FXT 5000 Series Field Service Guide

Avere Systems, Inc.

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www.averesystems.com

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CHAPTER

ONE

INTRODUCTION

This *Avere FXT 5000 Series Field Service Guide* is written for qualified service personnel who are familiar with the FXT 5000 Series product. Only those people who are familiar with the FXT 5000 Series products and are trained in the potential hazards involved with servicing this type of equipment should attempt the procedures in this guide. It includes information that is needed to remove and replace field-replaceable units, and to perform system maintenance procedures.

The procedures in this guide assume you have the following skills and experience:

- Working familiarity with accepted tools and procedures for safely installing, operating, and maintaining commercial information technology equipment
- Working familiarity with computer server hardware theory and operation
- Basic understanding of common networking concepts and practices

Before using this guide, please familiarize yourself with the Avere FXT system by reading the following documents:

- FXT 5000 Series Installation Guide (https://download.averesystems.com/software/FXT_5000_Installation_Guide.pdf)
- FXT Cluster Creation Guide (http://library.averesystems.com/#fxt_cluster)
- Configuration Guide (http://library.averesystems.com/#operations)

  The Avere OS Configuration Guide is written for system administrators who need to manage an Avere cluster. It assumes that you have a basic knowledge of networked storage, including network access protocols such as NFS and SMB.

Additional documentation can be found online at http://library.averesystems.com/

1.1 Precaution Statements Used in this Document

This document uses the following highlights to draw attention to potentially hazardous or undesirable situations:

A warning indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.

A caution indicates a potentially hazardous situation that, if not avoided, could result in minor or moderate injury.

A notice indicates information considered important, but not related to personal harm or injury.

CHAPTER

TWO

PRECAUTIONS FOR PRODUCT SERVICE AND USE

This section discusses considerations you must take before installing, using, or servicing FXT 5000 Series edge filers.

2.1 Unpacking and Handling FXT Equipment

To prevent damage to the edge filer or components, carefully unpack and handle the FXT Series edge filer and components.

Inspect the boxes that the edge filer or component was shipped in and note whether there is any damage. If the shipment shows evidence of damage, file a damage claim with the carrier that delivered it.

2.2 Restricted Access

⚠WARNING

The FXT Series edge filer nodes must be installed in a restricted-access location. A restricted-access location is defined as a location that can be accessed only by use of a tool, lock and key, or other means of security and is controlled by the authority responsible for the location. Anyone entering the restricted-access location, or installing or replacing modules in an FXT Series node, must be trained in the potential hazards associated with the FXT Series node, including but not limited to exposure to hazardous energy levels when the cover is removed, when modules have been removed, or when modules are being replaced.

2.3 Preventing Condensation

NOTICE

Condensation can occur when exposing a colder product to a warmer and/or more humid environment.

If an item has been moved from an environment that is colder and less humid than the current installation and operating environment, allow it to reach the same temperature as the current environment before unpacking it, and before installing it or powering it on.

If you notice condensation on any part of the item, Avere Systems recommends waiting a minimum of 24 hours for it to acclimate before installation and use.

2.4 Electrical Considerations

This section lists guidelines for safe electrical handling of the FXT Series edge filer node.

2.4.1 Electrical Code Compliance

⚠ WARNING

To avoid the possibility of an electrical shock hazard, the electrical installation of an FXT Series edge filer and its associated rack(s) and power distribution units (PDUs) must comply with all applicable local, state, and national electrical codes and regulations. Contact a qualified electrician if you are unsure about proper electrical installation.

2.4.2 Earth Grounding

⚠ WARNING

- The building site, rack, and PDU electrical receptacles powering the FXT Series edge filer must be properly grounded during the lifetime of the installation.
- The earth-ground connection for the rack must be designed and installed specifically for the rack, and must not rely solely on unintentional grounding connections made through FXT Series nodes and other equipment installed into the rack.
- The Avere FXT Series node has been approved for use only with TN-type earth grounding systems. It has not been approved for use with IT-type earth grounding systems. Do not connect the node to any non-TN type of earth grounding system.
- To avoid the possibility of an electrical shock hazard, the FXT Series edge filer must be properly connected to earth ground during the lifetime of the installation. The edge filer receives its earth ground connection through the AC power cords. To ensure the integrity of the ground connection, observe the following guidelines:
  - Use only power cords with a grounding plug.
  - Inspect the ground pins of each power cord before initial use.
  - Never remove or disable the grounding pin on a power cord or use an adapter that might affect the integrity of the ground connection.

2.4.3 AC Mains Disconnect

⚠ WARNING

- The AC power cords serve as AC mains disconnect for the FXT Series edge filer and therefore must remain readily accessible during the lifetime of the installation.
- The FXT Series edge filer is provided with multiple power cords, and has a power-on/standby-type power switch. This switch does not function as an AC mains disconnect. To disconnect all power for maintenance or an electrical emergency, remove *all* power cords.

2.4.4 Power Supply Replacement

WARNING

The power supply units for FXT series nodes have detachable power cords. Disconnect the power cord at the power supply unit before removing the power supply unit from the node. When installing a power supply unit, insert the unit into the node before connecting the power cord.

NOTICE

When running on a single power supply unit, the node has an increased probability of losing all power as a result of the single unit failing. Always replace a failed power supply unit as soon as possible after failure.

2.4.5 Hazardous Energy Levels

WARNING

- To avoid potential injury, remove all chains, rings, watches, and other metal jewelry before performing maintenance on powered-on equipment. Burns and other injuries can be caused by the flow of current through a metallic object if the metallic object comes in contact with powered circuits.
- When replacing externally accessible components while power is applied to the node, *never* reach into the empty space created by the removed components, because hazardous energy levels may be present.

2.5 Racked FXT 5000 Series Nodes

WARNING

To avoid the potential of serious injury and equipment damage, observe the following precautions before installing nodes into racks or before removing them from racks:

- Ensure that the node's weight is fully supported by two people at all times while it is being installed into or removed from a rack.
- The rack installation must be designed to remain stable while supporting the full weight of the installed equipment in its maximum extended position.
- Follow the rack manufacturer's recommendations and use the appropriate load calculator if available when designing and installing rack systems.
- Contact the rack manufacturer or an engineering consultant if you require assistance determining the stability of the rack for its intended purpose.
- For single-rack installations, specify and install stability options such as ballast kits, bolt-down kits, and extensible or permanent stabilizing mechanisms.
- In multiple-rack installations, specify and install a multirack tie-kit option. If the multirack tie kit is not sufficient to guarantee stability, then install ballast kits, bolt-down kits, and extensible or permanent stabilizing mechanisms.
- Unless the rack installation is designed otherwise, extend only one piece of equipment from the rack at a time.
- Install the first piece of equipment into the bottom of the rack, with future equipment installed above that.

- For installing multiple pieces of equipment at the same time, first install the heavier equipment at the bottom, then install the lighter equipment sequentially above that.
- Rack-mounted equipment should not be used as a shelf, work space, step, or seat.

2.6 General Precautions

Observe the following precautions to prevent injury to yourself and damage to the FXT Series edge filer.

2.6.1 Service Area Clearance

⚠ WARNING

To permit service personnel to perform maintenance procedures on the FXT Series edge filer, a minimum of 24 inches of clearance must be provided in front of and behind the immediate area being serviced.

2.6.2 California Perchlorate Warning

⚠ WARNING

This product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

The following notice is provided in accordance with California Code of Regulations Title 22, Division 4.5, Chapter 33, Best Management Practices for Perchlorate Materials.

This product includes a lithium manganese dioxide battery that contains a perchlorate substance.

Perchlorate Material – special handling may apply. See www.dtsc.ca.gov/hazardouswaste/perchlorate.

2.6.3 Two-Person Lift

⚠ CAUTION

A bare node without accessories and outer rails weighs 33 pounds (15.0 kilograms). For ease of installation it is recommended to use two people to lift and install the node into the rack. When lifting a node, handle it in such a way that the weight is evenly distributed and stabilized. Be sure to comply with any personal lifting limits that may be in effect for your locale.

2.6.4 CMOS Battery Replacement

⚠ CAUTION

DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER. DISPOSE OF USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.

ATTENTION: IL Y A DANGER D'EXPLOSION S'IL Y A REMPLACEMENT INCORRECT DE LA BATTERIE, REMPLACER UNIQUEMENT AVEC UNE BATTERIE DU MÊME TYPE OU D'UN TYPE ÉQUIVALENT RECOMMANDÉ PAR LE CONSTRUCTEUR. METTRE AU REBUT LES BATTERIES USAGÉES CONFORMÉMENT AUX INSTRUCTIONS DU FABRICANT.

The motherboard battery maintains clock and CMOS settings when the node is without power for any reason. Contact Avere Global Services if you suspect that the motherboard battery needs to be replaced.

2.7 Laser Radiation

NOTICE

CLASS 1 LASER PRODUCT

FXT Series nodes that contain optical networking ports may emit invisible laser radiation from those ports. When no fiber-optic cable is connected, do not stare into the open apertures. In addition, install protective covers over any optical ports that will not have a cable connected.

2.8 Thermal Considerations

NOTICE

- FXT Series nodes use front-to-back cooling airflow. If the FXT Series node is installed in a rack, the installer is responsible for ensuring that adequate airflow is available through the rack to effectively cool the node.
- Environmental ambient temperature requirements apply to the area immediately around the node. For a node installed into an enclosed rack or a rack with perforated doors, the ambient temperature requirement applies to the area inside the rack or door, immediately around the node.
- Operating the FXT Series node in a rack with open EIA U spaces can cause unintended airflow paths and associated temperature inconsistencies. To maintain proper airflow and temperatures, cover all open rack spaces with blank panels.
- Ensure that the node cover is in place when the node is operating to assure proper airflow and cooling. Thermal damage to the system can occur if this practice is not strictly followed.
- Do not remove disk drives or power supply units unless a replacement component is immediately available. If you remove a replaceable component, replace it before putting the unit back into service to ensure proper airflow and cooling. Damage to the system can occur if this practice is not strictly followed.

2.9 Electrostatic Discharge (ESD) Precautions

NOTICE

An ESD event occurs when two objects with different electrical charges come into contact with each other. Electronic devices can be severely damaged by ESD.

When handling electronic modules such as disk drives, printed circuit boards (PCBs), and power supplies, observe the following basic ESD precautions to prevent damage.

- If possible, perform any maintenance at an approved ESD-safe workstation.
- Do not unpack or install electronic modules without using a properly grounded wrist or heel strap.
- Keep all electronic modules such as power supplies, PCBs, and disk drives in their original ESD-protective packaging until you are ready to install them.
- Handle all electronic modules carefully. Do not touch connectors, contacts, or component leads.
- Ensure that electronic modules do not come into contact with insulators such as clothing and plastics.

CHAPTER

THREE

FXT 5000 SERIES EDGE FILER OVERVIEW

The Avere FXT Edge Filer solution uses a cluster of network-attached storage (NAS) devices, called nodes, to increase file operation performance between back-end storage (NAS devices or cloud storage) and clients.

Each node is a server that runs Avere OS software. Physical nodes in the FXT 5000 Series contain and use multiple types of storage media.

If a part fails, any combination of the following will happen:

- An alert will appear on the Avere Control Panel software monitoring system
- An LED will light on the node chassis
- An audible alarm will sound from the node

For more information on alerts, refer to the Avere Control Panel Dashboard Guide (http://library.averesystems.com/#operations).

Status LEDs are described in detail in the following sections of this document:

- *FXT 5000 Series Front and Rear Illustrations* (page 10)
- *Control Panel Buttons* (page 12)
- *FXT 5000 Series Front Panel LEDs* (page 13)
- *FXT 5000 Series Rear Panel LEDs* (page 15)

3.1 Field-Replaceable Units

Some devices can be replaced without opening the node. The following is a list of FXT 5000 Series system-level units and components that can be serviced in the field:

- Power supply units - read *Replacing Power Supply Units* (page 17)
- Data drives - read *Replacing A Failed Data Drive* (page 20)
- System drives - read *Replacing A Failed System Drive* (page 23)
- SFP+ modules - read *Replacing SFP+ Modules* (page 29)
- Complete node - read *Replacing a Complete FXT 5000 Series Node* (page 31)

If there are problems with other components, the node must be returned and serviced at Avere Systems.

3.2 Attaching a Console to an FXT 5000 Series Node

You will need to attach a console to the node's serial port in certain situations, including these:

- The Avere Control Panel becomes unresponsive and SSH terminal access to the cluster or individual nodes fails
- To monitor a node's boot process after replacing both system drives

The serial port on the FXT 5000 Series node is configured as follows:

- Speed: 115200 baud
- Data bits: 8
- Stop bits: 1
- Parity: None
- Flow control: None

To attach the console:

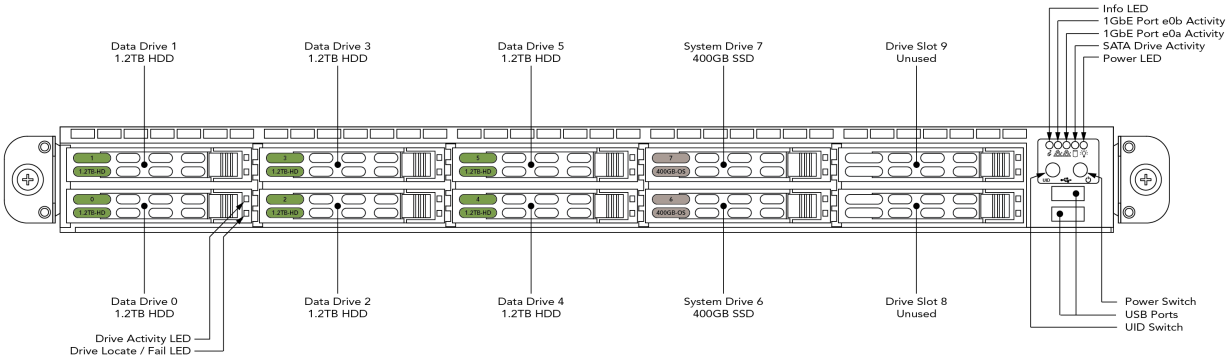
1. Locate the serial (COM1) port on the rear of the node
2. Use a null modem cable to connect the COM1 serial port to a terminal configured for ANSI-115200-8N1.
3. Log in to the console.

3.3 FXT 5000 Series Front and Rear Illustrations

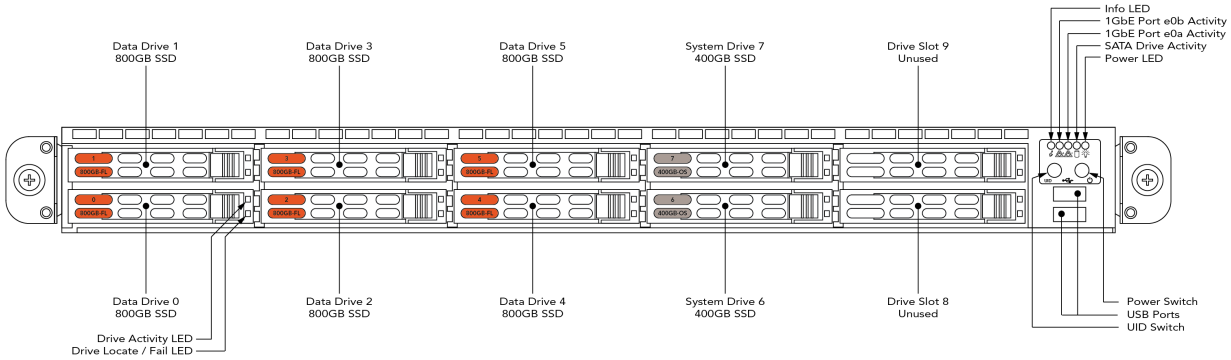
These diagrams show the front and rear layouts of FXT 5000 Series nodes. Front views are shown without the optional bezel.

The rear layout is the same for all FXT 5000 Series nodes.

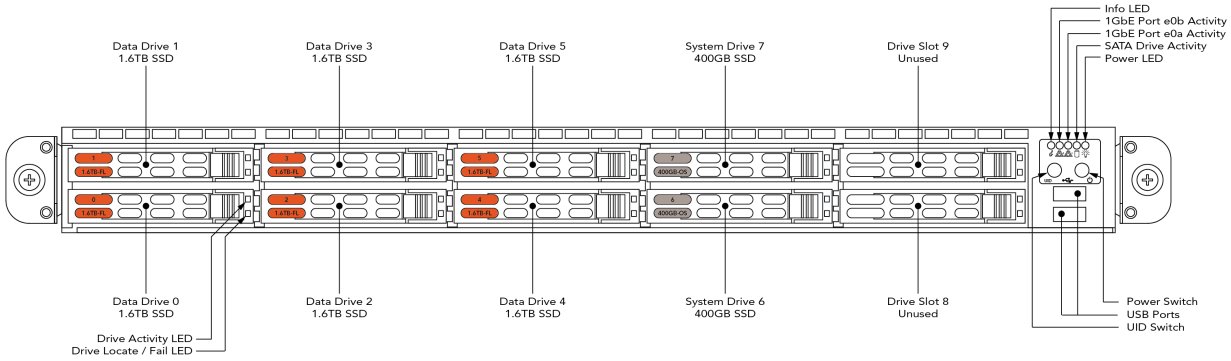
3.3.1 FXT 5200 Front Illustration



3.3.2 FXT 5400 Front Illustration

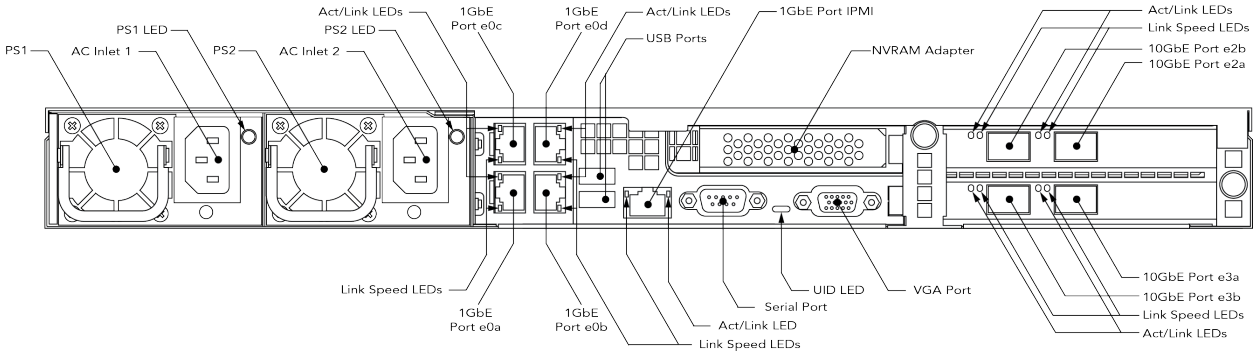


3.3.3 FXT 5600 Front Illustration



3.3.4 Rear View of the FXT 5000 Series Models

All FXT 5000 models have the same back layout.

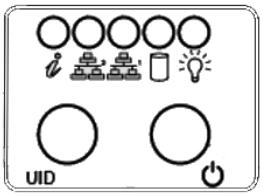


3.4 Controls and LED Status Lights

This section gives details about the buttons and LED indicators on the FXT 5000 Series.

3.4.1 Control Panel Buttons

Each FXT 5000 Series node has two buttons, which appear on the front right control panel section.



Front Control Panel

Power Button

The power button can be used to turn the node on and off.

WARNING

The power button should never be used to power off a system unless absolutely necessary. All system shutdowns should be done from the Avere Control Panel interface so that the cluster can properly reconfigure itself when restarting.

In some circumstances the user might have no other choice but to use the power button to power off a node. In that case, follow this procedure:

1. Press and release the power button once, and wait. The system will attempt to perform an orderly shutdown, which can take several minutes.

   If you do not see evidence of the node shutting down within five minutes, try the next step.

2. If the node does not power down from the single button press, press and hold the power button for at least 3 seconds. The system will shut down immediately.

Unit Identifier (UID) Button

Push the UID button on the front of the chassis to activate or deactivate the unit identifier LED.

3.4.2 FXT 5000 Series Front Panel LEDs

LED indicators are used on the front control panel (pictured *above* (page 12)) and on the drives.

Front Control Panel LEDs

LED Name and Symbol	State	Meaning	Action (if applicable)
Information LED 	Unlit	Normal state (no information to report)	N/A
	Solid red	The node is overheated	Check the ambient room temperature and improve cooling if needed. If the room temperature is within normal operating range, contact Avere Global Services.
	Blinking red once per second (1Hz)	Fan failure	Check the management interface for a failed fan alert message. Contact Avere Global Services for assistance.
	Blinking red once every four seconds (0.25Hz)	Power failure	Check that all power supplies are fully seated and that power cords are correctly installed. Ensure that AC power is being applied to the power supply. Reseat, install cords, and/or apply power as required. Check the power supply LEDs and the management interface for a failed power supply alert. Use the information in the alert and the instructions in this guide to replace the failed power supply.
1GbE port activity/link LEDs (e0a - right, labeled "1", and e0b - left, labeled "2") 	Unlit	The port is not linked	Check networking cables and associated Ethernet switch ports. Replace or reconnect cable as required and/or enable switch port.
	Flashing green	The port is linked and there is network activity	N/A
	Solid green	The port is linked but there is no network activity	N/A
SATA drive activity LED 	Not used - there are no SATA-connected drives in the FXT 5000 Series		

(continued)

LED Name and Symbol	State	Meaning	Action (if applicable)
Power LED 	Unlit	Neither power supply is receiving AC power, or at least one power supply is receiving power but the unit is powered off	Check that at least one power supply has AC power Power the unit on by pressing the front panel power switch or by using the Avere Control Panel
	Solid green	Unit is powered on and power is being supplied to at least one of the node's power supply units	N/A
Unit Identification LED (within the UID button)	Unlit	Normal state (unit identification has not been activated)	N/A
	Solid blue	Local UID has been activated by pressing the UID button on the front panel	Push the UID button again to turn off the light
	Blinking blue	Remote UID has been activated from the remote web interface (Avere Control Panel)	Turn off the LED by deactivating the remote UID in the IPMI web interface

Front SAS Drive LEDs

Each SAS drive has two status lights. This chart applies to data drives and system drives.

LED name	State	Meaning	Action (if applicable)
Drive Activity LED	Unlit	Drive is not installed, or unit is not powered on	Check for proper drive installation; power on the node if necessary
	Solid blue	Drive is installed	N/A
	Blinking blue	Drive is active	N/A
Drive Status LED	Unlit	Normal state	N/A
	Solid red	Drive failure	Check the Avere Control Panel dashboard for a failed drive alert; replace the drive
	Blinking red four times per second (4Hz)	Drive failure **or** Drive locator function has been activated from the Avere Control Panel	Check the Avere Control Panel dashboard for a failed drive alert and replace the drive **or** Deactivate the drive locate function from the Avere Control Panel **Node Details** page

3.4.3 FXT 5000 Series Rear Panel LEDs

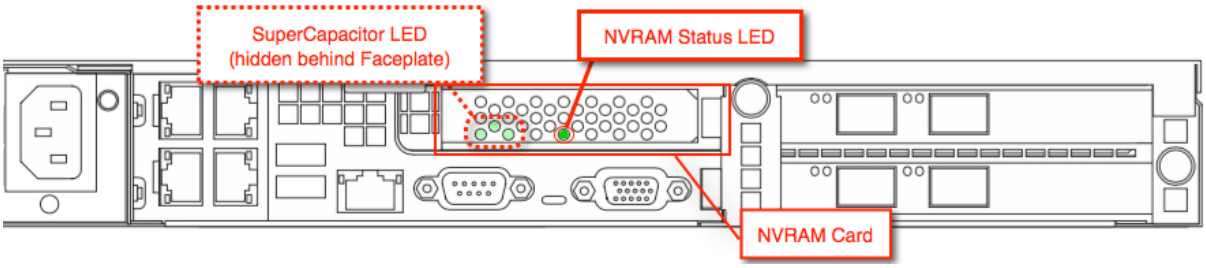
On the back of FXT 5000 Series nodes, LEDs can be seen on the power supply units, network ports, and inside the chassis on the nonvolatile RAM units.

Rear Power Supply LEDs

LED name	State	Meaning	Action (if applicable)
Power Supply LEDs (PS1, PS2)	Unlit	Neither power supply is receiving AC power	Check that each power supply is fully seated, has a power cord installed, and is connected to AC power. Reseat each power supply, install cords, and/or apply power as required.
	Solid green	Power is being supplied and the unit is powered on	N/A
	Blinking green	Power is being supplied but the unit is powered off	To power on the system, press the power button on the front of the node
	Solid yellow	This power supply is not receiving AC power, but the other power supply is receiving power	Check that the power supply is fully seated, has a power cord installed, and is connected to AC power. Reseat each power supply, install cords, and/or apply power as required.
	Blinking yellow	Overheat warning: The power supply internal temperature has reached at least 63° C (145.4° F). If the power supply temperature reaches 70° C (158° F), the system will automatically power down. It will restart when the power supply temperature falls below 60 °C (140° F).	Check the ambient room temperature and improve cooling if needed

NVRAM LEDs

On the back of the FXT 5000 Series, LEDs from the nonvolatile RAM units can be seen through a perforated panel in the NVRAM casing.



LED name and location	State	Meaning
NVRAM Status LED (center of NVRAM card)	Solid green	Firmware loaded successfully, ready for operation
	Solid orange	Uncorrectable error detected
	Solid red	One of the following events detected: • Power loss • Heartbeat loss • Over temperature CPU, system, or supercapacitor
	Flashing green once per second (1Hz)	Driver loaded successfully
	Flashing orange once per second (1Hz)	Restore operation in progress
	Flashing red once per second (1Hz)	Backup operation in progress
	Flashing red twice per second (2Hz)	Reset operation in progress
NVRAM Power LED	Unlit	Normal operation
	Flash green once	Safe to remove
	Solid red	DC/DC power failure
NVRAM Supercapacitor LED (behind adapter panel at lower left)	Solid green	Supercapacitor charged
	Flashing green once per second (1Hz)	Supercapacitor charging
	Flashing red once per second (1Hz)	Supercapacitor discharging
	Solid red	Critical failure
	Solid orange	Temperature alert

CHAPTER

FOUR

REPLACING POWER SUPPLY UNITS

This section describes how to detect and replace a failed power supply unit (sometimes abbreviated PSU) on a FXT 5000 Series node.

WARNING

Before replacing a power supply unit, review the following warnings:

- *AC Mains Disconnect* (page 4)
- *Power Supply Replacement* (page 5)
- *Hazardous Energy Levels* (page 5)
- *Service Area Clearance* (page 6)

4.1 Detecting a Failed Power Supply Unit

An FXT 5000 Series node has two power supply units. If either unit fails, the other continues to provide full power to the node, which continues to operate without interruption.

During a single power supply unit failure:

- The node emits an audible alarm
- The information LED on the front of the node flashes red at 0.25Hz (once every four seconds)
- A yellow warning alert about a power supply error appears on the status page of the Avere Control Panel

These conditions will continue until the failed power supply unit is replaced.

The information LED on the front of the node chassis does not indicate which of the two power supply units has failed.

As an aid to determining which unit has failed, check the LED beside the node's power cord connection on the rear of the chassis.

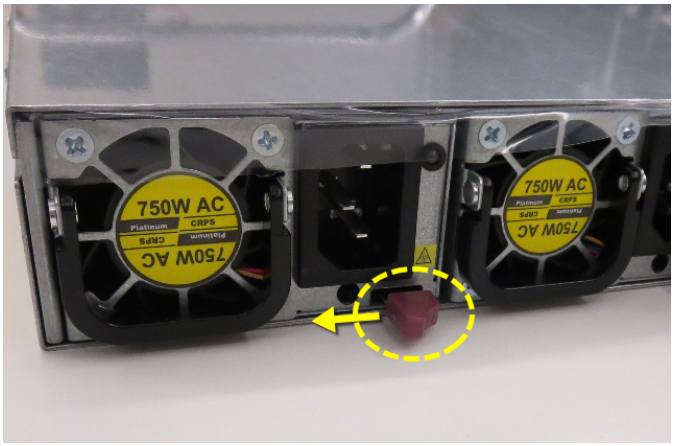
- On a functioning power supply, the LED will be green.
- If the power supply has failed, the LED will be yellow or off.

4.2 Replacing a Failed Power Supply Unit

Tip: You can replace a failed power supply without powering down the node.

Follow this procedure to replace a failed power supply unit:

1. Unplug the power cord from the failed power supply unit.
2. Wait one minute for the internal circuitry to discharge.
3. Press the red latch on the power supply unit to the left.



Unlatching a power supply unit

4. Use the unit's handle to pull it straight out of the node.
5. With the red latch positioned on the lower right, insert the replacement power supply unit into the node.
6. Push the replacement power supply unit into the power bay until the red latch engages.
7. Pull on the unit to ensure that it is properly seated in the node.
8. Plug the power cord into the newly replaced power supply unit.
9. Ensure that the information LED on the front of the node is no longer illuminated.
10. Log in to the Avere Control Panel and dismiss any alerts associated with the power supply unit failure.
11. Return the failed power supply unit to Avere Systems. Instructions for returning the failed unit are included in the replacement part's shipping box, or can be emailed from Avere Global Services.

CHAPTER

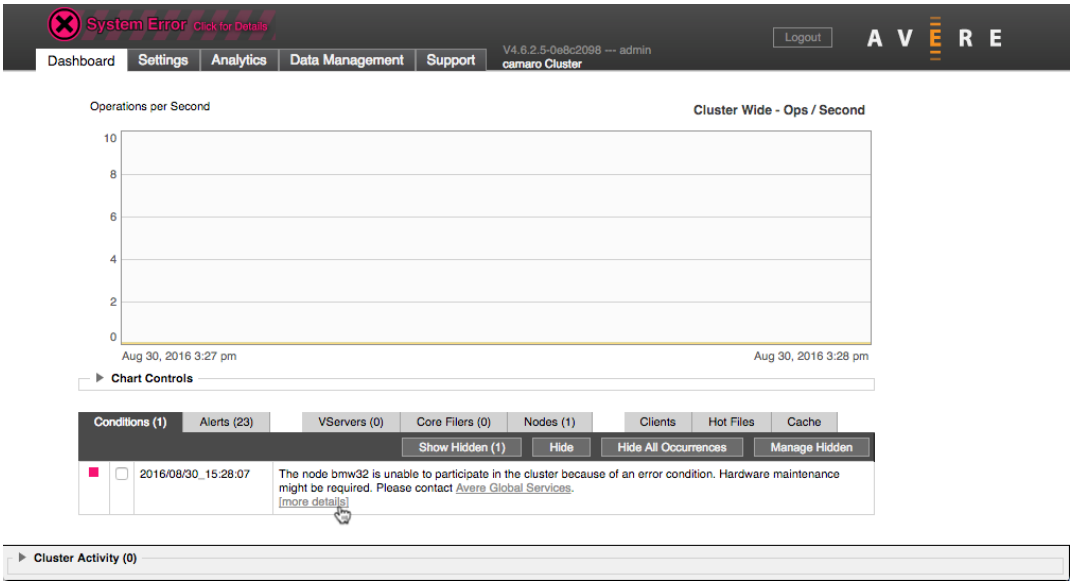
FIVE

REPLACING FAILED DRIVES

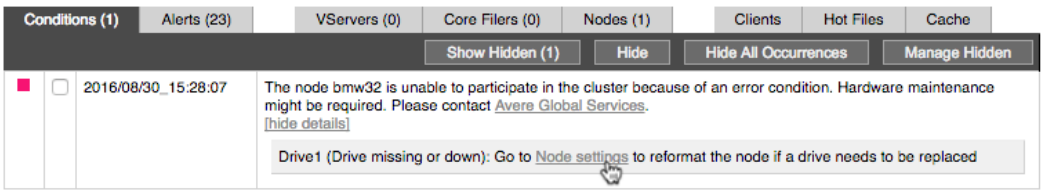
This section describes how to detect and replace a faulty drive on an FXT Series node.

5.1 Identifying a Failed Data or System Drive

If a drive fails, an alert appears on the Avere Control Panel dashboard.

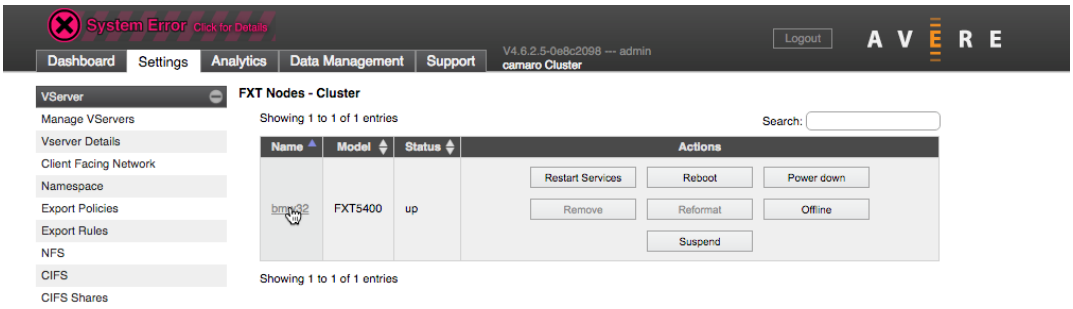


Click **More details** to show more information.

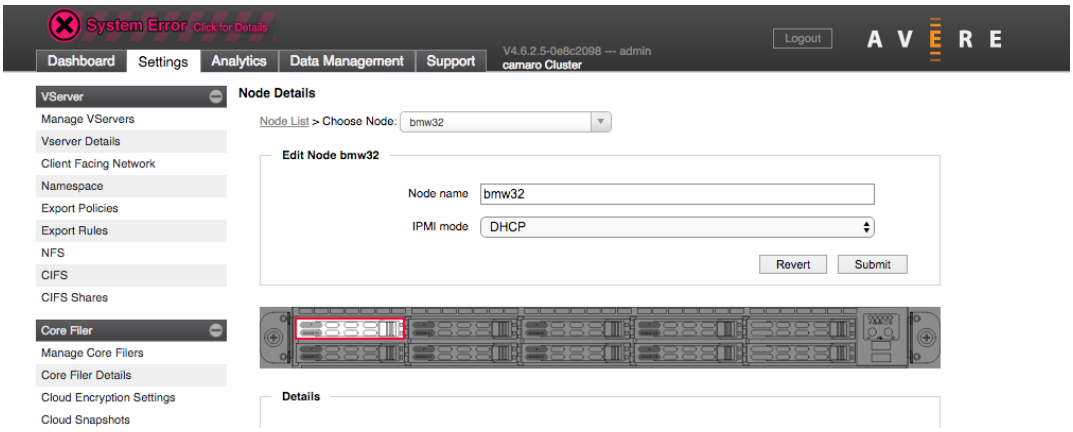


The informational message indicates that the drive is missing or has failed. Click **Node Settings** to see the status of the FXT 5000 Series node that includes the drive. Avere Control Panel loads the **FXT Nodes** page for the cluster.

Find the affected node in the list and click its name to show its **Node Details** page.



The image on the **Node Details** page highlights the failed drive.



Note: If you cannot identify the failed drive, contact Avere Global Services for assistance before proceeding.

The drive replacement process is different for data drives and for system drives, so you must determine which kind of drive has failed.

- The first six drive slots on the left of the chassis are data drives.
- The two drives to the right of the data drives are system drives.

The two rightmost drive slots are unused. Refer to the diagrams in *FXT 5000 Series Front and Rear Illustrations* (page 10) for more information.

If a data drive has failed, follow the instructions in *Replacing A Failed Data Drive* (page 20).

If a system drive has failed, follow the instructions in *Replacing A Failed System Drive* (page 23).

5.2 Replacing A Failed Data Drive

As an overview, there are three steps in replacing a failed data drive on an FXT 5000 Series node that is part of an Avere cluster.

1. Remove the failed drive from the system (Avere OS software does this automatically)
2. Replace the drive hardware
3. Reformat the node to add the new drive

It is unnecessary to power down the node to replace a drive.

5.2.1 Automatic Drive Failover

When Avere OS detects a data drive failure, the node automatically reformats its data storage system to remove the failed drive. The failed drive's files are recovered from its HA partner drive, and the node resumes operation using the remaining drives.

The following condition message appears in the Avere Control Panel dashboard:

> Node *node_name* has been reformatted to run without replacing failed drive *drive_name*. Please replace the failed drive as soon as possible. After replacing it, go to **Node Settings** to reformat the node to include the replacement drive.

When this message appears, the drive has automatically been removed from use. The node can continue operation with the available drives until a replacement drive is received.

After replacing the drive, you must reformat the node again to add the replacement drive to the node's data storage system. This process is not automatic. Instructions are below in *Reformatting the Node To Use the New Drive* (page 22).

5.2.2 Data Drive Removal and Replacement

⚠ WARNING

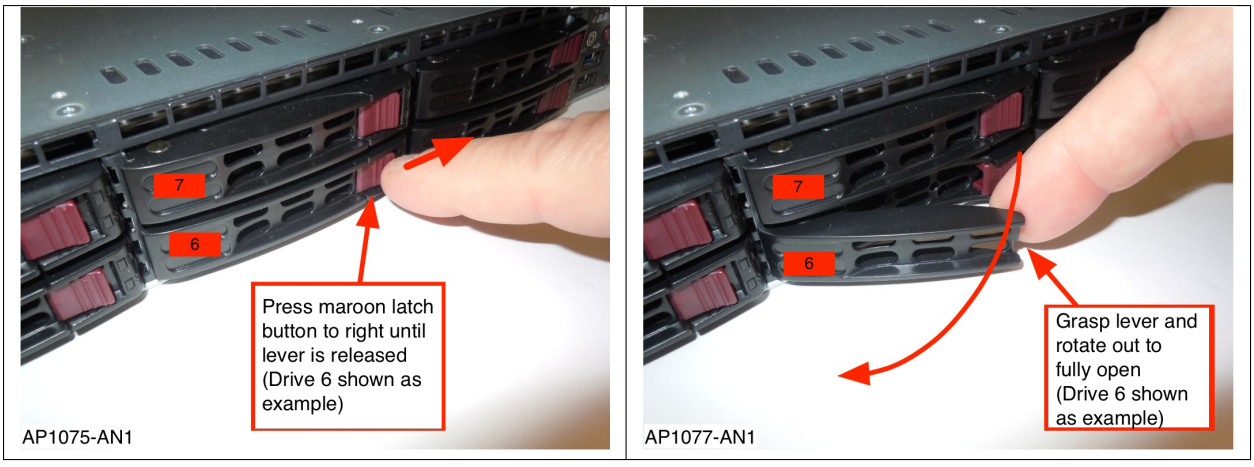
Before replacing a failed data drive, review the following warnings:

- *Hazardous Energy Levels* (page 5)
- *Service Area Clearance* (page 6)

Use these steps to remove the failed drive and install the new one.

1. Unlatch and eject the drive

   As shown in the following illustrations, press the maroon button on the drive assembly of the failed drive to release it. A black lever is released from the front of the drive assembly. Grasp the lever of the drive assembly and rotate it out to eject the drive. (Note that these images show the system drives, 6 and 7; the procedure is identical for data drives.)



   Unlocking a drive

2. Remove the drive

Use the lever to pull the drive assembly from the node chassis. Note the number on the label applied to the assembly lever.

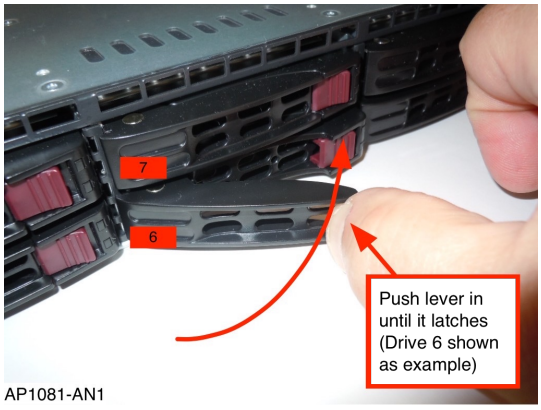
From the set of labels that is supplied with the replacement drive assembly, select the label with the same number as the drive being replaced and apply it to the lever of the replacement drive. Apply the numbered label to the replacement drive assembly in the same orientation and the same location as the original drive's label. Press the label firmly to make sure that it sticks to the drive. See *FXT 5000 Series Front and Rear Illustrations* (page 10) for an illustration of how drives are labeled.

3. Insert the new drive

   Make sure that you have labeled the new drive with the correct numbered label.

   As shown in the photo below, insert the replacement drive assembly into the slot of the drive being replaced, then slide the assembly into the slot by pushing firmly on the bezel until the lever begins to close.

   Completely seat the drive assembly into place by pressing the replacement drive assembly's lever until it locks into place.



   Latching a drive in the chassis

4. Package the failed drive and return it to Avere Systems. Instructions for returning the drive are included in the replacement part's shipping box, or can be emailed from Avere Global Services.

After installing the replacement drive, follow the steps in the next section (*Reformatting the Node To Use the New Drive* (page 22)) to add it to the node.

5.2.3 Reformatting the Node To Use the New Drive

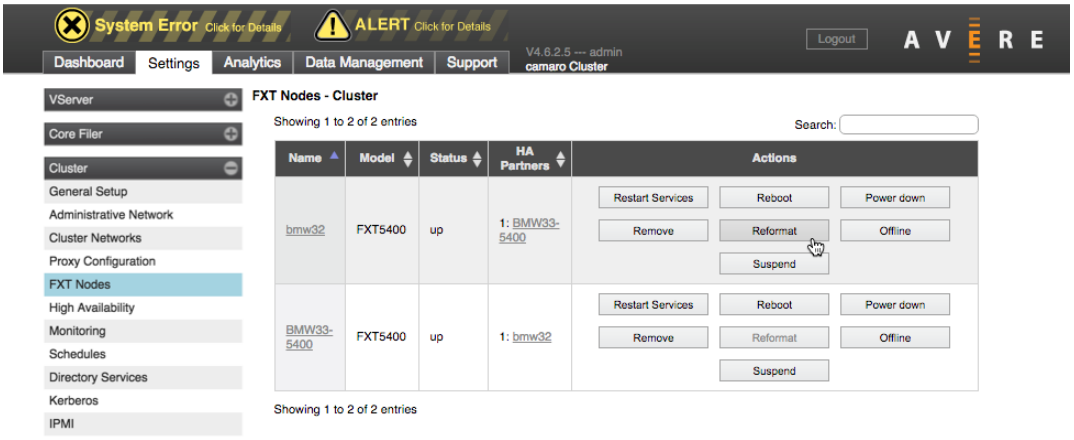
After installing the replacement drive in the node, you must manually start a node reformat operation before the node will recognize and use the newly installed data drive.

Note: During the reformat process, a minor disruption in service to clients might be seen while virtual interfaces are moved. The interruption is minimal, but if your system requires consistent throughput, reformat the node at a non-peak usage time or during a system maintenance period.

To reformat a node, follow these steps:

1. In the Avere Control Panel, navigate to the **FXT Nodes** page, under the **Cluster** heading on the **Settings** tab.
2. Locate the node with the replaced drive in the **FXT Nodes** table.

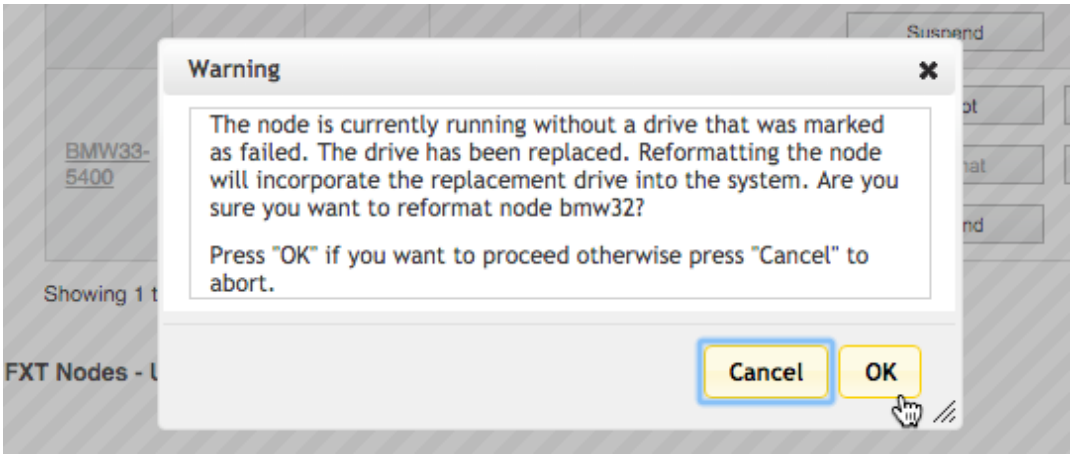
Note: Nodes with a failed drive will have the **Reformat** button available; healthy nodes have this button greyed out.



3. Click the **Reformat** button in the **Actions** column of the node.

Note: The node will reboot as part of the reformat process.

In the pop-up confirmation dialog, click **OK**.



The node will show the status **Reformatting/Down** for several minutes while the system reorganizes the data drives. Eventually, the node will reboot. After the reboot, the node will rejoin the cluster.

5.3 Replacing A Failed System Drive

The FXT 5000 Series nodes use mirrored system drives. If a single system drive fails, the other drive in the mirrored pair will keep the system operating.

When you receive a replacement system drive, simply replace the failed drive to repair the node. Avere OS will automatically rebuild the mirror by copying the contents from the working drive to the replacement drive.

You do not need to power down the node to replace a single system drive, but if both system drives need to be replaced you must power down the node and remove it from the cluster.

Read *Replacing a Single System Drive* (page 24) for the steps to replace one failed system drive.

Read *Replacing Both System Drives* (page 25) for the steps to replace a pair of failed system drives.

WARNING

Before replacing a failed system drive, review the following warnings:

- *Hazardous Energy Levels* (page 5)
- *Service Area Clearance* (page 6)

5.3.1 Replacing a Single System Drive

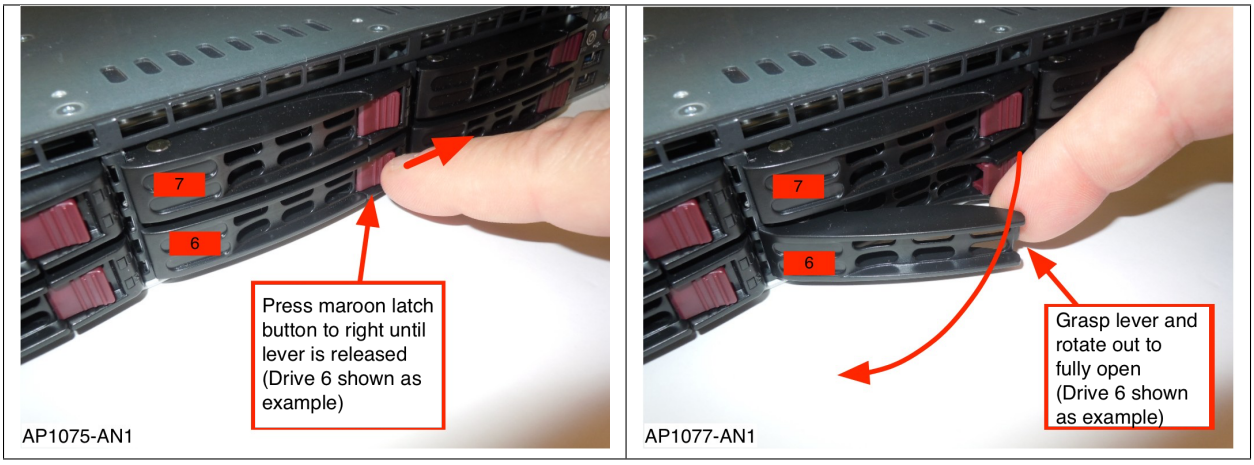
To replace a single failed system drive on an FXT 5000 Series node, you only need to remove the faulty drive and install the new one. No reformat process is required, and the node does not need to reboot.

Follow these steps.

Tip: Drives numbered 6 and 7 are system drives.

1. Unlatch and eject the drive

   As shown in the following illustrations, press the maroon button on the drive assembly of the failed drive to release it. A black lever is released from the front of the drive assembly. Grasp the lever of the drive assembly and rotate it out to eject the drive.



Unlocking a drive

2. Remove the drive

   Use the lever to pull the drive assembly from the node chassis. Note the number on the label applied to the assembly lever.

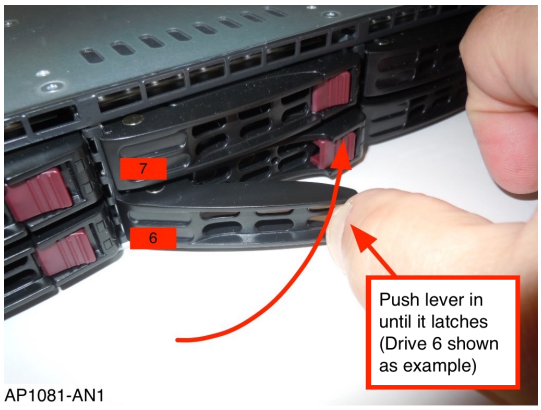
   From the set of labels that is supplied with the replacement drive assembly, select the label with the same number as the drive being replaced. Apply the numbered label to the lever of the replacement drive assembly in the same orientation and the same location as the original label. Press the label firmly to make sure that it sticks to the drive. See *FXT 5000 Series Front and Rear Illustrations* (page 10) for an illustration of how drives are labeled.

3. Insert the new drive

   Make sure that you have labeled the new drive with the correct numbered label.

   Insert the replacement drive assembly into the slot of the drive being replaced, then slide the assembly into the slot by pushing firmly on the bezel until the lever begins to close.

   Completely seat the drive assembly into place by pressing the replacement drive assembly's lever until it locks into place.



   Latching a drive in the chassis

After the new system drive is inserted, the activity LEDs on both system drives will begin to flash quickly while Avere OS rebuilds the mirror. This is normal operation.

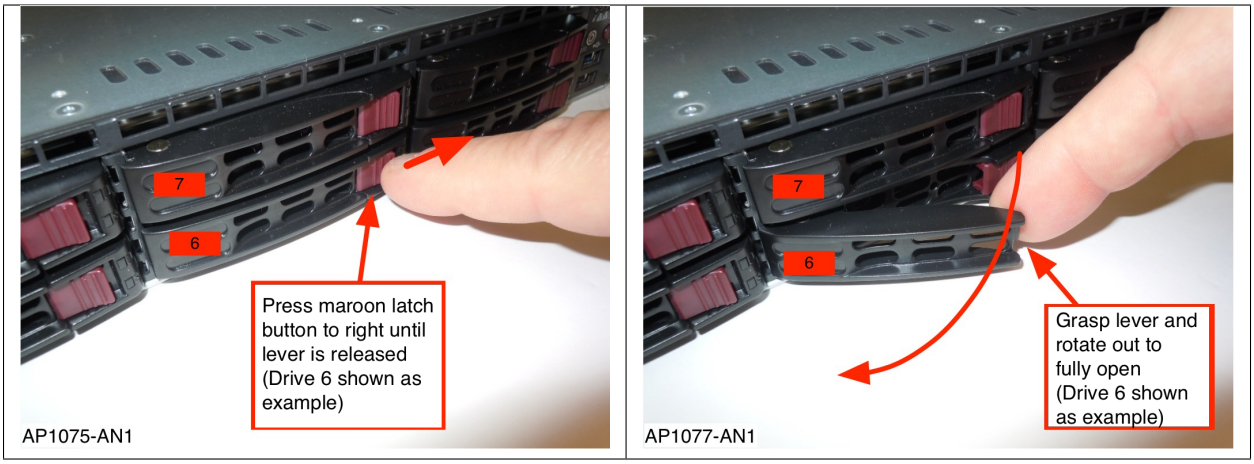
4. Package the failed system drive and return it to Avere Systems. Instructions for returning the drive are included in the replacement part's shipping box, or can be emailed from Avere Global Services.

5.3.2 Replacing Both System Drives

Follow these steps if you need to replace a pair of system drives on an FXT 5000 Series node that have both failed.

1. Use the Avere Control Panel web interface to remove the node from the cluster. A detailed description of this process is included in *Removing the Node from the Cluster Configuration* (page 36).
   - Open the **FXT Nodes** page in the **Cluster** section of the **Settings** tab.
   - Locate the failed node in the table.
   - Click the **Remove** button in the **Actions** column.
2. If the node is still powered on, use the power button to shut it down according to the procedure in *Control Panel Buttons* (page 12).
3. Unlatch and eject the drives

   As shown in the following illustrations, press the maroon button on each drive assembly of the failed drive to release it. A black lever is released from the front of the drive assembly. Grasp the lever of the drive assembly and rotate it out to eject the drive.



Unlocking a drive

4. Remove the drives

   Use the lever to pull each drive assembly from the node chassis.

5. Insert the new drives

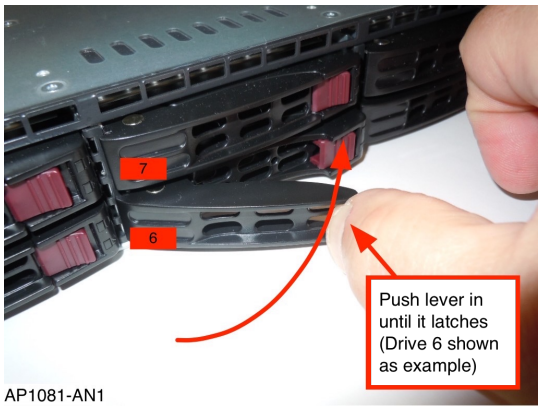
   The replacement system drives have the Avere OS software preinstalled and are configured as system drive pair. Be sure to install the correct drive in each drive slot:

   - The drive labeled **6** should be installed in the bottom system drive slot.
   - The drive labeled **7** should be installed in the top system drive slot.

   Refer to the photos above to see the relative position of the system drives.

   Insert the replacement drive assembly into the slot of the drive being replaced, then slide the assembly into the slot by pushing firmly on the bezel until the lever begins to close.

   Completely seat each drive assembly by pressing the lever until it locks into place.



Latching a drive in the chassis

6. Power on the node by pressing the power button on the front of the node chassis.

   The replacement drive assemblies are shipped with an operating system installed and will boot the node.

7. Use the Avere Control Panel web interface to add the node back to the cluster, as described in *Adding the Node to the Cluster* (page 37).

8. Package the failed system drives and return them to Avere Systems. Instructions for returning the drives are included in the replacement part shipping box, or can be emailed from Avere Global Services.

CHAPTER

SIX

REPLACING SFP+ MODULES

This section describes how to replace an SFP+ module on an FXT 5000 Series node.

Note: This procedure applies to Avere FXT 5000 Series models only. Other Avere FXT nodes might use slightly different SFP+ modules, and the modules can be installed in a different orientation, so it is important to follow instructions that are specific to the model being serviced.

NOTICE

Before replacing an SFP+ module, read *Laser Radiation* (page 7).

6.1 Accessing SFP+ Modules

Because the FXT 5000 Series are 1U servers, there is little clearance between the SFP+ module handle and the edge of the server case. It can be awkward to unlatch and remove the SFP+ modules or the fiber optic cables connected to them.

A flat-head screwdriver might be needed to unlatch the SFP+ module. Other convenient implements that are hard and relatively flat may be used - a key, pen cap, or credit card might be useful. Take care not to use excessive force on the modules or their latching handles.

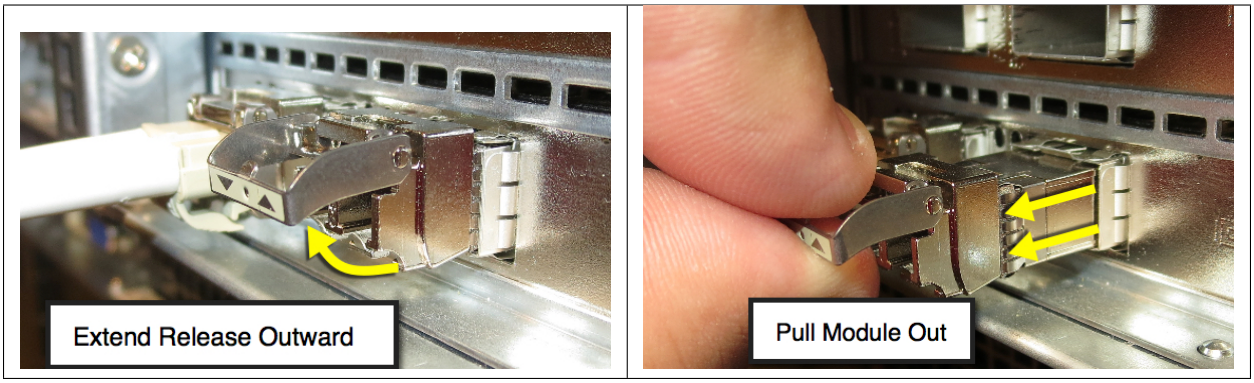
6.2 Removing an SFP+ Module

To remove an SFP+ module:

1. Extend the module's release handle outward. (The handle swings up from the bottom of the installed module.)

   The handle serves as a release mechanism; it must be fully extended to unlock the SFP+ module from its adapter card.

2. Gently pull on the release handle. The module should slide out of the card. If the module is not removable, check that the release handle is fully extended.



Removing an SFP+ module

6.3 Installing an SFP+ Module

To replace an SFP+ module:

1. Orient the replacement module so that the edge card connector is **facing up**.
2. With the handle closed, slide the module into the SFP+ port until it is firmly seated.

CHAPTER

SEVEN

REPLACING A COMPLETE FXT 5000 SERIES NODE

The components listed in this section cannot be replaced in the field. If any of these non-replaceable components fails, the FXT 5000 Series node must be replaced.

Non-replaceable components:

- Motherboard, including any onboard disk, networking, and IPMI ports and controllers
- Fans
- SAS midplane
- CPUs and heatsinks
- DRAM modules (DIMMs)
- PCIe drive controller adapters
- PCIe Ethernet networking adapters
- PCIe NVRAM adapters
- Front control panel

⚠ WARNING

Before opening a node to investigate any failure, review the following warnings and notices:

- *Restricted Access* (page 3)
- *Electrical Code Compliance* (page 4)
- *Earth Grounding* (page 4)
- *AC Mains Disconnect* (page 4)
- *Racked FXT 5000 Series Nodes* (page 5)
- *Hazardous Energy Levels* (page 5)
- *Service Area Clearance* (page 6)

NOTICE

- *Preventing Condensation* (page 3)
- *Laser Radiation* (page 7)

7.1 About Replacement Nodes

Depending on the situation, Avere Systems provides two different replacement node kits:

- An FXT node with only system drives preinstalled (most common)
- An FXT node with system drives and data drives preinstalled (uncommon)

Typically, the replacement node kit includes only the two system drives. When using this replacement kit, you must move the data drives from the failed node to the replacement node. This replacement node kit ships with empty "dummy" drive assemblies in each of the data drive slots.

If you are unsure whether or not your replacement node contains data drives, check for drive labels on the six data drive slots (real drives will be have numbered labels), or open the drive assembly (dummy drive assemblies are empty).

Dummy drive assembly

The steps in this chapter assume that you have received the typical Avere Systems replacement node kit, which is shipped without data drives. The data drive slots in the replacement node contain empty drive assemblies that must be replaced with the data drives from the failed node. If your replacement node includes data drives, skip the steps for removing and replacing the data drives.

7.2 Removing a Failed Node

To remove the failed node from the system for replacement, follow this procedure.

1. Use the Avere Control Panel web interface to remove the node from the cluster. A detailed description of this process is included in *Removing the Node from the Cluster Configuration* (page 36).
    - Open the **FXT Nodes** page in the **Cluster** section of the **Settings** tab.
    - Locate the failed node in the table.
    - Click the **Remove** button in the **Actions** column.
2. Shut down the node from the Avere Control Panel. (Use the **Power down** button from the **FXT Nodes** cluster settings page.)

If the node cannot be shut down from the web interface, follow the instructions in *Control Panel Buttons* (page 12) to use the power button.

After the machine has powered down, the power LED will either be unlit, or show a steady red light.

The FXT 5000 Series node has multiple power cords, and has a power-on/standby-type power switch. This switch does not function as an AC mains disconnect. To disconnect all power for maintenance or an electrical emergency, remove all power cords.

Before removing any power cords or network cables, label or make note of the connections so that you can connect the cables to the new node correctly.

3. After noting their positions, remove all power cords from the node.
4. After noting their positions, remove all data cables and any other connections from the node.

Note: If your replacement node was shipped with data drives, skip Step 5.

---

5. Remove all six data drives from the node and set them aside. These will be installed in the replacement node.

   Refer to *Data Drive Removal and Replacement* (page 21) for help unlatching and removing drives from the chassis.

6. Remove the node from the rack, as described in *Racking and Unracking an FXT 5000 Series Node* (page 35).

7.3 Installing a Replacement Node

1. Install the replacement node into the rack, as described in *Installing an FXT 5000 Series Node in a Rack* (page 38).

Note: If your replacement node was shipped with data drives, skip steps 2, 3, and 4.

---

2. Remove the six dummy drive assemblies from the data drive slots, numbered 0 through 5. Use the images in *FXT 5000 Series Front and Rear Illustrations* (page 10) to confirm the location of the data drives.

   Slots 6 and 7 contain the new system drives, which have Avere OS software preinstalled.

Dummy drive assembly

Refer to *Data Drive Removal and Replacement* (page 21) for help unlatching and removing drives.

3. Install the data drives from the old node in the drive slots of the replacement node. Be sure to install them in the correct slots according to the numbered labels on the drive assemblies. Drive numbers and position are shown in *FXT 5000 Series Front and Rear Illustrations* (page 10).

   Refer to *Data Drive Removal and Replacement* (page 21) for help inserting and latching drives in the node chassis.

4. Insert the six dummy drive assemblies into the drive slots of the failed node for return to Avere Systems.
5. Attach all network cables to the new node as they were connected to the failed node, and then attach the power cords to the AC inputs on the new node's power supply units.
6. Power on the FXT 5000 Series node by pressing the power button on the front of the node.
7. Using the Avere Control Panel, add the node back to the cluster, as described in *Adding the Node to the Cluster* (page 37).

Note: The replacement node will have a node name that was randomly assigned before shipping. When you add the node to your cluster, it will be renamed according to your cluster naming scheme. The Avere OS Configuration Guide (http://library.averesystems.com/#operations) explains how to customize node names on the Cluster > General Settings page of the Avere Control Panel.

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8. Return the failed node to Avere Systems. Instructions for returning the failed node are included in the replacement node's shipping box, or can be emailed from Avere Global Services.

CHAPTER

EIGHT

RACKING AND UNRACKING AN FXT 5000 SERIES NODE

In many situations, it is unnecessary to remove an FXT 5000 Series node from the rack for service. Depending on the clearance around the equipment rack, it is possible to replace data drives, system drives, power supply units, and SFP+ modules with the node in the rack.

If you choose to remove the node for service, or if you need to remove and replace a failed FXT 5000 Series node, follow the instructions in this chapter to rack and unrack the node safely.

To remove and replace a node for service, follow these guidelines.

1. Before removing or powering down the node, use the Avere Control Panel to remove the node from the cluster. Read *Removing the Node from the Cluster* (page 36) for details.
2. If removing the node from the rack, power down the node and remove the power cables. Follow the procedure in *Removing an FXT 5000 Series Node from a Rack* (page 37).
3. To replace the node in the rack, see *Installing an FXT 5000 Series Node in a Rack* (page 38).
4. After replacing and powering on the node, use the Avere Control Panel to add the node to the cluster. Read *Adding the Node to the Cluster* (page 37) to learn how.

8.1 Precautions

To avoid injury and equipment damage, observe the electrical and other cautions listed in *Precautions for Product Service and Use* (page 3).

To avoid the potential for serious injury and equipment damage caused by rack tip-over, the equipment rack must be properly designed and installed.

These instructions are for installing an Avere FXT 5000 Series node into a typical square-hole, non-threaded four-post server rack. Every effort has been made to supply the most accurate instructions possible. However, rack designs can vary greatly from model to model and from manufacturer to manufacturer. Because Avere Systems cannot anticipate every known rack design, the installer assumes the following responsibilities:

1. The installer must determine if the instructions provided apply to the installer's specific rack.
2. The installer must determine whether or not the instructions provided will result in a safe rack installation in the installer's specific rack.

If there is any doubt about the applicability or safety of using the provided instructions, do not proceed. Immediately contact Avere Global Services, the rack manufacturer, or both for assistance.

In addition to the information provided by Avere Systems, also refer to the installation and safety instructions that came with the rack unit that you are using. If there is any conflicting information, do not proceed. Immediately contact Avere Global Services, the rack manufacturer, or both for assistance.

8.1.1 FXT 5000 Series Differences from other Avere FXT Nodes

The physical design of the FXT 5000 Series node is significantly different from earlier Avere products like the FXT 4000 and 3000 series:

- The node height of the FXT 5000 Series is 1U instead of 2U.
- Rail assemblies are different in the FXT 5000 Series, and different installation steps are required.
- Inner rails on the FXT 5000 Series do not extend the full length of the node's chassis. The back of the node must be supported when removing it from a rack. Read *Removing an FXT 5000 Series Node from a Rack* (page 37) to learn how to safely extract a node.
- Several connectors and ports are different from previous systems, and some are installed in a different orientation than they were in other Avere Systems products.

Even if you have previously worked with Avere FXT systems, be sure to read the instructions here before attempting to install or service an FXT 5000 Series filer.

8.2 Removing the Node from the Cluster Configuration

Before taking a node out of service, you should use the Avere Control Panel web interface to remove the node from the cluster. If you do not remove the node, the Avere OS software will give errors and warnings until it can re-establish connection with the node.

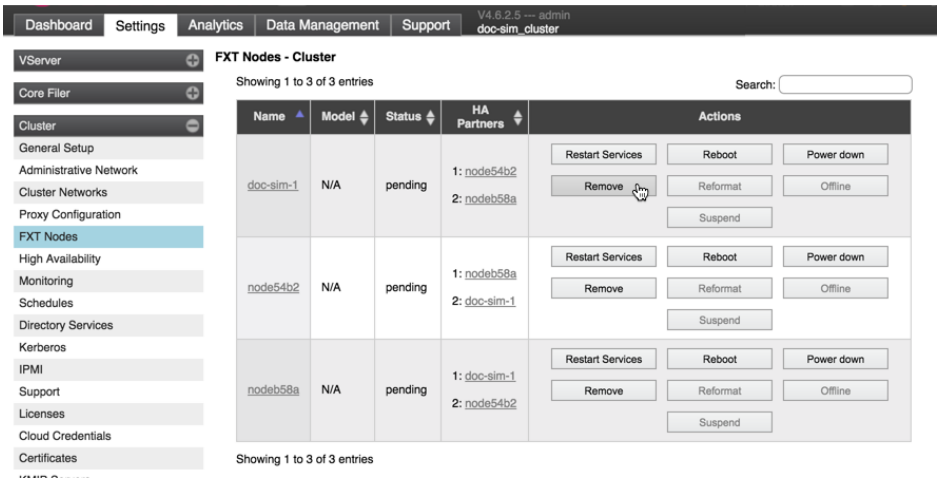
You can use this procedure to remove a failed node, as long as the node still appears in the node list.

After replacing the node, use the Avere Control Panel to add the node to the cluster.

8.2.1 Removing the Node from the Cluster

To remove a node from the cluster, use the **FXT Nodes** page in the **Settings** tab of the Avere Control Panel.

Find the node that will be removed, and click the **Remove** button in its **Actions** menu.



The software will show one or more dialog boxes that describe the impact of removing the node and ask you to confirm the removal by typing answers in a text box.

8.2.2 Adding the Node to the Cluster

After powering on the replaced node, use a web browser to access the **FXT Nodes** page in the **Settings** tab of the Avere Control Panel.

Find the replaced node in the **FXT Nodes - Unjoined** list and click its **Allow to Join** button.

8.3 Removing an FXT 5000 Series Node from a Rack

WARNING

The inner rails on the FXT 5000 Series node chassis do not extend completely to the back of the chassis. After disengaging the side locks, it is possible to completely pull the node out of the rack and off the rails.

To avoid possible injury and equipment damage, always support the node completely after disengaging the safety locks.

If completely removing the node from the rack, power it down and remove all cables and connectors. Also remove the node from the cluster by using the Avere Control Panel as described in *Removing the Node from the Cluster Configuration* (page 36).

8.3.1 Extending the FXT 5000 Series Node

To slide the node out to its extended position:

1. Loosen the captive screws at the front of each rail.
2. Slide the node forward until the latches on each side engage, stopping the chassis from moving forward.

8.3.2 Removing the Node from the Rails

To remove the node from the rack completely:

1. Follow steps 1 and 2 above to put the node into the locked extended position.
2. Locate the black plastic latches on the sides of the inner rails, and disengage them.

   ⚠CAUTION

   There is only one set of locks on the rack slides. After these locks are disengaged, the node can slide off the outer rail and be unsupported. Always fully support the node from the front and back when locks are disengaged.

   Disengage the locks by pushing the long lever up or down, depending on the orientation of the lock:

   - If standing in front of the rack, the latch on the left side releases by pushing the lever up, and the latch on the right side releases by pushing the lever down.
3. Make sure that the node is fully supported by two people.
4. Carefully slide the node farther out until the inner rails slide out of the rack. The inner rails extend only 19 inches (48 centimeters), which is about two thirds of the depth of the chassis, so be alert for the rails to disengage.

If you will reinstall an Avere FXT 5000 Series node in this rack slot, removing the outer rails from the rack is unnecessary.

8.4 Installing an FXT 5000 Series Node in a Rack

This procedure assumes that you are replacing an FXT 5000 Series node in a rack that already has the outer rails snapped in place in the rack. Inner rails are pre-installed on the sides of the replacement node's chassis.

For a new rack installation, please follow the procedure in the FXT 5000 Series Installation Guide (https://download.averesystems.com/software/FXT_5000_Installation_Guide.pdf), which includes instructions for assembling the outer rails and attaching them to the rack.

8.4.1 Placing the Node in the Rack

⚠CAUTION

A bare node without accessories and outer rails weighs 33 pounds (15.0 kilograms). For ease of installation it is recommended to use two people to lift and install the node into the rack. When lifting a node, handle it in such a way that the weight is evenly distributed and stabilized. Be sure to comply with any personal lifting limits that may be in effect for your locale.

To install the node in the rack:

1. Make sure that the rails are correctly installed and secure in the rack slots.
2. Align the rails attached to the side of the node chassis with the rails at the front of the rack.
3. Slide the node into the outer rails, maintaining equal pressure on both sides.
4. As the node slides into the rack, you should hear a click when the safety latches engage. There is one latch on each side.

(a) Verify that the safety latches operate properly by pulling the node forward and making sure that it stops in its fully extended position.

(b) Verify that the rack and rail installation can safely hold the node's weight in the extended position.

5. Slide the node into its final position in the rack.
6. To secure the node from sliding out of the rack, tighten the captive screws at the front of each rail.

8.5 Installing and Removing the Front Bezel

This section provides instructions for installing or removing the FXT 5000 Series's front bezel (faceplate). Using the bezel is optional.

The front bezel hides some indicator lights, including the power status indicator, and it prevents access to the node's power button. If you do not plan to power on the node immediately after installation, consider waiting to install the bezel until after the node is up and running.

To install the front bezel:

1. Position the bezel with the decorative face outward and the latch to the left.
2. Hold the left side of the bezel away from the chassis and insert the two pins on the right side of the bezel into the holes located on the node's right side rack mount flange.
3. Press the bezel's latch to the right to retract the two locking pins on the bezel's left side.
4. Move the left side of the bezel into position so that the entire faceplate is flush with the node's front panel.
5. Release the latch so that the two locking pins on the latch engage with the holes in the left side rack mount flange. If the pins do not engage fully, adjust the bezel's position. Make sure that it is pressed against the face of the node chassis.
6. Pull on the bezel to test that it is correctly attached.
7. To ensure the bezel remains securely attached under all conditions, locking the bezel is recommended. Use the key provided in the accessory kit.

To remove the front bezel:

1. If necessary, unlock the front bezel with the key provided in the accessory kit.
2. Press the latch tabs on the left side of the bezel to the right and gently pull the bezel, left to right, from the node.

CHAPTER

NINE

CONTACTING AVERE GLOBAL SERVICES

For assistance with hardware or software issues, get in touch with Avere Global Services through one of the following methods.

- Online at http://www.averesystems.com/support
- By phone:
  - US and Canada, toll free: 1-888-88-AVERE (888-882-8373), press 2 for support
  - US: 412-894-2570, press 2 for support
  - United Kingdom: +44 20 3695 1638, press 2 for support
  - International: +1-412-894-2570, press 2 for support
- By email to support@averesystems.com

This information also is available from the **Support** tab in the Avere Control Panel web interface.

CHAPTER

TEN

COPYRIGHT AND TRADEMARK INFORMATION

10.1 Copyright Information

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10.3 Revision History

2018-04-05 - fixed FXT 5600 image

2018-03-20 - revised links to Dashboard Guide and Cluster Creation Guide documents (minor updates, no version change)

2017-03-02 - updated images for SSD system drives (rev B)

2016-03-03 - added FXT 5200 (rev A)

2016-01-20 - initial release for FXT 5400 and FXT 5600

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