ServeRAID M5115 SAS/SATA Controller for Flex System

Installation Guide

ServeRAID M5115 SAS/SATA Controller for Flex System

Installation Guide

Note: Before using this information and the product it supports, read the general information in "Notices" on page 159 and see the *Important Notices* and *Warranty Information* documents that comes with the options.

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Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الأمنية

Antes de instalar este produto, leia as Informações de Segurança.

在安装本产品之前，请仔细阅读 Safety Information
(安全信息)。

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

Ennen kuin asennat tämän tuotteen, lue turvaohjeet kohdasta Safety Information.

Avant d'installer ce produit, lisez les consignes de sécurité.

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

Πριν εγκαταστήσετε το προϊόν αυτό, διαβάστε τις πληροφορίες ασφάλειας
(safety information).

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

Prima di installare questo prodotto, leggere le Informazioni sulla Sicurezza.

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

Пред да се инсталира овој продукт, прочитајте информацијата за безбедност.

Les sikkerhetsinformasjonen (Safety Information) før du installerer dette produktet.

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Przed zainstalowaniem tego produktu, należy zapoznać się
z książką "Informacje dotyczące bezpieczeństwa" (Safety Information).

Antes de instalar este produto, leia as Informações sobre Segurança.

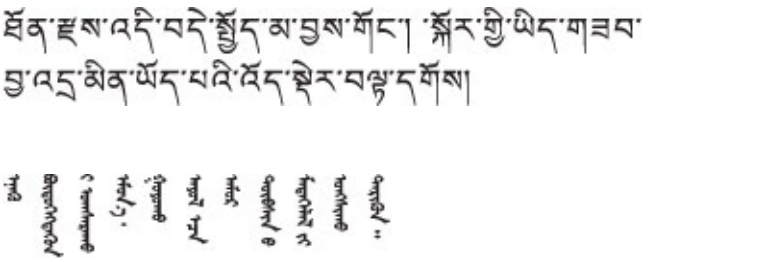
Перед установкой продукта прочтите инструкции по
технике безопасности.

Pred inštaláciou tohto zariadenia si pečítaje Bezpečnostné predpisy.

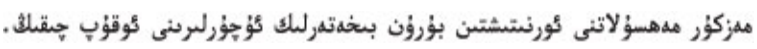
Pred namestitvijo tega proizvoda preberite Varnostne informacije.

Antes de instalar este producto, lea la información de seguridad.

Läs säkerhetsinformationen innan du installerar den här produkten.



Youq mwngz yungh canjbinj neix gaxgonq, itdingh aeu doeg aen
canjbinj soengq cungj vahgangj ancien siusik.



Bu ürünü kurmadan önce güvenlik bilgilerini okuyun.

Be sure to read all caution and danger statements in this document before you perform the procedures. Read any additional safety information that comes with the server or optional device before you install the device.

Important:

Each caution and danger statement in this document is labeled with a number. This number is used to cross reference an English-language caution or danger statement with translated versions of the caution or danger statement in the *Safety Information* document.

For example, if a caution statement is labeled “Statement 1,” translations for that caution statement are in the *Safety Information* document under “Statement 1.”

Be sure to read all caution and danger statements in this document before you perform the procedures. Read any additional safety information that comes with the server or optional device before you install the device.

Statement 1

DANGER

Electrical current from power, telephone, and communication cables is hazardous.

To avoid a shock hazard:

- **Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.**
- **Connect all power cords to a properly wired and grounded electrical outlet.**
- **Connect to properly wired outlets any equipment that will be attached to this product.**
- **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.**
- **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 table when installing, moving, or opening covers on this product or attached devices.**

To Connect:	**To Disconnect:**
1. Turn everything OFF.	1. Turn everything OFF.
2. First, attach all cables to devices.	2. First, remove power cords from outlet.
3. Attach signal cables to connectors.	3. Remove signal cables from connectors.
4. Attach power cords to outlet.	4. Remove all cables from devices.
5. Turn device ON.	

Statement 12

CAUTION:
The following label indicates a hot surface nearby.

Statement 21

CAUTION:
Hazardous energy is present when the blade is connected to the power source. Always replace the blade cover before installing the blade.

UL regulatory information

This device is for use only with Listed Accessory Lenovo Compute Nodes.

Chapter 1. Introduction

This *Installation Guide* provides information about installing the following Flex System™ compute node options:

- ServeRAID M5115 SAS/SATA Controller for Flex System
- ServeRAID M5100 Series Enablement Kit for x240
- ServeRAID M5100 Series Flex System Flash Kit for x240
- ServeRAID M5100 Series Flex System Flash Kit v2 for x240
- ServeRAID M5100 Series SSD Expansion Kit for x240
- ServeRAID M5100 Series Enablement Kit for x440
- ServeRAID M5100 Series Flex System Flash Kit for x440
- ServeRAID M5100 Series Flex System Flash Kit v2 for x440
- ServeRAID M5100 Series SSD Expansion Kit for x440
- ServeRAID M5100 Series Flex System Flash Kit for X6

The Lenovo Documentation CD

The Lenovo® *Documentation* CD contains documentation for the controller in Portable Document Format (PDF).

Hardware and software requirements

The Lenovo *Documentation* CD requires the following minimum hardware and software:

- Microsoft Windows 2000, or Red Hat Linux
- 100 MHz microprocessor
- 32 MB of RAM
- Adobe Acrobat Reader 3.0 (or later) or xpdf, which comes with Linux operating systems

Using the Documentation Browser

Use the Documentation Browser to browse the contents of the CD, read brief descriptions of the documents, and view documents, using Adobe Acrobat Reader or xpdf. The Documentation Browser automatically detects the regional settings in your computer and displays the documents in the language for that region (if available). If a document is not available in the language for that region, the English-language version is displayed.

Use one of the following procedures to start the Documentation Browser:

- If Autostart is enabled, insert the CD into the CD or DVD drive. The Documentation Browser starts automatically.
- If Autostart is disabled or is not enabled for all users, use one of the following procedures:
  - If you are using a Windows operating system, insert the CD into the CD or DVD drive and click **Start --> Run**. In the **Open** field, type

    ```
    e:\win32.bat
    ```

    where *e* is the drive letter of the CD or DVD drive, and click **OK**.

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– If you are using Red Hat Linux, insert the CD into the CD or DVD drive; then, run the following command from the /mnt/cdrom directory:

```
sh runlinux.sh
```

Select the controller from the **Product** menu. The **Available Topics** list displays all the documents for the controller. Some documents might be in folders. A plus sign (+) indicates each folder or document that has additional documents under it. Click the plus sign to display the additional documents.

When you select a document, a description of the document is displayed under **Topic Description**. To select more than one document, press and hold the Ctrl key while you select the documents. Click **View Book** to view the selected document or documents in Acrobat Reader or xpdf. If you selected more than one document, all the selected documents are opened in Acrobat Reader or xpdf.

To search all the documents, type a word or word string in the **Search** field and click **Search**. The documents in which the word or word string appears are listed in order of the most occurrences. Click a document to view it, and press Crtl+F to use the Acrobat search function, or press Alt+F to use the xpdf search function within the document.

Click **Help** for detailed information about using the Documentation Browser.

Notices and statements in this document

The caution and danger statements in this document are also in the multilingual *Safety Information* document that comes with the option kit. Each statement is numbered for reference to the corresponding statement in your language in the *Safety Information* document.

The following notices and statements are used in this document:

- **Note:** These notices provide important tips, guidance, or advice.
- **Important:** These notices provide information or advice that might help you avoid inconvenient or problem situations.
- **Attention:** These notices indicate potential damage to programs, devices, or data. An attention notice is placed just before the instruction or situation in which damage might occur.
- **Caution:** These statements indicate situations that can be potentially hazardous to you. A caution statement is placed just before the description of a potentially hazardous procedure step or situation.
- **Danger:** These statements indicate situations that can be potentially lethal or extremely hazardous to you. A danger statement is placed just before the description of a potentially lethal or extremely hazardous procedure step or situation.

Installation guidelines

Before you remove or replace a field replaceably unit (FRU) or install an optional device, read the following information:

- Before you begin, read “Safety” on page “Safety” on page v and “Handling static-sensitive devices” on page 3. This information will help you work safely.
- Observe good housekeeping in the area where you are working. Place removed covers and other parts in a safe place.
- Back up all important data before you make changes to hard disk drives.

- Before you remove a compute node from the Flex System chassis, you must shut down the operating system and turn off the compute node. You do not have to shut down the chassis itself.
- To ensure proper cooling, do not operate the Flex System chassis without a compute node or node bay filler in each node bay.
- Blue on a component indicates touch points, where you can grip the component to remove it from or install it in the compute node, open or close a latch, and so on.

Handling static-sensitive devices

To reduce the possibility of damage from electrostatic discharge, observe these precautions.

Attention: Static electricity can damage the compute node and other electronic devices. To avoid damage, keep static-sensitive devices in their static-protective packages until you are ready to install them.

- Limit your movement. Movement can cause static electricity to build up around you.
- Handle the device carefully, holding it by its edges or its frame.
- Do not touch solder joints, pins, or exposed circuitry.
- Do not leave the device where others can handle and damage it.
- While the device is still in its static-protective package, touch it to an *unpainted* metal part of the Flex System chassis or any *unpainted* metal surface on any other grounded rack component in the rack in which you are installing the device for at least 2 seconds. This drains static electricity from the package and from your body.
- Remove the device from its package and install it directly into the compute node without setting down the device. If it is necessary to set down the device, put it back into its static-protective package. Do not place the device on the compute node cover or on a metal surface.
- Take additional care when you handle devices during cold weather. Heating reduces indoor humidity and increases static electricity.

Returning a device or component

If you are instructed to return a device or component, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Updating the compute node configuration

Use this information to update the compute node configuration. When the compute node starts for the first time after you add or remove an internal device, you might receive a message that the configuration has changed.

The Setup utility automatically starts so that you can save the new configuration settings. For more information about the Setup utility, see the *Installation and Service Guide* that comes with the compute node.

Some devices have device drivers that you must install. See the documentation that comes with each device for information about installing device drivers.

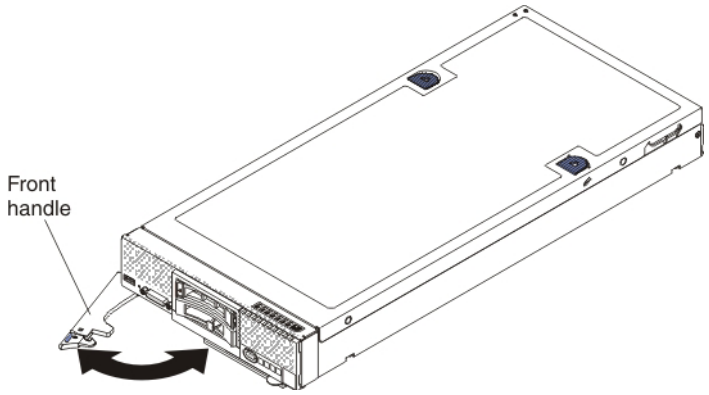
Removing a compute node from a chassis

To remove a compute node from a Flex System chassis, complete the following steps:

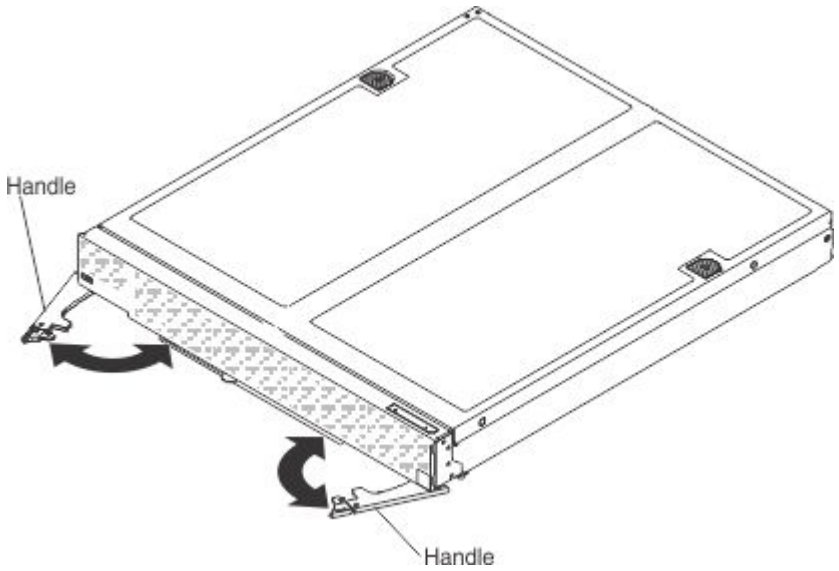
1. Read the safety information that begins on page "Safety" on page v and "Handling static-sensitive devices" on page 3.
2. If the compute node is operating, shut down the operating system.
3. Press the power button to turn off the compute node. For more information, see the *Installation and Service Guide* that comes with the compute node.
4. Open the front handle (x240) or handles (x440 and X6) on the compute node as shown in the illustration for your model. The compute node moves out of the node bay approximately 0.6 cm (0.25 inch).

   Note: The illustrations in this document might differ slightly from your hardware.

   - **Flex System x240:**



   - **Flex System x440 and X6:**



Attention:

- To maintain proper system cooling, do not operate the Flex System chassis without a compute node or node bay filler installed in each node bay.

- When you remove the compute node, note the node bay number. Reinstalling a compute node into a different node bay from the one it was removed from can have unintended consequences. Some configuration information and update options are established according to node bay number. If you reinstall the compute node into a different node bay, you might have to reconfigure the compute node.

5. Pull the compute node out of the node bay.
6. Install either a node bay filler or another compute node in the node bay within 1 minute.

Installing a compute node in a chassis

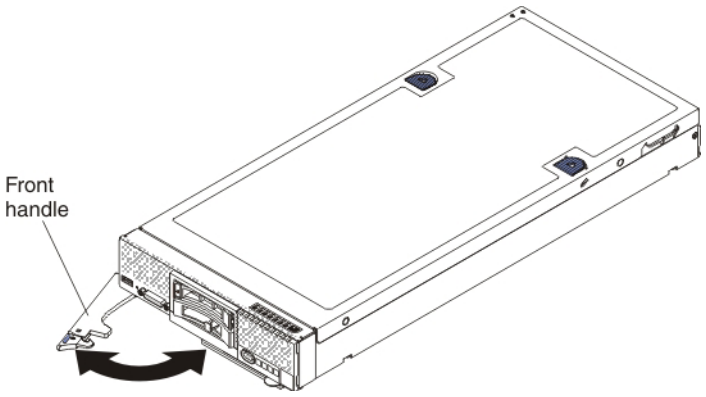
Statement 21

CAUTION:
Hazardous energy is present when the blade is connected to the power source. Always replace the blade cover before installing the blade.

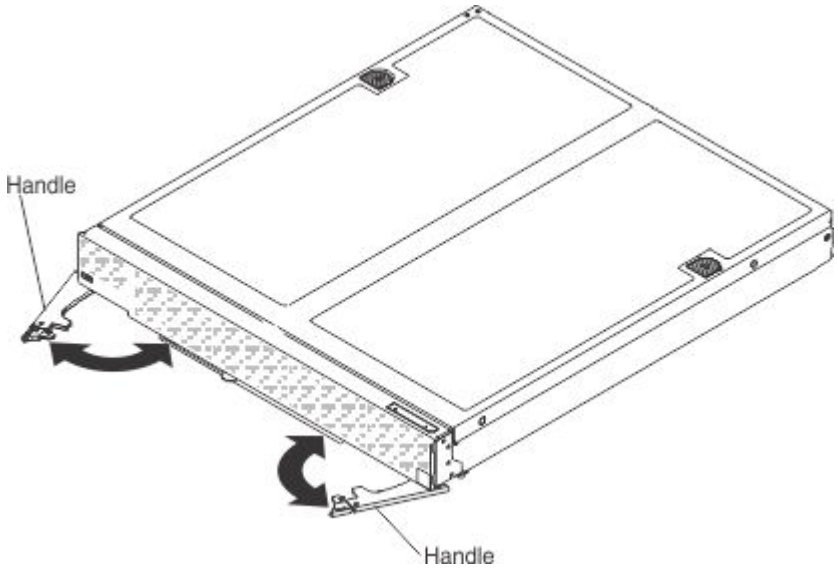
To install a compute node in the Flex System chassis, complete the following steps.

Attention: You cannot insert the compute node into the Flex System chassis until the cover is installed and closed. Do not attempt to override this protection.

1. Read the safety information that begins on page "Safety" on page v and "Handling static-sensitive devices" on page 3.
2. Select the node bay. If you are reinstalling a compute node that you removed, you must install it in the same node bay from which you removed it.
3. Open the front handle (x240) or handles (x440 and X6) on the compute node as shown in the illustration for your model.
   - **Flex System x240:**



   - **Flex System x440 and X6:**



4. Slide the compute node into the node bay until it stops.
5. Push the front handle (x240) or handles (x440 and X6) on the compute node to the closed position.

   Note: After the compute node is installed, the Integrated Management Module (IMM) in the compute node initializes and synchronizes with the Chassis Management Module (CMM). This process takes several minutes, depending on your configuration. The power LED flashes rapidly, and the power button on the compute node does not respond until this process is complete.
6. Turn on the compute node. For more information, see the *Installation and Service Guide* that comes with the compute node.
7. Make sure that the power LED on the compute node control panel is lit continuously, indicating that the compute node is receiving power and is turned on.

Removing the compute node cover

Statement 12

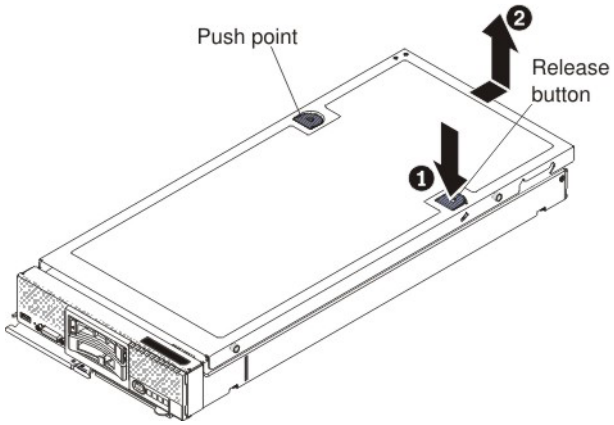
CAUTION:
The following label indicates a hot surface nearby.

Statement 21

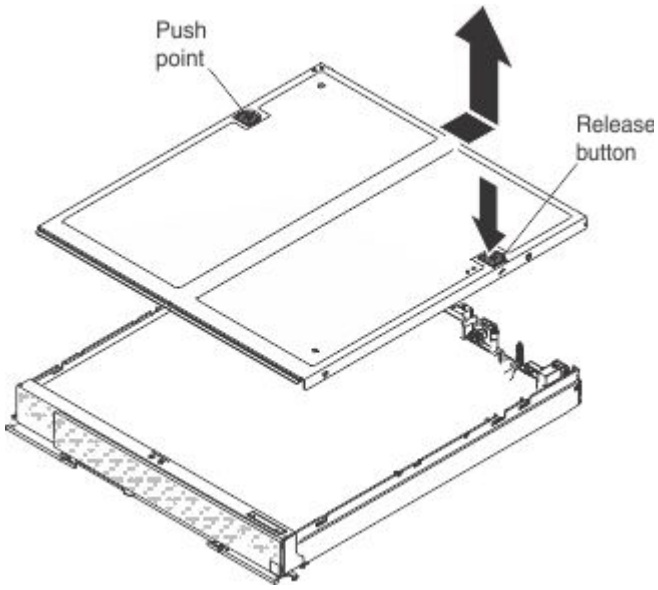
CAUTION:
Hazardous energy is present when the blade is connected to the power source. Always replace the blade cover before installing the blade.

To remove the cover from a compute node, complete the following steps:

1. Read the safety information that begins on page "Safety" on page v and "Handling static-sensitive devices" on page 3.
2. If the compute node is installed in a Flex System chassis, remove it (see "Removing a compute node from a chassis" on page 4 for instructions).
3. Carefully lay the compute node on a flat, static-protective surface, orienting the compute node with the bezel pointing toward you.
4. Press the release button **1** and the push point at the same time and slide the cover toward the rear of the compute node **2**.
   - **Flex System x240:**



   - **Flex System x440 and X6:**



5. Lift the cover away from the compute node and set it on a flat, static-protective surface.

Installing the compute node cover

Attention: You cannot insert the compute node into the Flex System chassis until the cover is installed and closed. Do not attempt to override this protection.

Statement 21

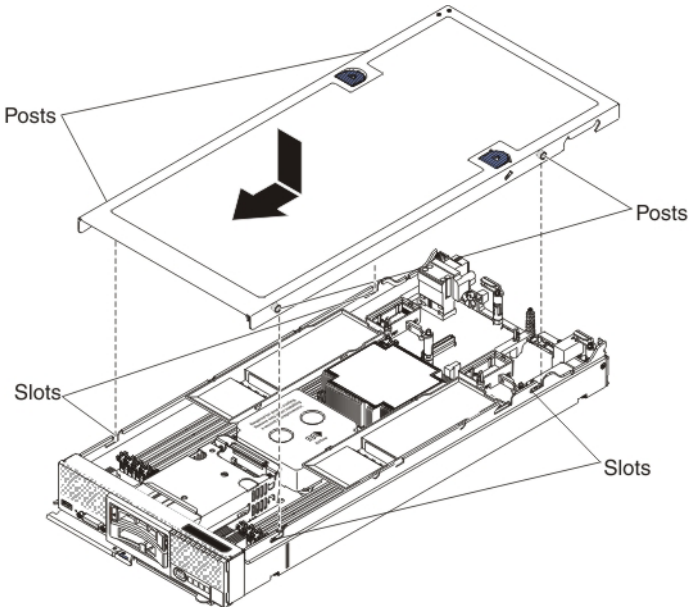
CAUTION:
Hazardous energy is present when the blade is connected to the power source. Always replace the blade cover before installing the blade.

To install the compute node cover, complete the following steps:

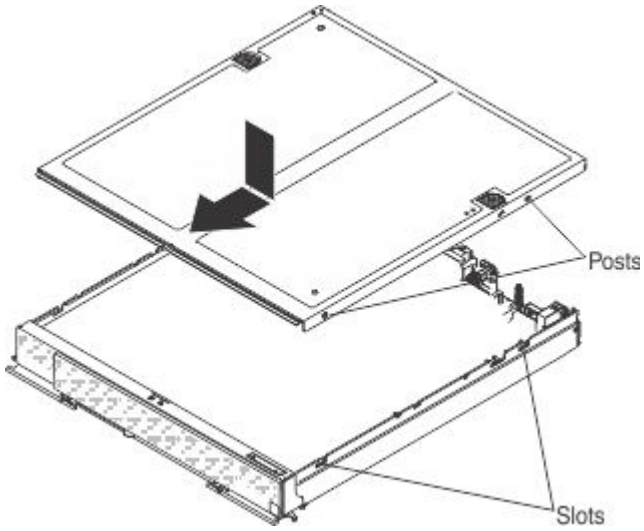
1. Read the safety information that begins on page "Safety" on page v and "Handling static-sensitive devices" on page 3.
2. Carefully lay the compute node on a flat, static-protective surface, orienting the compute node with the bezel pointing toward you.
3. Orient the cover so that the posts on the inside of the cover slide into the slots on the compute node.

   Note: Before you close the cover, make sure that the air baffles and all components are installed and seated correctly and that you have not left loose tools or parts inside the compute node.

   - **Flex System x240:**



   - **Flex System x440 and X6:**



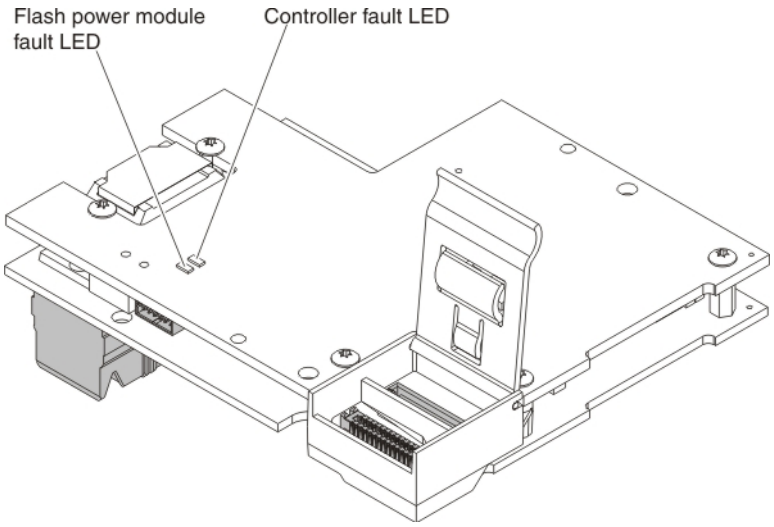
4. Hold the front of the compute node and slide the cover forward to the closed position, until it clicks into place.

Chapter 2. Installing the ServeRAID M5115 SAS/SATA Controller for Flex System

The ServeRAID M5115 SAS/SATA Controller for Flex System is a 6 Gb SAS 2.5 RAID controller that is installed in a Flex System compute node.

ServeRAID controller LEDs

The controller LEDs are shown in the following illustration.



Flash power module fault LED

When this yellow LED is lit, it indicates that the flash power module and associated logic are not working. Data loss can occur during a sudden power failure. Replace the flash power module. If the problem remains, replace the controller.

Controller fault LED

When this yellow LED is lit, it indicates that the controller has failed. Replace the controller.

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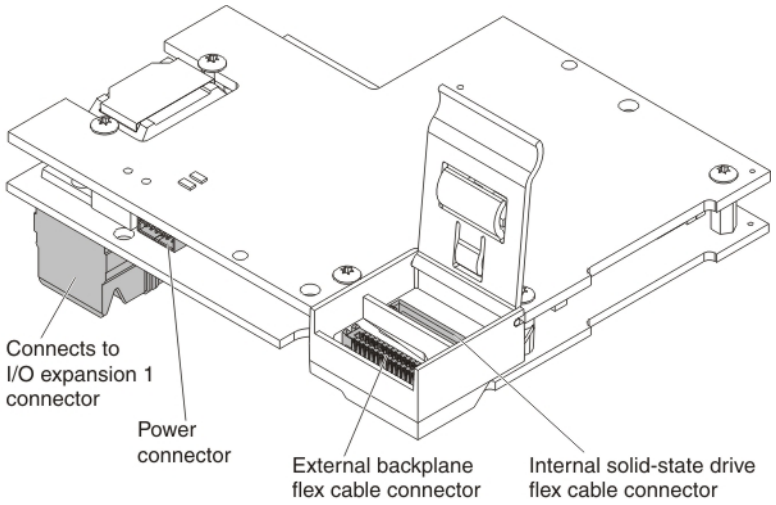
ServeRAID controller connectors

The controller connectors are shown in the following illustration.



I/O expansion 1 connector
The controller connects to the compute node system board with this connector.

Power connector
Connect a power cable to the flash power module and to the controller power connector.

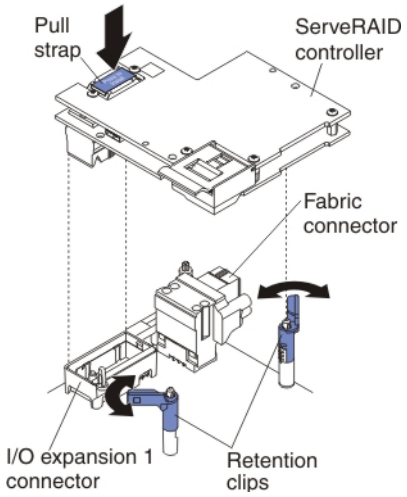
External drive backplane flex cable connector
Connect the hard disk drive backplane flex cable or the solid-state drive backplane flex cable to this connector.

Internal solid-state drive flex cable connector
Connect the solid-state drive flex cable to this connector.

Installing the ServeRAID M5115 SAS/SATA Controller for Flex System

About this task

To install the controller in the compute node, complete the following steps.



Procedure

1. Read the safety information that begins on page "Safety" on page v and "Handling static-sensitive devices" on page 3.
2. Remove the compute node from the chassis (see "Removing a compute node from a chassis" on page 4).
3. Remove the compute node cover (see "Removing the compute node cover" on page 6).
4. Locate the fabric connector and I/O expansion 1 connector on the left rear of the compute node system board.
5. Remove the cover from the I/O expansion 1 connector, if one is present.
6. Touch the static-protective package that contains the ServeRAID controller to any *unpainted* metal surface on the Flex System chassis or any *unpainted* metal surface on any other grounded rack component; then, remove the controller from the package.
7. Open the retention clips by rotating them outward.
8. Orient the connector on the underside of the ServeRAID controller with the I/O expansion 1 connector and the alignment posts on the system board. The controller nests around the fabric connector.
9. Firmly press on the pull strap (see the illustration) to seat the controller in the I/O expansion 1 connector and over the alignment posts.
10. Rotate the retention clips inward until they click closed.

Results

If you have other devices to install, do so now. Otherwise, install the cover on the compute node (see "Installing the compute node cover" on page 8) and reinstall the compute node in the same node bay from which you removed it (see "Installing a compute node in a chassis" on page 5).

Replaceable components

Field replaceable units (FRUs) must be replaced only by a trained service technician, unless they are classified as customer replaceable units (CRUs).

Tier 1 CRU: Replacement of Tier 1 CRUs is your responsibility. If Lenovo installs a Tier 1 CRU at your request without a service contract, you will be charged for the installation.

For more information about the terms of the warranty and getting service and assistance, see the *Warranty Information* document that comes with the optional device.

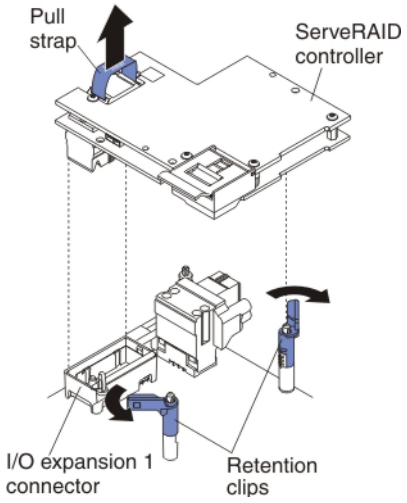
Table 1. Field replaceable units for the ServeRAID M5115 SAS/SATA Controller for Flex System

Description	CRU part number (Tier 1)
ServeRAID M5115 SAS/SATA Controller for Flex System	00JY171

Removing and replacing the ServeRAID M5115 SAS/SATA Controller for Flex System

About this task

To remove the ServeRAID controller from the compute node, complete the following steps.



Procedure

1. Read the safety information that begins on page "Safety" on page v and "Handling static-sensitive devices" on page 3.
2. Remove the compute node from the chassis (see "Removing a compute node from a chassis" on page 4).
3. Remove the compute node cover (see "Removing the compute node cover" on page 6).
4. If a flash power module is installed, disconnect the power cable from the connector on the lower edge of the controller.
5. Lift up the plastic connector door on the controller and, depending on your configuration, disconnect the solid-state drive flex cable and the hard disk drive flex cable.
6. Using your fingers, rotate the retention clips outward and away from the controller.
7. Place the palm of one hand on the heat sink to hold down the compute node.
8. Put one finger under the pull tab on the top side of the controller and carefully pull up to remove the controller from the connector.
9. Touch the static-protective package that contains the replacement ServeRAID controller to any *unpainted* metal surface on the Flex System chassis or any *unpainted* metal surface on any other grounded rack component; then, remove the controller from the package.
10. Orient the connector on the underside of the ServeRAID controller with the I/O expansion 1 connector and the alignment pins on the system board. The controller nests around the fabric connector.
11. Firmly press on the pull strap (see the illustration) to seat the controller in the I/O expansion 1 connector and over the alignment pins.
12. Rotate the retention clips inward until they click closed.

13. Install the cover on the compute node (see “Installing the compute node cover” on page 8 for instructions).
14. Reinstall the compute node in the same node bay from which you removed it (see “Installing a compute node in a chassis” on page 5 for instructions).

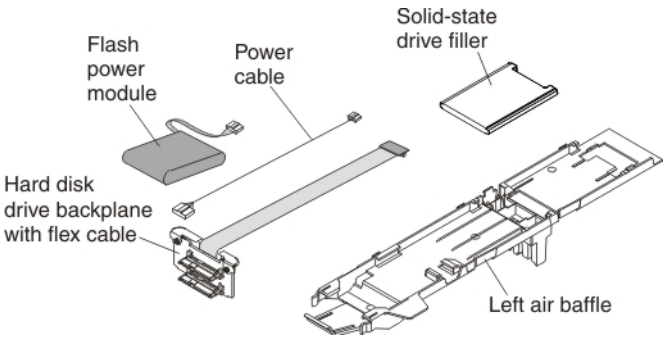
    Note: After the compute node is installed, the IMM in the compute node initializes and synchronizes with the CMM. This process takes several minutes, depending on your configuration. The power LED flashes rapidly, and the power button on the compute node does not respond until this process is complete.
15. Turn on the compute node. Make sure that the power LED on the compute node control panel is lit continuously, indicating that the compute node is receiving power and is turned on.

Chapter 3. Installing the ServeRAID M5100 Series Enablement Kit for x240

This chapter describes how to install the ServeRAID M5100 Series Enablement Kit for x240 in the compute node.

Parts that come in the enablement kit

The following illustration shows the parts that come in the enablement kit for the Flex System x240.



Installing the enablement kit

About this task

To install the enablement kit components, complete the following steps:

Procedure

1. If you have not already done so, remove the compute node from the chassis and remove the cover. For more information, see “Removing a compute node from a chassis” on page 4 and “Removing the compute node cover” on page 6.
2. Install the ServeRAID M5115 SAS/SATA controller for Flex System. For more information, see “Installing the ServeRAID M5115 SAS/SATA Controller for Flex System” on page 12.
3. Press the release latch (orange) on the hard disk drive to release the drive handle; then, use the drive handle to slide the hard disk drive approximately 12 mm (0.5 in.) out of the bay. Repeat this step for the other hard disk drive.
4. Grasp the lip on the top of the hard disk drive backplane and lift it out.

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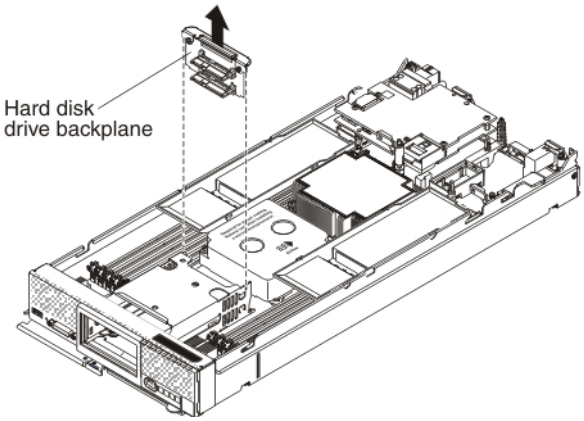
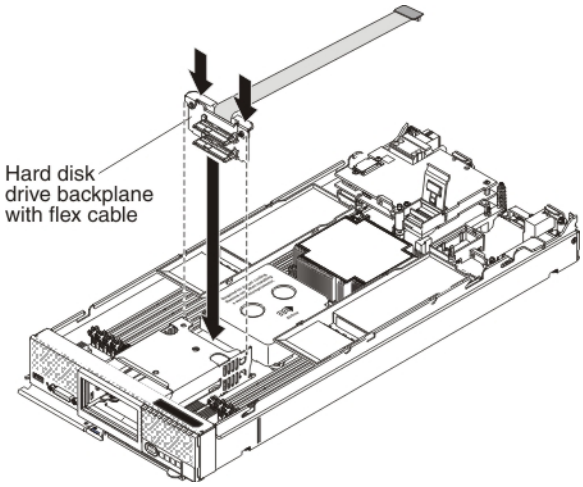
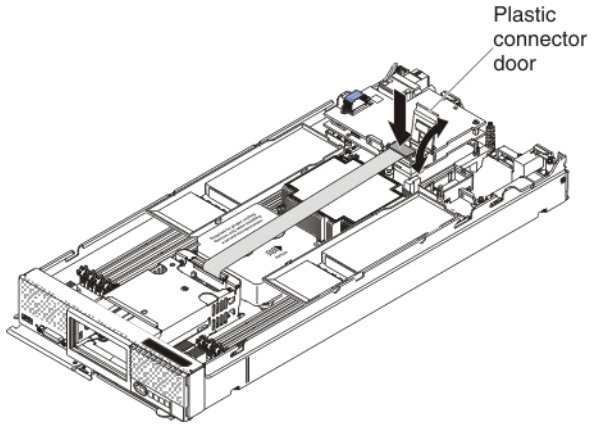


5. To install the new enablement kit backplane with the attached flex cable, complete the following steps:
   a. Touch the static-protective package that contains the new hard disk drive backplane (comes with the enablement kit) to any *unpainted* metal surface on the Flex System chassis or any *unpainted* metal surface on any other grounded rack component; then, remove the backplane from the package.



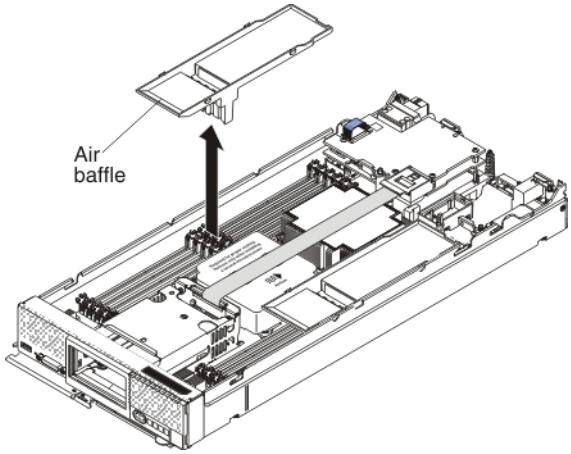
   b. Align the new backplane with the hard disk drive cage and the connector on the system board and press the backplane into position until it is fully seated in the connector.
6. To connect the flex cable that is connected to the hard disk drive backplane to the controller connector, complete the following steps:
   a. Lift up the plastic connector door on the controller.



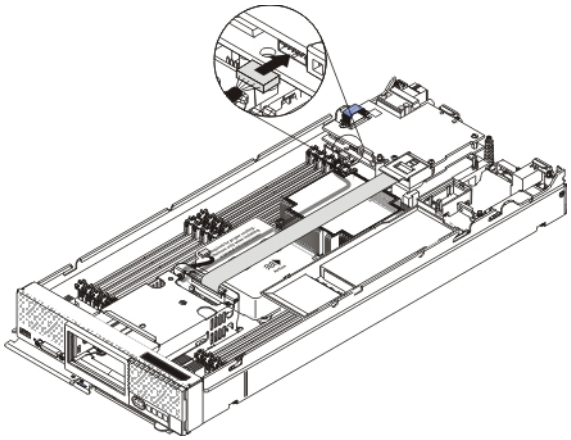
b. Press down firmly on the flex cable connector to connect it to the external drive flex cable connector on the controller. (For the location of the connector on the controller, see the illustration in “ServeRAID controller connectors” on page 12.)

c. Close the plastic connector door.

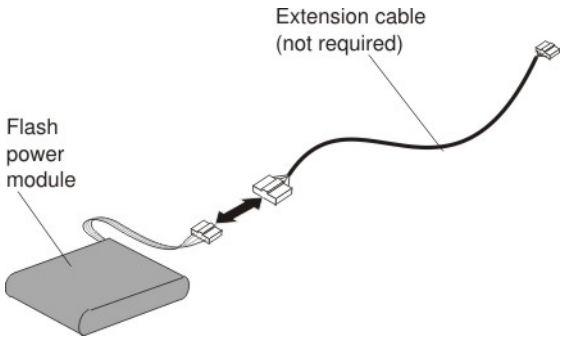
7. Remove the left air baffle as shown in the illustration for your compute node model.



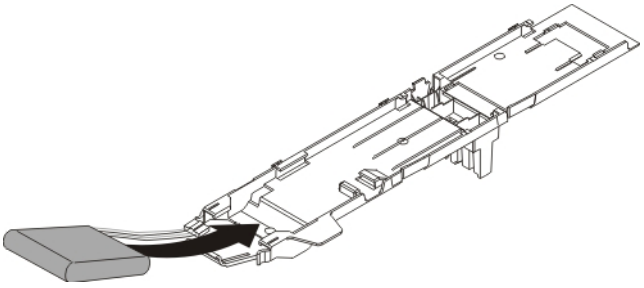
8. Connect the smaller end of the power cable that comes with the enablement kit to the connector underneath the controller (see the illustration). Route the cable through the space between the DIMMS and the microprocessor heat sinks.



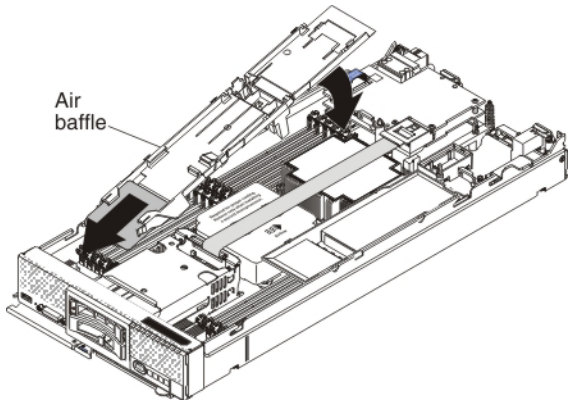
9. To attach the flash power module to the air baffle, complete the following steps:
   a. Remove the new air baffle and the flash power module that come with the enablement kit from the packaging.
   b. Remove the extension cable from the flash power module cable. The extension cable comes with the replacement flash power module but is not required for this procedure.



   c. With the flash power module cable out straight, slide the flash power module into the slot under the guides on the end of the air baffle until it snaps into place.



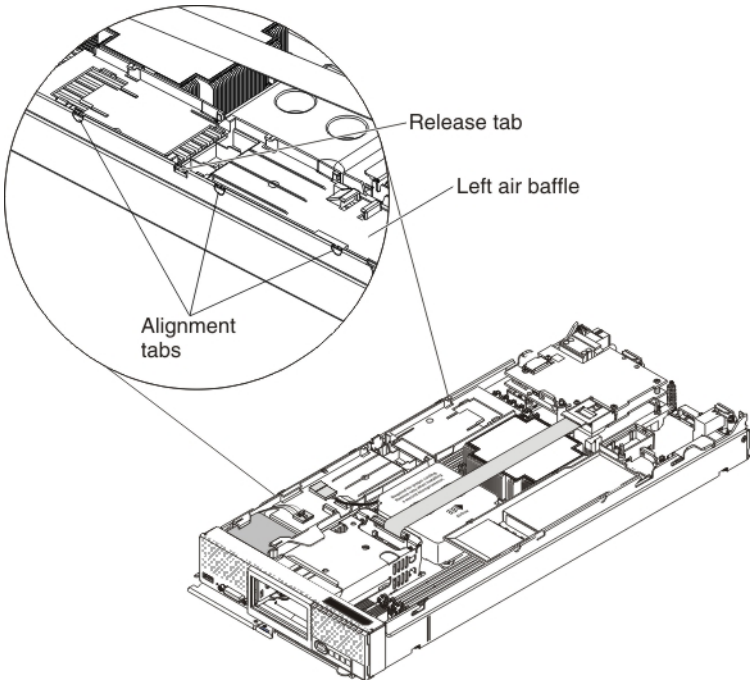
10. To install the air baffle in the compute node, complete the following steps:
    a. Orient the air baffle so that the flash power module end is at the left front of the compute node.



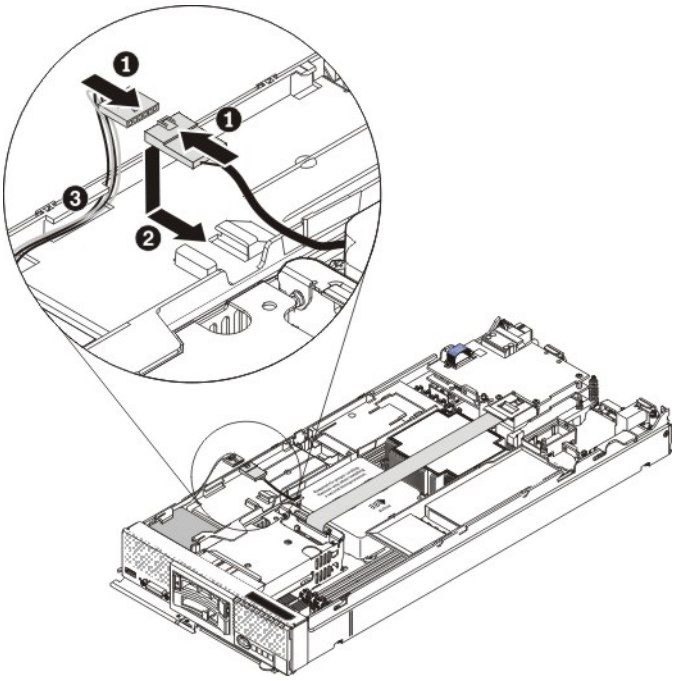
b. Tilt the air baffle and place it under the bezel in the front of the compute node.

c. Align the air baffle with the three alignment tabs and the release tab in the side wall of the compute node and place it on top of the DIMMs. Make sure that the flash power module cable is out of the way before the air baffle snaps into the tabs.

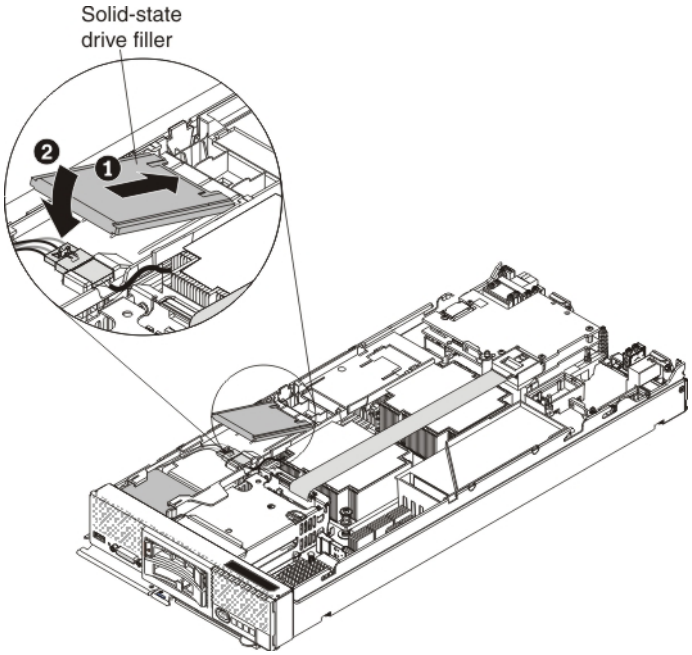
Note: The following illustration shows the Flex System x240. The location of the alignment and release tabs might be different for your compute node model.



11. Connect the larger end of the power cable to the flash power module cable **1** . Slide the connected cables under the tabs on the air baffle **2** . Then, push the extra power module cable under the lip on the side of the air baffle **3** .



12. Reconnect the hot-swap hard disk drives by sliding them fully into the bay and closing the drive tray handle.
13. Install a solid-state drive filler in the front slot on the left air baffle. Slide the end of the solid-state drive filler under the two tabs **1** and lower the filler **2** so that it rests flat on the left air baffle.



14. Install the cover on the compute node (see “Installing the compute node cover” on page 8 for instructions).
15. Reinstall the compute node in the same node bay from which you removed it (see “Installing a compute node in a chassis” on page 5 for instructions).

Note: After the compute node is installed, the IMM in the compute node initializes and synchronizes with the CMM. This process takes several minutes, depending on your configuration. The power LED flashes rapidly, and the power button on the compute node does not respond until this process is complete.

16. Turn on the compute node. Make sure that the power LED on the compute node control panel is lit continuously, indicating that the compute node is receiving power and is turned on.
17. Use the Human Interface Infrastructure (HII) to configure the controller. To open the HII, turn on the compute node and when the prompt `<F1> Setup` is displayed, press F1. Then, select **System Settings > Storage > HII**

    You can also run the WebBIOS Configuration Utility to configure the drive groups and the virtual drives. To run the utility, turn on the compute node and when the message `Press <Ctrl><H> for WebBIOS` is displayed on the screen, immediately press Ctrl+H.

    For detailed information about configuring drive groups and virtual drives, see the *ServeRAID M Software User's Guide* on the *ServeRAID M Documentation* CD.
18. Install the operating-system device driver.

    To view the operating systems that support the controller and to download the latest device drivers, go to http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/. For updates, go to http://www.ibm.com/supportportal/.

    Be sure to use the latest service pack for the operating system and review the readme file that accompanies the device driver. Be sure to install the software device drivers before you operate the controller.

Replaceable components

Field replaceable units (FRUs) must be replaced only by a trained service technician, unless they are classified as customer replaceable units (CRUs).

Tier 1 CRU: Replacement of Tier 1 CRUs is your responsibility. If Lenovo installs a Tier 1 CRU at your request without a service contract, you will be charged for the installation.

For more information about the terms of the warranty and getting service and assistance, see the *Warranty Information* document that comes with the optional device.

Table 2. Field replaceable units for the ServeRAID M5100 Series Enablement Kit for x240

Description	CRU part number (Tier 1)
Hard disk drive backplane with attached flex cable	46C9941
ServeRAID M5100 Series Flash Power Module	81Y4579
Power cable	44E4767
Enablement kit left air baffle (Flex System x240)	00D5080
Solid-state drive filler	49Y4936

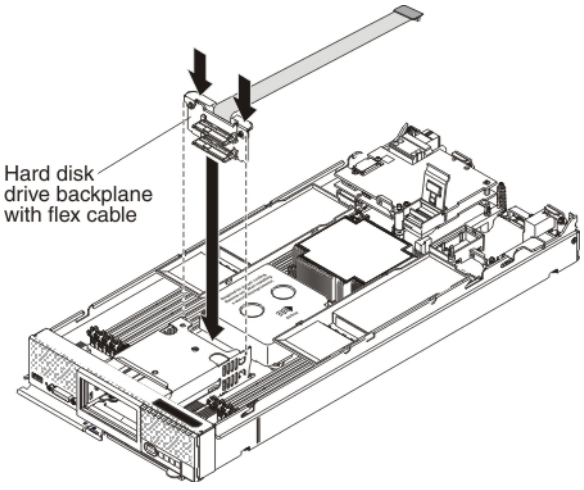
Removing and replacing the hard disk drive backplane with attached flex cable

About this task

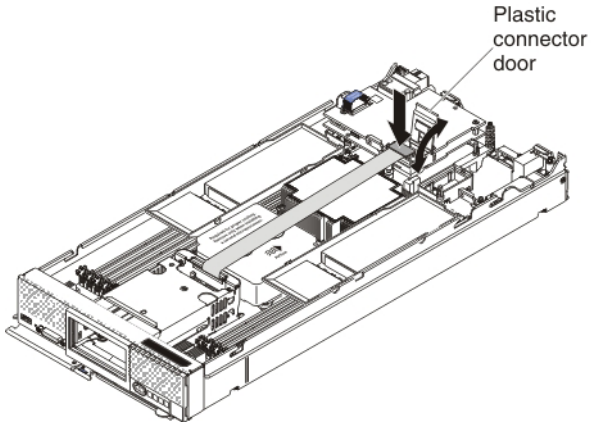
To remove and replace the hard disk drive back plane with attached flex cable, complete the following steps:

Procedure

1. Read the safety information that begins on page "Safety" on page v and "Handling static-sensitive devices" on page 3.
2. Remove the compute node from the chassis (see "Removing a compute node from a chassis" on page 4).
3. Remove the compute node cover (see "Removing the compute node cover" on page 6).
4. Press the release latch (orange) on the hard disk drive to release the drive handle; then, use the drive handle to slide the hard disk drive approximately 12 mm (0.5 in.) out of the bay. Repeat this step for the other hard disk drive.
5. Lift up the plastic connector door on the controller and disconnect the hard disk drive flex cable.
6. Grasp the lip on the top of the hard disk drive backplane and lift out the backplane and the flex cable.
7. Touch the static-protective package that contains the new hard disk drive backplane to any *unpainted* metal surface on the Flex System chassis or any *unpainted* metal surface on any other grounded rack component; then, remove the backplane from the package.
8. Align the new backplane with the hard disk drive cage and the connector on the system board and press the backplane into position until it is fully seated in the connector.



9. To connect the flex cable, lift up the plastic connector door on the controller, press down firmly on the flex cable connector to connect it to the controller connector, and close the plastic connector door.



10. Reconnect the hot-swap hard disk drives by sliding them fully into the bay and closing the drive tray handle.
11. Install the cover on the compute node (see “Installing the compute node cover” on page 8 for instructions).
12. Reinstall the compute node in the same node bay from which you removed it (see “Installing a compute node in a chassis” on page 5 for instructions).

    Note: After the compute node is installed, the IMM in the compute node initializes and synchronizes with the CMM. This process takes several minutes, depending on your configuration. The power LED flashes rapidly, and the power button on the compute node does not respond until this process is complete.
13. Turn on the compute node. Make sure that the power LED on the compute node control panel is lit continuously, indicating that the compute node is receiving power and is turned on.

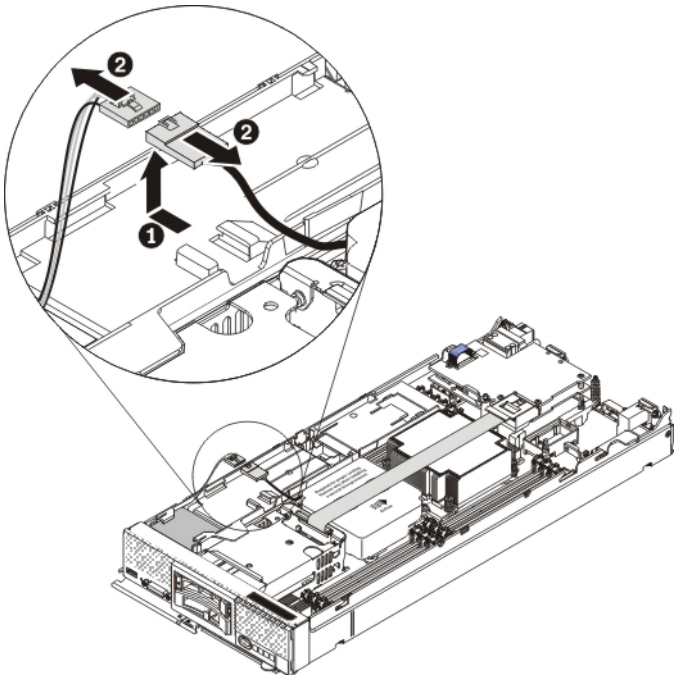
Removing and replacing the flash power module

About this task

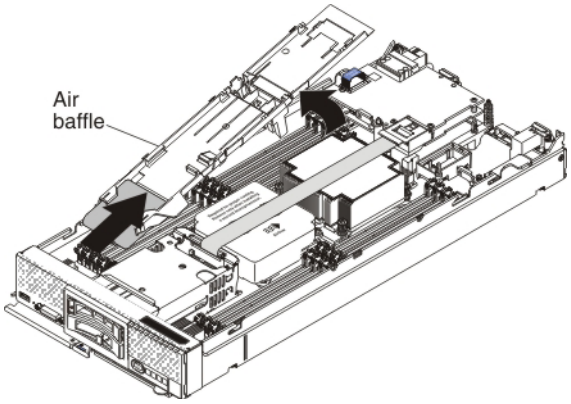
To remove and replace the flash power module, complete the following steps:

Procedure

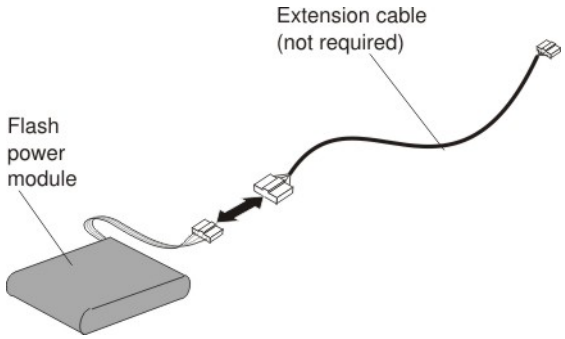
1. Read the safety information that begins on page “Safety” on page v and “Handling static-sensitive devices” on page 3.
2. Remove the compute node from the chassis (see “Removing a compute node from a chassis” on page 4).
3. Remove the compute node cover (see “Removing the compute node cover” on page 6).
4. Slide the connected power cable and flash power module cable out from the tabs on the air baffle **1**. Then, disconnect the power cable from the flash power module cable **2**.



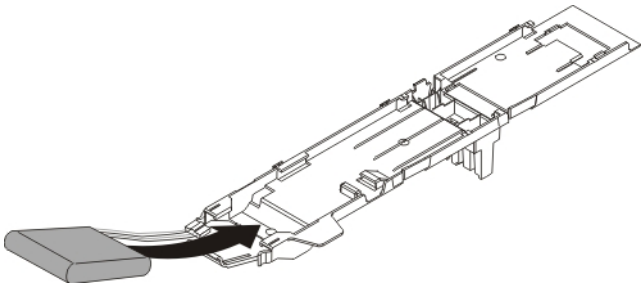
5. Carefully remove the left air baffle by unlatching the tab on the side wall and lifting the air baffle up and toward the back of the compute node.



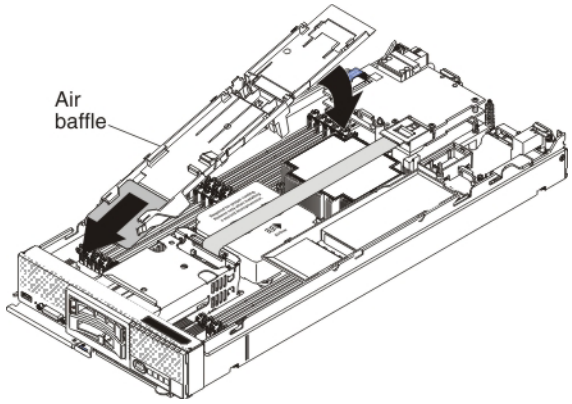
6. Carefully slide the flash power module out of the slot under the guides on the end of the air baffle.
7. To attach the new flash power module to the air baffle, complete the following steps:
   a. Touch the static-protective package that contains the new flash power module to any *unpainted* metal surface on the Flex System chassis or any *unpainted* metal surface on any other grounded rack component; then, remove it from the package.
   b. Remove the extension cable from the flash power module cable. The extension cable comes with the replacement flash power module but is not required for this procedure.



c. With the flash power module cable out straight, slide the flash power module cable first into the slot under the guides on the end of the air baffle until it snaps into place.

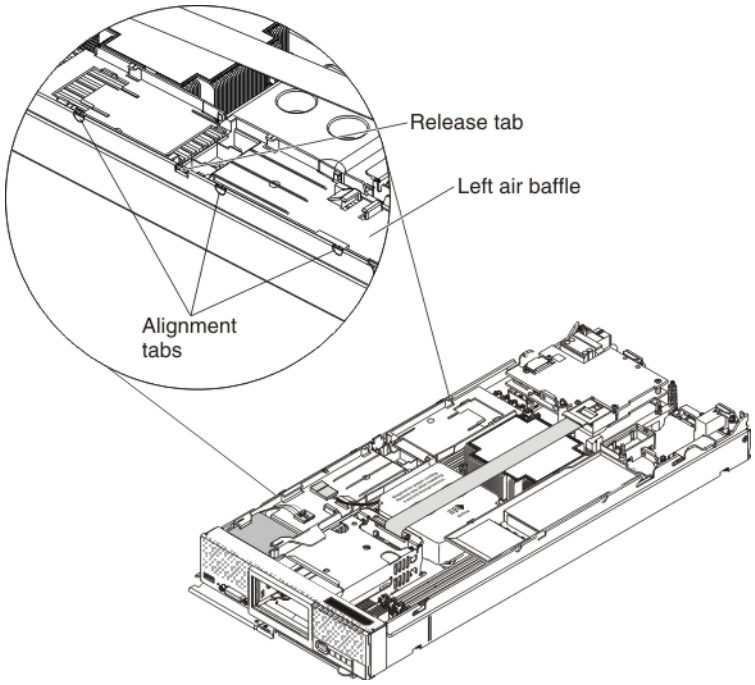


8. To install the air baffle in the compute node, complete the following steps:
   a. Orient the air baffle so that the flash power module end is at the left front of the compute node.

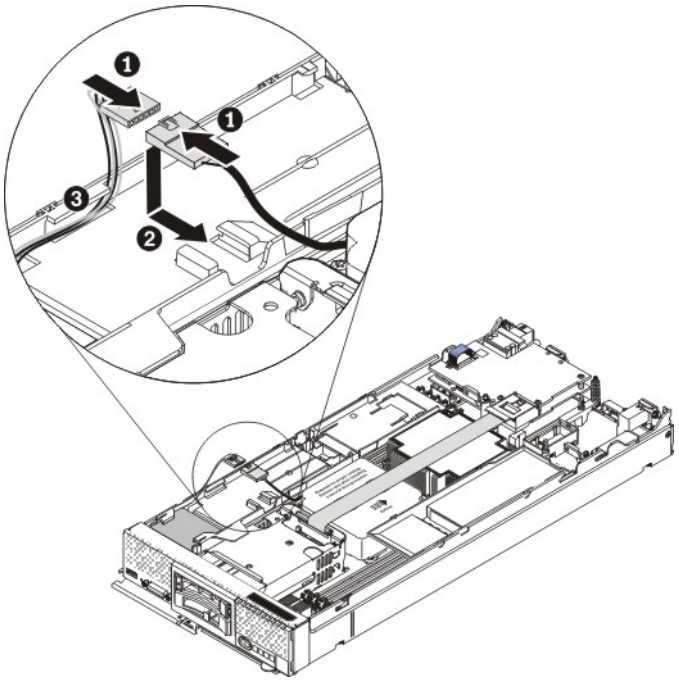


   b. Tilt the air baffle and place it under the bezel in the front of the compute node.
   c. Align the air baffle with the three alignment tabs and the release tab in the side wall of the compute node and place it on top of the DIMMs. Make sure that the flash power module cable is out of the way before the air baffle snaps into the tabs.

      Note: The following illustration shows the Flex System x240. The location of the alignment and release tabs might be different for your compute node model.



9. Connect the larger end of the power cable to the flash power module cable **1** . Slide the connected cables under the tabs on the air baffle **2** . Then, push the extra power module cable under the lip on the side of the air baffle **3** .



10. Make sure that the solid-state drive filler is installed in the front slot of the left air baffle.
11. Install the cover on the compute node (see “Installing the compute node cover” on page 8 for instructions).
12. Reinstall the compute node in the same node bay from which you removed it (see “Installing a compute node in a chassis” on page 5 for instructions).

Note: After the compute node is installed, the IMM in the compute node initializes and synchronizes with the CMM. This process takes several minutes, depending on your configuration. The power LED flashes rapidly, and the power button on the compute node does not respond until this process is complete.

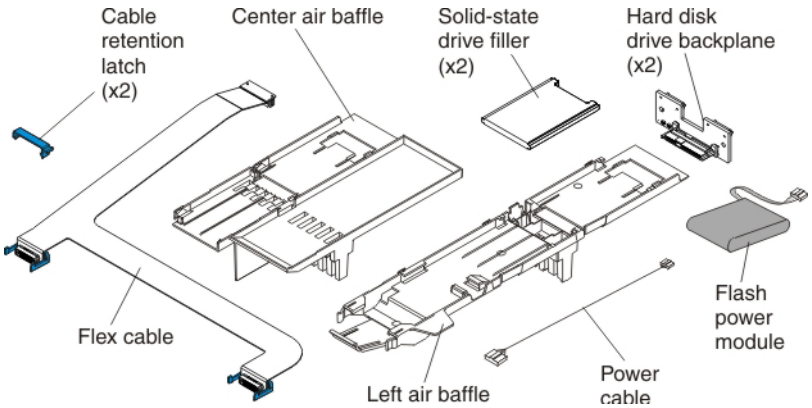
13. Turn on the compute node. Make sure that the power LED on the compute node control panel is lit continuously, indicating that the compute node is receiving power and is turned on.

Chapter 4. Installing the ServeRAID M5100 Series Enablement Kit for x440

This chapter describes how to install the ServeRAID M5100 Series Enablement Kit for x440 in the compute node.

Parts that come in the enablement kit for x440

The following illustration shows the parts that come in the enablement kit.



Installing the enablement kit for x440

About this task

To install the enablement kit components, complete the following steps:

Procedure

1. If you have not already done so, remove the compute node from the chassis and remove the cover. For more information, see “Removing a compute node from a chassis” on page 4 and “Removing the compute node cover” on page 6.
2. Install the ServeRAID M5115 SAS/SATA controller for Flex System. For more information, see “Installing the ServeRAID M5115 SAS/SATA Controller for Flex System” on page 12.
3. Press the release latch (orange) on the hard disk drive to release the drive handle; then, use the drive handle to slide the hard disk drive approximately 12 mm (0.5 in.) out of the bay. Repeat this step for the other hard disk drive.
4. Remove the center air baffle.

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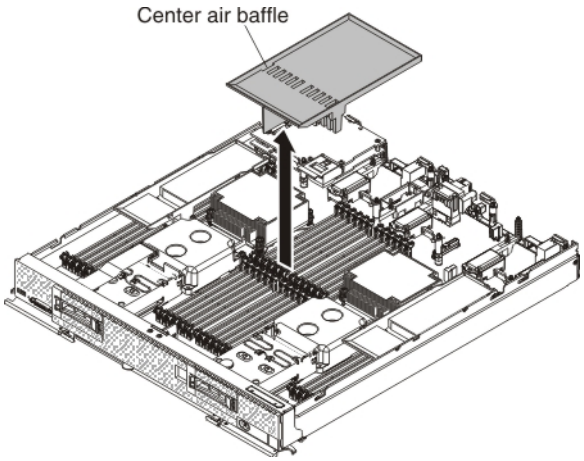
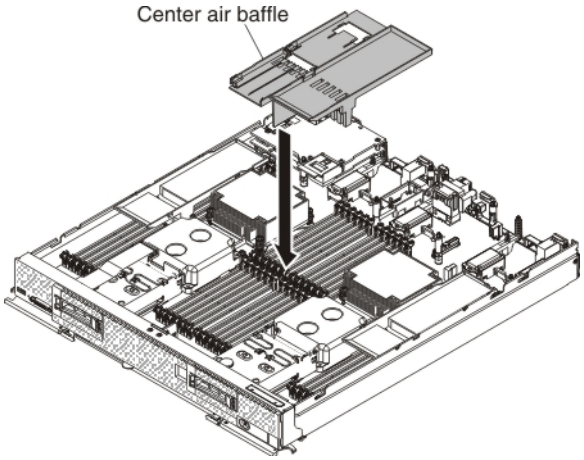
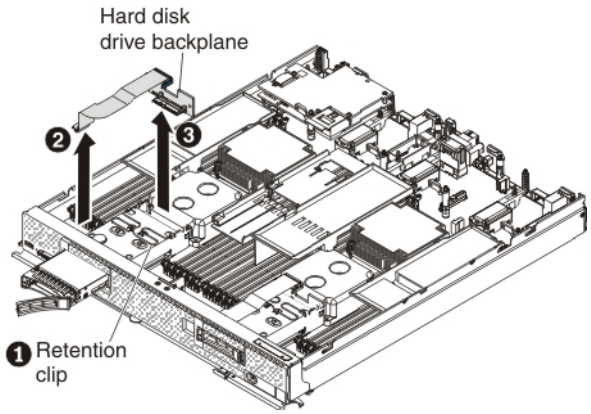


5. Install the center air baffle that comes with the enablement kit.

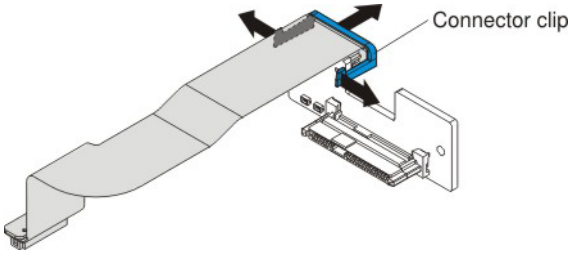


6. Remove the hard disk drive backplanes:
   a. Push the metal retention clip on the hard disk drive cage toward the rear of the compute node to release it from under the tab; then slide the metal retention clip toward the front of the compute node to release the hard disk drive backplane **1** .



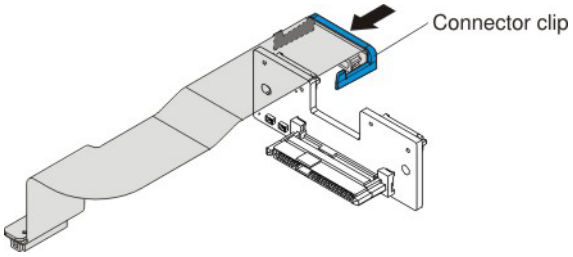
   b. Disconnect the hard disk drive backplane cable from the system board **2** .
   c. Rotate the hard disk drive backplane toward the front of the compute node and away from the pins on the drive cage; then, lift it out of the compute node. **3** .

d. To disconnect the cable from the hard disk drive backplane that you removed, pull the connector clip away from the cable to unhook the clip from the backplane as you push the cable connector toward the rear of the compute node.

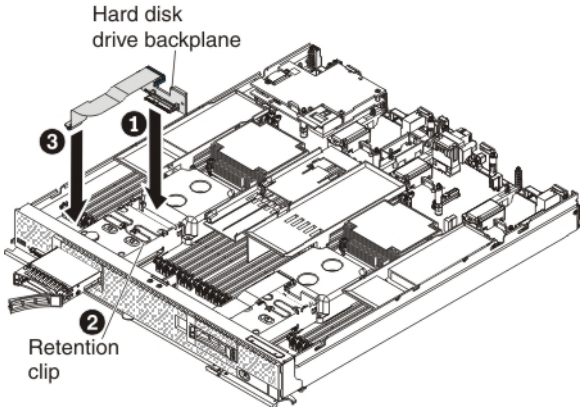


e. Repeat step 6a on page 32 to step 6d to remove the second hard disk drive backplane.

7. Install the new hard disk drive backplanes:
   a. Touch the static-protective package that contains the new hard disk drive backplane (comes with the enablement kit) to any *unpainted* metal surface on the Flex System chassis or any *unpainted* metal surface on any other grounded rack component; then, remove the backplane from the package.
   b. To connect the backplane cable to the new hard disk drive backplane, hold open the connector clip while you push the cable connector into the backplane cable connector. Make sure that the connector clip clicks into place around the backplane.



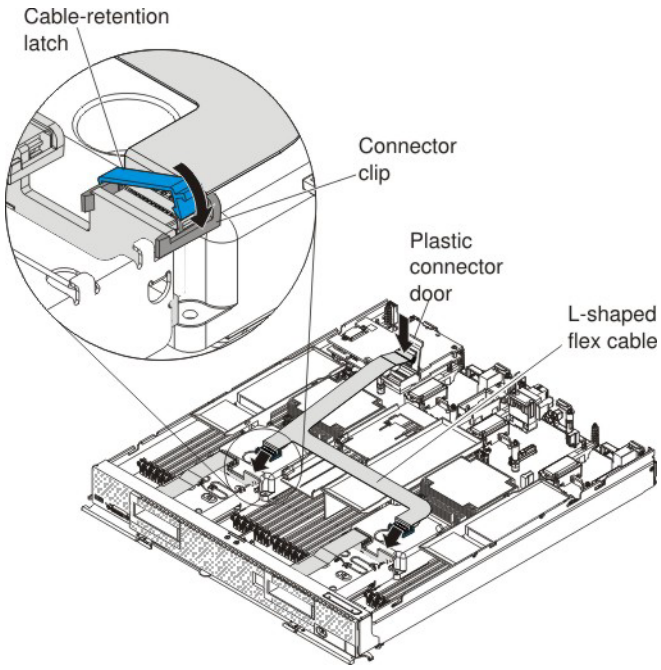
   c. Align the new hard disk drive backplane as shown in the following illustration **1** . Place the backplane into the notch at the rear of the drive cage and rotate the backplane toward the rear of the compute node. Make sure that the two pins at the rear of the drive cage are in the two holes on the backplane and that the backplane is flush with the drive cage.



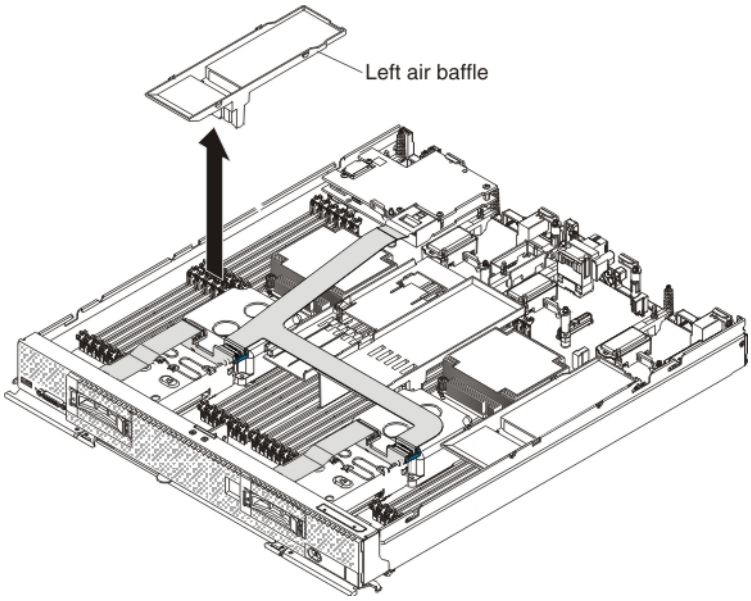
   d. Push the metal retention clip on the hard disk drive cage toward the rear of the compute node and under the tab to secure the backplane **2** .
   e. Connect the hard disk drive backplane cable to the system board **3** .

f. Repeat step 7a on page 33 to step 7e on page 33 to install the second hard disk drive backplane.

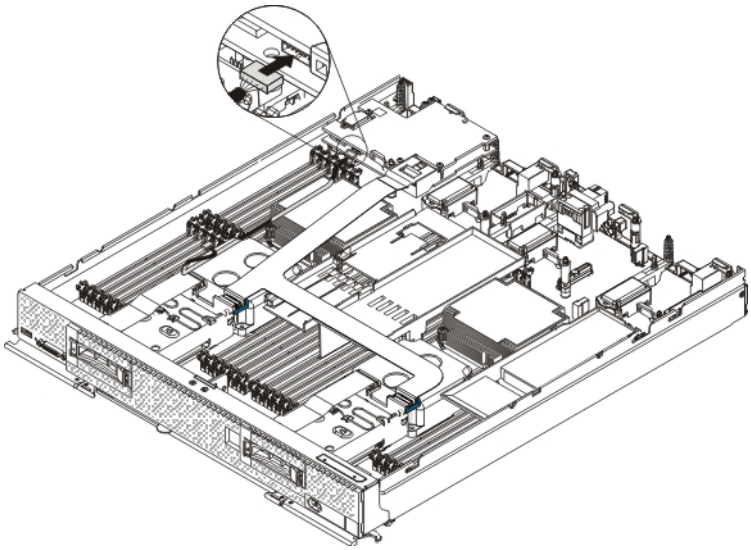
8. To connect the flex cable to both hard disk drive backplanes and to the controller connector, complete the following steps:
   a. Lift up the plastic connector door on the controller.



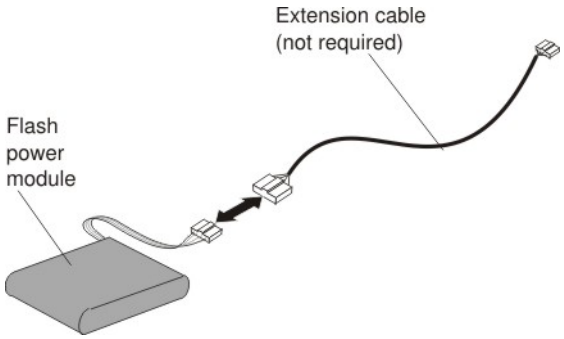
   b. Press down firmly on the flex cable connector to connect it to the external drive flex cable connector on the controller. (For the location of the connector on the controller, see the illustration in "ServeRAID controller connectors" on page 12.)
   c. Close the plastic connector door.
   d. Firmly press each flex cable connector into the connector on the hard disk drive backplanes (see the illustration).
   e. Orient the cable-retention latch as shown in the illustration.
   f. Hook the square side of the cable-retention latch around the left side of the connector clip.
   g. Rotate the right side of the cable-retention latch and snap it into place around the right side of the connector clip.
9. Remove the left air baffle as shown in the illustration.



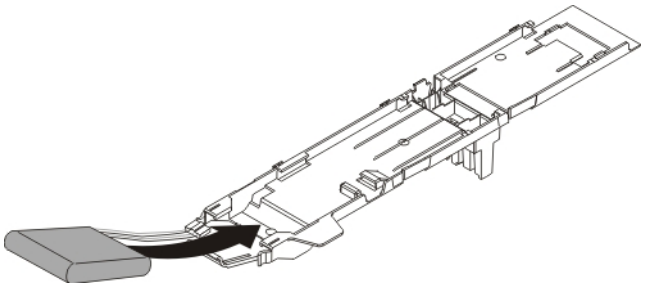
10. Connect the smaller end of the power cable that comes with the enablement kit to the connector underneath the controller (see the illustration). Route the cable through the space between the DIMMS and the microprocessor heat sinks.



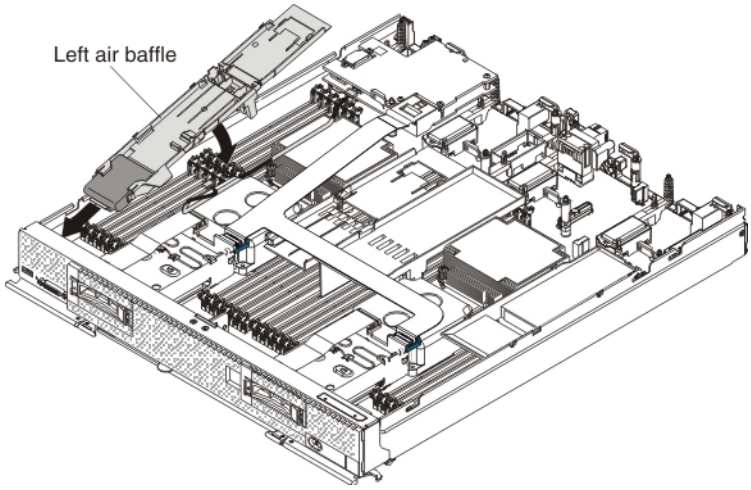
11. To attach the flash power module to the air baffle, complete the following steps:
    a. Remove the new air baffle and the flash power module that come with the enablement kit from the packaging.
    b. Remove the extension cable from the flash power module cable. The extension cable comes with the replacement flash power module but is not required for this procedure.



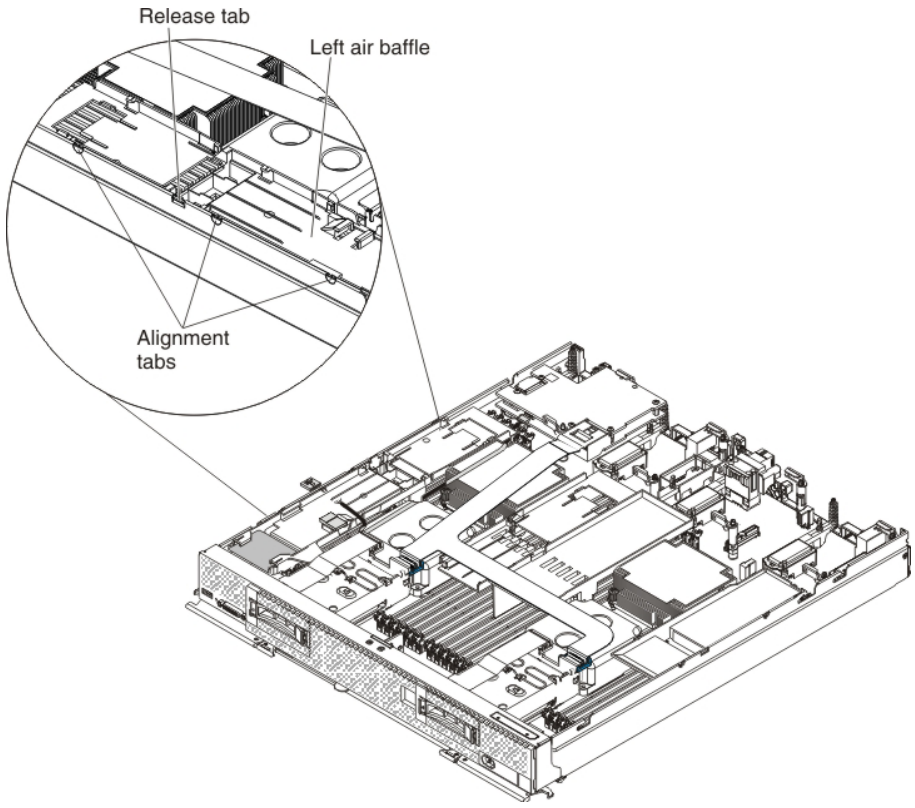
c. With the flash power module cable out straight, slide the flash power module into the slot under the guides on the end of the air baffle until it snaps into place.



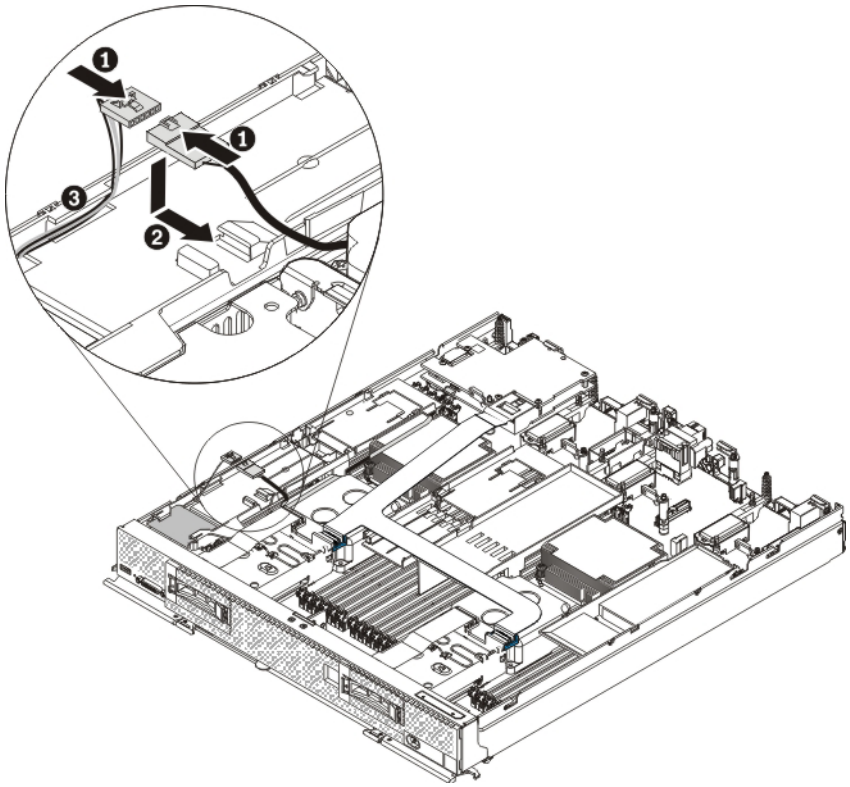
12. To install the left air baffle in the compute node, complete the following steps:
    a. Orient the left air baffle so that the flash power module end is at the left front of the compute node.



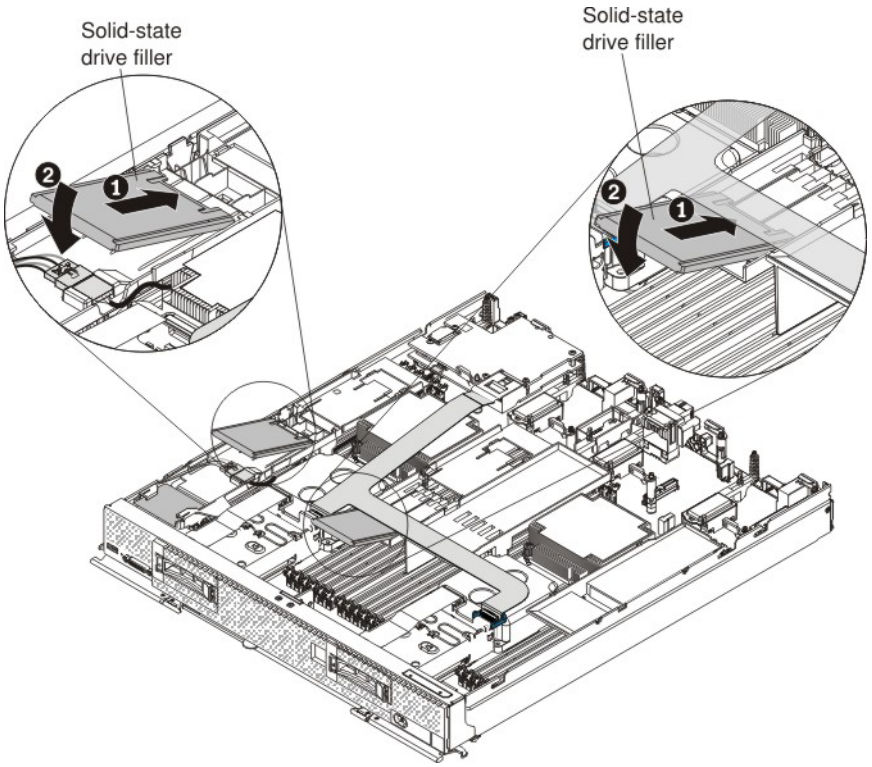
    b. Tilt the air baffle and place it under the bezel in the front of the compute node.
    c. Align the air baffle with the three alignment tabs and the release tab in the side wall of the compute node and place it on top of the DIMMs. Make sure that the flash power module cable is out of the way before the air baffle snaps into the tabs.



13. Connect the larger end of the power cable to the flash power module cable **1** . Slide the connected cables under the tabs on the air baffle **2** . Then, push the extra power module cable under the lip on the side of the air baffle **3** .



14. Reconnect each hard disk drive by sliding it fully into the bay and closing the drive tray handle.
15. For the correct air flow, install a solid-state drive filler in the front slot on the left and center air baffles. Slide the end of the solid-state drive filler under the two tabs **1** and lower the filler **2** so that it rests flat on the air baffle.



16. Install the cover on the compute node (see "Installing the compute node cover" on page 8 for instructions).
17. Reinstall the compute node in the same node bay from which you removed it (see "Installing a compute node in a chassis" on page 5 for instructions).

    Note: After the compute node is installed, the IMM in the compute node initializes and synchronizes with the CMM. This process takes several minutes, depending on your configuration. The power LED flashes rapidly, and the power button on the compute node does not respond until this process is complete.
18. Turn on the compute node. Make sure that the power LED on the compute node control panel is lit continuously, indicating that the compute node is receiving power and is turned on.
19. Use the Human Interface Infrastructure (HII) to configure the controller. To open the HII, turn on the compute node and when the prompt `<F1> Setup` is displayed, press F1. Then, select **System Settings > Storage > HII**.

    You can also run the WebBIOS Configuration Utility to configure the drive groups and the virtual drives. To run the utility, turn on the compute node and when the message `Press <Ctrl><H> for WebBIOS` is displayed on the screen, immediately press Ctrl+H.

    For detailed information about configuring drive groups and virtual drives, see the *ServeRAID M Software User's Guide* on the *ServeRAID M Documentation* CD.
20. Install the operating-system device driver.

To view the operating systems that support the controller and to download the latest device drivers, go to http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/. For updates, go to http://www.ibm.com/supportportal/.

Be sure to use the latest service pack for the operating system and review the readme file that accompanies the device driver. Be sure to install the software device drivers before you operate the controller.

Replaceable components

Field replaceable units (FRUs) must be replaced only by a trained service technician, unless they are classified as customer replaceable units (CRUs).

Tier 1 CRU: Replacement of Tier 1 CRUs is your responsibility. If Lenovo installs a Tier 1 CRU at your request without a service contract, you will be charged for the installation.

For more information about the terms of the warranty and getting service and assistance, see the *Warranty Information* document that comes with the optional device.

Table 3. Field replaceable units for the ServeRAID M5100 Series Enablement Kit for x440

Description	CRU part number (Tier 1)
Hard disk drive backplane	44E4763
ServeRAID M5100 Series Flash Power Module	81Y4579
Power cable	44E4767
Enablement kit center air baffle	46C9933
Enablement kit left air baffle	00D5080
L-shaped flex cable (includes cable-retention latch)	00D5089
Solid-state drive filler	49Y4936

Removing and replacing a hard disk drive backplane

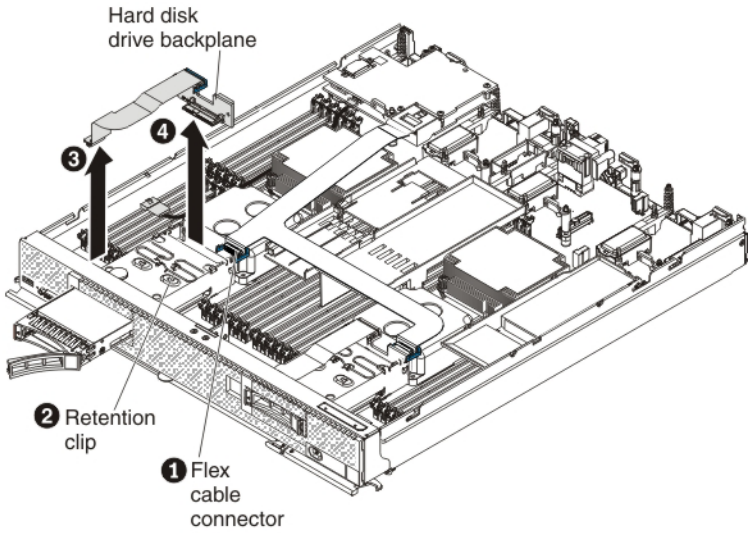
About this task

To remove and replace the hard disk drive back plane with attached flex cable, complete the following steps:

Procedure

1. Read the safety information that begins on page “Safety” on page v and “Handling static-sensitive devices” on page 3.
2. Remove the compute node from the chassis (see “Removing a compute node from a chassis” on page 4).
3. Remove the compute node cover (see “Removing the compute node cover” on page 6).
4. For the hard disk drive backplane that you have to replace, disconnect the applicable hard disk drive by pressing the release latch (orange) on the hard disk drive to release the drive handle; then, use the drive handle to slide the hard disk drive approximately 12 mm (0.5 in.) out of the bay.
5. Remove the hard disk drive backplane:

a. To disconnect the flex cable from the flex cable connector on the hard disk drive backplane, pull the connector clip away from the cable to unhook the clip from the backplane as you push the cable connector toward the rear of the compute node **1** .

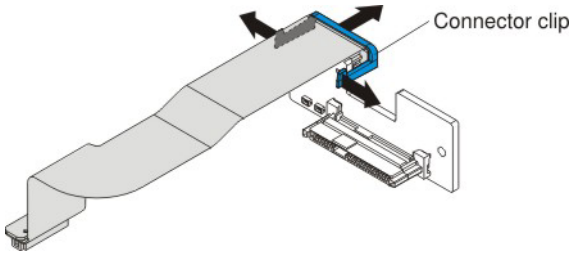


b. Push the metal retention clip on the hard disk drive cage toward the rear of the compute node to release it from under the tab; then, slide the metal retention clip toward the front of the compute node to release the hard disk drive backplane **2** .

c. Disconnect the hard disk drive backplane cable from the system board **3** .

d. Rotate the hard disk drive backplane toward the front of the compute node and away from the pins on the drive cage; then, lift it out of the compute node. **4** .

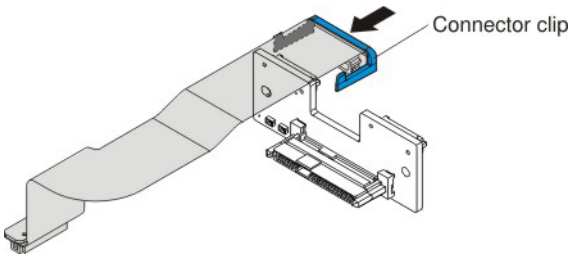
e. To disconnect the cable from the hard disk drive backplane that you removed, pull the connector clip away from the cable to unhook the clip from the backplane as you push the cable connector toward the rear of the compute node.



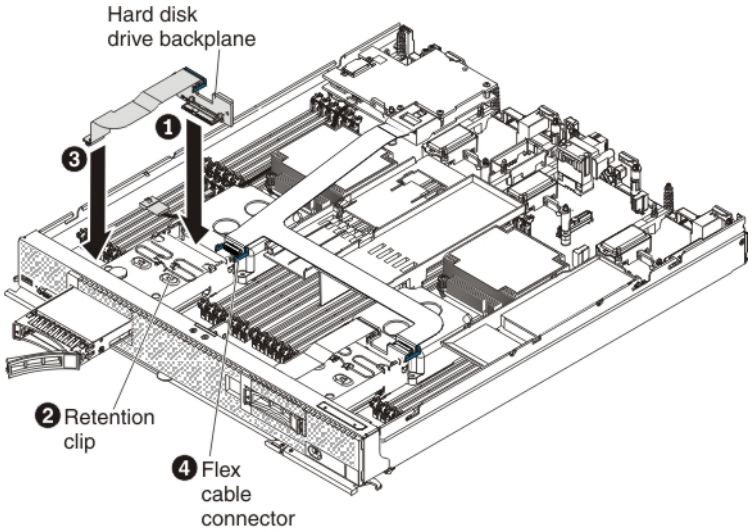
6. Install the new hard disk drive backplane:

a. Touch the static-protective package that contains the new hard disk drive backplane (comes with the enablement kit) to any *unpainted* metal surface on the Flex System chassis or any *unpainted* metal surface on any other grounded rack component; then, remove the backplane from the package.

b. To connect the backplane cable to the new hard disk drive backplane, hold open the connector clip while you push the cable connector into the backplane cable connector. Make sure that the connector clip clicks into place around the backplane.



c. Align the new hard disk drive backplane as shown in the following illustration **1** . Place the backplane into the notch at the rear of the drive cage and rotate the backplane toward the rear of the compute node. Make sure that the two pins at the rear of the drive cage are in the two holes on the backplane and that the backplane is flush with the drive cage.



d. Push the metal retention clip on the hard disk drive cage toward the rear of the compute node and under the tab to secure the backplane **2** .

e. Connect the hard disk drive backplane cable to the system board **3** .

f. To connect the flex cable to the hard disk drive backplane connector, hold open the connector clip while you push the cable connector into the backplane connector. Make sure that the connector clip clicks into place around the backplane **4** .

g. To install the cable-retention latch, hook the square side of the latch around the left side of the connector clip; then, rotate the right side of the latch and snap it into place around the right side of the connector clip.

7. Reconnect the hard disk drive by sliding it fully into the bay and closing the drive tray handle.
8. Install the cover on the compute node (see “Installing the compute node cover” on page 8 for instructions).
9. Reinstall the compute node in the same node bay from which you removed it (see “Installing a compute node in a chassis” on page 5 for instructions)

Note: After the compute node is installed, the IMM in the compute node initializes and synchronizes with the CMM. This process takes several minutes, depending on your configuration. The power LED flashes rapidly, and the power button on the compute node does not respond until this process is complete.

10. Turn on the compute node. Make sure that the power LED on the compute node control panel is lit continuously, indicating that the compute node is receiving power and is turned on.

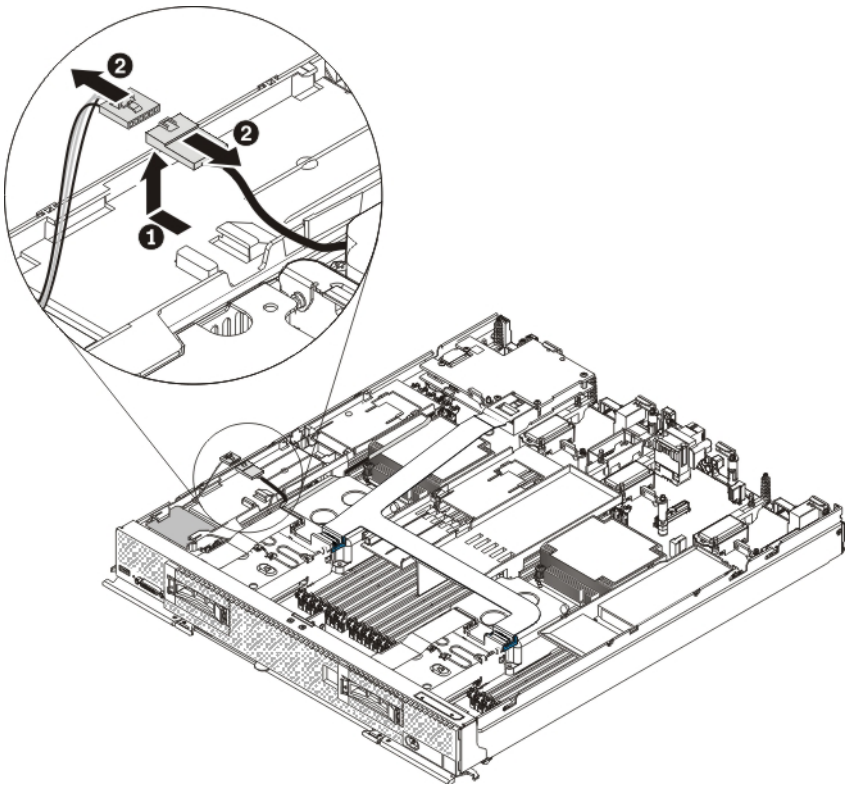
Removing and replacing the flash power module

About this task

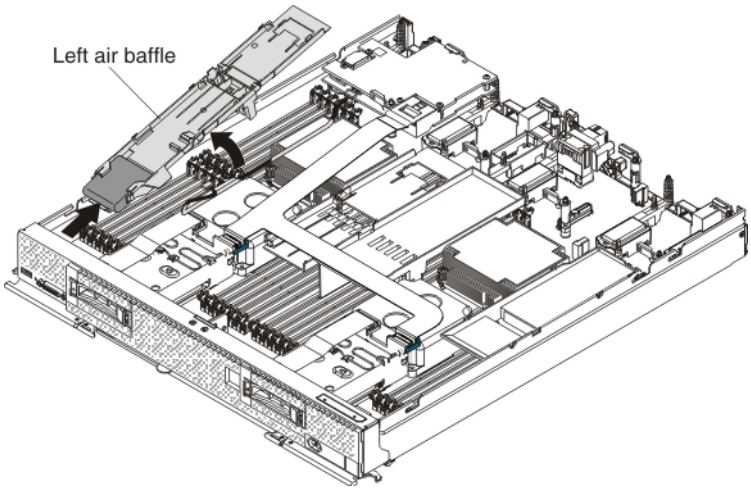
To remove and replace the flash power module, complete the following steps:

Procedure

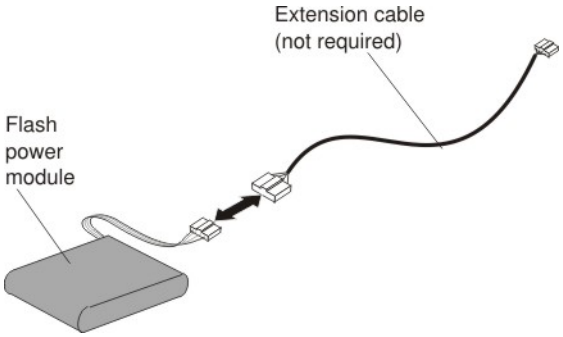
1. Read the safety information that begins on page "Safety" on page v and "Handling static-sensitive devices" on page 3.
2. Remove the compute node from the chassis (see "Removing a compute node from a chassis" on page 4).
3. Remove the compute node cover (see "Removing the compute node cover" on page 6).
4. Slide the connected power cable and flash power module cable out from the tabs on the air baffle **1**.



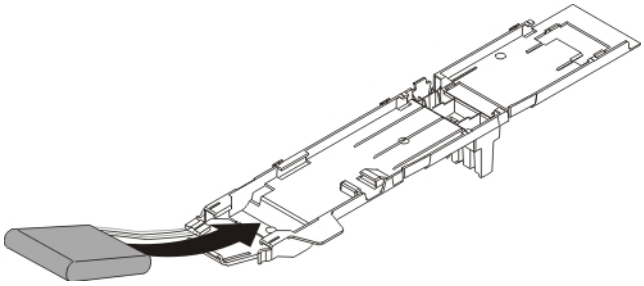
5. Disconnect the power cable from the flash power module cable **2**.
6. Carefully remove the left air baffle by unlatching the tab on the side wall and lifting the air baffle up and toward the back of the compute node.



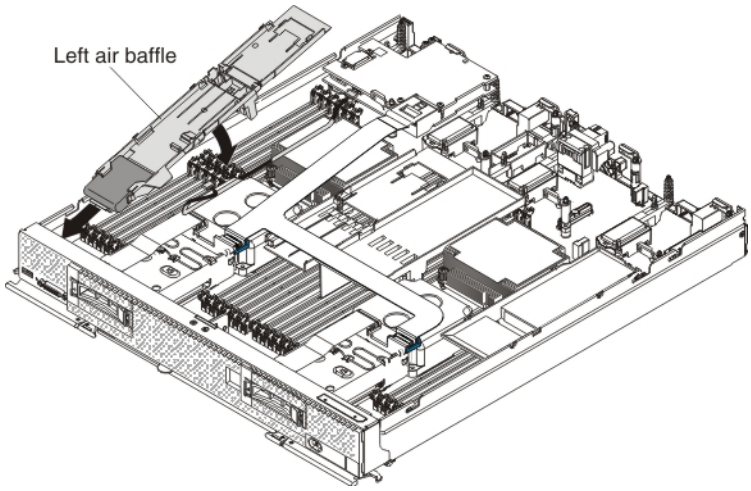
7. Carefully slide the flash power module out of the slot under the guides on the end of the air baffle.
8. To attach the new flash power module to the air baffle, complete the following steps:
   a. Touch the static-protective package that contains the new flash power module to any *unpainted* metal surface on the Flex System chassis or any *unpainted* metal surface on any other grounded rack component; then, remove it from the package.
   b. Remove the extension cable from the flash power module cable. The extension cable comes with the replacement flash power module but is not required for this procedure.



   c. With the flash power module cable out straight, slide the flash power module cable firstinto the slot under the guides on the end of the air baffle until it snaps into place.

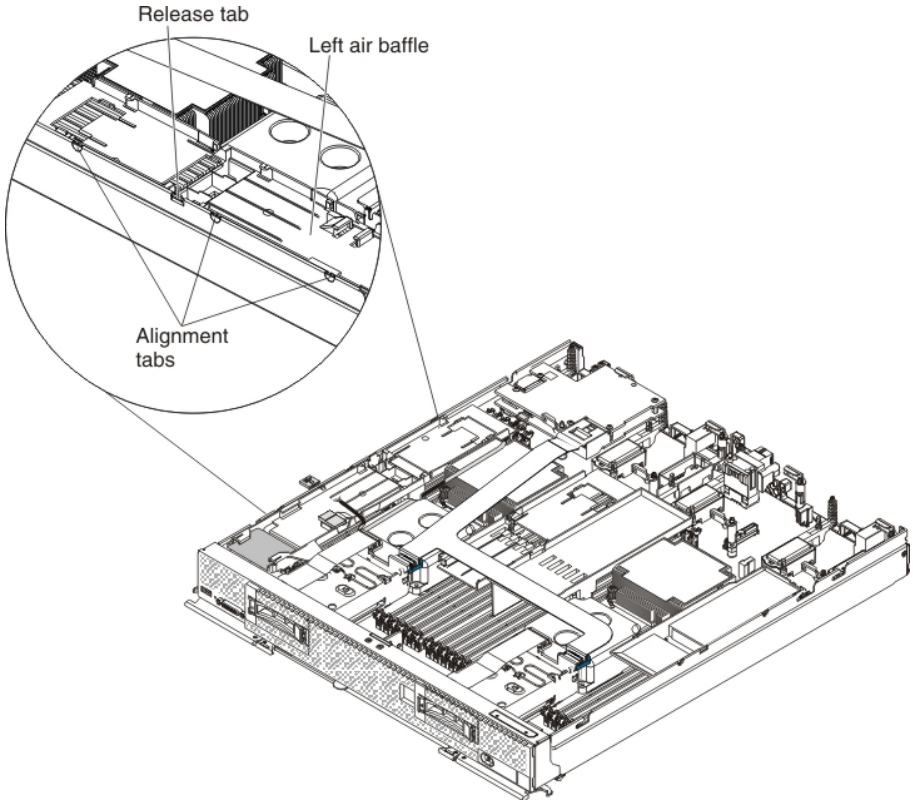


9. To install the air baffle in the compute node, complete the following steps:
   a. Orient the air baffle so that the flash power module end is at the left front of the compute node.

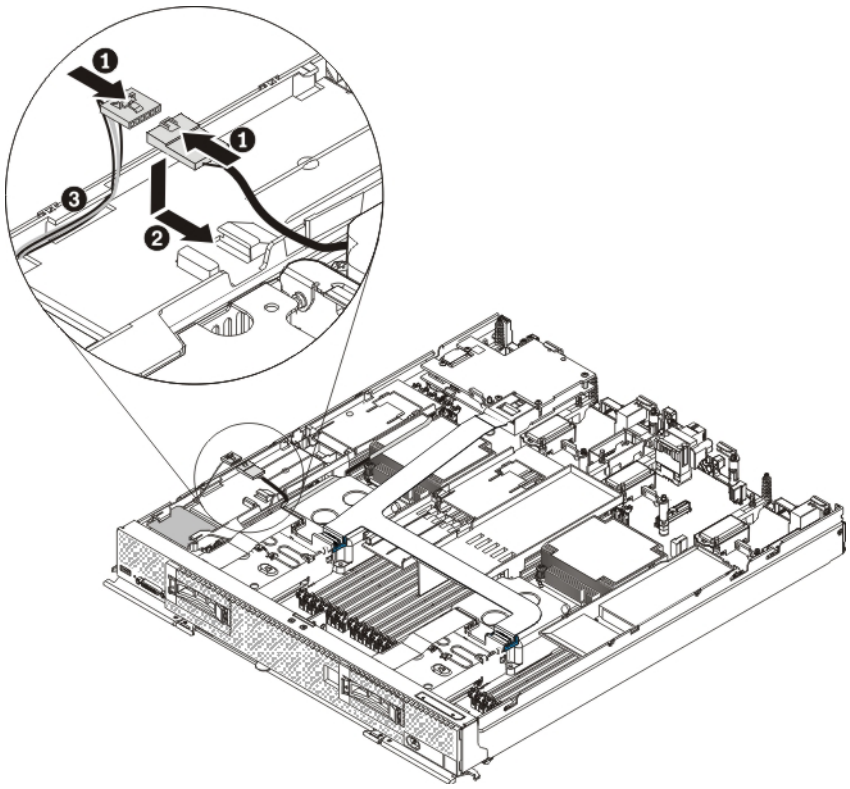


b. Tilt the air baffle and place it under the bezel in the front of the compute node.

c. Align the air baffle with the three alignment tabs and the release tab in the side wall of the compute node and place it on top of the DIMMs. Make sure that the flash power module cable is out of the way before the air baffle snaps into the tabs.



10. Connect the larger end of the power cable to the flash power module cable **1** . Slide the connected cables under the tabs on the air baffle **2** . Then, push the extra power module cable under the lip on the side of the air baffle **3** .



11. Install the cover on the compute node (see “Installing the compute node cover” on page 8 for instructions).
12. Reinstall the compute node in the same node bay from which you removed it (see “Installing a compute node in a chassis” on page 5 for instructions).

    Note: After the compute node is installed, the IMM in the compute node initializes and synchronizes with the CMM. This process takes several minutes, depending on your configuration. The power LED flashes rapidly, and the power button on the compute node does not respond until this process is complete.
13. Turn on the compute node. Make sure that the power LED on the compute node control panel is lit continuously, indicating that the compute node is receiving power and is turned on.

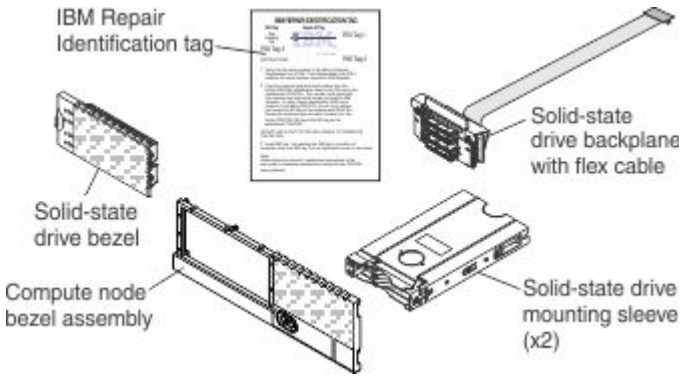
Chapter 5. Installing the ServeRAID M5100 Series Flex System Flash Kit for x240

This chapter describes how to install the following flash kit options in the compute node:

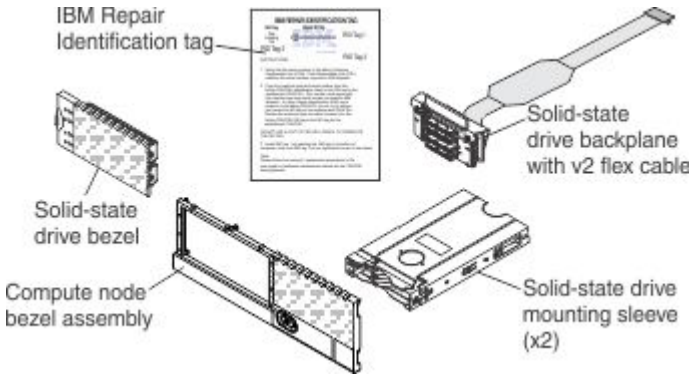
- ServeRAID M5100 Series Flex System Flash Kit for x240
- ServeRAID M5100 Series Flex System Flash Kit v2 for x240

Parts that come in the flash kit for x240 and the flash kit v2 for x240

The following illustration shows the parts that come in the flash kit for x240.



The following illustration shows the parts that come in the flash kit v2 for the x240 only.



Installing the Flex System Flash Kit for the x240

About this task

To install the Flex System Flash Kit, complete the following steps.

Procedure

1. Read the safety information that begins on page "Safety" on page v and "Handling static-sensitive devices" on page 3.

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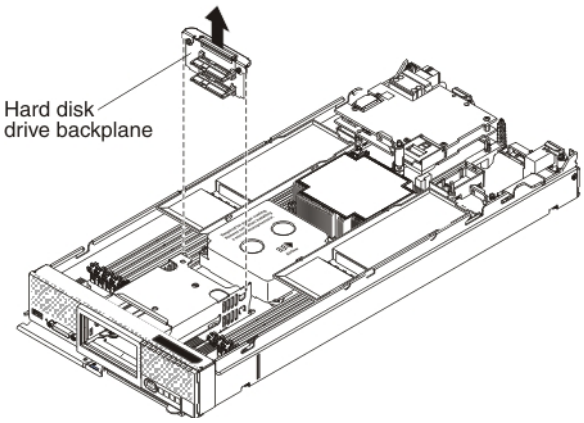
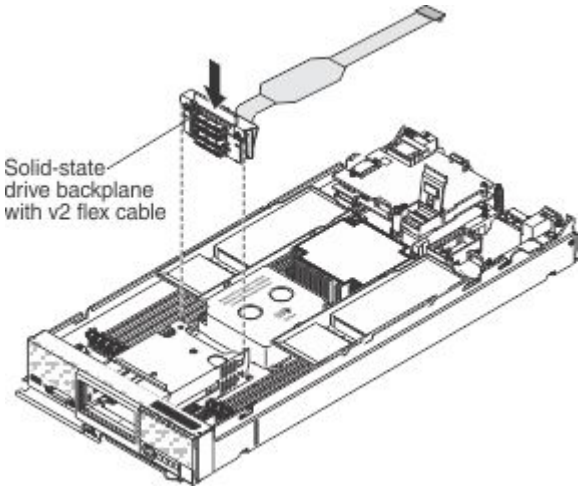
2. If you have not already done so, remove the compute node from the chassis and remove the cover. For more information, see “Removing a compute node from a chassis” on page 4 and “Removing the compute node cover” on page 6.
3. Install the ServeRAID M5115 SAS/SATA controller for Flex System. For more information, see “Installing the ServeRAID M5115 SAS/SATA Controller for Flex System” on page 12.
4. Remove the hot-swap hard disk drives and hard disk drive bay fillers.
5. Grasp the lip on the top of the hard disk drive backplane and lift it out.

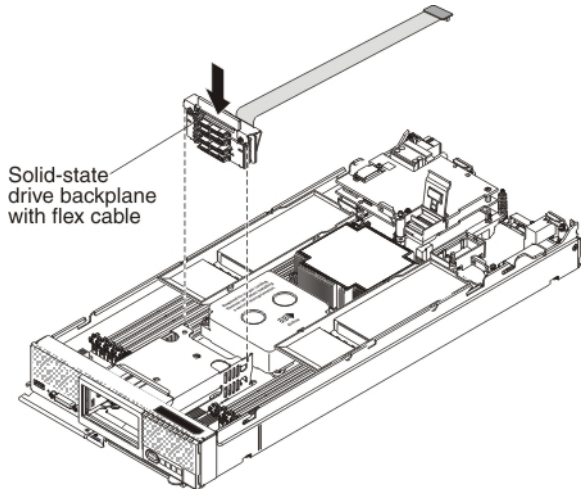


6. To install the new solid-state drive backplane with the flex cable, complete the following steps:
   a. Touch the static-protective package that contains the new solid-state drive backplane (comes with the flash kit) to any *unpainted* metal surface on the Flex System chassis or any *unpainted* metal surface on any other grounded rack component; then, remove the backplane from the package.

      For the Flash Kit v2 for x240:



      For the Flash Kit for x240:

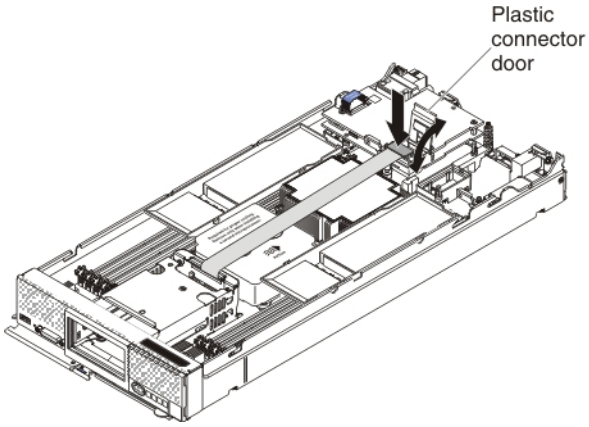


b. Align the new backplane with the solid-state drive cage and the connector on the system board and press the backplane into position until it is fully seated in the connector.

7. To connect the flex cable (or v2 flex cable) that is attached to the solid-state drive backplane to the controller connector, complete the following steps.

   Note: The v2 flex cable is for the x240 only.

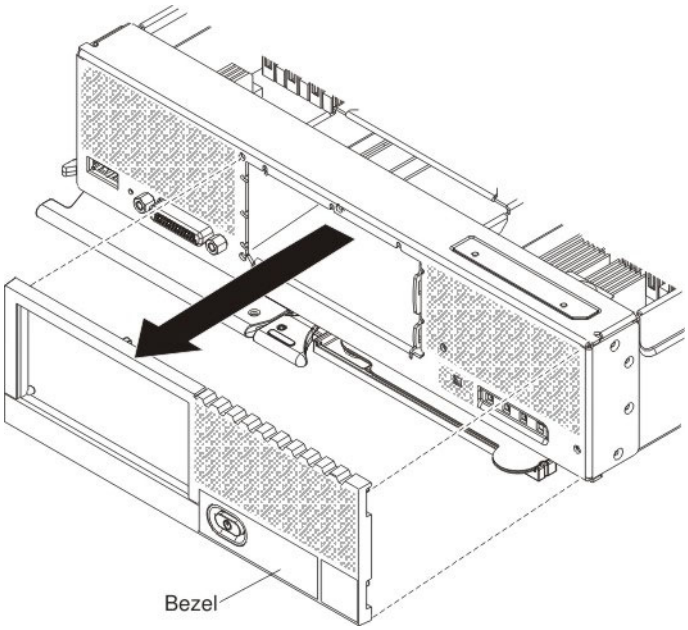
   a. Lift up the plastic connector door on the controller.



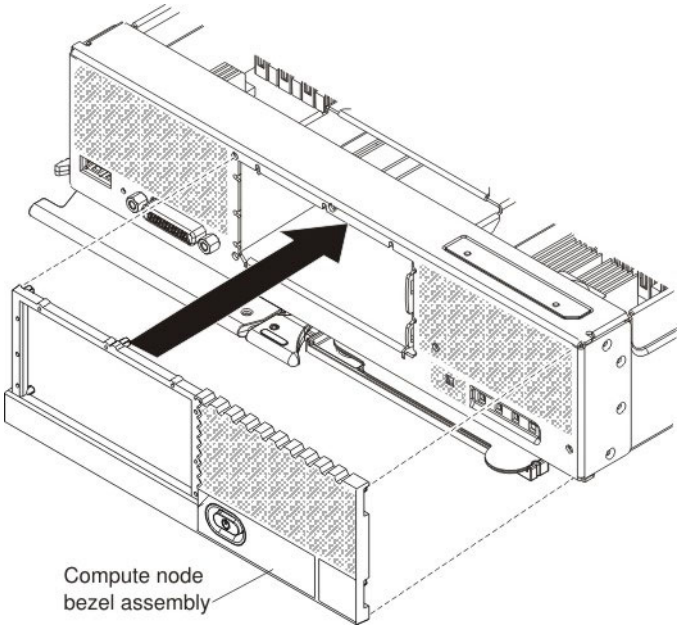
   b. Press down firmly on the flex cable connector to connect it to the external drive flex cable connector on the controller. (For the location of the connector on the controller, see the illustration in “ServeRAID controller connectors” on page 12.)

   c. Close the plastic connector door.

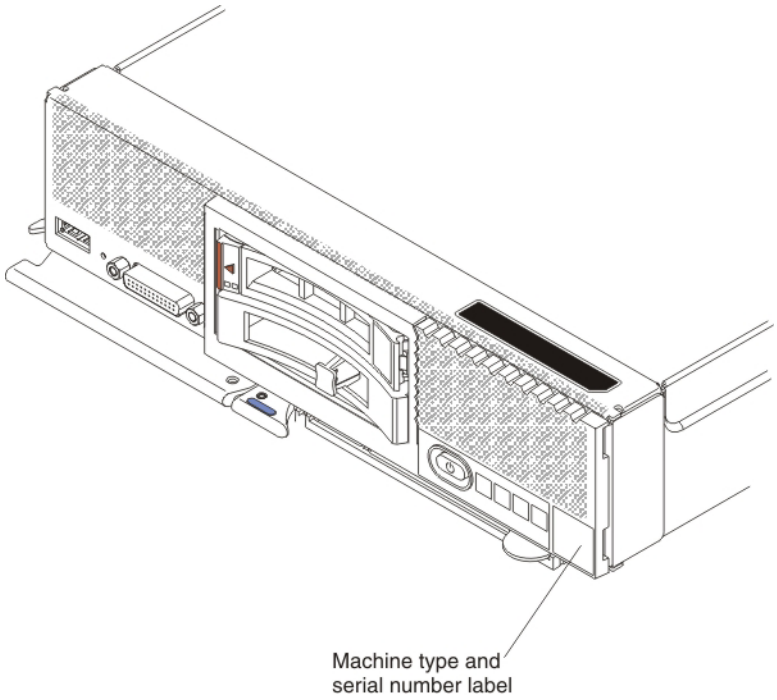
8. Remove the compute node bezel and keep it nearby. You will copy the machine type and serial number to the new compute node bezel assembly in step 10 on page 50.



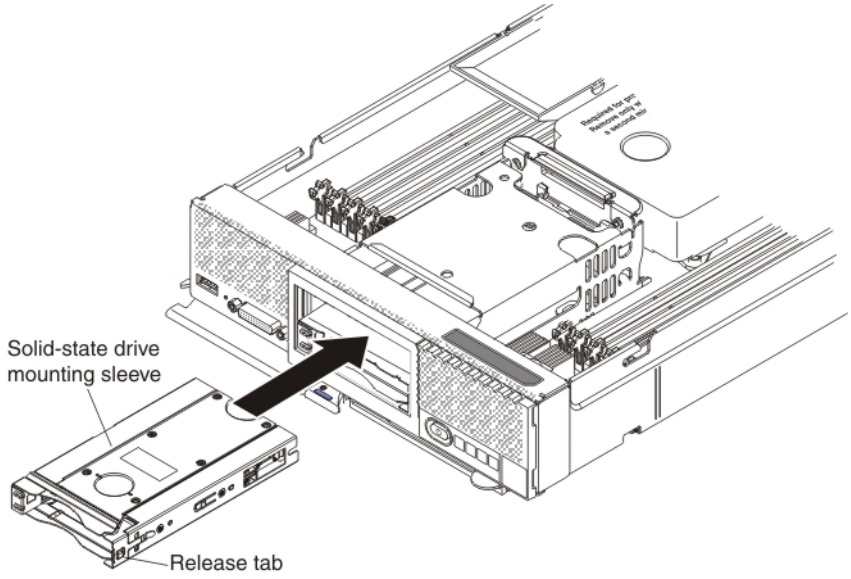
9. Install the new compute node bezel assembly that comes in the option kit. The larger opening in the new bezel enables you to correctly install the solid-state drive mounting sleeves.



10. The flash kit comes with an Lenovo Repair Identification (RID) tag. Using a ball point pen, transfer the machine type and serial number from the old bezel assembly to the RID Tag 3 label on the RID tag. Place the Tag 3 label on the lower right corner of the new bezel. The other RID tags are not used in this procedure.



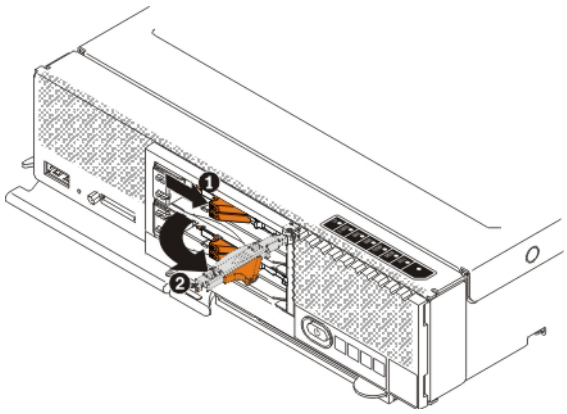
11. To install the two solid-state drive mounting sleeves that come with the option, complete the following steps:
    a. Make sure that the two retention levers on the front of the solid-state drive mounting sleeve are closed.



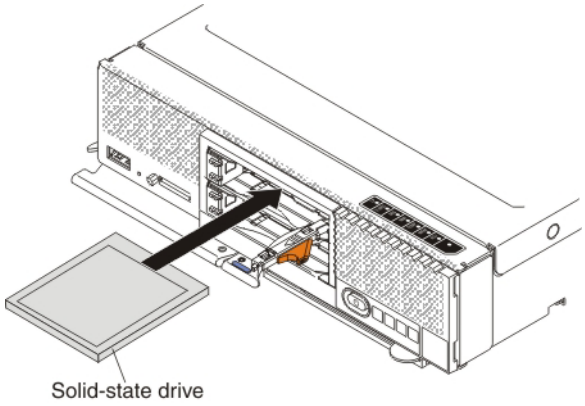
    b. Slide the solid-state drive mounting sleeve in the drive bay, pressing on the two closed retention levers until the sleeve is fully seated in the bay.
    c. Repeat steps 11a and 11b to install the second solid-state drive mounting sleeve.
12. Install the cover on the compute node (see "Installing the compute node cover" on page 8 for instructions).
13. To install up to four solid-state drives or fillers in the solid-state drive mounting sleeve (two drives per sleeve), complete the following steps:

a. Touch the static-protective package that contains the new solid-state drive to any *unpainted* metal surface on the Flex System chassis or any *unpainted* metal surface on any other grounded rack component; then, remove the solid-state drive from the package.

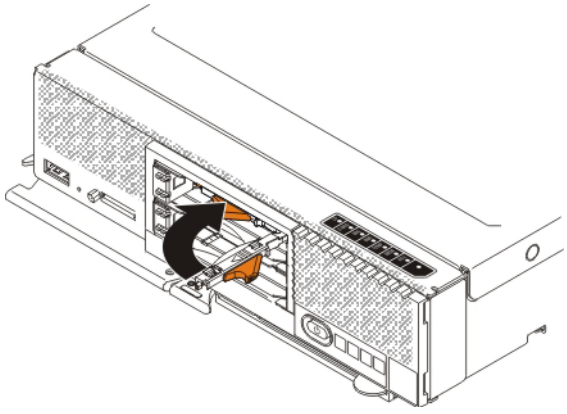
b. Press the mounting sleeve release latch to the right **1** and rotate the loose end of the retention lever away from the compute node **2**.



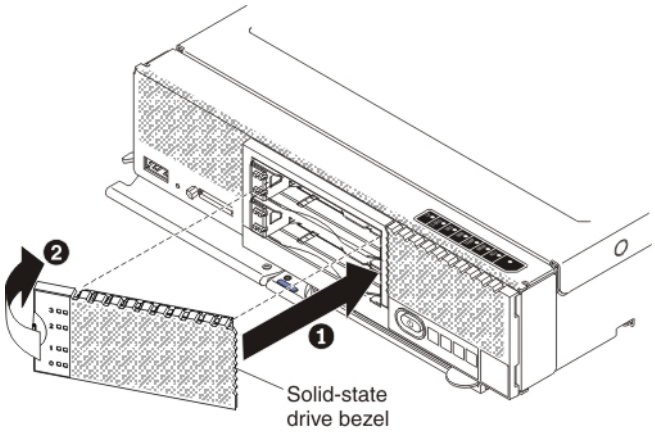
c. Slide the solid-state drive all the way into the mounting sleeve until it is fully seated in the sleeve.



d. Press the release latch to the right and rotate the retention lever toward the compute node until it clicks closed.



14. Install the new solid-state drive bezel that comes in the option kit. Align the bezel with the front of the drive bay and press the right side of the bezel onto the chassis **1**; then, rotate the left side of the bezel toward the chassis and press it into place **2**.



15. Reinstall the compute node in the same node bay from which you removed it (see "Installing a compute node in a chassis" on page 5 for instructions).

    Note: After the compute node is installed, the IMM in the compute node initializes and synchronizes with the CMM. This process takes several minutes, depending on your configuration. The power LED flashes rapidly, and the power button on the compute node does not respond until this process is complete.

16. Turn on the compute node. Make sure that the power LED on the compute node control panel is lit continuously, indicating that the compute node is receiving power and is turned on.

17. Use the Human Interface Infrastructure (HII) to configure the controller. To open the HII, turn on the compute node and when the prompt `<F1> Setup` is displayed, press F1. Then, select **System Settings > Storage > HII**.

    You can also run the WebBIOS Configuration Utility to configure the drive groups and the virtual drives. To run the utility, turn on the compute node and when the message `Press <Ctrl><H> for WebBIOS` is displayed on the screen, immediately press Ctrl+H.

    For detailed information about configuring drive groups and virtual drives, see the *ServeRAID M Software User's Guide* on the *ServeRAID M Documentation* CD.

18. Install the operating-system device driver.

    To view the operating systems that support the controller and to download the latest device drivers, go to http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/. For updates, go to http://www.ibm.com/supportportal/.

    Be sure to use the latest service pack for the operating system and review the readme file that accompanies the device driver. Be sure to install the software device drivers before you operate the controller.

Replaceable components

Field replaceable units (FRUs) must be replaced only by a trained service technician, unless they are classified as customer replaceable units (CRUs).

Tier 1 CRU: Replacement of Tier 1 CRUs is your responsibility. If Lenovo installs a Tier 1 CRU at your request without a service contract, you will be charged for the installation.

For more information about the terms of the warranty and getting service and assistance, see the *Warranty Information* document that comes with the optional device.

Table 4. Field replaceable units for the ServeRAID M5100 Series Flex System Flash Kit for x240

Description	CRU part number (Tier 1)
Solid-state drive backplane with attached flex cable	46C9943
Solid-state drive backplane with attached v2 flex cable (for the x240 only)	47C8843
Solid-state drive mounting sleeves (2 each)	49Y4983
Compute node bezel assembly and Lenovo RID tag (Flex System x240)	81Y4363
Solid state drive bezel	44E4768
Lenovo Repair Identification (RID) tag	81Y4395

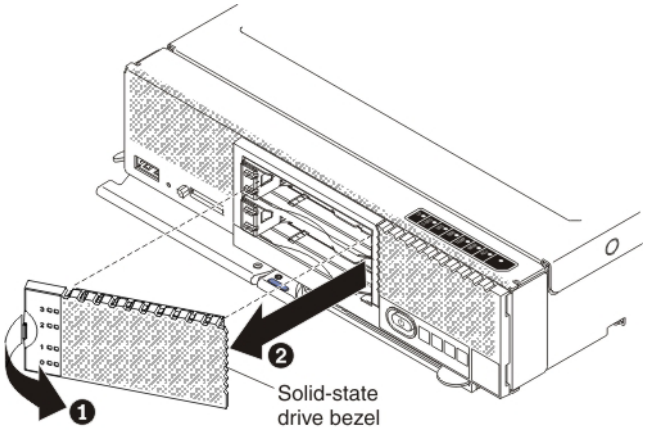
Removing and replacing the solid-state drive backplane with attached flex cable

About this task

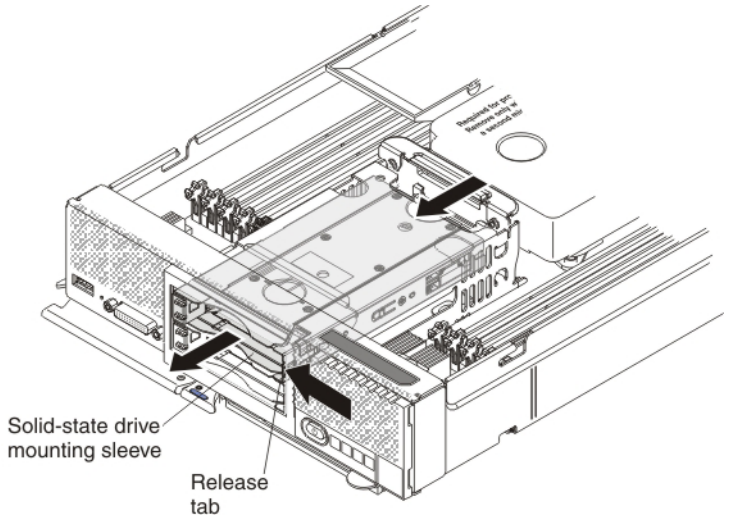
To remove and replace the solid-state drive backplane with attached flex cable, complete the following steps:

Procedure

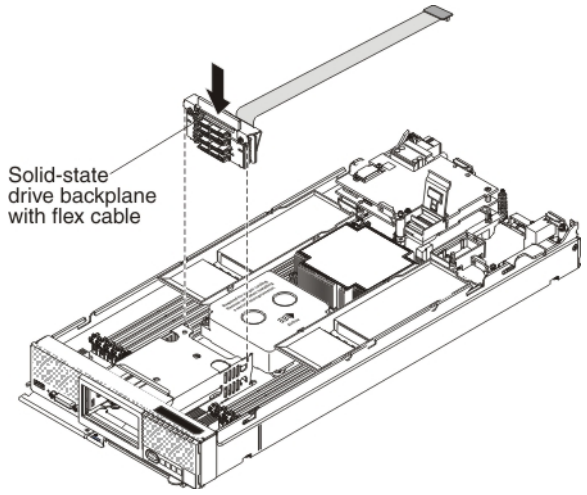
1. Read the safety information that begins on page "Safety" on page v and "Handling static-sensitive devices" on page 3.
2. If you have not already done so, remove the compute node from the chassis. For more information, see "Removing a compute node from a chassis" on page 4.
3. To remove the solid-state drive bezel, place a finger on the left side of the bezel, pull and rotate the bezel away from the front of the compute node **1**, and pull the left side of the bezel away from the chassis **2**.



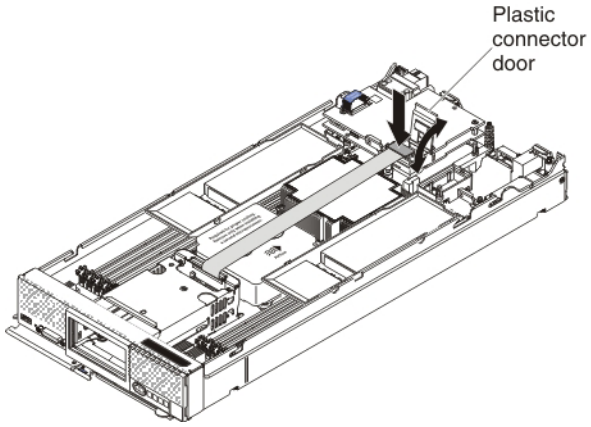
4. Remove the compute node cover (see "Removing the compute node cover" on page 6.)
5. Using a tool such as a flat-blade screwdriver, gently pry open the release tab on the right side of the solid-state drive mounting sleeve while you push the rear of the sleeve forward and slide the sleeve out of the compute node approximately 12 mm (0.5 in.). Repeat this step for the other solid-state drive mounting sleeve.



6. Lift up the plastic connector door on the controller and disconnect the solid-state drive flex cable.
7. Grasp the lip on the top of the solid-state drive backplane and lift out the backplane and the flex cable.
8. To install the new solid-state drive backplane with the flex cable (or v2 flex cable), complete the following steps:
   a. Touch the static-protective package that contains the new solid-state drive backplane (comes with the flash kit) to any *unpainted* metal surface on the Flex System chassis or any *unpainted* metal surface on any other grounded rack component; then, remove the backplane from the package.



   b. Align the new backplane with the solid-state drive cage and the connector on the system board and press the backplane into position until it is fully seated in the connector.
9. To connect the flex cable (or v2 flex cable) that is attached to the solid-state drive backplane to the controller connector, complete the following steps:
   a. Lift up the plastic connector door on the controller.



b. Press down firmly on the flex cable connector to connect it to the controller connector.

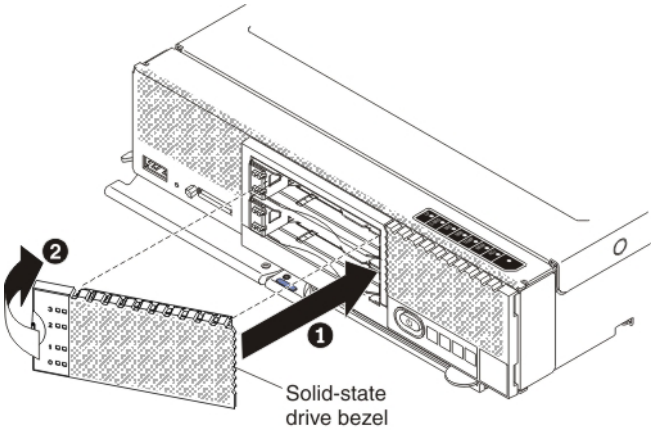
c. Close the plastic connector door.

10. Install the cover on the compute node (see "Installing the compute node cover" on page 8 for instructions).

11. Slide each solid-state drive mounting sleeve completely into the drive bay; then, slide each solid-state drive all the way into the mounting sleeve until it clicks into the backplane connector.

12. To close the retention levers, press the release latch to the right and rotate the retention lever toward the compute node to close it.

13. Install the solid-state drive bezel. Align the bezel with the front of the drive bay and press the right side of the bezel onto the chassis **1** ; then, rotate the left side of the bezel toward the chassis and press it into place **2** .



14. Reinstall the compute node in the same node bay from which you removed it (see "Installing a compute node in a chassis" on page 5 for instructions).

    Note: After the compute node is installed, the IMM in the compute node initializes and synchronizes with the CMM. This process takes several minutes, depending on your configuration. The power LED flashes rapidly, and the power button on the compute node does not respond until this process is complete.

15. Turn on the compute node. Make sure that the power LED on the compute node control panel is lit continuously, indicating that the compute node is receiving power and is turned on.

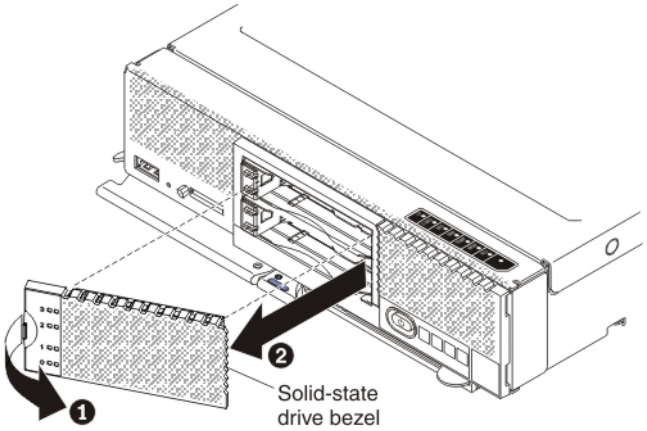
Removing and replacing a solid-state drive mounting sleeve

About this task

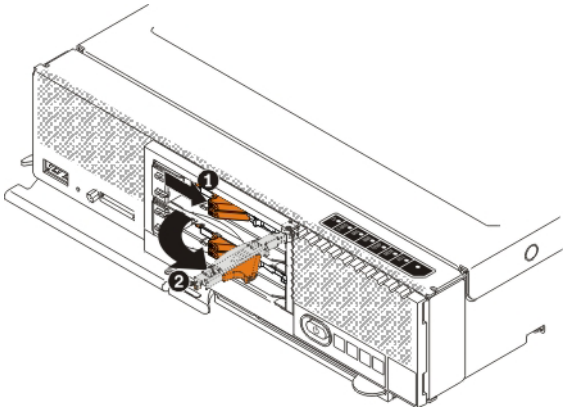
To remove and replace a solid-state drive mounting sleeve, complete the following steps:

Procedure

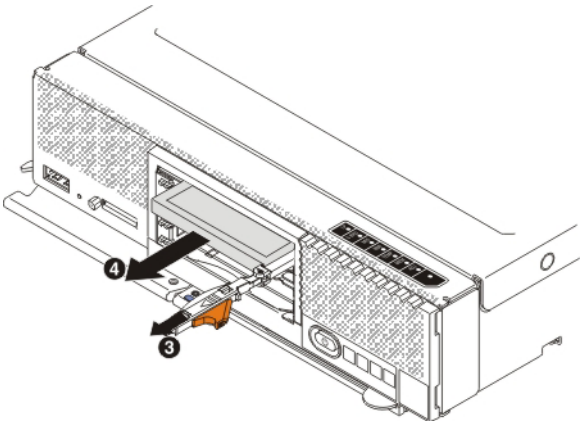
1. Read the safety information that begins on page "Safety" on page v and "Handling static-sensitive devices" on page 3.
2. If you have not already done so, remove the compute node from the chassis. For more information, see "Removing a compute node from a chassis" on page 4 and "Removing the compute node cover" on page 6.
3. To remove the solid-state drive bezel, place a finger on the left side of the bezel, pull and rotate the bezel away from the front of the compute node **1**, and pull the left side of the bezel away from the chassis **2**.



4. Locate the solid-state drive mounting sleeve that you want to replace (upper or lower).
5. To remove the two solid-state drives, complete the following steps:
   a. Press the mounting sleeve release latch to the right **1** and rotate the loose end of the retention lever away from the compute node **2**.

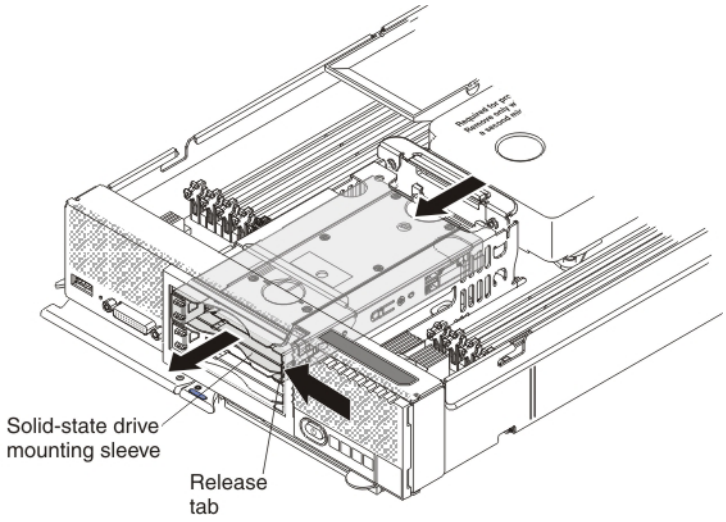


   b. Pull the retention lever toward you **3** to slide the drive completely out of the mounting sleeve **4**. Repeat this step to remove the other drive in the sleeve.

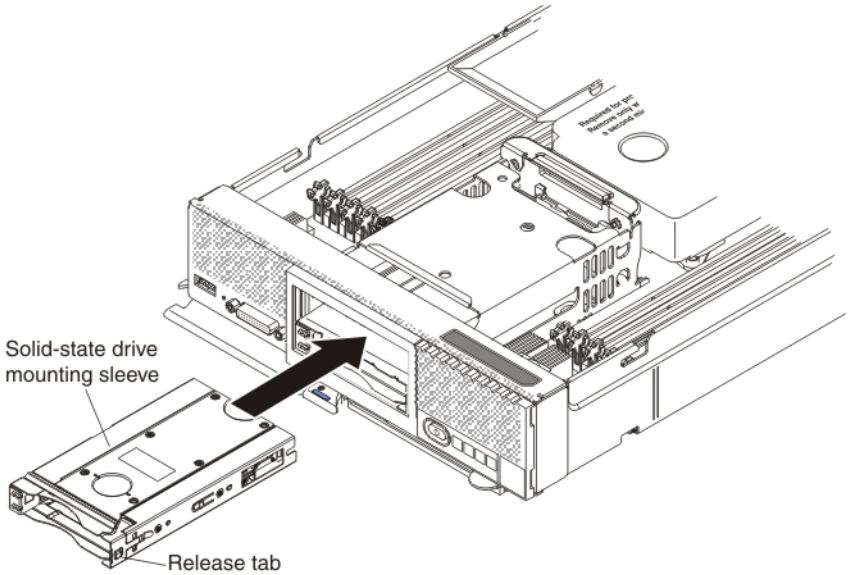


c. Close the two mounting sleeve retention levers.

6. Remove the compute node cover. For more information, see "Removing the compute node cover" on page 6.
7. Using a tool such as a flat-blade screwdriver, gently pry open the release tab on the right side of the solid-state drive mounting sleeve while you push the rear of the sleeve forward and slide the sleeve out of the compute node.



8. Remove the new solid-state drive mounting sleeve from the packaging and make sure that the two retention levers on the front of the sleeve are closed.
9. Slide the solid-state drive mounting sleeve in the drive bay, pressing on the two closed retention levers until the sleeve is fully seated in the bay.



10. Reinstall the solid-state drives or fillers in the solid-state drive mounting sleeve.
11. Reinstall the solid-state drive bezel. Align the bezel with the front of the drive bay and press the right side of the bezel onto the chassis; then, rotate the left side of the bezel toward the chassis and press it into place.
12. Reinstall the compute node cover. For more information, see "Installing the compute node cover" on page 8.
13. Reinstall the compute node in the same node bay from which you removed it (see "Installing a compute node in a chassis" on page 5 for instructions).

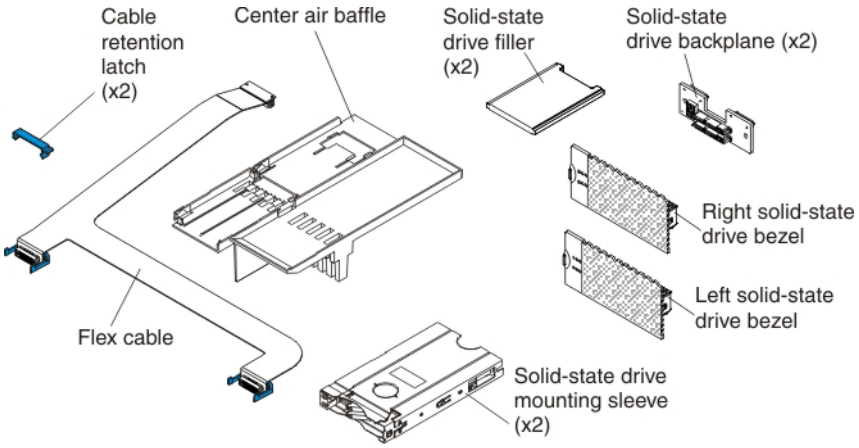
    Note: After the compute node is installed, the IMM in the compute node initializes and synchronizes with the CMM. This process takes several minutes, depending on your configuration. The power LED flashes rapidly, and the power button on the compute node does not respond until this process is complete.
14. Turn on the compute node. Make sure that the power LED on the compute node control panel is lit continuously, indicating that the compute node is receiving power and is turned on.

Chapter 6. Installing the ServeRAID M5100 Series Flex System Flash Kit for x440

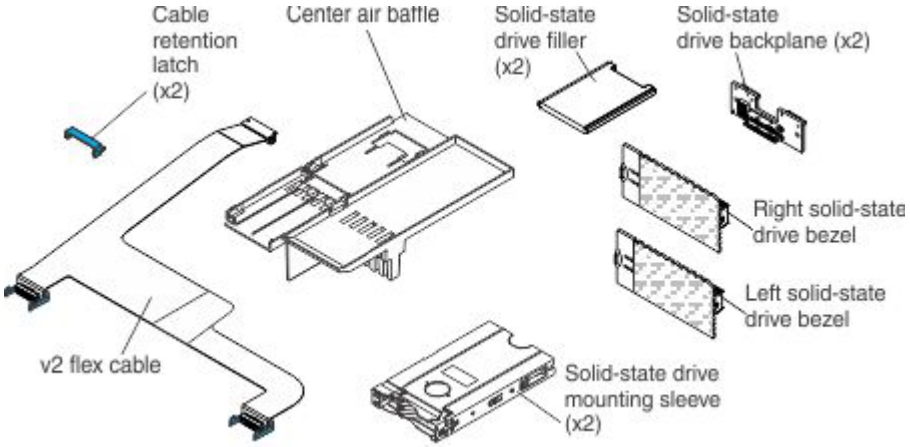
This chapter describes how to install the ServeRAID M5100 Series Flex System Flash Kit and Flash Kit v2 for x440 in the compute node.

Parts that come in the flash kit and flash kit v2 for the x440

The following illustration shows the parts that come in the flash kit.



The following illustration shows the parts that come in the flash kit v2.



Installing the Flex System Flash Kit for x440

About this task

To install the Flex System Flash Kit, complete the following steps.

Procedure

1. Read the safety information that begins on page “Safety” on page v and “Handling static-sensitive devices” on page 3.

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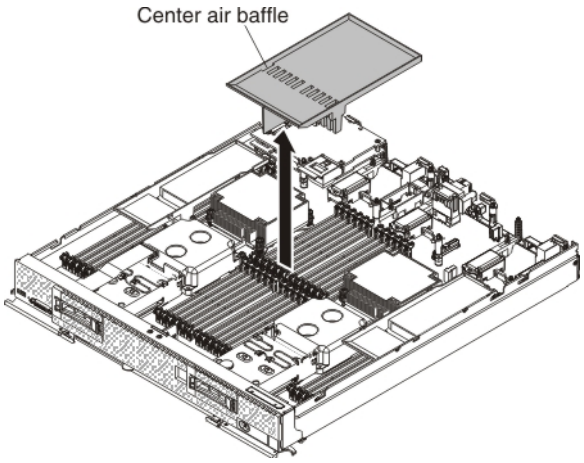
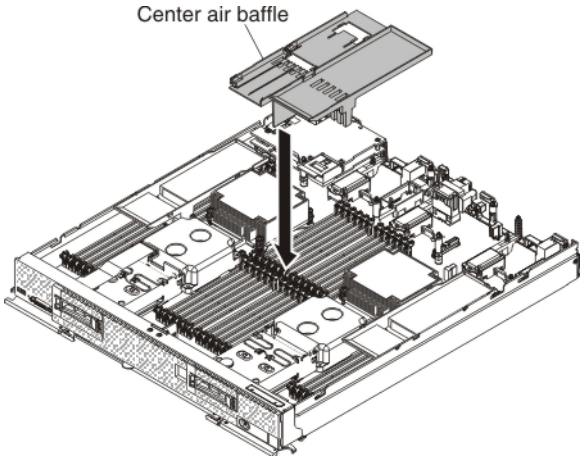
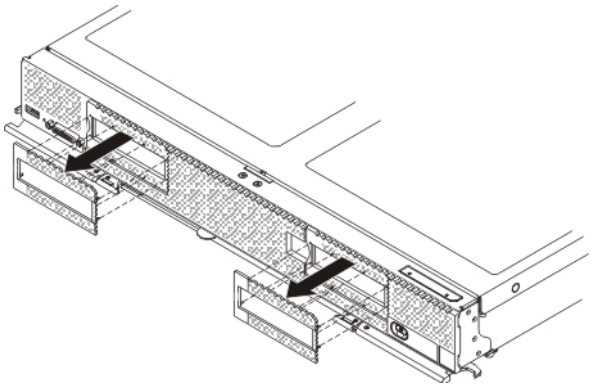
2. If you have not already done so, remove the compute node from the chassis and remove the cover. For more information, see “Removing a compute node from a chassis” on page 4 and “Removing the compute node cover” on page 6.
3. Install the ServeRAID M5115 SAS/SATA controller for Flex System. For more information, see “Installing the ServeRAID M5115 SAS/SATA Controller for Flex System” on page 12.
4. Remove the center air baffle.



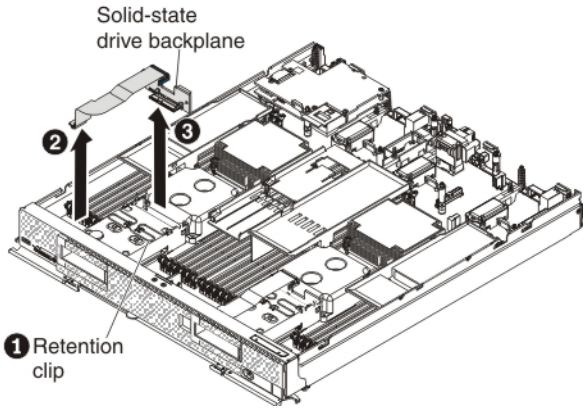
5. Install the center air baffle that comes with the flash kit.



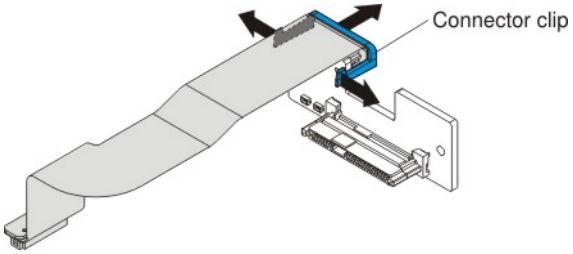
6. Remove the hot-swap hard disk drives and hard disk drive bay fillers from the left and right drive bays.
7. Use a flat-blade screwdriver to carefully pull the two small bezels from the front of the compute node.



8. Remove the hard disk drive backplanes:
   a. Push the metal retention clip **1** on the drive cage toward the rear of the compute node to release it from under the tab; then slide the metal retention clip toward the front of the compute node to release the hard disk drive backplane.



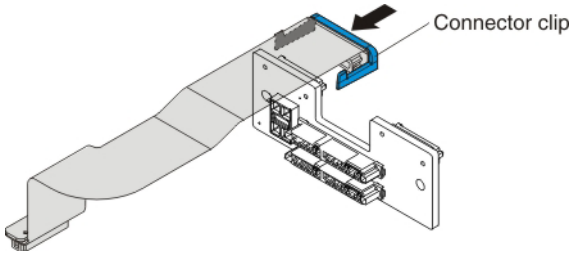
   b. Disconnect the hard disk drive backplane cable from the system board **2**.
   c. Rotate the hard disk drive backplane toward the front of the compute node and away from the pins on the drive cage; then, lift it out of the compute node. **3**.
   d. To disconnect the cable from the hard disk drive backplane that you removed, pull the connector clip away from the cable to unhook the clip from the backplane as you push the cable connector toward the rear of the compute node.



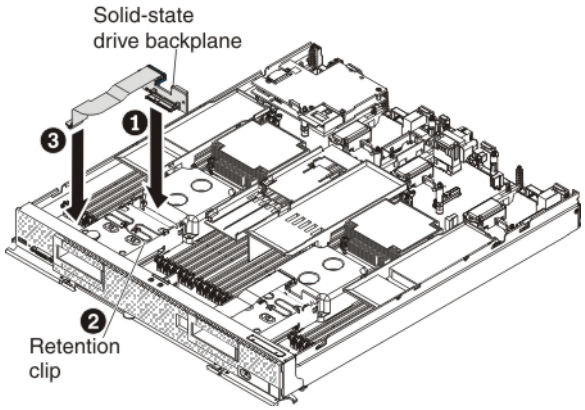
   e. Repeat step 8a to step 8d to remove the second hard disk drive backplane.
9. Install the new solid-state drive backplanes:
   a. Touch the static-protective package that contains the new solid-state drive backplane (comes with the flash kit) to any *unpainted* metal surface on the

Flex System chassis or any *unpainted* metal surface on any other grounded rack component; then, remove the backplane from the package.

b. To connect the backplane cable to the new solid-state drive backplane, hold open the connector clip while you push the cable connector into the backplane cable connector. Make sure that the connector clip clicks into place around the backplane.



c. Align the new solid-state drive backplane as shown in the following illustration **1** . Place the backplane into the notch at the rear of the drive cage and rotate the backplane toward the rear of the compute node. Make sure that the two pins at the rear of the drive cage are in the two holes on the backplane and that the backplane is flush with the drive cage.



d. Push the metal retention clip on the drive cage toward the rear of the compute node and under the tab to secure the backplane **2** .

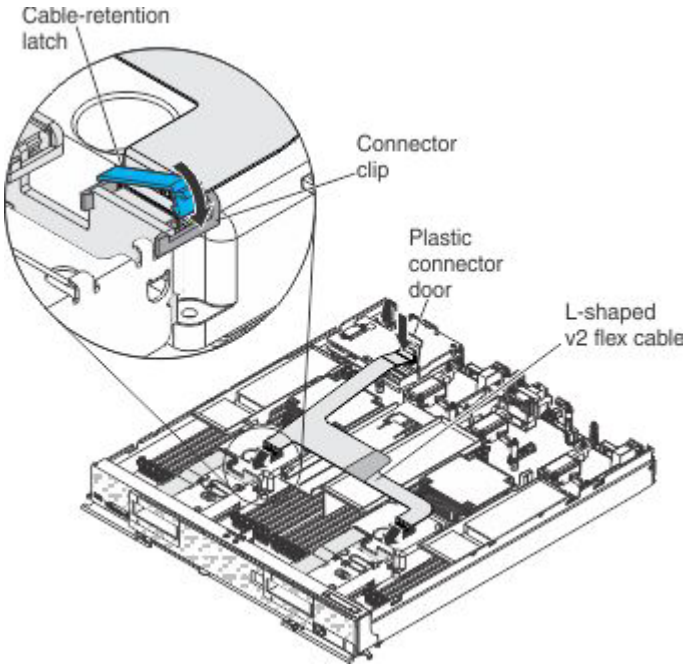
e. Connect the solid-state drive backplane cable to the system board **3** .

f. Repeat step 9a on page 63 to step 9e to install the second solid-state drive backplane.

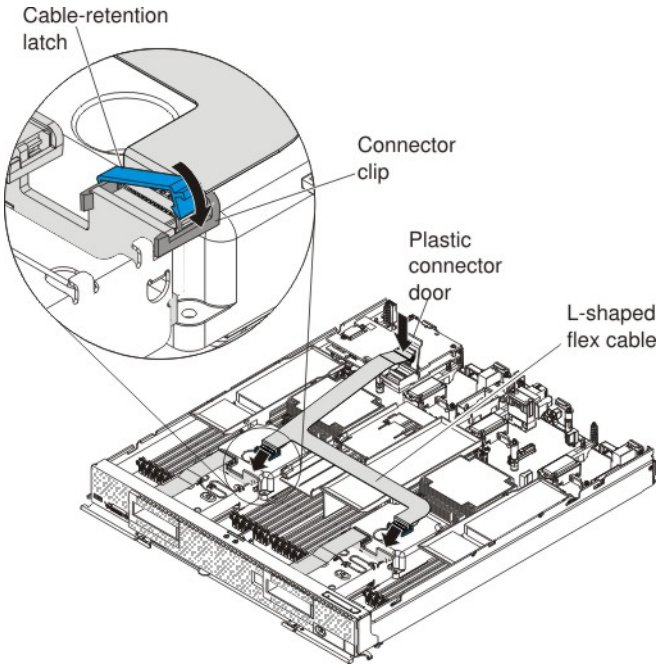
10. To connect the L-shaped flex cable to both solid-state drive backplanes and to the controller connector, complete the following steps:

a. Position the L-shaped v2 flex cable or the L-shaped flex cable as shown in the following illustration.

For the L-shaped v2 flex cable:



For the L-shaped flex cable:



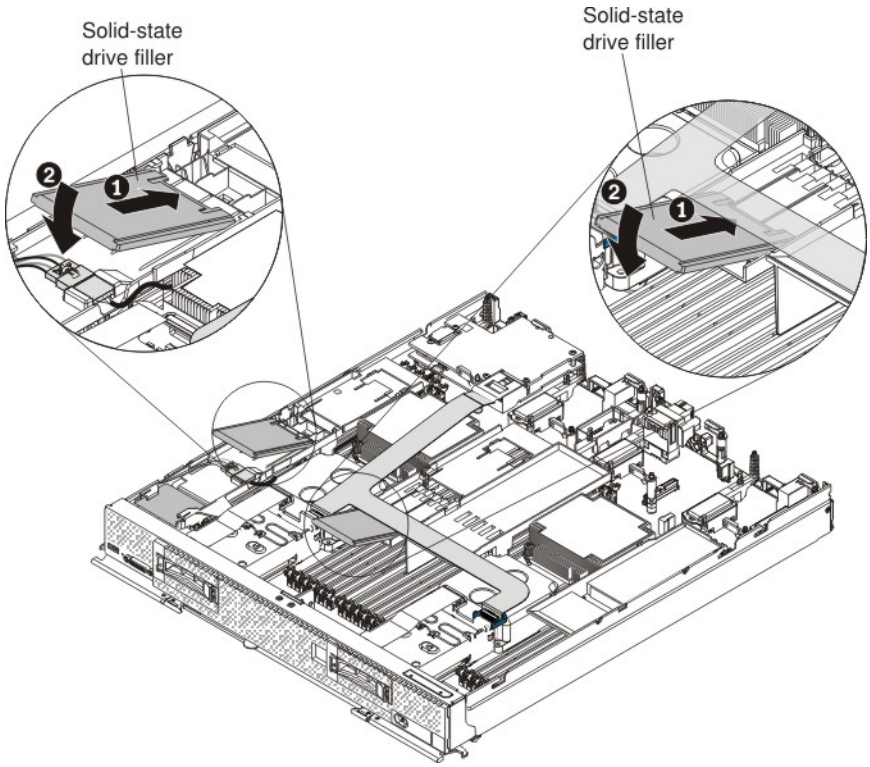
b. Lift up the plastic connector door on the controller.
c. Press down firmly on the flex cable connector to connect it to the external drive flex cable connector on the controller. (For the location of the connector on the controller, see the illustration in "ServeRAID controller connectors" on page 12.)
d. Close the plastic connector door.
e. Firmly press one L-shaped flex cable connector end into the connector on the solid-state drive backplane and secure the cable with a connector clip (see the illustration). Repeat this step to connect the other flex cable connector end.

f. Orient the cable-retention latch as shown in the illustration.

g. Hook the square side of the cable-retention latch around the left side of the connector clip.

h. Rotate the right side of the cable-retention latch and snap it into place around the right side of the connector clip.

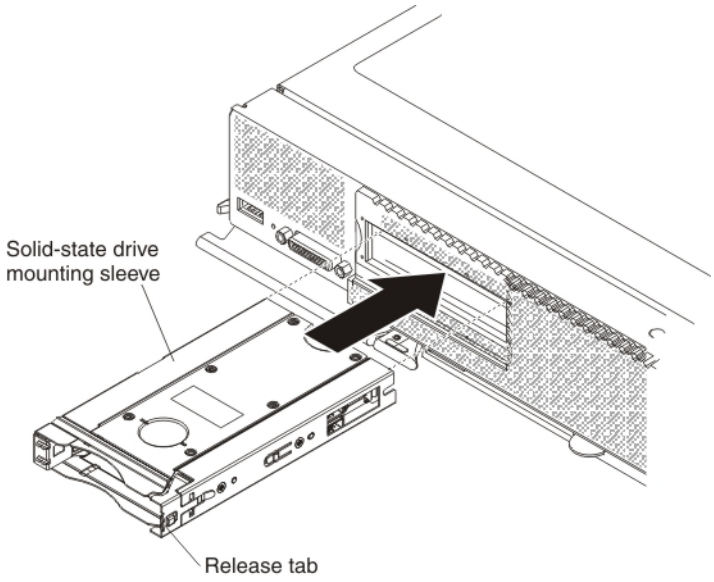
11. For the correct air flow, install a solid-state drive filler in the front slot on the left and center air baffles. Slide the end of the solid-state drive filler under the two tabs **1** and lower the filler **2** so that it rests flat on the air baffle.



12. Install the cover on the compute node (see "Installing the compute node cover" on page 8 for instructions).

13. To install the two solid-state drive mounting sleeves that come with the flash kit, complete the following steps:

a. Remove the two solid-state drive mounting sleeves from the packaging and make sure that the two retention levers on the front of the each sleeve are closed.



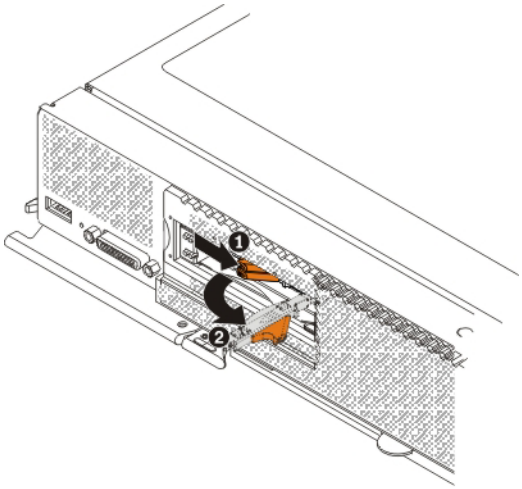
b. Slide the solid-state drive mounting sleeve in the drive bay, pressing on the two closed retention levers until the sleeve is fully seated in the bay.

c. Repeat steps 13a on page 66 and 13b to install the second solid-state drive mounting sleeve.

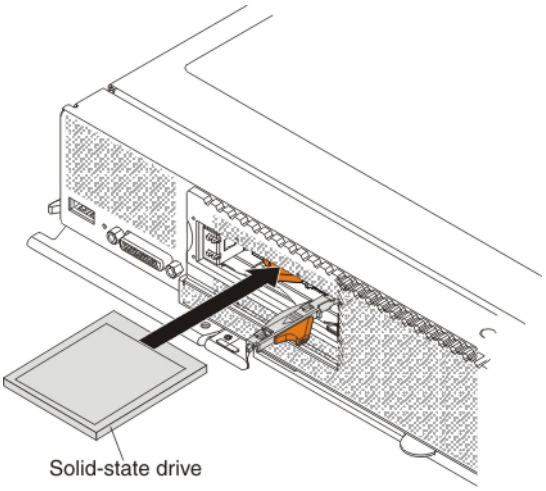
14. To install up to four solid-state drives or fillers in the solid-state drive mounting sleeve (two drives per sleeve), complete the following steps:

a. Touch the static-protective package that contains the new solid-state drive to any *unpainted* metal surface on the Flex System chassis or any *unpainted* metal surface on any other grounded rack component; then, remove the solid-state drive from the package.

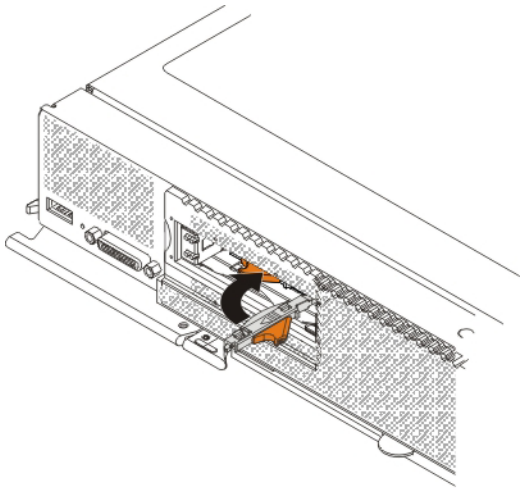
b. Press the mounting sleeve release latch to the right **1** and rotate the loose end of the retention lever away from the compute node **2**.



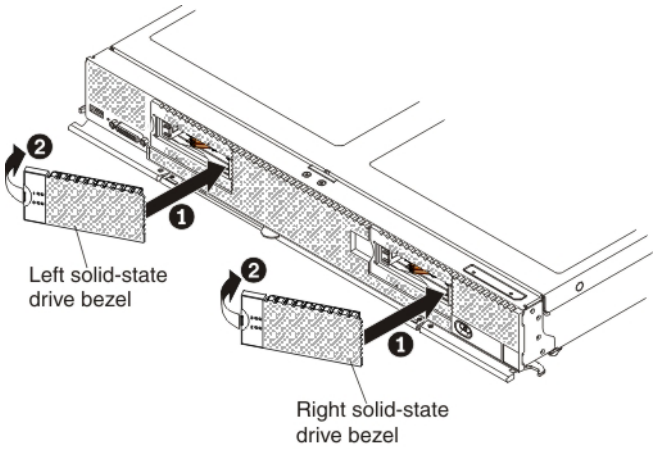
c. Slide the solid-state drive all the way into the mounting sleeve until it is fully seated in the sleeve.



d. Press the release latch to the right and rotate the retention lever toward the compute node until it clicks closed.



15. Install the new left and right solid-state drive bezels that come in the flash kit. Align the bezel with the front of the drive bay and press the right side of the bezel onto the chassis **1** ; then, rotate the left side of the bezel toward the chassis and press it into place **2** . Repeat this step to install the other bezel.



16. Reinstall the compute node in the same node bay from which you removed it (see "Installing a compute node in a chassis" on page 5 for instructions).

    Note: After the compute node is installed, the IMM in the compute node initializes and synchronizes with the CMM. This process takes several minutes, depending on your configuration. The power LED flashes rapidly, and the power button on the compute node does not respond until this process is complete.

17. Turn on the compute node. Make sure that the power LED on the compute node control panel is lit continuously, indicating that the compute node is receiving power and is turned on.
18. Use the Human Interface Infrastructure (HII) to configure the controller. To open the HII, turn on the compute node and when the prompt `<F1> Setup` is displayed, press F1. Then, select **System Settings > Storage > HII**.

    You can also run the WebBIOS Configuration Utility to configure the drive groups and the virtual drives. To run the utility, turn on the compute node and when the message `Press <Ctrl><H> for WebBIOS` is displayed on the screen, immediately press Ctrl+H.

    For detailed information about configuring drive groups and virtual drives, see the *ServeRAID M Software User's Guide* on the *ServeRAID M Documentation* CD.
19. Install the operating-system device driver.

    To view the operating systems that support the controller and to download the latest device drivers, go to http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/. For updates, go to http://www.ibm.com/supportportal/.

    Be sure to use the latest service pack for the operating system and review the readme file that accompanies the device driver. Be sure to install the software device drivers before you operate the controller.

Replaceable components

Field replaceable units (FRUs) must be replaced only by a trained service technician, unless they are classified as customer replaceable units (CRUs).

Tier 1 CRU: Replacement of Tier 1 CRUs is your responsibility. If Lenovo installs a Tier 1 CRU at your request without a service contract, you will be charged for the installation.

For more information about the terms of the warranty and getting service and assistance, see the *Warranty Information* document that comes with the optional device.

Table 5. Field replaceable units for the ServeRAID M5100 Series Flex System Flash Kit for x440

Description	CRU part number (Tier 1)
Solid-state drive backplane	47C8844
Solid-state drive mounting sleeves (2 each)	49Y4983
Right solid-state drive bezel	46C9935
Left solid-state drive bezel	46C9935
Solid state drive filler	49Y4936
L-shaped flex cable (includes cable-retention latch)	00D5089
L-shaped v2 flex cable (includes cable-retention latch)	00FE024
Center air baffle	46C9933

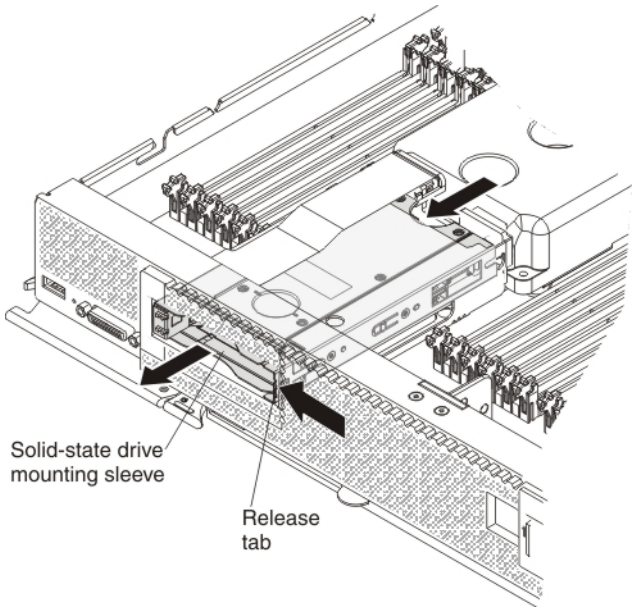
Removing and replacing a solid-state drive backplane

About this task

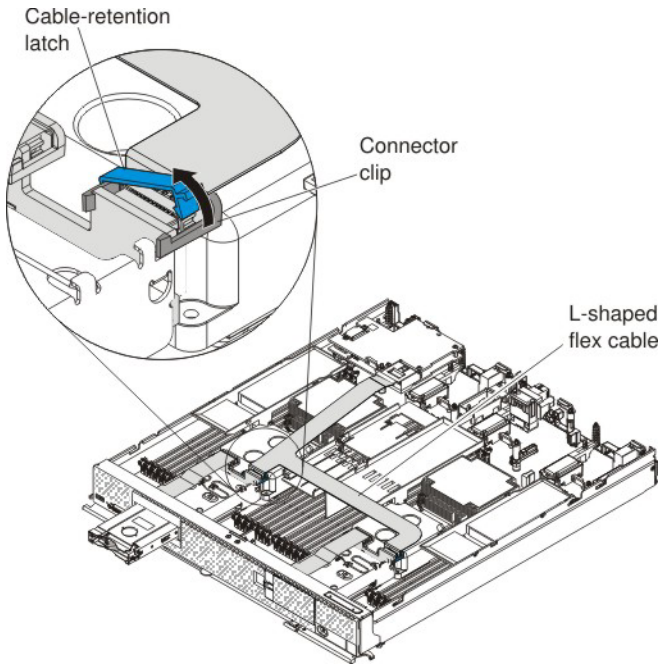
To remove and replace the solid-state drive back plane, complete the following steps:

Procedure

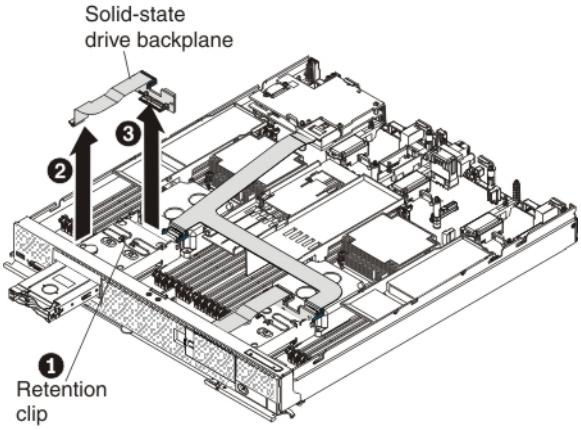
1. Read the safety information that begins on page "Safety" on page v and "Handling static-sensitive devices" on page 3.
2. Remove the compute node from the chassis (see "Removing a compute node from a chassis" on page 4).
3. Remove the compute node cover (see "Removing the compute node cover" on page 6).
4. For the solid-state drive backplane that you have to replace, remove the applicable solid-state drive bezel. Place a finger on the left side of the bezel, pull and rotate the bezel away from the front of the compute node, and pull the left side of the bezel away from the chassis.
5. Using a tool such as a flat-blade screwdriver, gently pry open the release tab on the right side of the solid-state drive mounting sleeve while you push the rear of the sleeve forward and slide the sleeve out of the compute node approximately 12 mm (0.5 in.).



6. Remove the solid-state drive backplane:
   a. On the L-shaped flex cable (or L-shaped v2 flex cable), unlatch both sides of the cable-retention latch to remove it; then, unhook the connector clip from the backplane and push the cable connector toward the rear of the compute node.



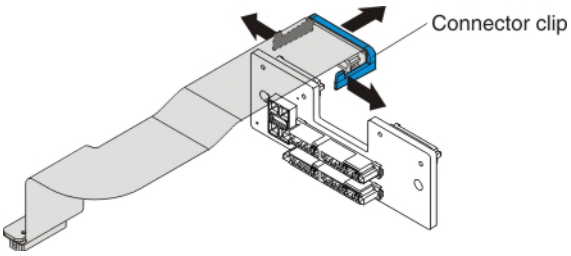
   b. Push the metal retention clip on the drive cage toward the rear of the compute node to release it from under the tab; then, slide the metal retention clip toward the front of the compute node to release the solid-state drive backplane **1**.



c. Disconnect the solid-state drive backplane cable from the system board **2** .

d. Rotate the solid-state drive backplane toward the front of the compute node and away from the pins on the drive cage; then, lift it out of the compute node. **3** .

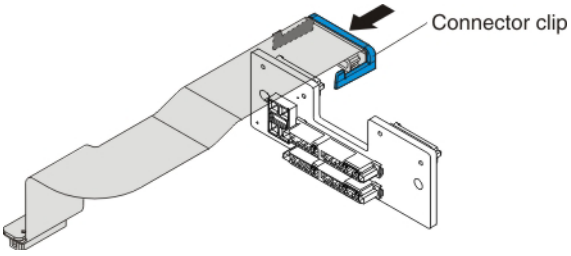
e. To disconnect the cable from the solid-state drive backplane that you removed, pull the connector clip away from the cable to unhook the clip from the backplane as you push the cable connector toward the rear of the compute node.



7. Install the new solid-state drive backplane:

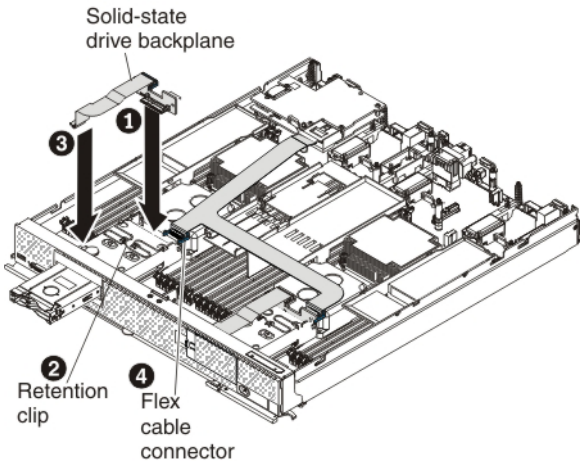
a. Touch the static-protective package that contains the new solid-state drive backplane to any *unpainted* metal surface on the Flex System chassis or any *unpainted* metal surface on any other grounded rack component; then, remove the backplane from the package.

b. To connect the backplane cable to the new solid-state drive backplane, hold open the connector clip while you push the cable connector into the backplane cable connector. Make sure that the connector clip clicks into place around the backplane.



c. Align the new solid-state drive backplane as shown in the following illustration **1** . Place the backplane into the notch at the rear of the drive cage and rotate the backplane toward the rear of the compute node. Make sure that the two pins at the rear of the drive cage are in the two holes on

the backplane and that the backplane is flush with the drive cage.



d. Push the metal retention clip on the drive cage toward the rear of the compute node and under the tab to secure the backplane **2**.

e. Connect the hard disk drive backplane cable to the system board **3**.

f. To connect the L-shaped flex cable (or L-shaped v2 flex cable) to the solid-state drive backplane connector **4**, hold open the connector clip while you push the cable connector into the backplane cable connector. Make sure that the connector clip clicks into place around the backplane.

g. Hook the cable-retention latch around the connector clip to secure the L-shaped flex cable to the backplane.

8. Slide the solid-state drive mounting sleeve into the drive bay until it is fully seated.
9. Install the solid-state drive bezel. Align the bezel with the front of the drive bay and press the right side of the bezel onto the chassis; then, rotate the left side of the bezel toward the chassis and press it into place.
10. Install the cover on the compute node (see "Installing the compute node cover" on page 8 for instructions).
11. Reinstall the compute node in the same node bay from which you removed it (see "Installing a compute node in a chassis" on page 5 for instructions)

    Note: After the compute node is installed, the IMM in the compute node initializes and synchronizes with the CMM. This process takes several minutes, depending on your configuration. The power LED flashes rapidly, and the power button on the compute node does not respond until this process is complete.
12. Turn on the compute node. Make sure that the power LED on the compute node control panel is lit continuously, indicating that the compute node is receiving power and is turned on.

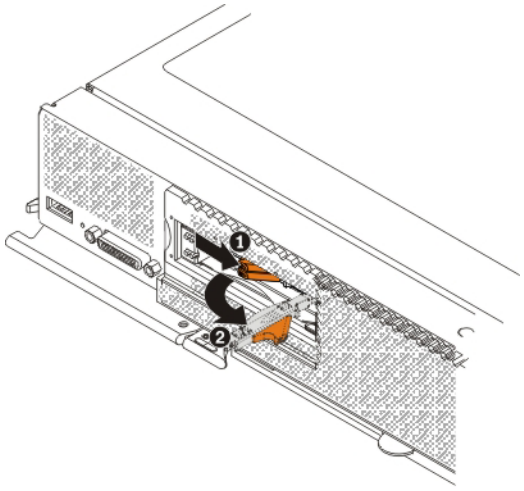
Removing and replacing a solid-state drive mounting sleeve

About this task

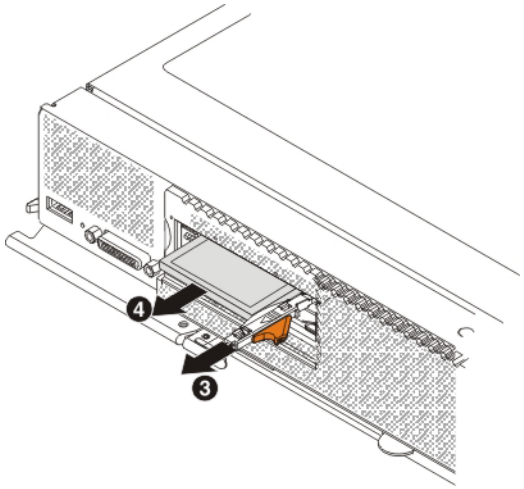
To remove and replace a solid-state drive mounting sleeve, complete the following steps:

Procedure

1. Read the safety information that begins on page “Safety” on page v and “Handling static-sensitive devices” on page 3.
2. If you have not already done so, remove the compute node from the chassis. For more information, see “Removing a compute node from a chassis” on page 4.
3. For the solid-state drive mounting sleeve that you have to replace, remove the applicable solid-state drive bezel. Place a finger on the left side of the bezel, pull and rotate the bezel away from the front of the compute node, and pull the left side of the bezel away from the chassis.
4. To remove the two solid-state drives, complete the following steps:
   a. Press the mounting sleeve release latch to the right **1** and rotate the loose end of the retention lever away from the compute node **2**.



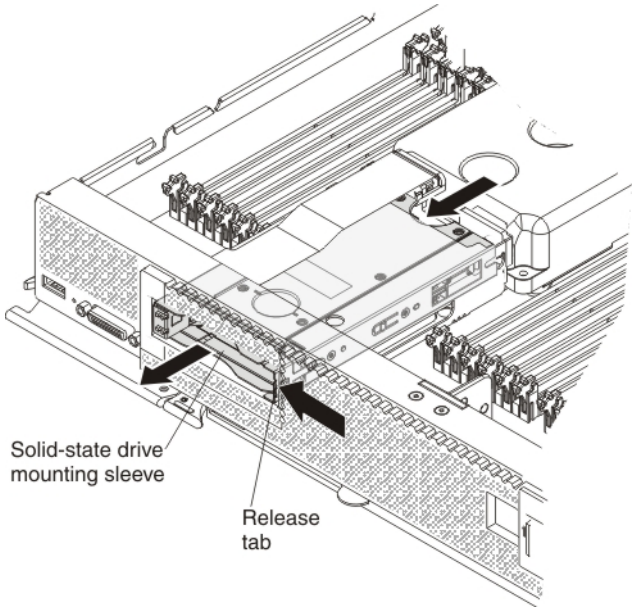
   b. Pull the retention lever toward you **3** to slide the drive completely out of the mounting sleeve **4**.



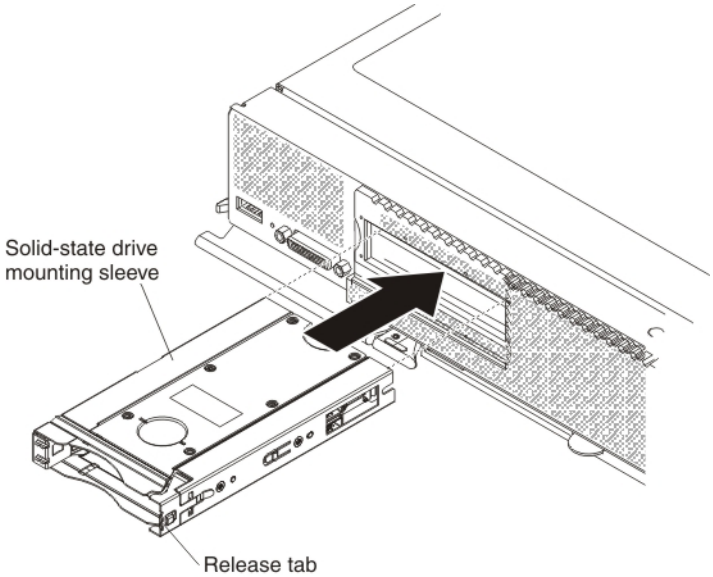
   c. Repeat steps 4a and 4b to remove the other drive in the sleeve.

d. Close the two mounting sleeve retention levers.

5. Using a tool such as a flat-blade screwdriver, gently pry open the release tab on the right side of the solid-state drive mounting sleeve while you push the rear of the sleeve forward and slide the sleeve out of the compute node.



6. Remove the new solid-state drive mounting sleeve from the packaging and make sure that the two retention levers on the front of the sleeve are closed.



7. Slide the solid-state drive mounting sleeve into the drive bay until it is fully seated.
8. Reinstall the solid-state drives in the solid-state drive mounting sleeve.
9. Install the solid-state drive bezel. Align the bezel with the front of the drive bay and press the right side of the bezel onto the chassis; then, rotate the left side of the bezel toward the chassis and press it into place.
10. Reinstall the compute node in the same node bay from which you removed it (see “Installing a compute node in a chassis” on page 5 for instructions).

Note: After the compute node is installed, the IMM in the compute node initializes and synchronizes with the CMM. This process takes several minutes, depending on your configuration. The power LED flashes rapidly, and the power button on the compute node does not respond until this process is complete.

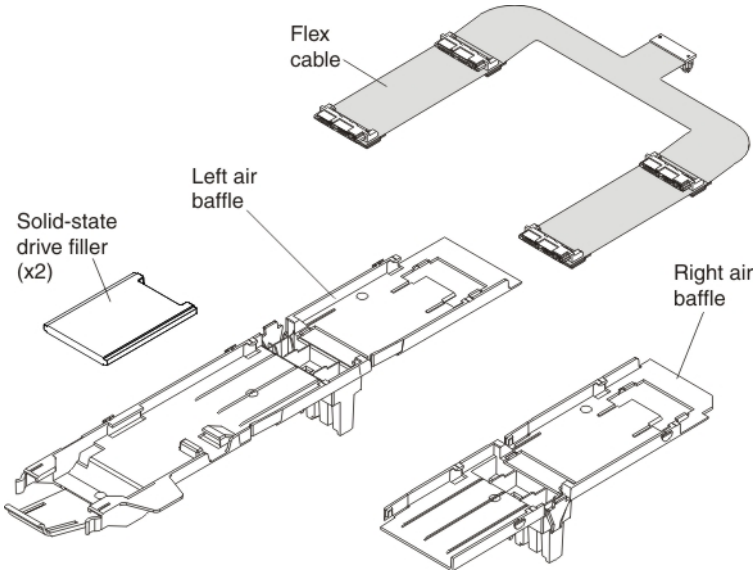
11. Turn on the compute node. Make sure that the power LED on the compute node control panel is lit continuously, indicating that the compute node is receiving power and is turned on.

Chapter 7. Installing the ServeRAID M5100 Series SSD Expansion Kit for x240

This chapter describes how to install the ServeRAID M5100 Series SSD Expansion Kit for x240.

Parts that come in the solid-state drive expansion kit for x240

The following illustration shows the parts that come in the solid-state drive expansion kit.



The solid-state drive expansion kit provides the capability to install up to four solid-state drives inside the compute node. By using a special flex cable, the solid-state drives connect to the ServeRAID M5115 SAS/SATA controller.

For instructions for installing the solid-state drive expansion kit, see one of the following sections, depending on your configuration:

- "Installing the SSD expansion option and the Enablement Kit for x240" on page 78
- "Installing the SSD expansion option and the ServeRAID M5100 Series Flex System Flash Kit for x240" on page 84
- "Installing the SSD expansion option with a previously installed Enablement Kit for x240" on page 92
- "Installing the SSD expansion option with a previously installed Flex System Flash Kit for x240" on page 97

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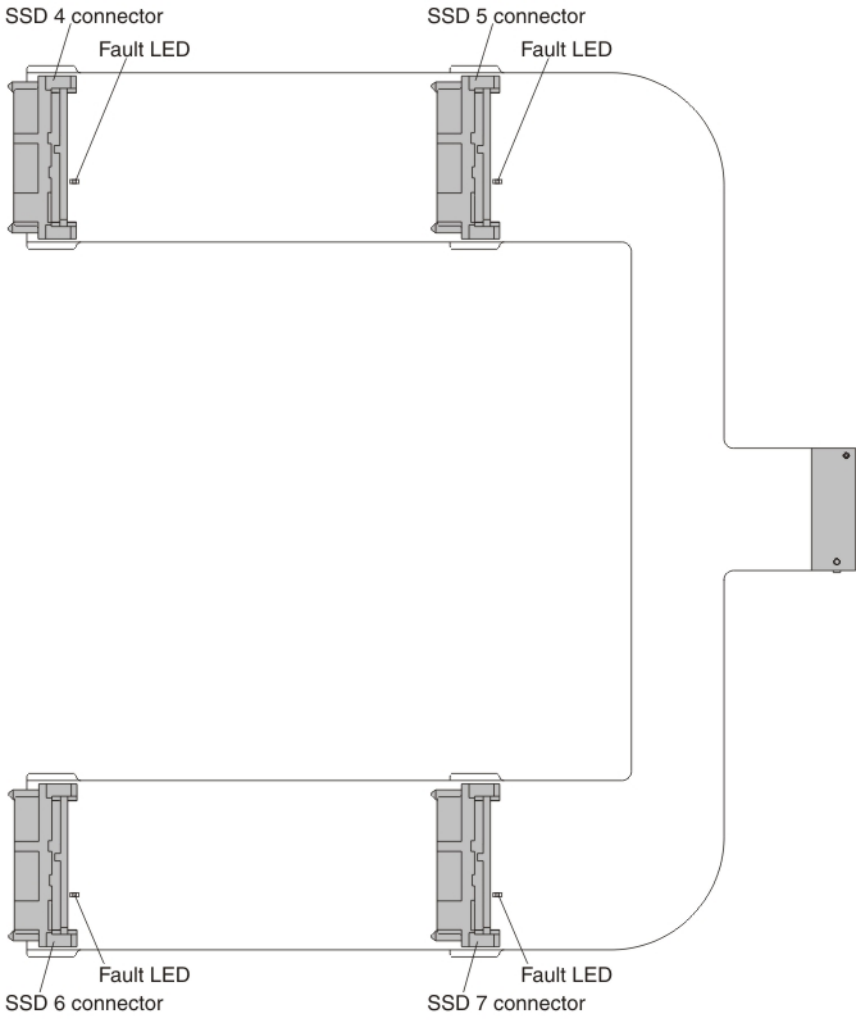
Internal solid-state drive flex cable connectors and LEDs

The following illustration shows the connectors and LEDs on the flex cable.



SSD connectors

You can connect one solid-state drive to each of the four connectors.

Fault LED

When this yellow LED is lit, it indicates that the associated solid-state drive has failed. Replace the solid-state drive.

Installing the SSD expansion option and the Enablement Kit for x240

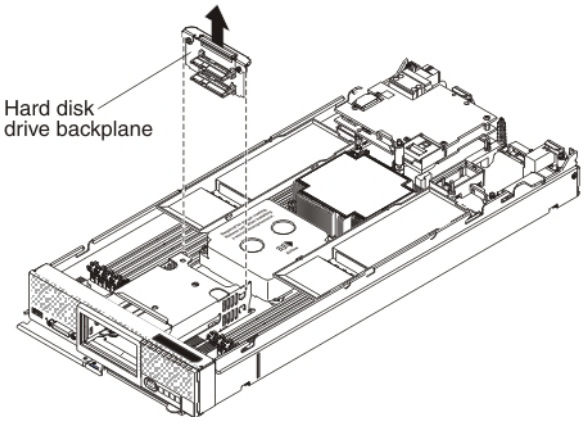
About this task

Use the procedure in this section to install the solid-state drive expansion kit option and the ServeRAID M5100 Series Enablement Kit for Flex System at the same time.

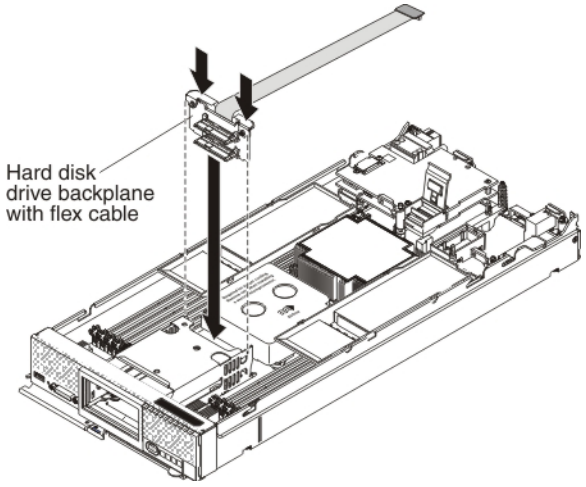
To install the solid-state drive expansion option and the enablement kit, complete the following steps:

Procedure

1. Read the safety information that begins on page "Safety" on page v and "Handling static-sensitive devices" on page 3.
2. If you have not already done so, remove the compute node from the chassis and remove the cover. For more information, see "Removing a compute node from a chassis" on page 4 and "Removing the compute node cover" on page 6.
3. Install the ServeRAID M5115 SAS/SATA controller for Flex System. For more information, see "Installing the ServeRAID M5115 SAS/SATA Controller for Flex System" on page 12.
4. Press the release latch (orange) on the hard disk drive to release the drive handle; then, use the drive handle to slide the hard disk drive approximately 12 mm (0.5 in.) out of the bay. Repeat this step for the other hard disk drive.
5. Grasp the lip on the top of the hard disk drive backplane and lift it out.

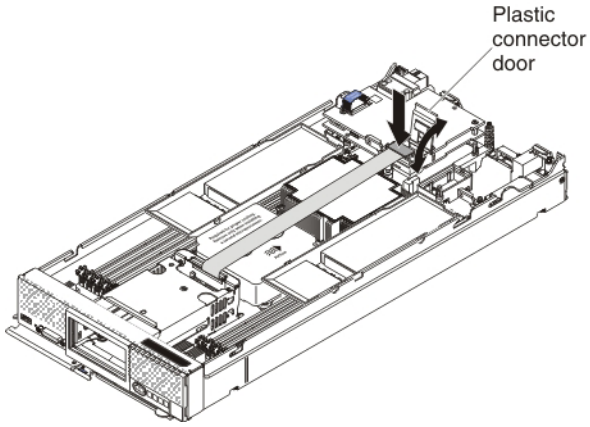


6. To install the new enablement kit backplane with the attached flex cable, complete the following steps:
   a. Touch the static-protective package that contains the new hard disk drive backplane (comes with the enablement kit) to any *unpainted* metal surface on the Flex System chassis or any *unpainted* metal surface on any other grounded rack component; then, remove the backplane from the package.

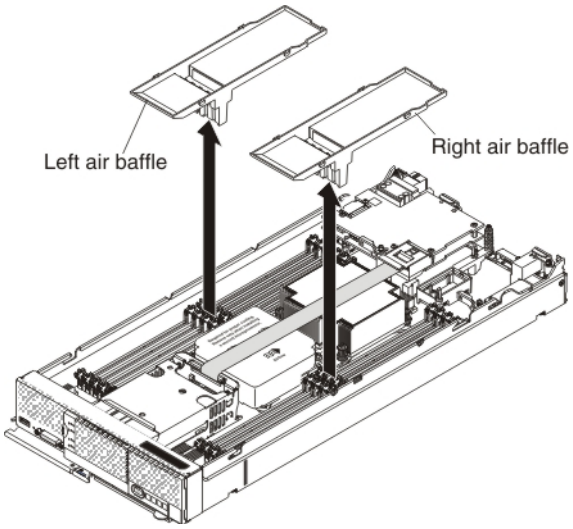


   b. Align the new backplane with the hard disk drive cage and the connector on the system board and press the backplane into position until it is fully seated in the connector.

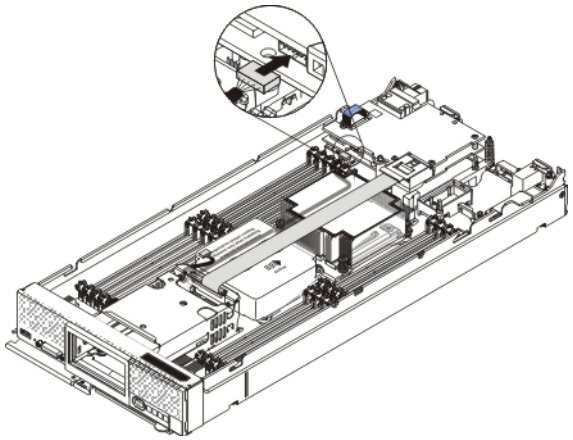
7. To connect the flex cable that is attached to the hard disk drive backplane to the controller connector, complete the following steps:
   a. Lift up the plastic connector door on the controller.



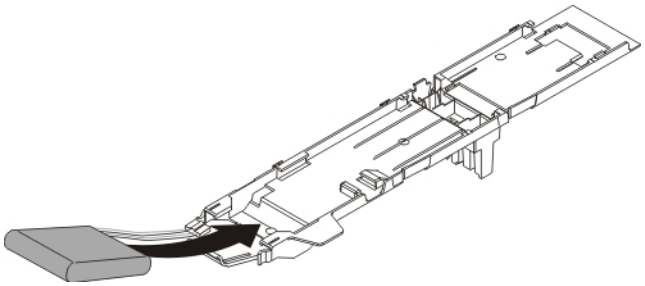
   b. Press down firmly on the flex cable connector to connect it to the external drive flex cable connector on the controller. (For the location of the connector on the controller, see the illustration in “ServeRAID controller connectors” on page 12.)
   c. Close the plastic connector door.
8. Remove the left and right air baffles that are installed over the DIMM connectors.



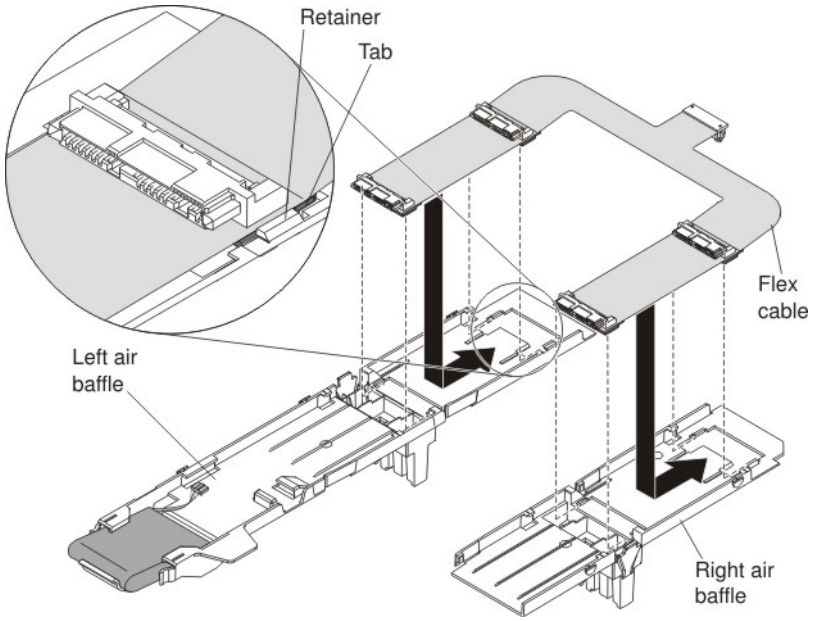
9. Connect the smaller end of the power cable that comes with the enablement kit to the connector underneath the controller (see the illustration). Route the cable along the inside edge of the air baffle.



10. To attach the flash power module to the left air baffle, complete the following steps:
    a. Locate the new left air baffle and the flash power module that come with the enablement kit.
    b. With the flash power module cable out straight, slide the flash power module into the slot under the guides on the end of the air baffle until it snaps into place.

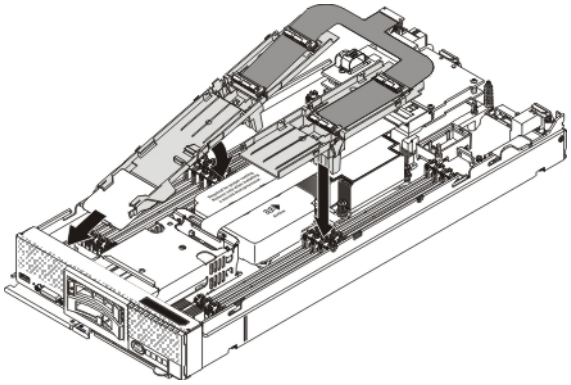


11. To connect the left and right air baffles to the flex cable, complete the following steps.

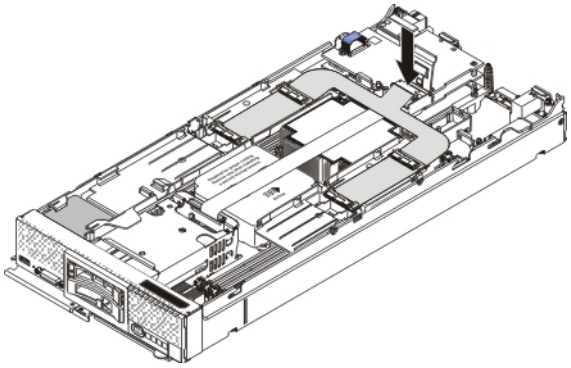


a. On a flat surface, orient the left air baffle, the new right air baffle, and the new flex cable as shown in the illustration.
b. Align the left side of the flex cable on top of the left air baffle, with the tabs on the flex cable (near the solid-state drive connectors) in front of the retainers on the air baffle.
c. Gently press on the flex cable with your thumbs and slide it forward as you slide the tabs into the retainers. The flex cable clicks into place.
d. Repeat steps 11b and 11c to connect the right side of the flex cable to the right air baffle.

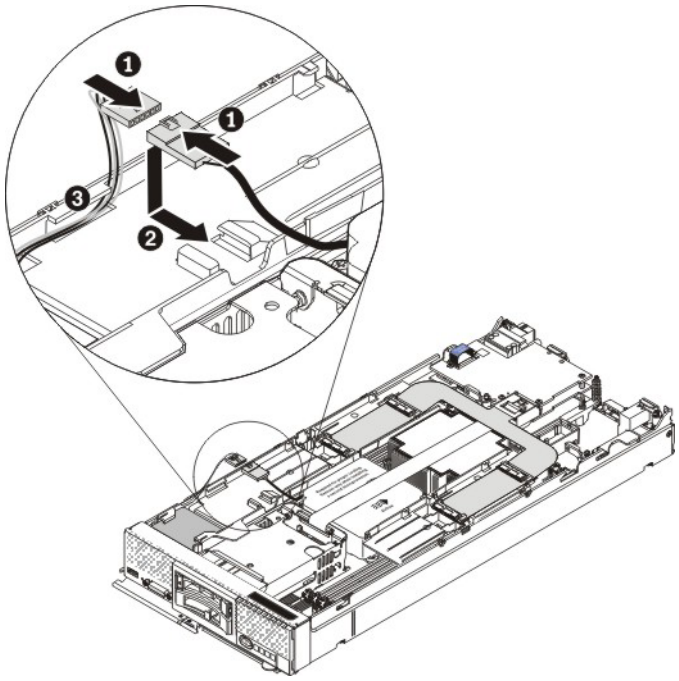
12. Carefully install the air baffles and flex cable in the compute node. Align the air baffle tabs with the notches in the side of the chassis and place the air baffles on top of the DIMMs, making sure that the flex cable connector sits on top of the backplane flex cable that is connected to the controller.



13. Press down firmly on the flex cable connector to connect it to the internal solid-state drive flex cable connector on the controller. (For the location of the connector on the controller, see the illustration in "ServeRAID controller connectors" on page 12.) Close the plastic door.

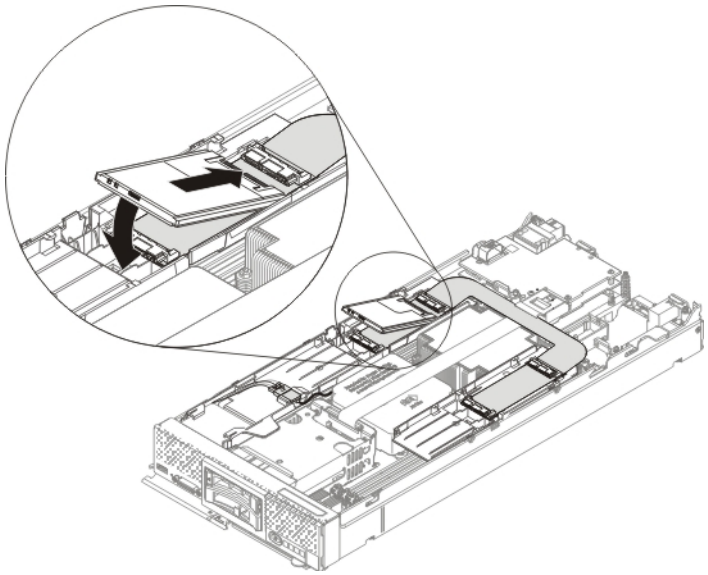


14. Connect the larger end of the power cable to the flash power module cable **1** . Slide the connected cables under the tabs on the air baffle **2** . Then, push the extra power module cable under the lip on the side of the air baffle **3** .



15. Reconnect the hot-swap hard disk drives by sliding them fully into the bay and closing the drive tray handle.
16. Install up to four solid-state drives in the connectors on the flex cable. Slide the solid-state drive into the connector until it is fully seated and carefully rest the solid-state drive on the flex cable.

    Note: Make sure that either a solid-state drive or filler is installed in the front slot on each air baffle.



17. Install the cover on the compute node (see “Installing the compute node cover” on page 8 for instructions).
18. Reinstall the compute node in the same node bay from which you removed it (see “Installing a compute node in a chassis” on page 5 for instructions).

Note: After the compute node is installed, the IMM in the compute node initializes and synchronizes with the CMM. This process takes several minutes, depending on your configuration. The power LED flashes rapidly, and the power button on the compute node does not respond until this process is complete.

19. Turn on the compute node. Make sure that the power LED on the compute node control panel is lit continuously, indicating that the compute node is receiving power and is turned on.
20. Use the Human Interface Infrastructure (HII) to configure the controller. To open the HII, turn on the compute node and when the prompt `<F1> Setup` is displayed, press F1. Then, select **System Settings > Storage > HII**.

    You can also run the WebBIOS Configuration Utility to configure the drive groups and the virtual drives. To run the utility, turn on the compute node and when the message `Press <Ctrl><H> for WebBIOS` is displayed on the screen, immediately press Ctrl+H.

    For detailed information about configuring drive groups and virtual drives, see the *ServeRAID M Software User's Guide* on the *ServeRAID M Documentation* CD.
21. Install the operating-system device driver.

    To view the operating systems that support the controller and to download the latest device drivers, go to http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/. For updates, go to http://www.ibm.com/supportportal/.

    Be sure to use the latest service pack for the operating system and review the readme file that accompanies the device driver. Be sure to install the software device drivers before you operate the controller.

Installing the SSD expansion option and the ServeRAID M5100 Series Flex System Flash Kit for x240

About this task

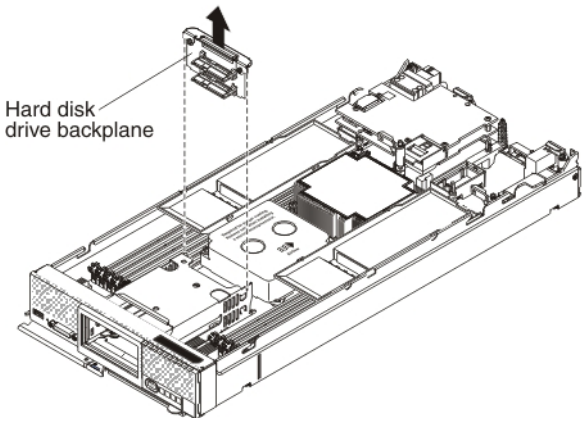
Use the procedure in this section to install the solid-state drive expansion kit option and the ServeRAID M5100 Series Flex System Flash Kit for x240 or the Flash Kit v2 for the x240, at the same time.

To install the solid-state drive expansion option and the Flex System flash kit for x240 or the flash kit v2 for x240, complete the following steps:

Procedure

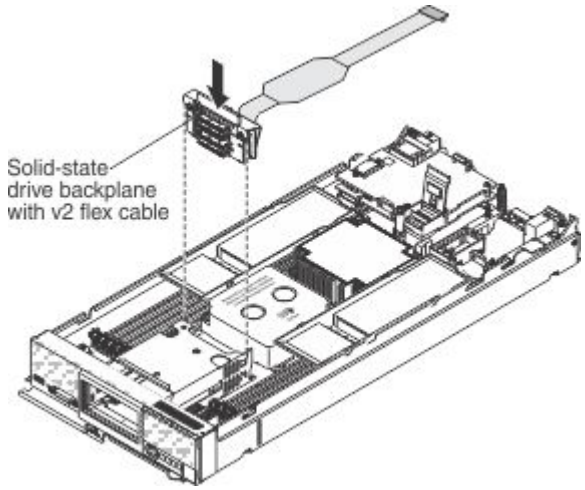
1. Read the safety information that begins on page "Safety" on page v and "Handling static-sensitive devices" on page 3.
2. If you have not already done so, remove the compute node from the chassis and remove the cover. For more information, see "Removing a compute node from a chassis" on page 4 and "Removing the compute node cover" on page 6.
3. Install the ServeRAID M5115 SAS/SATA controller for Flex System. For more information, see "Installing the ServeRAID M5115 SAS/SATA Controller for Flex System" on page 12.
4. Press the release latch (orange) on the hard disk drive to release the drive handle; then, use the drive handle to slide the hard disk drive completely out of the bay. Repeat this step for the other hard disk drive.

5. Grasp the lip on the top of the hard disk drive backplane and lift it out.

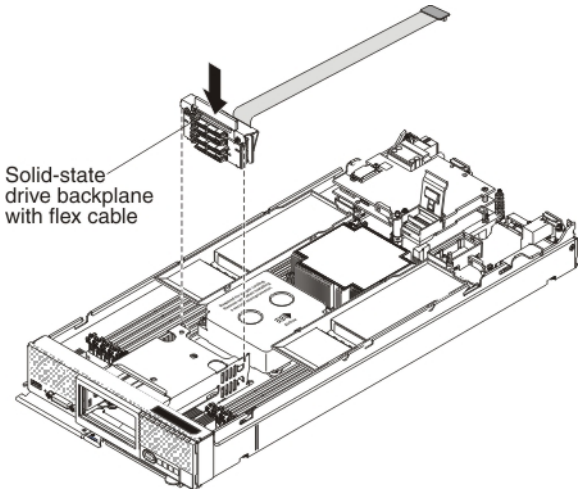


6. To install the new solid-state drive backplane with the flex cable or v2 flex cable, complete the following steps:
   a. Touch the static-protective package that contains the new solid-state drive backplane (comes with the flash kit) to any *unpainted* metal surface on the Flex System chassis or any *unpainted* metal surface on any other grounded rack component; then, remove the backplane from the package.

      For the Flash Kit v2 for the x240:

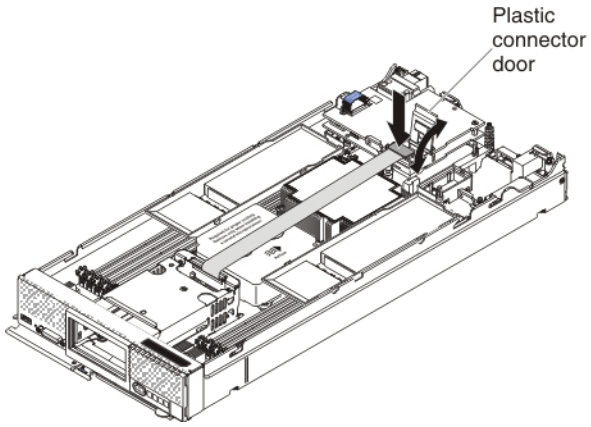


      For the Flash Kit for x240:

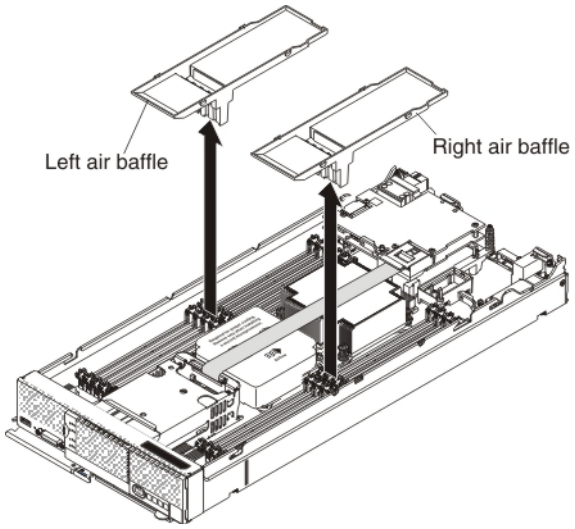


b. Align the new backplane with the hard disk drive cage and the connector on the system board and press the backplane into position until it is fully seated in the connector.

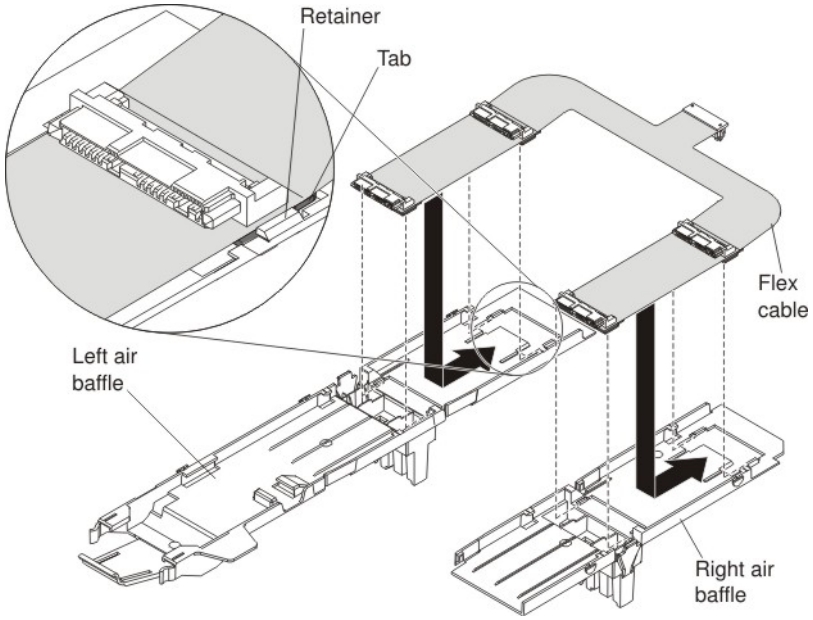
7. To connect the flex cable (or v2 flex cable for the x240 only) that is attached to the solid-state drive backplane to the controller connector, complete the following steps:
   a. Lift up the plastic connector door on the controller.



   b. Press down firmly on the flex cable connector to connect it to the external drive flex cable connector on the controller. (For the location of the connector on the controller, see the illustration in “ServeRAID controller connectors” on page 12.)
   c. Close the plastic connector door.
8. Remove the left and right air baffles that are installed over the DIMM connectors.

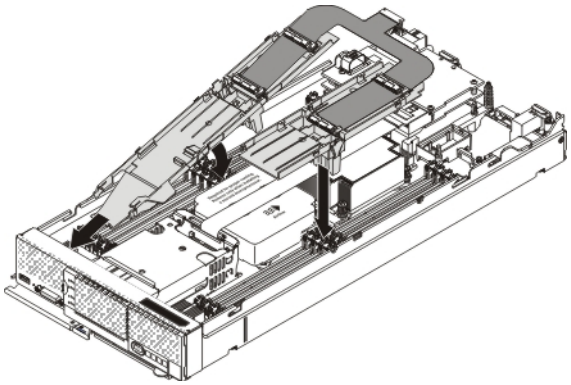


9. To connect the new left and right air baffles to the flex cable, complete the following steps.

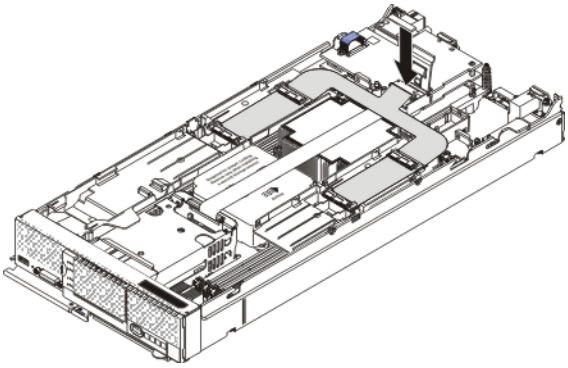


   a. On a flat surface, orient the left air baffle, the new right air baffle, and the new flex cable as shown in the illustration.
   b. Align the left side of the flex cable on top of the left air baffle, with the tabs on the flex cable (near the solid-state drive connectors) in front of the retainers on the air baffle.
   c. Gently press on the flex cable with your thumbs and slide it away from you as you slide the tabs into the retainers. The flex cable clicks into place.
   d. Repeat steps 9b and 9c to connect the right side of the flex cable to the right air baffle.

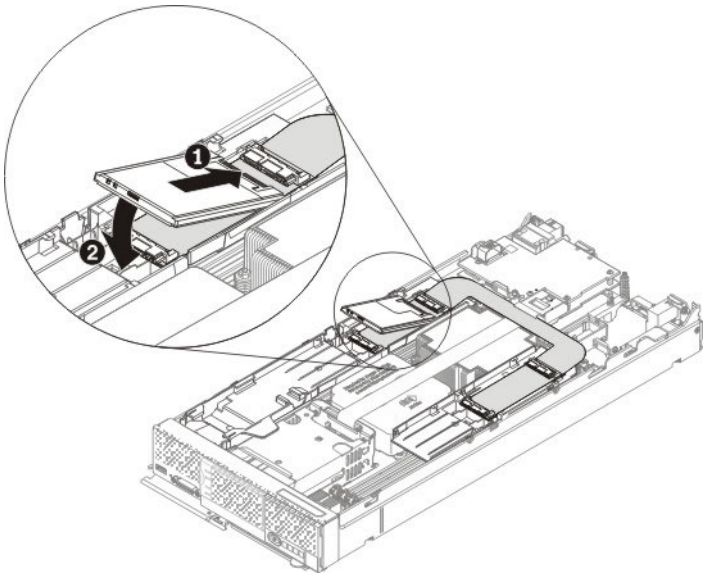
10. Carefully install the air baffles and flex cable in the compute node. Align the air baffle tabs with the notches in the side of the chassis and place the air baffles on top of the DIMMs, making sure that the flex cable connector sits on top of the backplane flex cable that is connected to the controller.



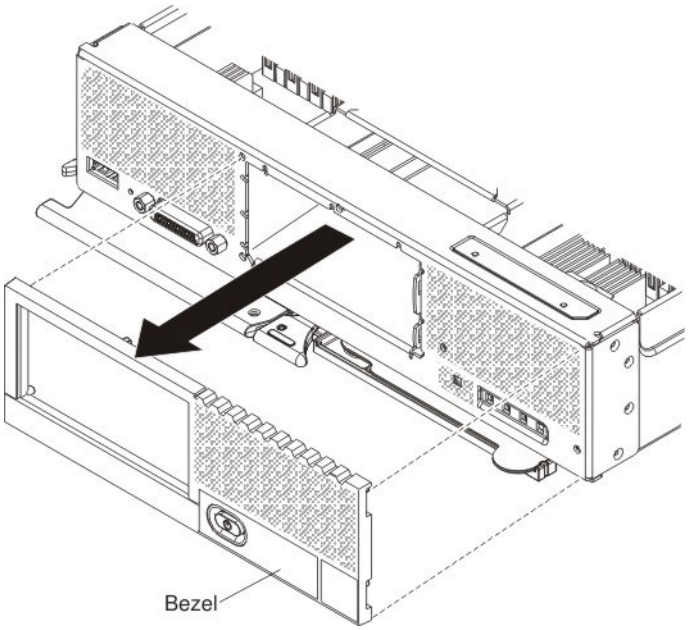
11. Press down firmly on the flex cable connector to connect it to the internal solid-state drive flex cable connector on the controller. (For the location of the connector on the controller, see the illustration in “ServeRAID controller connectors” on page 12.) Close the plastic door.



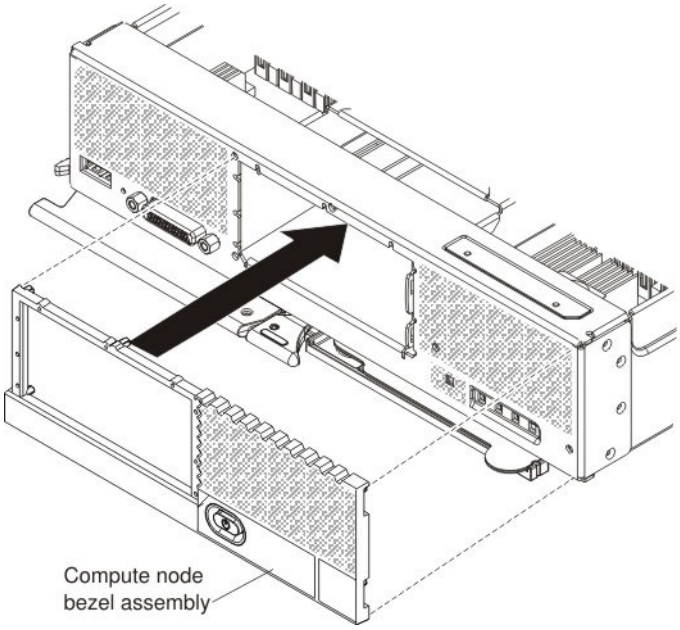
12. Install up to four solid-state drives in the connectors on the flex cable. Slide the solid-state drive into the connector until it is fully seated **1** and carefully lower the drive **2** so that it rests flat on the flex cable.



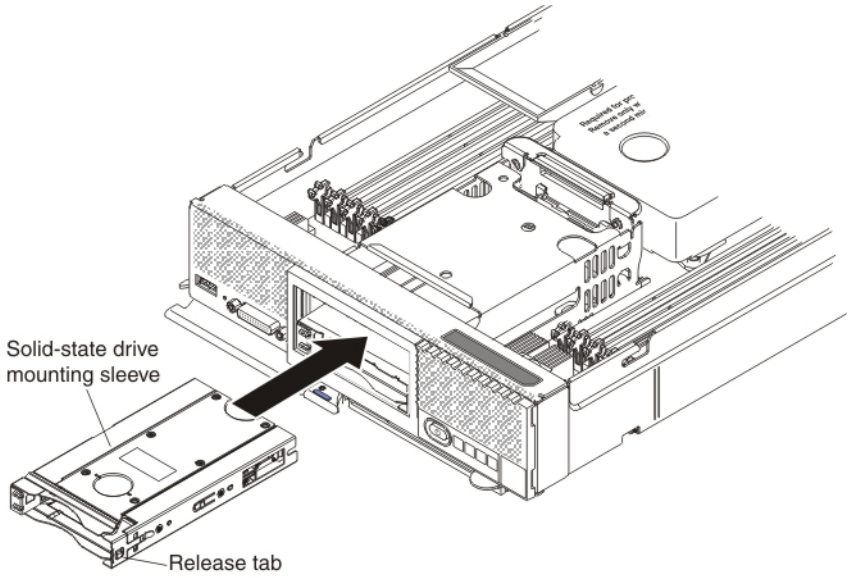
13. Remove the compute node bezel. You will install the new compute node bezel assembly in the next step.



14. Install the new compute node bezel assembly that comes in the option kit. The larger opening in the new bezel enables you to correctly install the solid-state drive mounting sleeves.



15. To install the two solid-state drive mounting sleeves that come with the option, complete the following steps:
    a. Make sure that the two retention levers on the front of the solid-state drive mounting sleeve are closed.



b. Slide the solid-state drive mounting sleeve into the drive bay until it is fully seated.

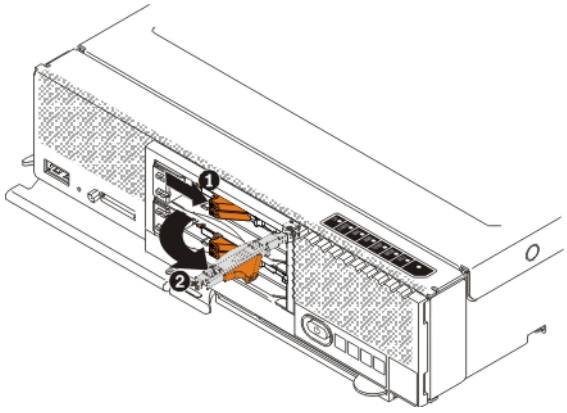
c. Repeat this step to install the second solid-state drive mounting sleeve.

16. Install the cover on the compute node (see "Installing the compute node cover" on page 8 for instructions).

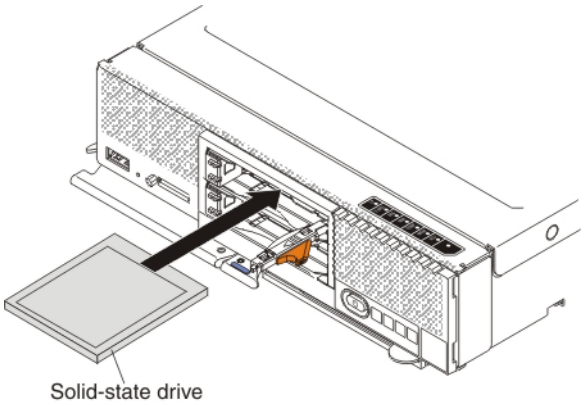
17. To install up to four solid-state drives or fillers in the solid-state drive mounting sleeve (two drives per sleeve), complete the following steps:

a. Touch the static-protective package that contains the new solid-state drive to any *unpainted* metal surface on the Flex System chassis or any *unpainted* metal surface on any other grounded rack component; then, remove the solid-state drive from the package.

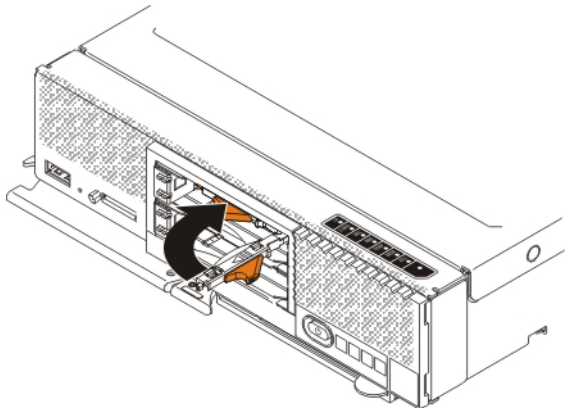
b. Press the mounting sleeve release latch to the right **1** and rotate the loose end of the retention lever away from the compute node **2**.



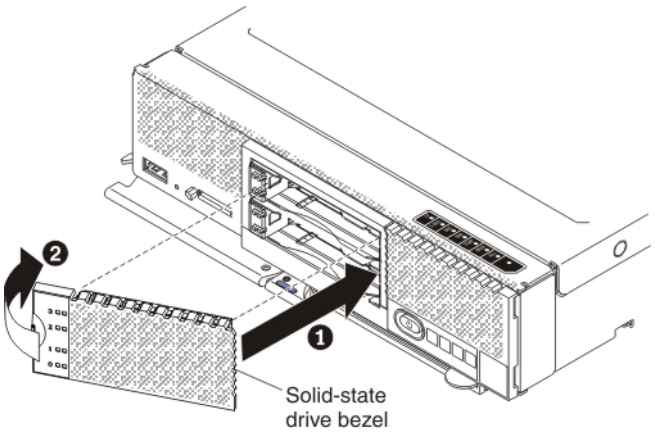
c. Slide the solid-state drive all the way into the mounting sleeve until it is fully seated.



d. Rotate the retention lever toward the compute node until it clicks closed.



18. Install the new solid-state drive bezel that comes in the option kit. Align the bezel with the front of the drive bay and press the right side of the bezel onto the chassis **1** ; then, rotate the left side of the bezel toward the chassis and press it into place **2** .



19. Reinstall the compute node in the same node bay from which you removed it (see “Installing a compute node in a chassis” on page 5 for instructions).

Note: After the compute node is installed, the IMM in the compute node initializes and synchronizes with the CMM. This process takes several minutes, depending on your configuration. The power LED flashes rapidly, and the power button on the compute node does not respond until this process is complete.

20. Turn on the compute node. Make sure that the power LED on the compute node control panel is lit continuously, indicating that the compute node is receiving power and is turned on.
21. Use the Human Interface Infrastructure (HII) to configure the controller. To open the HII, turn on the compute node and when the prompt `<F1> Setup` is displayed, press F1. Then, select **System Settings > Storage > HII**.

    You can also run the WebBIOS Configuration Utility to configure the drive groups and the virtual drives. To run the utility, turn on the compute node and when the message `Press <Ctrl><H> for WebBIOS` is displayed on the screen, immediately press Ctrl+H.

    For detailed information about configuring drive groups and virtual drives, see the *ServeRAID M Software User's Guide* on the *ServeRAID M Documentation* CD.
22. Install the operating-system device driver.

    To view the operating systems that support the controller and to download the latest device drivers, go to http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/. For updates, go to http://www.ibm.com/supportportal/.

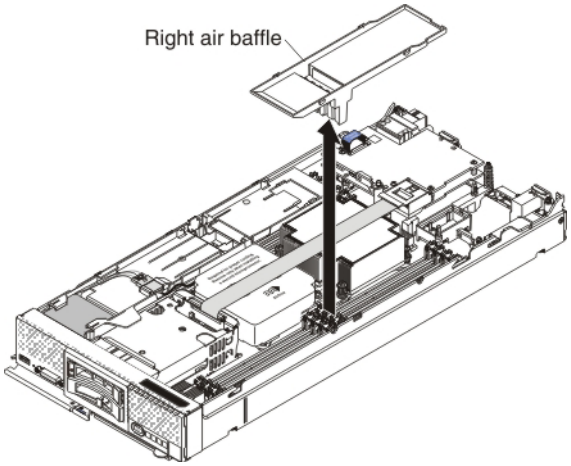
    Be sure to use the latest service pack for the operating system and review the readme file that accompanies the device driver. Be sure to install the software device drivers before you operate the controller.

Installing the SSD expansion option with a previously installed Enablement Kit for x240

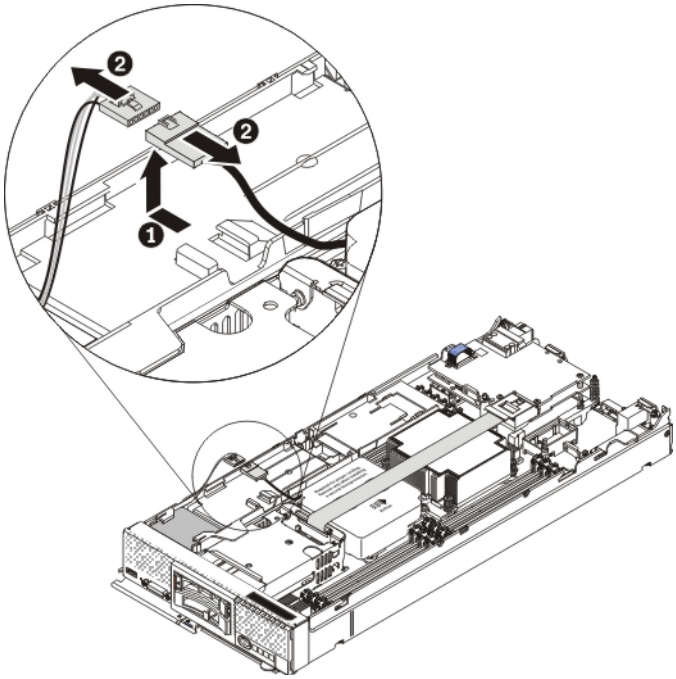
Use the procedure in this section to install the solid-state drive expansion kit option if a ServeRAID M5100 Series Enablement Kit for Flex System is already installed in the compute node.

To install the solid-state drive expansion option, complete the following steps:

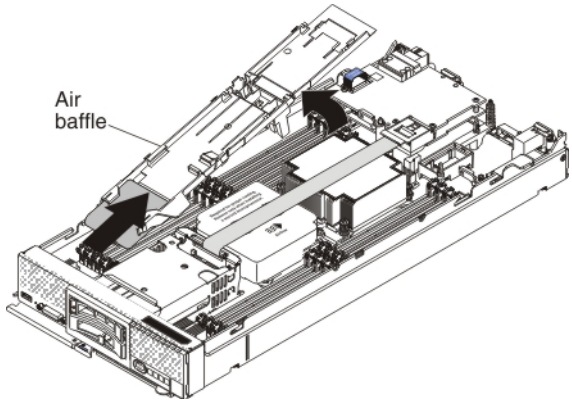
1. Read the safety information that begins on page "Safety" on page v and "Handling static-sensitive devices" on page 3.
2. If you have not already done so, remove the compute node from the chassis and remove the cover. For more information, see "Removing a compute node from a chassis" on page 4 and "Removing the compute node cover" on page 6.
3. Remove the right air baffle that is installed over the right DIMM connectors.



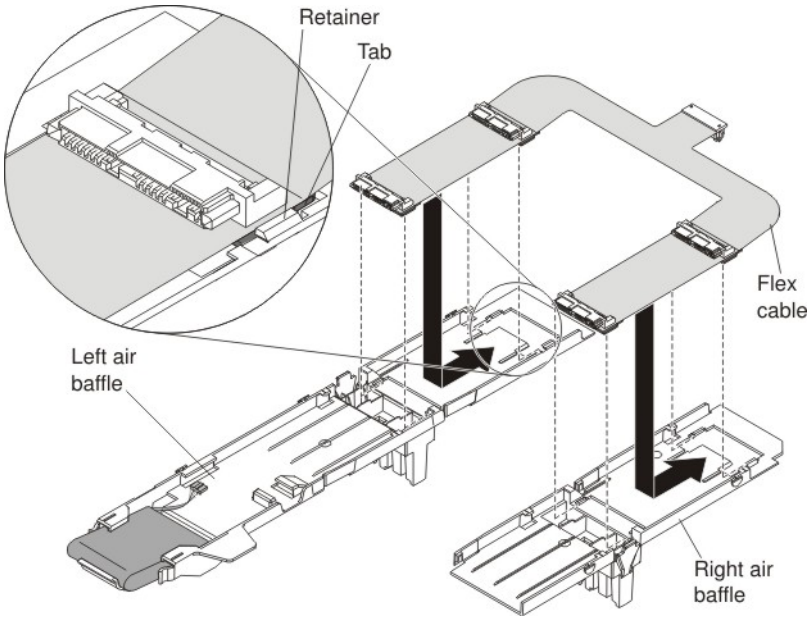
4. To remove the left air baffle, complete the following steps:
   a. Slide the connected power cable and flash power module cable out from the tabs on the air baffle **1**.



   b. Disconnect the power cable from the flash power module cable **2**.
   c. Carefully remove the left air baffle by unlatching the tab on the side wall and lifting the air baffle up and toward the back of the compute node. You will use the left air baffle in the next step.



5. To connect the left and right air baffles to the flex cable, complete the following steps.



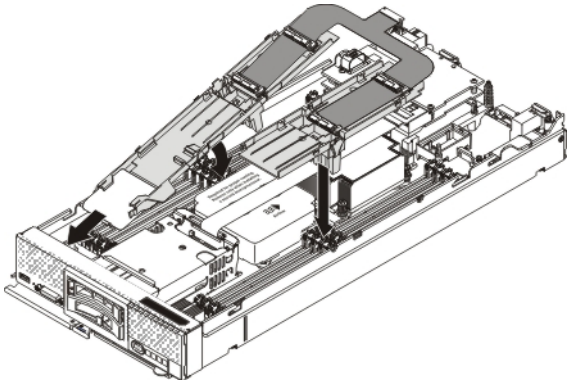
a. On a flat surface, orient the left air baffle, the new right air baffle, and the new flex cable as shown in the illustration.

b. Align the left side of the flex cable on top of the left air baffle, with the tabs on the flex cable (near the solid-state drive connectors) in front of the retainers on the air baffle.

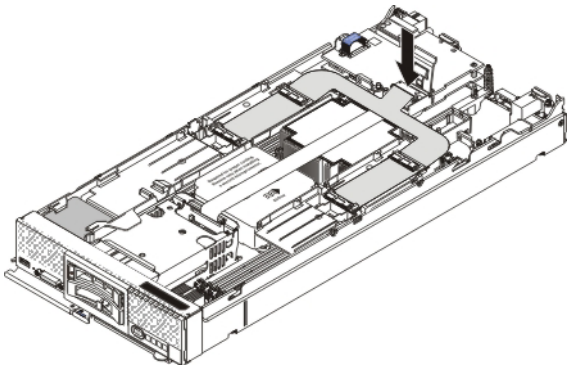
c. Gently press on the flex cable with your thumbs and slide it away from you as you slide the tabs into the retainers. The flex cable clicks into place.

d. Repeat steps 5b and 5c to connect the right side of the flex cable to the right air baffle.

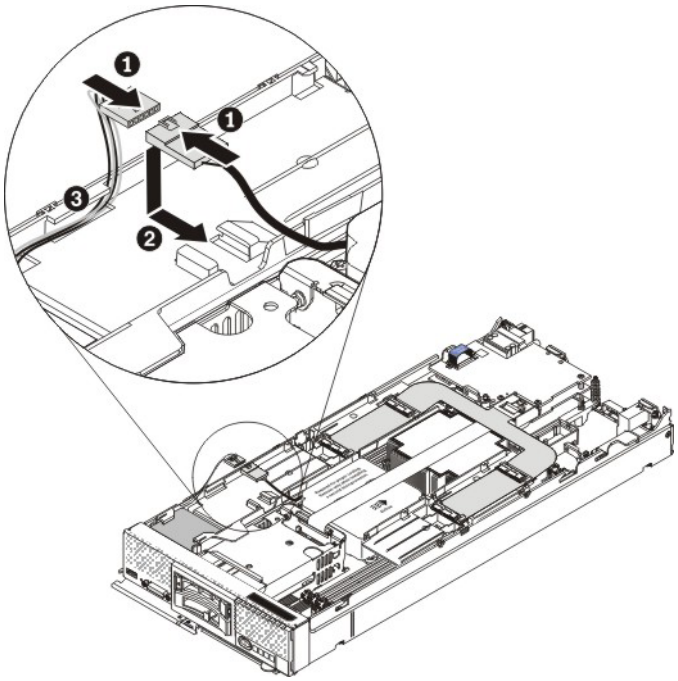
6. Carefully install the air baffles and flex cable in the compute node. Align the air baffle tabs with the notches in the side of the chassis and place the air baffles on top of the DIMMs, making sure that the flex cable connector sits on top of the backplane flex cable that is connected to the controller.



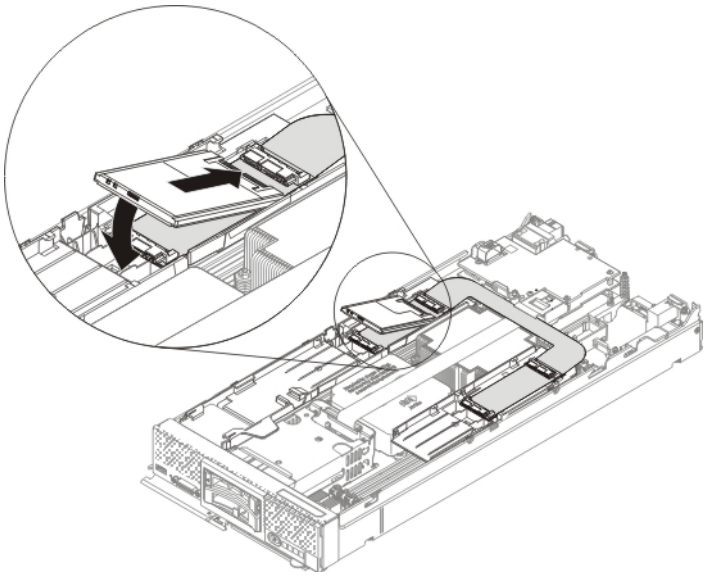
7. Press down firmly on the flex cable connector to connect it to the internal solid-state drive flex cable connector on the controller. (For the location of the connector on the controller, see the illustration in “ServeRAID controller connectors” on page 12.) Close the plastic door.



8. Connect the larger end of the power cable to the flash power module cable **1** . Slide the connected cables under the tabs on the air baffle **2** . Then, push the extra power module cable under the lip on the side of the air baffle **3** .



9. Install up to four solid-state drives in the connectors on the flex cable. Slide the solid-state drive into the connector until it is fully seated and carefully rest the solid-state drive on the flex cable.



10. Install the cover on the compute node (see “Installing the compute node cover” on page 8 for instructions).
11. Reinstall the compute node in the same node bay from which you removed it (see “Installing a compute node in a chassis” on page 5 for instructions).

    Note: After the compute node is installed, the IMM in the compute node initializes and synchronizes with the CMM. This process takes several minutes, depending on your configuration. The power LED flashes rapidly, and the power button on the compute node does not respond until this process is complete.
12. Turn on the compute node. Make sure that the power LED on the compute node control panel is lit continuously, indicating that the compute node is receiving power and is turned on.
13. Use the Human Interface Infrastructure (HII) to configure the controller. To open the HII, turn on the compute node and when the prompt `<F1> Setup` is displayed, press F1. Then, select **System Settings > Storage > HII**.

    You can also run the WebBIOS Configuration Utility to configure the drive groups and the virtual drives. To run the utility, turn on the compute node and when the message `Press <Ctrl><H> for WebBIOS` is displayed on the screen, immediately press Ctrl+H.

    For detailed information about configuring drive groups and virtual drives, see the *ServeRAID M Software User's Guide* on the *ServeRAID M Documentation* CD.
14. Install the operating-system device driver.

    To view the operating systems that support the controller and to download the latest device drivers, go to http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/. For updates, go to http://www.ibm.com/supportportal/.

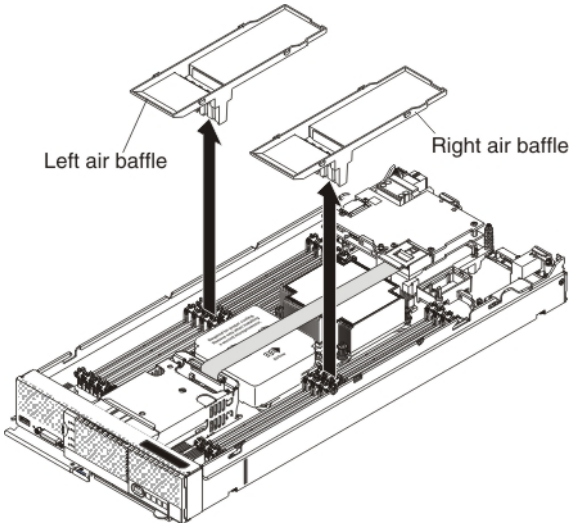
    Be sure to use the latest service pack for the operating system and review the readme file that accompanies the device driver. Be sure to install the software device drivers before you operate the controller.

Installing the SSD expansion option with a previously installed Flex System Flash Kit for x240

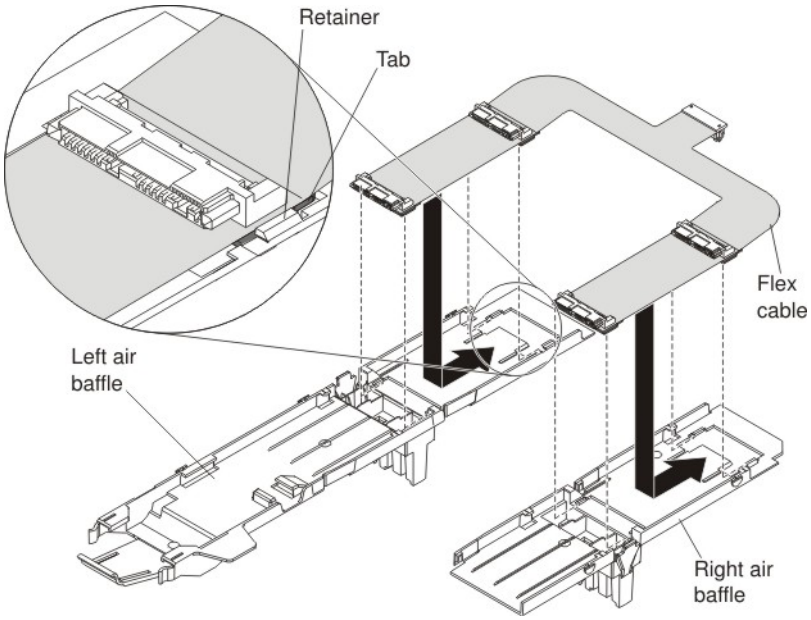
Use the procedure in this section to install the solid-state drive expansion kit option if a ServeRAID M5100 Series Flex System Flash Kit is already installed in the compute node.

To install the solid-state drive expansion option, complete the following steps:

1. Read the safety information that begins on page "Safety" on page v and "Handling static-sensitive devices" on page 3.
2. If you have not already done so, remove the compute node from the chassis and remove the cover. For more information, see "Removing a compute node from a chassis" on page 4 and "Removing the compute node cover" on page 6.
3. Remove the left and right air baffles that are installed over the DIMM connectors.

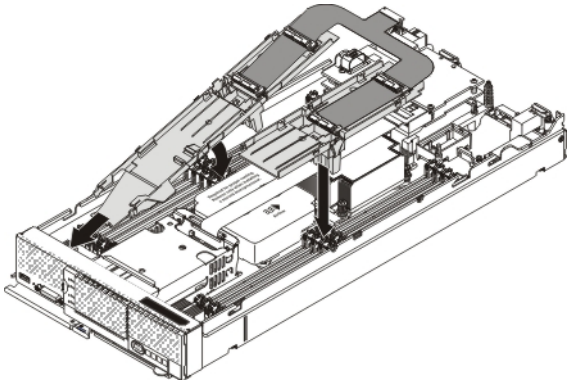


4. To connect the new left and right air baffles to the flex cable, complete the following steps.

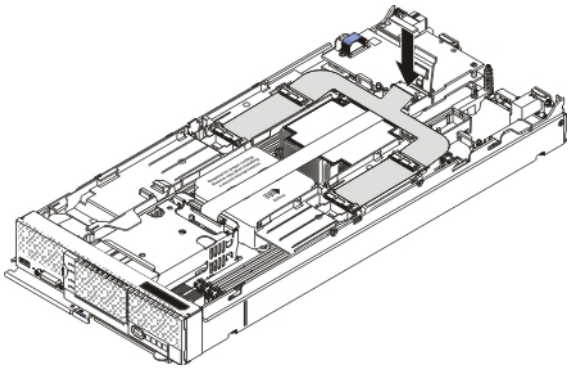


a. On a flat surface, orient the left air baffle, new right air baffle, and the new flex cable as shown in the illustration.
b. Align the left side of the flex cable on top of the left air baffle, with the tabs on the flex cable (near the solid-state drive connectors) in front of the retainers on the air baffle.
c. Gently press on the flex cable with your thumbs and slide it away from you as you slide the tabs into the retainers. The flex cable clicks into place.
d. Repeat steps 4b and 4c to connect the right side of the flex cable to the right air baffle.

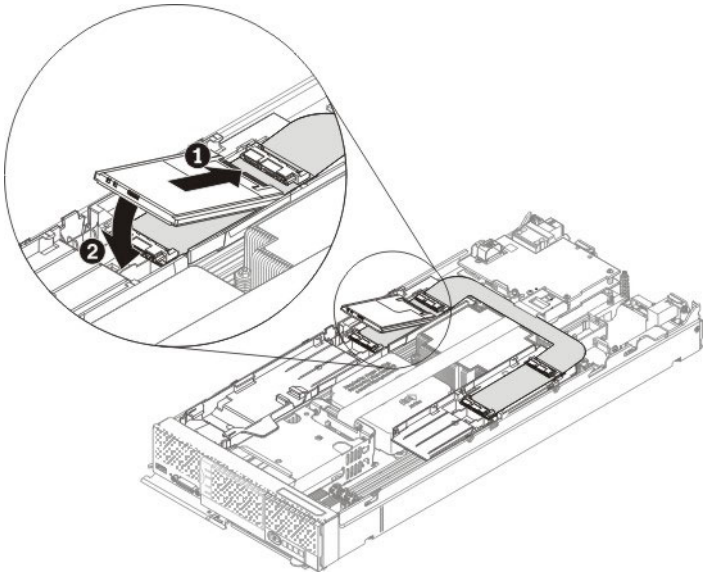
5. Carefully install the air baffles and flex cable in the compute node. Align the air baffle tabs with the notches in the side of the chassis and place the air baffles on top of the DIMMs, making sure that the flex cable connector sits on top of the backplane flex cable that is connected to the controller.



6. Press down firmly on the flex cable connector to connect it to the internal solid-state drive flex cable connector on the controller. (For the location of the connector on the controller, see the illustration in “ServeRAID controller connectors” on page 12.) Close the plastic door.



7. Install up to four solid-state drives in the connectors on the flex cable. Slide the solid-state drive into the connector until it is fully seated **1** and carefully lower the drive **2** so that it rests flat on the flex cable.



8. Install the cover on the compute node (see “Installing the compute node cover” on page 8 for instructions).
9. Reinstall the compute node in the same node bay from which you removed it (see “Installing a compute node in a chassis” on page 5 for instructions).

   Note: After the compute node is installed, the IMM in the compute node initializes and synchronizes with the CMM. This process takes several minutes, depending on your configuration. The power LED flashes rapidly, and the power button on the compute node does not respond until this process is complete.
10. Turn on the compute node. Make sure that the power LED on the compute node control panel is lit continuously, indicating that the compute node is receiving power and is turned on.
11. Use the Human Interface Infrastructure (HII) to configure the controller. To open the HII, turn on the compute node and when the prompt `<F1> Setup` is displayed, press F1. Then, select **System Settings > Storage > HII**.

    You can also run the WebBIOS Configuration Utility to configure the drive groups and the virtual drives. To run the utility, turn on the compute node and when the message `Press <Ctrl><H> for WebBIOS` is displayed on the screen, immediately press Ctrl+H.

For detailed information about configuring drive groups and virtual drives, see the *ServeRAID M Software User's Guide* on the *ServeRAID M Documentation* CD.

12. Install the operating-system device driver.

    To view the operating systems that support the controller and to download the latest device drivers, go to http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/. For updates, go to http://www.ibm.com/supportportal/.

    Be sure to use the latest service pack for the operating system and review the readme file that accompanies the device driver. Be sure to install the software device drivers before you operate the controller.

Replaceable components

About this task

Field replaceable units (FRUs) must be replaced only by a trained service technician, unless they are classified as customer replaceable units (CRUs).

Tier 1 CRU: Replacement of Tier 1 CRUs is your responsibility. If Lenovo installs a Tier 1 CRU at your request without a service contract, you will be charged for the installation.

For more information about the terms of the warranty and getting service and assistance, see the *Warranty Information* document that comes with the optional device.

Table 6. Field replaceable units for the ServeRAID M5100 Series SSD Expansion Kit for x240

Description	CRU part number (Tier 1)
Enablement kit left air baffle (Flex System x240)	00D5080
Enablement kit right air baffle (Flex System x240)	00D5081
Internal solid-state drive flex cable (U-shaped)	00D5078
Solid-state drive filler	49Y4936

For the field replaceable units for the ServeRAID M5115 SAS/SATA Controller for Flex System, see Table 1 on page 13.

For the field replaceable units for the ServeRAID M5100 Series Enablement Kit for Flex System, see Table 2 on page 23.

For the field replaceable units for the ServeRAID M5100 Series Flex System Flash Kit for Flex System, see Table 4 on page 54.

Removing and replacing the U-shaped solid-state drive flex cable

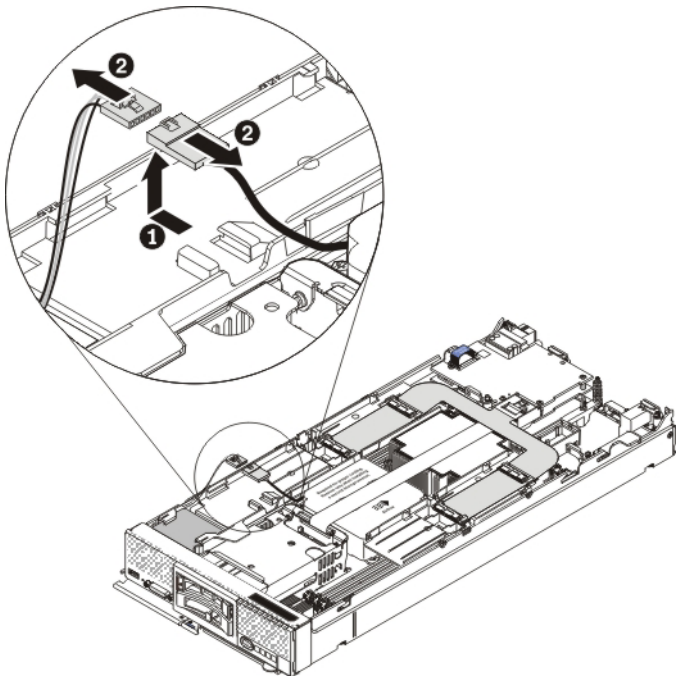
About this task

To remove and replace the internal solid-state drive flex cable (U-shaped), complete the following steps:

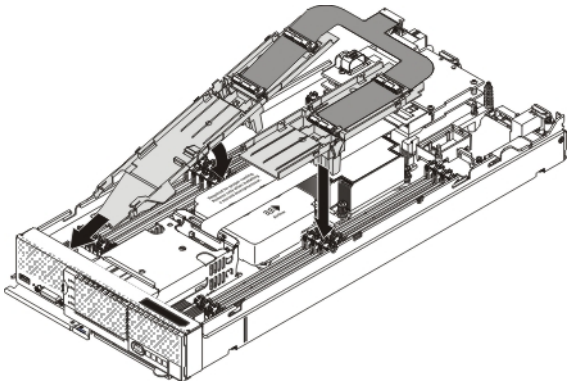
Procedure

1. Read the safety information that begins on page "Safety" on page v and "Handling static-sensitive devices" on page 3.

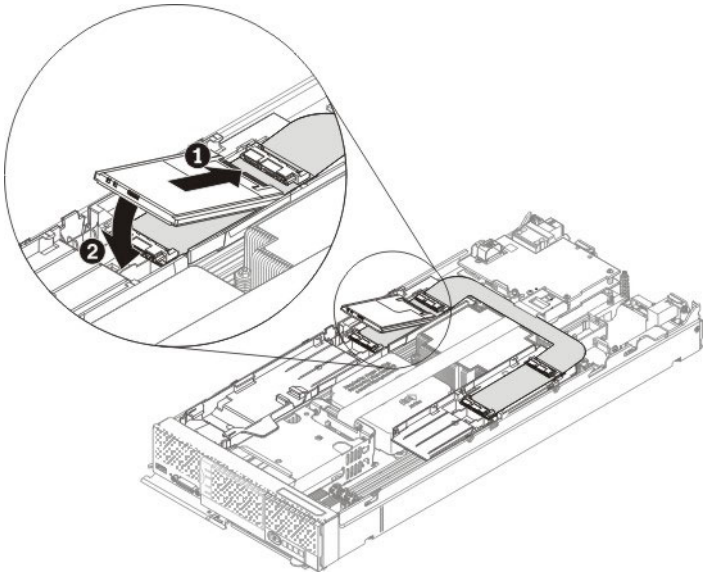
2. If you have not already done so, remove the compute node from the chassis and remove the cover. For more information, see “Removing a compute node from a chassis” on page 4 and “Removing the compute node cover” on page 6.
3. Remove the four solid-state drives that are connected to the solid-state drive flex cable inside the compute node.
4. Open the plastic door cover on the ServeRAID controller and disconnect the solid-state drive flex cable.
5. If the Enablement Kit for Flex System is installed, slide the connected power cable and flash power module cable out from the tabs on the air baffle **1**. Then, disconnect the power cable from the flash power module cable **2**.



6. Remove the air baffles with the attached U-shaped flex cable by unlatching the tabs on the side wall. If the left air baffle contains a flash power module, lift the air baffle up and toward the back of the compute node.
7. Press on the flex cable and slide it away from the air baffles to detach it.
8. Touch the static-protective package that contains the new solid-state drive flex cable to any *unpainted* metal surface on the Flex System chassis or any *unpainted* metal surface on any other grounded rack component; then, remove the flex cable from the package.
9. Attach the solid-state drive flex cable to the left and right air baffles.
10. Carefully install the air baffles and flex cable in the compute node.



11. Press down firmly on the flex cable connector to connect it to the internal solid-state drive flex cable connector on the controller. (For the location of the connector on the controller, see the illustration in “ServeRAID controller connectors” on page 12.)
12. Reinstall the solid-state drives in the connectors on the flex cable. Slide the solid-state drive into the connector until it is fully seated **1** and carefully lower the drive **2** so that it rests flat on the flex cable.



13. Install the cover on the compute node (see “Installing the compute node cover” on page 8 for instructions).
14. Reinstall the compute node in the same node bay from which you removed it (see “Installing a compute node in a chassis” on page 5 for instructions).

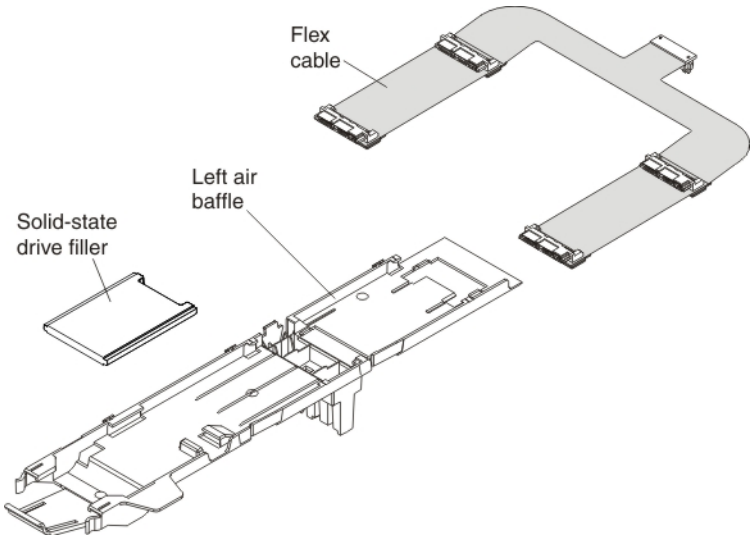
    Note: After the compute node is installed, the IMM in the compute node initializes and synchronizes with the CMM. This process takes several minutes, depending on your configuration. The power LED flashes rapidly, and the power button on the compute node does not respond until this process is complete.
15. Turn on the compute node. Make sure that the power LED on the compute node control panel is lit continuously, indicating that the compute node is receiving power and is turned on.

Chapter 8. Installing the ServeRAID M5100 Series SSD Expansion Kit for x440

This chapter describes how to install the ServeRAID M5100 Series SSD Expansion Kit for x440.

Parts that come in the solid-state drive expansion kit for x440

The following illustration shows the parts that come in the solid-state drive expansion kit.



The solid-state drive expansion kit provides the capability to install up to four solid-state drives inside the compute node. By using a special flex cable, the solid-state drives connect to the ServeRAID M5115 SAS/SATA controller.

For instructions for installing the solid-state drive expansion kit, see one of the following sections, depending on your configuration:

- "Installing the SSD expansion option and the Enablement Kit for x440" on page 104
- "Installing the SSD expansion option and the ServeRAID M5100 Series Flex System Flash Kit for x440" on page 113
- "Installing the SSD expansion option with a previously installed Enablement Kit for x440" on page 121
- "Installing the SSD expansion option with a previously installed Flex System Flash Kit for x440" on page 126

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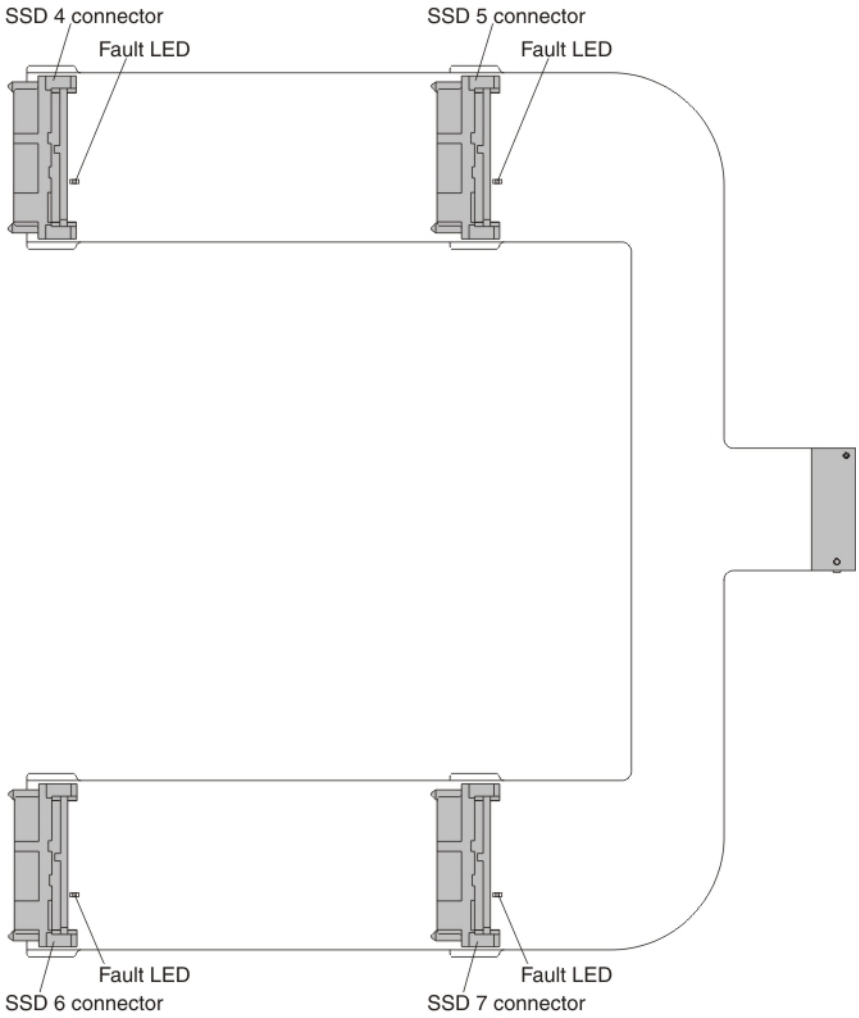
Internal solid-state drive flex cable connectors and LEDs

The following illustration shows the connectors and LEDs on the flex cable.



SSD connectors

You can connect one solid-state drive to each of the four connectors.

Fault LED

When this yellow LED is lit, it indicates that the associated solid-state drive has failed. Replace the solid-state drive.

Installing the SSD expansion option and the Enablement Kit for x440

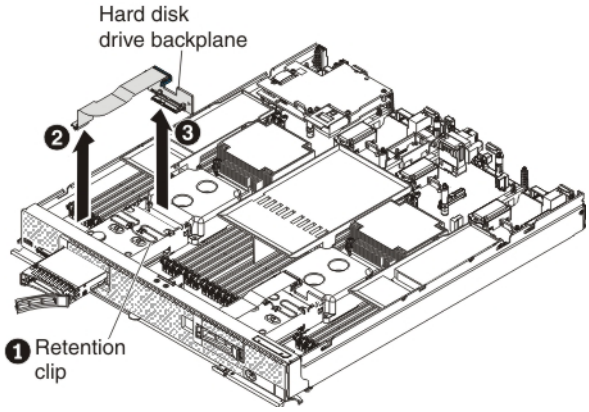
About this task

Use the procedure in this section to install the ServeRAID M5100 Series SSD Expansion Kit for x440 option and the ServeRAID M5100 Series Enablement Kit for x440 at the same time.

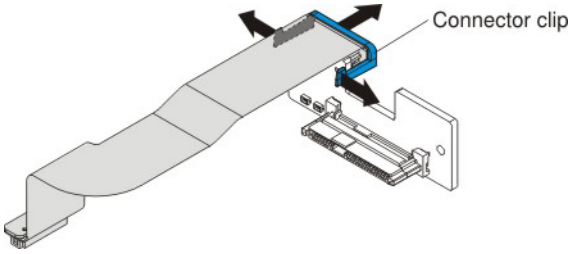
To install the solid-state drive expansion option and the enablement kit, complete the following steps:

Procedure

1. Read the safety information that begins on page "Safety" on page v and "Handling static-sensitive devices" on page 3.
2. If you have not already done so, remove the compute node from the chassis and remove the cover. For more information, see "Removing a compute node from a chassis" on page 4 and "Removing the compute node cover" on page 6.
3. Install the ServeRAID M5115 SAS/SATA controller for Flex System. For more information, see "Installing the ServeRAID M5115 SAS/SATA Controller for Flex System" on page 12.
4. Press the release latch (orange) on the hard disk drive to release the drive handle; then, use the drive handle to slide the hard disk drive approximately 12 mm (0.5 in.) out of the bay. Repeat this step for the other hard disk drive.
5. Remove the hard disk drive backplanes:
   a. Push the metal retention clip on the hard disk drive cage toward the rear of the compute node to release it from under the tab; then, slide the metal retention clip toward the front of the compute node to release the hard disk drive backplane **1**.



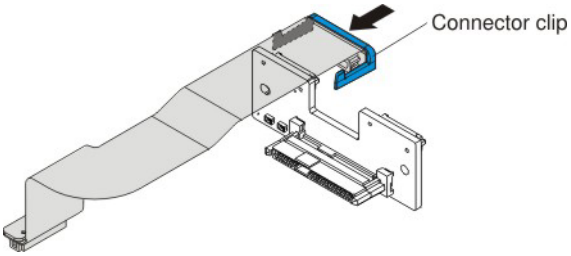
   b. Disconnect the hard disk drive backplane cable from the system board **2**.
   c. Rotate the hard disk drive backplane toward the front of the compute node and away from the pins on the drive cage; then, lift it out of the compute node. **3**.
   d. To disconnect the cable from the hard disk drive backplane that you removed, pull the connector clip away from the cable to unhook the clip from the backplane as you push the cable connector toward the rear of the compute node.



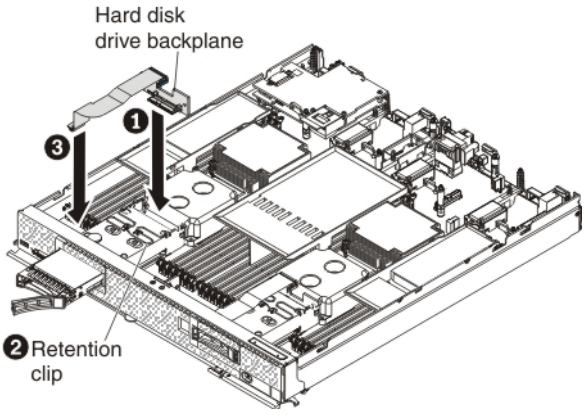
   e. Repeat step 5a to step 5d to remove the second hard disk drive backplane.
6. Install the new hard disk drive backplanes:
   a. Touch the static-protective package that contains the new hard disk drive backplane (comes with the enablement kit) to any *unpainted* metal surface

on the Flex System chassis or any *unpainted* metal surface on any other grounded rack component; then, remove the backplane from the package.

b. To connect the backplane cable to the new hard disk drive backplane, hold open the connector clip while you push the cable connector into the backplane cable connector. Make sure that the connector clip clicks into place around the backplane.



c. Align the new hard disk drive backplane as shown in the following illustration **1** . Place the backplane into the notch at the rear of the drive cage and rotate the backplane toward the rear of the compute node. Make sure that the two pins at the rear of the drive cage are in the two holes on the backplane and that the backplane is flush with the drive cage.

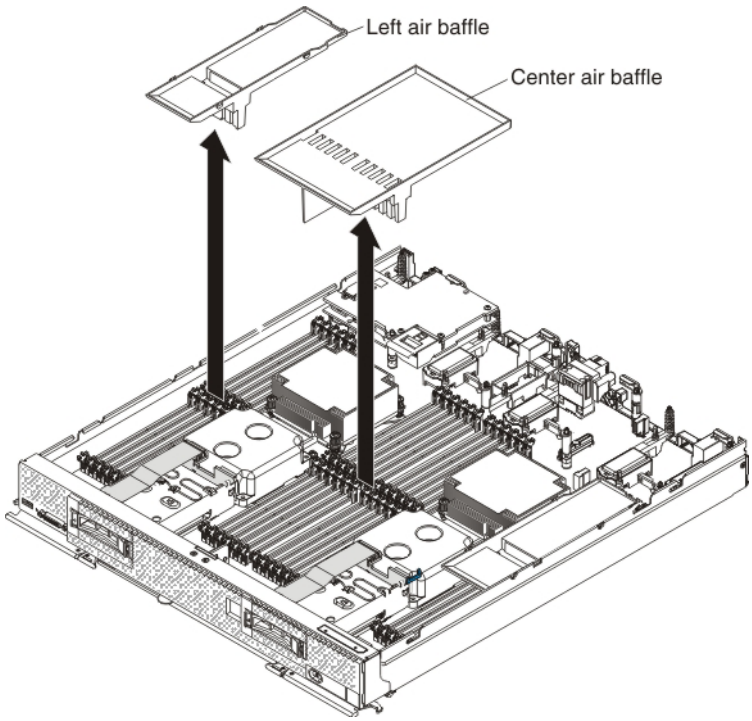


d. Push the metal retention clip on the hard disk drive cage toward the rear of the compute node and under the tab to secure the backplane **2** .

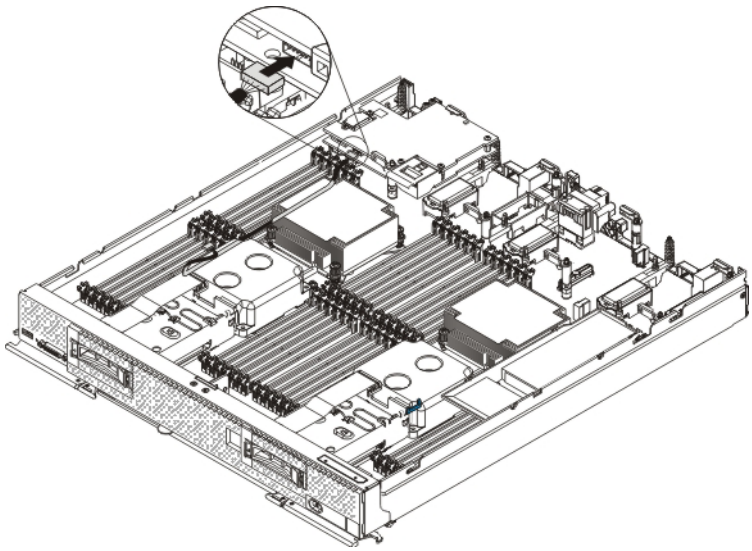
e. Connect the hard disk drive backplane cable to the system board **3** .

f. Repeat step 6a on page 105 to step 6e to install the second hard disk drive backplane.

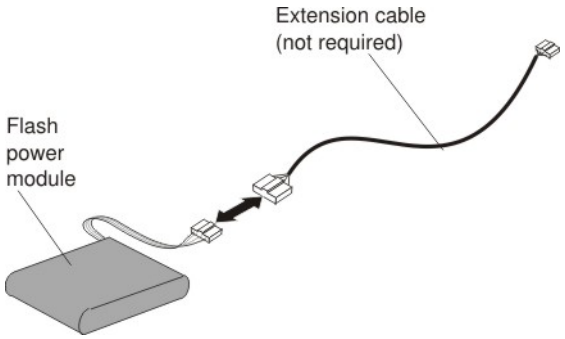
7. Remove the left and center air baffles as shown in the following illustration.



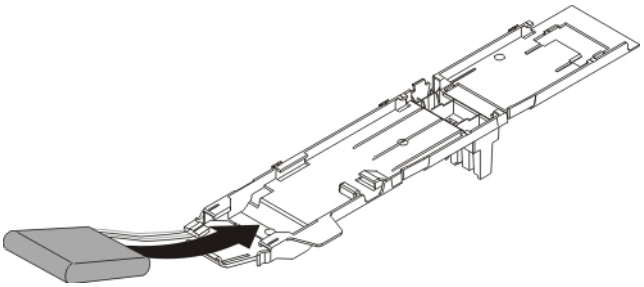
8. Connect the smaller end of the power cable that comes with the enablement kit to the connector underneath the controller (see the illustration). Route the cable through the space between the DIMMS and the microprocessor heat sinks.



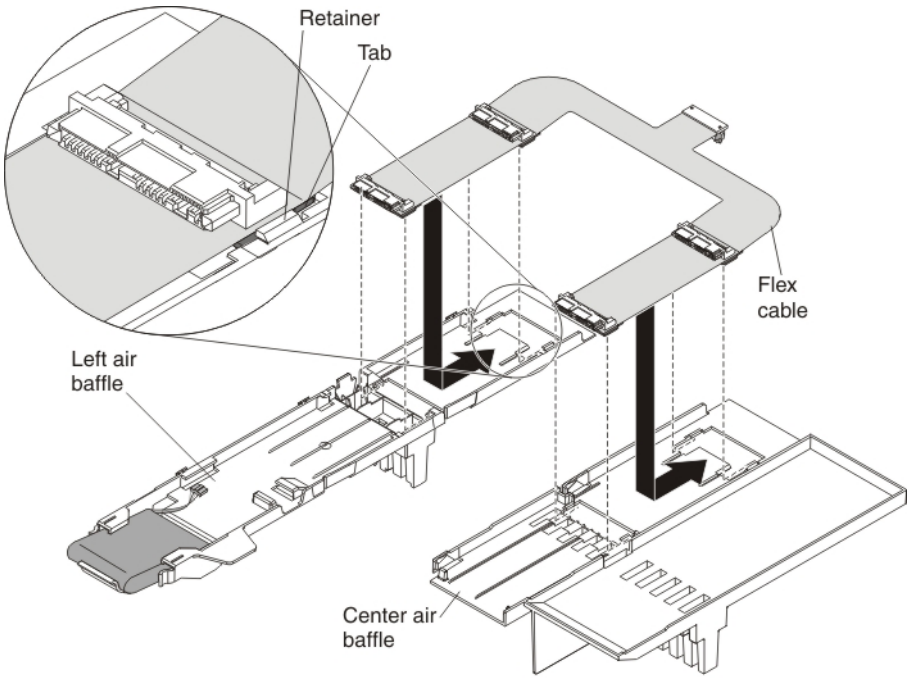
9. To attach the flash power module to the air baffle, complete the following steps:
   a. Remove the new air baffle and the flash power module that come with the enablement kit from the packaging.
   b. Remove the extension cable from the flash power module cable. The extension cable comes with the flash power module but is not required for this procedure.



c. With the flash power module cable out straight, slide the flash power module into the slot under the guides on the end of the air baffle until it snaps into place.



10. To connect the left and center air baffles to the U-shaped flex cable, complete the following steps.



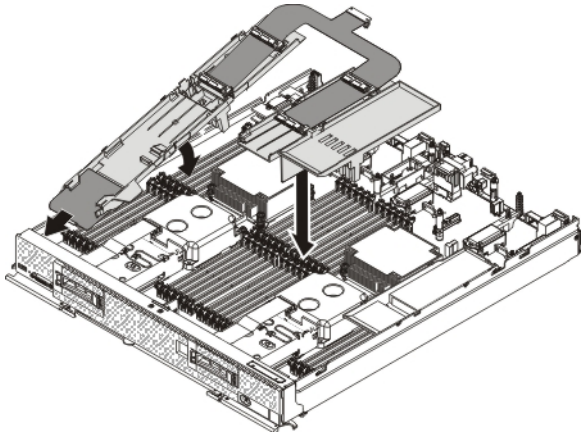
a. On a flat surface, orient the left and center air baffles and the U-shaped flex cable as shown in the illustration.

b. Align the left side of the flex cable on top of the left air baffle, with the tabs on the flex cable (near the solid-state drive connectors) in front of the retainers on the air baffle.

c. Gently press on the flex cable with your thumbs and slide it forward as you slide the tabs into the retainers. The flex cable clicks into place.

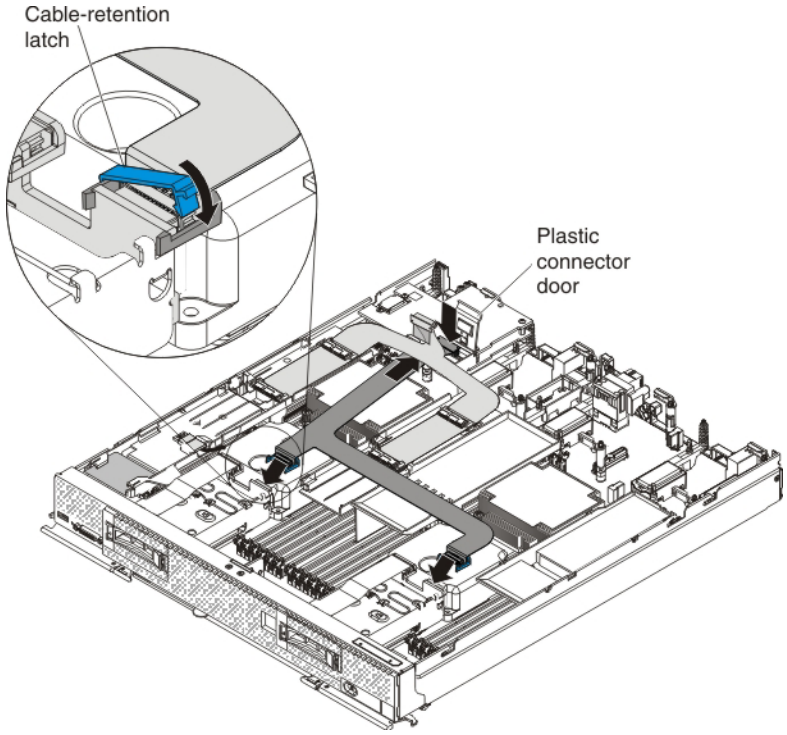
d. Repeat steps 10b on page 108 and 10c to connect the right side of the flex cable to the center air baffle.

11. Carefully install the air baffles and flex cable in the compute node. Align the left air baffle with the three alignment tabs and the release tab in the side wall of the compute node and place it on top of the DIMMs. Lower the center air baffle into the compute node on top of the center DIMMs.



12. To connect the L-shaped flex cable to both hard disk drive backplanes and to the controller, complete the following steps:

a. Position the L-shaped flex cable as shown in the following illustration. Make sure that the controller connector on the L-shaped flex cable is routed underneath the U-shaped flex cable.



b. Lift up the plastic connector door on the controller.

c. Press down firmly on the L-shaped flex cable connector to connect it to the external drive flex cable connector on the controller. (For the location of the connector on the controller, see the illustration in "ServeRAID controller connectors" on page 12.)

d. Firmly press one L-shaped flex cable connector end into the connector on the solid-state drive backplane and secure the cable with the connector clip (see the illustration). Repeat this step to connect the other flex cable connector end.

e. To attach the cable-retention latch to the flex cable connector, complete the following steps:

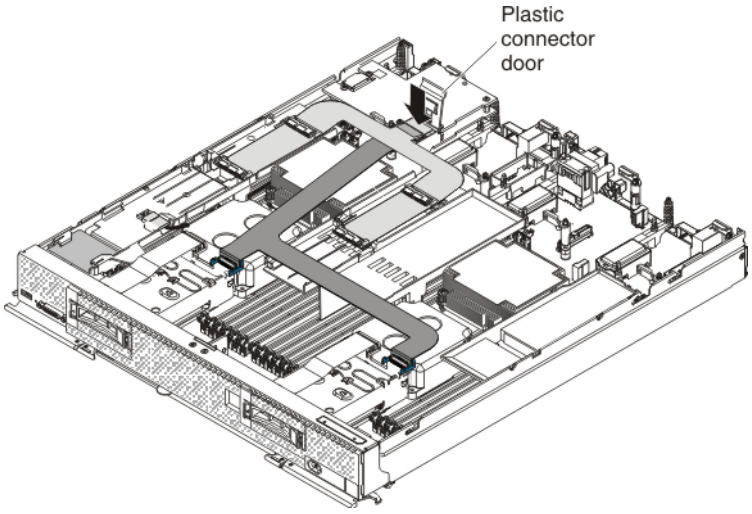
   1) Orient the cable-retention latch as shown in the illustration.

   2) Hook the square side of the cable-retention latch around the left side of the connector clip.

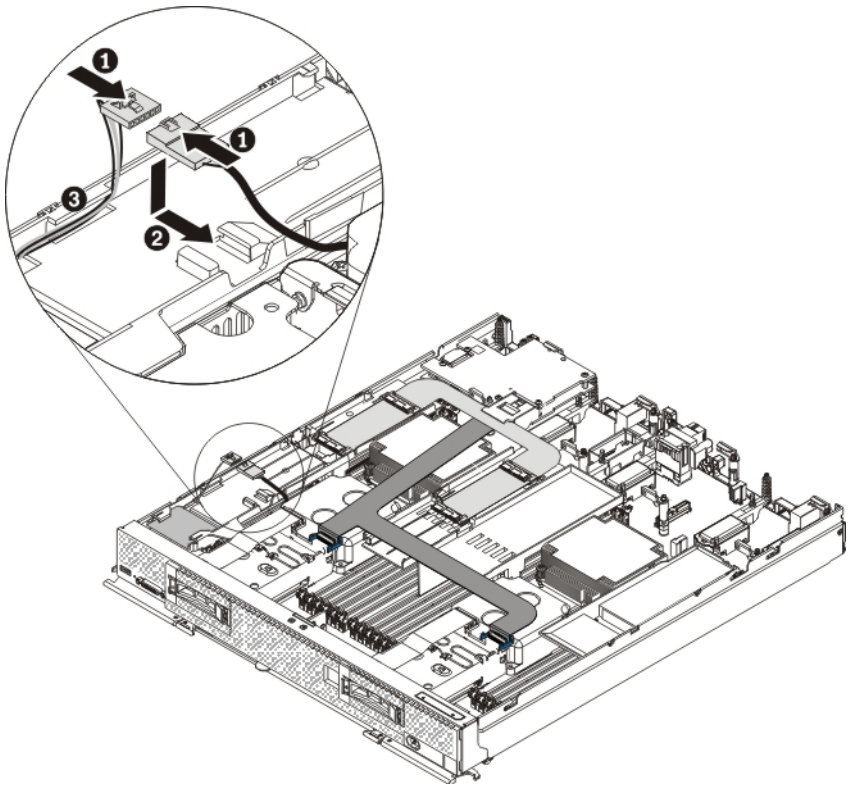
   3) Rotate the right side of the cable-retention latch and snap it into place around the right side of the connector clip.

   4) Repeat steps 12e1 to 12e3 to secure the other L-shaped flex cable connector to the backplane.

13. Press down firmly on the U-shaped flex cable connector to connect it to the internal solid-state drive flex cable connector on the controller. (For the location of the connector on the controller, see the illustration in "ServeRAID controller connectors" on page 12.) Close the plastic door.

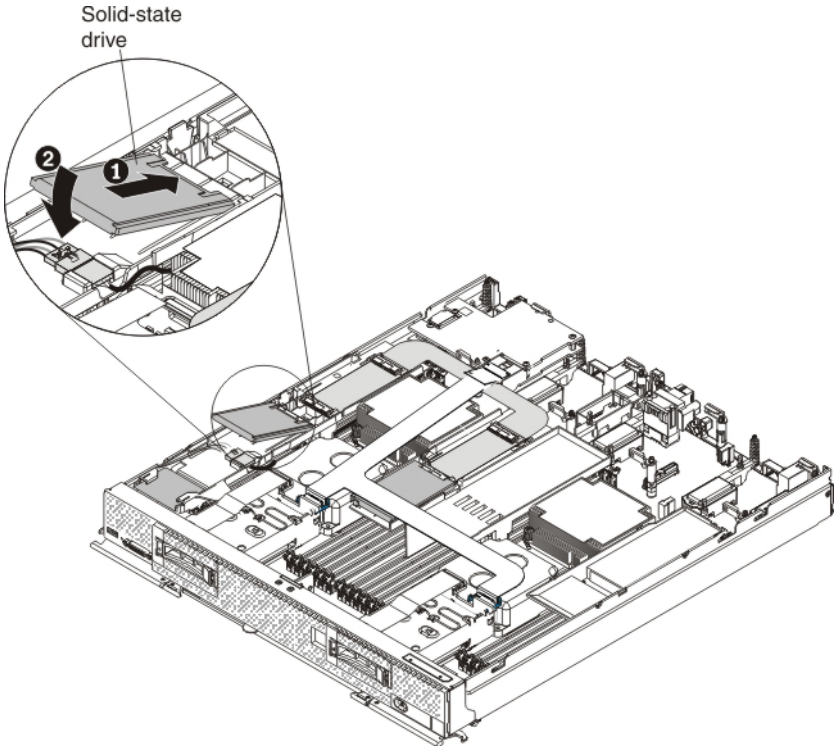


14. Connect the larger end of the power cable to the flash power module cable **1** . Slide the connected cables under the tabs on the air baffle **2** . Then, push the extra power module cable under the lip on the side of the left air baffle **3** .



15. Reconnect the hot-swap hard disk drives by sliding them fully into the bay and closing the drive tray handle.
16. Install up to four solid-state drives in the connectors on the U-shaped flex cable. Slide the solid-state drive into the connector until it is fully seated and carefully rest the solid-state drive on the flex cable.

    Note: Make sure that either a solid-state drive or filler is installed in the front slot on the left and center air baffles.



17. Install the cover on the compute node (see “Installing the compute node cover” on page 8 for instructions).
18. Reinstall the compute node in the same node bay from which you removed it (see “Installing a compute node in a chassis” on page 5 for instructions).

    Note: After the compute node is installed, the IMM in the compute node initializes and synchronizes with the CMM. This process takes several minutes, depending on your configuration. The power LED flashes rapidly, and the power button on the compute node does not respond until this process is complete.
19. Turn on the compute node. Make sure that the power LED on the compute node control panel is lit continuously, indicating that the compute node is receiving power and is turned on.
20. Use the Human Interface Infrastructure (HII) to configure the controller. To open the HII, turn on the compute node and when the prompt `<F1> Setup` is displayed, press F1. Then, select **System Settings > Storage > HII**.

    You can also run the WebBIOS Configuration Utility to configure the drive groups and the virtual drives. To run the utility, turn on the compute node and when the message `Press <Ctrl><H> for WebBIOS` is displayed on the screen, immediately press Ctrl+H.

    For detailed information about configuring drive groups and virtual drives, see the *ServeRAID M Software User's Guide* on the *ServeRAID M Documentation* CD.
21. Install the operating-system device driver.

    To view the operating systems that support the controller and to download the latest device drivers, go to http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/. For updates, go to http://www.ibm.com/supportportal/.

Be sure to use the latest service pack for the operating system and review the readme file that accompanies the device driver. Be sure to install the software device drivers before you operate the controller.

Installing the SSD expansion option and the ServeRAID M5100 Series Flex System Flash Kit for x440

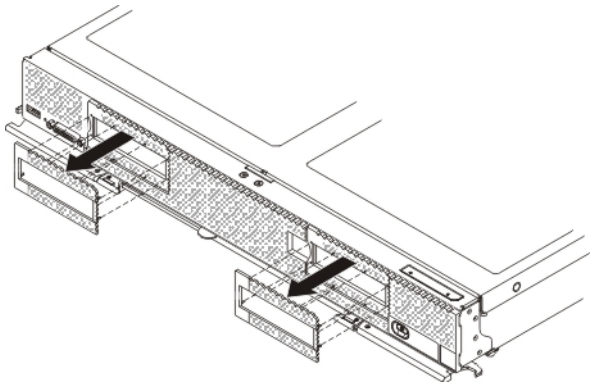
About this task

Use the procedure in this section to install the solid-state drive expansion kit option and the ServeRAID M5100 Series Flex System Flash Kit for x440 at the same time.

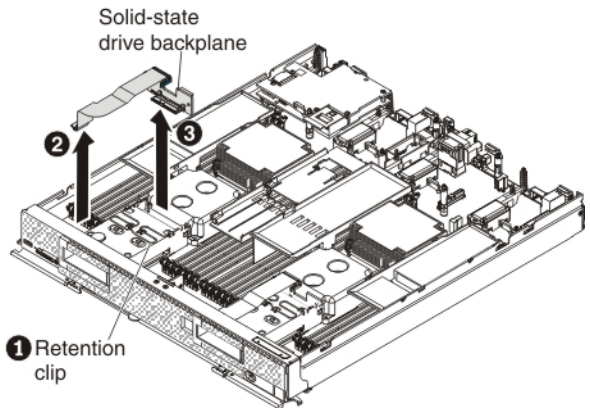
To install the solid-state drive expansion option and the Flex System flash kit, complete the following steps:

Procedure

1. Read the safety information that begins on page "Safety" on page v and "Handling static-sensitive devices" on page 3.
2. If you have not already done so, remove the compute node from the chassis and remove the cover. For more information, see "Removing a compute node from a chassis" on page 4 and "Removing the compute node cover" on page 6.
3. Install the ServeRAID M5115 SAS/SATA controller for Flex System. For more information, see "Installing the ServeRAID M5115 SAS/SATA Controller for Flex System" on page 12.
4. Remove the hot-swap hard disk drives and hard disk drive bay fillers from the left and right drive bays.
5. Use a flat-blade screwdriver to carefully pull the two small bezels from the front of the compute node.



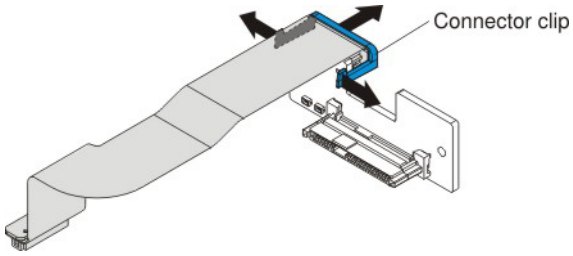
6. Remove the hard disk drive backplanes:
   a. Push the metal retention clip **1** on the hard disk drive cage toward the rear of the compute node to release it from under the tab; then slide the metal retention clip toward the front of the compute node to release the hard disk drive backplane.



b. Disconnect the hard disk drive backplane cable from the system board **2**.

c. Rotate the hard disk drive backplane toward the front of the compute node and away from the pins on the drive cage; then, lift it out of the compute node. **3**.

d. To disconnect the cable from the hard disk drive backplane that you removed, pull the connector clip away from the cable to unhook the clip from the backplane as you push the cable connector toward the rear of the compute node.

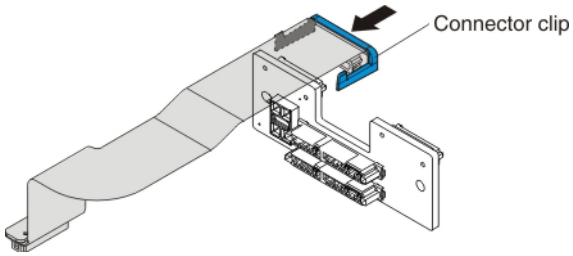


e. Repeat step 6a on page 113 to step 6d to remove the second hard disk drive backplane.

7. Install the new solid-state drive backplanes:

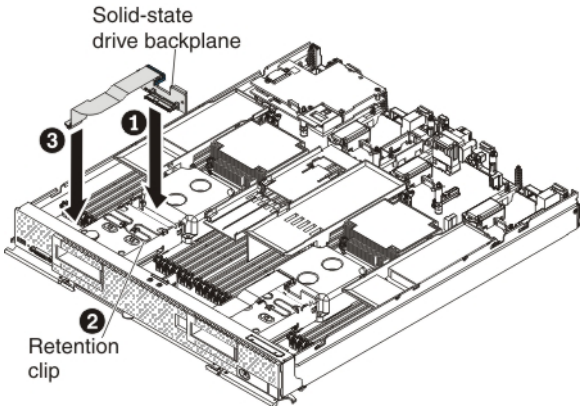
a. Touch the static-protective package that contains the new solid-state drive backplane (comes with the flash kit) to any *unpainted* metal surface on the Flex System chassis or any *unpainted* metal surface on any other grounded rack component; then, remove the backplane from the package.

b. To connect the backplane cable to the new solid-state drive backplane, hold open the connector clip while you push the cable connector into the backplane cable connector. Make sure that the connector clip clicks into place around the backplane.



c. Align the new solid-state drive backplane as shown in the following illustration **1**. Place the backplane into the notch at the rear of the drive cage and rotate the backplane toward the rear of the compute node. Make

sure that the two pins at the rear of the drive cage are in the two holes on the backplane and that the backplane is flush with the drive cage.

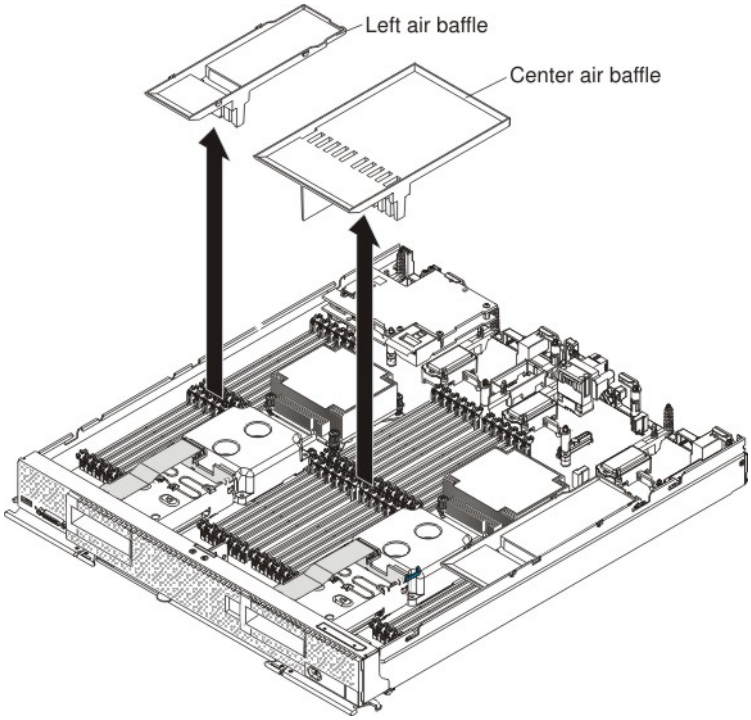


d. Push the metal retention clip on the drive cage toward the rear of the compute node and under the tab to secure the backplane **2** .

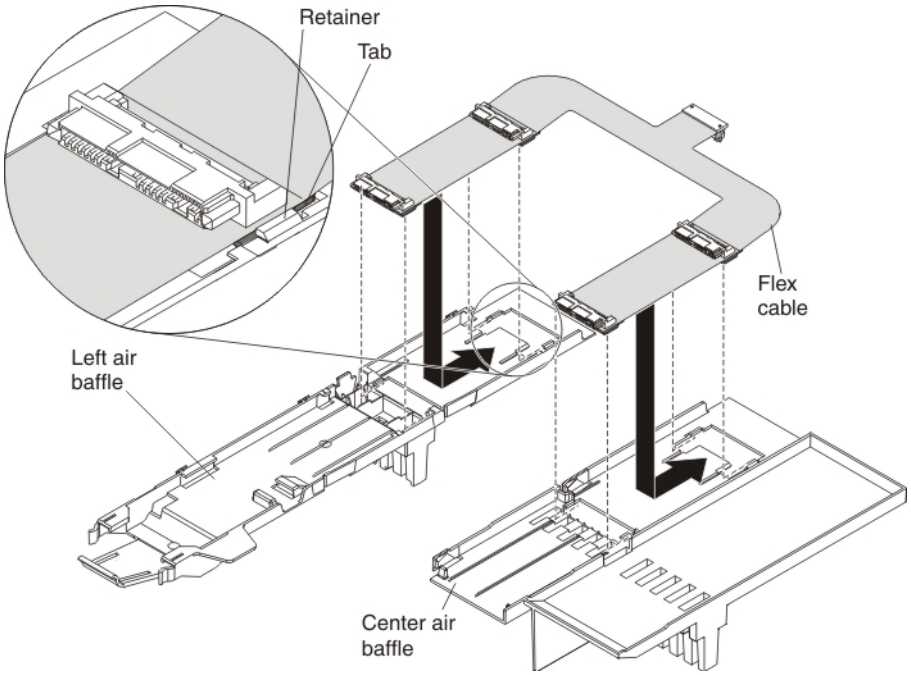
e. Connect the solid-state drive backplane cable to the system board **3** .

f. Repeat step 7a on page 114 to step 7e to install the second solid-state drive backplane.

8. Remove the left and center air baffles as shown in the following illustration.



9. To connect the left and center air baffles to the U-shaped flex cable, complete the following steps.



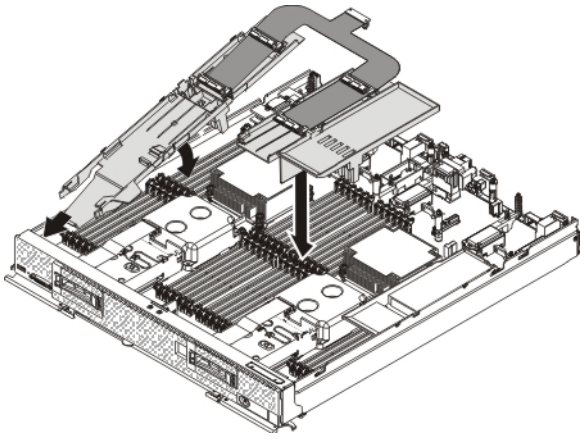
a. On a flat surface, orient the left and center air baffles and the U-shaped flex cable as shown in the illustration.

b. Align the left side of the flex cable on top of the left air baffle, with the tabs on the flex cable (near the solid-state drive connectors) in front of the retainers on the air baffle.

c. Gently press on the flex cable with your thumbs and slide it away from you as you slide the tabs into the retainers. The flex cable clicks into place.

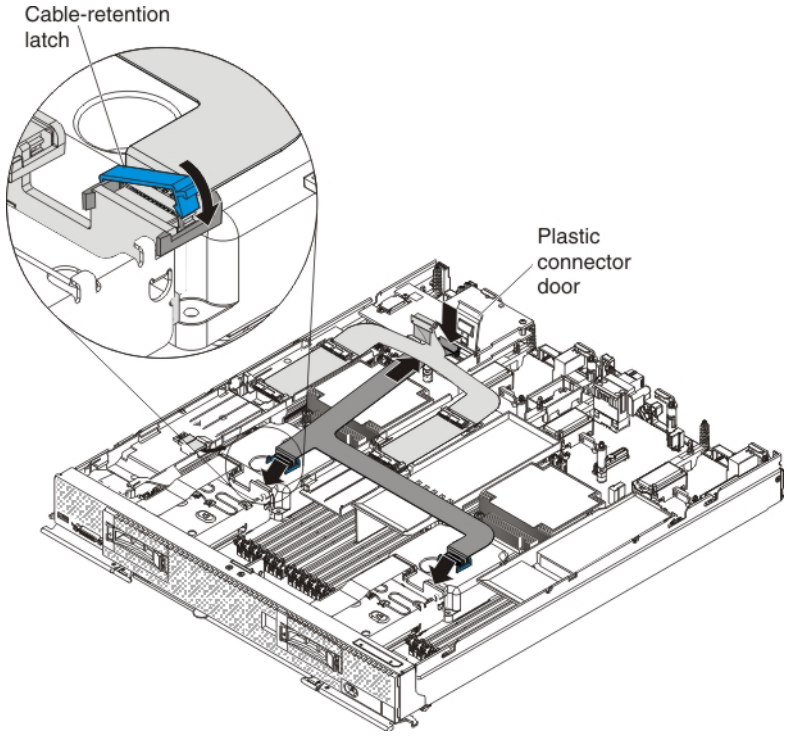
d. Repeat steps 9b and 9c to connect the right side of the flex cable to the center air baffle.

10. Carefully install the air baffles and flex cable in the compute node. Align the left air baffle with the three alignment tabs and the release tab in the side wall of the compute node and place it on top of the DIMMs. Lower the center air baffle into the compute node on top of the center DIMMs.



11. To connect the L-shaped flex cable to both solid-state drive backplanes and to the controller, complete the following steps:

a. Position the L-shaped flex cable (or L-shaped v2 flex cable) as shown in the following illustration. Make sure that the controller connector on the L-shaped flex cable is routed underneath the U-shaped flex cable.



b. Lift up the plastic connector door on the controller.

c. Press down firmly on the L-shaped flex cable connector to connect it to the external drive flex cable connector on the controller. (For the location of the connector on the controller, see the illustration in "ServeRAID controller connectors" on page 12.)

d. Align the other two connector ends of the L-shaped flex cable with the connectors on the solid-state drive backplanes and firmly press the flex cable connectors into the backplane connectors.

e. To attach a cable-retention latch to the L-shaped flex cable connector, complete the following steps:

   1) Orient the cable-retention latch as shown in the illustration.

   2) Hook the square side of the cable-retention latch around the left side of the connector clip.

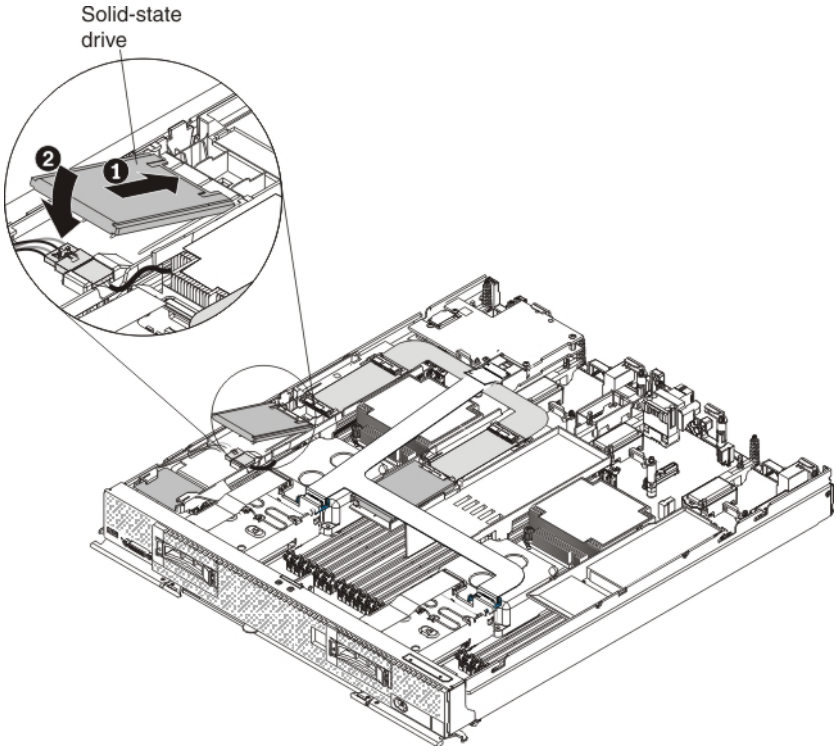
   3) Rotate the right side of the cable-retention latch and snap it into place around the right side of the connector clip.

   4) Repeat steps 11e1 to 11e3 to secure the other L-shaped flex cable connector to the backplane.

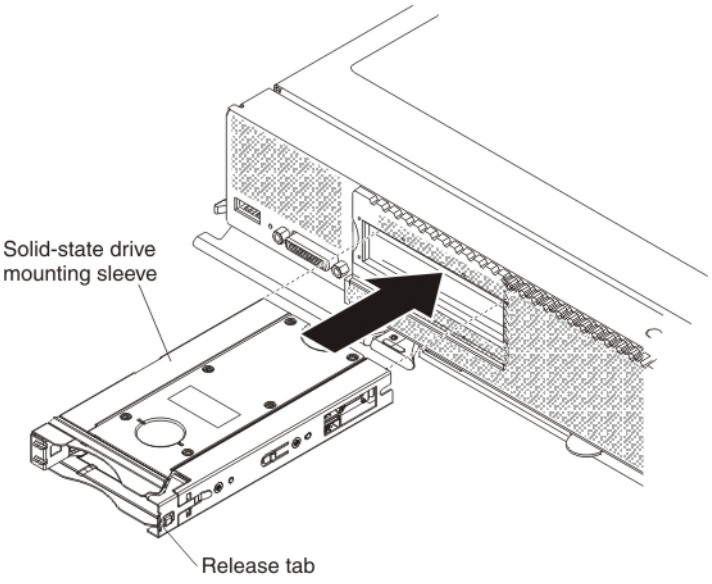
12. Press down firmly on the U-shaped flex cable connector to connect it to the internal solid-state drive flex cable connector on the controller. (For the location of the connector on the controller, see the illustration in "ServeRAID controller connectors" on page 12.) Close the plastic connector door.

13. Install up to four solid-state drives in the connectors on the flex cable. Slide the solid-state drive into the connector until it is fully seated **1** and carefully rest the solid-state drive on the flex cable **2**.

    Note: Make sure that either a solid-state drive or filler is installed in the front slot on both the left and center air baffles.



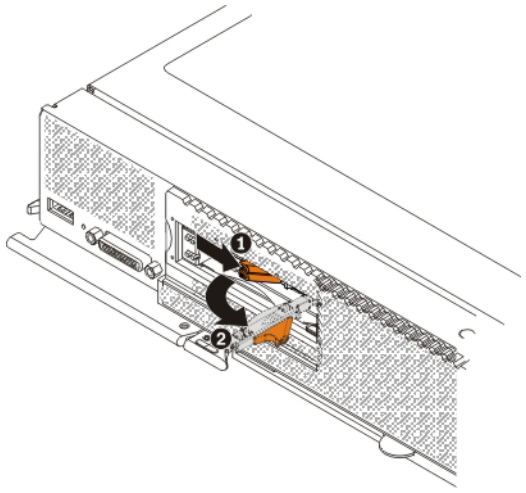
14. To install the two solid-state drive mounting sleeves that come with the flash kit, complete the following steps:
    a. Make sure that the two retention levers on the front of the solid-state drive mounting sleeve are closed.



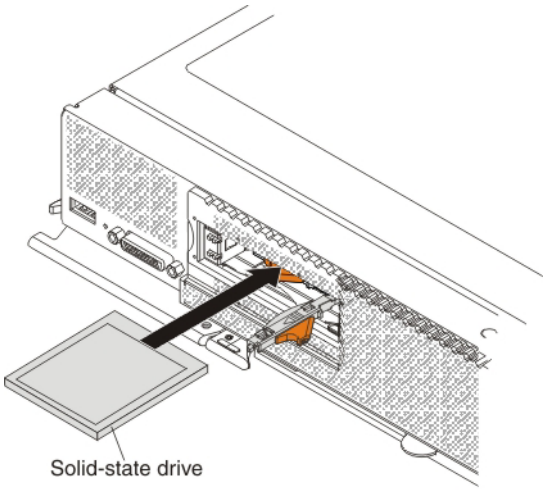
    b. Slide the solid-state drive mounting sleeve into the drive bay until it is fully seated.
    c. Repeat steps 14a and 14b to install the second solid-state drive mounting sleeve.
15. To install up to four solid-state drives or fillers in the solid-state drive mounting sleeve (two drives per sleeve), complete the following steps:

a. Touch the static-protective package that contains the new solid-state drive to any *unpainted* metal surface on the Flex System chassis or any *unpainted* metal surface on any other grounded rack component; then, remove the solid-state drive from the package.

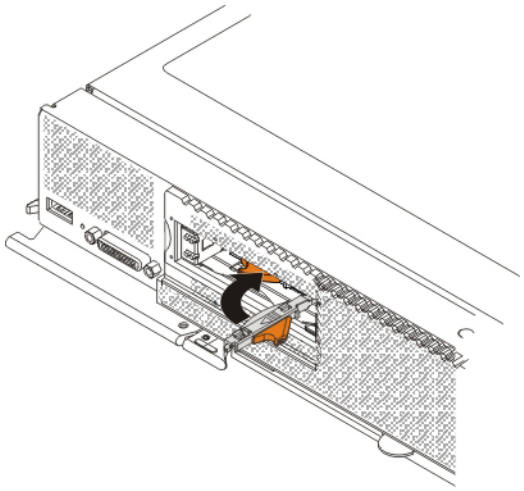
b. Press the mounting sleeve release latch to the right **1** and rotate the loose end of the retention lever away from the compute node **2**.



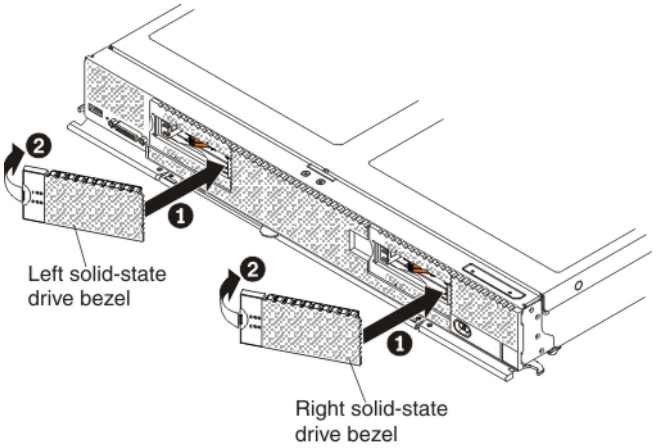
c. Slide the solid-state drive all the way into the mounting sleeve until it is fully seated in the sleeve.



d. Press the release latch to the right and rotate the retention lever toward the compute node until it clicks closed.



16. Install the new left and right solid-state drive bezels that come in the flash kit. Align the bezel with the front of the drive bay and press the right side of the bezel onto the chassis **1** ; then, rotate the left side of the bezel toward the chassis and press it into place **2** .



17. Install the cover on the compute node (see “Installing the compute node cover” on page 8 for instructions).
18. Reinstall the compute node in the same node bay from which you removed it (see “Installing a compute node in a chassis” on page 5 for instructions).

    Note: After the compute node is installed, the IMM in the compute node initializes and synchronizes with the CMM. This process takes several minutes, depending on your configuration. The power LED flashes rapidly, and the power button on the compute node does not respond until this process is complete.
19. Turn on the compute node. Make sure that the power LED on the compute node control panel is lit continuously, indicating that the compute node is receiving power and is turned on.
20. Use the Human Interface Infrastructure (HII) to configure the controller. To open the HII, turn on the compute node and when the prompt `<F1> Setup` is displayed, press F1. Then, select **System Settings > Storage > HII**.

You can also run the WebBIOS Configuration Utility to configure the drive groups and the virtual drives. To run the utility, turn on the compute node and when the message `Press <Ctrl><H> for WebBIOS` is displayed on the screen, immediately press Ctrl+H.

For detailed information about configuring drive groups and virtual drives, see the *ServeRAID M Software User's Guide* on the *ServeRAID M Documentation* CD.

21. Install the operating-system device driver.

    To view the operating systems that support the controller and to download the latest device drivers, go to http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/. For updates, go to http://www.ibm.com/supportportal/.

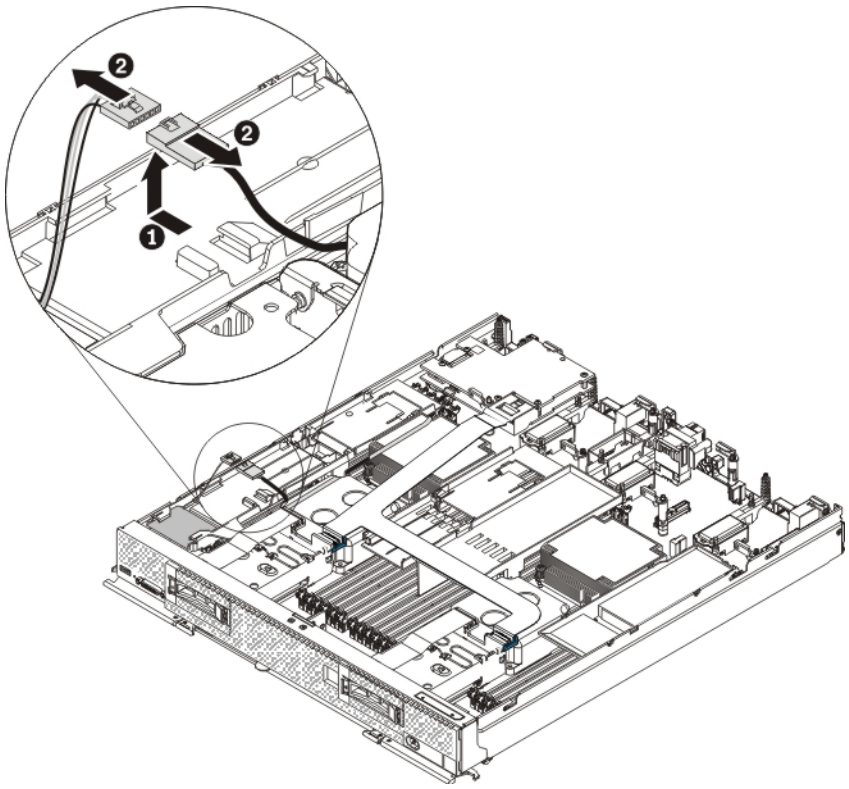
    Be sure to use the latest service pack for the operating system and review the readme file that accompanies the device driver. Be sure to install the software device drivers before you operate the controller.

Installing the SSD expansion option with a previously installed Enablement Kit for x440

Use the procedure in this section to install the solid-state drive expansion kit option if a ServeRAID M5100 Series Enablement Kit for Flex System is already installed in the compute node.

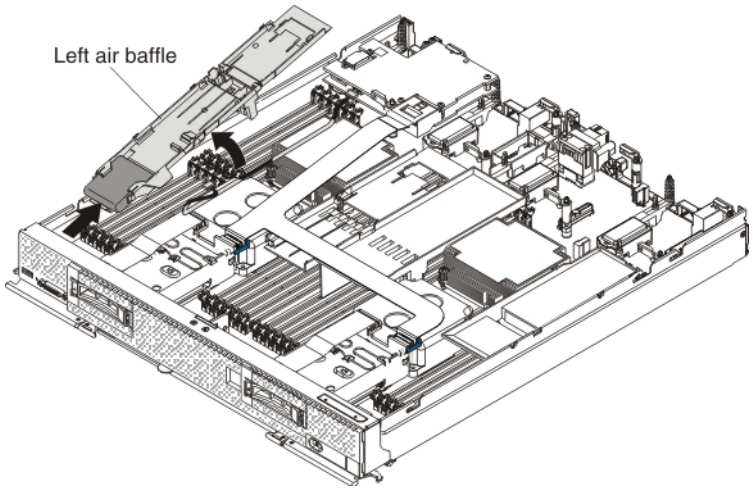
To install the solid-state drive expansion option, complete the following steps:

1. Read the safety information that begins on page "Safety" on page v and "Handling static-sensitive devices" on page 3.
2. If you have not already done so, remove the compute node from the chassis and remove the cover. For more information, see "Removing a compute node from a chassis" on page 4 and "Removing the compute node cover" on page 6.
3. To remove the left and center air baffles, complete the following steps:
   a. Slide the connected power cable and flash power module cable out from the tabs on the air baffle **1**.

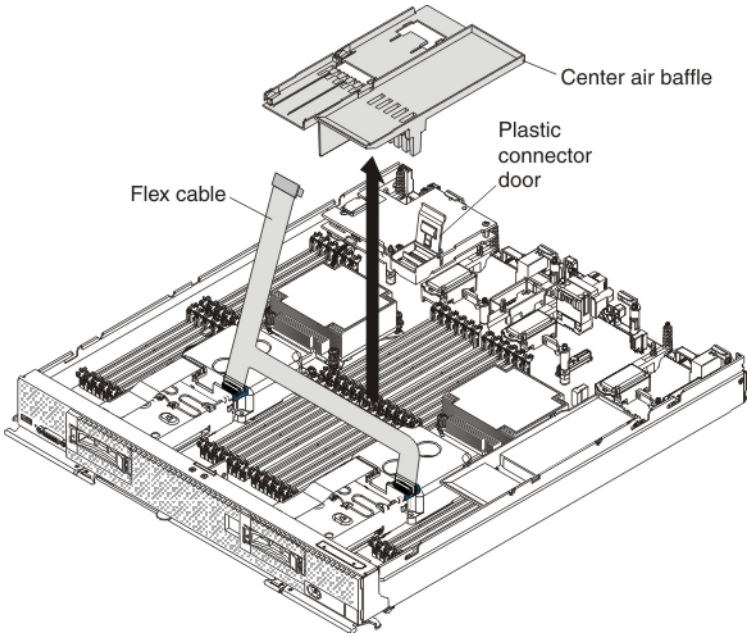


b. Disconnect the power cable from the flash power module cable **2**.

c. Carefully remove the left air baffle by unlatching the release tab on the side wall and lifting the air baffle up and toward the rear of the compute node.

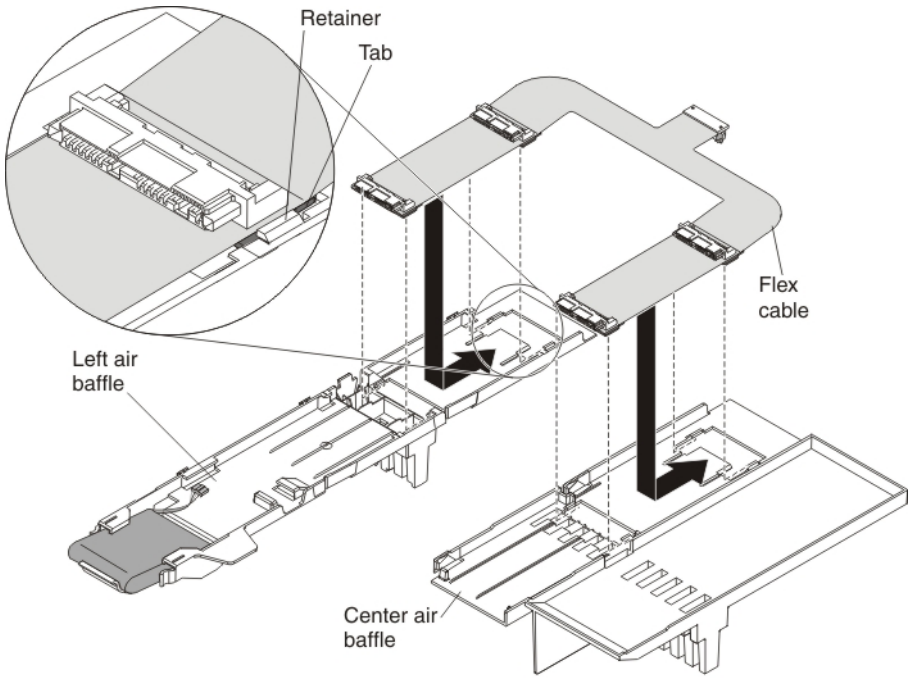


d. Open the plastic connector door and disconnect the L-shaped flex cable from the controller.



e. Rotate the L-shaped flex cable upward and remove the center air baffle as shown in the illustration.

4. To connect the left and center air baffles to the U-shaped flex cable, complete the following steps.



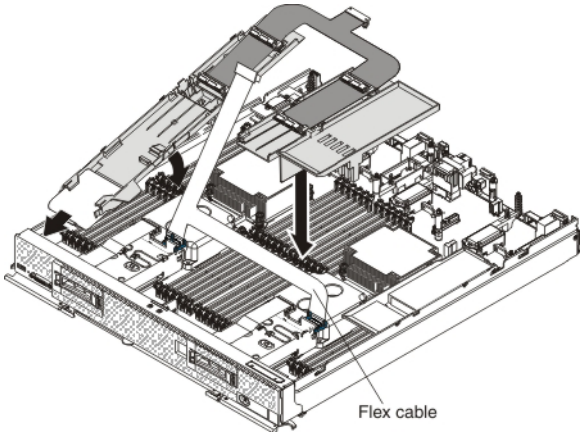
a. On a flat surface, orient the left and center air baffles and the U-shaped flex cable as shown in the illustration.

b. Align the left side of the flex cable on top of the left air baffle, with the tabs on the flex cable (near the solid-state drive connectors) in front of the retainers on the air baffle.

c. Gently press on the flex cable with your thumbs and slide it away from you as you slide the tabs into the retainers. The flex cable clicks into place.

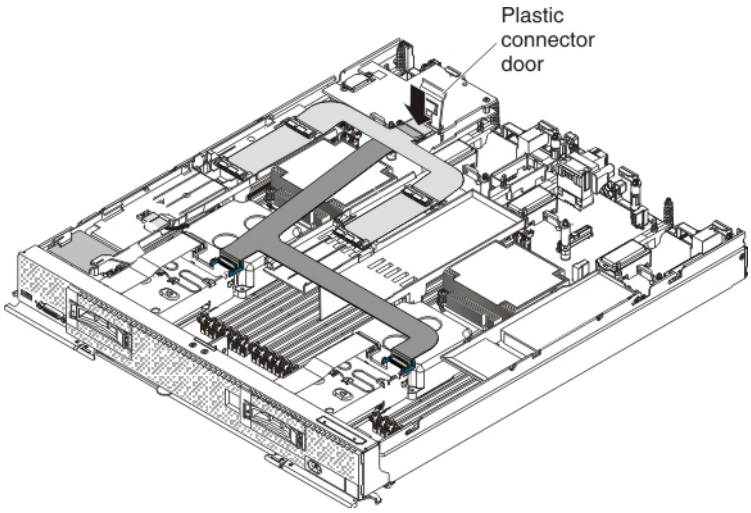
d. Repeat steps 4b on page 123 and 4c on page 123 to connect the right side of the flex cable to the center air baffle.

5. Carefully install the air baffles and U-shaped flex cable in the compute node as shown in the following illustration. Align the air baffle tabs with the notches in the side of the chassis and place the air baffles on top of the DIMMs.

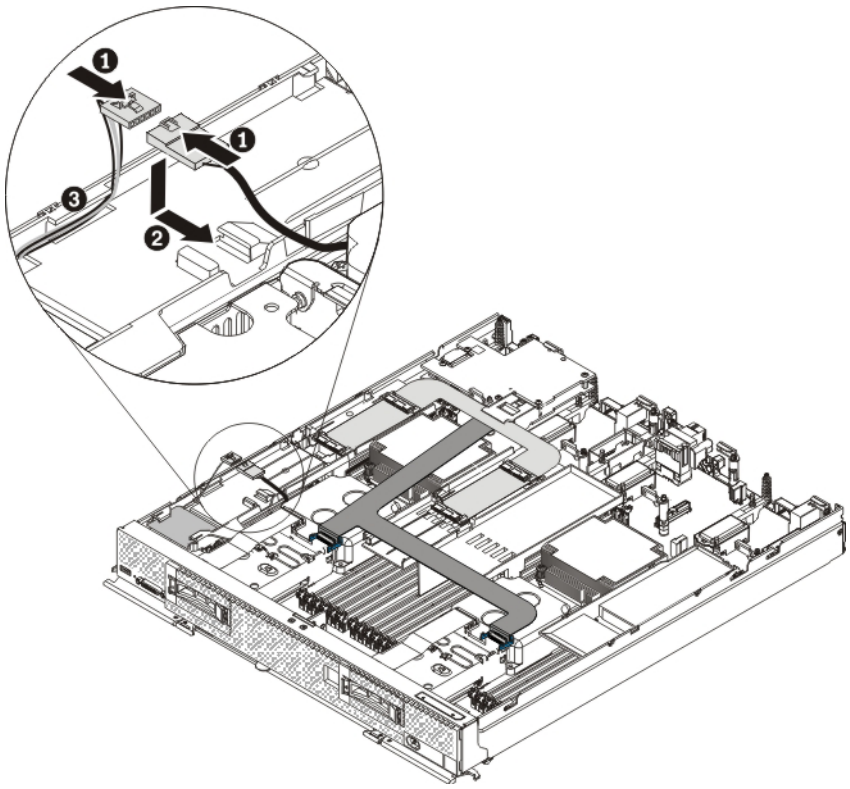


6. Route the loose end of the L-shaped flex cable underneath the U-shaped flex cable. Press down firmly on the L-shaped flex cable connector to connect it to the external drive flex cable connector on the controller. (For the location of the connector on the controller, see the illustration in "ServeRAID controller connectors" on page 12.)

7. Press down firmly on the U-shaped flex cable connector to connect it to the internal solid-state drive flex cable connector on the controller. (For the location of the connector on the controller, see the illustration in "ServeRAID controller connectors" on page 12.) Close the plastic connector door.

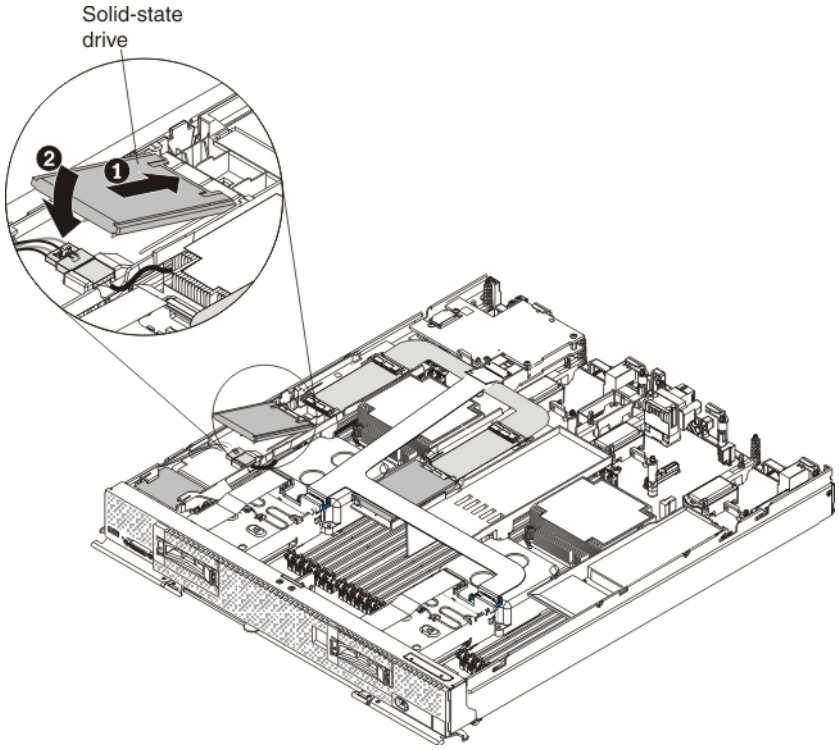


8. Connect the larger end of the power cable to the flash power module cable **1** . Slide the connected cables under the tabs on the air baffle **2** . Then, push the extra power module cable under the lip on the side of the air baffle **3** .



9. Install up to four solid-state drives in the connectors on the flex cable. Slide the solid-state drive into the connector until it is fully seated **1** and carefully rest the solid-state drive on the flex cable **2**.

   Note: Make sure that either a solid-state drive or filler is installed in the front slot on both the left and center air baffles.



10. Install the cover on the compute node (see “Installing the compute node cover” on page 8 for instructions).
11. Reinstall the compute node in the same node bay from which you removed it (see “Installing a compute node in a chassis” on page 5 for instructions).

    Note: After the compute node is installed, the IMM in the compute node initializes and synchronizes with the CMM. This process takes several minutes, depending on your configuration. The power LED flashes rapidly, and the power button on the compute node does not respond until this process is complete.
12. Turn on the compute node. Make sure that the power LED on the compute node control panel is lit continuously, indicating that the compute node is receiving power and is turned on.
13. Use the Human Interface Infrastructure (HII) to configure the controller. To open the HII, turn on the compute node and when the prompt `<F1> Setup` is displayed, press F1. Then, select **System Settings > Storage > HII**.

    You can also run the WebBIOS Configuration Utility to configure the drive groups and the virtual drives. To run the utility, turn on the compute node and when the message `Press <Ctrl><H> for WebBIOS` is displayed on the screen, immediately press Ctrl+H.

    For detailed information about configuring drive groups and virtual drives, see the *ServeRAID M Software User's Guide* on the *ServeRAID M Documentation* CD.
14. Install the operating-system device driver.

    To view the operating systems that support the controller and to download the latest device drivers, go to http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/. For updates, go to http://www.ibm.com/supportportal/.

    Be sure to use the latest service pack for the operating system and review the readme file that accompanies the device driver. Be sure to install the software device drivers before you operate the controller.

Installing the SSD expansion option with a previously installed Flex System Flash Kit for x440

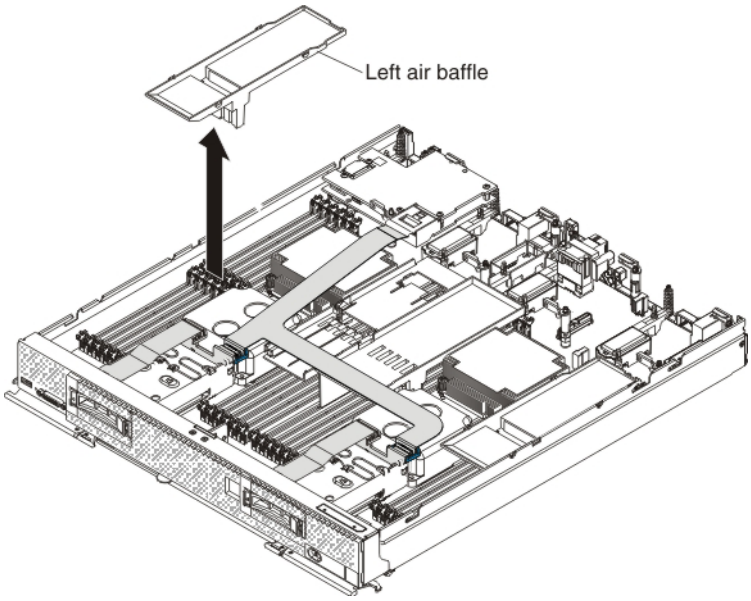
About this task

Use the procedure in this section to install the solid-state drive expansion kit option if a ServeRAID M5100 Series Flex System Flash Kit for x440 is already installed in the compute node.

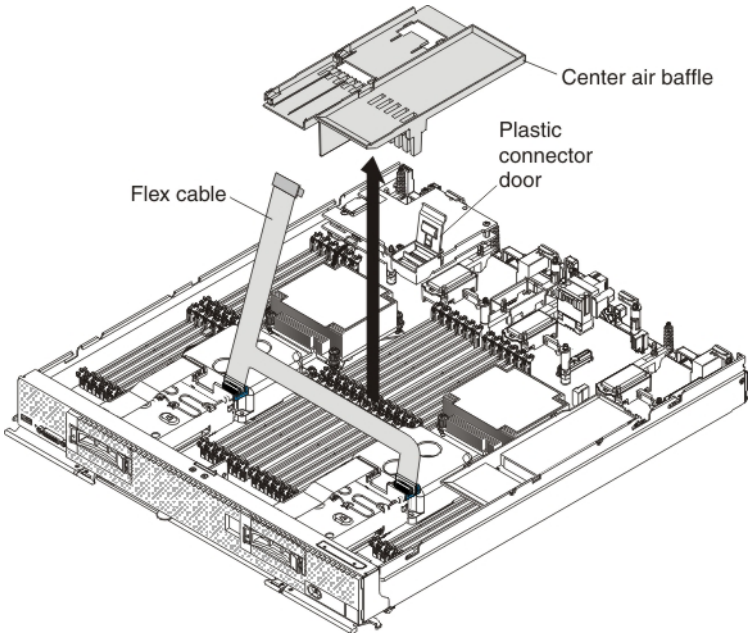
To install the solid-state drive expansion option, complete the following steps:

Procedure

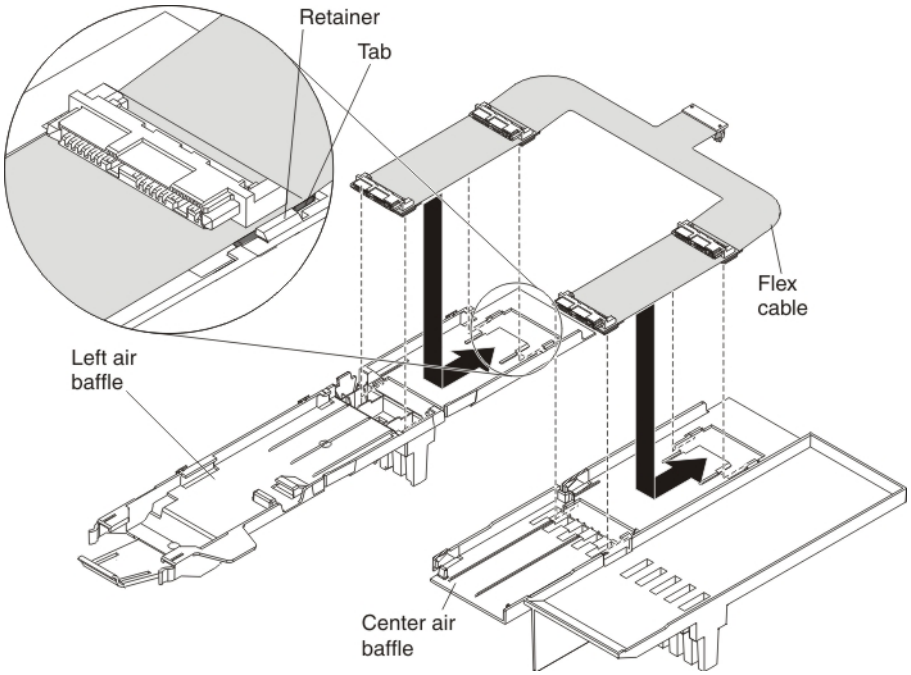
1. Read the safety information that begins on page “Safety” on page v and “Handling static-sensitive devices” on page 3.
2. If you have not already done so, remove the compute node from the chassis and remove the cover. For more information, see “Removing a compute node from a chassis” on page 4 and “Removing the compute node cover” on page 6.
3. Remove the left air baffle as shown in the following illustration.



4. Open the plastic connector door and disconnect the L-shaped flex cable (or L-shaped v2 flex cable) from the controller, rotate the L-shaped flex cable upward, and remove the center air baffle.

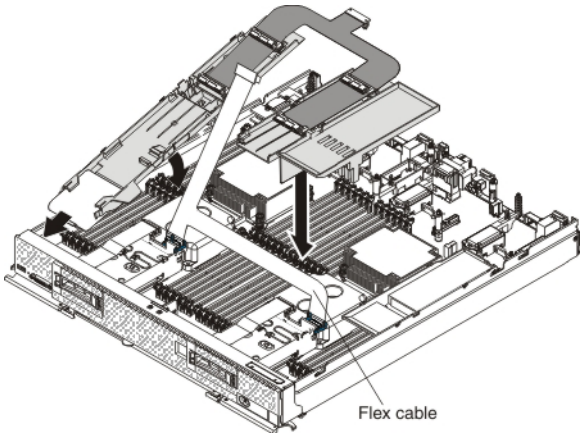


5. To connect the left and center air baffles to the U-shaped flex cable, complete the following steps.



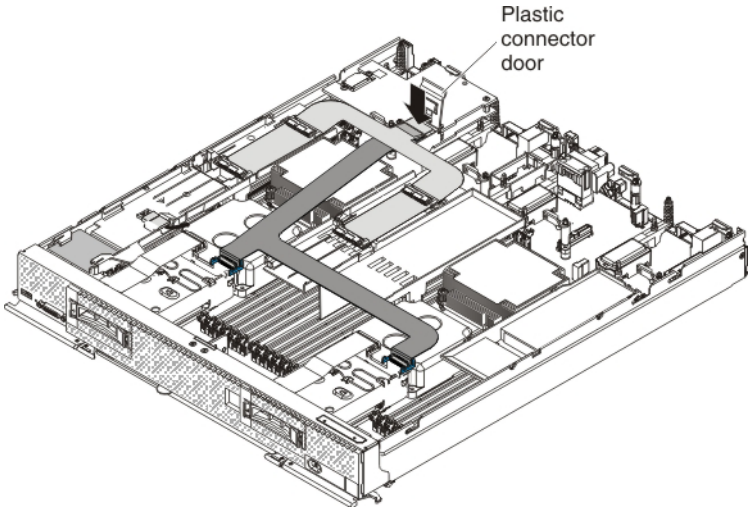
a. Locate the left air baffle that comes in the solid-state drive expansion kit.
b. On a flat surface, orient the left and center air baffles and the U-shaped flex cable as shown in the illustration.
c. Align the left side of the flex cable on top of the left air baffle, with the tabs on the flex cable (near the solid-state drive connectors) in front of the retainers on the air baffle.
d. Gently press on the flex cable with your thumbs and slide it away from you as you slide the tabs into the retainers. The flex cable clicks into place.
e. Repeat steps 5c and 5d to connect the right side of the flex cable to the center air baffle.

6. Carefully install the air baffles and U-shaped flex cable in the compute node. Align the air baffle tabs with the notches in the side of the chassis and place the air baffles on top of the DIMMs.



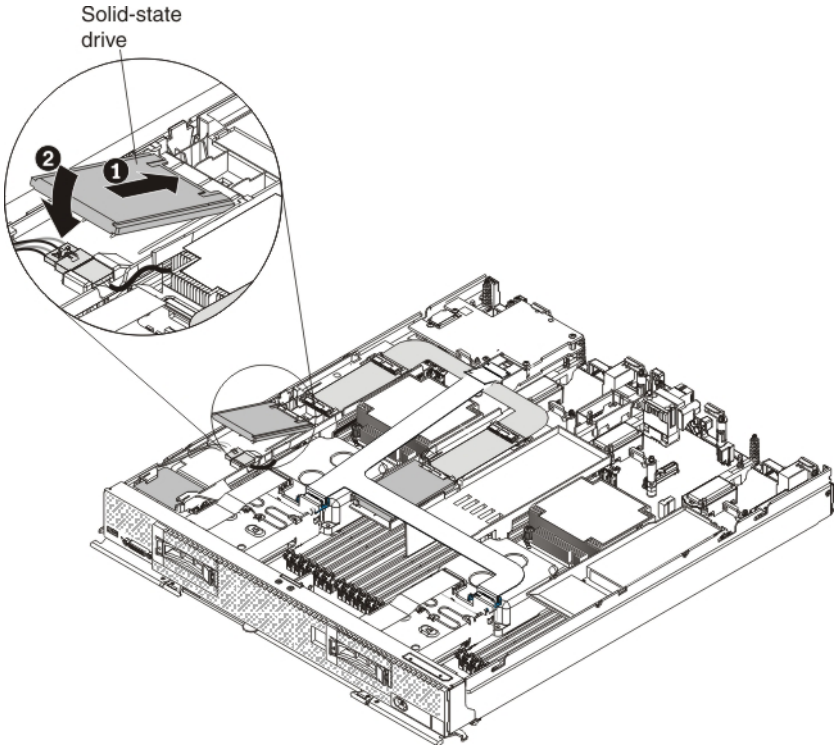
7. Route the loose end of the L-shaped flex cable (or L-shaped v2 flex cable) underneath the U-shaped flex cable. Press down firmly on the L-shaped flex cable connector to connect it to the external drive flex cable connector on the controller. (For the location of the connector on the controller, see the illustration in "ServeRAID controller connectors" on page 12.)

8. Press down firmly on the U-shaped flex cable connector to connect it to the internal solid-state drive flex cable connector on the controller. (For the location of the connector on the controller, see the illustration in "ServeRAID controller connectors" on page 12.) Close the plastic connector door.



9. Install up to four solid-state drives in the connectors on the flex cable. Slide the solid-state drive into the connector until it is fully seated **1** and carefully rest the solid-state drive on the flex cable **2**.

   Note: Make sure that either a solid-state drive or filler is installed in the front slot on both the left and center air baffles.



10. Install the cover on the compute node (see "Installing the compute node cover" on page 8 for instructions).
11. Reinstall the compute node in the same node bay from which you removed it (see "Installing a compute node in a chassis" on page 5 for instructions).

Note: After the compute node is installed, the IMM in the compute node initializes and synchronizes with the CMM. This process takes several minutes, depending on your configuration. The power LED flashes rapidly, and the power button on the compute node does not respond until this process is complete.

12. Turn on the compute node. Make sure that the power LED on the compute node control panel is lit continuously, indicating that the compute node is receiving power and is turned on.
13. Use the Human Interface Infrastructure (HII) to configure the controller. To open the HII, turn on the compute node and when the prompt `<F1> Setup` is displayed, press F1. Then, select **System Settings > Storage > HII**.

    You can also run the WebBIOS Configuration Utility to configure the drive groups and the virtual drives. To run the utility, turn on the compute node and when the message `Press <Ctrl><H> for WebBIOS` is displayed on the screen, immediately press Ctrl+H.

    For detailed information about configuring drive groups and virtual drives, see the *ServeRAID M Software User's Guide* on the *ServeRAID M Documentation* CD.
14. Install the operating-system device driver.

    To view the operating systems that support the controller and to download the latest device drivers, go to http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/. For updates, go to http://www.ibm.com/supportportal/.

    Be sure to use the latest service pack for the operating system and review the readme file that accompanies the device driver. Be sure to install the software device drivers before you operate the controller.

Replaceable components

Field replaceable units (FRUs) must be replaced only by a trained service technician, unless they are classified as customer replaceable units (CRUs).

Tier 1 CRU: Replacement of Tier 1 CRUs is your responsibility. If Lenovo installs a Tier 1 CRU at your request without a service contract, you will be charged for the installation.

For more information about the terms of the warranty and getting service and assistance, see the *Warranty Information* document that comes with the optional device.

Table 7. Field replaceable units for the ServeRAID M5100 Series SSD Expansion Kit for x440

Description	CRU part number (Tier 1)
Left air baffle	00D5080
Internal solid-state drive flex cable (U-shaped)	00D5078
Solid-state drive filler	49Y4936

For the field replaceable units for the ServeRAID M5115 SAS/SATA Controller for Flex System, see Table 1 on page 13.

For the field replaceable units for the ServeRAID M5100 Series Enablement Kit for Flex System, see Table 2 on page 23.

For the field replaceable units for the ServeRAID M5100 Series Flex System Flash Kit for x440, see Table 5 on page 70.

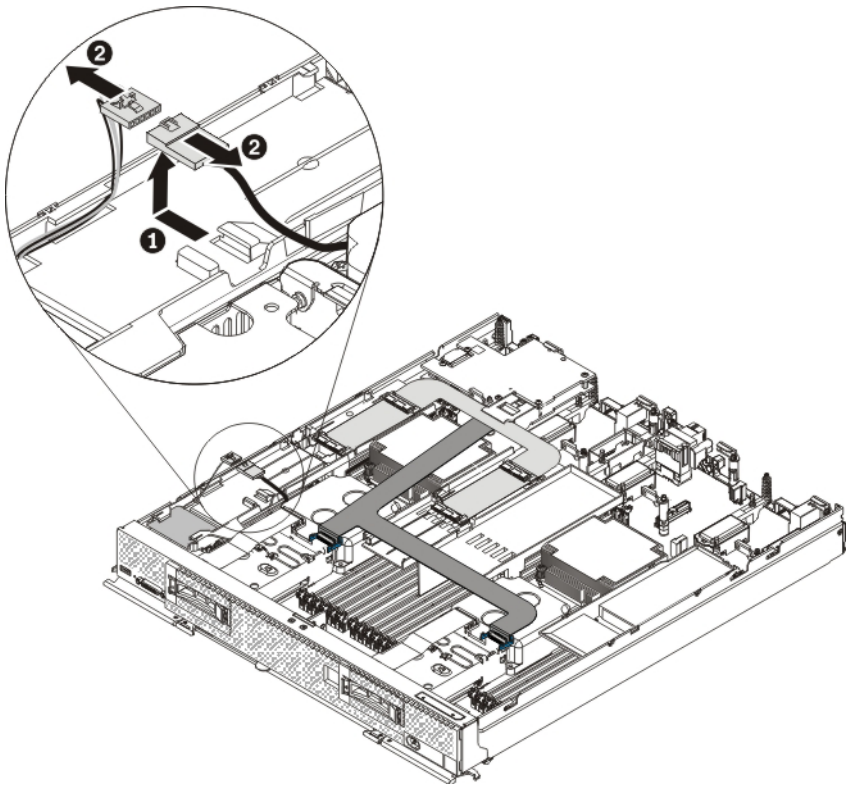
Removing and replacing the internal solid-state drive flex cable (U-shaped)

About this task

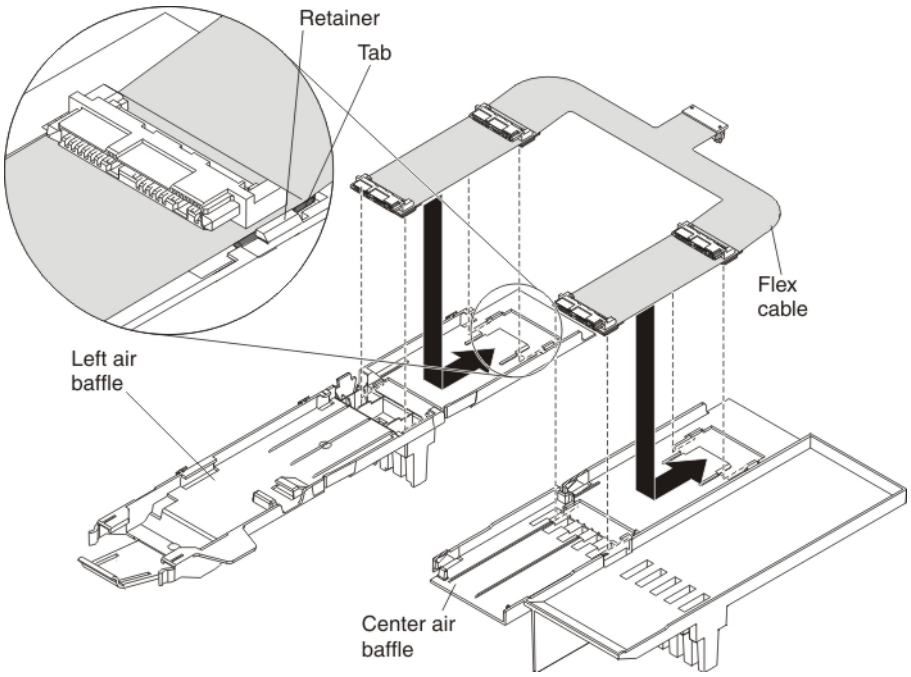
To remove and replace the internal solid-state drive flex cable (U-shaped), complete the following steps:

Procedure

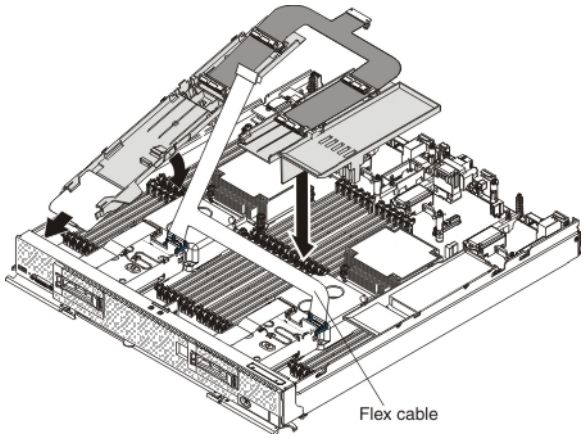
1. Read the safety information that begins on page "Safety" on page v and "Handling static-sensitive devices" on page 3.
2. If you have not already done so, remove the compute node from the chassis and remove the cover. For more information, see "Removing a compute node from a chassis" on page 4 and "Removing the compute node cover" on page 6.
3. Remove the four solid-state drives that are connected to the solid-state drive flex cable inside the compute node.
4. Open the plastic door cover on the ServeRAID controller and disconnect the U-shaped flex cable and the L-shaped drive flex cable.
5. Slide the connected power cable and flash power module cable out from the tabs on the air baffle **1** . Then, disconnect the power cable from the flash power module cable **2** .



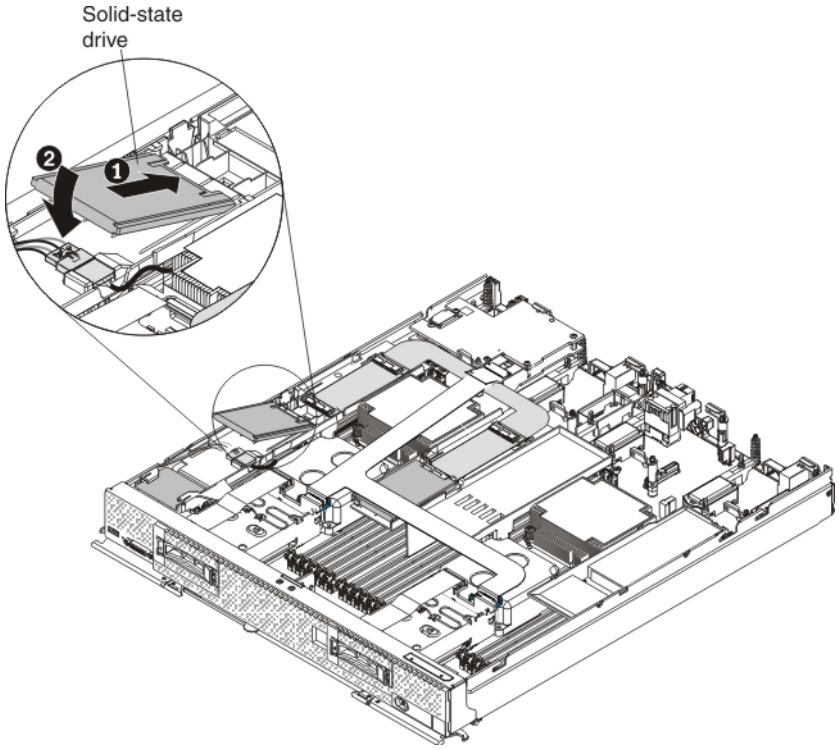
6. Remove the air baffles with the attached U-shaped flex cable by unlatching the release tab on the side wall. Lift the air baffles up and toward the rear of the compute node, making sure that the center air baffle is lifted away from the L-shaped flex cable.
7. Press on the flex cable and slide it away from the air baffles to detach it.
8. Touch the static-protective package that contains the new solid-state drive flex cable to any *unpainted* metal surface on the Flex System chassis or any *unpainted* metal surface on any other grounded rack component; then, remove the flex cable from the package.
9. To connect the left and center air baffles to the U-shaped flex cable, complete the following steps.



   a. Locate the left air baffle that comes in the solid-state drive expansion kit.
   b. On a flat surface, orient the left and center air baffles and the U-shaped flex cable as shown in the illustration.
   c. Align the left side of the flex cable on top of the left air baffle, with the tabs on the flex cable (near the solid-state drive connectors) in front of the retainers on the air baffle.
   d. Gently press on the flex cable with your thumbs and slide it away from you as you slide the tabs into the retainers. The flex cable clicks into place.
   e. Repeat steps 9c and 9d to connect the right side of the flex cable to the center air baffle.
10. Carefully install the air baffles and flex cable in the compute node as shown in the following illustration.



11. Press down firmly on the L-shaped flex cable connector to connect it to the external drive flex cable connector on the controller. (For the location of the connector on the controller, see the illustration in "ServeRAID controller connectors" on page 12.)
12. Press down firmly on the U-shaped flex cable connector to connect it to the internal solid-state drive flex cable connector on the controller. (For the location of the connector on the controller, see the illustration in "ServeRAID controller connectors" on page 12.)
13. Reinstall the solid-state drives in the connectors on the flex cable. Slide the solid-state drive into the connector until it is fully seated **1** and carefully lower the drive **2** so that it rests flat on the flex cable.



14. Install the cover on the compute node (see "Installing the compute node cover" on page 8 for instructions).
15. Reinstall the compute node in the same node bay from which you removed it (see "Installing a compute node in a chassis" on page 5 for instructions).

Note: After the compute node is installed, the IMM in the compute node initializes and synchronizes with the CMM. This process takes several minutes, depending on your configuration. The power LED flashes rapidly, and the power button on the compute node does not respond until this process is complete.

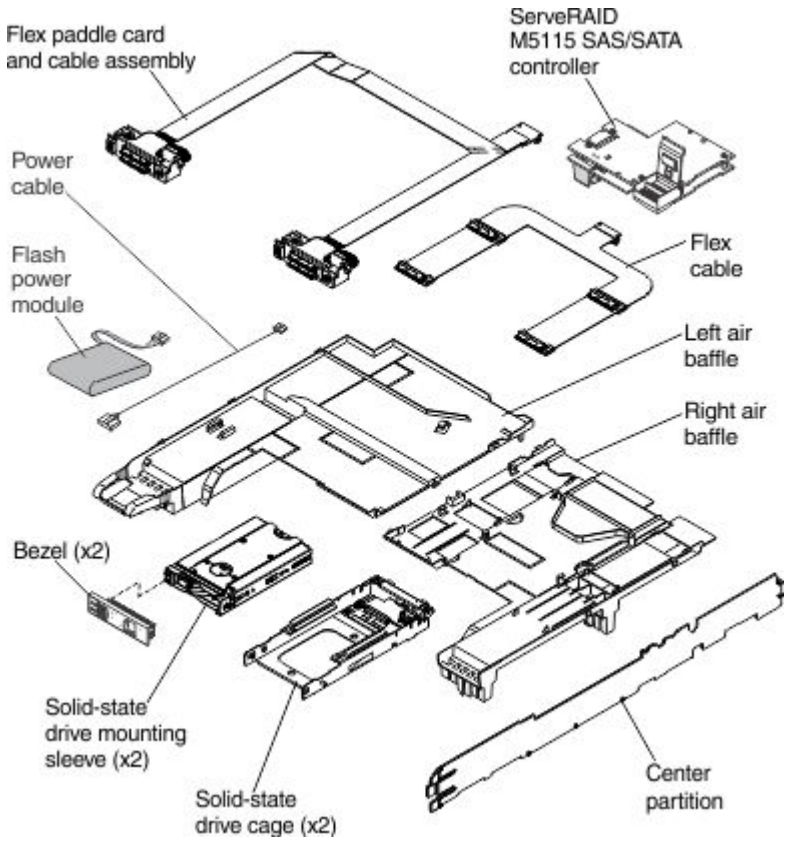
16. Turn on the compute node. Make sure that the power LED on the compute node control panel is lit continuously, indicating that the compute node is receiving power and is turned on.

Chapter 9. Installing the ServeRAID M5100 Series Flex System Flash Kit for X6

This chapter describes how to install the ServeRAID M5100 Series Flex System Flash Kit for X6.

Parts that come in the ServeRAID M5100 Series Flex System Flash Kit for X6

The following illustration shows the parts that come in the ServeRAID M5100 Series Flex System Flash Kit for X6.



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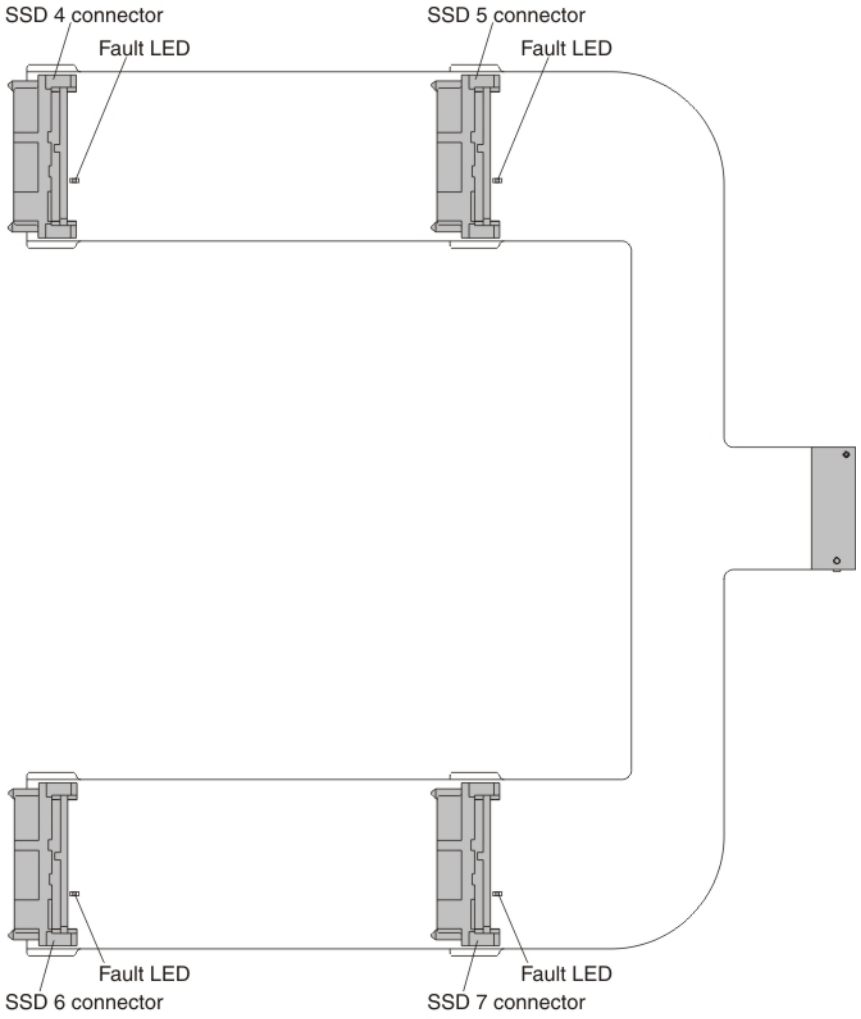
Internal solid-state drive flex cable connectors and LEDs

The following illustration shows the connectors and LEDs on the solid-state drive flex cable.



SSD connectors
You can connect one solid-state drive to each of the four connectors.

Fault LED
When this yellow LED is lit, it indicates that the associated solid-state drive has failed. Replace the solid-state drive.

Installing the ServeRAID M5100 Series Flex System Flash Kit for X6

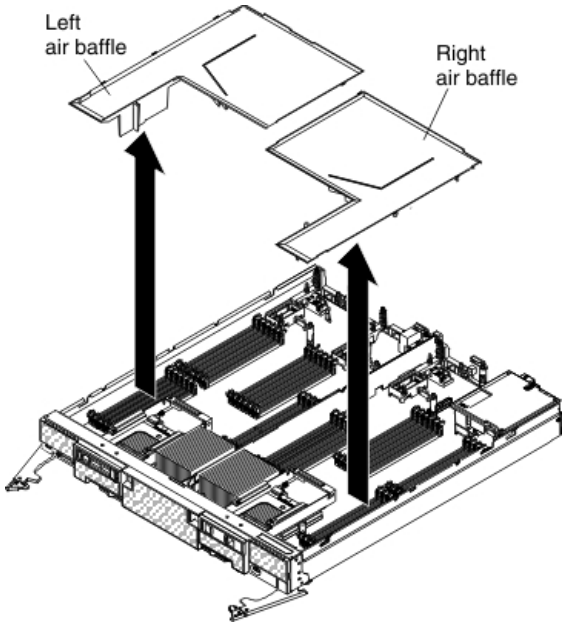
About this task

To install the ServeRAID M5100 Series Flex System Flash Kit for X6, complete the following steps:

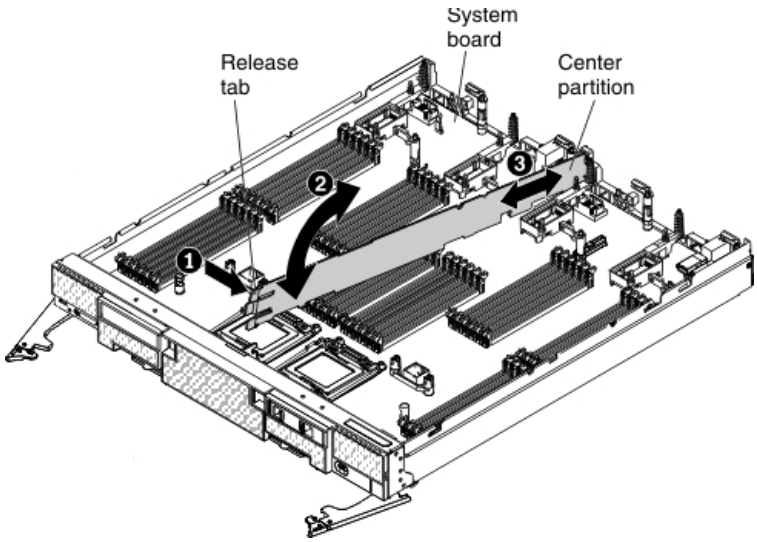
Procedure

1. Read the safety information that begins on page "Safety" on page v and "Handling static-sensitive devices" on page 3.

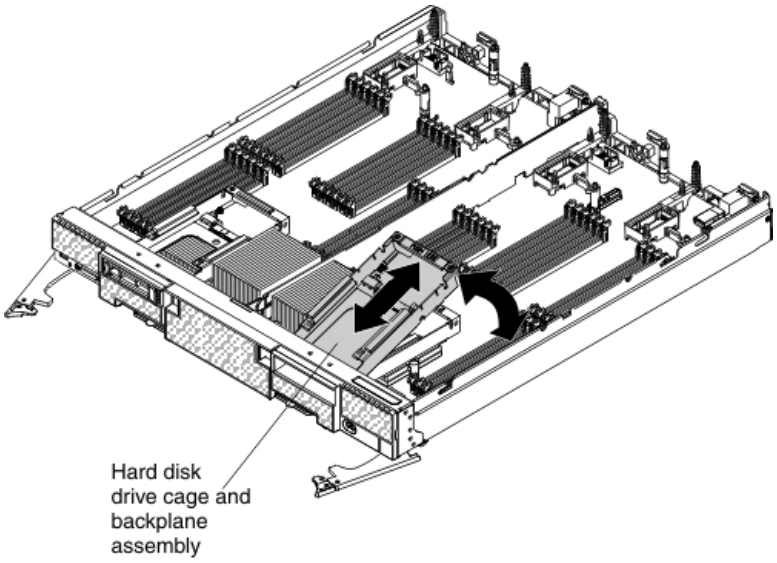
2. If you have not already done so, remove the compute node from the chassis and remove the cover. For more information, see “Removing a compute node from a chassis” on page 4 and “Removing the compute node cover” on page 6.
3. Remove the left and right air baffles.



4. Remove the center divider.

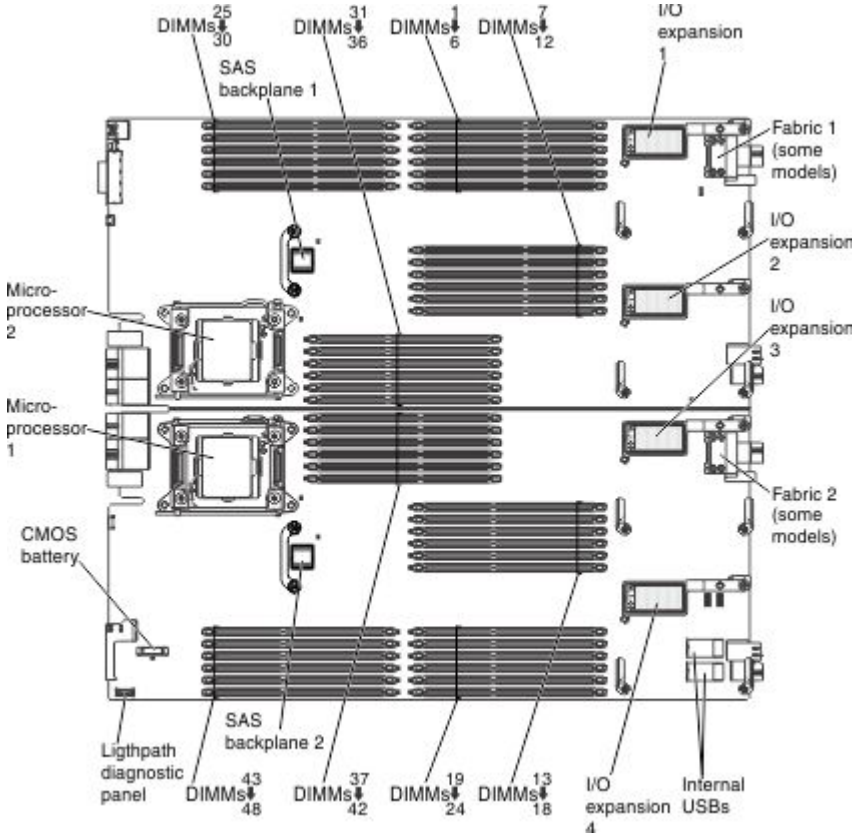


5. Install the center divider that comes with the kit.
6. Remove the 2.5-inch hot-swap hard disk drives and hard disk drive bay fillers.
7. Lift up on the hard disk drive cage and backplane assembly to disconnect it from the connector on the system board and from the alignment pins. Remove the assembly from the compute node at an angle. Repeat this step for the other hard disk drive cage and backplane assembly.

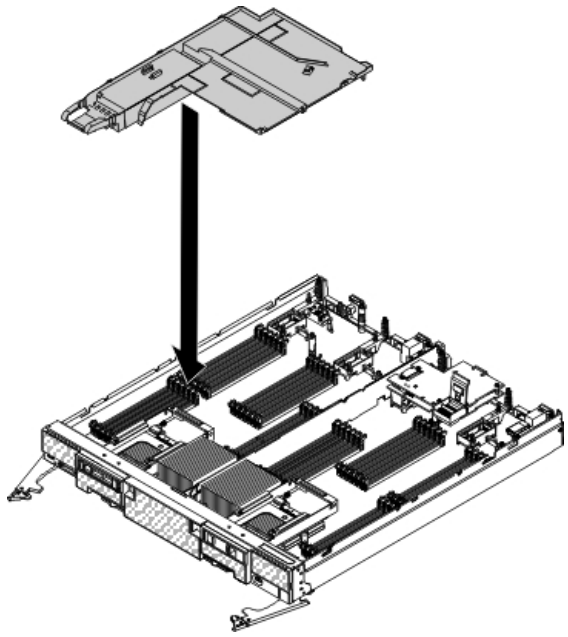


8. Position the SSD cage in the drive bay at an angle and rotate the SSD cage into the connector on the system board. Press the assembly firmly into the system board connector and the alignment pins. Repeat this step for the other SSD cage.
9. Connect the power cable that comes with the kit to the connector underneath the ServeRAID controller. Then, install the ServeRAID controller in the compute node. For more information, see “Installing the ServeRAID M5115 SAS/SATA Controller for Flex System” on page 12.

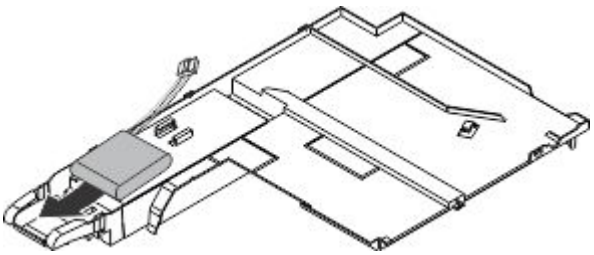
   Important: Install the ServeRAID controller in I/O expansion connector 3 only.



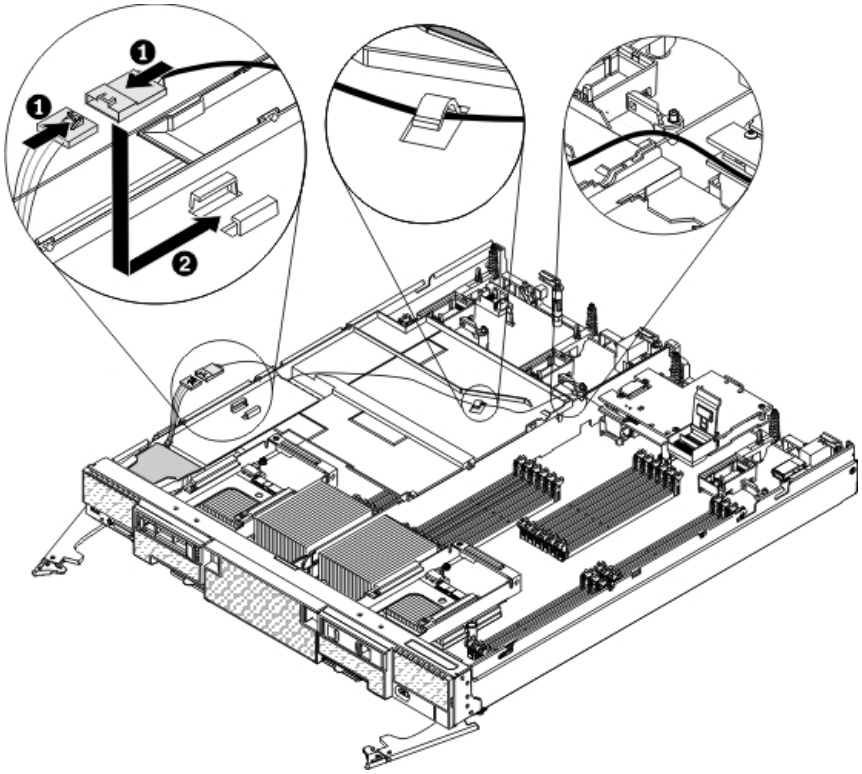
10. Install the new left air baffle.



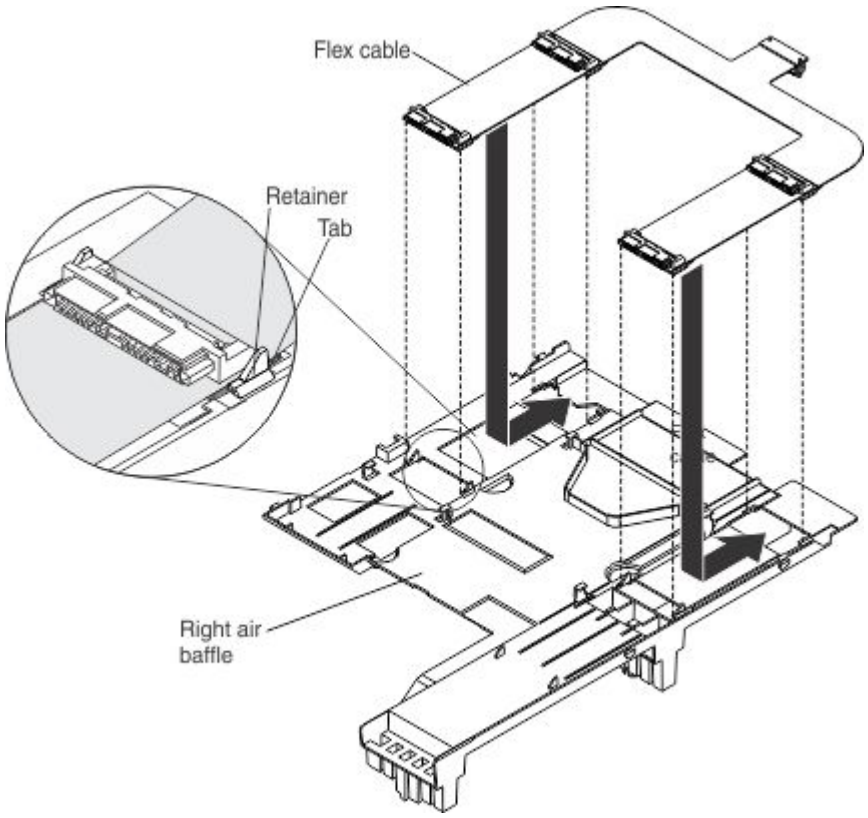
11. Attach the flash power module to the new left air baffle. With the flash power module cable out straight, slide the flash power module into the guides until it snaps into place.



12. Connect the larger end of the power cable to the flash power module cable **1** . Secure the cable under the tab on the air baffle **2** . Then, route the cable through the rear of the air baffle and the opening in the center divider.

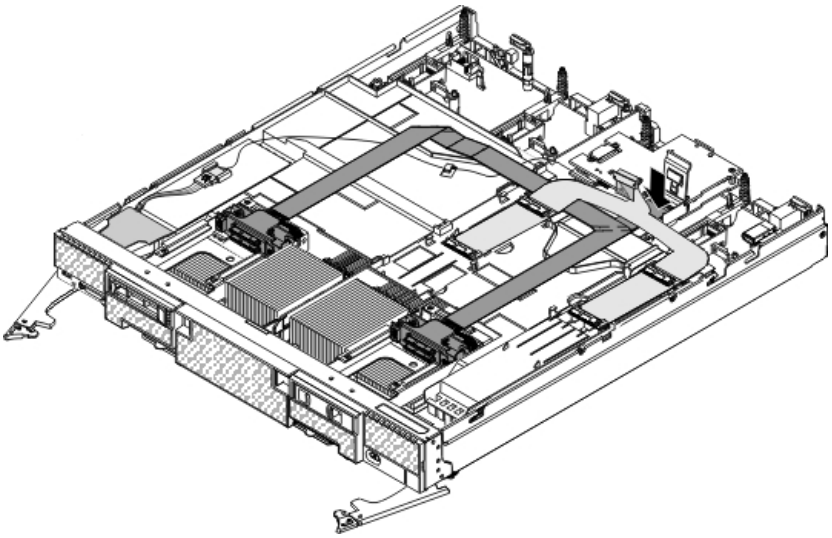


13. Connect the right air baffle to the solid-state drive flex cable:



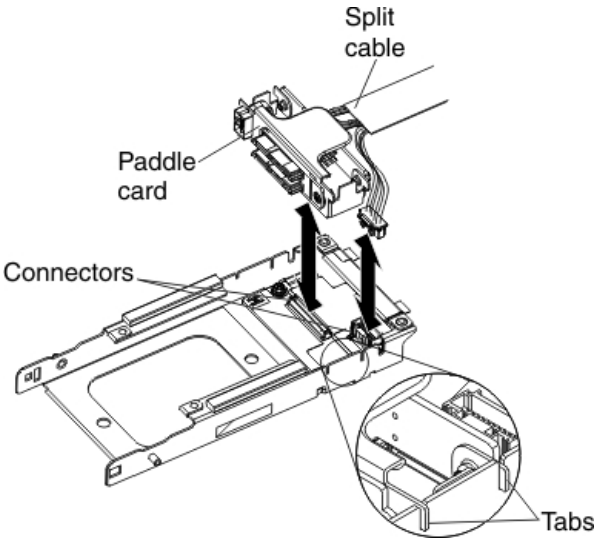
a. On a flat surface, orient the right air baffle and the solid-state drive flex cable.
b. Position the flex cable on the air baffle.
c. Press the flex cable with your thumbs and slide it backwards as you slide the tabs into the retainers. The flex cable clicks into place.

14. Install the right air baffle.
15. Connect the flex paddle card and cable assembly to the SSD cages and to the controller:
    a. Position the flex paddle card and cable assembly underneath the solid-state drive flex cable. Make sure that the controller connector on the flex paddle card and cable assembly is routed underneath the solid-state drive flex cable.



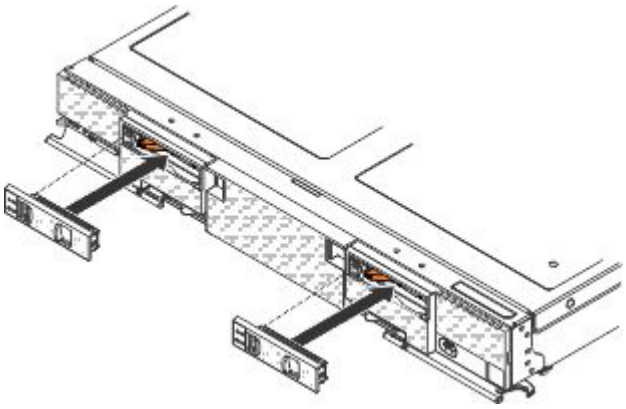
b. Open the connector door on the controller.

c. Press down firmly on the cable connector to connect it to the external drive flex cable connector on the controller. (For the location of the connector on the controller, see “ServeRAID controller connectors” on page 12.)



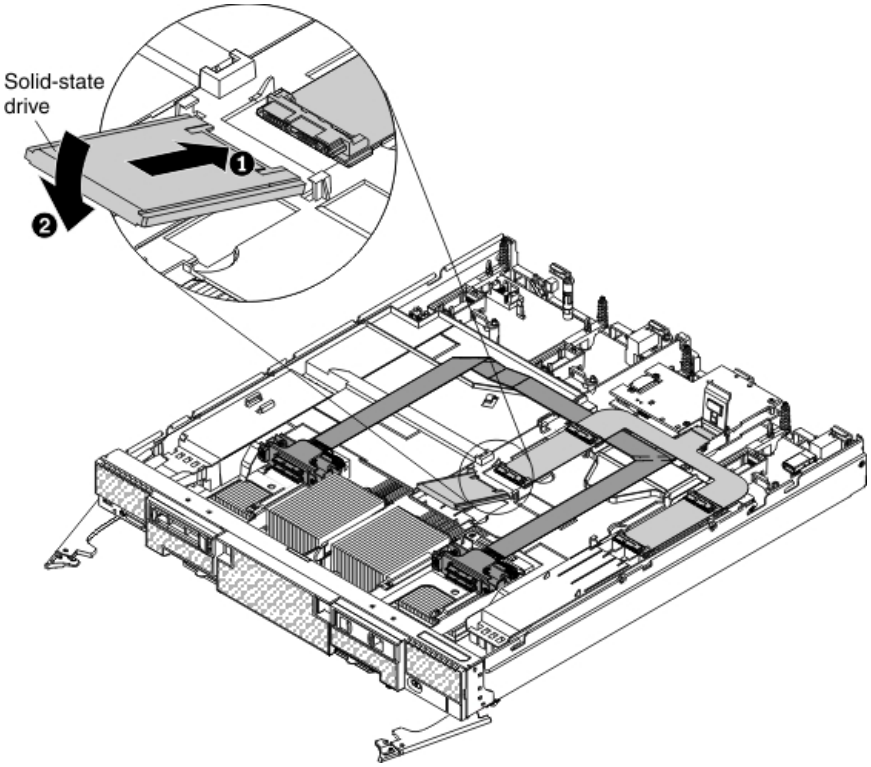
d. Align the tabs on the paddle card with the matching slots on the SSD cage and press the paddle card firmly in the SSD cage. Press the split cable into the connector in the cage.

16. Slide the SSD mounting sleeve in the compute node until the release latch on the mounting sleeve clicks into place. Repeat this step for the other bay.
17. Slide the solid state drives into the slots until they are firmly seated in the connectors and close the drive handles. Repeat this step for the other bay.
18. Install the new left and right solid-state drive bezels. Align the bezel with the front of the drive bay, press together the release tabs on the front of the bezel, and press the bezel into the drive bay. Repeat this step to install the other bezel.



Note: When preparing to install optional solid-state drives in the front drive bays, you remove the left and right solid-state drive bezels.

19. Install up to four solid-state drives in the connectors on the solid-state drive flex cable. Slide the solid-state drive into the connector until it is fully seated and carefully rest the solid-state drive on the flex cable.



20. Install the cover on the compute node (see “Installing the compute node cover” on page 8 for instructions).
21. Reinstall the compute node in the same node bay from which you removed it (see “Installing a compute node in a chassis” on page 5 for instructions).
22. Turn on the compute node. Make sure that the power LED on the compute node control panel is lit continuously, indicating that the compute node is receiving power and is turned on.
23. Use the Human Interface Infrastructure (HII) to configure the controller. To open the HII, turn on the compute node and when the prompt `<F1> Setup` is displayed, press F1. Then, select **System Settings > Storage > HII**.

You can also run the WebBIOS Configuration Utility to configure the drive groups and the virtual drives. To run the utility, turn on the compute node and when the message `Press <Ctrl><H> for WebBIOS` is displayed on the screen, immediately press Ctrl+H.

For detailed information about configuring drive groups and virtual drives, see the *ServeRAID M Software User's Guide* on the *ServeRAID M Documentation* CD.

24. Install the operating-system device driver.

    To view the operating systems that support the controller and to download the latest device drivers, go to http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/. For updates, go to http://www.ibm.com/supportportal/.

    Be sure to use the latest service pack for the operating system and review the readme file that accompanies the device driver. Be sure to install the software device drivers before you operate the controller.

Replaceable components

Field replaceable units (FRUs) must be replaced only by a trained service technician, unless they are classified as customer replaceable units (CRUs).

Tier 1 CRU: Replacement of Tier 1 CRUs is your responsibility. If Lenovo installs a Tier 1 CRU at your request without a service contract, you will be charged for the installation.

For more information about the terms of the warranty and getting service and assistance, see the *Warranty Information* document that comes with the optional device.

See the *Flex System x280 X6, x480 X6, and x880 X6 Compute Node Types 7196 and 4258 Installation and Service Guide* available at http://pic.dhe.ibm.com/infocenter/flexsys/information/index.jsp for the field replaceable units for the ServeRAID M5100 Series Flex System Flash Kit for X6.

For the field replaceable units for the ServeRAID M5115 SAS/SATA Controller for Flex System, see Table 1 on page 13.

Removing and replacing a flex paddle card and cable assembly

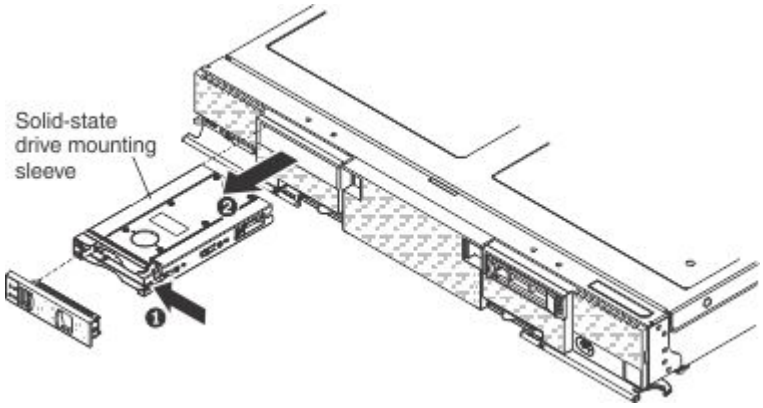
About this task

To remove and replace the flex paddle card and cable assembly, complete the following steps:

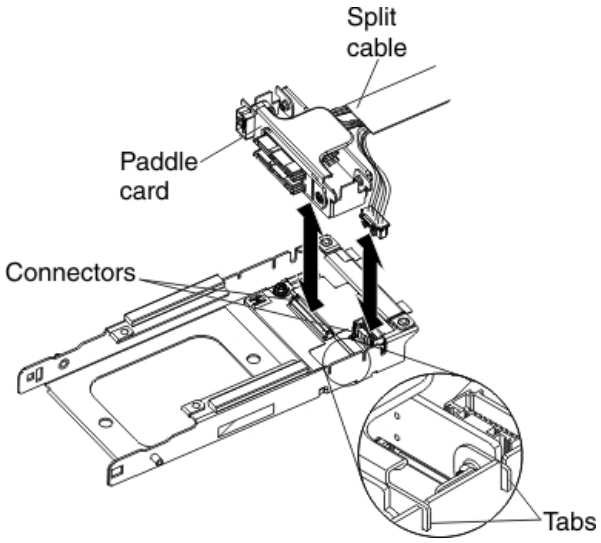
Procedure

1. Read the safety information that begins on page "Safety" on page v and "Handling static-sensitive devices" on page 3.
2. Remove the compute node from the chassis (see "Removing a compute node from a chassis" on page 4).
3. Remove the compute node cover (see "Removing the compute node cover" on page 6).
4. Remove the solid-state drive bezels. Press together the release tabs on the front of the bezel and pull the bezel away from the compute node.

5. Disconnect the solid-state drives by pressing the release latch (orange) on the drive to release the drive handle; then, use the drive handle to slide the drive out of the bay.
6. Using a tool such as a flat-blade screwdriver, gently pry open the release tab on the right side of the solid-state drive mounting sleeve while you push the rear of the sleeve forward and slide the sleeve out of the compute node approximately 12 mm (0.5 in.).



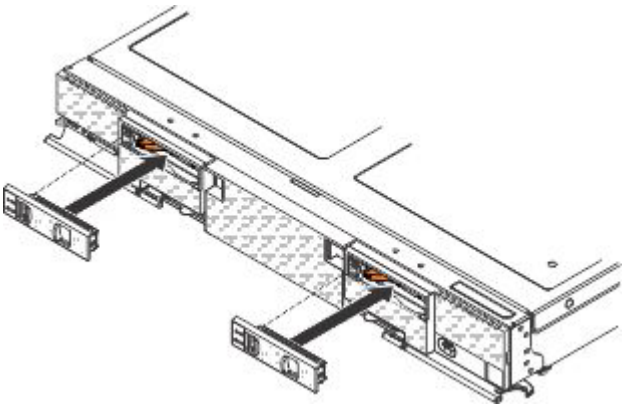
7. Remove the flex paddle card and cable assembly:



   a. Disconnect the split cable from the connector on the SSD cage.
   b. Lift up on the flex paddle card and cable assembly to disconnect it from the SSD cage.
   c. Lift up the plastic connector door on the controller and disconnect the flex paddle card and cable assembly from the controller.
8. Install the new flex paddle card and cable assembly:
   a. Touch the static-protective package that contains the new flex paddle card and cable assembly to any *unpainted* metal surface on the Flex System chassis or any *unpainted* metal surface on any other grounded rack component; then, remove the assembly from the package.
   b. Position the flex paddle card and cable assembly. Make sure that the controller connector on the flex paddle card and cable assembly is routed underneath the solid-state drive flex cable.

c. Install the paddle card firmly in the SSD cage and press the split cable into the connector on the board.
d. Lift up the plastic connector door on the controller.
e. Press down firmly on the flex paddle card and cable assembly to connect it to the controller.

9. Slide the solid-state drive mounting sleeve into the drive bay until it is fully seated.
10. Reconnect the drives by sliding them fully into the bay and closing the drive tray handle.
11. Align the bezel with the front of the drive bay, press together the release tabs, and press the bezel onto the compute node. Repeat this step to install the other bezel.



12. Install the cover on the compute node (see “Installing the compute node cover” on page 8 for instructions).
13. Reinstall the compute node in the same node bay from which you removed it (see “Installing a compute node in a chassis” on page 5 for instructions).
14. Turn on the compute node. Make sure that the power LED on the compute node control panel is lit continuously, indicating that the compute node is receiving power and is turned on.

Removing and replacing the internal solid-state drive flex cable

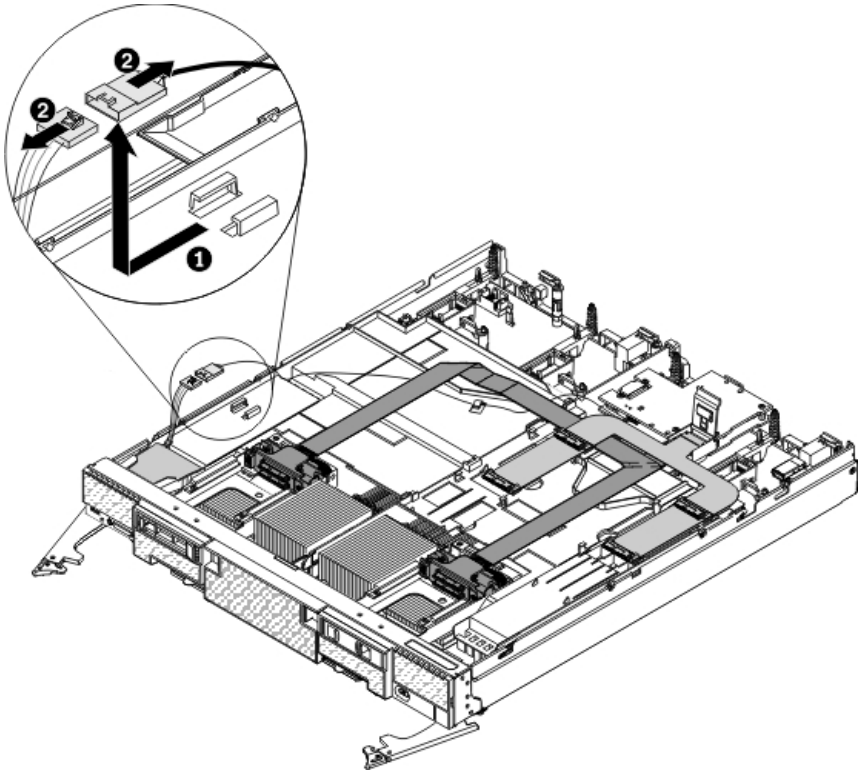
About this task

To remove and replace the internal solid-state drive flex cable, complete the following steps:

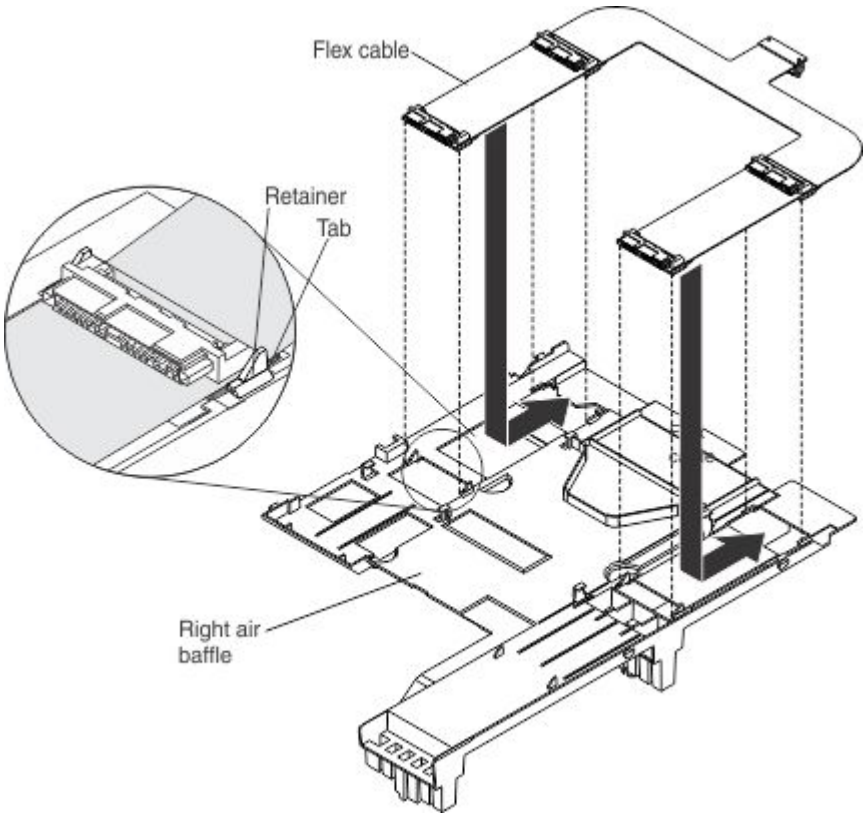
Procedure

1. Read the safety information that begins on page “Safety” on page v and “Handling static-sensitive devices” on page 3.
2. If you have not already done so, remove the compute node from the chassis and remove the cover. For more information, see “Removing a compute node from a chassis” on page 4 and “Removing the compute node cover” on page 6.
3. Remove the four solid-state drives that are connected to the solid-state drive flex cable.
4. Open the plastic door cover on the ServeRAID controller and disconnect the solid-state drive flex cable.

5. Slide the power cable and flash power module cable out from the tabs on the air baffle **1** . Then, disconnect the power cable from the flash power module cable **2** .

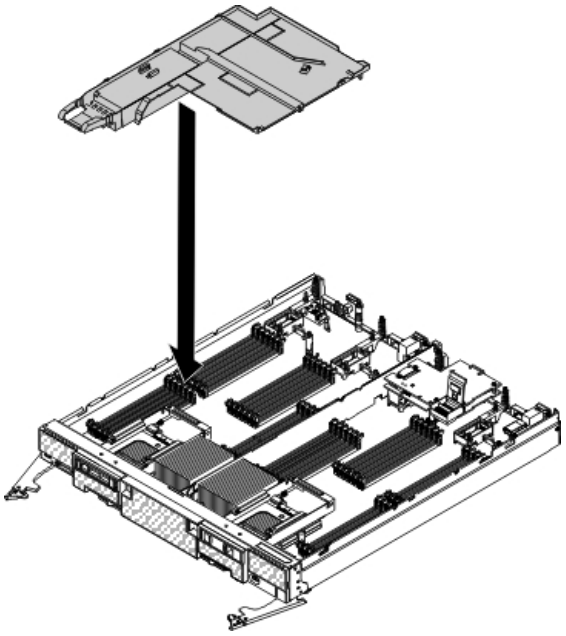


6. Remove the air baffles by unlatching the release tab on the side wall. Lift the air baffles up and toward the rear of the compute node.
7. Press on the flex cable and slide it away from the air baffles to detach it.
8. Touch the static-protective package that contains the new solid-state drive flex cable to any *unpainted* metal surface on the Flex System chassis or any *unpainted* metal surface on any other grounded rack component; then, remove the flex cable from the package.
9. Connect the left and right air baffles to the solid-state drive flex cable:

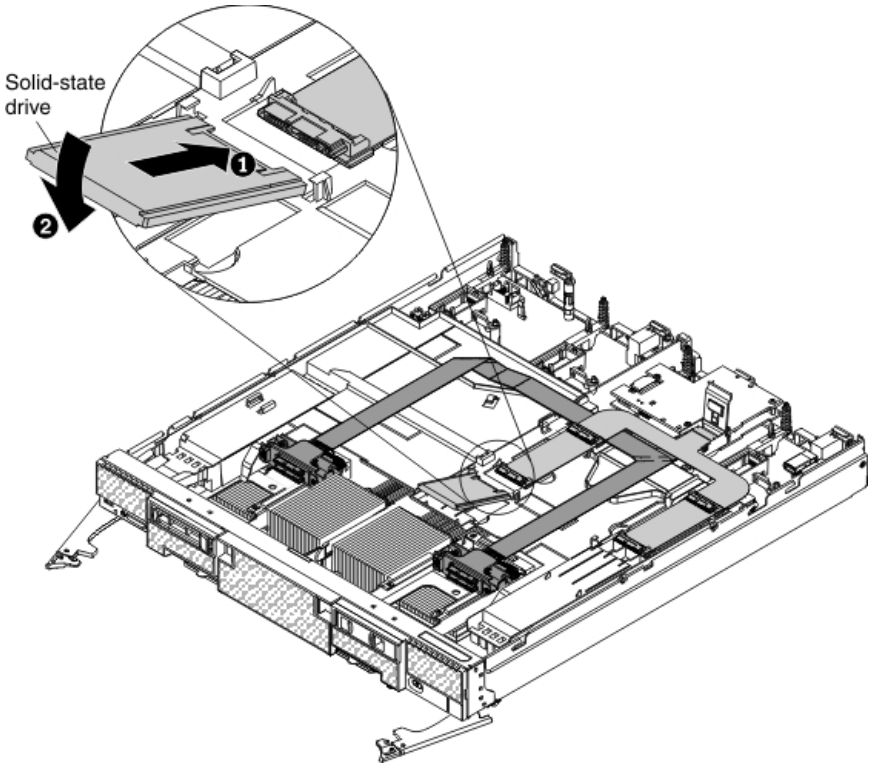


a. Align the left side of the flex cable on top of the new left air baffle, with the tabs on the flex cable in front of the retainers on the air baffle.
b. Gently press on the flex cable with your thumbs and slide it away from you as you slide the tabs into the retainers. The flex cable clicks into place.
c. Repeat steps 9a and 9b to connect the right side of the flex cable to the right air baffle.

10. Install the air baffles and flex cable in the compute node.



11. Press down firmly on the solid-state drive flex cable connector to connect it to the internal solid-state drive flex cable connector on the controller. (For the location of the connector on the controller, see the illustration in "ServeRAID controller connectors" on page 12.)
12. Reinstall the solid-state drives in the connectors on the flex cable. Slide the solid-state drive into the connector until it is fully seated **1** and carefully lower the drive **2** so that it rests flat on the flex cable.



13. Install the cover on the compute node (see "Installing the compute node cover" on page 8 for instructions).
14. Reinstall the compute node in the same node bay from which you removed it (see "Installing a compute node in a chassis" on page 5 for instructions).
15. Turn on the compute node. Make sure that the power LED on the compute node control panel is lit continuously, indicating that the compute node is receiving power and is turned on.

Removing and replacing the flash power module

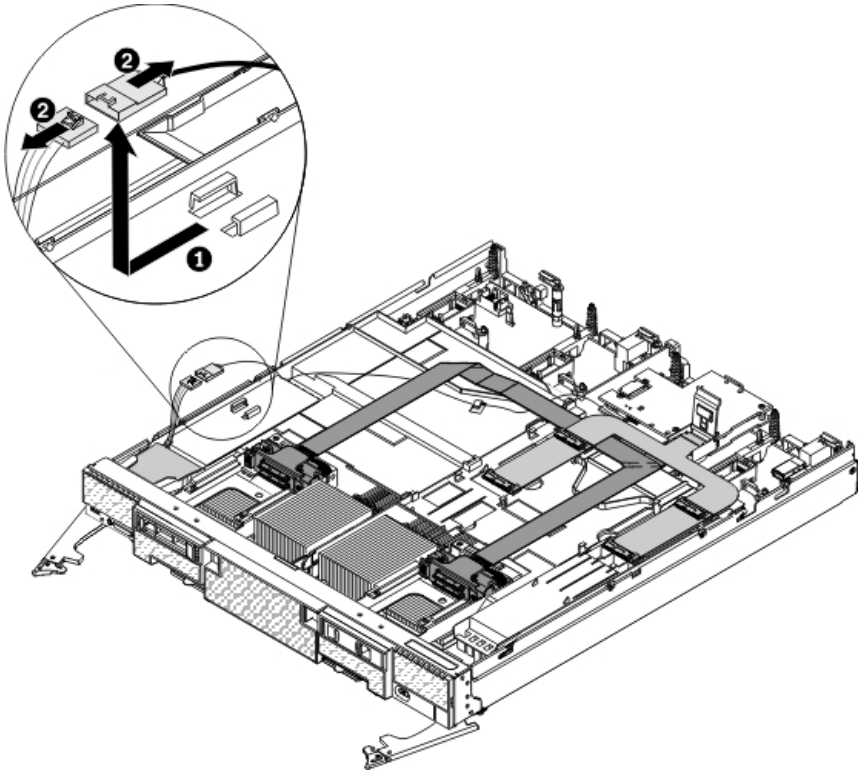
About this task

To remove and replace the flash power module, complete the following steps:

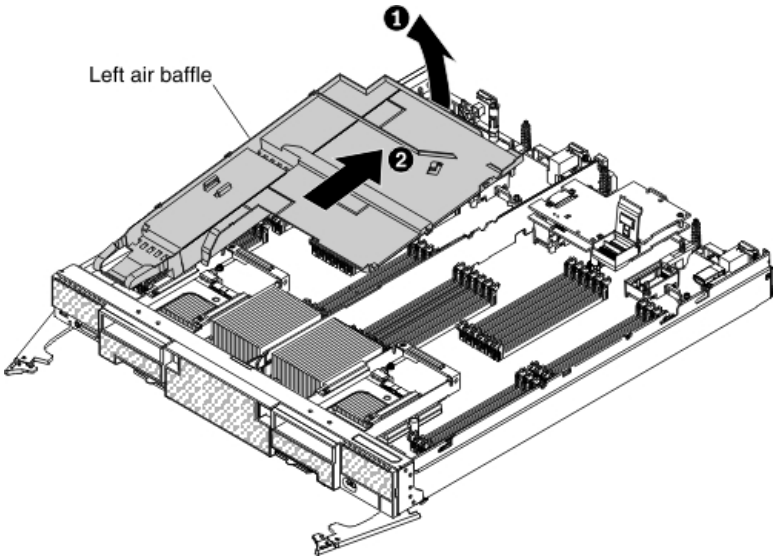
Procedure

1. Read the safety information that begins on page "Safety" on page v and "Handling static-sensitive devices" on page 3.
2. Remove the compute node from the chassis (see "Removing a compute node from a chassis" on page 4).
3. Remove the compute node cover (see "Removing the compute node cover" on page 6).

4. Slide the power cable and flash power module cable out from the tabs on the air baffle **1** .



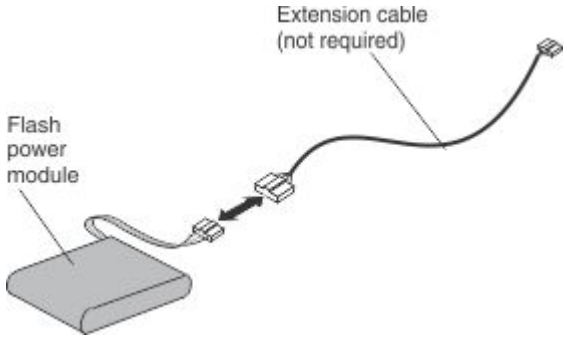
5. Disconnect the power cable from the flash power module cable **2** .
6. Remove the left air baffle by unlatching the tab on the side wall and lifting the air baffle up and toward the back of the compute node.



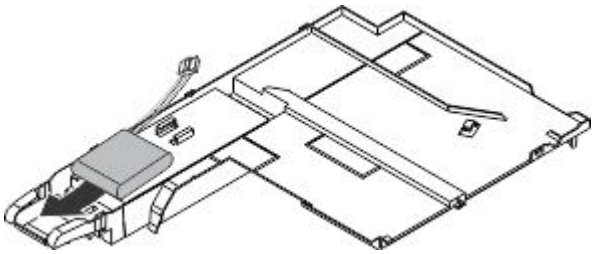
7. Slide the flash power module out of the slot under the guides on the end of the air baffle.
8. Attach the new flash power module to the air baffle:

a. Touch the static-protective package that contains the new flash power module to any *unpainted* metal surface on the Flex System chassis or any *unpainted* metal surface on any other grounded rack component; then, remove it from the package.

b. Remove the extension cable from the flash power module cable. The extension cable comes with the replacement flash power module but is not required for this procedure.

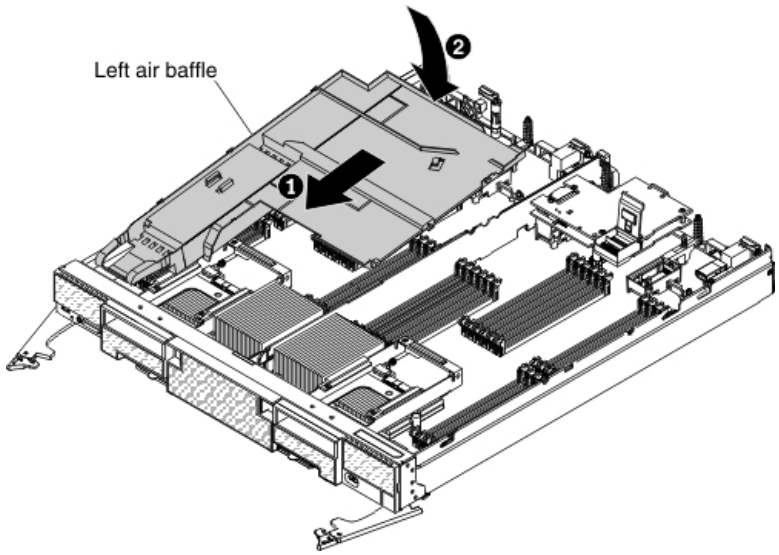


c. With the flash power module cable out straight, slide the flash power module cable first into the slot under the guides on the end of the air baffle until it snaps into place.



9. Install the air baffle in the compute node:

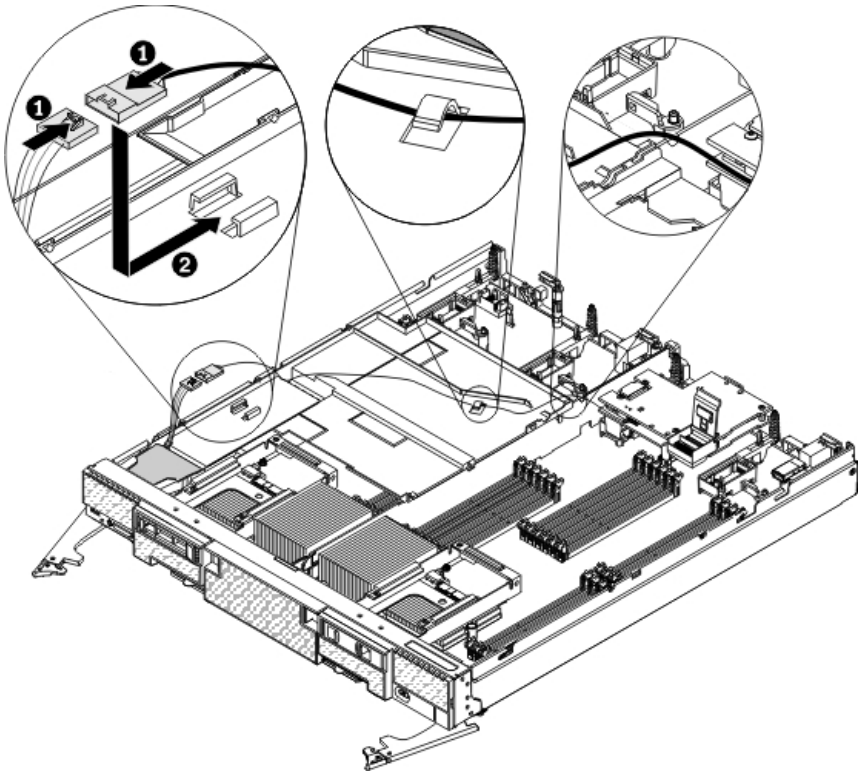
a. Orient the air baffle so that the flash power module end is at the left front of the compute node.



b. Tilt the air baffle and place it under the bezel in the front of the compute node.

c. Align the air baffle in the compute node and place it on top of the DIMMs.

10. Connect the larger end of the power cable to the flash power module cable **1** . Slide the connected cables under the tabs on the air baffle **2** . Then, push the extra power module cable under the lip on the side of the air baffle **3** .



11. Install the cover on the compute node (see “Installing the compute node cover” on page 8 for instructions).
12. Reinstall the compute node in the same node bay from which you removed it (see “Installing a compute node in a chassis” on page 5 for instructions).
13. Turn on the compute node. Make sure that the power LED on the compute node control panel is lit continuously, indicating that the compute node is receiving power and is turned on.

Removing and replacing a solid-state drive mounting sleeve

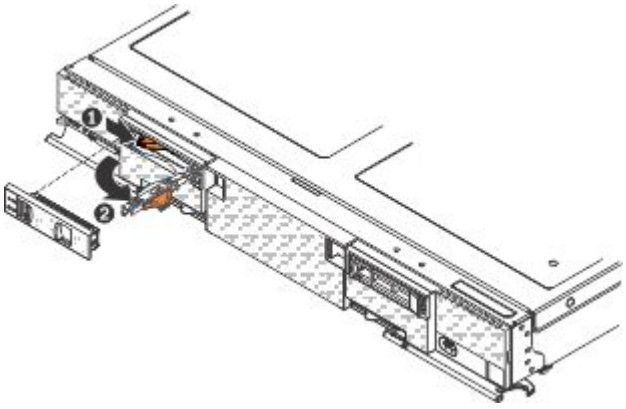
About this task

To remove and replace a solid-state drive mounting sleeve, complete the following steps:

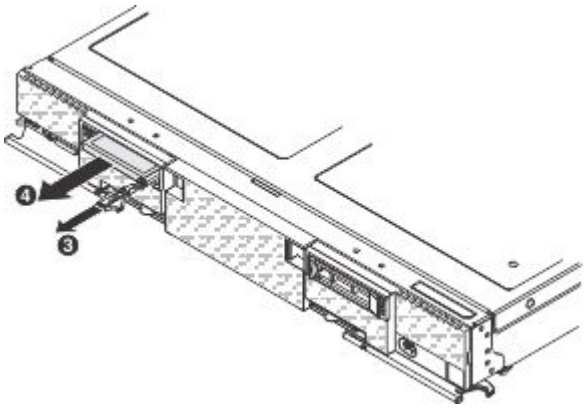
Procedure

1. Read the safety information that begins on page “Safety” on page v and “Handling static-sensitive devices” on page 3.
2. If you have not already done so, remove the compute node from the chassis. For more information, see “Removing a compute node from a chassis” on page 4.
3. Remove the solid-state drive bezel. Press together the tabs on the front of the bezel and pull the bezel away from the compute node.
4. Remove the two solid-state drives:

a. Press the mounting sleeve release latch to the right **1** and rotate the loose end of the retention lever away from the compute node **2**.

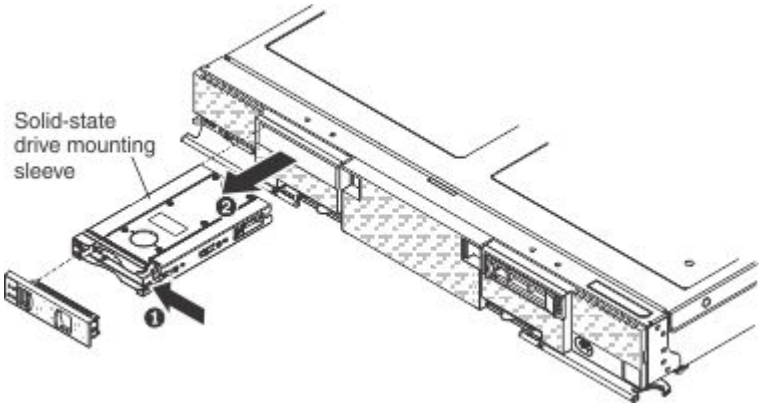


b. Pull the retention lever toward you **3** to slide the drive completely out of the mounting sleeve **4**. Repeat this step to remove the other drive in the sleeve.

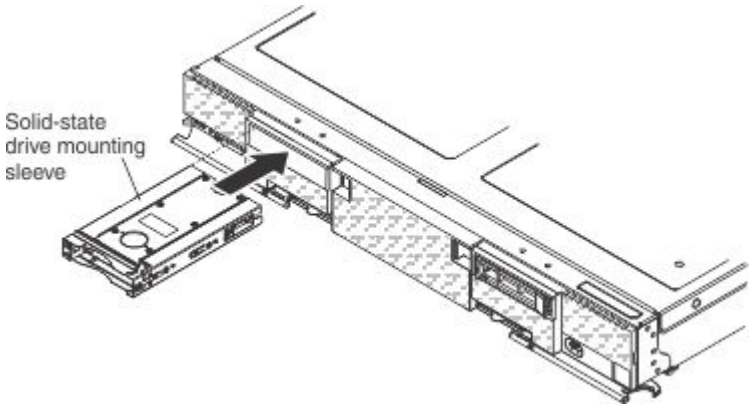


c. Close the two mounting sleeve retention levers.

5. Using a tool such as a flat-blade screwdriver, gently pry open the release tab on the right side of the solid-state drive mounting sleeve while you push the rear of the sleeve forward and slide the sleeve out of the compute node.



6. Remove the new solid-state drive mounting sleeve from the packaging and make sure that the two retention levers on the front of the sleeve are closed.



7. Slide the solid-state drive mounting sleeve into the drive bay until it is fully seated.
8. Reinstall the solid-state drives in the solid-state drive mounting sleeve.
9. Install the solid-state drive bezel. Align the bezel with the front of the drive bay, press together the release tabs on the front of the bezel, and press the bezel onto the compute node.
10. Reinstall the compute node in the same node bay from which you removed it (see "Installing a compute node in a chassis" on page 5 for instructions).
11. Turn on the compute node. Make sure that the power LED on the compute node control panel is lit continuously, indicating that the compute node is receiving power and is turned on.

Appendix. Getting help and technical assistance

If you need help, service, or technical assistance or just want more information about Lenovo products, you will find a wide variety of sources available from Lenovo to assist you.

Use this information to obtain additional information about Lenovo and Lenovo products, and determine what to do if you experience a problem with your Lenovo system or optional device.

Note: This section includes references to IBM web sites and information about obtaining service. IBM is Lenovo's preferred service provider for the System x, Flex System, and NeXtScale System products.

Before you call

Before you call, make sure that you have taken these steps to try to solve the problem yourself.

If you believe that you require warranty service for your Lenovo product, the service technicians will be able to assist you more efficiently if you prepare before you call.

- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system and any optional devices are turned on.
- Check for updated software, firmware, and operating-system device drivers for your Lenovo product. The Lenovo Warranty terms and conditions state that you, the owner of the Lenovo product, are responsible for maintaining and updating all software and firmware for the product (unless it is covered by an additional maintenance contract). Your service technician will request that you upgrade your software and firmware if the problem has a documented solution within a software upgrade.
- If you have installed new hardware or software in your environment, check http://www.ibm.com/systems/info/x86servers/serverproven/compat/us/ to make sure that the hardware and software is supported by your product.
- Go to http://www.ibm.com/supportportal to check for information to help you solve the problem.
- Gather the following information to provide to the service technician. This data will help the service technician quickly provide a solution to your problem and ensure that you receive the level of service for which you might have contracted.
  - Hardware and Software Maintenance agreement contract numbers, if applicable
  - Machine type number (Lenovo 4-digit machine identifier)
  - Model number
  - Serial number
  - Current system UEFI and firmware levels
  - Other pertinent information such as error messages and logs
- Go to http://www.ibm.com/support/entry/portal/Open_service_request to submit an Electronic Service Request. Submitting an Electronic Service Request

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will start the process of determining a solution to your problem by making the pertinent information available to the service technicians. The IBM service technicians can start working on your solution as soon as you have completed and submitted an Electronic Service Request.

You can solve many problems without outside assistance by following the troubleshooting procedures that Lenovo provides in the online help or in the Lenovo product documentation. The Lenovo product documentation also describes the diagnostic tests that you can perform. The documentation for most systems, operating systems, and programs contains troubleshooting procedures and explanations of error messages and error codes. If you suspect a software problem, see the documentation for the operating system or program.

Using the documentation

Information about your Lenovo system and preinstalled software, if any, or optional device is available in the product documentation. That documentation can include printed documents, online documents, readme files, and help files.

See the troubleshooting information in your system documentation for instructions for using the diagnostic programs. The troubleshooting information or the diagnostic programs might tell you that you need additional or updated device drivers or other software. Lenovo maintains pages on the World Wide Web where you can get the latest technical information and download device drivers and updates. To access these pages, go to http://www.ibm.com/supportportal.

Getting help and information from the World Wide Web

Up-to-date information about Lenovo products and support is available on the World Wide Web.

On the World Wide Web, up-to-date information about Lenovo systems, optional devices, services, and support is available at http://www.ibm.com/supportportal. The most current version of the product documentation is available in the following product-specific Information Centers:

Flex System products:
http://pic.dhe.ibm.com/infocenter/flexsys/information/index.jsp

System x products:
http://www.ibm.com/systems/x/

NeXtScale System products:
http://pic.dhe.ibm.com/infocenter/nxtscale/documentation/index.jsp

How to send DSA data

You can use the Enhanced Customer Data Repository to send diagnostic data to IBM.

Before you send diagnostic data to IBM, read the terms of use at http://www.ibm.com/de/support/ecurep/terms.html.

You can use any of the following methods to send diagnostic data:

- **Standard upload:** http://www.ibm.com/de/support/ecurep/send_http.html
- **Standard upload with the system serial number:** http://www.ecurep.ibm.com/app/upload_hw

- **Secure upload:** http://www.ibm.com/de/support/ecurep/send_http.html#secure
- **Secure upload with the system serial number:** https://www.ecurep.ibm.com/app/upload_hw

Creating a personalized support web page

You can create a personalized support web page by identifying Lenovo products that are of interest to you.

To create a personalized support web page, go to http://www.ibm.com/support/mynotifications. From this personalized page, you can subscribe to weekly email notifications about new technical documents, search for information and downloads, and access various administrative services.

Software service and support

Through IBM Support Line, you can get telephone assistance, for a fee, with usage, configuration, and software problems with your Lenovo products.

For more information about Support Line and other IBM services, see http://www.ibm.com/services or see http://www.ibm.com/planetwide/ for support telephone numbers. In the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

Hardware service and support

IBM is Lenovo's preferred service provider for the System x, Flex System and NeXtScale System products.

You can receive hardware service through your Lenovo reseller or from IBM. To locate a reseller authorized by Lenovo to provide warranty service, go to http://www.ibm.com/partnerworld/ and click **Business Partner Locator**. For IBM support telephone numbers, see http://www.ibm.com/planetwide/. In the U.S. and Canada, call 1-800-IBM-SERV (1-800-426-7378).

In the U.S. and Canada, hardware service and support is available 24 hours a day, 7 days a week. In the U.K., these services are available Monday through Friday, from 9 a.m. to 6 p.m.

Taiwan product service

Use this information to contact IBM Taiwan product service.

台灣 IBM 產品服務聯絡方式：
台灣國際商業機器股份有限公司
台北市松仁路 7 號 3 樓
電話：0800-016-888

IBM Taiwan product service contact information:

IBM Taiwan Corporation
3F, No 7, Song Ren Rd.
Taipei, Taiwan
Telephone: 0800-016-888

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Important notes

Processor speed indicates the internal clock speed of the microprocessor; other factors also affect application performance.

CD or DVD drive speed is the variable read rate. Actual speeds vary and are often less than the possible maximum.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for 1 024 bytes, MB stands for 1 048 576 bytes, and GB stands for 1 073 741 824 bytes.

When referring to hard disk drive capacity or communications volume, MB stands for 1 000 000 bytes, and GB stands for 1 000 000 000 bytes. Total user-accessible capacity can vary depending on operating environments.

Maximum internal hard disk drive capacities assume the replacement of any standard hard disk drives and population of all hard-disk-drive bays with the largest currently supported drives that are available from Lenovo.

Maximum memory might require replacement of the standard memory with an optional memory module.

Each solid-state memory cell has an intrinsic, finite number of write cycles that the cell can incur. Therefore, a solid-state device has a maximum number of write cycles that it can be subjected to, expressed as `total bytes written` (TBW). A device that has exceeded this limit might fail to respond to system-generated commands or might be incapable of being written to. Lenovo is not responsible for replacement of a device that has exceeded its maximum guaranteed number of program/erase cycles, as documented in the Official Published Specifications for the device.

Lenovo makes no representations or warranties with respect to non-Lenovo products. Support (if any) for the non-Lenovo products is provided by the third party, not Lenovo.

Some software might differ from its retail version (if available) and might not include user manuals or all program functionality.

Recycling information

Lenovo encourages owners of information technology (IT) equipment to responsibly recycle their equipment when it is no longer needed. Lenovo offers a variety of programs and services to assist equipment owners in recycling their IT products. For information on recycling Lenovo products, go to: http://www.lenovo.com/recycling.

Particulate contamination

Attention: Airborne particulates (including metal flakes or particles) and reactive gases acting alone or in combination with other environmental factors such as humidity or temperature might pose a risk to the device that is described in this document.

Risks that are posed by the presence of excessive particulate levels or concentrations of harmful gases include damage that might cause the device to malfunction or cease functioning altogether. This specification sets forth limits for particulates and gases that are intended to avoid such damage. The limits must not be viewed or used as definitive limits, because numerous other factors, such as temperature or moisture content of the air, can influence the impact of particulates or environmental corrosives and gaseous contaminant transfer. In the absence of specific limits that are set forth in this document, you must implement practices that maintain particulate and gas levels that are consistent with the protection of human health and safety. If Lenovo determines that the levels of particulates or gases in your environment have caused damage to the device, Lenovo may condition provision of repair or replacement of devices or parts on implementation of appropriate remedial measures to mitigate such environmental contamination. Implementation of such remedial measures is a customer responsibility.

Table 8. Limits for particulates and gases

Contaminant	Limits
Particulate	• The room air must be continuously filtered with 40% atmospheric dust spot efficiency (MERV 9) according to ASHRAE Standard 52.2[1]. • Air that enters a data center must be filtered to 99.97% efficiency or greater, using high-efficiency particulate air (HEPA) filters that meet MIL-STD-282. • The deliquescent relative humidity of the particulate contamination must be more than 60%[2]. • The room must be free of conductive contamination such as zinc whiskers.
Gaseous	• Copper: Class G1 as per ANSI/ISA 71.04-1985[3] • Silver: Corrosion rate of less than 300 Å in 30 days

Table 8. Limits for particulates and gases (continued)

Contaminant	Limits
[1] ASHRAE 52.2-2008 - *Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size*. Atlanta: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. [2] The deliquescent relative humidity of particulate contamination is the relative humidity at which the dust absorbs enough water to become wet and promote ionic conduction. [3] ANSI/ISA-71.04-1985. *Environmental conditions for process measurement and control systems: Airborne contaminants*. Instrument Society of America, Research Triangle Park, North Carolina, U.S.A.	

Telecommunication regulatory statement

This product may not be certified in your country for connection by any means whatsoever to interfaces of public telecommunications networks. Further certification may be required by law prior to making any such connection. Contact a Lenovo representative or reseller for any questions.

Electronic emission notices

When you attach a monitor to the equipment, you must use the designated monitor cable and any interference suppression devices that are supplied with the monitor.

Federal Communications Commission (FCC) statement

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 not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Properly shielded and grounded cables and connectors must be used in order to meet FCC emission limits. Lenovo is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

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, and (2) this device must accept any interference received, including interference that might cause undesired operation.

Industry Canada Class A emission compliance statement

This Class A digital apparatus complies with Canadian ICES-003.

Avis de conformité à la réglementation d'Industrie Canada

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Australia and New Zealand Class A statement

Attention: 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.

European Union EMC Directive conformance statement

This product is in conformity with the protection requirements of EU Council Directive 2004/108/EC on the approximation of the laws of the Member States relating to electromagnetic compatibility. Lenovo cannot accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the installation of option cards from other manufacturers.

This product has been tested and found to comply with the limits for Class A Information Technology Equipment according to European Standard EN 55022. The limits for Class A equipment were derived for commercial and industrial environments to provide reasonable protection against interference with licensed communication equipment.

Lenovo, Einsteinova 21, 851 01 Bratislava, Slovakia

Germany Class A statement

Deutschsprachiger EU Hinweis: Hinweis für Geräte der Klasse A EU-Richtlinie zur Elektromagnetischen Verträglichkeit

Deutschsprachiger EU Hinweis: Hinweis für Geräte der Klasse A EU-Richtlinie zur Elektromagnetischen Verträglichkeit Dieses Produkt entspricht den Schutzanforderungen der EU-Richtlinie 2004/108/EG (früher 89/336/EWG) zur Angleichung der Rechtsvorschriften über die elektromagnetische Verträglichkeit in den EU-Mitgliedsstaaten und hält die Grenzwerte der EN 55022 Klasse A ein.

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Deutschland:

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Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Betriebsmitteln, EMVG vom 20. Juli 2007

(früher Gesetz über die elektromagnetische Verträglichkeit von Geräten), bzw. der EMV EG Richtlinie 2004/108/EC (früher 89/336/EWG), für Geräte der Klasse A.

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Informationen in Hinsicht EMVG Paragraf 4 Abs. (1) 4: **Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55022 Klasse A.**

Nach der EN 55022: „Dies ist eine Einrichtung der Klasse A. Diese Einrichtung kann im Wohnbereich Funkstörungen verursachen; in diesem Fall kann vom Betreiber verlangt werden, angemessene Maßnahmen durchzuführen und dafür aufzukommen.“

Nach dem EMVG: „Geräte dürfen an Orten, für die sie nicht ausreichend entstört sind, nur mit besonderer Genehmigung des Bundesministers für Post und Telekommunikation oder des Bundesamtes für Post und Telekommunikation betrieben werden. Die Genehmigung wird erteilt, wenn keine elektromagnetischen Störungen zu erwarten sind.“ (Auszug aus dem EMVG, Paragraph 3, Abs. 4). Dieses Genehmigungsverfahren ist nach Paragraph 9 EMVG in Verbindung mit der entsprechenden Kostenverordnung (Amtsblatt 14/93) kostenpflichtig.

Anmerkung: Um die Einhaltung des EMVG sicherzustellen sind die Geräte, wie in den Handbüchern angegeben, zu installieren und zu betreiben.

Japan VCCI Class A statement

この装置は、クラス A 情報技術装置です。この装置を家庭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

This is a Class A product based on the standard of the Voluntary Control Council for Interference (VCCI). If this equipment is used in a domestic environment, radio interference may occur, in which case the user may be required to take corrective actions.

Japan Electronics and Information Technology Industries Association (JEITA) statement

高調波ガイドライン準用品

Japan Electronics and Information Technology Industries Association (JEITA) Confirmed Harmonics Guidelines with Modifications (products greater than 20 A per phase)

Korea Communications Commission (KCC) statement

이 기기는 업무용(A급)으로 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

This is electromagnetic wave compatibility equipment for business (Type A). Sellers and users need to pay attention to it. This is for any areas other than home.

Russia Electromagnetic Interference (EMI) Class A statement

ВНИМАНИЕ! Настоящее изделие относится к классу А.
В жилых помещениях оно может создавать радиопомехи, для снижения которых необходимы дополнительные меры

People's Republic of China Class A electronic emission statement

中华人民共和国“A类”警告声明

声 明

此为A级产品，在生活环境中，该产品可能会造成无线电干扰。在这种情况下，可能需要用户对其干扰采取切实可行的措施。

Taiwan Class A compliance statement

警告使用者:
這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

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