**Procedure created on:** **28.05.2008 15:31**

|  |
| --- |
| **SITE AND CONFIGURATION INFORMATION:** |

**Installation/Upgrade Information:**

|  |  |
| --- | --- |
| Change Control Ref Number: |  |
| Installing or Upgrading CE: |  |
| Installation/Upgrade Date/Time: | (EST) |

**Customer and Site Information:**

|  |  |
| --- | --- |
| Customer Name: |  |
| Site ID/Region or Country: | | |
| Lab Contact: |  |
| Contact Phone Number: |  |
| Site Address: |  |
| CSI Service Request (SR) Number: |  |

**Array Information:**

|  |  |  |
| --- | --- | --- |
| Serial Number of Array(s): |  |  |
|  |  |
|  |  |

|  |  |
| --- | --- |
| **Software in configuration** | **Revision** |
| FLARE/Access Logix |  |
| Navisphere Agent |  |
| Navisphere Manager |  |
| PowerPath |  |
| ATF/CDE |  |
| VxVM DMP |  |
| SnapView |  |
| MirrorView/A |  |
| MirrorView/S |  |
| SAN Copy/SAN Copy/E |  |
| CLARalert/OnAlert |  |
| Admsnap |  |
| Admhost |  |
| Replication Manager (RM) |  |

|  |
| --- |
| **REPORTING PROBLEMS:** |

If you find any errors in this procedure or have comments regarding this application, please send email to [CLARiiONProcedureGenerator@emc.com](mailto:CLARiiONProcedureGenerator@emc.com). **Be sure to reference any modules by the correct filename (located to the right of the module title).**

|  |
| --- |
| **CONFIGURATION DESCRIPTION:** |

1. **Product: CX3-Series \***
2. **Activity: Existing Storage System/Host Procedures**
3. **Existing Storage System/Host Procedure: Install or Replace Hardware**
4. **Model: CX3-10c**
5. **Hardware Type: Replace DAE**
6. **DAE Type: DAE3P**
7. **DAE Activity on a Running Array: Yes**
8. **Employee of: EMC Authorized Service Provider (ASP)**
9. **\*The CLARiiON Procedure Generator uses the following terms to reference product lines: CX3-Series refers to CX3-80, CX3-40-Series, CX3-20-Series, and CX3-10-Series. CX-Series refers to CX700, CX600, CX500-Series, CX400, CX300-Series, and CX200-Series.**

**WARNINGS:**



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| **TABLE OF CONTENTS:**  To link immediately to a specific page within this procedure, position the cursor over the page number on the right and click.  Denotes a checkpoint |

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 Disable array from calling home cnalr010\_R005 11

 Replace a DAE2P or DAE3P in a running array redae060\_R003 13

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APPENDICES 29

 Appendix: How to report missing, wrong, or damaged parts cnmwd010\_R001 29

 Appendix: Handling CX3-Series FRUs inc3s010\_R005 29

|  |  |  |
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| Verify you have reviewed the latest CLARiiON CCA rules cncca010\_R007 | | |
|  | Verify you have reviewed the latest version of the CLARiiON CCA Rules document.  The document can be obtained using the link below or rerunning the CLARiiON Procedure Generator and selecting CCA Rules from the Reference Materials menu.  [View Latest CLARiiON CCA Rules](file:///C:\Program%20Files\CLARiiON%20Procedure%20Generator\Reference%20Materials\CCA%20Rules.doc) | 🗸 Done  □ |

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| Before you go onsite prste010\_R028 | | |
|  | **UPDATED 02/22/08:**  **Before adding a new DAE with disk modules, adding a disk module or replacing a disk module, please refer to the Parts Information Guide (PIG) to verify the minimum FLARE requirements for the disk you are about to add or replace. The PIG can be found by running the CLARiiON Procedure Generator and choosing the Reference Material radio button and then selecting: Parts Information Guide (PIG).**  Disk module FLARE requirements are no longer always fully backwards compatible. You must insure that the drive you are about to add or replace is compatible with the FLARE revision running on the array. Also, note if any minimum LCC/BCC FRUMON is required for adding or replacing drives. | 🗸 Done  □ |
|  | **UPDATED 01/30/08:**  **If the customer is running Release 26, up to and including patch .010 (0x.26.xxx.5.010), and MirrorView/Asynchronous, then the only versions to which you can upgrade are Release 26 patch .011 and later. See** **ETA emc176189***: Performing a CLARiiON NDU upgrade to Release 26 may result in rolling reboots if MirrorView/Asynchronous is configured.*  **If the customer is running MirrorView/Asynchronous do NOT upgrade to any version of Release 26 prior to patch .011. The only versions to which you can upgrade are Release 26, patch .011 and later.**  The upgrade to R26 is the issue, so even if the customer has already upgraded successfully to R26, they also should not upgrade to patch .010 or lower. | □ |
|  | **UPDATED 01/30/08:**  **If the customer is running or plans to run SnapView:**  There is a potential performance issue under certain circumstances with **R26 SnapView,** detailed in **ETA emc171888:** *CLARiiON: Storage systems running SnapView with FLARE Release 26 may experience reduced performance.* This has been addressed in R26 patch .010 and later.  If the customer is already running R26, but is running a lower version than .010, then alert them to the possible issue, then advise to upgrade to R26 patch .010 or later, **unless they are also running MirrorView/Asynchronous, in which case, they should upgrade to Release 26 patch .011 or later. See** **ETA emc176189***: Performing a CLARiiON NDU upgrade to Release 26 may result in rolling reboots if MirrorView/Asynchronous is configured.* | □ |
|  | **UPDATED 01/30/08 CAUTION:**  **UPDATED 5/27/08**  **If you are upgrading from Release 22 to Release 24 or Release 26,** check to see if there are more than 50% of the maximum initiators logged in. If so, do not proceed since a potential Data Unavailable situation could arise.See **ETA emc174391:** *Possible SP panic reboot of secondary SP when upgrading from Release 22 (03.22 - any revision) to Release 24 (03.24, patch levels up to and including .016) or Release 26 (03.26, patch levels up to and including .010)*  Model Max Initiators 50%  CX3-20 256 128  CX3-40 256 128  CX3-80 512 256  **UPDATED 05/27/08:** Version 6.26 of the Navisphere Service Taskbar incorrectly checks the number of initiators for CX3-80. If there are more than 128 initiators logged in, then you cannot use the Software Assistant to perform the update. Workarounds are:   * Shut down hosts to reduce the number of initiators * Use navicli to perform the update   See **emc188371:** *"Check Logged in Initiators” rule fails during Software Assistant Rules Check when upgrading FLARE from Release 22 to Release 24 or Release 26 on CX3-80 storage system.* | □ |
|  | **CAUTION 10/26/07:**    **SnapView, MirrorView/A, and Incremental SAN Copy and Release 22 patch .513: See ETA emc172945** *Possible Storage Processor bugchecks when using SnapView, MirrorView/A, or Incremental SAN Copy****.***  **Updated 11/29/07: Release 22 patch .514 is now available.** This corrects the issue described in ETA emc172945. Do not use patch .513. | □ |
|  | **NOTE: As of Release 26 (02**.**26 and 03.26), navicli commands may be disabled.** You will be required to use Secure CLI (naviseccli) commands instead of classic CLI (navicli). If a valid Secure CLI Security file has been set up, then you can replace “navicli” with “naviseccli” with no other changes. If a Security file has not been set up then you will have to specify the username, password and scope for each command. See the EMC Navisphere® Command Line Interface (CLI) for more details.  **If you are using Release 26 Navisphere CLI, then please change any commands in the CLARiiON Procedure Generator to use “naviseccli” rather than “navicli”.**  **BEFORE GOING ONSITE**   1. Verify that you have reviewed the latest version of the EMC CLARiiON Best Practices for Fibre Channel Storage White Paper, which can be obtained from PowerLink by entering “CLARiiON Best Practices” into the search field. 2. Verify you have downloaded the latest versions of the following software as well as any storage system software that you may need for your scheduled activity such as FLARE bundles, replication software, etc.:  * **CAP2:** If needed for the activity you are to do onsite. Download and install the latest CAP2 program to the default location on your laptop. CAP2 can be downloaded from the CS Internal Website or the EMC Services Partner Web via PowerLink. CAP2 version 6.26 requires a minimum of JRE 1.5; check Navisphere Release Notes for the preferred version. See Knowledgebase article emc167252 if you experience problems.    **NOTE:** This is a service tool and should not be left on the customer’s Management station. If you must leave it on there, then stress to the customer that this is a **service tool** **only** and that is not meant for customers to use. There have been instances of customers using it and then calling the Support Center looking for help. The Support Center does not provide support for this service tool. * **A copy of the interactive Installation Guide (iiG) CD:**  If this is going to be an iiG activity\*, and the customer does not have access to the CD that was shipped with the storage system, ensure that you have the iiG, either as a burned CD from the ISO image available on the CS Internal Website or the EMC Services Partner Web via PowerLink, or the ISO image itself if you have access to CD emulation software.   \* Currently the only iiG activity is installation of a CX3-10c, or installation of other factory-racked CX3-Series storage systems running Release 24 FLARE, where the Array Installation Wizard platform is Windows. * **Navisphere Service Taskbar (NST):** This is present on the iiG but always check if there is a later version posted on the download site.  **Important**: **Please use R26 version 06.26.50.1.31 or later** of the Navisphere Service Taskbar. Do NOT use any R26 NST version prior to .31.  This will be loaded on the customer management station, and may be needed for the activity you are going to perform on-site. This is available with the Navisphere Management Station Software on the software download sites. * **The latest version of ATA LCC (BCC) FRUMON code if the array that you will be servicing has ATA enclosures.** There have been updates to the ATA LCC (BCC) FRUMON code to:    + - Recognize the Seagate Galaxy ATA drives that are to be used as replacements for the 250 GB and 320 GB Maxtor Tomcat drives as supplies of these drives become increasingly unavailable (FRUMON 1.93: see EMC Knowledgebase article emc147810).     - Correct an issue with sector reconstructs and uncorrectable errors on Klondike ATA drives (FRUMON 1.95: see EMC Knowledgebase article emc155543)   This FRUMON code can be found on the CS Internal Website or the EMC Services Partner Web via PowerLink. If you know that the version of FLARE that you will be loading or that is already loaded on the storage system contains this FRUMON code, then you do not need to do this. See the EMC Knowledgebase articles mentioned above for affected versions of FLARE.   1. If you will be adding an SPS, and you have to lift the SPS to insert it, you may need a second person to help you do this. 2. If you are installing hardware, you may need a Phillips screwdriver. 3. If you are installing a storage system, ensure that power is available for the storage system and that it is adequate. 4. Read the following notes and determine if they apply:  * **COUNTRY SPECIFIC POWER CORDS** Field planning will now require ordering country-specific power cords when needed. Wall power cords will not ship with components after mid-April 2007. North American customers that rely on these cords must now order them as an option.   **NOTE:** The optional power cord is for when a field installed array is connected to a customer's wall power outlet rather than a cabinet PDU. **C13-to-C14** power cords for installation of product in an EMC 40U rack as well as third-party racks with C14 inlet Power Distribution Units (PDUs) will remain standard. All arrays that are factory and field installed into a cabinet will continue to use C13-to-C14 power cords and these cords will ship standard with the product.   * Understand your customer’s local wall power requirements. * Review the power cord catalog. See EMC Knowledgebase article emc158207. * Order the correct optional wall power cords, when required. If the power cord is not ordered, not included or is the wrong country specific power cord you must go through the MWD (Missing Wrong Damaged) process to receive the proper power cord or missing cord. See “[Appendix: How to report missing, wrong, or damaged parts](#AppendixMWD)” located at the end of this procedure.      * **DRIVE FIRMWARE UPGRADE (updated 04/13/07)** This applies to **all** NDUs that will use an upgrade path **from or through** Release 14:   Example 1: Release 14 to Release 19 Example 2: Release 11 to Release 14 to Release 19.  Certain Seagate Cheetah VI 146 GB drives that are currently running drive firmware 7A0A **must** have their drive firmware updated to 7A10 **prior** to performing an NDU from Release 14 to any other code. See EMC Knowledgebase article emc158525 for more information as to how to identify the drives, where to get the firmware file, and how to perform the firmware upgrade.   1. **If you will be attaching a removable storage device such as a USB flash drive** (thumb drive, jump drive) to the customer’s work station, please check that this device is virus-free before using it. 2. **Navisphere Manager Release 26 (06.26) and later**: this requires a minimum of JRE 1.5; check Navisphere Release Notes for the preferred version. Navisphere Manager behaves differently with these JRE versions – see Knowledgebase articles emc167250 and emc167251. 3. **Release 24**: If MV/S is or will be installed: Release 24 patch .015 or later must be loaded. See emc170213 and emc169553 for additional information.  UUNET dial-home numbers: UUNET is a service EMC contracted to provide local numbers to be used for EMC device dial home.  The UUNET service provider has informed EMC that their services will no longer be available as of December 31, 2007, and so all customer devices utilizing UUNET dial home numbers must be reconfigured to utilize MCI or AT&T dial home numbers.  See Knowledgebase article emc168911 for more information as to how to determine if the number currently being used is a UUNET number, the new numbers which must be utilized, and links to various procedures. | □ |

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| When you get onsite onste010\_R015 | | |
|  | **UPDATED 01/30/08:**  **If the customer is running or plans to run SnapView:**  There is a potential performance issue under certain circumstances with **R26 SnapView,** detailed in **ETA emc171888**. This has been addressed in R26 patch .010 and later. If the customer is already running R26, but is running a version lower than .010, then alert them to the possible issue and advise to upgrade to R26 patch .010 or later, **unless they are also running MirrorView/Asynchronous, in which case, they should upgrade to patch .011 or later (see ETA emc176189).** | 🗸 Done  □ |
|  | **10/26/07:**  **If the customer is running or plans to run SnapView, MirrorView/A, or Incremental SAN Copy, and Release 22 patch .513 (03.22.xxx.5.513), alert them of ETA emc172945**: *Storage Processor bugchecks when using SnapView, MirrorView/A, or Incremental SAN Copy:*   * If the customer is already running this version of FLARE, then alert them of the possible issue. * **Updated 11/29/07: Release 22 patch .514 is now available. This corrects the issue described in ETA emc172945.** If the customer is planning an upgrade to Release 22, then this patch, or a later patch, must be used. If the customer is running Release 22 patch .513, then advise an upgrade to patch .514 or later. | □ |
|  | **10/19/07:**  **If the customer meets all the following conditions:**   * + **is running or plans to run MirrorView/Asynchronous,**   + **has, or is likely to have, LUNs greater than 2 Terabytes,**   + **is running Release 24 or Release 26**   Please alert the customer of **ETA emc172250**: *CLARiiON: Do not attempt to perform a SnapView rollback or to promote a MirrorView/A secondary image with image condition 'Updating' for LUNs greater than 2-terabyte capacity with Release 24 or Release 26* | □ |
|  | **10/19/07:**  **If the customer is at a version of Release 24 earlier than patch .016, and is running or plans to run Distributed Event Monitoring and MirrorView/Asynchronous:**  Please make them aware that under certain conditions, storage systems running **Release 24** that are configured for **distributed event monitoring** and are running **MirrorView/Asynchronous** may experience Storage Processor (SP) bugchecks (panics). See **ETA emc172251** for full details and a workaround. | □ |
|  | **If you have Missing, Wrong, or Damaged Parts,** see “[Appendix: How to report missing, wrong, or damaged parts](#AppendixMWD)” located at the end of this procedure.  **If you are doing an upgrade:**  To check the current version of the software on the storage system: in Navisphere Manager, right-click on the storage system, select **Properties** > **Software**.  **If your activity involves a CX3-80 SPS or SPE2:**  If you have to lift these components, you may need a second person to help you do this.  **If your activity involves using the Navisphere Service Taskbar:**   1. **Remember to enter Engineering mode once you have connected to the array, by pressing Ctrl/shift/F12 and entering the password “SIR” (case sensitive). This allows you to register the activity as a service person if you choose to go to SYR via the internet after the activity AND in the Software Assistant, it allows you to override a failed rule if it can be overridden, including the FLARE version check.** 2. **Starting with Release 26 of the Navisphere Service Taskbar (06.26),** the Navisphere Service Taskbar will automatically check if there is an updated version of the tool. 3. You will see a message in the bottom right corner of the screen.      1. If a new version is available, it will be downloaded. Install this new version. 2. You can configure when the Navisphere Service Taskbar checks for updates by selecting **Tools, Navisphere Service Taskbar Update, Configure Update Settings.**      1. Check with the customer as to what setting they would like. The default setting is shown. | □ |
|  | **Arrays running Release 24 prior to patch .014 (0x.xxx.5.014):** if you experience problems accessing the events logs, run into communication problems, or cannot retrieve the SPcollects, see Knowledgebase article emc157213. Verify with the customer that the ports can be changed. | □ |
|  | **Arrays running Release 24 up to and including patch .014 (0x.xxx.5.014):** There is a small risk that if the Navisphere Management Server is restarted via the Setup Page or the debug page, the SP will bugcheck or the SP will go unmanaged. See Knowledgebase article emc170903. | □ |

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| For your own records: Collect environment configuration information instr090\_R005 | | |
|  | For your own records, collect and archive the environment configuration information for the customer site as described below.  It is recommended that you should have the generated report handy for reference upon request. The contained information is useful for audits, hardware/software configuration reference, and troubleshooting.  **NOTE:** It is recommended to have the latest version of Navisphere CLI installed. Otherwise, new CLI commands may be inaccessible. | 🗸 Done  □ |
|  | Collect the CLARiiON information:  a. If necessary, create a new directory folder on your service laptop that will be used  to hold the generated configuration reports.  b. Open the CAP2 application and select **Tools** and then **Capture**. Check the  **Collect Storage System Information** box and enter the IP address for SP A and  SP B.  Click the **Finish** button and save the XML Report for reference.  c. At a DOS command prompt, go to the directory containing the navicli files by  entering:  **cd Program Files\EMC\Navisphere CLI**  d. At the prompt, run a getall command as follows:  **NOTE:** Alternatively, a spcollect command can be run to collect the information.  **navicli -h** *sp\_IP\_address* **getall >***folder\_path\_and\_filename.txt* For example:   navicli -h 10.11.22.333 getall >c:\configuration reports\1234.txt  **NOTE:** Refer to EMC Knowledgebase article emc97547 for information on running  the getall command on legacy storage systems.  Either command will generate a current configuration report of the CLARiiON and  all attached hosts and send the report with the specified file name to the directory.  e. Repeat the CLI command for each SP in the configuration. | □ |
|  | Collect the switch information (if applicable):  Collect the information for the switches in the configuration. Use the applicable capture commands or GUI features depending on the switch type.  The switch configuration should be saved to a file and stored in a safe place. | □ |

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| Verify you have reviewed the latest FRU handling information cnfru010\_R001 | | |
|  | Verify you have reviewed the latest precautions that you must take and the general procedures you must follow when removing, installing, and storing any field replaceable unit (FRU).  This information is included in “[Appendix: Handling FRUs](#AppendixHandleFRU)” located at the end of this procedure. | 🗸 Done  □ |

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| Locate the customer’s purchased training materials plstr120\_R001 | | |
|  | If the customer purchased a training package, then these materials are shipped along with the storage system hardware/software. When unpacking the storage system and/or software, locate the box that contains these training materials. Be sure that the customer’s storage manager or IT manager is handed this box and that it is not misplaced. The box looks similar to the following:  **NOTE:** If the customer did not order training or the system was ordered before April 9, 2007, the material box may not be present.  Box cover small | 🗸 Done  □ |

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| Disable array from calling home cnalr010\_R005 | | |
|  | To prevent multiple inconsequential call-homes from being generated it is important that you disable call home for the system you will be servicing. The FLARE release running on the system and CLARalert version running in the environment determines which step you should perform to disable the array from calling home.  **NOTE:** If you will be performing an NDU using your service laptop running the Software Assistant and disconnecting the array SP management ports from the customer’s network. Perform either step 2 for central monitoring configurations or step 3 for distributed monitoring configurations to disable call home. | 🗸 Done  □ |
|  | *CLARalert 6.7 through 6.22.X or higher Arrays running Release 14 through Release 22 or higher* ***Central Monitoring*** *configuration*  Navisphere Service Taskbar v6.26.5 or greater will automatically attempt to disable central monitoring call home response when performing an NDU via the Software Assistant. The Software Assistance Wizard will not allow the user to start the NDU until the CLARalert call home responses are disabled. If the Wizard fails to disable call home or you are disabling call home for other than an NDU or will be disconnecting the array network management ports from the customer network and using your laptop to perform the NDU. Perform the steps below to manually disable call home.  **IMPORTANT!** Network connectivity between the array you are upgrading and the call-home monitoring station is required for the Software Assistant to automatically disable call-home and verify the call-home rules.   1. Log into the Navisphere Manager domain which contains the array you want to disable from calling home. 2. Select the **Monitors** tab and click the plus sign on the central monitor. 3. Right-click the array that maintenance is being performed on and click **Stop** **Monitoring**. 4. The array will be removed from the central monitor configuration file and the GUI will update and not display the array icon under the central monitor.  **IMPORTANT!** You have just removed the array from the central monitor configuration. When you are finished performing your service activities you **MUST** restore the array to the central monitor configuration otherwise the array will no longer call home. Make sure you perform the “restore array monitoring” section of this procedure. | □ |
|  | *CLARalert 6.7 through 6.22.X or higher Arrays running Release 14 through Release 22 or higher* ***Distributed Monitoring*** *configuration*  Navisphere Service Taskbar v6.26.5 or greater does not disable a CLARalert distributed monitoring call home response. Follow the steps below to disable distributed monitoring call home.   1. Log into the Navisphere Manager domain which contains the array you want to disable from calling home. 2. Select the **Monitors** tab and expand the array SP A monitor icon which you want to disable. 3. Right click the Call Home template icon and select **Stop Using** from the drop down menu. 4. Repeat steps b and c for SP B monitor.  **IMPORTANT!** You have just removed the Call-Home template from the distributed monitor configuration. When you are finished performing your service activities you **MUST** restore the Call-Home template to the distributed monitor configuration otherwise the array will no longer call home. Make sure you perform the “restore array monitoring” section of this procedure. | □ |
|  | *CLARalert 6.22.X or greater Arrays running Release 22 or greater* ***Central and Distributed Monitoring*** *configuration*  Navisphere Service Taskbar v6.26.5 or greater Software Assistance Wizard will automatically attempt to set quiet mode (Disable/Enable Responses) for central and distributed monitoring call home response when performing an NDU via the Software Assistant. The Software Assistance Wizard will not allow the user to start the NDU until the CLARalert call home responses are disabled. If the Wizard fails to set quiet mode or you are disabling call home for other than an NDU via the Software Assistance Wizard perform the steps below to manually disable call home.  **IMPORTANT!** Network connectivity between the array you are upgrading and the call-home monitoring station is required for the Software Assistant to automatically disable call-home and verify the call-home rules.   1. Log into the Navisphere Manager domain which contains the array you want to disable from calling home. 2. Select the **Monitors** tab and right click the array SP A monitor which you want to disable. 3. From the drop down menu select **Disable/Enable Reponses**. 4. In the dialog box select **Disable Responses** check box and set the disable time period from 30 to 240 minutes from the drop down menu. 5. Click the **OK** button. 6. Repeat steps b through e for SP B.  **IMPORTANT!** You **MUST** disable responses on **BOTH** SP A and SP B to disable the array from calling home.   The array will now not call home or responded to any other template applied to the array until the timer you set expires. You can enable the array responses before the timer expires by simply un-checking the Disable Responses check box. | □ |

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| Replace a DAE2P or DAE3P in a running array redae060\_R003 | | |
|  | This procedure covers the replacement of the following types of DAEs in a running CX-Series array:   * DAE2P with a DAE2P * DAE3P with a DAE3P   **NOTE:** This procedure **DOES NOT** cover the DPE or the OS BOOT chassis (where vault/boot drives reside) | 🗸 Done  □ |
|  | **Limitations**   * This procedure does not cover the boot chassis of any array. * There can be NO partial RAID groups in this chassis to be replaced. All drives of a RAID group must be contained within this chassis. * All attached servers to the array must have functioning failover software. * Help will be needed to remove the old DAE2/DAE-ATA from its rails and to insert the new one. | □ |
|  | **Overview**   * Ensure that the administrator/customer knows that if servers are still accessing LUNs in the chassis to be replaced, they must stop I/O to those LUNs. These LUNs will be unavailable during this chassis replacement. * Ensure that each attached host has failover software. * Jump over the A-side LCC of the chassis to be removed, connecting the prior chassis on the back-end (BE) loop to the next chassis on the back-end loop. * Using Navisphere Manager, ensure that the rest of the LUNs (other than on this chassis) are owned by their default owners (not trespassed). * Perform the same function on the B-side. * Replace the DAE2/DAE3P, relocating the old Power Supplies and LCCs and disks in the new chassis * Re-cable each side (one at a time) to include the new chassis.   **IMPORTANT NOTE:** A timing change has been made to FLARE that requires clarification on how to successfully reattach or reset any type of LCC in any type of enclosure. This change affects resetting the enclosure by means of disconnecting and reconnecting the cable, or for re-seating the LCC itself.  When resetting an LCC for any reason, wait 30 seconds after removing or disconnecting the LCC before re-inserting or reconnecting the LCC to the bus. This will ensure that FLARE actually records that the LCC leaves the configuration and then returns. FLARE code now requires this delay before it will recognize that the enclosure has actually left and rejoined the bus. | □ |
|  | **Details**  Ensure that the administrator/customer knows that if hosts are still accessing LUNs in the chassis to be replaced, they must stop I/O to those LUNs. These LUNs will be unavailable during this chassis replacement. | □ |
|  | Confirm valid failover software in each attached host. This should have been done in the previous module. | □ |
|  | **Do not power-off the chassis at this point** as this will remove power to the LCCs, causing all chassis above it on the same BE loop to go offline. | □ |
|  | On LCC-A of the chassis to be removed, remove the HSSDC-2 cable that is connected to the EXP port (if present).  Remove the other end of the same cable (if present) from the PRI port of the chassis above where it is connected. It will be connected to a chassis on the same backend bus and will likely be the next enclosure number on the bus. | □ |
|  | Remove the HSSDC-2 cable that is connected to the PRI port of the LCC of the chassis to be replaced, and connect it to the PRI port of the next physical chassis on the same backend bus (cable just removed from it). *You are physically skipping over this chassis on the bus. You may need a different length or type of cable, depending upon the chassis type above this one.*  A longer cable may be needed in a CX700 chassis as you could be skipping 7 chassis. A 1-meter cable will skip over 3 chassis of different backend buses but two 5-meter cables may need to be on-hand for this process. | □ |
|  | The removal of the cable in the preceding step will likely cause some LUNs in the “above chassis” to trespass to the other SP. The reconnection of the cable as described, will give a valid path from SP-A back to these LUNs, causing them to return to their default owner (SP-A). | □ |
|  | Perform the same activity on the B-side of this chassis by “skipping over” the LCC-B of the chassis to be removed. Again, removal of the cable may cause trespasses, but the reconnection will re-supply the path from SP-B to all disks in the “above” chassis. | □ |
|  | When the chassis is completely un-cabled from the array, power it off by removing the power cables from the AC source. | □ |
|  | Remove the 2 screws in the front of the chassis and the 2 at the rear of the chassis that secure it to the rails. | □ |
|  | *With the help of another person*, remove the chassis from the cabinet by sliding it off its rails out the front of the cabinet.  **CAUTION:** A chassis full of disk drives weighs approximately 90 lbs.  DO NOT remove the disks. | □ |
|  | *With the help of another person*, lift the replacement enclosure and from the front of the cabinet, slide the enclosure onto the rails as shown below. | □ |
|  | Secure the front and rear of the chassis to the rails as shown: | □ |
|  | **Relocate the disk drives**  Remove the drives **ONE AT A TIME** from the old chassis, relocating them **into the EXACT same slots** of the new chassis. **Any deviation from this will result in loss of access to data** after this chassis replacement procedure is complete. | □ |
|  | **Turn on the power to this new DAE2/DAE3P chassis**  All DAEs shipped now have no power switches on their power supplies. Connect the AC source cables from the power supplies, to their respective PDUs in the cabinet: the A-side power supply to the right-side PDU in the cabinet and the B-side power supply to the left-side power PDU. If the chassis has power switches, turn them both on after connecting to the power source.  **NOTE:** Verify you secure the power cord with the strain reliefs at each connector. The strain reliefs prevent the power cord from pulling out of the connections. | □ |
|  | Monitor the fault LEDs on the LCCs, the power supplies, and the disk drives that were just inserted.  There should be no amber LEDs at this time. | □ |
|  | **Set the Enclosure Address (EA) of the chassis to be added.**  **IMPORTANT:** Ensure that the EA of this chassis to be installed is set to the SAME enclosure number of the chassis removed.  Set the enclosure address to the desired value.  **NOTE:** The DAE2/3P EA must be set when power is ON and **NOT** connected to a backend loop.  In most cases, the factory sets the enclosure address before shipment to coincide with the rest of the system; you will need to reset the switch if you installed the enclosure into your rack independently. The enclosure address ranges from 0 through 7 (valid addresses for the CX500 and CX300 are 0, 1, 2, and 3 only). You set the EA with the enclosure selection button. To set the EA, use a tool such as a pen, paper clip, or small screwdriver.  **NOTE:**  You can set the enclosure address on either LCC. The second LCC will automatically change to the new value.  Untitled-1 copy | □ |
|  | **Connect the HSSDC2 cables to the new chassis (LCC-A only)**  **NOTE:** Ensure that there is sufficient slack and clearance in the cable routing so it will not inhibit any future maintenance on this chassis or any other chassis or FRU.   1. On the LCC-A side, disconnect the cable that was used to skip over the chassis to be replaced. *It is connected from the EXP port of the chassis prior to this one on the same BE bus to the PRI port of the chassis AFTER this one on the same BE bus.* 2. Reconnect the lower chassis EXP port to the PRI port of this new chassis and the EXP port of this new chassis to the PRI port of the upper chassis on the backend bus. 3. Look for any fault LEDs. If there any LCC fault LEDs on, stop here and escalate to the next level of Technical Support. 4. Confirm that the loop ID LED (back-end bus ID) on the LCC is what you expect. | □ |
|  | **Verify that the array acknowledges the new DAE2/3P.**  Use either Navisphere Manager or CLI to verify that the new enclosure is seen by the array and there are no problems.  **NOTE:** The chassis and disks should become visible within Navisphere Manager almost immediately after the disks drives become ready. If this does not occur, then perform an **Update Now** from Navisphere Manager and confirm that the enclosure address is unique for the backend bus. If the enclosure does not appear in Navisphere Manager after the **Update Now**, restart the Management Server by going to <*IPaddress>/*setup and clicking the **Restart Management Server** button.  The array icon in Navisphere will be faulted as it senses a cabling difference between SPA and SPB. This is expected if loop B is not yet connected. |  |
|  | **Connect the B-Side HSSDC2 cable.**  Now connect the LCC-B of this chassis.   1. On the LCC-B side, disconnect the cable that was used to skip over the chassis to be replaced. *It is connected from the EXP port of the chassis prior to this one on the same BE bus to the PRI port of the chassis AFTER this one on the same BE bus.* 2. Reconnect the lower chassis EXP port to the PRI port of this new chassis and the EXP port of this new chassis to the PRI port of the upper chassis on the backend bus. 3. Look for any fault LEDs. If there any LCC fault LEDs on, stop here and escalate to the next level of Technical Support. 4. Confirm that the loop ID LED (back-end bus ID) on the LCC is what you expect. | □ |
|  | Using Navisphere Manager, verify that LCC-B of this chassis is connected and Navisphere reports no faults. | □ |
|  | Verify all the disk module slots in each disk enclosure contain either disk or filler modules, for proper cooling and normal operation. | □ |

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| Restore array call home monitoring cnalr020\_R007 | | |
|  | Once the maintenance procedure is complete you must restore call home for the array you disabled from calling home. The FLARE release running on the system and CLARalert version running in the environment determines which step you should perform re-enable call home for the array.  **NOTE:** If you performed an NDU using your service laptop running the Software Assistant and disconnected the array SP management ports from the customer’s network. Perform either step 2 for central monitoring configurations or step 3 for distributed monitoring configurations to re-enable call home. | 🗸 Done  □ |
|  | *CLARalert 6.7 through 6.22.X or higher Arrays running Release 14 through Release 22 or higher* ***Central Monitoring*** *configuration*  Navisphere Service Taskbar v6.26.5 or greater will automatically attempt to enable central monitoring call home response when performing an NDU via the Software Assistant. The install wizard will try to add the array to the configuration when the user clicks “Next” on the Software Maintenance Status screen. The user will not be able to close NST until the install wizard has tried at least once to restore the configuration i.e., until the user has clicked “Next” at least once on the Software Maintenance Status screen. If the Wizard fails to enable call home or you are enabling call home for other than an NDU or disconnected the array network management ports from the customer network and used your laptop to perform the NDU perform the steps below to manually enable call home.  **IMPORTANT!** Network connectivity between the array you are upgrading and the call-home monitoring station is required for the Software Assistant to automatically enable call-home and verify the call-home rules.   1. Log into the Navisphere Manager domain that contains the array call home was disabled on. 2. Select the **Monitor** tab, right-click the central monitor system, and click **Monitor System**. 3. In the **Select** **System** window that appears, select the array you disabled from the drop-down list and click **OK**.   The array is now restored to the Central Monitor configuration and call home for the array is re-enabled. | □ |
|  | *CLARalert 6.7 through 6.22.X or higher Arrays running Release 14 through Release 22 or higher* ***Distributed Monitoring*** *configuration*  Navisphere Service Taskbar v6.26.5 or greater does not enable a CLARalert distributed monitoring call home response. Follow the steps below to enable distributed monitoring call home.   1. Log into the Navisphere Manager domain that contains the array call home was disabled on. 2. Select the **Monitor** tab, expand the array you disabled SP A monitor icon. 3. Right click the array icon under SP A monitor and select **Monitor Using Template** from the drop down menu. 4. From the dialog box template drop down list select the Call-Home template and click **OK**. 5. Repeat steps b through d for SP A.   The array is now restored to the Distributed Monitor configuration and call home for the array is re-enabled. | □ |
|  | *CLARalert 6.22.X or greater Arrays running Release 22 or greater* ***Central and Distributed Monitoring*** *configuration*  Disable/Enable Responses (quiet mode) feature will automatically re-enable call home when the timer you set to disable call home expires. Perform these steps only if you need to re-enable call home immediately before the timer expires.  **IMPORTANT!** Network connectivity between the array you are upgrading and the call-home monitoring station is required for the Software Assistant to automatically enable call-home and verify the call-home rules.   1. Log into the Navisphere Manager domain that contains the array call home was disabled on. 2. Select the **Monitors** tab and right click the array SP A monitor on which you disabled call home. 3. From the drop down menu select **Disable/Enable Reponses**. 4. In the dialog box de-select **Disable Responses** check box. 5. Click the **OK** button. 6. Repeat steps b through e for SP B.  **IMPORTANT!** You **MUST** enable responses on **BOTH** SP A and SP B to enable the array call home.   The array will now call home or responded to any other template applied to the array. | □ |

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| Verify you have completed the EMC Field Return Tag cntoe010\_R001 | | |
|  | Complete the EMC Field Return Tag with the required information and be as specific and detailed as possible. | 🗸 Done  □ |
|  | Securely attach the completed tag to the part to be returned. | □ |

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| To be done before you leave the customer site innst020\_R018 | | |
| 1. 1. | At this point, you will:   1. Remove access to CAP2 or notify the customer that this is a service-only tool. **NOTE:** CAP2 is a service tool and should not be left on the customer’s Management station. If you must leave it on there, then stress to the customer that this is a **service tool** **only** and that is not meant for customers to use. There have been instances of customers using it and then calling the Support Center looking for help. The Support Center does not provide support for this service tool. 2. Check that write cache is enabled. 3. Install the latest version of the Navisphere Service Taskbar (NST) on the Windows Management Station if that has not already been done, or any workstation that the customer uses to access the array if no management station exists.   You are installing this so that the DRU (which is part of the NST) will be available for remote personnel to run should a drive failure be reported. They will use it to determine if the drive failure is a candidate for the Disk Replacement Utility. 4. Update the ATA LCC (BCC) FRUMON code if necessary.   There have been updates to the ATA LCC (BCC) FRUMON code to   * 1. Recognize the Seagate Galaxy ATA drives that are to be used as replacements for the 250 GB and 320 GB Maxtor Tomcat drives as supplies of these drives become increasingly unavailable (FRUMON 1.93: see EMC Knowledgebase article emc147810).   2. Correct an issue with sector reconstructs and uncorrectable errors on Klondike ATA drives (FRUMON 1.95: see EMC Knowledgebase article emc155543)   This procedure will take you through checking and, if necessary, updating the FRUMON code. Check for and remove UUNET dial-home numbers.  UUNET is a service EMC contracted to provide local numbers to be used for EMC device dial home.  The UUNET service provider has informed EMC that their services will no longer be available as of December 31, 2007. All customer devices utilizing UUNET dial home numbers must be reconfigured to utilize MCI or AT&T dial home numbers. | 🗸 Done  □ |
|  | **If you installed CAP2 on the customer Management Station**: remove access to it by either uninstalling it (Start, Settings, Control Panel, Add/Remove programs, CAP2), or removing the desktop icon.  **NOTE:** CAP2 is a service tool and should not be left on the customer’s Management station. If you must leave it on there, then stress to the customer that this is a **service tool** **only** and that is not meant for customers to use. There have been instances of customers using it and then calling the Support Center looking for help. The Support Center does not provide support for this service tool. | □ |
|  | **If you disabled write cache during this activity or if you performed an NDU:** check that write cache has been re-enabled by using the following command  **navicli –h** <*SP\_IP\_address*> **getcache *-****or-* **naviseccli –h** <*SP\_IP\_address*> **getcache**  If cache has not been enabled, then use Navisphere Manager to re-enable as follows:   1. Right-click on the array and select **Properties** > **Cache**. 2. Check write cache (enabled) box. | □ |
|  | **Navisphere Service Taskbar**  Determine what version of the NST has been installed on the management station, if any, by performing either of the following:   * Look for an icon on the desktop similar to the following:  |  | | --- | |  |  * Select **Start** > **Programs** > **EMC** > **Navisphere** > **Navisphere Service Taskbar** > **Navisphere Service Taskbar**   3 | □ |
|  | If the Navisphere Service Taskbar is not installed, or the installed version is not the latest available, perform the following:   1. Copy the latest NST setup executable to the customer management workstation or any work station that the customer would use to access the array. 2. Install the NST, accepting the License Agreement and following the installation steps. 3. If the customer already has a version of the NST installed, this will automatically be uninstalled by the installation procedure. You will be asked to confirm that you want to uninstall this old version.  **Note**: if you experience difficulty uninstalling the old version, see Knowledgebase article emc135209.   **Note: if you start up the Navisphere Service Taskbar after installing it:**   1. Starting with Release 26 of the Navisphere Service Taskbar (06.26), the Navisphere Service Taskbar will automatically check if there is an updated version of the tool. You will see a message in the bottom right corner of the screen.      1. If a new version is available, download it and install it. 2. You can configure when the Navisphere Service Taskbar checks for updates by selecting **Tools, Navisphere Service Taskbar Update, Configure Update Settings.**   Check with the customer as to what setting they would like. The default setting is shown. | □ |
|  | **Check For and Remove UUNET dial-home numbers**  The UUNET service provider has informed EMC that their services will no longer be available as of December 31, 2007. To avoid service delays and to ensure continued dial home services, all customer devices utilizing UUNET dial home numbers must be reconfigured to utilize MCI or AT&T dial home numbers.  In addition, all new customer installations that would have utilized UUNET must now be configured with either MCI or AT&T dial home numbers.  **These changes must be in place before December 31, 2007.**  See Knowledgebase article emc168911 for more information as to how to determine if the number currently being used is a UUNET number, the new numbers which must be utilized, and links to various procedures.  Using the information contained in emc168911, determine if this customer is using UUNET, and if so, configure the dial home software to use the new MCI or AT&T dial home numbers. If the customer is not using UUNET then go to the next step.  To change the ConnectEMC Dialup Connection number:   1. Double click the **ConnectEMC Console** desktop shortcut icon on management workstation desktop. 2. The ConnectEMC GUI opens. From the menu bar select **Action** > **Login**. The **Login** dialog box opens. Enter your **User Name** and **Password**. 3. In the left pane expand the **Connection** directory and highlight the **General** file icon. The connection records are displayed in the right pane. 4. Double click the dial connection record you want to modify. The Connection Record Pane (Dial Pane) opens. Change the following connection record fields: 5. **Phone Number** Telephone number you need to dial for this connection. Enter the entire string of digits needed for your modem to reach an outside line and then connect to the receiving modem. For information on configuring the connection numbers/methods, refer to the “Call Home Dialing Information” available on the **EMC Global Services Internal Web Site** or the **EMC Services Partner Web** via PowerLink. 6. **Dial Type** Name of the dial script to be used. Select “Direct Dial” from the drop down menu.   g. Stage the modified connection record in ConnectEMC RAM. Click the connection pane **Apply** button.  h. Test the modified connection record settings, click the **Test** button. A dialog box opens displaying the test call home file name, click **Ok**. ConnectEMC will perform the test connection displaying the dialup connection log. The connection is successful if the Last Connection Log folder, ConnectEMC\_dial.log file last log entry reads “Call home status: Success”.  i. Save the connection record. Make sure the Connection List window is in focus: Click your mouse while in that window (or specifically on the Connection Record line) to select it. Select **File**, **Save** from the Main Menu, or click the “Save” icon (looks like a floppy disk) from toolbar.  j. Repeat steps d through i for each additional dial home number. An additional dialup to EMC connection records must be configured as secondary in the alert type field.  *For complete ConnectEMC 2.x features and information refer to the ConnectEMC 2.x Users Guide and Release Notes. Both of these documents are available on both the EMC Global Services Internal Web Site or the EMC Services Partner Web via PowerLink.* | □ |
|  | **Determine if ATA LCC (BCC) FRUMON code needs to be updated on the storage system:**   1. Does the Array have ATA enclosures (ATA drives)? If No – no need to upgrade, you can skip to the next section. 2. What is the current version of ATA LCC (BCC) FRUMON code on the storage system?   **To determine the current version of FRUMON code, either:**   * Perform a “getcrus” command to determine the version of ATA LCC/BCC FRUMON code **navicli –h** <*SP\_IP\_address*> **getcrus –lccreva -lccrevb *-****or-* **naviseccli –h** <*SP\_IP\_address*> **getcrus –lccreva -lccrevb**   *-or-*   * In Navisphere Manager, expand the array’s navigation tree to show the elements under **Physical > DAE-ATA > LCC** or **BCC**.   Right-click on the icon for either SP A’s or SP B’s ATA LCCs/BCCs and select **Resume** from the pop-up menu.  *-or- for CX and CX3 only*   * + From the Navisphere Service Taskbar Toolbar, select **Tools, Disk Enclosure Firmware (FRUMON) Status.**     Select to show details. The current LCC FRUMON code is displayed.    If all of the FRUMON code versions shown are at the currently recommended level or higher, then you do not need to update the FRUMON code. Go to the next section.  If any of the FRUMON code versions shown is lower than the currently recommended level, then the FRUMON code must be updated. Go to the next step: **Update the FRUMON code**. | □ |
|  | **Update the FRUMON code:**  **NOTE:** This FRUMON update may take up to an hour to complete, and once you start it, you should not leave until you have checked that it has successfully completed. If you cannot stay until the update has completed, then do not start it. Instead, go to the next section.  You will use the Navisphere Service Taskbar to update the FRUMON code on the array, using the Hot Fix Wizard.  **NOTE:** The Hot Fix Wizard can only be used to load software that does not require a storage system reboot. The Hot Fix Wizard will check the software being installed and will not allow installation of inappropriate packages. **However**, the Hot Fix Wizard does not differentiate to the patch level. If you are running a version of FLARE that is lower than R14 patch .016 (02.07.xxx.5.016), then you must not apply this FRUMON code.   1. Start the NST. 2. Select **Software Assistant**. 3. Select **Download and Install Hot Fix** if you do not already have the FRUMON code  –*or*- Select **Install Hot Fix** if you have already downloaded the code. 4. When the **Select** **Storage** **System** **to Connect** screen opens, enter the IP address of an SP in the storage system to which you want to add a disk-array enclosure, and click **Connect**.   Once you connect to a storage system, you do not need to reconnect to it again during the same NST session. To connect to a different storage system, you must disconnect the current storage system by selecting **File** > **Disconnect**.  Enter your Navisphere login username, password, and account type (global or local) and click **OK**. 5. **IMPORTANT: Press Ctrl, Shift, F12 and type SIR (case sensitive) for the engineering mode password, to indicate that you are a service person performing this update.** You will see **Engineering Mode** displayed. 6. Follow the directions given by the utility, including the steps to send the updated system storage information. 7. The FRUMON code on the ATA LCCs/BCCs in any attached ATA DAE chassis will be updated.   **NOTE**: Even though the Hot Fix Wizard completes, the FRUMON upgrade may take up to an hour to complete. 8. **To verify that the FRUMON code has been applied either:**  * Perform a “getcrus” command to determine the version of ATA LCC/BCC FRUMON code  **navicli –h** <*SP\_IP\_address*> **getcrus –lccreva -lccrevb *-****or-* **naviseccli –h** <*SP\_IP\_address*> **getcrus –lccreva -lccrevb**   *-or-*   * In Navisphere Manager, expand the array’s navigation tree to show the elements under **Physical > DAE-ATA > LCC** or **BCC**.  Right-click on the icon for either SP A’s or SP B’s ATA LCCs/BCCs and select **Resume** from the pop-up menu.   *-or- for CX and CX3 only*   * + From the Navisphere Service Taskbar Toolbar, select **Tools, Disk Enclosure Firmware (FRUMON) Status.**     The LCCs requiring update and their update status (details available) are displayed.    Check that the FRUMON code versions shown are as expected.   **NOTE:** If any of the ATA LCCs/BCCs does not update to the new version, then repeat this update step (i.e. reload the rebootless package).   1. View the event logs of both SPs to ensure there are no unexpected events that could signal a problem. 2. Exit the Navisphere Service Taskbar. | □ |

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| For your own records: Collect environment configuration information instr090\_R005 | | |
|  | For your own records, collect and archive the environment configuration information for the customer site as described below.  It is recommended that you should have the generated report handy for reference upon request. The contained information is useful for audits, hardware/software configuration reference, and troubleshooting.  **NOTE:** It is recommended to have the latest version of Navisphere CLI installed. Otherwise, new CLI commands may be inaccessible. | 🗸 Done  □ |
|  | Collect the CLARiiON information:  a. If necessary, create a new directory folder on your service laptop that will be used  to hold the generated configuration reports.  b. Open the CAP2 application and select **Tools** and then **Capture**. Check the  **Collect Storage System Information** box and enter the IP address for SP A and  SP B.  Click the **Finish** button and save the XML Report for reference.  c. At a DOS command prompt, go to the directory containing the navicli files by  entering:  **cd Program Files\EMC\Navisphere CLI**  d. At the prompt, run a getall command as follows:  **NOTE:** Alternatively, a spcollect command can be run to collect the information.  **navicli -h** *sp\_IP\_address* **getall >***folder\_path\_and\_filename.txt* For example:   navicli -h 10.11.22.333 getall >c:\configuration reports\1234.txt  **NOTE:** Refer to EMC Knowledgebase article emc97547 for information on running  the getall command on legacy storage systems.  Either command will generate a current configuration report of the CLARiiON and  all attached hosts and send the report with the specified file name to the directory.  e. Repeat the CLI command for each SP in the configuration. | □ |
|  | Collect the switch information (if applicable):  Collect the information for the switches in the configuration. Use the applicable capture commands or GUI features depending on the switch type.  The switch configuration should be saved to a file and stored in a safe place. | □ |

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| Update the CSI database for the hardware replacement upcsi120\_R001 | | |
|  | Verify that the customer information is correct. If changes are necessary, contact the CS Help Desk for assistance. | 🗸 Done  □ |
|  | Complete a Parts Usage by recording the failed part and installing the replacement part.  **NOTE:** If any issues arise that affect the CSI update process, contact the CS Help Desk for assistance. | □ |
|  | Enter the time spent to complete the replacement procedure. | □ |

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| APPENDICES |

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| Appendix: How to report missing, wrong, or damaged parts cnmwd010\_R001 | | |
|  | **If you have Missing, Wrong, or Damaged Parts:**   1. Report and obtain replacement parts by accessing PowerLink and following the path:  **Home** > **Resources** > **Tools** > **Report Shipment Issues** 2. Select the “**MWD Application**” link to file a complaint.  **NOTE:** EMC employees can access the MWD Application directly from <https://emcmwd.emc.com/>. | 🗸 Done  □ |

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| Appendix: Handling CX3-Series FRUs inc3s010\_R005 | | |
|  | This section describes the precautions that you must take and the general procedures you must follow when removing, installing, and storing any field replaceable unit (FRU). | 🗸 Done  □ |
|  | Power issues and FRUs  Your storage system is designed to be powered on continuously. Most components are hot repairable; that is, you can replace these components while the storage system is running. Front bezels should always be attached and each compartment should contain a FRU or filler panel to ensure EMI compliance and proper air flow over the FRUs.  You should not remove a faulty FRU until you have a replacement available.  When you replace or install FRUs, 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.  Read and understand the following instructions:   * 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 storage system, 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. * An ESD wristband is supplied with your storage system. To use it, attach the clip of the ESD wristband (strap) to any bare (unpainted) metal on the storage system; then put the wristband around your wrist with the metal button against your skin. * Use the ESD kit when handling any FRU. If an emergency arises and the ESD kit is not available, follow the procedures in the “Emergency procedures (without an ESD kit)” section below. | □ |
|  | Emergency procedures (without an ESD kit)  In an emergency when an ESD kit is not available, use the following procedures 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 storage system. * Before removing any FRU from its antistatic bag, place one hand firmly on a bare metal surface of the storage system, 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. | □ |

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