ASR 5500 Card Replacements Method of Procedure (MOP)

Contents

Introduction

This document describes how to remove and replace different cards in the Cisco Aggregation Services Router (ASR) 5500 PRODUCTION chassis. Precautions must be taken when you replace or remove any cards from an ACTIVE chassis because this action might impact live traffic.

> **Caution**: DO NOT perform card maintenance on more than one (1) card at a time on an ACTIVE powered-up production chassis. DO NOT remove more than one (1) card at a time from a chassis because this WILL result in traffic loss. Follow all precautions.

ASR 5500 Card Types

There are four types of cards that make up the ASR 5500 chassis. In order to see how your chassis is populated, enter this command:

```
[local]ASR5500# show card table
Slot          Card Type                             Oper State    SPOF  Attach
----------    -------------------------------------  ------------  ----  ------
1: DPC        Data Processing Card                  Active        No
2: DPC        Data Processing Card                  Active        No
3: DPC        Universal Data Processing Card        Active        No
4: DPC        None                                  -             -
5: MMIO       Management & 20x10Gb I/O Card         Active        No
6: MMIO       Management & 20x10Gb I/O Card         Standby       -
```

```
 7: DPC      None                                   -             -
 8: DPC      Universal Data Processing Card         Standby       -
 9: DPC      Data Processing Card                   Active        No
10: DPC      Data Processing Card                   Standby       -
11: SSC      System Status Card                     Active        No
12: SSC      System Status Card                     Active        No
13: FSC      None                                   -             -
14: FSC      Fabric & 2x200GB Storage Card          Active        No
15: FSC      Fabric & 2x200GB Storage Card          Active        No
16: FSC      Fabric & 2x200GB Storage Card          Active        No
17: FSC      Fabric & 2x200GB Storage Card          Active        No
18: FSC      None                                   -             -
19: NONE     None                                   -             -
20: NONE     None                                   -             -
```

Front Cards

Fabric Storage Card (FSC)

Chassis can have a maximum of four FSC cards. Six slots are reserved for the chassis. Slots 13 to 18 are for the FSC cards. Presently Cisco uses four FSC cards in Slots 14 to 17.

System Status Card (SSC)

The chassis can have a maximum of two SSC cards in Slots 11 and 12. Both cards are normally installed in a standard chassis.

Rear Cards

Data Processing Card (DPC)

Chassis can have a maximum of eight DPC cards in Slots 1 to 4 and 7 to 10. Normally all cards are installed in a fully-populated chassis.

Management & I/O Card (MIO)

The chassis can have a maximum of two MIO cards in Slots 5 and 6. Both cards are normally installed in a fully redundant chassis.

Prerequisites for Card Replacements

Before you proceed with the steps outlined in this Method of Procedure (MOP), capture this important information in case you must undo your changes:

- Save the current configuration and sync the file system.

```
 show boot
save config /flash/<config-filename.cfg> -re -no
filesystem synchronize all -no
```

- Take **show support details** (SSD) before and after the maintenance activity in case there is an issue to be investigated by the Cisco Technical Assistance Center (TAC) team.

```
show support details to file /flash/<ssd-file-name> compress -no
```

- Have appropriate hardware available for your chassis (highly recommended).

- Ensure console access using a serial Console cable for the console connection (supplied with chassis).

- Use a standard non-magnetic #2 screwdriver.

- Use an anti-static protection strap/wristband.

- Perform a basic health check and ensure that there are no issues before you start the activity.

MIO Card Replacement

Note: This procedure can be used in order to replace multiple cards during a single maintenance window, as long as a single card is replaced at a given time. This procedure must be followed in its entirety for each card that is replaced, one card at a time. It is not advisable to pull multiple cards out of a live, production chassis simultaneously.

1. Complete all prep work described in the Prerequisites for Card Replacements section before you proceed.

2. If the card to be replaced is currently active, perform a card switchover from that active card to an available standby card. Use the **show card table** in order to determine the card status.

```
[local]ASR5500# card switch from <active slot> to <standby slot>
```

3. Use the **show card table** in order to verify that the card switchover is successful.

4. If applicable, identify and label all cables before you remove them.

5. Pull out the card (ensure that the ejector interlock is disengaged when you pull out the card).

6. Insert the new card. For an MIO card, the Secure Digital High Capacity (SDHC) card on the MIO must be swapped as part of this process. The SDHC memory card on the MIO/UMIO appears as the /flash drive on the CLI. It stores configuration data, which includes the boot priority settings.

Caution: Removal and replacement of the SDHC card must be performed at an ESD-safe workstation. Observe ESD precautions when you handle the SDHC card and MIO/UMIO cards. Moreover, make sure that the SD cards go into respective new MIO cards from which the old MIO were removed (the SD card from the old active MIO card should be inserted in the new active MIO card; the same applies to the SD card from the standby MIO card).
On the removed MIO card, locate the SDHC card in the bottom rear corner of the circuit card. The SDHC card resides in a push-push type holder. With your fingertip, push the rear edge of the SDHC card inward until you hear a click. Release your finger and the card will pop out of the holder. Remove the card and store it safely aside.

The SDHC card resides in a push-push type holder. With your fingertip, push the rear edge of the SDHC card inward until you hear a click. Release your finger and the card will pop out of the holder. Remove the card and store it safely aside.

On the replacement MIO/UMIO, locate the SDHC card holder and remove the SDHC card. That card contains only a basic configuration for testing purposes; insert it into the removed card prior to when you return the circuit card to Cisco.

On the replacement MIO/UMIO, insert the SDHC card that was removed from the removed MIO/UMIO. With your fingertip, push the SDHC card inward until you hear a click and release your finger. This completes the SDHC card swap-out procedure.

7. If applicable, make cable connections to the new card using the identification information collected in Step 4.

8. Synchronize the file system:

```
[local]ASR5500# filesystem synchronize all - noconfirm
```
9. Check if firmware requires a manual update. If the output shows **up to date** then skip the next step and go to step 11.
   If the output contains **is out of date** then proceed with the next step.

```
[local]ASR5500# show card hardware <card number> | grep -i Programmables
```
10. The firmware upgrade is performed with thiscommand. After the upgrade is completed confirm that all programmables are up to date.
   Caution: A card upgrade will update the programmables stored on the card to the versions included with this software build. Performing any operations while this upgrade is in progress is not recommended.
```
[local]ASR5500# card upgrade <card number>
```
11. If desirable, perform a card switchover in order to make the new card active. Use the **show card table** in order to determine the card status.

```
[local]ASR5500# card switch from <active slot> to <standby slot>
```

12. Use the **show card table** in order to verify that the card switchover is successful.

13. Repeat health checks in order to ensure there are no issues.

DPC Card Replacement

1. Complete all prep work described in the Prerequisites for Card Replacements section before you proceed.

2. If the card to be replaced is currently active, perform a card switchover from the active card to an available standby card. Use **show card table** in order to determine card status.

```
[local]ASR5500# card switch from <active slot> to <standby slot>
```

3. Use **show card table** in order to verify that the card switchover is successful.

4. Pull out the card (ensure that the ejector interlock is disengaged when you pull out the card).

5. Insert the new card.

6. Check if firmware requires a manual update. If the output shows **up to date** then skip the next step and go to step 8.
   If the output contains **is out of date** then proceed with the next step.

```
[local]ASR5500# show card hardware <card number> | grep -i Programmables
```
7. The firmware upgrade is performed with the following command. After the upgrade is completed confirm that all programmables are up to date.
   Caution: A card upgrade will update the programmables stored on the card to the versions included with this software build. Performing any operations while this upgrade is in progress is not recommended.
```
[local]ASR5500# card upgrade <card number>
```
8. If desirable, perform the card switchover in order to make the new card active. Use the **show card table** in order to determine the card status.

```
[local]ASR5500# card switch from <active slot> to <standby slot>
```
9. Use the **show card table** in order to verify that the card switchover is successful.

10. Repeat health checks in order to ensure that there are no issues.

FSC Card Replacement

1. Complete all prep work described in the Prerequisites for Card Replacements section before you proceed.

2. Check the current state of the Redundant Array of Independent Disks (RAID) array.

```
[local]ASR5500# show hd raid
```
Normally the RAID state is **Available**, Degraded is **No**, and all cards should be **In-sync**.If Degraded is **Yes**, note which cards are **In-sync**.You should have a minimum of three FSC cards In-sync in order to maintain the data integrity of the storage array.

Note: **Degraded Array:** If the RAID drive is degraded, it means a slot has failed and the hard drive (HD) on that slot is not available to the RAID controller. If the FSC you replace is the same as the component not In-sync, you can continue with the replacement. Otherwise, stop the maintenance; you need an additional FSC to replace the failed card first, and then replace the FSC that was originally scheduled for replacement.

```
[local]ASR5500# show hd raid ver
Friday November 07 10:10:12 CST 2014
HD RAID:
 State                  : Available (clean)
 Degraded               : No
 UUID                   : 34259b4e:4ee9add9:4d84f2ab:21bef1d5
 Size                   : 1.2TB (1200000073728 bytes)
 Action                 : Idle
 Card 14
   State                : In-sync card
   Created              : Tue Feb 11 13:47:34 2014
   Updated              : Fri Nov  7 10:09:43 2014
   Events               : 74778
   Description          : FSC14 LLYYWWSSSSS
   Size                 : 400GB (400096755712 bytes)
   Disk hd14a
     State              : In-sync component
     Created            : Tue Feb 11 13:47:30 2014
     Updated            : Tue Feb 11 13:47:30 2014
     Events             : 0
     Model              : STEC Z16IZF2D-200UCT E12A
     Serial Number      : LLYYWWSSSSSS
     Size               : 200GB (200049647616 bytes)
   Disk hd14b
     State              : In-sync component
     Created            : Tue Feb 11 13:47:30 2014
     Updated            : Tue Feb 11 13:47:30 2014
     Events             : 0
     Model              : STEC Z16IZF2D-200UCT E12A
     Serial Number      : LLYYWWSSSSSS
     Size               : 200GB (200049647616 bytes)
 Card 15
   State                : In-sync card
   Created              : Tue Feb 11 13:47:34 2014
   Updated              : Fri Nov  7 10:09:43 2014
   Events               : 74778
   Description          : FSC15 LLYYWWSSSSSS
   Size                 : 400GB (400096755712 bytes)
   Disk hd15a
     State              : In-sync component
     Created            : Tue Feb 11 13:47:30 2014
     Updated            : Tue Feb 11 13:47:30 2014
     Events             : 0
     Model              : STEC Z16IZF2D-200UCT E12A
     Serial Number      : LLYYWWSSSSSS
```

```
      Size                     : 200GB (200049647616 bytes)
    Disk hd15b
      State                    : In-sync component
      Created                  : Tue Feb 11 13:47:30 2014
      Updated                  : Tue Feb 11 13:47:30 2014
      Events                   : 0
      Model                    : STEC Z16IZF2D-200UCT E12A
      Serial Number            : LLYYWWSSSSSS
      Size                     : 200GB (200049647616 bytes)
  Card 16
    State                      : In-sync card
    Created                    : Tue Feb 11 13:47:34 2014
    Updated                    : Fri Nov  7 10:09:43 2014
    Events                     : 74778
    Description                : FSC16 LLYYWWSSSSSS
    Size                       : 400GB (400096755712 bytes)
    Disk hd16a
      State                    : In-sync component
      Created                  : Tue Feb 11 13:47:30 2014
      Updated                  : Tue Feb 11 13:47:30 2014
      Events                   : 0
      Model                    : STEC Z16IZF2D-200UCT E12A
      Serial Number            : LLYYWWSSSSSS
      Size                     : 200GB (200049647616 bytes)
    Disk hd16b
      State                    : In-sync component
      Created                  : Tue Feb 11 13:47:30 2014
      Updated                  : Tue Feb 11 13:47:30 2014
      Events                   : 0
      Model                    : STEC Z16IZF2D-200UCT E12A
      Serial Number            : LLYYWWSSSSSS
      Size                     : 200GB (200049647616 bytes)
  Card 17
    State                      : In-sync card
    Created                    : Tue Feb 11 13:47:34 2014
    Updated                    : Fri Nov  7 10:09:43 2014
    Events                     : 74778
    Description                : FSC17 LLYYWWSSSSSS
    Size                       : 400GB (400096755712 bytes)
    Disk hd17a
      State                    : In-sync component
      Created                  : Fri Oct 31 08:57:49 2014
      Updated                  : Fri Oct 31 08:57:49 2014
      Events                   : 0
      Model                    : STEC Z16IZF2D-200UCT E12A
      Serial Number            : LLYYWWSSSSSS
      Size                     : 200GB (200049647616 bytes)
    Disk hd17b
      State                    : In-sync component
      Created                  : Fri Oct 31 08:57:49 2014
      Updated                  : Fri Oct 31 08:57:49 2014
      Events                   : 0
      Model                    : STEC Z16IZF2D-200UCT E12A
      Serial Number            : LLYYWWSSSSSS
      Size                     : 200GB (200049647616 bytes)
```

3. If the RAID is healthy, you can continue with the card replacements; if the RAID is in a degraded state, proceed only if the card you must replace is already offline.

4. As soon as you remove an FSC card, the RAID becomes degraded. Replace a single FSC

only. If you replace more than one FSC, you lose data.

5. Perform a health check in order to ensure that the card is replaced.

```
[local]ASR5500# show card diag <active slot>
```

6. Use **show hd raid** in order to check the status of the RAID drive. If the status is rebuilding, continue to wait for the RAID drive to rebuild. This could take up to one hour.

7. If the RAID drive is not rebuilding, you must manually start the rebuild process. As an administrator, run:

```
[local]ASR5500# hd raid overwrite <hd slot>
```
use the hdxx slot number of the card you replaced. For example, hd14.

8. Use **show hd raid** in order to recheck the status of the RAID drive, which should be **rebuilding**. Continue to wait for the RAID drive to rebuild. This could take up to one hour.

9. Continue to use **show hd raid** in order to periodically check the status until complete. When the RAID rebuild is complete, ensure that the card goes back to **In-sync** and the RAID status is once again **Available**.

10. Repeat health checks in order to ensure there are no issues.

SSC Card Replacement

1. Complete all prep work described in the Prerequisites for Card Replacements section before you proceed.

2. If the card to be replaced is currently active, perform a card halt from the CLI in order to place the card OFFLINE. Use **show card table** in order to determine card status.

```
[local]ASR5500# show card table
[local]ASR5500# card halt <active slot>
```

3. Use **show card table** in order to verify that the card is offline.

4. If applicable, identify and label all cables before you remove all cables.

5. Pull out the card (make sure that ejector interlock is disengaged when you pull out the card).

6. Insert the new card.

7. Perform a health check on the card that was replaced.

```
[local]ASR5500# show card diag <active slot>
```
The card diagnostics should be **Pass** and usable.

Next Steps

If this information does not solve your issue, then open a Service Request with the Cisco TAC team with this data attached to the case:

- SSD - **show support details to file /flash/<ssd-file-name> compress -noconfirm**
- Simple Network Management Protocol (SNMP) Traps - **show snmp trap history verbose**
- Syslogs two hours before and two hours after the incident - **show logs**

Related Information

- **ASR 5500 Installation Guide**
- **ASR 5500 System Administration Guide**
- **Technical Support & Documentation - Cisco Systems**