CHAPTER 1

Overview

This chapter contains the following topics:

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Additional resources

As part of an improvement effort, revisions of the software and hardware are periodically released. Therefore, some functions described in this document might not be supported by all versions of the software or hardware currently in use. The product release notes provide the most up-to-date information on product features. Contact your technical support professional if a product does not function properly or does not function as described in this document.

Where to get help
Support, product, and licensing information can be obtained as follows:

Product information
For product and feature documentation or release notes, go to Unity Technical Documentation at: www.emc.com/en-us/documentation/unity-family.htm.

Troubleshooting
For information about products, software updates, licensing, and service, go to Online Support (registration required) at: https://Support.EMC.com. After logging in, locate the appropriate Support by Product page.

Technical support
For technical support and service requests, go to Online Support at: https://Support.EMC.com. After logging in, locate Create a service request. To open a service request, you must have a valid support agreement. Contact your Sales Representative for details about obtaining a valid support agreement or to answer any questions about your account.

Special notice conventions used in this document

⚠️ DANGER
Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

⚠️ WARNING
Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

⚠️ CAUTION
Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

⚠️ NOTICE
Addresses practices not related to personal injury.

Note
Presents information that is important, but not hazard-related.
Handling replaceable units

This section describes the precautions that you must take and the general procedures that you must follow when removing, installing, and storing any replaceable unit.

Avoiding electrostatic discharge (ESD) damage

When replacing or installing hardware units, you can inadvertently damage the sensitive electronic circuits in the equipment by simply touching them. Electrostatic charge 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.

Be aware of the following requirements:

- 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 units from their antistatic packaging until you are ready to install them.
- Before you begin service, 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 ESD anti-static gloves or an ESD wristband (with strap).
  
  If using an ESD wristband with a strap:
  - Attach the clip of the ESD wristband to the ESD bracket or bare metal on a cabinet/rack or enclosure.
  - Wrap the ESD wristband around your wrist with the metal button against your skin.
  - If a tester is available, test the wristband.
- If an emergency arises and the ESD kit is not available, follow the procedures in Emergency Procedures (without an ESD kit).

Emergency procedures (without an ESD kit)

In an emergency when an ESD kit is not available, use the following precautions to reduce the possibility of an electrostatic discharge by ensuring that your body and the subassembly are at the same electrostatic potential.

**NOTICE**

These precautions are not a substitute for the use of an ESD kit. Follow them only in the event of an emergency.

- Before touching any unit, touch a bare (unpainted) metal surface of the cabinet/rack or enclosure.
- Before removing any unit from its antistatic bag, place one hand firmly on a bare metal surface of the cabinet/rack or enclosure, and at the same time, pick up the
unit 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 unit.

- When you remove a unit 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 unit, first place the unit back in the antistatic bag. When you are ready again to install the unit, repeat these procedures.

**Hardware acclimation times**

Systems and components must acclimate to the operating environment before applying power. This requires the unpackaged system or component to reside in the operating environment for up to 16 hours in order to thermally stabilize and prevent condensation.

Refer to the table, Table 1 on page 6, to determine the precise amount of stabilization time required.

**Table 1 Hardware acclimation times (systems and components)**

<table>
<thead>
<tr>
<th>If the last 24 hours of the TRANSIT/STORAGE environment was this:</th>
<th>...and the OPERATING environment is this:</th>
<th>...then let the system or component acclimate in the new environment this many hours:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Temperature</strong></td>
<td><strong>Humidity</strong></td>
<td></td>
</tr>
<tr>
<td>Nominal 68-72°F (20-22°C)</td>
<td>Nominal 40-55% RH</td>
<td>Nominal 68-72°F (20-22°C) 40-55% RH</td>
</tr>
<tr>
<td>Cold &lt;68°F (20°C)</td>
<td>Dry &lt;30% RH</td>
<td>&lt;86°F (30°C)</td>
</tr>
<tr>
<td>Cold &lt;68°F (20°C)</td>
<td>Damp ≥30% RH</td>
<td>&lt;86°F (30°C)</td>
</tr>
<tr>
<td>Hot &gt;72°F (22°C)</td>
<td>Dry &lt;30% RH</td>
<td>&lt;86°F (30°C)</td>
</tr>
<tr>
<td>Hot &gt;72°F (22°C)</td>
<td>Humid 30-45% RH</td>
<td>&lt;86°F (30°C)</td>
</tr>
<tr>
<td></td>
<td>Humid 45-60% RH</td>
<td>&lt;86°F (30°C)</td>
</tr>
<tr>
<td></td>
<td>Humid ≥60% RH</td>
<td>&lt;86°F (30°C)</td>
</tr>
<tr>
<td>Unknown</td>
<td></td>
<td>&lt;86°F (30°C)</td>
</tr>
</tbody>
</table>
If there are signs of condensation after the recommended acclimation time has passed, allow an additional eight (8) hours to stabilize.

Systems and components must not experience changes in temperature and humidity that are likely to cause condensation to form on or in that system or component. Do not exceed the shipping and storage temperature gradient of 45°F/hr (25°C/hr).

Do NOT apply power to the system for at least the number of hours specified in the table, Table 1 on page 6. If the last 24 hours of the transit/storage environment is unknown, then you must allow the system or component 16 hours to stabilize in the new environment.

---

Removing, installing, or storing replaceable units

Use the following precautions when removing, handling, or storing replaceable units.

**CAUTION**

Some replaceable units have the majority of their weight in the rear of the component. Ensure that the back end of the replaceable unit is supported while installing or removing it. Dropping a replaceable unit could result in personal injury or damage to the equipment.

**NOTICE**

- For a module that must be installed into a slot in an enclosure, examine the rear connectors on the module for any damage before attempting its installation.
- A sudden jar, drop, or even a moderate vibration can permanently damage some sensitive replaceable units.

- Do not remove a faulted replaceable unit until you have the replacement available.
- When handling replaceable units, avoid electrostatic discharge (ESD) by wearing ESD anti-static gloves or an ESD wristband with a strap. For additional information, refer to Avoiding electrostatic discharge (ESD) damage on page 5.
- Avoid touching any exposed electronic components and circuits on the replaceable unit.
- Never use excessive force to remove or install a replaceable unit. Take time to read the instructions carefully.
- Store a replaceable unit in the antistatic bag and the specially designed shipping container in which you received it. Use the antistatic bag and special shipping container when you need to return the replaceable unit.
- Replaceable units must acclimate to the operating environment before applying power. This requires the unpackaged component to reside in the operating environment for up to 16 hours in order to thermally stabilize and prevent condensation. Refer to Hardware acclimation times on page 6 to ensure the replaceable unit has thermally stabilized to the operating environment.
Note

- Front bezels should always be attached to ensure EMI compliance. Make sure you reattach the bezel after replacing a component.
- Each slot should contain a component or filler panel to ensure proper air flow throughout the system.

Unpacking a part

Procedure

1. Wear ESD gloves or attach an ESD wristband to your wrist and the enclosure in which you are installing the part.
2. Unpack the part and place it on a static-free surface.
3. If the part is a replacement for a faulted part, save the packing material to return the faulted part.

Standard touch point colors

Touch points are component locations where you can:
- Grip the hardware to remove or install a component.
- Open or close a latch.
- Turn a knob to open, close, or adjust a component.

Standard touch point colors are terra-cotta (orange) or blue.

Note

Within this documentation, the color orange is used instead of terra-cotta for simplicity.

Table 2 Standard touch point colors

<table>
<thead>
<tr>
<th>Touch point color</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terra-cotta (orange)</td>
<td>This color indicates that you can perform the task, such as remove a component with a terra-cotta (orange) lever, while the system remains powered (up/on).</td>
</tr>
<tr>
<td><img src="orange.png" alt="Terra-cotta" /></td>
<td></td>
</tr>
<tr>
<td><strong>Note</strong></td>
<td>Some tasks may require additional steps.</td>
</tr>
<tr>
<td>Blue</td>
<td>This color indicates that a shutdown of the system or component is required before you can perform the task, such as removing a component with a blue lever.</td>
</tr>
<tr>
<td><img src="blue.png" alt="Blue" /></td>
<td></td>
</tr>
</tbody>
</table>
Verify shipping package contents

Confirm that you receive all necessary equipment needed to perform the data in place conversion.

Verify that you received the following:

- Storage processor (SP) assembly (2)
- Cable clamp kit
  - Cable clamps (6 total, 3 for each SP)
  - Cable clamp labels (6 total, 3 for each SP)
- Data in place conversion Insert (1)
- Product Serial Number Tag (PSNT) sticker sheet (1)

Valid hardware upgrade paths

Review this information to ensure that your current storage processor (SP) assembly is eligible for an upgrade to the target storage processor assembly.

Upgrade limitations

The following configurations are not eligible for data in place conversion:

- A storage processor assembly cannot be converted from Hybrid to All-Flash, or from All-Flash to Hybrid.
- A storage processor assembly cannot be converted to a lower model number from a higher model number.
- DC-powered Unity systems are not eligible for conversion.

Valid upgrade paths

**Table 3 Upgrade path for Unity Hybrid systems**

<table>
<thead>
<tr>
<th>Source SP model</th>
<th>Target SP model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unity 300</td>
<td>Unity 400</td>
</tr>
<tr>
<td></td>
<td>Unity 500</td>
</tr>
<tr>
<td></td>
<td>Unity 600</td>
</tr>
<tr>
<td>Unity 400</td>
<td>Unity 500</td>
</tr>
<tr>
<td></td>
<td>Unity 600</td>
</tr>
<tr>
<td>Unity 500</td>
<td>Unity 600</td>
</tr>
<tr>
<td>Unity 600</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

**Table 4 Upgrade path for Unity All-Flash systems**

<table>
<thead>
<tr>
<th>Source SP model</th>
<th>Target SP model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unity 300F</td>
<td>Unity 350F</td>
</tr>
<tr>
<td></td>
<td>Unity 400F</td>
</tr>
</tbody>
</table>
### Table 4 Upgrade path for Unity All-Flash systems (continued)

<table>
<thead>
<tr>
<th>Source SP model</th>
<th>Target SP model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unity 450F</td>
</tr>
<tr>
<td></td>
<td>Unity 500F</td>
</tr>
<tr>
<td></td>
<td>Unity 550F</td>
</tr>
<tr>
<td></td>
<td>Unity 600F</td>
</tr>
<tr>
<td></td>
<td>Unity 650F</td>
</tr>
<tr>
<td>Unity 350F</td>
<td>Unity 450F</td>
</tr>
<tr>
<td></td>
<td>Unity 550F</td>
</tr>
<tr>
<td></td>
<td>Unity 650F</td>
</tr>
<tr>
<td>Unity 400F</td>
<td>Unity 450F</td>
</tr>
<tr>
<td></td>
<td>Unity 500F</td>
</tr>
<tr>
<td></td>
<td>Unity 550F</td>
</tr>
<tr>
<td></td>
<td>Unity 600F</td>
</tr>
<tr>
<td></td>
<td>Unity 650F</td>
</tr>
<tr>
<td>Unity 450F</td>
<td>Unity 550F</td>
</tr>
<tr>
<td></td>
<td>Unity 650F</td>
</tr>
<tr>
<td>Unity 500F</td>
<td>Unity 550F</td>
</tr>
<tr>
<td></td>
<td>Unity 600F</td>
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<tr>
<td></td>
<td>Unity 650F</td>
</tr>
<tr>
<td>Unity 550F</td>
<td>Unity 650F</td>
</tr>
<tr>
<td>Unity 600F</td>
<td>Unity 650F</td>
</tr>
<tr>
<td>Unity 650F</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

### Choosing an offline or an online conversion

Before starting the upgrade, choose whether to perform an online or offline data in place conversion.

Data in place conversions can be performed with data online or offline. All user data and configurations are saved in both conversions.

During an online data in place conversion, users have continued access to data on the system but I/O operations may be limited. The online conversion takes longer to complete than an offline conversion.

Online conversions are only available in version 4.2.1.x or later.

During an offline data in place conversion, both storage processors are powered off. Data on the storage processors is unavailable. Ensure that downtime is scheduled before proceeding with an offline conversion.
• To perform an offline data in place conversion, follow the steps in Performing an offline data in place conversion on page 13.

• To perform an online data in place conversion, follow the steps in Performing the online data in place conversion on page 27.
CHAPTER 2

Performing an offline data in place conversion

Take the following actions to perform an offline data in place conversion.

Note

The offline conversion involves powering down the storage processor assemblies. When all SPs are down, all I/O services stop and hosts lose access to the system. Before starting the conversion, you should disconnect all network shares, LUNs, and VMware datastores from each host to prevent data loss. When the system is fully powered up, you can reconnect the hosts to these storage resources.

⚠️ CAUTION

The new storage processor assembly is locked to its configuration. Do not attempt to move internal components.

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- Installing SP assembly B ............................................................................. 18
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Starting the offline hardware upgrade

The upgrade procedure must begin in Unisphere before the physical hardware swap can occur.

Before you begin

⚠️ **CAUTION**

Due to ETA 518863, the minimum required operating environment is Unity OE 4.3.1 or later. When possible, upgrade to the latest code available before starting the data in place conversion.

- Pause all synchronous replication sessions on the replication source array:
  - In Unisphere, navigate to Protection & Mobility > Replication.
  - Select the synchronous replication session, then click More Actions > Pause.
  - Wait for Unisphere to pause the selected replication session.
  - Pause any remaining synchronous replication sessions.
  - Click Refresh to verify that all synchronous replication sessions are paused.
- Verify the model number of the new system, located on the replacement SP's packaging.
- Working with hardware may cause electrostatic discharge that could damage your hardware. Before working with any hardware, review the precautions when removing or replacing components.

Procedure

1. In Unisphere, select Service, then Service Tasks.
2. Select Hardware Upgrade, then Execute.
3. Complete the Hardware Upgrade wizard.
   a. Select Offline storage processor upgrade.
      - If you are unsure of which upgrade method to pick, review the considerations in Choosing an offline or an online conversion on page 10 before proceeding.
   b. Select the target upgrade model from the list.
   c. Perform a pre-upgrade health check (PUHC) to ensure the system is healthy before proceeding.
   d. Review the Summary screen and ensure that the information displayed is correct.

   The wizard halts the system.
4. Wait for the wizard to halt the system before continuing.
   - To ensure that the system is halted, check that the fault and power lights on both SPs are off, and that the amber fault LEDs on both power supplies are lit. The solid green AC/DC power indicator LED will still be lit on the power supplies.
Preparing the SP assemblies for offline hardware upgrade

Follow these tasks before removing the SP assembly to ensure that the upgrade is successful.

**Before you begin**

Ensure that the fault and power lights on both SPs are off, and that the amber fault LEDs on both power supplies are lit. This indicates that both SP assemblies have been halted successfully. The solid green AC/DC power indicator LED will still be lit on the power supplies.

**NOTICE**

DO NOT REMOVE an SP assembly while the "Unsafe to remove SP" LED shown below is lit.

**Procedure**

1. Remove power cables from both SP assemblies.
2. Wait for the disk processor enclosure (DPE) to power off before continuing.
3. Place the provided cable clamps onto all front- and back-end cables, including the I/O modules, CNA ports, and onboard ports of SP B, then remove all cables from the system.
   - Clearly mark all cable clamps with meaningful and detailed information about where cables connect, which aids in re-connection following the conversion process.
   - All front- and back-end cables that connect to an I/O module in a slot use one cable clamp.
   - All cable clamps will be used for both SP assemblies.
   - Ensure that all cables are set into the grooves in the cable clamp as seen in the illustration below, and that no cables are pinched in the space between the grooves.
Figure 2  Cable clamp with labels

Cable clamp may or may not include numbering.

Note

After performing the conversion, be sure to reinsert the cables, I/O modules, and CNA SFPs in the same configuration after the new SP assembly is inserted, using the labels on the cable clamps as a guide. It is recommended that you upgrade one SP assembly at a time to avoid reinserting parts into the wrong SP assembly.

Figure 3  DPE rear view with component locations

Table 5  DPE rear view descriptions

<table>
<thead>
<tr>
<th>Location</th>
<th>Description</th>
<th>Location</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Power supply module (SP B)</td>
<td>3</td>
<td>Ultraflex I/O module slots (SP B), filler modules shown</td>
</tr>
<tr>
<td>2</td>
<td>Storage processor assembly (SP B)</td>
<td>4</td>
<td>SP A</td>
</tr>
</tbody>
</table>
Removing SP assembly B

This procedure describes how to remove SP assembly B from the enclosure. There are two SP assemblies: SP A and SP B. The top SP assembly is SP B, and is opposite of the bottom SP assembly, SP A. The illustration shows removal of SP assembly B. The procedure for removing SP assembly A is the same.

Before you begin

Ensure that all cables are properly labeled using the cable clamps, and removed from the storage processor assembly.

Procedure

1. Pull the torque limit screw handle out of SP assembly B (1).
2. Turn the handle counterclockwise to release SP assembly B from the enclosure (1). As the handle is turned, the SP assembly extracts out of the enclosure. When outward movement stops, the SP assembly is ready for removal.

⚠️ CAUTION

The SP assembly is heavy. Exercise caution when removing the SP assembly to avoid personal injury and/or damage to the equipment.
3. Use the handle to pull the SP assembly outward enough to grasp the sides with both hands (2). Then with both hands supporting the SP assembly, pull the SP assembly fully out of the enclosure.

4. Place the SP assembly on a clean, flat static-free work surface.

Installing SP assembly B

Install the new SP assembly to complete the physical hardware swap.

Procedure

1. Align the SP assembly with the enclosure slot and slide it into the slot until it stops (1).

2. Turn the orange torque limit screw handle clockwise until you hear a click sound from the handle (1). The click sound indicates the torque limit is reached and the SP assembly is seated in the enclosure.

3. Push the orange torque limit screw handle into the SP assembly until you hear a click sound from the handle (2). The click sound indicates screw handle is secured in the assembly.
4. If the conversion kit shipped with extra power supplies, install the new power supply.
   Do not transfer the power supply in the next step if you install a new power supply.

   **Note**
   All data in place All-Flash Array (AFA) conversions from a Unity x00F series to a Unity x50F series include two new power supplies. Review KB 520323 for additional information if you did not receive new power supplies for this specific type of conversion.

5. Transfer each I/O module, CNA SFP and power supply from the old SP into the same location on the new SP.
   Documentation with detailed steps for removing and installing customer replaceable units, such as I/O modules, CNA SFPs, and power supplies, is available on [https://support.emc.com/products/39949](https://support.emc.com/products/39949).

6. Connect each I/O module cable, CNA cable and onboard cable into the same port from which it was removed.

   **Note**
   Do not insert the power cable.
Removing and installing SP assembly A

You have just upgraded SP B. Now you are ready to upgrade SP A by repeating the following tasks that you just performed for SP B.

**Procedure**

1. Place the provided cable clamps onto all cables, including the I/O modules, CNA ports, and onboard ports of SP A, then remove all cables from the system.
   - Clearly mark all cable clamps with meaningful and detailed information about where cables connect, which aids in re-connection following the conversion process.
   - All front- and back-end cables that connect to an I/O module in a slot use one cable clamp.
   - All cable clamps will be used for both SP assemblies.
   - Ensure that all cables are set into the grooves in the cable clamp as seen in the illustration below, and that no cables are pinched in the space between the grooves.

**Figure 6** Cable clamp with labels

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Performing an offline data in place conversion
Table 6 DPE rear view descriptions

<table>
<thead>
<tr>
<th>Location</th>
<th>Description</th>
<th>Location</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Power supply module (SP B)</td>
<td>3</td>
<td>Ultraflex I/O module slots (SP B), filler modules shown</td>
</tr>
<tr>
<td>2</td>
<td>Storage processor assembly (SP B)</td>
<td>4</td>
<td>SP A</td>
</tr>
</tbody>
</table>

2. Remove SP A from the enclosure.
3. Install the new SP into the empty slot for SP A.
4. If the conversion kit shipped with extra power supplies, install the new power supply.

Do not transfer the power supply in the next step if you install a new power supply.

Note

All data in place All-Flash Array (AFA) conversions from a Unity x00F series to a Unity x50F series include two new power supplies. Review KB 520323 for additional information if you did not receive new power supplies for this specific type of conversion.

5. Transfer each I/O module, CNA SFP and power supply from the old SP into the same location on the new SP.

Documentation with detailed steps for removing and installing customer replaceable units, such as I/O modules, CNA SFPs, and power supplies, is available on https://support.emc.com/products/39949.

6. Connect each I/O module cable, CNA cable and onboard cable into the same port from which it was removed.

Completing the offline hardware upgrade

Insert the power cables and complete the Hardware Upgrade wizard in Unisphere to finish the Data in Place conversion.

Before you begin

Ensure that you have performed the physical swap of both storage processor assemblies. Check that all cables, power supplies, I/O modules and CNA adaptors are in their proper location.

Note

Once the upgrade is complete, it is no longer possible to revert to the old SP assembly. The Data in Place conversion process can be canceled at any point before restarting the system with the new SPs. For more information about canceling the upgrade, see Canceling the Data in Place conversion on page 47.

Procedure

1. Insert power cables for both SP A and SP B to power on the system.
2. Wait for the system to power on and complete the upgrade.

**Note**

The system may take up to 120 minutes to restart. The SP Fault LEDs blink blue while the system is restarting, and turns off when the system has restarted.

**Figure 8** SP fault and power LEDs

<table>
<thead>
<tr>
<th>Location</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SP power LED</td>
</tr>
<tr>
<td>2</td>
<td>SP fault LED</td>
</tr>
<tr>
<td>3</td>
<td>Unsafe to remove SP LED</td>
</tr>
</tbody>
</table>

3. Unisphere times out, closing the **Hardware Upgrade**. To verify that the upgrade was successful, log back into Unisphere after the system has restarted, and confirm that the new model number on the **System View** page matches the new hardware model number.

The wizard will not complete if the new SP assembly is not functional, and the old SPs must be returned to the system. If the wizard does not complete, or states that the upgrade failed, troubleshoot the problem using the information in **Troubleshooting** on page 46 and check for hardware faults.

4. Place the corresponding new part number sticker over the Product Serial Number Tag (PSNT) part number field, and change the model field to match the new hardware.

Refer to **Upgrade conversion worksheet** on page 42 for part numbers of new hardware.
After a data in place conversion, the **Performance** dashboard in Unisphere resets and may appear blank until new data is collected. If you require historical data from the dashboard, refer to KB article 519081 and call support.
Verifying the new storage processor assembly

Verify that the new storage processor assembly is recognized by your system, and operating correctly using the procedure that follows.

Procedure

1. In Unisphere, select System View.
2. On the Summary page, confirm that the system status is OK.
3. Select the Enclosures page.
4. Verify that the storage processor assembly appears with OK status in the enclosure view.
   You may need to refresh Unisphere by clicking on the refresh icon next to the Enclosures view.
   Select the DPE in the Enclosure dropdown menu and select the Rear view of the enclosure. Select the new storage processor shown in this enclosure view.

   Figure 11 Healthy storage processor A - example location

If the system health monitor shows the part as faulted, contact your service provider.

Post-upgrade tasks

Complete these tasks after successfully upgrading the storage processor assemblies.

Completing the upgrade conversion worksheet
It is important that you complete the upgrade conversion worksheet to ensure that we receive the new product number of your system. Refer to Update install base records on page 42.

Changing the array name field
Your array has both a Model field and a Name field. The model name updates automatically after the conversion is completed, but the Name field does not change. When the array is first installed, the Name field defaults to the array serial number, however the name of the array can be customized by the owner. If the conversion requires the array name to be altered, you can change the Name field at any time.

Follow these steps to change the name field:

1. In Unisphere, select the gear icon in the top right of the dashboard.
2. Select Management, then Unisphere IPs.
3. Type a new name for the system in the Name field, then select Apply to save the changes.
4. Confirm that the name change is reflected in System > System View > Summary.
Enable Secure Shell (SSH) on the system
By default, the Secure Shell (SSH) protocol is disabled after an offline upgrade. To connect to the system and perform advanced system maintenance, you need to enable SSH on the storage system. This service action allows you to run service tools, such as service actions or service scripts, on the storage system. Once SSH is enabled, you or your service provider can run the tools through a service portal. When the service tools have finished running, disable the SSH protocol to ensure the system is secure.

Follow these steps to enable SSH:

1. In Unisphere, select Service > Service Tasks > Enable SSH.
2. Select Execute.

Disposal of the original storage processor assemblies
The two storage processor assemblies that were removed from your array belong to you, but can no longer be used with the upgraded system. Contact your local recycling center for instructions on how to dispose of the hardware. Dell EMC is not responsible for the pick up or disposal of old hardware.

Note
Internal disks may contain sensitive data. Be sure to remove the disks and securely dispose of them before recycling the rest of the SP.
Performing an offline data in place conversion
CHAPTER 3

Performing the online data in place conversion

Take the following actions to perform an online data in place conversion.

**CAUTION**

The new storage processor assembly is locked to its configuration. Do not attempt to move internal components.

- Starting the online hardware upgrade ................................................................. 28
- Preparing the SP assemblies for online upgrade ............................................... 29
- Removing the first SP assembly ......................................................................... 31
- Installing the new SP assembly .......................................................................... 32
- Preparing the second SP for replacement ............................................................ 34
- Removing and installing the second SP .............................................................. 34
- Completing online hardware upgrade ................................................................. 36
- Verifying the new storage processor assembly .................................................. 38
- Post-upgrade tasks ............................................................................................ 39
Starting the online hardware upgrade

The upgrade procedure must begin in Unisphere before the physical hardware swap can occur.

Before you begin

⚠️ CAUTION

Due to ETA 518863, the minimum required operating environment is Unity OE 4.3.1 or later. When possible, upgrade to the latest code available before starting the data in place conversion.

- Pause all replication sessions on the replication source array:
  - In Unisphere, navigate to Protection & Mobility > Replication.
  - Select the replication session, then click More Actions > Pause.
  - Wait for Unisphere to pause the selected replication session.
  - Pause any remaining replication sessions.
  - Click Refresh to verify that all replication sessions are paused.
- Ensure that the combined CPU utilization is below 120%.
- Verify the model number of the new system, located on the replacement SP’s packaging.
- Working with hardware may cause electrostatic discharge that could damage your hardware. Before working with any hardware, review the precautions when removing or replacing components.

Procedure

1. In Unisphere, select Service, then Service Tasks.
2. Select Hardware Upgrade, then Execute.
3. Complete the Hardware Upgrade wizard.
   a. Select Online storage processor upgrade.
      If you are unsure of which upgrade method to pick, review the considerations in Choosing an offline or an online conversion on page 10 before proceeding.
   b. Select the target upgrade model from the list.
   c. Perform a pre-upgrade health check (PUHC) to ensure the system is healthy before proceeding.
      Refer to Troubleshooting on page 46 for more information on failed pre-upgrade health checks.
   d. Review the Summary screen and ensure that the information displayed is correct.
      The wizard halts the storage processor assembly.
4. Wait for the wizard to halt the SP before continuing.
Note
The wizard directs you to replace either SP A or SP B. Follow the instructions in
the wizard to replace the correct SP.

To ensure that the SP is halted, check that the fault and power lights on the SP
are off, and that the amber fault LEDs on the power supply is lit. Do not remove
an SP while the Unsafe to remove SP LED (3) is lit.

Figure 12 SP fault and power LEDs

<table>
<thead>
<tr>
<th>Location</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SP power LED</td>
</tr>
<tr>
<td>2</td>
<td>SP fault LED</td>
</tr>
<tr>
<td>3</td>
<td>Unsafe to remove SP LED</td>
</tr>
</tbody>
</table>

Preparing the SP assemblies for online upgrade

Follow these tasks before removing the SP assembly to ensure that the upgrade is
successful.

Before you begin
To ensure that the storage processor assembly is halted, check that the SP fault and
power LEDs are both off. This indicates that the SP assembly has been halted
successfully. The power supply power LED remains green. Management Ethernet
connection LEDs also remain lit.

**NOTICE**

DO NOT REMOVE an SP assembly while the "Unsafe to remove SP" LED shown
below is lit.

Note
The Data in Place conversion process can be canceled at any point before replacing
the first SP. To cancel the upgrade, re-seat the original SP by pulling the SP out an
inch or so, and then reinsert it. For more information about cancelling the upgrade, see
Canceling the Data in Place conversion on page 47.
Procedure

1. Remove the power cable from the SP indicated in the **Hardware Upgrade** wizard in Unisphere.

   Leave all cables plugged into the other SP while replacing this SP.

2. Wait for the SP to power off before continuing.

3. Place the provided cable clamps onto all front- and back-end cables, including the I/O modules, CNA ports, and onboard ports of the SP, then remove all cables from the SP.

   - Clearly mark all cable clamps with meaningful and detailed information about where cables connect, which aids in re-connection following the conversion process.
   - All front- and back-end cables that connect to an I/O module in a slot use one cable clamp.
   - All cable clamps will be used for both SP assemblies.
   - Ensure that all cables are set into the grooves in the cable clamp as seen in the illustration below, and that no cables are pinched in the space between the grooves.

   **Figure 13** Cable clamp with labels

   Cable clamp may or may not include numbering.

**Note**

After performing the conversion, be sure to reinsert the I/O modules, CNA SFPs and cables in the same configuration after the new SP assembly is inserted, using the labels on the cable clamps as a guide.
Removing the first SP assembly

This procedure describes how to remove SP assembly B from the enclosure. There are two SP assemblies: SP A and SP B. The top SP assembly is SP B, and mirrors the bottom SP assembly, SP A. The illustration shows removal of SP assembly B. The procedure for removing SP assembly A is the same.

**Before you begin**

Ensure that all cables attached to the SP assembly to be replaced are properly labeled using the cable clamps, and removed from the SP assembly. Only replace the SP assembly that is indicated in the Hardware Upgrade wizard in Unisphere.

**Procedure**

1. Pull the torque limit screw handle out of the SP assembly (1).
2. Turn the handle counterclockwise to release the SP assembly from the enclosure (1). As the handle is turned, the SP assembly extracts out of the enclosure. When outward movement stops, the SP assembly is ready for removal.

**CAUTION**

The SP assembly is heavy. Exercise caution when removing the SP assembly to avoid personal injury and/or damage to the equipment.
3. Use the handle to pull the SP assembly outward enough to grasp the sides with both hands (2). Then with both hands supporting the SP assembly, pull the SP assembly fully out of the enclosure.

4. Place the SP assembly on a clean, flat static-free work surface.

**Installing the new SP assembly**

Install the new SP assembly to complete the physical hardware swap.

**Procedure**

1. Align the SP assembly with the enclosure slot and slide it into the slot until it stops (1).

2. If the conversion kit shipped with extra power supplies, install the new power supply.

   Do not transfer the power supply in the next step if you install a new power supply.
All data in place All-Flash Array (AFA) conversions from a Unity x00F series to a Unity x50F series include two new power supplies. Review KB 520323 for additional information if you did not receive new power supplies for this specific type of conversion.

3. Transfer each I/O module, CNA SFP and power supply from the old SP into the same location on the new SP.

   Documentation with detailed steps for removing and installing customer replaceable units, such as I/O modules, CNA SFPs, and power supplies, is available on https://support.emc.com/products/39949.

4. Connect each I/O module cable, CNA cable and onboard cable into the same port from which it was removed.

5. Turn the orange torque limit screw handle clockwise until you hear a click sound from the handle (1). The click sound indicates the torque limit is reached and the SP assembly is seated in the enclosure.

6. Push the orange torque limit screw handle into the SP assembly until you hear a click sound from the handle (2). The click sound indicates screw handle is secured in the assembly.

   **Figure 16 Installing the SP assembly**

7. Connect the power cord to the power supply and secure the cord with the retention bail at the connector.
Preparing the second SP for replacement

Return to Unisphere to continue the data in place conversion.

Before you begin

Ensure that you have performed the physical swap of the first storage processor assembly. Check that all cables, power supplies, I/O modules, and CNA adaptors are in their proper location. The green power supply LED and the amber fault LED on the SP should be lit.

Procedure

1. Return to Unisphere, and wait for services to restart on the first SP.
2. Wait for Unisphere to halt the other SP.
3. Once the other SP is halted, continue to Removing and installing the second SP on page 34.

Removing and installing the second SP

You have just upgraded the first SP. Now you are ready to upgrade the second SP by repeating the following tasks that you just performed for the first SP.

Procedure

1. Remove the power cable from the SP indicated in the Hardware Upgrade wizard in Unisphere.
   Leave all cables plugged into the other SP while replacing this SP.
2. Wait for the SP to power off before continuing.
3. Place the provided cable clamps onto all cables, including the I/O module cables, CNA cables, and onboard ports cables of the SP.
   - Clearly mark all cable clamps with meaningful and detailed information about where cables connect, which aids in re-connection following the conversion process.
   - All front- and back-end cables that connect to an I/O module in a slot use one cable clamp.
   - All cable clamps will be used for both SP assemblies.
Removing and installing the second SP

4. Remove marked cables from the SP.
5. Remove the SP from the enclosure.
6. If the conversion kit shipped with extra power supplies, install the new power supply.
   Do not transfer the power supply in the next step if you install a new power supply.

Table 8 DPE rear view descriptions

<table>
<thead>
<tr>
<th>Location</th>
<th>Description</th>
<th>Location</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Power supply module (SP B)</td>
<td>3</td>
<td>Ultraflex I/O module slots (SP B), filler modules shown</td>
</tr>
<tr>
<td>2</td>
<td>Storage processor assembly (SP B)</td>
<td>4</td>
<td>SP A</td>
</tr>
</tbody>
</table>
All data in place All-Flash Array (AFA) conversions from a Unity x00F series to a Unity x50F series include two new power supplies. Review KB 520323 for additional information if you did not receive new power supplies for this specific type of conversion.

7. Transfer each I/O module, CNA SFP and power supply from the old SP into the same location on the new SP.

Documentation with detailed steps for removing and installing customer replaceable units, such as I/O modules, CNA SFPs, and power supplies, is available on https://support.emc.com/products/39949.

8. Install the new SP into the empty slot for the SP.
9. Connect each I/O module cable, CNA cable and onboard cable into the same port from which it was removed.

**Completing online hardware upgrade**

Insert the power cables and complete the Hardware Upgrade wizard in Unisphere to finish the Data in Place conversion.

**Before you begin**

Ensure that you have performed the physical swap of both storage processor assemblies. Check that all cables, power supplies, I/O modules and CNA adaptors are in their proper location.

**Note**

Once the upgrade is complete, it is no longer possible to revert to the old SP assembly. For more information about canceling the upgrade, see Canceling the Data in Place conversion on page 47

**Procedure**

1. Insert the power cable into the SP to power on the system.
2. Wait for the SP to power on and complete the upgrade.

**Note**

The SP may take up to 120 minutes to restart. The SP Fault LED blinks blue while the system is restarting, and turns off when the SP has restarted.

**Figure 19** SP fault and power LEDs

![Figure 19 SP fault and power LEDs](image-url)
3. Confirm that the new model number on the System View page matches the new hardware model number.

If Unisphere timed out and closed the Hardware Upgrade wizard, log back into Unisphere.

The wizard will not complete if the new SP assembly is not functional, and the old SPs must be returned to the system. If the wizard does not complete, or states that the upgrade failed, troubleshoot the problem using the information in Troubleshooting on page 46 and check for hardware faults.

4. Place the corresponding new part number sticker over the Product Serial Number Tag (PSNT) part number field, and change the model field to match the new hardware.

Refer to Upgrade conversion worksheet on page 42 for part numbers of new hardware.

Figure 20 PSNT location on 12-slot DPE
Verifying the new storage processor assembly

Verify that the new storage processor assembly is recognized by your system, and operating correctly using the procedure that follows.

Procedure

1. In Unisphere, select System View.
2. On the Summary page, confirm that the system status is OK.
3. Select the Enclosures page.
4. Verify that the storage processor assembly appears with OK status in the enclosure view.

You may need to refresh Unisphere by clicking on the refresh icon next to the Enclosures view.
Select the DPE in the Enclosure dropdown menu and select the Rear view of the enclosure. Select the new storage processor shown in this enclosure view.

Figure 22 Healthy storage processor A - example location
If the system health monitor shows the part as faulted, contact your service provider.

**Post-upgrade tasks**

Complete these tasks after successfully upgrading the storage processor assemblies.

**Completing the upgrade conversion worksheet**

It is important that you complete the upgrade conversion worksheet to ensure that we receive the new product number of your system. Refer to Update install base records on page 42.

**Changing the array name field**

Your array has both a Model field and a Name field. The model name updates automatically after the conversion is completed, but the Name field does not change. When the array is first installed, the Name field defaults to the array serial number, however the name of the array can be customized by the owner. If the conversion requires the array name to be altered, you can change the Name field at any time.

Follow these steps to change the name field:

1. In Unisphere, select the gear icon in the top right of the dashboard.
2. Select Management, then Unisphere IPs.
3. Type a new name for the system in the Name field, then select Apply to save the changes.
4. Confirm that the name change is reflected in System > System View > Summary.

**Disposal of the original storage processor assemblies**

The two storage processor assemblies that were removed from your array belong to you, but can no longer be used with the upgraded system. Contact your local recycling center for instructions on how to dispose of the hardware. Dell EMC is not responsible for the pick up or disposal of old hardware.

**Note**

Internal disks may contain sensitive data. Be sure to remove the disks and securely dispose of them before recycling the rest of the SP.
Performing the online data in place conversion
APPENDIX A

Upgrade conversion worksheet

Complete this worksheet after performing the conversion to update the Install Base Group (IBG) Records.

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- Upgrade conversion worksheet ............................................................. 42
Update install base records

Follow these instructions to update the install base records. Up-to-date install base records allows Dell EMC to pro-actively contact customers in case of known issues.

For customers and Dell EMC personnel
Copy and paste Sections 1, 2 and 3 of the Upgrade conversion worksheet on page 42 into a Microsoft Word document or text document and complete the information as required. An example of a completed upgrade conversion worksheet is available in Example - Completed upgrade conversion worksheet on page 43. Save the document as "Upgrade Conversion Worksheet".

Navigate to Business Services (http://emc.force.com/BusinessServices), and select Install Base Group under the Post Sales heading. Complete all required fields in the Case Creation Application form, selecting Upgrade/Conversion as the Case Sub Type. Upload the "Upgrade Conversion Worksheet" document you created earlier as an attachment.

For Partners
Copy and paste Sections 1, 2 and 3 of the Upgrade conversion worksheet on page 42 into a Microsoft Word document or text document and complete the information as required. An example of a completed upgrade conversion worksheet is available in Example - Completed upgrade conversion worksheet on page 43. Save the document as "Upgrade Conversion Worksheet".

Navigate to the Partner Portal (http://emc.force.com/createPSCcase/Cases_PSC_Site_SubPage?recordType=Install%20Base%20Group&langForPage=en_US), and select Model Quantity Update. Complete all required fields in the Case Details form. Upload the "Upgrade Conversion Worksheet" document you created earlier as an attachment.

Upgrade conversion worksheet

Section 1: General Information
Sales order number for this conversion:
Customer:
Customer contact name:
Customer contact phone number:
Customer Party/Site ID number:
Installation or completion date:
Dell EMC Customer Engineer name (if applicable):
Dell EMC Customer Engineer email address (if applicable):
Task or Service Request (SR) number (if applicable):

Section 2: Unity System Installation Details
Unity serial number (on the PSNT):
Current Unity OE software version:

Section 3: Unity Hardware Upgrade Conversion
Unity model number change (Refer to the following tables for the 900 model numbers)
Original array model and 900 model number:
New array model and 900 model number:

Table 9 Unity SP model numbers for Hybrid arrays

<table>
<thead>
<tr>
<th>Hybrid arrays</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Unity 300</td>
<td>900-542-002</td>
</tr>
<tr>
<td>Unity 400</td>
<td>900-542-004</td>
</tr>
<tr>
<td>Unity 500</td>
<td>900-542-005</td>
</tr>
<tr>
<td>Unity 600</td>
<td>900-542-010</td>
</tr>
</tbody>
</table>

Table 10 Unity SP model numbers for All Flash arrays

<table>
<thead>
<tr>
<th>All Flash arrays</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Unity 300F</td>
<td>900-542-012</td>
</tr>
<tr>
<td>Unity 350F</td>
<td>900-538-011</td>
</tr>
<tr>
<td>Unity 400F</td>
<td>900-542-013</td>
</tr>
<tr>
<td>Unity 450F</td>
<td>900-538-012</td>
</tr>
<tr>
<td>Unity 500F</td>
<td>900-542-014</td>
</tr>
<tr>
<td>Unity 550F</td>
<td>900-538-013</td>
</tr>
<tr>
<td>Unity 600F</td>
<td>900-542-015</td>
</tr>
<tr>
<td>Unity 650F</td>
<td>900-538-014</td>
</tr>
</tbody>
</table>

Example - Completed upgrade conversion worksheet

Section 1: General Information
Sales order number for this conversion: 1234567
Customer: ABC Company
Customer contact name: John Doe
Customer contact phone number: 555-123-4567
Customer Party ID/Site number: 987654
Installation or completion date: 9-13-2018
Dell EMC Customer Engineer name (if applicable):
Dell EMC Customer Engineer email address (if applicable):
Task or Service Request (SR) number (if applicable):

Section 2: Unity System Installation Details
Unity serial number (on the PSNT): FNM00000000000
Current Unity OE software version: 4.1.0.8406905

Section 3: Unity Hardware Upgrade Conversion
Unity model number change
Original array model and 900 model number: Unity 400, 900-542-004
New array model and 900 model number: Unity 500, 900-542-005
APPENDIX B

Troubleshooting

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Troubleshooting

This section describes possible issues and workarounds, limitations, and things to be aware of when upgrading the storage processor assembly.

**Detected incorrect hardware**
If, after performing the conversion, the storage processor assembly hardware type does not match what was selected at the start of the wizard, the system will enter Service Mode. The system will not exit Service Mode until the original SP assemblies are restored. Replacing the original SP assemblies will cancel the existing conversion process. Start a new conversion process to continue.

The issue can occur if the wrong SP assembly hardware type was selected at the beginning of the wizard. If you are sure that the right hardware is being used, please contact your service provider.

**Pre-Upgrade Health Check failed**
Excessive CPU utilization - The PUHC fails when the combined CPU utilization is above 120%. To resolve the failure, close the Hardware Upgrade Wizard, reduce workload on the system, then restart the wizard.

*Note*

The CPU utilization warning can be bypassed, and the upgrade process continued by clicking Retry. However, if you continue the upgrade with excessive CPU utilization levels, you may experience poor performance during the upgrade, and other failures may occur.

**Hardware Upgrade fails; fault LED lit**
After replacing the second SP assembly, the Hardware Upgrade wizard might display the message "Hardware Upgrade has Failed", with the option to retry the upgrade. The fault LED on the SP assembly might also turn on.

Do not click Retry. Refresh Unisphere to see if the failure message clears. Wait at least 120 minutes after replacing the second SP assembly for the array to stabilize from the conversion.

Review the upgrade logs to determine if the error is due to stale data in the wizard, or a true failed upgrade. The upgrade log files are located in /var/tmp/upgrade/upgrade.log. Obtain the upgrade status by using the /sys/upgrade show command. For more information about using Unisphere CLI commands, refer to the Dell EMC Unity Unisphere CLI User Guide. For more information about this issue, refer to KB519171.

If, after waiting 120 minutes, the Hardware Upgrade wizard states that the upgrade has failed, and you cannot confirm the upgrade's status in the logs, contact your service provider.

**Hardware Upgrade wizard shows incorrect SP to be replaced**
After replacing the second SP assembly, the Hardware Upgrade might ask you to replace the same SP assembly that was previously replaced.

Ignore the error and continue to replace the second SP assembly. To avoid the error, cancel the hardware upgrade and update the operating environment to the latest version.
All other failures
If any failure occurs during the conversion process, the system will enter Service Mode. Record the error and contact your service provider. The conversion can be canceled and the system can be brought back online by restoring the original Storage Processors.

Canceling the Data in Place conversion
The following table describes the situations in which you can cancel the DIP conversion and revert to the original storage processor assembly. Once the new SP assemblies have been inserted and the upgrade has been completed, it is no longer possible to revert to the original SP assembly.

<table>
<thead>
<tr>
<th>Situation</th>
<th>Procedure to revert to original SP</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Offline conversions only) The new SP assemblies have been inserted, but have not been powered on</td>
<td>Replace the original SP assemblies and restart the system. The system automatically cancels the DIP conversion.</td>
</tr>
<tr>
<td>(Offline conversions only) The new SP assemblies have been inserted, but the new hardware has a fault</td>
<td>Replace the original SP assemblies and restart the system. The system automatically cancels the DIP conversion.</td>
</tr>
<tr>
<td>(Online conversions only) The Hardware Upgrade wizard started, but no SP assemblies were replaced.</td>
<td>Wait until the Hardware Upgrade displays &quot;REMOVE THIS SP.&quot; Power on the SP that is indicated in the wizard by pulling it out about an inch, and then reinserting it.</td>
</tr>
<tr>
<td>The health check failed</td>
<td>Click Cancel in the Hardware Upgrade wizard.</td>
</tr>
</tbody>
</table>

Note
The DIP conversion can also be canceled in these situations via the Unisphere CLI using the command /sys/upgrade cancel. For more information about using Unisphere CLI commands, see the EMC Unity Family Unisphere Command Line Interface User Guide.