IBM Cloud Object Storage System™
Version 3.13.1

Slicestor 2448 Appliance Manual

3409-S01/3401-S01/3403-S01

IBM

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Intended purpose and audience

This manual contains the instructions for installing and maintaining this appliance. The audience for this guide consists of those individuals responsible for installing IBM Cloud Object Storage System™ appliances.

Note:

- The equipment and device described for installation herein are sophisticated and relatively complex to install. The party or parties installing the equipment must be familiar with installations of computer hardware and disk drives prior to attempting this installation. Only personnel proficient in working with computer hardware and disk drives should attempt to install this appliance.
- After all appliances have been installed in the rack, refer to the *Appliance Configuration Guide* to configure the appliance settings required prior to setting up the system.
- After these appliances are configured, refer to the *System Manager Administration Guide* for information about how to configure, operate, and maintain your system.
- Both the *Appliance Configuration Guide* and the *System Manager Administration Guide* assume that all necessary appliances for the system are installed in the rack.

Safety and environmental notices

Review the safety notices, environmental notices, and electronic emission notices for IBM® Cloud Object Storage System before you install and use the product.

Suitability for telecommunication environment - This product is not intended to connect directly or indirectly by any means whatsoever to interfaces of public telecommunications networks.

Examples of a caution and a danger notice. Numbers in parentheses refer to message numbers in the *IBM Safety Notices* publication G229-9054, which is included with your product.

CAUTION:
A caution notice indicates the presence of a hazard that has the potential of causing moderate or minor personal injury. (C001)

DANGER

A danger notice indicates the presence of a hazard that has the potential of causing death or serious personal injury. (D002)

Safety notices

Safety notices for this product.

Familiarize yourself with the *IBM Safety Notices* publication G229-9054, which is included with your product.

DANGER: When working on or around the system, observe the following precautions:

Electrical voltage and current from power, telephone, and communication cables are hazardous. To avoid a shock hazard:

- If IBM supplied a power cord(s), connect power to this unit only with the IBM provided power cord. Do not use the IBM provided power cord for any other product.

- Do not open or service any power supply assembly.

- Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.

- The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords.

- Connect all power cords to a properly wired and grounded electrical outlet. Ensure that the outlet supplies proper voltage and phase rotation according to the system rating plate.

- Connect any equipment that will be attached to this product to properly wired outlets.

- When possible, use one hand only to connect or disconnect signal cables.

- Never turn on any equipment when there is evidence of fire, water, or structural damage.

- Do not attempt to switch on power to the machine until all possible unsafe conditions are corrected.

- Assume that an electrical safety hazard is present. Perform all continuity, grounding, and power checks specified during the subsystem installation procedures to ensure that the machine meets safety requirements.

- Do not continue with the inspection if any unsafe conditions are present.

- Disconnect the attached power cords, telecommunications systems, networks, and modems before you open the device covers, unless instructed otherwise in the installation and configuration procedures.

- Connect and disconnect cables as described in the following procedures when installing, moving, or opening covers on this product or attached devices.

  To disconnect:

  1. Turn off everything (unless instructed otherwise).

  2. Remove the power cords from the outlets.

  3. Remove the signal cables from the connectors.

  4. Remove all cables from the devices.

  To connect:

  1. Turn off everything (unless instructed otherwise).

  2. Attach all cables to the devices.

  3. Attach the signal cables to the connectors.

  4. Attach the power cords to the outlets.

  5. Turn on the devices.

- Sharp edges, corners and joints may be present in and around the system. Use care when handling equipment to avoid cuts, scrapes and pinching. (D005)

DANGER: Heavy equipment — personal injury or equipment damage might result if mishandled. (D006)

DANGER: Professional movers are to be used for all relocation activities. Serious injury or death may occur if systems are handled and moved incorrectly. (D008)

DANGER: Serious injury or death can occur if loaded lift tool falls over or if a heavy load falls off the lift tool. Always completely lower the lift tool load plate and properly secure the load on the lift tool before moving or using the lift tool to lift or move an object. (D010)

CAUTION: The battery contains lithium. To avoid possible explosion, do not burn or charge the battery.
Do not: Throw or immerse into water, heat to more than 100°C (212°F), repair or disassemble. (C003)

Use the following general safety information for all rack mounted devices:

DANGER: Observe the following precautions when working on or around your IT rack system:

- Heavy equipment—personal injury or equipment damage might result if mishandled.

- Always lower the leveling pads on the rack cabinet.

- Always install stabilizer brackets on the rack cabinet.

- To avoid hazardous conditions due to uneven mechanical loading, always install the heaviest devices in the bottom of the rack cabinet. Always install servers and optional devices starting from the bottom of the rack cabinet.

- Rack-mounted devices are not to be used as shelves or work spaces. Do not place objects on top of rack-mounted devices.

- Each rack cabinet might have more than one power cord. Be sure to disconnect all power cords in the rack cabinet when directed to disconnect power during servicing.

- Connect all devices installed in a rack cabinet to power devices installed in the same rack cabinet. Do not plug a power cord from a device installed in one rack cabinet into a power device installed in a different rack cabinet.

- An electrical outlet that is not correctly wired could place hazardous voltage on the metal parts of the system or the devices that attach to the system. It is the responsibility of the customer to ensure that the outlet is correctly wired and grounded to prevent an electrical shock. (R001 part 1 of 2)

CAUTION:

- Do not install a unit in a rack where the internal rack ambient temperatures will exceed the manufacturer's recommended ambient temperature for all your rack-mounted devices.

- Do not install a unit in a rack where the air flow is compromised. Ensure that air flow is not blocked or reduced on any side, front or back of a unit used for air flow through the unit.

- Consideration should be given to the connection of the equipment to the supply circuit so that overloading of the circuits does not compromise the supply wiring or overcurrent protection. To provide the correct power connection to a rack, refer to the rating labels located on the equipment in the rack to determine the total power requirement of the supply circuit.

- (For sliding drawers): Do not pull out or install any drawer or feature if the rack stabilizer brackets are not attached to the rack. Do not pull out more than one drawer at a time. The rack might become unstable if you pull out more than one drawer at a time.

- (For fixed drawers): This drawer is a fixed drawer and must not be moved for servicing unless specified by the manufacturer. Attempting to move the drawer partially or completely out of the rack might cause the rack to become unstable or cause the drawer to fall out of the rack. (R001 part 2 of 2)

DANGER: Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)

CAUTION:

>18 kg (39.7 lb)

18-32 kg (39.7-70.5 lb)

The weight of this part or unit is between 18 and 32 kg (39.7 and 70.5 lb). It takes two persons to safely lift this part or unit. (C009)

Environmental notices

This information contains all of the environmental notices for IBM Systems products in English and other languages.

The IBM Systems Environmental Notices (http://ibm.co/1fBgWFI) information includes statements on limitations, product information, product recycling and disposal, battery information, flat panel display, refrigeration and water-cooling systems, external power supplies, and safety data sheets.

Declared noise emissions

Table 1. Declared noise emissions in accordance with ISO 9296[1,2,3]

Product description	Declared A-Weighted Sound Power Level, L_{WAd} (B)		Declared A-Weighted Sound Pressure Level, L_{pAm} (dB)	
	Operating	Idling	Operating	Idling
Model S01 & S02 @ 25 deg. C room ambient	7.7[4]	7.7[4]	62	62
Model S01 & S02 @ 35 deg. C room ambient	8.3[4]	8.3[4]	68	68
Model S01 & S02 @ 25 deg. C room ambient Acoustical Doors Feature codes FC EC07 = back FC EC08 = front	7.5	7.5	57	57
Model S01 & S02 @ 35 deg. C room ambient Acoustical Doors Feature codes FC EC07 = back FC EC08 = front	7.7[4]	7.7[4]	62	62

Notes:

1. Declared level L_{WAd} is the upper-limit A-weighted sound power level; Declared level L_{pAm} is the mean A-weighted sound pressure level measured at the 1-meter bystander positions.

2. All measurements made in conformance with ISO 7779 and declared in conformance with ISO 9296.

3. B, dB, abbreviations for bels and decibels, respectively. 1 B = 10 dB.

4.

   Note: Government regulations (such as those prescribed by OSHA or European Community Directives) may govern noise level exposure in the workplace and may apply to you and your server installation. This IBM system is available with an optional acoustical door feature that can help reduce the noise emitted from this system. The actual sound pressure levels in your installation depend upon a variety of factors, including the number of racks in the installation; the size, materials, and configuration of the room where you designate the racks to be installed; the noise levels from other equipment; the room ambient temperature, and employees' location in relation to the equipment. Further, compliance with such government regulations also depends upon a variety of additional factors, including the duration of employees' exposure and whether employees wear hearing protection. IBM recommends that you consult with qualified experts in this field to determine whether you are in compliance with the applicable regulations.

Support information

For more information on the product or help with troubleshooting, contact IBM Support at IBMCloudStorageSupport@us.ibm.com or visit the Directory of worldwide contacts.

Chapter 1. Appliance safety precautions

Observe physical, electrical, and electronic component safety precautions.

DANGER: An electrical outlet that is not correctly wired could place hazardous voltage on the metal parts of the system or the devices that attach to the system. It is the responsibility of the customer to ensure that the outlet is correctly wired and grounded to prevent an electrical shock. (D004)

DANGER: Multiple power cords. The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. (L003)

Physical

Ensure that your equipment rack is placed in a dust-free, well-ventilated area close to an uninterruptible power supply (UPS). Leave enough room behind and around the rack for services and sufficient airflow.

- Keep the area around the appliance clean and free of clutter.
- Place the appliance top cover and any appliance components that were removed away from the appliance or on a table so that they do not accidentally get damaged.
- While you are working on the appliance, do not wear loose clothing such as neckties and unbuttoned shirt sleeves. They can retain a charge even if you are wearing a wrist strap, or could be pulled into a fan.
- After you access the inside of the appliance, close the appliance and secure it to the rack unit with the retention screws after you ensure that all connections are made.
- Close the rack's front door and all panels and components on the appliances when not servicing to maintain proper cooling.

Electrical

Basic electrical safety precautions must be followed to protect yourself and the appliance:

- Do not work alone with high-voltage components.
- Be aware of the locations of the power switch on the appliance and the room's emergency power-off switch, disconnection switch, or electrical outlet. If an electrical accident occurs, quickly remove power from the system.

DANGER

> **A danger of explosion exists if the Onboard battery is installed upside down, which reverses its polarities. This battery must be replaced only with the same or an equivalent type that is recommended by the manufacturer. Dispose of used batteries according to the battery manufacturer's instructions.**

Electronic components

Electrostatic discharge (ESD) is generated by two objects with different electrical charges when they come into contact with each other. An ESD neutralizes this difference, which can damage electronic components and printed circuit boards (PCBs). In general, the following measures are sufficient to neutralize this difference before contact is made to protect equipment from ESD:

- Use a grounded wrist strap that is designed to prevent ESDs.
- Keep all components in their antistatic containers until ready for installation.
- Touch a grounded metal object before you remove any board from its antistatic container.
- Remove any jewelry or metal objects from your body. They are excellent metal conductors that can create short circuits and harm you if they come into contact with printed circuit boards or areas where power is present.

Chapter 2. Specifications and requirements

Appliance specifications

- Single Intel Xeon E5-2637v3 processor
- 8 x 16 GB PC4-17000 2133 MHz ECC Registered RAM modules
- 2 OS Intel SSDSC2BB120G4 drives
- Onboard IPMI
- 2 Onboard 1 Gbps network ports.
- 1 Onboard 1 Gbps dedicated IPMI network port.
- Four dual-rotor 80 mm internal fans
- 2 hot-swappable 1100 W PSUs in 1+1 configuration

Extra Networking Options

The appliance can support other networking cards to provide extra Ethernet ports. These ports are shown in the highlighted card slots on the rear of the appliance in the following figure.
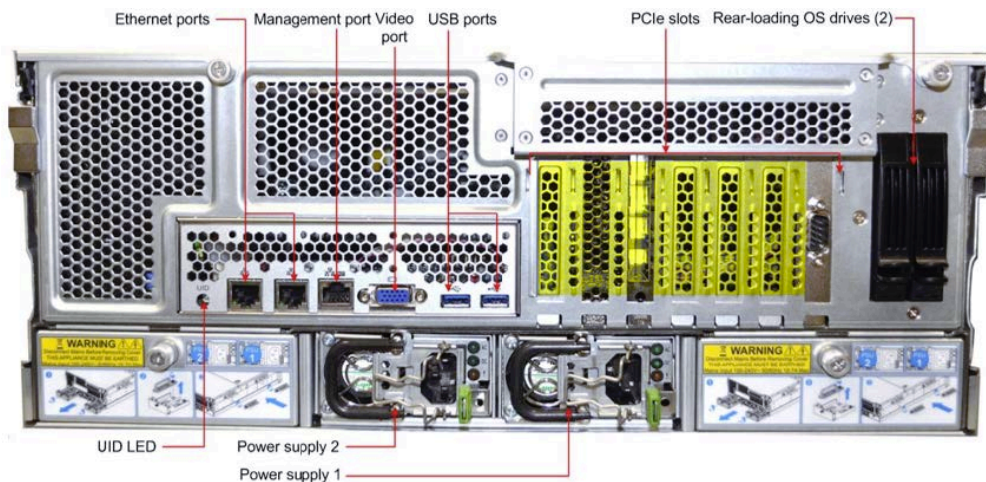
Figure 1. Rear of appliance with card slot highlighted

Requirements

Physical space and power

The appliance uses 200 - 240 V power.

Table 2. Space and power requirements for the appliance

Model	Rack Units	W (in)	H (in)	D (in)	Weight (lbs)	W (cm)	H (cm)	D (cm)	Weight (kg)	Power (W)
S2448	4	17.3	6.9	32	160	43.8	17.6	81.5	73	850 W max

Environmental conditions

Table 3. Operating and non-operating temperatures and humidity for the appliance

Environment	Temperature (°C)	Temperature (°F)	Humidity (non-condensing)
Operating	10–35	50–95	8–90%
Non-operating	-40–70	-40–158	5–95%

Cabling

Table 4. Cabling requirements for the appliance

Cable	Type and Usage
Power cords	Use only the power cords that are supplied with the appliance. Do not use another type of cord. Do not use extension cords. If extra power cords are needed, contact IBM Support.
1000BASE-T Copper Cables	Use high-quality Category 5e or 5 (CAT5e, CAT5) copper cables.
Optical Fiber Cables	Use IBM authorized enhanced small form-factor pluggable (QSFP and SFP+) transceivers only. Optical fiber cable specifications depend on the SFP+ module used.
Direct Attach Copper Cables	Any SFP+ passive or active direct attach copper cable compliant with the SFF-8431 v4.1 and SFF-8472 v10.4 specifications is supported.

Chapter 3. Install the appliance into a rack

Many racks are on the market, which means that the assembly procedure might differ slightly. This rail fits a rack between 28.5" and 35.5" deep.

Prepare for installation

Assemble tools

A #2 Phillips screwdriver and a cage nut tool are needed to install and secure the rails to the appliance.

Wear a set of leather work gloves when racking the appliance. They help to get a grip on the appliance and avoid injury from any metal edges.

CAUTION:
Do not use of any sort of hammer to secure the rails on the appliance. A hammer might damage the drives within the chassis and possibly void the warranty.

Choose a setup location

Decide on a suitable location for the rack unit that holds your appliance.

Table 5. Appliance location considerations

Factor	Comments
Restricted access location	Install this appliance in a physically secure, limited access location only, such as a service closet or data center.
Clean environment	Situate it in a clean, well-ventilated, dust-free area.
Ambient operating temperature	If installed in a closed or multi-unit rack assembly, the ambient operating temperature of the rack environment might be greater than the ambient temperature of the room. Install the equipment in an environment compatible with the maximum rated ambient temperature (TMRA) for the appliance.
Sufficient airflow	Mount the equipment into a rack so that the amount of airflow that is needed for safe operation is not compromised. Leave enough clearance in front of the rack to open the front door completely (36 inches). Leave about 36 inches of clearance behind the rack for sufficient airflow and ease in servicing.
Mechanical loading	Mount the equipment into a rack so that a hazardous condition does not arise due to uneven mechanical loading. Install heavier items into the bottom of the equipment rack to keep the rack stable. Mount equipment in a rack evenly to prevent a later hazard.
Circuit overloading	Consideration should be given to the connection of the equipment to the power supply circuitry and the effect that any possible overloading of circuits might have on overcurrent protection and power supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern. **Note:** The maximum current draw is printed on a label on the appliance power supplies. The system can draw more than 15 Amps at startup (inrush current).
Reliable ground	A reliable ground must be maintained always. To ensure grounding, the rack itself must be grounded. Particular attention should be given to power supply connections other than the direct connections to the branch circuit, such as the use of power distribution units.

Table 5. Appliance location considerations (continued)

Factor	Comments
Power supply	Use a regulating uninterruptible power supply (UPS) to protect the appliance from power surges and voltage spikes, and to keep your system operating in a power failure.
Heat, electricity, and EMI	Avoid areas where heat, electrical noise, and electromagnetic fields are generated.

Prepare the rack

1. Ensure that the leveling jacks on the bottom of the rack are fully extended to the floor with the full weight of the rack resting on them.
   - In single rack installations, attach stabilizers to the rack.
   - In multiple rack installations, couple the racks together.
2. Check that the rack is stable before extending an appliance from the rack.
3. Extend only one appliance at a time. Extending two or more simultaneously can destabilize the rack.
4. Determine the placement of each appliance in the rack before you install the rails.
5. Install the heaviest appliances (usually the Slicestor® appliances) on the bottom of the rack first, and then work upward.

Unpack and inspect the box and its contents

1. Inspect outside of box for damage.
2. Note if the box was damaged in any way.
3. Open the top of the box and inspect for damage.
4. Remove all of the components from the packaging and inspect for damage.
5. Arrange for assistance when lifting or installing the appliance in a rack. Use a forklift or lift table to prevent possible injury.
   CAUTION:
   To prevent personal injury and equipment damage, have someone assist you during the equipment installation. If necessary, reduce the weight of the enclosure by removing the hard disk drives and power supply units during installation.

   When using the lifting straps, keep them even and at the same level always. Otherwise, the system can slide to one side, and possibly out of the straps completely. Make sure that the rubberized sides of the lifting straps are against the chassis metal.
6. If the appliance itself shows damage, file a damage claim with the carrier who delivered it.

In addition to the appliance, the box includes:
- Rail kits
- Cables
- Documentation Package

Application installation

Attention: Allow the enclosure assembly to acclimate to room temperature before installation. Store the drives at room temperature for at least 2 hours before use.

Identify the sections of the rack rails

Several rail assemblies are provided:
- Left and right slide assemblies

- Left and right cabinet section assemblies
- Left and right chassis section assemblies

Install the handles on the server

You must install two handles on each side of the server before lifting it.

CAUTION:
Make sure that you have adequate support to lift the system. Releasing it before it is fixed in the rack might cause personal injury or damage the equipment.

To install the handles on the server, do the following steps.
1. Take out the handle carriers on the rear side by releasing the thumb screws, as shown in the following figure.
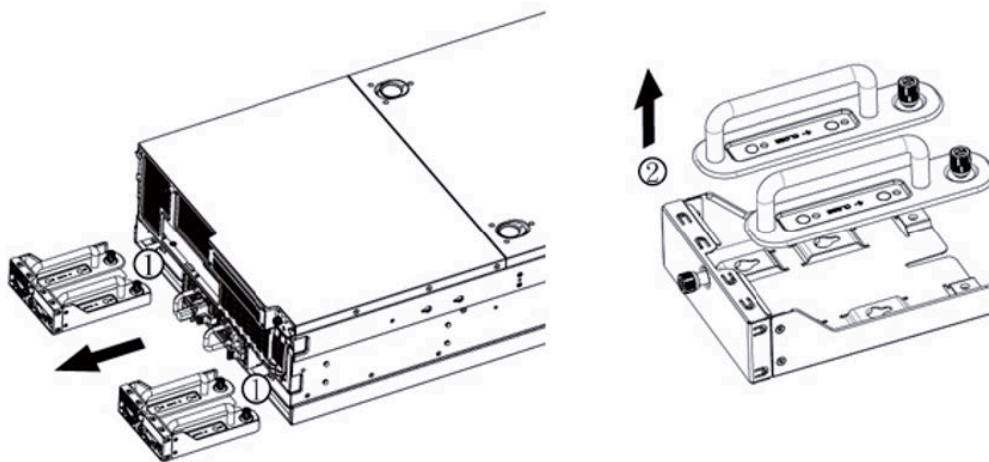

Figure 2. Remove handles from handle carriers

2. Remove all four handles from the two carriers.
3. Install side handles on both sides of server and make sure that they are securely tightened before lifting the server.
   CAUTION:
   Before lifting or transporting the server, make sure the four side handles (two on each side) are securely screwed into the server. Failure to do so can result in severe personal injury and server damage.

When you are ready to install the server in the rack, you must use a lifting device. Alternatively, use four individuals, each lifting the server by the side handles to place the server in position and begin inserting it into the rack rails.

After the server is partially inserted into the rack rails, you must remove the server side handles to fully insert the server into the rack. Then, you can place the handles back in the drive carriers and replace the carriers into the back of the server.

See "Unlock the rails to insert or remove the chassis" for more details on how to install the server into the rack rails.

Disconnect chassis section slide assembly

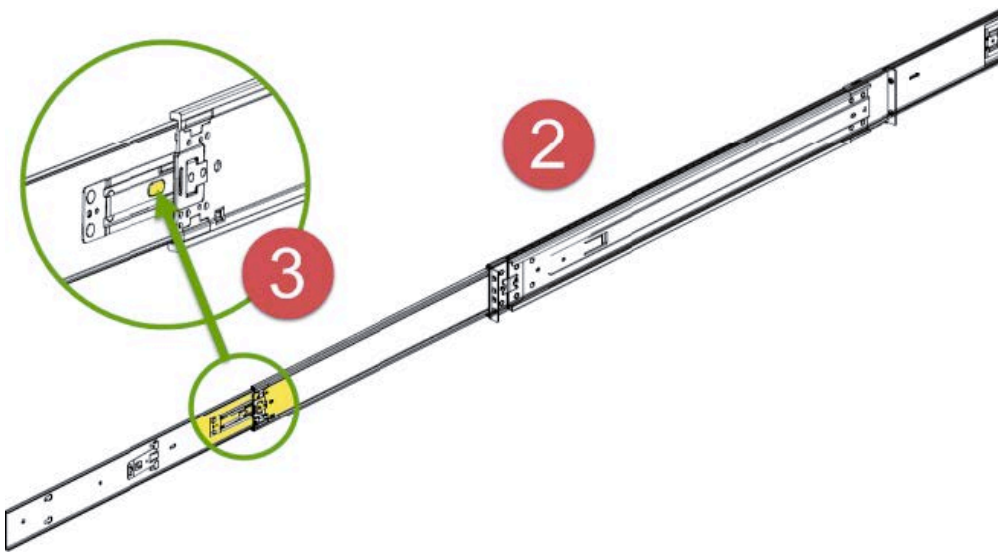Refer to the following figure to open the chassis section slide assembly.

Figure 3. Disconnecting the chassis slide assembly

Install the chassis slide rails to the appliance

1. With the heads of the locating pins protruding through the set of keyhole openings in the chassis section assembly, pull the slide toward the front of the chassis until the screw holes line up, as shown in the following figure.
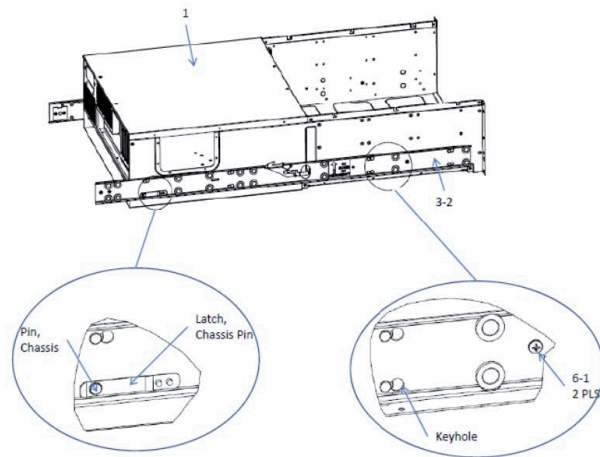

Figure 4. Install the chassis slide rails to the appliance

2. Attach the slide by inserting two M4 screws through the holes in the slide and securing them to the chassis.
3. Repeat these steps for the other side of the chassis.

Attach the rack slide rails to the rack

1. Define the "U" spacing and attach the slide, as shown in the following figure.
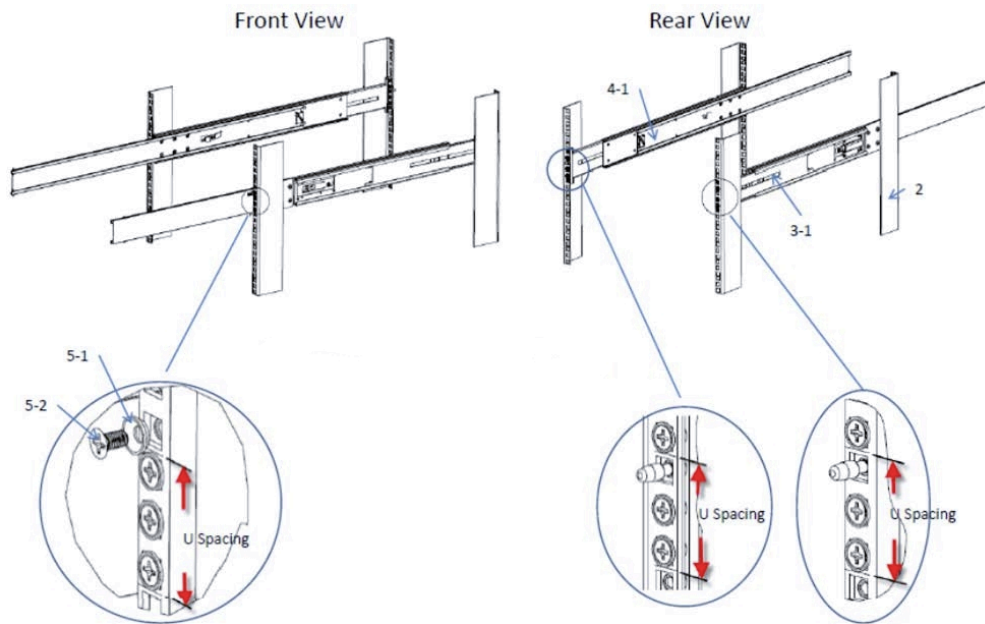
Figure 5. Attach the rack rails to the rack

2. Attach the front mounting bracket to the rack rail.
3. Attach the rear mounting bracket to the rack rail.

Unlock the rails to insert or remove the chassis

1. With a suitable lift or with four people, align the chassis with the extended rails.
2. Continue to close until the side rails lock.
3. After the server is partially inserted into the rack rails, remove the server-side handles.
4. Place the handles back in the drive carriers and replace the carriers into the back of the server.
5. Move the lever to the unlock position to close or remove the chassis, as shown in the following figure.
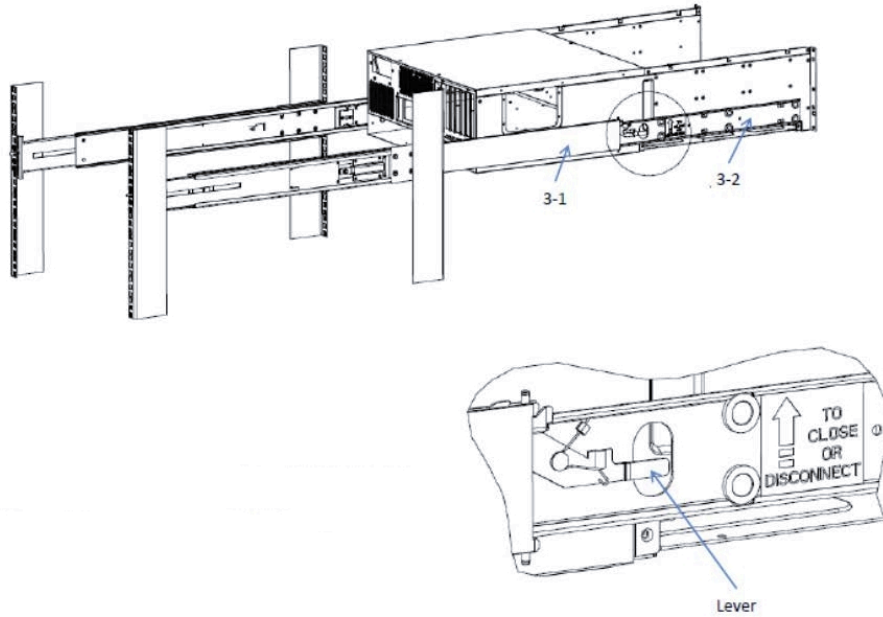
Lever

Figure 6. Unlock the rails

Cable the appliance

1. On the rear panel, connect the C13 end of the power cables to the C14 inlets in the PSUs. The power supply power connectors are in the center at the bottom of the rear panel, as shown in the following figure.

Figure 7. Rear of appliance
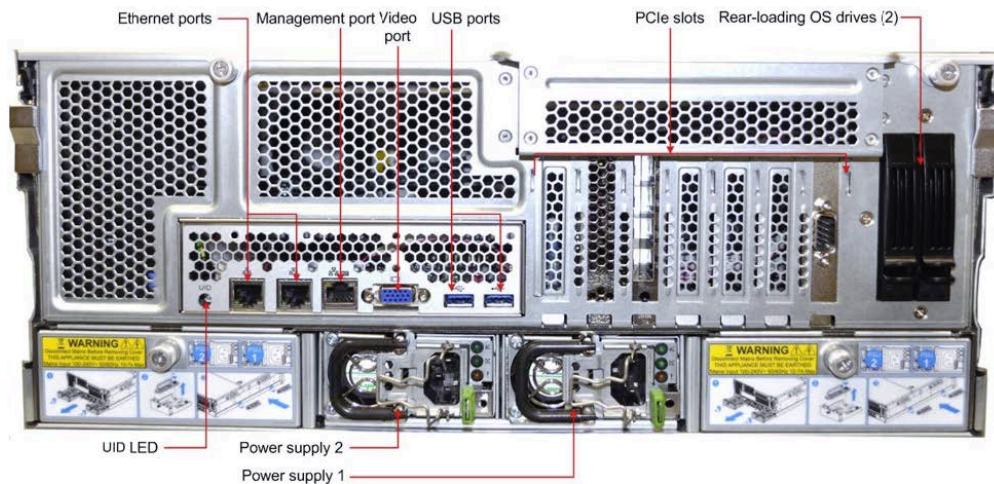
2. The Ethernet connections are located just to the left of the center of the appliance and are next to each other. Connect a standard Ethernet cable to the left Ethernet port.

3. Press the power button that is on the bottom center of the appliance front panel.

4. To ensure that the power is on, verify that the power and network link lights are lit and listen for running fans.

Chapter 4. Appliance physical interface

The physical interface for the appliance consists of buttons and LEDs on the front panel and ports and LEDs on the back panel.

Front control panel

The power status and the hard disk drive and network activity of the appliance can be read from its front control panel, as shown in the following figure.
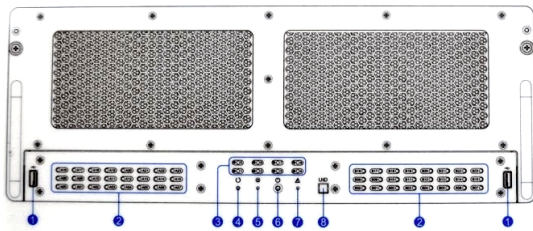

Figure 8. Front panel buttons and LEDs for the appliance

Front panel buttons and LEDs

The front control panel provides the following buttons (preceded by the callout numbers from the previous figure).

1. USB Ports

4. Reset button
> Reboots the system. A needle, pin, or other small device is needed to activate this button and reset the system.

6. Power button
> Powers on or powers off the system. Turning off system power with this button removes the main power but keeps standby power that is supplied to the system. Therefore, you must unplug the system before servicing.

8. Unit Identification (UID) button
> When depressed, illuminates the UID LED on the front panel as well as the system board UID LED, which is visible at the rear of the system. Use these LEDs to locate the server within a rack. Press again to turn off the LEDs.

The front panel also provides the following LEDs (preceded by the callout numbers from the previous figure):

2. HDD activity LEDs (48 LEDs total)
> Indicate the following possible statuses:

Table 6. HDD activity LEDs

Status	Green	Red
Offline or idle	Off	Off
Active	Flash	Off
Fail	Off	On

Table 6. HDD activity LEDs (continued)

Status	Green	Red
Locate	Off	4-Hz flash
Rebuild	Flash	1-Hz flash

3. **Fan failure LEDs**

   Shows red if the fan has an error or is missing (each indicator represents one system fan). If any fan experiences an error or is missing, all system fans are run at full speed as a way to compensate for the error or the missing fan. If a fan error occurs, replace the fan immediately to avoid the risk of a system high temperature condition.

   Attention: There are eight fans, and four fan assemblies. Each fan assembly consists of a pair of fans, in a dual rotor configuration. The fan pairs are 1-5, 2-6, 3-7, and 4-8. So if fan 1 fails (the fan led marked "1" is lit), the fan assembly 1-5, which consists of a single dual motor fan, must be replaced. See "Replace the Fans" for details.

5. **Power LED**

   Shows green when power is on, unlit when power is off.

7. **Global failure indicator**

   Lights when a PSU fault or fan error or high temperature condition or any combination is encountered.

Top Loading Drive Carrier LEDs

   A single LED on the top extractor handle of each drive indicates drive activity when flashing green.

Rear panel

The rear panel contains I/O ports, network interface ports, power supplies, and two hard disk drive carriers.

I/O ports

The I/O ports are color-coded per the PC 99 specification. The locations of the various I/O ports are shown in the following figure.
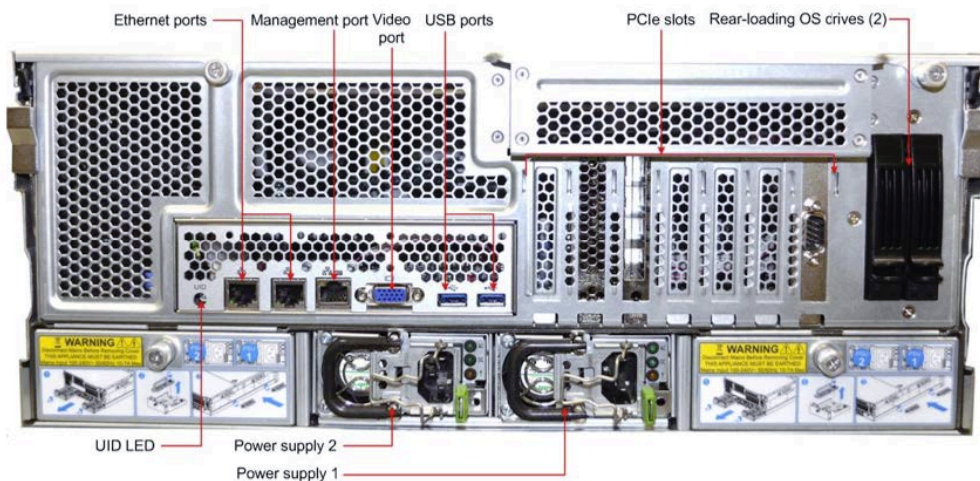

Figure 9. Rear panel I/O ports for the appliance

Rear Loading Boot Drive Carrier LEDs

At the bottom of the boot drive carrier, the left LED shows Power, and is Blue when power is on; the right LED shows Activity, and flashes green when there is activity.

10 GbE NIC Card LEDs

Each SFP connector on the four-port NIC card has two LEDs. The Upper LED indicates link speed (Blue = 10G link, Yellow = 1G link), and the bottom LED indicates Link/Activity (Link = green, Activity = flashing green).

Onboard 1 GbE NIC LEDs

Each of the two RJ45 1 GbE connectors on the back panel has two built-in LEDs. The left LED indicates Link/Activity (Link = green, Activity = flashing green), and the right LED indicates Link Speed (Amber = 1 Gb/s, Green = 100 Mb/s, and Off = 10 Mb/s).

Chapter 5. Field replaceable or upgrade units

A number of components can be replaced or upgraded in the field.

Replacement parts

Contact IBM Support for replacement parts for this appliance.

The following customer serviceable parts are available:
- Power Supply Module
- Chassis Fan
- Operating System Drive
- Rail Kit

The following customer installable upgrade units are available:
- Data drives
- Optical modules (SFP+ / QSFP)

See the *Field Replaceable Units Reference Guide* for a complete list of available data drives.

System diagram

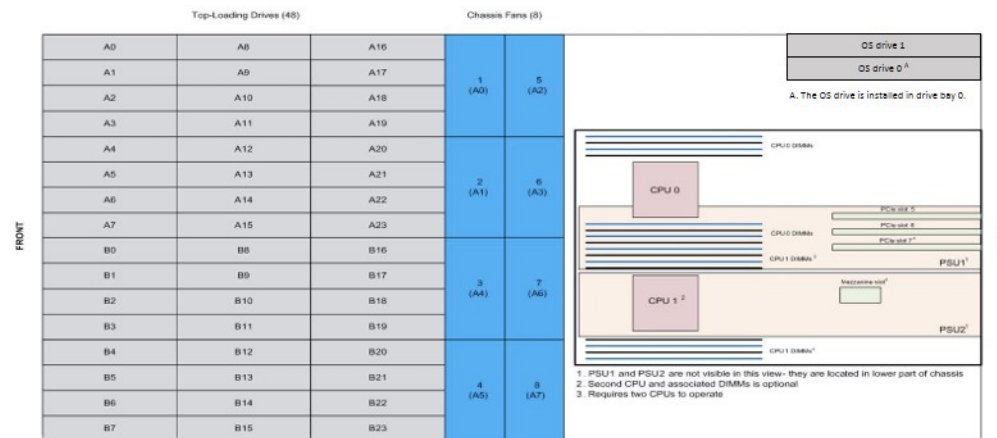The following figures show the appliance schematics.

Figure 10. System diagram

Note: There are four chassis fan units, each with two rotors and two motors. If a fan fails, you must replace the entire unit.

Replace internal components

Replace fans

After determining which fan failed, follow these steps to remove and replace the fan assembly:
1. Log in to the device as `localadmin`.

2. At the command prompt, type `poweroff`.
3. After the appliance is powered off, remove the power cord and network cables from the back of the chassis.
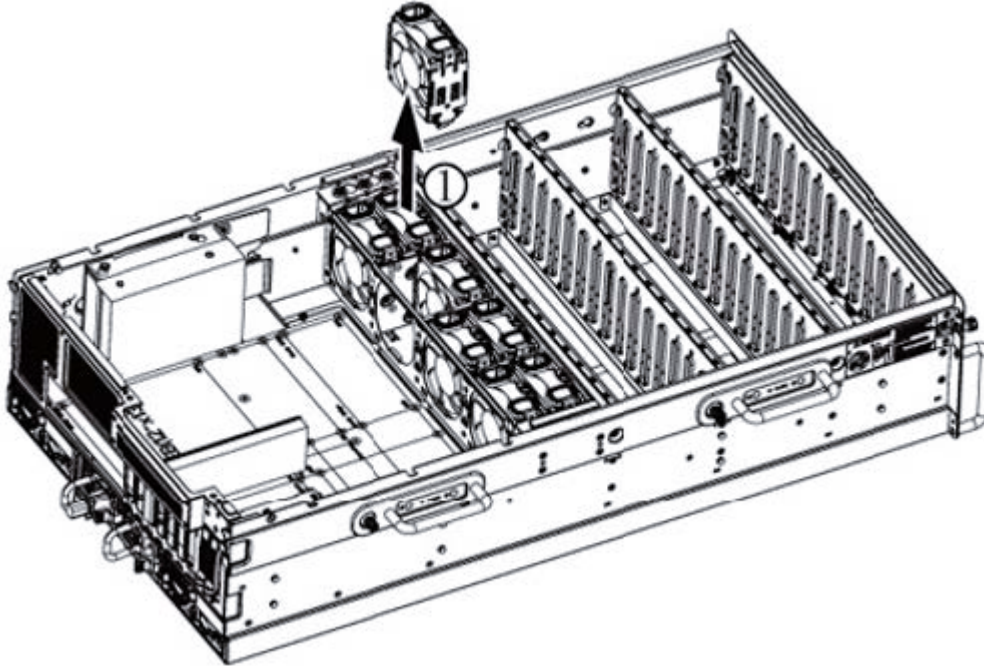4. Insert finger and thumb into fan assembly holder slots and pull fan assembly out of fan cage.

Figure 11. Removing a fan

5. Insert another fan assembly for replacement.
6. Keep your fingers away from fan blades.

Replace a 2.5 in. rear loading OS drive

1. Log in to the device as `localadmin`.
2. At the command prompt, type `poweroff`.
3. After the appliance is powered off, remove the power cord and network cables from the back of the chassis.
4. Locate the failed drive in Rear Drive-Bay 0, and pinch together the two tabs to open the drive release handle.
5. Pull upward on the release handle to slide the drive tray out of the drive bay, as shown in the following figure.
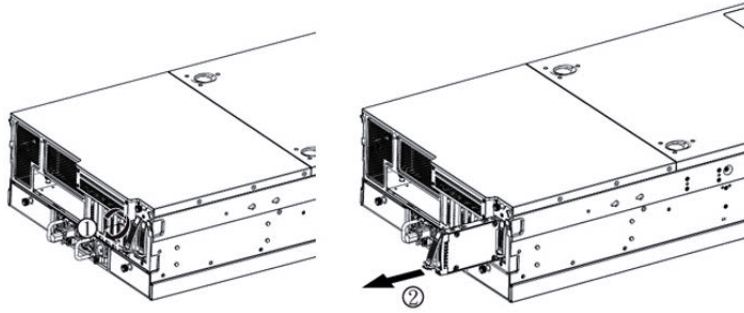
Figure 12. Removing a boot drive

6. Replace the drive.
7. Insert the new drive tray into the drive bay until it is fully inserted and clicks into place.
8. Plug in the power cable and network cables.
9. Power on the appliance.
10. For drives with no OS installed, see Install an operating system on a drive.

Install an operating system on a drive

Note: To install an operating system (OS) on a drive, you need a USB flash drive, a computer that is running a Linux OS, a VGA-capable monitor, and a USB keyboard.

CAUTION:
The following procedure destroys any existing data on the USB flash drive.

1. Download the installation ISOs from IBM.
2. Insert the USB flash drive into the computer.
3. Determine the name of this drive.

   `#lsblk`
4. Determine that the drive is not mounted.

   `#mount`
5. Copy the ClevOS ISO to the USB flash drive.

   `#dd if=/{path}/{ClevOS}.iso of=/dev/{drivename} bs=1M`
6. When copying is done, remove the USB flash drive from the computer.
7. Power down the device on which you want to install the OS.
   - If the device is in an unresponsive state, it can be powered down by PDU or by removing the power cables.
   - If the device is still responding, do the following steps.
     a. Log in to the device as `localadmin`.
     b. At the command prompt, type `poweroff/`
8. Attach the USB keyboard and VGA monitor to the device.
9. Insert the USB flash drive in the remaining USB port.
10. Restart the machine while pressing **F11** to enter the boot menu.
11. In the boot menu, select **USB Key** and press **Enter**. The device loads the operating system, and the installer appears.
12. In the installer, choose **OS only install**. When installation completes, the device reboots.
13. After the device reboots, remove the USB flash drive.

Replace a data drive

1. Remove the top front cover and locate the drive by location label or failure LED.
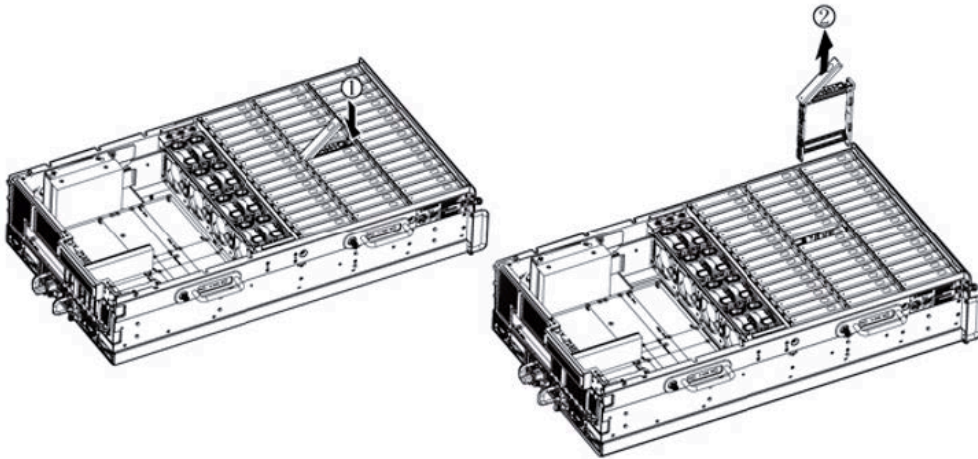2. Press the release tab and pull out the drive tray, as shown in the following figure.

Figure 13. Removing a drive tray

3. Replace the drive in the tray with a new drive.
4. Insert the new drive tray into the chassis until it is fully inserted and clicks into place.

Add a data drive upgrade kit

Note: Upgrade drives must match the model of drive that is already populated in other slots.

1. Log in to the device as `localadmin`.
2. At the command prompt, type `poweroff`.
3. Remove the top front cover.
4. Add upgrade drives in full rows starting from the rear of the chassis.

   Note: Do not leave open slots in rows as it affects the cooling capabilities of the appliance.
5. Insert the new drives into the chassis until they are fully inserted and click into place.
6. Press down on the latch of each drive until they lock in place.
7. Replace the top cover.
8. Restart the system.

Replace a power supply unit

This server implements two 1100 W AC-DC switching power supplies. Each power supply can operate as a single supply or in an N+1 parallel operation with active load sharing in an N+1 redundant configuration.

If either of the two power supply modules fail, the other module takes the full load and allow the system to continue operation without interruption. However, the global failure indicator on the front panel remains lit until the failed module is replaced.

Each power supply module has three LEDs to indicate power supply status. They are marked with the following abbreviations:

* AC (top LED)
* DC (middle LED)

- ! (bottom LED)

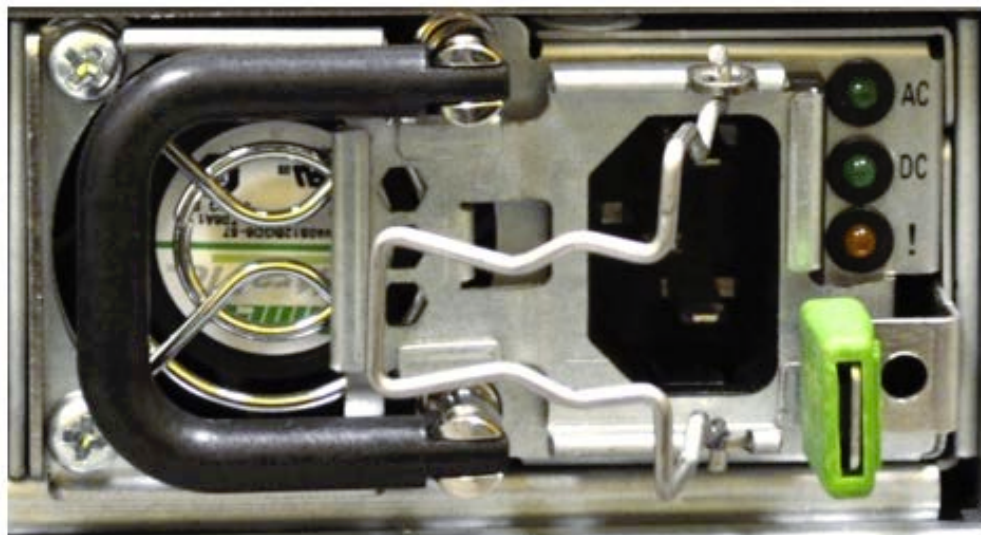The following figure shows the LEDs.

Figure 14. Power supply LEDs

The LEDs are driven by internal circuitry and illuminate in an N+1 configuration even without input power. See the following table for the power supply LED meanings.

Table 7. Power supply LED meanings

Power supply condition	Power supply LEDs
No AC power to all PSUs	Off
No AC power to this PSU	AC LED 1 Hz flashing green
AC present/only standby output on/ CR-State	AC LED green
Power supply DC output ON and OK	AC and DC LED green
Power supply failure	FAIL LED amber
Power supply warning	1 Hz flashing amber

Follow these steps to replace a failed power supply.

1. Unplug the power cord.

   CAUTION:
   After you remove the power cord, wait for at least 15 seconds before you attempt to remove the power supply unit for maintenance or repair to avoid accidental shock or personal injury due to any residual power supply electrical charge.

2. Actuate the green power supply lever to release the power supply.
3. Slide the power supply out of the chassis, as shown in the following figure.
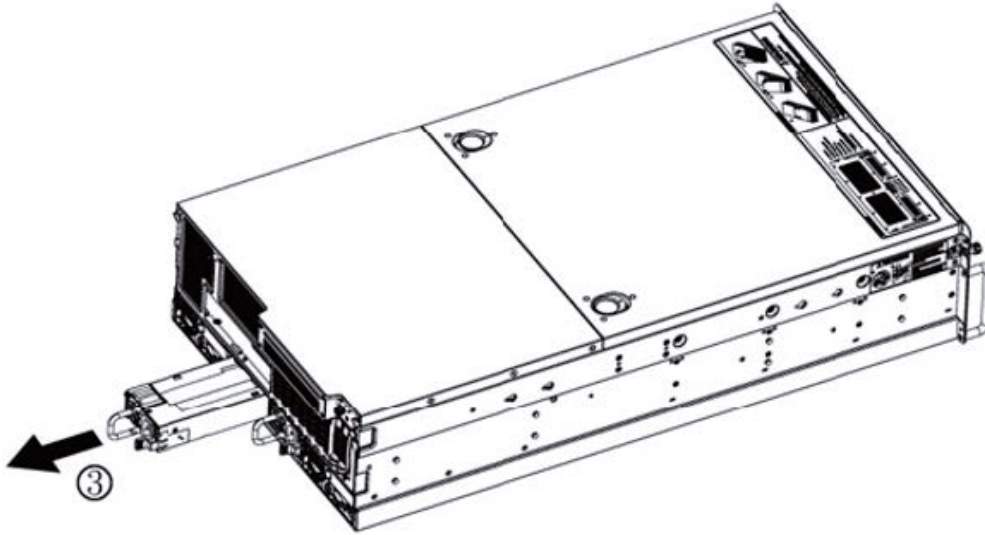
Figure 15. Removing the PSU

4. Insert the new power supply fully into the chassis until the green lever snaps into place.
5. Insert the power cord.
6. Verify that all power supply indicators are normal.

Install an SFP+ / QSFP optical module

1. Log in to the device as `localadmin`.
2. At the command prompt, type `poweroff`.
3. Remove the SFP+ / QSFP module from the packaging.
4. Remove the black plastic protective cap from the optical side of the module.
5. Insert the module into the network card until it clicks into place.
6. Insert the fiber optic cable into the SFP+ / QSFP module.
7. Restart system and configure the network interface. For more information, see the *Appliance Configuration Guide*.

Battery removal and installation

Battery removal

CAUTION: The battery contains lithium. To avoid possible explosion, do not burn or charge the battery.
Do not: Throw or immerse into water, heat to more than 100°C (212°F), repair or disassemble. (C003)

To remove the Onboard battery, follow these steps:
1. Power off your system and unplug your power cable.
2. Locate the Onboard battery, as shown in the figure.
3. Using a tool such as a pen or a small screwdriver, push the battery lock outwards to unlock it. When unlocked, the battery pops out from the holder.
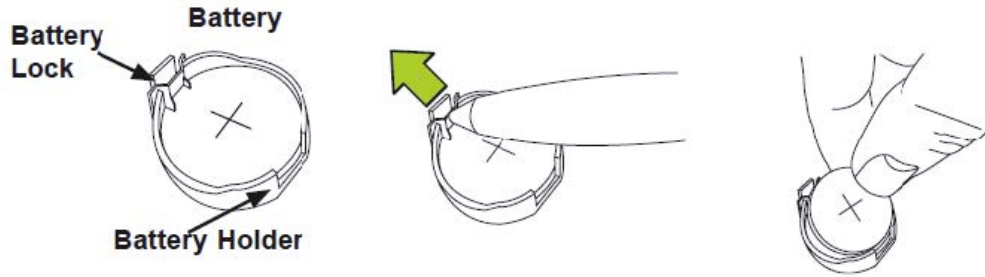4. Remove the battery, as shown in the following figure.

Figure 16. Remove the battery

CAUTION:
Handle used batteries carefully. Do not damage the battery in any way; a damaged battery can release hazardous materials into the environment. Do not discard a used battery in the garbage or a public landfill. Refer to the IBM Systems Environmental Notices for battery disposal guidelines.

Battery installation

To install an onboard battery, follow these steps:

1. Identify the battery's polarity. The positive (+) side must be facing up.
2. Insert the battery into the battery holder. Push it down until you hear a click to ensure that the battery is securely locked, as shown in the following figure.

Figure 17. Install the battery

CAUTION:
Be sure to replace the battery with the same type only.

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