

**Hewlett Packard
Enterprise**

HPE **aruba**
networking

AOS-CX 10.13 Update: Hitless VSF In-Service Software Upgrade

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Agenda

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3	Details
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Definitions

Acronyms

- **ACL** **A**ccess **C**ontrol **L**ist
- **ARP** **A**ddress **R**esolution **P**rotocol
- **ASIC** **A**pplication-**S**pecific **I**ntegrated **C**ircuit
- **CLI** **C**ommand **L**ine **I**nterface
- **DPSE** **D**ata **P**lane **S**etup **E**ngine
- **ESU** **E**nhanced **S**oftware **U**pgade
- **ISSU** **I**n-**S**ervice **S**oftware **U**pgade
- **MAC** **M**edia **A**ccess **C**ontrol
- **SMF** **S**chema **M**igration **F**ramework
- **VSF** **V**irtual **S**witching **F**ramework

System Components

- **dpsed** **D**ata **P**lane **S**etup **E**ngine **D**aemon
- **hotpatchd** **H**otpatch **D**aemon
- **hpe-cardd** **C**ard **D**aemon
- **issud** **I**SSU **D**aemon
- **mmtomm** **M**ember-**to**-**m**ember IP network¹
- **switchd** **S**witch **D**aemon
- **switchd-agent** **A**gent **D**aemon
- **vsfd** **V**SF **D**aemon
- **vsfhad** **V**SF **H**igh **A**vailability **D**aemon
- **vsflinkd** **V**SF **L**ink **D**aemon

¹ *Technically, it's "management module to management module", but this is a VSF stack, not a chassis, so this software component is used for member-to-member communication across the VSF links instead.*



Overview

Hitless VSF In-Service Software Upgrade (ISSU)

Hitless VSF In-Service Software Upgrade (ISSU) is a high-availability feature for Aruba CX 6300 switches in a VSF stack that permits software upgrades while keeping all member ports up and forwarding traffic.

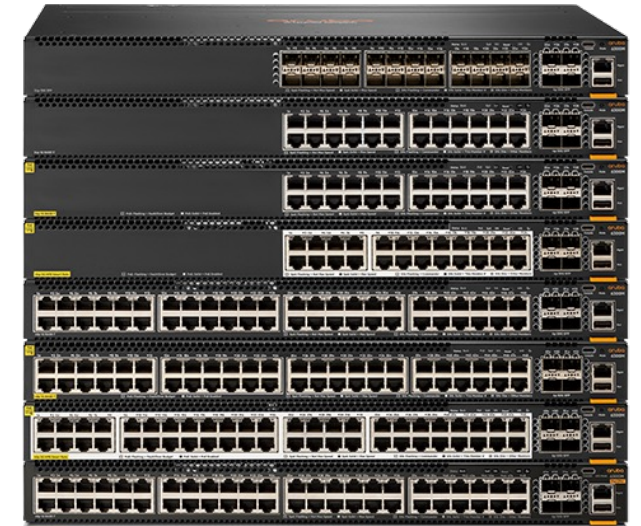
Hitless upgrades are enabled by allowing the Conductor to change role to Standby without rebooting.

Supported in AOS-CX 10.13:

- Aruba CX 6300 VSF stacks
- Upgrades to newer versions within the same major release (e.g., 10.13.0005 to 10.13.0010)

Not supported in AOS-CX 10.13:

- Aruba CX 6200 VSF stacks
- Major version upgrades (e.g., 10.13.xxxx to 10.14.xxxx)
- Version downgrades



AOS-CX ISSU Feature Evolution

10.10
June 2022

Single-chassis ISSU

CX 6400 (v1 line cards)

10.11
November 2022

Single-chassis ISSU

CX 6400 (v2 line cards)

VSF Enhanced Software Upgrade

CX 6300 VSF stacks

10.13
November 2023

Hitless VSF ISSU

CX 6300 VSF stacks

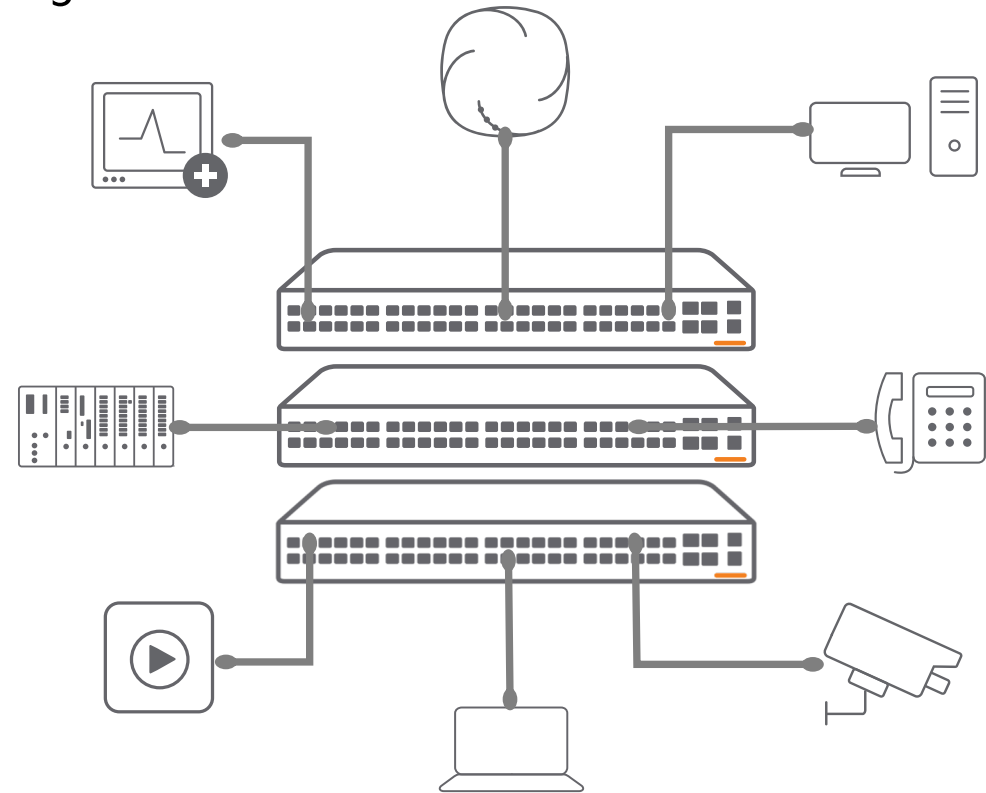


Use Cases

Use cases for Hitless VSF ISSU

Hitless VSF ISSU is intended for use in campus access and aggregation deployments using CX 6300 VSF stacks where high availability is required or desired, including:

- Medical facilities
- Financial institutions
- Media production/broadcast
- Industrial facilities
- Municipal networks



Details

In-Service Software Upgrade

Platform support

Feature	4100i	6000	6100	6200	6300	6400	8100	8320	8325	8360	8400	9300	10000	OVA
Single-chassis ISSU	No	No	No	No	No	Yes	No	No	No	No	No	No	No	No
VSF Enhanced Software Upgrade (ESU)	No	No	No	No	Yes: 10.11– 10.12	No	No	No	No	No	No	No	No	No
Hitless VSF ISSU	No	No	No	No	Yes: 10.13+	No	No	No	No	No	No	No	No	No

- **6400**
 - v1 line cards: **10.10.0002**
 - v2 line cards: **10.11.0001**
- **6300 VSF** (enhanced)
 - All models except R8S89A, R8S90A, R8S91A, R8S92A: **10.11.0001**
 - R8S89A, R8S90A, R8S91A, R8S92A: **10.11.1005**
- **6300 VSF** (hitless)
 - All supported 6300F and 6300M models: **10.13.0005**



Hitless VSF ISSU

High-level sequence

Hitless VSF ISSU is an orchestrated upgrade process that performs the following high-level steps, in order:

1. Validate System Readiness
2. Upgrade Standby and Member Modules
3. Upgrade Line Module Services
4. Prepare for Switchover
5. Finalize Upgrade

CLI syntax and upgrade behavior for upgrades on AOS-CX 10.11, 10.12, and 10.13 is identical up to step 5; with the key difference between VSF ESU and hitless VSF ISSU noted below:

VSF ESU (10.11–10.12)

Current Conductor reboots after VSF switchover, with ports down for the duration of the reboot

Hitless VSF ISSU (10.13+)

After VSF switchover, Conductor changes role to Standby *without* rebooting, keeping ports up and forwarding traffic



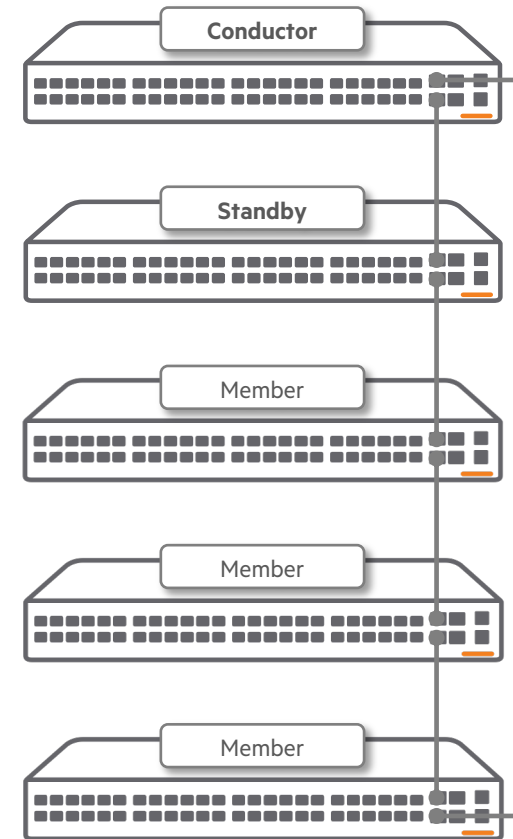
Step 1: Validate System Readiness

Pre-upgrade system state validation

When ISSU is initiated, the following conditions are validated:

- All connected stack members fully booted and operating normally
- Standby is present in the stack and synchronized with Conductor
- VSF topology is a ring
- Only supported VSF member types are present
- Software image in active boot bank matches running version
- Software image in alternate boot bank is ISSU compatible
- No ACL, policy, class applications are in 'failed' state
- Startup configuration matches running configuration
- Previous ISSU upgrade has been confirmed (if rollback timer is enabled)

Any failed validation checks result in an immediate ISSU abort, with an error generated in the event log; the system continues operating on the running software with no changes made.

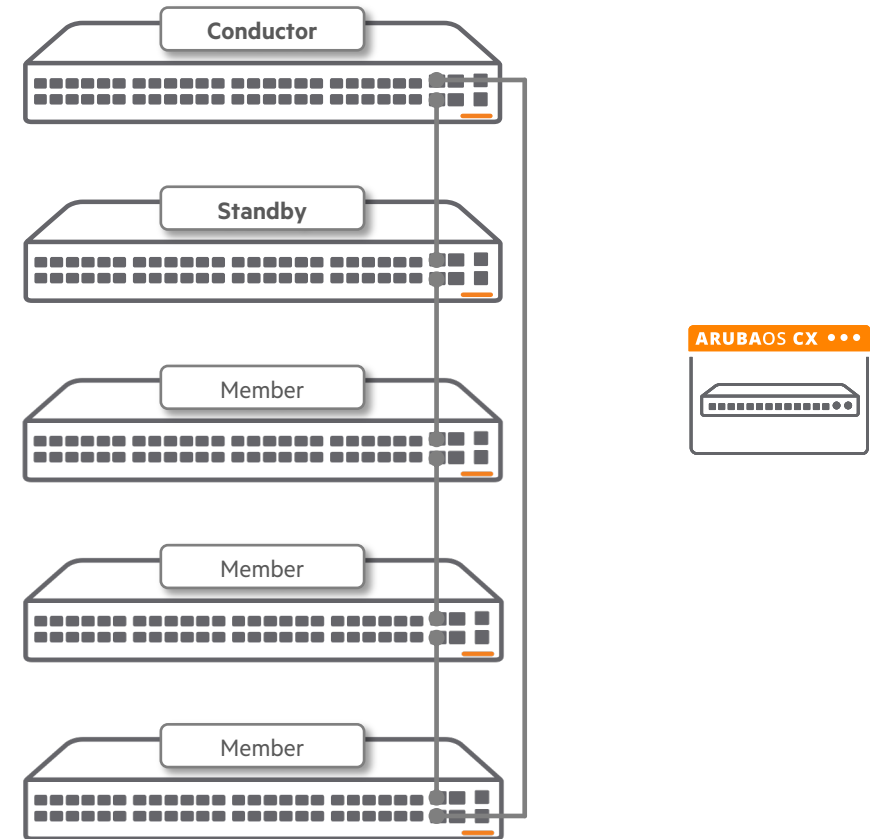


Step 2: Upgrade Standby and Member Modules

Hot-patch deployment to Standby and Members

Once the new software image has been synced and validated:

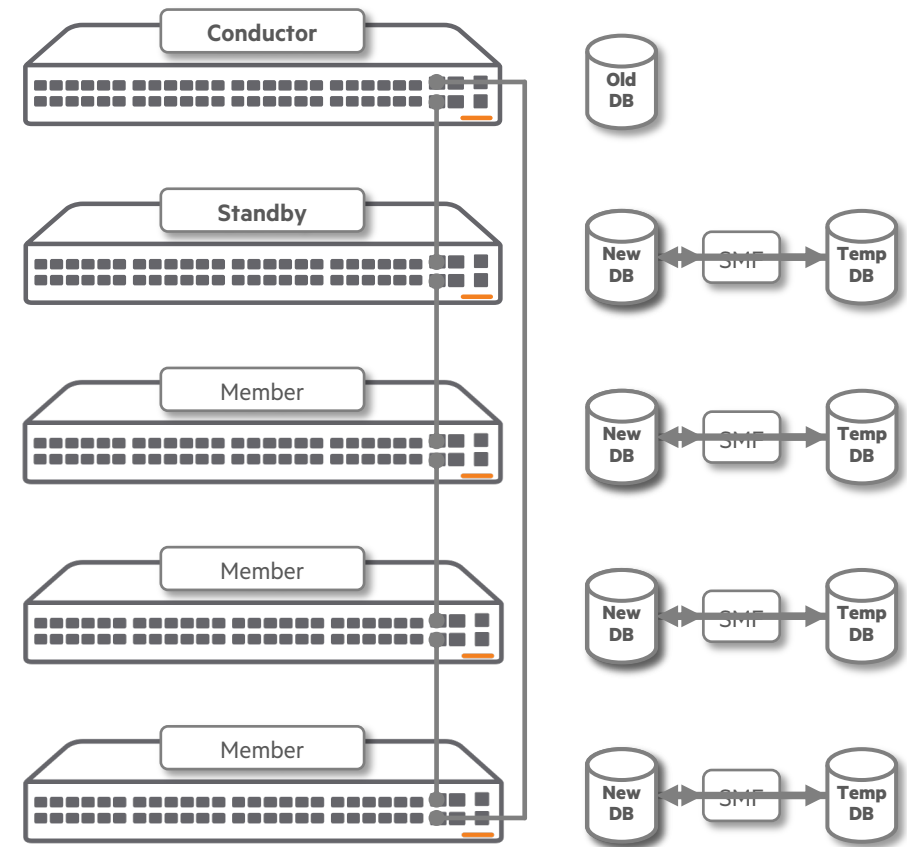
- **issud** updates ISSU state in Conductor's main database to trigger start of upgrade
- **hot_patch** row is created by **vsfhad** in Conductor's database containing path to the filesystem location of the new software image (.swi file)
- **hotpatchd** on the Standby and each Member extracts binaries from the designated .swi file and applies them as a set of hot-patches
- **hotpatchd** on each member updates database on Conductor to indicate that hot-patching is complete
- On completion of hot-patch application, database migration begins



Step 2: Upgrade Standby and Member Modules

Standby/Member database migration using Schema Migration Framework

- Non-critical control and data plane daemons on the Standby and Members are stopped in preparation for database migration
- The Schema Migration Framework (SMF) is used to migrate data between databases based on different schemas, including:
 - Old to new version local database instances on Standby and Members
 - ISSU cache to new Standby database
 - Old Conductor main database to new Standby database
- **vsfhad** on Standby and Members starts initial database migration:
 - Temporary new database instance created, minimal sync from original database via SMF
 - Original database instance, local migration SMF instance terminated
 - New local database instance created, reverse sync from temporary database
 - Temporary database instance terminated



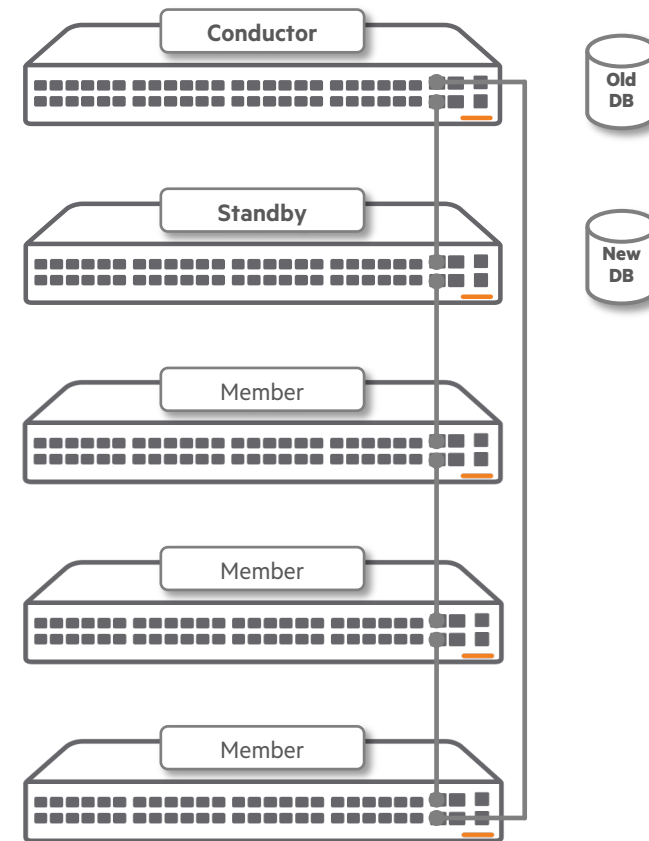
Step 2: Upgrade Standby and Member Modules

Standby/Member daemon restart using migrated database

Once initial Standby/Member database migration is complete:

- **crash-handler** is temporarily halted to prevent member reboot when specific critical daemons are restarted
- Upgraded control plane daemons on Standby are restarted: **hpe-cardd**, **dpseed**, **issud**, **switchd**, **vsflinkd**, **vsfhad**
 - **hotpatchd** will not be restarted until the end of the ISSU process, after VSF switchover.
- **crash-handler** is restarted to resume critical daemon monitoring
- **vsfhad** updates member state in Conductor database to indicate each member is ready to proceed with data plane configuration freeze

Note: A minimal interruption in traffic forwarding (≤ 1 millisecond) may be observed during this step of the upgrade process as Standby/Member daemons are restarted.

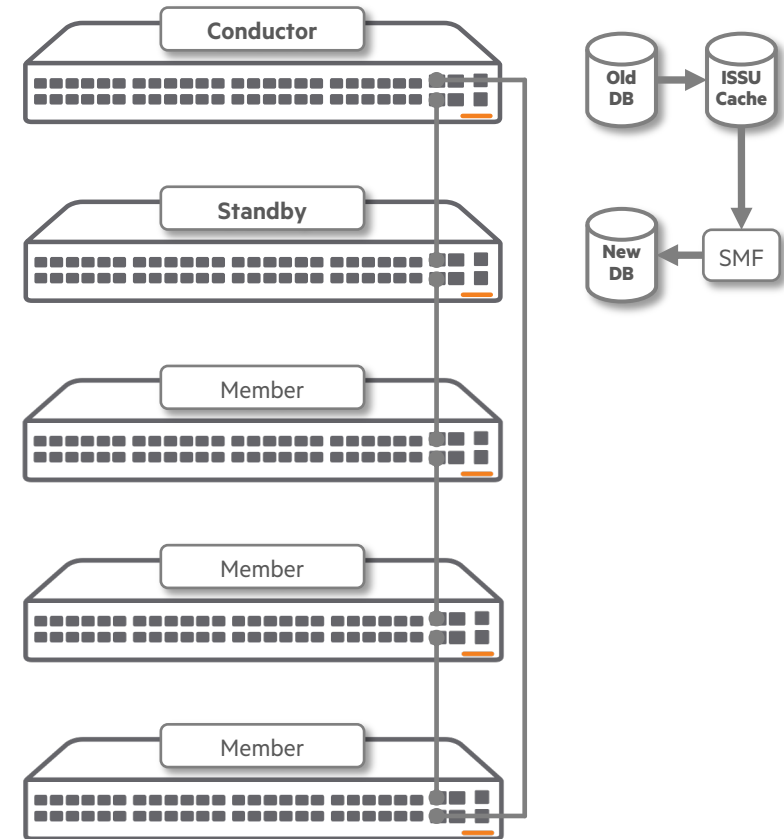


Step 3: Upgrade Line Module Services

Data plane/system state freeze, warmboot

After previous database migration steps are completed:

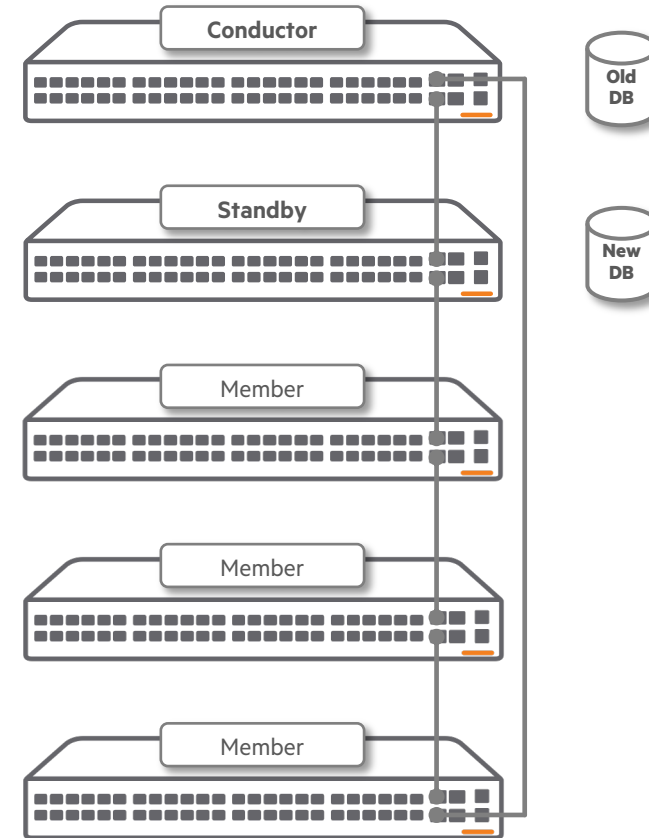
- Stack data plane state is frozen by terminating any remaining connections from daemons on Standby and Members to the main database on the Conductor, along with halting MAC learning and link scanning on all members
 - Only daemons on the Conductor itself remain connected to the main database at this point
- System state is frozen by creating a shadow copy of the main database on the Conductor called the *ISSU cache*
 - The ISSU cache is a temporary, static shadow database instance used solely for migration of stack configuration and state data to the Standby
- Standby initiates full database sync with the ISSU cache via a new SMF instance



Step 3: Upgrade Line Module Services

Data plane/system state freeze, warmboot

- **switchd-agent** creates a *warmboot* file on each stack member to freeze hardware state for post-relaunch reconstruction
 - The warmboot process allows the Agent to detach from the member's ASIC, dump its state to flash, relaunch, then reconstruct its state and reattach to the ASIC without impacting traffic flow
- IP address used for stack database sync is released by Conductor and taken over by Standby
- **switchd-agent** and remaining upgraded daemons on Standby and Members are restarted:
 - Agent uses the warmboot file to reconstruct its state and reconnects to the member's ASIC
 - Relunched daemons connect to new version database on Standby

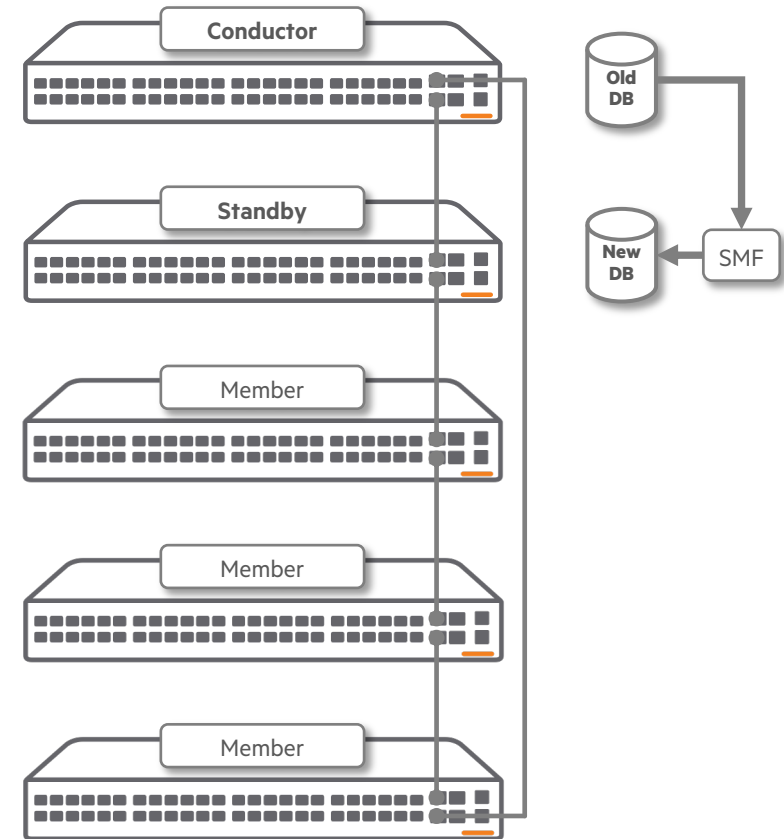


Step 4: Prepare for Switchover

Final database sync from Conductor to Standby

In preparation for VSF switchover:

- The Standby initiates a final “last gasp” full database sync from the main database instance on the Conductor via SMF
 - The main database is still being updated by protocol daemons running on the Conductor, so this data needs to be migrated to the Standby before switchover
- Once the database sync is complete, the stack is ready for switchover

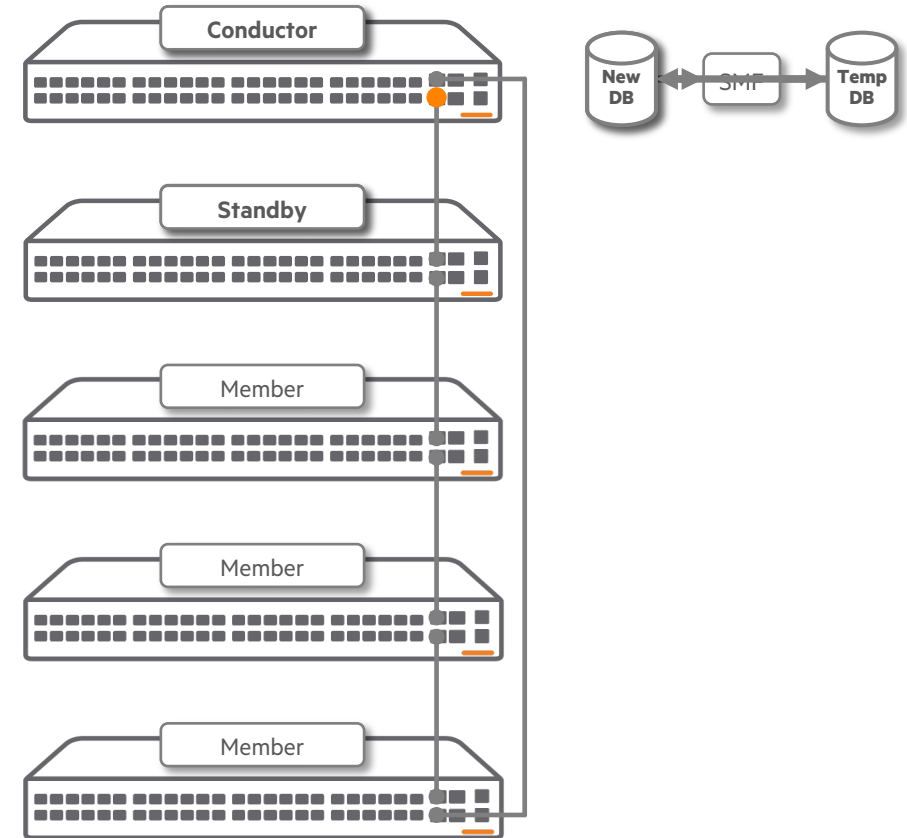


Step 5: Finalize Upgrade

VSF switchover, former Conductor upgrade and role change to Standby

Conductor sets ISSU state in database to **HA failover**, triggering the following sequence:

- Conductor sends a VSF takeover control packet to the Standby
- Standby takes over the stack control plane and assumes the Conductor role
- Old Conductor stops most control plane and data plane daemons in preparation for upgrade and role change
 - All ports on the old Conductor stay up and forwarding/routing traffic using the existing ASIC programming during upgrade and role change
- Software on old Conductor is upgraded by **hotpatchd**
- Database is migrated to new schema
- Critical daemons are restarted once database migration is complete

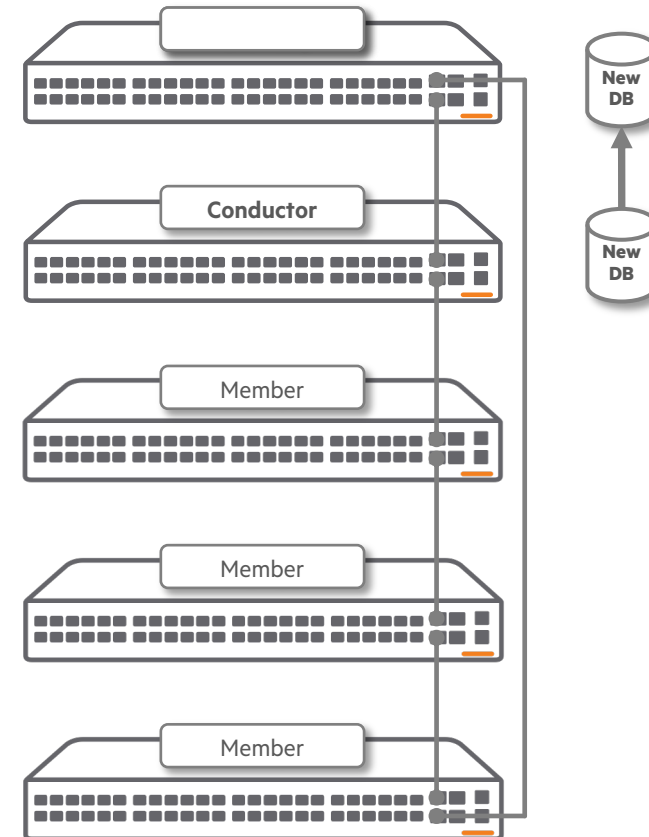


Step 5: Finalize Upgrade

VSF switchover, former Conductor upgrade and role change to Standby

- Role change from Conductor to Standby is initiated, member ID of new Standby is updated in Conductor's database
 - As part of role change, a reboot is simulated by purging files that are normally generated or synced from the Conductor during the Standby boot process
- New Standby initiates database sync with Conductor
- On completion of database sync, ISSU state in the stack database on the new Conductor is updated to **STEADY_STATE**, and **hotpatchd** is restarted on all stack members

At this point, **ISSU is complete** and the stack resumes normal operation on the new software version.



ISSU rollback timer

- The ISSU rollback timer (**disabled by default**) starts when ISSU is complete.
- When the rollback timer is enabled, the `issu update-software confirm` command **must** be entered after the upgrade is complete and before the timer expires, or the stack will automatically reboot to the previous version.
- An active rollback timer will prevent subsequent ISSU upgrades; the previous upgrade must be confirmed before another upgrade can be started.
- The timer may be configured for a value between 30 and 1,440 minutes (1 day). The default is **30 minutes**.

```
switch(config)# issu rollback-timer ?
  wait-time  Setup ISSU rollback timer wait-time (Default: 30 minutes)
  <cr>
switch(config)# issu rollback-timer wait-time ?
  <30-1440>  Wait time in minutes
switch(config)# issu rollback-timer
switch(config)#
```

```
switch# issu update-software
```

This command will perform an in-service software upgrade using pre-staged secondary operating system image FL.10.13.0010
This will save the current running configuration

WARNING:

The rollback timer is enabled and configured to 30 minutes. After the upgrade is done, execute "issu update-software confirm" to confirm the new image works as expected. If the command is not entered, the system will be rebooted to the previous version.

Continue (y/n)? **y**

Starting in-service software upgrade.

Use "show issu" to monitor status and progress.
Use "show events -c issu" to view event notifications.



Operational notes

Restrictions and system monitoring impacts

Not allowed during VSF ISSU

- Configuration changes
 - Enforced by configuration lockout for duration of upgrade
- Stack member/topology changes
 - Member addition, removal, replacement
- Button presses

Not updated during VSF ISSU

- Link state transitions
- Temperatures
- Power consumption values
- LED system state indicators
- MAC learning
- MAC changes via Gratuitous ARP

Disallowed operations that take place during ISSU may result in upgrade failure and resulting traffic impact.



Operational notes

Feature-specific interactions

- **MACsec**

- ISSU cannot be used when MACsec is enabled on any port.

- **PIM with MSDP**

- On RP routers with PIM and MSDP enabled, traffic loss is expected during the upgrade.

- **Dynamic Authorization**

- All Dynamic Authorization requests will be rejected with NAK during the upgrade, impacting Captive Portal workflows.

- **BFD**

- Only recommended for sessions with failure detection time greater than 6 seconds and less than 64 sessions.

- **NAE**

- A momentary disruption of NAE operation will occur during VSF switchover.



Deployment

ISSU preparation

Identifying the active boot bank

- Before initiating ISSU, determine which boot bank contains the running software image:

```
switch# show images
```

```
-----  
ArubaOS-CX Primary Image  
-----
```

```
Version : FL.10.13.0005  
Size    : 1015 MB  
Date    : 2023-10-08 09:43:22 UTC  
SHA-256 : a373148fd208417da447c19f247291a88eedeb968abee5a6ff9186ab5adc7f44  
-----
```

```
ArubaOS-CX Secondary Image  
-----
```

```
Version : FL.10.13.0005  
Size    : 1015 MB  
Date    : 2023-10-08 09:43:22 UTC  
SHA-256 : a373148fd208417da447c19f247291a88eedeb968abee5a6ff9186ab5adc7f44  
-----
```

```
Default Image : primary  
Boot Profile Timeout : 5 seconds  
-----
```

```
Management Module 1/1 (Active)  
-----
```

```
Active Image      : primary  
Service OS Version : FL.01.14.0002  
BIOS Version      : FL.01.0007
```



ISSU preparation

Load new software image to alternate boot bank

- Copy the new software image to the *alternate* boot bank (the one not containing the active/default image):
 - Do not copy to the *active* boot bank as this will prevent ISSU from executing; the active image is used for recovery in the event of an ISSU error or post-upgrade rollback.
- Once the image copy is completed and the software image has been written to flash on the Conductor, it will be automatically synced to all other members of the stack; this may take 2-3 minutes.

```
switch# copy tftp://192.168.1.250/FL_10_13_0010.swi secondary vrf mgmt
The secondary image will be deleted.
```

```
Continue (y/n)? y
```



ISSU preparation

Validate ISSU readiness

- Verify that the stack is ready for ISSU by using the `issu update-software validate` command:
 - The command output will show a Pass/Fail status for each condition; if all conditions display **Pass**, the system is ready for ISSU.
 - If any condition reports a **Fail** status, ISSU cannot be used; correct the failed condition and retry validation.
- Results of the last run validation check can be displayed using the command `show issu validation`:

```
switch# issu update-software validate
```

```
ISSU Validation
```

```
=====
```

Condition	Status
-----------	--------

Current Image Valid	Pass
Target Image Valid	Pass
Target Version Compatible	Pass
Management Modules Ready	Pass
Line Modules Ready	Pass
Features Ready	Pass

```
ISSU Validation has completed
```

```
switch# show issu validation
```

```
ISSU Validation
```

```
=====
```

Condition	Status
-----------	--------

Current Image Valid	Pass
Target Image Valid	Pass
Target Version Compatible	Pass
Management Modules Ready	Pass
Line Modules Ready	Pass
Features Ready	Pass

ISSU preparation

Optional: Configure rollback timer

- If the rollback timer will be used to confirm proper operation of the new software image and permit automatic rollback to the prior version, enable the timer from the configuration context:
- Use the `issu rollback-timer wait-time` command if a timer longer than the default 30 minutes is desired
- The status of the rollback timer is displayed in the output of `show issu`:
 - **Not configured** if timer is disabled
 - **Not started** if timer is enabled, but not active
 - Time remaining (in minutes) if active

```
switch(config)# issu rollback-timer
switch(config)#
```

```
switch# show issu
ISSU Summary
=====
ISSU Status      : Ready
Current Version  : FL.10.13.0010      Upgrade Version : --
Upgrade Image    : --                Start Date       : --
Last ISSU Result: Completed
Rollback timer   : 44 minutes remaining

ISSU Progress
=====
Upgrade Operation      Status      Start Date
-----
Initiate ISSU          Complete    2023-10-12 11:56:21
Validate System Readiness Complete    2023-10-12 11:56:21
Upgrade Standby and Member Modules Complete    2023-10-12 11:56:38
Upgrade Line Module Services Complete    2023-10-12 11:59:32
Prepare for Switchover Complete    2023-10-12 12:00:41
Finalize Upgrade       Complete    2023-10-12 12:00:47
ISSU Complete          Complete    2023-10-12 12:03:25
```



ISSU deployment

Initiate ISSU

- Once the new image has been staged in the alternate boot bank and synced to all stack members, initiate ISSU via the CLI using the **issu update-software** command:
 - If the rollback timer is enabled, a warning message will be displayed.
- Once system readiness is validated, the update will start

```
switch# issu update-software
```

```
This command will perform an in-service software upgrade  
using pre-staged secondary operating system image  
FL.10.13.0010  
This will save the current running configuration
```

```
WARNING:
```

```
The rollback timer is enabled and configured to 45 minutes.  
After the upgrade is done, execute "issu update-software confirm"  
to confirm the new image works as expected. If the command is not  
entered, the system will be rebooted to the previous version.
```

```
Continue (y/n)? y
```

```
Starting in-service software upgrade.
```

```
Use "show issu" to monitor status and progress.  
Use "show events -c issu" to view event notifications.
```



ISSU deployment

Monitoring ISSU progress

- To monitor ISSU status, use the **show issu** command from the Conductor:
- Note: you can use the **repeat delay n** command to automatically repeat the command every *n* seconds.

```
switch# show issu
ISSU Summary
=====
ISSU Status      : In Progress
Current Version  : FL.10.13.0005
Upgrade Image    : secondary
Last ISSU Result: --
Rollback timer   : Not started

Upgrade Version  : FL.10.13.0010
Start Date      : 2023-10-12 11:56:21

ISSU Progress
=====
Upgrade Operation      Status      Start Date
-----
Initiate ISSU          Complete    2023-10-12 11:56:21
Validate System Readiness Complete    2023-10-12 11:56:21
Upgrade Standby and Member Modules In Progress 2023-10-12 11:56:38
Upgrade Line Module Services Pending      --
Prepare for Switchover Pending      --
Finalize Upgrade       Pending      --
ISSU Complete          Pending      --
```



ISSU deployment

VSF switchover

- Once the Standby and Members have been updated (steps 2–3) and switchover preparation is complete (step 4), the Conductor role change will begin, which will disconnect the active CLI session.
- If continued monitoring of the ISSU process is desired, reconnect to the Standby via the stack management IP or console port.

```
switch# show issu
ISSU Summary
=====
ISSU Status      : In Progress
Current Version  : FL.10.13.0005
Upgrade Image    : secondary
Last ISSU Result: --
Rollback timer   : Not started
Upgrade Version  : FL.10.13.0010
Start Date       : 2023-10-12 11:56:21
```

```
ISSU Progress
=====
Upgrade Operation      Status      Start Date
-----
Initiate ISSU          Complete    2023-10-12 11:56:21
Validate System Readiness Complete    2023-10-12 11:56:21
Upgrade Standby and Member Modules Complete    2023-10-12 11:56:38
Upgrade Line Module Services Complete    2023-10-12 11:59:32
Prepare for Switchover In Progress 2023-10-12 12:00:41
Finalize Upgrade       Pending     --
ISSU Complete          Pending     --
```

The current session terminated as role change event is in progress.
Login again once role change event is complete after few minutes to access the router.



ISSU deployment

Upgrade complete

- Once the former Conductor has assumed the Standby role and has synced with the new Conductor to re-establish redundancy, the upgrade is complete.
- If the rollback timer is enabled, the **issu update-software confirm** command **must** be entered prior to timer expiration to prevent an automatic reboot to the previous software version

```
switch# show issu
```

```
ISSU Summary
```

```
=====
```

```
ISSU Status      : Ready
```

```
Current Version  : FL.10.13.0010
```

```
Upgrade Version  : --
```

```
Upgrade Image    : --
```

```
Start Date      : --
```

```
Last ISSU Result: Completed
```

```
Rollback timer   : 44 minutes remaining
```

```
ISSU Progress
```

```
=====
```

Upgrade Operation	Status	Start Date
Initiate ISSU	Complete	2023-10-12 11:56:21
Validate System Readiness	Complete	2023-10-12 11:56:21
Upgrade Standby and Member Modules	Complete	2023-10-12 11:56:38
Upgrade Line Module Services	Complete	2023-10-12 11:59:32
Prepare for Switchover	Complete	2023-10-12 12:00:41
Finalize Upgrade	Complete	2023-10-12 12:00:47
ISSU Complete	Complete	2023-10-12 12:03:25

```
switch# issu update-software confirm
```

```
The ISSU has been confirmed and the rollback timer has been cancelled.
```


ISSU Deployment – REST API

Run ISSU validation checks

PATCH

/system/issu

Parameters

No parameters

Request body

application/json

```
{
  "software_update_validate": true
}
```

Execute



ISSU Deployment – REST API

Initiate ISSU upgrade

PATCH /system/issu

Parameters

Cancel

No parameters

Request body

application/json

```
{  
  "software_update_start": true  
}
```

Execute



Demo

Best Practices

Best Practices

- Even though VSF ISSU does not cause network downtime, software upgrades should be scheduled during periods of minimal network activity where possible to avoid impact of delayed link state transitions, MAC table updates, and other network changes that are not processed while an upgrade is in progress
- VSF stacks should be deployed using a ring topology whenever possible for resiliency against link or member failures



Troubleshooting

Troubleshooting – general

Show commands

- The main show command is **show issu**, which displays a summary of overall ISSU status and a progress chart of the current or most recent ISSU upgrade.
- **show issu brief** displays only the top summary section.

```
switch# show issu
ISSU Summary
=====
ISSU Status      : Ready
Current Version  : FL.10.13.0010      Upgrade Version : --
Upgrade Image    : --                  Start Date      : --
Last ISSU Result: Completed
Rollback timer   : Not started

ISSU Progress
=====
Upgrade Operation      Status      Start Date
-----
Initiate ISSU          Complete    2023-10-12 11:56:21
Validate System Readiness Complete    2023-10-12 11:56:21
Upgrade Standby and Member Modules Complete    2023-10-12 11:56:38
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Prepare for Switchover Complete    2023-10-12 12:00:41
Finalize Upgrade       Complete    2023-10-12 12:00:47
ISSU Complete         Complete    2023-10-12 12:03:25
```

```
switch# show issu brief
ISSU Summary
=====
ISSU Status      : Ready
Current Version  : FL.10.13.0010      Upgrade Version : --
Upgrade Image    : --                  Start Date      : --
Last ISSU Result: Completed
Rollback timer   : Not started
```



Troubleshooting – general

Diagnosing VSF ISSU errors

- In the event of a failed ISSU upgrade (or an upgrade completed with errors), an error message will be displayed in **show issu** output
- ISSU-related errors and events are also printed to the switch event log by **issud**, **vsfd**, **vsfhad**, and **hotpatchd**

```
switch# show issu
ISSU Summary
=====
ISSU Status      : Ready
Current Version  : FL.10.13.0010      Upgrade Version : --
Upgrade Image    : --                Start Date       : --
Last ISSU Result: Completed (With errors)
Rollback timer   : Not configured
```

```
switch# show events -a
[...]
issud[3480]: Event|13514|LOG_INFO|CDTR|1|In-service software upgrade validation started
issud[3480]: Event|13515|LOG_INFO|CDTR|1|In-service software upgrade validation finished
issud[3480]: Event|13501|LOG_INFO|CDTR|1|Started in-service software upgrade to secondary operating system image FL.10.13.0010
issud[3480]: Event|13502|LOG_INFO|CDTR|1|In-service software upgrade started operation Validate System Readiness
issud[3480]: Event|13502|LOG_INFO|CDTR|1|In-service software upgrade started operation Upgrade Standby and Member Modules
hotpatchd[5059]: Event|13220|LOG_INFO|CDTR|1|Hot-patch secondary.swi is applying.
hotpatchd[5059]: Event|13203|LOG_INFO|CDTR|1|Hot-patch secondary.swi successfully applied
issud[3480]: Event|13502|LOG_INFO|CDTR|1|In-service software upgrade started operation Upgrade Line Module Services
vsfd[833]: Event|9920|LOG_WARN|CDTR|1|Heart beat lost for member 3
vsfd[833]: Event|9908|LOG_INFO|CDTR|1|Topology is Chain
vsfhad[900]: Event|9954|LOG_WARN|||VSF member 3 going out of stack during ISSU operation: "Upgrade Line Module Services", rebooting the stack
[...]
crash-tools[4361]: Event|1206|LOG_INFO|||Module rebooted. Reason : Member 3 lost during ISSU, Version: FL.10.13.0010#012, Boot-ID : xxx
[...]
```



Troubleshooting – scenarios

No Standby present. ISSU upgrade aborted

- This error message indicates that there is no stack member operating with the Standby role.
- **Potential causes:**
 - Standby is down or still booting.
 - There is no secondary member configured.
- **Resolution:**
 - Ensure that a secondary member is designated in the stack configuration, and that either the designated member or the primary member is operating normally with the Standby role.
 - If this error resulted from a VSF member or link hardware fault, replace the affected hardware.

```
switch# issu update-software
```

```
No Standby present. ISSU upgrade aborted
```

```
switch# show vsf
```

```
Force Autojoin           : Disabled
Autojoin Eligibility Status: Not Eligible
MAC Address               : 18:7a:3b:1b:36:00
Secondary                 : 2
Topology                  : Chain
Status                    : Active Fragment
Split Detection Method    : mgmt
```

Mbr ID	Mac Address	type	Status
1	18:7a:3b:1b:36:00	R8S89A	Conductor
2		R8S91A	Not Present
3	18:7a:3b:1b:a7:40	R8S90A	Member

Troubleshooting – scenarios

Stack topology is not a ring. ISSU upgrade aborted

- This error message indicates that the stack is operating as a chain topology.
- **Potential causes:**
 - The stack was originally deployed as a chain topology.
 - One or more members are booting (with VSF links not yet active).
 - One or more VSF links or members have failed.
- **Resolution:**
 - Ensure that the stack is configured as a ring topology and that all VSF members and links are operating normally.
 - If this error resulted from a VSF member or link hardware failure, replace the affected hardware.

```
switch# issu update-software
Stack topology is not a ring. ISSU upgrade aborted
```

```
switch# show vsf
```

```
Force Autojoin           : Disabled
Autojoin Eligibility Status: Not Eligible
MAC Address               : 18:7a:3b:1b:36:00
Secondary                 : 2
Topology                  : Chain
Status                    : No Split
Split Detection Method    : mgmt
```

Mbr ID	Mac Address	type	Status
1	18:7a:3b:1b:36:00	R8S89A	Conductor
2	18:7a:3b:1b:47:c0	R8S91A	Standby
3		R8S90A	Not Present

Troubleshooting – scenarios

ISSU upgrade aborted. One or more members are booting

- This error message indicates that at least one stack member is present with VSF links up, but not fully booted.
- **Potential causes:**
 - Member is still booting as a result of initial deployment or stack/member reboot.
 - Member has experienced a software issue preventing the boot process from finishing.
- **Resolution:**
 - Ensure that all stack members are fully booted with status displayed as Member before attempting ISSU again.
 - If error resulted from a VSF member hardware fault, replace the affected member switch.

```
switch# issu update-software
```

```
ISSU upgrade aborted. One or more members are booting
```

```
switch# show vsf
```

```
Force Autojoin           : Disabled
Autojoin Eligibility Status: Not Eligible
MAC Address              : 18:7a:3b:1b:36:00
Secondary                : 2
Topology                 : Chain
Status                   : No Split
Split Detection Method    : mgmt
```

Mbr ID	Mac Address	type	Status
1	18:7a:3b:1b:36:00	R8S89A	Conductor
2	18:7a:3b:1b:47:c0	R8S91A	Standby
3	18:7a:3b:1b:a7:40	R8S90A	Member Booting

Troubleshooting – scenarios

Upgrade image already matches the running software version

- This error message indicates that the upgrade was aborted because the software image in the alternate boot bank is the same as the running version on the Conductor.
- **Resolution:**
 - Ensure that the desired upgrade image is loaded in the alternate boot bank in flash.

```
switch# show issu brief
ISSU Summary
=====
ISSU Status      : Ready
Current Version  : FL.10.13.0005      Upgrade Version : --
Upgrade Image    : --                Start Date       : --
Last ISSU Result: Aborted (Upgrade image already matches the running software version)
Rollback timer   : Not configured

switch# show images
-----
ArubaOS-CX Primary Image
-----
Version : FL.10.13.0005
Size    : 941 MB
Date    : 2023-10-26 09:42:40 UTC
SHA-256 : e527edd456dd5265a9a8f9170eedd14d9fc10f55a8864888cfa1fffb4ee0455d
-----

ArubaOS-CX Secondary Image
-----
Version : FL.10.13.0005
Size    : 941 MB
Date    : 2023-10-26 09:42:40 UTC
SHA-256 : e527edd456dd5265a9a8f9170eedd14d9fc10f55a8864888cfa1fffb4ee0455d
-----

Default Image : primary
Boot Profile Timeout : 5 seconds
-----

Management Module 1/1 (Active)
-----

Active Image : primary
Service OS Version : FL.01.14.0002
BIOS Version      : FL.01.0007
```

Troubleshooting – scenarios

Active image no longer matches the running software version

- This error message indicates that the upgrade was aborted because the software image in the active boot bank does not match the running version on the Conductor.
- **Resolution:**
 - Copy the software image matching the running version into the active boot bank in flash.

```
switch# show issu brief
ISSU Summary
=====
ISSU Status      : Ready
Current Version  : FL.10.13.0005      Upgrade Version : --
Upgrade Image    : --                Start Date       : --
Last ISSU Result: Aborted (Active image no longer matches the running software version)
Rollback timer   : Not configured

switch# show images
-----
ArubaOS-CX Primary Image
-----
Version : FL.10.13.0010
Size    : 984 MB
Date    : 2023-10-30 09:40:45 UTC
SHA-256 : 9e03a75ba07cbcee99fe23320670bbc8435d52464478561a2d546bea8ce5b2b9

-----
ArubaOS-CX Secondary Image
-----
Version : FL.10.13.0005
Size    : 941 MB
Date    : 2023-10-26 09:42:40 UTC
SHA-256 : e527edd456dd5265a9a8f9170eedd14d9fc10f55a8864888cfa1fffb4ee0455d

Default Image : primary
Boot Profile Timeout : 5 seconds

-----
Management Module 1/1 (Active)
-----
Active Image      : primary
Service OS Version : FL.01.14.0002
BIOS Version      : FL.01.0007
```

Troubleshooting – scenarios

File Synchronization is in progress. ISSU upgrade aborted

- This error message indicates a recently-loaded software image has not yet been synced to all operating VSF members.
- **Resolution:**
 - Wait a few minutes to allow the new software image to be synced to all stack members before attempting the upgrade again.

```
switch# issu update-software
File Synchronization is in progress. ISSU upgrade aborted

switch# issu update-software validate

ISSU Validation
=====

Condition                               Status
-----
Current Image Valid                     Pass
Target Image Valid                      Pass
Target Version Compatible                Pass
Management Modules Ready                Pass
Line Modules Ready                      Pass
Features Ready                          Fail

ISSU Validation has completed
```



Additional Resources

Additional Resources

- User Guides
 - **AOS-CX 10.13 Fundamentals Guide (6300, 6400 Switch Series)**
 - Chapter 10: **Configuration and firmware management**
 - Section: **In-Service Software Upgrade**



Thank you!

