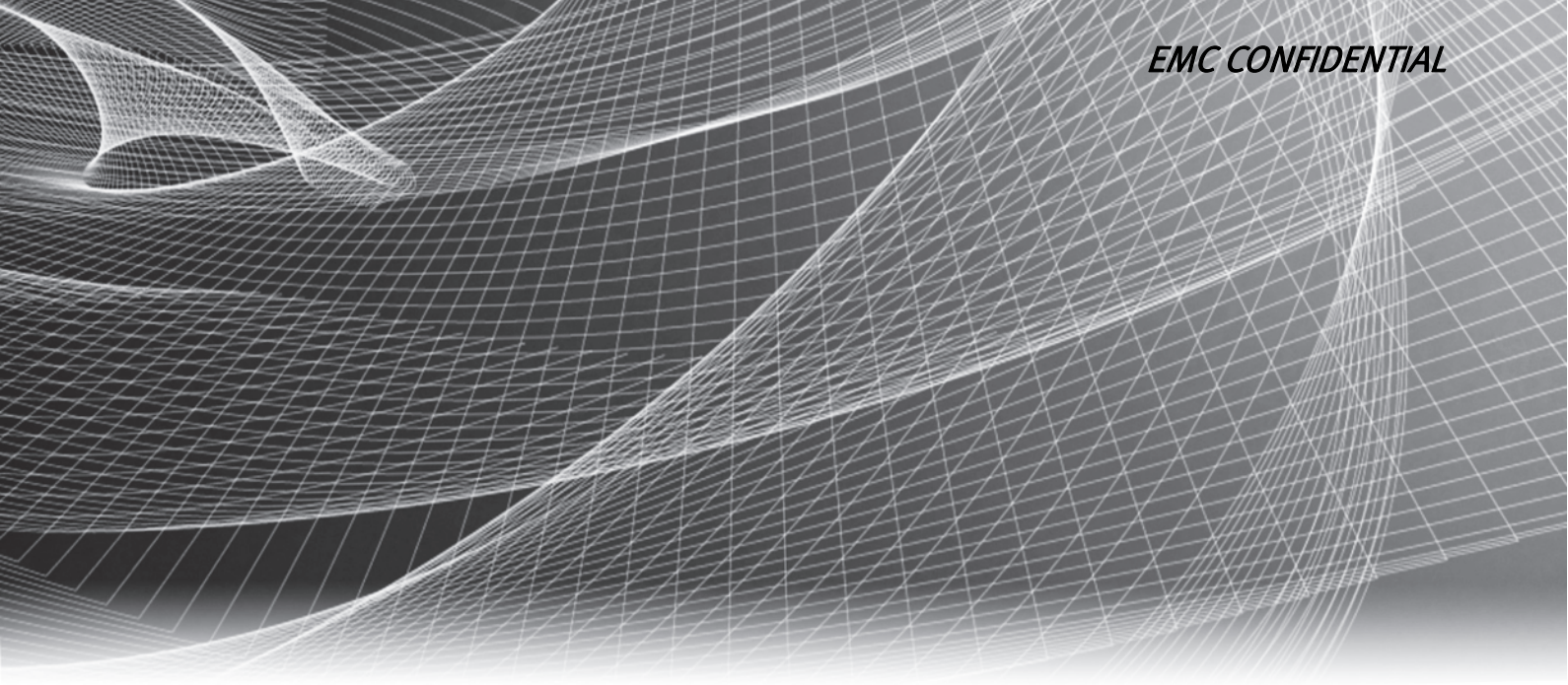

EMC® Greenplum Data Computing Appliance

Appliance Version 2.0.0.0/2.0.1.0/2.0.2.0 /2.0.3.0

Maintenance Guide

REV 11

EMC²

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CHAPTER 1
Important Information Before You Begin

For detailed descriptions of DCA components and configurations, see Appendix A, "System Information and Configuration," on page 137.

This chapter includes the following major sections:

New firmware updates in support of DCA software version 2.0.3.0

Customers can apply optional firmware updates prior to upgrading to DCA software version 2.0.3.0 as follows:

- **Arista 7050S-52 and Arista 7048T switches**
  - New firmware version `EOS-4.9.8.swi`
  - Field personnel can access the `EOS-4.9.8.swi.zip` firmware upgrade package from:

    ftp://ftp.aristanetworks.com/emc/certifiedeos/EOS-4.9.8.swi

    Field personnel can obtain the following document available on http://support.emc.com for step-by-step instructions:

    EMC Greenplum DCA Firmware Upgrade Instructions for the Interconnect Switch (Arista 7050S-52) and Administration Switch (Arista 7048T)
- **Intel Servers (Kylin with eight drives, Dragon 12 with twelve drives, and Dragon 24 with 24 drives)**
  - New BIOS upgrade revision level `SE5C600.86B.02.01.0002`
  - Field personnel can access both the BIOS upgrade package, and the *EMC Greenplum DCA Intel BIOS Upgrade Instructions for Intel Servers* from http://support.emc.com.

Identify the version of the installed DCA software

The replacement procedures in this guide pertain only to DCA clusters running software version **2.0.x.x.** DCA documentation is tied to a specific version of the DCA software. Before beginning any replacement procedure on a DCA, make sure that the version of the software running on the clusters matches the version of the guide that you are using.

1. Log in to the Primary Master server as the user **`root`** (see "Connect a workstation to the DCA" on page 176).
2. View the contents of the `/opt/dca/etc/dca-build-info.txt` file. Verify that the `ISO_VERSION` value is **`2.0.x.x`**

   ```
   # cat /opt/dca/etc/dca-build-info.txt

   ISO_BUILD_DATE="Wed Oct 15 21:59:56 PST 2013"
   ISO_VERSION="2.0.2.0"
   ISO_BUILD_VERSION="4"
   ISO_INSTALL_TYPE="iso"
   ```

   If the version of the software is not `2.0.x.x`, go to he EMC Online Support site http://support.emc.com. From the Support by Product pages, search for Greenplum Data Computing Appliance and obtain the documentation that matches the software version running on the Primary Master server.

Avoid electrostatic discharge damage (ESD)

When you replace and install field replaceable units (FRUs), you can inadvertently damage sensitive electronic circuits in the equipment simply by touching them. Electrostatic charge that has accumulated on your body can discharge through the circuits. If the air in the work area is dry, running a humidifier in the work area can help decrease the risk of electrostatic discharge (ESD) damage.

Read and understand the following guidelines:

- Provide enough room to work on the equipment. Clear the work site of any unnecessary materials, especially materials that naturally build up electrostatic charge such as foam packaging, foam cups, cellophane wrappers, and similar items.
- Do not remove replacement or upgrade FRUs from their antistatic packaging until you are ready to install them.
- Set up your EMC-issued ESD kit and all other materials that you need before servicing a Greenplum system. Once you begin service, avoid moving away from the work site; otherwise, your body can build up an electrostatic charge.
- Use the ESD kit when handling system components.
- Wear an ESD wristband. Attach the clip of the ESD wristband to any bare (unpainted) metal in the bay, and then place the wristband around your wrist with the metal button against your skin.

Handling field replaceable units (FRUs)

This section describes the precautions that you must take and the general procedures that you must follow when removing and storing any field replaceable unit (FRU). The only FRUs in the server are the disk drive assemblies and power supply modules. Depending on the product in which the server is used, the disk drive assemblies may be hot-swappable; that is you can replace a disk drive assembly while the server is running. To determine if disk drive assemblies are hot-swappable, refer to your product documentation. Regardless of the product in which the server is used, the power supply modules are hot-swappable; that is you can replace a power supply module while the server is running.

You should not remove a faulty FRU until you have a replacement available.

When you replace FRUs, you can inadvertently damage the sensitive electronic circuits in the equipment by simply touching them. Electrostatic charge (ESD) that has accumulated on your body discharges through the circuits. If the air in the work area is very dry, running a humidifier in the work area will help decrease the risk of ESD damage. Follow the procedures below to prevent damage to the equipment.

- Provide enough room to work on the equipment. Clear the work site of any unnecessary materials or materials that naturally build up electrostatic charge, such as foam packaging, foam cups, cellophane wrappers, and similar items.
- Do not remove replacement or upgrade FRUs from their antistatic packaging until you are ready to install them.
- Before you service a server, gather together the ESD kit and all other materials you will need. Once servicing begins, avoid moving away from the work site; otherwise, you may build up an electrostatic charge.
- Use the ESD kit when handling any FRU. Use an ESD wristband. To use the ESD wristband (strap), attach the clip of the wristband to any bare (unpainted) metal on the server; then put the wristband around your wrist with the metal button against your skin. If an emergency arises and the ESD kit is not available, follow the procedures in "Emergency procedures (without an ESD kit)" on page 8.

Emergency procedures (without an ESD kit)

In an emergency when an ESD kit is not available, use the procedures below to reduce the possibility of an electrostatic discharge by ensuring that your body and the subassembly are at the same electrostatic potential. These procedures are not a substitute for the use of an ESD kit. Follow them only in the event of an emergency.

- Before touching any FRU, touch a bare (unpainted) metal surface of the cabinet or server.
- Before removing any FRU from its antistatic bag, place one hand firmly on a bare metal surface of the server, and at the same time, pick up the FRU while it is still sealed in the antistatic bag. Once you have done this do not move around the room or touch other furnishings, personnel, or surfaces until you have installed the FRU.
- When you remove a FRU from the antistatic bag, avoid touching any electronic components and circuits on it.

- If you must move around the room or touch other surfaces before installing a FRU, first place the FRU back in the antistatic bag. When you are ready again to install the FRU, repeat these procedures.

CHAPTER 2
Replace a Master Server

This chapter describes how to replace a Primary or Standby Master server in a **GPDB-only DCA**, a **mixed DCA**, or a **Hadoop-only DCA**.

NOTICE

(Applies only to version 2.0.1.0 and later)

Additional steps are required if you are servicing a **Hadoop-only DCA**. Look for the following notice in the left margin:

If you are servicing a **Hadoop-only DCA**

Topics include:

Required tools

You need the following tools to remove and replace a server:

- #2 Phillips screwdriver
- Wrist grounding strap

Task summary

Table 1 Summary of Master server replacement tasks

Tasks	Primary Master	Standby Master	Primary or Standby Master in a DCA with no initialized GP database
Check BIOS version when replacing a Master server in the cluster When installing a replacement server, identify the BIOS version on the new server (as well as the versions already running in the DCA). Then upgrade so that all servers reflect the same firmware levels. Go to http://support.emc.com to obtain the pertinent BIOS upgrade instructions. The upgrade instructions provide information on how to access and install the upgrade package.	x	x	x
Check with the customer if any custom configurations have been applied.	x	x	x
Disable health monitoring.	x	x	x
Check Master server sync state.	x	x	
Check Greenplum database for errors.	x	x	
If necessary, initiate an orchestrated failover from the Primary server to the Standby server. ***If you are replacing a Primary Master in a **Hadoop-only DCA*****: include the argument `--deletevip`	x	x	
Verify the success of the failover.	x		
Power off the failed server.	x	x	x
Label then remove cables from the failed server.	x	x	x
Install the replacement server.	x	x	x
Transfer drives from the failed server to the replacement server.	x	x	x
Connect cables to the replacement server (but do not power it on yet).	x	x	x
Configure the BMC IP address.	x	x	x
Power on the replacement server.	x	x	x
Import foreign disk configurations.	x	x	x
Check the health of the replacement server.	x	x	x
Exchange SSH keys.	x	x	
Initialize the replacement server as the *acting* Standby Master server (temporarily).	x		

Table 1 Summary of Master server replacement tasks

Tasks	Primary Master	Standby Master	Primary or Standby Master in a DCA with no initialized GP database
Initiate a failover from the replacement server (the *acting* Standby Master server). ***If you are replacing a Primary Master in a **Hadoop-only DCA*****: include the argument `--deletevip`	x		
Revert the **`smdw`** server to its former standby role.	x		
If you are replacing a Primary or Standby Master in a **Hadoop-only DCA**Recover and rebalance the GPDB segment instances on the Primary Master server.	x	x	
Synchronize the system clock.	x	x	
Ask the customer if there are any custom configurations that must be reapplied to the DCA (for example, NFS mounts or gateways).	x	x	
Re-enable health monitoring.	x	x	x

Service tag location

When replacing any hardware component, it is important that you properly debrief the part. The serial number of a Master server is located on the blue service label affixed to the front left corner of the server.

Figure 1 Service tag location on the Master server (Dragon24 shown)

Replace the Primary Master server

Perform this procedure if the Primary Master server has failed or is failing.

IMPORTANT

This procedure directs you to transfer drives from the failed server to the replacement server. Take great care when transferring drives. Transfer only one drive at a time. Insert drives in the same slots that they occupied in the failed server.

1. You may want to consult "Task summary" on page 11 for a overview of the Master server replacement procedures.
2. If it is not already connected, connect your service laptop to the red service cable located on the laptop tray. The red service cable is connected to port 48 on the Administration switch in the SYSRACK. For instructions on how to configure the IP address on your laptop, see "Connect a workstation to the DCA" on page 176).
3. If the Primary Master server is still accessible through SSH, perform step a through step e below. If the Primary Master server is not accessible through SSH, skip to step 4.
   a. Log in to the *Primary Master server* as the user **root** (see "Connect a workstation to the DCA" on page 176).
   b. Activate the server identification LED.

      ```
      # dca_blinker -h mdw -a ON
      ```

   c. Switch to the user `gpadmin` and determine whether the Primary and Standby Master servers are synced:

      ```
      # su - gpadmin
      $ gpstate -f
      ```

      If the output returns the status `synchronized`, the master servers are in sync. If `synchronized` is not returned in the output or the database is not running, do not replace the Primary Master server. Contact EMC Support.

   d. Switch to the user `root` and make note of any custom NFS mounts the customer may have created:

      ```
      $ su -
      # cat /etc/fstab
      ```

   e. Make note of any custom network gateways the customer may have created:

      ```
      # cat /etc/sysconfig/network
      ```

4. Before you replace the failed Primary Master server, perform the sub-steps below to determine whether an automatic failover occurred when the Primary Master failed. If an automatic failover did not occur, you must initiate an orchestrated (manual) failover before you replace the failed server (see step 5 below). To determine whether an automated failover occurred, do the following:
   a. Start the DCA Setup utility as the user **root**:

      ```
      # dca_setup
      ```

b. Select option **2** to `Modify DCA Settings`.

c. Note the text of option **19**:

- If the text is **`Disable Master Server Auto Failover (currently enabled)`**, an automatic failover occurred when the Primary Master failed. Skip to step 6 to determine if the failover was successful.
- If the text is **`Enable Master Server Auto Failover (currently disabled)`**, you must initiate an orchestrated (manual) failover as described in step 5.

d. Enter **`x`** to exit the DCA Setup utility.

5. If an automatic failover did occur, proceed to step 6. If an automatic failover did not occur, initiate a orchestrated (manual) failover as follows:

a. From the *Standby Master server*, issue the `dca_failover` command:

```
# dca_failover --stopmasterdb --noninteractive --vip 10.10.10.10
--gateway 10.10.10.1 --netmask 255.255.255.0
```

If you are servicing a Hadoop-only DCA

In a Hadoop-only DCA, make sure to include the option `--deletevip`***:***

```
# dca_failover --stopmasterdb --noninteractive --vip 10.10.10.10
--gateway 10.10.10.1 --netmask 255.255.255.0 --deletevip
```

b. Replace the values shown in **bold** above with the IP, Gateway, and Netmask of the virtual IP address provided by the customer. If the customer has not specified a virtual IP address, do not include the `--vip`, `--gateway`, and `--netmask` parameters. Wait for the prompt to appear indicating that the failover has completed before you continue.

c. When the failover has completed, proceed to step 6 to determine if the failover operation was successful.

6. To determine whether the Master server failover operation was successful, switch to the user `gpadmin` and issue the following command. Verify that the text in **bold** is returned in the output:

```
# su - gpadmin
$ gpstate -f
[INFO]:-Starting gpstate with args: -f
[INFO]:-local Greenplum Version: 'postgres (Greenplum Database)
4.1.1.3 build 4'
[INFO]:-Obtaining Segment details from master...
[INFO]:-Standby master instance not configured
```

7. Check the Greenplum Database for errors. If any errors are returned in the output, you must resolve them before you continue with this procedure:

```
$ gpstate -e
[INFO]:-----------------------------------------------------
[INFO]:-Segment Mirroring Status Report
[INFO]:-----------------------------------------------------
[INFO]:-All segments are running normally
```

8. To prevent false dial home messages from being sent to EMC Support during service, log in to the *Standby Master server* as the user `root` and stop the healthmon daemon to disable health monitoring:

```
$ su -
```

```
# dca_healthmon_ctl -d
```

9. Shut down the Primary Master server:

   - If the failed Primary Master server is accessible through SSH, log into to it as the user **root** and issue the **shutdown** command.

     IMPORTANT

     Check the prompt to make sure that you are on the Primary Master (**mdw**) before you issue the shutdown command!

     ```
     $ ssh root@mdw
     # shutdown -h now
     ```

   - If the failed server is not accessible through SSH, power it off by pressing the power button on the front of the server for 5 seconds (see Figure 2 below).

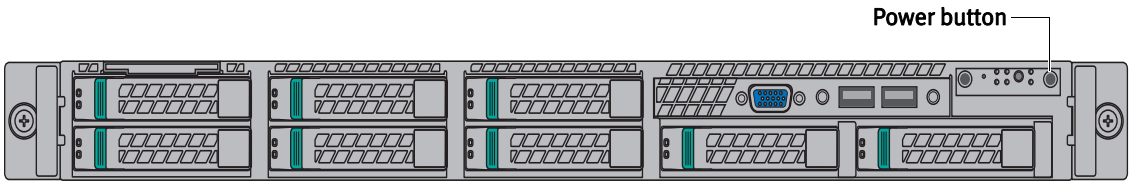


Figure 2 Power button location on Master server

10. Label all the cables connected to the failed server so that you'll know where to connect them on the replacement server.
11. Remove all power, Ethernet, and twin-axial cables from the back of the server.

Note: If the system has Dual NICs installed, note the connections for customer and interconnect networks prior to disconnecting.

12. Remove the failed server and install the replacement server (see Appendix E, "Replace a Server in the Greenplum DCA Rack," on page 192).
13. Transfer disk drives one at a time from the failed server to the replacement server.

    IMPORTANT

    Use caution when transferring drives. Transfer only one drive at a time. Insert the drives in the same slots that they occupied in the failed server.

14. Connect Ethernet and twin-ax cables to the replacement server. Refer to the labels on the cables for proper connectivity.

    IMPORTANT

    Do not connect power to the replacement server yet.

15. From the *Standby Master server* start the dhcpd service as the user **root**:

    ```
    # service dhcpd start
    ```

16. Connect the power cables to the replacement server.

17. Next, use these steps to identify the IP address assigned to the server.

    a. Issue the following command to obtain the lease information provided in the `dhcpd.leases` file:

    ```
    # tail /var/lib/dhcpd/dhcpd.leases
    ```

    b. The `dhcpd.leases` file dispays (similar to the following):

    Example

    ```
    lease 172.28.6.170 {
      starts 4 2012/10/18 20:09:08;
      ends 5 2013/10/18 20:09:08;
      cltt 4 2012/10/18 20:09:08;
      binding state active;
      next binding state free;
      hardware ethernet 00:00:00:00:00:04;
      uid "\001\000\036g,\242\014";
    ```

    c. Locate the MAC address labelled **hardware ethernet** in the example `dhcpd.leases` file above:

    00:00:00:00:00:04

    d. Locate the MAC address on the replacement server's service tag (highlighted in the photograph below):

    MAC1 00:00:00:00:00:00

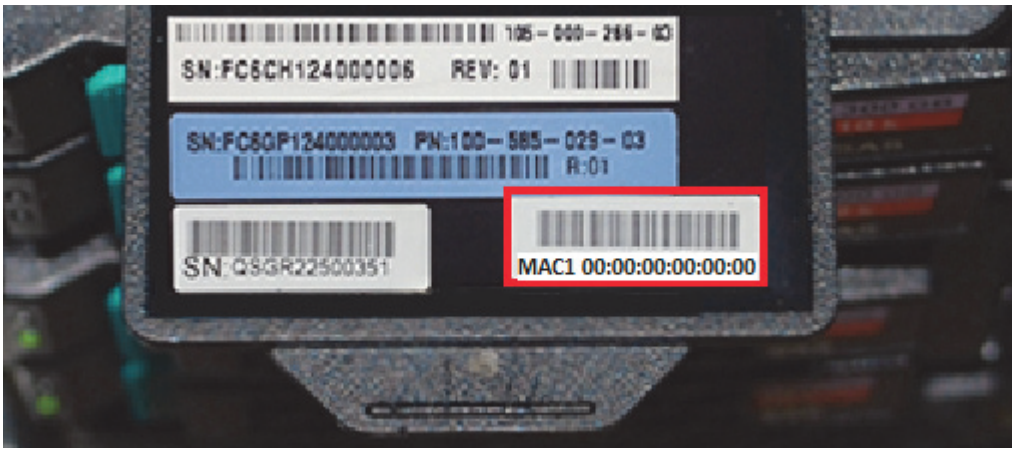


Figure 3 Locating the MAC address on the service tag (Primary Master server shown, Dragon24)

    e. Compare the last two digits in the MAC addresses referenced in step c and step d (for example, 00:00:00:00:00:**04** and 00:00:00:00:00:**00**). Verify that the MAC address in the `dhcpd.leases` file is four greater than the last two numbers in the MAC address on the replacement server's service tag.

    If this is the case, it is certain that the IP address in the `dhcpd.leases` file is the correct one to associate with the server. For example, the scenario described above verifies that **`172.28.6.170`** is correct in this specific instance.

f. Issue the following `ipmiutil` command. Insert the IP address (**172.28.6.170**) identified in the previous steps using the example above as a guide:

Note: Disregard the long, detailed output after this command is executed.

```
# ipmiutil lan -e -l -I 172.28.0.250 -S 255.255.248.0 -N 172.28.6.170 -U root -P sephiroth
```

g. Ping the new address to verify that the change was applied:

```
# ping 172.28.0.#
```

Where **#** is the number of the server you are replacing.

18. Turn off the dhcpd service:

```
# service dhcpd stop
```

19. From the Primary Master server as user root, issue the following command to open a BMC console session on the replacement Master server **mdw**:

```
# ipmiutil sol -a -e -N mdw-sp -U root -P sephiroth
```

⚠WARNING

You will need to press the F key within 15 seconds after seeing this WARNING message:

```
Foreign configuration(s) found on adapter
Press any key to continue or 'C' load the configuration
utility, or 'F' to import foreign configuration(s) and
continue.
```

20. Power on the replacement server by pressing the power button on the front panel, and press the **F** key when prompted.

21. When the following message displays, disregard and press the space bar:

```
All of the disks from your previous configuration are gone. If this
is an unexpected message, then please power off your system and
check your cables to ensure all disks are present. Press any key to
continue, or 'C' to load the configuration utility.
```

22. If the message below appears you will need to power off the server, verify that all LED lights are off, and repeat steps 20 through 21.

```
CLIENT MAC ADDR: 00 1E 67 4D C5 1D  GUID: 2A9B43A4 A50A 11E1 AAA0
001E674DC51D
   DHCP....\
```

23. Monitor the boot process onscreen and verify that the system boots from hard disk.
    If the system **does** boot from hard disk, proceed to step 24.
    If the system **does not** boot from hard disk, perform the following sub-steps to force it to boot from hard disk:

    a. Exit the BMC console utility by pressing the a tilde key (~), and then the period (.) key, as follows on the keyboard:

     then 

    Note: When you exit the BMC console you are returned to your connection on the **smdw** as the user `root`.

    b. Issue the following command from **smdw** to force the appliance to boot from hard drive:

    ```
    # ipmiutil reset -h -N mdw-sp -U root -P sephiroth
    ```

    c. Once the operating system is loaded, issue the following command to change the boot order on `mdw`:

    ```
    # ssh mdw
    # syscfg /bbo "emcbios" HDD NW
    ```

    d. Reboot **mdw**:

    ```
    # reboot
    ```

    e. Following the reboot, issue the following commands to connect to **mdw** and verify the boot order:

    ```
    # ssh mdw
    # syscfg /bbosys
    ```

    f. Exit `mdw`:

    ```
    # exit
    ```

    g. Proceed to step 24. (You can skip step 24 because you already exited the BMC console in sub-step a above.)

24. From the Standby Master server (`smdw`) check the health of the replacement server:

    ```
    # dcacheck -h mdw
    ```

    Verify that no errors display.

25. Exchange SSH keys on the replacement server using the DCA Setup utility:

    a. Start the DCA Setup utility as the user **`root`**:

    ```
    # dca_setup
    ```

    b. Select option **`2`** to `Modify DCA Settings`.

    c. Select option **`6`** to `Generate SSH Keys`.

    d. Enter **`x`** to exit the DCA Setup utility.

    e. Check the firmware level of the RAID controllers with the CmdTool2 utility:

    ```
    # ssh mdw /opt/MegaRAID/CmdTool2/CmdTool2 -adpallinfo -aall | grep
    "FW Package Build"
    ```

    If the above command returns either: **`FW Package Build: 23.7.0-0033`** or **`FW Package Build: 23.9.0-0026`**, your firmware needs updating. Follow steps a through n below to update the firmware.

    f. Download ir3_2208SASHWR_FWPKG-v23.12.0-0013.zip file from Support Zone to your laptop.

    https://support.emc.com/downloads/9507_Greenplum-Data-Computing-Appliance

    g. Extract the files to your laptop using unzip or similar unpacking tool. For example:

    ```
    Unzip ir3_2208SASHWR_FWPKG-v23.12.0-0013.zip
    ```

    h. As a root user copy the MR56p.rom file to the Master server (mdw) and place the file in /root. You can use WinSCP or a similar utility.

    Note: You may be required to provide a login to the destination server.

    i. For each server in need of an update, log into the server as root.

    j. SCP the MR56p.rom file from the master to the server you are updating.

    k. Install the new firmware using the following command:

    Note: This will take longer on 24-disk servers.

    ```
    # /opt/MegaRAID/CmdTool2/CmdTool2 -adpfwflash -f /root/MR56p.rom
    -aall
    ```

    l. Reboot the server.

    ```
    # reboot
    ```

    m. When the server reboots, check the new firmware version:

    ```
    # /opt/MegaRAID/CmdTool2/CmdTool2 -adpallinfo -aall | grep "FW
    Package Build"
    ```

The following should be returned, indicating your firmware has successfully been updated on this server:

```
FW Package Build: 23.12.0-0013
```

n. Repeat these alphabetic steps to check/update the remaining servers in the cluster.

26. Switch to the user **gpadmin** and issue the following commands to initialize the replacement server as the *acting* Standby Master server:

```
# su - gpadmin
$ ssh mdw rm -r /data/master/*
$ gpinitstandby -s mdw
```

27. At the message `Do you want to continue with standby master initialization?` enter **Y** to continue.

    Wait for the message `Successfully created standby master on mdw`.

28. Log in to the replacement server (now the new *acting* Standby Master server) as the user **root**:

```
$ ssh root@mdw
```

29. Issue the following command to initiate the orchestrated (manual) failover:

```
dca_failover --stopmasterdb --noninteractive --vip 10.10.10.10
--gateway 10.10.10.1 --netmask 255.255.255.0
```

If you are servicing a Hadoop-only DCA

In a Hadoop-only DCA, make sure to include the option `--deletevip`*:*

```
dca_failover --stopmasterdb --noninteractive --vip 10.10.10.10
--gateway 10.10.10.1 --netmask 255.255.255.0 --deletevip
```

30. At the message `Do you want to continue?` enter **y**.

    IMPORTANT

    Initiating a failover stops the Greenplum Database and renders it temporarily unavailable.

    When the failover operation finishes you are returned to the prompt **[root@mdw]#** .

31. Switch to the user `gpadmin`:

```
# su - gpadmin
```

32. Connect to the Standby Master server and empty the `/data/master` directory:

```
$ ssh smdw rm -r /data/master/*
```

33. Issue the following command to revert the **smdw** server to its standby role:

```
$ gpinitstandby -s smdw
```

34. At the message `Do you want to continue with standby master initialization?` enter **Y**.

If you are servicing a **Hadoop-only DCA**

Perform the next two steps only if you are replacing a Master server in a Hadoop-only DCA

35. Issue the following command to **recover** the GPDB segment instances running on the Primary and Standby Master servers:

    ```
    $ gprecoverseg
    ```

    Enter **Y** when prompted. For example:

    ```
    Continue with segment recovery procedure Yy|Nn (default=N):
    >  Y
    ```

36. Issue the following command to **rebalance** the GPDB segment instances running on the Primary and Standby Master servers:

    ```
    $ gprecoverseg -r
    ```

    Enter **Y** when prompted. For example:

    ```
    Continue with segment rebalance procedure Yy|Nn (default=N):
    >  Y
    ```

The procedure continues here for all DCA types:

37. Exit the user `gpadmin`:

    ```
    $ exit
    ```

38. Start the DCA Setup utility:

    ```
    # dca_setup
    ```

39. Synchronize the system clock:

    a. Select option **2** for `Modify DCA Settings`.

    b. Select option **5** for `Modify NTP/Clock Configuration Options`.

    c. Select option **3** for `Synchronize clocks across the cluster to the NTP server`.

    Enter **X** to exit the DCA Setup utility.

40. ***IMPORTANT*** - Note that the same DCA system Serial Number (located on a label affixed to the top, rear of the rack) must be included in the following files for Dial Home to work after replacing a Master application server (mdw and smdw in the case of GPDB and hdm, and standby hdm in the case of Hadoop):

    - `/opt/connectemc/ConnectEMC.ini`
    - `/opt/greenplum/serialnumber`

    First, check the DCA system Serial Number in the connectemc initialization file, **`/opt/connectemc/ConnectEMC.ini`** file, as follows:

    a. Open the connectemc initialization file:

    `/opt/connectemc/ConnectEMC.ini`

    b. Locate the DCA system Serial Number per the following keyword in the file:

    SERIAL_NUMBER=

c. Check that this matches the DCA system Serial Number on the label affixed to the top, rear of the rack. Go to the next step (step d.) if the Serial Number is missing.

d. If missing, enter the Serial Number in the `/opt/connectemc/ConnectEMC.ini` file, for example:

SERIAL_NUMBER=APMXXXXXXXXX

41. Next, check that the DCA system Serial Number in the `/opt/greenplum/serialnumber` file matches the DCA system Serial Number in the `/opt/connectemc/ConnectEMC.ini` file, per *step 40* above.

For example:

```
SERIAL_NUMBER=APM00140732731
```

Note: After verifying that the DCA system Serial Numbers are identical, remember to save the `/opt/greenplum/serialnumber` file if you made any changes.

42. Re-enable health monitoring:

```
# dca_healthmon_ctl -e
```

43. You must stop and start the connectemc service (also referred to as Dial Home) to complete restarting the healthmon daemon.

Enter the command:

```
service connectemc stop
```

You will see the message:

```
Shutting down ConnectEMC
```

44. When you see the # prompt again, enter:

```
service connectemc start
```

You will see the message:

```
Starting ConnectEMC
```

The # prompt returns, indicating that you have re-enabled health monitoring.

Replace the Standby Master server

Perform this procedure if the Standby Master server has failed or is failing and the Primary Master server is in good health.

IMPORTANT

This procedure directs you to transfer drives from the failed server to the replacement server. Take great care when transferring drives. Transfer only one drive at a time. Insert drives in the same slots that they occupied in the failed server.

1. You may want to consult "Task summary" on page 11 for a overview of the Master server replacement procedures.

2. If it is not already connected, connect your service laptop to the red service cable located on the laptop tray. For details on how to configure the IP address of your laptop, see "Connect a workstation to the DCA" on page 176.
3. To prevent false dial home messages from being sent to EMC Support during service, stop the healthmon daemon to disable health monitoring:

   ```
   # dca_healthmon_ctl -d
   ```

4. If the Standby Master server is still accessible through SSH, perform step a through step e below. If the failed Standby Master server is not accessible through SSH, skip to step 5.

   a. Log in to the *Primary Master server* as the user **root** (see "Connect a workstation to the DCA" on page 176).

   b. Activate the server identification LED.

      ```
      # dca_blinker -h smdw -a ON
      ```

   c. Switch to the user gpadmin and determine whether the Primary and Standby Master servers are synchronized:

      ```
      # su - gpadmin
      $ gpstate -f
      ```

      If the output returns the status synchronized, the Master servers are in sync. If synchronized is not returned in the output, do not replace the Standby Master server. Contact EMC Support.

   d. Switch to the user **root** and make note of any custom NFS mounts the customer may have created:

      ```
      $ su -
      # cat /etc/fstab
      ```

   e. Make note of any custom network gateways the customer may have created:

      ```
      # cat /etc/sysconfig/network
      ```

5. From the *Primary Master server*, switch to the user **gpadmin** and remove the Standby Master server from the configuration:

   ```
   # su - gpadmin
   $ gpinitstandby -r
   ```

6. When prompted, enter **Y** to continue.
7. Shut down the Standby Master server:

   - If the failed Standby Master server is accessible through SSH, log into to it as the user **root** and issue the **shutdown** command.

     IMPORTANT

     Check the prompt to make sure that you are on the Standby Master (**smdw**) before you issue the shutdown command!

     ```
     $ ssh root@smdw
     # shutdown -h now
     ```

- If the failed server is not accessible through SSH, power it off by pressing the power button on the front of the server.

8. Label all the cables connected to the failed server so that you'll know where to connect them on the replacement server.
9. Remove all power, Ethernet, and twin-axial cables from the back of the server.

Note: If the system has Dual NICs installed, note the connections for customer and interconnect networks prior to disconnecting.

10. Remove the failed server and install the replacement server (see Appendix E, "Replace a Server in the Greenplum DCA Rack," on page 192).
11. Transfer disk drives one at a time from the failed server to the replacement server.

    IMPORTANT

    Use caution when transferring drives. Transfer only one drive at a time. Insert the drives in the same slots that they occupied in the failed server.

12. Connect Ethernet and twin-ax cables to the replacement server. Refer to the labels on the cables for proper connectivity.

    IMPORTANT

    Do not connect power to the replacement server yet.

13. From the Primary Master server start the dhcpd service as the user **root**:

    ```
    # service dhcpd start
    ```

14. Connect the power cables to the replacement server.
15. Next, use these steps to identify the IP address assigned to the server.
    a. Issue the following command to obtain the lease information provided in the `dhcpd.leases` file:

       ```
       # tail /var/lib/dhcpd/dhcpd.leases
       ```

    b. The `dhcpd.leases` file dispays (similar to the following):

       Example

       ```
       lease 172.28.6.170 {
         starts 4 2012/10/18 20:09:08;
         ends 5 2013/10/18 20:09:08;
         cltt 4 2012/10/18 20:09:08;
         binding state active;
         next binding state free;
         hardware ethernet 00:00:00:00:00:04;
         uid "\001\000\036g,\242\014";
       ```

c. Locate the MAC address labelled **hardware ethernet** in the example `dhcpd.leases` file above:

   00:00:00:00:00:04

d. Locate the MAC address on the replacement server's service tag (highlighted in the photograph below):

   MAC1 00:00:00:00:00:00

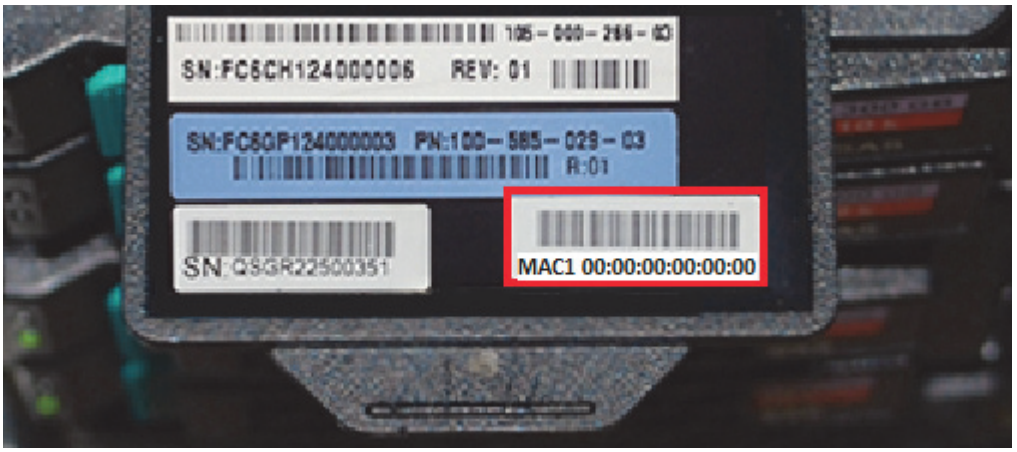


Figure 4 Locating the MAC address on the service tag (Standby Master server shown, Dragon24)

e. Compare the last two digits in the MAC addresses referenced in step c and step d (for example, 00:00:00:00:00:**04** and 00:00:00:00:00:**00**). Verify that the MAC address in the `dhcpd.leases` file is four greater than the last two numbers in the MAC address on the replacement server's service tag.

   If this is the case, it is certain that the IP address in the `dhcpd.leases` file is the correct one to associate with the server. For example, the scenario described above verifies that `172.28.6.170` is correct in this specific instance.

f. Issue the following `ipmiutil` command. Insert the IP address (**`172.28.6.170`**) identified in the previous steps using the example above as a guide:

Note: Disregard the long, detailed output after this command is executed.

```
# ipmiutil lan -e -l -I 172.28.0.250 -S 255.255.248.0 -N 172.28.6.170 -U root -P sephiroth
```

g. Ping the new address to verify that the change was applied:

```
# ping 172.28.0.#
```

   Where **#** is the number of the server you are replacing.

16. Turn off the dhcpd service:

```
# service dhcpd stop
```

17. Power on the replacement server by pressing the button on the front panel.

18. Issue the following command to open a BMC console session on the replacement Master server:

```
# ipmiutil sol -a -e -N smdw-sp -U root -P sephiroth
```

⚠WARNING

You will need to press the F key within 15 seconds after seeing this WARNING message:

```
Foreign configuration(s) found on adapter
Press any key to continue or 'C' load the configuration
utility, or 'F' to import foreign configuration(s) and
continue.
```

19. Power on the replacement server by pressing the power button on the front panel, and press the **F** key when prompted.

20. When the following message displays, disregard and press the space bar:

```
All of the disks from your previous configuration are gone. If this
is an unexpected message, then please power off your system and
check your cables to ensure all disks are present. Press any key to
continue, or 'C' to load the configuration utility.
```

21. If the message below appears it indicates that the server did not accept the "F" key request per the above WARNING. This means that you will need to power off the server, verify that all LED lights are off, and go back to step 19 (press the **F** key when prompted again):

```
CLIENT MAC ADDR: 00 1E 67 4D C5 1D  GUID: 2A9B43A4 A50A 11E1 AAA0
001E674DC51D
   DHCP....\
```

22. Monitor the boot process onscreen and verify that the system boots from hard disk. *If it does not*, do the following to force it to boot from hard disk:

    a. Exit the BMC console utility by pressing the a tilde key (~), and then the period (.) key, as follows on the keyboard:

     then 

    Note: When you exit the BMC console you are returned to your connection on the **mdw** as the user `root`.

    b. Issue the following command from **mdw** to force the replacement server to boot from hard drive:

    ```
    # ipmiutil reset -h -N smdw-sp -U root -P sephiroth
    ```

    c. Once the operating system is loaded, issue the following command to change the boot order on `smdw`:

    ```
    # ssh smdw
    # syscfg /bbo "emcbios" HDD NW
    ```

    d. Reboot the system:

    ```
    # reboot
    ```

    e. Following the reboot, issue the following commands to connect to **smdw** and verify the boot order:

    ```
    # ssh smdw
    # syscfg /bbosys
    ```

    f. Exit **smdw**:

    ```
    # exit
    ```

23. Check the health of the replacement server:

    ```
    # dcacheck -h smdw
    ```

    Verify that no errors display.

24. Exchange SSH keys on the replacement server using the DCA Setup utility:

    a. Start the DCA Setup utility as the user **root**:

    ```
    # dca_setup
    ```

    b. Select option **2** to `Modify DCA Settings`.

    c. Select option **6** to `Generate SSH Keys`.

    d. Enter **x** to exit the DCA Setup utility.

    e. Check the firmware level of the RAID controllers with the CmdTool2 utility:

    ```
    # ssh smdw /opt/MegaRAID/CmdTool2/CmdTool2 -adpallinfo -aall | grep
    "FW Package Build"
    ```

If the above command returns either: **`FW Package Build: 23.7.0-0033`** or **`FW Package Build: 23.9.0-0026`**, your firmware needs updating. Follow steps a through n below to update the firmware.

f. Download ir3_2208SASHWR_FWPKG-v23.12.0-0013.zip file from Support Zone to your laptop.

   https://support.emc.com/downloads/9507_Greenplum-Data-Computing-Appliance

g. Extract the files to your laptop using unzip or similar unpacking tool. For example:

```
Unzip ir3_2208SASHWR_FWPKG-v23.12.0-0013.zip
```

h. As a root user copy the MR56p.rom file to the Master server (mdw) and place the file in /root. You can use WinSCP or a similar utility.

   Note: You may be required to provide a login to the destination server.

i. For each server in need of an update, log into the server as root.

j. SCP the MR56p.rom file from the master to the server you are updating.

k. Install the new firmware using the following command:

   Note: This will take longer on 24-disk servers.

```
# /opt/MegaRAID/CmdTool2/CmdTool2 -adpfwflash -f /root/MR56p.rom
-aall
```

l. Reboot the server.

```
# reboot
```

m. When the server reboots, check the new firmware version:

```
# /opt/MegaRAID/CmdTool2/CmdTool2 -adpallinfo -aall | grep "FW
Package Build"
```

   The following should be returned, indicating your firmware has successfully been updated on this server:

```
FW Package Build: 23.12.0-0013
```

n. Repeat these alphabetic steps to check/update the remaining servers in the cluster.

25. Switch to the user **`gpadmin`** and issue the following command from the *Primary Master server* (**`mdw`**) to initialize the replacement server as the Standby Master server:

```
# su - gpadmin
$ gpinitstandby -s smdw
```

If you are servicing a **Hadoop-only DCA**

Perform the next two steps only if you are replacing a Master server in a Hadoop-only DCA

26. Issue the following command to **recover** the GPDB segment instances running on the Primary and Standby Master servers:

```
$ gprecoverseg
```

    Enter **`Y`** when prompted. For example:

```
Continue with segment recovery procedure Yy|Nn (default=N):
>  Y
```

27. Issue the following command to **rebalance** the GPDB segment instances running on the Primary and Standby Master servers:

    ```
    $ gprecoverseg -r
    ```

    Enter **Y** when prompted. For example:

    ```
    Continue with segment rebalance procedure Yy|Nn (default=N):
    >  Y
    ```

The procedure continues here for all DCA types:

28. Exit from the user `gpadmin` to the user `root`:

    ```
    $ exit
    ```

29. Start the dca_setup utility:

    ```
    # dca_setup
    ```

30. Synchronize the system clock:

    a. Select option **2** for `Modify DCA Settings`.

    b. Select option **5** for `Modify NTP/Clock Configuration Options`.

    c. Select option **3** for `Synchronize clocks across the cluster to the NTP server`.

    d. Enter **x** to exit the DCA Setup utility.

31. ***IMPORTANT*** - Note that the same DCA system Serial Number (located on a label affixed to the top, rear of the rack) must be included in the following files for Dial Home to work after replacing a Master application server (mdw and smdw in the case of GPDB and hdm, and standby hdm in the case of Hadoop):

    - `/opt/connectemc/ConnectEMC.ini`
    - `/opt/greenplum/serialnumber`

    First, check the DCA system Serial Number in the connectemc initialization file, **`/opt/connectemc/ConnectEMC.ini`** file, as follows:

    a. Open the connectemc initialization file:

    `/opt/connectemc/ConnectEMC.ini`

    b. Locate the DCA system Serial Number per the following keyword in the file:

    SERIAL_NUMBER=

    c. Check that this matches the DCA system Serial Number on the label affixed to the top, rear of the rack. Go to the next step (step **d.**) if the Serial Number is missing.

    d. If missing, enter the Serial Number in the `/opt/connectemc/ConnectEMC.ini` file, for example:

    SERIAL_NUMBER=APMXXXXXXXXX

32. Next, check that the DCA system Serial Number in the `/opt/greenplum/serialnumber` file matches the DCA system Serial Number in the `/opt/connectemc/ConnectEMC.ini` file, per *step 31* above.

    For example:

    ```
    SERIAL_NUMBER=APM00140732731
    ```

Note: After verifying that the DCA system Serial Numbers are identical, remember to save the `/opt/greenplum/serialnumber` file if you made any changes.

33. Re-enable health monitoring:

    ```
    # dca_healthmon_ctl -e
    ```

34. You must stop and start the connectemc service (also referred to as Dial Home) to complete restarting the healthmon daemon.

    Enter the command:

    ```
    service connectemc stop
    ```

    You will see the message:

    ```
    Shutting down ConnectEMC
    ```

35. When you see the # prompt again, enter:

    ```
    service connectemc start
    ```

    You will see the message:

    ```
    Starting ConnectEMC
    ```

    The # prompt returns, indicating that you have re-enabled health monitoring.

Identifying a single-NIC master versus a dual-NIC master in a DCAv2

The Master server is a dual-NIC master if both eth6 and eth7 are present on the mdw or smdw. If the server is powered up, the only way to identify a dual-NIC master is to visually inspect it, by counting the number of SFP ports.

Replace a Master server in a DCA without a Greenplum database

Perform this procedure to replace a failed Master server in a DCA in which the Greenplum database is either not installed or is uninitialized.

IMPORTANT

This procedure directs you to transfer drives from the failed server to the replacement server. Take great care when transferring drives. Transfer only one drive at a time. Insert drives in the same slots that they occupied in the failed server.

1. You may want to consult "Task summary" on page 11 for a overview of the Master server replacement procedures.
2. If it is not already connected, connect your service laptop to the red service cable located on the laptop tray. The red service cable is connected to port 48 on the first Administration switch `a-sw-1` (see "Connect a workstation to the DCA" on page 176).
3. To prevent false dial home messages from being sent to EMC Support during service, stop the healthmon daemon to disable health monitoring:

   ```
   # dca_healthmon_ctl -d
   ```

4. If the failed server is still accessible by SSH, perform the following steps. If the failed Master server is not accessible through SSH, skip to step 5.
   a. Log in to the *functioning* Master server as the user **`root`** (see "Connect a workstation to the DCA" on page 176).
   b. Activate the server identification LED:

      Enter either **`mdw`** or **`smdw`** for the hostname, whichever applies.

      ```
      # dca_blinker -h smdw -a ON
      ```

   c. Make note of any custom NFS mounts the customer may have created:

      ```
      # cat /etc/fstab
      ```

   d. Make note of any custom network gateways the customer may have created:

      ```
      # cat /etc/sysconfig/network
      ```

5. If possible, while connected to the failed Master server, issue the following command to shut down the server.

   IMPORTANT

   Check the prompt to make sure that you are on the correct Master server (**`mdw`** or **`smdw`**) before you issue the shutdown command!

   ```
   # shutdown -h now
   ```

6. If the failed server is inaccessible through SSH, power it off by pressing the power button on the front of the server.
7. Label all the cables connected to the failed server so that you'll know where to connect them on the replacement server.
8. Remove all power, Ethernet, and twin-axial cables from the back of the server.

Note: If the system has Dual NICs installed, note the connections for customer and interconnect networks prior to disconnecting.

9. Remove the failed server and install the replacement server (see Appendix E, "Replace a Server in the Greenplum DCA Rack," on page 192).
10. Transfer disk drives one at a time from the failed server to the replacement server.

IMPORTANT

Use caution when transferring drives. Transfer only one drive at a time. Insert the drives in the same slots that they occupied in the failed server.

11. Connect Ethernet and twin-ax cables to the replacement server. Refer to the labels on the cables for proper connectivity.

IMPORTANT

Do not connect power to the replacement server yet.

12. From the functional Master server start the dhcpd service:

```
# service dhcpd start
```

13. Connect the power cables to the replacement server.

14. Next, use these steps to identify the IP address assigned to the server.

    a. Issue the following command to obtain the lease information provided in the `dhcpd.leases` file:

    ```
    # tail /var/lib/dhcpd/dhcpd.leases
    ```

    b. The `dhcpd.leases` file dispays (similar to the following):

    Example

    ```
    lease 172.28.6.170 {
      starts 4 2012/10/18 20:09:08;
      ends 5 2013/10/18 20:09:08;
      cltt 4 2012/10/18 20:09:08;
      binding state active;
      next binding state free;
      hardware ethernet 00:00:00:00:00:04;
      uid "\001\000\036g,\242\014";
    ```

    c. Locate the MAC address labelled **hardware ethernet** in the example `dhcpd.leases` file above:

    00:00:00:00:00:04

    d. Locate the MAC address on the replacement server's service tag (highlighted in the photograph below):

    MAC1 00:00:00:00:00:00

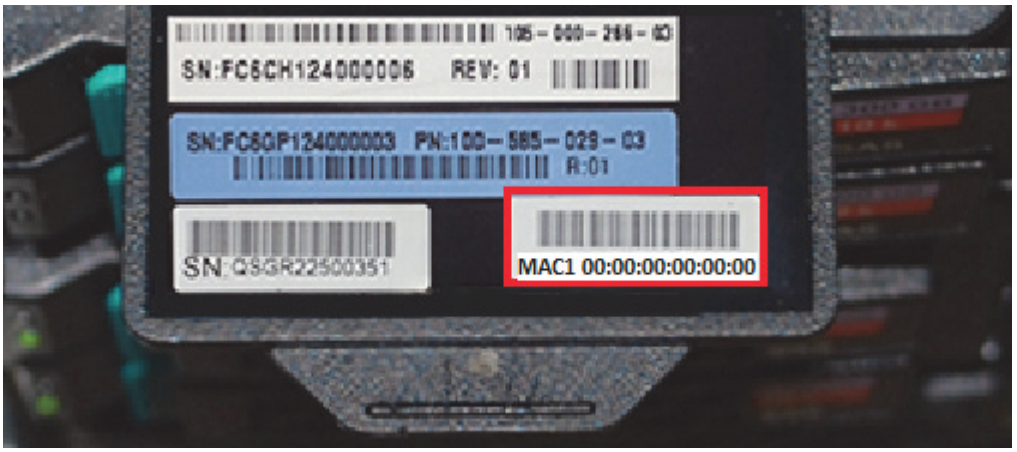


Figure 5 Locating the MAC address on the service tag (Master server shown, Dragon24)

    e. Compare the last two digits in the MAC addresses referenced in step c and step d (for example, 00:00:00:00:00:**04** and 00:00:00:00:00:**00**). Verify that the MAC address in the `dhcpd.leases` file is four greater than the last two numbers in the MAC address on the replacement server's service tag.

    If this is the case, it is certain that the IP address in the `dhcpd.leases` file is the correct one to associate with the server. For example, the scenario described above verifies that `172.28.6.170` is correct in this specific instance.

f. Issue the following `ipmiutil` command. Insert the IP address (**172.28.6.170**) identified in the previous steps using the example above as a guide:

Note: Disregard the long, detailed output after this command is executed.

```
# ipmiutil lan -e -l -I 172.28.0.250 -S 255.255.248.0 -N 172.28.6.170 -U root -P sephiroth
```

g. Ping the new address to verify that the change was applied:

```
# ping 172.28.0.#
```

Where **#** is the number of the server you are replacing.

15. Turn off the dhcpd service:

```
# service dhcpd stop
```

16. Power on the replacement server by pressing the button on the front panel.

17. Issue the following command to open a console session on the replacement server. Enter either **mdw** or **smdw** for the hostname, whichever applies. For example, for **smdw**:

```
# ipmiutil sol -a -e -N smdw-sp -U root -P sephiroth
```

⚠WARNING

You will need to press the F key within 15 seconds after seeing this WARNING message:

```
Foreign configuration(s) found on adapter
Press any key to continue or 'C' load the configuration
utility, or 'F' to import foreign configuration(s) and
continue.
```

18. Power on the replacement server by pressing the power button on the front panel, and press the **F** key when prompted.

19. When the following message displays, disregard and press the space bar:

```
All of the disks from your previous configuration are gone. If this
is an unexpected message, then please power off your system and
check your cables to ensure all disks are present. Press any key to
continue, or 'C' to load the configuration utility.
```

20. If the message below appears it indicates that the server did not accept the "F" key request per the above WARNING. This means that you will need to power off the server, verify that all LED lights are off, and go back to step 18 (press the **F** key when prompted again):

```
CLIENT MAC ADDR: 00 1E 67 4D C5 1D  GUID: 2A9B43A4 A50A 11E1 AAA0
001E674DC51D
   DHCP....\
```

21. Monitor the boot process onscreen and verify that the system boots from hard disk. ***If it does not***, do the following to force it to boot from hard disk:

    a. Exit the BMC console utility by pressing the a tilde key (~), and then the period (.) key, as follows on the keyboard:

     then 

    Note: When you exit the BMC console you are returned to your connection on the functioning master server the user `root`.

    b. Issue the following command from either the Primary or the Standby Master server, which ever applies.

    – If you replaced a *Primary* Master, issue the command from **`smdw`**.

    – If you replaced a *Standby* Master, issue the command from **`mdw`**.

    For example, for **`mdw`**:

    ```
    # ipmiutil reset -h -N mdw-sp -U root -P sephiroth
    ```

    c. Once the operating system is loaded, issue the following command to change the boot order on the replacement server. For example, if you replaced **`mdw`**:

    ```
    # ssh mdw
    # syscfg /bbo "emcbios" HDD NW
    ```

    d. Reboot the system:

    ```
    # reboot
    ```

    e. Following the reboot, issue the following commands to connect to the replacement server and verify the boot order. For example, if you replaced **`mdw`**:

    ```
    # ssh mdw
    # syscfg /bbosys
    ```

    f. Check the firmware level of the RAID controllers with the CmdTool2 utility:

```
# ssh mdw /opt/MegaRAID/CmdTool2/CmdTool2 -adpallinfo -aall | grep
"FW Package Build"
```

If the above command returns either: **`FW Package Build: 23.7.0-0033`** or **`FW Package Build: 23.9.0-0026`**, your firmware needs updating. Follow steps a through n below to update the firmware.

g. Download ir3_2208SASHWR_FWPKG-v23.12.0-0013.zip file from Support Zone to your laptop.

   https://support.emc.com/downloads/9507_Greenplum-Data-Computing-Appliance

h. Extract the files to your laptop using unzip or similar unpacking tool. For example:

```
Unzip ir3_2208SASHWR_FWPKG-v23.12.0-0013.zip
```

i. As a root user copy the MR56p.rom file to the Master server (mdw) and place the file in /root. You can use WinSCP or a similar utility.

   Note: You may be required to provide a login to the destination server.

j. For each server in need of an update, log into the server as root.

k. SCP the MR56p.rom file from the master to the server you are updating.

l. Install the new firmware using the following command:

   Note: This will take longer on 24-disk servers.

```
# /opt/MegaRAID/CmdTool2/CmdTool2 -adpfwflash -f /root/MR56p.rom
-aall
```

m. Reboot the server.

```
# reboot
```

n. When the server reboots, check the new firmware version:

```
# /opt/MegaRAID/CmdTool2/CmdTool2 -adpallinfo -aall | grep "FW
Package Build"
```

   The following should be returned, indicating your firmware has successfully been updated on this server:

```
FW Package Build: 23.12.0-0013
```

o. Repeat these alphabetic steps to check/update the remaining servers in the cluster.

22. Issue the following command to check the health of the replacement server. For example, if you replaced **mdw**:

```
# dcacheck -h mdw
```

    Verify that no errors display.

23. Re-enable health monitoring by restarting the healthmon daemon:

```
# dca_healthmon_ctl -e
```

24. You must stop and start the connectemc service to complete restarting the healthmon daemon:

CHAPTER 3
Replace a Segment, DIA, or Hadoop server

This chapter describes how to replace a server used in GPDB, DIA, and GP HD modules. It includes the following major sections:

Required tools

You need the following tools to remove and replace a server:

- #2 Phillips screwdriver
- Wrist grounding strap

Task summary

Table 2 Segment (GPDB), DIA, and Hadoop server replacement task summary

Tasks	Segment server in an initialized GPDB module	DIA server; Segment server in an uninitialized GPDB module	Hadoop Master or Worker server
Check BIOS version when replacing a server When installing a replacement server, identify the BIOS version on the new server (as well as the versions already running in the DCA). Then upgrade so that all servers reflect the same firmware levels. Go to http://support.emc.com to obtain the pertinent BIOS upgrade instructions. The upgrade instructions provide information on how to access and install the upgrade package.	x	x	x
Check and reseat cables.	x	x	x
Connect to the DCA.	x	x	x
Disable health monitoring.	x	x	x
Check number of segments that are showing Change Tracking.	x		
Activate light bar to locate the failed server.	x	x	x
Ask the customer about 3rd party software.		x	
Note MAC address of the adapter **`eth1`**		x	
Note NFS mounts and custom gateways.	x	x	
Power off the failed server.	x	x	x
Install the replacement server.	x	x	x
Transfer drives from the failed server to the replacement server.	x	x	x
Connect cables to the replacement server.	x	x	x
Configure the BMC IP address.	x	x	x
Power on the replacement server.	x	x	x
Import foreign disk configurations.	x	x	x
Monitor the boot process and verify that the replacement server boots from hard disk.	x	x	x
Check the health of the replacement server.	x	x	x
Exchange SSH keys.	x	x	x
Launch gprecoverseg utility.	x		
Issue **`gpstate -m`** to verify data status of all segments is **`Synchronized.`**	x		
Issue `gprecoverseg` to restore the server to its optimal configuration.	x		
Issue **`gpstate -e`** to check for errors.	x		

Table 2 Segment (GPDB), DIA, and Hadoop server replacement task summary

Tasks	Segment server in an initialized GPDB module	DIA server; Segment server in an uninitialized GPDB module	Hadoop Master or Worker server
Synchronize the system clock.	x	x	x
Verify with the customer that NFS mounts or gateways (if any) are functioning.	x	x	
Configure the external IP address (eth1).		x	
Re-enable health monitoring.	x	x	x
Tell customer that they can reinstall 3rd party software.		x (DIA server only)	

Service tag locations

When replacing any hardware component, make sure to properly de-brief the part. Locate the serial number on the blue label affixed to the rear of the rotating power console on the front of each segment server.

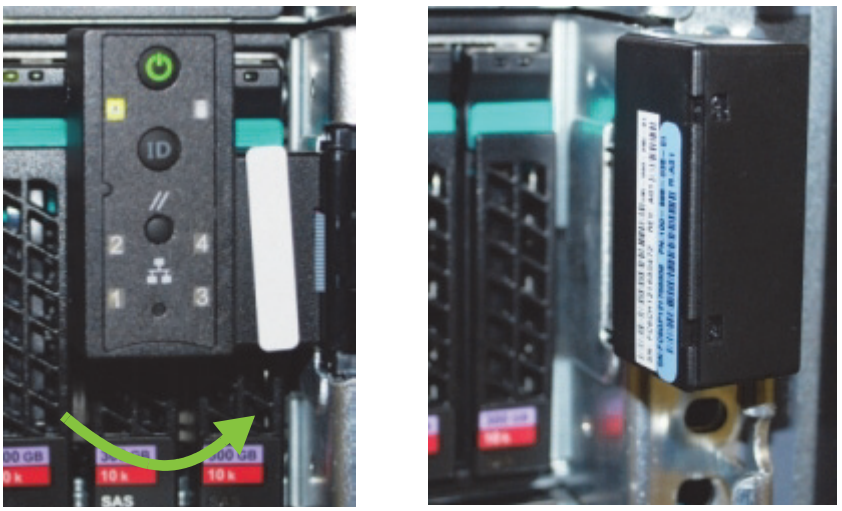


Figure 6 Service tag location on 24-drive Segment server

Reseat cables before replacing a server

Before you replace a failed server, determine whether the problem is caused by a faulty cable connection. Remove and then reconnect cables as described below.

1. Connect your service laptop to the red service cable located on the laptop tray in Rack 1. The red service cable is connected to port 48 on the first Administration switch `a-sw-1` (see "Connect a workstation to the DCA" on page 176).
2. Open a console connection to the Primary Master server as the user **`root`** using IP Address **`172.28.4.250`** and password **`changeme`**.
3. To identify the failed server, activate its server identification light by issuing the following command. Replace the hostname shown in **bold** below with the hostname of the server want to identify:

   ```
   # dca_blinker -h sdw1 -a ON
   ```

   Note: If the server is completely non-operational, the light might not work.

4. Shut down the failed server:
   - If you can access the server through SSH: Enter the following command. Replace the hostname shown in **bold** with the hostname of the segment server you are working on:

     IMPORTANT
     Check the prompt to make sure that you are on the correct server before you issue the shutdown command!

     ```
     # ssh sdw1
     # shutdown -h now
     ```

   - If you cannot access the server through SSH: Make sure that the server is powered off. Press the power button on the front of the server if necessary.
5. Once the server is powered off, unplug and then firmly reconnect the administration network cable, two interconnect cables, and two power supply AC cables. Figure 7 shows the relevant cable connection sites.

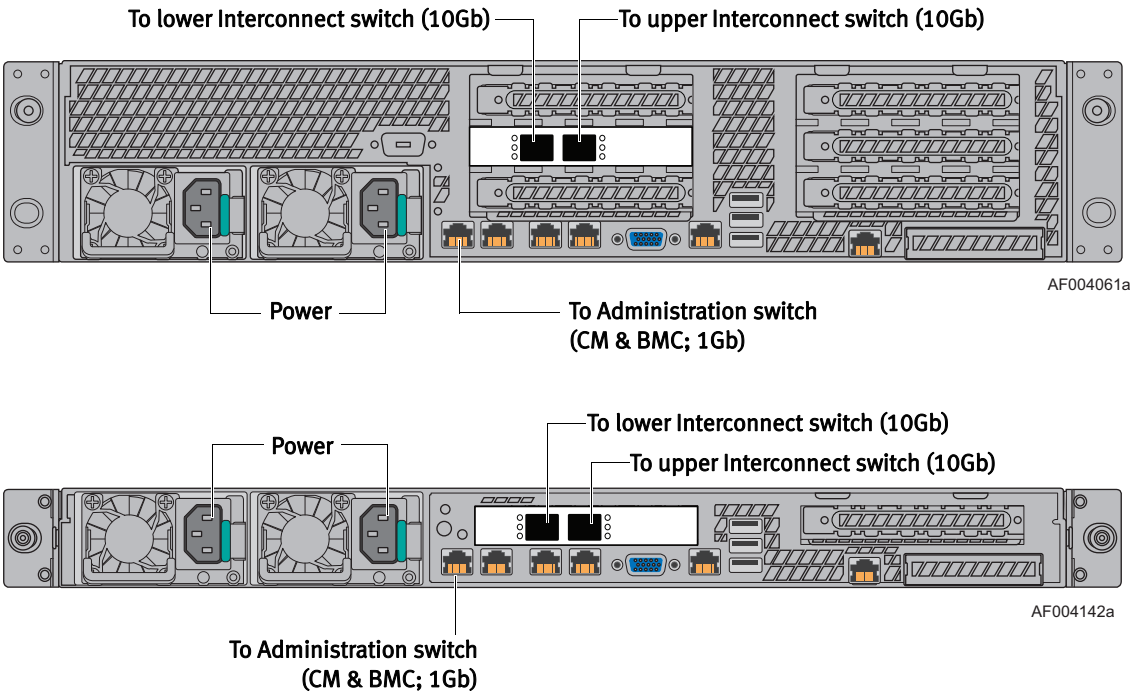


Figure 7 Re-seat cables on the back of the server

6. Power on the server by pressing the power button on the front of the server.

   Wait for the server to boot (approximately 5 minutes).

7. From the Primary Master server, issue the `ping` command to each interface on the server. Replace the text in **bold** with the hostname of the server you are evaluating.

   ```
   # ping sdw1-cm
   # ping sdw1
   ```

   - If there is no response from the interfaces, replace the server by performing the appropriate procedure listed below:
     - "Replace a server in an initialized GPDB module" on page 44
     - "Replace a DIA server or a server in an uninitialized GPDB module" on page 51
     - "Replace a server in a Greenplum Hadoop module (DCA version 2.0.0.0)" on page 58
   - If **all** interfaces on the server respond, you do not need to replace the server. If the server you are evaluating is a DIA server, you are done. If the server you are evaluating is part of a GPDB or HD module, issue the following commands to recover the segment instances:

     ```
     # su - gpadmin
     $ gprecoverseg
     ```

Replace a server in an initialized GPDB module

Perform this procedure to replace a failed or failing Segment Server that is part of an initialized GPDB module. This procedure describes how to replace the server hardware and recover segment instances.

To replace a server that is part of a DIA module or part of an *uninitialized* GPDB module (or a module in which GPBD is not installed), see page 51.

IMPORTANT

This procedure directs you to transfer drives from the failed server to the replacement server. Take great care when transferring drives. Transfer only one drive at a time. Insert drives in the same slots that they occupied in the failed server.

1. You may want to consult "Task summary" on page 40 for a overview of the segment server replacement procedures.
2. Make sure that you have checked the cable connections (see "Reseat cables before replacing a server" on page 42).
3. If it is not already connected, connect your service laptop to the red service cable located on the laptop tray in Rack 1. The red service cable is connected to port 48 on the first Administration switch `a-sw-1` (see "Connect a workstation to the DCA" on page 176).
4. To prevent false dial home messages from being sent to EMC Support during service, disable health monitoring by stopping the healthmon daemon:

   ```
   # dca_healthmon_ctl -d
   ```

5. Log in to the Primary Master Server as the user **`gpadmin`**.
6. Issue the **`gpstate -m`** command. Verify that no more than eight segment instances display a status of `Change Tracking`. In this example, **`sdw1`** has failed:

```
$ gpstate -m
Mirror   Datadir                 Port    Status              Data Status
sdw2-2   /data2/mirror/gpseg0  50003   Acting as Primary   Change Tracking
sdw3-2   /data2/mirror/gpseg1  50003   Acting as Primary   Change Tracking
sdw4-2   /data2/mirror/gpseg2  50003   Acting as Primary   Change Tracking
sdw2-1   /data1/mirror/gpseg3  50000   Acting as Primary   Change Tracking
sdw3-1   /data1/mirror/gpseg4  50000   Acting as Primary   Change Tracking
sdw4-1   /data1/mirror/gpseg5  50000   Acting as Primary   Change Tracking
sdw3-1   /data1/mirror/gpseg6  50000   Acting as Primary   Change Tracking
sdw4-1   /data1/mirror/gpseg7  50000   Acting as Primary   Change Tracking
```

7. To locate the server, use the DCA Setup Utility to activate the green lightbar on the DCA door and the blue server identification LED as the user **`root`**:
   a. Launch the DCA Setup utility:

      ```
      # dca_setup
      ```

   b. Select option **`2`** to `Modify DCA Settings`.
   c. Select option **`18`** for `Light Bar Controls`.
   d. Select option **`3`** for `Blink the light bar`.

e. Enter the hostname of the server and press **ENTER**.

f. Enter **x** to exit the DCA Setup utility.

The green lightbar on the DCA door and the blue server identification LED begin to blink.

Note: If the DCA door does not have a lightbar, an error message displays. You can safely ignore the error message. To identify the failed server, locate the blue server identification LED.

8. If you can still access the server via SSH, perform sub-steps (a) through (d) below. If you cannot access the server via SSH, proceed to step 9.

   a. Log in to the failed segment server as the user **root**. Replace the hostname shown in **bold** with the hostname of the failed server:

   ```
   # ssh root@sdw1
   ```

   b. Make note of any custom NFS mounts the customer may have created:

   ```
   # cat /etc/fstab
   ```

   c. Make note of any custom network gateways the customer may have created:

   ```
   # cat /etc/sysconfig/network
   ```

   d. Shut down the failed server:

   ```
   # shutdown -h now
   ```

9. If the failed server is inaccessible through SSH, power it off by pressing the power button on the front of the server.
10. Label all the cables connected to the failed server so that you'll know where to connect them on the replacement server.
11. Remove all power, Ethernet, and twin-axial cables from the back of the server.

Note: If the system has Dual NICs installed, note the connections for customer and interconnect networks prior to disconnecting.

12. Remove the failed server and install the replacement server (see Appendix E, "Replace a Server in the Greenplum DCA Rack," on page 192).
13. Transfer disk drives one at a time from the failed server to the replacement server.

IMPORTANT

Use caution when transferring drives. Transfer only one drive at a time. Insert the drives in the same slots that they occupied in the failed server.

14. Connect Ethernet and twin-ax cables to the replacement server. Refer to the labels on the cables for proper connectivity.

IMPORTANT

Do not connect power to the replacement server yet.

15. From the Primary Master server start the dhcpd service:

```
# service dhcpd start
```

16. Connect the power cables to the replacement server.
17. Next, use these steps to identify the IP address assigned to the server.
    a. Issue the following command to obtain the lease information provided in the `dhcpd.leases` file:

```
# tail /var/lib/dhcpd/dhcpd.leases
```

    b. The `dhcpd.leases` file dispays (similar to the following):

Example

```
lease 172.28.6.170 {
  starts 4 2012/10/18 20:09:08;
  ends 5 2013/10/18 20:09:08;
  cltt 4 2012/10/18 20:09:08;
  binding state active;
  next binding state free;
  hardware ethernet 00:00:00:00:00:04;
  uid "\001\000\036g,\242\014";
```

    c. Locate the MAC address labelled **hardware ethernet** in the example `dhcpd.leases` file above:

00:00:00:00:00:04

    d. Locate the MAC address on the replacement server's service tag (highlighted in the photograph below):

MAC1 00:00:00:00:00:00

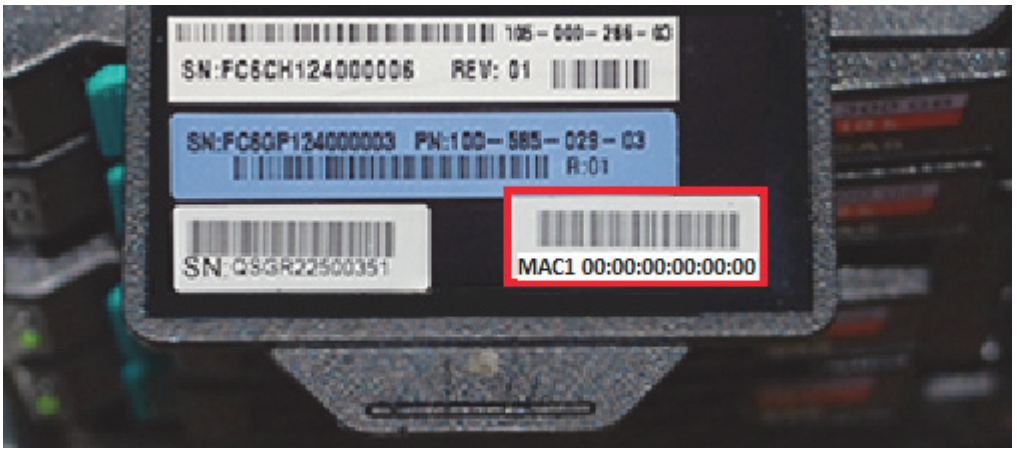


Figure 8 Locating the MAC address on the service tag (Dragon24)

    e. Compare the last two digits in the MAC addresses referenced in step c and step d (for example, 00:00:00:00:00:**04** and 00:00:00:00:00:**00**). Verify that the MAC address in the `dhcpd.leases` file is four greater than the last two numbers in the MAC address on the replacement server's service tag.

If this is the case, it is certain that the IP address in the `dhcpd.leases` file is the correct one to associate with the server. For example, the scenario described above verifies that **`172.28.6.170`** is correct in this specific instance.

f. Issue the following `ipmiutil` command. Insert the IP address (**`172.28.6.170`**) you've identified in the previous steps using the example above as a guide:

Note: Disregard the long, detailed output after this command is executed.

```
# ipmiutil lan -e -l -I 172.28.0.250 -S 255.255.248.0 -N 172.28.6.170 -U root -P sephiroth
```

g. Ping the new address to verify that the change was applied:

```
# ping 172.28.0.#
```

Where **#** is the number of the server you are replacing.

18. Turn off the dhcpd service:

```
# service dhcpd stop
```

19. From the Primary Master server as user **`root`**, issue the following command to open a BMC console session on the replacement server. Replace the hostname shown in **bold** below with the hostname of the replacement server:

```
# ipmiutil sol -a -e -N sdw1-sp -U root -P sephiroth
```

⚠WARNING

You will need to press the F key within 15 seconds after seeing this WARNING message:

```
Foreign configuration(s) found on adapter
Press any key to continue or 'C' load the configuration
utility, or 'F' to import foreign configuration(s) and
continue.
```

20. Power on the replacement server by pressing the power button on the front panel, and press the **F** key when prompted.

⚠WARNING

Note that after pressing the space bar in the next step you will again be prompted to press the F key within 15 seconds.

21. When the following message displays, disregard and press the space bar:

```
All of the disks from your previous configuration are gone. If this
is an unexpected message, then please power off your system and
check your cables to ensure all disks are present. Press any key to
continue, or 'C' to load the configuration utility.
```

22. Press the F key when prompted.

23. When the following message displays, disregard and press the space bar:

```
All of the disks from your previous configuration are gone. If this
is an unexpected message, then please power off your system and
check your cables to ensure all disks are present. Press any key to
continue, or 'C' to load the configuration utility.
```

24. If the message below appears you will need to power off the server,essage below appears you will need to power off the server, verify that all LED lights are off, and repeat steps 21 through 23.

```
CLIENT MAC ADDR: 00 1E 67 4D C5 1D  GUID: 2A9B43A4 A50A 11E1 AAA0
001E674DC51D
```

25. Monitor the boot process onscreen and verify that the replacement server boots from hard disk. If it does not, do the following to force it to boot from hard disk:

    a. Exit the BMC console utility by pressing the a tilde key (~), and then the period (.) key, as follows on the keyboard:

     then 

    Note: When you exit the BMC console you are returned to your connection on the Primary Master server as the user `root`.

    b. Issue the following command from the Primary Master server to force the replacement server to boot from the hard drive. Change the hostname shown in **bold** below to the hostname of the server you replaced:

    ```
    # ipmiutil reset -h -N sdw1-sp -U root -P sephiroth
    ```

    c. Once the operating system is loaded, issue the following command to change the boot order on the replacement server. For example, on **`sdw1`**:

    ```
    # ssh sdw1
    # syscfg /bbo “emcbios” HDD NW
    ```

    d. Reboot the replacement server:

    ```
    # reboot
    ```

    e. Following the reboot, issue the following commands to connect to the replacement server and verify the boot order. Change the hostname shown in **bold** below to the hostname of the server you replaced:

    ```
    # ssh sdw1
    # syscfg /bbosys
    ```

26. Check the health of the replacement server. Replace the text in **bold** with the hostname of the replacement segment server:

    ```
    # dcacheck -h sdw1
    ```

    Verify that no errors display.

27. Exchange SSH keys on the replacement server using the DCA Setup utility:

    a. Start the DCA Setup utility as the user **`root`**:

    ```
    # dca_setup
    ```

    b. Select option **2** to `Modify DCA Settings`.

    c. Select option **6** to `Generate SSH Keys`.

d. Enter **x** to exit the DCA Setup utility.

e. When the server reboots, check the new firmware version. Replace the text in **bold** with the hostname of the replacement server:

```
# ssh sdw1 /opt/MegaRAID/CmdTool2/CmdTool2 -adpallinfo -aall |
grep "FW Package Build"
```

If the above command returns either: **FW Package Build: 23.7.0-0033** or **FW Package Build: 23.9.0-0026**, your firmware needs updating. Follow steps a through n below to update the firmware.

f. Download ir3_2208SASHWR_FWPKG-v23.12.0-0013.zip file from Support Zone to your laptop.

https://support.emc.com/downloads/9507_Greenplum-Data-Computing-Appliance

g. Extract the files to your laptop using unzip or similar unpacking tool. For example:

```
Unzip ir3_2208SASHWR_FWPKG-v23.12.0-0013.zip
```

h. As a root user copy the MR56p.rom file to the Master server (mdw) and place the file in /root. You can use WinSCP or a similar utility.

Note: You may be required to provide a server login name and password.

i. For each server in need of an update, log into the server as root.

j. SCP the MR56p.rom file from the master to the server you are updating.

k. Install the new firmware using the following command:

Note: This will take longer on 24-disk servers.

```
# /opt/MegaRAID/CmdTool2/CmdTool2 -adpfwflash -f /root/MR56p.rom
-aall
```

l. Reboot the server.

```
# reboot
```

m. When the server reboots, check the new firmware version. Replace the text in **bold** with the hostname of the replacement server:

```
# ssh sdw1 /opt/MegaRAID/CmdTool2/CmdTool2 -adpallinfo -aall |
grep "FW Package Build"
```

The following should be returned, indicating your firmware has successfully been updated on this server:

```
FW package Build: 23.12.0-0013
```

n. Repeat these alphabetic steps to check/update the remaining servers in the cluster.

28. Switch to the user `gpadmin` and launch the **gprecoverseg** utility to recover the segment instances:

```
$ gprecoverseg -a
```

29. When the `gprecoverseg` utility is finished, issue the **`gpstate -m`** command and verify that the data status is reported as **`Resynchronizing`** in the output.
30. Wait a few minutes, and then issue the `gpstate -m` command again to verify that the data status of all segments is reported as **`Synchronized`** in the output.
31. Return the Greenplum system to its optimal configuration:

    ```
    $ gprecoverseg -ra
    ```

    IMPORTANT

    Issuing `gprecoverseg -ra` cancels running queries but does not interrupt database connections.

32. Issue the **`$ gpstate -e`** command and verify that no errors are reported.
33. Synchronize the system clock:
    a. Select option **2** for `Modify DCA Settings`.
    b. Select option **5** for `Modify NTP/Clock Configuration Options`.
    c. Select option **3** for `Synchronize clocks across the cluster to the NTP server`.

Enter **`x`** to exit the DCA Setup utility.

34. Re-enable health monitoring by restarting the healthmon daemon:

    ```
    # dca_healthmon_ctl -e
    ```

Replace a DIA server or a server in an uninitialized GPDB module

Perform this procedure only to replace a failed server that is part of a DIA module or part of an uninitialized GPDB module (or module in which GPBD is not installed).

IMPORTANT

This procedure directs you to transfer drives from the failed server to the replacement server. Take great care when transferring drives. Transfer only one drive at a time. Insert drives in the same slots that they occupied in the failed server.

1. Make sure that you have checked the cable connections as described in "Reseat cables before replacing a server" on page 42.
2. If it is not already connected, connect your service laptop to the red service cable located on the laptop tray in Rack 1. The red service cable is connected to port 48 on the first Administration switch `a-sw-1` (see "Connect a workstation to the DCA" on page 176).
3. To prevent false dial home messages from being sent to EMC Support during service, disable health monitoring by stopping the healthmon daemon:

   ```
   # dca_healthmon_ctl -d
   ```

4. To locate the server, use the DCA Setup Utility to activate the green lightbar on the DCA door and the blue server identification LED as the user **`root`**:
   a. Launch the DCA Setup utility:

      ```
      # dca_setup
      ```

   b. Select option **`2`** to `Modify DCA Settings`.
   c. Select option **`18`** for `Light Bar Controls`.
   d. Select option **`3`** for `Blink the light bar`.
   e. Enter the hostname of the server and press **`ENTER`**.
   f. Enter **`x`** to exit the DCA Setup utility.

      The green lightbar on the DCA door and the blue server identification LED begin to blink.

      Note: If the DCA door does not have a lightbar, an error message displays. You can safely ignore the error message. To identify the failed server, locate the blue server identification LED.

5. Log in to the Primary Master Server as the user **`gpadmin`**.
6. If you can still access the server via SSH, perform sub-steps (a) through (f) below. If you cannot access the server via SSH, proceed to step 7.
   a. Log in to the failed server as the user **`root`**. Replace the hostname shown in **bold** with the hostname of the failed server:

      ```
      $ ssh root@etl1
      ```

b. If the server is part of a DIA module, ask the customer if any third-party software is installed. Discuss with the customer whether any files need to be saved before you power off the server.

c. Switch to the user **root** and make note of the MAC address of the adapter **eth1** .

```
# ifconfig eth1
```

d. Make note of any custom NFS mounts the customer may have created:

```
# cat /etc/fstab
```

e. Make note of any custom network gateways the customer may have created:

```
# cat /etc/sysconfig/network
```

f. Shut down the failed server:

```
# shutdown -h now
```

7. Label all the cables connected to the failed server so that you'll know where to connect them on the replacement server.
8. Remove all power, Ethernet, and twin-axial cables from the back of the server.

Note: If the system has Dual NICs installed, note the connections for customer and interconnect networks prior to disconnecting.

9. Remove the failed server and install the replacement server (see Appendix E, "Replace a Server in the Greenplum DCA Rack," on page 192).
10. Transfer disk drives one at a time from the failed server to the replacement server.

IMPORTANT

Use caution when transferring drives. Transfer only one drive at a time. Insert the drives in the same slots that they occupied in the failed server.

11. Connect Ethernet and twin-ax cables to the replacement server. Refer to the labels on the cables for proper connectivity.

IMPORTANT

Do not connect power to the replacement server yet.

12. From the Primary Master server start the dhcpd service:

```
# service dhcpd start
```

13. Connect the power cables to the replacement server.

14. Next, use these steps to identify the IP address assigned to the server.

    a. Issue the following command to obtain the lease information provided in the `dhcpd.leases` file:

    ```
    # tail /var/lib/dhcpd/dhcpd.leases
    ```

    b. The `dhcpd.leases` file dispays (similar to the following):

    Example

    ```
    lease 172.28.6.170 {
      starts 4 2012/10/18 20:09:08;
      ends 5 2013/10/18 20:09:08;
      cltt 4 2012/10/18 20:09:08;
      binding state active;
      next binding state free;
      hardware ethernet 00:00:00:00:00:04;
      uid "\001\000\036g,\242\014";
    ```

    c. Locate the MAC address labelled **hardware ethernet** in the example `dhcpd.leases` file above:

    00:00:00:00:00:04

    d. Locate the MAC address on the replacement server's service tag (highlighted in the photograph below):

    MAC1 00:00:00:00:00:00

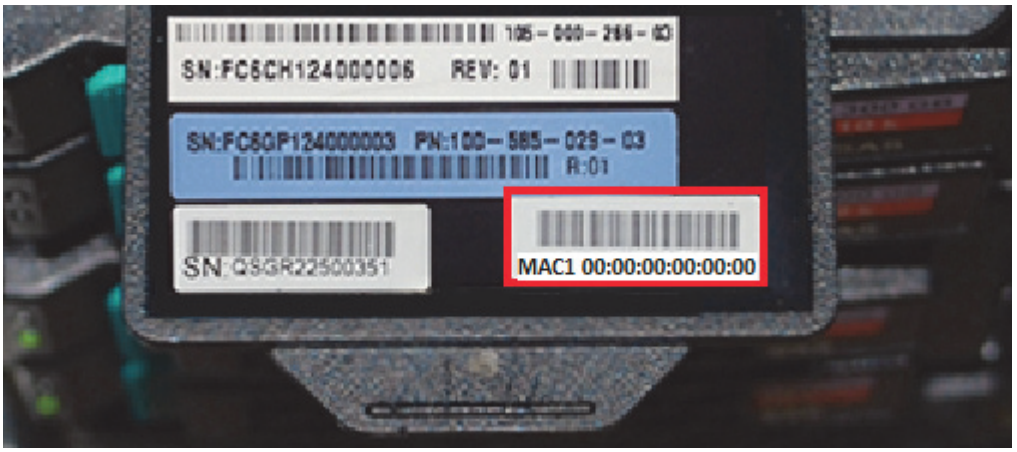


Figure 9 Locating the MAC address on the service tag (Dragon24)

    e. Compare the last two digits in the MAC addresses referenced in step c and step d (for example, 00:00:00:00:00:**04** and 00:00:00:00:00:**00**). Verify that the MAC address in the `dhcpd.leases` file is four greater than the last two numbers in the MAC address on the replacement server's service tag.

    If this is the case, it is certain that the IP address in the `dhcpd.leases` file is the correct one to associate with the server. For example, the scenario described above verifies that `172.28.6.170` is correct in this specific instance.

f. Issue the following `ipmiutil` command. Insert the IP address (**`172.28.6.170`**) identified in the previous steps using the example above as a guide:

Note: Disregard the long, detailed output after this command is executed.

```
# ipmiutil lan -e -l -I 172.28.0.250 -S 255.255.248.0 -N 172.28.6.170 -U root -P sephiroth
```

g. Ping the new address to verify that the change was applied:

```
# ping 172.28.0.#
```

Where **#** is the number of the server you are replacing.

15. Turn off the dhcpd service:

```
# service dhcpd stop
```

16. Power on the replacement server by pressing the button on the front panel.

17. From the Primary Master server issue the following command to open a BMC console session on the replacement server. Replace the hostname shown in **bold** with the hostname of the replacement server:

```
# ipmiutil sol -a -e -N etl1-sp -U root -P sephiroth
```

⚠WARNING

You will need to press the F key within 15 seconds after seeing this WARNING message:

```
Foreign configuration(s) found on adapter
Press any key to continue or 'C' load the configuration
utility, or 'F' to import foreign configuration(s) and
continue.
```

18. Power on the replacement server by pressing the power button on the front panel, and press the **F** key when prompted.

⚠WARNING

Note that after pressing the space bar in the next step you may be prompted again to press the F key within 15 seconds (if the DIA server is a Dragon24).

19. When the following message displays, disregard and press the space bar:

```
All of the disks from your previous configuration are gone. If this
is an unexpected message, then please power off your system and
check your cables to ensure all disks are present. Press any key to
continue, or 'C' to load the configuration utility.
```

20. Press the F key when prompted.

21. When the following message displays, disregard and press the space bar:

```
All of the disks from your previous configuration are gone. If this
is an unexpected message, then please power off your system and
check your cables to ensure all disks are present. Press any key to
continue, or 'C' to load the configuration utility.
```

22. If the message below appears it indicates that the server did not accept the "F" key request per the above WARNING. This means that you will need to power off the server, verify that all LED lights are off, and go back to step 18 (press the **F** key when prompted again):

```
CLIENT MAC ADDR: 00 1E 67 4D C5 1D  GUID: 2A9B43A4 A50A 11E1 AAA0
001E674DC51D
   DHCP....\
```

23. Monitor the boot process onscreen and verify that the replacement server boots from hard disk. If it does not, do the following to force it to boot from hard disk:

    a. Exit the BMC console utility by pressing the a tilde key (~), and then the period (.) key, as follows on the keyboard:

     then 

    Note: When you exit the BMC console you are returned to your connection on the Primary Master server as the user `root`.

    b. Issue the following command from the Primary Master server to force the Segment server to boot from hard drive:

    ```
    # ipmiutil reset -h -N etl1-sp -U root -P sephiroth
    ```

    Change the hostname shown in **bold** above to the hostname of the server you replaced.

    c. Once the operating system is loaded, issue the following command to change the boot order on the Segment server. For example, on **etl1**:

    ```
    # ssh etl1
    # syscfg /bbo "emcbios" HDD NW
    ```

    d. Reboot the system:

    ```
    # reboot
    ```

    e. Following the reboot, issue the following commands to connect to the replacement server and verify the boot order:

    ```
    # ssh etl1
    # syscfg /bbosys
    ```

    Change the hostname shown in **bold** above to the hostname of the server you replaced.

24. Issue the following command to check the health of the replacement server. Replace the text in **bold** with the hostname of the replacement DIA or Segment server:

    ```
    # dcacheck -h etl1
    ```

    Verify that no errors display.

25. Exchange SSH keys on the replacement server using the DCA Setup utility:

a. Start the DCA Setup utility as the user **root**:

```
# dca_setup
```

b. Select option **2** to `Modify DCA Settings`.

c. Select option **6** to `Generate SSH Keys`.

d. Enter **x** to exit the DCA Setup utility.

26. Using `gpssh`, check the firmware level of the RAID controllers with the CmdTool2 utility:

```
# /opt/MegaRAID/CmdTool2/CmdTool2 -adpallinfo -aall | grep "FW
Package Build"
```

If the above command returns either: **FW Package Build: 23.7.0-0033** or **FW Package Build: 23.9.0-0026**, your firmware needs updating. Follow steps a through n below to update the firmware.

e. Download ir3_2208SASHWR_FWPKG-v23.12.0-0013.zip file from Support Zone to your laptop.

https://support.emc.com/downloads/9507_Greenplum-Data-Computing-Appliance

f. Extract the files to your laptop using unzip or similar unpacking tool. For example:

```
Unzip ir3_2208SASHWR_FWPKG-v23.12.0-0013.zip
```

g. As a root user copy the MR56p.rom file to the Master server (mdw) and place the file in /root. You can use WinSCP or a similar utility.

Note: You may be required to provide a server login name and password.

h. For each server in need of an update, log into the server as root.

i. SCP the MR56p.rom file from the master to the server you are updating.

j. Install the new firmware using the following command:

Note: This will take longer on 24-disk servers.

```
# /opt/MegaRAID/CmdTool2/CmdTool2 -adpfwflash -f /root/MR56p.rom
-aall
```

k. Reboot the server.

```
# reboot
```

l. When the server reboots, check the new firmware version. Replace the text in **bold** with the hostname of the replacement server:

```
# ssh sdw1 /opt/MegaRAID/CmdTool2/CmdTool2 -adpallinfo -aall |
grep "FW Package Build"
```

The following should be returned, indicating your firmware has successfully been updated on this server:

```
FW package Build: 23.12.0-0013
```

m. Repeat these alphabetic steps to check/update the remaining servers in the cluster.

27. Synchronize the system clock:

    a. Select option **2** for `Modify DCA Settings`.

    b. Select option **5** for `Modify NTP/Clock Configuration Options`.

    c. Select option **3** for `Synchronize clocks across the cluster to the NTP server`.

Enter **x** to exit the DCA Setup utility.

28. (*Applies only if you replaced a DIA server*): SSH into the replacement DIA server and configure the external interface IP address:

    Edit the file ...

    ```
    # vi /etc/sysconfig/network-scripts/ifcfg-eth1
    ```

    ... and change the **HWADDR** setting using the **MACADDRESS** of `eth1` that you determined in step 6-c above. Change the values shown in **bold** below. Do not change the other parameters:

    ```
    DEVICE=eth1
    BOOTPROTO=static
    IPADDR=10.6.193.46
    NETMASK=255.255.252.0
    ONBOOT=YES
    MTU=1500
    HWADDR=MACADDRESS
    ```

29. Re-enable health monitoring by restarting the healthmon daemon:

    ```
    # dca_healthmon_ctl -e
    ```

30. If any third-party software was installed, inform the customer that it is now safe to reinstall and validate the software.

Replace a server in a Greenplum Hadoop module (DCA version 2.0.0.0)

Perform this procedure to replace a failed server that is part of a Hadoop module in DCA version 2.0.0.0.

To replace a Hadoop server in DCA version 2.0.0.0, see the procedure "Replace a server in a Pivotal Hadoop module (version 2.0.1.0 and later)" on page 64.

IMPORTANT

This procedure directs you to transfer drives from the failed server to the replacement server. Take great care when transferring drives. Transfer only one drive at a time. Insert drives in the same slots that they occupied in the failed server.

1. Make sure that you have checked the cable connections as described in "Reseat cables before replacing a server" on page 42.
2. If it is not already connected, connect your service laptop to the red service cable located on the laptop tray in Rack 1. The red service cable is connected to port 48 on the first Administration switch `a-sw-1` (see "Connect a workstation to the DCA" on page 176).
3. To prevent false dial home messages from being sent to EMC Support during service, disable health monitoring by stopping the healthmon daemon:

   ```
   # dca_healthmon_ctl -d
   ```

4. To locate the server, use the DCA Setup Utility to activate the green lightbar on the DCA door and the blue server identification LED as the user **`root`**:
   a. Launch the DCA Setup utility:

      ```
      # dca_setup
      ```

   b. Select option **`2`** to `Modify DCA Settings`.
   c. Select option **`18`** for `Light Bar Controls`.
   d. Select option **`3`** for `Blink the light bar`.
   e. Enter the hostname of the server and press **`ENTER`**.
   f. Enter **`x`** to exit the DCA Setup utility.

      The green lightbar on the DCA door and the blue server identification LED begin to blink.

      Note: If the DCA door does not have a lightbar, an error message displays. You can safely ignore the error message. To identify the failed server, locate the blue server identification LED.

5. If you can still access the server via SSH, perform sub-steps (a) through (c) below. If you cannot access the server via SSH, proceed to step 6.

a. Log in to the failed server as the user **root**. Replace the hostname shown in **bold** with the hostname of the failed server. For example, for the first Hadoop Master:

```
# ssh root@hdm1
```

b. Make note of any custom network gateways the customer may have created:

```
# cat /etc/sysconfig/network
```

c. Shut down the failed server:

```
# shutdown -h now
```

6. Label all the cables connected to the failed server so that you'll know where to connect them on the replacement server.
7. Remove all power, Ethernet, and twin-axial cables from the back of the server.

Note: If the system has Dual NICs installed, note the connections for customer and interconnect networks prior to disconnecting.

8. Remove the failed server and install the replacement server (see Appendix E, "Replace a Server in the Greenplum DCA Rack," on page 192).
9. Transfer disk drives one at a time from the failed server to the replacement server.

IMPORTANT

Use caution when transferring drives. Transfer only one drive at a time. Insert the drives in the same slots that they occupied in the failed server.

10. Connect Ethernet and twin-ax cables to the replacement server. Refer to the labels on the cables for proper connectivity.

IMPORTANT

Do not connect power to the replacement server yet.

11. From the Primary Master server start the dhcpd service:

```
# service dhcpd start
```

12. Connect the power cables to the replacement server.

```
binding state active;
  next binding state free;
  hardware ethernet [server_mac_address];
  uid "\001\000\036g,\242\014";
```

13. Next, use these steps to identify the IP address assigned to the server.

    a. Issue the following command to obtain the lease information provided in the `dhcpd.leases` file:

    ```
    # tail /var/lib/dhcpd/dhcpd.leases
    ```

    b. The `dhcpd.leases` file dispays (similar to the following):

    Example

    ```
    lease 172.28.6.170 {
      starts 4 2012/10/18 20:09:08;
      ends 5 2013/10/18 20:09:08;
      cltt 4 2012/10/18 20:09:08;
      binding state active;
      next binding state free;
      hardware ethernet 00:00:00:00:00:04;
      uid "\001\000\036g,\242\014";
    ```

    c. Locate the MAC address labelled **hardware ethernet** in the example `dhcpd.leases` file above:

    00:00:00:00:00:04

    d. Locate the MAC address on the replacement server's service tag (highlighted in the photograph below):

    MAC1 00:00:00:00:00:00

Figure 10 Locating the MAC address on the service tag (server shown, Dragon12)

e. Compare the last two digits in the MAC addresses referenced in step c and step d (for example, 00:00:00:00:00:**04** and 00:00:00:00:00:**00**). Verify that the MAC address in the `dhcpd.leases` file is four greater than the last two numbers in the MAC address on the replacement server's service tag.

If this is the case, it is certain that the IP address in the `dhcpd.leases` file is the correct one to associate with the server. For example, the scenario described above verifies that **`172.28.6.170`** is correct in this specific instance.

f. Issue the following `ipmiutil` command. Insert the IP address (**`172.28.6.170`**) identified in the previous steps using the example above as a guide:

Note: Disregard the long, detailed output after this command is executed.

```
# ipmiutil lan -e -l -I 172.28.0.250 -S 255.255.248.0 -N 172.28.6.170 -U root -P sephiroth
```

g. Ping the new address to verify that the change was applied:

```
# ping 172.28.0.#
```

Where **#** is the number of the server you are replacing.

14. Turn off the dhcpd service:

```
# service dhcpd stop
```

15. From the Primary Master server issue the following command to open a console session on the replacement server. Replace the hostname shown in **bold** with the hostname of the replacement server:

```
# ipmiutil sol -a -e -N hdm1-sp -U root -P sephiroth
```

⚠WARNING

You will need to press the F key within 15 seconds after seeing this WARNING message:

```
Foreign configuration(s) found on adapter
Press any key to continue or 'C' load the configuration
utility, or 'F' to import foreign configuration(s) and
continue.
```

16. Power on the replacement server by pressing the power button on the front panel, and press the **F** key when prompted.
17. When the following message disp
18. lays, disregard and press the space bar:

```
All of the disks from your previous configuration are gone. If this
is an unexpected message, then please power off your system and
check your cables to ensure all disks are present. Press any key to
continue, or 'C' to load the configuration utility.
```

19. If the message below appears it indicates that the server did not accept the "F" key request per the above WARNING. This means that you will need to power off the server, verify that all LED lights are off, and go back to step 16 (press the **F** key when prompted again):

```
CLIENT MAC ADDR: 00 1E 67 4D C5 1D  GUID: 2A9B43A4 A50A 11E1 AAA0
001E674DC51D
   DHCP....\
```

20. Monitor the boot process onscreen and verify that the replacement server boots from hard disk. If it does not, do the following to force it to boot from hard disk:
    a. Exit the BMC console utility by pressing the a tilde key (~), and then the period (.) key, as follows on the keyboard:

     then 

    Note: When you exit the BMC console you are returned to your connection on the Primary Master server as the user `root`.

    b. Issue the following command from the Primary Master server to force the Segment server to boot from hard drive:

    ```
    # ipmiutil reset -h -N hdm1-sp -U root -P sephiroth
    ```

    Change the hostname shown in **bold** above to the hostname of the server you replaced.

    c. Once the operating system is loaded, issue the following command to change the boot order on the server. For example, on **`hdm1`**:

    ```
    # ssh hdm1
    # syscfg /bbo "emcbios" HDD NW
    ```

    d. Reboot the system:

    ```
    # reboot
    ```

    e. Following the reboot, issue the following commands to connect to the replaced server, and verify the boot order:

    ```
    # ssh hdm1
    # syscfg /bbosys
    ```

    Change the hostname shown in **bold** above to the hostname of the server you replaced.

21. Issue the following command to check the health of the replacement server. Replace the text in **bold** with the hostname of the replacement hadoop server:

    ```
    # dcacheck -h hdm1
    ```

    Verify that no errors display.

22. Exchange SSH keys on the replacement server using the DCA Setup utility:
    a. Start the DCA Setup utility as the user **`root`**:

    ```
    # dca_setup
    ```

    b. Select option **2** to `Modify DCA Settings`.

    c. Select option **6** to `Generate SSH Keys`.

d. Enter **x** to exit the DCA Setup utility.

23. Using `gpssh`, check the firmware level of the RAID controllers with the CmdTool2 utility:

```
# /opt/MegaRAID/CmdTool2/CmdTool2 -adpallinfo -aall | grep "FW
Package Build"
```

If the above command returns either: **`FW Package Build: 23.7.0-0033`** or **`FW Package Build: 23.9.0-0026`**, your firmware needs updating. Follow steps a through n below to update the firmware.

e. Download ir3_2208SASHWR_FWPKG-v23.12.0-0013.zip file from Support Zone to your laptop.

https://support.emc.com/downloads/9507_Greenplum-Data-Computing-Appliance

f. Extract the files to your laptop using unzip or similar unpacking tool. For example:

```
Unzip ir3_2208SASHWR_FWPKG-v23.12.0-0013.zip
```

g. As a root user copy the MR56p.rom file to the Master server (mdw) and place the file in /root. You can use WinSCP or a similar utility.

Note: You may be required to provide a server login name and password.

h. For each server in need of an update, log into the server as root.

i. SCP the MR56p.rom file from the master to the server you are updating.

j. Install the new firmware using the following command:

Note: This will take longer on 24-disk servers.

```
# /opt/MegaRAID/CmdTool2/CmdTool2 -adpfwflash -f /root/MR56p.rom
-aall
```

k. Reboot the server.

```
# reboot
```

l. When the server reboots, check the new firmware version. Replace the text in **bold** with the hostname of the replacement server:

```
# ssh sdw1 /opt/MegaRAID/CmdTool2/CmdTool2 -adpallinfo -aall |
grep "FW Package Build"
```

The following should be returned, indicating your firmware has successfully been updated on this server:

```
FW package Build: 23.12.0-0013
```

m. Repeat these alphabetic steps to check/update the remaining servers in the cluster.

24. Synchronize the system clock:

a. Select option **2** for `Modify DCA Settings`.

b. Select option **5** for `Modify NTP/Clock Configuration Options`.

c. Select option **3** for `Synchronize clocks across the cluster to the NTP server`.

d. Enter **x** to exit the DCA Setup utility.

25. Re-enable health monitoring by restarting the healthmon daemon:

```
# dca_healthmon_ctl -e
```

Replace a server in a Pivotal Hadoop module (version 2.0.1.0 and later)

Perform this procedure to replace a failed server that is part of a Pivotal Hadoop (PHD) module.

To replace a Greenplum Hadoop server in DCA version 2.0.0.0, see the procedure "Replace a server in a Greenplum Hadoop module (DCA version 2.0.0.0)" on page 58.

Choose the procedure for the type of PHD server you are replacing (see Table 3 below).

Table 3 Server replacement procedures by PHD module type

Hostname	Server Module / Role	Use this procedure
`hdm1`	Master Module - Namenode	Replace hdm1 (namenode, DCA version 2.0.1.0)
`hdm2`	Master Module - Secondary Namenode, Zookeeper	Replace hdm2 (zookeeper/secondary-namenode, DCA version 2.0.1.0)
`hdm3`	Master Module - resourcemanager	Replace hdm3 (resourcemanager, DCA version 2.0.1.0)
`hdm4`	Master Module - Zookeeper, Hive, Hive-Metastore	Replace hdm4 (zookeeper/hive/hive-metastore, DCA version 2.0.1.0)
`hdw#`	Worker Module - Nodemanager, Datanode	Replace hdw# (datanode, nodemanager, DCA version 2.0.1.0)

Remove the failed PHD server and install the replacement PHD server

IMPORTANT

This procedure directs you to transfer drives from the failed server to the replacement server. Take great care when transferring drives. Transfer only one drive at a time. Insert drives in the same slots that they occupied in the failed server.

1. Make sure that you have checked the cable connections as described in "Reseat cables before replacing a server" on page 42.
2. If it is not already connected, connect your service laptop to the red service cable located on the laptop tray in Rack 1 (see "Connect a workstation to the DCA" on page 176).

3. To prevent false dial home messages from being sent to EMC Support during service, disable health monitoring by stopping the healthmon daemon:

   ```
   # dca_healthmon_ctl -d
   ```

4. To locate the server, use the DCA Setup Utility to activate the green lightbar on the DCA door and the blue server identification LED as the user **root**:

   a. Launch the DCA Setup utility:

      ```
      # dca_setup
      ```

   b. Select option **2** to `Modify DCA Settings`.

   c. Select option **18** for `Light Bar Controls`.

   d. Select option **3** for `Blink the light bar`.

   e. Enter the hostname of the server and press **ENTER**.

   f. Enter **x** to exit the DCA Setup utility.

      The green lightbar on the DCA door and the blue server identification LED begin to blink.

      Note: If the DCA door does not have a lightbar, an error message displays. You can safely ignore the error message. To identify the failed server, locate the blue server identification LED.

5. If you can still access the server via SSH, perform sub-steps (a) through (c) below. If you cannot access the server via SSH, proceed to step 6.

   a. Log in to the failed server as the user **root**. Replace the hostname shown in **bold** with the hostname of the failed server:

      ```
      # ssh root@hdm1
      ```

   b. Make note of any custom network gateways the customer may have created:

      ```
      # cat /etc/sysconfig/network
      ```

   c. Shut down the failed server:

      ```
      # shutdown -h now
      ```

6. Label all the cables connected to the failed server so that you'll know where to connect them on the replacement server.

7. Remove all power, Ethernet, and twin-axial cables from the back of the server.

Note: If the system has Dual NICs installed, note the connections for customer and interconnect networks prior to disconnecting.

8. Remove the failed server and install the replacement server (see Appendix E, "Replace a Server in the Greenplum DCA Rack," on page 192).

9. Transfer disk drives one at a time from the failed server to the replacement server.

IMPORTANT

Use caution when transferring drives. Transfer only one drive at a time. Insert the drives in the same slots that they occupied in the failed server.

10. Connect Ethernet and twin-ax cables to the replacement server. Refer to the labels on the cables for proper connectivity.

    IMPORTANT

    Do not connect power to the replacement server yet.

11. From the Primary Master server start the dhcpd service:

    ```
    # service dhcpd start
    ```

12. Connect the power cables to the replacement server.
13. Next, use these steps to identify the IP address assigned to the server.
    a. Issue the following command to obtain the lease information provided in the `dhcpd.leases` file:

       ```
       # tail /var/lib/dhcpd/dhcpd.leases
       ```

    b. The `dhcpd.leases` file dispays (similar to the following):

       Example

       ```
       lease 172.28.6.170 {
         starts 4 2012/10/18 20:09:08;
         ends 5 2013/10/18 20:09:08;
         cltt 4 2012/10/18 20:09:08;
         binding state active;
         next binding state free;
         hardware ethernet 00:00:00:00:00:04;
         uid "\001\000\036g,\242\014";
       ```

    c. Locate the MAC address labelled **hardware ethernet** in the example `dhcpd.leases` file above:

       00:00:00:00:00:04

    d. Locate the MAC address on the replacement server's service tag (highlighted in **Figure 11**):

MAC1 00:00:00:00:00:00

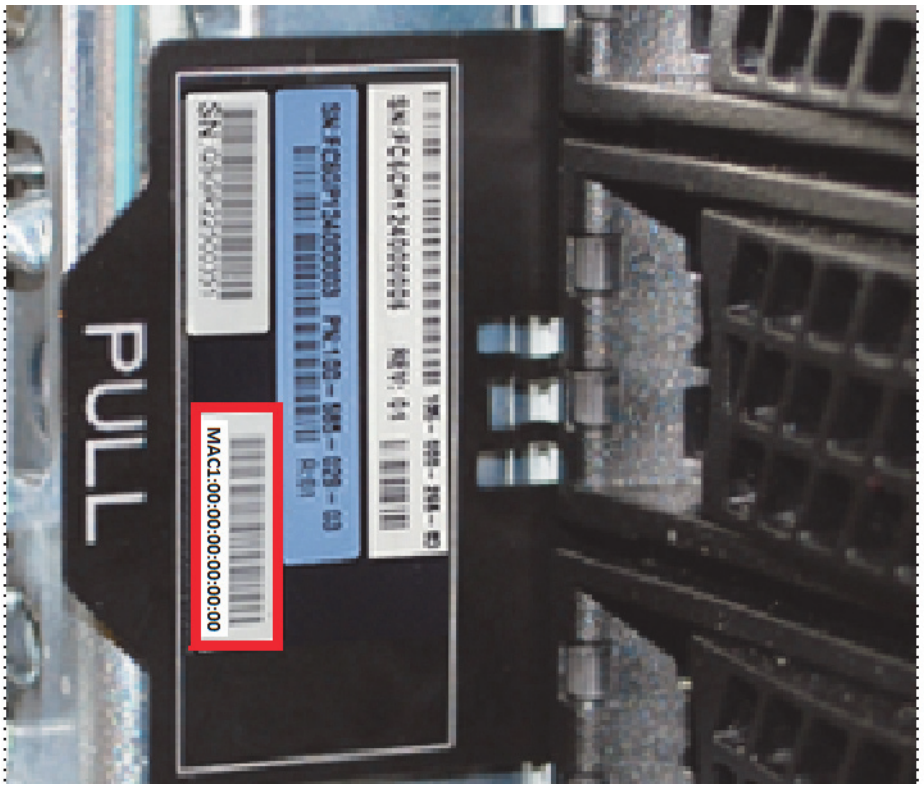


Figure 11 Locating the MAC address on the service tag (server shown, Dragon12)

e. Compare the last two digits in the MAC addresses referenced in step c and step d (for example, 00:00:00:00:00:**04** and 00:00:00:00:00:**00**). Verify that the MAC address in the `dhcpd.leases` file is four greater than the last two numbers in the MAC address on the replacement server's service tag.

   If this is the case, it is certain that the IP address in the `dhcpd.leases` file is the correct one to associate with the server. For example, the scenario described above verifies that **`172.28.6.170`** is correct in this specific instance.

f. Issue the following `ipmiutil` command. Insert the IP address (**`172.28.6.170`**) identified in the previous steps using the example above as a guide:

Note: Disregard the long, detailed output after this command is executed.

```
# ipmiutil lan -e -l -I 172.28.0.250 -S 255.255.248.0 -N 172.28.6.170 -U root -P sephiroth
```

g. Ping the new address to verify that the change was applied:

```
# ping 172.28.0.#
```

Where **#** is the number of the server you are replacing.

14. Turn off the dhcpd service:

```
# service dhcpd stop
```

15. Power on the replacement server by pressing the button on the front panel.

Replace hdm1 (namenode, DCA version 2.0.1.0)

1. From the Primary Master server issue the following command to open a console session on the replacement server. Replace the hostname shown in **bold** with the hostname of the replacement server:

```
# ipmiutil sol -a -e -N hdm1-sp -U root -P sephiroth
```

⚠WARNING

You will need to press the F key within 15 seconds after seeing this WARNING message:

```
Foreign configuration(s) found on adapter
Press any key to continue or 'C' load the configuration
utility, or 'F' to import foreign configuration(s) and
continue.
```

2. Power on the replacement server by pressing the power button on the front panel, and press the **F** key when prompted.
3. When the following message displays, disregard and press the space bar:

```
All of the disks from your previous configuration are gone. If this
is an unexpected message, then please power off your system and
check your cables to ensure all disks are present. Press any key to
continue, or 'C' to load the configuration utility.
```

4. If the message below appears it indicates that the server did not accept the “F” key request per the above WARNING. This means that you will need to power off the server, verify that all LED lights are off, and go back to step 2 (press the **F** key when prompted again):

```
CLIENT MAC ADDR: 00 1E 67 4D C5 1D  GUID: 2A9B43A4 A50A 11E1 AAA0
001E674DC51D
   DHCP....\
```

5. Monitor the boot process onscreen and verify that the replacement server boots from hard disk. If it does not, do the following to force it to boot from hard disk:

   a. Exit the BMC console utility by pressing the a tilde key (~), and then the period (.) key, as follows on the keyboard:

    then 

   Note: When you exit the BMC console you are returned to your connection on the Primary Master server as the user `root`.

   b. Issue the following command from the Primary Master server to force the Segment server to boot from hard drive:

   ```
   # ipmiutil reset -h -N hdm1-sp -U root -P sephiroth
   ```

   c. Once the operating system is loaded, issue the following command to change the boot order on the server. For example, on **`hdm1`**:

   ```
   # ssh hdm1
   # syscfg /bbo "emcbios" HDD NW
   ```

   d. Reboot the system:

   ```
   # reboot
   ```

   e. Following the reboot, issue the following commands to connect to the replacement server and verify the boot order:

   ```
   # ssh hdm1
   # syscfg /bbosys
   ```

   Change the hostname shown in **bold** above to the hostname of the server you replaced.

6. Issue the following command to check the health of the replacement server:

   ```
   # dcacheck -h hdm1
   ```

   Verify that no errors display.

7. Exchange SSH keys on the replacement server using the DCA Setup utility:

   a. Start the DCA Setup utility as the user **`root`**:

   ```
   # dca_setup
   ```

   b. Select option **2** to `Modify DCA Settings`.

   c. Select option **6** to `Generate SSH Keys`.

   d. Enter **`X`** to exit the DCA Setup utility.

   e. When the server reboots, check the new firmware version. Replace the text in **bold** with the hostname of the replacement server:

   ```
   # ssh sdw1 /opt/MegaRAID/CmdTool2/CmdTool2 -adpallinfo -aall |
   grep "FW Package Build"
   ```

If the above command returns either: **`FW Package Build: 23.7.0-0033`** or **`FW Package Build: 23.9.0-0026`**, your firmware needs updating. Follow steps a through n below to update the firmware.

f. Download ir3_2208SASHWR_FWPKG-v23.12.0-0013.zip file from Support Zone to your laptop.

https://support.emc.com/downloads/9507_Greenplum-Data-Computing-Appliance

g. Extract the files to your laptop using unzip or similar unpacking tool. For example:

```
Unzip ir3_2208SASHWR_FWPKG-v23.12.0-0013.zip
```

h. As a root user copy the MR56p.rom file to the Master server (mdw) and place the file in /root. You can use WinSCP or a similar utility.

Note: You may be required to provide a login to the destination server.

i. For each server in need of an update, log into the server as root.

j. SCP the MR56p.rom file from the master to the server you are updating.

k. Install the new firmware using the following command:

Note: This will take longer on 24-disk servers.

```
# /opt/MegaRAID/CmdTool2/CmdTool2 -adpfwflash -f /root/MR56p.rom
-aall
```

l. Reboot the server.

```
# reboot
```

m. When the server reboots, check the new firmware version:

```
# /opt/MegaRAID/CmdTool2/CmdTool2 -adpallinfo -aall | grep "FW
Package Build"
```

The following should be returned, indicating your firmware has successfully been updated on this server:

```
FW package Build: 23.12.0-0013
```

n. Repeat these alphabetic steps to check/update the remaining servers in the cluster.

8. Synchronize the system clock:

a. Select option **2** for `Modify DCA Settings`.

b. Select option **5** for `Modify NTP/Clock Configuration Options`.

c. Select option **3** for `Synchronize clocks across the cluster to the NTP server`.

d. Enter **x** to exit the DCA Setup utility.

9. Re-enable health monitoring by restarting the healthmon daemon:

```
# dca_healthmon_ctl -e
```

10. Connect to `hdm1`:

    ```
    # ssh hdm1
    ```

11. Issue the following command to view the status of the PHD cluster:

    ```
    # dca_hadoop --status all
    ```

    Verify that the status of **`hdm1`** is stopped:

    ```
    module namenode(service hadoop-namenode) is stopped on host hdm1
    ```

12. Start the `namenode` service:

    ```
    # dca_hadoop --start namenode
    ```

    When the namenode service starts the PHD cluster is in **safemode**.

13. Switch to the user **`hdfs`** and issue the following command:

    ```
    # su - hdfs
    $ hadoop fsck /
    ```

    The following message indicates that the filesystem has an error:

    ```
    The filesystem under path '/' is CORRUPT
    ```

14. Exit **safemode** and return the filesystem to a normal state:

    ```
    $ hadoop dfsadmin -safemode leave
    ```

15. Verify that the filesystem is healthy:

    ```
    $ hadoop fsck /
    ```

    The following message indicates that the filesystem is healthy:

    ```
    The filesystem under path '/' is HEALTHY
    ```

Replace hdm2 (zookeeper/secondary-namenode, DCA version 2.0.1.0)

1. From the Primary Master server issue the following command to open a console session on the replacement server. Replace the hostname shown in **bold** with the hostname of the replacement server:

   ```
   # ipmiutil sol -a -e -N hdm2-sp -U root -P sephiroth
   ```

   ⚠WARNING

   You will need to press the F key within 15 seconds after seeing this WARNING message:

   ```
   Foreign configuration(s) found on adapter
   Press any key to continue or 'C' load the configuration
   utility, or 'F' to import foreign configuration(s) and
   continue.
   ```

2. Power on the replacement server by pressing the power button on the front panel, and press the **F** key when prompted.

3. When the following message displays, disregard and press the space bar:

   ```
   All of the disks from your previous configuration are gone. If this
   is an unexpected message, then please power off your system and
   check your cables to ensure all disks are present. Press any key to
   continue, or 'C' to load the configuration utility.
   ```

4. If the message below appears it indicates that the server did not accept the "F" key request per the above WARNING. This means that you will need to power off the server, verify that all LED lights are off, and go back to step 2 (press the **F** key when prompted again):

   ```
   CLIENT MAC ADDR: 00 1E 67 4D C5 1D  GUID: 2A9B43A4 A50A 11E1 AAA0
   001E674DC51D
       DHCP....\
   ```

5. Monitor the boot process onscreen and verify that the replacement server boots from hard disk. If it does not, do the following to force it to boot from hard disk:

   a. Exit the BMC console utility by pressing the a tilde key (~), and then the period (.) key, as follows on the keyboard:

   
   then

   Note: When you exit the BMC console you are returned to your connection on the Primary Master server as the user `root`.

   b. Issue the following command from the Primary Master server to force the Segment server to boot from hard drive:

   ```
   # ipmiutil reset -h -N hdm2-sp -U root -P sephiroth
   ```

   Change the hostname shown in **bold** above to the hostname of the server you replaced.

c. Once the operating system is loaded, issue the following command to change the boot order on the server. For example, on **hdm2**:

```
# ssh hdm2
# syscfg /bbo "emcbios" HDD NW
```

d. Reboot the system:

```
# reboot
```

e. Following the reboot, issue the following commands to connect to the replacement server and verify the boot order:

```
# ssh hdm2
# syscfg /bbosys
```

6. Issue the following command to check the health of the replacement server:

```
# dcacheck -h hdm2
```

Verify that no errors display.

7. Exchange SSH keys on the replacement server using the DCA Setup utility:

a. Start the DCA Setup utility as the user **root**:

```
# dca_setup
```

b. Select option **2** to `Modify DCA Settings`.

c. Select option **6** to `Generate SSH Keys`.

d. Enter **x** to exit the DCA Setup utility.

e. When the server reboots, check the new firmware version. Replace the text in **bold** with the hostname of the replacement server:

```
# ssh hdm2 /opt/MegaRAID/CmdTool2/CmdTool2 -adpallinfo -aall |
grep "FW Package Build"
```

If the above command returns either: **FW Package Build: 23.7.0-0033** or **FW Package Build: 23.9.0-0026**, your firmware needs updating. Follow steps a through n below to update the firmware.

f. Download ir3_2208SASHWR_FWPKG-v23.12.0-0013.zip file from Support Zone to your laptop.

https://support.emc.com/downloads/9507_Greenplum-Data-Computing-Appliance

g. Extract the files to your laptop using unzip or similar unpacking tool. For example:

```
Unzip ir3_2208SASHWR_FWPKG-v23.12.0-0013.zip
```

h. As a root user copy the MR56p.rom file to the Master server (mdw) and place the file in /root. You can use WinSCP or a similar utility.

Note: You may be required to provide a login to the destination server.

i. For each server in need of an update, log into the server as root.

j. SCP the MR56p.rom file from the master to the server you are updating.

k. Install the new firmware using the following command:

Note: This will take longer on 24-disk servers.

```
# /opt/MegaRAID/CmdTool2/CmdTool2 -adpfwflash -f /root/MR56p.rom
-aall
```

l. Reboot the server.

```
# reboot
```

m. When the server reboots, check the new firmware version:

```
# /opt/MegaRAID/CmdTool2/CmdTool2 -adpallinfo -aall | grep "FW
Package Build"
```

The following should be returned, indicating your firmware has successfully been updated on this server:

```
FW package Build: 23.12.0-0013
```

n. Repeat these alphabetic steps to check/update the remaining servers in the cluster.

8. Synchronize the system clock:

a. Select option **2** for `Modify DCA Settings`.

b. Select option **5** for `Modify NTP/Clock Configuration Options`.

c. Select option 3 for `Synchronize clocks across the cluster to the NTP server`.

d. Enter **x** to exit the DCA Setup utility.

9. Re-enable health monitoring by restarting the healthmon daemon:

```
# dca_healthmon_ctl -e
```

10. Connect to **hdm1**:

```
# ssh hdm1
```

11. Issue the following command to view the status of the Hadoop cluster:

```
# dca_hadoop --status all
```

The status of the **secondary-namenode** and **zookeeper** modules on **hdm2** should be:

```
module secondary-namenode(service hadoop-secondarynamenode) has error on host hdm2
module zookeeper(service zookeeper-server) has error on host hdm2
```

12. Start the `secondary-namenode` and `zookeeper` services:

```
# dca_hadoop --start secondary-namenode
# dca_hadoop --start zookeeper
```

13. Switch to the user **hdfs** and issue the following command:

```
# su - hdfs
$ hadoop fsck /
```

14. Verify that the filesystem is healthy:

```
$ hadoop fsck /
```

The following message indicates that the filesystem is healthy:

```
The filesystem under path '/' is HEALTHY
```

Replace hdm3 (resourcemanager, DCA version 2.0.1.0)

1. From the Primary Master server issue the following command to open a console session on the replacement server. Replace the hostname shown in **bold** with the hostname of the replacement server:

   ```
   # ipmiutil sol -a -e -N hdm3-sp -U root -P sephiroth
   ```

   ⚠WARNING

   You will need to press the F key within 15 seconds after seeing this WARNING message:

   ```
   Foreign configuration(s) found on adapter
   Press any key to continue or 'C' load the configuration
   utility, or 'F' to import foreign configuration(s) and
   continue.
   ```

2. Power on the replacement server by pressing the power button on the front panel, and press the **F** key when prompted.

3. When the following message displays, disregard and press the space bar:

   ```
   All of the disks from your previous configuration are gone. If this
   is an unexpected message, then please power off your system and
   check your cables to ensure all disks are present. Press any key to
   continue, or 'C' to load the configuration utility.
   ```

4. If the message below appears it indicates that the server did not accept the "F" key request per the above WARNING. This means that you will need to power off the server, verify that all LED lights are off, and go back to step 2 (press the **F** key when prompted again):

   ```
   CLIENT MAC ADDR: 00 1E 67 4D C5 1D  GUID: 2A9B43A4 A50A 11E1 AAA0
   001E674DC51D
       DHCP....\
   ```

5. Monitor the boot process onscreen and verify that the replacement server boots from hard disk. If it does not, do the following to force it to boot from hard disk:

   a. Exit the BMC console utility by pressing the a tilde key (~), and then the period (.) key, as follows on the keyboard:

   
   then

   Note: When you exit the BMC console you are returned to your connection on the Primary Master server as the user `root`.

   b. Issue the following command from the Primary Master server to force the Segment server to boot from hard drive:

   ```
   # ipmiutil reset -h -N hdm3-sp -U root -P sephiroth
   ```

   Change the hostname shown in **bold** above to the hostname of the server you replaced.

c. Once the operating system is loaded, issue the following command to change the boot order on the server. For example, on **hdm3**:

```
# ssh hdm3
# syscfg /bbo "emcbios" HDD NW
```

d. Reboot the system:

```
# reboot
```

e. Following the reboot, issue the following commands to connect to the replacement server and verify the boot order:

```
# ssh hdm3
# syscfg /bbosys
```

6. Issue the following command to check the health of the replacement server:

```
# dcacheck -h hdm3
```

Verify that no errors display.

7. Exchange SSH keys on the replacement server using the DCA Setup utility:

a. Start the DCA Setup utility as the user **root**:

```
# dca_setup
```

b. Select option **2** to `Modify DCA Settings`.

c. Select option **6** to `Generate SSH Keys`.

d. Enter **x** to exit the DCA Setup utility.

e. When the server reboots, check the new firmware version. Replace the text in **bold** with the hostname of the replacement server:

```
# ssh hdm3 /opt/MegaRAID/CmdTool2/CmdTool2 -adpallinfo -aall |
grep "FW Package Build"
```

If the above command returns either: **FW Package Build: 23.7.0-0033** or **FW Package Build: 23.9.0-0026**, your firmware needs updating. Follow steps a through n below to update the firmware.

f. Download ir3_2208SASHWR_FWPKG-v23.12.0-0013.zip file from Support Zone to your laptop.

https://support.emc.com/downloads/9507_Greenplum-Data-Computing-Appliance

g. Extract the files to your laptop using unzip or similar unpacking tool. For example:

```
Unzip ir3_2208SASHWR_FWPKG-v23.12.0-0013.zip
```

h. As a root user copy the MR56p.rom file to the Master server (mdw) and place the file in /root. You can use WinSCP or a similar utility.

Note: You may be required to provide a login to the destination server.

i. For each server in need of an update, log into the server as root.

j. SCP the MR56p.rom file from the master to the server you are updating.

k. Install the new firmware using the following command:

Note: This will take longer on 24-disk servers.

```
# /opt/MegaRAID/CmdTool2/CmdTool2 -adpfwflash -f /root/MR56p.rom
-aall
```

l. Reboot the server.

```
# reboot
```

m. When the server reboots, check the new firmware version:

```
# /opt/MegaRAID/CmdTool2/CmdTool2 -adpallinfo -aall | grep "FW
Package Build"
```

The following should be returned, indicating your firmware has successfully been updated on this server:

```
FW package Build: 23.12.0-0013
```

n. Repeat these alphabetic steps to check/update the remaining servers in the cluster.

8. Synchronize the system clock:

a. Select option **2** for `Modify DCA Settings`.

b. Select option **5** for `Modify NTP/Clock Configuration Options`.

c. Select option **3** for `Synchronize clocks across the cluster to the NTP server`.

d. Enter **x** to exit the DCA Setup utility.

9. Re-enable health monitoring by restarting the healthmon daemon:

```
# dca_healthmon_ctl -e
```

10. Connect to **hdm1**:

```
# ssh hdm1
```

11. Issue the following command to view the status of the Hadoop cluster:

```
# dca_hadoop --status all
```

The status of the **resourcemanager** and **zookeeper** modules on **hdm3** should be:

```
module resourcemanager(service hadoop-resourcemanager) has error on host hdm3
module zookeeper(service zookeeper-server) has error on host hdm3
```

12. Start the `resourcemanager` and `zookeeper` services:

```
# dca_hadoop --start resourcemanager
# dca_hadoop --start zookeeper
```

13. Verify that all services are shown as started:

```
# dca_hadoop --status all
```

14. Switch to the user **hdfs** and issue the following command:

```
# su - hdfs
$ hadoop fsck /
```

15. Verify that the filesystem is healthy:

    ```
    $ hadoop fsck /
    ```

    The following message indicates that the filesystem is healthy:

    ```
    The filesystem under path '/' is HEALTHY
    ```

Replace hdm4 (zookeeper/hive/hive-metastore, DCA version 2.0.1.0)

1. From the Primary Master server issue the following command to open a console session on the replacement server. Replace the hostname shown in **bold** with the hostname of the replacement server:

   ```
   # ipmiutil sol -a -e -N hdm4-sp -U root -P sephiroth
   ```

   ⚠WARNING

   You will need to press the F key within 15 seconds after seeing this WARNING message:

   ```
   Foreign configuration(s) found on adapter
   Press any key to continue or 'C' load the configuration
   utility, or 'F' to import foreign configuration(s) and
   continue.
   ```

2. Power on the replacement server by pressing the power button on the front panel, and press the **F** key when prompted.
3. When the following message displays, disregard and press the space bar:

   ```
   All of the disks from your previous configuration are gone. If this
   is an unexpected message, then please power off your system and
   check your cables to ensure all disks are present. Press any key to
   continue, or 'C' to load the configuration utility.
   ```

4. If the message below appears it indicates that the server did not accept the "F" key request per the above WARNING. This means that you will need to power off the server, verify that all LED lights are off, and go back to step 2 (press the **F** key when prompted again):

   ```
   CLIENT MAC ADDR: 00 1E 67 4D C5 1D  GUID: 2A9B43A4 A50A 11E1 AAA0
   001E674DC51D
      DHCP....\
   ```

5. Monitor the boot process onscreen and verify that the replacement server boots from hard disk. If it does not, do the following to force it to boot from hard disk:

   a. Exit the BMC console utility by pressing the a tilde key (~), and then the period (.) key, as follows on the keyboard:

    then 

Note: When you exit the BMC console you are returned to your connection on the Primary Master server as the user `root`.

b. Issue the following command from the Primary Master server to force the Segment server to boot from hard drive:

```
# ipmiutil reset -h -N hdm4-sp -U root -P sephiroth
```

Change the hostname shown in **bold** above to the hostname of the server you replaced.

c. Once the operating system is loaded, issue the following command to change the boot order on the server. For example, on **hdm4**:

```
# ssh hdm4
# syscfg /bbo "emcbios" HDD NW
```

d. Reboot the system:

```
# reboot
```

e. Following the reboot, issue the following commands to connect to the replacement server and verify the boot order:

```
# ssh hdm4
# syscfg /bbosys
```

6. Issue the following command to check the health of the replacement server:

```
# dcacheck -h hdm4
```

Verify that no errors display.

7. Exchange SSH keys on the replacement server using the DCA Setup utility:

a. Start the DCA Setup utility as the user **root**:

```
# dca_setup
```

b. Select option **2** to `Modify DCA Settings`.

c. Select option **6** to `Generate SSH Keys`.

d. Enter **x** to exit the DCA Setup utility.

e. When the server reboots, check the new firmware version. Replace the text in **bold** with the hostname of the replacement server:

```
# ssh hdm4 /opt/MegaRAID/CmdTool2/CmdTool2 -adpallinfo -aall |
grep "FW Package Build"
```

If the above command returns either: **FW Package Build: 23.7.0-0033** or **FW Package Build: 23.9.0-0026**, your firmware needs updating. Follow steps a through n below to update the firmware.

f. Download ir3_2208SASHWR_FWPKG-v23.12.0-0013.zip file from Support Zone to your laptop.

https://support.emc.com/downloads/9507_Greenplum-Data-Computing-Appliance

g. Extract the files to your laptop using unzip or similar unpacking tool. For example:

```
Unzip ir3_2208SASHWR_FWPKG-v23.12.0-0013.zip
```

h. As a root user copy the MR56p.rom file to the Master server (mdw) and place the file in /root. You can use WinSCP or a similar utility.

Note: You may be required to provide a login to the destination server.

i. For each server in need of an update, log into the server as root.

j. SCP the MR56p.rom file from the master to the server you are updating.

k. Install the new firmware using the following command:

Note: This will take longer on 24-disk servers.

```
# /opt/MegaRAID/CmdTool2/CmdTool2 -adpfwflash -f /root/MR56p.rom
-aall
```

l. Reboot the server.

```
# reboot
```

m. When the server reboots, check the new firmware version:

```
# /opt/MegaRAID/CmdTool2/CmdTool2 -adpallinfo -aall | grep "FW
Package Build"
```

The following should be returned, indicating your firmware has successfully been updated on this server:

```
FW package Build: 23.12.0-0013
```

n. Repeat these alphabetic steps to check/update the remaining servers in the cluster.

8. Synchronize the system clock:

a. Select option **2** for `Modify DCA Settings`.

b. Select option **5** for `Modify NTP/Clock Configuration Options`.

c. Select option **3** for `Synchronize clocks across the cluster to the NTP server`.

d. Enter **x** to exit the DCA Setup utility.

9. Re-enable health monitoring by restarting the healthmon daemon:

```
# dca_healthmon_ctl -e
```

10. Connect to **hdm1**:

```
# ssh hdm1
```

11. Issue the following command to view the status of the Hadoop cluster:

```
# dca_hadoop --status all
```

The status of the **zookeeper**, **hive**, and **hive-metastore** modules on **hdm4** should be:

```
module hive-server(service hive-server) is stopped on host hdm4
module hive-server(service hive-metastore) is stopped on host hdm4
module zookeeper(service zookeeper-server) is stopped on host hdm4
```

12. Start the stopped services:

```
# dca_hadoop --start zookeeper
# dca_hadoop --start hive-server
```

13. Verify that all services are shown as started:

```
# dca_hadoop --status all
```

14. Switch to the user **hdfs** and issue the following command:

```
# su - hdfs
$ hadoop fsck /
```

15. Verify that the filesystem is healthy:

```
$ hadoop fsck /
```

The following message indicates that the filesystem is healthy:

```
The filesystem under path '/' is HEALTHY
```

Replace hdw# (datanode, nodemanager, DCA version 2.0.1.0)

1. From the Primary Master server issue the following command to open a console session on the replacement server. Replace the hostname shown in **bold** with the hostname of the replacement Hadoop Worker server.

```
# ipmiutil sol -a -e -N hdw1-sp -U root -P sephiroth
```

⚠WARNING

You will need to press the F key within 15 seconds after seeing this WARNING message:

```
Foreign configuration(s) found on adapter
Press any key to continue or 'C' load the configuration
utility, or 'F' to import foreign configuration(s) and
continue.
```

2. Power on the replacement server by pressing the power button on the front panel, and press the **F** key when prompted.
3. When the following message displays, disregard and press the space bar:

```
All of the disks from your previous configuration are gone. If this
is an unexpected message, then please power off your system and
check your cables to ensure all disks are present. Press any key to
continue, or 'C' to load the configuration utility.
```

4. If the message below appears it indicates that the server did not accept the "F" key request per the above WARNING. This means that you will need to power off the server, verify that all LED lights are off, and go back to step 2 (press the **F** key when prompted again):

```
CLIENT MAC ADDR: 00 1E 67 4D C5 1D  GUID: 2A9B43A4 A50A 11E1 AAA0
001E674DC51D
   DHCP....\
```

5. Monitor the boot process onscreen and verify that the replacement server boots from hard disk. If it does not, do the following to force it to boot from hard disk:

   a. Exit the BMC console utility by pressing the a tilde key (~), and then the period (.) key, as follows on the keyboard:

    then 

   Note: When you exit the BMC console you are returned to your connection on the Primary Master server as the user `root`.

   b. Issue the following command from the Primary Master server to force the replacement Hadoop Worker server to boot from hard drive. Change the hostname shown in **bold** to the hostname of the server you replaced:

```
# ipmiutil reset -h -N hdw1-sp -U root -P sephiroth
```

   c. Once the operating system is loaded, issue the following command to change the boot order on the server. Change the hostname shown in **bold** to the hostname of the server you replaced:

```
# ssh hdw1
# syscfg /bbo "emcbios" HDD NW
```

   d. Reboot the system:

```
# reboot
```

   e. Following the reboot, issue the following commands to connect to the replacement server and verify the boot order. Change the hostname shown in **bold** to the hostname of the server you replaced:

```
# ssh hdw1
# syscfg /bbosys
```

6. Issue the following command to check the health of the replacement server. Change the hostname shown in **bold** to the hostname of the server you replaced:

```
oreign
```

   Verify that no errors display.

7. Exchange SSH keys on the replacement server using the DCA Setup utility:

   a. Start the DCA Setup utility as the user **root**:

```
# dca_setup
```

b. Select option **2** to `Modify DCA Settings`.

c. Select option **6** to `Generate SSH Keys`.

d. Enter **x** to exit the DCA Setup utility.

e. When the server reboots, check the new firmware version. Replace the text in **bold** with the hostname of the replacement server:

```
# ssh hdw1 /opt/MegaRAID/CmdTool2/CmdTool2 -adpallinfo -aall |
grep "FW Package Build"
```

If the above command returns either: **`FW Package Build: 23.7.0-0033`** or **`FW Package Build: 23.9.0-0026`**, your firmware needs updating. Follow steps a through n below to update the firmware.

f. Download ir3_2208SASHWR_FWPKG-v23.12.0-0013.zip file from Support Zone to your laptop.

https://support.emc.com/downloads/9507_Greenplum-Data-Computing-Appliance

g. Extract the files to your laptop using unzip or similar unpacking tool. For example:

```
Unzip ir3_2208SASHWR_FWPKG-v23.12.0-0013.zip
```

h. As a root user copy the MR56p.rom file to the Master server (mdw) and place the file in /root. You can use WinSCP or a similar utility.

Note: You may be required to provide a login to the destination server.

i. For each server in need of an update, log into the server as root.

j. SCP the MR56p.rom file from the master to the server you are updating.

k. Install the new firmware using the following command:

Note: This will take longer on 24-disk servers.

```
# /opt/MegaRAID/CmdTool2/CmdTool2 -adpfwflash -f /root/MR56p.rom
-aall
```

l. Reboot the server.

```
# reboot
```

m. When the server reboots, check the new firmware version:

```
# /opt/MegaRAID/CmdTool2/CmdTool2 -adpallinfo -aall | grep "FW
Package Build"
```

The following should be returned, indicating your firmware has successfully been updated on this server:

```
FW package Build: 23.12.0-0013
```

n. Repeat these alphabetic steps to check/update the remaining servers in the cluster.

8. Synchronize the system clock:

a. Select option **2** for `Modify DCA Settings`.

b. Select option **5** for `Modify NTP/Clock Configuration Options`.

c. Select option **3** for `Synchronize clocks across the cluster to the NTP server`.

d. Enter **x** to exit the DCA Setup utility.

9. Re-enable health monitoring by restarting the healthmon daemon:

```
# dca_healthmon_ctl -e
```

10. Connect to **hdm1**:

```
# ssh hdm1
```

11. Issue the following command to view the status of the Hadoop cluster:

```
# dca_hadoop --status all
```

The status of the **datanode** and **nodemanager** modules on all **hdw**'s should be:

```
module hive-server(service hadoop-datanode) is stopped on host hdw#
module hive-server(service hadoop-nodemanager) is stopped on host
hdw#
```

12. Start the stopped **datanode** and **nodemanager** services:

```
# dca_hadoop --start datanode
# dca_hadoop --start nodemanager
```

13. Verify that all services are shown as started:

```
# dca_hadoop --status all
```

14. Switch to the user **hdfs**:

```
# su - hdfs
```

15. Verify that the filesystem is healthy:

```
$ hadoop fsck /
```

The following message indicates that the filesystem is healthy:

```
The fiesystem under path '/' is HEALTHY
```

CHAPTER 4
Replace a Disk Drive

This chapter describes how to replace a failed drive in a Master, Segment, DIA, or Hadoop server. It includes the following major sections:

Hot spare drives and the Copyback operation

(*Does not apply to drives in an Hadoop Worker server*) When a drive fails, the RAID controller begins the rebuild process and writes data to the hot spare disk drive in the server. A slowly blinking amber LED on the hot spare drive indicates that the drive has been invoked as the rebuild drive. You must allow the rebuild process to complete on the hot spare before you remove the failed drive and replace it with a replacement drive.

When the rebuild process is finished and you replace the failed drive with a replacement drive, data is copied automatically from the hot spare drive to the replacement drive in a process called the **Copyback** operation. When the Copyback operation is complete, the hot spare drive ends its role as the rebuild drive and resumes its original role as the hot spare drive. Returning the hot spare to its original role ensures that the hot spare drive always occupies the same slot in the server. Hot spare locations are shown in Table 4 below.

Table 4 Hot spare drive locations per server type

Server type	Hot spare drive location(s)
Master, DIA, or Hadoop Compute server, 8 disk slots (slots 6 and 7 are empty)	Slot 5 (see Figure 12 on page 88)
GPDB server, 24 disk slots	Slot 11 and Slot 23 (see Figure 15 on page 92)
Hadoop Master server, 12 disk slots	Slot 11 (see Figure 18 on page 98)

Note: Hadoop Worker servers do not have a hot spare drive.

The Copyback operation runs in the background. During the operation the virtual drive is still available online to the host.

Replace a disk drive in a Master, DIA, or Hadoop Compute server

All drives are installed at the front of the server and connect to the system board through the backplane. Hard drives are supplied in special hot-swappable hard-drive carriers that fit in the hard-drive slots.

In addition to describing how to physically remove and insert the disk drive, this procedure also describes how to do the following:

- Determine if the RAID group is still rebuilding and how to monitor the rebuild process.
- Verify that the Copyback operation is in progress and how to monitor it.
- Manually initiate the Copyback operation if necessary.

1. Connect your service laptop to the DCA and log in to the Primary Master as the user **root** (see "Connect a workstation to the DCA" on page 176).
2. To locate the server, use the DCA Setup Utility to activate the green lightbar on the DCA door and the blue server identification LED as the user **root**:
   a. Launch the DCA Setup utility:
      ```
      # dca_setup
      ```
   b. Select option **2** to `Modify DCA Settings`.
   c. Select option **18** for `Light Bar Controls`.
   d. Select option **3** for `Blink the light bar`.
   e. Enter the hostname of the server and press **ENTER**.
   f. Enter **x** to exit the DCA Setup utility.

      The green lightbar on the DCA door and the blue server identification LED begin to blink.

      Note: If the DCA door does not have a lightbar, an error message displays. You can safely ignore the error message. To identify the failed server, locate the blue server identification LED.

3. Locate the failed drive.

   Note: In this procedure, Disk 0 is the failed drive.

   LED indicators on each drive carrier indicate the current status of the drive within it. A failed drive is indicated by an amber LED or no LED. (A drive in the rebuild process also displays an amber LED.)

If the dial-home information includes a drive number, locate the drive with the help of the following illustration:

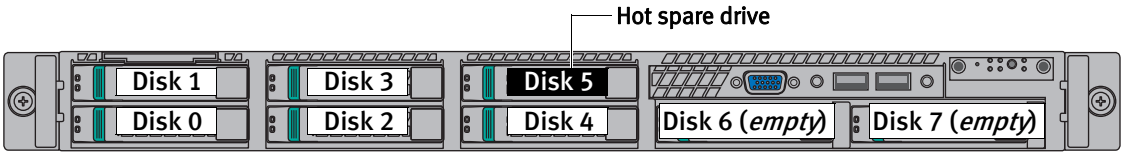


Figure 12 Master and DIA server drive slot numbering

Verify the state of the RAID group rebuild process.

4. Before you remove the faulted drive, read the topic "Hot spare drives and the Copyback operation" on page 86. Then issue the following command to determine whether the RAID group is still being rebuilt:

```
# CmdTool2 -PDList -aALL|egrep "Adapter|Enclosure|Slot Number|Firmware state"
```

Example output is shown below. Focus on the items in **bold**.

```
Adapter #0
Enclosure Device ID: 252
Slot Number: 1
Enclosure position: 0
Firmware state: Online, Spun Up
Enclosure Device ID: 252
Slot Number: 2
Enclosure position: 0
Firmware state: Online, Spun Up
Enclosure Device ID: 252
Slot Number: 3
Enclosure position: 0
Firmware state: Online, Spun Up
Slot Number: 4
Enclosure position: 0
Firmware state: Online, Spun Up
Enclosure Device ID: 252
Slot Number: 5
Enclosure position: 0
Firmware state: Rebuild
```

In the example output above, note that the rebuild process is still in progress.

- If **`Rebuild`** appears anywhere in the output, the rebuild process is in progress. Do remove the faulted drive yet. Monitor the rebuild process as described in step 5.
- If all drives in the output are shown as **`Online, Spun Up`**, the rebuild process is complete. Proceed to removing the failed drive as described in step 6.

Monitor the rebuild process.

5. To monitor the rebuild process if it is in progress, issue the following command. Change the values in **bold** below to the actual values from your output. For example:

```
# CmdTool2 -pdrbld -progdsply -PhysDrv[252:5] -a0
```

The values in the above example refer to the following parameters:

- **`252`** refers to the **`Enclosure Device ID`**.
- **`5`** refers to the **`Slot Number`** of the hotspare drive invoked as the rebuild drive.
- **`0`** refers to the **`Adapter Number`**.

6. If the rebuild is complete, remove the failed drive from the server:
   a. Press the button on the front of the drive carrier to release the drive handle.
   b. Wait 10 seconds to allow the platter in the drive to stop spinning.
   c. Pull the drive carrier out of the server.

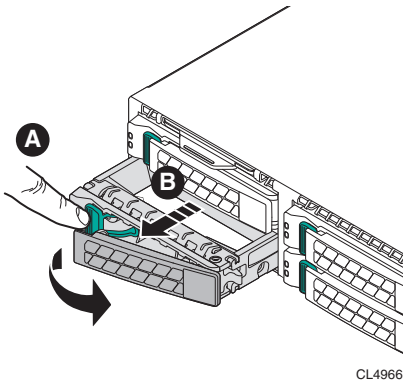


Figure 13 Removing a drive from a Master Server

IMPORTANT

Make sure that adjacent drive carriers are fully installed and locked in place before you remove or replace a drive carrier. Replacing a drive carrier and attempting to lock its handle when the adjacent drive is only partially-installed can damage the drives.

7. To replace a drive in the server:
   a. Press the button on the front of the drive carrier and open the handle.
   b. Insert the drive carrier into the drive bay until the carrier contacts the backplane.
   c. Close the handle to lock the drive carrier in place. The LED on the drive turns green and blinks while it automatically starts the Copyback operation.

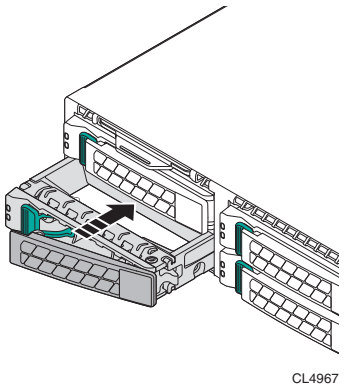


Figure 14 Replacing a drive in a Master Server

8. The Copyback operation should begin automatically when you insert the replacement drive. (For details about Copyback, see "Hot spare drives and the Copyback operation" on page 86.) Wait for the Copyback operation to complete. The hot spare always occupies **slot 5** on a Master server (see Figure 12 on page 88).

Verify that the Copyback operation is in progress.

9. Issue the following command to verify that the Copyback operation is in progress:

```
# CmdTool2 -pdlist -aall | egrep  "Adapter|Enclosure|Slot Number|Firmware state"
```

Example output is shown below. Focus on the items in **bold**.

```
Adapter #0
Enclosure Device ID: 252
Slot Number: 0
Enclosure position: 0
Firmware state: Copyback
Enclosure Device ID: 252
Slot Number: 1
Enclosure position: 0
Firmware state: Online, Spun Up
Enclosure Device ID: 252
Slot Number: 2
Enclosure position: 0
Firmware state: Online, Spun Up
Enclosure Device ID: 252
Slot Number: 3
Enclosure position: 0
Firmware state: Online, Spun Up
Enclosure Device ID: 252
Slot Number: 4
Enclosure position: 0
Firmware state: Online, Spun Up
Enclosure Device ID: 252
Slot Number: 5
Enclosure position: 0
Firmware state: Online, Spun Up
```

In the example output above, note that the firmware state of the drive in **Slot Number 0** is shown as **Copyback**. This indicates that the copyback operation is in progress and that data is being restored to the new drive in Slot 0.

If no firmware states are shown as **Copyback** (for example, if the firmware states are shown as **Online, Spun Up** or **Hotspare Spun Up**) the **Copyback** operation is complete.

Monitor the Copyback operation.

10. To monitor the progress of the **Copyback** operation, issue the following command. Change the values shown in **bold** below to the actual values from your output.

```
# CmdTool2 -pdcpybk -progdsply -PhysDrv[252:0] -a0
```

The values in the above example refer to the following parameters:

- **252** refers to the **Enclosure Device ID**.
- **0** refers to the **Slot Number** of the hotspare drive invoked as the rebuild drive.
- **0** refers to the **Adapter Number**.

The following is an example output of the **Copyback** progress.

```
Copyback Progress of Physical Drive...

Enclosure:Slot           Percent Complete                 Time Elps
     252 :00 ##################*********29 %********** 00:10:38

Press <ESC> key to quit...
```

NOTICE

If the firmware state is reported as **Unconfigured(Good)** then the **Copyback** operation did **not** occur automatically. In this unlikely event, you must initiate **Copyback** manually by issuing the following command:

If necessary, manually initiate the Copyback operation.

```
# CmdTool2 -pdcpybk -start -PhysDrv[252:5,252:0] -a0
```

View the **Copyback** progress as described in step 10.

If no firmware states are shown as **Copyback**, the **Copyback** operation is complete.

11. Issue the following command:

```
CmdTool2 -pdlist -aall | egrep  "Adapter|Enclosure|Slot Number|Firmware state"
```

12. In the output verify that the firmware state of the drives is reported as follows:
    - Drives 0 - 4: **Online, Spun Up**
    - Drive 5: **hotspare, Spun Up**

Replace a drive in a Segment Server

All drives are installed at the front of the server and connect to the system board through the backplane. Hard drives are supplied in special hot-swappable hard-drive carriers that fit in the hard-drive slots.

In addition to describing how to physically remove and insert the disk drive, this procedure also describes how to do the following:

- Determine if the RAID group is still rebuilding and how to monitor the rebuild process.
- Verify that the Copyback operation is in progress and how to monitor it.
- Manually initiate the Copyback operation if necessary.

1. Connect your service laptop to the DCA and log in to the Primary Master as the user **root** (see "Connect a workstation to the DCA" on page 176).
2. To locate the server, use the DCA Setup Utility to activate the green lightbar on the DCA door and the blue server identification LED as the user **root**:
   a. Launch the DCA Setup utility:
      ```
      # dca_setup
      ```
   b. Select option **2** to `Modify DCA Settings`.
   c. Select option **18** for `Light Bar Controls`.
   d. Select option **3** for `Blink the light bar`.
   e. Enter the hostname of the server and press **ENTER**.
   f. Enter **x** to exit the DCA Setup utility.

      The green lightbar on the DCA door and the blue server identification LED begin to blink.

Note: If the DCA door does not have a lightbar, an error message displays. You can safely ignore the error message. To identify the failed server, locate the blue server identification LED.

g. Locate the failed drive.

Note: In this procedure, Disk 0 is the failed drive.

LED indicators on the each drive carrier indicate the current status of the drive within it. A failed drive is indicated by a solid (unblinking) amber LED.

If the dial-home information includes a drive number, locate the drive with the help of the following illustration:

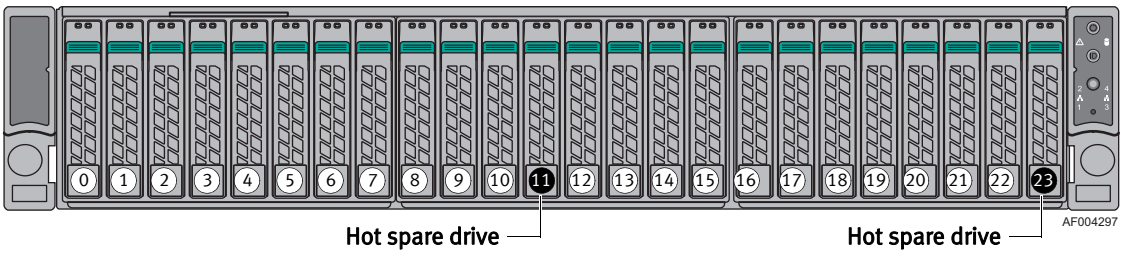


Figure 15 Segment server drive slot numbering

Verify the state of the RAID group rebuild process.

3. Before you remove the faulted drive, read the topic "Hot spare drives and the Copyback operation" on page 86.
4. Issue the following command to determine whether the RAID group is still being rebuilt:

```
# CmdTool2 -pdlist -aall | egrep  "Adapter|Enclosure|Slot Number|Firmware state"
```

Example output is shown below. Focus on the items in **bold**.

NOTICE

Note from the output that 24-disk GPDB servers have two Adapters (**#0** and **#1**) that control 12 slots each. Make sure that you investigate the correct area of the output for the drive that you are replacing.

```
Adapter #0
Enclosure Device ID: 28
Slot Number: 1
Enclosure position: 0
Firmware state: Online, Spun Up

. . .

Enclosure Device ID: 28
Slot Number: 10
Enclosure position: 0
Firmware state: Online, Spun Up
Enclosure Device ID: 28
Slot Number: 11
Enclosure position: 0
Firmware state: Rebuild
```

```
Adapter #1
Enclosure Device ID: 13
Slot Number: 0
Enclosure position: 0
Firmware state: Online, Spun Up
Enclosure Device ID: 13

. . .

Enclosure Device ID: 13
Slot Number: 11
Enclosure position: 0
Firmware state: Hotspare, Spun Up
```

In the example output above, note that the rebuild is still in progress.

- If **Rebuild** appears anywhere in the output, the rebuild is in progress. Do not remove the faulted drive yet. Monitor the rebuild process as described in step 5.
- If all drives in the output are shown as **Online, Spun Up** the rebuild is complete. Proceed to removing the failed drive as described in step 6.

Monitor the rebuild process.

5. To monitor the rebuild process, issue the following command. Change the values shown in **bold** below to the actual values from your output. For example:

```
# CmdTool2 -pdrbld -progdsply -PhysDrv[28:11] -a0
```

IMPORTANT

Remember that **GPDB servers** have two Adapters (**#0** and **#1**) that control 12 slots each. Make sure to specify the correct adapter number, slot number, and enclosure device ID when issuing the above command.

The values in the above example refer to the following parameters:

- **28** refers to the **Enclosure Device ID**.
- **11** refers to the **Slot Number** of the hotspare drive invoked as the rebuild drive.
- **0** refers to the **Adapter Number**.

6. If the rebuild is complete, remove the failed carrier from the server:
   a. Press the button on the front of the drive carrier to release the drive handle.
   b. Wait 10 seconds to allow the platter in the drive to stop spinning.

c. Pull the drive carrier out of the server.

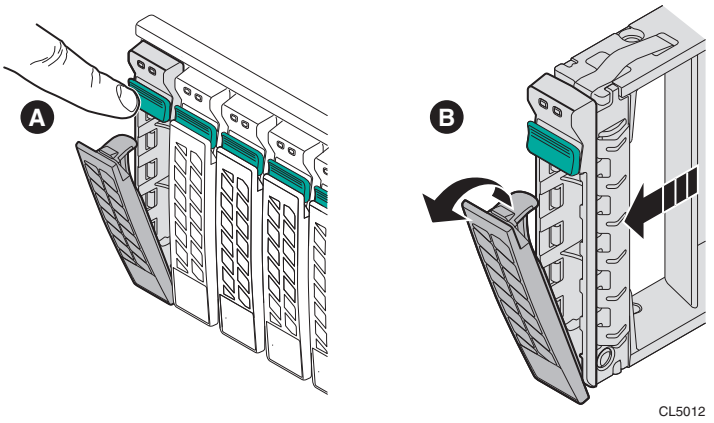


Figure 16 Removing a drive from a Segment server

7. Make sure that the capacity of the replacement drive matches the capacity of the failed drive. The drive capacity is printed on the label on each drive.

IMPORTANT

Do not mix drives of different capacities within a server.

8. To replace a drive carrier in the server:
   a. Insert the drive carrier into the drive bay until the carrier contacts the backplane.
   b. Close the handle to lock the drive carrier in place. The LED on the drive turns green and blinks while it automatically starts the Copyback operation.

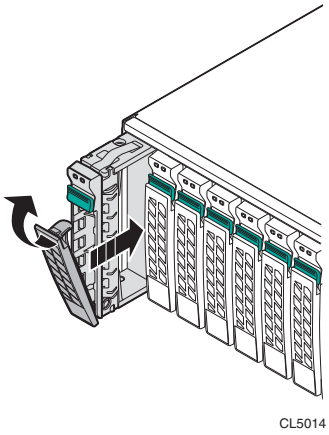


Figure 17 Replacing a drive in a Segment server

9. The Copyback operation should begin automatically when you insert the replacement drive. (For details about Copyback, see "Hot spare drives and the Copyback operation" on page 86.) Wait for the Copyback operation to complete. The hot spare drives always occupy **slot 11 and slot 23** in a 24-disk segment server (see Figure 15 on page 92).

Verify that the Copyback operation is in progress.

10. Issue the following command to verify that the Copyback operation is in progress:

```
# CmdTool2 -pdlist -aall | egrep  "Adapter|Enclosure|Slot Number|Firmware state"
```

Example output is shown below. Focus on the items in **bold**.

```
Adapter #0
Enclosure Device ID: 28
Slot Number: 0
Enclosure position: 0
Firmware state: Copyback

. . .

Enclosure Device ID: 28
Slot Number: 11
Enclosure position: 0
Firmware state: Online, Spun Up


Adapter #1
Enclosure Device ID: 13
Slot Number: 0
Enclosure position: 0
Firmware state: Online, Spun Up

. . .

Enclosure Device ID: 13
Slot Number: 11
Enclosure position: 0
Firmware state: Hotspare, Spun Up
```

In the example output above, note that the firmware state of the drive in **Adapter #0, Slot Number 0** is shown as **Copyback**. This indicates that the copyback operation is in progress and that data is being restored to the new drive in Slot 0.

If no firmware states are shown as **Copyback**, (for example, the firmware states are **Online, Spun Up** or **Hotspare Spun Up**) the **Copyback** operation is complete.

Monitor the Copyback operation.

11. To view the **Copyback** progress, issue the following command. Change the values shown in **bold** below to the actual values from your output.

    ```
    # CmdTool2 -pdcpybk -progdsply -PhysDrv[28:0] -a0
    ```

    The values in the above example refer to the following parameters:

    - **28** refers to the **Enclosure Device ID**.
    - **0** refers to the **Slot Number** of the hotspare drive invoked as the rebuild drive.
    - **0** refers to the **Adapter Number**.

    The following is an example output of the **Copyback** progress.

    ```
    Copyback Progress of Physical Drive...

Enclosure:Slot            Percent Complete                  Time Elps
       28 :00 ##################**********29 %********** 00:10:38

Press <ESC> key to quit...
    ```

NOTICE

If the firmware state is reported as **Unconfigured(Good)** then the **Copyback** operation did **not** occur automatically. In this unlikely event, you must initiate **Copyback** manually by issuing the following command:

If necessary, manually initiate the Copyback operation.

```
# CmdTool2 -pdcpybk -start -PhysDrv[28:11,28:0] -a0
```

View the Copyback progress as described in step 11.

If no firmware states are shown as **Copyback**, the **Copyback** operation is complete.

12. Issue the following command:

```
CmdTool2 -pdlist -aall | egrep  "Adapter|Enclosure|Slot Number|Firmware state"
```

13. In the output verify that the firmware state of the drives is reported as follows:
    - Drives 0 - 10 and 12 - 22: **Online, Spun Up**
    - Drives 11 and 23: **hotspare, Spun Up**

Replace a drive in an Hadoop server

The section describes how to replace a drive in a Hadoop server in **DCA version 2.0.1.0 or later**. For details on replacing a drive in a Hadoop server in DCA version 2.0.0.0, see the *EMC Data Computing Appliance Maintenance Guide for 2.0.0.0, Rev A02*.

NOTICE

Hadoop-related procedures were not available at the time of this document's publication. The document will be updated in the short term and re-released. Until that time, please contact platform-eng-support@gopivotal.com for Hadoop-related service questions.

The replacement procedure you use to replace a drive in a Hadoop server depends on the type of Hadoop server it is, and—in the case of a Hadoop Worker—whether the faulted drive is a System drive or a Data drive.

- **Hadoop Master servers**—Drives are part of a **RAID 5** configuration which can be rebuilt automatically by the server's RAID controller. For instructions, see "Replace a drive in a Hadoop Master server" on page 97.
- **Hadoop Worker servers**—The server has two different RAID configurations:
  - **System disks 0 – 1** are configured as RAID 1. If one of the System disks fails, the RAID is rebuilt automatically by the server's RAID controller after the replacement drive is inserted. For instructions, see "Replace a System Disk (0 through 1)" on page 101.
  - **Data disks 2 – 11** are each configured as single RAID-0. You must recover data through the Hadoop filesystem after you replace the drive. For instructions, see "Replace a failed Data Disk (2 through 11)" on page 104.

Replace a drive in a Hadoop Master server

All drives are installed at the front of the server and connect to the system board through the backplane. Hard drives are supplied in special hot-swappable hard-drive carriers that fit in the hard-drive slots.

In addition to describing how to physically remove and insert the disk drive, this procedure also describes how to do the following:

- Determine if the RAID group is still being rebuilt and how to monitor the rebuild process.
- Verify that the **Copyback** operation is in progress and how to monitor the **Copyback** operation.
- Manually initiate the **Copyback** operation if necessary.

1. Connect your service laptop to the DCA and log in to the Primary Master as the user **root** (see "Connect a workstation to the DCA" on page 176).
2. To locate the server, use the DCA Setup Utility to activate the green lightbar on the DCA door and the blue server identification LED as the user **root**:
   a. Launch the DCA Setup utility:

      ```
      # dca_setup
      ```

   b. Select option **2** to `Modify DCA Settings`.
   c. Select option **18** for `Light Bar Controls`.
   d. Select option **3** for `Blink the light bar`.
   e. Enter the hostname of the server and press **ENTER**.
   f. Enter **x** to exit the DCA Setup utility.

      The green lightbar on the DCA door and the blue server identification LED begin to blink.

      Note: If the DCA door does not have a lightbar, an error message displays. You can safely ignore the error message. To identify the failed server, locate the blue server identification LED.

   g. Locate the failed drive.

      Note: In this procedure, Disk 0 is the failed drive.

      LED indicators on the each drive carrier indicate the current status of the drive within it. A faulted drive is indicated by a solid (unblinking) amber LED.

If the dial-home information includes a drive number, locate the drive with the help of the following illustration:

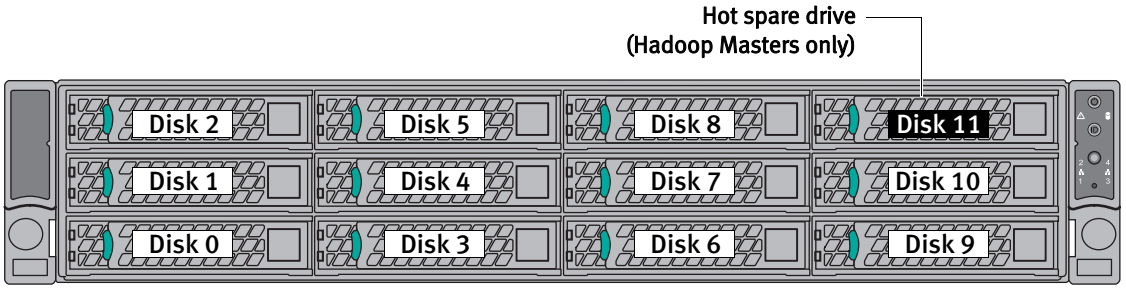


Figure 18 Hadoop Master server drive slot numbering

Verify the state of the RAID group rebuild process.

3. Before you remove the faulted drive, read the topic "Hot spare drives and the Copyback operation" on page 86.
4. Issue the following command to determine whether the RAID group is still being rebuilt:

```
# CmdTool2 -pdlist -aall | egrep  "Adapter|Enclosure|Slot Number|Firmware state"
```

Example output is shown below. Focus on the items in **bold**.

```
Adapter #0
Enclosure Device ID: 28
Slot Number: 1
Enclosure position: 0
Firmware state: Online, Spun Up

. . .

Enclosure Device ID: 28
Slot Number: 11
Enclosure position: 0
Firmware state: Rebuild
```

In the example output above, note that the rebuild is still in progress.

- If **`Rebuild`** appears anywhere in the output, the rebuild is in progress. Do not remove the faulted drive yet. Monitor the rebuild process as described in step 5.
- If all drives in the output are shown as **`Online, Spun Up`** the rebuild is complete. Proceed to removing the failed drive as described in step 6.

Monitor the rebuild process.

5. To monitor the rebuild process, issue the following command. Change the values shown in **bold** below to the actual values from your output. For example:

```
# CmdTool2 -pdrbld -progdsply -PhysDrv[28:11] -a0
```

The values in the above example refer to the following parameters:

- **`28`** refers to the **`Enclosure Device ID`**.
- **`11`** refers to the **`Slot Number`** of the hotspare drive invoked as the rebuild drive.
- **`0`** refers to the **`Adapter Number`**.

6. If the rebuild is complete, remove the failed drive from the server:
   a. Press the button on the front of the drive carrier to release the drive handle.

b. Wait 10 seconds to allow the platter in the drive to stop spinning.

c. Pull the drive carrier out of the server.

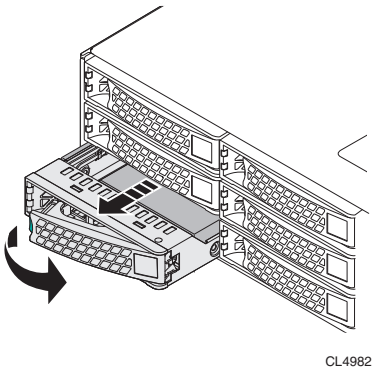


Figure 19 Removing a drive from a Hadoop Master server

7. Make sure that the capacity of the replacement drive matches the capacity of the failed drive. The drive capacity is printed on the label on each drive.

IMPORTANT

Do not mix drives of different capacities within a server.

8. To replace a drive carrier in the server:

   a. Insert the drive carrier into the drive bay until the carrier contacts the backplane.

   b. Close the handle to lock the drive carrier in place. The LED on the drive turns green and blinks while it automatically starts the Copyback operation.

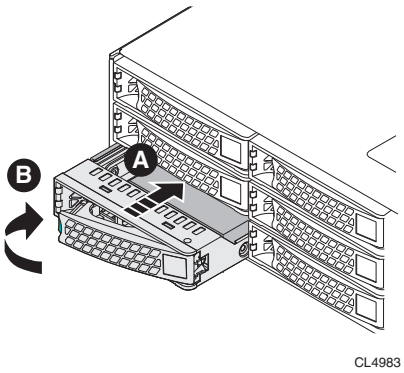


Figure 20 Replacing a drive in a Hadoop Master server

9. The Copyback operation should begin automatically when you insert the replacement drive. (For details about Copyback, see "Hot spare drives and the Copyback operation" on page 86.) Wait for the Copyback operation to complete. The hot spare always occupies **Slot 11** on a Hadoop Master server (see Figure 15 on page 92).

Verify that the Copyback operation is in progress.

10. Issue the following command to verify that the Copyback operation is in progress:

```
# CmdTool2 -pdlist -aall | egrep  "Adapter|Enclosure|Slot Number|Firmware state"
```

Example output is shown below. Focus on the items in **bold**.

```
Adapter #0

Enclosure Device ID: 28
Slot Number: 0
Enclosure position: 0
Firmware state: Copyback

. . .

Enclosure Device ID: 28
Slot Number: 11
Enclosure position: 0
Firmware state: Online, Spun Up
```

In the example output above, note that the firmware state of the drive in **Slot Number 0** is shown as **Copyback**. This indicates that the copyback operation is in progress and that data is being restored to the new drive in Slot 0.

If no firmware states are shown as **Copyback**, (for example, the firmware states are **Online, Spun Up** or **Hotspare Spun Up**) the Copyback operation is complete.

Monitor the Copyback operation.

11. To view the Copyback progress, issue the following command. Change the values shown in **bold** below to the actual values from your output.

```
# CmdTool2 -pdcpybk -progdsply -PhysDrv[28:0] -a0
```

The values in the above example refer to the following parameters:

- **28** refers to the **Enclosure Device ID**.
- **0** refers to the **Slot Number** of the hotspare drive invoked as the rebuild drive.
- **0** refers to the **Adapter Number**.

The following is an example output of the **Copyback** progress.

```
Copyback Progress of Physical Drive...

Enclosure:Slot            Percent Complete                  Time Elps
       28 :00 ##############**********29 %********** 00:10:38

Press <ESC> key to quit...
```

NOTICE

If the firmware state is reported as **Unconfigured(Good)** then the Copyback operation did **not** occur automatically. In this unlikely event, you must initiate Copyback manually by issuing the following command:

If necessary, manually initiate the Copyback operation.

```
# CmdTool2 -pdcpybk -start -PhysDrv[28:11,28:0] -a0
```

View the Copyback progress as described in step 11.

If no firmware states are shown as **Copyback**, the Copyback operation is complete.

12. Issue the following command:

```
CmdTool2 -pdlist -aall | egrep  "Adapter|Enclosure|Slot Number|Firmware state"
```

13. In the output verify that the firmware state of the drives is reported as follows:
    - Drives 0 - 10: **`Online, Spun Up`**
    - Drive 11: **`Hotspare, Spun Up`**

Replace a drive in a Hadoop Worker server

There are two types of RAID configurations in an Hadoop Worker server:

- **System disks 0 – 1** are configured as **RAID 1**. If one of the System disks fail, the RAID is rebuilt automatically by the server's RAID controller after the replacement drive is inserted. For instructions, "Replace a System Disk (0 through 1)" on page 101.
- **Data disks 2 – 11** are each configured as individual **RAID 0** disks. If a drive fails, data must be recovered through the Hadoop filesystem after you replace the drive. For instructions, see "Replace a failed Data Disk (2 through 11)" on page 104.

Note: Unlike other server types, Hadoop Workers do not have a hot spare drive.

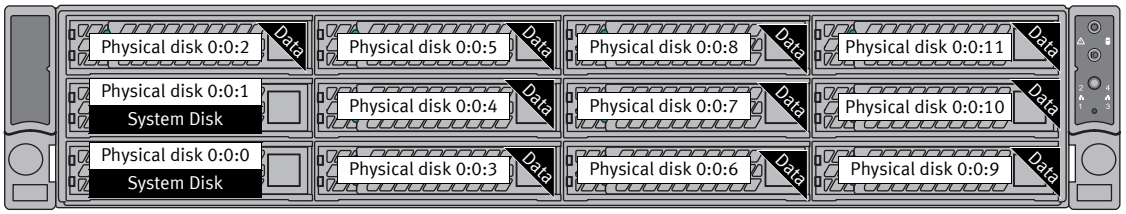


Figure 21 Hadoop Worker server drive types and locations

Replace a System Disk (0 through 1)

All drives are installed at the front of the server and connect to the system board through the backplane. Hard drives are supplied in special hot-swappable hard-drive carriers that fit in the hard-drive slots.

In addition to describing how to physically remove and insert the disk drive, this procedure also describes how to determine if the RAID group is still rebuilding and how to monitor the rebuild process.

1. Connect your service laptop to the DCA and log in to the Primary Master as the user **`root`** (see "Connect a workstation to the DCA" on page 176).
2. To locate the server, use the DCA Setup Utility to activate the green lightbar on the DCA door and the blue server identification LED as the user **`root`**:
    a. Launch the DCA Setup utility:

    ```
    # dca_setup
    ```

    b. Select option **`2`** to `Modify DCA Settings`.
    c. Select option **`18`** for `Light Bar Controls`.
    d. Select option **`3`** for `Blink the light bar`.
    e. Enter the hostname of the server and press **`ENTER`**.

f. Enter **x** to exit the DCA Setup utility.

The green lightbar on the DCA door and the blue server identification LED begin to blink.

Note: If the DCA door does not have a lightbar, an error message displays. You can safely ignore the error message. To identify the failed server, locate the blue server identification LED.

g. Locate the failed drive.

Note: In this procedure, System Disk 0 is the failed drive.

LED indicators on the each drive carrier indicate the current status of the drive within it. A failed drive is indicated by a solid (unblinking) amber LED.

If the dial-home information includes a drive number, locate the drive with the help of the following illustration:

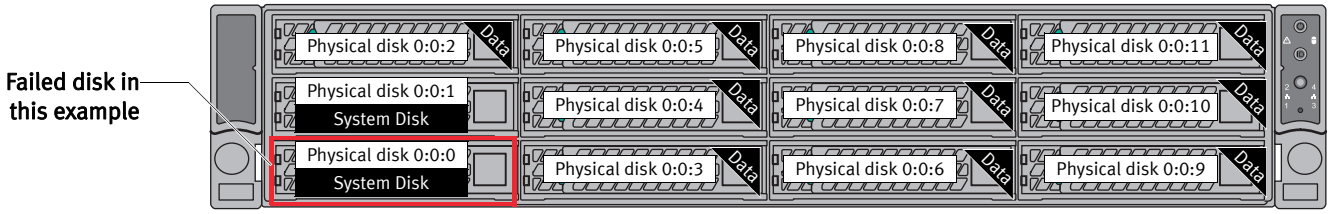


Figure 22 Hadoop Worker server drive slot numbering

3. Remove the failed drive from the server:
   a. Press the button on the front of the drive carrier to release the drive handle.
   b. Wait 10 seconds to allow the platter in the drive to stop spinning.
   c. Pull the drive carrier out of the server.

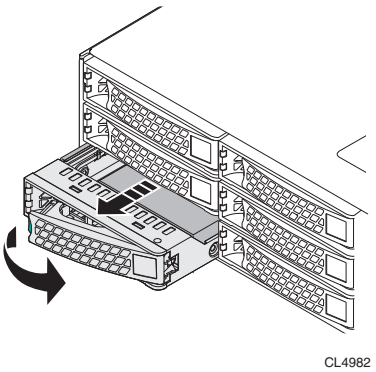


Figure 23 Removing a drive from a Hadoop Master server

4. Make sure that the capacity of the replacement drive matches the capacity of the failed drive. The drive capacity is printed on the label on each drive.

IMPORTANT

Do not mix drives of different capacities within a server.

5. To replace a drive carrier in the server:
   a. Insert the drive carrier into the drive bay until the carrier contacts the backplane.
   b. Close the handle to lock the drive carrier in place. The LED on the drive turns green and blinks while it automatically starts the Copyback operation.

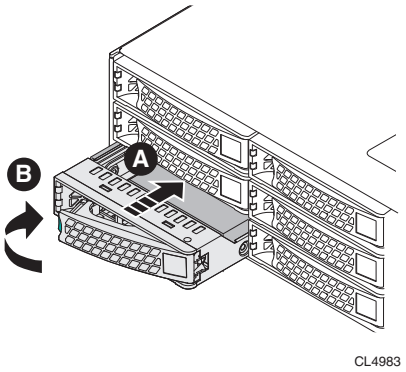


Figure 24 Replacing a drive in a Hadoop Master server

After the replacement drive is inserted the RAID controller automatically begins the rebuild process and writes data to the replacement drive, as indicated by a slowly blinking amber LED on the drive. Do not interrupt the rebuild process.

Verify the state of the RAID group rebuild process.

6. To determine whether the RAID group is still being rebuilt, issue the following command:

```
# CmdTool2 -pdlist -aall | egrep  "Adapter|Enclosure|Slot Number|Firmware state"
```

Example output is shown below. Focus on the items in **bold**.

```
Adapter #0
Enclosure Device ID: 21
Slot Number: 0
Enclosure position: 0
Firmware state: Rebuild
```

In the example output above, note that the firmware state indicates that the rebuild is still in progress.

- If the firmware state of the replacement drive is shown as **`Rebuild`**, the rebuild is in progress.
- If the firmware state of the replacement drive is shown as **`Online, Spun Up`** the rebuild is complete.

Monitor the rebuild process.

7. To monitor the rebuild process, issue the following command. Change the values shown in **bold** below to the actual values from your output. For example:

   ```
   # CmdTool2 -pdrbld -progdsply -PhysDrv[21:0] -a0
   ```

   The values in the above example refer to the following parameters:

   - **21** refers to the **Enclosure Device ID**.
   - **0** refers to the slot from which you removed the faulted drive and inserted a replacement drive.
   - **-a0** refers to **Adapter Number 0**.

8. Issue the following command:

   ```
   CmdTool2 -pdlist -aall | egrep  "Adapter|Enclosure|Slot Number|Firmware state"
   ```

9. In the output verify that the firmware state of the drives is reported as:

   Online, Spun Up

If necessary, manually initiate the rebuild process.

NOTICE

If the firmware state is reported as **Unconfigured(Good)** then the rebuild did **not** occur automatically. In this unlikely event, you must initiate the rebuild manually by issuing the following command:

```
# CmdTool2 -pdrbld -start -PhysDrv[21:0] -a0
```

Monitor the rebuild as described in step 7.

If the firmware state of the replacement drive is shown as **Online, Spun Up**, the rebuild is complete.

Replace a failed Data Disk (2 through 11)

Data disks 2 through 11 are each configured as individual RAID 0 disks. Because data from a RAID 0 cannot be recovered automatically by the server's RAID controller, you must recover it through the Hadoop software as described in this procedure.

1. Log in to the Primary Master Server as the user **gpadmin** (see " Connect to the Master Server using an SSH client" on page 178).
2. To locate the server, use the DCA Setup Utility to activate the green lightbar on the DCA door and the blue server identification LED as the user **root**:
   a. Launch the DCA Setup utility:

      ```
      # dca_setup
      ```

   b. Select option **2** to `Modify DCA Settings`.
   c. Select option **18** for `Light Bar Controls`.
   d. Select option **3** for `Blink the light bar`.
   e. Enter the hostname of the server and press **ENTER**.
   f. Enter **x** to exit the DCA Setup utility.

The green lightbar on the DCA door and the blue server identification LED begin to blink.

Note: If the DCA door does not have a lightbar, an error message displays. You can safely ignore the error message. To identify the failed server, locate the blue server identification LED.

3. Locate the failed data disk (see Figure 22). Make note of the drive position in the format 0:0:**X**. where **X** is the slot number of the faulted data drive.
4. Remove the faulted drive from the server:
   a. Press the button on the front of the drive carrier to release the drive handle.
   b. Wait 10 seconds to allow the platter in the drive to stop spinning.
   c. Pull the drive carrier out of the server.
5. Make sure that the capacity of the replacement drive matches the capacity of the failed drive. The drive capacity is printed on the label on each drive.

   IMPORTANT
   Do not mix drives of different capacities within a server.

6. Install the replacement drive carrier in the server:
   a. Insert the drive carrier into the drive bay until the carrier contacts the backplane.
   b. Close the handle to lock the drive carrier in place. The LED on the drive turns green and blinks while it automatically starts the Copyback operation.
7. Log in to the Primary Master Server as the user **`root`** (see " Connect to the Master Server using an SSH client" on page 178).
8. Connect as the user **`root`** to the server with the new disk. For example, if you replaced a disk in **`hdw1`**:

   ```
   $ ssh root@hdw1
   ```

Create a new virtual disk

9. Create a new virtual disk on the replacement drive:
   a. For the disk that you replaced, determine the Enclosure Device ID of the server and the Adapter Number :

      ```
      # CmdTool2 -pdlist -aall | egrep  "Adapter|Enclosure|Slot Number"
      ```

      The following output is returned:

      ```
      Adapter #0
      Enclosure Device ID: 13
      Slot Number: 0
      Enclosure position: 0

      . . .

      Enclosure Device ID: 13
      Slot Number: 11
      Enclosure position: 0
      ```

b. Using information from the output above, issue the command from Table 5 that corresponds to the physical disk that you installed.

For example, to create a virtual disk on physical disk `0:0:11`, issue:

```
# CmdTool2 -CfgLdAdd r0 '[13:11]' -a0
```

The values in the above command example refer to the following:

- **`r0`** refers to the RAID level (which is always 0 for a Hadoop Worker data disk).
- **`13`** refers to the **`Enclosure Device ID`**.
- **`11`** refers to the **`Slot Number`** of the physical disk that you replaced.
- **`-a0`** refers to the **`Adapter Number`**.

Table 5 Virtual disk creation commands per physical disk slot

Physical Disk	Command
0:0:0, 0:0:1	`# CmdTool2 -CfgLdAdd r1 '[13:0,13:1]' -sz 102400 -a0`
	`# CmdTool2 -CfgLdAdd r1 '[13:0,13:1]' -sz 65536 -a0`
	`# CmdTool2 -CfgLdAdd r1 '[13:0,13:1]' -sz 102400 -a0`
	`# CmdTool2 -CfgLdAdd r1 '[13:0,13:1]' -a0`
0:0:2	`# CmdTool2 -CfgLdAdd r0 '[13:2]' -a0`
0:0:3	`# CmdTool2 -CfgLdAdd r0 '[13:3]' -a0`
0:0:4	`# CmdTool2 -CfgLdAdd r0 '[13:4]' -a0`
0:0:5	`# CmdTool2 -CfgLdAdd r0 '[13:5]' -a0`
0:0:6	`# CmdTool2 -CfgLdAdd r0 '[13:6]' -a0`
0:0:7	`# CmdTool2 -CfgLdAdd r0 '[13:7]' -a0`
0:0:8	`# CmdTool2 -CfgLdAdd r0 '[13:8]' -a0`
0:0:9	`# CmdTool2 -CfgLdAdd r0 '[13:9]' -a0`
0:0:10	`# CmdTool2 -CfgLdAdd r0 '[13:10]' -a0`
0:0:**11**	`# CmdTool2 -CfgLdAdd r0 '[13:11]' -a0`

`0:0:11` *is used as the example replacement drive throughout this procedure.*

Table 6 below matches each physical disk in the server with its corresponding virtual disk. Note that the virtual disk for physical disk **`0:0:11`** is **`13`**.

Table 6 Disk attributes in a Hadoop Worker server

Physical Disk	Virtual Disk	Mount (Device name)	Label
0:0:0, 0:0:1	0	/sda1	/boot
	1	/sda2	/
	2	/sdbswap	swap
	3	/sdc1	crash
0:0:2	4	/sde	/data1

Table 6 Disk attributes in a Hadoop Worker server

Physical Disk	Virtual Disk	Mount (Device name)	Label
0:0:3	5	/sdf	/data2
0:0:4	6	/sdg	/data3
0:0:5	7	/sdh	/data4
0:0:6	8	/sdi	/data5
0:0:7	9	/sdj	/data6
0:0:8	10	/sdk	/data7
0:0:9	11	/sdl	/data8
0:0:10	12	/sdm	/data9
0:0:11	13	/sdn	/data10

Determine the automatically-assigned device name.

10. Confirm the device name that was assigned to the new virtual disk. When issuing the following command, change the values in **bold** below with the values specific to your situation:

    ```
    # CmdTool2 -LDInfo -L13 -a0
    ```

    The values in the above command example refer to the following:

    - **13** refers to the virtual disk created on physical disk `0:0:11`.
    - **0** refers to the **`Adapter Number`** (i.e., the RAID controller).

    ```
    Virtual Drive: 13 (Target Id: 13)
    Name                :sdn
    RAID Level          : Primary-0, Secondary-0, RAID Level Qualifier-0
    Size                : 2.727 TB
    Parity Size         : 0
    State               : Optimal
    Strip Size          : 256 KB
    Number Of Drives    : 1
    Span Depth          : 1
    Default Cache Policy: WriteBack, ReadAdaptive, Direct, No Write Cache
    if Bad BBU
    Current Cache Policy: WriteBack, ReadAdaptive, Direct, No Write Cache
    if Bad BBU
    Default Access Policy: Read/Write
    Current Access Policy: Read/Write
    Disk Cache Policy   : Disk's Default
    Encryption Type     : None
    PI type: No PI

    Is VD Cached: No
    ```

    In the example output above, note the value next to **`Name`**. This is the device name that you will use in step 11 to format a filesystem on the new virtual disk.

NOTICE

If the name does not appear in your output as it did in the above example, refer to Table 6 on page 106 and look up the device name value that corresponds to the physical disk that you replaced. Then issue the following command to set the device name. For example, to set the virtual disk device name of physical disk 11 to **sdn** (as specified in Table 6 on page 106):

```
# CmdTool2 -ldsetprop -name sdn -L13 -a0
```

---

11. Format and label the filesystem on the new virtual disk. Replace the text in **bold** with values from the **Label** column and the **Mount/Device name** column in Table 6 that correspond to the physical disk that you replaced.

```
# mkfs -t xfs -L /data10 -f /dev/sdn
# mount /data10
```

If necessary, clear the state of the disk

NOTICE

If for any reason you eject and then reseat an *existing* drive, you may have put the drive into a foreign state. If so, you must clear the state of the drive.

a. To check the state of the drive in this case, switch to the user **root** and then issue the following command:

```
# CmdTool2 -pdlist -aall | egrep  "Adapter|Enclosure|Slot Number|Firmware state|Foreign State"
```

Example output for a drive with a foreign state would look like this:

```
Enclosure Device ID: 13
Slot Number: 11
Enclosure position: 0
Firmware state: foreign
```

b. Examine the output carefully. If the output shows the drive state to be **foreign**, clear the state by issuing the following command, making sure to replace the Enclosure Device and Slot Number shown in **bold** below with the Enclosure Device ID and Slot Number given in your output.

```
# CmdTool2 -PDMakeGood -PhysDrv[13:11]-Force -aALL
```

c. Then, issue the following command. Change the values in **bold** with the Enclosure Device ID and Slot Number given in your output:

```
# CmdTool2 -PDClear -Start -PhysDrv[13:11]-a0
```

d. Wait 5 minutes, then issue the following command, making sure to change the values in **bold** with the Enclosure Device ID and Slot Number given in your output:

```
# CmdTool2 -PDClear -Stop -PhysDrv[13:11]-a0
```

Introduce the replacement drive to the Hadoop cluster and restart Hadoop

12. Make the following directories on the replacement drive:

```
mkdir /data10/hadoop
mkdir /data10/hadoop/data
mkdir /data10/hadoop/local
```

13. Set permissions on the new directories that you made in the previous step:

```
# chown hdfs:hadoop /datat10/hadoop/data
# chown mapred:hadoop /datat10/hadoop/local
```

14. Set permissions on Hadoop to `755`:

```
# chmod 755 /data10/hadoop
# chmod 755 /data10/hadoop/local
```

15. Restart Hadoop on the recovered Hadoop Worker node:

```
# service hadoop-datanode restart
# service hadoop-tasktracker restart
```

16. Connect to the host `hdm1` :

```
# ssh hdm1
```

17. Switch to the user `hdfs` and verify that the Hadoop filesystem is healthy:

```
# su - hdfs
$ hadoop fsck /
```

    The following message in the output indicates a healthy filesystem:

```
The filesystem under path '/' is HEALTHY
```

CHAPTER 5
Replace a Power Supply in a Server

This chapter describes how to replace power supplies in DCA UAP servers.

Power supply LEDs

Each server in the UAP DCA has two power supplies that share the power load and provide redundancy. When the power load is below a certain threshold, only one power supply in each server is active and its LED is solid green to reflect the active state. The other power supply is in standby mode and its LED flashes green to reflect the standby state.

Table 7 Power supply LED behavior

LED behavior	Definition
Solid green	Active mode
Blinking green, slow	Standby mode
Blinking green, rapid	Power supply firmware updating
Off	No AC power to both power supplies in the server
Amber	No AC power to this power supply, other power supply has AC power

Replace a power supply in a server

The servers in the DCA rack are powered by dual redundant hot-swappable power supplies located in the rear of the appliance. To replace a power supply in a server, perform the following procedure.

1. Log in to the Primary Master Server as the user **`root`** (see "Connect to the Master Server using an SSH client" on page 178).
2. To locate the server, use the DCA Setup Utility to activate the green lightbar on the DCA door and the blue server identification LED as the user **`root`**:
   a. Launch the DCA Setup utility:

      ```
      # dca_setup
      ```

   b. Select option **`2`** to `Modify DCA Settings`.
   c. Select option **`18`** for `Light Bar Controls`.
   d. Select option **`3`** for `Blink the light bar`.
   e. Enter the hostname of the server and press **`ENTER`**.
   f. Enter **`x`** to exit the DCA Setup utility.

      The green lightbar on the DCA door and the blue server identification LED begin to blink.

Note: If the DCA door does not have a lightbar, an error message displays. You can safely ignore the error message. To identify the failed server, locate the blue server identification LED.

3. Locate the failed power supply in the server.

   The LED on a failed power supply is either amber or, if the power supply has completely failed, the LED is off.

4. Verify that the LED on the functioning (redundant) power supply is solid green.
5. Check the connection of the AC power cable. Make sure that both ends of the cable are securely connected.
6. If the power supply still appears to be failed, try a known-good power cable.
7. If the power supply still appears to be failed, disengage the retaining clip that secures the AC power cable, and then disconnect the AC power cable from the power supply.
8. While pressing the green release latch leftward, pull on the handle to slide the power supply out of the chassis.

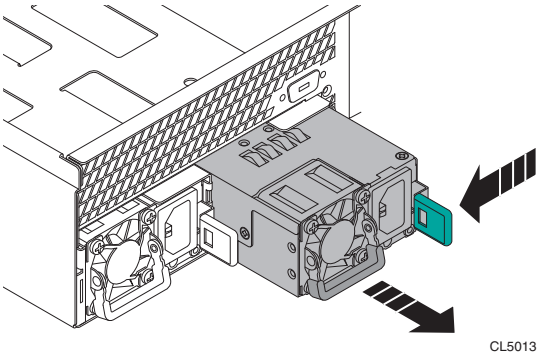


Figure 25 Remove a server power supply

9. Make sure that the replacement power supply is the correct part number:

   EMC P/N 105-000-244

   The part number is located on the packaging, not on the power supply itself. Both power supplies in a server must provide the same maximum output power.

10. Install the replacement power supply in the chassis.

    Slide the replacement power supply into the chassis until the power supply is fully seated and the release latch clicks into place.

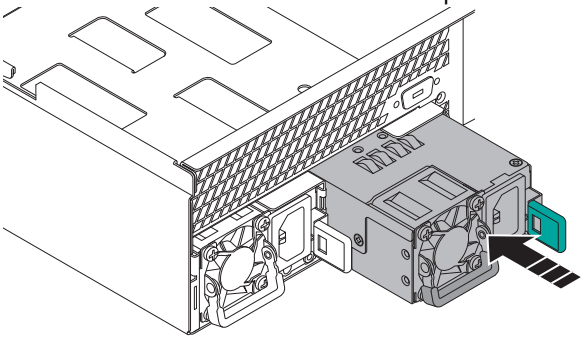


Figure 26 Insert a server power supply

11. Connect the AC power cable to the power supply and secure it with the retaining clip.
12. Verify that the power supply LED indicator is solid or blinking greeTurn off the green lightbar on the DCA door and the blue server identification LED:
    a. If you are not already in it, start the DCA Setup utility as the user **root**:

       ```
       # dca_setup
       ```

    b. Select option **2** to `Modify DCA Settings`.
    c. Select option **18** for `Light Bar Controls`.
    d. Select option **2** for `Turn off the light bar.`
    e. Enter the hostname of the server and press **ENTER**. For example, `sdw1`.

The lightbar on the DCA door and the blue server identification LED stop blinking.

13.

CHAPTER 6
Replace a Fan Assembly or Power Supply in an Arista Switch

Refer to the appropriate section to replace a fan assembly or a power supply in an Arista switch.

Replace a Fan Assembly in an Arista Switch

The Admin, Interconnect, and Aggregate switches (Arista 7048/7050 series) in a DCA rack are cooled by their four modular fan assemblies that can be replaced individually upon failure as shown in Figure 20. The fans provide rear-to-front airflow.

⚠CAUTION

- Leave any failed fan assembly installed until the point where it can be immediately replaced.
- Do not remove a fan assembly from the chassis until you are ready to replace it.
- Follow ESD precautions, including the use of a wrist grounding strap, when you replace components.
- The cooling system requires pressurized air in order to function properly. Do not leave any fan assembly slot unoccupied for longer than two minutes when the appliance is operating.

Fan Assembly Replacement Order Information

Use the following information to order the Arista Fan Assembly for the 7048T and 7050S Switch:

- **Description:** Fan Assembly for the Arista Switch (rear-to-front air flow)
- **Model Number:** FAN-7000-R
- **EMC Part Number:** 105-000-313

Tools

The procedure only requires a wrist grounding strap (there are no screws to remove).

Identify the Failed Fan Assembly

1. Once on site, you must locate the DCA rack and confirm the switch physical location within the cabinet top level assembly (TLA) serial number reported in the service request. Arista switches (7050S) function as server interconnect or rack aggregation and are mounted mid-point in the 40RU rack height. The Admin (7048T) switch is mounted at the top of the rack.
2. You must confirm that the fan assembly specified for replacement is the failed fan assembly, and that the LED on the other fans are operational green and lit steadily (Figure 20 and Figure 21). Access to the fans is from the front of the rack.

Figure 27 Four fan assemblies in the Arista switch

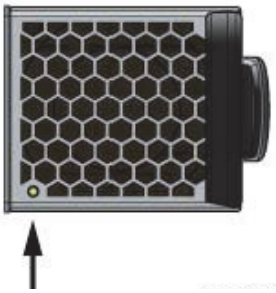


Figure 28 Fan Status LED location

3. Analyze the failure using Table 8 or possible actions.

Table 8 Fan assembly LED Indicators

LED Behavior	Possible State	Action
No light	Fan assembly is not receiving power.	Verify that the fan assembly is seated correctly, and there is no air movement.
Steady Green	Fan assembly is operating normally.	No action
Steady Red or Amber	Fan has failed or power supply was removed from switch.	Failed and must be replaced.

Remove the Failed Fan Assembly and Install the Replacement Part

⚠CAUTION

The cooling system relies on pressurized air. Do not leave any of the Fan assembly slots empty longer than two minutes when the switch is in operation.

1. Remove the fan assembly. While pressing on the black release latch leftward, grip the blue pull-ring and slide the fan assembly out of the chassis.
2. Slide the new Fan assembly into the chassis until the unit is fully seated, and the release latch snaps back into its original position.

⚠CAUTION

Do not force the insertion as damage can occur. If it resists, ensure that it is oriented correctly for a smooth slide and fit.

3. Verify that the Fan status LED is lit (steady green) to indicate normal operation.

Parts Return

1. Locate the Parts Return Label package. Fill out the shipping label. Apply the shipping label to the box for return to EMC.
2. Read enclosed *Shipping Instructions* sheet.
3. Apply other labels for the box appropriate to this returning part, including the Failure Analysis (FA) tag which is currently required for all DCA replacement parts.
4. Securely tape the box and ship the failed part back to EMC.
5. Send questions regarding this return shipment to:

   CS_Logistics_IC@emc.com

   This completes the fan assembly replacement.

Replace a Power Supply in an Arista Switch

The Admin, Interconnect, and Aggregate switches (Arista 7048/7050 series) in a DCA rack are powered by dual redundant modular power supply assemblies that can be replaced individually upon failure as shown in Figure 22.

⚠CAUTION

- Leave any failed power supply installed until the point where it can be immediately replaced.
- Follow ESD precautions, including the use of a wrist grounding strap, when you replace components.
- The cooling system requires pressurized air in order to function properly. Do not leave any power supply slot unoccupied for longer than two minutes when the appliance is operating.

Power Supply Assembly Replacement Order Information

Use the following information to order the Arista Power Supply Assembly for the 7048T and 7050S switch:

- **Description:** Power Supply Assembly for the Arista Switch, 460W AC (rear-to-front air flow)
- **Model Number:** PWR-460AC-R
- **EMC Part Number:** 105-000-314

Tools

The procedure only requires a wrist grounding strap (there are no screws to remove).

Identify the Failed Power Supply

1. Once on site, you must locate the DCA rack and confirm the switch physical location within the cabinet top level assembly (TLA) serial number reported in the service request. Arista switches (7050S) function as server interconnect or rack aggregation and are mounted mid-point in the 40RU rack height. The Admin (7048T) switch is mounted at the top of the rack.
2. You must confirm that the power supply specified for replacement is not working, and that the LED on the other power supplies are operational green and lit steadily (Figure 30). Access to the power supplies is from the front of the rack.

Figure 29 Dual power supply assemblies in the Arista switch

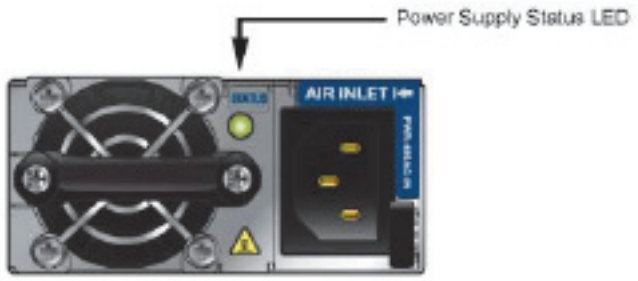


Figure 30 Power Supply Status LED location

3. Analyze the failure using Table 9 for possible actions.

Table 9 Power Supply LED indicators

LED Behavior	Possible State	Action
No light	Power supply is not connected to rack AC power source, or not inserted fully.	Remove and reinsert firmly.
Steady Green	Power supply is operating normally.	No action
Steady Red or Amber	Power supply overheated or has failed.	Failed and must be replaced.

Remove the Failed Power Supply and Install the Replacement Part

⚠CAUTION

The cooling system relies on pressurized air. Do not leave any of the power supply slots empty longer than two minutes when the switch is in operation.

1. Unplug the AC power cable from the power supply you intend to remove (see Figure 30).
2. Locate the black release latch (lower right). While pressing on the release latch leftward, grip the blue pull-ring and slide the power supply out of the chassis.
3. Slide the new power supply into the chassis until it is fully seated. The release latch snaps into place.

⚠CAUTION

Do not force the insertion as damage can occur. If it resists, ensure that it is oriented correctly for a smooth slide and fit.

4. Reconnect the AC power cable to the power supply.

Note: When applying power to a new power supply, allow for the system to recognize the power supply and determine its status. The power supply status indicator turns green to signify that it is functioning properly.

5. Verify that the power supply status LED is lit to indicate normal operation.

Parts Return

1. Locate the Parts Return Label package. Fill out the shipping label. Apply the shipping label to the box for return to EMC.
2. Read enclosed *Shipping Instructions* sheet.
3. Apply other labels for the box appropriate to this returning part, including the Failure Analysis (FA) tag which is currently required for all DCA replacement parts.
4. Securely tape the box and ship the failed part back to EMC.
5. Send questions regarding this return shipment to:

   CS_Logistics_IC@emc.com

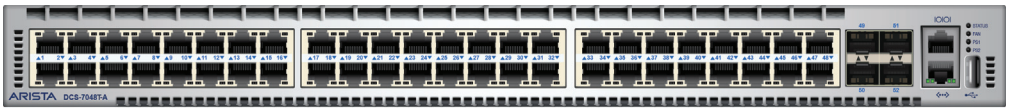
   This completes the fan assembly replacement.

CHAPTER 7
Replace a Switch in the DCA

This chapter describes how to replace Arista 7048T and 7050S-52 switches in a DCA. It also describes how you can use the DCA Setup Utility to upload switch configuration files from the Master server to switches. Switch types include:

- Interconnect and Aggregation (10GB; SWCH-AR1U-7050S-52)

- Administration (1GB; SWCH-AR1U-7048T)



Note: Beginning in DCA 2.0.0.0, you cannot use the DCA Setup Utility to back up switch configuration files to the Master server.

Major topics include:

Requirements

- Wrist grounding strap
- 9-Pin serial cable (RJ-45 to 9-pin d-sub connector)

IMPORTANT

If your laptop does not have a serial port, you must use a USB-to-serial adapter cable.

- Materials to label 20 cables
- Phillips #2 screwdriver
- 1/4-inch flathead screwdriver

Switch hostnames and IP addresses

You must configure the replacement switch with the correct hostname and IP address for the type of rack it inhabits and its position within the rack, as detailed in Table 10 below. For a table containing IP addresses for all configurations, see Appendix A, "Network Configuration Information."

Table 10 Switch hostnames and IP addresses (page 1 of 2)

Rack	Hostname	IP Address
Arista 7050S Interconnect switches (10GB)		
SYSRACK (Rack 1)	i-sw-2 (Upper switch)	172.28.0.180
	i-sw-1 (Lower switch)	172.28.0.170
AGGREG (Rack 2)	i-sw-4 (Upper switch)	172.28.0.181
	i-sw-3 (Lower switch)	172.28.0.171
EXPAND (Rack 3)	i-sw-6 (Upper switch)	172.28.0.182
	i-sw-5 (Lower switch)	172.28.0.172
EXPAND (Rack 4)	i-sw-8 (Upper switch)	172.28.0.183
	i-sw-7 (Lower switch)	172.28.0.173
EXPAND (Rack 5)	i-sw-10 (Upper switch)	172.28.0.184
	i-sw-9 (Lower switch)	172.28.0.174
EXPAND (Rack 6)	i-sw-12 (Upper switch)	172.28.0.185
	i-sw-11 (Lower switch)	172.28.0.175
EXPAND (Rack 7)	i-sw-14 (Upper switch)	172.28.0.186
	i-sw-13 (Lower switch)	172.28.0.176
EXPAND (Rack 8)	i-sw-16 (Upper switch)	172.28.0.187
	i-sw-15 (Lower switch)	172.28.0.177

Table 10 Switch hostnames and IP addresses (page 2 of 2)

Rack	Hostname	IP Address
EXPAND (Rack 9)	i-sw-18 (Upper switch)	172.28.0.188
	i-sw-17 (Lower switch)	172.28.0.178
EXPAND (Rack 10)	i-sw-20 (Upper switch)	172.28.0.189
	i-sw-19 (Lower switch)	172.28.0.179
EXPAND (Rack 11)	i-sw-22 (Upper switch)	172.28.1.180
	i-sw-21 (Lower switch)	172.28.1.170
Arista 7050S Aggregation switches (10GB)		
AGGREG (Rack 2 only)	aggr-sw-2 (Upper switch)	172.28.0.249
	aggr-sw-1 (Lower switch)	172.28.0.248
Arista 7048T Administration switches (1GB)		
SYSRACK (Rack 1)	a-sw-1	172.28.0.190
AGGREG (Rack 2)	a-sw-2	172.28.0.191
EXPAND (Rack 3)	a-sw-3	172.28.0.192
EXPAND (Rack 4)	a-sw-4	172.28.0.193
EXPAND (Rack 5)	a-sw-5	172.28.0.194
EXPAND (Rack 6)	a-sw-6	172.28.0.195
EXPAND (Rack 7)	a-sw-7	172.28.0.196
EXPAND (Rack 8)	a-sw-8	172.28.0.197
EXPAND (Rack 9)	a-sw-9	172.28.0.198
EXPAND (Rack 10)	a-sw-10	172.28.0.199
EXPAND (Rack 11)	a-sw-11	172.28.1.190

Replace an Arista 7050S Interconnect or Aggregation Switch

Summary of main tasks:

- When installing a replacement switch, identify the firmware version on the new switch (as well as the versions already running in the DCA). Then upgrade so that all switches reflect the same firmware levels.

  Go to http://support.emc.com to obtain the pertinent firmware upgrade instructions. The upgrade instructions provide information on how to access and install the firmware upgrade package.
- Remove the failed switch and install the replacement switch
- Establish a serial connection and log in to the replacement switch
- Configure the switch management port and password
- Check the current firmware version
- Update the firmware if necessary
- Upload the switch configuration through DCA Setup
- Check the health of the GPDB

1. Identify the type and location of the switch that you are going to replace.

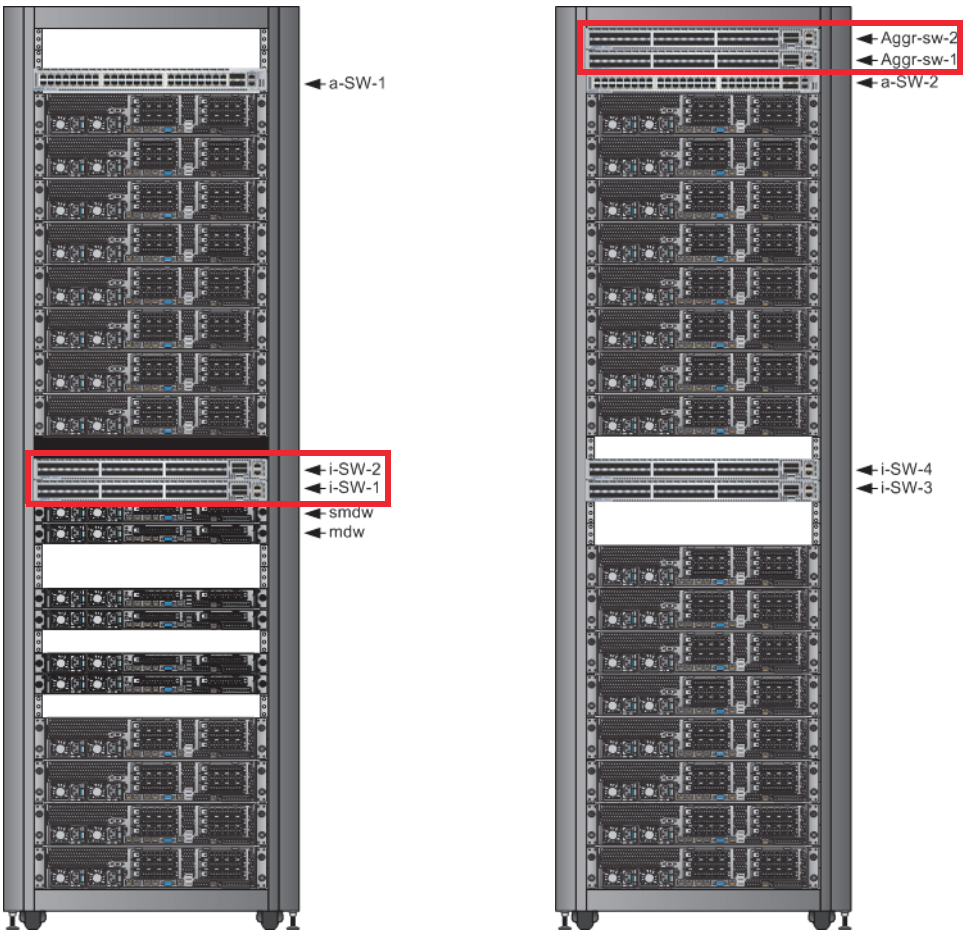


Figure 31 Location of Interconnect and Aggregation switches

2. Connect your service laptop to the red service cable located on the laptop tray in Rack 1. The red service cable is connected to port 48 on the Administration switch in the Rack 1 (see "Connect a workstation to the DCA" on page 176).
3. To prevent false dial home messages from being sent to EMC Support during service, stop the healthmon daemon to disable health monitoring:

```
# dca_healthmon_ctl -d
```

Remove the failed switch and install the replacement switch

4. Label all cables connected to the switch.

   On the label, include the server and server port from which each cable originates and the switch and switch port to which each cable connects. For connectivity details, see the following:

   - **Interconnect Switch cabling**—see "" on page 152.
   - **Aggregation Switch cabling**—see "Aggregation switch reference" on page 163.

5. Power off the switch by removing both AC power cables from the power supplies on the back of the switch.
6. Make sure that the interconnect cables are labeled as described in step 4 above, and then remove the interconnect cables from the Interconnect switch.
7. Remove the failed switch and install the replacement switch (see "Install a Switch in a Rack" on page 200).
8. Connect all data cables to the correct ports on the switch.

   Refer to the labels for the correct connectivity information. For more information, see "Network and cabling configurations" on page 152.
9. Power on the switch by connecting the AC power cables to the power supplies on the back of the replacement switch. The switch powers up as soon as AC power is applied Verify that the power supply LEDs are solid green after a few seconds.

IMPORTANT

Each switch power supply should be connected to a separate AC power zone on the rack. See "Power supply reference" on page 146.

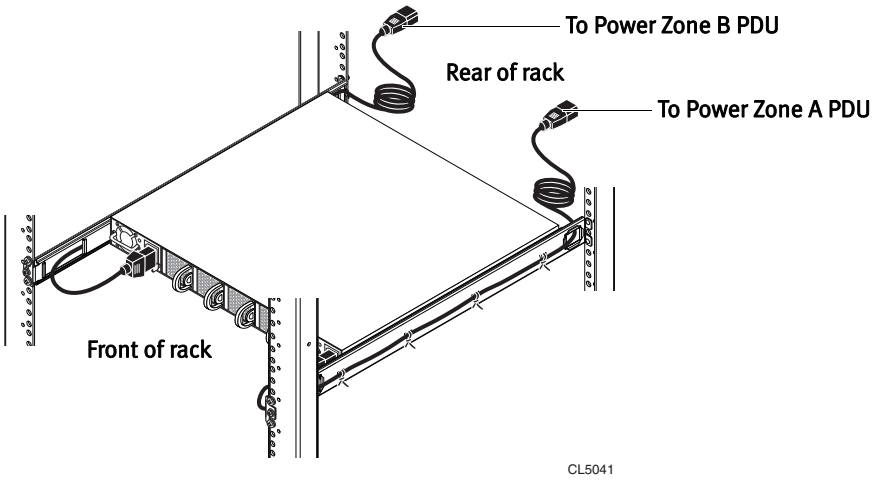


Figure 32 Connecting switch power cords to AC power

Note: Because the replacement switch was configured at the factory, it is not yet accessible through SSH, so you must configure the replacement switch through a serial connection as described in "Connect to an Interconnect or Administration switch using PuTTY" on page 181.

Establish a serial connection and log in to the replacement switch

10. Connect your service laptop to the serial console port on the replacement switch using a native RJ-45 serial cable. If you do not have a native RJ-45 serial cable, use a DB-9-to-RJ45 or USB-to-RJ45 serial adapter.

Figure 33 Arista 7050S serial port location

11. Using a terminal emulator such as Hyperterminal, log in to the switch as user **admin** and no password with the following settings:
    - Connection type: serial
    - Data rate: 9600
    - Data bits: 8
    - Parity: none
    - Stop bits: 1
    - Hardware flow control: none
12. At the localhost prompt, issue the following commands to disable the Arista zerotouch feature:

    ```
    # enable
    # zerotouch cancel
    ```

    Wait as the switch reboots.
13. When the switch is finished booting, log in again as user **admin** and no password.

Configure the switch management port and password; hostname, and IP address

14. At the localhost prompt, issue the following commands to configure the management port:

    Note: Change the IP address shown in **bold** below as appropriate for the type and location of the switch you are configuring. For details see "Switch hostnames and IP addresses" on page 120.

    ```
    # enable
    # conf t
    # hostname i-sw-1
    (config)# interface management 1
    (config-if-Ma1)# ip address 172.28.0.170/21
    (config-if-Ma1)# exit
    (config)# user admin secret 0 changeme
    (config)# write mem
    (config)# exit
    ```
15. Connect all data cables to the correct ports and the ethernet cable to the management port of the switch.
16. Determine whether you need to update the Extensible Operating System (EOS) firmware on the switch:

    ```
    # show boot-config
    ```

    In the output, focus on the value shown in **bold** below:

    ```
    Software image: flash:/EOS-4.9.3.2.swi
    ```

    - If **4.9.3.2** is returned, you do not need to update the switch firmware. Proceed to step 18 to complete the switch configuration.
    - If **4.9.3.2** is not returned, you must update the switch firmware. Proceed to step 17.

Update the firmware if necessary

17. If you determined in the previous step that you need to update the switch firmware:
    a. Before proceeding, back up the current switch configuration. Please read Appendix G for instructions on backing up the switch configurations.
    b. Download the Arista firmware from http://support.emc.com and place in `/opt/dca/etc/arista_fw/`

       You may need to create the directory if it does not exist.
    c. Next, download the current switch configuration. Customizing the switches is a common practice. This procedure will reload the switches with default configurations. Backing up the switch configurations allows for easy restoration after installing the new firmware.
    d. Issue the following commands to copy the EOS firmware file from the Primary Master Server to the switch:

```
# copy scp://root@172.28.4.250/opt/dca/etc/arista_fw/EOS-4.9.3.2.swi flash:/EOS-4.9.3.2.swi
```

    e. When prompted, enter password **changeme**.

```
root@172.28.4.250's password:
# conf t
(config)# boot system flash:/EOS-4.9.3.2.swi
(config)# exit
```

    f. Check the EOS firmware version that you installed.

```
# show boot-config
```

       The following output is returned:

```
Software image: flash:/EOS-4.9.3.2.swi
Console speed: (not set)
Aboot password (encrypted): (not set)
```

    g. Save the EOS configuration and reload. The switch reboots.

```
# write mem
# reload
```

    h. Recover the switch config using the instructions in Appendix G.
18. Disconnect the serial cable.
19. Connect your service laptop to the red service cable located on the laptop tray in Rack 1 and log in to the Primary Master as the user **root** (see "Connect a workstation to the DCA" on page 176).

Check the health of the GPDB

20. Log in to the Primary Master as **gpadmin** and issue the following command to verify that the database is healthy:

```
$ gpstate -m
```

    Verify that all segments are reported as **Synchronized**:

```
Mirror   Datadir                 Port    Status              Data Status
sdw2-2   /data2/mirror/gpseg0    50003   Acting as Primary   Synchronized
```

21. Re-enable health monitoring:

```
# dca_healthmon_ctl -e
```

Replace an Arista 7048T Administration Switch

Summary of main tasks:

- When installing a replacement switch, identify the firmware version on the new switch (as well as the versions already running in the DCA). Then upgrade so that all switches reflect the same firmware levels.

  Go to http://support.emc.com to obtain the pertinent firmware upgrade instructions. The upgrade instructions provide information on how to access and install the firmware upgrade package.
- Remove the failed switch and install the replacement switch
- Establish a serial connection and log in to the replacement switch
- Configure the switch management port
- Configure the switch password
- Check the current firmware version
- Update the firmware if necessary
- Upload the switch configuration through DCA Setup
- Check the health of the GPDB

1. Identify the Administration switch the rack.

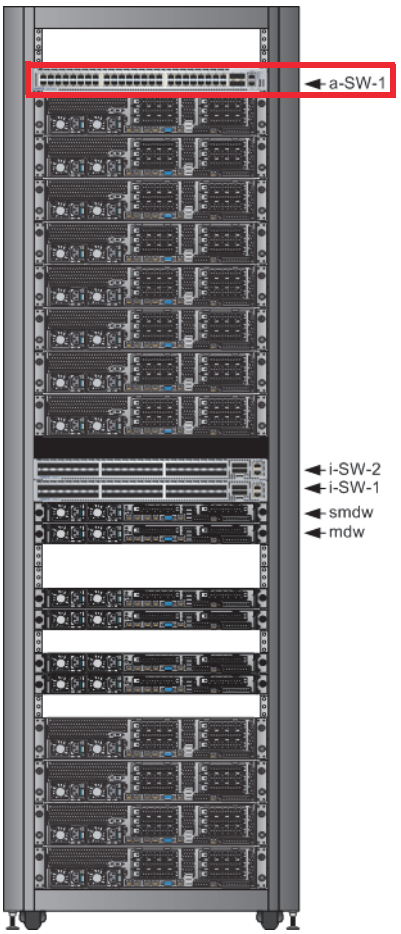


Figure 34 Location of the Aggregation switch

2. To prevent false dial home messages from being sent to EMC Support during service, stop the healthmon daemon to disable health monitoring:

   ```
   # dca_healthmon_ctl -d
   ```

Remove the failed switch and install the replacement switch

3. Label all cables connected to the switch.

   On the label, include the server and server port from which each cable originates and the switch and switch port to which each cable connects. For connectivity details, see "Administration switch reference" on page 159.

4. Power off the switch by removing both AC power cables from the power supplies on the back of the switch.

5. Make sure that the cables are labeled as described in step above, and then remove the interconnect cables from the Interconnect switch.

6. Remove the failed switch and install the replacement switch (see "Install a Switch in a Rack" on page 200).

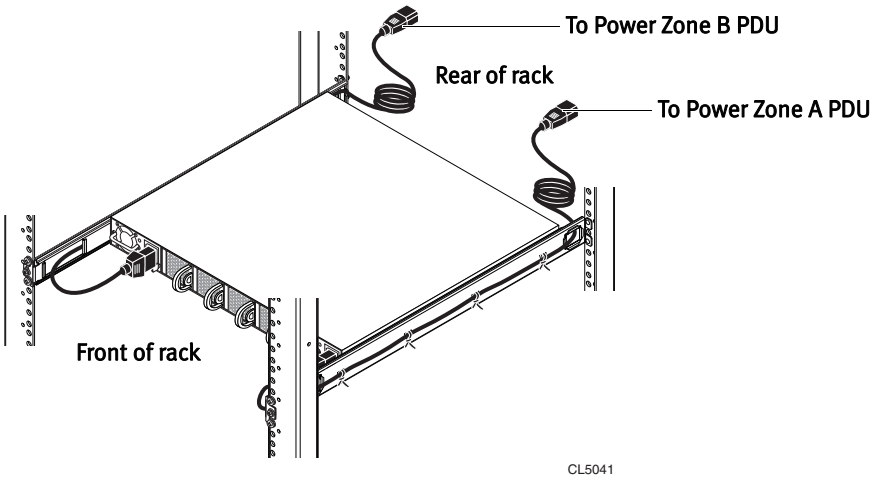
7. Connect all data cables to the correct ports on the switch.

   Refer to the labels for the correct connectivity information. For more information, see "Network and cabling configurations" on page 152.

8. Power on the switch by connecting the AC power cables to the power supplies on the back of the replacement switch. The switch powers up as soon as AC power is applied Verify that the power supply LEDs are solid green after a few seconds.

   IMPORTANT

   Each switch power supply should be connected to a separate AC power zone on the rack. See "Power supply reference" on page 146.



   IMPORTANT

   Because the replacement switch was configured at the factory, it is not yet accessible through SSH, so you must configure it through a serial connection as described in "Connect to an Interconnect or Administration switch using PuTTY" on page 181.

Establish a serial connection and log in to the replacement switch

9. Connect your service laptop to the serial console port on the replacement switch using a native RJ-45 serial cable. If you do not have a native RJ-45 serial cable, use a DB-9-to-RJ45 or USB-to-RJ45 serial adapter.

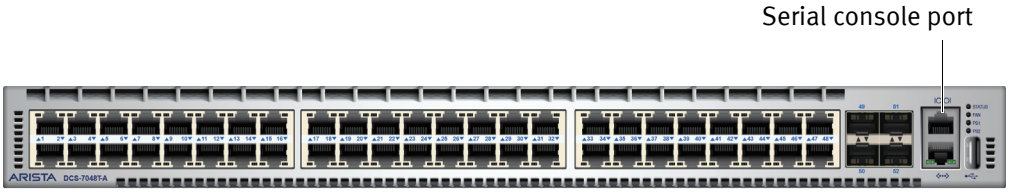


Figure 35 Arista 7048T serial port location

10. Using a terminal emulator such as Hyperterminal, log in to the switch as user **`admin`** and no password with the following settings:

    - Connection type: serial
    - Data rate: 9600
    - Data bits: 8
    - Parity: none

- Stop bits: 1
- Hardware flow control: none

11. At the localhost prompt, issue the following commands to disable the Arista zerotouch feature:

```
# enable
# zerotouch cancel
```

Wait as the switch reboots.

12. When the switch is finished booting, log in again as user **admin** and no password.

Configure the switch VLAN port service, hostname, and IP address

13. At the localhost prompt, issue the following commands to set the VLAN port service:

Change the hostname and IP address shown in **bold** below as appropriate for the switch you are configuring. For details see "Switch hostnames and IP addresses" on page 120.

IMPORTANT

This step differs slightly according to the specific Administration switch that you are replacing.

Administration switch in Rack 1 (a-sw-1)

```
# enable
# conf t
(config)# hostname a-sw-1
(config)# interface vlan 3
```

The following output displays:

```
! Access VLAN does not exist.  Creating vlan 3
```

Continue:

```
(config-if-Vl3)# ip address 172.28.0.190/21
(config-if-Vl3)#interface ethernet 1-48
(config-if-Et1-48)#switchport access vlan 3
```

Administration switch in Rack 2 (a-sw-2)

```
# enable
# conf t
(config)# hostname a-sw-2
(config)# interface vlan 3
```

The following output displays:

```
! Access VLAN does not exist.  Creating vlan 3
```

Continue:

```
(config-if-Vl3)# ip address 172.28.0.191/21
(config-if-Vl3)#interface ethernet 1-48
(config-if-Et1-48)#switchport access vlan 3
(config-if-Et1-48)#interface port-Channel 1000
(config-if-Po1000)#switchport mode trunk
(config-if-Po1000)#switchport trunk group mlagpeerlink
(config-if-Po1000)#interface ethernet 45-46
```

```
(config-if-Et45-46)#channel-group 1000 mode active
```

Administration switch in Racks 3 to 12 (a-sw-3 to a-sw-12)

Change the hostname and IP address shown in **bold** below as appropriate for the specific Administration switch you are configuring. For details see Appendix A, "Network Configuration Information."

```
# enable
# conf t
(config)# hostname a-sw-3
(config)# interface vlan 3
```

The following output displays:

```
! Access VLAN does not exist.  Creating vlan 3
```

Continue:

```
(config-if-Vl3)# ip address 172.28.0.192/21
(config-if-Vl3)#interface ethernet 1-48
(config-if-Et1-48)#switchport access vlan 3
(config)#interface port-Channel 900
(config-if-Po900)#switchport access vlan 3
(config-if-Po900)#interface ethernet 45-46
(config-if-Et45-46)#channel-group 900 mode active
```

14. Verify the that the ports were added to vlan 3:

```
(config-if-Et1-48)#show vlan
```

The following output displays:

```
VLAN     Name    Status    Ports
-----    -----   -----     -----

1        default  active

3        VLAN0003 active    Cpu, Et1, Et2, Et3, Et4, Et5, Et6, Et7, Et8,
                                  Et17, Et18, Et19, Et20
```

Note: Only active ports display in the above output. You may see different output.

Configure the switch password

15. Configure the switch password:

```
(config-if-Et1-48)# exit
(config)# user admin secret 0 changeme
(config)# write mem
(config)# exit
```

16. Connect all data cables to the correct ports and the ethernet cable to the management port of the switch.

17. Determine whether you need to update the Extensible Operating System (EOS) firmware on the switch:

```
# show boot-config
```

In the output, focus on the value shown in **bold** below:

```
Software image: flash:/EOS-4.9.3.2.swi
```

- If **4.9.3.2** is returned, you do not need to update the switch firmware. Proceed to step 19 to complete the switch configuration.
- If **4.9.3.2** is not returned, you must update the switch firmware. Proceed to step 18.

Update the firmware if necessary

18. If you determined in the previous step that you need to update the switch firmware:
    a. Before proceeding, back up the current switch configuration. Please read Appendix G for instructions on backing up the switch configurations.
    b. Download the Arista firmware from http://support.emc.com and place in `/opt/dca/etc/arista_fw/`

       You may need to create the directory if it does not exist.
    c. Next, download the current switch configuration. Customizing the switches is a common practice. This procedure will reload the switches with default configurations. Backing up the switch configurations allows for easy restoration after installing the new firmware.
    d. Issue the following commands to copy the EOS firmware file from the Primary Master Server to the switch:

```
# copy scp://root@172.28.4.250/opt/dca/etc/arista_fw/EOS-4.9.3.2.swi flash:/EOS-4.9.3.2.swi
```

    e. When prompted, enter password **changeme**.

```
root@172.28.4.250's password:
# conf t
(config)# boot system flash:/EOS-4.9.3.2.swi
(config)# exit
```

    f. Check the EOS firmware version that you installed.

```
# show boot-config
```

       The following output is returned:

```
Software image: flash:/EOS-4.9.3.2.swi
Console speed: (not set)
Aboot password (encrypted): (not set)
```

    g. Save the EOS configuration and reload. The switch reboots.

```
# write mem
# reload
```

    h. Recover the switch config using the instructions in Appendix G.
19. Disconnect the serial cable.
20. Connect your service laptop to the red service cable located on the laptop tray in Rack 1 and log in to the Primary Master as the user **root** (see "Connect a workstation to the DCA" on page 176).

Check the health of the GPDB

21. Log in to the Primary Master as **gpadmin** and issue the following command to verify that the database is healthy:

```
$ gpstate -m
```

    Verify that all segments are reported as **Synchronized**:

```
          Mirror   Datadir                 Port    Status              Data Status
          sdw2-2   /data2/mirror/gpseg0    50003   Acting as Primary   Synchronized
```

22. Re-enable health monitoring:

```
# dca_healthmon_ctl -e
```

CHAPTER 8
Replace an Interconnect Switch Cable

This chapter describes how to replace a twin-ax cable used to connect servers and interconnect switches in the DCA.

Note: Some failed cables may be part of a cable bundle. Plan for multiple systems losing connectivity. It is recommended to disable the database and healthmon until cables are replaced.

Locate and replace the failed cable

1. Log in to the Primary Master server as the user `root`. Refer to "Connect to the Master Server using an SSH client" on page 178 for details.
2. Activate the server identification LED on the server with the failed cable. For example, on **`sdw8`**:

   ```
   # dca_blinker -h sdw8 -a ON
   ```

3. From the rear of the system, locate the Converged Network Adapter (CNA) card in the server's expansion slot.

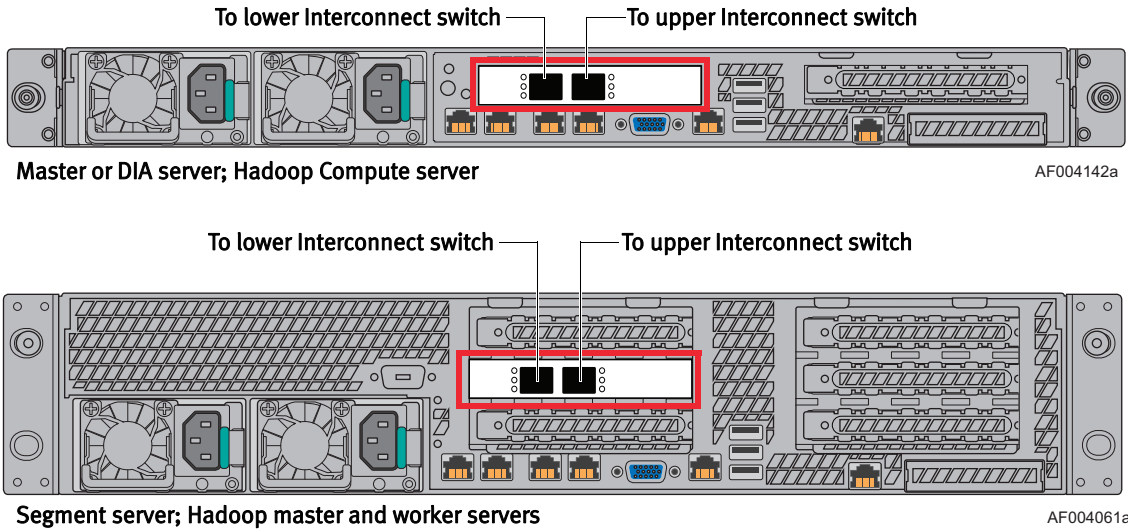


Figure 36 CNA card location in DCA servers

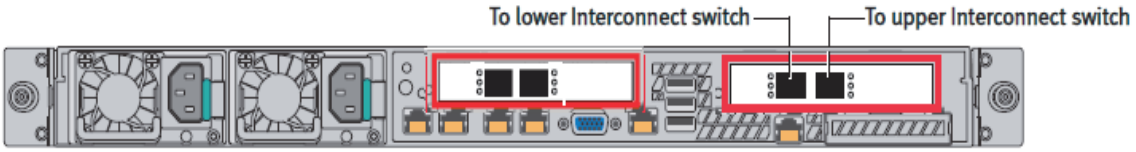


Figure 37 Master server with extra 10Gb NICs

4. Observe the `Link` and `Act` LEDs adjacent to each port on the card. A single, steadily flashing LED indicates that the attached cable has failed. If both LEDs are flashing, further diagnosis is required. DO NOT replace the cables in this case. Instead, contact EMC technical support services for assistance.

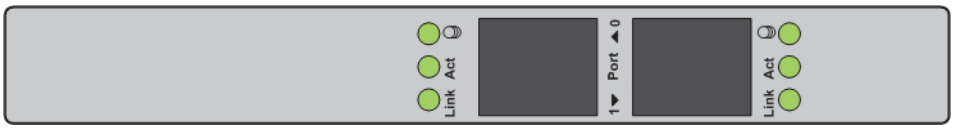


Figure 38 Interconnect switch CNA port LEDs

5. Before connecting the replacement cable the database will need to be shutdown. This is due to the new cabling bundling introduced in release 2.0.2.0. Shutting down the database will prevent false dial home messages from being sent to EMC Support during service.

   To shutdown the database:

   a. Disable health monitoring by stopping the healthmon daemon:

      ```
      # dca_healthmon_ctl -d
      ```

   b. Switch to the user gpadmin:

      ```
      # su - gpadmin
      ```

   c. When prompted for the password, enter `changeme`.

      If the default password `changeme` was changed; enter the current password.

   d. Stop the Greenplum Database:

      ```
      $ gpstop -af
      ```

   e. Switch to the user root:

      ```
      $ su -
      ```

6. Disconnect both ends of the cable and remove the cable from the cable bundle. For Interconnect cable diagrams, refer to “” on page 152.
7. Connect one end of the new cable to the CNA port on the server and the other end to the correct port on the appropriate Interconnect switch.
8. Verify that the `Link` LED on the CNA card is solid green.
9. Secure the cable back into the cable bundle.
10. Verify that the **`eth4`** interface on the affected server is **`UP`** and **`RUNNING`**:

    ```
    # ifconfig eth4
    ```

    The following output should be returned:

    ```
    eth4      Link encap:Ethernet  HWaddr 8C:7C:FF:20:93:32
              UP BROADCAST RUNNING SLAVE MULTICAST  MTU:1500  Metric:1
              RX packets:921818 errors:0 dropped:0 overruns:0 frame:0
              TX packets:908966 errors:0 dropped:0 overruns:0 carrier:0
              collisions:0 txqueuelen:1000
               RX bytes:129140405 (123.1 MiB)  TX bytes:88721575 (84.6 MiB)
              Memory:ec440000-ec47ffff
    ```

If **eth4** is not **UP**, bring it up by issuing:

```
# ifup eth4
```

11. Once all of the connections are fixed, the database may be started up.

APPENDIX A
System Information and Configuration

This appendix includes the following sections:

- Greenplum DCA configurations
- Power supply reference
- Network and cabling configuration
- Network hostname and IP configuration
- Multiple-rack cabling reference
- Configuration files
- Default passwords

New firmware updates for DCA software version 2.0.3.0

Customers can apply optional firmware updates prior to upgrading to DCA software version 2.0.3.0 as follows:

- **Arista 7050S-52 and Arista 7048T switches**
  - New firmware version `EOS-4.9.8.swi`
  - Field personnel can access the `EOS-4.9.8.swi.zip` firmware upgrade package from:

    ftp://ftp.aristanetworks.com/emc/certifiedeos/EOS-4.9.8.swi

    Field personnel can obtain the following document available on http://support.emc.com for step-by-step instructions:

    EMC Greenplum DCA Firmware Upgrade Instructions for the Interconnect Switch (Arista 7050S-52) and Administration Switch (Arista 7048T)
- **Intel Servers (Kylin with eight drives, Dragon 12 with twelve drives, and Dragon 24 with 24 drives)**
  - New BIOS upgrade revision level `SE5C600.86B.02.01.0002`
  - Field personnel can access both the BIOS upgrade package, and the *EMC Greenplum DCA Intel BIOS Upgrade Instructions for Intel Servers* from http://support.emc.com.

Identify the version of the installed DCA software

DCA documentation is tied to a specific version of the DCA software. To identify the version of the software running on a particular DCA, perform this procedure:

1. Log in to the Primary Master server as the user **root**.
2. View the contents of the /opt/dca/etc/dca-build-info.txt file.
   For example:

   ```
   # cat opt/dca/etc/dca-build-info.txt
   ```

   In the output see the `ISO_Version` information.

   ```
   ## ============================================
   ISO_BUILD_DATE="Wed Oct 15 21:59:56 PST 2013"
   ISO_VERSION="2.0.2.0"
   ISO_BUILD_VERSION="4"
   ISO_INSTALL_TYPE="iso"
   ## ============================================
   ```

DCA configuration rules

Manufacturing ships three basic types of racks for the UAP DCA:

- **System** - DCA2-SYSRACK
- **Aggregation** - DCA2-AGGREG
- **Expansion** - DCA2-EXPAND

Supported DCA modules

Module type	Server/drive types and quantities
Greenplum Database (GPDB)	Four Dragon 24 servers: • Compute: x24 300GB drives per server • Standard: x24 900GB drives per server • Compute High Memory: x24 300GB drives per server, 256GB of Memory • Two Kylin servers: x6 300GB drives per server
Data Integration Accelerator (DIA) (One of these items)	• Two Kylin servers: x6 300GB drives per server • Two Dragon 12 servers: x12 3TB drives per server • Two Dragon 24 servers: 256GB of memory • Two DIA High Memory servers: x24 300GB drives per server (256GB of memory)
Hadoop (HD) (master or worker)	Four Dragon 12 servers: x12 3TB drives per server
Hadoop Compute option (referred to as HD-C module and used for Hadoop with Isilon)	Two Kylin servers: x6 300GB drives per server

Racking order

All master nodes and switches are racked first. All other nodes are racked in the following order.

Table 11 Approved DCA Racking Sequence

SKU	Rack Priority (when present)
Dragon 24, 900GB disks, 64GB RAM (100-585-031-07)	First
Dragon 24, 300GB disks, 64GB RAM (100-585-035-06)	Second
Dragon 12, 3TB disks, 64GB RAM HDM, HDW, or DIA (100-585-030-06)	Third
Dragon 24, 900GB disks, 256GB RAM SDW or DIA (100-585-055-01)	Fourth
Kylin, 64GB RAM DIA, HDC, or HDM (100-585-029-05)	Fifth

Racking guidelines

- GPDB Compute, Standard, or High Memory modules must not occupy the same DCA.
- The minimum Hadoop configuration must include two Hadoop modules, one serving as the Hadoop Master module (**hdm**) and a second serving as the Hadoop Worker (data) module (**hdw**). For Hadoop Compute with Isilon the minimum requirements are 8 Kylins (4 x2 Hadoop Compute modules).
- The 2nd rack (if present) is always an Aggregation rack.
- Racks 3 through 11 (if present) are Expansion racks.
- Any rack containing even one 100-585-055-01 is limited to thirty rack units for servers. Switches remain in the standard locations. Racks with High Memory servers should not exceed 30U.

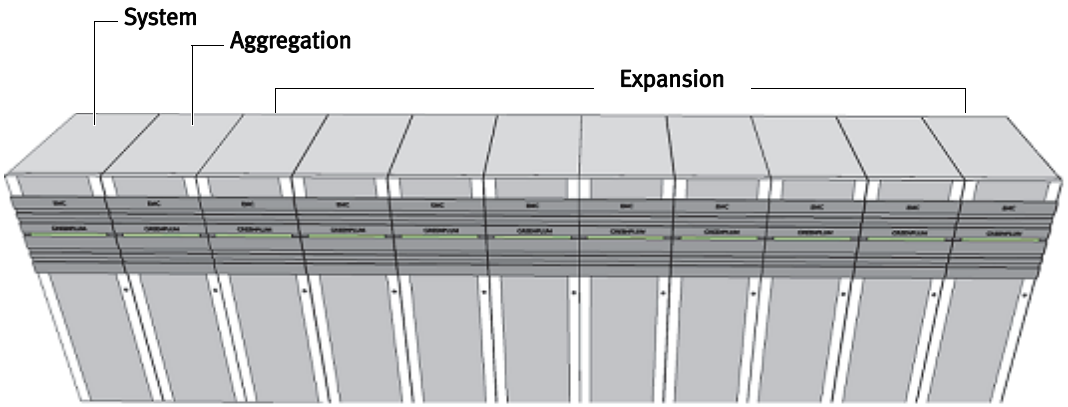


Figure 39 11-rack configuration

Figure 40 Aggregation switch locations in a multi-rack DCA

Mixed System rack components

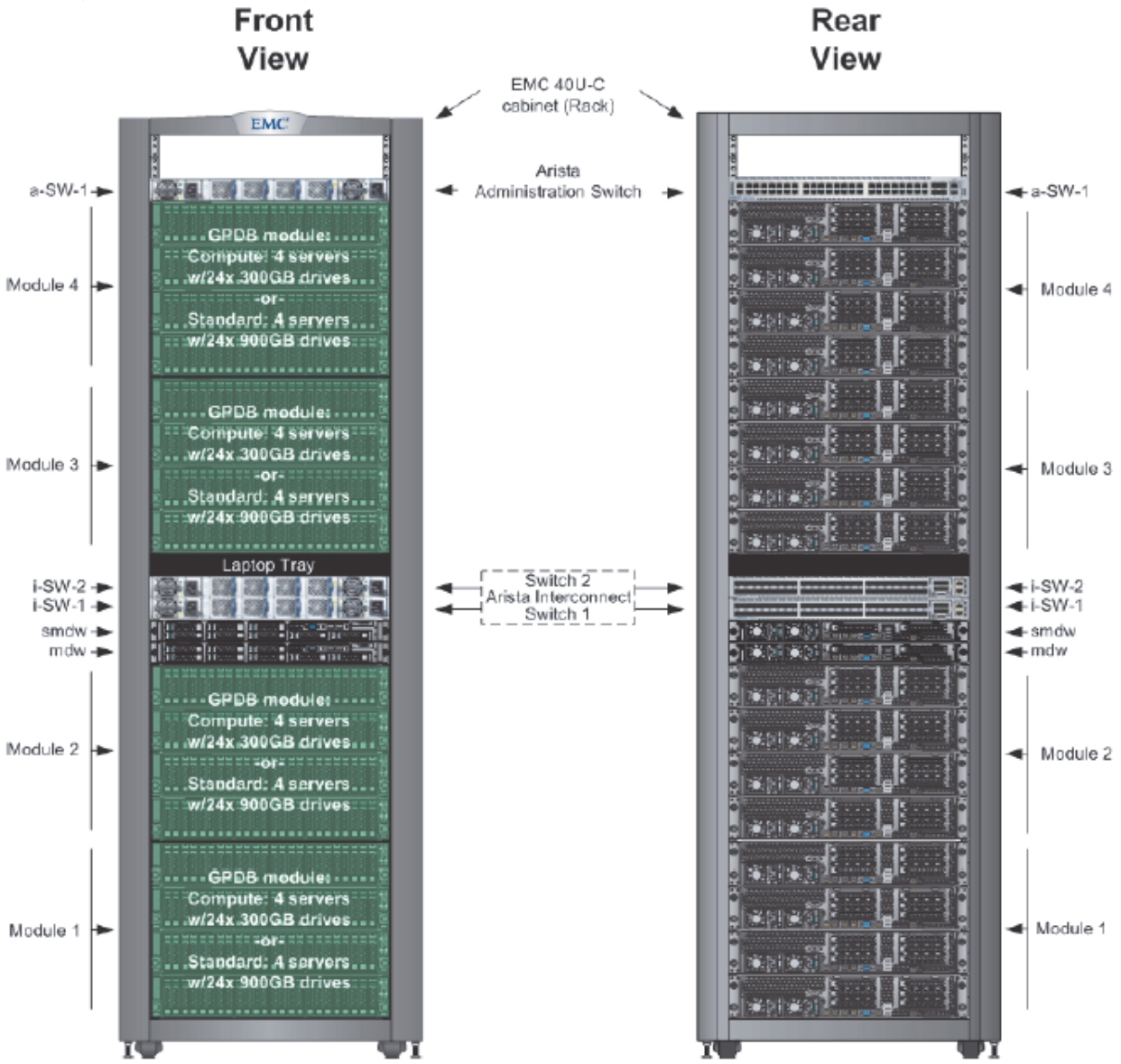


Figure 41 Greenplum DCA2-SYSRACK

Table 12 Greenplum DCA2-SYSRACK - System rack components

DCA Component	Quantity
Hadoop Servers (Dragon 12, 2U)	16 (8 minimum, 4 hdw + 4 hdm) or 12 High Memory Systems
Master Servers (Kylin, 1U)	2 (1 Primary + 1 Standby)
GPDB (Segment) Servers (Dragon 24, 2U)	16 or 12 High Memory Systems
Interconnect Switches (Arista 7050S-52)	2
Administration Switches (Arista 7048T-A)	1

Hadoop-only System Rack components (minimum config.)

Note: Supported in DCA version 2.0.1.0 and later.

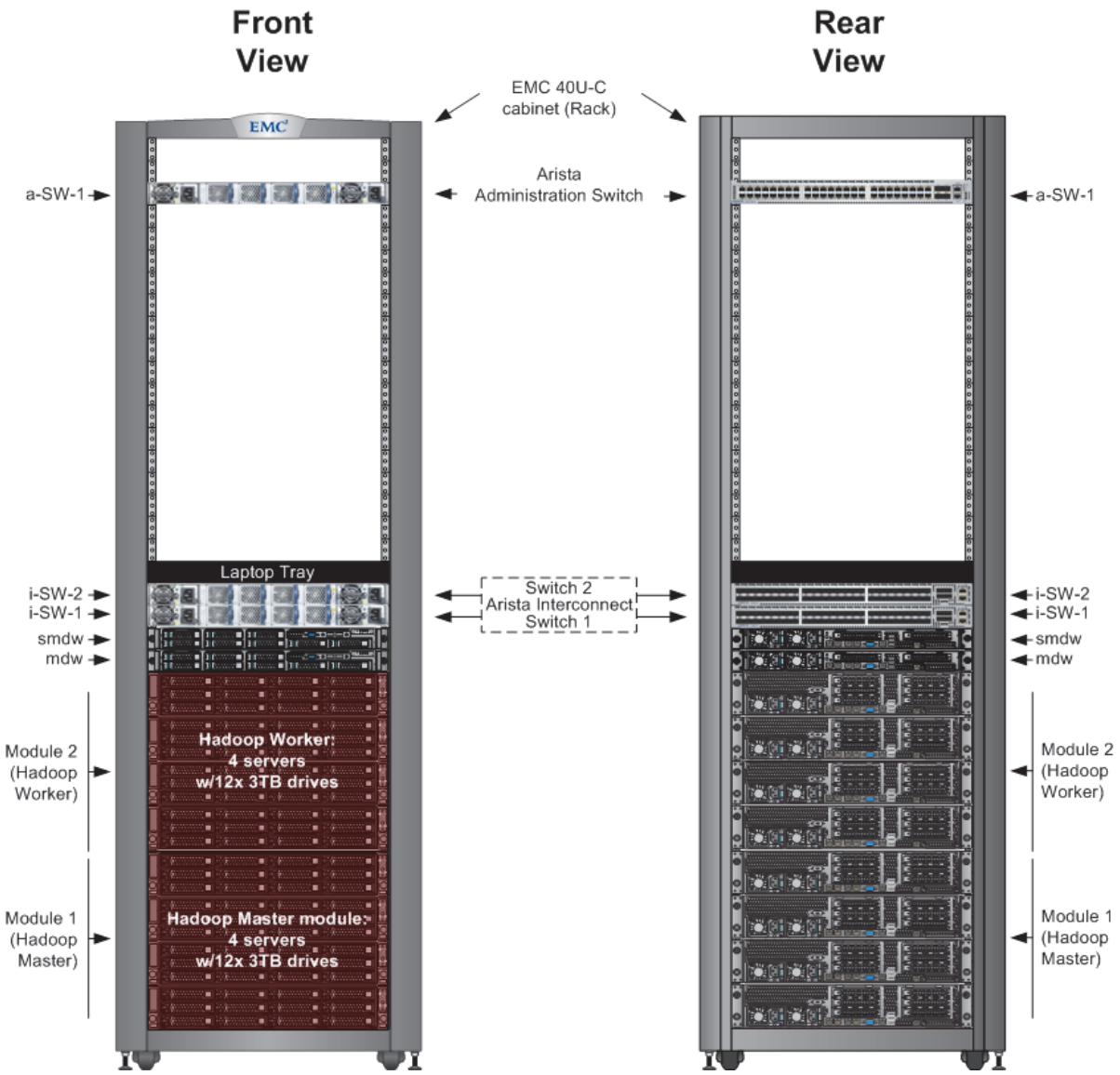


Figure 42 Hadoop-only System rack

Table 13 Hadoop-only System Rack components

DCA Component	Quantity
Hadoop Master Servers (hdm)	4 minimum
Hadoop Worker Servers (hdw)	4 minimum
Master Servers (Kylin, 1U)	2
Interconnect Switches (Arista 7050S-52)	2
Administration Switch (Arista 7048T-A)	1

HD-Compute System Rack components (minimum config.)

Note: Supported in DCA version 2.0.2.0 and later.

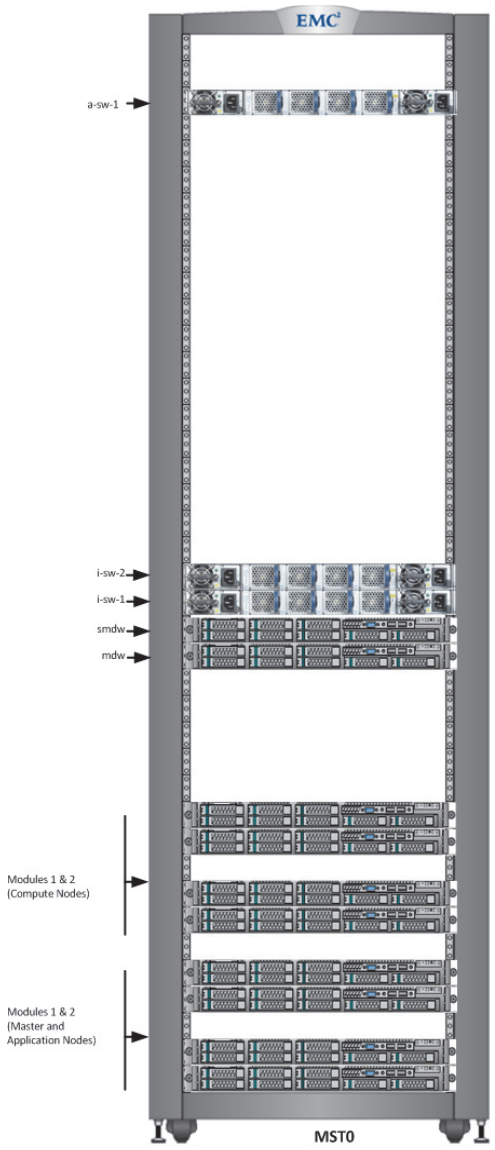


Figure 43 HDC-Compute System rack

Table 14 HDC-Compute System rack components

DCA Component	Quantity
Hadoop Compute Servers (hdc)	8 minimum, 22 maximum

Aggregation rack components

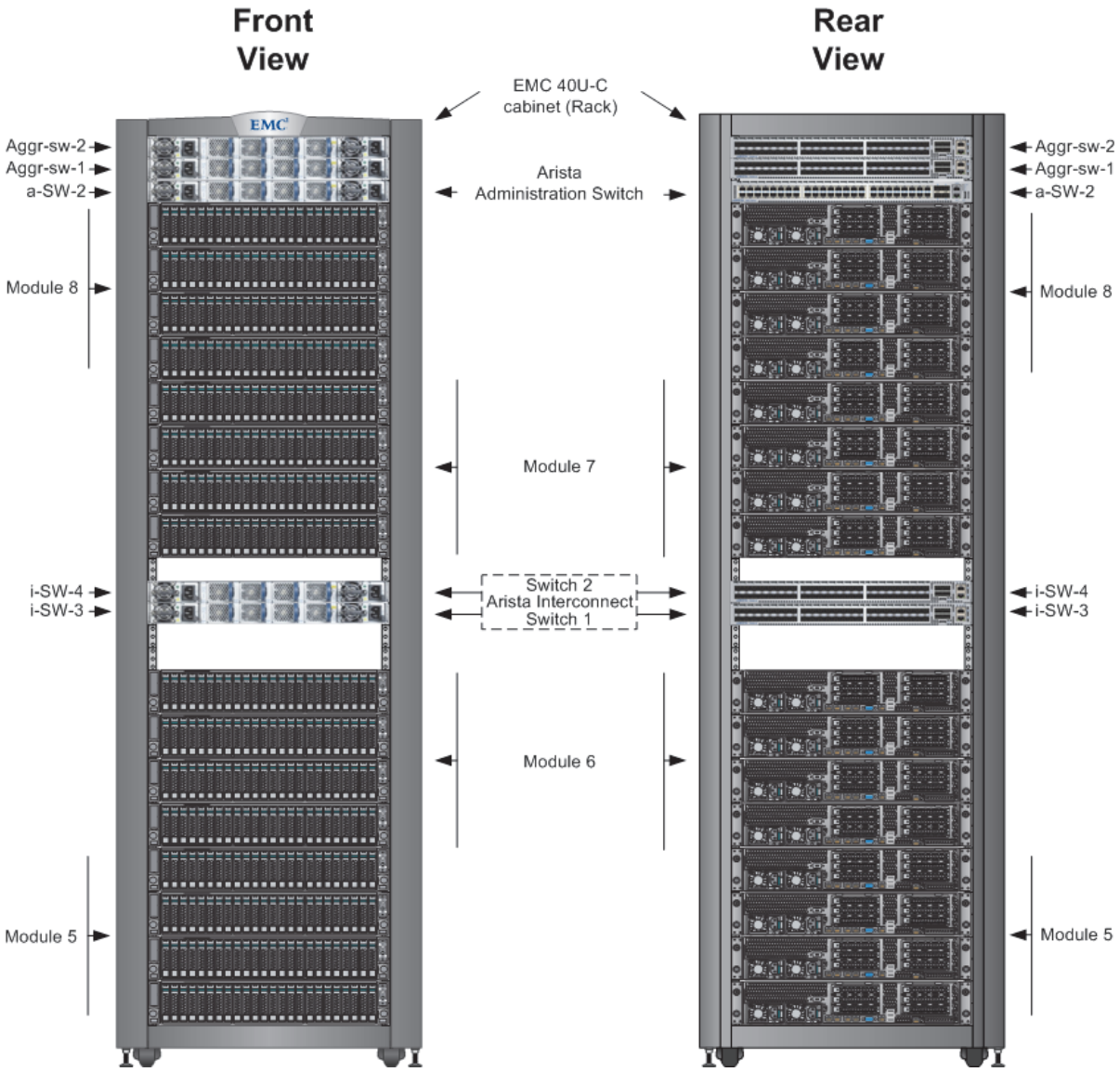


Figure 44 Greenplum DCA2-AGGREG

Table 15 Greenplum DCA2-AGGERG - Aggregation rack components

DCA Component	Quantity
Segment Servers	16 maximum (or 12 maximum with High Memory Modules)
Master Servers (Kylin, 1U)	0
Interconnect Switches (Arista 7050S-52)	4 (2 for the Interconnect network; 2 for the Aggregation network)
Administration Switch (Arista 7048T-A)	1

Expansion rack components

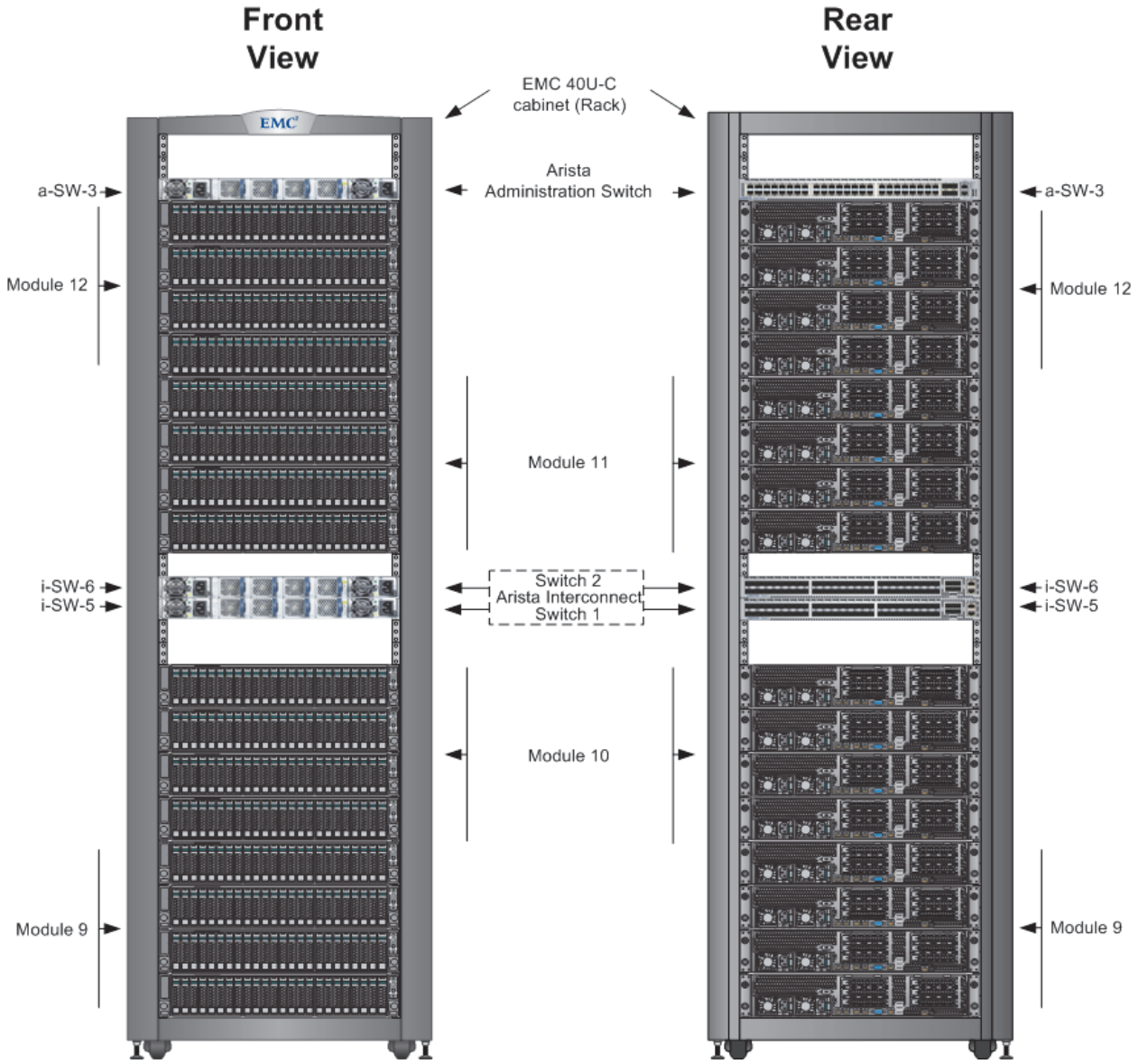


Figure 45 Greenplum DCA2-EXPAND

Table 16 Greenplum DCA2-EXPAND - Expansion rack components

Component	Quantity
Segment Servers	16 maximum (or 12 maximum with High Mem Module)
Master Servers (Kylin, 1U)	0
Interconnect Switches (Arista 7050S-52)	2
Administration Switch (Arista 7048T-A)	1

Power supply reference

Figure 46 shows four external customer-supplied power input circuits connected to DCA Power Distribution Units (PDUs). The figure shows a full System rack.

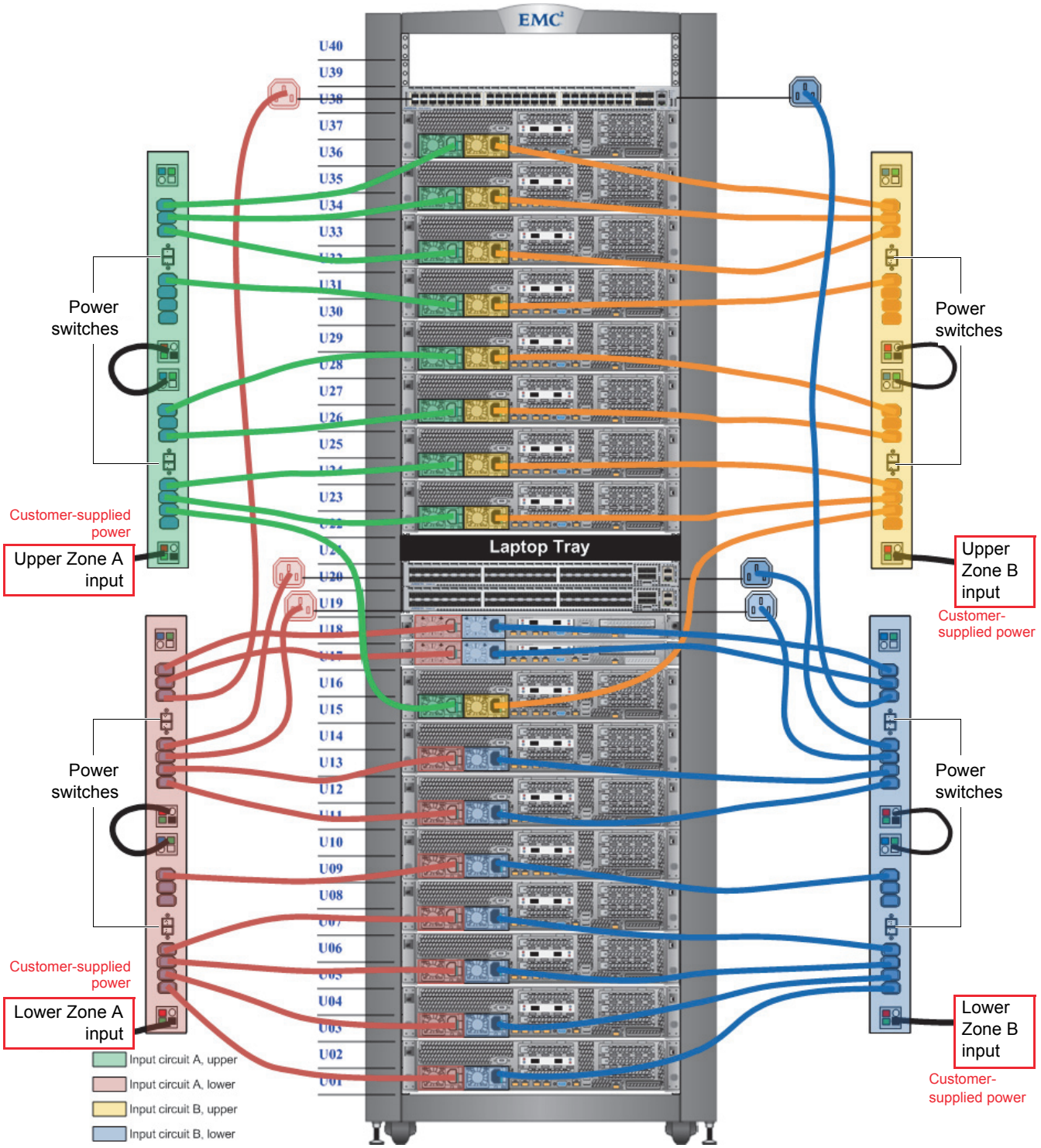


Figure 46 Greenplum DCA power cable configuration, full System rack

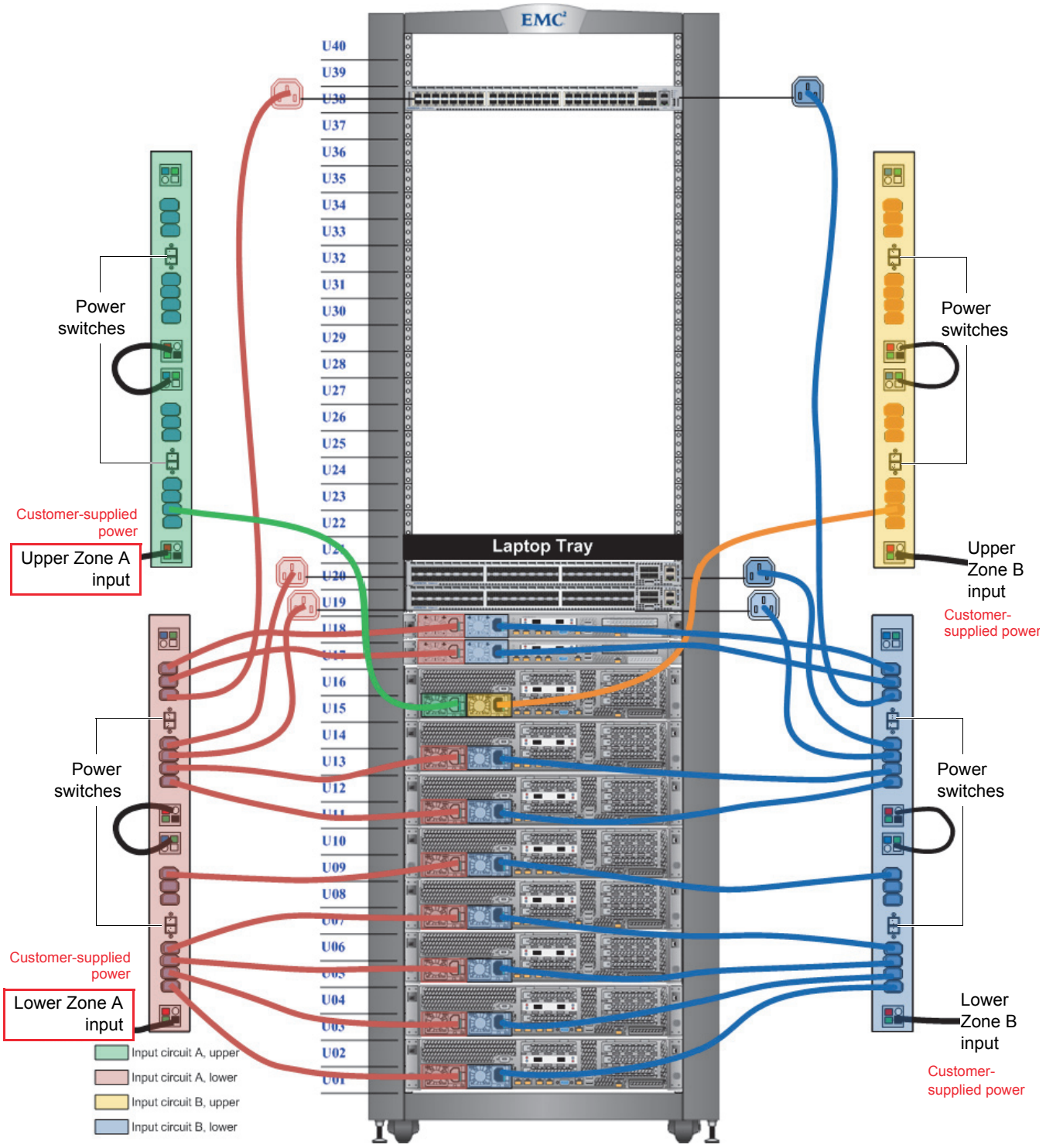


Figure 47 Greenplum DCA power cable configuration, 1/2 System rack

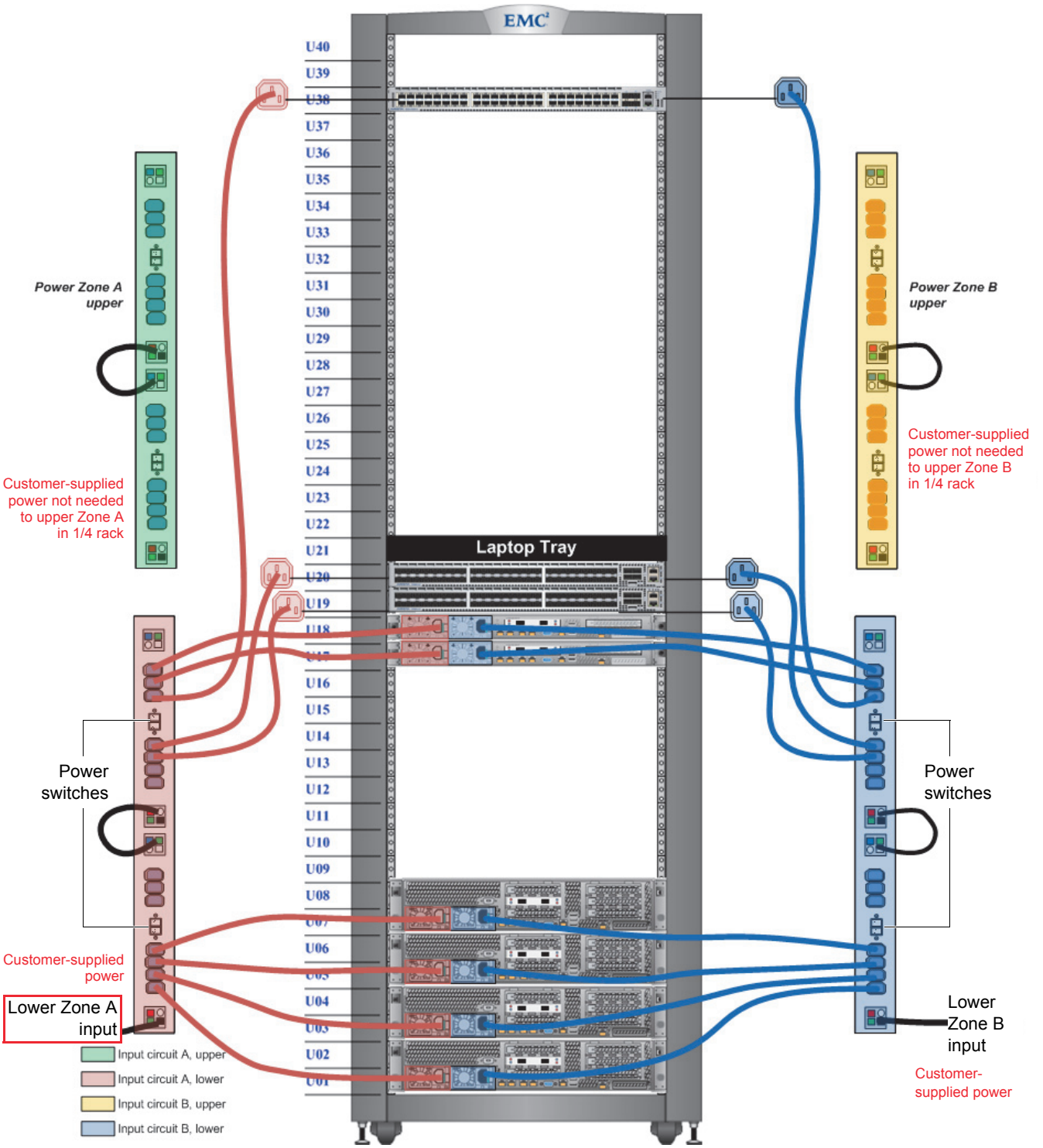


Figure 48 Greenplum DCA power cable configuration, 1/4 System rack

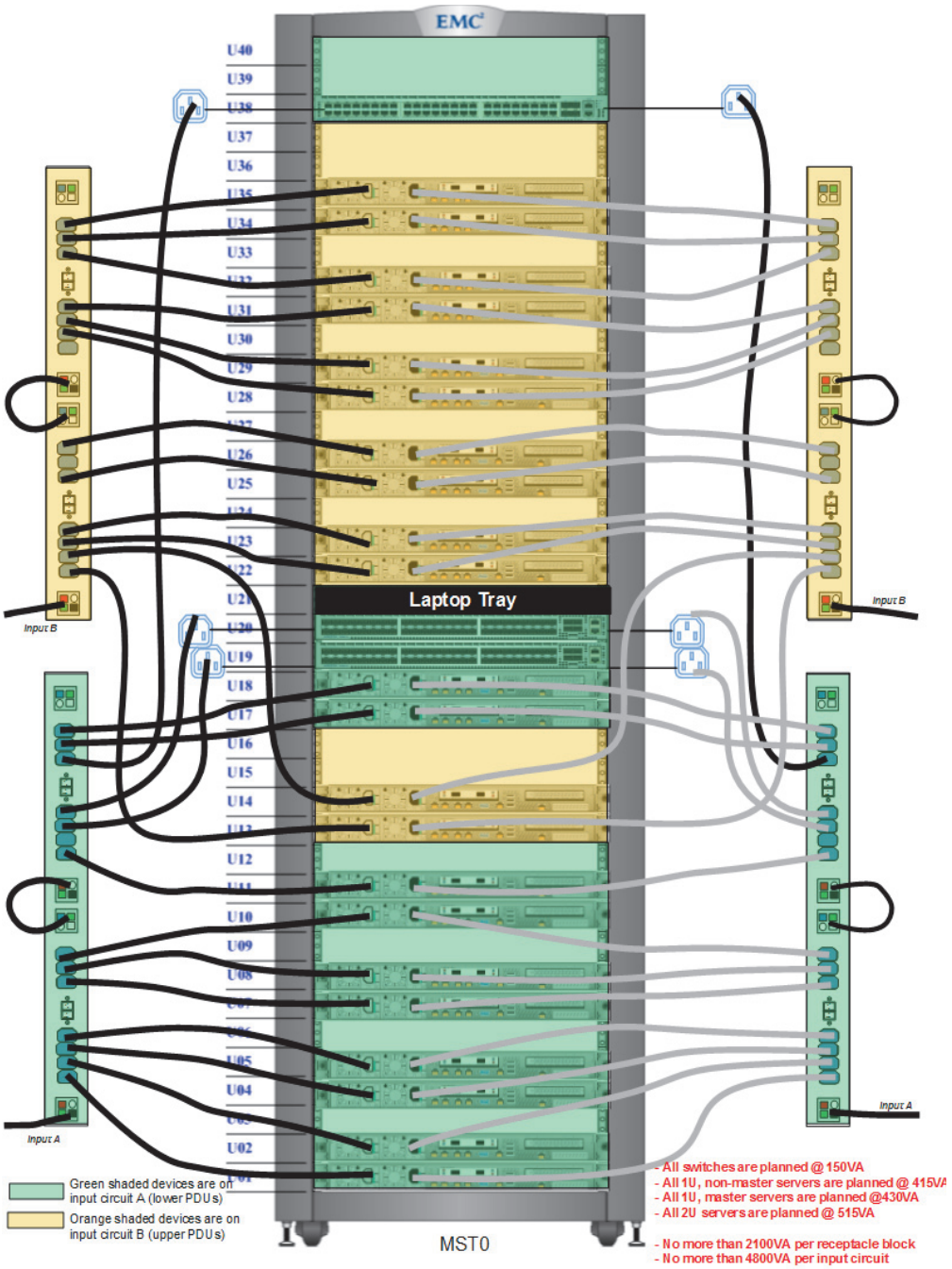


Figure 49 Dense rack configuration

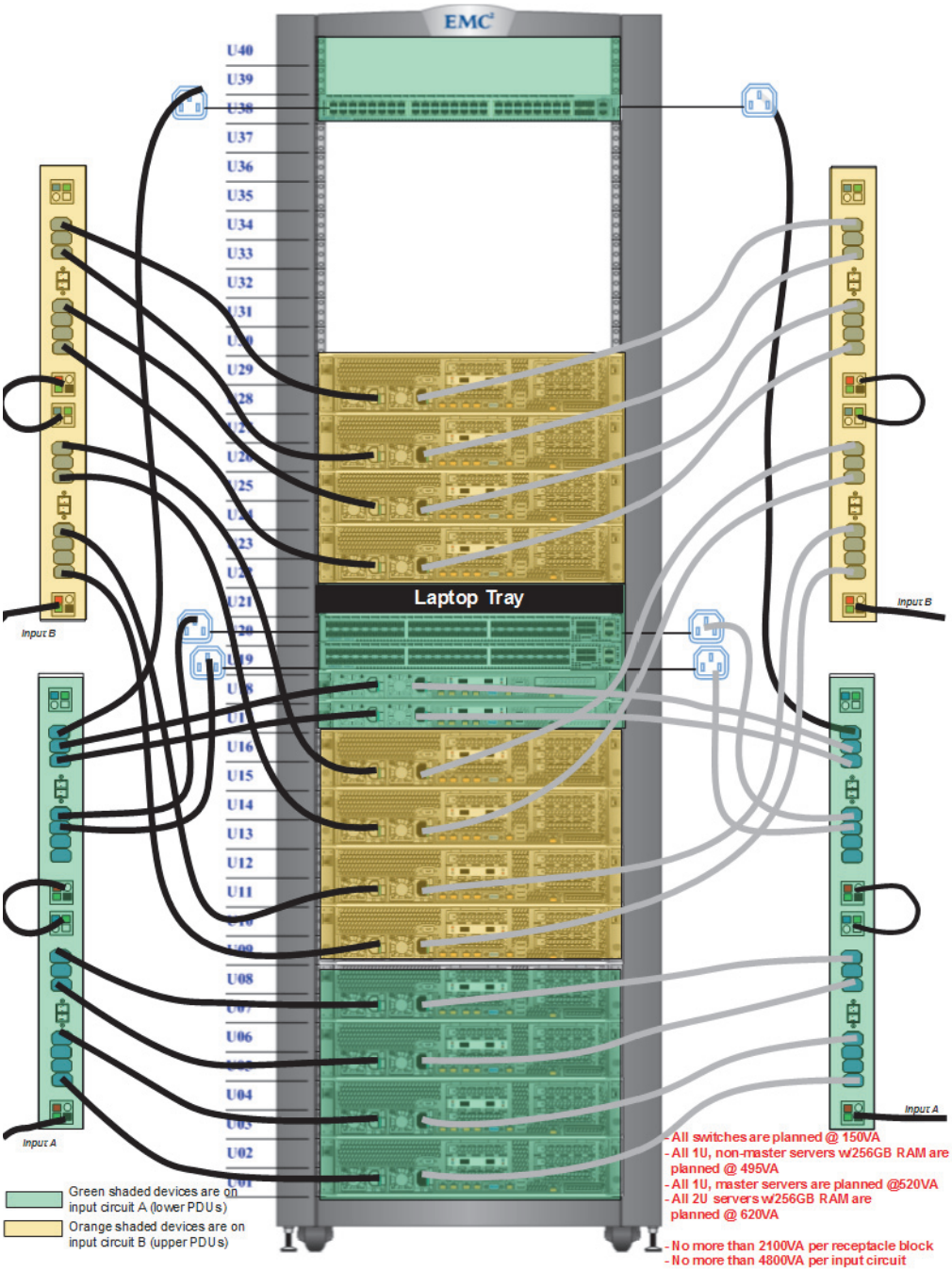


Figure 50 High memory system rack configuration

BMC Controller interface functionality

The baseboard management controller (BMC) is a built-in interface included in most DCA servers. The BMC provides out-of-band system management facilities. The controller integrates its own processor, memory, battery, network connection, and access to the system bus. Key features (available through a supported web browser) include:

- Power management
- Virtual media access
- Remote console capabilities

BMC gives system administrators the ability to manage a machine as if they were sitting at the local console.

BMC Controller LED indicators and meanings

Table 17 lists BMC LED states and components to check.

Table 17 BMC LED indictor status and possible required action

Color	State	Criticality	Description
Green	Solid On	Normal	No action required by Field Support. BMC is operating in a healthy state.
Green	Blink (1 per second)	Degraded	**Redundancy is lost or a non-critical warning/error** Check for these possible issues: • Redundancy loss such as power-supply or fan • Correctable ECC memory error • Non-critical threshold crossed (Temp, Voltage, input power)
Amber	Solid On	Non-critical	**Non-fatal alarm** Check for critical thresholds surpassed on: • Temp • Voltage • Input power • Hard Drives • Fans (minimum number of fans not present)
Amber	Blink (1 per second)	Critical	**Critical error** Check for: • Power fault • Insufficient memory present • CPU thermal trip

Network and cabling configurations

This section describes the network cabling configurations for the Interconnect and administration switches.

Interconnect cabling reference

Each rack in the DCA contains two Interconnect switches which provide the Greenplum Interconnect network. Topics in this section include:

- "Lower Interconnect switch cabling reference"
- "Upper Interconnect switch cabling reference"
- "Dense rack switch cabling reference"
- "Dense rack Interconnect 2 configuration (dual NIC)"

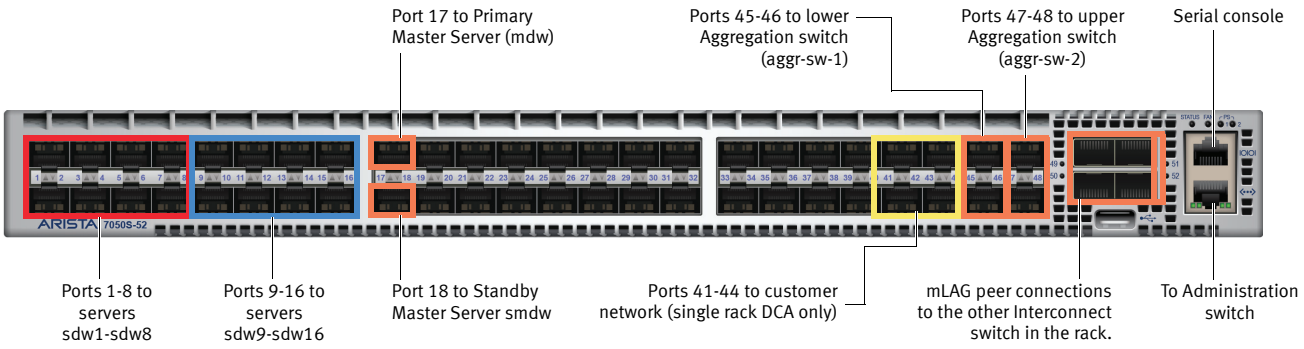


Figure 51 Interconnect switch port map

Lower Interconnect switch cabling reference

The lower Interconnect switch connects servers to the first Interconnect. Lower Interconnect switches are always odd-numbered hostnames (for example, i-sw-1, i-sw-3, i-sw-5, etc.).

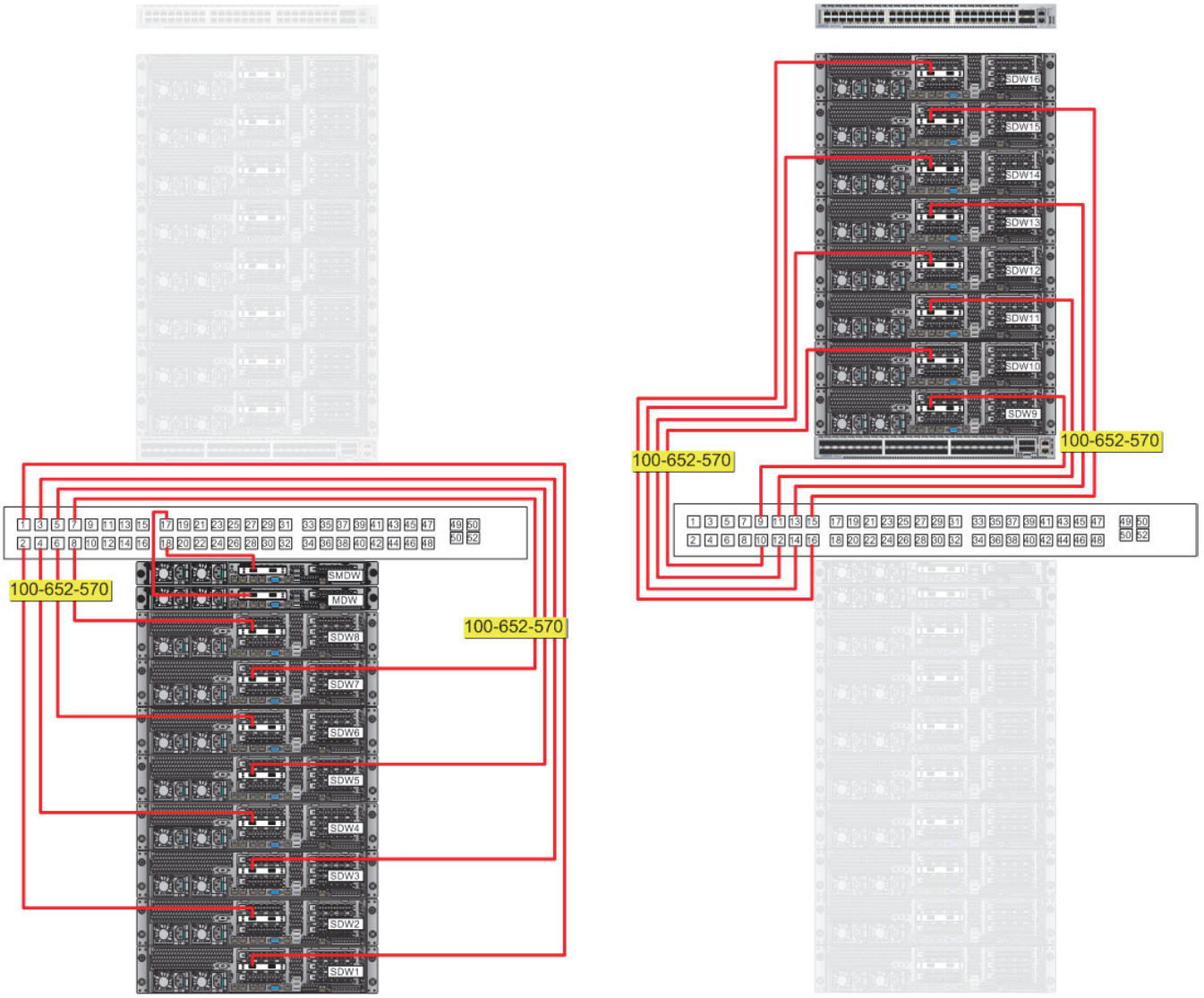


Figure 52 Lower Interconnect switch cabling reference

Upper Interconnect switch cabling reference

The upper Interconnect Switch connects servers to the second Interconnect. Upper Interconnect switches are always even-numbered hostnames (for example, i-sw-2, i-sw-4, i-sw-6, etc.).

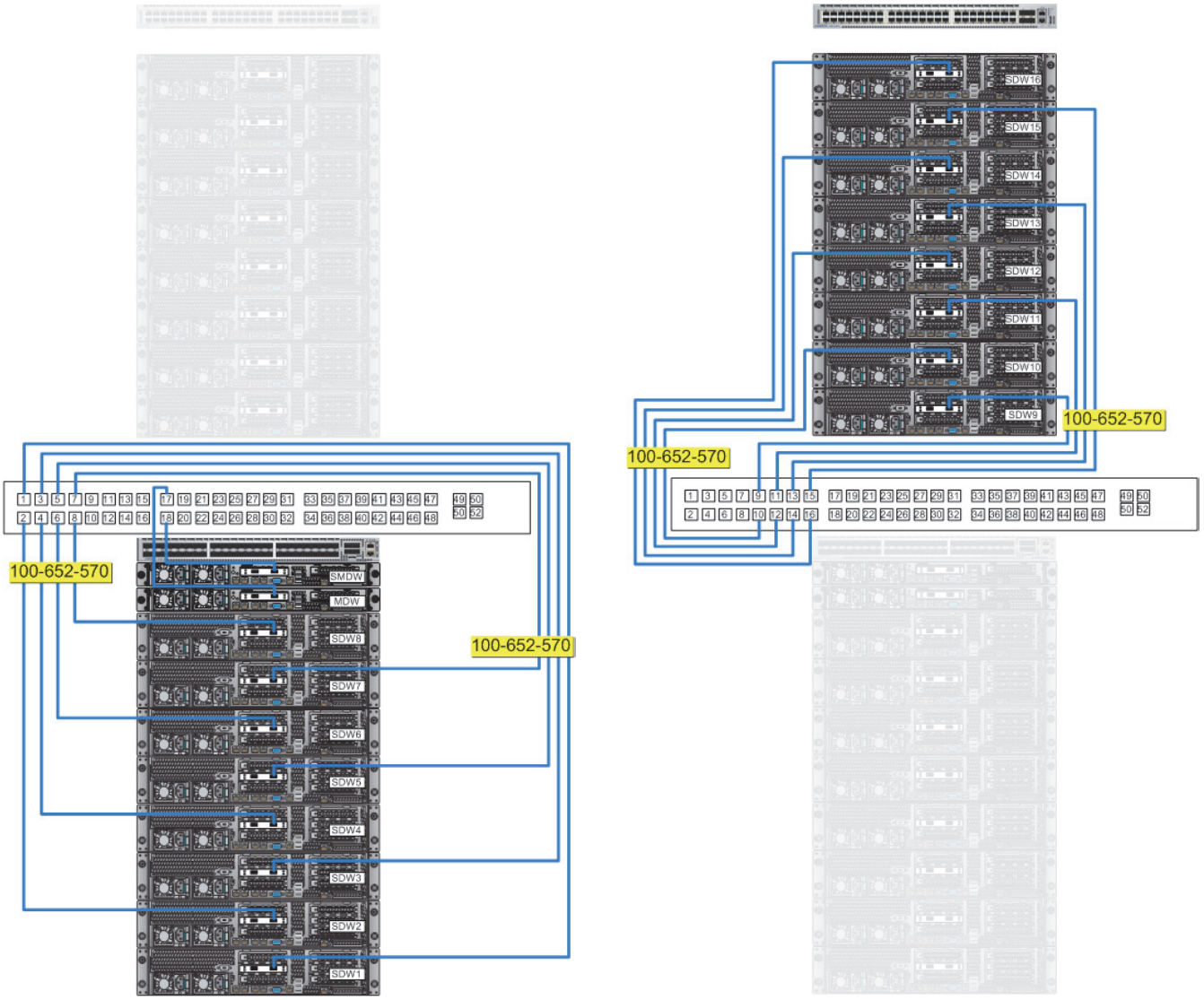


Figure 53 Upper Interconnect switch cabling reference

Dense rack switch cabling reference

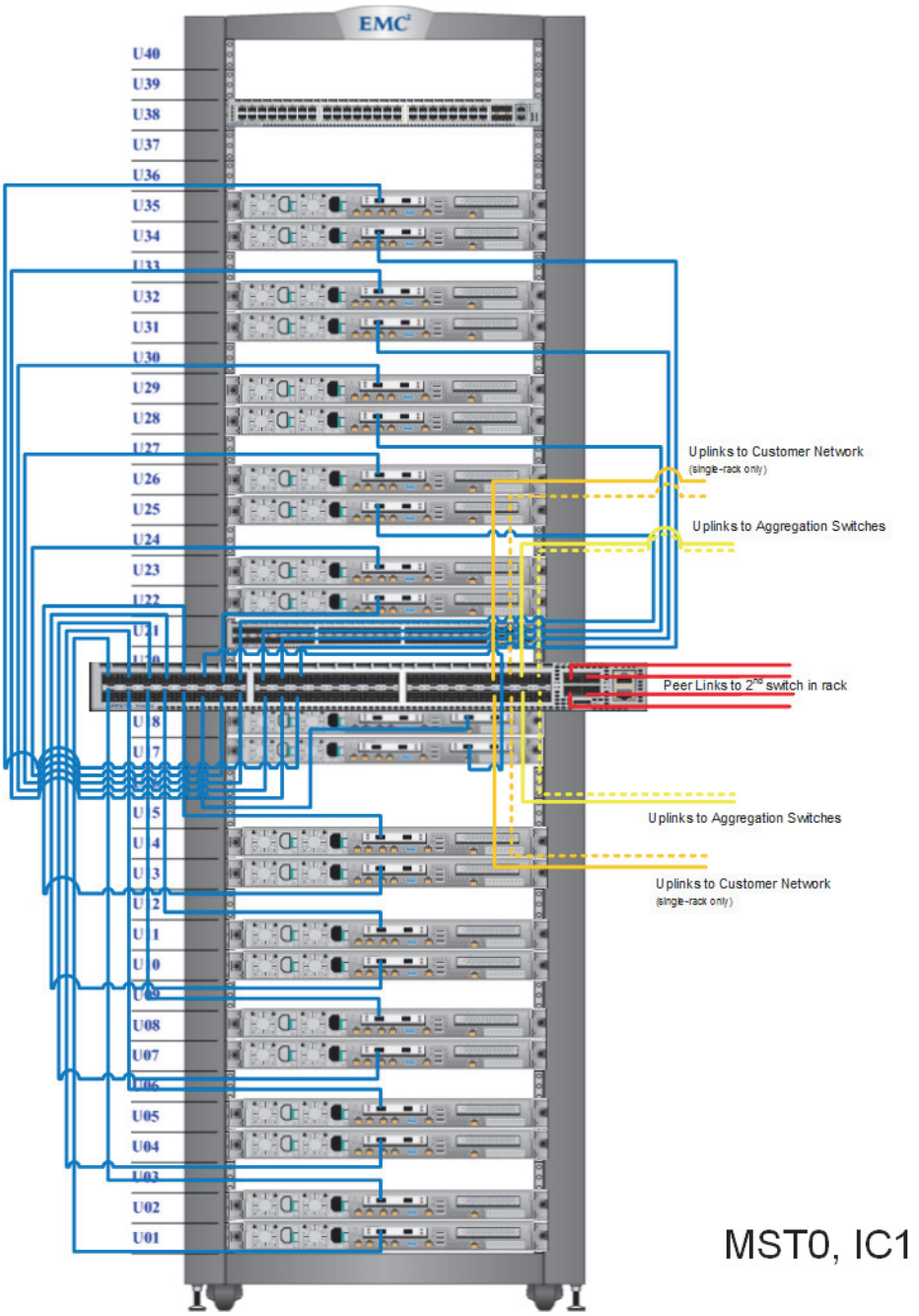


Figure 54 Dense rack Interconnect 1 configuration (dual NIC)

Dense rack Interconnect 2 configuration (dual NIC)

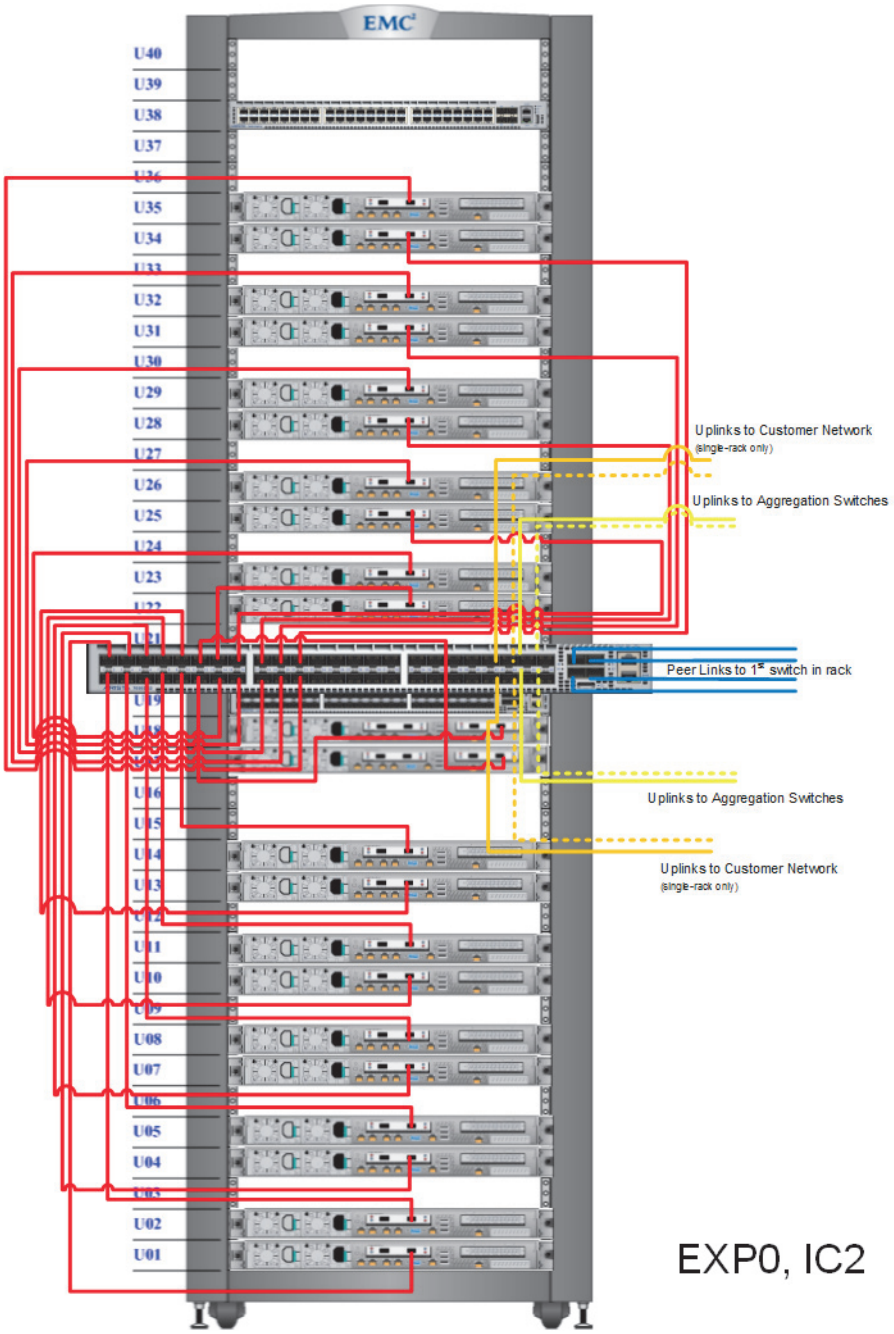


Figure 55 Dense rack Interconnect 2 configuration (dual NIC)

Table 18 Interconnect switch cable routing, 3-rack DCA (page 1 of 2)

	SYS-RACK		AGGR-RACK		EXPAND-RACK	
	i-sw-1	i-sw-2	i-sw-3	i-sw-4	i-sw-5	i-sw-6
IC switch port	Server CNA port 0	Server CNA port 1	Server CNA port 0	Server CNA port 1	Server CNA port 0	Server CNA port 1
1	server 1	server 1	server 1	server 1	server 1	server 1
2	server 2	server 2	server 2	server 2	server 2	server 2
3	server 3	server 3	server 3	server 3	server 3	server 3
4	server 4	server 4	server 4	server 4	server 4	server 4
5	server 5	server 5	server 5	server 5	server 5	server 5
6	server 6	server 6	server 6	server 6	server 6	server 6
7	server 7	server 7	server 7	server 7	server 7	server 7
8	server 8	server 8	server 8	server 8	server 8	server 8
9	server 9	server 9	server 9	server 9	server 9	server 9
10	server 10	server 10	server 10	server 10	server 10	server 10
11	server 11	server 11	server 11	server 11	server 11	server 11
12	server 12	server 12	server 12	server 12	server 12	server 12
13	server 13	server 13	server 13	server 13	server 13	server 13
14	server 14	server 14	server 14	server 14	server 14	server 14
15	server 15	server 15	server 15	server 15	server 15	server 15
16	server 16	server 16	server 16	server 16	server 16	server 16
17	mdw	mdw	server 17	server 17	server 17	server 17
18	smdw	smdw	server 18	server 18	server 18	server 18
19	server 17	server 17	server 19	server 19	server 19	server 19
20	server 18	server 18	server 20	server 20	server 20	server 20
21	server 19	server 19				
22	server 20	server 20				
23 to 40						
41 to 44	Customer network (in single-rack DCA)					
45	aggr-sw-1 port 1	aggr-sw-1 port 3	aggr-sw-1 port 5	aggr-sw-1 port 7	aggr-sw-1 port 9	aggr-sw-1 port 11
46	aggr-sw-1 port 2	aggr-sw-1 port 4	aggr-sw-1 port 6	aggr-sw-1 port 8	aggr-sw-1 port 10	aggr-sw-1 port 12
47	aggr-sw-2 port 1	aggr-sw-2 port 3	aggr-sw-2 port 5	aggr-sw-2 port 7	aggr-sw-2 port 9	aggr-sw-2 port 11
48	aggr-sw-2 port 2	aggr-sw-2 port 4	aggr-sw-2 port 6	aggr-sw-2 port 8	aggr-sw-2 port 10	aggr-sw-2 port 12
49	mLAG peer link: i-sw-1 to i-sw-2		mLAG peer link: i-sw-3 to i-sw-4		mLAG peer link: i-sw-5 to i-sw-6	

Table 18 Interconnect switch cable routing, 3-rack DCA (page 2 of 2)

	SYS-RACK	AGGR-RACK	EXPAND-RACK
50	mLAG peer link: i-sw-1 to i-sw-2	mLAG peer link: i-sw-3 to i-sw-4	mLAG peer link: i-sw-5 to i-sw-6
51	mLAG peer link: i-sw-1 to i-sw-2	mLAG peer link: i-sw-3 to i-sw-4	mLAG peer link: i-sw-5 to i-sw-6
52	mLAG peer link: i-sw-1 to i-sw-2	mLAG peer link: i-sw-3 to i-sw-4	mLAG peer link: i-sw-5 to i-sw-6

Administration switch reference

The DCA contains one Administration switch per rack. The Administration switch routes management traffic, connects all of the servers and switches in a DCA, and provides service connectivity through a red service cable.

Topics in this section include:

- "Rack 1 Administration switch cabling reference"
- "Dense rack Interconnect 2 configuration (dual NIC)"
- "Dense rack Interconnect 2 configuration (dual NIC)"

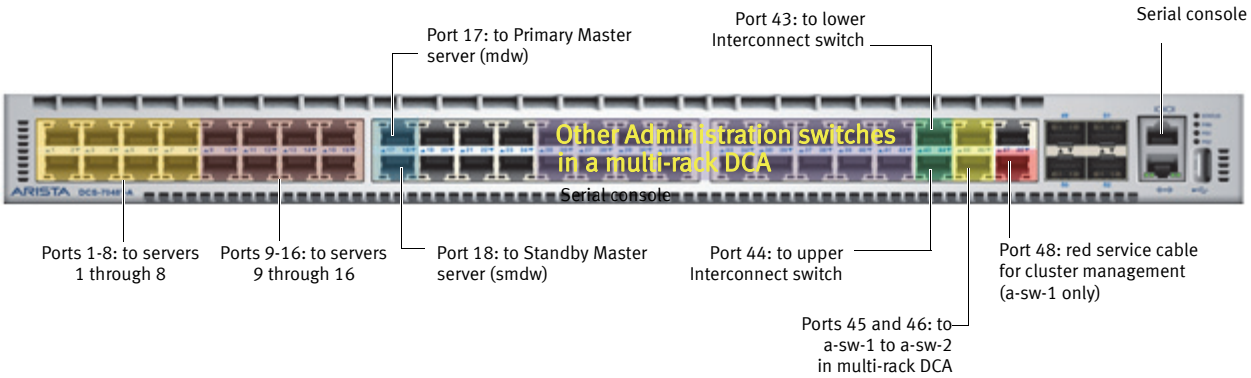


Figure 56 Administration switch port map, single rack DCA

Rack 1 Administration switch cabling reference

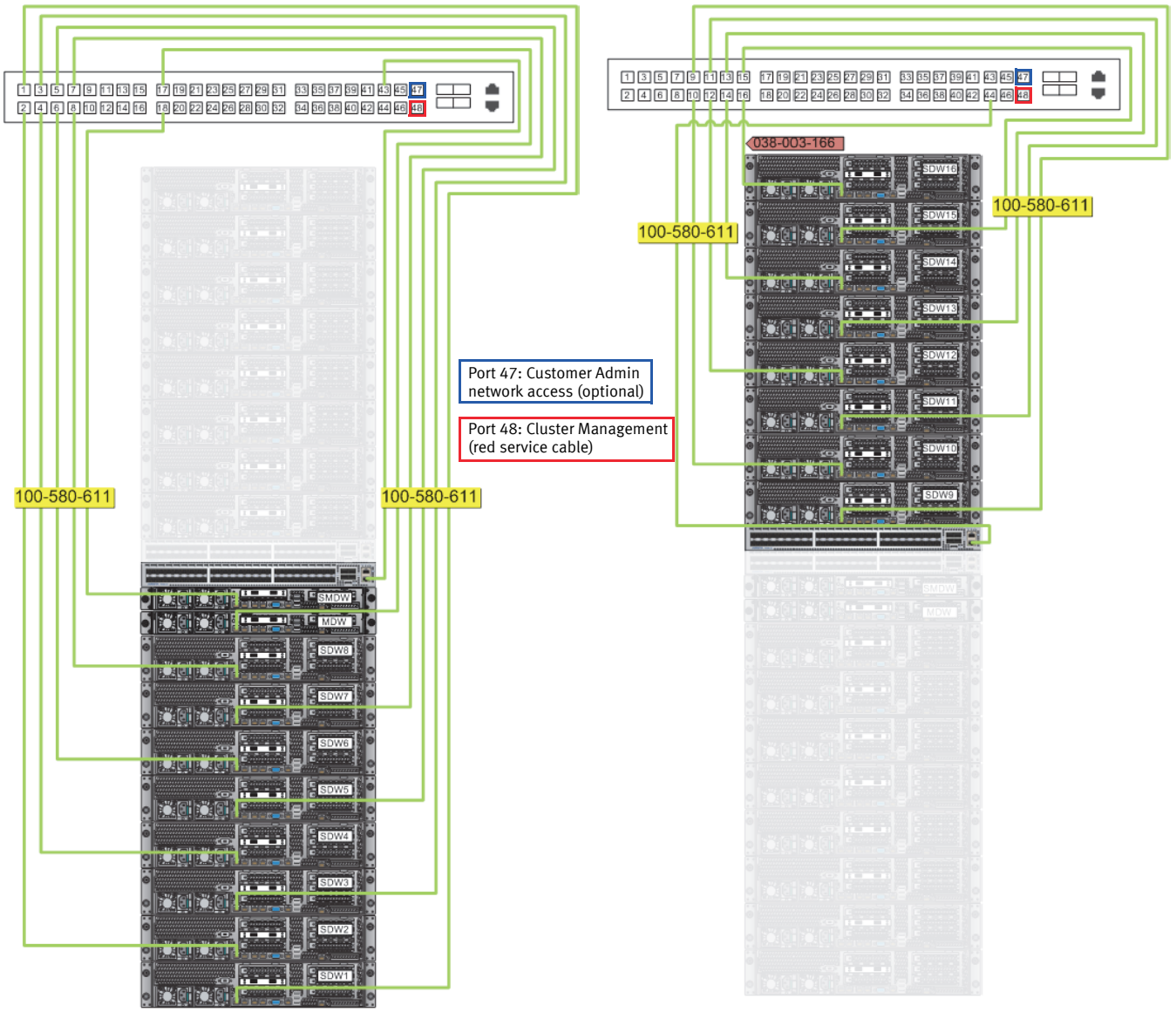


Figure 57 Rack 1 Administration switch cabling reference

Dense rack Administration switch port mapping reference

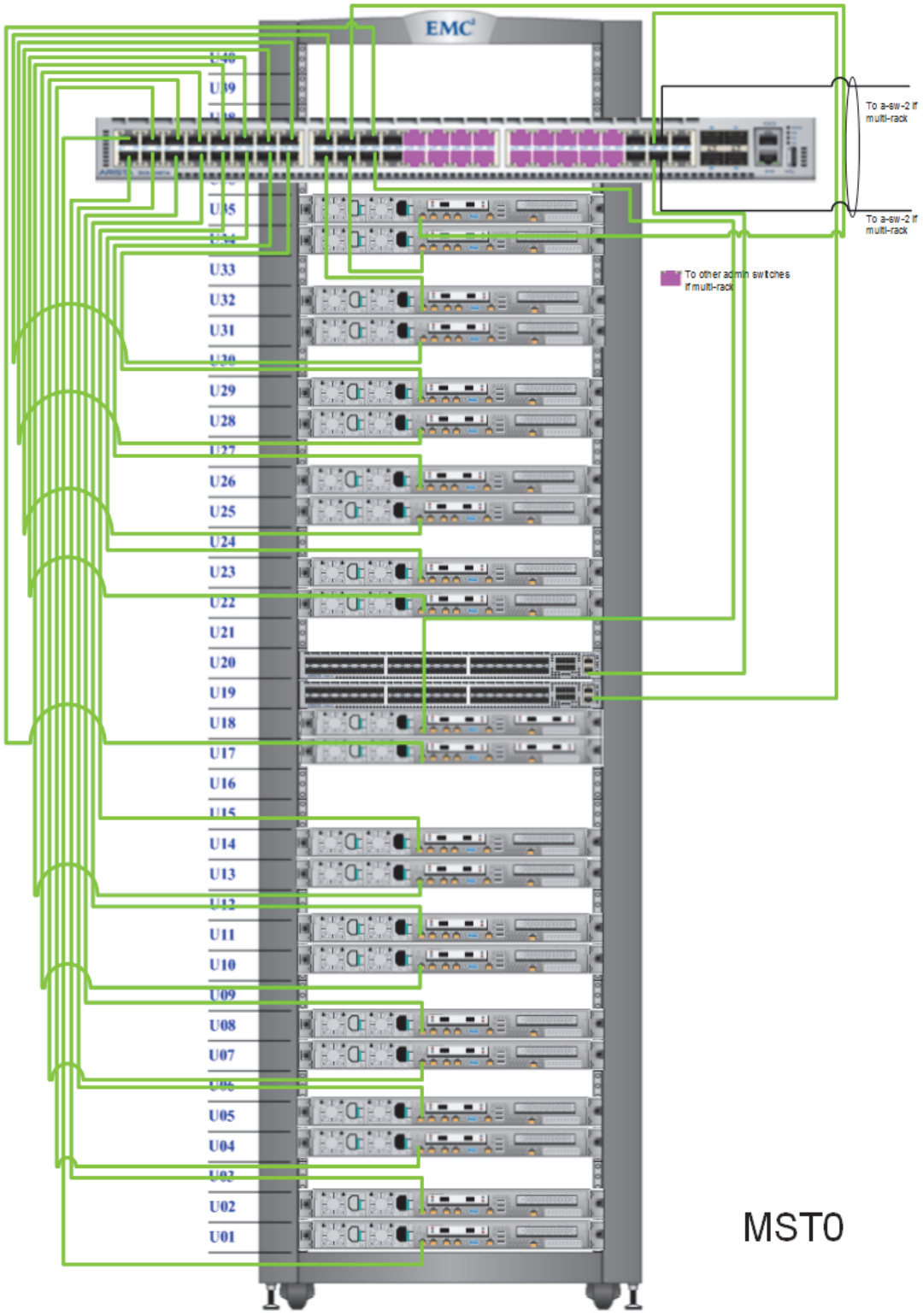


Figure 58 Dense rack Administration switch port mapping to servers 9 - 16

Administration switch cabling routing reference

Table 19 Administration switch cable routing

Admin Switch Port	a-sw-1 in SYS-RACK	a-sw-2 in AGGR-RACK	a-sw-3 in EXPAND-RACK
1	server 1	server 1	server 1
2	server 2	server 2	server 2
3	server 3	server 3	server 3
4	server 4	server 4	server 4
5	server 5	server 5	server 5
6	server 6	server 6	server 6
7	server 7	server 7	server 7
8	server 8	server 8	server 8
9	server 9	server 9	server 9
10	server 10	server 10	server 10
11	server 11	server 11	server 11
12	server 12	server 12	server 12
13	server 13	server 13	server 13
14	server 14	server 14	server 14
15	server 15	server 15	server 15
16	server 16	server 16	server 16
17	mdw	server 17	server 17
18	smdw	server 18	server 18
19	server 17	server 19	server 19
20	server 18	server 20	server 20
21	server 19	—	—
22	server 20	—	n/a
23	—	—	n/a
24	—	—	n/a

Admin Switch Port	a-sw-1 in SYS-RACK	a-sw-2 in AGGR-RACK	a-sw-3 in EXPAND-RACK
25	a-sw-3, port 45	a-sw-3, port 46	n/a
26	a-sw-4, port 45	a-sw-4, port 46	n/a
27	a-sw-5, port 45	a-sw-5, port 46	n/a
28	a-sw-6, port 45	a-sw-6, port 46	n/a
29	a-sw-7, port 45	a-sw-7, port 46	n/a
30	a-sw-8, port 45	a-sw-8, port 46	n/a
31	a-sw-9, port 45	a-sw-9, port 46	n/a
32	a-sw-10, port 45	a-sw-10, port 46	n/a
33	a-sw-11, port 45	a-sw-11, port 46	n/a
34	a-sw-12, port 45	a-sw-12, port 46	n/a
35	n/a	n/a	n/a
36	n/a	n/a	n/a
37	n/a	n/a	n/a
38	n/a	n/a	n/a
39	n/a	n/a	n/a
40	n/a	n/a	n/a
41	n/a	n/a	n/a
42	n/a	n/a	n/a
43	Lower Interconnect switch ‹···› port		
44	Upper Interconnect switch ‹···› port		
45	a-sw-2 peer	a-sw-1 peer	a-sw-1, port 25
46	a-sw-2 peer	a-sw-1 peer	a-sw-2, port 25
47	Customer Admin network access (optional)	Customer Admin network access (optional)	n/a
48	Cluster management (red service cable)	n/a	n/a

Note: A dash (-) indicates cable connections that vary depending on the specific type(s) and quantity of servers and racks in the DCA.

Aggregation switch reference

Servers in a multiple-rack configuration communicate through the two Aggregation switches located in Rack 2. The following diagram and table show the proper connectivity.

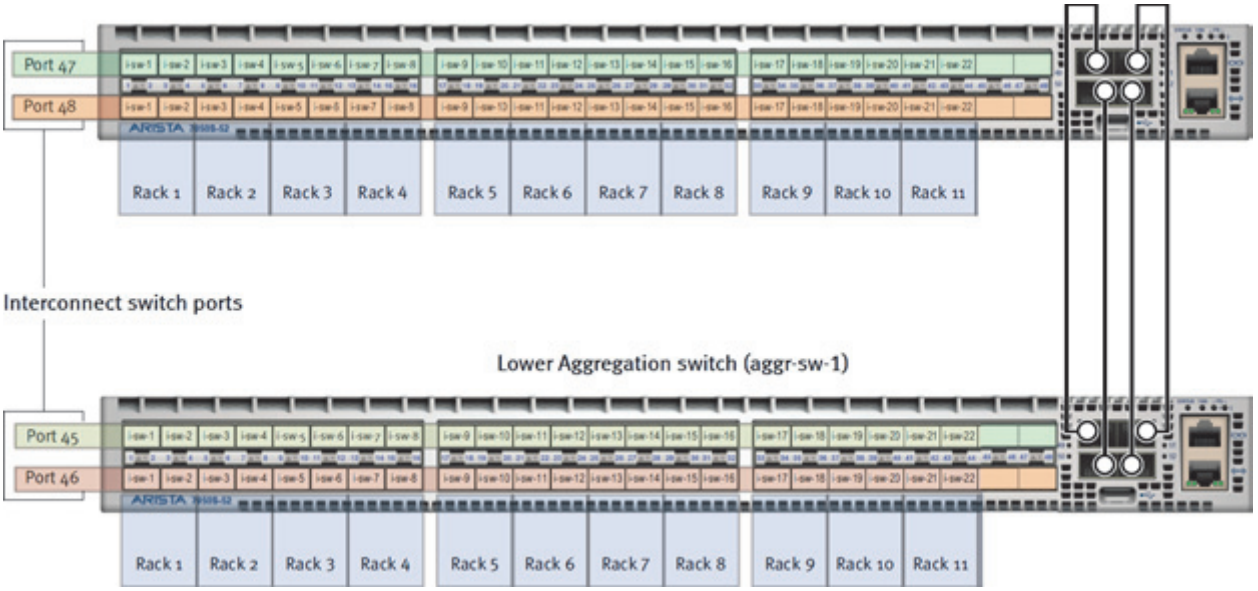


Figure 59 Aggregation switch port map

Interconnect switch-to-Aggregation switch port mapping

Table 20 Interconnect switch-to-Aggregation switch port mapping (page 1 of 6)

Rack 1 Expansion	**Upper** *Interconnect* switch (i-sw-2)	Ports		Ports		Rack 2 AGGR Rack
		47	‹·····›	3	**Upper** *Aggregation* switch (aggr-sw-2)	
		48	‹·····›	4		
		Ports		Ports		
		45	‹·····›	3	**Lower** *Aggregation* switch (aggr-sw-1)	
		46	‹·····›	4		
	Lower *Interconnect* switch (i-sw-1)	Ports		Ports		
		47	‹·····›	1	**Upper** *Aggregation* switch (aggr-sw-2)	
		48	‹·····›	2		
		Ports		Ports		
		45	‹·····›	1	**Lower** *Aggregation* switch (aggr-sw-1)	
		46	‹·····›	2		
Rack 2 AGG Rack	**Upper** *Interconnect* switch (i-sw-4)	Ports		Ports		Rack 2 AGGR Rack
		47	‹·····›	7	**Upper** *Aggregation* switch (aggr-sw-2)	
		48	‹·····›	8		
		Ports		Ports		
		45	‹·····›	7	**Lower** *Aggregation* switch (aggr-sw-1)	
		46	‹·····›	8		
	Lower *Interconnect* switch (i-sw-3)	Ports		Ports		
		47	‹·····›	5	**Upper** *Aggregation* switch (aggr-sw-2)	
		48	‹·····›	6		
		Ports		Ports		
		45	‹·····›	5	**Lower** *Aggregation* switch (aggr-sw-1)	
		46	‹·····›	6		

Table 20 Interconnect switch-to-Aggregation switch port mapping (page 2 of 6)

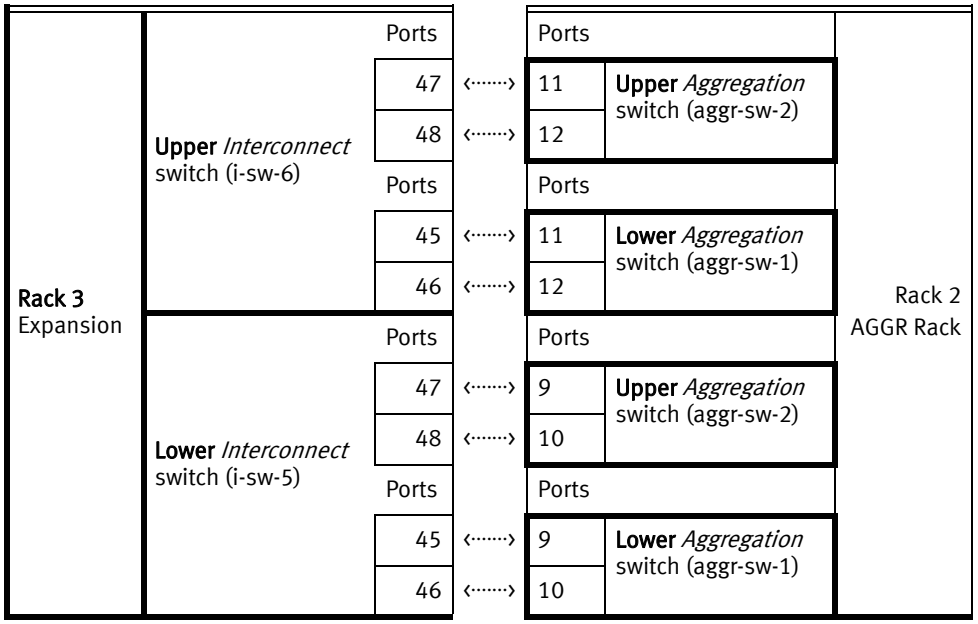


Table 20 Interconnect switch-to-Aggregation switch port mapping (page 3 of 6)

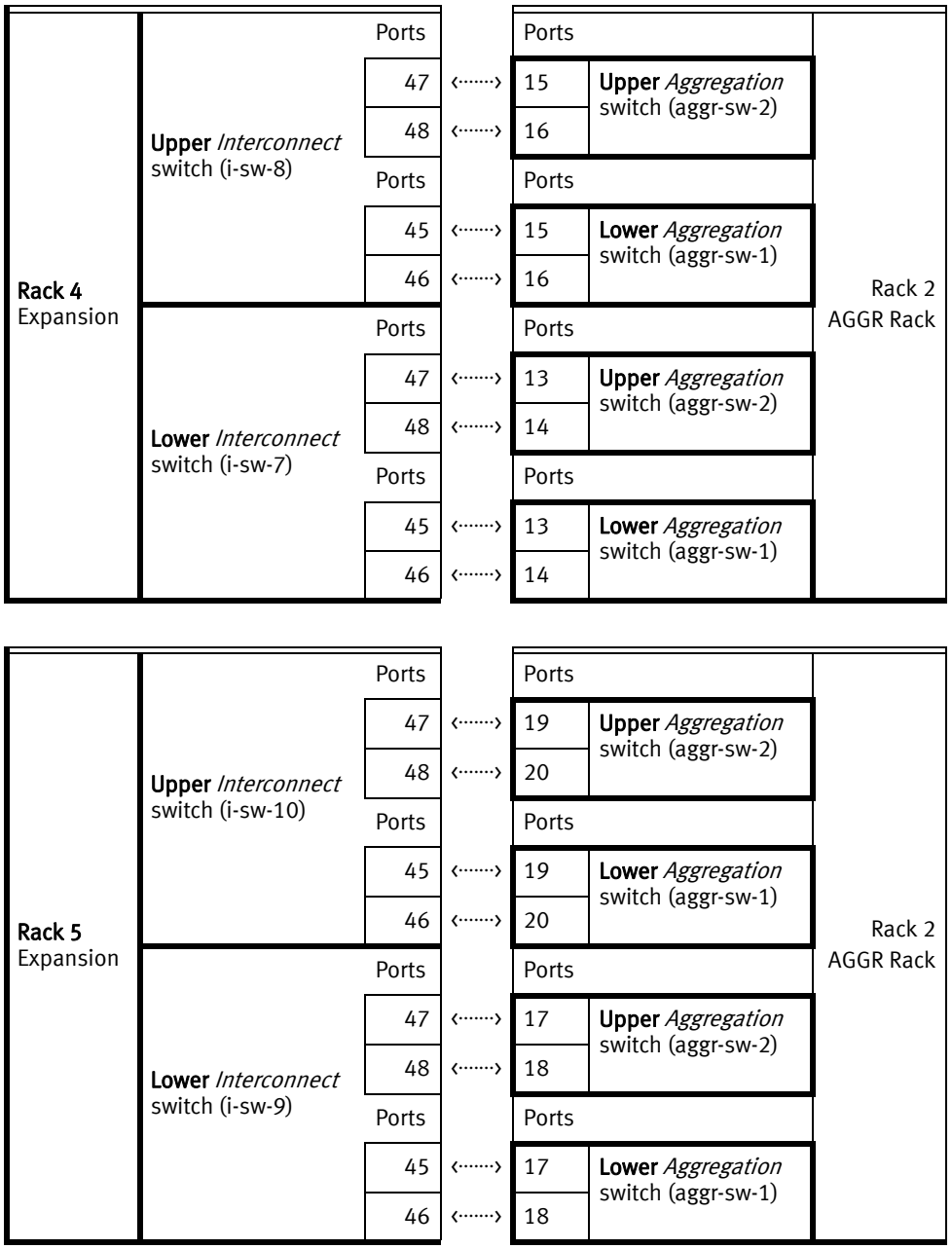


Table 20 Interconnect switch-to-Aggregation switch port mapping (page 4 of 6)

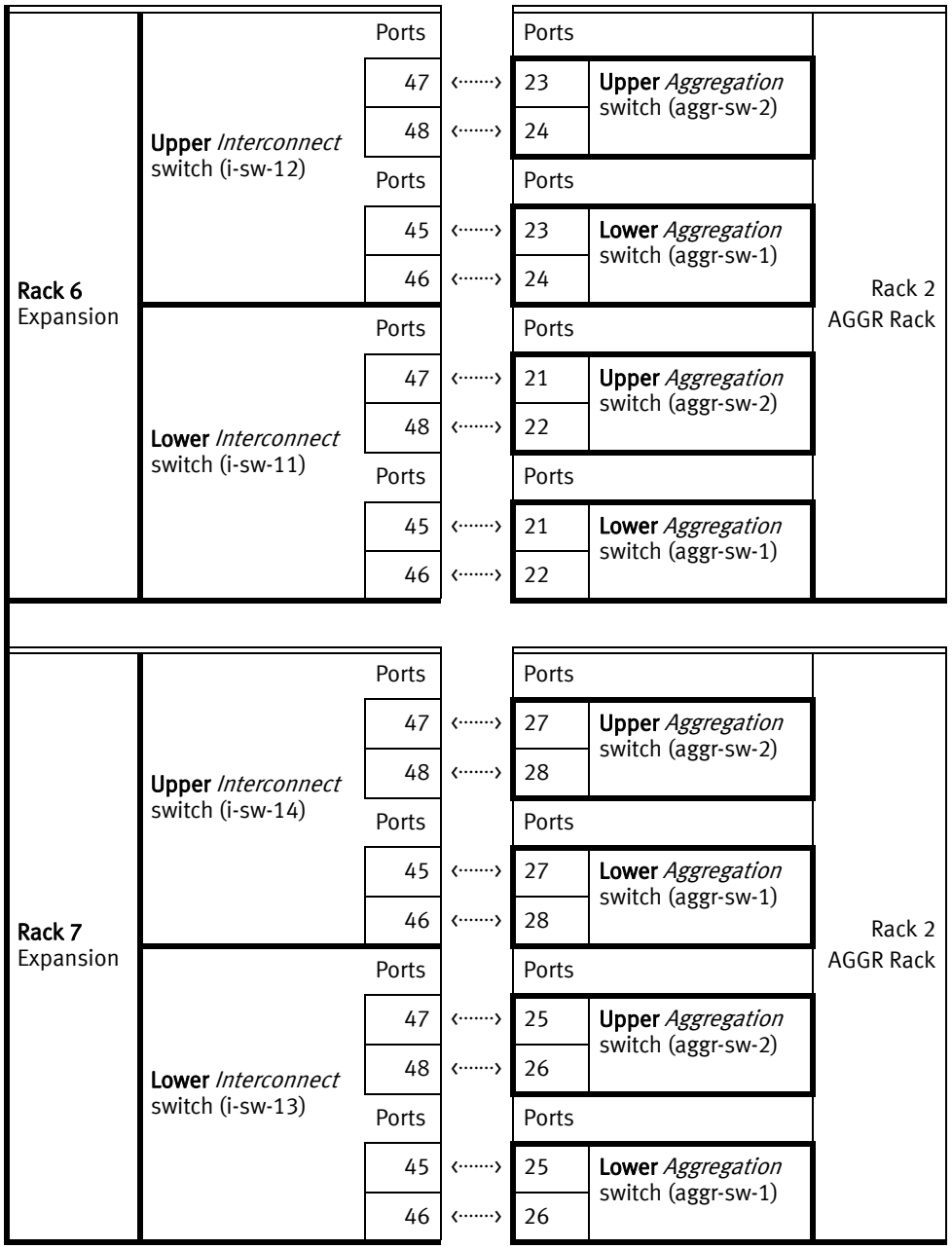


Table 20 Interconnect switch-to-Aggregation switch port mapping (page 5 of 6)

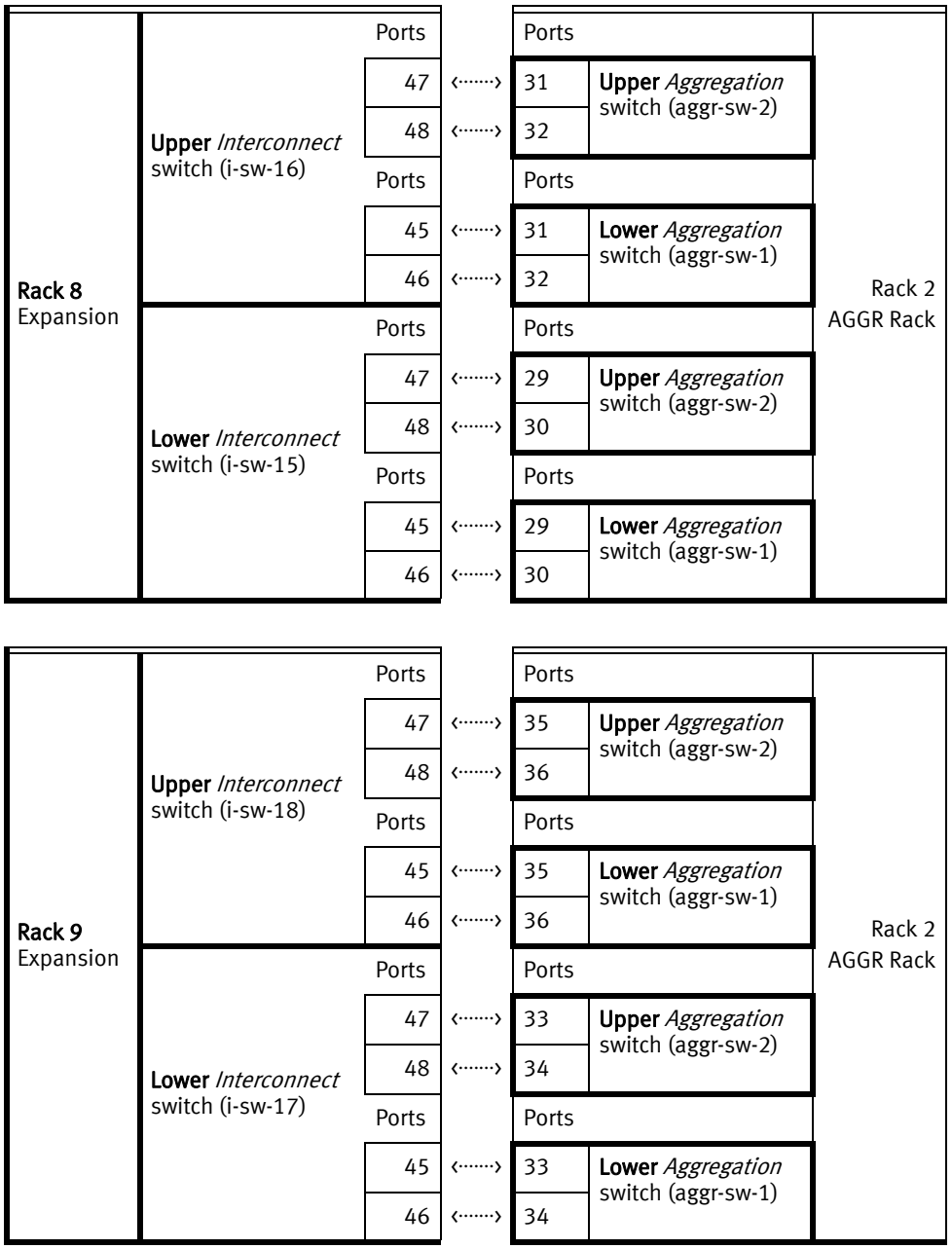
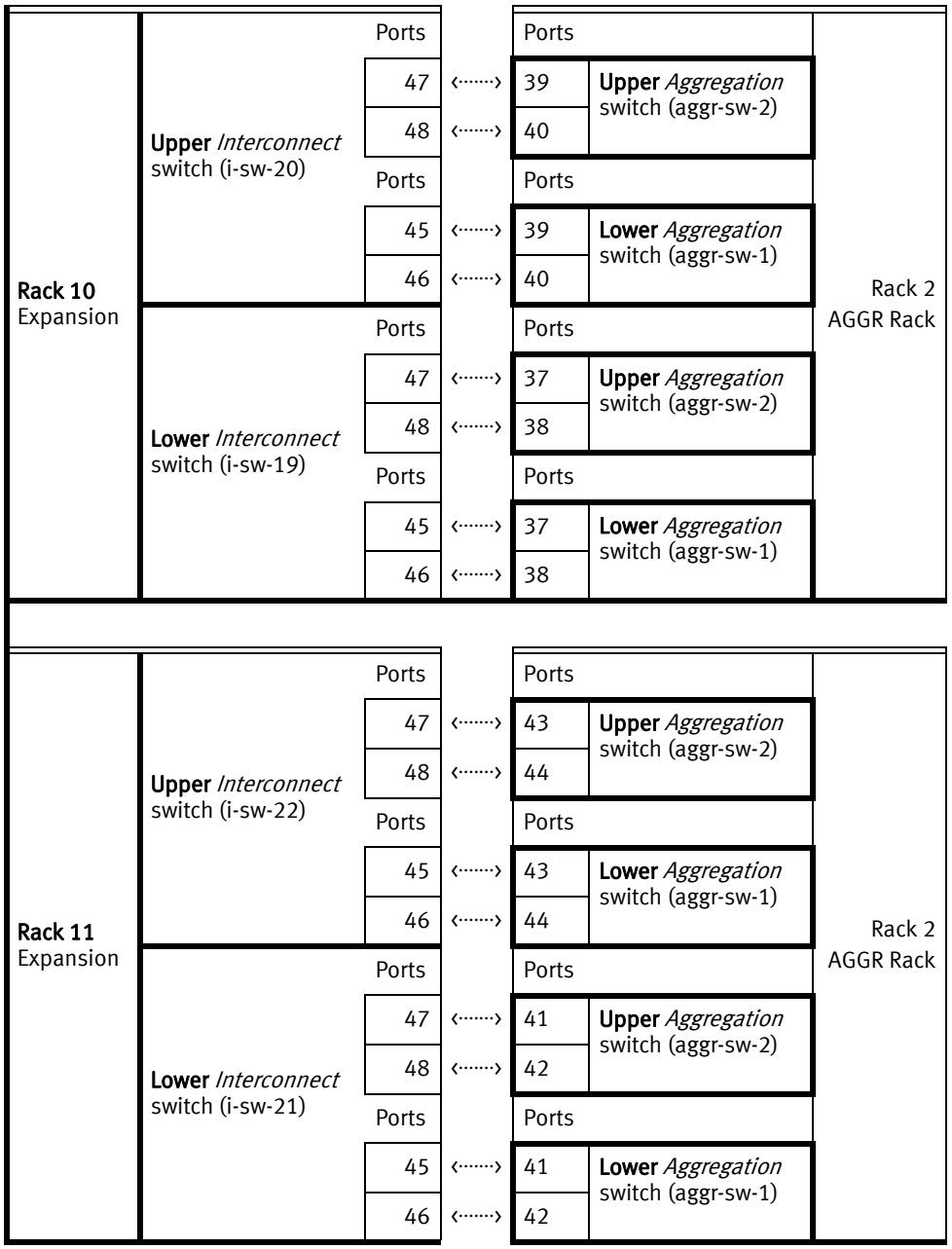


Table 20 Interconnect switch-to-Aggregation switch port mapping (page 6 of 6)



Network hostname and IP configuration

Table 21 DCA network configuration (page 1 of 3)

Rack	Component	hostname	BMC IP host-sp	NIC 1 IP host-cm	Interconnect
	Reserved for DHCP	n/a	n/a	172.28.6.170 through 172.28.6.179	n/a
Rack 1	Administration Switch	a-sw-1		172.28.0.190	
Rack 2	Administration Switch	a-sw-2		172.28.0.191	
Rack 3	Administration Switch	a-sw-3		172.28.0.192	
Rack 4	Administration Switch	a-sw-4		172.28.0.193	
Rack 5	Administration Switch	a-sw-5		172.28.0.194	
Rack 6	Administration Switch	a-sw-6		172.28.0.195	
Rack 7	Administration Switch	a-sw-7		172.28.0.196	
Rack 8	Administration Switch	a-sw-8		172.28.0.197	
Rack 9	Administration Switch	a-sw-9		172.28.0.198	
Rack 10	Administration Switch	a-sw-10		172.28.0.199	
Rack 11	Administration Switch	a-sw-11		172.28.1.190	
Rack 1	Interconnect Switch, lower	i-sw-1		172.28.0.170	
	Interconnect Switch, upper	i-sw-2		172.28.0.180	
Rack 2	Interconnect Switch, lower	i-sw-3		172.28.0.171	
	Interconnect Switch, upper	i-sw-4		172.28.0.181	
Rack 3	Interconnect Switch, lower	i-sw-5		172.28.0.172	
	Interconnect Switch, upper	i-sw-6		172.28.0.182	
Rack 4	Interconnect Switch, lower	i-sw-7		172.28.0.173	
	Interconnect Switch, upper	i-sw-8		172.28.0.183	
Rack 5	Interconnect Switch, lower	i-sw-9		172.28.0.174	
	Interconnect Switch, upper	i-sw-10		172.28.0.184	
Rack 6	Interconnect Switch, lower	i-sw-11		172.28.0.175	
	Interconnect Switch, upper	i-sw-12		172.28.0.185	
Rack 7	Interconnect Switch, lower	i-sw-13		172.28.0.176	
	Interconnect Switch, upper	i-sw-14		172.28.0.186	
Rack 8	Interconnect Switch, lower	i-sw-15		172.28.0.177	
	Interconnect Switch, upper	i-sw-16		172.28.0.187	

Table 21 DCA network configuration (page 2 of 3)

Rack	Component	hostname	BMC IP host-sp	NIC 1 IP host-cm	Interconnect
Rack 9	Interconnect Switch, lower	i-sw-17		172.28.0.178	
	Interconnect Switch, upper	i-sw-18		172.28.0.188	
Rack 10	Interconnect Switch, lower	i-sw-19		172.28.0.179	
	Interconnect Switch, upper	i-sw-20		172.28.0.189	
Rack 11	Interconnect Switch, lower	i-sw-21		172.28.1.170	
	Interconnect Switch, upper	i-sw-22		172.28.1.180	
Rack 2	Aggregation Switch, lower	aggr-sw-1		172.28.0.248	
	Aggregation Switch, upper	aggr-sw-2		172.28.0.249	
Rack 1	Primary Master Server, lower server	mdw	172.28.0.250	172.28.4.250	172.28.8.250
	Standby Master Server, upper server	smdw	172.28.0.251	172.28.4.251	172.28.8.251

Table 21 DCA network configuration (page 3 of 3)

Rack	Component	hostname	BMC IP host-sp	NIC 1 IP host-cm	Interconnect
	GPDB Segment Server 1-160	sdw#	172.28.0.#	172.28.4.#	172.28.8.#
	GPDB Segment Server 161-176	sdw#	172.28.1.1 - 172.28.1.16	172.28.5.1 - 172.28.5.16	172.28.9.1 - 172.28.9.16
	DIA Server 1-16	etl#	172.28.0.20#	172.28.4.20#	172.28.8.20#
	DIA Server 17-32	etl#	172.28.1.201 - 172.28.1.216	172.28.5.201 - 172.28.5.216	172.28.9.201 - 172.28.9.216
	DIA Server 33-48	etl#	172.28.2.231 - 172.28.2.246	172.28.6.231 - 172.28.6.246	172.28.10.231 - 172.28.10.246
	DIA Server 49-64	etl#	172.28.3.231 - 172.28.3.246	172.28.7.231 - 172.28.7.246	172.28.11.231 - 172.28.11.246
	Hadoop Master Node 1-8	hdm1 hdm2 hdm3 hdm4 hdm5 hdm6 hdm7 hdm8	172.28.1.250 172.28.1.251 172.28.1.252 172.28.1.253 172.28.2.250 172.28.2.251 172.28.3.250 172.28.3.251	172.28.5.250 172.28.5.251 172.28.5.252 172.28.5.253 172.28.6.250 172.28.6.251 172.28.7.250 172.28.7.251	172.28.9.250 172.28.9.251 172.28.9.252 172.28.9.253 172.28.10.250 172.28.10.251 172.28.11.250 172.28.11.251
	Hadoop Worker Node 1-160	hdw1-160	172.28.2.#	172.28.6.#	172.28.10.#
	[1]Hadoop Worker Node 161-320	hdw161-320	172.28.3.# # = node number minus 160. Example: hdw162-sp = 172.28.3.2	172.28.7.# # = node number minus 160. Example: hdw162 -cm= 172.28.7.2	172.28.11.# # = node number minus 160. Example: hdw162-1 = 172.28.11.2
	Hadoop Compute Node 1-60	hdc1-60	172.28.2.170 - 172.28.2.229	172.28.6.170 - 172.28.6.229	172.28.10.170 - 172.28.10.229
	Hadoop Compute Node 61-120	hdc61-120	172.28.3.170 - 172.28.3.229	172.28.7.170 - 172.28.7.229	172.28.11.170 - 172.28.11.229
	[2] IP Addresses reserved for Isilon				

1. Hadoop Worker nodes are numbered 1-320. In order to accommodate the required number of hosts, the third IP address octet is incremented by 1 and the fourth octet restarts at 1 when the node number reaches 161. For example, the host hdw160-sp uses a third octet of 2 and a fourth octet of 160 - host hdw-161-sp uses a third octet of 3 and a fourth octet of 1. To see a complete list of IP addresses and hostnames, view the `/etc/hosts` file.

2.) 172.28.8.217 through 172.28.8.246 and 172.28.9.217 through 172.28.9.246

Multiple-rack cabling reference

Table 22 Cabling kit contents and part numbers

Kit Name	Component Part Numbers	Component Quantity	Component Description
DCA2-CBL10	100-585-048	16	ARISTA 10GBASE-SRL SFP+ OPTIC MODULE
	038-003-733	8	10m LC to LC Optical 50 Micron MM Cable Assemblies
	038-003-476	2	25' CAT6 Ethernet Cable
DCA2-CBL30	100-585-048	16	ARISTA 10GBASE-SRL SFP+ OPTIC MODULE
	038-003-740	8	30m LC to LC Optical 50 Micron MM Cable Assemblies
	038-003-475	2	100' CAT6 Ethernet Cable

Table 23 Cable kits for a 7-to-11-rack DCA

Connect from:	To:	Use cable kit:
Rack 2 - AGGREG	Rack 1 - SYSRACK	DCA2-CBL10
	Rack 2 - AGGREG	DCA2-CBL10
	Rack 3 - 1st EXPAND	DCA2-CBL10
	Rack 4 - 2nd EXPAND	DCA2-CBL10
	Rack 5 - 3rd EXPAND	DCA2-CBL10
	Rack 6 - 4th EXPAND	DCA2-CBL10
	Rack 7 - 5th EXPAND	DCA2-CBL30
	Rack 8 - 6th EXPAND	DCA2-CBL30
	Rack 9 - 7th EXPAND	DCA2-CBL30
	Rack 10 - 8th EXPAND	DCA2-CBL30
	Rack 11 - 9th EXPAND	DCA2-CBL30

Configuration files

Configuration files are text files that contain the hostnames of servers that occupy quarter, half, or full rack configurations. The file used depends on the desired function. Refer to the table below for a description of each configuration and host file. The hostfiles are located at `$ /home/gpadmin/gpconfigs`:

Table 24 Hostfiles created by the DCA Setup utility

File	Description
gpexpand_map	Expansion MAP file created during the dca_setup option *Expand the DCA*. It's purpose is to during GPDB reallocate primary and mirror instances on the new hardware.
gpinitsystem_map	MAP file used during installation of GPDB blocks to assign primary and mirror segments to each server.
hostfile	Contains one hostname per server for ALL servers in the system. Includes GPDB, DIA and HD (if present).
hostfile_segments	Contains the hostnames of the segment servers of all GPDB blocks.
hostfile_gpdb	Contains the hostnames for GPDB servers.
hostfile_dia	Contains the hostnames of the DIA servers.
hostfile_hadoop	Contains the hostnames of the Hadoop servers.
hostfile_hdm	Contains the hostnames of all Hadoop Master servers.
hostfile_hdw	Contains the hostnames of all Hadoop Worker servers.
hostfile_hdc	Contains the hostnames of all Hadoop Compute servers.

Location of old core files

(*Applies to DCA version 2.0.1.0 and later*) Old core files are moved automatically to a separate directory to prevent them from being sent to Support following a healthmon restart. For example, for `sdw1`, old core files are moved to `/var/crash/user`.

```
[root@sdw1 user-processed]# ls -l /var/crash/user
```

Default passwords

The following table lists default passwords for all the components in a DCA.

Table 25 Default user names and passwords

Component	User	Password
Master Servers	`BMC root user`	For a new unconfigured server: `password` For an existing configured server: `sephiroth`
	`root`	`changeme`
	`gpadmin`	`changeme`
Interconnect, Adminstration, and Aggregation switches	`admin`	`changeme`

APPENDIX B
Connect a workstation to the DCA

This section describes how to connect a workstation to the DCA in prepration for performing various maintenance tasks. Administration is always performed from the Primary Master server (hostname `mdw`). A Windows laptop with the PuTTY application installed is required.

Laptop prerequisites

The laptop you use to connect to the Greenplum DCA must have the following capabilities in order to perform Greenplum DCA administration:

- RJ-45 Ethernet port
- Administrator access on the laptop
- An `ssh` client such as PuTTY or Cygwin with the OpenSSH package enabled
- An `scp` client such as WinSCP, PuTTY PSCP or Cygwin with the OpenSSH package enabled

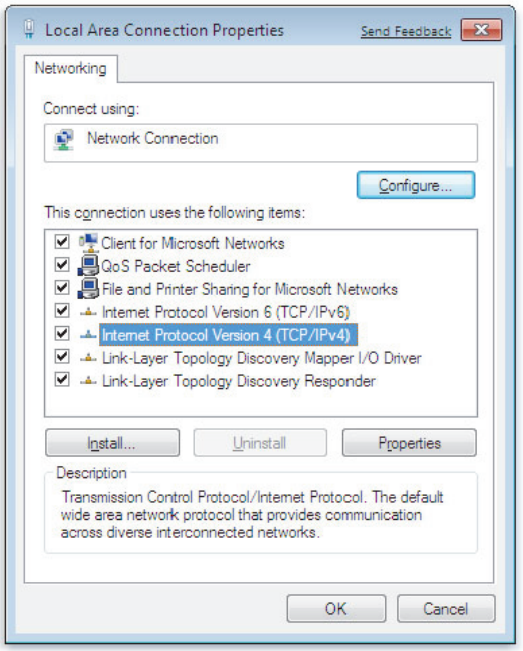
Configure your laptop to connect to the DCA

Perform the appropriate procedure to configure your laptop to connect to the DCA Administration Network.

Configure a Windows 7 laptop

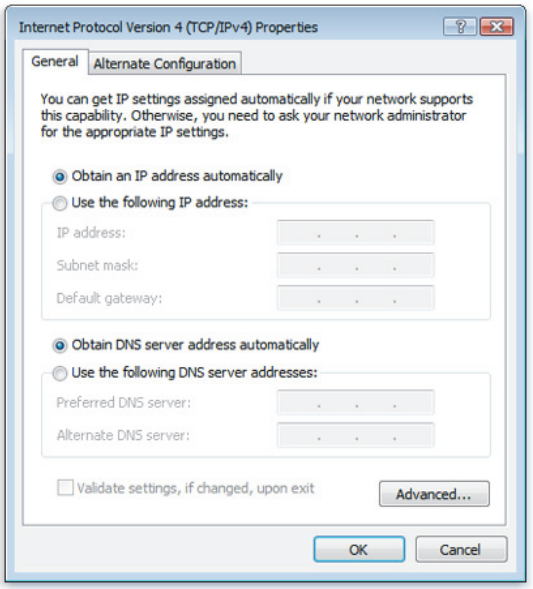
1. Locate the red service cable on the laptop tray. The cable is connected to port 48 of the first administration switch (a-sw-1). Connect the service cable to your laptop.
2. Click **Start › Control Panel › Network and Internet › Network Sharing Center**.
3. On the left pane click **Change adapter settings.**
4. Right-click the connection that you want to change, and then click **Properties**. If you are prompted for an administrator password or confirmation, type the password or provide confirmation.

5. From the Networking tab select **Internet Protocol Version 4 (TCP/IPv4)**, and then click **Properties**.



6. Click **Properties.**
7. Select **Use the following IP address,** and then type the following IP address and subnet mask:
   - **IP address:** 172.28.3.253
   - **Subnet mask:** 255.255.248.0

   Note: Leave the Default gateway field blank. Do not configure a gateway.

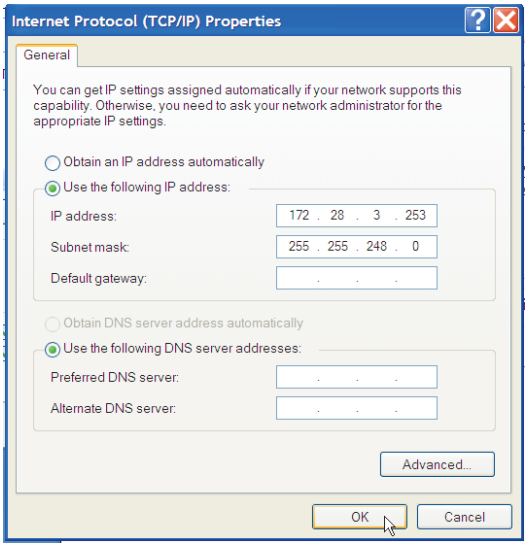


8. Click OK.
9. Click Close.

Configure a Windows XP laptop

1. Locate the red service cable on the laptop tray. The cable is connected to port 48 of the first administration switch (a-sw-1). Connect the service cable to your laptop.
2. On your Windows laptop, open **Control Panel**.
3. Double-click **Network Connections**.
4. Right-click **Local Area Connection** and then select **Properties**.
5. Select **Internet Protocol (TCP/IP)** and then click **Properties**.
6. Enter the IP address and subnet mask:
   - **IP address:** 172.28.3.253
   - **Subnet mask:** 255.255.248.0

   Note: Leave the Default gateway field blank. Do not configure a gateway.
7. Click **OK**.



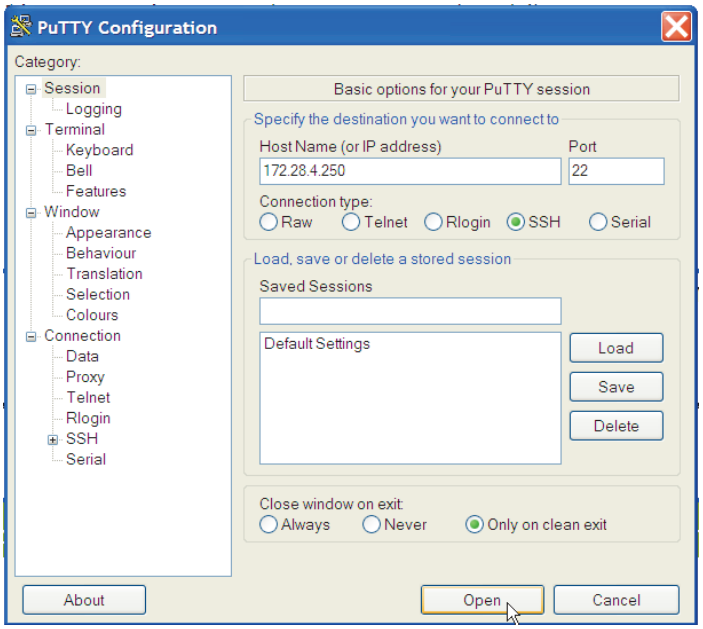
Connect to the Master Server using an SSH client

The method you use to establish an ssh connection to the Master Server depends on your chosen ssh client (PuTTY, Cygwin, etc.). Regardless of the ssh client, connect using the following values:

- **hostname:** `172.28.4.250`
- **username:** `root`
- **root password:** `changeme` (or whatever the customer's root password is)

PuTTY example

1. Open PuTTY and enter **172.28.4.250** in the **Host Name (or IP address)** field. Select **SSH** as the **Connection type**.



2. Click **Open**.
3. If this is the first time you have connected to this server, a security alert will display. Click **Yes** to continue.
4. At the **SSH Login** window, enter your username and password. For example:

```
login as: root
root@172.28.4.250 password: changeme
```

Cygwin example

To use Cygwin, you must have enabled the OpenSSH package when you installed Cygwin. Open a Cygwin terminal window and type the following at the prompt:

```
$ ssh root@172.28.4.250
```

When prompted, type the root password (default is `changeme`).

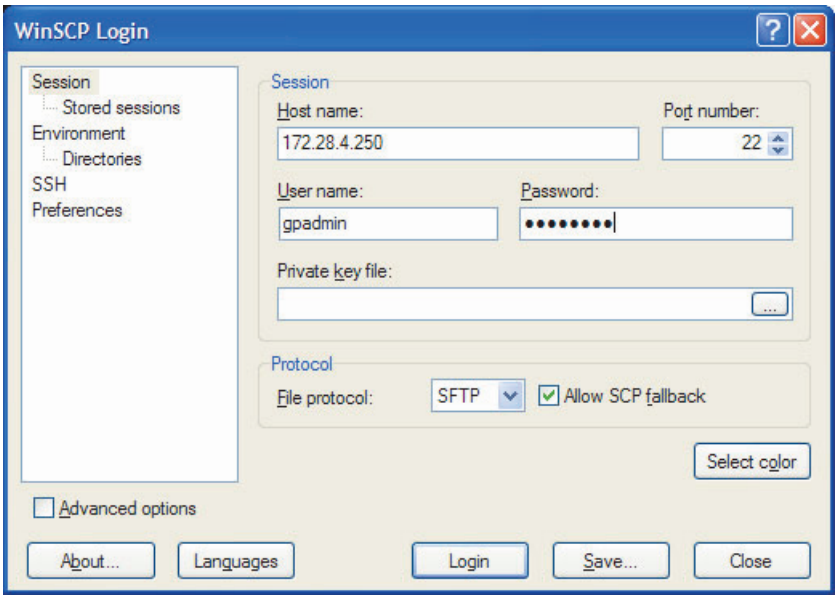
Copy a file to the Master Server using an SCP client

The method you use to copy a file from your local laptop to the Greenplum master server depends on your chosen scp client (WinSCP, Cygwin, etc.). Regardless of the scp client, connect using the following values:

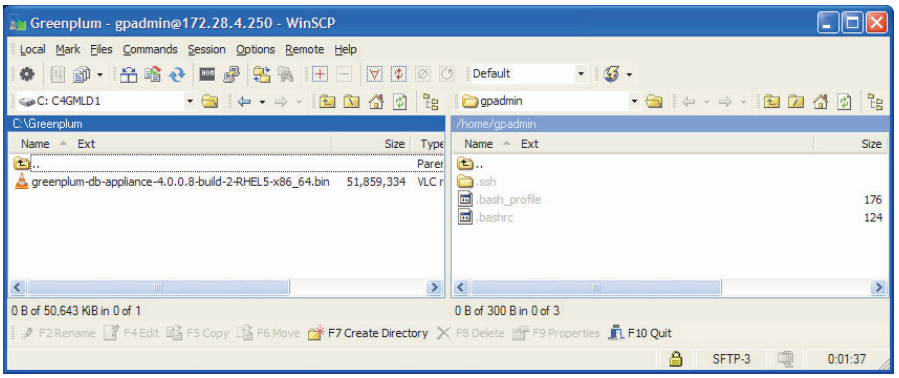
- **hostname:** `172.28.4.250`
- **username:** `gpadmin`
- **root password:** `changeme` (or whatever the customer's root password is)
- **Destination on the master:** `/home/gpadmin`

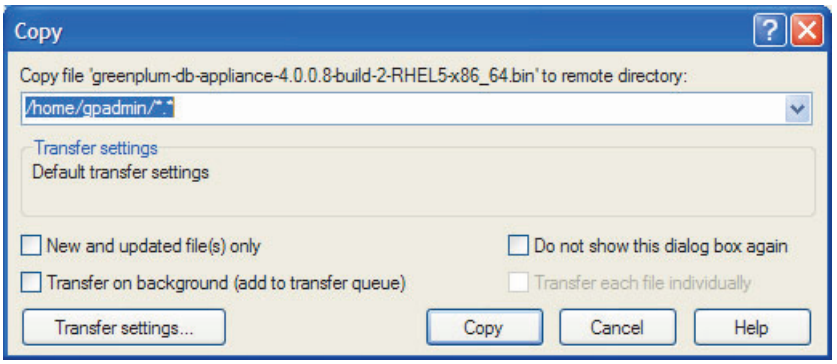
WinSCP Example

1. Log in to the master host IP `172.28.4.250` as user `gpadmin`. Select **SFTP** as the **File protocol**.



2. On your local host, locate the file you want to copy and then choose the `/home/gpadmin` directory on the master server.





3. Click **Copy**.

Cygwin example

1. To use Cygwin, you must have enabled the OpenSSH package when you installed Cygwin. Open a Cygwin terminal window and type the following at the prompt:

```
$ cd <local_location_of_file>
$ scp <file_name> gpadmin@172.28.4.250:/home/gpadmin
```

2. When prompted, type the `gpadmin` password (the default is `changeme`).

Connect to an Interconnect or Administration switch using PuTTY

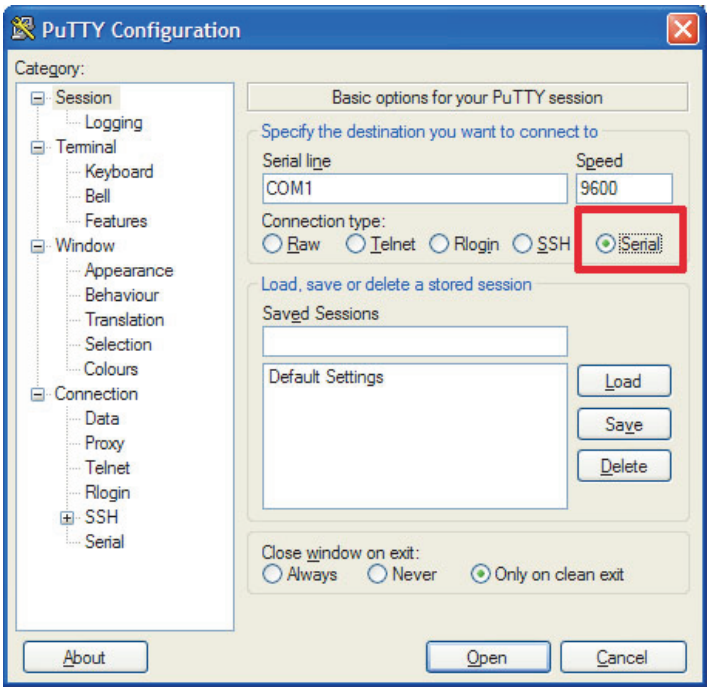
This section describes how to connect your service laptop to a serial port on an Interconnect or Administration switch. You must perform this procedure if the switch contains factory settings or cannot be accessed by telnet or ssh through the DCA Administration network.

1. Connect one end of a serial cable from the serial port on the switch. Connect the other end of the cable to your workstation.

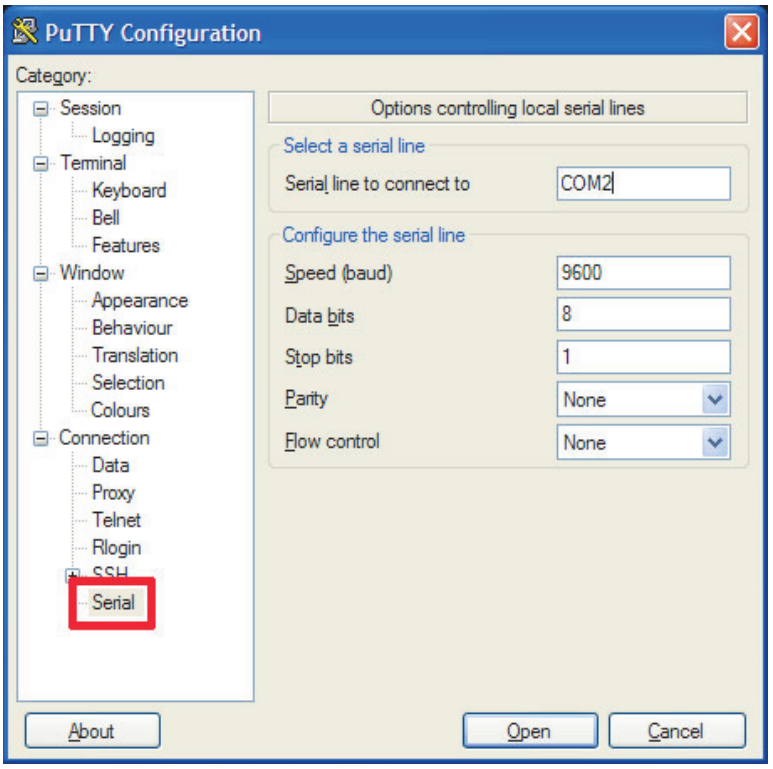
   Note: If the service laptop or workstation does not have a serial port, you can use a USB-to-Serial Adapter.

2. Launch the PuTTY application.
3. Select **Serial** in Basic Options under the Session section.

   Serial option in a PuTTY session



4. Expand the connection section and select **Serial**. Verify that the settings for the COM port are 9600 Baud, 8 data bits, and no hardware flow control.



5. Click **Open** to connect.
6. Press **‹Enter›** to display the login prompt.

APPENDIX C
Power Off the DCA

To safely shut down and power off Greenplum DCA hardware and software, perform the following tasks in sequence:

IMPORTANT

Stop all running queries and data loading before you power down the DCA.

Task 1: Connect to the Greenplum DCA Master Server

The fastest method to shut down a DCA is to SSH in to a Master Server through an external network connection.

If the external conection is not available and you have a service laptop, connect to the DCA as described in this procedure. This procedure assumes you are using the Windows Operating System.

1. Locate the system rack of the DCA.

   The systm rack contains the Primary and Standby Master servers. Master servers are highlighted in red in Figure 60.

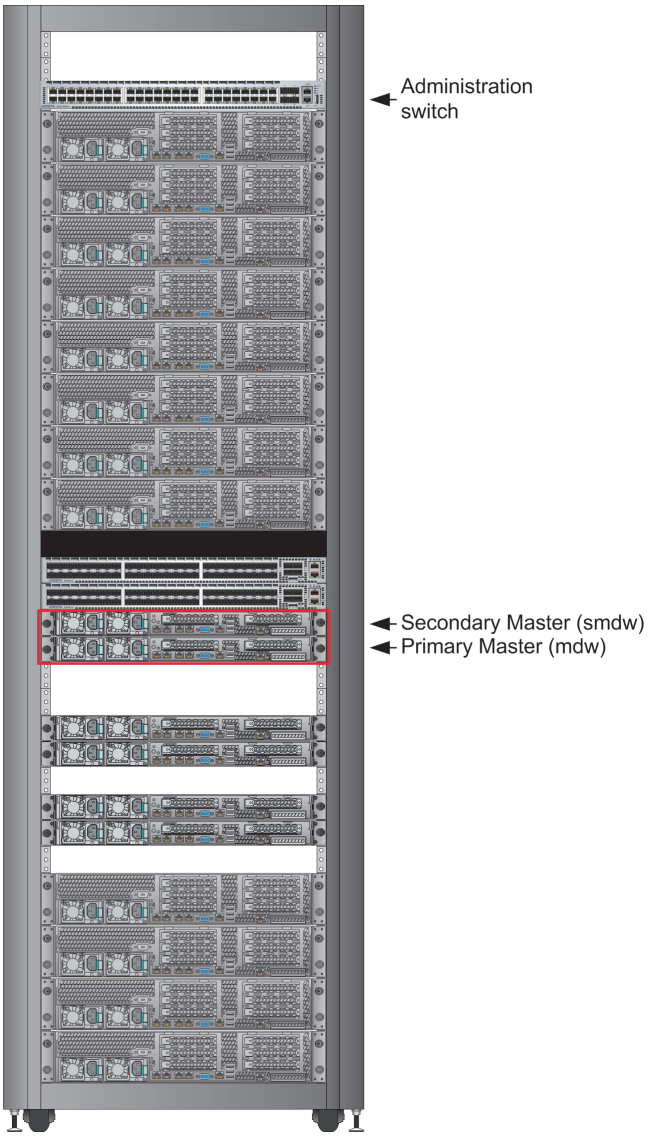


Figure 60 Master Servers in the System rack

2. Locate the red service cable on the laptop tray and connect it to your laptop. The red service cable is connected to port 48 on the Administration switch.

3. From your Windows laptop navigate to **Start › Control Panel › Network and Internet › Network Sharing Center**.
4. On the left pane click **Change adapter settings**..
5. Right-click **Local Area Connection** and select **Properties**.
6. From the Networking tab select **Internet Protocol Version 4 (TCP/IPv4)**.
7. Click **Properties.**
8. Select **Use the following IP address**, and then enter the following IP address and subnet mask:
   - **IP address:** 172.28.3.253
   - **Subnet mask:** 255.255.248.0
9. Click **OK**.
10. Click **Close**.
11. Open an SSH client (such as PuTTY) and enter:
    - **Host Name (or IP address)**: 172.28.4.250
    - **Connection type**: SSH
12. Click **Open**.

    If this is the first time you have connected to this server, a security alert will display.
13. Click **Yes** to continue.
14. Log in as the user `root` with password `changeme`.

    If the default password `changeme` was changed, enter the current password.

Task 2: Stop the Greenplum Database software and shut down the OS

To ensure data consistency across primary and mirror segments, you must stop the Greenplum Database software correctly.

1. To prevent false dial home messages from being sent to EMC Support during service, disable health monitoring by stopping the healthmon daemon:

   ```
   # dca_healthmon_ctl -d
   ```
2. Switch to the user gpadmin:

   ```
   # su - gpadmin
   ```
3. When prompted for the password, enter `changeme`.

   If the default password `changeme` was changed, enter the current password.
4. Stop the Greenplum Database:

   ```
   $ gpstop -af
   ```
5. Stop Greenplum Command Center:

   ```
   $ gpcmdr --stop
   ```

6. Switch to the user `root`:

   ```
   $ su -
   ```

7. Start the DCA Shutdown utility:

   ⚠WARNING

   Issuing the shutdown command immediately shuts down the DCA. Make sure that you are ready to shut down the DCA before you issue this command.

   ```
   # dca_shutdown
   ```

8. Verify that the green LED on the power button on each server turns off after 1-2 minutes (see Figure 61 and Figure 62).
9. If a server does not power off, power it off manually by pressing the power button.

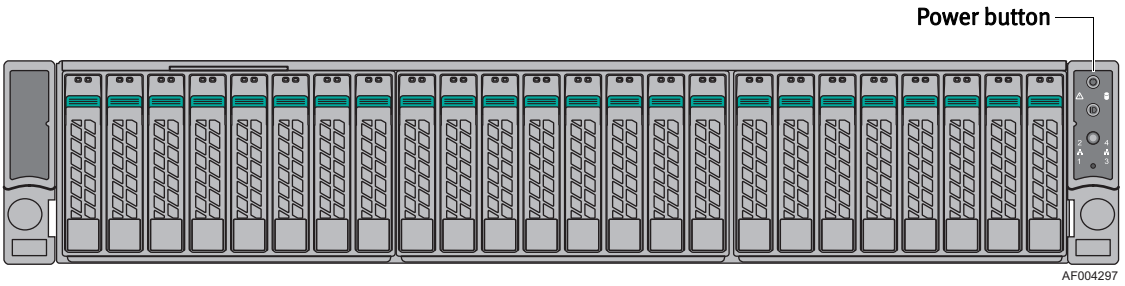


Figure 61 Location of power button on a GPDB server (applies also to Hadoop Masters & Workers)

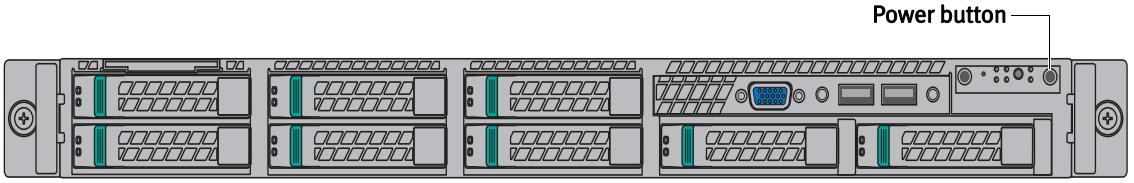


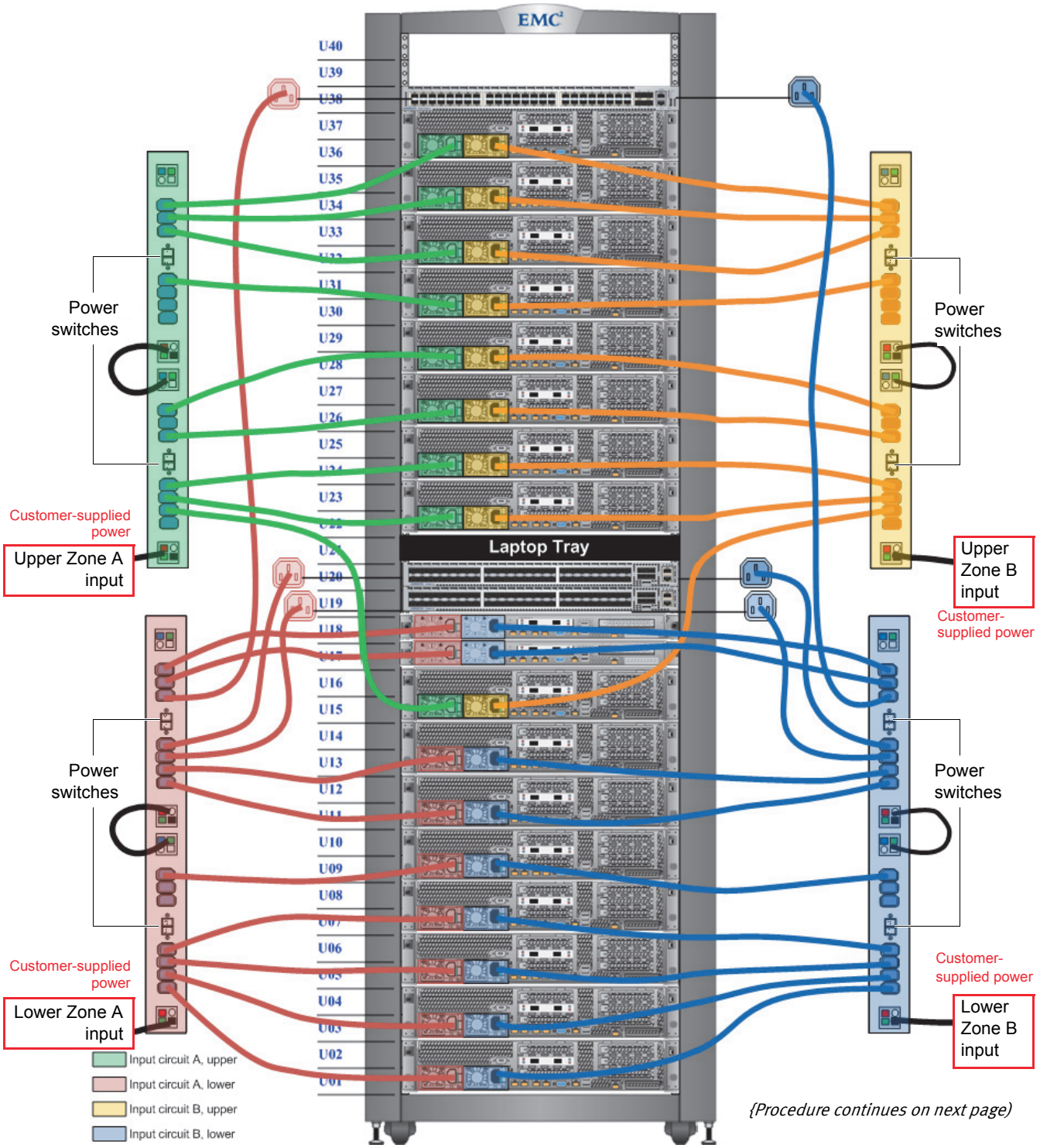
Figure 62 Location of power button on a Master, DIA, and Hadoop Compute servers

{*Procedure continues on next page*}

Task 3: Place the PDU power switches in the OFF position

When the Greenplum Database is stopped and the operating system is shut down on each server, it is safe to power off the system via the eight PDU power switches in each rack.

1. Starting from the rear of the System rck (Rack 1), locate the power switches in the upper and lower Power Zones A and B (see Figure 63).



{Procedure continues on next page}

Figure 63 Rack power switch locations

2. First place the power switches in ***lower*** Power Zones A and B in the OFF position, and then place the power switches in ***upper*** Power Zones A and B in the OFF position.
3. Power off the remaining racks in the same way, one rack at a time, first placing the power switches in the lower zone and then the upper zone in the OFF position.

After a few seconds, there should be no lit LEDs on any components in the system. Shutdown is complete.

APPENDIX D
Linux and vi Command Reference

This appendix is a quick reference of basic Red Hat Linux commands, Greenplum-specific Linux commands, and common Vi text editor commands.

Common Linux command reference

Table 26 Common Linux commands (page 1 of 2)

Linux command	Description
Moving Around	
/	refers to the root directory
..	refers to the parent directory
Up/down arrows	repeats the last (up arrow) or next (down arrow) command you typed
pwd	displays the current directory
cd *name*	changes to the named directory
cd	returns you to your home directory
Basic Commands	
ls	lists the contents of the current directory
ls *dir_name*	lists the content of the named directory
ls -l	lists the content of the named directory in long format; this includes file permissions, ownership information, and file size
ls -a	lists all the files in the named directory including files that start with a period (".)"
cat *filename*	prints the content of the named file to the screen, one page at a time
more *filename*	prints the content of the named file to the screen, with scrolling and search facilities
cp *source destination*	copies the source file to the named destination for example: cp */misc/temp* . copies a file called *temp* located in the *misc* directory, to the current directory (".")
mv *source destination*	moves the source file or directory to the named destination for example: mv */misc/temp* . this moves a file called *temp* located in the *misc* directory, to the current directory (".")
rm *filename*	deletes (removes) the named file
mkdir *dir_name*	creates a new directory
rmdir *dir_name*	removes the specified directory (directory must be empty)
source	source path information

Table 26 Common Linux commands (page 2 of 2)

Linux command	Description
`su`	assume the super user (root) identity
`tar`	untars a tape archived and compressed file
`unzip`	extracts compressed files from a ZIP archive
`grep string filename`	prints all the lines in a file that contain the specified string
`su`	temporarily become the superuser - useful for system administration tasks
`passwd`	allows you to change the password used to access your user account. You are prompted to enter your current password, then enter a new one.
`who`	displays a list of users currently logged onto this computer
Getting Help	
`man command`	displays a (manual page (man) about the specified command, possible options and switches, and more detailed information about using that command
Shutting down and rebooting a Linux machine	
`/sbin/shutdown - r now`	reboots the machine immediately
`/sbin/shutdown - h now`	shuts down the machine immediately
Greenplum Linux Commands	
`gpcheck`	verifies and validates Greenplum Database platform settings
`gpexpand`	expands an existing Greenplum Database across new hosts in the array
`gpinitsystem`	initializes a Greenplum Database system by using configuration parameters specified in the `gp_init_config` file
`gpinitstandby`	adds and/or initializes a standby master host for a Greenplum Database system
`gpseginstall`	installs the Greenplum Database software on multiple hosts
`gpscp`	copies files between multiple hosts at the same time
`gpssh-exkeys`	provides ssh access to multiple hosts at the same time
`gpstate`	verifies the DCA master server status

vi Quick Reference

The following is a quick reference for the vi editor.

Table 27 Common vi commands

vi command	Description
Inserting/Deleting Text *(To exit insert mode, press the [ESC] key)*	
`a`	append text, after the cursor
`i`	insert text, before the cursor
`R`	enter overtype mode
`x`	delete character
`dd`	delete current line
Moving Cursor	
`h, [BACKSPACE]`	left one character
`l, [SPACE]`	right one character
`w`	forward one word
`b`	back one word
`e`	end of word
`j`	down one line
`k`	up one line
`?`*`pattern`*	search backward for *`pattern`*
`/`*`pattern`*	search forward for *`pattern`*
`n`	repeat last search
`N`	repeat last search in the opposite direction
Saving File and Exiting	
`:wq`	save file and quit
`:q!`	force quit the editor, do not save changes

APPENDIX E
Replace a Server in the Greenplum DCA Rack

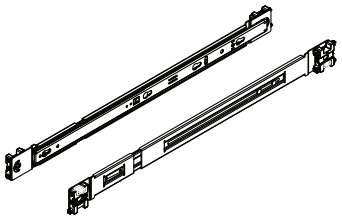
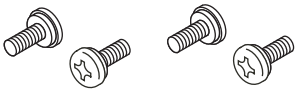
This appendix describes how to replace the servers in a DCA 40U rack. Server types include:

- **1U servers**—Master, DIA, and Hadoop compute servers (EMC SVR-I1U-1208)
- **2U servers**—GPDB (EMC SVR-I2U-R2224) and Hadoop Master and Worker servers (EMC SVR-I2U-R2312)

This appendix includes the following sections:

Mounting kit parts

The server mounting kit includes rails and screws as listed in the following table. Verify that these parts are included with the replacement server.

Component	Use
2 universal rail assemblies (consists of slide rails for connection to the rack and inner rails for connection to server) 	Attach back to front on either side between rack channels
Four Phillips pan-head 8-32 x 0.35 in screws 	Stabilize the server and rail mounting

You need a # 2 Phillips-head screwdriver to complete the installation of the rails and server.

Task 1: Remove the server from the rack

⚠WARNING

The enclosure is heavy and should be installed into or removed from a rack by two people. To avoid personal injury and/or damage to the equipment, do not attempt to lift and install the enclosure into a rack without a mechanical lift and/or help from another person.

Procedure:

IMPORTANT

When removing the server from the rack, do **not** hold the server up by its power/control module, which is on the right side of the front of the server.

1. Unplug all power and I/O cables from the back of the server, and label the cables so you can easily identify them when you need to connect them to the replacement server.
2. Remove the stabilizing screw behind the latch bracket on each side (Figure 64).

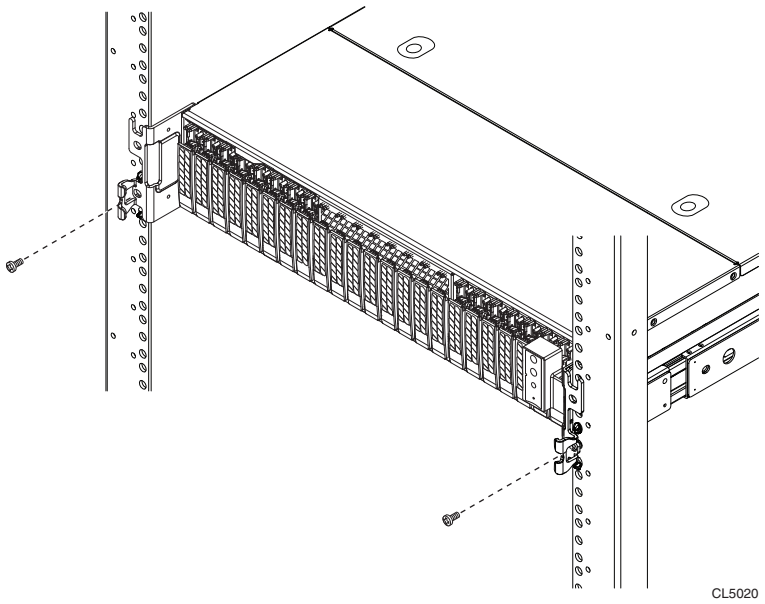


Figure 64 Remove the stabilizer screws

3. Pull the server forward until it locks in place (Figure 65).

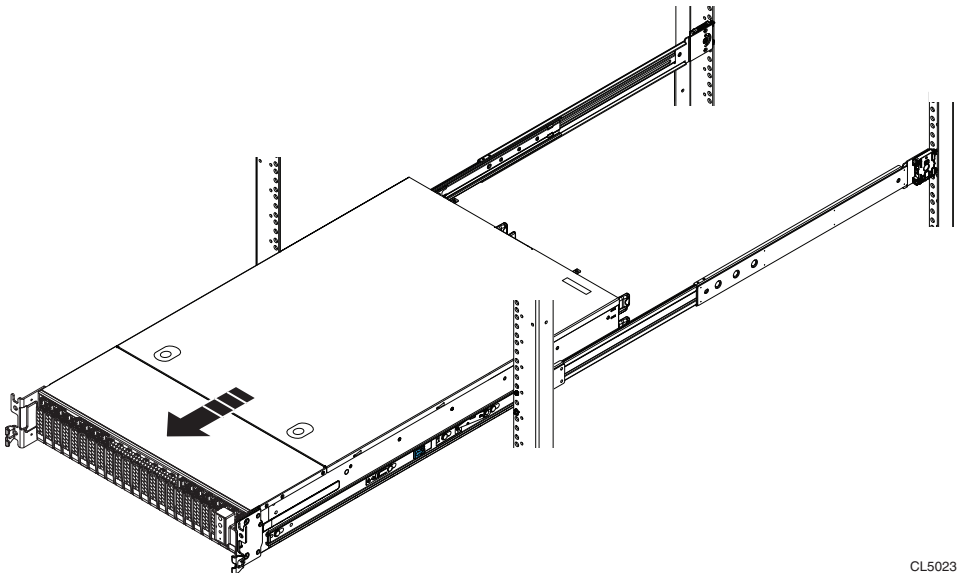


Figure 65 Slide server out of the rack to the locked position

4. Slide the blue disconnect tabs forward to release the inner rails from the slide rails (Figure 66).

⚠CAUTION

Once you release the server from the inner rails, you must support the full weight of the server.

5. Be prepared to support the full weight of the server, and then slowly pull the server forward and remove it from the rack (Figure 66).

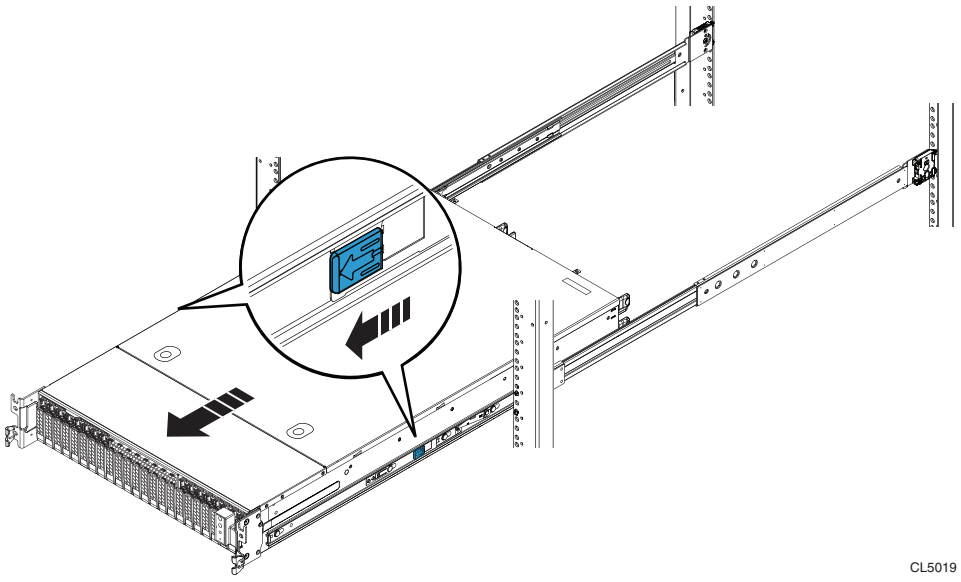


Figure 66 Release the inner rail locks and remove the server from the rack

Task 2: Remove the inner rails from the original server

1. On the middle of the inner rail, push in and hold the metal latch.
2. Push the rail forward to release the connection studs from the small end of the rail notches.
3. When the connections studs are in the large end of the rail notches, release the metal latch.
4. Pull the inner rails away from the server.

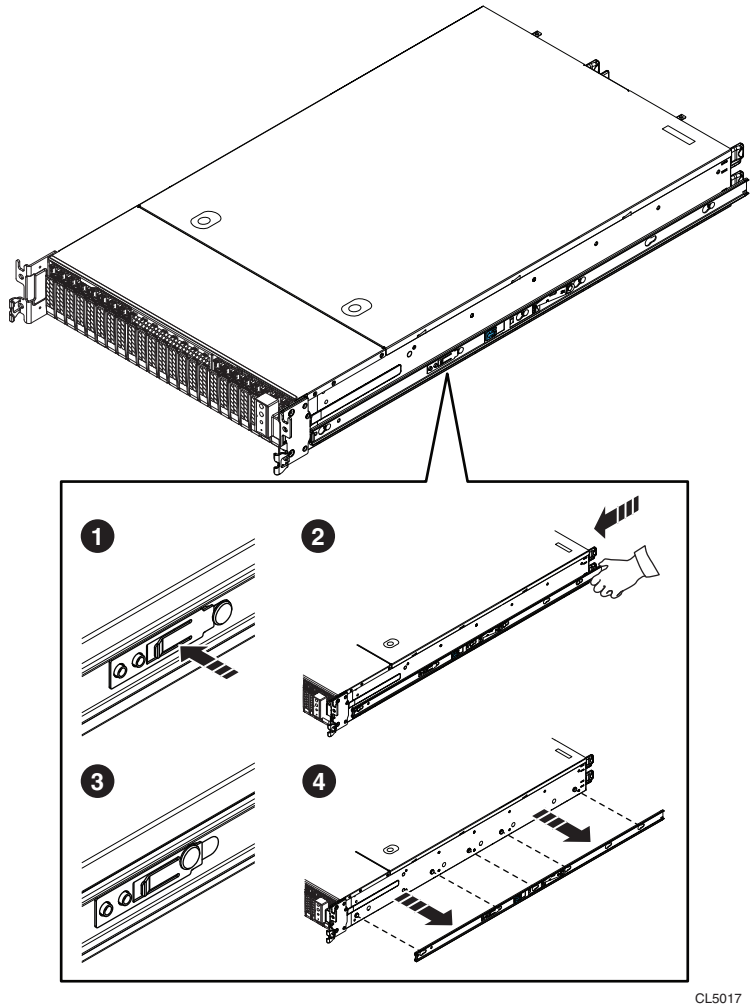


Figure 67 Release the inner rails from the server

Task 3: Attach the inner rails to the replacement server

1. Align the large end of the rail notches on the inner rail with the connection studs on the side of the server.
2. Push the flat side of the inner rail onto connection studs.
3. Slide the inner rail backwards along the server until the studs fit securely into the small end of the rail notches.

   An audible click indicates that the rail is secure.

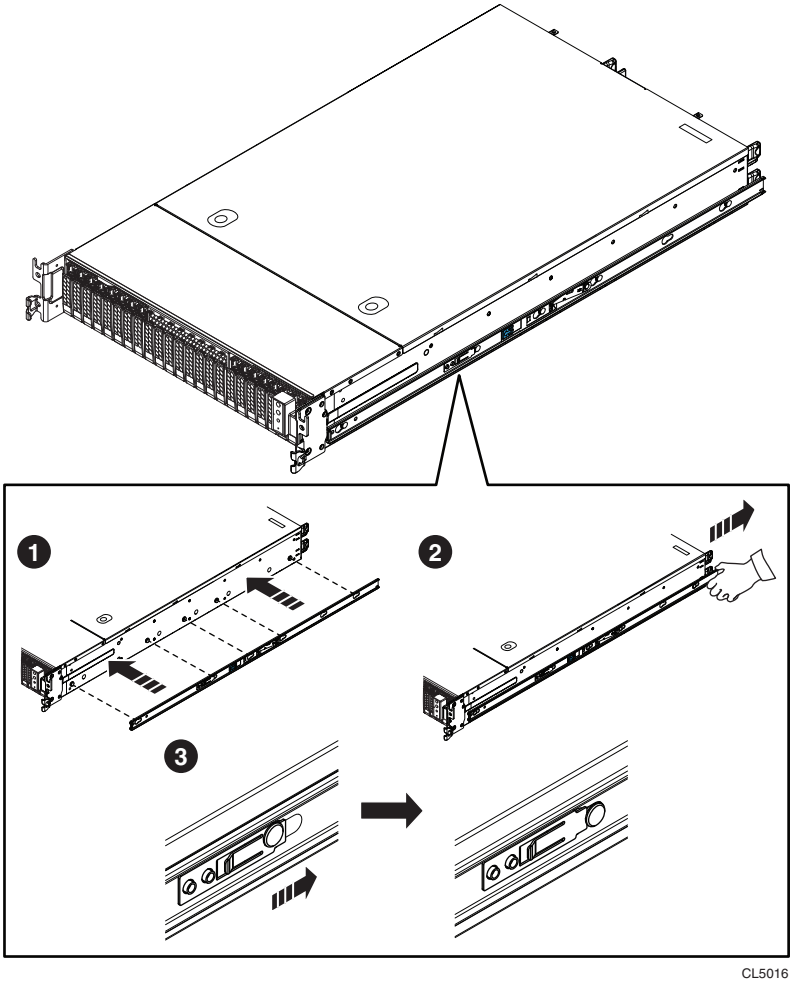


Figure 68 Attach an inner rail to the server

Task 4: Install the server in the rack

⚠WARNING

The enclosure is heavy and should be installed into or removed from a rack by two people. To avoid personal injury and/or damage to the equipment, do not attempt to lift and install the enclosure into a rack without a mechanical lift and/or help from another person.

Procedure:

IMPORTANT

When installing the server in the rack, do **not** pick the server up by the rotating power console on the front right side of the server and do **not** push on the power console.

1. On each slide rail bring the ball bearing retainer assembly fully to the front, so it rides onto the security knob (Figure 69).

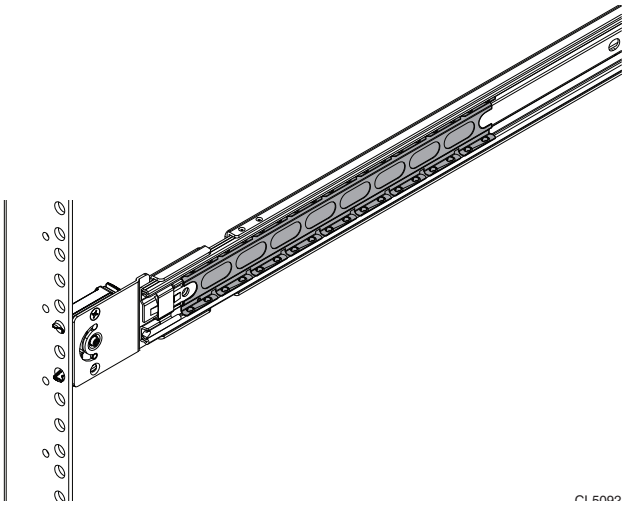


Figure 69 Correct location for ball bearing retainer assembly

2. From the front of the rack, align the inner rails attached to the server with the white plastic guide block front inside of each slide rail (Appendix EFigure 70).

Note: For clarity Figure 70 shows the inner rail without the server attached.

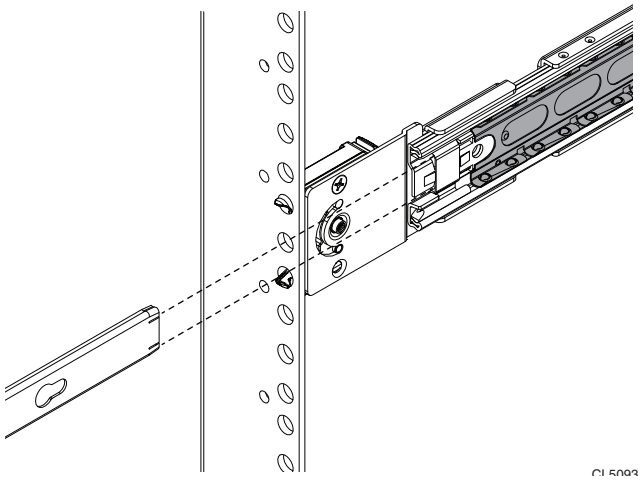


Figure 70 Align the inner rail with white plastic guide block

3. Slide the server into the chassis so the inner rails extend over the plastic guide blocks and the first part of the ball bearing retainer assemblies (Figure 71).

Note: For clarity Figure 71 shows the inner rail without the server attached.

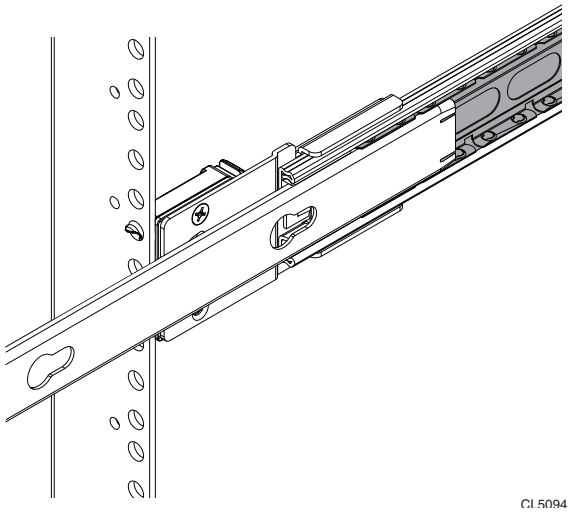


Figure 71 Inner rail over the first part of ball bearing retainer assembly

4. Once the inner rails are properly engaged with the ball bearing retainer assemblies, push the server into into the rack until the slide rails are engaged and locked.

   An audible click indicates that the slide rails are engaged and locked.

5. On the outside of each rail assembly, slide the blue disconnect tab forward to unlock the server, and push the server completely into the rack (Figure 72).

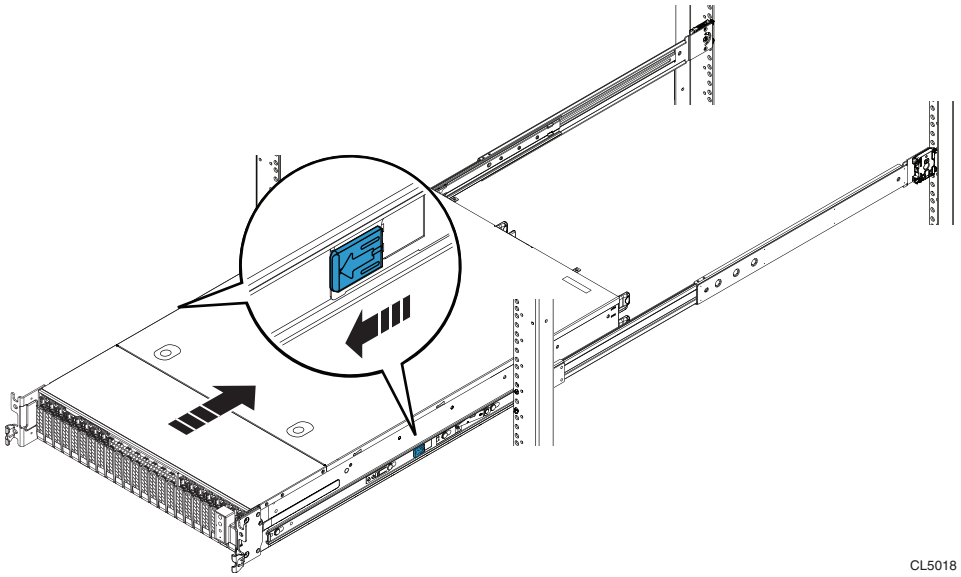


Figure 72 Inserting the server completely into the rack

6. To further secure the rail assembly and server in the rack, insert and tighten a small stabilizer screw directly behind each bezel latch (Figure 73).

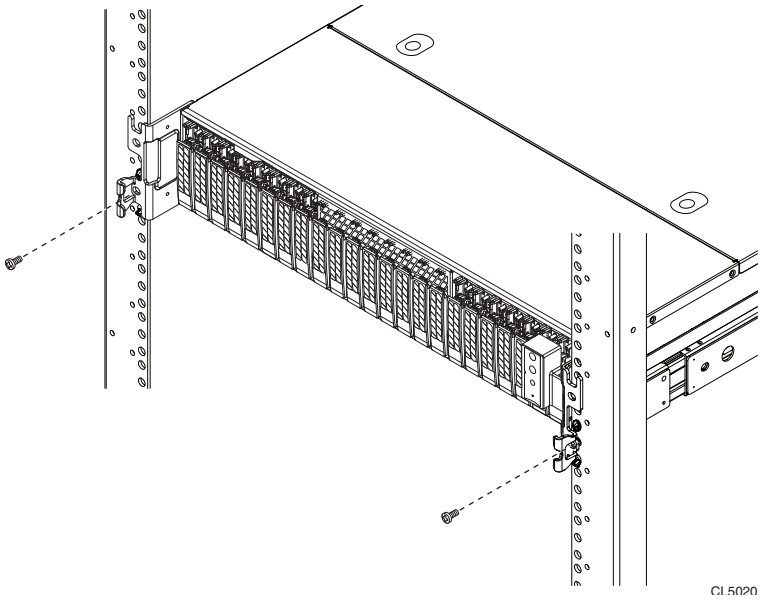


Figure 73 Installing the stabilizer screws

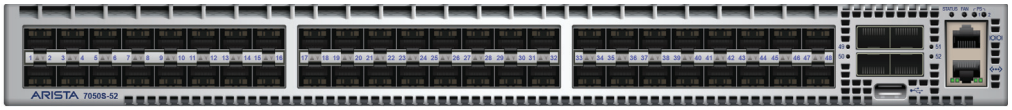
7. Reconnect data and power cables as described in the server replacement procedure.

APPENDIX F
Install a Switch in a Rack

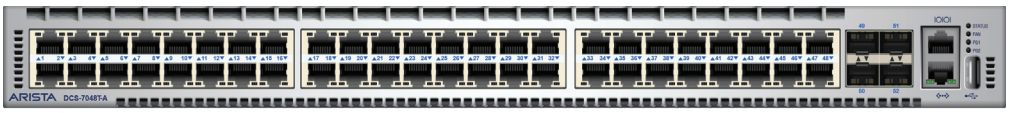
This appendix describes how to replace the switches in a DCA 40U rack. It includes the following major sections:

Switch types include:

- Interconnect and Aggregation (10GB; SWCH-AR1U-7050S-52)

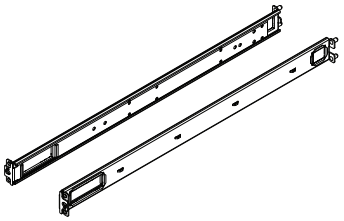


- Administration (1GB; SWCH-AR1U-7048T)



Switch mounting kit parts

The switch mounting kit includes rail assemblies and screws as listed below.

Component	Use
2 rail assemblies (consists of outer rails for connection to the rack and inner rails for connection to switch) 	Attach back to front on either side between rack channels and to the switch.
Eight Phillips pan-head 4M x 6 mm screws 	Attach inner rails to switch (4 per rail)
Six Phillips pan-head 5M x 16 mm screws 	Stabilize the rail mounting (3 per rail)

You need a Phillips-head screwdriver to complete the installation of the rails and switch.

Replace the switch in the rack

Replacement of non-FRU switch components by unauthorized personnel may void service warranties. If any non-FRU component fail you must replace the entire switch.

Replacing the switch consists of the following steps:

- "Task 1: Unpack the replacement switch" on page 201
- "Task 2: Remove the old switch from the rack" on page 201
- "Task 3: Transfer any optical SFP modules" on page 203
- "Task 4: Transfer the inner rails to the replacemet switch" on page 204
- "Task 6: Install the switch in the rack" on page 206

Task 1: Unpack the replacement switch

Unpack the replacement switch and place it on a clean, static-free surface near the rack with the faulted switch.

Task 2: Remove the old switch from the rack

1. From the back of the rack:
   a. Unplug all cables from the switch, and label the cables for easy identification when you need to plug them into the replacement switch.

b. Unplug both switch power cords from the rack's power distribution unit(s).

2. From the front of the rack:

   a. Unplug both power cords from the switch.

   b. Push the end of each power cord through the large hole in the front of the each rail assembly so you will be able to slide the switch forward.

   c. Remove the *middle* stabilizing screw from the front of each rail assembly (Figure 74).

   d. Pull the switch out of the rack and place it near the replacement switch (Figure 75).

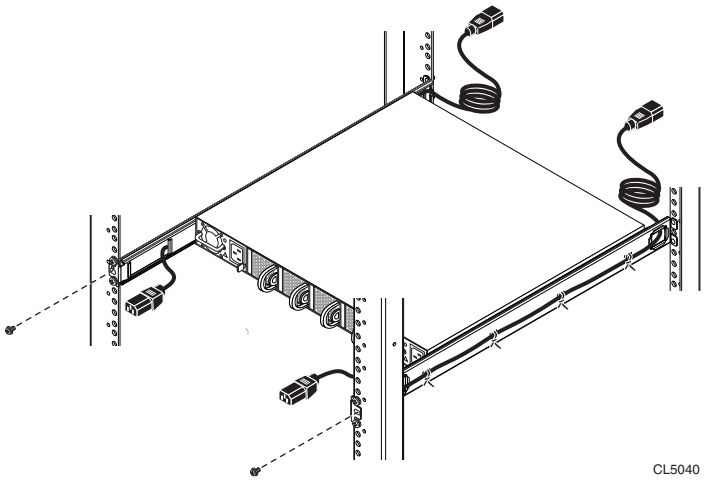


Figure 74 Removing the middle stabilizer screws

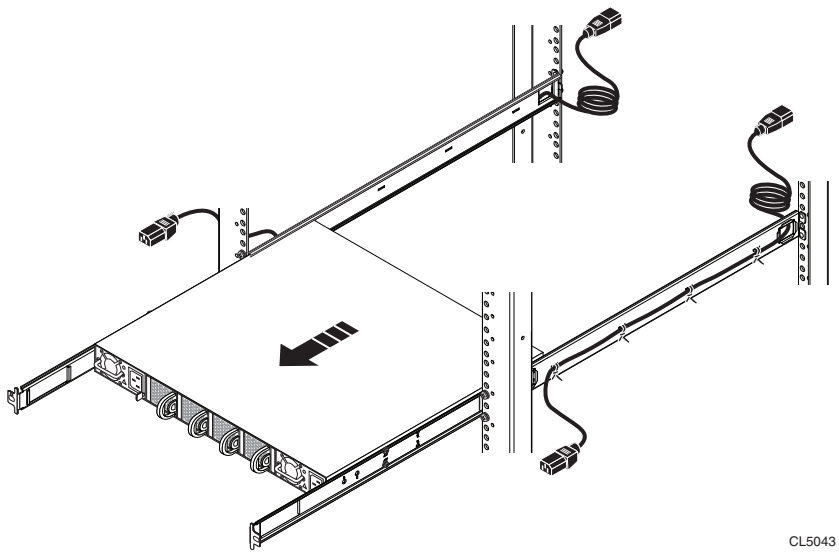


Figure 75 Removing the switch from the rack

Task 3: Transfer any optical SFP modules

You must transfer any optical SFP modules from the switch ports in the faulted switch to the same numbered switch ports in the replacement switch.

For *each* optical SPF module in a port on the faulted switch:

1. Remove the optical SFP module (Figure 76):
   a. On the SPF module, gently pull down on the spring release latch up.
   b. While still holding onto the latch, gently pull out the SFP module.

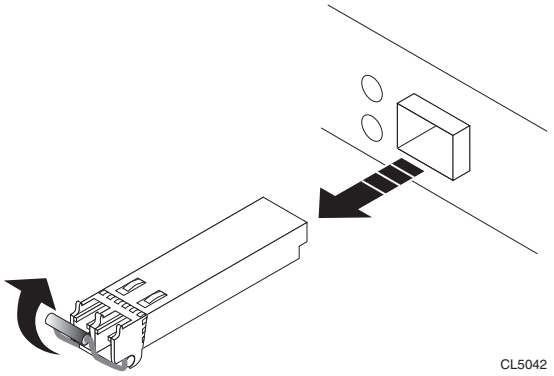


Figure 76 Removing an optical SFP module from a switch port

2. On the replacement switch, install the optical SFP module in the port with the same number as the port from which you removed it (Figure 77):
   a. On the SPF module, push the spring release latch up.
   b. Align the replacement SPF module with the switch port.
   c. Slide the SFP module into the switch port until it is securely connected.

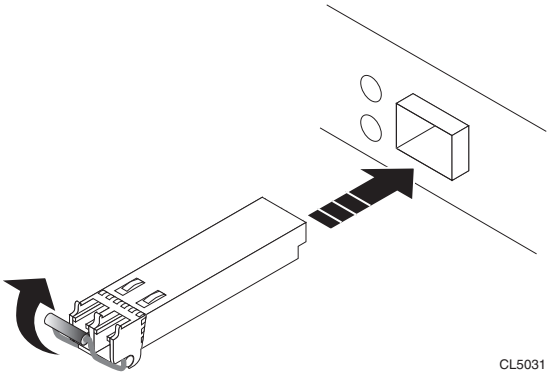


Figure 77 Installing an optical SFP module in a switch port

Task 4: Transfer the inner rails to the replacemet switch

Transfer the inner rails from the faulted switch to the replacement switch.

1. Unscrew the four screws attaching each inner rail to the faulted switch.

   Each rail assembly consists of an inner rail and an outer rail.

2. Attach an inner rail to each side of the replacement switch:

   a. Slide the rail sections apart to separate the inner rail from the outer rail (Figure 78).

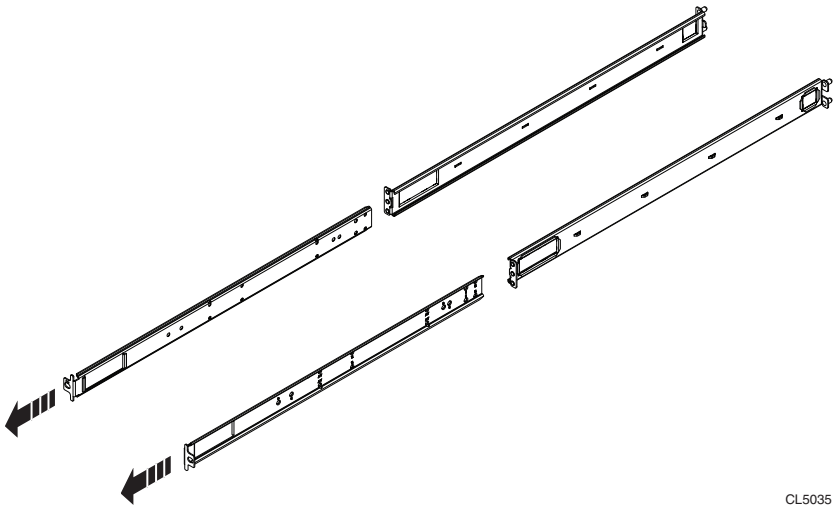


Figure 78 Removing the inner rail from the outer rail

   b. Align the holes labelled on the inner rail with the holes on the side of the replacement switch and secure the inner rail to the replacement switch with four M4 x 6mm screws (Figure 79).

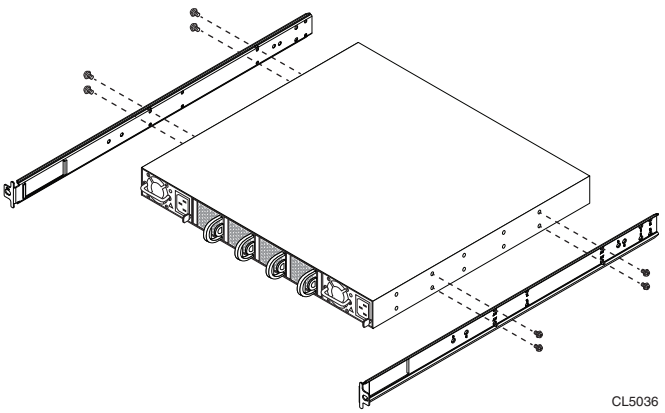


Figure 79 Attaching an inner rail to the switch

Task 5: Attach the outer rails to the rack (if necessary)

NOTICE

In most service situations that you encounter the outer rails will already be attached to the rack and you will not have to perform this procedure. This procedure is provided here mainly for reference.

1. Attach a switch power cord to *each* outer rail (Figure 80):

   a. At the rear of the outer rail (the end with the alignment pins), feed the male (prong) end of a switch power cord through small hole on the outer rail from the outside to the inside of the rail.

   b. Pull enough of the power cord through the hole to allow the cable to be plugged into the AC power outlet in the rack.

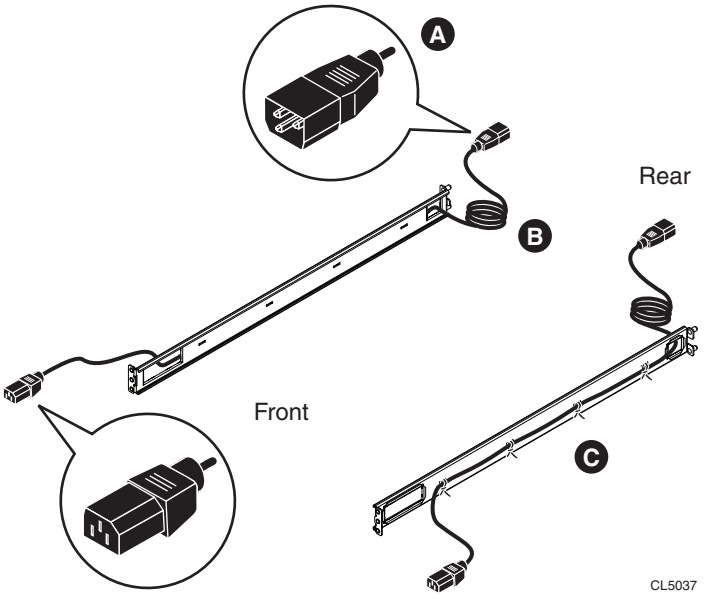


Figure 80 Attaching power cord the outer rail

   c. Attach the cord loosely to the rail with plastic ties. Anchor the plastic ties through the metal loops on the outside of the rail.

   The outside of the rail is the side with the two posts.

2. Attach the outer rails to the rack channels:

    a. From the front of the rack, align rail alignment posts with the *rear* channel holes for the selected 1 U (1.75 in) of rack space, and insert the rail alignment posts securely into the holes (Figure 81).

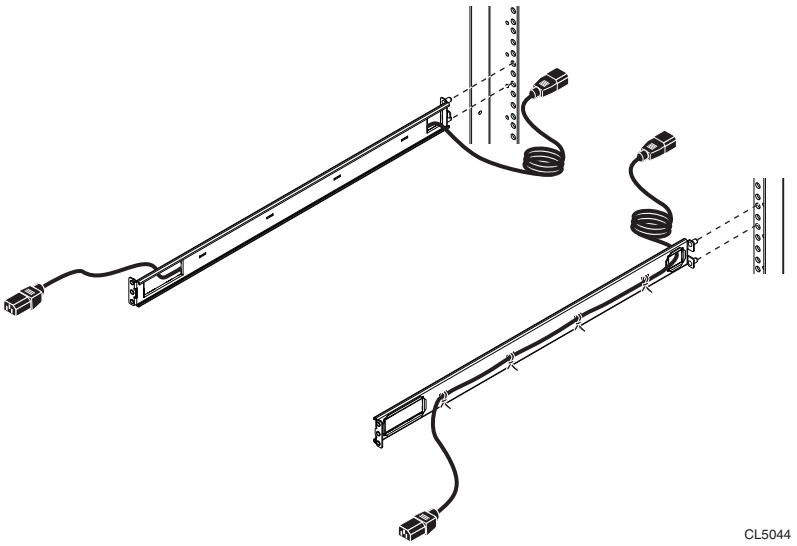


Figure 81 Inserting the rail alignment posts in the rear channel holes

    b. Secure the rail to the front channel with two small stablizer screws in the top and bottom holes, leaving the screws slightly loose (Figure 82).

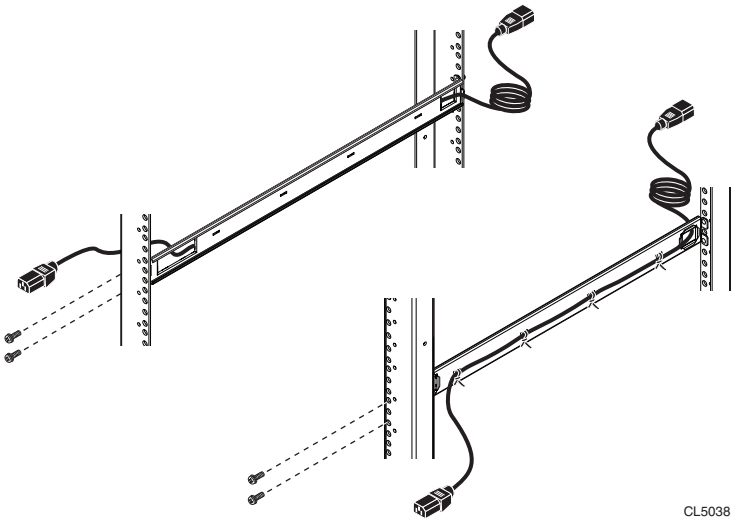


Figure 82 Securing the rails to the front channel

Task 6: Install the switch in the rack

1. Install the switch in the rack (Figure 83):

    a. At the front of the rack, align the rails attached to the switch with the channels of the outer rails.

b. Slide the switch into the outer rails and push the switch into the rack.

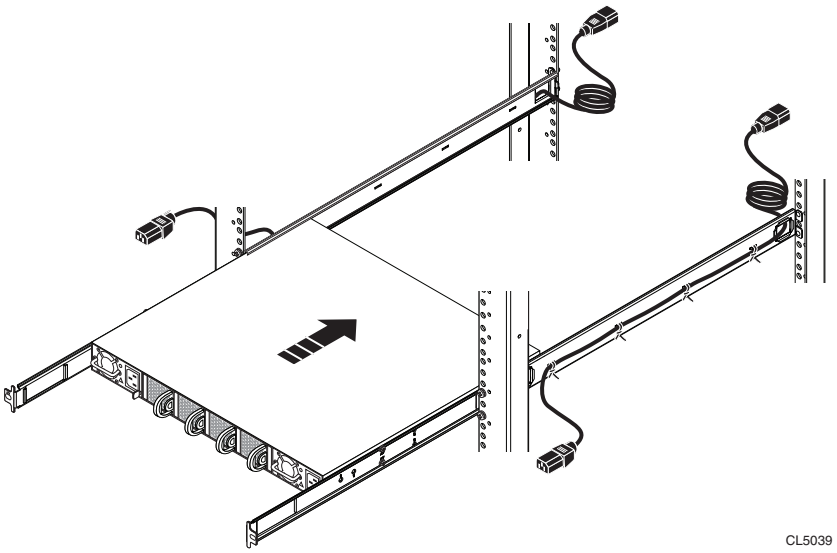


Figure 83 Installing the switch in the rack

2. Secure the rails in the rack by threading a small stabilizer screw through the front rack channel and into the middle hole of each rail (Figure 84).

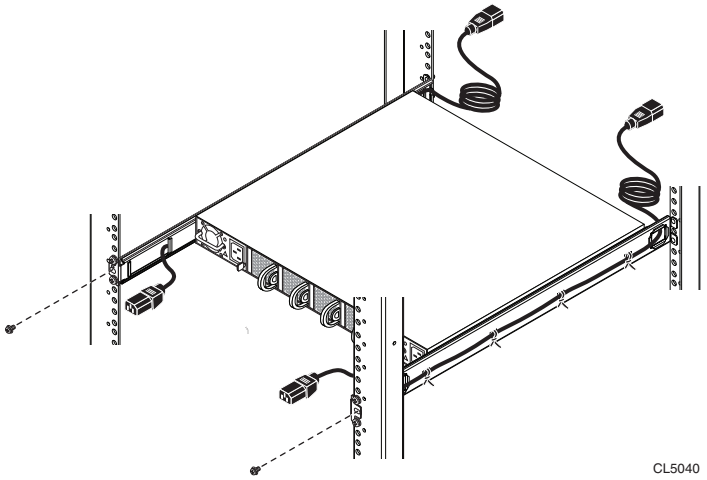


Figure 84 Installing the middle stablizer screws

3. Firmly tighten the three small stabilizing screws that you previously installed on front of each rail.

4. At the front of the rack, feed the female end of each switch power cord through the large hole in each rail assembly, and plug the cord into a power connector on the switch (Appendix FFigure 85).

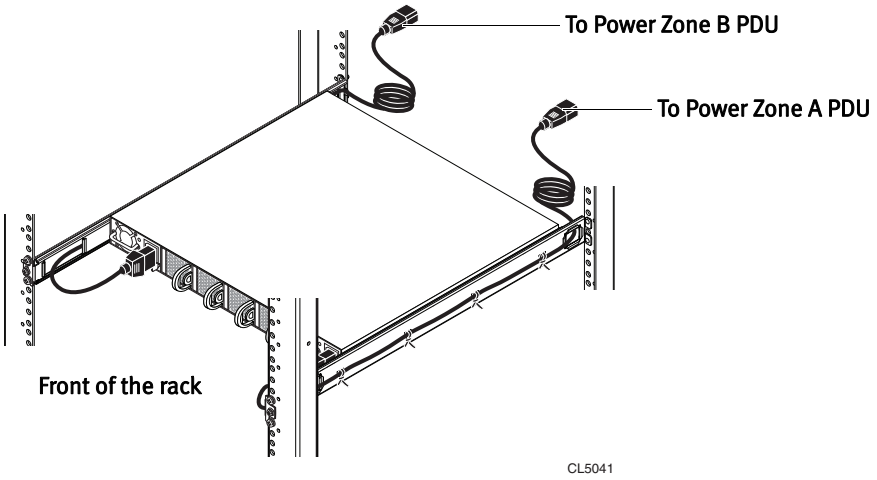


Figure 85 Plugging the switch power cords into the switch

5. At the back of the rack attach the required power and Ethernet cables as described in "Replace a Switch in the DCA" on page 119.

Replace an optical SFP module

1. Unpack the replacement optical SFP module and place it on a clean, static-free surface near the switch.
2. Identify the faulted SFP optical module in the switch.

   Consult your product documentation for information on identifying a faulted SFP module.
3. Remove the faulted optical SFP module (Figure 86):
   a. If a cable is connected to the SFP module, disconnect it.
   b. On the SPF module, gently pull down on the spring release latch.
   c. While still holding onto the latch, gently pull out the SFP module.

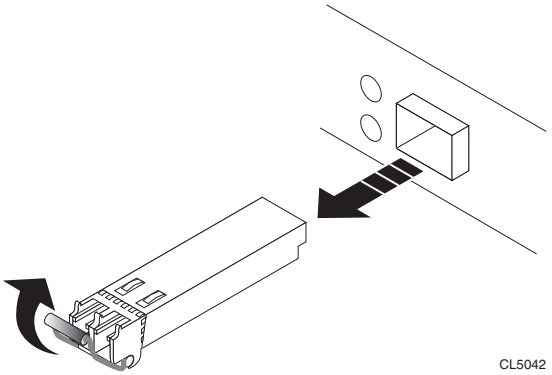


Figure 86 Removing an optical SFP module from a switch port

4. Install the replacement optical SFP module (Figure 87):
   a. On the replacement SFP module, push spring release latch up.
   b. Align the replacement SPF module with the switch port that contained the faulted module.
   c. Slide the SFP module into the switch port until it is securely connected.

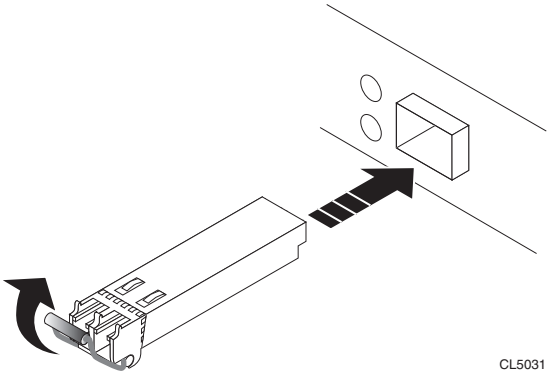


Figure 87 Installing an optical SFP module in a switch port

APPENDIX G
Switch Configuration: Backup and Recovery

This appendix explains how to cause the DCA to export the current switch configurations of all switches in the cluster. All switches need to be accessible and have ssh keys exchanged. Cases where there is a failure in this procedure should be reported as a new support ticket.

Create Two Files for Switch Recovery

First, create two files for each switch as follows.

1. Log into the master as `root`.
2. Run the command `dca_setup`.
3. Select options **2**, **13**, **4**.
4. Enter `/root` as the location for the switch backups.
5. In the `/root` folder on the master node, two files for each switch (the running configs and the startup configs) will be created that can be used to recover the current configuration after this process is complete.

Recover the Switch Configurations

Complete these steps to recover the previous configuration of a switch.

1. Log into the switch as user `admin`:

   ```
   # ssh admin@[switch hostname]
   ```

   For example, to connect to the lowest switch in the first rack:

   ```
   # ssh admin@i-sw-1
   ```

2. Copy the correct switch configuration to the startup configuration with the copy command:

   ```
   [switch]#copy
   scp://root@172.28.4.250/root/[switch].startup_config
   startup-config
   ```

Note: If the switches were backed up to the stand-by master, use 172.27.4.251 instead of 172.28.4.250.

For example, if uploading to i-sw-1 from a file stored in /root on mdw:

```
i-sw-1#copy scp://root@172.28.4.250/root/i-sw-1.startup_config
startup-config
```

3. Type the root password per the prompt. The startup-config is updated:

   ```
   root@172.28.4.250's password:
   i-sw-1.startup_config 100% 8302 8.1KB/s 00:00
   ```

4. Type the `reload` command to reload the switch.

   If prompted, answer no to saving changes as this will overwrite the startup-config with what is in the running-config. The switch will reboot and come up with the recovered configuration.

5. Repeat these steps for each switch to be recovered.

APPENDIX H
DCA Part Numbers

This appendix lists the part numbers for all field replaceable units (FRU) in a DCA. Refer to this appendix when ordering replacement parts.

Table 28 DCA Server replacement part numbers and specifications (page 1 of 2)

Module Type and EMC Internal Server Name	Official Description	Part Number (SKU)	Disks	Memory	Volume Name
DIA Module (Kylin)	PV V2 SVR 1NIC C1U-6 300GB HDD 64GB MEM	100-585-029-xx (covers each Rev from -01 thru -xx)	6x300GB	64GB	etl1, ...
HD-Compute Module (Kylin)	PV V2 SVR 1NIC C1U-6 300GB HDD 64GB MEM	100-585-029-xx (covers each Rev from -01 thru -xx)	6x300GB	64GB	hdc1, ...
Master Server (Kylin)	PV V2 SVR 1NIC C1U-6 300GB HDD 64GB MEM	100-585-029-xx (covers each Rev from -01 thru -xx)	6x300GB	64GB	mdw, smdw
*DIA 3TB Disk Module (Dragon 12) *Requires DCA software 2.0.2.0 or greater	PV V2 SERVER D2U-12 3TB HDD 64GB MEM	100-585-030-xx (covers each Rev from -01 thru -xx)	12x3TB	64GB	etl1, ...
Hadoop (HD) Master Module (Dragon 12)	PV V2 SERVER D2U-12 3TB HDD 64GB MEM	100-585-030-xx (covers each Rev from -01 thru -xx)	12x3TB	64GB	hdm1, hdm2, hdm3, hdm4
Hadoop (HD) Data Module (Dragon 12)	PV V2 SERVER D2U-12 3TB HDD 64GB MEM	100-585-030-xx (covers each Rev from -01 thru -xx)	12x3TB	64GB	hdw1, ...
GPDB UAP Standard Module (Dragon 24)	PV V2 SERVER D2U-24 900GB HDD 64GB MEM	100-585-031-xx (covers each Rev from -01 thru -xx)	24x900GB	64GB	sdw1, ...

Table 28 DCA Server replacement part numbers and specifications (page 2 of 2)

Module Type and EMC Internal Server Name	Official Description	Part Number (SKU)	Disks	Memory	Volume Name
GPDB UAP Compute Module (Dragon 24)	PV V2 SERVER D2U-24 300GB HDD 64GB MEM	100-585-035-xx (covers each Rev from -01 thru -xx)	24x300GB	64GB	sdw1, ...
*Master Server with additional NIC (Kylin) *Requires DCA software 2.0.2.0 or greater	PV V2 SVR 2NIC C1U-6 300GB HDD 64GB MEM	100-585-049-xx (covers each Rev from -01 thru -xx)	6x300GB	64GB	mdw, smdw
*GPDB Memory Module (Dragon 24) *Requires DCA software 2.0.2.0 or greater	PV V2 SERVER D2U-24 300GB HDD 256GB MEM	100-585-055-xx (covers each Rev from -01 thru -xx)	24x300GB	256GB	sdw1, ...

Table 29 Additional DCA FRU part numbers

Part Number	Description	Official Description
100-585-043 100-585-062 (sub)	10GB Ethernet Switch	ARISTA 7050S-52 10GB ETHERNET SWITCH
100-585-045 100-585-063 (sub)	1GB Ethernet Switch	ARISTA 7048T-A 1GB ETHERNET SWITCH
100-585-043 100-585-062 (sub)	10GB Ethernet Switch	ARISTA 7050S-52 10GB ETHERNET SWITCH
100-585-045 100-585-063 (sub)	1GB Ethernet Switch	ARISTA 7048T-A 1GB ETHERNET SWITCH
105-000-244	750W Power Supply	INTEL 750W POWER SUPPLY ROMLEY
100-585-043	Interconnect / Aggregation Switch, 52-port	ARISTA 7050S-52 10GB ETHERNET SWITCH
100-585-062	Interconnect / Aggregation Switch, 52-port	ARISTA 7050S-52 10GB ETHERNET SWITCH (CCC certified)
100-585-045	Administration Switch, 48-port	ARISTA 7048T-A 1GB ETHERNET SWITCH
100-585-063	Administration Switch, 48-port	ARISTA 7048T-A 1GB ETHERNET SWITCH (CCC certified)
100-585-048	Arista 10GBASE-SRL SFP+ OPTIC MODULE	ARISTA 10GBASE-SRL SFP+ OPTIC MODULE
105-000-313	Fan assembly, Arista switch	ARISTA FAN ASSEMBLY FOR 7048T, 7050S SWITCH

Part Number	Description	Official Description
105-000-314	Power supply, Arista switch	ARISTA POWER SUPPLY, 460W AC, FOR 7048T, 7050S SWITCH
105-000-222	Disk drive assembly for Hadoop Masters & Workers	INTEL DISK ASSEMBLY/3.5” SATA/3TB/7.2K/512BPS
105-000-237	Disk drive assembly for GPDB Compute, Master servers, DIA server, Hadoop Compute server	INTEL DISK ASSEMBLY/2.5” SAS/300GB/10K/512BPS
105-000-228	Disk drive assembly for GPDB Standard server	INTEL DISK ASSEMBLY/2.5” SAS/900GB/10K/512BPS
105-000-244	Power supply for Masters, GPDB Standard & Capacity, DIA, Hadoop Masters & Workers	INTEL 750W POWER SUPPLY ROMLEY
100-563-477	Power Distribution Unit (PDU)	PDU: TITAN-D RACK:SINGLE PHASE
038-004-176	1 Meter Interconnect Cable	ACTIVE SFP+ TO SFP+ 1M 8G/10G CABLE
038-004-177	3 Meter Interconnect Cable	ACTIVE SFP+ TO SFP+ 3M 8G/10G CABLE
038-004-186		12 INCH PDU JUMPER CABLE
038-003-733	10 Meter Optical Cable	10M OM3 LC to LC 50µm OPTICAL CABLE
038-003-347	30 Meter Optical Cable	30m LC to LC OPTICAL 50 MICRON MM CABLE ASSEMBLIES
038-004-224		PWR CORD 24A SP 15FT 56PA332 BL 4PPP
038-004-293		CBL, 15 FT SINGLE PHASE, GRAY, N. AMERICA
038-004-294		CBL, 15 FT SINGLE PHASE, GRAY, IEC, PIN & SLEEVE
038-004-295		CBL, 15 FT SINGLE PHASE, GRAY, AUSTRALIA
038-004-296		CBL, 15 FT SINGLE PHASE, GRAY, RUSSELLSTOLL 3750DP
038-004-223		SINGLE POER INLET CORD OPTION IEC-309-332P6 INTERNATIONAL 15'
038-004-222		SINGLE POWER INLET CORD OPTION WITH HUBBELL L6-30P CONNECTOR, NORTH AMERICA/JAPAN 15'
038-004-228		HUBBELL L6-30R to RUSSELLSTOLL 3750DP CABLE 15'
038-003-888	Service Cable - Administration Switch-to-Laptop	ETHERNET CABLE, 71 INCHES, RED