Level Sanity Check
```

```
STAGE 1: Installing software on Standby
```

```
=====
```

```
--- Starting install_remote ---
```

```
Performing install_remote on Chassis remote
```

```
[1] install_remote package(s) on switch 1
```

```
[1] Finished install_remote on switch 1
```

```
install_remote: Passed on [1]
```

```
Finished install_remote
```

```
STAGE 2: Restarting Standby
```

```
=====
```

```
--- Starting standby reload ---
```

```
Finished standby reload
```

```
--- Starting wait for Standby to reach terminal redundancy state ---
```

```
<<<<< Standby (Sw-1)
```

```
reloads here!!!
```

```
<<<<<<< After Standby (Sw-1) comes up >>>>>>>>>>
```

```
*Feb 8 10:19:10.223 jst: %REDUNDANCY-3-IPC: IOS versions do not match.
```

```

*Feb  8 10:19:48.421 jst: %HA_CONFIG_SYNC-6-BULK_CFGSYNC_SUCCEED: Bulk Sync succeeded

*Feb  8 10:19:49.422 jst: %RF-5-RF_TERMINAL_STATE: Terminal state reached for (SSO) <<<<<
Standby (Sw-1) comes up on new code and joins as Hot Standby..

*Feb  8 10:21:02.975 jst: %PLATFORM-6-HASTATUS_DETAIL: RP switchover, received chassis event
became active. Switch to primary (count 1) <<<<<< Switchover happens after this log and the
previous active (Sw-2) reloads.

<<<<<<< After new Standby (Sw-2) comes up >>>>>>>

*Feb  8 10:27:09.715 jst: %HA_CONFIG_SYNC-6-BULK_CFGSYNC_SUCCEED: Bulk Sync succeeded

*Feb  8 10:27:10.717 jst: %RF-5-RF_TERMINAL_STATE: Terminal state reached for (SSO). <<<<< ISSU
commit starts after this automatically..

*Feb  8 10:28:27.302 jst: %INSTALL-5-INSTALL_START_INFO: Switch 2 R0/0: install_engine: Started
install commit
%IOSXEBOOT-4-ISSU_ONE_SHOT: (rp/0): ISSU finished successfully

*Feb  8 10:29:32.127 jst: %INSTALL-5-INSTALL_COMPLETED_INFO: Switch 2 R0/0: install_engine:
Completed install commit ISSU

```

在ISSU完成后，请继续对。

3 STEP工作流程

- 此工作流包括三个步骤—请添加，激活，并且做。在激活以后，所有交换机升级对新的软件版本，除了软件没有自动地做，然而必须通过**install commit**命令手工执行。
- 此方法优点是系统可以滚动回到一个上一个软件版本。
- 使用**安装自动中止计时器终止**或**install commit**命令，如果回退计时器没有被终止系统自动地滚动回到。如果回退计时器被终止，新的软件版本在所有持续时间的设备可能运行然后滚动回到以前版本。

步骤 1 : Install add

此命令在两交换机下载镜像到Bootflash并且展开它。

```

// Below example has SW-1 as Active and Sw-2 as Standby before starting ISSU

C9500#install add file flash:cat9k-universalk9.SPA.16.09.03.BETA.E1.SSA.bin.bin
install_add: START Fri Feb  8 09:22:00 jst 2019

*Feb  8 09:22:02.055 jst: %INSTALL-5-INSTALL_START_INFO: Switch 1 R0/0: install_engine: Started
install add flash:cat9k-universalk9.SPA.16.09.03.BETA.E1.SSA.bin.bininstall_add: Adding PACKAGE

--- Starting initial file syncing ---
[1]: Copying flash:cat9k-universalk9.SPA.16.09.03.BETA.E1.SSA.bin.bin from switch 1 to switch 2
[2]: Finished copying to switch 2
Info: Finished copying flash:cat9k-universalk9.SPA.16.09.03.BETA.E1.SSA.bin.bin to the selected
switch(es)
Finished initial file syncing

--- Starting Add ---
Performing Add on all members

```

```
[1] Add package(s) on switch 1
[1] Finished Add on switch 1
[2] Add package(s) on switch 2
[2] Finished Add on switch 2
Checking status of Add on [1 2]
Add: Passed on [1 2]
Finished Add
```

```
SUCCESS: install_add Fri Feb 8 09:26:26 jst 2019 <<<< Wait until install_add says SUCCESS. If fails, manually abort ISSU.
```

步骤 2 : Install activate

在执行此命令，以下事件顺序出现：

(i)回退计时器开始。如果回退计时器超时，系统滚动回到同一状态在ISSU开始前。回退计时器可以被终止通过使用**stop命令安装的自动中止计时器**。使用**安装中止issu命令**，ISSU可以是滚动的上一步。

(ii)暂挂交换机配置有新的软件，并且重新加载与新的软件版本。其次，活动交换机配置有新的软件，并且重新加载。有新的镜像的暂挂交换机当前变为活动交换机，并且旧有活动交换机变为待机。

在此步骤结束时，两个与新的软件镜像的交换机运行。

```
C9500#install activate issu
```

```
install_activate: START Fri Feb 8 09:28:27 jst 2019
install_activate: Activating ISSU
```

```
*Feb 8 09:28:28.905 jst: %INSTALL-5-INSTALL_START_INFO: Switch 1 R0/0: install_engine: Started
install activate ISSU
NOTE: Going to start Activate ISSU install process
```

```
STAGE 0: Initial System Level Sanity Check before starting ISSU
```

```
=====
--- Verifying install_issu supported ---
--- Verifying standby is in Standby Hot state ---
--- Verifying booted from the valid media ---
--- Verifying AutoBoot mode is enabled ---
Finished Initial System Level Sanity Check
```

```
STAGE 1: Installing software on Standby
```

```
=====
--- Starting install_remote ---
Performing install_remote on Chassis remote
```

```
*Feb 8 09:28:31.880 jst: %INSTALL-5-INSTALL_AUTO_ABORT_TIMER_PROGRESS: Switch 1 R0/0:
rollback_timer: Install auto abort timer will expire in 7200 seconds
```

```
[2] install_remote package(s) on switch 2
[2] Finished install_remote on switch 2
install_remote: Passed on [2]
Finished install_remote
```

```
STAGE 2: Restarting Standby
```

```
=====
```

--- Starting standby reload ---
Finished standby reload

--- Starting wait for Standby to reach terminal redundancy state --- <<<<<<< Standby (Sw-2) reloads here!!!

*Feb 8 09:35:16.489 jst: %REDUNDANCY-3-IPC: IOS versions do not match.

*Feb 8 09:36:00.238 jst: %HA_CONFIG_SYNC-6-BULK_CFGSYNC_SUCCEED: Bulk Sync succeeded

*Feb 8 09:36:01.240 jst: %RF-5-RF_TERMINAL_STATE: Terminal state reached for (SSO) <<<< At this point, Standby (Sw-2) comes up with new code and joins as Hot Standby Finished wait for Standby to reach terminal redundancy state **STAGE 3: Installing software on Active**

=====

--- Starting install_active ---
Performing install_active on Chassis 1

1] install_active package(s) on switch 1
[1] Finished install_active on switch 1
install_active: Passed on [1]
Finished install_active

Chassis 1 reloading, reason - Non participant detected
STAGE 4: Restarting Active (switchover to standby)
switchover and then the previous Active (Sw-1) reloads.

<<<<<<< At this point, there is a

=====

--- Starting active reload ---
New software will load after reboot process is completed
SUCCESS: install_activate Fri Feb 8 09:37:14 jst 2019

在活化态结束时，请检查ISSU状态。

C9500#show issu state detail

--- Starting local lock acquisition on switch 2 ---
Finished local lock acquisition on switch 2

Operation type: Step-by-step ISSU
Install type : Image installation using ISSU
Current state : Activated state
Last operation: Switchover

Completed operations: Operation Start time -----
--- Activate location standby Chassis 2 2019-02-08:09:28:32 Activate location active Chassis 1
2019-02-08:09:36:03 Switchover 2019-02-08:09:37:16

State transition: Added -> Standby activated -> Active switched-over

Auto abort timer: automatic, remaining time before rollback: 01:43:55

Running image: flash:packages.conf

Operating mode: sso, terminal state reached

<<<<< Wait until SSO terminal state

before proceeding to commit.

步骤 3 : Install commit

commit命令执行必要整理，启用新的软件作为永久性(删除软件的早版本)并且终止回退计时器。任何重新启动，在进行将启动与新的软件后。

C9500#install commit

install_commit: START Fri Feb 8 09:45:22 jst 2019

install_commit: Committing ISSU


```
*Feb 8 09:45:23.533 jst: %INSTALL-5-INSTALL_START_INFO: Switch 2 R0/0: install_engine: Started
install commit
```

NOTE: Going to start Commit ISSU install process

STAGE 0: Initial System Level Sanity Check before starting ISSU

```
=====
--- Verifying install_issu supported ---
--- Verifying standby is in Standby Hot state ---
--- Verifying booted from the valid media ---
--- Verifying AutoBoot mode is enabled ---
Finished Initial System Level Sanity Check
```

--- Starting install_commit_2 ---

```
Performing install_commit_2 on Chassis 2
[2] install_commit_2 package(s) on switch 2
[2] Finished install_commit_2 on switch 2
install_commit_2: Passed on [2]
Finished install_commit_2
```

STAGE 1: Dispatching the commit command to remote

```
=====
--- Starting install_commit_remote ---
```

```
Performing install_commit_remote on Chassis 1
Feb 8 09:48:33.364: %INSTALL-5-INSTALL_START_INFO: R0/0: install_engine: Started install commit
```

```
*Feb 8 09:48:33.352 jst: %INSTALL-5-INSTALL_START_INFO: Switch 1 R0/0: install_engine: Started
install commit
```

```
Feb 8 09:51:27.505: %INSTALL-5-INSTALL_COMPLETED_INFO: R0/0: install_engine: Completed install
commit ISSU
```

```
[1] install_commit_remote package(s) on switch 1
[1] Finished install_commit_remote on switch 1
install_commit_remote: Passed on [1]
Finished install_commit_remote
```

```
SUCCESS: install_commit Fri Feb 8 09:51:27 jst 2019 <<<<< ISSU is completed here!!!!
```

发表物ISSU清单

一旦ISSU顺利地完成，

- 检查两交换机是否在新的软件运行。
- 检查“显示issu”输出的状态详细信息是干净和不显示进展中任何的ISSU。
- 检查“show install”输出的issu历史记录保证成功的ISSU操作(注意:只开始16.10.1版本)的可以使用命令
- 推荐给足够在新的软件里浸泡时间在启用任何新特性前。

在ISSU失败的操作

- 如果ISSU发生故障，预计自动中止将恢复系统回到初始状态(旧镜像)。然而，如果这发生故障，机箱的手工的恢复预计。
- 在手工的恢复期间，检查激活和待机是否运行旧镜像(如果没有-请恢复各自的机箱)
- 在保证两个机箱以后运行旧镜像，运行“非激活的install remove”删除所有未使用镜像包。
- 一旦两个机箱运行旧有软件，请手工清洗ISSU操作的所有内部状态。(下面参考关于怎样清洗内

部ISSU状态)

1. 中止ISSU

• 在3 STEP工作流程，在激活ISSU进程中，如果中止计时器超时，系统自动中止对旧镜像。
注意：在中止期间，如果待机不到达SSO，手工的中止要求。并且，如果因故希望中间中止ISSU，手工的中止要求。

EXAMPLE : During install add, we notice the below errors:

```
C9400#install add file flash:cat9k_iosxe.16.09.02.SPA.bin
```

```
install_add: START Tue Nov 13 20:47:53 UTC 2018
```

```
*Nov 13 20:47:54.787: %INSTALL-5-INSTALL_START_INFO: Chassis 1 R1/0: install_engine: Started  
install add flash:cat9k_iosxe.16.09.02.SPA.bininstall_add: Adding PACKAGE
```

```
--- Starting initial file syncing ---
```

```
[1]: Copying flash:cat9k_iosxe.16.09.02.SPA.bin from chassis 1 to chassis 2
```

```
[2]: Finished copying to chassis 2
```

```
Info: Finished copying flash:cat9k_iosxe.16.09.02.SPA.bin to the selected chassis
```

```
Finished initial file syncing
```

```
--- Starting Add ---
```

```
Performing Add on all members
```

```
 [1] Add package(s) on chassis 1
```

```
 [1] Finished Add on chassis 1
```

```
 [2] Add package(s) on chassis 2
```

```
    cp: cannot stat '/tmp/packages.conf': No such file or directory
```

```
 [2] Finished Add on chassis 2
```

```
Checking status of Add on [1 2]
```

```
Add: Passed on [1]. Failed on [2]
```

```
Finished Add
```

```
FAILED: install_add exit(1) Tue Nov 13 20:51:58 UTC 2018 <<<<<< install_add failed. If see any  
such error, first do a manual abort before proceeding further.
```

```
C9400#install abort issu
```

```
install_abort: START Tue Nov 13 20:57:40 UTC 2018
```

```
install_abort: Abort type ISSU subtype NONE smutype NONE
```

```
*Nov 13 20:57:41.759: %INSTALL-5-INSTALL_START_INFO: Chassis 1 R1/0: install_engine: Started  
install abort ISSU
```

```
NOTE: Going to start Abort ISSU install process
```

```
STAGE 0: Initial System Level Sanity Check before starting ISSU
```

```
=====
```

```
--- Verifying install_issu supported ---
```

```
--- Verifying booted from the valid media ---
```

```
--- Verifying AutoBoot mode is enabled ---
```

```
Finished Initial System Level Sanity Check
```

```
FAILED: ABORT operation is not allowed in ADDED state
```

```
ERROR: install_abort exit(2 ) Tue Nov 13 20:57:49 UTC 2018
```

```
*Nov 13 20:57:49.756: %INSTALL-5-INSTALL_COMPLETED_INFO: Chassis 1 R1/0: install_engine:
```

```
Completed install abort ISSU
```

2.Cleaning ISSU状态

如果ISSU升级/降级/中止/自动中止不是成功的，指南清扫ISSU内部状态要求。

C9400#sh issu state detail

--- Starting local lock acquisition on chassis 1 ---
Finished local lock acquisition on chassis 1

Operation type: One-shot ISSU

Install type : Image installation using ISSU

**Current state : Added state Last operation: Activate location standby Chassis 2 <<<< Previous
Add is still pending. This needs to be cleared before starting ISSU**

Completed operations:

Operation	Start time
-----	-----
Activate location standby Chassis 2	2018-11-13:16:26:34

State transition: Added

Auto abort timer: inactive

Running image: flash:packages.conf

Operating mode: sso, terminal state not reached

NOTE: Enable Service Internal before run the below command

C9400#clear install state

clear_install_state: START Tue Nov 13 17:05:47 UTC 2018

--- Starting clear_install_state ---

Performing clear_install_state on all members

[1] clear_install_state package(s) on chassis 1

[1] Finished clear_install_state on chassis 1

Checking status of clear_install_state on [1]

clear_install_state: Passed on [1]

Finished clear_install_state

C9400#sh issu state detail

--- Starting local lock acquisition on chassis 1 ---
Finished local lock acquisition on chassis 1

No ISSU operation is in progress