



# User Guide

*OpenFlex™ F3x00 and E3000*

*1ET2212*

*Version 1.1*

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**Western Digital®**

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## Revision History

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Date	Revision	Comment
July 2020	1.0	Initial Release
December 2020	1.1	Added UK Import Representation Contact

## Notices

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## Points of Contact

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For further assistance with a Western Digital product, contact Western Digital Datacenter Platforms technical support. Please be prepared to provide the following information: part number (P/N), serial number (S/N), product name and/or model number, and a brief description of the issue.

**Email:**

[support@wdc.com](mailto:support@wdc.com)

**Website:**

<https://portal.wdc.com/Support/s/>

**UK Import Representation Contact**

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# Overview

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## 1.1 OpenFlex F3x00 and E3000

The OpenFlex F3x00 and E3000 is a 3U rack mounted data storage enclosure built on the OpenFlex platform. OpenFlex is Western Digital's architecture that supports Open Composable Infrastructure (OCI). The OpenFlex F3x00 and E3000 are fabric devices that leverage this OCI approach in the form of disaggregated data storage using NVMe-over-Fabrics (NVMe-oF™). NVMe-oF is a networked storage protocol that allows storage to be disaggregated from compute to make that storage widely available to multiple applications and servers. By enabling applications to share a common pool of storage capacity, data can be easily shared between applications, or needed capacity can be allocated to an application regardless of location. Exploiting NVMe™ device-level performance, NVMe-oF promises to deliver the lowest end-to-end latency from application to shared storage. NVMe-oF enables composable infrastructures to deliver the data locality benefits of NVMe DAS (low latency, high performance) while providing the agility and flexibility of sharing storage and compute.



The maximum data storage capacity is 614TB<sup>1</sup> when leveraging a full set of 10 F3x00 fabric devices. The enclosure runs on an input voltage of 200V - 240V and consumes ~1400W of power under typical conditions. It requires a maximum of 1600W at full load.

### Composable Infrastructure

An emerging category of datacenter infrastructure that seeks to disaggregate compute, storage, and networking fabric resources into shared resource pools that can be available for on-demand allocation (i.e., "composable"). Composability occurs at the software level, disaggregation occurs at the hardware level using NVMe™-over-Fabric—will vastly improve compute and storage utilization, performance, and agility in the data center.

- 614TB<sup>2</sup>
- 12GBps NVMe-oF over QSFP28 Cables
- 68.5 kg (151.1 lbs.)

### OpenFlex

OpenFlex is Western Digital's architecture that supports Open Composable Infrastructure through storage disaggregation – both disk and flash natively attached to a scalable fabric. OpenFlex does not rule out multiple fabrics, but whenever possible, Ethernet will be used as a unifying connect for both flash and disk because of its broad applicability and availability.

- 200V - 240V Input Voltages
- 3U Form Factor
- Hot-swappable PSUs and Fans

### Open Composable API

Western Digital's new Open Composable API is designed for data center composability. It builds upon existing industry standards utilizing the best features of those standards as well as practices from proprietary management protocols.

- Dual 1600W PSUs
- Operational Temperature: 5°C to 35°C
- Dynamic Provisioning Supported

1. Max storage capacity depends on device version and device configuration.

## 1.1.1 Servicing Features

The OpenFlex F3x00 and E3000 are equipped with several features that make servicing simpler and safer.

- Every CRU component has been designed with toolless removal features.
- The BMC Module, Fan Module, PSU, and F3x00 devices are all hotswappable components.

This document provides full instructions on how these features operate in the [Management \(page 29\)](#) section.

## 1.1.2 Composable Infrastructures

An emerging category of datacenter infrastructure that seeks to disaggregate compute, storage, and networking fabric resources into shared resource pools that can be available for on-demand allocation (i.e., "composable"). Composable occurs at the software level, disaggregation occurs at the hardware level.

Western Digital's vision for Open Composable Infrastructures is based on four key pillars:

- Open
  - Open in both API and form factor
  - Designed for robust interoperability of multi-vendor solutions
- Scalable
  - Ability to compose solutions at the width of the network
  - Enable self-organizing systems of composable elements that communicate horizontally
- Disaggregated
  - Pools of resources available for any use case that is defined at run time
  - Independent scaling of compute & storage elements to maximize efficiency & agility
- Extensible
  - Inclusive of both disk and flash
  - Entire ecosystem of composable elements managed & orchestrated using a common API framework
  - Prepared for yet-to-come composable elements – e.g., memory, accelerators

### 1.1.2.1 Open Composable

The Western Digital Open Composable Infrastructure (OCI) uses a common API to manage and coordinate with all fabric-attached storage including pools of flash and disk. The infrastructure also supports the management of networking and compute resources. The API is used for all managed elements to accelerate the ability to use disaggregated resources where components are no longer sub-components, but core elements connected to the network.

### 1.1.2.2 Open Composable API (OCAPI)

Western Digital's Open Composable API is a RESTful interface for OpenFlex that enables a Unified Fabric Control Plane for Storage Fabric Devices. This allows for composing disaggregated storage resources—with compute, networking, and memory—into virtual systems in the future. These virtual systems will be dynamically provided to the right application at the right time, ensuring SLAs can be met automatically.

- Volume management (create / modify / delete namespaces, format media)
- Monitor hardware sensors (temperatures, voltages, fan speeds, hardware state)
- Configure hardware (update firmware, reboot individual components or systems, assert LEDs)
- Monitor performance (statistics, bandwidth, IOPS, latency)
- Capture inventory data (serial number, part number, etc.)
- Capture log information
- Configure policies (user access lists, authentication, LUN masking, HTTPS/TLS encryption/security with certificate/key settings)
- Self-discovery of other locally-available resources configurable using the Open Composable API for OpenFlex

### 1.1.2.3 OCGUI

The Open Composable Graphical User Interface (OCGUI) is the graphical representation of all of the data shared up to the fabric by the OCAPI. This GUI is presented to the user by browsing to the IP address of any device on the fabric. The GUI has a "command-center" design layout that presents all vital health, utilization, and performance statistics related to devices on the network at a glance.

### 1.1.3 NVMe-oF

Non-Volatile Memory Express over Fabric (NVMe-oF) is one of the primary enabling technologies for the OpenFlex platform. NVMe-oF enables the high-speed, low-latency storage performance of NVMe over a fabric switching network. OpenFlex products drive network communications across the fabric using 100Gb/s Ethernet protocol. This allows for a complex network of computing devices to all share the same storage resources with very high performance.

### 1.1.4 Supported SKUs

The following table lists the versions of Western Digital product that are supported by this document.

**Table 1:** Devices

Device	Volume	Bandwidth <sup>3</sup>	Drive Writes	Encryption	Part Number
OpenFlex F3000 Fabric Device	12.8TB	12GB/s	RI-3DW/D	ISE	1EX1906
OpenFlex F3000 Fabric Device	12.8TB	12GB/s	RI-3DW/D	SE	1EX1910
OpenFlex F3100 Fabric Device	12.8TB	12GB/s	RI-2DW/D	ISE	1EX2413
OpenFlex F3200 Fabric Device	12.8TB	12GB/s	RI-2DW/D	ISE	1EX2269
OpenFlex F3000 Fabric Device	15.2TB	12GB/s	RI-1DW/D	ISE	1EX1907
OpenFlex F3000 Fabric Device	15.2TB	12GB/s	RI-1DW/D	SE	1EX1911
OpenFlex F3100 Fabric Device	15.36TB	12GB/s	RI-0.8DW/D	ISE	1EX2416
OpenFlex F3200 Fabric Device	15.36TB	12GB/s	RI-0.8DW/D	ISE	1EX2272
OpenFlex F3000 Fabric Device	25.6TB	12GB/s	RI-3DW/D	ISE	1EX1908
OpenFlex F3000 Fabric Device	25.6TB	12GB/s	RI-3DW/D	SE	1EX1912

3. Bandwidth obtained by sequential read

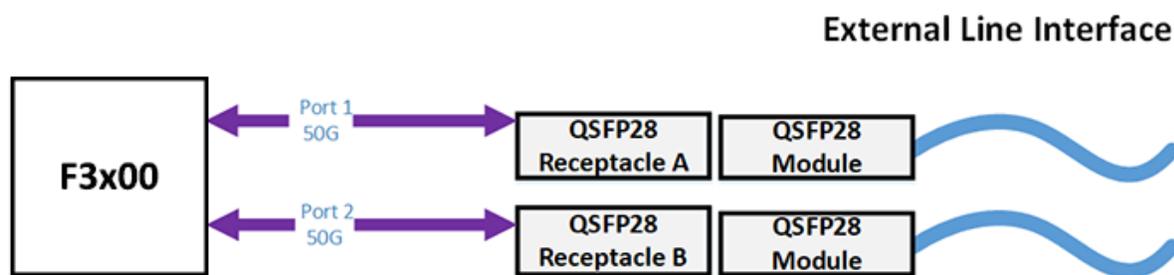
Device	Volume	Bandwidth <sup>3</sup>	Drive Writes	Encryption	Part Number
OpenFlex F3100 Fabric Device	25.6TB	12GB/s	RI-2DW/D	ISE	1EX2414
OpenFlex F3200 Fabric Device	25.6TB	12GB/s	RI-2DW/D	ISE	1EX2270
OpenFlex F3000 Fabric Device	30.72TB	12GB/s	RI-1DW/D	ISE	1EX1909
OpenFlex F3000 Fabric Device	30.72TB	12GB/s	RI-1DW/D	SE	1EX1913
OpenFlex F3100 Fabric Device	30.72TB	12GB/s	RI-0.8DW/D	ISE	1EX2417
OpenFlex F3200 Fabric Device	30.72TB	12GB/s	RI-0.8DW/D	ISE	1EX2273
OpenFlex F3100 Fabric Device	51.2TB	12GB/s	RI-2DW/D	ISE	1EX2415
OpenFlex F3200 Fabric Device	51.2TB	12GB/s	RI-2DW/D	ISE	1EX2271
OpenFlex F3000 Fabric Device	61.44TB	12GB/s	RI-1DW/D	SE	1EX1914
OpenFlex F3100 Fabric Device	61.44TB	12GB/s	RI-0.8DW/D	ISE	1EX2418
OpenFlex F3200 Fabric Device	61.44TB	12GB/s	RI-0.8DW/D	ISE	1EX2274

## 1.2 System Architecture Overview

### 1.2.1 System High Speed Data Ingest Architecture

The system main data ingest architecture uses two separate 50G Ethernet connections each on a dual QSFP28 connector on the rear I/O of the chassis. This completes the connection from the device that is inserted into a chassis slot, through the backplane into the QSFP connectors. The architecture supports the hot swap nature of the devices and does not require any sort of shut down or disconnection before servicing. Each 100G Ethernet connection is split in half at the QSFP28 connectors resulting in 50G per connector allowing for dual port functionality with the device.

**Figure 2:** System High Speed Data Ingest

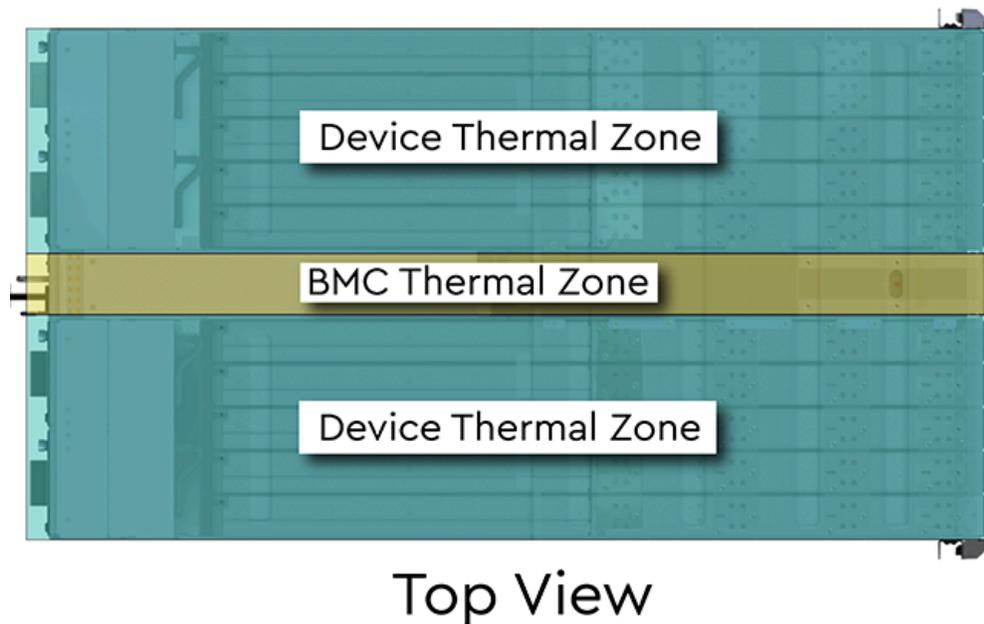


### 1.2.2 System Thermal and Cooling

3. Bandwidth obtained by sequential read

The following image displays the thermal zones as viewed from the top of the enclosure. When viewing the enclosure from the front, the right device zone is on the right-hand side and the left device zone is on the left-hand side. When viewing the enclosure from the rear, the order is reversed. Each of the two thermal zones contains major components that are thermally maintained within their specific zone.

**Figure 3:** System Thermal Zones



The E3000 uses a base algorithm, called a thermal algorithm, to control the overall thermal environment of the system. The system is mechanically separated into two thermal zones to support efficient cooling of the system components in order to achieve the intended performance of the system. The thermal zones are split into device zones (the left and right side of the enclosure) and center zone when standing at the front of the system. The device thermal zones contain up to ten devices or device blanks each that are cooled by four fan modules that are located directly behind the devices. The four fan modules behind the devices maintain the cooling for devices contained within the device slot installed into A through J. The center thermal zone contains the BMC module that is cooled by the fans contained in the redundant PSUs that are located directly behind the BMC module. The different thermal zones are designed to maintain proper thermal cooling across the entire system. During servicing the system increases the speed of the fan modules and PSU fans to maintain a balanced thermal load.

### 1.2.2.1 System Thermal Algorithm

The System Thermal Algorithm is designed to use temperature sensors and defined thresholds to determine if the algorithm will select critical, increase, decrease, or no change as the device decision.

The System Thermal Algorithm uses the concept of priorities to ensure the proper function of the system. As a result, any critical fault results in the system ramping the fans to maximum RPMs to protect the hardware for the duration of the fault. The fault will remain in a critical state until the fault is fully resolved and by bringing the temperature back within the specified defined thresholds.

The System Thermal Algorithm contains minimum and maximum thresholds related to the ambient temperature of the system. The system is designed to maintain a maximum ambient temperature of 35°C. Exceeding 35°C may result in damage to the hardware and potentially void the product warranty. These thresholds allow for the best possible operating conditions. If the system goes outside of the minimum or maximum threshold window, the BMC will adjust the fan speed to accommodate the issue and a fault will be reported. The following table lists the Thermal Algorithm Thresholds along with the related fault levels and threshold values.

The following table lists the different severity of thermal algorithm critical faults that are reported to the user.

**Table 2:** Thermal Algorithm Critical Faults

Component	Critical Faults
Device	Any sensor $\geq$ critical
BMC	Not installed FAN
	Not installed PSU
	Not installed Device or Blank
	Not installed BMC
PSU	Any sensor $\geq$ critical
	Any critical status on SMBus

The following table lists the device decision values that the system chooses from during operation. It describes how the pulse width modulation (PWM) of the power that is being distributed to the cooling fans reacts to different fault types. The fault will be reported based on the severity of the thermal issue.

**Table 3:** Thermal Algorithm Device Decision for Fan Control

Fault	Sensor Value	Fan Response
Critical	Sensor $\geq$ Critical	100% PWM
Increase	Sensor $\geq$ Max	PWM + increase step
Decrease	Sensor $\leq$ Min	PWM - decrease step
No Change	Min < Sensor < Max	Hold PWM

## 1.3 Electrical Specifications

**Table 4:** Electrical Specifications

Specification	Value
Max Power Consumption	1600W
Typical Power Consumption	~1400W
Input Voltage	200V - 240V
PSU Connector Type	C16

Specification	Value
Inrush Current Maximum (per PSU)	AC line inrush current shall not exceed 40A peak, for up to one-quarter of the AC cycle after which, the input current should be no more than the specified maximum input current.
PSU Efficiency	80 PLUS Platinum

## 1.4 Environmental Specifications

**Table 5:** Environmental Specifications

Specification	Non-Operational	Operational
Temperature	-30°C to 60°C	5°C to 35°C
Temperature Gradient	30°C per hour max	20°C per hour max
Temperature De-rating	1°C per 300m above 3000m	1°C per 175m above 950m
Relative Humidity	5-95% Non-Condensing	8-85% Non-Condensing
Relative Humidity Gradient	30% per hour maximum	30% per hour maximum
Altitude	-300m to 12,000m / -984 ft. to 39,370 ft	-300m to 3048m / -984 ft. to 10,000 ft.
Cooling	N/A	4 Fan Modules (N+1 Supported), containing two fans per module

## 1.5 Mechanical Specifications

**Table 6:** Mechanical Specifications

Specification	Non-Operational	Operational
Shock	20G, 7ms half sine; 3 positive and 3 negative pulses in each axis Z and Y. X axis- 15G, 7ms half sine, 3 positive and 3 negative pulses	5G, 11ms half sine; 3 positive and 3 negative pulses in each axis X, Y, and Z. Minimum 6 seconds between shocks
Vibration	<p><b>Linear Random:</b> 0.17G, 0 - peak swept sine; 5 - 500Hz; 1 complete sweep @ 1/2 octave per minute, ~13 minutes each axis in X, Y, and Z</p> <p><b>Linear Random:</b> 0.50Grms; 5-500Hz; 10 minutes each axis in X, Y, and Z</p> <p><b>Linear Random:</b> 0.54Grms; 1-200Hz; 60 minutes each axis in X, Y, and Z</p>	<p><b>Linear Random:</b> 0.15Grms; 5 - 500Hz; 10 minutes each axis in X, Y, and Z</p> <p><b>Swept Sine:</b> 0.17 G, 0 - peak, 5-500 Hz 0.5 octaves/min, approx. 13 minutes each axis</p>

Specification	Non-Operational	Operational
	<b>Swept Sine:</b> 0.50G, 0 - peak swept sine; 5 - 500Hz; 1 complete sweep @ 1/2 octave per minute	
Weight	107.04 kg / 236 lbs.	
Dimensions	<b>W:</b> 448.8 mm x <b>L:</b> 1000 mm x <b>H:</b> 176.7 mm / <b>W:</b> 17.6 in. x <b>L:</b> 39.4 in. x <b>H:</b> 6.9 in.	
System Installation Length	1000 mm / 39.4 in. from the front rack chassis mounts to the rear of the system	
Required Rack Depth	1000 mm / 39.4 in. of usable rack space, frame to frame	
Required Rack Width	450mm (17.72in.) with 465mm (18.31in.) ± 1.5mm nominal hole spacing. See EIA-310 Rack Standard	
Rack Units (U)	4U	
Vertical Rack Rail Spacing	718 mm – 850 mm / 28.26 in. – 33.46 in.	

**Table 7:** Acoustic Specifications

Quantities Declared	Idle Mode	Operating Mode	Fan Fail Mode <sup>5</sup>	Max Fan Mode
A-weighted sound power level <sup>1</sup> , $L_{WAd}$ {1 B = 10 dB}	8.5	8.5	9.6	9.6
Average A-weighted emission sound pressure level <sup>2</sup> , $L_{pAm}$ (dB) {bystander position <sup>3</sup> }	66.0	66.0	74.9	76.2
Statistical adder for verification <sup>4</sup> , $K$ (dB)	2.5	2.5	2.5	2.5

**Notes on Acoustic Testing Methodology and Environment:**

- Background noise: <7dBA
- Environmental test conditions: ~23° C, 57% RH, 101.3 kPa
- Tested configuration: 3U NVMeOF VBOF device with 10 devices installed.

<sup>1</sup> Declared A-weighted sound power level for a single machine, calculated per section 4.4.2 of ISO 9296-1988 and measured per ISO 3744

<sup>2</sup> Declared A-weighted sound pressure level for a single machine, calculated per section 4.4.4 of ISO-9296-1988 and measured per ISO 3744

<sup>3</sup> The front and rear of the UUT were selected for the bystander location due to access typically from the cool or hot aisle in a data center. This does not meet the four bystander positions as specified in ECMA-74 2012, but the microphones were adjusted to the preferred location.

<sup>4</sup> The statistical adder,  $K$ , accounts for random measurement error, and is equal to 2.5 dB, which is appropriate for a 5% risk of rejection for  $S_R = 1.5$  dB per section 4.4.2 of ISO 9296-1988.

<sup>5</sup> At steady state condition, system/PSU fans reached 100% pwm speeds during fan fail mode testing.

## 1.6 Performance Specifications

**Table 8:** Performance Specifications

Specification	Value
Number of Device Slots	10 Dual-port Fabric Device Bays
Data Transfer Rates	12GBps NVMe-oF
Max Raw Data Storage Capacity	614TB <sup>4</sup>
Ethernet Ports	20 x 50Gbps QSFP28 ( 2 per Fabric Device) 1 x 10/100/1G Ethernet

**Table 9:** F3000 Performance Specifications by CRU P/N

CRU P/N	1EX1906/ 1EX1910	1EX1907/ 1EX1911	1EX1908/ 1EX1912	1EX1909/ 1EX1913	1EX1914
Capacity/ Endurance	12.8TB 3DWPD	15.4TB 1DWPD	25.6TB 3DWPD	30.7TB 1DWPD	61.4TB 1DWPD
Random Read (4KB, QD=1024)	2021K IOPs	2021K IOPs	2004K IOPs	2002K IOPs	2220K IOPs <sup>1</sup>
Random Write (4KB, QD=1024)	918K IOPs	919K IOPs	609K IOPs	608K IOPs	2420K IOPs <sup>1</sup>
Random Mixed 70R/30W (4KB, QD=1024)	1570K IOPs	1537K IOPs	1194K IOPs	1194K IOPs	2253K IOPs
Sequential Read (128KB, QD=320)	11.9 GB/s				
Sequential Write (128KB, QD=320)	9.3 GB/s	9.3 GB/s	10.2 GB/s	10.2 GB/s	11.7 GB/s
Random Write Latency (4KB, QD=1, 99.99%)	107 μs	114 μs	75.3 μs	76.3 μs	48.9 μs

<sup>1</sup> Queue depth for 61.4TB device optimized at 1536, not 1024 as stated for other capacities

**Notes on Performance Testing:**

- Latency measured through a single Mellanox SN2700 switch
- K IOPs = IOPs x 1000
- Devices pre-conditioned with 2 full sequential fills

**Table 10:** F3100 Performance Specifications by CRU P/N

CRU P/N	1EX2413	1EX2416	1EX2414	1EX2417	1EX2415	1EX2418
Capacity/ Endurance	12.8TB 2DWPD	15.4TB 0.8DWPD	25.6TB 2DWPD	30.7TB 0.8DWPD	51.2TB 2DWPD	61.4TB 0.8DWPD
Random Read (4KB, QD=1024)	2199K IOPs	2111K IOPs	2164K IOPs	2160K IOPs	2176K IOPs	2191K IOPs

4. Max storage capacity depends on device version and device configuration.

CRU P/N	1EX2413	1EX2416	1EX2414	1EX2417	1EX2415	1EX2418
Random Write (4KB, QD=1024)	1493K IOPs	1433K IOPs	1431K IOPs	1397K IOPs	1464K IOPs	1400K IOPs
Random Mixed 70R/30W (4KB, QD=1024)	2199K IOPs	2137K IOPs	2183K IOPs	2188K IOPs	2227K IOPs	2251K IOPs
Sequential Read (128KB, QD=320)	11.8 GB/s	11.7 GB/s	11.7 GB/s	11.7 GB/s	11.7	11.7 GB/s
Sequential Write (128KB, QD=320)	9.9 GB/s	9.9 GB/s	9.9 GB/s	9.4 GB/s	9.4 GB/s	9.9 GB/s
Random Write Latency (4KB, QD=1, 99.99%)	33.9 $\mu$ s	33.7 $\mu$ s	33.7 $\mu$ s	33.9 $\mu$ s	33.7 $\mu$ s	33.5 $\mu$ s

**Notes on Performance Testing:**

- K IOPs = IOPs x 1000
- Devices pre-conditioned with 2 full sequential fills

**Table 11:** F3200 Performance Specifications by CRU P/N

CRU P/N	1EX2513	1EX2516	1EX2514	1EX2517	1EX2515	1EX2518
Capacity/ Endurance	12.8TB 2DWPD	15.4TB 0.8DWPD	25.6TB 2DWPD	30.7TB 0.8DWPD	51.2TB 2DWPD	61.4TB 0.8DWPD
Random Read (4KB, QD=1024)	2218K IOPs	2209K IOPs	2212K IOPs	2210K IOPs	2221K IOPs	2214K IOPs
Random Write (4KB, QD=1024)	2130K IOPs	1998K IOPs	2124K IOPs	2129K IOPs	1930K IOPs	1907K IOPs
Random Mixed 70R/30W (4KB, QD=1024)	2292K IOPs	882K IOPs	2256K IOPs	2252K IOPs	2308K IOPs	2285K IOPs
Sequential Read (128KB, QD=320)	11.5 GB/s	11.5 GB/s	11.5 GB/s	11.5 GB/s	11.5 GB/s	11.5 GB/s
Sequential Write (128KB, QD=320)	11.5 GB/s	11.5 GB/s	11.5 GB/s	11.5 GB/s	11.5 GB/s	11.5 GB/s
Random Write Latency (4KB, QD=1, 99.99%)	38.5 $\mu$ s	38.1 $\mu$ s	38.1 $\mu$ s	38.0 $\mu$ s	46.7 $\mu$ s	38.1 $\mu$ s

**Notes on Performance Testing:**

- K IOPs = IOPs x 1000
- Devices pre-conditioned with 2 full sequential fills

## 1.7 Physical Design

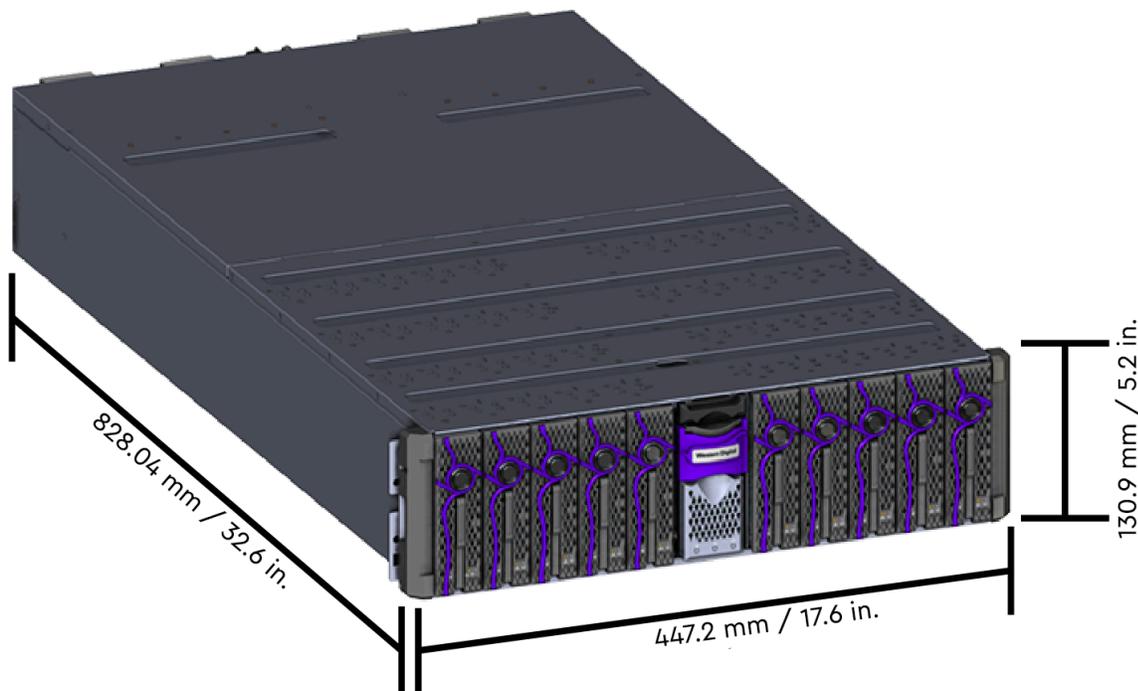
The OpenFlex F3x00 and E3000 physical design emphasizes easy access to hot-swappable components, maximization of data storage capacity in the rack, and bold aesthetic design.

**Figure 4:** OpenFlex F3x00 and E3000 Layout



The enclosure measures 447.2 mm/17.6 in. wide by 828.04 mm/32.6 in. long. It's height is 130.9 mm/5.2 in. or 3U. The chassis installation length is 778 mm (30.6 in.) from front rack chassis mounts to rear of system.

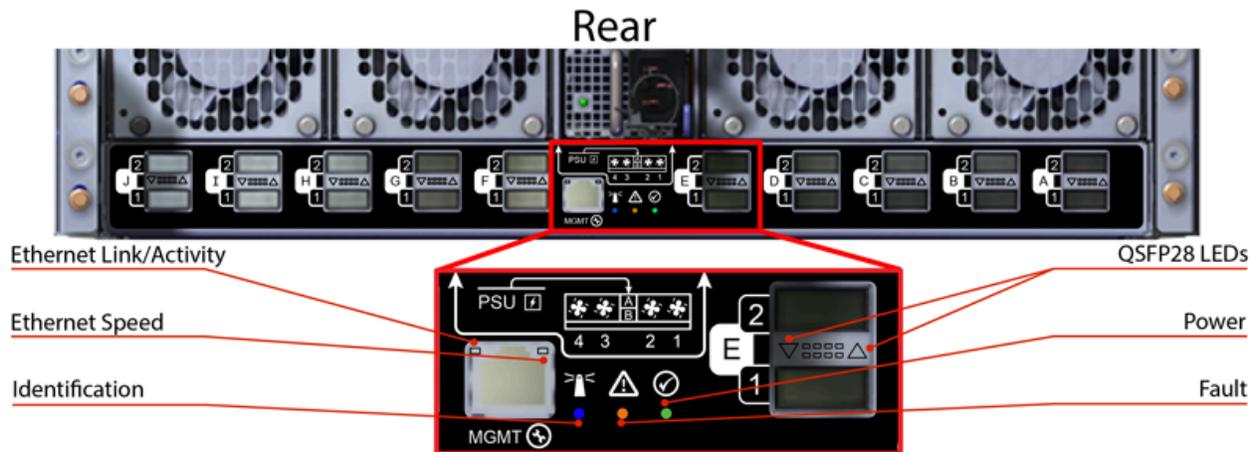
**Figure 5:** OpenFlex F3x00 and E3000 Dimensions



## 1.7.1 LEDs

### Chassis LEDs

**Figure 6:** Chassis Rear IO LEDs



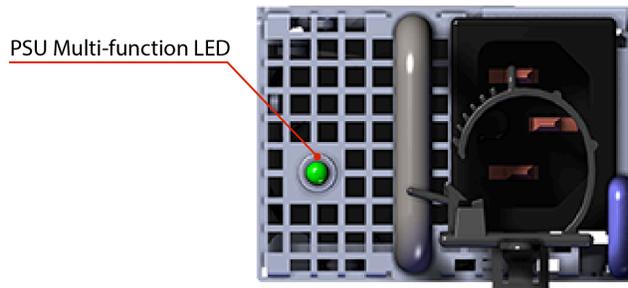
**Table 12:** Chassis Rear IO LED Flash Patterns

LED Name	Color	Behavior
Ethernet Link/Activity	Green	<b>Solid On:</b> Connected <b>Blink:</b> Activity <b>Off:</b> No Connection
Ethernet Speed	Green	<b>Solid On :</b> Operating at 100 Mbps <b>Off:</b> Operating at 10 Mbps
	Amber	<b>Solid On:</b> Operating at 1 Gbps <b>Off:</b> Operating at 10 Mbps
Identification	Blue	<b>Blink @ 1 Hz:</b> Enclosure or <b>any</b> component being identified (fans, PSUs, etc.) <b>Off:</b> Enclosure/components not being identified
	Green	<b>Solid On:</b> Link operating at maximum speed <b>Blink @ 3 Hz:</b> Link activity <b>Off:</b> Default state
QSF28 LED	Green	<b>Solid On:</b> Link operating at maximum speed <b>Blink @ 3 Hz:</b> Link activity <b>Off:</b> Default state
	Amber	<b>Solid On:</b> Link operating at a lower speed, 50G or less <b>Blink @ 3 Hz:</b> Low speed link activity <b>Blink @ 1 Hz:</b> On/Off - Identify
Power	Green	<b>Solid On:</b> Enclosure is powered on

LED Name	Color	Behavior
Fault	Amber	<b>Off:</b> Enclosure is powered off <b>Solid On:</b> Enclosure is not ready or BMC is not present <b>Blink @ 2 Hz:</b> Enclosure has a fault <b>Off:</b> Enclosure has no fault

**PSU LED**

**Figure 7:** PSU LED

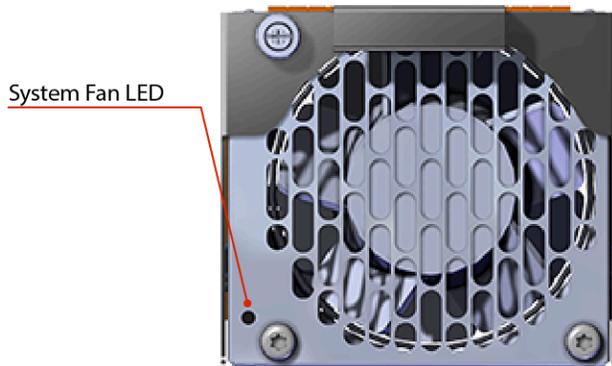


**Table 13:** PSU LED Flash Patterns

LED Name	Color	Behavior
Multi-function LED	Green	<b>Solid On:</b> PSU on and reporting no faults <b>Off:</b> PSU disconnected from power
	Amber	<b>Solid On:</b> PSU disconnected from power or critical fault, causing shutdown failure <b>Blink @ 1 Hz:</b> PSU reporting fault <b>Off:</b> PSU reporting no fault

**Fan Module LED**

**Figure 8:** Fan Module LED

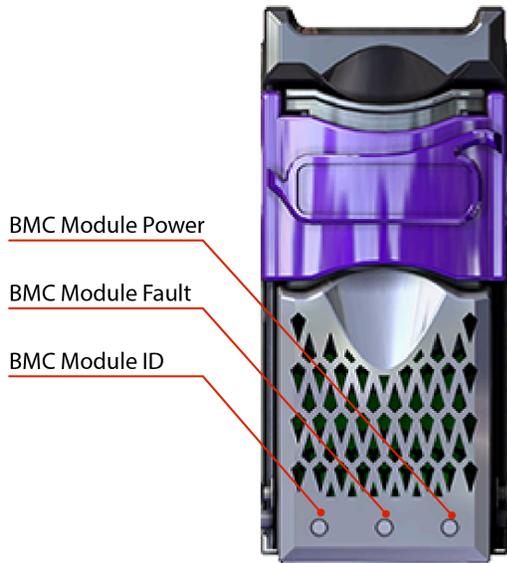


**Table 14:** Fan Module LED Flash Patterns

LED Name	Color	Behavior
LED	Amber	<b>Solid On:</b> Fan reporting fault <b>Blink @ 1 Hz:</b> Fan being identified <b>Off:</b> Fan on and reporting no fault

**BMC Module LEDs**

**Figure 9:** BMC Module LEDs

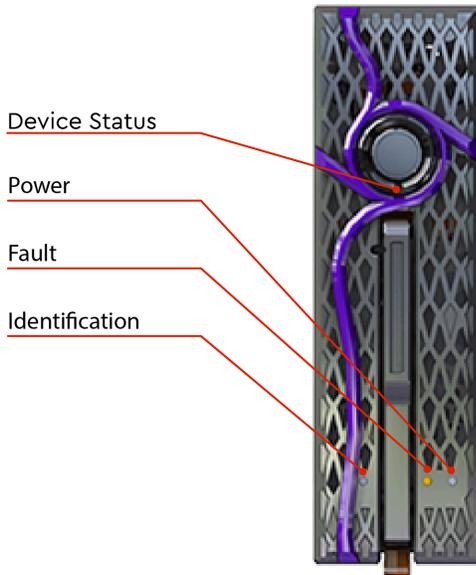


**Table 15:** BMC Module LED Flash Patterns

LED Name	Color	Behavior
Identification	Blue	<b>Blink @ 1 Hz:</b> BMC or <b>any</b> component being identified (fans, PSUs, etc.)
Fault	Amber	<b>Blink @ 2 Hz:</b> Enclosure reporting fault <b>Off:</b> Default State
Power	Green	<b>Solid:</b> Powered On

**OpenFlex F3x00 LEDs**

**Figure 10:** OpenFlex F3x00 LEDs



**Table 16:** OpenFlex F3x00 LED Flash Patterns

LED Name	Color	Behavior
Device Status	White	<b>Solid On:</b> Powered on and connected <b>Off:</b> Not ready or powered down
Power	Green	<b>Solid On:</b> Powered on <b>Off:</b> Powered down
Fault	Amber	<b>Solid On:</b> Device powered down <b>Blink @ 1 Hz:</b> Device reporting fault <b>Off:</b> Device has no fault
Identification	Blue	<b>Solid On:</b> Device shutting down or powering on <b>Blink @ 1 Hz:</b> Device being identified <b>Off:</b> Device not being identified

## 1.7.2 Cables

### Approved Power Cables

Type	Part Number	Length
IEC C14 to IEC C15 Heavy Duty 15A Power Cable	(Provided in Accessory Kit)	6 ft.



**Note:** The following Ethernet cables are compatible with the OpenFlex F3x00 and E3000 but are not provided by Western Digital.

**Table 17:** Compatible Passive Cables

Manufacturer	Model	Length	Speed
Mellanox	MCP1600-C001 Direct Attach Cable	1m	100Gb/s
	MCP1600-C002 Direct Attach Cable	2m	100Gb/s
	MCP1600-C002E26N Direct Attach Cable	2m	100Gb/s
	MCP1600-C002E30N Direct Attach Cable	2m	100Gb/s
	MCP1600-C003 Direct Attach Cable	3m	100Gb/s
	MCP7H00-G001 Direct Attach Splitter Cable	1m	2 x 50Gb/s
	MCP7H00-G003 Direct Attach Splitter Cable	3m	2 x 50Gb/s
Amphenol	NDARHG-0001 Direct Attach Cable	1m	100Gb/s
	NDARHG-0002 Direct Attach Cable	2m	100Gb/s
	NDARHG-0004 Direct Attach Cable	4m	100Gb/s
	NDARHJ-0003 Direct Attach Cable	3m	100Gb/s
	NDARHJ-0005 Direct Attach Cable	5m	100Gb/s

**Table 18:** Compatible Active Cables

Manufacturer	Model	Length	Speed
Mellanox	MFA1A00-C005 Active Optical Cable	5m	100Gb/s
	MFA7A20-C003 Active Optical Cable	3m	100Gb/s
	MFA7A20-C010 Active Optical Cable	10m	100Gb/s

## 1.8 Restrictions and Limitations

The OpenFlex F3x00 and E3000 have the following restrictions and limitations on functionality:

- The E3000 chassis must be full for proper airflow. If there is only one F3x00 storage device installed, the rest of the slots must be filled with device blanks.
- If the BMC Module is not installed in the E3000 chassis, F3x00 devices cannot be added or slot-swapped. In the absence of BMC Module, the LEDs may not function as designed.
- Only hot-swap a single device at a time. Never remove more than one at a time. Both PSUs must be functional in order to detect new hot-plugged F3x00s.
- The F3x00 storage device does not support RoCE v1; it supports RoCE v2 only.
- Powering on an F3x00 storage device must be accomplished through the E3000 chassis (via its GUI) that contains it, but powering off an F3x00 can be accomplished from the storage device itself (via its GUI).
- The F3x00 storage device data ports support IPv4 networking only.
- The E3000 chassis device management port supports both IPv4 and IPv6 networking.
- The E3000 chassis device does not support DNS configuration or administration.
- Only one browser session is allowed to an individual F3x00 storage device at a time.
- Enforced maximum limits on configuration:
  - 256 Volumes
  - 256 Hosts
  - 2048 Queue Pairs
  - 128 Queue Pairs (1 Admin, 127 IO) per connection
  - 64 max. queue depth per IO Queue Pair
  - 8 VLANs per F3x00 storage device

## 1.9 Site Requirements

### 1.9.1 Power Requirements

The E3000 is equipped with redundant power supply units. The PSUs are hot-swappable and are located at the rear of the chassis. The following is a power specification summary. Note that the system does not support low-line voltage.

**Table 19:** Power Specification Summary

Specification	Value
Power Output	1600W
Input Voltage	200V - 240V
80 PLUS Standard	Platinum
Connector Type	C16

### 1.9.2 Rack Requirements

The E3000 is designed to be installed into a rack that meets the EIA-310 standard with a minimum of 1000 mm (39.4 in.) of usable rack space, frame to frame. The vertical rack rails must be set between 718 mm (28.26 in.) – 850 mm (33.46 in.) to support the enclosure. It requires 3U of rack space, and it should be installed into the rack at the lowest possible U height to keep the load on the rack balanced.

**Table 20:** Required Rack Specifications

Parameter	Requirement
Rack Depth	1000 mm (39.4 in.) of usable rack space, frame to frame
Rack Width	450mm (17.72in.) with 465mm (18.31in.) ± 1.5mm nominal hole spacing. See EIA-310 Rack Standard
Rack Units (U)	3U
Vertical Rack Rail Spacing	718 mm (28.26 in.) – 850 mm (33.46 in.)
Static Load Rating	Rack meets ISTA 3E or 3B test requirements and regulations when mounted to the shipping pallet
Dynamic Load Rating	Rack meets ISTA 3E or 3B test requirements and regulations when mounted to the shipping pallet

### 1.9.3 Thermal and Cooling Requirements

The thermal output of the enclosure depends on the number of F3x00s that are populated in the E3000 chassis. Use the following table to determine how many BTUs of heat will exhaust from the rear of the unit.

**Table 21:** BTU Exhaust per Component

Condition	Typical BTU Output	Max BTU Output
Single E3000 with BMC Module	768 BTU/hr = 225 W (25C/77F, fans at 50%)	1177 BTU/hr = 345 W (35C/95F, fans at 100%)
Single F3x00	409 BTU/hr = 120 W (25C/77F, Workload: Random Read/Write, queue depth 32, 80% internal processors dedicated to workload)	546 BTU/hr = 160 W (35C/95F, Workload: Highest throughput to drives – Seq Write, queue depth 32, all internal processors at 100%)
E3000 Fully Populated with F3x00s	5244 BTU/hr = 1537 W (25C/77F, fans at 50%)	5884 BTU/hr = 1725 W (35C/95F, fans at 100%)

### 1.9.4 Installation and Servicing Requirements

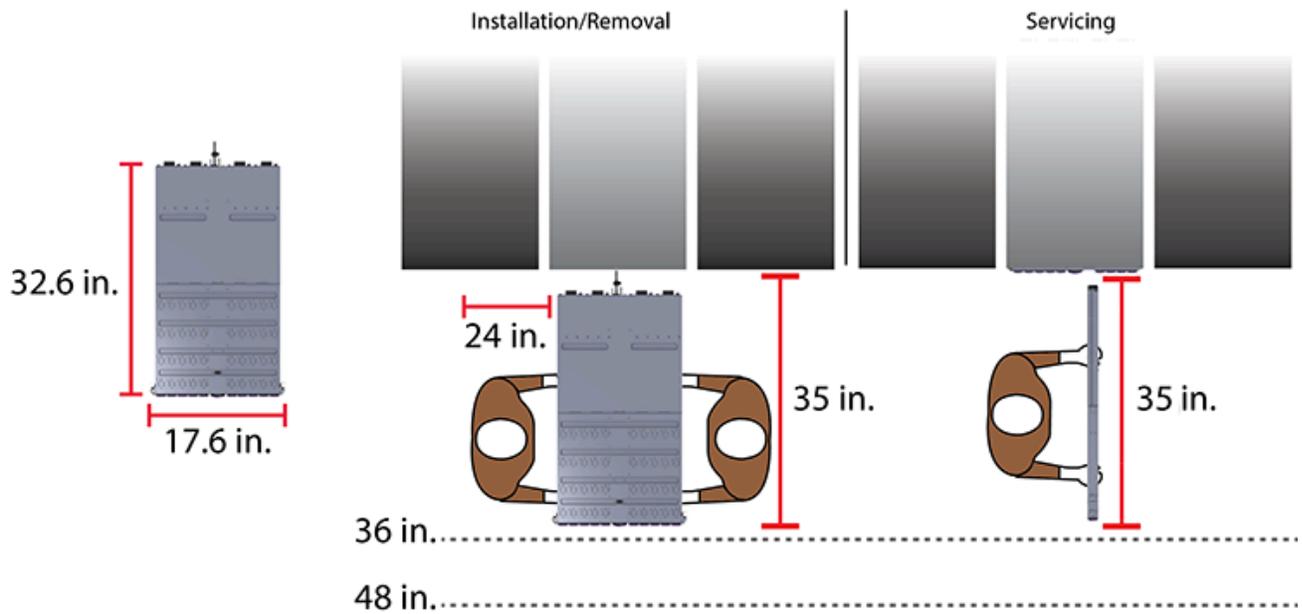
**Space Requirements**

Installation of the OpenFlex F3x00 and E3000 requires two people and enough space in front of the rack for a safe installation. The recommended forward clearance is 889 mm / 35 in. from the front of the rack and 609.6 mm / 24 in. on both sides of the enclosure. It is also recommended to make considerations for any carts or lift equipment that might be used to perform the installation.<sup>5</sup>

Servicing of the OpenFlex F3x00 and E3000 requires one person and a minimum of 889 mm / 35 in. of space in front of the rack to allow enough clearance to remove an F3x00 from the enclosure.

The following diagram provides measurement details for installation and servicing:

**Figure 11:** Installation and Servicing Space



5. The weight of the enclosure during installation will vary, depending on the number of F3x00 devices and blanks contained in the E3000. In some situations, carts or lift equipment may be required.



# Components

## In This Chapter:

- Chassis..... 21
- PSU.....22
- Fan Module.....23
- BMC Module.....24
- Rails.....25
- OpenFlex F3x00.....26
- OpenFlex E3000 Fabric Device Blank.....27
- List of Field/Customer Replaceable Units..... 28

## 2.1 Chassis

The OpenFlex E3000 chassis is the primary housing that contains and connects all of the system components that comprise the OpenFlex F3x00 and E3000. The chassis contains ten device slots and one BMC Module slot on the front, and the rear contains slots for the redundant PSUs and four Fan Modules. The OpenFlex F3x00 and E3000 is installed and secured onto shelf style rail mounts. The rear IO houses the primary connections such as power and QSFP28 ports and the status LEDs for all of the components.

### 2.1.1 Chassis Specifications



**Table 22:** Chassis Specification Summary

Specification	Value
Rack Units	3U
Number of Device Slots	10
Number of BMC Slots	1
Part Number	1EX1919
Hot Swappable?	No
Dimensions	<b>W:</b> 447.2 mm x <b>L:</b> 828.04 mm x <b>H:</b> 130.9 mm  <b>W:</b> 17.6 in. x <b>L:</b> 32.6 in. x <b>H:</b> 5.2 in.
Weight	17.32 kg / 38.2 lbs

## 2.2 PSU

The OpenFlex E3000 chassis contains toolless redundant 1600W Power Supply Units (PSU). Each PSU requires an input voltage of between 200V - 240V. The PSUs are certified 80 PLUS Platinum and use the C16 connector type. Due to the redundant nature of the PSUs, they may be serviced or replaced, one at a time, while the enclosure is powered on.

### 2.2.1 PSU Specifications



**Table 23:** PSU Specification Summary

Specification	Value
Power Output	1600W
Input Voltage	200V - 240V
80 PLUS Standard	Platinum
Connector Type	C16
Internal Fan Speed	Up to 25,000 RPM
Number per Enclosure	2
Part Number	1EX1916
Hot Swappable?	Yes
Service Window	5 minutes
Dimensions	<b>W:</b> 54.5 mm x <b>L:</b> 321.5 mm x <b>H:</b> 40.1 mm <b>W:</b> 2.15 in. x <b>L:</b> 12.66 in. x <b>H:</b> 1.58 in.
Weight	1.05 kg / 2.31 lbs.

## 2.3 Fan Module

The OpenFlex E3000 contains four toolless Fan Modules to maintain the cooling across the entire system. The Fan Modules are connected to the rear of the Chassis using a handle to seat the module in place and a captive screw to secure the Fan Module into the fan bay. Due to the redundant nature of the Fan Modules, they may be serviced or replaced, one at a time, while the enclosure is powered on. The Fan Modules will accelerate to the maximum RPM while the BMC Module or devices are removed during servicing or replacement.

### 2.3.1 Fan Module Specifications



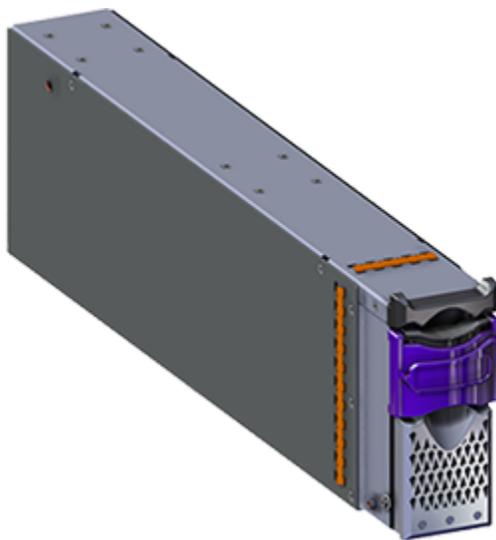
**Table 24:** Fan Module Specification Summary

Specification	Value
Rated Voltage	12V
Fan Speed	12000 RPM
Acoustics	76 dB measured at 1 meter from the fan inlet
Number per Enclosure	4 Fan Modules containing two rotors per module
Part Number	1EX1915
Hot Swappable?	Yes
Service Window	5 minutes
Dimensions	<b>W:</b> 92.74 mm x <b>L:</b> 127.2 mm x <b>H:</b> 85.2 mm <b>W:</b> 3.65 in x <b>L:</b> 5.01 in x <b>H:</b> 3.35 in
Weight	0.8 kg / 1.76 lbs.

## 2.4 BMC Module

The OpenFlex E3000 contains a toolless BMC Module that is installed into the center slot at the front of the Chassis. The BMC Module is accessed using a 1G Ethernet management RJ45 port on the rear IO of the Chassis. The BMC Module enables out of band management (OOBM) using a RESTful interface (via HTTP or HTTPS). OOBM controls the actions between devices and the BMC Module for powering down, setting system configurations, and the cooling algorithm for the Fan Modules. The BMC Module may be serviced or replaced while the enclosure is powered on as long as it is replaced within five minutes of removing it from the slot.

### 2.4.1 BMC Module Specifications



**Table 25:** BMC Module Specification Summary

Specification	Value
Input Current	2A Maximum
Input Power	25W
Rated Voltage	12V +/- 10%
Number per Enclosure	1 installed in the center device slot
Part Number	1EX1917
Hot Swappable?	Yes
Service window	5 minutes
Dimensions	<b>W:</b> 55.6 mm x <b>L:</b> 459.12 mm x <b>H:</b> 126.94 mm <b>W:</b> 2.19 in x <b>L:</b> 18.08 in x <b>H:</b> 5 in
Weight	1.48 kg / 3.26 lbs.

## 2.5 Rails

The E3000 is installed onto shelf style rails. The rail length can be adjusted between 850.31 mm / 33.47 in (max) and 693.69 mm / 27.31 in. (min) in order to fit into different vertical rack rail settings. Once the enclosure is installed onto the rails, it may be secured to the rails using the provided M5 screws.

### 2.5.1 Rails Specifications



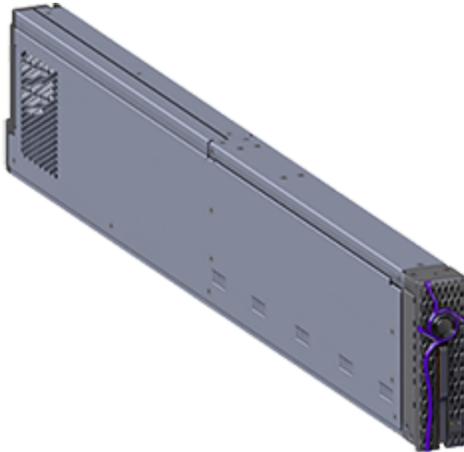
**Table 26:** Rails Specification Summary

Specification	Value
Length	693.69 mm / 27.31 in. (min) 850.31 mm / 33.47 in (max)
Part Number	1EX2198
Hot Swappable?	No
Dimensions	<b>W:</b> 34.4 mm x <b>L:</b> 693.69 mm x <b>H:</b> 89.65 mm <b>W:</b> 1.35 in. x <b>L:</b> 27.31 in. x <b>H:</b> 3.53 in.
Weight	5.08 kg / 11.2 lbs (both rails)

## 2.6 OpenFlex F3x00

The F3x00 is a fabric device that contains a maximum of 61.4TB of raw data storage capacity per device. The device supports Open Composable Infrastructure (OCI) through storage disaggregation using NVMe-over-Fabrics (NVMe-oF). The front of the F3x00 contains a button latch release system and status LEDs, and the rear contains the device connector.

### 2.6.1 OpenFlex F3x00 Specifications



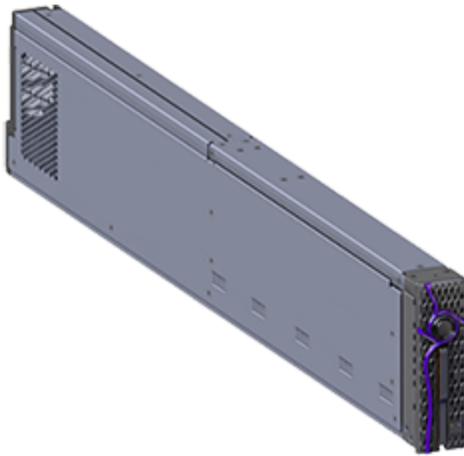
**Table 27:** OpenFlex F3x00 Specification Summary

Specification	Value
Max Raw Data Storage Capacity per device	61.4 TB
Data Ingest Capability	2x 50G Ethernet (see <a href="#">System High Speed Data Ingest Architecture (page 5)</a> )
Data Transfer Rates	12 GBps
Number per enclosure	Up to 10
Part Numbers	See <a href="#">Supported SKUs (page 4)</a> to find the specific part number required.
Hot Swappable?	Yes
Service Window	5 minutes
Dimensions	<b>W:</b> 37.53 mm x <b>L:</b> 694.4 mm x <b>H:</b> 124.11 mm <b>W:</b> 1.48 in x <b>L:</b> 27.34 in x <b>H:</b> 4.89 in
Weight	4.44 kg / 9.8 lbs

## 2.7 OpenFlex E3000 Fabric Device Blank

The OpenFlex E3000 chassis may contain up to 9 E3000 Fabric Device Blanks<sup>6</sup>. The chassis must contain at least one device, and the remaining slots must be populated with either devices or device blanks to avoid compromising the cooling of the enclosure. Each E3000 Fabric Device Blank may be replaced with a device as the enclosure is scaled up. The E3000 Fabric Device Blank may be serviced or replaced one at a time while the enclosure is powered on.

### 2.7.1 E3000 Fabric Device Blank Specifications



**Table 28:** E3000 Fabric Device Blank Specification Summary

Specification	Value
Number per enclosure	Up to 9
Part Number	1EX1918
Hot Swappable?	Yes
Service Window	5 minutes
Dimensions	<b>W:</b> 37.53 mm x <b>L:</b> 694.4 mm x <b>H:</b> 124.11 mm <b>W:</b> 1.48 in x <b>L:</b> 27.34 in x <b>H:</b> 4.89 in
Weight	1.87 kg / 4.12 lbs.

6. The form factor of the fabric device blank is compatible with all F-Series devices.

## 2.8 List of Field/Customer Replaceable Units

---

The following table lists the replaceable components and their part numbers.

**Table 29:** List of Field/Customer Replaceable Components

Component	Part Number
Chassis	1EX1919
PSU	1EX1916
Fan Module	1EX1915
BMC Module	1EX1917
Rails	1EX2198
Accessory Kit	1EX2199
E3000 Fabric Device Blank	1EX1918
OpenFlex F3x00 Fabric Device	See <a href="#">Supported SKUs (page 4)</a>

# Management

**In This Chapter:**

- OCGUI.....30
- Part Replacement..... 113



## 3.1 OCGUI

### 3.1.1 Compatible Browsers

The OCGUI is compatible with the following web browsers.

**Table 30:** OCGUI Browser Compatibility

Browser	Version
Google Chrome	71.0.3578.98 and higher
Mozilla Firefox	40.15063.674.0 and higher
Microsoft Edge	60.5.0 and higher



**Note:** The OCGUI is not compatible with Internet Explorer.

### 3.1.2 Login Page

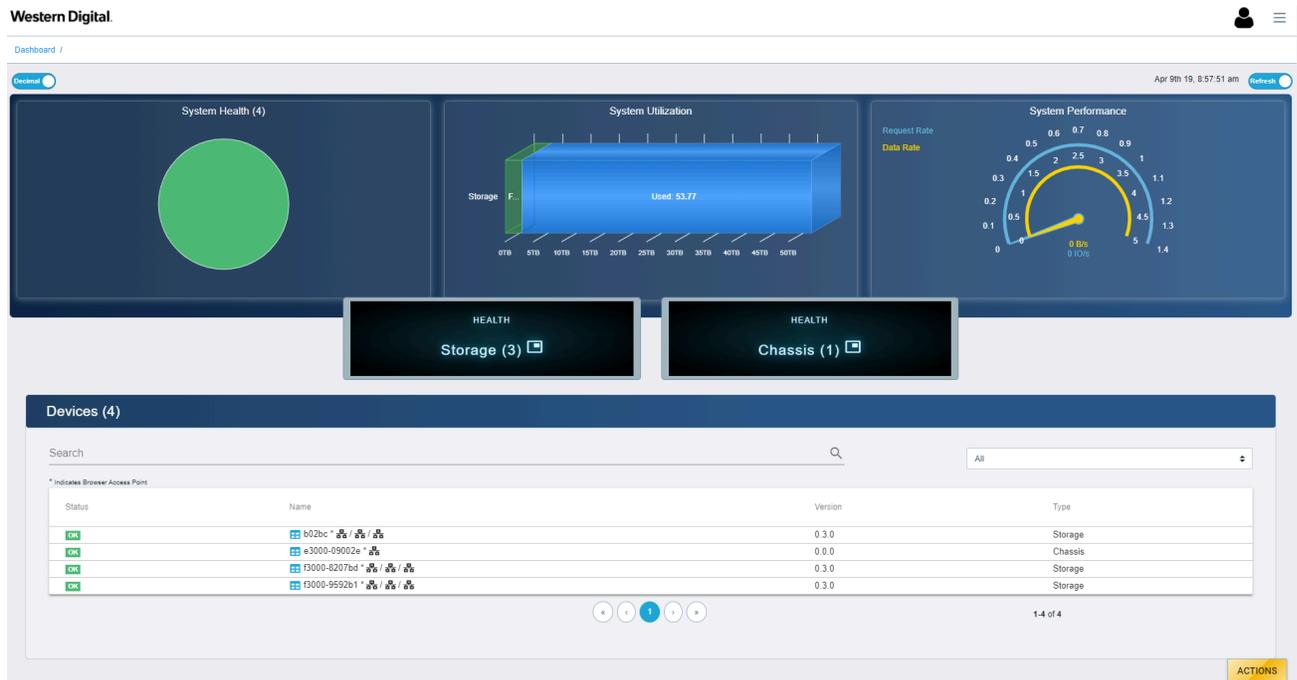
The screenshot displays two panels on the login page. The left panel, titled 'Login - E3000-0900F5', includes a 'Sign In to your account' header, input fields for 'Username' and 'Password', and a 'Login' button. The right panel, titled 'Login ?', contains the message 'You will need to login first to access the system.' Below this is a grey box with the device ID 'E3000-0900F5' and a green box listing device details: Type - Chassis, ID - 000cca0900f5, Device OS Version - 1.1.0, Manufacturer - Western Digital Corporation, Model - OpenFlex E3000, and Status - OK. At the bottom of the right panel, it shows the date and time 'May 19th 20, 12:45:07 pm' and the copyright notice '© 2020 Western Digital Corporation'.

The login page displays two panels. The left panel provides **username** and **password** fields for logging into the device. The right panel lists basic information about the device itself, including its type, status, and OS version.



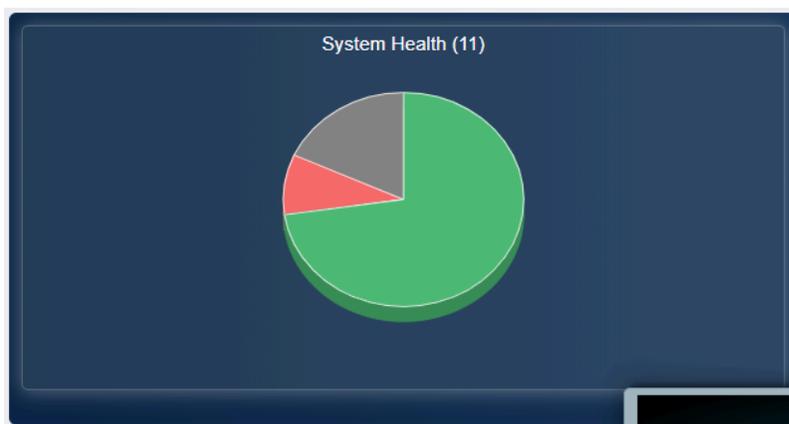
**Note:** For instructions on navigating to the login page, see [Navigating to a Device \(page 50\)](#).

### 3.1.3 Dashboard



The **Dashboard** is the first page that will load when one logs into any of the fabric-attached devices. It provides vital statistics on the health and performance of all devices on the subnet configured on the BMC. In addition, it provides a clickable list that allows users to navigate to the device page for any device on the subnet.

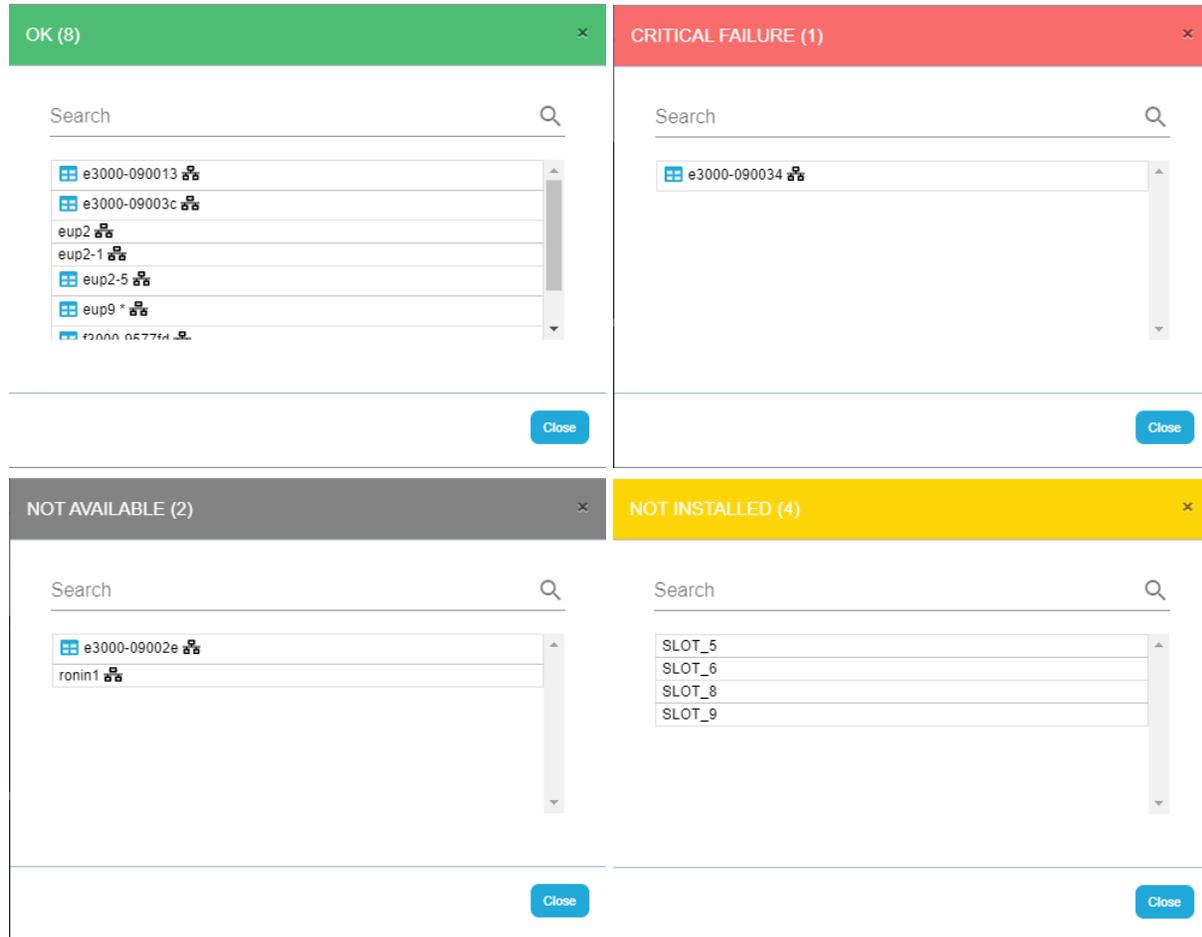
#### 3.1.3.1 System Health



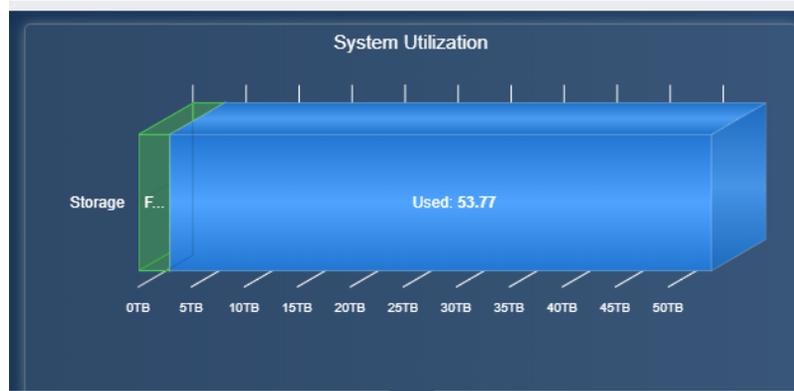
The **System Health** section provides an overview of the health of the fabric network. The interfaces of all devices on the same subnet as the chassis's BMC and Storage devices are queried when the page loads, and the pie chart is updated with their responses. If fabric devices respond with errors or faults, the system health chart will update accordingly.

**Figure 22:** System Health States

The **System Health** pie chart contains segments for grouping fabric devices by their health states. Clicking on a segment will bring up a modal window that provides a summary of the devices in that state. The following is a sampling of modal windows:



### 3.1.3.2 System Utilization



The **System Utilization** section displays the total, free, and used storage on the fabric in TB.

### 3.1.3.3 System Performance



The **System Performance** section provides general, bitwise system performance information for all devices on the fabric.

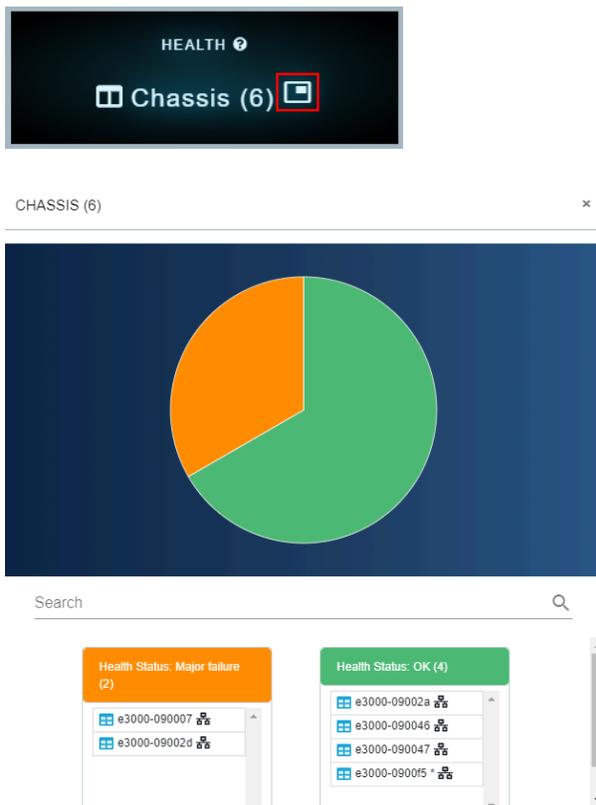
### 3.1.3.4 Storage Health

The figure shows the "Storage Health" section. At the top, a "HEALTH" indicator is shown with a green status and a "Storage (3)" label. Below this, a detailed view of "STORAGE (3)" is shown, featuring a large green circle indicating a healthy status. A search bar is located below the circle. At the bottom, a list of storage devices is displayed with a green header "Health Status: OK (3)".

Health Status: OK (3)	
eup2-1	OK
f3000-82260d *	OK
f3000-958cd5 *	OK

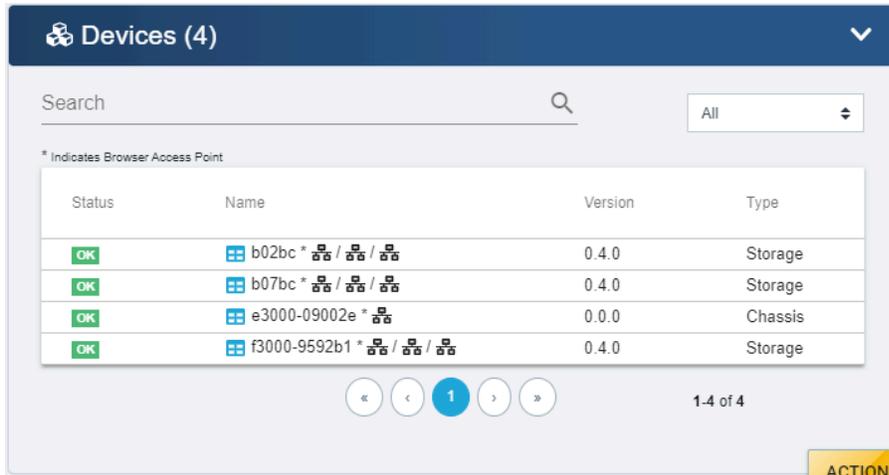
The **Storage Health** modal provides an overview of the health of all storage devices visible on the fabric (those in the subnets of what is configured on the chassis's BMC and storage devices). The modal provides separate tables for fabric devices that are presenting different health states up to the OCGUI.

### 3.1.3.5 Chassis Health



The **Chassis Health** modal provides an overview of the health of all chassis devices visible on the fabric (those in the subnets of what is configured on the chassis's BMC and storage devices). This status comes from the BMC module installed in the chassis. The modal provides separate tables for fabric devices that are presenting different health states up to the OCGUI.

### 3.1.3.6 Devices



Devices (4)

Search

\* Indicates Browser Access Point

Status	Name	Version	Type
OK	b02bc *  /  / 	0.4.0	Storage
OK	b07bc *  /  / 	0.4.0	Storage
OK	e3000-09002e * 	0.0.0	Chassis
OK	f3000-9592b1 *  /  / 	0.4.0	Storage

« < 1 > » 1-4 of 4

ACTIONS

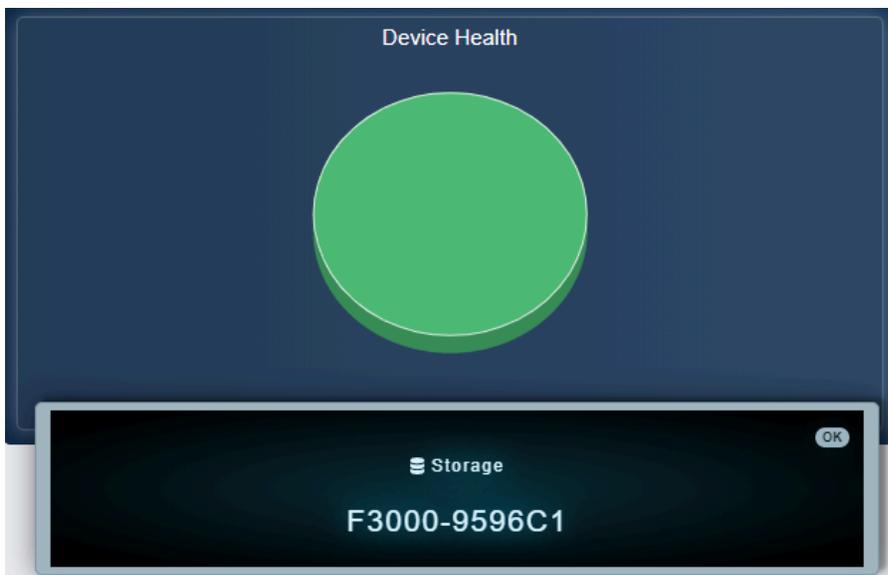
The **Devices** list provides summary details about all devices visible on the fabric. Users can also link to the device page for the OpenFlex device of their choosing for management purposes. Vital information is provided, such as the version of firmware code loaded on each device, the type of device that was discovered, and the UUID. This list will be updated with each refresh of the page, as a query command is sent across the fabric network to discover OpenFlex devices. The search field—located at the top of the devices list—allows for users to access specific devices without having to review the list for specific devices or device configurations.

### 3.1.4 Storage Device Page



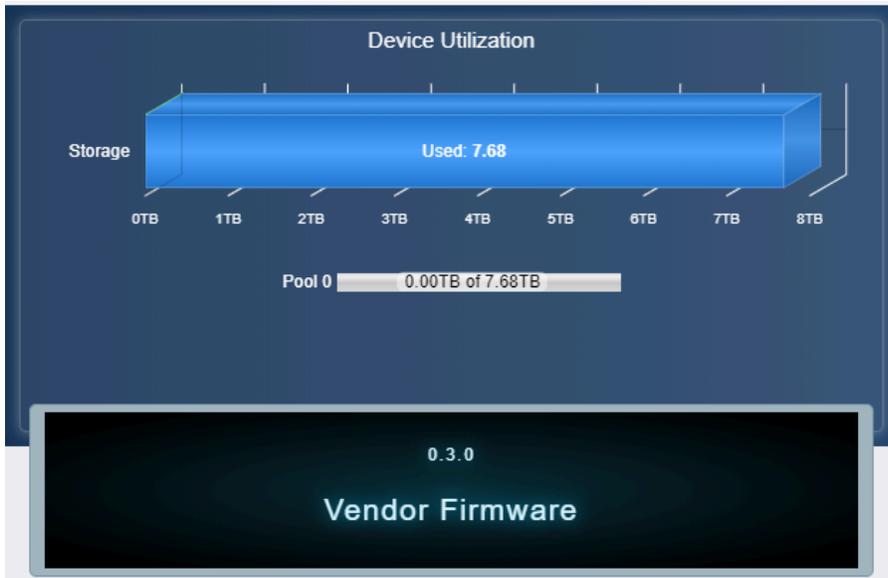
The storage device page presents all of the vital information related to a specific storage resource.

#### 3.1.4.1 Storage Device Health



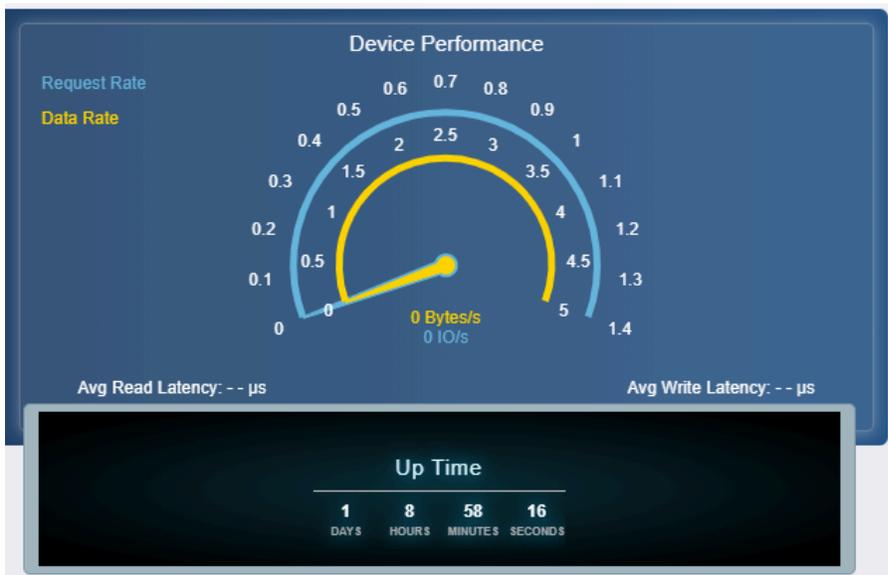
The storage **Device Health** section provides a visual summary of the health of pools and volumes on the device.

#### 3.1.4.2 Storage Device Utilization



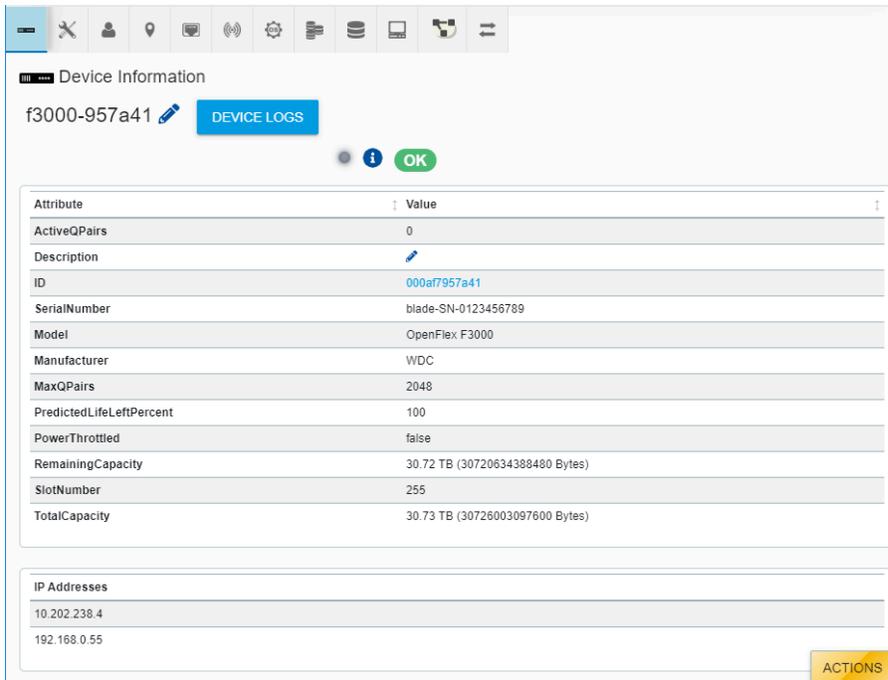
The storage **Device Utilization** section provides a visual summary of the available and used storage on the device.

### 3.1.4.3 Storage Device Performance



The storage **Device Performance** section provides a visual summary of the current IO performance of the device.

### 3.1.4.4 Storage Device Information



Device Information

f3000-957a41 [DEVICE LOGS](#)

[i](#) [OK](#)

Attribute	Value
ActiveQPairs	0
Description	<a href="#">✎</a>
ID	000af7957a41
SerialNumber	blade-SN-0123456789
Model	OpenFlex F3000
Manufacturer	WDC
MaxQPairs	2048
PredictedLifeLeftPercent	100
PowerThrottled	false
RemainingCapacity	30.72 TB (30720634388480 Bytes)
SlotNumber	255
TotalCapacity	30.73 TB (30726003097600 Bytes)

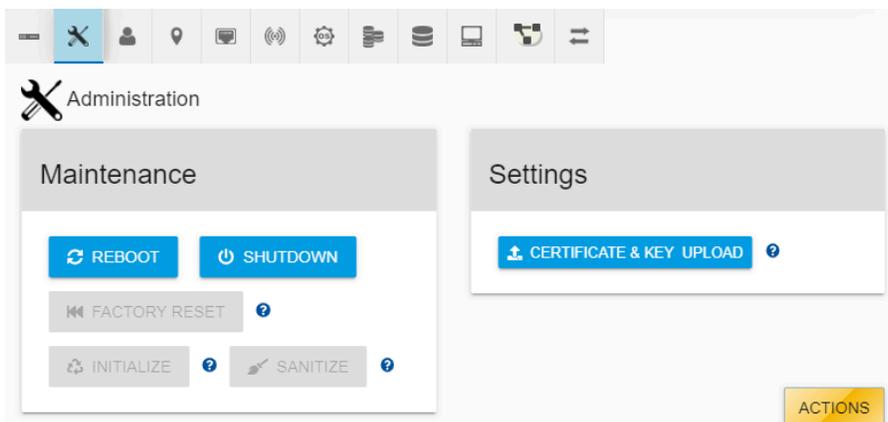
IP Addresses

10.202.238.4
192.168.0.55

[ACTIONS](#)

The storage **Device Information** section provides information about the device itself, such as the ID, Serial Number, and performance statistics.

### 3.1.4.5 Storage Administration



Administration

**Maintenance**

[REBOOT](#) [SHUTDOWN](#)

[FACTORY RESET](#) [?](#)

[INITIALIZE](#) [?](#) [SANITIZE](#) [?](#)

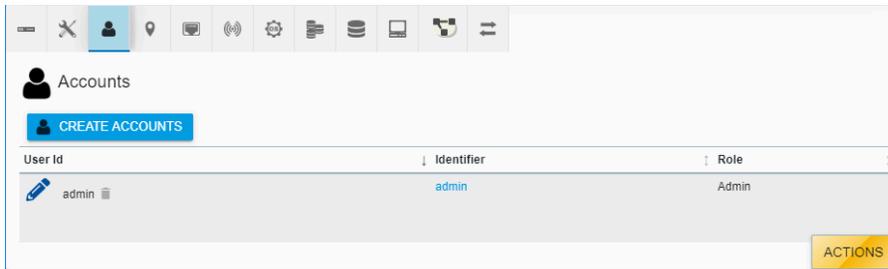
**Settings**

[CERTIFICATE & KEY UPLOAD](#) [?](#)

[ACTIONS](#)

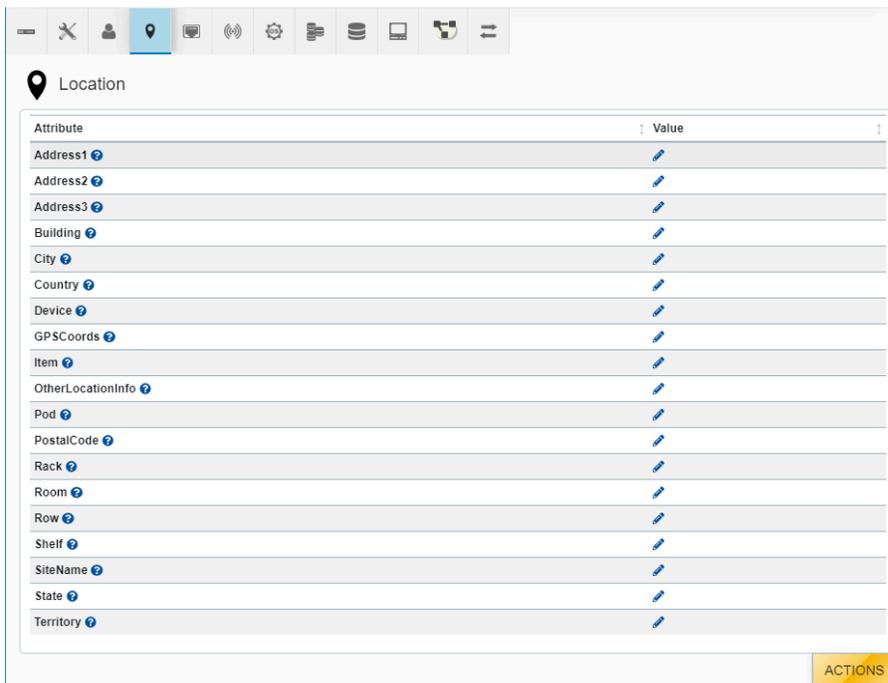
The storage device's **Administration** section allows system administrators to perform important management functions to the device.

### 3.1.4.6 Storage Accounts



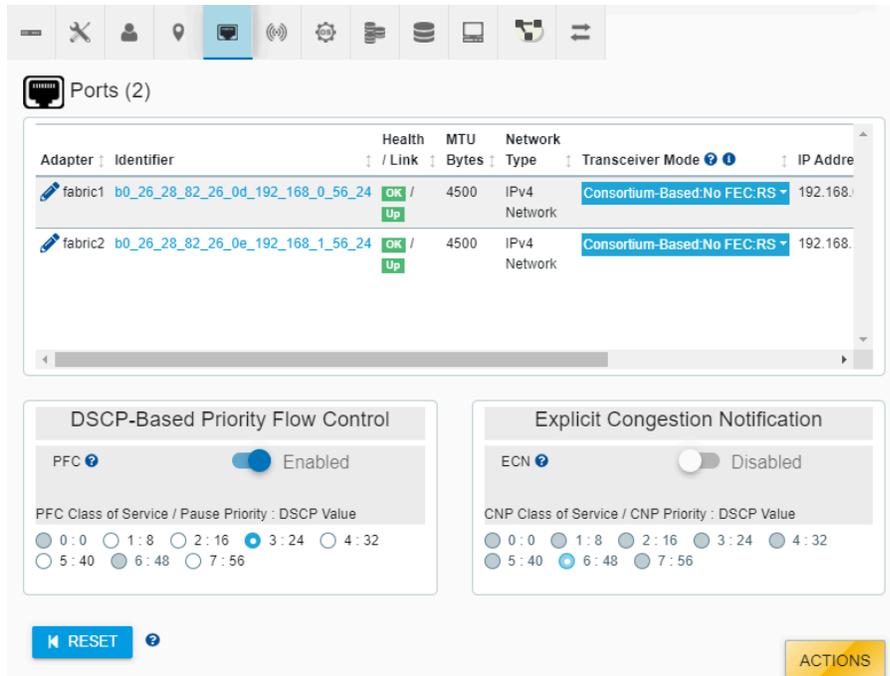
The storage device's **Accounts** section provides a list of all accounts that can access the device.

### 3.1.4.7 Storage Location



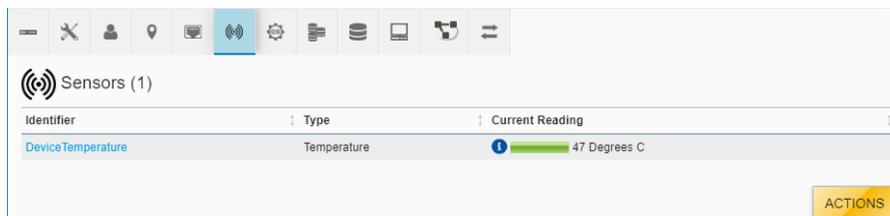
The storage device's **Location** section provides information about the physical location of the device.

### 3.1.4.8 Storage Ports



The storage device's **Ports** section provides access to the networking settings for the ports that exist on the device.

### 3.1.4.9 Storage Sensors



The storage device's **Sensors** section lists all the sensors present on the device hardware and reports the readings from those sensors.

### 3.1.4.10 Storage Device OS



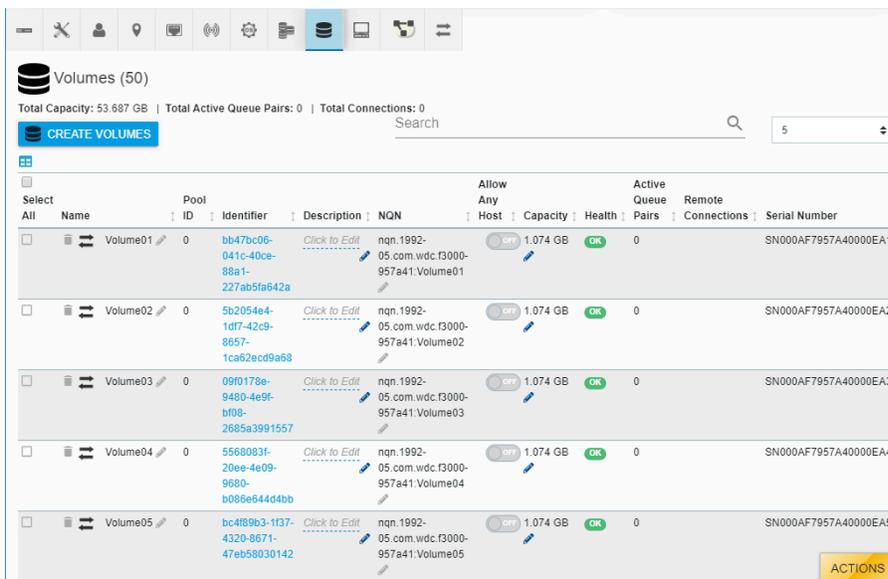
The storage **Device OS** section displays the device's firmware version and can be used to upgrade firmware.

### 3.1.4.11 Storage Pools



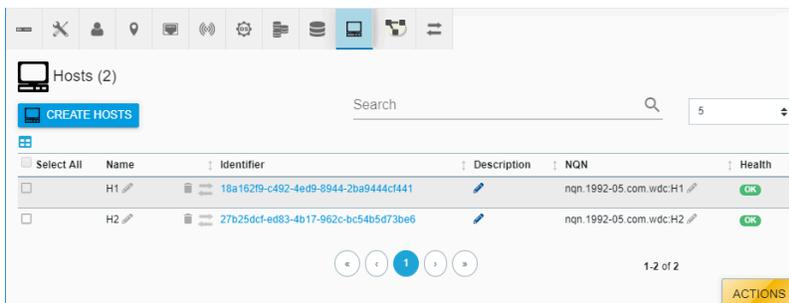
The storage device's **Pools** section shows all of the pools configured on the storage device. The number of pools can be set to 1, 2, 4, or 8.

### 3.1.4.12 Storage Volumes



The storage device's **Volumes** section displays all of the volumes configured on the device and allows for volumes to be added, modified, or deleted.

### 3.1.4.13 Storage Hosts



The storage device's **Hosts** section provides information on the hosts that are available to be connected to storage and allows configuration of those hosts on the fabric.

### 3.1.4.14 Storage VLANs

The screenshot displays the 'VLANs (1 of 8)' section. A 'CREATE VLANs' button is visible at the top left. Below it is a search bar. The main area contains a table with the following data:

Select	Tag	Identifier	IPv4Address	Port	Health
<input type="checkbox"/>	fabric1.2	d26b2a5d-75ea-4d48-815d-1187a080814c	192.168.2.255/24	FABRIC1	OK

At the bottom right, there is a '1-1 of 1' indicator and an 'ACTIONS' button.

The storage device's Virtual LANs (**VLANs**) section displays all of the VLANs that have been created on the device and allows for VLANs to be created, modified, or deleted.

### 3.1.4.15 Storage Paths

The screenshot displays the 'Paths (4)' section. A search bar is present with the number '5' in a dropdown. The table below lists the paths:

Select	Identifier	Health	Volume NQN	Host NQN	VLAN
<input type="checkbox"/>	78f27ba1-ec9-4f81-a2b9-e5d6c3e9ec78e71db812-47ad-4e49-892e-a60d48ef7b09	OK	nqn.1992-05.com.wdc.b260c.vol1		fabric2.3
<input type="checkbox"/>	cd958cae-d7a4-44cc-a772-73833dd08148712578aa-b36f-44fe-aaf7-3b4da3528392	OK	nqn.1992-05.com.wdc.b260c.vol2	nqn.1992-05.com.wdc.test1	
<input type="checkbox"/>	c02428b1-170e-4cbf-9a44-2677f65a5e20f1656e72-a40d-4d7d-a766-49a0a20d1253	OK	nqn.1992-05.com.wdc.b260c.vol3		fabric2.2
<input type="checkbox"/>	35bf8f84-7e46-4170-91fe-f89f2f6ab7133d4cc02-8e2b-4dc2-8726-c3cfc32a9745	OK	nqn.1992-05.com.wdc.b260c.vol4	nqn.1992-05.com.wdc.test2	

At the bottom, there is a pagination control showing '1' of 4 and an 'ACTIONS' button.

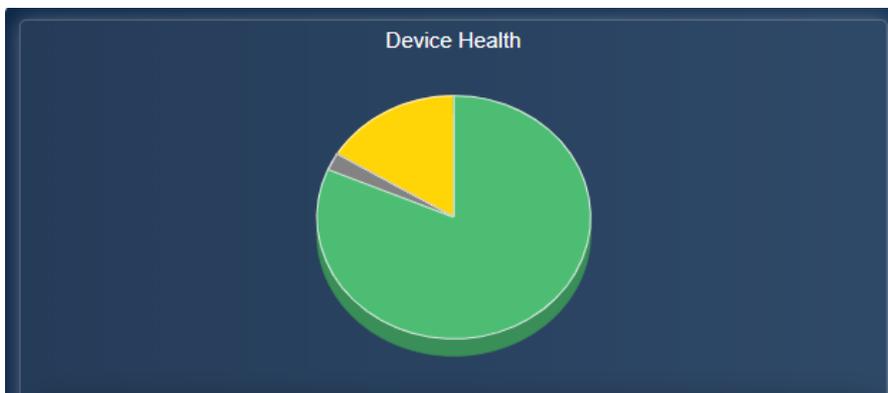
The storage device's **Paths** section lists all of the current paths available to the storage volumes. Paths connect storage volumes to hosts and VLANs.

## 3.1.5 Chassis Device Page



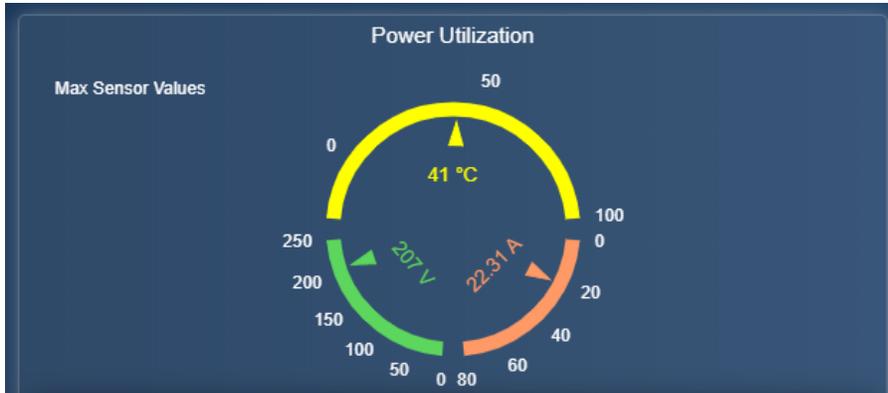
The chassis device page presents all of the vital information related to a specific chassis resource.

### 3.1.5.1 Chassis Device Health



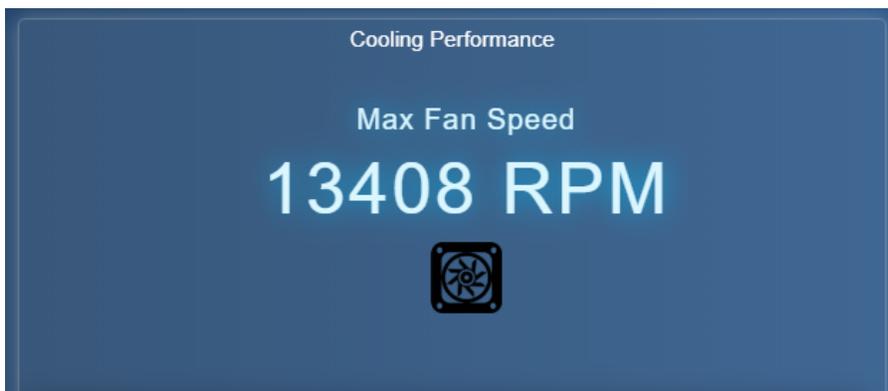
The chassis's **Device Health** section shows a visual summary of the general health of devices on the network.

### 3.1.5.2 Chassis Power Utilization



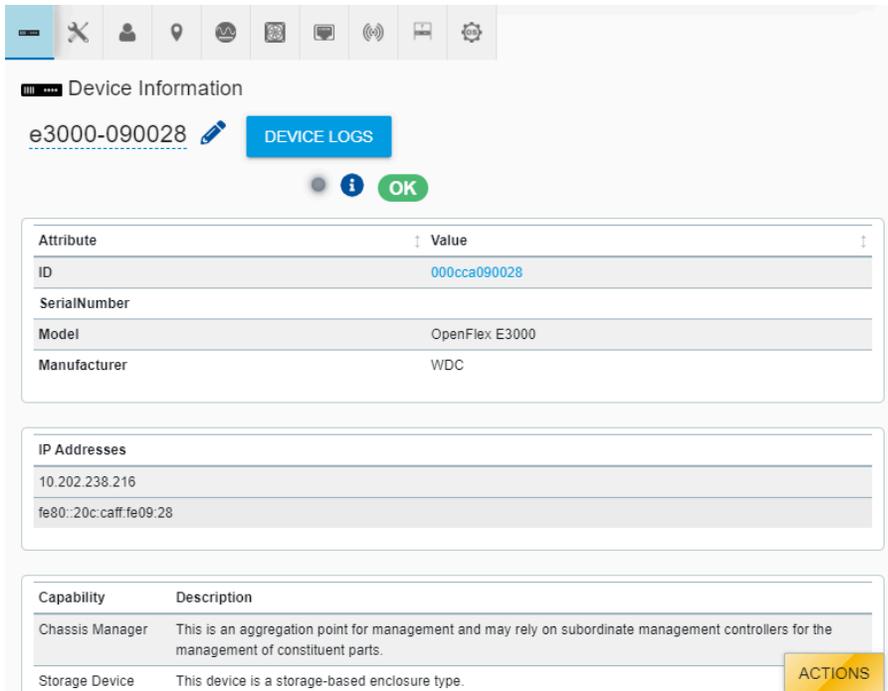
The chassis's **Power Utilization** section gives a summary of the sensor data that is being reported by the power supplies. Charts display the current amps and volts being consumed by the system, as well as the temperature.

### 3.1.5.3 Chassis Cooling Performance



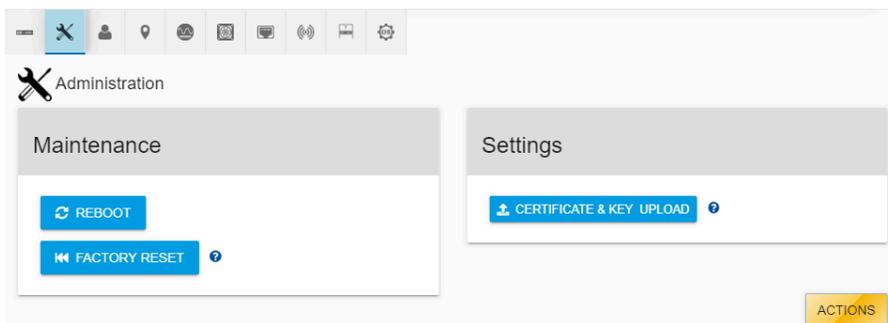
The chassis's **Cooling Performance** section displays the current RPMs at which the onboard cooling fans are operating.

### 3.1.5.4 Chassis Device Information



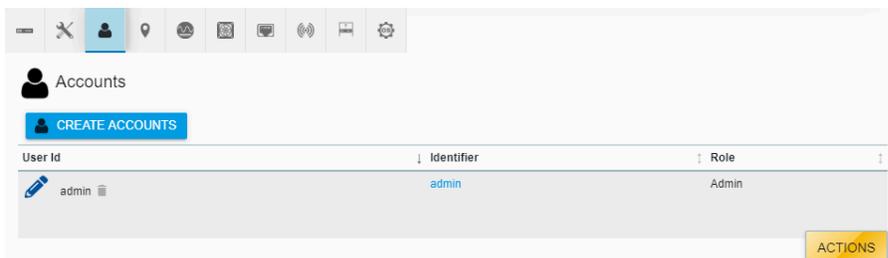
The chassis's **Device Information** section provides information about the device itself, such as the ID and Serial Number.

### 3.1.5.5 Chassis Administration



The chassis's **Administration** section provides access to maintenance and system administration functions.

### 3.1.5.6 Chassis Accounts



The chassis's **Accounts** section provides a list of all the accounts that can access the device.

### 3.1.5.7 Chassis Location

Location

Attribute	Value
Address1	
Address2	
Address3	
Building	
City	
Country	
Device	
GPSCoords	
Item	
OtherLocationInfo	
Pod	
PostalCode	
Rack	
Room	
Row	
Shelf	
SiteName	
State	
Territory	

ACTIONS

The chassis's **Location** section provides information regarding the physical location of the device.

### 3.1.5.8 Chassis Power Supplies

Power Supplies (2)

Identifier	Health	Details	Removal Conditions
POWER_SUPPLY_A_fwrev_00012200_maxpower_0x0640_1600_pn_DPS-1600AB-23_A_sectfwrev_56303432_sn_IUBD7CS905Y23_A	OK		Removable when on or off
POWER_SUPPLY_B_fwrev_00012400_maxpower_0x0640_1600_pn_DPS-1600AB-23_A_sectfwrev_56303432_sn_IUBD87H00BX23_A	OK		Removable when on or off

ACTIONS

The chassis's **Power Supplies** section provides health and status information of the power supplies installed in the device.

### 3.1.5.9 Chassis Fans

**Fans (10)**

Identifier	Current Speed	Health	Locator LED	Removal Conditions
FAN_ENCL_0	11856 RPM	OK	●	Removable when on or off
FAN_ENCL_1	11104 RPM	OK	●	Removable when on or off
FAN_ENCL_2	11856 RPM	OK	●	Removable when on or off
FAN_ENCL_3	11184 RPM	OK	●	Removable when on or off
FAN_ENCL_4	11952 RPM	OK	●	Removable when on or off
FAN_ENCL_5	11104 RPM	OK	●	Removable when on or off
FAN_ENCL_6	11904 RPM	OK	●	Removable when on or off
FAN_ENCL_7	11152 RPM	OK	●	Removable when on or off
FAN_PSU_A	13344 RPM	OK	●	Removable when on or off
FAN_PSU_B	13344 RPM	OK	●	Removable when on or off

**ACTIONS**

The chassis's **Fans** section shows the status and health of all the fans installed in the device (2 rotors per Fan Module, plus 2 PSU fans).

### 3.1.5.10 Chassis Ports

**Ports (2)**

Adapter	Identifier	Health	MTU Bytes	Network Type	IP Address	IP Gateway	MAC Address	Address Origin
eth1	00_0c_ca_09_00_f5_10_202_238_70_22	OK	1500	IPv4 Network	10.202.238.70/22	10.202.236.1	00:0c:ca:09:00:f5	DHCPv4
eth1	00_0c_ca_09_00_f5_fe80_20c_caff_fe09_f5_64	OK	1500	IPv6 Network	fe80:20c:caff:fe09:f5:64		00:0c:ca:09:00:f5	Link Local
eth1	<Click to Assign a Global IPv6 Address>	Unknown	1500	IPv6 Network			00:0c:ca:09:00:f5	STATIC

**ACTIONS**

The chassis's **Ports** section provides access to the networking settings for the ports that exist on the device.

### 3.1.5.11 Chassis Sensors

Identifier	Type	Current Reading	Health
TEMP_BACKPL_LT	Temperature	31 Degrees C	OK
TEMP_BACKPL_RT	Temperature	31 Degrees C	OK
TEMP_PSU_A_AMB	Temperature	52 Degrees C	OK
TEMP_PSU_A_HOT	Temperature	61 Degrees C	OK
TEMP_PSU_A_PRI	Temperature	28 Degrees C	OK
TEMP_PSU_B_AMB	Temperature	45 Degrees C	OK
TEMP_PSU_B_HOT	Temperature	58 Degrees C	OK
TEMP_PSU_B_PRI	Temperature	47 Degrees C	OK
TEMP_BMC_IN	Temperature	22 Degrees C	OK
TEMP_BMC_OUT	Temperature	26 Degrees C	OK
VOLT_PSU_A_AC_IN	Voltage	206.50 Volts	OK
VOLT_PSU_A_12V_O	Voltage	12.01 Volts	OK
VOLT_PSU_B_AC_IN	Voltage	206.50 Volts	OK
VOLT_PSU_B_12V_O	Voltage	11.99 Volts	OK
VOLT_BMC_12V_IN	Voltage	12.12 Volts	OK
VOLT_BMC_12V_OUT	Voltage	12.21 Volts	OK
CURR_PSU_A_IN	Current	1.31 Amps	OK
CURR_PSU_A_OUT	Current	20.68 Amps	OK
CURR_PSU_B_IN	Current	1.20 Amps	OK
CURR_PSU_B_OUT	Current	18.56 Amps	OK
CURR_BMC_12V_OUT	Current	0.37 Amps	OK

The chassis device's **Sensors** section lists all the sensors present on the chassis hardware and reports the readings from those sensors.

### 3.1.5.12 Chassis Slots

Device Actions	Identifier	Health
POWER ON	b260c_slot_0_id_b0262882260d_sn_THCLS04614PS0193	OK
POWER ON	b8cd4_slot_1_id_000af7958cd5_sn_THCLS04614PS0193	OK
	SLOT_2_slot_2	Not installed
	SLOT_3_slot_3	Not installed
	SLOT_4_slot_4	Not installed
	SLOT_5_slot_5	Not installed
	SLOT_6_slot_6	Not installed
	SLOT_7_slot_7	Not installed
	SLOT_8_slot_8	Not installed
	SLOT_9_slot_9	Not installed

The chassis's **Slots** section provides information about the devices installed in each slot.

### 3.1.5.13 Chassis Device OS



The chassis's **Device OS** section displays the firmware version and can be used to upgrade firmware.

## 3.1.6 Basic Operational Functions

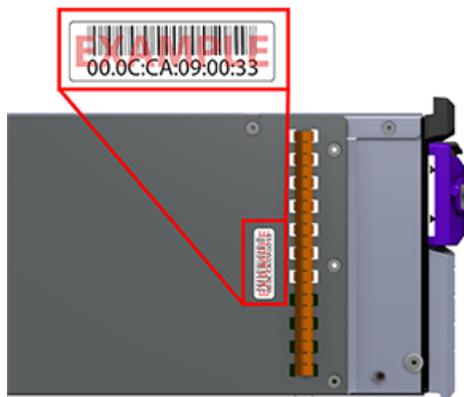
This section provides instructions for basic operational functions that the user is likely to perform during the initial operation of the OpenFlex F3x00 and E3000, such as checking the system health, creating a user account, etc.

### 3.1.6.1 Navigating to a Device

This task provides instructions for using the OCGUI to navigate to a device's dashboard through any other fabric-connected device.

**Before you begin:** The BMC's MAC address is listed on a label affixed to the module's side. This MAC address can be used to determine the IP addresses assigned via DHCP to the OpenFlex E3000 chassis and the F3x00 storage devices contained within it.

**Figure 61:** BMC Module MAC Address Label



**Step 1:** Open a browser and enter the IP address for any fabric-connected device into the **address bar**.

The login page for the device appears:

### Login - E3000-0900F5

Sign In to your account

- E3000-0900F5

### Login ?

You will need to login first to access the system.

E3000-0900F5

Type - Chassis  
 ID - 000cca0900f5  
 Device OS Version - 1.1.0  
 Manufacturer - Western Digital Corporation  
 Model - OpenFlex E3000  
 Status - OK

May 19th 20, 12:45:07 pm  
 © 2020 Western Digital Corporation

**Step 2:** Enter a valid username and password, and click the **Login** button:

 Login



**Note:** The default username/password is admin/admin.

The system dashboard appears. In addition, the **Devices** section provides access to all other fabric-connected devices:



**Step 3:** If needed, click the **Devices** banner to expand the list of all connected devices:



**Step 4:** From the list, identify the device to which you want to navigate.

**Step 5:** Click the **Device Actions** icon:



The **Device Actions** window appears:



**Step 6:** Click the **Open in a new tab/window** option to open the device page in a new window.

The device's dashboard appears in a new tab/window.

### 3.1.6.2 Checking System Health

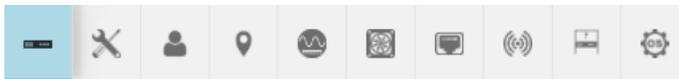
This task provides instructions for checking the health of the E3000 chassis device using the OCGUI, including:

- Device Information
- Device Logs
- Power Supplies
- Fans
- Ports
- Sensors
- Slots

#### Checking the Device Information

**Step 1:** Navigate to the chassis device (see [Navigating to a Device \(page 50\)](#)).

**Step 2:** Click the chassis's **Device Information** icon:



The **Device Information** appears:

Device Information

e3000-090028 ✎ DEVICE LOGS

ⓘ OK

Attribute	Value
ID	000cca090028
SerialNumber	
Model	OpenFlex E3000
Manufacturer	WDC

IP Addresses

- 10.202.238.216
- fe80::20c:caff:fe09:28

Capability	Description
Chassis Manager	This is an aggregation point for management and may rely on subordinate management controllers for the management of constituent parts.
Storage Device	This device is a storage-based enclosure type.

ACTIONS

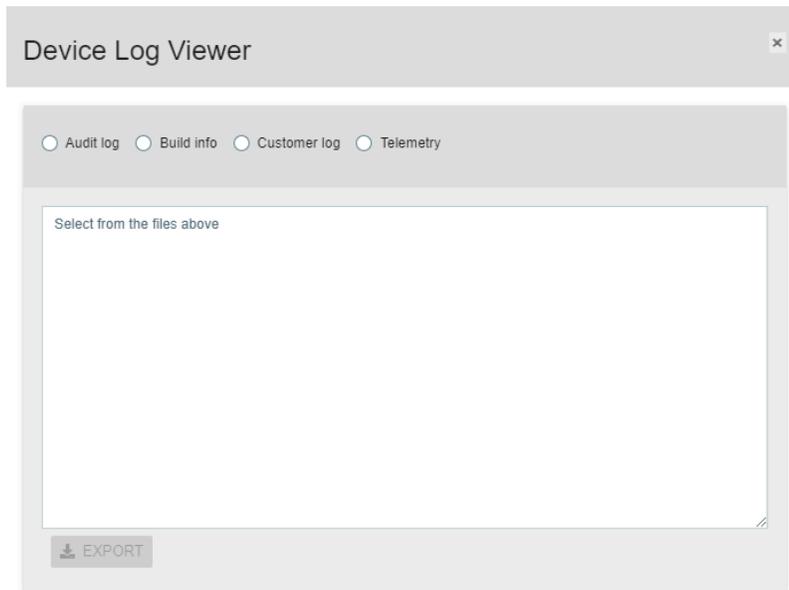
**Step 3:** Review the chassis's device information and ensure that its health status reports **OK** in the header.

### Checking the Device Logs

**Step 4:** Click the **Device Logs** button:



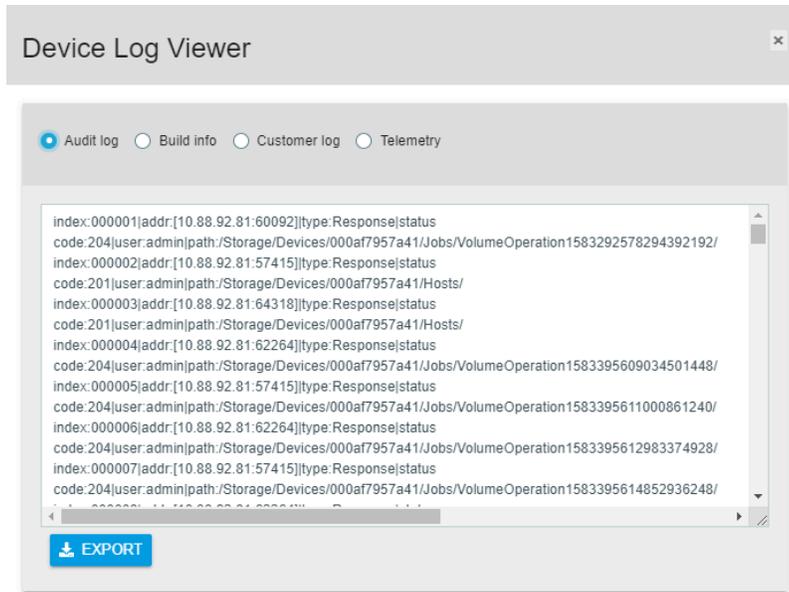
The **Device Log Viewer** appears:



[CLOSE](#)

**Step 5:** Select one of the log types by clicking its radio button.

The **Device Log Viewer** updates to show the selected log information, which can then be exported by clicking the **Export** button at the bottom of the viewer:



CLOSE

### Checking the Power Supplies

**Step 6:** Click the chassis's **Power Supplies** icon:



The **Power Supplies** information appears:



**Step 7:** Review the chassis's power supply information and ensure that both PSUs report **OK** in the **Health** column.

### Checking the Fans

**Step 8:** Click the chassis's **Fans** icon:



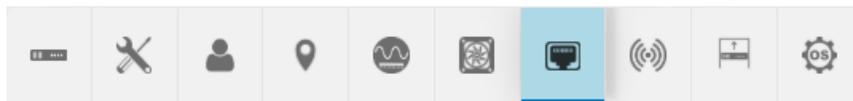
The **Fans** information appears:

Identifier	Current Speed	Health	Locator LED	Removal Conditions
FAN_ENCL_0	11856 RPM	OK	●	Removable when on or off
FAN_ENCL_1	11104 RPM	OK	●	Removable when on or off
FAN_ENCL_2	11856 RPM	OK	●	Removable when on or off
FAN_ENCL_3	11184 RPM	OK	●	Removable when on or off
FAN_ENCL_4	11952 RPM	OK	●	Removable when on or off
FAN_ENCL_5	11104 RPM	OK	●	Removable when on or off
FAN_ENCL_6	11904 RPM	OK	●	Removable when on or off
FAN_ENCL_7	11152 RPM	OK	●	Removable when on or off
FAN_PSU_A	13344 RPM	OK	●	Removable when on or off
FAN_PSU_B	13344 RPM	OK	●	Removable when on or off

**Step 9:** Review the chassis's fan information and ensure that each fan reports **OK** in the **Health** column.

### Checking the Ports

**Step 10:** Click the chassis's **Ports** icon:



The **Ports** information appears:

Adapter	Identifier	Health	MTU	Bytes	Network Type	IP Address	IP Gateway	MAC Address	Address Origin
eth1	00_0c_ca_09_00_f5_10_202_238_70_22	OK	1500		IPv4 Network	10.202.238.70/22	10.202.236.1	00:0c:ca:09:00:f5	DHCPv4
eth1	00_0c_ca_09_00_f5_fe80_20c_caff_fe09_f5_64	OK	1500		IPv6 Network	fe80::20c:caff:fe09:f5/64		00:0c:ca:09:00:f5	Link Local
eth1	<Click to Assign a Global IPv6 Address>	Unknown	1500		IPv6 Network			00:0c:ca:09:00:f5	STATIC

**Step 11:** Review the chassis's port information and ensure that each port is reporting **OK** in the **Health** column.

### Checking the Sensors

**Step 12:** Click the chassis's **Sensors** icon:



The **Sensors** information appears:

Identifier	Type	Current Reading	Health
TEMP_BACKPL_LT	Temperature	31 Degrees C	OK
TEMP_BACKPL_RT	Temperature	31 Degrees C	OK
TEMP_PSU_A_AMB	Temperature	52 Degrees C	OK
TEMP_PSU_A_HOT	Temperature	61 Degrees C	OK
TEMP_PSU_A_PRI	Temperature	28 Degrees C	OK
TEMP_PSU_B_AMB	Temperature	45 Degrees C	OK
TEMP_PSU_B_HOT	Temperature	58 Degrees C	OK
TEMP_PSU_B_PRI	Temperature	47 Degrees C	OK
TEMP_BMC_IN	Temperature	22 Degrees C	OK
TEMP_BMC_OUT	Temperature	26 Degrees C	OK
VOLT_PSU_A_AC_IN	Voltage	206.50 Volts	OK
VOLT_PSU_A_12V_O	Voltage	12.01 Volts	OK
VOLT_PSU_B_AC_IN	Voltage	206.50 Volts	OK
VOLT_PSU_B_12V_O	Voltage	11.99 Volts	OK
VOLT_BMC_12V_IN	Voltage	12.12 Volts	OK
VOLT_BMC_12V_OUT	Voltage	12.21 Volts	OK
CURR_PSU_A_IN	Current	1.31 Amps	OK
CURR_PSU_A_OUT	Current	20.68 Amps	OK
CURR_PSU_B_IN	Current	1.20 Amps	OK
CURR_PSU_B_OUT	Current	18.56 Amps	OK
CURR_BMC_12V_OUT	Current	0.37 Amps	OK

**Step 13:** Review the chassis's sensor information and ensure that each sensor is reporting **OK** in the **Health** column.

**Checking the Slots**

**Step 14:** Click the chassis's **Slots** icon:



The **Slots** information appears:

Device Actions	Identifier	Health
POWER ON	b260c_slot_0_id_b0262882260d_sn_THCLS04614PS0193	OK
POWER ON	b8cd4_slot_1_id_000af7958cd5_sn_THCLS04614PS0193	OK
	SLOT_2_slot_2	Not installed
	SLOT_3_slot_3	Not installed
	SLOT_4_slot_4	Not installed
	SLOT_5_slot_5	Not installed
	SLOT_6_slot_6	Not installed
	SLOT_7_slot_7	Not installed
	SLOT_8_slot_8	Not installed
	SLOT_9_slot_9	Not installed

**Step 15:** Review the chassis's slot information and ensure that each slot with an installed device is reporting **OK** in the **Health** column. If the slot does not have an installed device, it will report **Not installed**.

### 3.1.6.3 Creating a Secure HTTPS Connection

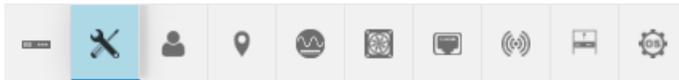
This task provides instructions for creating a secure HTTPS connection for the OpenFlex F3x00 and E3000 using the OCGUI.

The OCGUI provides a feature for uploading a customer-generated SSL/TLS certificate and key, based on the IP address and/or DNS name, to create a fully-secure HTTPS connection to a device.

**Step 1:** Navigate to the chassis or storage device (see [Navigating to a Device \(page 50\)](#)).

**Step 2:** Click the device's **Administration** icon:

**Figure 75:** Chassis Device Administration Icon

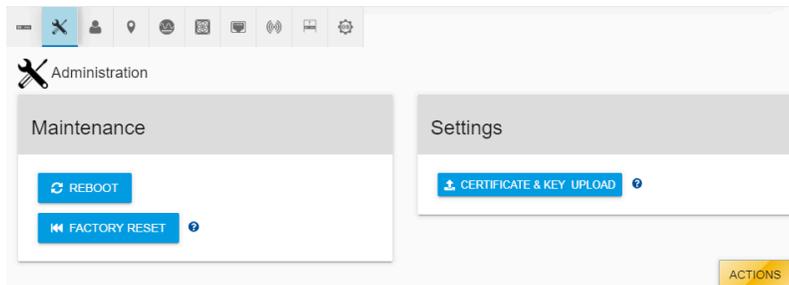


**Figure 76:** Storage Device Administration Icon

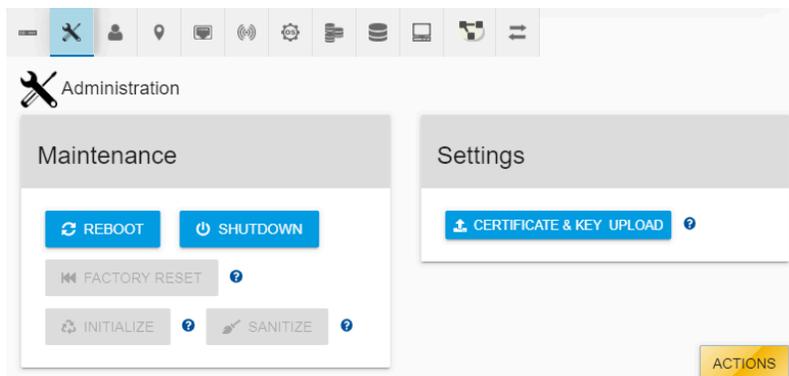


The **Administration** information appears:

**Figure 77:** Chassis Device Administration Information



**Figure 78:** Storage Device Administration Information



**Step 3:** Click the **Certificate & Key Upload** button:

**CERTIFICATE & KEY UPLOAD**

The **TLS Certificate & Key Pair** window appears, showing the **Browse & Select Certificate & Key Pair** step:

The screenshot shows a window titled "TLS Certificate & Key Pair". At the top, there are two progress steps: "1 Browse & Select Certificate & Key Pair" (active) and "2 Upload TLS Certificate & Key Pair". The main area contains two file selection fields. The first field is labeled "Certificate File" and has a "SELECT FILE" button to its left. The second field is labeled "Key File" and also has a "SELECT FILE" button to its left. At the bottom left of the window is a "NEXT" button, and at the bottom right is a "CLOSE" link.

**Step 4:** Click the **Select File** button:

**Step 5:** Navigate to the location of the appropriate PEM files for the **Certificate File** and **Key File** fields:



**Note:** The files are not validated. It is the user's responsibility to ensure that the correct file is chosen for the appropriate field. If the chosen files are not valid, the OCGUI will reuse the defaults already on the system.

## TLS Certificate &amp; Key Pair

1 Browse & Select Certificate & Key Pair ————— 2 Upload TLS Certificate & Key Pair

<a href="#">SELECT FILE</a>	Certificate File cert.pem	0.81 KB
Certificate File Staged Successfully; Ready for Upload		
<a href="#">SELECT FILE</a>	Key File key.pem	0.23 KB
Key File Staged Successfully; Ready for Upload		

[NEXT](#)

[CLOSE](#)

**Step 6:** Click the **Next** button:

[NEXT](#)

The **TLS Certificate & Key Pair** confirmation window updates, showing the **Upload TLS Certificate & Key Pair** step:

## TLS Certificate &amp; Key Pair

1 Browse & Select Certificate & Key Pair ————— 2 Upload TLS Certificate & Key Pair

Certificate: cert.pem  
Key: key.pem

Please Confirm

UPLOAD CERTIFICATE & KEY

BACK START OVER

CLOSE

**Step 7:** Confirm that the correct files are listed for **Certificate** and **Key**. If so, select the **Please Confirm** checkbox and click the **Upload Certificate & Key** button:

## TLS Certificate &amp; Key Pair

1 ————— 2

Certificate: cert.pem  
Key: key.pem

Please Confirm

UPLOAD CERTIFICATE & KEY

BACK START OVER

CLOSE

The **TLS Certificate & Key Pair** confirmation window closes, and the device's dashboard appears.

**Step 8:** Click the **Device Information** icon:

**Figure 83:** Chassis Device Information Icon



**Figure 84:** Storage Device Information Icon



The **Device Information** appears:

**Figure 85:** Chassis Device Information

Device Information

e3000-090028 ✎ DEVICE LOGS

ⓘ OK

Attribute	Value
ID	000cca090028
SerialNumber	
Model	OpenFlex E3000
Manufacturer	WDC

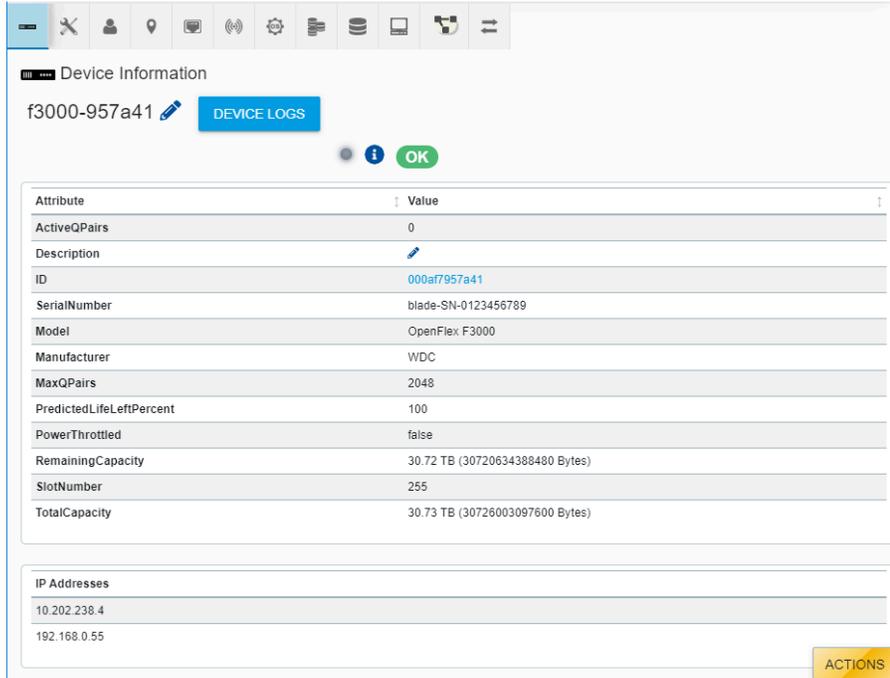
IP Addresses

- 10.202.238.216
- fe80::20c:caff:fe09:28

Capability	Description
Chassis Manager	This is an aggregation point for management and may rely on subordinate management controllers for the management of constituent parts.
Storage Device	This device is a storage-based enclosure type.

ACTIONS

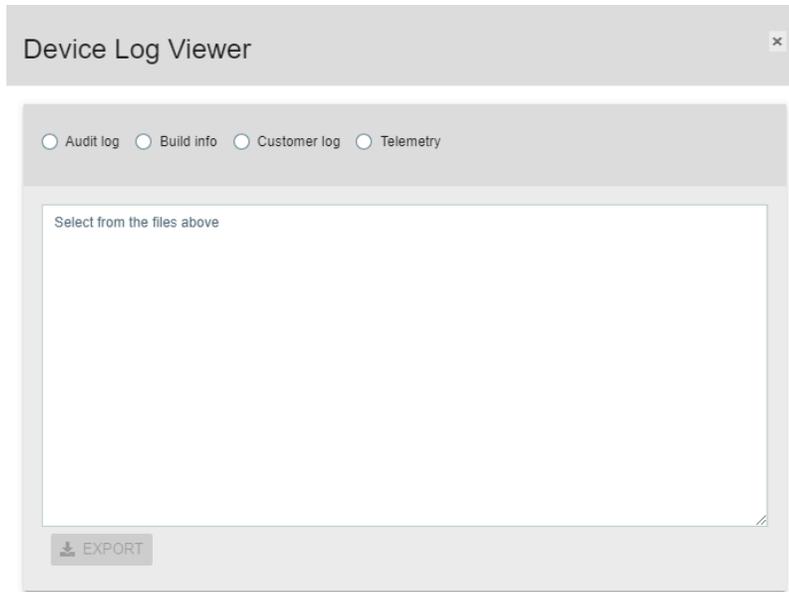
**Figure 86:** Storage Device Information



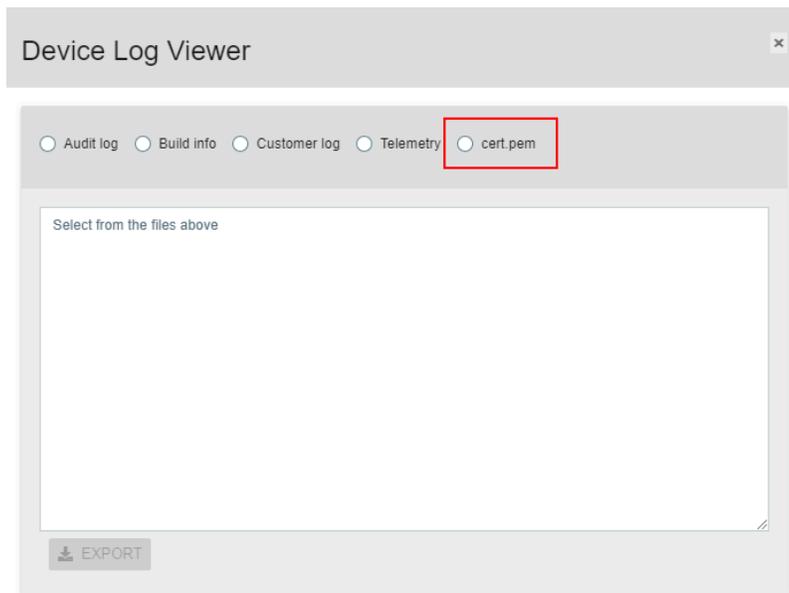
**Step 9:** Click the **Device Logs** button:



The **Device Log Viewer** appears:

[CLOSE](#)

**Step 10:** Confirm that the chosen certificate file is one of the selectable options. If so, a secure HTTPS connection has been established:

[CLOSE](#)

#### 3.1.6.4 Creating Accounts

This task provides instructions for creating a user account on the OpenFlex F3x00 and E3000 using the OCGUI.

**Step 1:** Navigate to the chassis or storage device (see [Navigating to a Device](#) (page 50)).

**Step 2:** Click the device's **Accounts** icon:

**Figure 89:** Chassis Device Accounts Icon

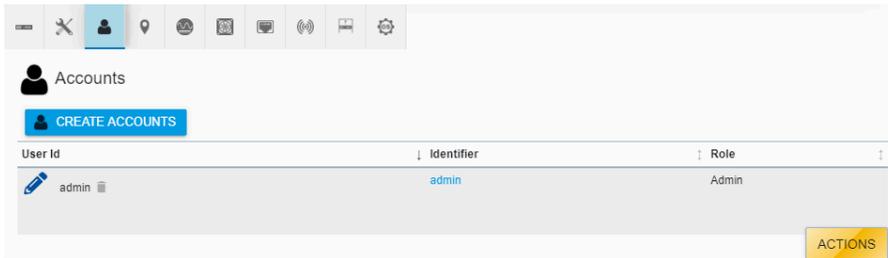


**Figure 90:** Storage Device Accounts Icon



The **Accounts** information appears:

**Figure 91:** Chassis Device Accounts Information



**Figure 92:** Storage Device Accounts Information



**Step 3:** Click the **Create Accounts** button:



The **Create Accounts** window appears, showing the **Account Details** step:

1 Account Details

User Id (Required) 0 / 64

Role

Password 0 / 32

Confirmation 0 / 32

CREATE START OVER

CLOSE

**Step 4:** Type a **User Id**, choose a **Role**, and type a **Password**:

1 Account Details

User Id (Required) test 4 / 64

Role Admin

Password ..... 8 / 32

Confirmation ..... 8 / 32

CREATE START OVER

CLOSE

**Step 5:** Click the **Create** button to create the account:

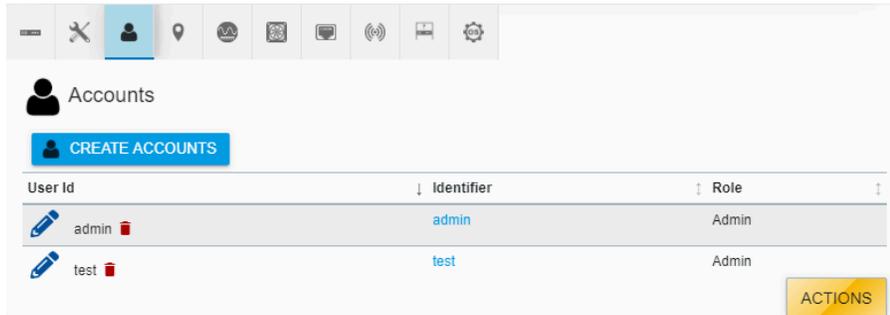
CREATE

**Step 6:** Click **Close** to close the **Create Accounts** window:

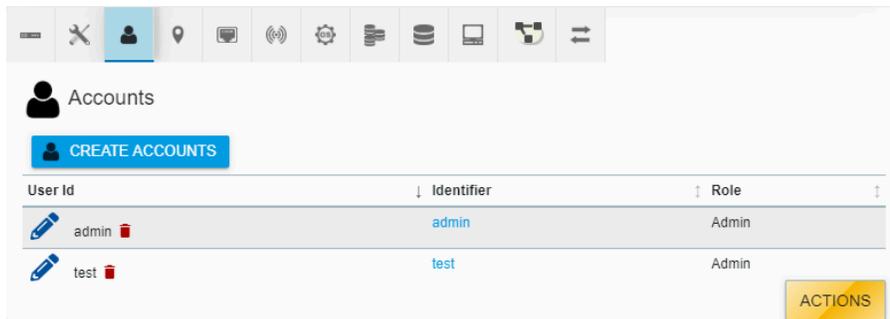
CLOSE

The **Accounts** information appears, showing the newly created account:

**Figure 97:** Chassis Device New Account



**Figure 98:** Storage Device New Account



### 3.1.6.5 Configuring a Location

This task includes instructions for configuring location information for the OpenFlex F3x00 and E3000 using the OCGUI.

- Step 1:** Navigate to the chassis or storage device (see [Navigating to a Device](#) (page 50)).
- Step 2:** Click the device's **Location** icon:

**Figure 99:** Chassis Device Location Icon



**Figure 100:** Storage Device Location Icon



The **Location** information appears:

Attribute	Value
Address1	
Address2	
Address3	
Building	
City	
Country	
Device	
GPSCoords	
Item	
OtherLocationInfo	
Pod	
PostalCode	
Rack	
Room	
Row	
Shelf	
SiteName	
State	
Territory	

**Step 3:** Each location attribute can be assigned a value by clicking its pencil icon in the **Value** column. Add the appropriate text to the field, and click the check mark to save the value. Enter all of the values that apply.

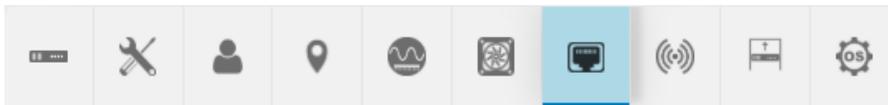
### 3.1.6.6 Editing Port Information

This task provides instructions for editing the port information for the OpenFlex F3x00 and E3000 using the OCGUI.

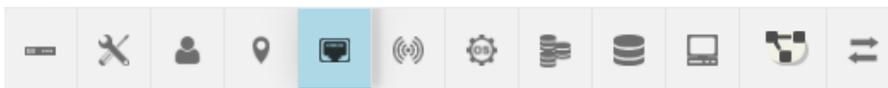
**Step 1:** Navigate to the chassis or storage device (see [Navigating to a Device](#) (page 50)).

**Step 2:** Click the device's **Ports** icon:

**Figure 102:** Chassis Device Ports Icon



**Figure 103:** Storage Device Ports Icon



The **Ports** information appears:

**Figure 104:** Chassis Device Ports Information

Adapter	Identifier	Health	MTU Bytes	Network Type	IP Address	IP Gateway	MAC Address	Address Origin
eth1	00_0c_ca_09_00_f5_10_202_238_70_22	OK	1500	IPv4 Network	10.202.238.70/22	10.202.236.1	00:0c:ca:09:00:f5	DHCPv4
eth1	00_0c_ca_09_00_f5_fe80_20c_caff_fe09_f5_64	OK	1500	IPv6 Network	fe80:20c:caff:fe09:f5:64		00:0c:ca:09:00:f5	Link Local
eth1	<Click to Assign a Global IPv6 Address>	Unknown	1500	IPv6 Network			00:0c:ca:09:00:f5	STATIC

**Figure 105:** Storage Device Ports Information

Adapter	Identifier	Health / Link	MTU Bytes	Network Type	Transceiver Mode	IP Address
fabric1	b0_26_28_82_26_0d_192_168_0_56_24	OK / Up	4500	IPv4 Network	Consortium-Based No FEC:RS	192.168.
fabric2	b0_26_28_82_26_0e_192_168_1_56_24	OK / Up	4500	IPv4 Network	Consortium-Based No FEC:RS	192.168.

**DSCP-Based Priority Flow Control**

PFC  Enabled

PFC Class of Service / Pause Priority : DSCP Value

0 : 0  
  1 : 8  
  2 : 16  
  3 : 24  
  4 : 32  
 5 : 40  
  6 : 48  
  7 : 56

**Explicit Congestion Notification**

ECN  Disabled

CNP Class of Service / CNP Priority : DSCP Value

0 : 0  
  1 : 8  
  2 : 16  
  3 : 24  
  4 : 32  
 5 : 40  
  6 : 48  
  7 : 56

**Step 3:** To edit the port information for a device, click the pencil icon next to that port's **Adapter** name.

The **Update Port** window appears, showing the **Address Type, IP, MTU Bytes** step:

**Figure 106:** Chassis Device Update Port Window

Update Port: eth1

1 Address Type, IP, MTUBytes — 2 Confirmation

DHCPv4

IPv4 Address / CIDR  
10.202.237.51/22  
.....  
nnn.nnn.nnn.nnn(/nn)  
Netmask: 255.255.252.0

IPv4 Gateway (optional)  
10.202.236.1  
.....  
nnn.nnn.nnn.nnn

NEXT

CANCEL

**Figure 107:** Storage Device Update Port Window

Update Port: fabric1

1 Address Type, IP, MTUBytes — 2 Confirmation

DHCPv4

IPv4 Address / CIDR  
192.168.0.56/24  
.....  
nnn.nnn.nnn.nnn(/nn)  
Netmask: 255.255.255.0

MTU Bytes  
4500

Range: 1500-5000 (Default: 1500)

IPv4 Gateway (optional)  
192.168.0.1  
.....  
nnn.nnn.nnn.nnn

NEXT

CANCEL

**Step 4:** Edit the port information for the device and click the **Next** button:



The **Confirmation** step appears:

Update Port: management

1 Address Type, IP, MTUBytes ————— 2 Confirmation

Address Origin: DHCP

Please Confirm

UPDATE BACK START OVER

CANCEL

**Step 5:** Select the **Please Confirm** checkbox to confirm the edits:

Update Port: management

1 Address Type, IP, MTUBytes ————— 2 Confirmation

Address Origin: DHCP

Please Confirm

UPDATE BACK START OVER

CANCEL

**Step 6:** Click the **Update** button to save the updates:

UPDATE

### 3.1.6.7 Setting up IPv6 on the Chassis Management Port

This task provides instructions for setting up IPv6 on the E3000 chassis device's management port using the OCGUI.



**Note:** IPv6 is only available on the E3000 management port; it is not available on the F3x00 storage device's data ports. The default networking setting for the E3000 is IPv4 DHCP. It can be configured for IPv6 static or DHCP if desired. After a factory reset, the networking setting will remain undefined until one of the available options is chosen.

**Step 1:** Navigate to the chassis device (see [Navigating to a Device](#) (page 50)).

**Step 2:** Click the chassis's **Ports** icon:

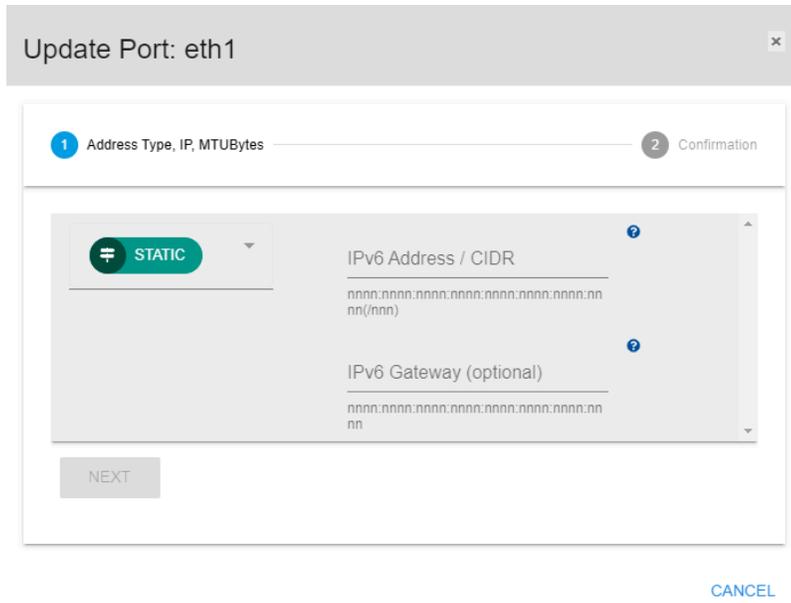


The **Ports** information appears:

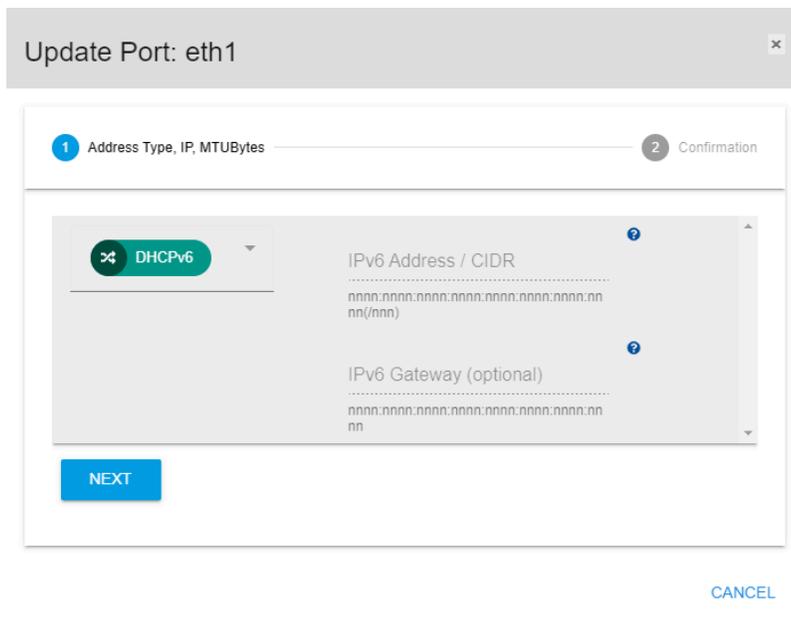
Adapter	Identifier	Health	MTU	Bytes	Network Type	IP Address	IP Gateway	MAC Address	Address Origin
eth1	<a href="#">00_0c_ca_09_00_f5_10_202_238_70_22</a>	OK	1500		IPv4 Network	10.202.238.70/22	10.202.238.1	00:0c:ca:09:00:f5	DHCPv4
eth1	<a href="#">00_0c_ca_09_00_f5_fe80_20c_caff_fe09_f5_64</a>	OK	1500		IPv6 Network	fe80::20c:caff:fe09:f5/64		00:0c:ca:09:00:f5	Link Local
eth1	<a href="#">&lt;Click to Assign a Global IPv6 Address&gt;</a>	Unknown	1500		IPv6 Network			00:0c:ca:09:00:f5	STATIC

**Step 3:** In the **Identifier** column, click the link that reads: **<Click to Assign a Global IPv6 Address>**:

The **Update Port** window appears, showing the **Address Type, IP, MTUBytes** step:



**Step 4:** From the drop-down list, select the **DHCPv6** option:



**Step 5:** Click the **Next** button:



The **Confirmation** step appears:

Update Port: eth1

Address Type, IP, MTUBytes — Confirmation

Address Origin: DHCP

Please Confirm

UPDATE BACK START OVER

CANCEL

**Step 6:** Select the **Please Confirm** checkbox to confirm the selection:

Update Port: eth1

Address Type, IP, MTUBytes — Confirmation

Address Origin: DHCP

Please Confirm

UPDATE BACK START OVER

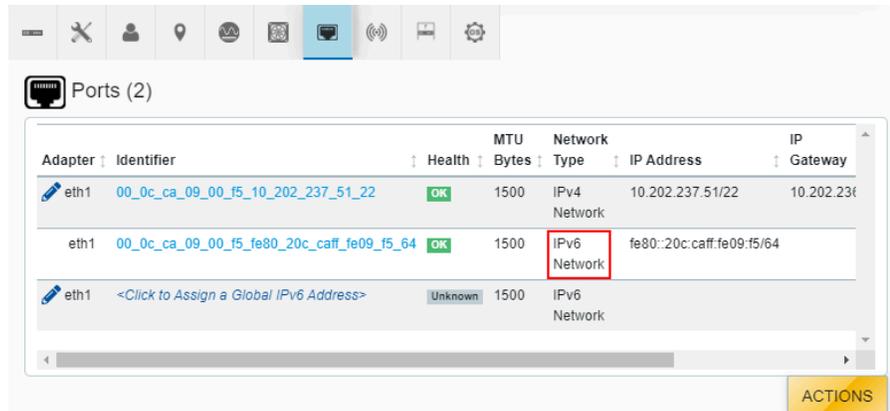
CANCEL

**Step 7:** Click the **Update** button to save the update:



A modal appears for a brief moment, showing the progress of the IPv6 configuration.

**Step 8:** When the **Ports** information appears again, review the **Network Type** column for the edited port to ensure that IPv6 is now configured:



### 3.1.6.8 Checking Sensors

This task provides instructions for checking the sensors of the OpenFlex F3x00 and E3000 using the OCGUI.

- Step 1:** Navigate to the chassis or storage device (see [Navigating to a Device \(page 50\)](#)).
- Step 2:** Click the device's **Sensors** icon:

**Figure 114:** Chassis Device Sensors Icon



**Figure 115:** Storage Device Sensors Icon



The **Sensors** information appears:

**Figure 116:** Chassis Device Sensors Information

Identifier	Type	Current Reading	Health
TEMP_BACKPL_LT	Temperature	31 Degrees C	OK
TEMP_BACKPL_RT	Temperature	31 Degrees C	OK
TEMP_PSU_A_AMB	Temperature	52 Degrees C	OK
TEMP_PSU_A_HOT	Temperature	61 Degrees C	OK
TEMP_PSU_A_PRI	Temperature	28 Degrees C	OK
TEMP_PSU_B_AMB	Temperature	45 Degrees C	OK
TEMP_PSU_B_HOT	Temperature	58 Degrees C	OK
TEMP_PSU_B_PRI	Temperature	47 Degrees C	OK
TEMP_BMC_IN	Temperature	22 Degrees C	OK
TEMP_BMC_OUT	Temperature	26 Degrees C	OK
VOLT_PSU_A_AC_IN	Voltage	206.50 Volts	OK
VOLT_PSU_A_12V_O	Voltage	12.01 Volts	OK
VOLT_PSU_B_AC_IN	Voltage	206.50 Volts	OK
VOLT_PSU_B_12V_O	Voltage	11.99 Volts	OK
VOLT_BMC_12V_IN	Voltage	12.12 Volts	OK
VOLT_BMC_12V_OUT	Voltage	12.21 Volts	OK
CURR_PSU_A_IN	Current	1.31 Amps	OK
CURR_PSU_A_OUT	Current	20.68 Amps	OK
CURR_PSU_B_IN	Current	1.20 Amps	OK
CURR_PSU_B_OUT	Current	18.56 Amps	OK
CURR_BMC_12V_OUT	Current	0.37 Amps	OK

**Figure 117:** Storage Device Sensors Information

Identifier	Type	Current Reading
DeviceTemperature	Temperature	47 Degrees C

**Step 3:** The sensor section provides an **Identifier** or name for each sensor, its **Type**, and **Current Reading**. The chassis's sensor information also includes a **Health** status. Hovering over the information icon in the temperature column will provide specific information related to that component's temperature thresholds, if applicable.

### 3.1.6.9 Checking the OS

This task provides instructions for checking the operating system of the OpenFlex F3x00 and E3000 using the OCGUI.

- Step 1:** Navigate to the chassis or storage device (see [Navigating to a Device](#) (page 50)).
- Step 2:** Click the device's **OS** icon:

**Figure 118:** Chassis Device OS Icon



**Figure 119:** Storage Device OS Icon



The **Device OS** information appears:

**Figure 120:** Chassis Device OS Information



**Figure 121:** Storage Device OS Information



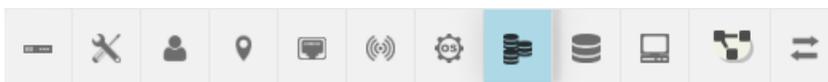
**Step 3:** Review the operating system information for the device. If the OS requires updating, see [Upgrading Firmware \(page 106\)](#).

### 3.1.6.10 Checking Pools

This task provides instructions for checking the pools of an F3x00 storage device using the OCGUI.

**Step 1:** Navigate to the storage device (see [Navigating to a Device \(page 50\)](#)).

**Step 2:** Click the storage device's **Pools** icon:

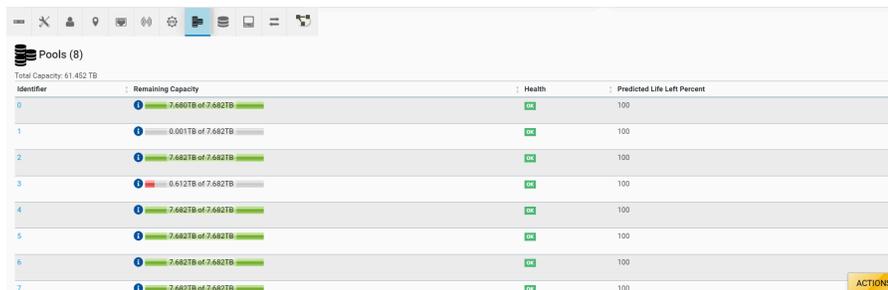


The **Pools** information appears:



Identifier	Remaining Capacity	Health	Predicted Life Left Percent
0	30.721TB of 30.726TB	OK	100

**Step 3:** The information list provides an **Identifier** for each pool, its **Remaining Capacity**, **Health**, and **Predicted Life Left Percent**. Hovering over the information icon in the **Remaining Capacity** column will provide details about the pool's remaining capacity.



Identifier	Remaining Capacity	Health	Predicted Life Left Percent
0	7.680TB of 7.682TB	OK	100
1	0.001TB of 7.682TB	OK	100
2	7.682TB of 7.682TB	OK	100
3	0.612TB of 7.682TB	OK	100
4	7.682TB of 7.682TB	OK	100
5	7.682TB of 7.682TB	OK	100
6	7.682TB of 7.682TB	OK	100
7	7.682TB of 7.682TB	OK	100

### 3.1.6.11 Checking and Creating Volumes

This task provides instructions for checking and creating volumes on an F3x00 storage device using the OCGUI.

**Step 1:** Navigate to the storage device (see [Navigating to a Device](#) (page 50)).

**Step 2:** Click the storage device's **Volumes** icon:



The **Volumes** information appears:

Volumes (50)  
Total Capacity: 53 687 GB | Total Active Queue Pairs: 0 | Total Connections: 0

CREATE VOLUMES

Select	Name	Pool	Identifier	Description	NQN	Allow Any Host	Capacity	Health	Active Queue Pairs	Remote Connections	Serial Number
<input type="checkbox"/>	Volume01	0	bb47bc06-041c-40ce-88a1-227ab5fa642a	Click to Edit	nqn.1992-05.com.wdc.f3000-957a41:Volume01	OFF	1.074 GB	OK	0		SN000AF7957A40000EA1
<input type="checkbox"/>	Volume02	0	5b2054e4-1df7-42c9-8657-1ca82ecd9a68	Click to Edit	nqn.1992-05.com.wdc.f3000-957a41:Volume02	OFF	1.074 GB	OK	0		SN000AF7957A40000EA2
<input type="checkbox"/>	Volume03	0	09f0178e-9490-4e9f-bf08-2685a3991557	Click to Edit	nqn.1992-05.com.wdc.f3000-957a41:Volume03	OFF	1.074 GB	OK	0		SN000AF7957A40000EA3
<input type="checkbox"/>	Volume04	0	5568083f-20ee-4e09-9680-b088e644d4bb	Click to Edit	nqn.1992-05.com.wdc.f3000-957a41:Volume04	OFF	1.074 GB	OK	0		SN000AF7957A40000EA4
<input type="checkbox"/>	Volume05	0	bc489b3-1f37-4320-8671-47eb58030142	Click to Edit	nqn.1992-05.com.wdc.f3000-957a41:Volume05	OFF	1.074 GB	OK	0		SN000AF7957A40000EA5

ACTIONS

**Step 3:** Review the listed volumes on the storage device.

**Step 4:** Click the **Create Volumes** button:



The **Create Volumes** window appears, showing the **Pool & Capacity** step:

Create Volumes

1 Pool & Capacity — 2 Name & Description — 3 Confirmation — 4 Creation

Select a Pool

NEXT

CLOSE

**Step 5:** Select a **Pool** from the drop-down list, and use the **Capacity** slider to assign a capacity to the volume being created. If multiple volumes of the same capacity are needed, select the number of volumes from the **Number of Volumes** drop-down list:

0 55.881 TiB

Capacity  GiB

7912

Number of Volumes  
2

NEXT

CLOSE

**Step 6:** Click the **Next** button to continue:



The **Names & Description** step appears:

Pool & Capacity — 2 Name & Description — 3 Confirmation — 4 Creation

Volume Name (Required) 0 / 32

NQN (Optional) 0 / 223  
nqn.YYYY-MM.com.company:text

Description (Optional) 0 / 256

Allow Any Host

NEXT BACK START OVER

CLOSE

**Step 7:** Type a name in the **Volume Name** field. The remaining fields for **Description**, **NQN**, and **Allow Any Host** are optional:

×
Create Volumes

1 Pool & Capacity
2 Name & Description
 3 Confirmation
4 Creation

Volume Name (Required) ?

4 / 32

NQN (Optional) ?

0 / 217

Description (Optional)

0 / 256

Allow Any Host ?

NEXT
BACK
START OVER

CLOSE

**Step 8:** Click the **Next** button to continue:

NEXT

The **Confirmation** step appears:

×
Create Volumes

1 Pool & Capacity
2 Name & Description
3 Confirmation
 4 Creation

Pool: 0
Capacity: 7912 GiB

ID	Name	NQN	Any Host	Desc
1	<span style="color: red;">■</span> test1 <span style="float: right;">✎</span>	<span style="color: blue;">✎</span> Click to Edit	<input checked="" type="checkbox"/>	<span style="color: blue;">✎</span> Click to Edit
2	<span style="color: red;">■</span> test2 <span style="float: right;">✎</span>	<span style="color: blue;">✎</span> Click to Edit	<input checked="" type="checkbox"/>	<span style="color: blue;">✎</span> Click to Edit

Please Confirm
Total Volumes: 2

CREATE
BACK
START OVER

CLOSE

**Step 9:** Review the volume entries and edit or update each as needed. Then check the **Please Confirm** checkbox:

×
Create Volumes

Pool & Capacity
 Name & Description
**3** Confirmation
**4** Creation

Pool: 0      Capacity: 7912 GiB

ID	Name	NQN	Any Host	Desc
1	test1		<input checked="" type="checkbox"/>	
2	test2		<input checked="" type="checkbox"/>	

Total Volumes: 2

Please Confirm

CREATE
BACK
START OVER

CLOSE

**Step 10:** Click the **Create** button to create the new volume(s):



The **Creation** step appears, showing creation progress and providing confirmation when the volume creation is complete:

×
Create Volumes

Pool & Capacity
 Name & Description
 Confirmation
**4** Creation

ID	Name	Status
1	test1	Completed - OK
2	test2	Completed - OK

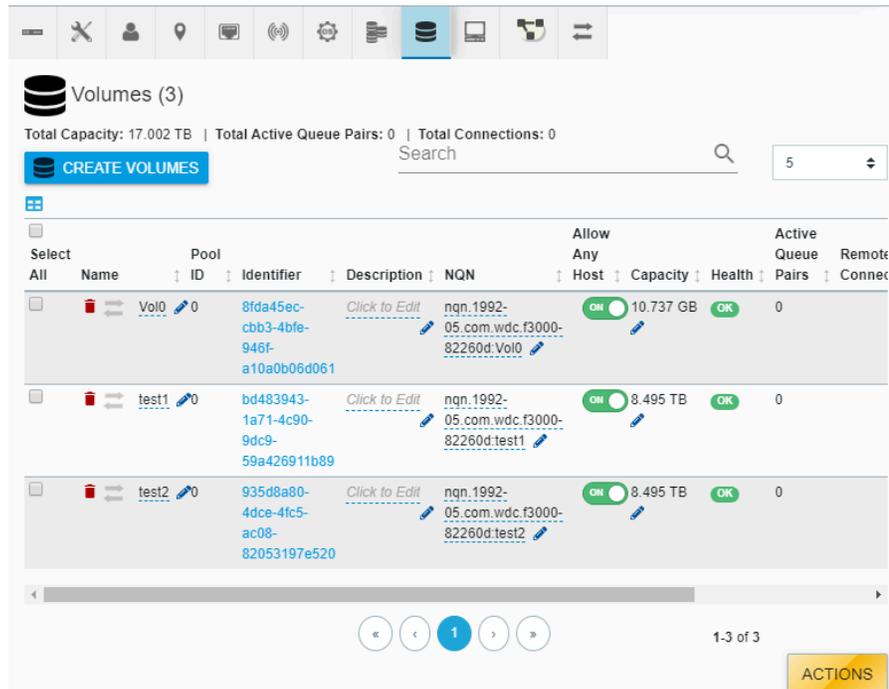
Start: 5 / 26, 8:01:13 am  
 End: 5 / 26, 8:01:32 am  
 Total: 0hr 0min 18s.291  
 Avg: 0hr 0min 9s.148

**4** Total Volumes: 2

CREATE MORE VOLUMES

CLOSE

**Step 11:** Click **Close** and review the **Volumes** information to verify that the newly created volume(s) appears on the list.



The screenshot shows the OCGUI interface for managing volumes. At the top, there is a navigation bar with various icons. Below it, the 'Volumes (3)' section is displayed, showing a summary of storage capacity (17.002 TB), active queue pairs (0), and total connections (0). A 'CREATE VOLUMES' button is visible. A search bar is present with the number '5' entered. Below the search bar is a table listing the volumes:

Select	Name	Pool	Identifier	Description	NQN	Allow Any	Host	Capacity	Health	Active Queue Pairs	Remote Connections
<input type="checkbox"/>	Vol0	0	8fda45ec-cbb3-4bfe-946f-a10a0b06d061	Click to Edit	nqn.1992-05.com.wdc.f3000-82260d:Vol0	ON		10.737 GB	OK	0	
<input type="checkbox"/>	test1	0	bd483943-1a71-4c90-9dc9-59a426911b89	Click to Edit	nqn.1992-05.com.wdc.f3000-82260d:test1	ON		3.495 TB	OK	0	
<input type="checkbox"/>	test2	0	935d8a80-4dce-4fc5-ac08-82053197e520	Click to Edit	nqn.1992-05.com.wdc.f3000-82260d:test2	ON		3.495 TB	OK	0	

At the bottom of the table, there are navigation controls (back, forward, page 1 of 3) and an 'ACTIONS' button.

### 3.1.6.12 Extending Volumes

This task provides instructions for extending (increasing) the capacity of an existing volume within an F3x00 storage device using the OCGUI.

#### Before you begin:



**Note:** A volume may only be extended a maximum of seven (7) times during its life. If that volume is deleted and another recreated in its place, the new volume can then be extended up to the maximum of seven (7) times.

**Step 1:** Navigate to the storage device (see [Navigating to a Device](#) (page 50)).

**Step 2:** Click the storage device's **Volumes** icon:



The **Volumes** information appears:

Volumes (50)  
Total Capacity: 53 687 GB | Total Active Queue Pairs: 0 | Total Connections: 0

CREATE VOLUMES Search 5

Select	Name	Pool ID	Identifier	Description	NQN	Allow Any Host	Capacity	Health	Active Queue Pairs	Remote Connections	Serial Number
<input type="checkbox"/>	Volume01	0	bb47bc06-041c-40ce-88a1-227ab5fa842a	Click to Edit	nqn.1992-05.com.wdc.f3000-957a41:Volume01	OFF	1.074 GB	OK	0		SN000AF7957A40000EA1
<input type="checkbox"/>	Volume02	0	5b2054e4-1d7f-42c9-8657-1ca82ecd9a68	Click to Edit	nqn.1992-05.com.wdc.f3000-957a41:Volume02	OFF	1.074 GB	OK	0		SN000AF7957A40000EA2
<input type="checkbox"/>	Volume03	0	09f0178e-9480-4e9f-bf08-2685a3991557	Click to Edit	nqn.1992-05.com.wdc.f3000-957a41:Volume03	OFF	1.074 GB	OK	0		SN000AF7957A40000EA3
<input type="checkbox"/>	Volume04	0	5568083f-20ee-4e09-9680-b086e644d4bb	Click to Edit	nqn.1992-05.com.wdc.f3000-957a41:Volume04	OFF	1.074 GB	OK	0		SN000AF7957A40000EA4
<input type="checkbox"/>	Volume05	0	bc4f89b3-1f37-4320-8671-47eb58030142	Click to Edit	nqn.1992-05.com.wdc.f3000-957a41:Volume05	OFF	1.074 GB	OK	0		SN000AF7957A40000EA5

ACTIONS

**Step 3:** Click the pencil icon in the **Capacity** column of the volume to be extended:

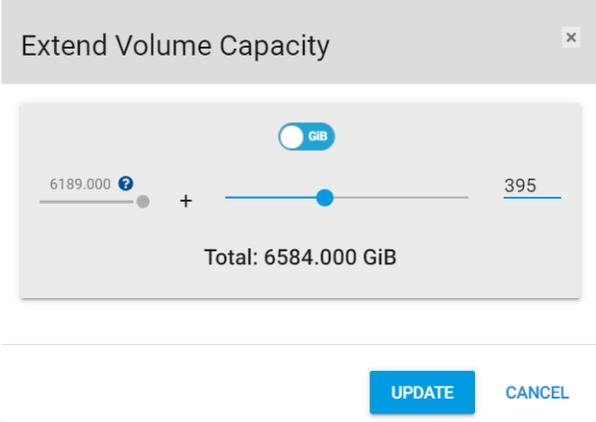
Volumes (50)  
Total Capacity: 53 687 GB | Total Active Queue Pairs: 0 | Total Connections: 0

CREATE VOLUMES Search 5

Select	Name	Pool ID	Identifier	Description	NQN	Allow Any Host	Capacity	Health	Active Queue Pairs	Remote Connections	Serial Number
<input type="checkbox"/>	Volume01	0	bb47bc06-041c-40ce-88a1-227ab5fa842a	Click to Edit	nqn.1992-05.com.wdc.f3000-957a41:Volume01	OFF	1.074 GB	OK	0		SN000AF7957A40000EA1
<input type="checkbox"/>	Volume02	0	5b2054e4-1d7f-42c9-8657-1ca82ecd9a68	Click to Edit	nqn.1992-05.com.wdc.f3000-957a41:Volume02	OFF	1.074 GB	OK	0		SN000AF7957A40000EA2
<input type="checkbox"/>	Volume03	0	09f0178e-9480-4e9f-bf08-2685a3991557	Click to Edit	nqn.1992-05.com.wdc.f3000-957a41:Volume03	OFF	1.074 GB	OK	0		SN000AF7957A40000EA3
<input type="checkbox"/>	Volume04	0	5568083f-20ee-4e09-9680-b086e644d4bb	Click to Edit	nqn.1992-05.com.wdc.f3000-957a41:Volume04	OFF	1.074 GB	OK	0		SN000AF7957A40000EA4
<input type="checkbox"/>	Volume05	0	bc4f89b3-1f37-4320-8671-47eb58030142	Click to Edit	nqn.1992-05.com.wdc.f3000-957a41:Volume05	OFF	1.074 GB	OK	0		SN000AF7957A40000EA5

ACTIONS

The **Extend Volume Capacity** window appears:



Extend Volume Capacity

6189.000 + 395

Total: 6584.000 GiB

UPDATE CANCEL

**Step 4:** To extend (increase) the capacity of the volume, click and drag the capacity slider to the right, or type the capacity increase into the text field on the right.

**Step 5:** Click the **Update** button to complete the capacity extension for the volume:



A progress modal appears for a brief moment.

**Step 6:** When the **Volumes** information is visible again, check the **Capacity** column and verify that the capacity of the volume has been increased.

### 3.1.6.13 Configuring a Host

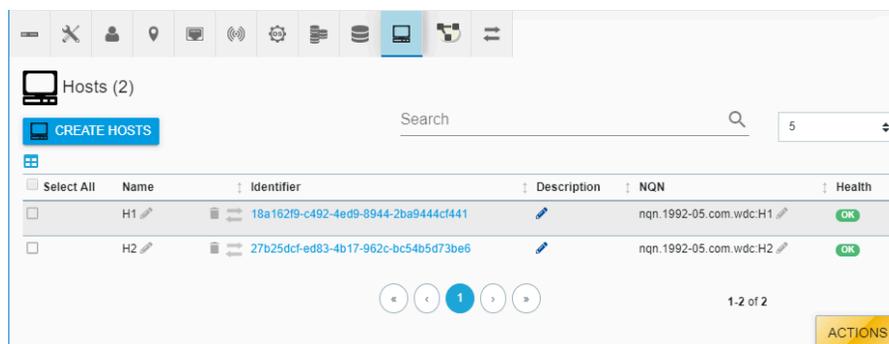
This task provides instructions for configuring a host on an F3x00 storage device using the OCGUI.

**Step 1:** Navigate to the storage device (see [Navigating to a Device](#) (page 50)).

**Step 2:** Click the storage device's **Hosts** icon:



The **Hosts** information appears:



Hosts (2)

CREATE HOSTS

Search

Select All	Name	Identifier	Description	NQN	Health
<input type="checkbox"/>	H1	18a162f9-c492-4ed9-8944-2ba944cf441		nqn.1992-05.com.wdc:H1	OK
<input type="checkbox"/>	H2	27b25dcf-ed83-4b17-962c-bc54b5d73be6		nqn.1992-05.com.wdc:H2	OK

1-2 of 2

ACTIONS

**Step 3:** Click the **Create Hosts** button:



The **Create Hosts** window appears, showing the **Name & Description** step:

A screenshot of the "Create Hosts" window. The window has a grey header bar with the title "Create Hosts". Below the header is a progress indicator with two steps: "1 Name & Description" (active, highlighted in blue) and "2 Confirmation" (inactive, grey). The main content area contains three input fields: "Host Name" with a character count of "0 / 32", "NQN (Optional)" with a character count of "0 / 223" and a help icon, and "Description" with a character count of "0 / 256". At the bottom left is a grey "NEXT" button, and at the bottom right is a blue "CLOSE" link.

**Step 4:** Type a **Host Name** and **Description** for the host.

**Step 5:** Click the **Next** button:



The **Create Hosts** window updates, showing the **Confirmation** step:

### Create Hosts

✓ Name & Description
2 Confirmation

Name: test  
Description: test

Please Confirm

CREATE
BACK
START OVER

[CLOSE](#)

**Step 6:** Click the checkbox next to **Please Confirm**, and then click the **Create** button:



The newly created host will appear in the list on the storage device's **Hosts** page.

### 3.1.6.14 Checking and Creating VLANs

This task provides instructions for checking and creating VLANs on an F3x00 storage device using the OCGUI.

**Step 1:** Navigate to the storage device (see [Navigating to a Device](#) (page 50)).

**Step 2:** Click the storage device's **VLANs** icon:



The **VLANs** information appears:

⊞ ✂ 👤 📍 📺 📶 ⚙️ 🗄️ 🗄️ 🖨️ VLANs ↔

**VLANs** (1 of 8)

CREATE VLANS
Search

Select All	Tag	Identifier	IPv4Address	Port	Health
<input type="checkbox"/>	fabric1:2	d26b2a5d-75ea-4d48-815d-1187ad080814c	192.168.2.255/24	FABRIC1	OK

1-1 of 1
ACTIONS

**Step 3:** Review the listed VLANs for the storage device.

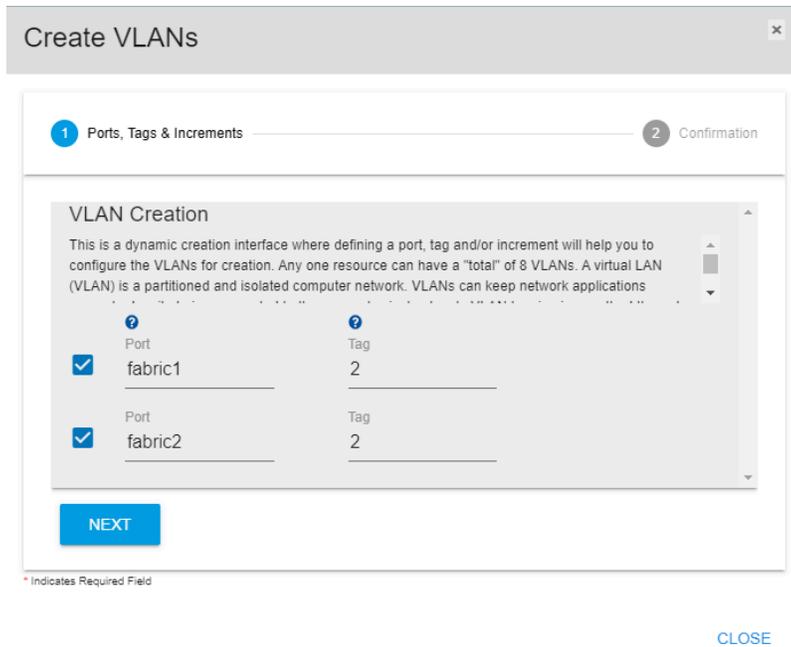
**Step 4:** Click the **Create VLANs** button:



The **Create VLANs** window appears, showing the **Ports, Tags & Increments** step:

A screenshot of the "Create VLANs" window. The window title is "Create VLANs" with a close button (X) in the top right. Below the title bar is a progress indicator with two steps: "1 Ports, Tags & Increments" (active) and "2 Confirmation". The main content area is titled "VLAN Creation" and contains a descriptive paragraph: "This is a dynamic creation interface where defining a port, tag and/or increment will help you to configure the VLANs for creation. Any one resource can have a 'total' of 8 VLANs. A virtual LAN (VLAN) is a partitioned and isolated computer network. VLANs can keep network applications...". Below the text is a table with two columns: "Port" and "Tag". Each row has a checkbox on the left. The first row shows "fabric1" under "Port" and "2" under "Tag". The second row shows "fabric2" under "Port" and "2" under "Tag". A "NEXT" button is located at the bottom left of the form. A small red asterisk and the text "\* Indicates Required Field" are at the bottom left. A "CLOSE" link is at the bottom right.

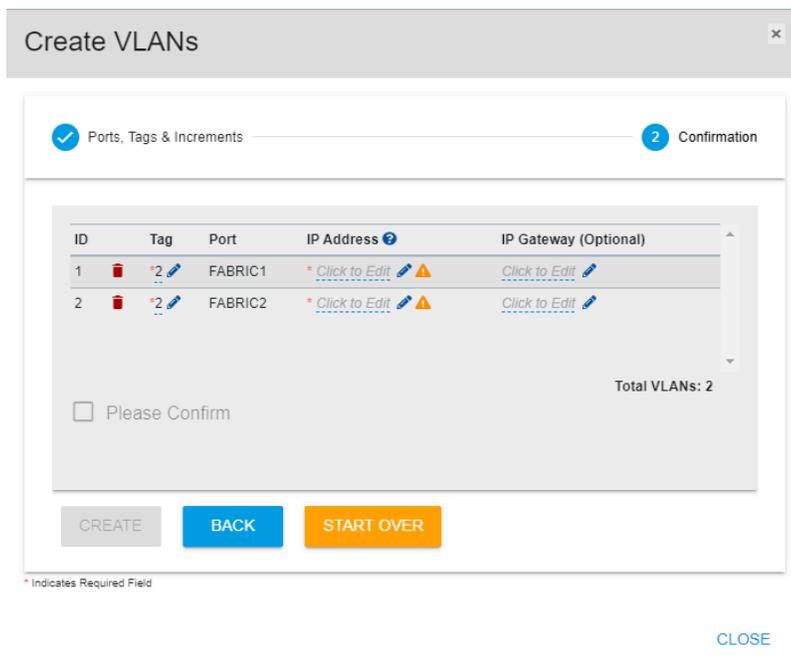
**Step 5:** Select the checkbox beside the applicable port to create a VLAN on that port. Use the **Tag** field to define an identifier (any number between 2 and 4094) that will be used for segregating the VLAN's traffic:



**Step 6:** Click the **Next** button:



The **Confirmation** step appears:



**Step 7:** Review the VLAN(s) selections and edit each as necessary. The **IP Address** field is required; enter a valid IPv4 address and CIDR that does not conflict with an existing IP address. Then check the **Please Confirm** checkbox:

Create VLANs
✕

✓ Ports, Tags & Increments
2 Confirmation

ID	Tag	Port	IP Address	IP Gateway (Optional)
1	*2	FABRIC1	* 192.168.3.56/24	
2	*2	FABRIC2	* 192.168.4.56/24	

Total VLANs: 2

Please Confirm

CREATE
BACK
START OVER

\* Indicates Required Field

[CLOSE](#)

**Step 8:** Click the **Create** button:

CREATE

A modal appears for a brief moment to show the VLAN creation progress.

**Step 9:** When the **VLANs** information is visible again, check the list to ensure that the created VLAN(s) is included.

VLANs (2 of 8)

CREATE VLANs

	Select All	Tag	Identifier	IPv4Address	IPv4Gateway	Port	Health
<input type="checkbox"/>	<input type="checkbox"/>	fabric1:2	02067cef-92e0-4413-b2e8-6cd89d59024d	192.168.3.56/24		FABRIC1	OK
<input type="checkbox"/>	<input type="checkbox"/>	fabric2:2	64b70470-56fd-4130-a5a0-e019d2c8c5bf	192.168.4.56/24		FABRIC2	OK

1-2 of 2
ACTIONS

### 3.1.6.15 Configuring a Path to a Host

This task provides instructions for configuring a path between a volume and a host on an F3x00 storage device using the OCGUI.

**Before you begin:**



**Note:** A path is a dedicated channel of communication, which cannot be established until both the volume and host have been created.



**Note:** The following instructions define how to create a path to a host through the storage device's **Volumes** section. That same path may also be created from the other direction—to a volume through the storage device's **Hosts** page.

**Step 1:** Navigate to the storage device (see [Navigating to a Device \(page 50\)](#)).

**Step 2:** Click the storage device's **Volumes** icon:



The **Volumes** information appears:

Select	Name	Pool ID	Identifier	Description	NQN	Allow Any Host	Capacity	Health	Active Queue Pairs	Remote Connections	Serial Number
<input type="checkbox"/>	Volume01	0	bb47bc06-041c-40ce-88a1-227ab5fa642a	Click to Edit	nqn.1992-05.com.wdc.f3000-957a41:Volume01	OFF	1.074 GB	OK	0		SN000AF7957A40000EA1
<input type="checkbox"/>	Volume02	0	5b2054e4-1d77-42c9-8657-1ca62ecd9a68	Click to Edit	nqn.1992-05.com.wdc.f3000-957a41:Volume02	OFF	1.074 GB	OK	0		SN000AF7957A40000EA2
<input type="checkbox"/>	Volume03	0	09f0178e-9480-4e9f-bf08-2685a3991557	Click to Edit	nqn.1992-05.com.wdc.f3000-957a41:Volume03	OFF	1.074 GB	OK	0		SN000AF7957A40000EA3
<input type="checkbox"/>	Volume04	0	5568083f-20ee-4e09-9690-b086e644d4bb	Click to Edit	nqn.1992-05.com.wdc.f3000-957a41:Volume04	OFF	1.074 GB	OK	0		SN000AF7957A40000EA4
<input type="checkbox"/>	Volume05	0	bc4f89b3-1f37-4320-8671-47eb58030142	Click to Edit	nqn.1992-05.com.wdc.f3000-957a41:Volume05	OFF	1.074 GB	OK	0		SN000AF7957A40000EA5

**Step 3:** From the list of available volumes, identify the one that will be used to create the path.

If that volume has been configured to allow any host, a dedicated path cannot be established between it and a specific host. If this is the case, it will be indicated by the following:

- The **Allow Any Host** setting will be toggled to the **ON** (enabled) position:



- When the user hovers over the path arrows beside the volume **Name**, the tooltip will indicate that this volume is expecting a VLAN path, not a host path:



**Step 4:** If needed, disable the **Allow Any Host** setting for that volume by clicking the on/off toggle switch:

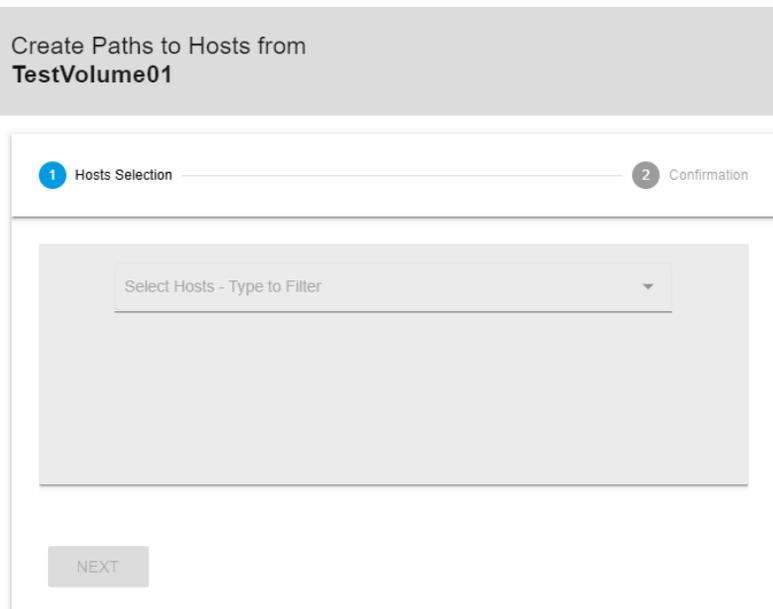


When the user hovers over the path arrows beside the volume **Name**, the tooltip will indicate that this volume is now expecting a host path:



**Step 5:** Click the path arrows beside the volume **Name**.

The **Create Paths to Hosts** dialog box opens, showing the **Hosts Selection** step:



[CLOSE](#)

**Step 6:** From the **Select Hosts** drop-down list, select one or more hosts to be connected to this volume. Then click the **Next** button:



The **Confirmation** step appears, displaying the chosen host(s):

Create Paths to Hosts from  
**TestVolume01**

1 Hosts Selection
2 Confirmation

These hosts will be mapped to "TestVolume01"

TestHost1: 949571ca-ed06-4742-9ec1-205467e8e3e5

Please Confirm

MAP HOSTS
BACK
START OVER

CLOSE

**Step 7:** Select the checkbox beside **Please Confirm**, and then click the **Map Hosts** button:



A dedicated path between the selected volume and hosts(s) is created.

**Step 8:** To verify that the path was created, click the storage device's **Paths** icon:



The **Paths** information appears:

Paths (4)

Search

Select	Identifier	Health	Volume NQN	Host NQN	VLAN
<input type="checkbox"/>	78f2ba1-ece9-4f81-a2b9-e5d6c3e9ec78e71db812-47ad-4e49-892e-a60d48ef7b09	OK	nqn.1992-05.com.wdc.b260c.vol1		fabric2:3
<input type="checkbox"/>	cd958cae-d7a4-44cc-a772-73833dd08148712578aa-b36f-44fe-aa7f-3b4da3528392	OK	nqn.1992-05.com.wdc.b260c.vol2	nqn.1992-05.com.wdc.test1	
<input type="checkbox"/>	c02428b1-170e-4cbf-9a44-2677f65a5e20f1656e72-a40d-4d7d-a766-49a0a20d1253	OK	nqn.1992-05.com.wdc.b260c.vol3		fabric2:2
<input type="checkbox"/>	35bf8f4-7e46-4170-91fe-f89f2f6afb7133d4cc02-9e2b-4dc2-8726-c3cfc32a9745	OK	nqn.1992-05.com.wdc.b260c.vol4	nqn.1992-05.com.wdc.test2	

< < 1 > >

1-4 of 4

ACTIONS

**Step 9:** Review the listed paths to identify the one referencing the previously selected volume and host(s); the volume and host NQNs will be listed under the **Volume NQN** and **Host NQN** columns.

### 3.1.6.16 Configuring a Path to a VLAN

This task provides instructions for configuring a path between a volume and a VLAN on an F3x00 storage device using the OCGUI.

#### Before you begin:



**Note:** A path is a dedicated line of communication, which cannot be established until both the volume and VLAN have been created.



**Note:** The following instructions define how to create a path to a VLAN through the storage device's **Volumes** page. That same path may also be created from the other direction—to a volume through the device's **VLANs** page.

**Step 1:** Navigate to the storage device (see [Navigating to a Device](#) (page 50)).

**Step 2:** Click the storage device's **Volumes** icon:



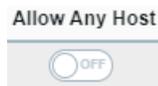
The **Volumes** information appears:

Select	Name	Pool	Identifier	Description	NQN	Allow Any Host	Capacity	Health	Active Queue Pairs	Remote Connections	Serial Number
<input type="checkbox"/>	Volume01	0	bb47bc06-041c-40ce-88a1-227ab5fa642a	Click to Edit	nqn.1992-05.com.wdc.f3000-957a41:Volume01	OFF	1.074 GB	OK	0		SN000AF7957A40000EA1
<input type="checkbox"/>	Volume02	0	5b2054e4-1d7f-42c9-8657-1ca62ecd9a68	Click to Edit	nqn.1992-05.com.wdc.f3000-957a41:Volume02	OFF	1.074 GB	OK	0		SN000AF7957A40000EA2
<input type="checkbox"/>	Volume03	0	09f0178e-9490-4e9f-ff08-2685a3991557	Click to Edit	nqn.1992-05.com.wdc.f3000-957a41:Volume03	OFF	1.074 GB	OK	0		SN000AF7957A40000EA3
<input type="checkbox"/>	Volume04	0	5568083f-20ee-4e09-9e80-b088e644d4bb	Click to Edit	nqn.1992-05.com.wdc.f3000-957a41:Volume04	OFF	1.074 GB	OK	0		SN000AF7957A40000EA4
<input type="checkbox"/>	Volume05	0	bc4f89b3-1f37-4320-8671-47eb58030142	Click to Edit	nqn.1992-05.com.wdc.f3000-957a41:Volume05	OFF	1.074 GB	OK	0		SN000AF7957A40000EA5

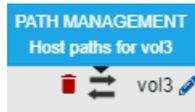
**Step 3:** From the list of available volumes, identify the one that will be used to create the path.

The volume must be configured to allow any host, or a path cannot be established between it and a VLAN. If the volume is incorrectly configured, it will be indicated by the following:

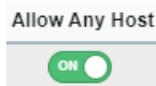
- The **Allow Any Host** setting will be toggled to the **OFF** (disabled) position:



- When the user hovers over the path arrows beside the volume **Name**, the tooltip will indicate that this volume is expecting a host path, not a VLAN path:



**Step 4:** If needed, enable the **Allow Any Host** setting for that volume by clicking the on/off toggle switch:

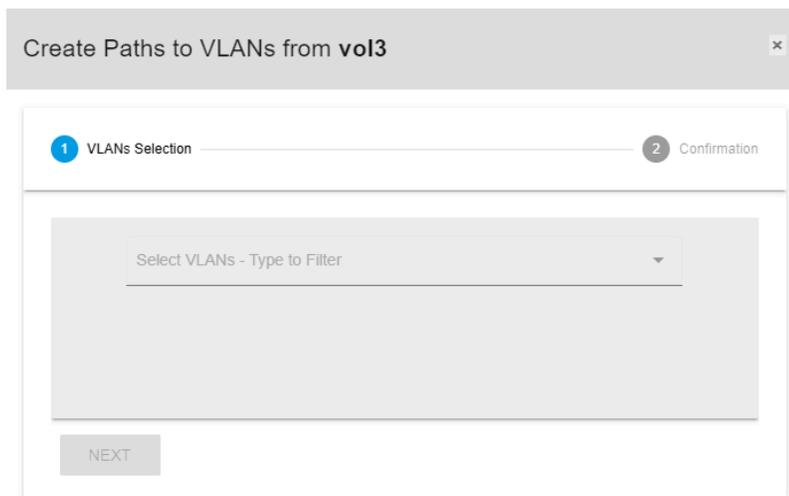


When the user hovers over the path arrows beside the volume **Name**, the tooltip will indicate that this volume is now expecting a VLAN path:



**Step 5:** Click the path arrows beside the volume **Name**.

The **Create Paths to VLANs** dialog box opens, showing the **VLANs Selection** step:



[CLOSE](#)

**Step 6:** From the **Select VLANs** drop-down list, select the VLAN to be connected to this volume. Then click the **Next** button:

**NEXT**

The **Confirmation** step appears, showing the chosen VLAN:

Create Paths to VLANs from **vol3**

---

These VLANs will be mapped to "vol3"

fabric1.2: d26b2a5d-75ea-4d48-815d-1187ad80814c

Please Confirm

MAP VLANS
BACK
START OVER

CLOSE

**Step 7:** Select the checkbox beside **Please Confirm**, and then click the **Map VLANs** button: A path between the selected volume and VLAN is created.

**Step 8:** To verify that the path was created, click the storage device's **Paths** icon:



The **Paths** information appears:

Paths (4)

Search

Select	Identifier	Health	Volume NQN	Host NQN	VLAN
<input type="checkbox"/>	78f2ba1-ec9-4f81-a2b9-e5d6c3e9ec78e71db812-47ad-4e49-892e-a60d48ef7b09	OK	nqn.1992-05.com.wdc.b260c.vol1		fabric2:3
<input type="checkbox"/>	cd958cae-d7a4-44cc-a772-73833dd08148712578aa-b36f-44fe-aa7f-3b4da3528392	OK	nqn.1992-05.com.wdc.b260c.vol2	nqn.1992-05.com.wdc.test1	
<input type="checkbox"/>	c02428b1-170e-4cbf-9a44-2677f65a5e20f1656e72-a40d-4d7d-a766-49a0a20d1253	OK	nqn.1992-05.com.wdc.b260c.vol3		fabric2:2
<input type="checkbox"/>	35bf8f4-7e46-4170-91fe-f89f2f6afb7133d4cc02-9e2b-4dc2-8726-c3cfc32a9745	OK	nqn.1992-05.com.wdc.b260c.vol4	nqn.1992-05.com.wdc.test2	

< < 1 > >

1-4 of 4

ACTIONS

**Step 9:** Review the listed paths to identify the one referencing the previously selected volume and VLAN; the volume NQN and VLAN identifiers will be listed under the **Volume NQN** and **VLAN** columns.

## 3.1.7 Maintenance

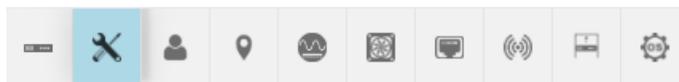
For the OpenFlex F3x00 and E3000, maintenance includes the options to power cycle, initialize, and sanitize selected devices. Power cycling is accomplished by powering-off an individual storage device from its **Administration** page in the OCGUI. Once powered-off, the storage device is no longer responsive, and must be powered-on from the **Slots** page of the chassis that encloses the storage device. Initializing and sanitizing a device can be accomplished from the same page in the OCGUI. These features provide the option to securely erase the mapping table and erase all of the blocks that have been written to the devices.

### 3.1.7.1 Power Cycling a Chassis

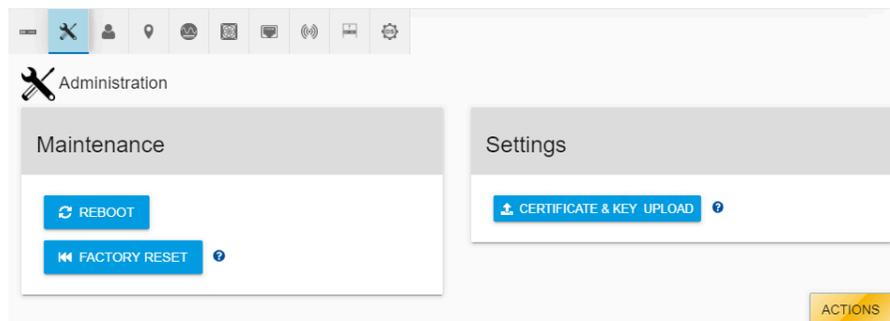
This task provides instructions for power cycling an E3000 chassis device using the OCGUI.

**Step 1:** Navigate to the chassis device (see [Navigating to a Device \(page 50\)](#)).

**Step 2:** Click the chassis's **Administration** icon:



The **Administration** information appears:



**Step 3:** Click the **Reboot** button:



A window appears, prompting the user to confirm the reboot:

Are you sure you want to **Reboot** this device?

Reboot is immediate and cannot be cancelled. This will render the device unavailable until the reboot is complete.

CANCEL REBOOT

**Step 4:** Click **Reboot**:

**REBOOT**

**Step 5:** The chassis device will reboot, rendering it unavailable until the reboot is complete. However, installed devices will remain functional.

**3.1.7.2 Power Cycling a Storage Device**

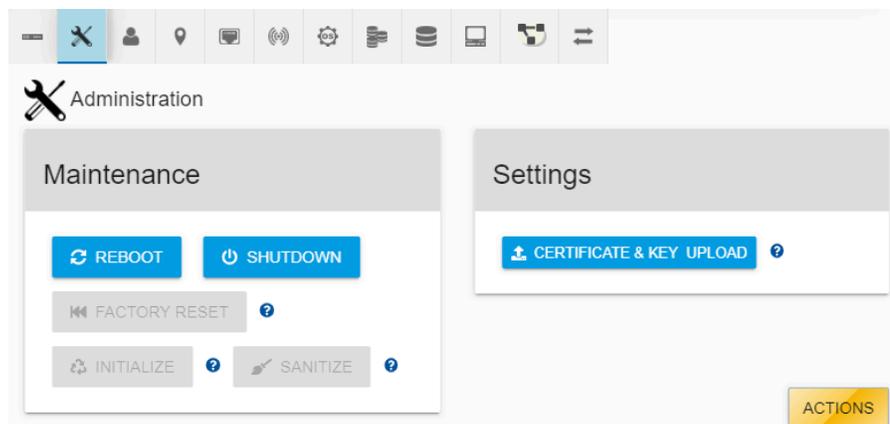
This task provides instructions for power cycling an F3x00 storage device using the OCGUI.

**Step 1:** Navigate to the storage device (see [Navigating to a Device \(page 50\)](#)).

**Step 2:** Click the storage device's **Administration** icon:



The **Administration** information appears:



**Step 3:** Click the **Reboot** button:



A window appears, prompting the user to confirm the reboot:

Are you sure you want to **Reboot** this device?

Reboot is immediate and cannot be cancelled. This will render the device unavailable until the reboot is complete.

CANCEL REBOOT

**Step 4:** Click **Reboot**:

**REBOOT**

**Step 5:** The storage device will reboot, rendering it unavailable until the reboot is complete.

### 3.1.7.3 Secure Erasing a Storage Device

This task provides instructions for performing a Secure Erase on an F3x00 storage device using the OCGUI.

**Before you begin:** The Secure Erase feature provides the following options for securely erasing the storage device:

- **No Secure Erase** – initializes the number of storage pools on the device
- **User Data Secure Erase** – deletes the mapping table and all user content present on the device
- **Crypto Secure Erase** – deletes the encryption key, making the data unrecoverable



**Note:** Before performing a Secure Erase, all paths and volumes on the storage device must be deleted. Instructions for deleting paths and volumes are included in this procedure.

**Step 1:** Navigate to the storage device (see [Navigating to a Device](#) (page 50)).

#### Deleting the Paths

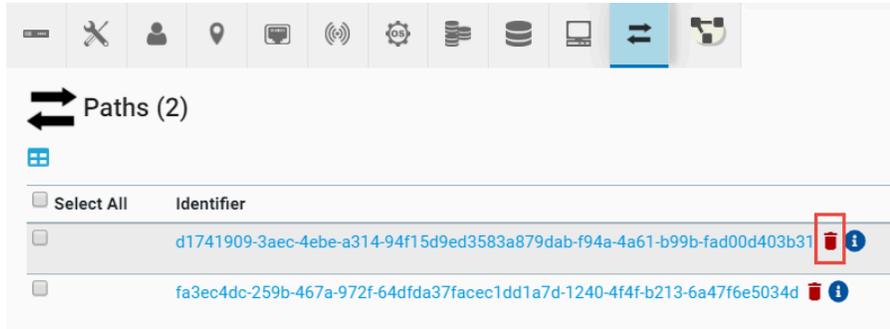
**Step 2:** Click the storage device's **Paths** icon:



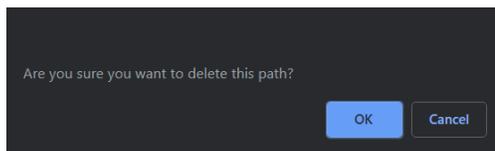
The **Paths** information appears:

Identifier	Health	Volume NQN	Host NQN	VLAN
78f2fba1-ec99-4f81-a2b9-e5d6c3e9ec78e71db812-47ad-4e49-892e-a60d48ef7b09	OK	nqn.1992-05.com.wdc.b260c.vol1		fabric2.3
cd958cae-d7a4-44cc-a772-73833dd08148712578aa-b36f-44fe-aaf7-3b4da3528392	OK	nqn.1992-05.com.wdc.b260c.vol2	nqn.1992-05.com.wdc.test1	
c02428b1-170e-4cbf-9a44-2677f65a5e20f1656e72-a40d-4d7d-a766-49a0a20d1253	OK	nqn.1992-05.com.wdc.b260c.vol3		fabric2.2
350ff8f4-7e46-4170-91fe-f89f2f6afb7133d4cc02-9e2b-4dc2-8726-c3cfc32a9745	OK	nqn.1992-05.com.wdc.b260c.vol4	nqn.1992-05.com.wdc.test2	

**Step 3:** Click the trash can icon next to the path:



The user is asked to confirm the deletion:



**Step 4:** Click the **OK** button to delete the path.

**Step 5:** If other paths are present, repeat these steps to delete any remaining paths.

**Step 6:** Review the **Paths** information to verify that all paths have been deleted:

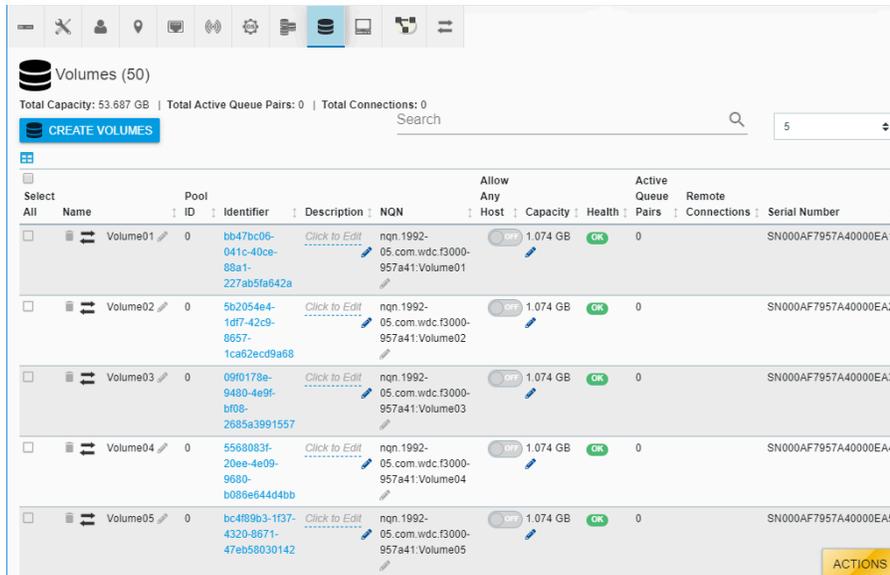


### Deleting the Volumes

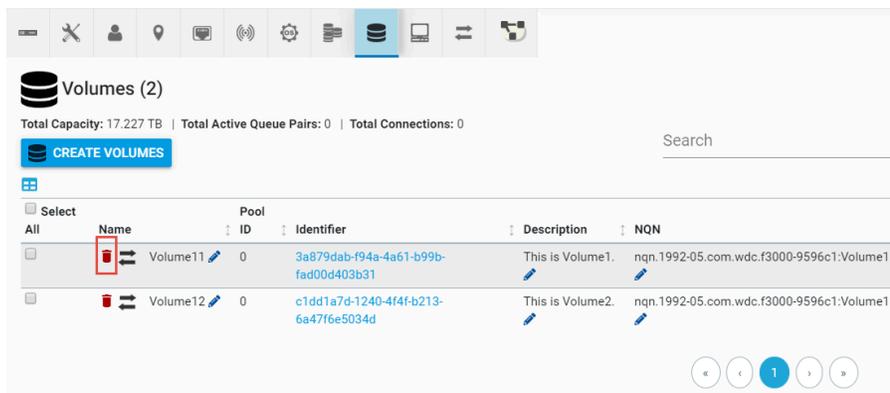
**Step 7:** Click the storage device's **Volumes** icon:



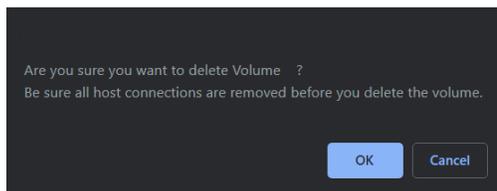
The **Volumes** information appears:



**Step 8:** Click the trash can icon in the **Name** column to delete the volume:



The user is asked to confirm the deletion:



**Step 9:** Click the **OK** button to delete the volume.

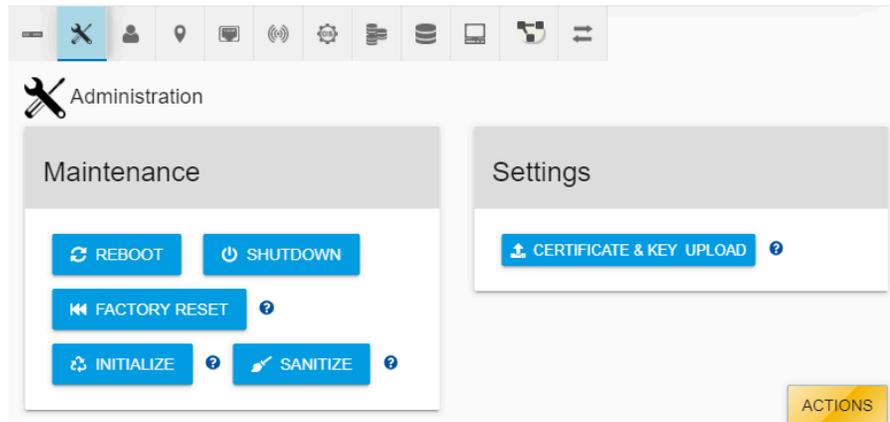
**Step 10:** If other volumes are present, repeat these steps to delete any remaining volumes.

**Performing the Secure Erase**

**Step 11:** Click the storage device's **Administration** icon:



The **Administration** information appears. If all paths and volumes have been deleted, the **Initialize** button will be enabled:



**Step 12:** Click the **Initialize** button:



A window appears, prompting the user to confirm the initialization. Drop-down lists provide options for selecting the number of pools on the storage device and the following secure erase types:

- **No Secure Erase** – Initializes the number of storage pools on the device
- **User Data Secure Erase** – Deletes the mapping table and all user content present on the device
- **Crypto Secure Erase** – Deletes the encryption key, making the data unrecoverable

Are you sure you want to **Initialize** this device?

This will Initialize the device. Please select the number of pools to be initialized.

-- Please select the number of Pools --

This will Secure Erase the device. Please select the type of Secure Erase:

No Secure Erase

\* User Data Erase deletes the mapping table and all user content present in the device.  
\*\* Cryptographic Erase deletes the encryption key making the data unrecoverable.

CANCEL INITIALIZE

**Step 13:** Select the appropriate options for the number of pools and secure erase type. Then click **Initialize**:

INITIALIZE

A progress modal appears, showing that the initialization is in progress:



**Result:** When the progress modal disappears, and the **Administration** information is displayed, the secure erase procedure is complete.

### 3.1.7.4 Sanitizing a Storage Device

This task provides instructions for performing a Sanitize on an F3x00 storage device using the OCGUI.

#### Before you begin:



**Note:** Before performing a Sanitize, all paths and volumes on the storage device must be deleted. Instructions for deleting paths and volumes are included in this procedure.

The Sanitize feature provides the following options for securely sanitizing the storage device:

- **Block Erase** – deletes the mapping table and erases all the blocks that have been written to the device
- **Cryptographic Erase** – deletes the encryption key, making the data unrecoverable

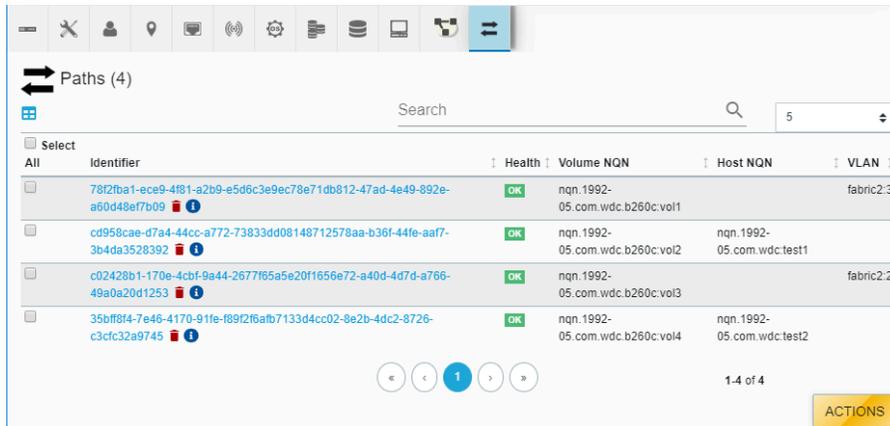
**Step 1:** Navigate to the storage device (see [Navigating to a Device](#) (page 50)).

#### Deleting the Paths

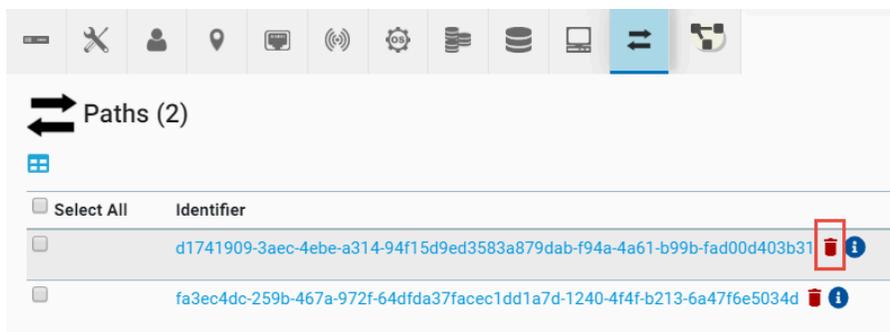
**Step 2:** Click the storage device's **Paths** icon:



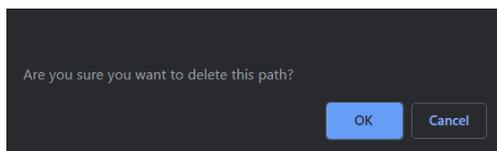
The **Paths** information appears:



**Step 3:** Click the trash can icon next to the path:



The user is prompted to confirm the deletion:



**Step 4:** Click the **OK** button to delete the path.

**Step 5:** If other paths are present, repeat these steps to delete any remaining paths.

**Step 6:** Review the **Paths** information to verify that all paths have been deleted:



### Deleting the Volumes

**Step 7:** Click the storage device's **Volumes** icon:



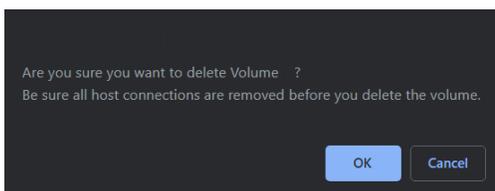
The **Volumes** information appears:

Select	Name	Pool	Identifier	Description	NQN	Allow Any Host	Capacity	Health	Active Queue Pairs	Remote Connections	Serial Number
<input type="checkbox"/>	Volume01	0	bb47bc06-041c-40ce-88a1-227ab5fa642a	Click to Edit	nqn.1992-05.com.wdc.f3000-957a41:Volume01	OFF	1.074 GB	OK	0		SN000AF7957A40000EA1
<input type="checkbox"/>	Volume02	0	5b2054e4-1d7f-42c9-8657-1ca62ecd9a68	Click to Edit	nqn.1992-05.com.wdc.f3000-957a41:Volume02	OFF	1.074 GB	OK	0		SN000AF7957A40000EA2
<input type="checkbox"/>	Volume03	0	09f0178e-9490-4e9f-8f08-2685a3991557	Click to Edit	nqn.1992-05.com.wdc.f3000-957a41:Volume03	OFF	1.074 GB	OK	0		SN000AF7957A40000EA3
<input type="checkbox"/>	Volume04	0	5568083f-20ee-4e09-9680-b088e644d4bb	Click to Edit	nqn.1992-05.com.wdc.f3000-957a41:Volume04	OFF	1.074 GB	OK	0		SN000AF7957A40000EA4
<input type="checkbox"/>	Volume05	0	bc4f89e3-1f37-4320-8671-47eb58030142	Click to Edit	nqn.1992-05.com.wdc.f3000-957a41:Volume05	OFF	1.074 GB	OK	0		SN000AF7957A40000EA5

**Step 8:** Click the trash can icon next to the volume:

Select	Name	Pool	Identifier	Description	NQN
<input type="checkbox"/>	Volume11	0	3a879dab-f94a-4a61-b99b-fad00d403b31	This is Volume1.	nqn.1992-05.com.wdc.f3000-9596c1:Volume11
<input type="checkbox"/>	Volume12	0	c1dd1a7d-1240-4f4f-b213-6a47f6e5034d	This is Volume2.	nqn.1992-05.com.wdc.f3000-9596c1:Volume12

The user is prompted to confirm the deletion:



**Step 9:** Click the **OK** button to delete the volume.

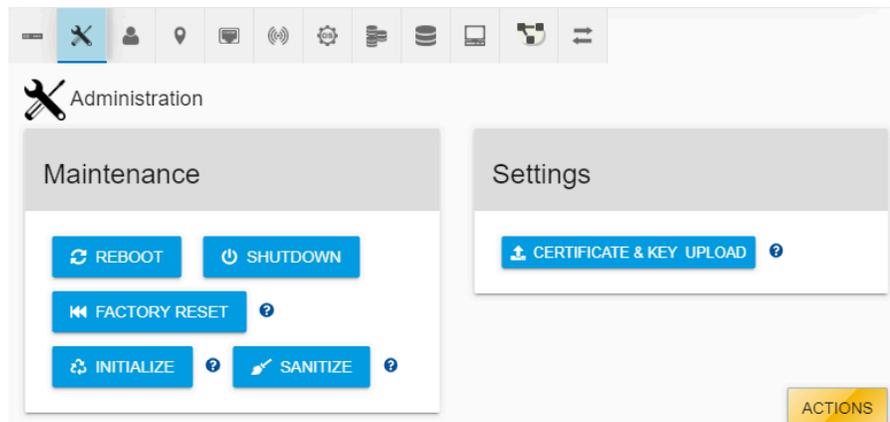
**Step 10:** If other volumes are present, repeat these steps to delete any remaining volumes.

## Sanitizing the Device

**Step 11:** Click the storage device's **Administration** icon:



The **Administration** information appears. If all paths and volumes have been deleted, the **Sanitize** button will be enabled:



**Step 12:** Click the **Sanitize** button:



A window appears, prompting the user to confirm the sanitization. A drop-down lists allows the user to select from the following sanitize options:

- **Start Block Erase** – deletes the mapping table and erases all the blocks that have been written to the device
- **Start Crypto Erase** – deletes the encryption key, making the data unrecoverable

Are you sure you want to **Sanitize** this device?

This will Sanitize the device. This operates similar to a Secure Erase.

-- Please select the Sanitize option --

\* Block Erase deletes the mapping table and erases all the blocks that have been written.  
\*\* Cryptographic Erase deletes the encryption key making the data unrecoverable.

CANCEL    SANITIZE

**Step 13:** Select the appropriate erase option. Then click **Sanitize**:

**SANITIZE**

A progress modal appears, showing that the sanitization is in progress:



**Result:** When the progress modal disappears, and the **Administration** information is displayed, the sanitize procedure is complete.

## 3.1.8 Firmware Upgrade

### 3.1.8.1 Upgrading Firmware

This task provides instructions for upgrading firmware on the OpenFlex F3x00 and E3000 using the OCGUI.

**Step 1:** Open a web browser and go to: <https://portal.wdc.com/Support/s/>.

The **Western Digital Enterprise Support Center** will appear.

**Step 2:** Log in to the **Western Digital Enterprise Support Center** using a valid email address and password:

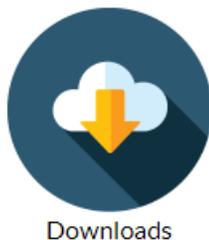
Sign in to  
SUPPORT PORTAL

Email
Password

LOGIN

Several support options will appear on the page.

**Step 3:** Click the **Downloads** option:



The Western Digital downloads page will appear.

**Step 4:** From the **Identify Product** section, select the **Product**, **OS / Type**, and **Release Version**:

1. Identify Product    2. Select Files for Download    3. Review & Download Files

**Pick Product Options:**

- 1 Select Product... ▾
- 2 Select OS / Type ▾
- 3 Release Version ▾

**Available Downloads:** Expand All

Please select your options on the left.

**Custom Download List:**

Files: 0    Total Size: 0b

The **Select Files for Download** section updates with the applicable options:

1. Identify Product    2. Select Files for Download    3. Review & Download Files

**Pick Product Options:**

- 1 Select Product... ▾
- 2 Select OS / Type ▾
- 3 Release Version ▾

**Available Downloads:** Expand All

- Documentation
- Firmware

**Custom Download List:**

Files: 0    Total Size: 0b

**Step 5:** From the **Select Files for Download** section, expand the **Firmware** option and select the checkbox for the appropriate firmware file(s):

**2. Select Files for Download**

**Available Downloads:** Expand All

File Name	Size	Released
<input checked="" type="checkbox"/> Firmware_File	1.96MB	11 Oct 2018
<input checked="" type="checkbox"/> Firmware_File	843.7KB	22 Oct 2018

 **Note:** Filenames will vary, depending on the options chosen in the **Identify Product** section.

**Step 6:** In the **Review & Download Files** section, review the selected files to ensure that all intended files are included in the list.

3. Review & Download Files

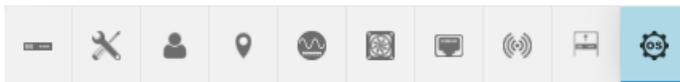
Custom Download List:

Firmware_File	1.96MB <span style="color: red; font-weight: bold;">✘</span>
Firmware_File	843.7KB <span style="color: red; font-weight: bold;">✘</span>
Files: 2 Total Size: 2.79MB	
<input checked="" type="radio"/> Zip <input type="radio"/> Tar	

RESET
DOWNLOAD FILES

- Step 7:** If needed, remove an unwanted file by clicking its red X.
- Step 8:** Select the appropriate archive file format by clicking either **Zip** or **Tar**.
- Step 9:** Click the **Download Files** button to download the selected files.
- Step 10:** If needed, unzip/extract the file to the desired location.
- Step 11:** Navigate to the chassis or storage device (see [Navigating to a Device \(page 50\)](#)).
- Step 12:** Click the device's **OS** icon:

**Figure 183:** Chassis Device OS Icon



**Figure 184:** Storage Device OS Icon



The **Device OS** information appears:

**Figure 185:** Chassis Device OS Information

✖
👤
📍
📶
🖨️
📡
📄
⚙️

OS
Device OS

UPDATE OS

Attribute		Attribute	
Name	Vendor Firmware	Version	1.1.0

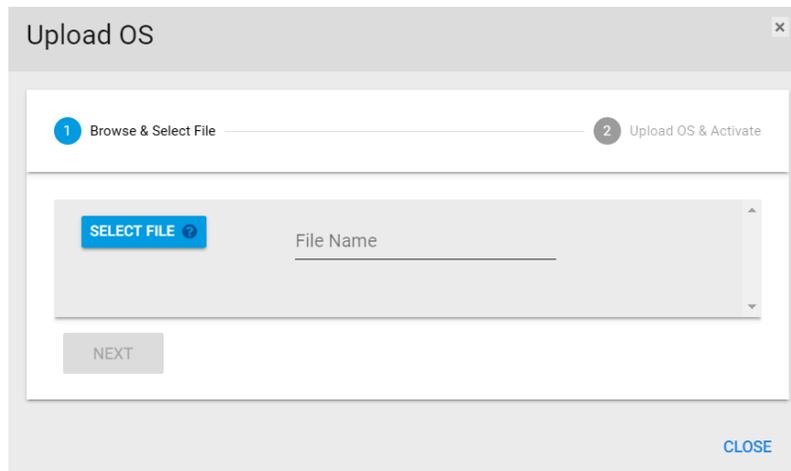
ACTIONS

**Figure 186:** Storage Device OS Information

**Step 13:** Click the **Update OS** button:

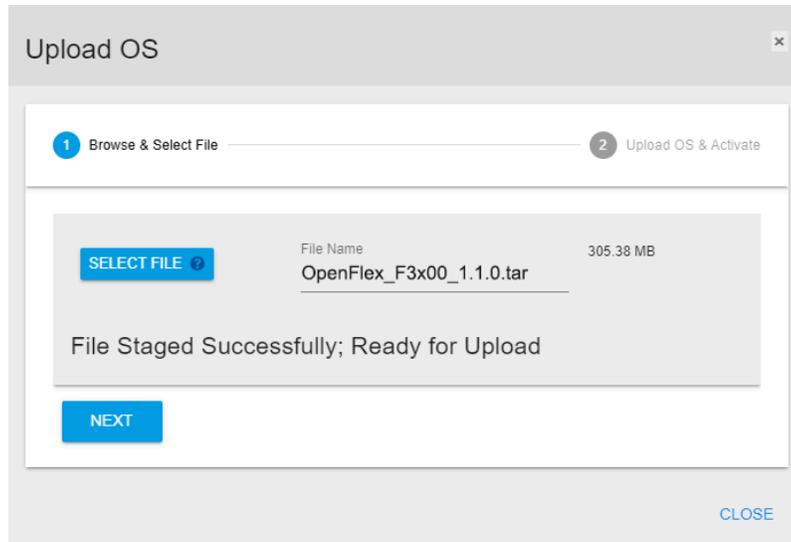


The **Update OS** window appears, showing the **Browse & Select File** step:



**Step 14:** Click the **Select File** button and select the firmware upgrade file that was previously downloaded.

The **Upload OS** window updates to display the selected file:

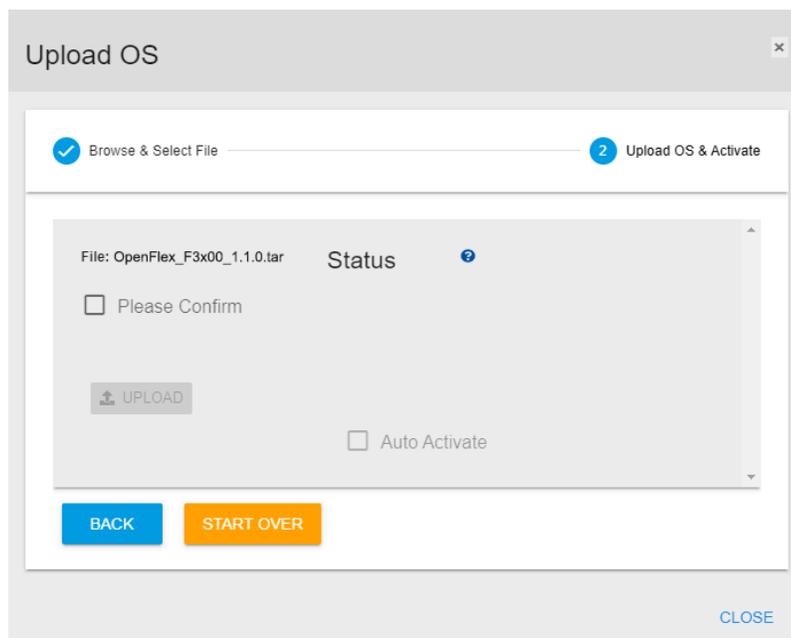


**Note:** Filenames will vary, depending on the device type and firmware version involved.

**Step 15:** Click the **Next** button:



The **Upload OS** window updates to show the **Upload OS & Activate** step:

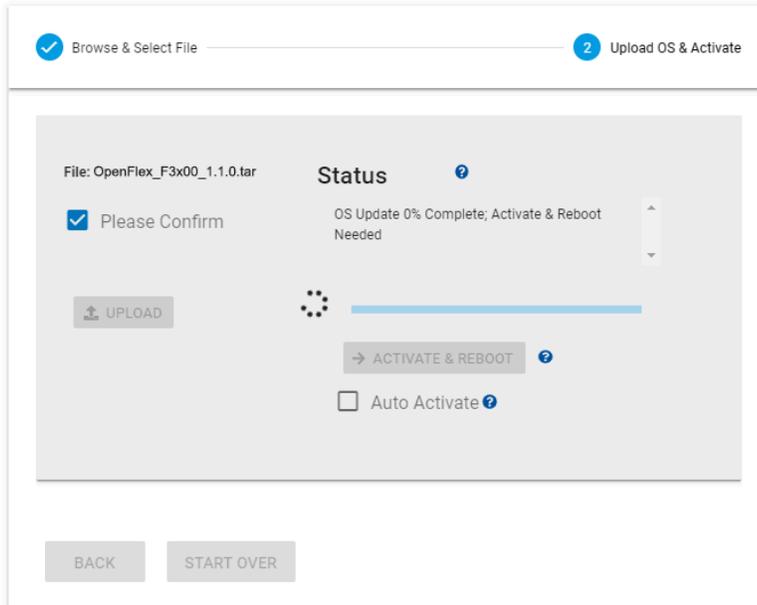


**Step 16:** Click the checkbox beside **Please Confirm**. Then click the **Upload** button:



The **Upload OS** window updates, showing an upload status:

### Upload OS

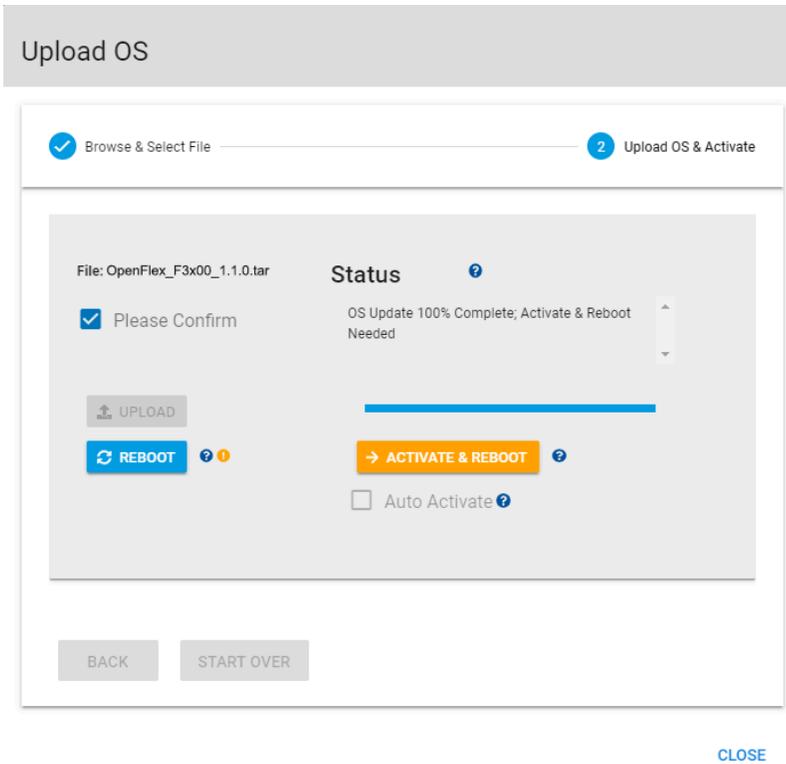


The screenshot shows the 'Upload OS' window with a progress bar at the top. The first step, 'Browse & Select File', is completed with a checkmark. The second step, 'Upload OS & Activate', is active. The main content area displays the file name 'OpenFlex\_F3x00\_1.1.0.tar' and a 'Status' section. The status indicates 'OS Update 0% Complete; Activate & Reboot Needed'. There is a 'Please Confirm' checkbox which is checked. Below this is an 'UPLOAD' button. A progress bar with a circular loading icon is shown. Below the progress bar is an 'ACTIVATE & REBOOT' button with a right-pointing arrow and a help icon. At the bottom of the main area is an 'Auto Activate' checkbox with a help icon. At the very bottom of the window are 'BACK' and 'START OVER' buttons.

[CLOSE](#)

**Step 17:** An activation and reboot cycle will be required after the upload is complete. Choose one of the following options:

- Click the **Auto Activate** checkbox to automatically activate the firmware and reboot the device after the upload is complete.
- Wait until the upload is complete; then click the **Activate & Reboot** button.



**Step 18:** After the device has rebooted, click the storage device's **OS** icon:



The **Device OS** information appears:



**Step 19:** Review the **Device OS** information to verify the firmware version has been updated.

## 3.2 Part Replacement



**Caution:** In the event of multiple/simultaneous part failures, the order of hot replacement should be as follows:

1. Fans
2. PSUs
3. All other CRUs

**Table 31:** Summary of Part Replacement Times

Part Name	Replacement Time
Fan Module	2 minutes
PSU	3 minutes
BMC Module	2 minutes
OpenFlex F3x00	2 minutes
Rails	65 minutes
Chassis	60 minutes

### 3.2.1 Fan Module Replacement



**Important:** If more than one Fan Module has failed, each Fan Module must be replaced one at a time. Replacing more than one Fan Module at a time may cause the enclosure to go into thermal shutdown.

**Table 32:** Replacement Procedure Info

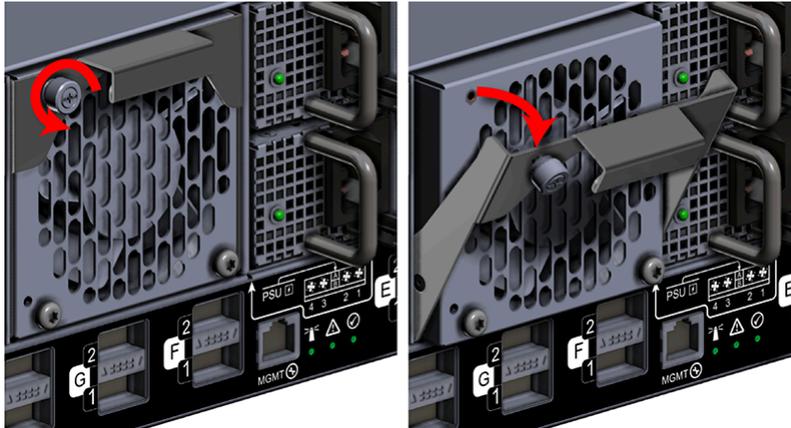
Required Tools	# of People Required	Time Required
None	1	2 minutes

**Step 1:** Unpack and inspect the new Fan Module for damage.

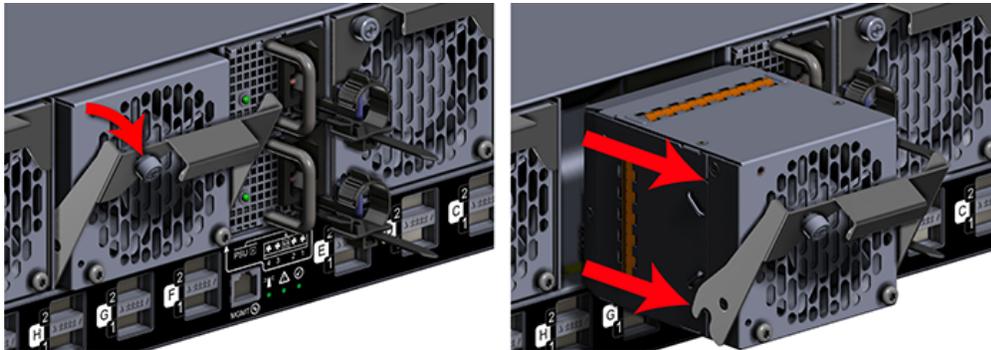
- a. Inspect the packaging that the Fan Module replacement was shipped in and record any damage to the box. Large cuts, open boxes, and crushed corners should be reported.
- b. Remove the Fan Module from the packaging and verify that there is no damage to the Fan Module. Dents, scratches, and broken parts should be reported. If major damage has occurred to the Fan Module, DO NOT use the replacement part.
- c. Store in a safe location until the Fan Module is needed for installation.

**Step 2:** Remove the Fan Module from the enclosure.

- a. From the rear of the rack, unlock the Fan Module by turning the thumbscrew counterclockwise until the screw threads are not engaged any longer. The location of the thumbscrew is shown in the following image.

**Figure 196:** Fan Module Release Handle Unlocked

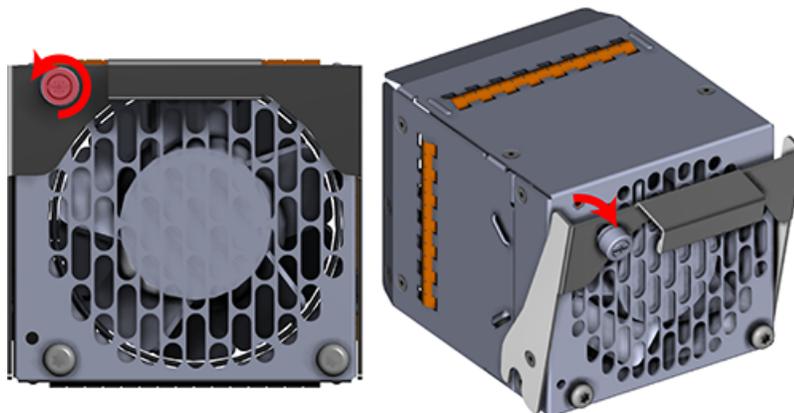
- b. Pull the release handle out until the Fan Module is unseated and can be removed from the fan bay.

**Figure 197:** Remove Fan Module

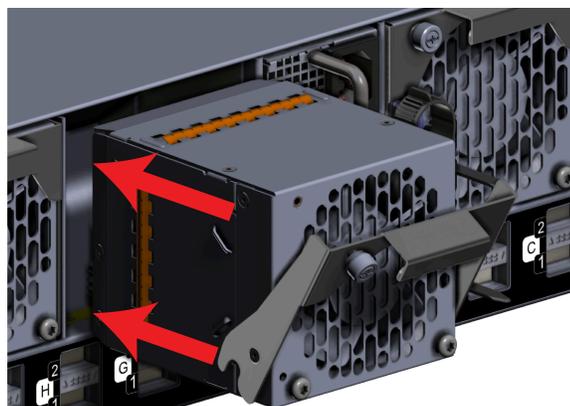
- c. Remove each Fan Module in the same way the first was removed.

**Step 3:** Install the new Fan Module into the enclosure.

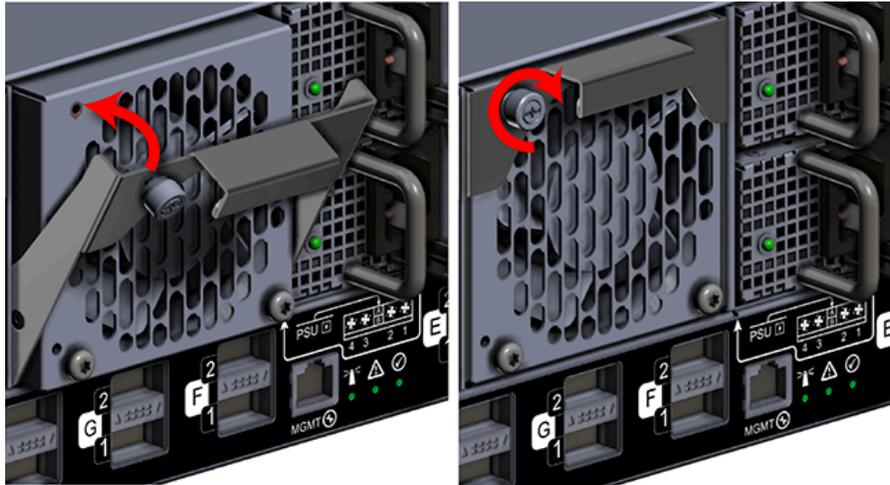
- a. Unlock the Fan Module by turning the thumbscrew counterclockwise until the screw threads are not engaged any longer. The location of the thumbscrew is shown in the following image.

**Figure 198:** Prepare Fan Module

- b. Gently slide the Fan Module into the fan bay until the release handle is engaged with the chassis. When the handle lifts up slightly, it is an indicator that the release handle is engaged with the chassis.

**Figure 199:** Fan Module Engaged

- c. Press the release handle into the Fan Module and secure it in place by turning the thumbscrew clockwise until it is tight.

**Figure 200:** Fan Module Secure

- d. Verify that the Fan Module is securely latched into the chassis by pulling on the release handle and ensuring the Fan Module does not move when pulled. Reinstall the Fan Module if it is not securely installed into the chassis.

### 3.2.2 PSU Replacement

Be careful not to remove both power cables if performing a hot-swap of a PSU. The system needs one PSU running to prevent data disruption.

**Table 33:** Replacement Procedure Info

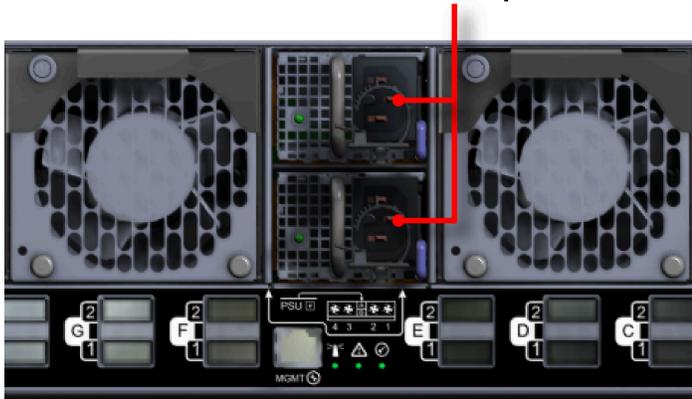
Required Tools	# of People Required	Time Required
None	1	3 minutes

**Step 1:** Unpack and inspect the new PSU for damage.

- a. Inspect the packaging that the PSU replacement was shipped in and record any damage to the box. Large cuts, open boxes, and crushed corners should be reported.
- b. Remove the PSU from the packaging and verify that there is no damage to the PSU. Dents, scratches, and broken parts should be reported. If major damage has occurred to the PSU, DO NOT use the replacement part.
- c. Store in a safe location until the PSU is needed for installation.

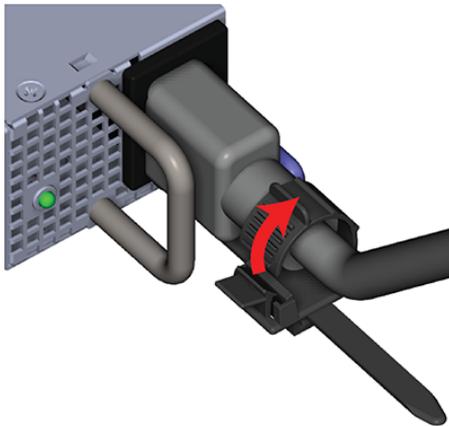
**Step 2:** Disconnect the power cable from the failed PSU.

**Figure 201:** Enclosure Power and Data Connections  
**Power Receptacles**



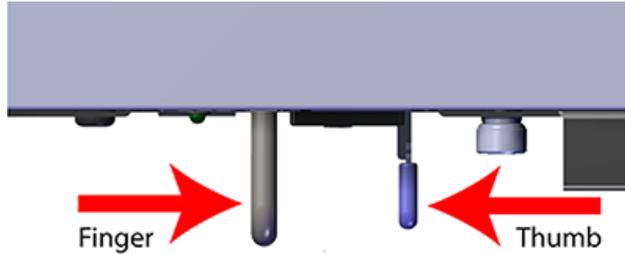
- a. Move to the rear of the rack and open the cable retention clip on the PSU and disconnect the power cable from the PSU.

**Figure 202:** Cable Retention Clip Operation

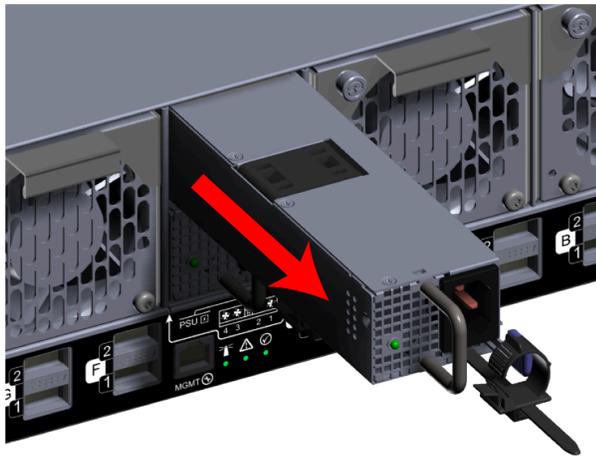


**Step 3:** Remove the PSU from the enclosure.

- a. With your left hand, grasp the metal ring handle with your fingers and use your thumb to press the latch release using a pinching motion.

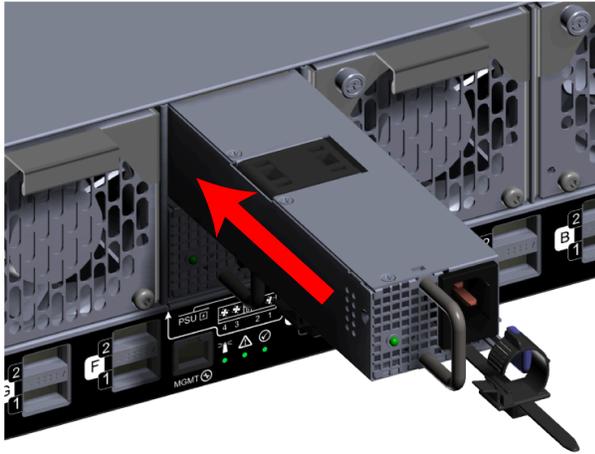
**Figure 203:** PSU Release Latch Operation (Top View)

- b. Carefully pull the PSU out of the PSU Bay.

**Figure 204:** Remove PSU

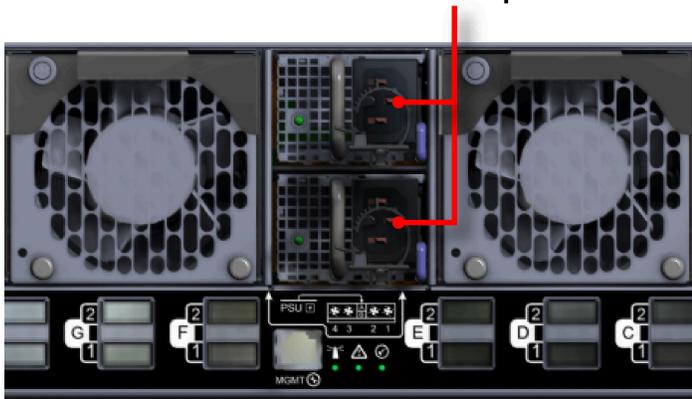
**Step 4:** Install the new PSU into the enclosure.

- a. Orient the PSU with the power socket oriented to the side shown in the image and insert it into the PSU slot.

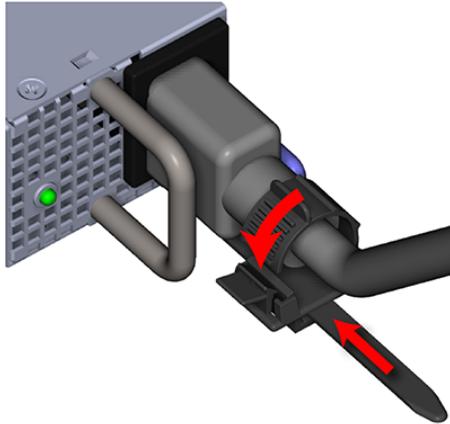
**Figure 205:** PSU Installation

- b. Verify that the PSU is fully seated and latched into the PSU slot by gently pulling on the handle.

**Step 5:** Connect the power cable into the new PSU.

**Figure 206:** Enclosure Power Connections  
Power Receptacles

- a. Open the cable retention clip on the PSU and connect the power cable into power receptacle on the PSU.

**Figure 207:** Cable Retention Clip Operation

- b. Slide the retention clip forward on the PSUs until it stops near the cable connectors. Doing this will ensure that the retention clips function properly in the event the cable is pulled on.

### 3.2.3 BMC Module Replacement

**Table 34:** Replacement Procedure Info

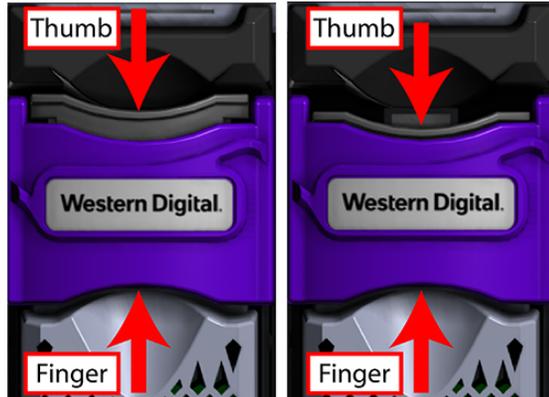
Required Tools	# of People Required	Time Required
None	1	2 minutes

**Step 1:** Unpack and inspect the new BMC Module for damage.

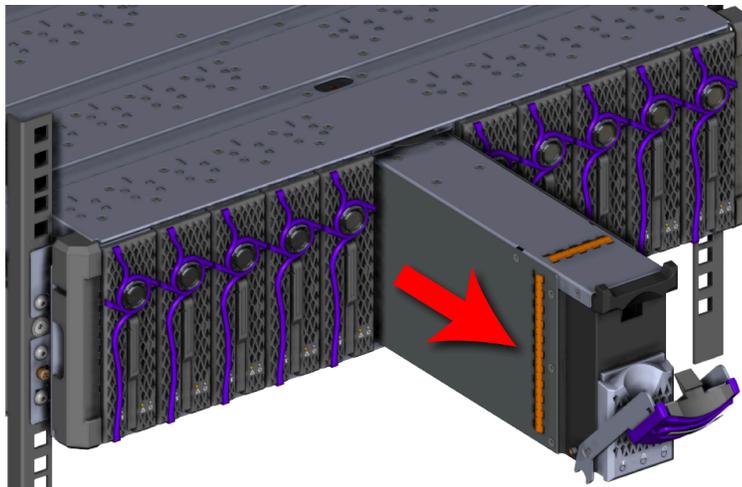
- a. Inspect the packaging that the BMC Module replacement was shipped in and record any damage to the box. Large cuts, open boxes, and crushed corners should be reported.
- b. Remove the BMC Module from the packaging and verify that there is no damage to the BMC Module. Dents, scratches, and broken parts should be reported. If major damage has occurred to the BMC Module, DO NOT use the replacement part.
- c. Store in a safe location until the BMC Module is needed for installation.

**Step 2:** Remove the BMC Module from the enclosure.

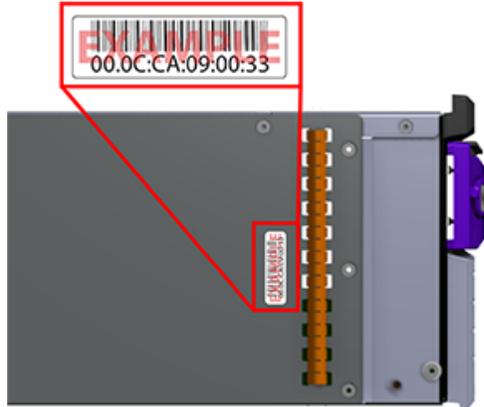
- a. From the front of the rack, grasp the release handle with your forefinger on the bottom and thumb on the top. Press the release latch downward with your thumb. The handle will eject from the front of the module:

**Figure 208:** BMC Module Release Handle Operation

- b. Lower the release handle until the BMC Module is fully unseated (this occurs at about 60°). Pull the BMC Module out of the chassis, ensuring that you support the under side of the module with your other hand:

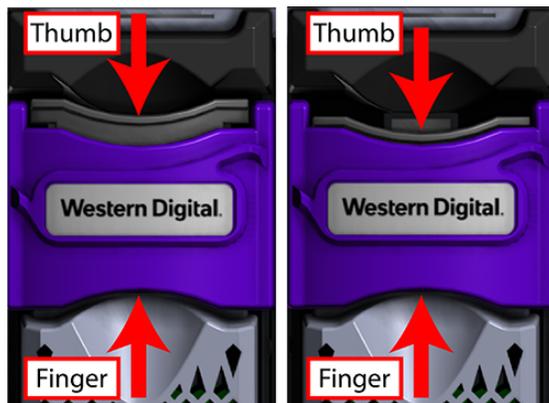
**Figure 209:** Remove BMC Module

- c. Locate the sticker on the side of the BMC Module that lists the MAC address for that module. Record the MAC address for later use; it will be used to navigate to the BMC/chassis GUI in order to verify the system health and access the storage.

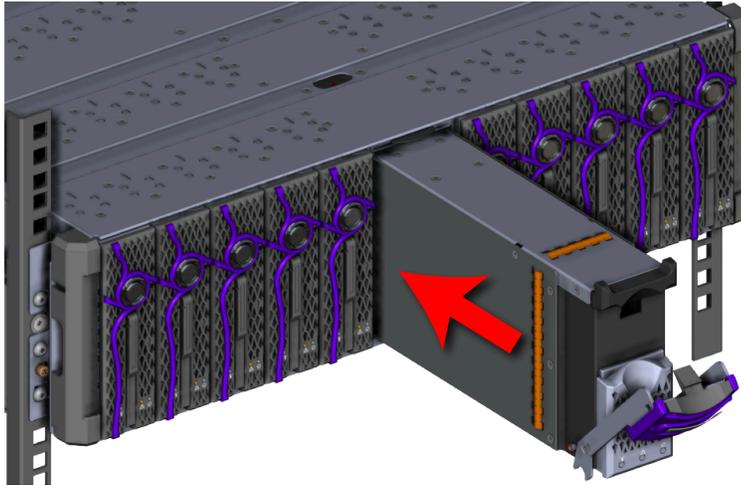
**Figure 210:** BMC Module MAC Address Label

**Step 3:** Install the new BMC Module into the enclosure.

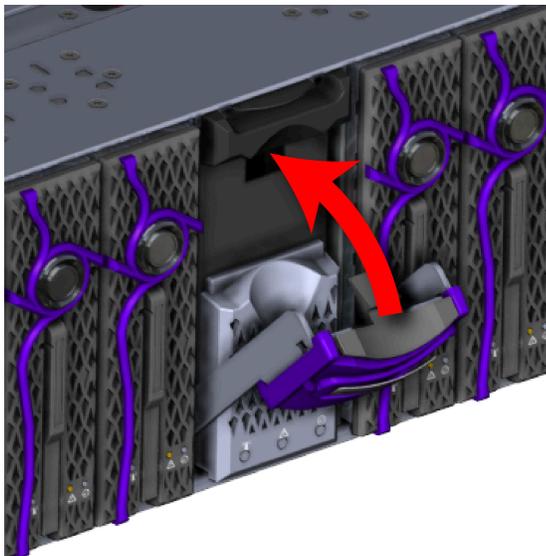
- a. Grasp the release handle with your forefinger on the bottom and thumb on the top of the release latch and press the release latch with your thumb. The handle will eject from the front of the BMC module.

**Figure 211:** BMC Module Release Handle Operation

- b. Gently slide the BMC Module into the center chassis slot until the release handle lifts up slightly, indicating that it is engaged with the chassis:

**Figure 212:** BMC Module Installation

- c. Lift the release handle up and press it into the BMC Module to secure it into the slot:

**Figure 213:** Secure BMC Module

- d. Verify that the BMC module is securely latched into the chassis by pulling on the latch and ensuring the BMC module does not move when pulled. Reinstall the BMC module if it is not securely installed into the chassis.

### 3.2.4 OpenFlex F3x00 Replacement



**Note:** Both PSUs and the BMC Module must be operational before replacing an OpenFlex F3x00 device.

**Table 35:** Replacement Procedure Info

Required Tools	# of People Required	Time Required
None	1	2 minutes

**Step 1:** Unpack and inspect the new OpenFlex F3x00 for damage.

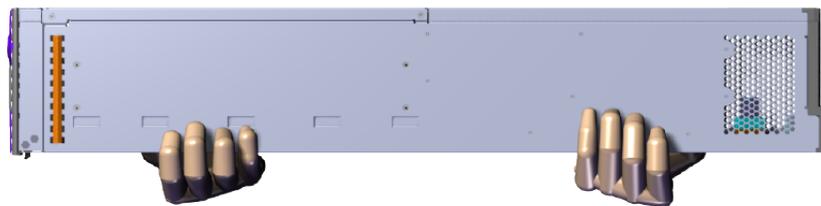
- Inspect the packaging that the OpenFlex F3x00 replacement was shipped in and record any damage to the box. Large cuts, open boxes, and crushed corners should be reported.
- Remove the OpenFlex F3x00 from the packaging and verify that there is no damage to the OpenFlex F3x00. Dents, scratches, and broken parts should be reported. If major damage has occurred to the OpenFlex F3x00, DO NOT use the replacement part.
- Store in a safe location until the OpenFlex F3x00 is needed for installation.

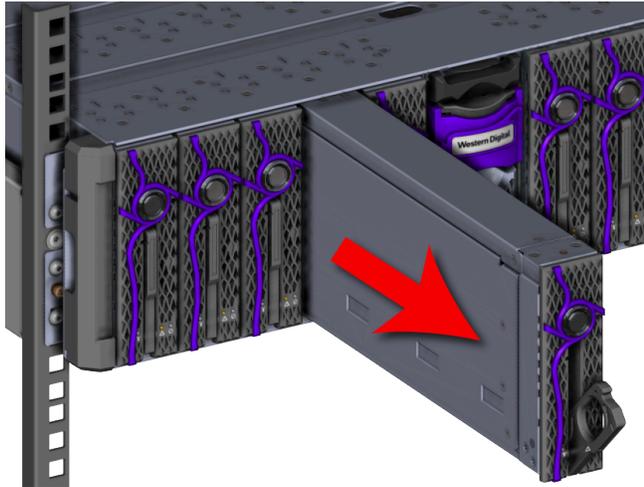
**Step 2:** Remove the OpenFlex F3x00 from the enclosure.

- From the front of the rack, press the release button on the front of the OpenFlex F3x00. The release handle will eject outward.

**Figure 214:** OpenFlex F3x00 Release Operation

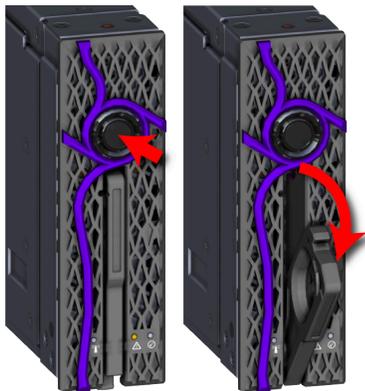
- Use the release handle to pull the OpenFlex F3x00 out of the enclosure part way. Then grasp the OpenFlex F3x00 from the underside to support it as you pull it the rest of the way out of the enclosure. See the hand placement in the image.



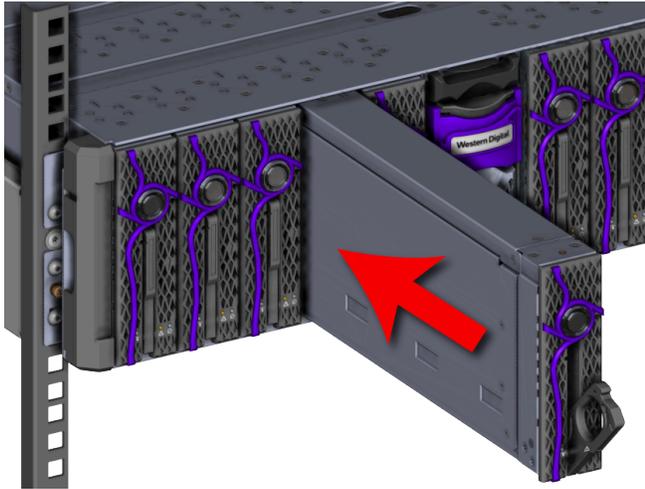
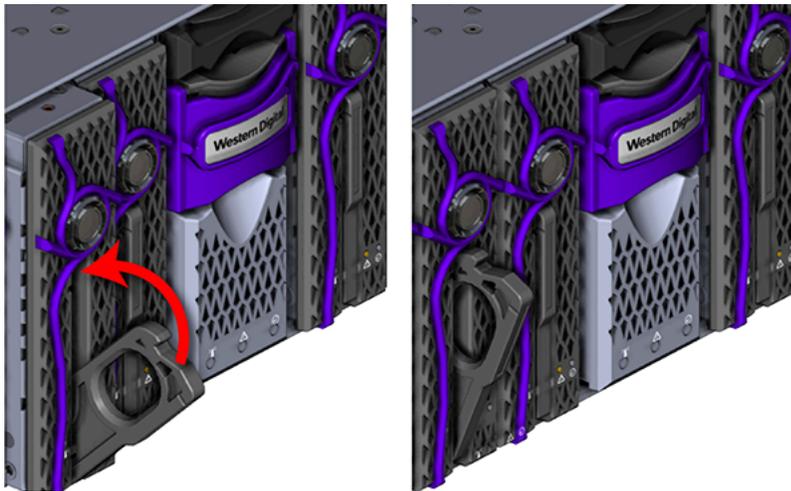
**Figure 215:** Remove OpenFlex F3x00

**Step 3:** Install the new OpenFlex F3x00 into the enclosure.

- a. Press the release button on the front of the OpenFlex F3x00. The release handle will eject outward.

**Figure 216:** OpenFlex F3x00 Release Operation

- b. Gently slide the F3x00 into the E3000 slot until the release handle lifts up slightly, indicating that it is engaged with the chassis.

**Figure 217:** OpenFlex F3x00 Install**Figure 218:** Release Handle Engage

- c. Rotate the release handle up and press it into the OpenFlex F3x00 to secure it into the slot. When it is fully installed the user will feel the handle snap and lock into place.

**Figure 219:** Secure OpenFlex F3x00

- d. Verify that the F3x00 is securely latched into the chassis by pulling on the latch and ensuring the device does not move when pulled. Reinstall the device if it is not securely installed into the chassis.



**Note:** The blue and amber LEDs will illuminate, followed shortly by the green LED. All three LEDs will remain illuminated for just over a minute until the device is initialized. Once the device is initialized, the amber and blue LEDs will turn off, and the Device Status LED that encircles the device release button will illuminate, indicating that the SPDK services are running. Wait time is **not** required between the installation of multiple OpenFlex F3x00 devices.

### 3.2.5 Rails Replacement

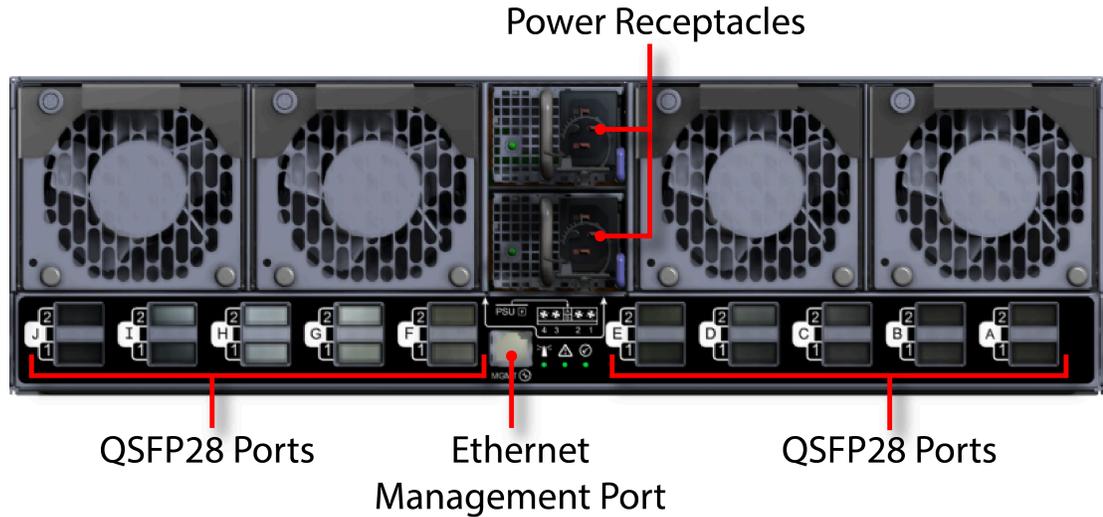
**Table 36:** Replacement Procedure Info

Required Tools	# of People Required	Time Required
T15 Torx screwdriver #2 Phillips screwdriver	2	65 minutes

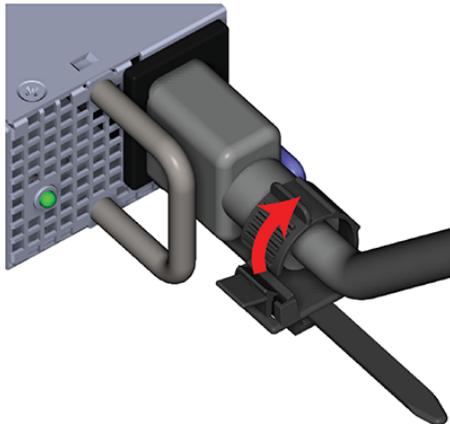
**Step 1:** Unpack and inspect the new Rack Mount Rails for damage.

- a. Inspect the packaging that the Rack Mount Rails replacement was shipped in and record any damage to the box. Large cuts, open boxes, and crushed corners should be reported.
- b. Remove the Rack Mount Rails from the packaging and verify that there is no damage to the Rack Mount Rails. Dents, scratches, and broken parts should be reported. If major damage has occurred to the Rack Mount Rails, DO NOT use the replacement part.
- c. Store in a safe location until the Rack Mount Rails is needed for installation.

**Step 2:** Disconnect the power and data cables from the enclosure.

**Figure 220:** Enclosure Power and Data Connections

- a. Move to the rear of the rack and open the cable retention clip on both of the PSUs and disconnect the power cables from each of the two PSUs.

**Figure 221:** Cable Retention Clip Operation

- b. Disconnect the Ethernet Cable from the Ethernet Management port.
- c. Disconnect the QSF28 Ethernet cables from all of the QSF28 ports.

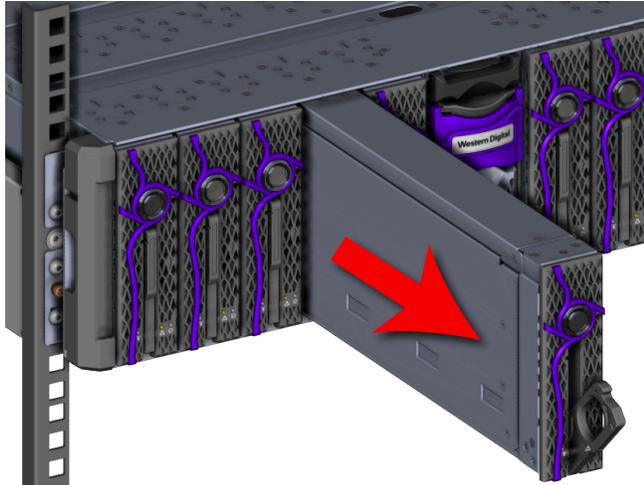
**Step 3: (Optional)** Remove the device blanks from the enclosure.

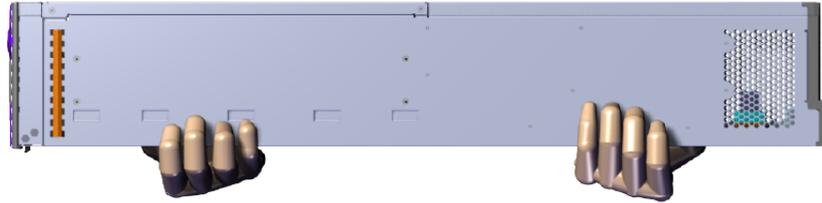
**i Attention:** This step is optional because not all configurations contain device blanks. If the configuration contains a device blank, this step will be required. Blanks must be installed in any empty slots to ensure proper cooling.

- a. From the front of the rack, press the release button on the front of the device blank. The release handle will eject outward.

**Figure 222:** Device Blank Release Operation

- b. Use the release handle to pull the device blank out of the enclosure part way. Then grasp the device blank from the underside to support it as you pull it the rest of the way out of the enclosure.

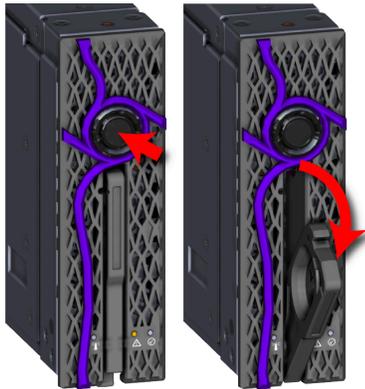
**Figure 223:** Remove Device Blank

**Figure 224:** Device Blank Hand Placement

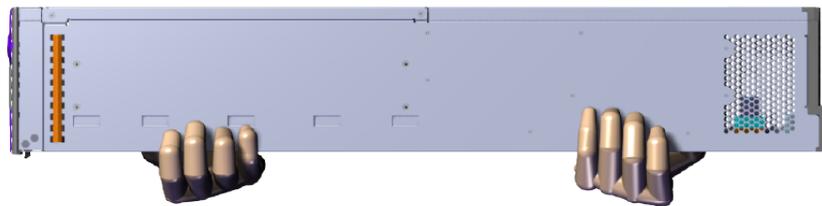
- c. Remove each device blank in the same way the first was removed.

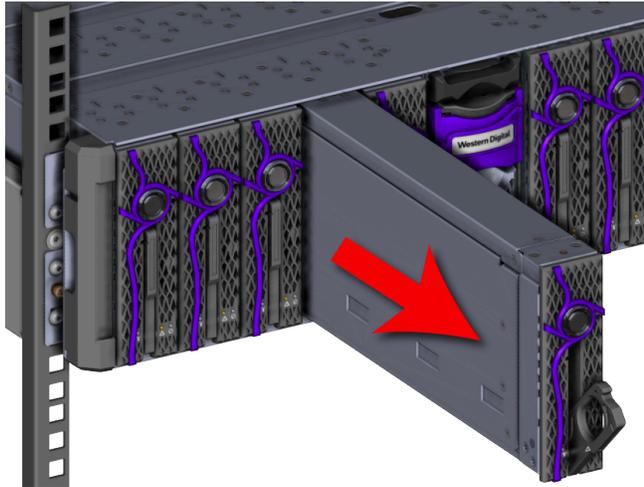
**Step 4:** Remove the OpenFlex F3x00 s from the enclosure.

- a. Press the release button on the front of the OpenFlex F3x00 . The release handle will eject outward.

**Figure 225:** OpenFlex F3x00 Release Operation

- b. Use the release handle to pull the OpenFlex F3x00 out of the enclosure part way. Then grasp the OpenFlex F3x00 from the underside to support it as you pull it the rest of the way out of the enclosure. See the hand placement in the image.



**Figure 226:** Remove OpenFlex F3x00

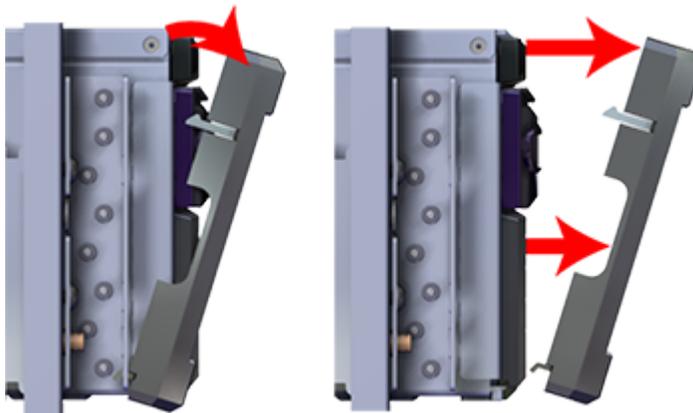
- c. Remove each OpenFlex F3x00 in the same way the first was removed.

**Step 5:** Remove the Chassis from the rack.

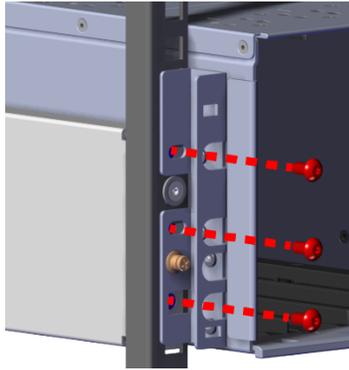


**Tip:** A T15 Torx screwdriver is required for this step.

- a. Remove the rack ear covers from both of the chassis mounts.

**Figure 227:** Remove Rack Ear Covers

- b. Using the #2 Phillips Head screwdriver, remove the two M5 screws that secure the chassis to the rail. Repeat this step to remove the two M5 screws that secure the chassis to the remaining rail.

**Figure 228:** Chassis Screw Removal

- c. Carefully pull the chassis out of the rack ensuring that you take extra care to support the weight of the chassis when the chassis is clear of the rack mount rails.

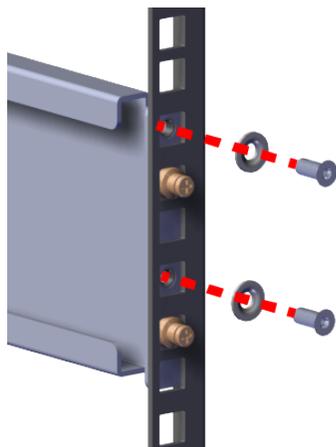
**Figure 229:** Remove Chassis

**Step 6:** Remove the Rack Mount Rails.

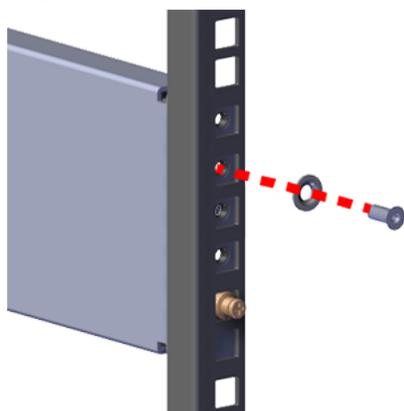


**Tip:** A T15 Torx screwdriver with torque measuring capabilities is recommended for this step.

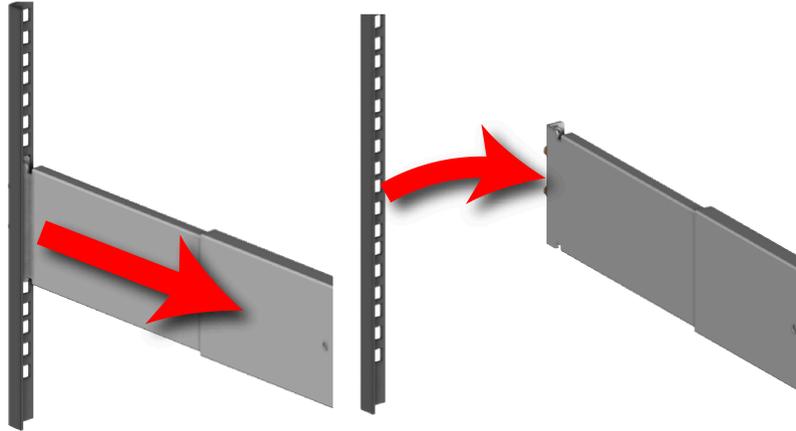
- a. Move to the rear of the rack and using the T15 Torx screwdriver, remove the two T15 screws that secure the rail to the vertical rack rails. Repeat this step to remove the two T15 screws that secure the remaining rail to the vertical rack rail.

**Figure 230:** Rear Rack Mount Rail Screw Removal

- b. Move to the front of the rack and using the T15 Torx screwdriver, remove the T15 screw that secure the rail to the vertical rack rails. Repeat this step to remove the remaining T15 screw that secure the remaining rail to the vertical rack rail.

**Figure 231:** Front Rack Mount Rail Screw Removal

- c. Remove the rails from the rack by sliding the rail mounts out of the vertical rack rail. The rail uses a spring loaded mechanism to secure the rails into the rack before securing them with the provided screws.

**Figure 232:** Rack Mount Rail Removal

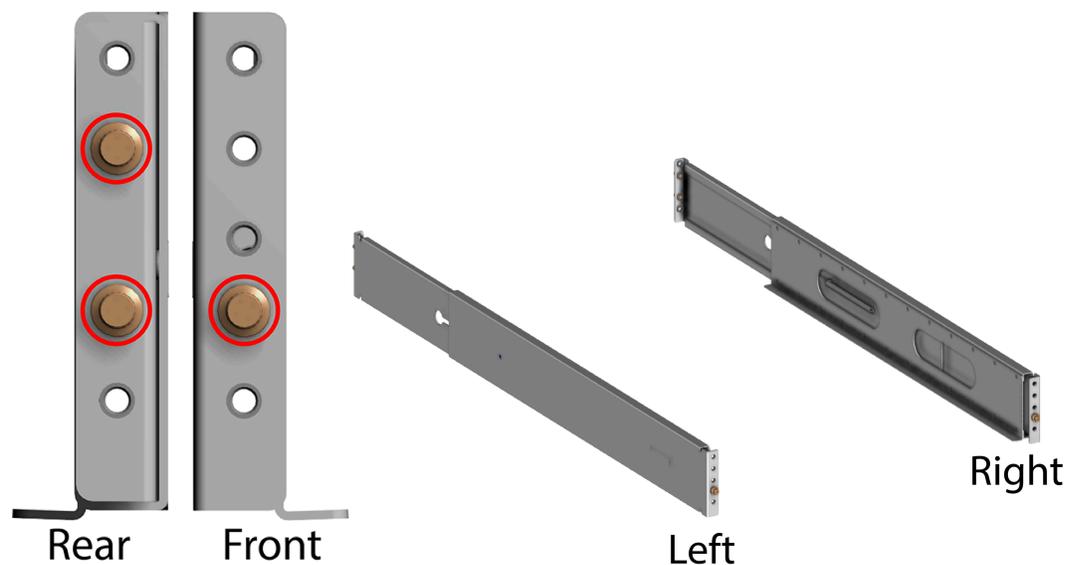
- d. Remove the remaining rail in the same way the first was removed.

**Step 7:** Install the new Rack Mount Rails.



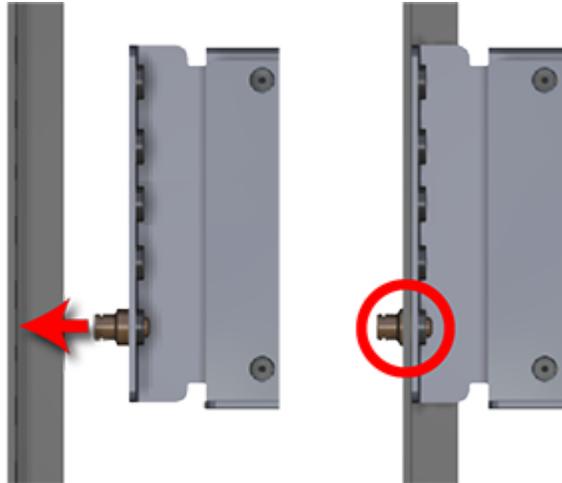
**Tip:** A T15 Torx screwdriver with torque measuring capabilities is recommended for this step.

- a. Determine which of the rails is the right and which is the left. The front of the rail can be identified by the single rack mount pin, and the rear of the rail can be identified by the two rack mount pins, as shown in the following image. Another way to orient the rails correctly is to ensure that the shelf-flanges that support the enclosure are facing toward each other, where the enclosure will reside.

**Figure 233:** Rails Identification

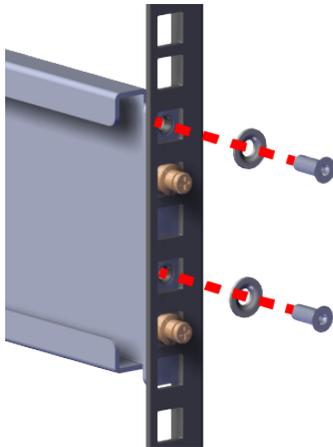
- b. Insert the front pin into the front vertical rack rail and slide the spring loaded rail until the rear pins line up with the rear vertical rack rail.

**Figure 234:** Rail Pin Installation

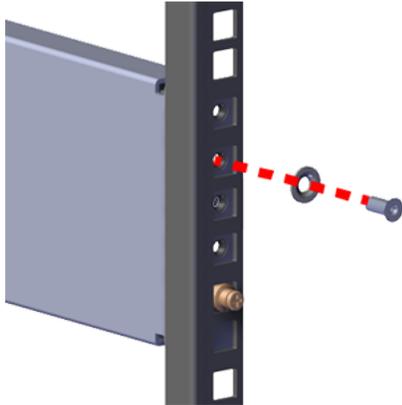


- c. From the rear of the rack, use a T15 Torx screwdriver to install two T15 screws (and washers) into each enclosure rail, securing it to the vertical rack rail:

**Figure 235:** Rear Rack Mount Rail Screw Installation



- d. From the front of the rack, use a T15 Torx screwdriver to install one flat head T15 screw (and washer) into each enclosure rail, securing it to the vertical rack rail:

**Figure 236:** Front Rack Mount Rail Screw Installation

- e. Install the remaining rail in the same way the first was installed.
- f. Verify the following to ensure that the rails have been properly installed:
  - Both rails are installed into the rack unit space and are level
  - The front of each rail contains one T15 screw in the rail mount
  - The rear of each rail contains two T15 screws in the rail mount

**Step 8:** Install the Chassis into the rack.



**Tip:** A T15 Torx screwdriver is required for this step.

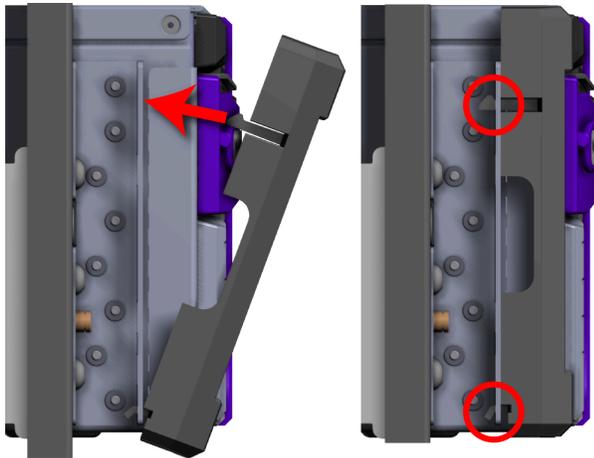
- a. Carefully slide the chassis onto the rails' inward-facing flanges until the chassis mounts are flush with the mounts on the rails:

**Figure 237:** Chassis Installation

- b. Use a T15 Torx screwdriver to install three M5 screws in each rack ear (6 total), securing the chassis to the vertical rack rails:

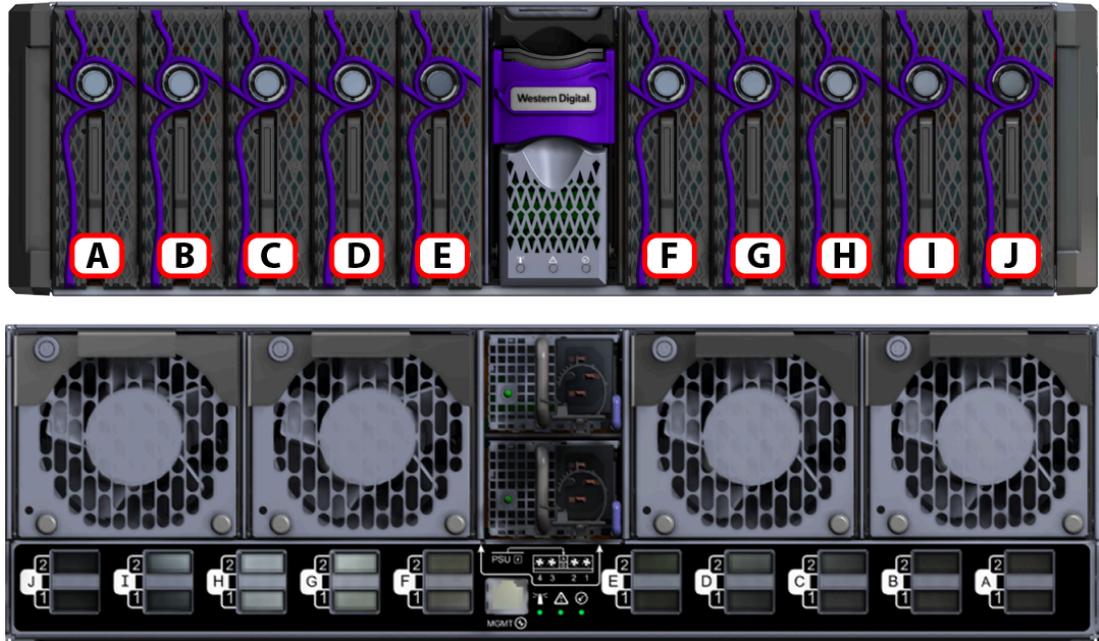
**Figure 238:** Chassis Screw Installation

- c. Verify that the Chassis is secured to the rails and does not move when pulled. If the enclosure is not secured to the rack, remove the screws and try again.
- d. Install the rack ear covers onto both of the chassis mounts:

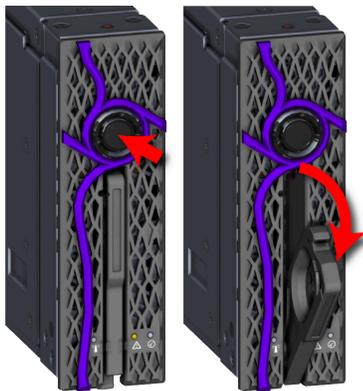
**Figure 239:** Rack Ear Cover Installation

**Step 9:** Install the OpenFlex F3x00 s into the enclosure:

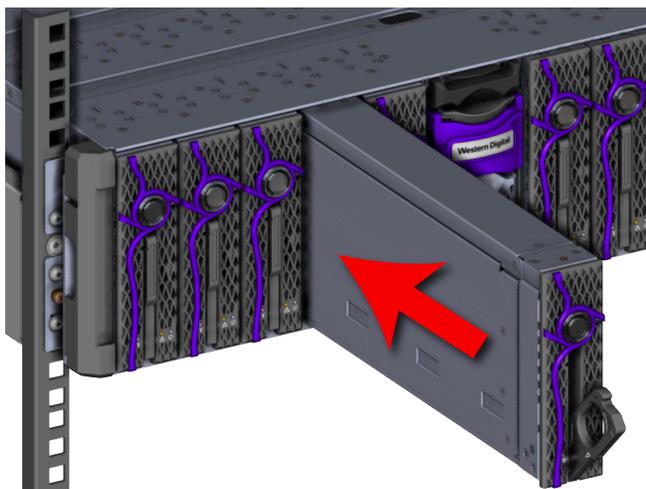
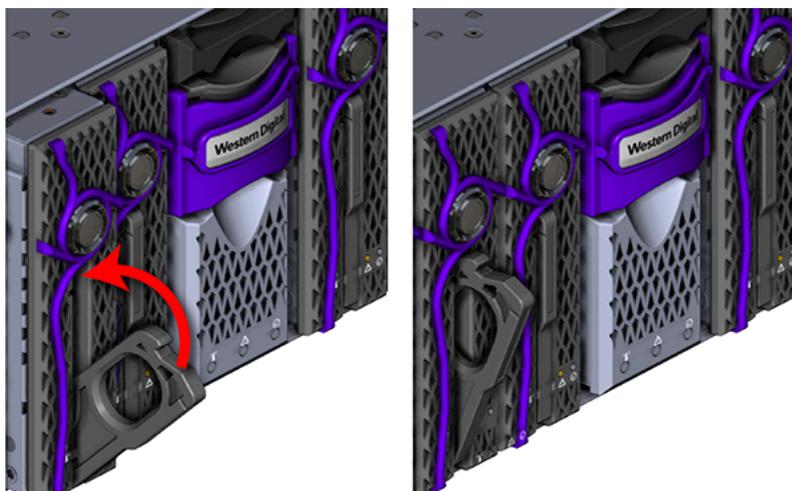
- a. Determine and record what slots are physically populated with an OpenFlex F3x00 . The slots are assigned letters A through J, from left to right, when facing the front of the enclosure. These slot assignments coincide with the QSFP28 ports on the rear of the enclosure. This information will be utilized during the connection of the QSFP28 ports.

**Figure 240:** OpenFlex F3x00 Slot Identification

- b. Press the release button on the front of the OpenFlex F3x00. The release handle will eject outward.

**Figure 241:** OpenFlex F3x00 Release Operation

- c. Gently slide the F3x00 into the E3000 slot until the release handle lifts up slightly, indicating that it is engaged with the chassis.

**Figure 242:** OpenFlex F3x00 Install**Figure 243:** Release Handle Engage

- d. Rotate the release handle up and press it into the OpenFlex F3x00 to secure it into the slot. When it is fully installed the user will feel the handle snap and lock into place.

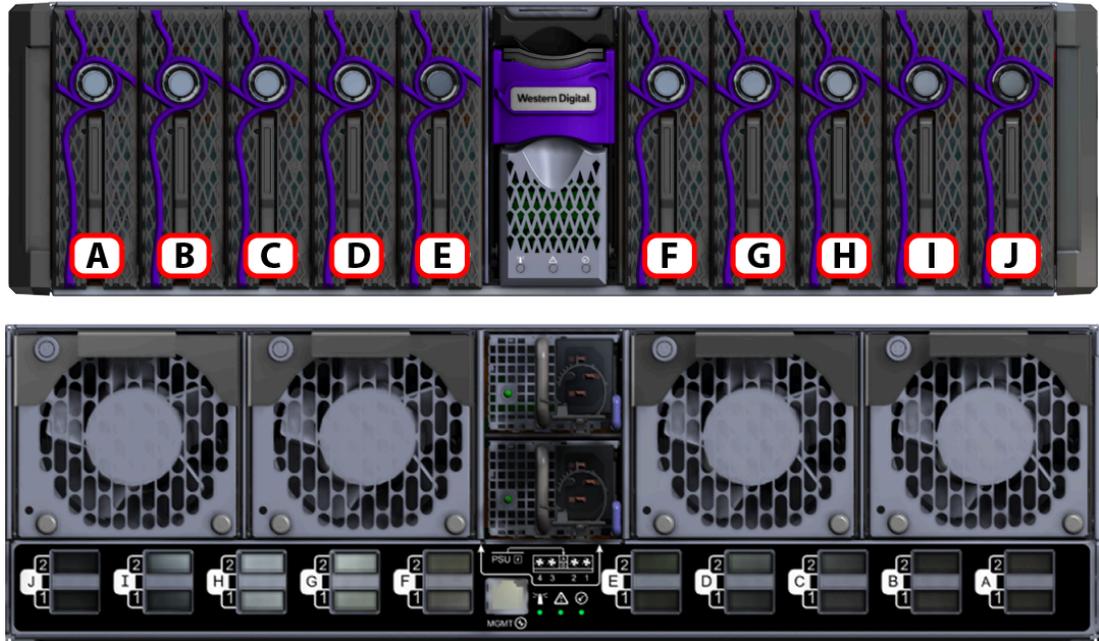
**Figure 244:** Secure OpenFlex F3x00

- e. Verify that the F3x00 is securely latched into the chassis by pulling on the latch and ensuring the device does not move when pulled. Reinstall the device if it is not securely installed into the chassis.



**Note:** The blue and amber LEDs will illuminate, followed shortly by the green LED. All three LEDs will remain illuminated for just over a minute until the device is initialized. Once the device is initialized, the amber and blue LEDs will turn off, and the Device Status LED that encircles the device release button will illuminate, indicating that the SPDK services are running. Wait time is **not** required between the installation of multiple OpenFlex F3x00 devices.

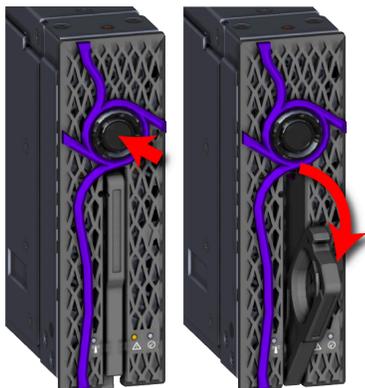
- f. Install each device in the same way the first was installed, and be sure to follow the installation order depicted in the following figure.

**Figure 245:** OpenFlex F3x00 Slot Identification

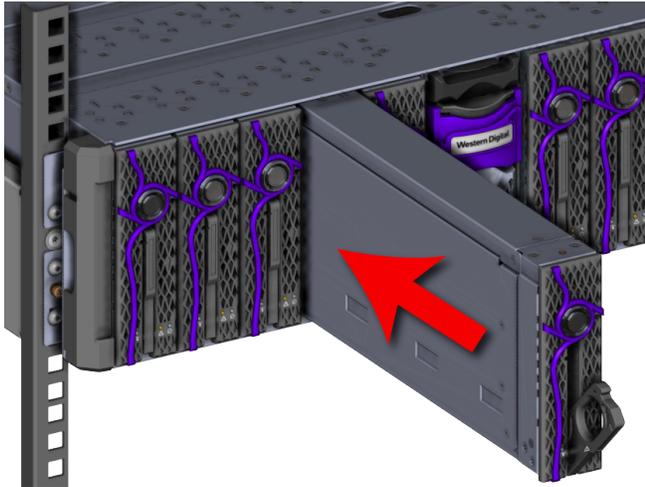
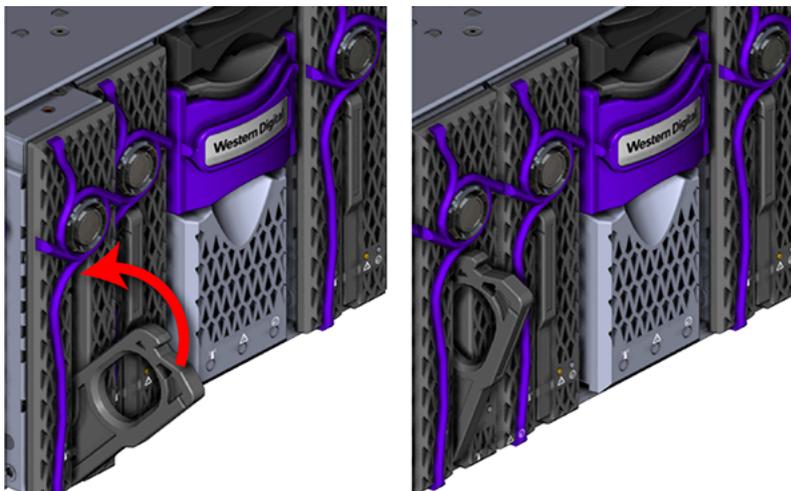
**Step 10: (Optional)** Install the device blanks into the enclosure.

**i Attention:** This step is optional because not all configurations contain device blanks. If the configuration contains a device blank, this step will be required. Blanks must be installed in any empty slots to ensure proper cooling.

- a. Press the release button on the front of the OpenFlex F3x00 . The release handle will eject outward.

**Figure 246:** OpenFlex F3x00 Release Operation

- b. Gently slide the device blank into a chassis device blank slot until the release handle is engaged with the chassis. When the handle lifts up slightly, it is an indicator that the release handle is engaged with the chassis.

**Figure 247:** Device Blank Install**Figure 248:** Release Handle Engage

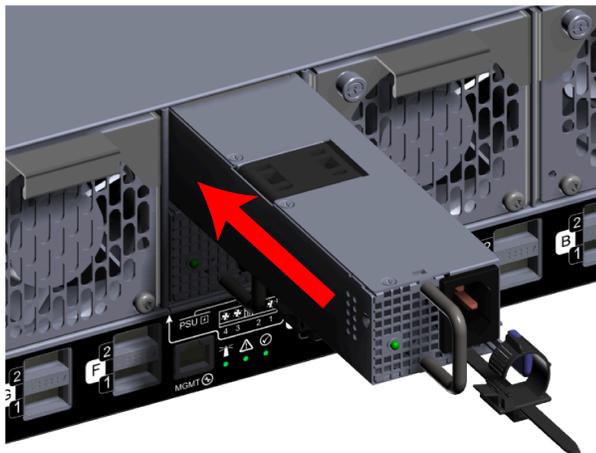
- c. Lift the release handle up and press it into the device blank to secure it into the slot.

**Figure 249:** Secure Device Blank

- d. Verify that the device blank is securely latched into the chassis by pulling on the release handle and ensuring the device blank does not move when pulled. Reinstall the device blank if it is not securely installed into the chassis.
- e. Install each device blank in the same way the first was installed.

**Step 11:** Install the PSUs into the enclosure.

- a. Move to the rear of the rack, orient the PSU with the power socket located on the bottom and insert it into the PSU slot.

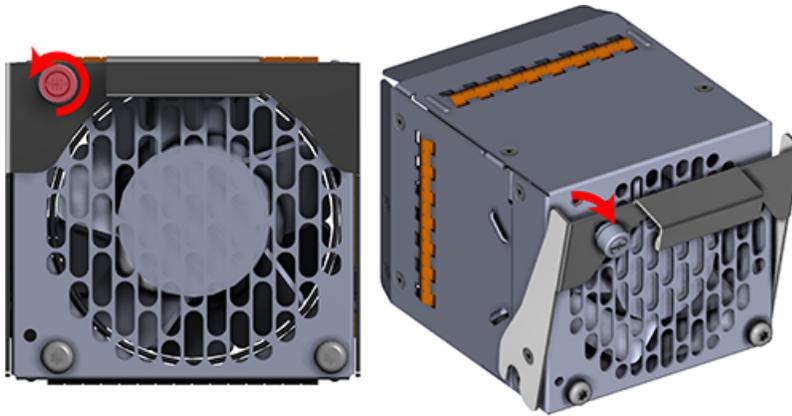
**Figure 250:** PSU Installation

- b. Verify that the PSU is fully seated and latched into the PSU slot by gently pulling on the handle.
- c. Install the remaining PSU in the same way the first was installed.

**Step 12:** Install the Fan Modules into the enclosure.

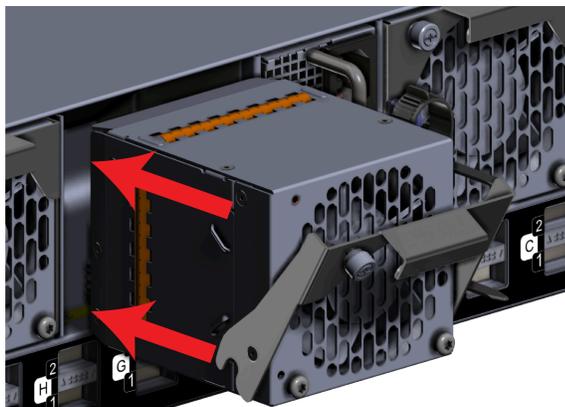
- a. Unlock the Fan Module by turning the thumbscrew counterclockwise until the screw threads are not engaged any longer. The location of the thumbscrew is shown in the following image.

**Figure 251:** Prepare Fan Module

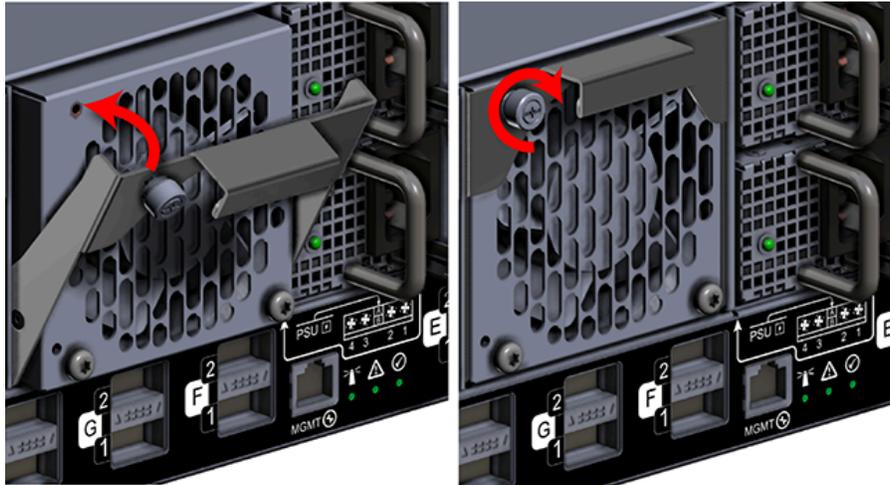


- b. Gently slide the Fan Module into the fan bay until the release handle is engaged with the chassis. When the handle lifts up slightly, it is an indicator that the release handle is engaged with the chassis.

**Figure 252:** Fan Module Engaged



- c. Press the release handle into the Fan Module and secure it in place by turning the thumbscrew clockwise until it is tight.

**Figure 253:** Fan Module Secure

- d. Verify that the Fan Module is securely latched into the chassis by pulling on the release handle and ensuring the Fan Module does not move when pulled. Reinstall the Fan Module if it is not securely installed into the chassis.
- e. Install each Fan Module in the same way the first was installed.

**Step 13:** Connect the power and data cables to the enclosure.

### 3.2.6 Chassis Replacement

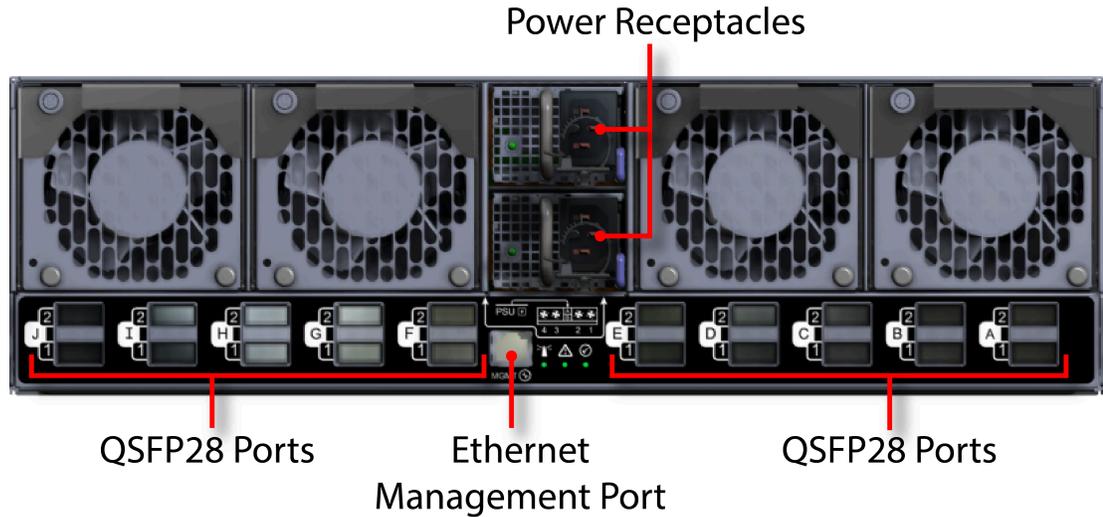
**Table 37:** Replacement Procedure Info

Required Tools	# of People Required	Time Required
T15 Torx screwdriver #2 Phillips screwdriver	2	60 minutes

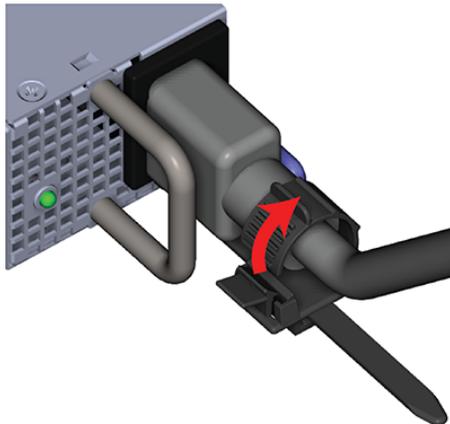
**Step 1:** Unpack and inspect the new Chassis for damage.

- a. Inspect the packaging that the Chassis replacement was shipped in and record any damage to the box. Large cuts, open boxes, and crushed corners should be reported.
- b. Remove the Chassis from the packaging and verify that there is no damage to the Chassis. Dents, scratches, and broken parts should be reported. If major damage has occurred to the chassis, DO NOT use the replacement part.
- c. Store in a safe location until the Chassis is needed for installation.

**Step 2:** Disconnect the power and data cables from the enclosure.

**Figure 254:** Enclosure Power and Data Connections

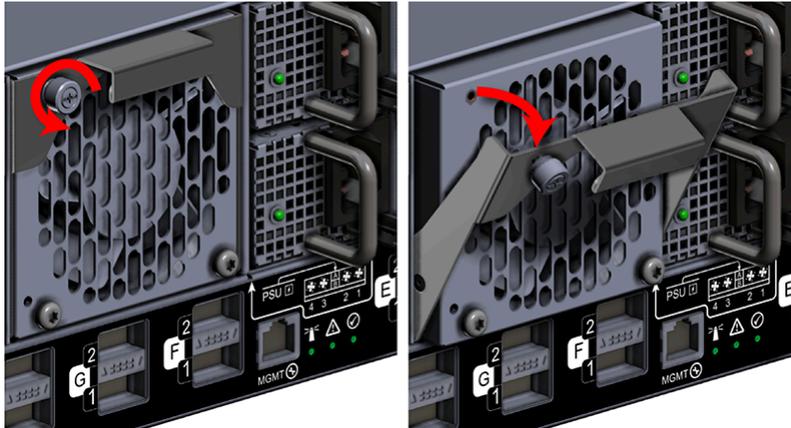
- a. Move to the rear of the rack and open the cable retention clip on both of the PSUs and disconnect the power cables from each of the two PSUs.

**Figure 255:** Cable Retention Clip Operation

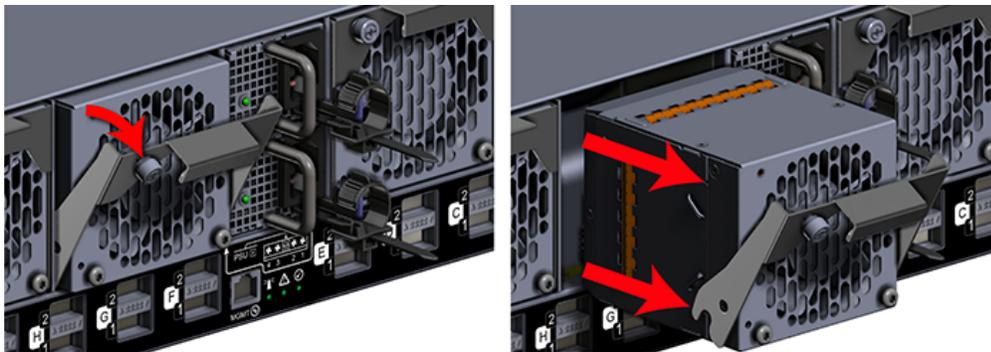
- b. Disconnect the Ethernet Cable from the Ethernet Management port.
- c. Disconnect the QSF28 Ethernet cables from all of the QSF28 ports.

**Step 3:** Uninstall the Fan Modules from the enclosure.

- a. Unlock the Fan Module by turning the thumbscrew counterclockwise until the screw threads are not engaged any longer. The location of the thumbscrew is shown in the following image.

**Figure 256:** Fan Module Release Handle Unlocked

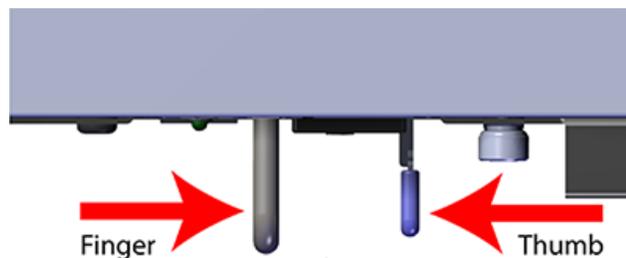
- b. Pull the release handle out until the Fan Module is unseated and can be removed from the fan bay.

**Figure 257:** Remove Fan Module

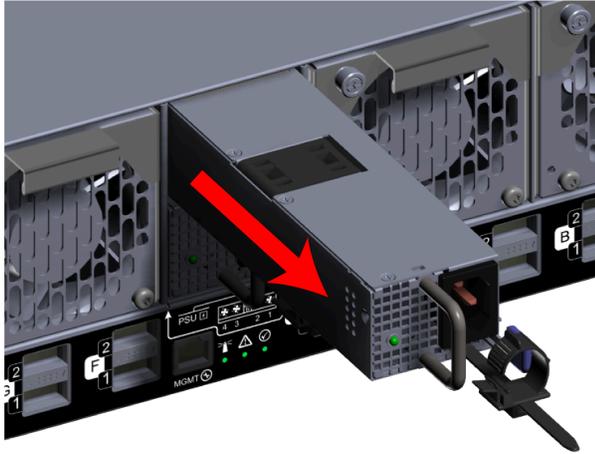
- c. Remove each Fan Module in the same way the first was removed.

**Step 4:** Uninstall the PSUs from the enclosure.

- a. With your left hand, grasp the metal ring handle with your fingers and use your thumb to press the latch release using a pinching motion.

**Figure 258:** PSU Release Latch Operation (Top View)

- b. Carefully pull the PSU out of the PSU Bay.

**Figure 259:** Remove PSU

- c. Uninstall the remaining PSU in the same way the first was uninstalled.

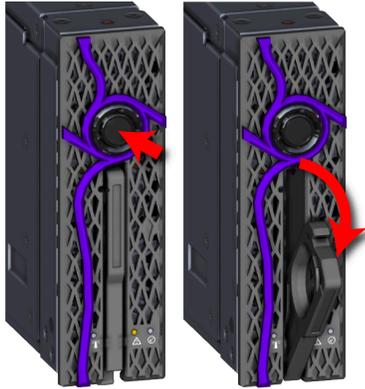
**Step 5: (Optional)** Remove the device blanks from the enclosure.

**i** **Attention:** This step is optional because not all configurations contain device blanks. If the configuration contains a device blank, this step will be required. Blanks must be installed in any empty slots to ensure proper cooling.

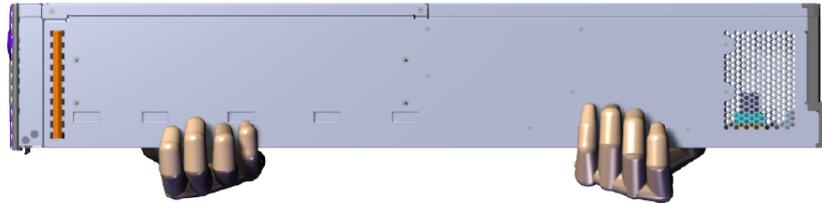
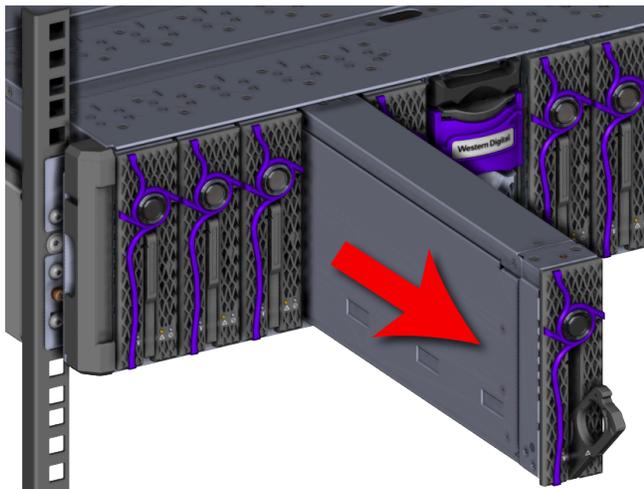
- a. From the front of the rack, press the release button on the front of the device blank. The release handle will eject outward.

**Figure 260:** Device Blank Release Operation



**Figure 263:** OpenFlex F3x00 Release Operation

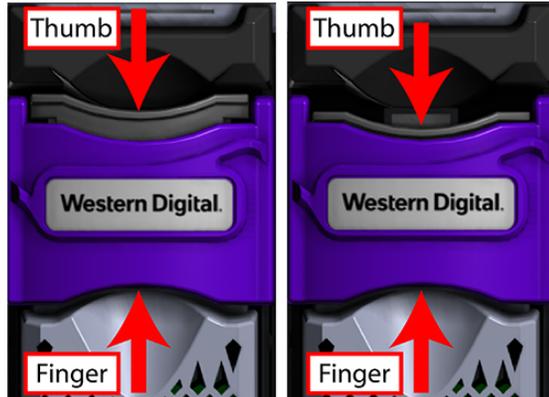
- b. Use the release handle to pull the OpenFlex F3x00 out of the enclosure part way. Then grasp the OpenFlex F3x00 from the underside to support it as you pull it the rest of the way out of the enclosure. See the hand placement in the image.

**Figure 264:** Remove OpenFlex F3x00

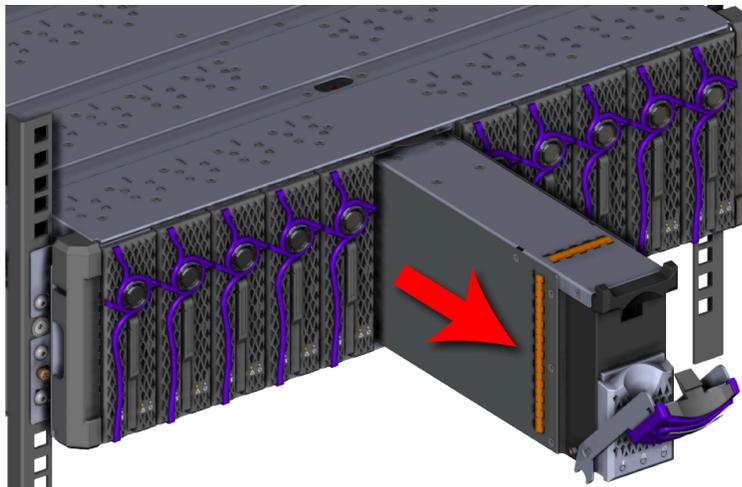
- c. Remove each OpenFlex F3x00 in the same way the first was removed.

**Step 7:** Uninstall the BMC module from the enclosure.

- a. Grasp the release handle with your forefinger on the bottom and thumb on the top of the release latch and press the release latch with your thumb. The handle will eject from the front of the BMC module.

**Figure 265:** BMC Module Release Handle Operation

- b. Lower the release handle until the BMC Module is fully unseated (this occurs at about 60°). Pull the BMC Module out of the chassis, ensuring that you support the under side of the module with your other hand:

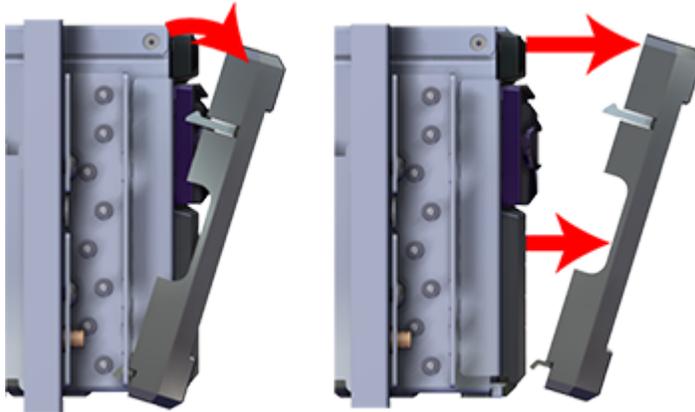
**Figure 266:** Remove BMC Module

**Step 8:** Remove the Chassis from the rack.



**Tip:** A T15 Torx screwdriver is required for this step.

- a. Remove the rack ear covers from both of the chassis mounts.

**Figure 267:** Remove Rack Ear Covers

- b. Using the #2 Phillips Head screwdriver, remove the two M5 screws that secure the chassis to the rail. Repeat this step to remove the two M5 screws that secure the chassis to the remaining rail.

**Figure 268:** Chassis Screw Removal

- c. Carefully pull the chassis out of the rack ensuring that you take extra care to support the weight of the chassis when the chassis is clear of the rack mount rails.

**Figure 269:** Remove Chassis

**Step 9:** Install the new Chassis into the rack.



**Tip:** A T15 Torx screwdriver is required for this step.

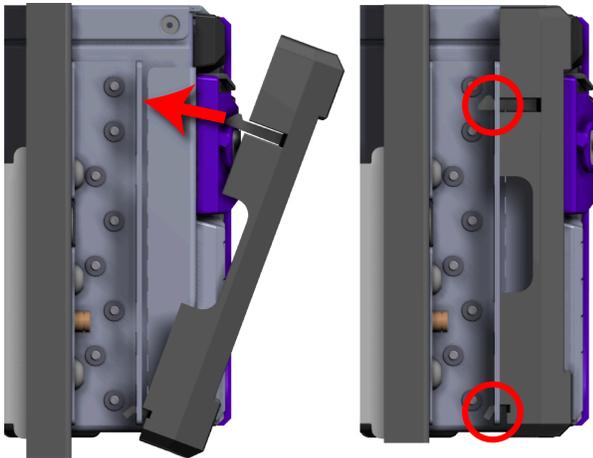
- a. Carefully slide the chassis onto the rails' inward-facing flanges until the chassis mounts are flush with the mounts on the rails:

**Figure 270:** Chassis Installation

- b. Use a T15 Torx screwdriver to install three M5 screws in each rack ear (6 total), securing the chassis to the vertical rack rails:

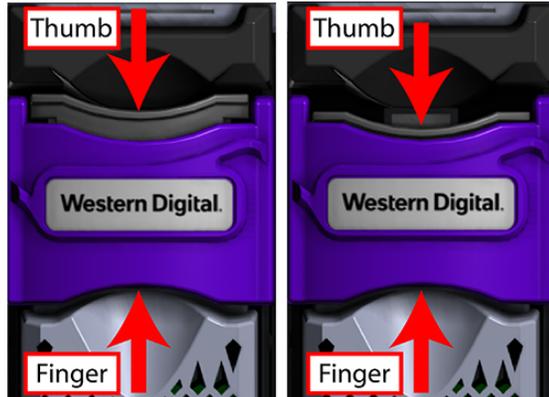
**Figure 271:** Chassis Screw Installation

- c. Verify that the Chassis is secured to the rails and does not move when pulled. If the enclosure is not secured to the rack, remove the screws and try again.
- d. Install the rack ear covers onto both of the chassis mounts:

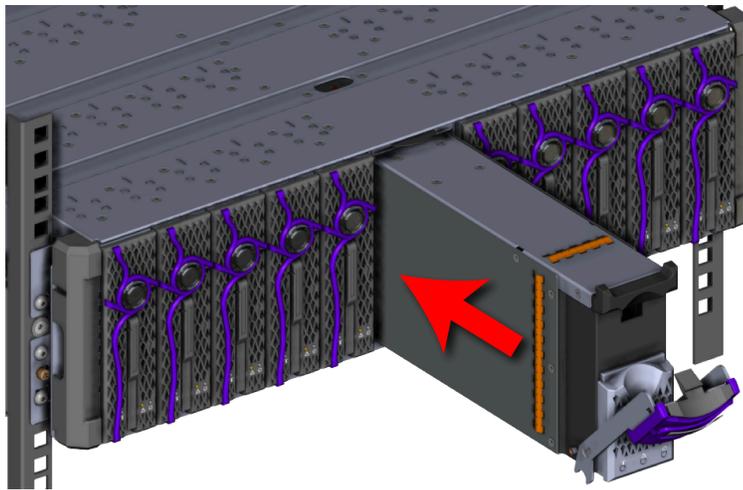
**Figure 272:** Rack Ear Cover Installation

**Step 10:** Install the BMC module into the enclosure.

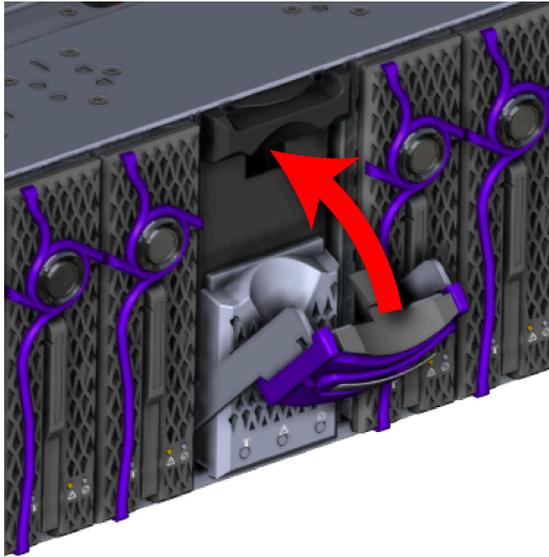
- a. Grasp the release handle with your forefinger on the bottom and thumb on the top of the release latch and press the release latch with your thumb. The handle will eject from the front of the BMC module.

**Figure 273:** BMC Module Release Handle Operation

- b. Gently slide the BMC Module into the center chassis slot until the release handle lifts up slightly, indicating that it is engaged with the chassis:

**Figure 274:** BMC Module Installation

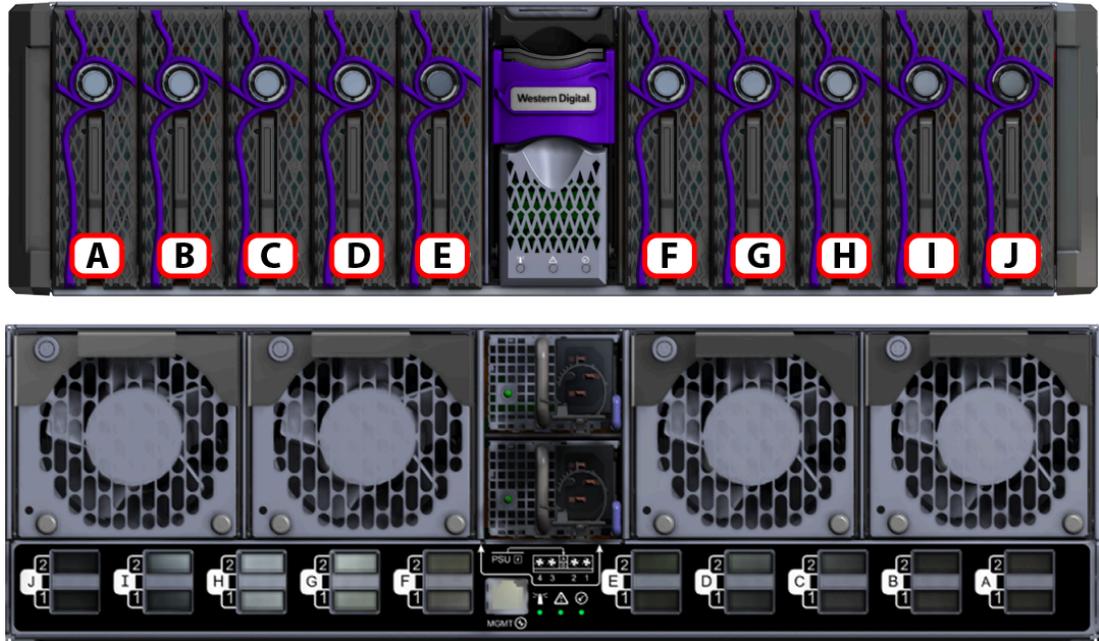
- c. Lift the release handle up and press it into the BMC Module to secure it into the slot:

**Figure 275:** Secure BMC Module

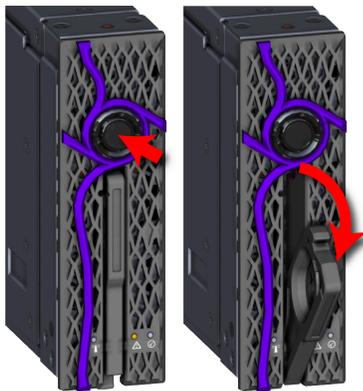
- d. Verify that the BMC module is securely latched into the chassis by pulling on the latch and ensuring the BMC module does not move when pulled. Reinstall the BMC module if it is not securely installed into the chassis.

**Step 11:** Install the OpenFlex F3x00 s into the enclosure:

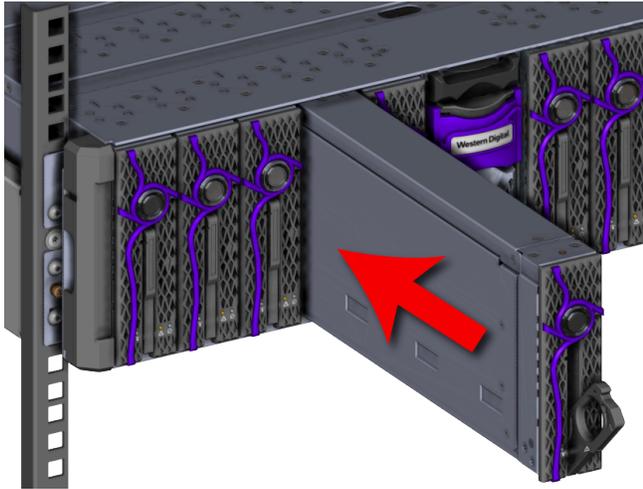
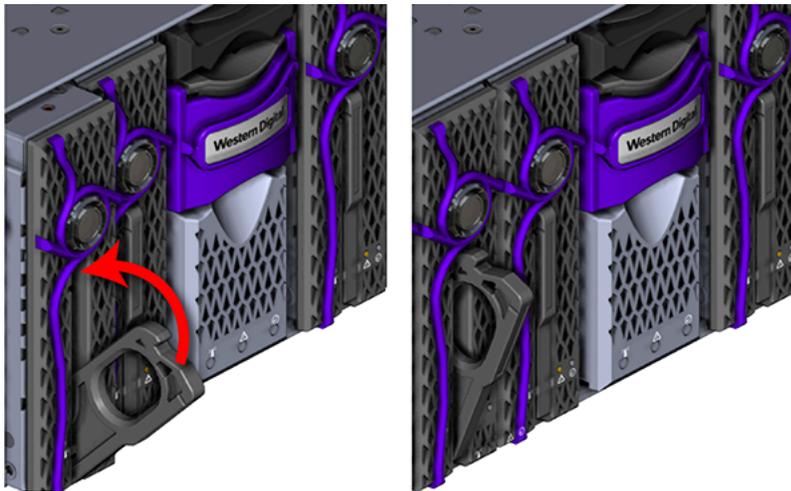
- a. Determine and record what slots are physically populated with an OpenFlex F3x00 . The slots are assigned letters A through J, from left to right, when facing the front of the enclosure. These slot assignments coincide with the QSFP28 ports on the rear of the enclosure. This information will be utilized during the connection of the QSFP28 ports.

**Figure 276:** OpenFlex F3x00 Slot Identification

- b. Press the release button on the front of the OpenFlex F3x00. The release handle will eject outward.

**Figure 277:** OpenFlex F3x00 Release Operation

- c. Gently slide the F3x00 into the E3000 slot until the release handle lifts up slightly, indicating that it is engaged with the chassis.

**Figure 278:** OpenFlex F3x00 Install**Figure 279:** Release Handle Engage

- d. Rotate the release handle up and press it into the OpenFlex F3x00 to secure it into the slot. When it is fully installed the user will feel the handle snap and lock into place.

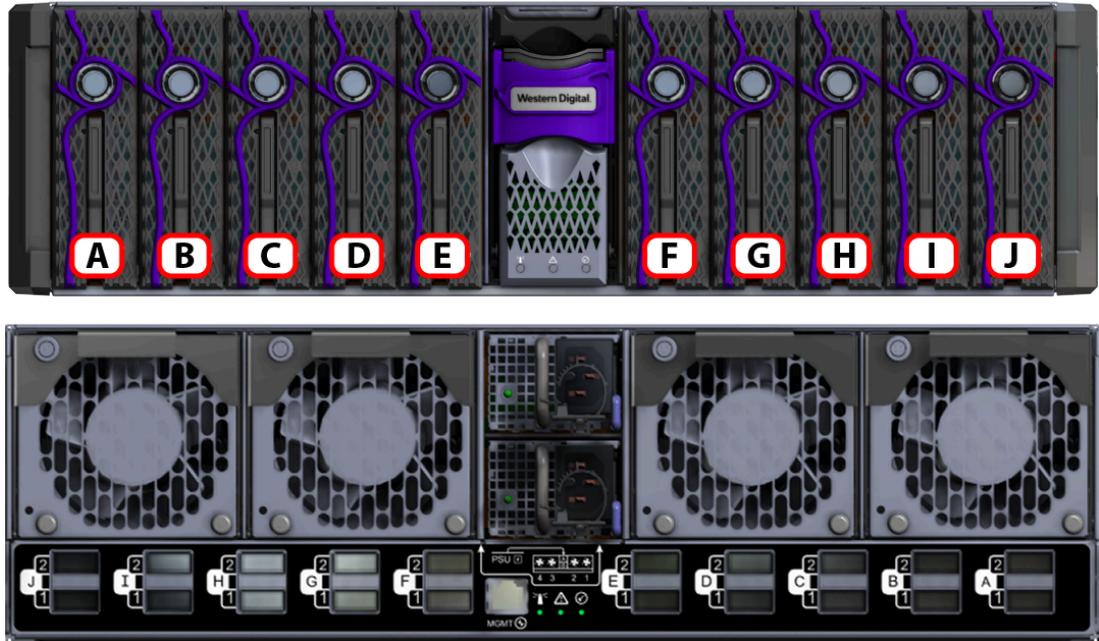
**Figure 280:** Secure OpenFlex F3x00

- e. Verify that the F3x00 is securely latched into the chassis by pulling on the latch and ensuring the device does not move when pulled. Reinstall the device if it is not securely installed into the chassis.



**Note:** The blue and amber LEDs will illuminate, followed shortly by the green LED. All three LEDs will remain illuminated for just over a minute until the device is initialized. Once the device is initialized, the amber and blue LEDs will turn off, and the Device Status LED that encircles the device release button will illuminate, indicating that the SPDK services are running. Wait time is **not** required between the installation of multiple OpenFlex F3x00 devices.

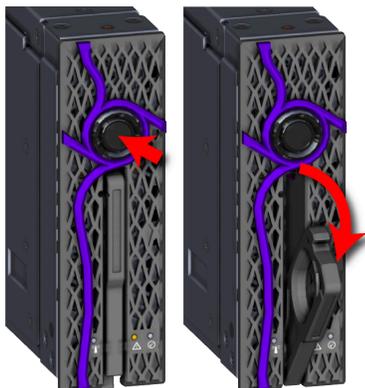
- f. Install each device in the same way the first was installed, and be sure to follow the installation order depicted in the following figure.

**Figure 281:** OpenFlex F3x00 Slot Identification

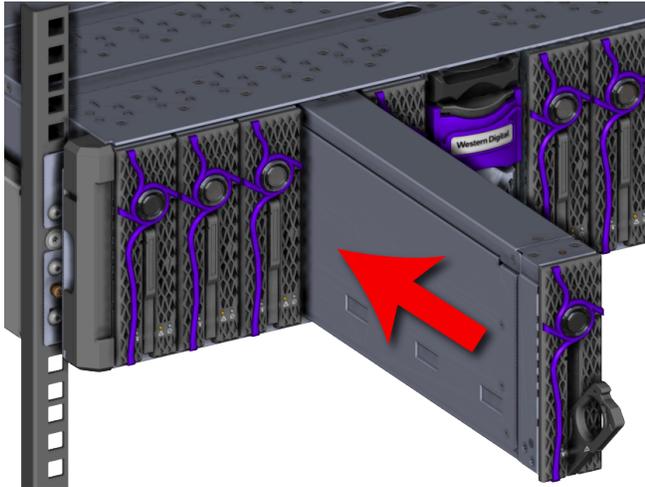
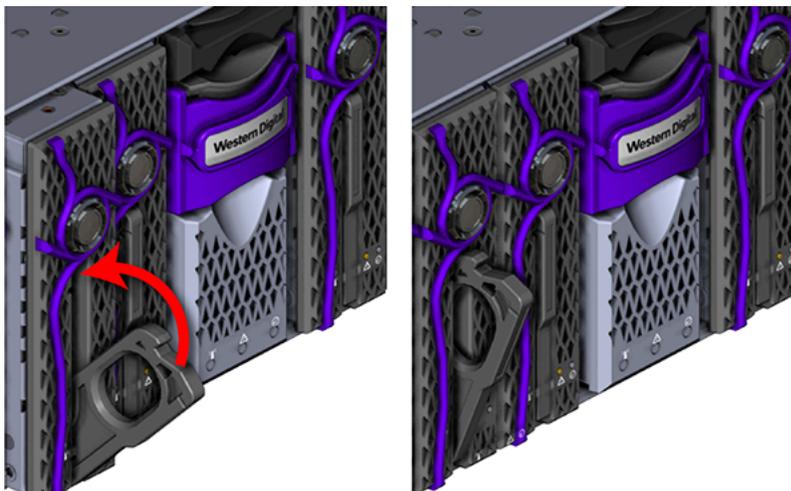
**Step 12: (Optional)** Install the device blanks into the enclosure.

**i Attention:** This step is optional because not all configurations contain device blanks. If the configuration contains a device blank, this step will be required. Blanks must be installed in any empty slots to ensure proper cooling.

- a. Press the release button on the front of the OpenFlex F3x00 . The release handle will eject outward.

**Figure 282:** OpenFlex F3x00 Release Operation

- b. Gently slide the device blank into a chassis device blank slot until the release handle is engaged with the chassis. When the handle lifts up slightly, it is an indicator that the release handle is engaged with the chassis.

**Figure 283:** Device Blank Install**Figure 284:** Release Handle Engage

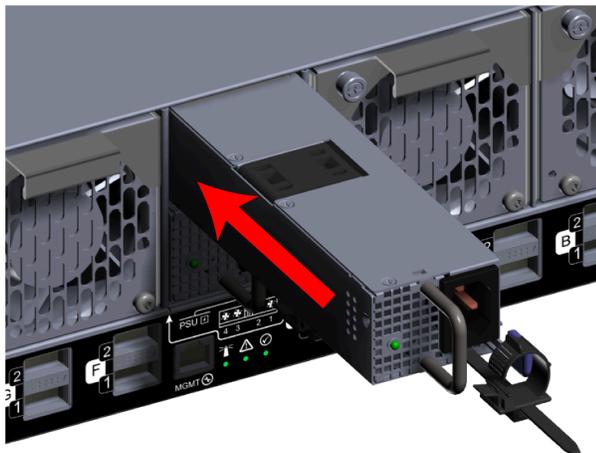
- c. Lift the release handle up and press it into the device blank to secure it into the slot.

**Figure 285:** Secure Device Blank

- d. Verify that the device blank is securely latched into the chassis by pulling on the release handle and ensuring the device blank does not move when pulled. Reinstall the device blank if it is not securely installed into the chassis.
- e. Install each device blank in the same way the first was installed.

**Step 13:** Install the PSUs into the enclosure.

- a. Move to the rear of the rack, orient the PSU with the power socket located on the bottom and insert it into the PSU slot.

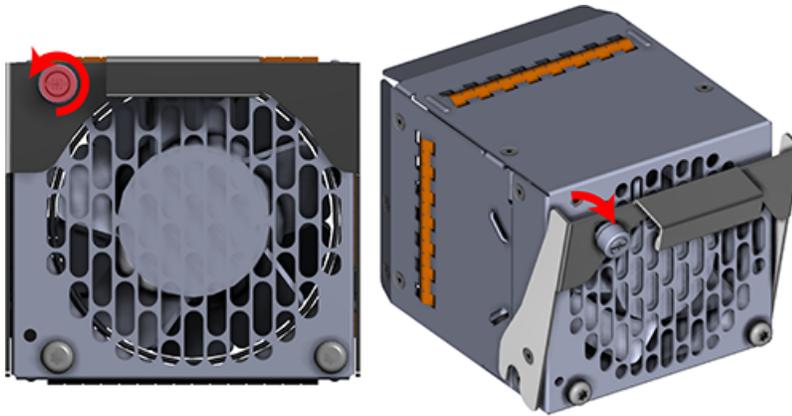
**Figure 286:** PSU Installation

- b. Verify that the PSU is fully seated and latched into the PSU slot by gently pulling on the handle.
- c. Install the remaining PSU in the same way the first was installed.

**Step 14:** Install the Fan Modules into the enclosure.

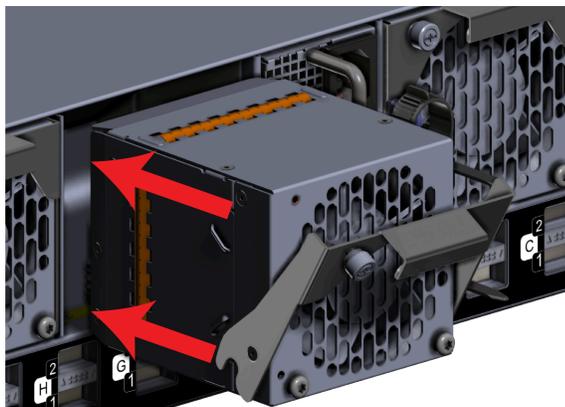
- a. Unlock the Fan Module by turning the thumbscrew counterclockwise until the screw threads are not engaged any longer. The location of the thumbscrew is shown in the following image.

**Figure 287:** Prepare Fan Module

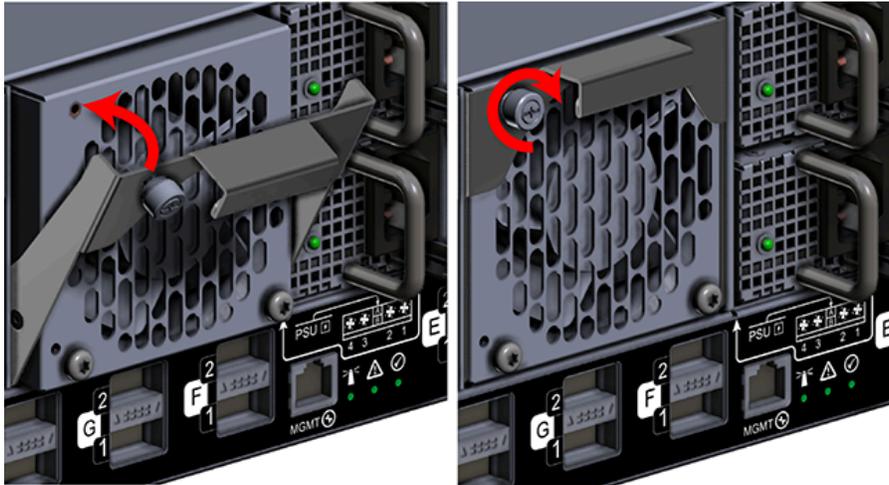


- b. Gently slide the Fan Module into the fan bay until the release handle is engaged with the chassis. When the handle lifts up slightly, it is an indicator that the release handle is engaged with the chassis.

**Figure 288:** Fan Module Engaged

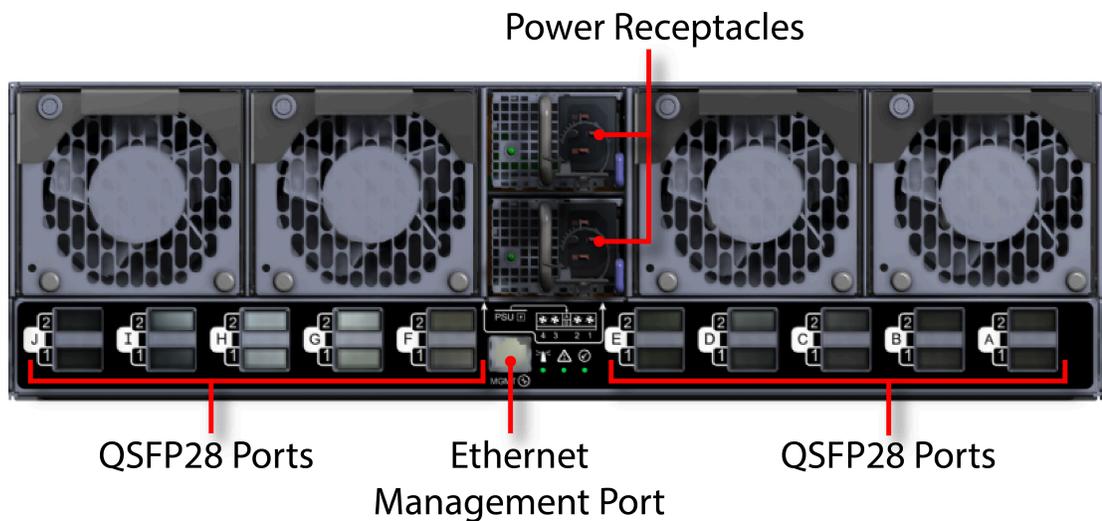


- c. Press the release handle into the Fan Module and secure it in place by turning the thumbscrew clockwise until it is tight.

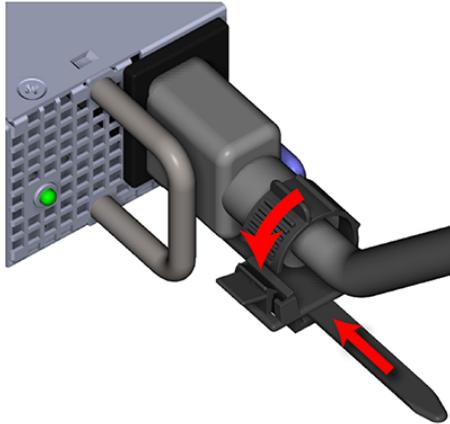
**Figure 289:** Fan Module Secure

- d. Verify that the Fan Module is securely latched into the chassis by pulling on the release handle and ensuring the Fan Module does not move when pulled. Reinstall the Fan Module if it is not securely installed into the chassis.
- e. Install each Fan Module in the same way the first was installed.

**Step 15:** Power up the E3000:

**Figure 290:** Enclosure Power and Data Connections

- a. Connect the power cables into each of the PSUs at the rear of the unit. The BMC Module, PSUs, and Fan Modules should all power on.
- b. Verify the LEDs are illuminated on the PSUs.
- c. Tighten the cable retention clips by sliding each one forward on the PSU until it stops near the cable connector. Doing this will ensure that the retention clip functions properly in the event the cable is pulled on.

**Figure 291:** Cable Retention Clip Operation

**Step 16:** Verify the status of E3000 powerup by checking the operational status of the enclosure components in the management GUI.

**Step 17:** Connect the power and data cables to the enclosure.

# Safety

## In This Chapter:

- Electrostatic Discharge..... 167
- Optimizing Location..... 167
- Power Connections.....167
- Power Cords..... 167
- Rackmountable Systems..... 168
- Restricted Access Location..... 168
- Safety and Service.....168
- Safety Warnings and Cautions..... 169

## 4.1 Electrostatic Discharge

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**CAUTION:** Electrostatic discharge can harm delicate components inside Western Digital products.

Electrostatic discharge (ESD) is a discharge of stored static electricity that can damage equipment and impair electrical circuitry. It occurs when electronic components are improperly handled and can result in complete or intermittent failures.

Wear an ESD wrist strap for installation, service and maintenance to prevent damage to components in the product. Ensure the antistatic wrist strap is attached to a chassis ground (any unpainted metal surface). If possible, keep one hand on the frame when you install or remove an ESD-sensitive part.

Before moving ESD-sensitive parts, place them in ESD static-protective bags until you are ready to install the part.

## 4.2 Optimizing Location

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Failure to recognize the importance of optimally locating your product, and failure to protect against electrostatic discharge (ESD) when handling your product, can result in lowered system performance or system failure.

Do not position the unit in an environment that has extreme high temperatures or extreme low temperatures. Be aware of the proximity of the unit to heaters, radiators, and air conditioners.

Position the unit so that there is adequate space around it for proper cooling and ventilation. Consult the product documentation for spacing information.

Keep the unit away from direct strong magnetic fields, excessive dust, and electronic/electrical equipment that generate electrical noise.

## 4.3 Power Connections

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Be aware of the ampere limit on any power supply or extension cables being used. The total ampere rating being pulled on a circuit by all devices combined should not exceed 80% of the maximum limit for the circuit.

**CAUTION:** The power outlet must be easily accessible close to the unit.



Always use properly grounded, unmodified electrical outlets and cables. Ensure all outlets and cables are rated to supply the proper voltage and current.



This unit has more than one power supply connection; both power cords must be removed from the power supplies to completely remove power from the unit. There is no switch or other disconnect device.

## 4.4 Power Cords

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Use only tested and approved power cords to connect to properly grounded power outlets or insulated sockets of the rack's internal power supply.

If an AC power cord was not provided with your product, purchase one that is approved for use in your country or region.

**CAUTION:** To avoid electrical shock or fire, check the power cord(s) that will be used with the product as follows:

- The power cord must have an electrical rating that is greater than that of the electrical current rating marked on the product.
- Do not attempt to modify or use the AC power cord(s) if they are not the exact type required to fit into the grounded electrical outlets.
- The power supply cord(s) must be plugged into socket-outlet(s) that is / are provided with a suitable earth ground.
- The power supply cord(s) is / are the main disconnect device to AC power. The socket outlet(s) must be near the equipment and readily accessible for disconnection.

## 4.5 Rackmountable Systems

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**CAUTION:** Always install rack rails and storage enclosure according to OpenFlex F3x00 and E3000 product documentation. Follow all cautions, warnings, labels, and instructions provided within the rackmount instructions.

Reliable grounding of rack-mounted equipment should be maintained.

If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (T<sub>ma</sub>) specified by the manufacturer.

Observe the maximum rated ambient temperature, which is specified in the product documentation.

**For safe operation of the equipment, installation of the equipment in a rack should be such that the amount of air flow is not impeded so that the safe operation of the equipment is not compromised.**

## 4.6 Restricted Access Location

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The OpenFlex F3x00 and E3000 are intended for installation in a server room or computer room where at least one of the following conditions apply:

- access can only be gained by **skilled** or **service persons** or by **instructed persons** who have been instructed about the restrictions applied to the location and about any precautions that shall be taken and/or
- access is through the use of a **tool** or lock and key, or other means of security, and is controlled by the authority responsible for the location.

## 4.7 Safety and Service

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All maintenance and service actions appropriate to the end-users are described in the product documentation. All other servicing should be referred to an Western Digital-authorized service technician.



To avoid shock hazard, turn off power to the unit by unplugging both power cords before servicing the unit. Use extreme caution around the chassis because potentially harmful voltages are present.



When replacing a hot-plug power supply, unplug the power cord to the power supply being replaced before removing it from the OpenFlex F3x00 and E3000 .



The power supply in this product contains no user-serviceable parts. Do not open the power supply. Hazardous voltage, current and energy levels are present inside the power supply. Return to manufacturer for servicing.



Use caution when accessing parts of the product that are labeled as potential shock hazards, or hazardous access to moving parts such as fan blades.

## 4.8 Safety Warnings and Cautions

To avoid personal injury or property damage, before you begin installing the product, read, observe, and adhere to all of the following safety instructions and information. The following safety symbols may be used throughout the documentation and may be marked on the product and/or the product packaging.

**CAUTION:** Indicates the presence of a hazard that may cause minor personal injury or property damage if the CAUTION is ignored.

**WARNING:** Indicates the presence of a hazard that may result in serious personal injury if the WARNING is ignored.



Indicates potential hazard if indicated information is ignored.



Indicates shock hazards that result in serious injury or death if safety instructions are not followed.



Indicates do not touch fan blades, may result in injury.



Indicates disconnect all power sources before servicing.

# Regulatory

## In This Chapter:

- Europe (CE Declaration of Conformity)..... 171
- FCC Class A Notice..... 171
- ICES-003 Class A Notice—Avis NMB-003, Classe A..... 171
- Japanese Compliance Statement, Class A ITE..... 171
- KCC Notice (Republic of Korea Only), Class A ITE.....172
- Taiwan Warning Label Statement, Class A ITE..... 172

## 5.1 Europe (CE Declaration of Conformity)

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Marking by the symbol indicates compliance of this system to the applicable Council Directives of the European Union, including the Electromagnetic Compatibility Directive (2014/30/EU) and the Low Voltage Directive (2014/30/EU). A "Declaration of Conformity" in accordance with the applicable directives has been made and is on file at HGST Europe.

### UK Import Representation Contact

**Western Digital UK Limited** Hamilton House, Regent Park, Kingston Road Leatherhead, Surrey KT22 7PL, GB, United Kingdom

**Telephone:** +44 1372 366000

## 5.2 FCC Class A Notice

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This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.



**Note:** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if it is not installed and used in accordance with the instruction manual, it may cause harmful interference to radio communications. Any modifications made to this device that are not approved by HGST may void the authority granted to the user by the FCC to operate equipment.

## 5.3 ICES-003 Class A Notice—Avis NMB-003, Classe A

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This Class A digital apparatus complies with Canadian ICES-003. Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

## 5.4 Japanese Compliance Statement, Class A ITE

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The following Japanese compliance statement pertains to VCCI EMI regulations:

この装置は、クラスA機器です。この装置を住宅環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

VCCI — A

English translation:

This is a Class A product based on the Technical Requirement of the Voluntary Control Council for Interference by Information Technology (VCCI). In a domestic environment, this product may cause radio interference, in which case the user may be required to take corrective actions.

## 5.5 KCC Notice (Republic of Korea Only), Class A ITE

기종별	사용자안내문
A급기기 (업무용 정보통신기기)	이 기기는 업무용으로 전자파허용등급을 받은 기기이오니 판매자 또는 사용자는 이 점을 주의하시기 바라며 만약 잘못 판매 또는 구입하였을 때에는 가정용으로 교환하시기 바랍니다.

### English translation:

Please note that this device has been approved for business purposes with regard to electromagnetic interference. If you find that this device is not suitable for your use, you may exchange it for a non-business device.

## 5.6 Taiwan Warning Label Statement, Class A ITE

### 警告使用者:

此為甲類資訊技術設備，於居住環境中使用時，  
可能會造成射頻擾動，在此種情況下，使用者會  
被要求採取某些適當的對策。

### English translation:

This is a Class A product. In a domestic environment, this product may cause radio interference, in which case, the user may be required to take adequate measures.