Migrate FlashStack to Cisco UCS 6400 Series Fabric Interconnects and Pure Storage FlashArray//X

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Contents

Summary

This document describes the process for migrating an existing FlashStack environment built from the Cisco UCS® 6200 Series Fabric Interconnects and the Pure Storage FlashArray//M Series to the Cisco UCS 6400 Series Fabric Interconnects and the Pure Storage FlashArray//X Series in a nondisruptive way.

Overview

This section provides an overview of this document.

Audience

The audience for this document consists of system architects, system engineers, and any other technical staff who are responsible for planning or upgrading the FlashStack environments. Although every effort has been made to make this document appeal to the widest possible audience, the document assumes that readers understand the Cisco Unified Computing System™ (Cisco UCS) and Pure FlashArray hardware, terminology, and configurations.

Cisco UCS 6545 Fabric Interconnect

The fourth-generation Cisco UCS 6454 Fabric Interconnect is a single-height rack-unit (RU) device with high-density, nonblocking, low-power ports. It has forty-eight 10 or 25 Gigabit Ethernet and Fibre Channel over Ethernet (FCoE) ports, six 40 or 100 Gigabit Ethernet and FCoE ports, and eight unified ports supporting both 10 and 25 Gigabit Ethernet and 8-, 16-, and 32-Gbps Fibre Channel.

Pure Storage FlashArray//X

Pure Storage FlashArray//X is the first mainstream, 100 percent Non-Volatile Memory Express (NVMe), enterprise-class all-flash array. //X represents a higher performance tier for mission-critical databases, top-of-rack (ToR) flash deployments, and Tier 1 application consolidation. //X, at 1 petabyte (PB) in 3RU, with latency in the hundred-microsecond range and gigabytes of bandwidth, delivers exceptional performance density that makes possible previously unattainable levels of consolidation.
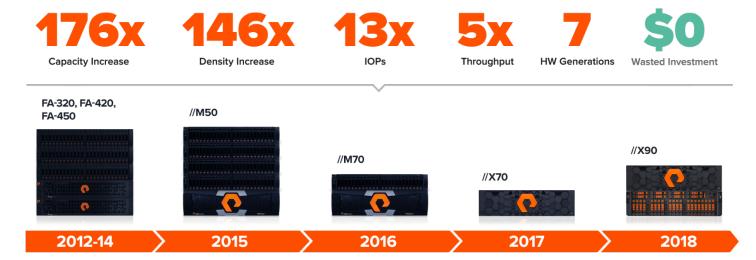
Evergreen Storage

Evergreen Storage Subscriptions deliver continuous improvements and innovations to keep your storage fresh and modern without downtime or performance impact (Figure 1). From acquisition, to operation, to upgrade, Evergreen delivers value and peace of mind. It provides a subscription to innovation in your data center.

Figure 1.   Evergreen Storage Subscriptions keeps your storage fresh and modern

Pre-upgrade steps

Complete the procedures presented here before you upgrade your system.

Verify hardware

Only the Cisco UCS 6200 Series Fabric Interconnects can be migrated to the Cisco UCS 6400 Series Fabric interconnects while they are in service.

Table 1 lists the servers supported by Cisco UCS Manager Release 4.0, which is required for the Cisco UCS 6400 Series. Table 2 lists the supported Cisco® virtual interface card (VIC) adapters, and Table 3 lists the supported FlashArray migration paths.

Table 1.   Supported servers

Cisco UCS B-Series Blade Servers	M3	M4	M5
Cisco UCS B22	Yes		
Cisco UCS B200	Yes	Yes	Yes
Cisco UCS B260		Yes	
Cisco UCS B420	Yes	Yes	
Cisco UCS B460		Yes	
Cisco UCS B480			Yes

Cisco UCS C-Series Rack Servers	M3	M4	M5
Cisco UCS C22	Yes		
Cisco UCS C24	Yes		
Cisco UCS C220	Yes	Yes	Yes
Cisco UCS C240	Yes	Yes	Yes

Cisco UCS C-Series Rack Servers	M3	M4	M5
Cisco UCS C460		Yes	
Cisco UCS C480			Yes

Table 2.   Supported adapters

Adapter for Cisco UCS-B Series servers
Cisco UCS VIC 1240
Cisco UCS VIC 1280
Cisco UCS VIC 1340
Cisco UCS VIC 1380
Cisco UCS VIC 1440
Cisco UCS VIC 1480

Adapter for Cisco UCS-C Series servers
Cisco UCS VIC 1225
Cisco UCS VIC 1227
Cisco UCS VIC 1285
Cisco UCS VIC 1385
Cisco UCS VIC 1387
Cisco UCS VIC 1455
Cisco UCS VIC 1457

Table 3.   FlashArray supported migration paths

FlashArray models	FA-400	M	X
FlashArray FA-300 Series	Yes	No*	No*
FlashArray FA-400 Series	–	Yes	Yes
FlashArray//M Series	–	–	Yes
FlashArray//X Series	–	–	–

*To migrate from the FlashArray FA-300 Series to the //M or //X, the system must first be updated to the FA-400 Series.

Verify VLANs

Confirm that the data VLANs do not overlap with the VLANs reserved for the 6454 Fabric Interconnect. Table 4 lists the reserved VLAN ranges.

Table 4.   Cisco UCS and fabric interconnect reserved VLANs

Cisco UCS 6200 Series	Cisco UCS 6400 Series
VLANs 4030 to 4047	VLANs 3915 to 4042 for Cisco NX-OS (modifiable)
	VLANs 4030 to 4047 for Cisco UCS Manager (fixed)
	VLAN 4095 (fixed)

VLANs 4030 to 4047 and 4095 are reserved and fixed for the 6400 Series Fabric Interconnects and cannot be changed.

Verify paths

Confirm that all servers have paths available through both fabric interconnects and to both storage controllers.

1. Log in to the FlashArray//X web user interface.

2. Select Health.

3. Select Connections.

4. Select the host and verify that the expected paths are shown in green and that the paths are listed as redundant.

Plan ports

The 6454 Fabric Interconnect port layout is different from the 6200 Series Fabric Interconnect port layout.

On the 6454, ports 1 to 8 are the ports that support Fibre Channel. Any Fibre Channel connections need to be planned from port 1 and then to higher-numbered ports, in contrast to the 6200 Series, which starts at the highest-numbered port and then moves to lower-numbered ports.

Verify the version

The Cisco USC Manager version on the 6400 Series Fabric Interconnects and the 6200 Series Fabric Interconnects **must** match. You should upgrade both sets of fabric interconnects to the currently recommended release of Cisco UCS Manager. The next section presents the steps for upgrading the Cisco UCS infrastructure.

Upgrading Cisco UCS

Follow the procedures presented here to upgrade Cisco UCS.

Upgrade the Cisco UCS infrastructure

Follow these steps to upgrade the Cisco UCS infrastructure:

1. Download the infrastructure software for Cisco UCS Manager Release 4.0 or later: for example, ucs-6200-k9-bundle-infra.4.0.2b.A.bin.

2. Copy the bundle to the fabric interconnect.

   a. Open Cisco UCS Manager.

   b. Select the Equipment tab.

   c. Choose Equipment > Firmware Management.

   d. Select Download Task.

    e.   Select Download Firmware.

    f.   Select Choose File and choose the 4.0 infrastructure bundle from step 1.

3.   Install the firmware.

    a.   Select Firmware Auto Install.

    b.   Select Install Infrastructure Firmware.

    c.   Respond to any warnings that may appear at this screen and click Next.

    d.   Select the Infra Pack for the version that you downloaded in step 1.

    e.   Click Upgrade Now or set a start time.

    f.   Click Finish.

Migrate the subordinate fabric interconnect

Follow these steps to migrate the subordinate fabric interconnect.

1.   Evacuate traffic from the subordinate fabric interconnect to help ensure that the migration process does not affect the data traffic. See https://www.cisco.com/c/en/us/td/docs/unified_computing/ucs/ucs-manager/GUI-User-Guides/Firmware-Mgmt/4-0/b_UCSM_GUI_Firmware_Management_Guide_4-0/b_UCSM_GUI_Firmware_Management_Guide_4-0_chapter_011.html#concept_D5A1607B910747E398054FA434D99059.

2.   Shut down the uplink ports on the subordinate fabric interconnect.

    a.   In Cisco UCS Manager, select the Equipment tab.

    b.   Expand Fabric Interconnects.

    c.   Select the fabric interconnect that is subordinate.

    d.   Right-click a configured uplink port.

    e.   Choose Disable.

    f.   Repeat the preceding steps for each uplink port.

3.   Unconfigure all the server ports on the subordinate fabric interconnect.

    a.   In Cisco UCS Manager, select the Equipment tab.

    b.   Expand Fabric Interconnects.

    c.   Select the fabric interconnect that is subordinate.

    d.   Right-click the server port.

    e.   Choose Unconfigure.

    f.   Repeat the preceding steps for each server port.

4.   Power down the subordinate fabric interconnect by unplugging it from the power source.

5.   Mount the replacement Cisco UCS 6454 Fabric Interconnect into either the same rack or an adjacent rack. See https://www.cisco.com/c/en/us/td/docs/unified_computing/ucs/hw/6454-install-guide/6454/6454_chapter_010.html.

6. Disconnect the cables from the chassis I/O modules (IOMs) or fabric extenders to the subordinate fabric interconnect ports.

7. Disconnect the uplink cables from the subordinate fabric interconnect ports.

8. Migrate the L1 and L2 connections from the subordinate Cisco UCS 6200 Series interconnect to the L1 and L2 ports the new Cisco UCS 6454 Fabric Interconnect. L1 connects to L1, and L2 connects to L2.

9. Connect the server and uplink cables that were disconnected in steps 6 and 7 to the new Cisco UCS 6454 Fabric Interconnect.

10. Connect the power to the new Cisco UCS 6454. The fabric interconnect will automatically boot and run power-on self-tests (POSTs). It may reboot, which is normal behavior.

11. Configure the server and uplink ports on the new Cisco UCS 6454 Fabric Interconnect.

    a. In Cisco UCS Manager, select the Equipment tab.

    b. Expand Fabric Interconnects.

    c. Select the fabric interconnect that is subordinate.

    d. Right-click the port to be configured.

    e. Choose Configure as Server Port or Configure as Uplink Port, as appropriate.

    f. Repeat the preceding steps for each port.

12. The new subordinate Cisco UCS 6454 Fabric Interconnect will automatically synchronize the configuration and database and state information from the primary Cisco UCS 6200 Series Fabric Interconnect.

    Synchronization between primary and subordinate fabric interconnects can take several minutes. You may see an error message that will persist until the server ports are enabled.

    The port configuration is copied from the subordinate switch to the new hardware.

13. Verify that the data path is ready. See https://www.cisco.com/c/en/us/td/docs/unified_computing/ucs/ucs-manager/GUI-User-Guides/Firmware-Mgmt/4-0/b_UCSM_GUI_Firmware_Management_Guide_4-0/b_UCSM_GUI_Firmware_Management_Guide_4-0_chapter_011.html - concept_7406EAC0852E4A52968DFBAE84E1A1C8.
    Verify that all faults are resolved before proceeding.

    Verify, and if necessary reconfigure, the port channel for uplink Ethernet ports.

14. Reconfigure the server ports that were unconfigured in step 3.

    If you have changed port mappings, you may need to again acknowledge the chassis or rack server connected to the subordinate fabric interconnect.

    Verify, and if necessary reconfigure, Ethernet ports as server ports.

15. Restart stopped traffic flows by disabling fabric evacuation.

16. Promote the subordinate fabric interconnect to primary and repeat the process on the second new Cisco UCS 6454 Fabric Interconnect.

    a. Use Secure Shell (SSH) to navigate to Cisco UCS.

    b. Connect to the local management context:

       ```
       connect local-mgmt
       ```

    c.   Prompt the Cisco UCS 6400 Series Fabric Interconnect to the cluster lead:

```
cluster lead {a | b}
```

17. Repeat steps 1 to 16 to migrate the second 6200 Series Fabric Interconnect.

Upgrading FlashArray

Follow the procedures presented here to upgrade FlashArray.

Open a case with Pure Storage Support

Before you begin the upgrade procedure, contact Pure Storage Support to open a case. Opening a case helps ensure that the upgrade procedure is tracked, and it enables you to easily access the resources of the support team.

You can contact support at support@purestorage.com or by calling (800) 379-7873 in the United States.

For international support, see https://support.purestorage.com.

Support is available 24 hours a day, seven days a week.

Make sure that you are in contact with support at least 48 hours before you start the upgrade process, so that the team can help you prepare for the upgrade.

Upgrade the secondary controller

Follow these steps to upgrade the secondary controller.

1. Use the keyboard, video, and monitor (KVM) cable to connect a local console to CT1 using the KVM port. Use either a VGA monitor and USB keyboard combination or a computer equipped with a serial-to-USB converter set to 115,200 bits per second (bps), N,8,1, and terminal emulation software.

   Sign into CT0 as **root** and enter the following command to make sure that both controllers are online and in a ready state:

   ```
   purearray list --controller
   ```

   Sample output is shown here:

Name	Mode	Model	Version	Status
CT0	primary	FA-m20r2	5.1.x	ready
CT1	secondary	FA-m20r2	5.1.x	ready

2. Perform a heath check on the array, verifying that all servers have redundant connections to both controllers and that I/O is evenly balanced. See https://support.purestorage.com/FlashArray/PurityFA/General_Troubleshooting/Doing_a_Health_Check_on_a_FlashArray.

3. Upgrade Purity on existing controllers to match the version installed on the FlashArray//X R2 controllers. See https://support.purestorage.com/FlashArray/PurityFA/PurityFA_Upgrades/01_Upgrading_Purity/FlashArray_Installation_Changing_PurityFA_Version_on_a_Fresh_FlashArray.

4. Suppress alerts on the array for the duration of the upgrade:

   ```
   purealert tag --timeout 240m --maintenance
   ```

5. Enter the following command to perform a manual failover and verify that CT0 is the secondary controller:

   ```
   puredb run giveback --safe
   ```

   If CT0 is already secondary, the command will report that the controller is not in primary mode and exit.

6. Enter the following command to stop Purity:

   ```
   pureadm stop
   ```

   Disconnect each cable from CT0. Label the host, management, replication, and shelf cables and set them aside for later reconnection (do not disconnect the power supply unit [PSU] cables).

7. Remove the old CT0 from the chassis and install the new FlashArray//X CT0.

8. Sign into CT1 as **root** and enter the following command:

   ```
   service chastity restart
   ```

   Sample output is shown here (the process ID will vary):

   ```
   # service chastity restart
   chastity stop/waiting
   chastity start/running, process 34232
   ```

   Determine the CT1 model by entering the following command:

   ```
   hwconfig --model
   ```

   Determine the version of Purity that is running on CT1 by entering the following command:

   ```
   pureversion -a
   ```

9. Disconnect the KVM cable from CT1, reconnect it to the KVM port on CT0, and open a Purity command-line interface (CLI) session.

   Identify the required Purity version on CT0 by entering the following command:

   ```
   pureversion -a.
   ```

   From the CLI, enter the following command:

   ```
   puresetup replace --from-controller controller_type (e.g.,FA-m20r2)
   ```

   The purity setup feature checks the array and provides cabling instructions.

   Sample output is shown here:

   ```
   #########################################
   # Welcome to the Purity Setup Wizard #
   #########################################
   Check smartcard for RDL....... OK
   Check shelf cabling........... OK
   Check controller link......... OK
   Check power supply............ OK
   purity start/running
   platform:.done
   foed: done
   gui: .........done
   rest: done
   ```

```
platform_env: 0.done
quorum: ..done
foed_env:
24.24.24.24.23.23.23.23.23.23.23.23.23.23.23.23.23.23.23.23.23.23.23.23.23.23.23.
23.23.23.23.2- 3.23.23.23.23.16.16.16.3.0.done
remote_patch: done
driver: done
san: Skip waiting for san during HW NDU
Please move ports as shown below:
[FA-m20r2.CT0.ETH0] ====>> [FA-X70R2.CT0.ETH0](Slot: LOM)
[FA-m20r2.CT0.ETH1] ====>> [FA-X70R2.CT0.ETH1](Slot: LOM)
[FA-m20r2.CT0.ETH2] ====>> [FA-X70R2.CT0.ETH2](Slot: LOM)
[FA-m20r2.CT0.ETH3] ====>> [FA-X70R2.CT0.ETH3](Slot: LOM)
[FA-m20r2.CT0.FC0] ====>> [FA-X70R2.CT0.FC0](Slot: 0)
[FA-m20r2.CT0.FC1] ====>> [FA-X70R2.CT0.FC1](Slot: 0)
[FA-m20r2.CT0.FC2] ====>> [FA-X70R2.CT0.FC2](Slot: 0)
[FA-m20r2.CT0.FC3] ====>> [FA-X70R2.CT0.FC3](Slot: 0)
```

10. Using the temporary labels and the output of the **puresetup replace** command as your guide, connect the cables to the FlashArray//X R2 controller.

    For example, the line **[FA-m20r2.CT0.ETH0] ====>> [FA-X70R2.CT0.ETH0](Slot: LOM)** tells you to take the cable that was connected to ETH0 on CT0 on the array FA-m20r2 and connect it to port ETH0 of CT0 on the array FA-X70R2.

    Type **continue** and then press Enter to proceed. Purity configures the network ports and performs ping tests on each of the interfaces.

    Sample output is shown here:

    ```
    Configuring network ports...
    Perform ping test on port ETH0 ....... OK
    Perform ping test on port ETH1 ....... OK
    Perform ping test on port ETH2 ....... OK
    Perform ping test on port ETH3 ....... OK
    ```

11. Repeat steps 1 to 10, this time replacing CT1 instead of CT0.

12. Verify that the upgrade process is complete by entering the following command to make that sure both controllers are online and in a ready state:

    ```
    purearray list --controller
    ```

    Sample output is shown here:

Name	Mode	Model	Version	Status
CT0	Primary	FA-X70R2	5.1.x	ready
CT1	secondary	FA-X70R2	5.1.x	ready

    If phone home is enabled, phone home the latest logs to support by entering the following command:

    ```
    purearray phonehome --send-today
    ```

Upgrading server firmware and drivers (optional)

After you upgrade of the Cisco UCS infrastructure to Release 4.0, you may want to upgrade the firmware of the Cisco UCS servers as well. The procedures for upgrading the server firmware and the drivers for VMware ESXi are presented here.

Upgrade Cisco UCS server firmware

Use the following steps to upgrade the Cisco UCS server firmware.

1. Download the Cisco UCS B-Series Blade Server bundle and Cisco UCS C-Series Rack Server bundle for the release that matches the newly deployed fabric interconnects: for example, ucs-k9-bundle-b-series.4.0.2b.B.bin, and ucs-k9-bundle-c-series.4.0.2b.C.bin.

2. Copy the bundle to the fabric interconnect.

   a. Open Cisco UCS Manager.

   b. Select the Equipment tab.

   c. Choose Equipment > Firmware Management.

   d. Select Download Task.

   e. Select Download Firmware.

   f. Select Choose File and choose the 4.0 infrastructure bundle that was downloaded.

3. Update the host firmware package.

   a. Select the Server tab.

   b. Choose Polices > Host Firmware Packages.

   c. Select the host firmware package policy used by your FlashStack service profiles.

   d. Select Modify Package Versions.

   e. Set the blade package to the version that you have downloaded: for example, 4.0(2b)B.

   f. Click OK. All hosts will be set to pending reboot.

4. Preform a rolling reboot of the servers to upgrade the firmware.

   a. In VMware vCenter, place one of the hosts in maintenance mode.

   b. Reboot the host.

   c. After the host has rebooted, exit maintenance mode.

   d. Repeat the preceding steps for each host.

Upgrade VMware ESXi drivers

You may need to upgrade the ESXi drivers. Consult the Cisco UCS Hardware Compatibility List (HCL) to determine whether you need to update the drivers after upgrading the server firmware.

1. Extract the contents of the ISO image to the ESXi host.

2. Identify the offline-bundle.zip file that contains the Ethernet network interface card (eNIC) or Fibre Channel network interface card (fNIC) driver being installed.

3. Log on to the ESXi host using the VMware vSphere Client with administrator privileges, such as **root**.

4. Using the data-store browser, upload the offline-bundle.zip file to the ESXi host's data store.

5. Enter maintenance mode.

6. Copy the offline-bundle.zip file to a data store accessible by the ESXi host using the following command:

    ```
    cp offline-bundle.zip /vmfs/volumes/datastore_name
    ```

7. Run the following command to install drivers using the offline bundle. An absolute path is required to run this command.

    ```
    esxcli software vib update -d /path/offline-bundle.zip
    ```

    Here is an example using an absolute path:

    ```
    esxcli software vib update -d /vmfs/volumes/datastore_name/offline-bundle.zip
    ```

8. Run the following command to verify that the VMware vSphere Installation Bundle (VIB) has been installed successfully:

    ```
    esxcli software vib list | grep -i vib_name
    ```

9. Restart the host.

10. Exit maintenance mode.

For more information about the Cisco UCS HCL, see https://ucshcltool.cloudapps.cisco.com/public/.

For driver upgrade guidance for Linux, Microsoft Windows, and VMware ESXi, see https://www.cisco.com/c/en/us/td/docs/unified_computing/ucs/os-install-guides/4-0/b_VIC_Installing_Cisco_VIC_Drivers-4-0/b_VIC_Installing_Cisco_VIC_Drivers-4-0_preface_00.html.

Upgrade VMware ESXi drivers using the VMware vSphere Update Manager (optional)

You can use VMware vSphere Update Manager (VUM) to plan and run driver updates across multiple hosts as part of a single workflow. For more information about using VUM, see the vSphere Update Manager Installation and Administration Guide: https://docs.vmware.com/en/VMware-vSphere/6.7/com.vmware.vsphere.update_manager.doc/GUID-F7191592-048B-40C7-A610-CFEE6A790AB0.html

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