Hardware Installation Guide for Cisco UCS E-Series Servers

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This document provides information that you should know before and during installation of Cisco UCS E-Series Servers in Cisco Integrated Services Routers (ISR G2), and contains the following sections:

Cisco UCS E-Series Servers Overview

The Cisco UCS E-Series Servers (E-Series Servers) are the next generation of Cisco UCS Express servers. E-Series Servers are a family of size, weight, and power efficient blade servers that are housed within Generation 2 Cisco Integrated Services Routers (ISR G2). These servers provide a general purpose compute platform for branch-office applications deployed either as bare-metal on operating systems, such as Microsoft Windows or Linux; or as virtual machines on hypervisors, such as VMware vSphere Hypervisor[TM], Microsoft Hyper-V, or Citrix XenServer.

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Hardware Requirements

E-Series Servers reside in the Cisco 2900 series or 3900 series ISR G2. The following E-Series Servers are supported:

- UCS-E140S—Single-wide E-Series Server
- UCS-E140D—Double-wide E-Series Server, 4 core CPU
- UCS-E160D—Double-wide E-Series Server, 6 core CPU
- UCS-E140DP—Double-wide E-Series Server, 4 core CPU, with PCIe
- UCS-E160DP—Double-wide E-Series Server, 6 core CPU, with PCIe

Table 1 provides hardware information about E-Series Servers.

Table 1   *E-Series Server Hardware at a Glance*

Feature	UCS-E140S Single-Wide E-Series Server)	UCS-E140D and UCS-E160D Double-Wide E-Series Servers	UCS-E140DP and UCS-E160DP Double-Wide E-Series Servers with PCIe
Form Factor	Single-wide SM	Double-wide SM	Double-wide SM
CPU	Intel Xeon™ E3-1105C	Intel Xeon™ E5-2428L and E5-2418L	Intel Xeon™ E5-2428L and E5-2418L
CPU Cores	4 Core	4 Core and 6 Core	4 Core and 6 Core
DIMM Slots	2 Slots	3 Slots	3 Slots
RAM	8 GB - 16 GB Supports DDR3 1333MHz VLP UDIMM 1.5 V, 4 GB, and 8 GB	8 GB - 48 GB Supports DDR3 1333 MHz RDIMM 1.35 V, 4 GB, 8 GB and 16 GB	8 GB - 48 GB Supports DDR3 1333 MHz RDIMM 1.35 V, 4 GB, 8 GB, and 16 GB
RAID	RAID 0 and RAID 1	RAID 0, RAID 1, and RAID 5	RAID 0 and RAID 1
Storage Type	SATA, SAS, SSD, and SED	SATA, SAS, SSD, and SED	SATA, SAS, SSD, and SED
HDD	SAS 10K RPM, SATA 7200 RPM, and SAS SSD Drives[1] Supports 2 Drives	SAS 10K RPM, SATA 7200 RPM, and SAS SSD Drives[1] Supports 3 Drives	SAS 10K RPM, SATA 7200 RPM, and SAS SSD Drives[1] Supports 2 Drives
Storage Capacity	200 GB - 2 TB	200 GB - 3 TB	200 GB - 2 TB
Internal Network Interface	2 Gigabit Ethernet Interfaces	2 Gigabit Ethernet Interfaces	2 Gigabit Ethernet Interfaces
External Interfaces	1 USB Connector 1 RJ-45 Gigabit Ethernet Connector 1 Management Port 1 KVM Port (Supports VGA, 1 USB, 1 Serial DB9)	2 USB Connectors 2 RJ-45 Gigabit Ethernet Connectors 1 Management Port 1 VGA Port 1 Serial DB9	2 USB Connectors 2 RJ-45 Gigabit Ethernet Connectors 1 Management Port 1 VGA Port 1 Serial DB9

Table 1   E-Series Server Hardware at a Glance (continued)

Router Platforms	2911, 2921, 2951, 3925, 3925e, 3945, 3945e	2921, 2951[2], 3925, 3925e, 3945, 3945e	2921, 2951[2], 3925, 3925e, 3945, 3945e
Maximum Number of E-Series Servers Per ISR G2	2900 ISR G2—1 E-Series Server 2951 ISR G2—2 E-Series Servers 3925 ISR G2—2 E-Series Servers 3945 ISR G2—4 E-Series Servers	2900 ISR G2—1 E-Series Server 3900 ISR G2—1 E-Series Server	2900 ISR G2—1 E-Series Server 3900 ISR G2—1 E-Series Server

1. All hardware drives within the E-Series Server must be installed with the same type of storage device; either all SAS drives or all SATA drives.

2. 2921 and 2951 support 4-core only.

Supported PCIe Cards and SFP Transceivers

The Double-wide E-Series Server supports the PCIe cards listed in Table 2.

Table 2   Supported PCIe Cards

PCIe Card SKU	Description
E100-PCIE10GEFCOE	1 port SFP+,PCIe,10GE fiber, FCOE support
E100-PCIE-4PGE	4 port GE, PCIe card, RJ-45

Table 3 lists the supported SFP transceivers that are supported on the E100-PCIE10GEFCOE.

Table 3   Supported SFP transceivers on the E100-PCIE10GEFCOE

SFP	Description
SFP-H10GB-CU1M	SFP+ 10GBASE-CU 1 Meter cable, passive
SFP-H10GB-CU3M	SFP+ 10GBASE-CU 3 Meter cable, passive
SFP-H10GB-CU5M	SFP+ 10GBASE-CU 5 Meter cable, passive
SFP-H10GB-ACU7M	SFP+ 10GBASE-CU 7 Meter cable, active
SFP-H10GB-ACU10M	SFP+ 10GBASE-CU 10 Meter cable, active
JDSU (PLRXPL-SC-S43-22-N) SFP+	SFP+ (Optical)
Cisco SFP-10G-SR	SFP+ 10GBase- SR (Optical)

E-Series Servers

E-Series Servers are available in the following two factor form:

- Single-wide interface (See Figure 1 and Figure 3)
- Double-wide interface (See Figure 4 and Figure 5)

Figure 1   ***Front Panel of the Single-Wide E-Series Server***

1	Gigabit Ethernet Port	**2**	Management Port
3	Power Switch	**4**	LEDs for HDD1
5	Keyboard, Video, Mouse (KVM) Port Use the KVM connector that is shipped with the E-Series Server (See Figure 2)	**6**	Hard Disk Drive 1
7	LEDs for HDD2	**8**	USB
9	Hard Disk Drive 2	**10**	Reset Switch

Figure 2 shows the KVM Connector

Figure 2 **KVM Connector**

1	USB Connector	**2**	DB15 Connector
3	DB9 Connector		

Figure 3   *Single-Wide E-Series Server*

1	DIMM Slots	**2**	HDD
3	SD0 (The SD card in the SD0 card slot contains the Integrated Management Controller software and should always be present.)	**4**	SD1

Figure 4   *Front Panel of the Double-Wide E-Series Server*

1	Power Switch	2	Reset Switch.
			Note This reset all CMOS settings.
3	LEDs	4	VGA Port
5	Serial Port	6	Dual SD card slots and cover
			Note Do not remove the SD card in the SD0 card slot when the system is in operation. The SD card in the SD0 card slot contains the Integrated Management Controller software and should always be present.
7	Gigabit Ethernet Ports (GE2 and GE3)	8	Management Port
9	USB Ports.	10	(Optional) HDD2, PCIe assembly or Blank slot.
	Note Each port can provide up to 500 mA of current. Devices with higher power requirements, such as CD/DVD ROM will need its own external power.		
11	Hard Disk Drives (HDD0 and HDD1)	12	(Optional) Alternate PCIe Assembly with FCoE port
			Note For use with Cisco PCIe assembly modules only.
13	(Optional) Alternate PCIe Assembly with 4-Gigabit Ethernet ports		
	Note For use with Cisco PCIe assembly modules only.		

Figure 5   Double-Wide E-Series Server

1	DIMM slots	2	(Optional) PCIe assembly
			Available for HDD2, FCoE port, or 4-Gigabit Ethernet ports.
3	Hard Disk Drives (HDD0 and HDD1)		

E-Series Servers LED States

There are LEDs on the E-Series Servers. Table 4 and Table 6 list the LED states.

Table 4   LED States for the Double-Wide E-Series Servers

LED	Color	Indicates
M0[1]	Off	No Memory installed in this socket
	Green	Memory M0 is installed
	Amber	Memory M0 is installed, but fault was detected
M1[2]	Off	No Memory installed in this socket
	Green	Memory M1 is installed
	Amber	Memory M1 is installed, but fault was detected

Table 4   *LED States for the Double-Wide E-Series Servers (continued)*

LED	Color	Indicates
M2[3]	Off	No Memory installed in this socket
	Green	Memory M2 is installed
	Amber	Memory M2 is installed, but fault was detected
HOT	Green	Temperature is in range
	Amber	A high temperature has been detected on the CPU, power supply, or other internal sensors
D0A	Green	Status of hard drive activity is as follows: • Steady—Hard Drive is present • Blinking—Activity • Off—Inactive or there is no power supplied to the CPU
D0F	Amber	Fault detected on the hard drive
D1A	Green	Status of hard drive activity is as follows: • Steady—Hard Drive is present • Blinking—Activity • Off—Inactive or there is no power supplied to the CPU
D1F	Amber	Fault is detected on the hard drive
D2A	Green	If the optional hard drive is present, then the status of hard drive activity is as follows: • Steady—Hard Drive is present • Blinking—Activity • Off—Inactive or there is no power supplied to the CPU If there is a PCIe card installed, the LED displays a steady Green
D2F	Amber	Fault is detected on the hard drive
ACT	Green	Blinks when the processor is active
STS	Green	Operation is normal
	Amber	Fault is detected on the processor
IMC	Green	Blinks when Cisco Integrated Management Controller is operating normally

Table 4 **LED States for the Double-Wide E-Series Servers (continued)**

LED	Color	Indicates
Power LED	Green	Status is as follows: • Steady—Cisco Integrated Management Controller and CPU are both operating normally • Blinking—CPU is operating normally and Cisco Integrated Management Controller is booting up
	Amber	Status is as follows: • Steady—Cisco Integrated Management Controller is operating normally and the CPU is powered down • Blinking —Cisco Integrated Management Controller is in the process of booting up and the CPU is powered down

1. This is memory installed on the outermost DIMM slot.
2. This is the middle DIMM slot.
3. This is the innermost DIMM slot.

Table 5 **LED States for the Single-Wide E-Series Servers**

LED	Color	Indicates
HDD 0 ACT	Green	Status of hard drive activity is as follows: • Steady—Hard Drive is present • Blinking—Activity • Off—Inactive or there is no power supplied to the CPU
HDD0 FLT	Amber	The CPU is in use. Fault detected on the hard drive. **Note** The SYS LED will still show solid green.
HDD1 ACT	Green	Status of hard drive activity is as follows: • Steady—Hard Drive is present • Blinking—Activity • Off—Inactive or there is no power supplied to the CPU
HDD1 FLT	Amber	The CPU is in use. Fault detected on the hard drive. **Note** The SYS LED will still show solid green.

Table 5   LED States for the Single-Wide E-Series Servers (continued)

LED	Color	Indicates
SYS	Green	Solid—Operation is normal **Note** If DRAM is not detected the SYS LED will still show solid green. Blinking—System is booting before entering EFI shell.
	Amber	Fault is detected on the processor
Power LED	Green	Status is as follows: • Steady—Cisco Integrated Management Controller and CPU are both operating normally • Blinking—CPU is operating normally and Cisco Integrated Management Controller is booting up
	Amber	Status is as follows: • Steady—Cisco Integrated Management Controller is operating normally and the CPU is powered down • Blinking —Cisco Integrated Management Controller is in the process of booting up and the CPU is powered down

Recommended Practices for Cisco UCS E-Series Servers

This section describes recommended practices for safe and effective installation of the hardware described in this document, and includes the following sections:

- Safety Recommendations, page 11
- Preventing Electrostatic Discharge Damage, page 12
- General Guidelines for Installing the E-Series Servers on a Rack, page 12
- General Maintenance Guidelines for E-Series Servers, page 13

The safety warnings included in this section apply to all Cisco UCS E-Series Servers.

Safety Recommendations

To prevent hazardous conditions, follow these safety recommendations while working with this equipment:

- Keep tools away from walk areas where you or others could fall over them.
- Do not wear loose clothing around the router. Fasten your tie or scarf and roll up your sleeves to prevent clothing from being caught in the chassis.
- Wear safety glasses when working under any conditions that might be hazardous to your eyes.
- Locate the emergency power-off switch in the room before you start working. If an electrical accident occurs, shut the power off.

- Before working on the router, turn off the power and unplug the power cord.
- Disconnect all power sources before doing the following:
    - Installing or removing a router chassis
    - Working near power supplies
- Do not work alone if potentially hazardous conditions exist.
- Always check that power is disconnected from a circuit.
- Remove possible hazards from your work area, such as damp floors, ungrounded power extension cables, or missing safety grounds.
- If an electrical accident occurs, proceed as follows:
    - Use caution; do not become a victim yourself.
    - Turn off power to the room using the emergency power-off switch.
    - If possible, send another person to get medical aid. Otherwise, determine the condition of the victim and then call for help.
    - Determine if the person needs rescue breathing or external cardiac compressions; then take appropriate action.

Preventing Electrostatic Discharge Damage

Electrostatic discharge can damage equipment and impair electrical circuitry. Electrostatic discharge occurs when electronic printed circuit cards, such as those used in Cisco service modules and network modules, are improperly handled and can result in complete or intermittent equipment failure. Always observe the following electrostatic discharge damage (ESD) prevention procedures when installing, removing, and replacing E-Series Servers, Cisco service modules, Cisco network modules, Cisco interface cards, Cisco expansion modules, or other electronic printed circuit cards:

- Make sure that the router chassis is electrically connected to earth ground.
- Wear an ESD-preventive wrist strap, and make sure that it makes good contact with your skin.
- Connect the wrist strap clip to an unpainted portion of the chassis frame to channel unwanted ESD voltages to ground.
- If no wrist strap is available, ground yourself by touching the metal part of the router chassis.

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Caution The wrist strap and clip must be used correctly to ensure proper ESD protection. Periodically confirm that the resistance value of the ESD-preventive wrist strap is between 1 and 10 megohms (Mohm).

General Guidelines for Installing the E-Series Servers on a Rack

Excessive vibration can result in the loss of data and disk drive failure. The E-Series Server with hard disk drives should not be installed in a rack cabinet where it may be exposed to excessive high vibration. Before you install the router and E-Series Server in the rack cabinet, review the following recommendations:

✎
Note The E-Series Server with solid state drives can withstand higher vibration levels.

- Install the server away from heating, ventilation, and air-conditioning (HVAC) system and other large building air movers.
- Install the rack away from areas that may be affected by external vibrations, such garage areas where there may be moving vehicles or factories with heavy machinary.
- Do not install in a rack that will be placed in a moving vehicle.

General Maintenance Guidelines for E-Series Servers

The following maintenance guidelines apply to E-Series Servers:

- Keep the router chassis area clear and dust-free during and after installation.
- If you remove the chassis cover for any reason, store it in a safe place.
- Do not perform any action that creates a hazard to people or makes equipment unsafe.
- Keep walk areas clear to prevent falls or damage to equipment.
- Follow installation and maintenance procedures as documented by Cisco Systems, Inc.

Safety Warnings for E-Series Servers

The following safety warning statements apply to all hardware procedures involving E-Series Servers for Cisco ISR G2 routers. Translations of these warnings are available in the *Cisco Network Modules and Interface Cards Regulatory Compliance and Safety Information* document, which ships with individual E-Series Server orders, and is also available online at

http://www.cisco.com/en/US/docs/routers/access/interfaces/rcsi/IOHrcsi.html

Warning   **IMPORTANT SAFETY INSTRUCTIONS**

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device. Statement 1071

SAVE THESE INSTRUCTIONS

Warning   **This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device.** Statement 1071

Warning   **Only trained and qualified personnel should be allowed to install or replace this equipment.** Statement 1030

Warning   **No user-serviceable parts inside. Do not open.** Statement 1073

Warning   **Ultimate disposal of this product should be handled according to all national laws and regulations.** Statement 1040

Warning   **Read the installation instructions before connecting the system to the power source.** Statement 1004

Warning   **Installation of the equipment must comply with local and national electrical codes.** Statement 1074

Warning   **This unit might have more than one power supply connection. All connections must be removed to de-energize the unit.** Statement 1028

Warning   **This equipment must be grounded. Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available.** Statement 1024

Warning   **When installing or replacing the unit, the ground connection must always be made first and disconnected last.** Statement 1046

Warning   **Do not use this product near water; for example, near a bath tub, wash bowl, kitchen sink or laundry tub, in a wet basement, or near a swimming pool.** Statement 1035

Warning   **Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.** Statement 1036

Warning   **Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.** Statement 1037

Warning   **Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning.** Statement 1038

Warning   **To report a gas leak, do not use a telephone in the vicinity of the leak.** Statement 1039

Warning   **Class 1 laser product.** Statement 1008

Warning   **Invisible laser radiation may be emitted from the end of the unterminated fiber cable or connector. Do not view directly with optical instruments. Viewing the laser output with certain optical instruments (for example, eye loupes, magnifiers, and microscopes) within a distance of 100 mm may pose an eye hazard.** Statement 1056

The following warnings apply in Australia:

Warning   **Do not touch the power supply when the power cord is connected. For systems with a power switch, line voltages are present within the power supply even when the power switch is OFF and the power cord is connected. For systems without a power switch, line voltages are present within the power supply when the power cord is connected.** Statement 4

Warning   **This equipment will be inoperable when mains power fails.** Statement 198

Warning   **To avoid electric shock, do not connect safety extra-low voltage (SELV) circuits to telephone-network voltage (TNV) circuits. LAN ports contain SELV circuits, and WAN ports contain TNV circuits. Both LAN and WAN ports may use RJ-45 connectors. Use caution when connecting cables.** Statement 1021

Warning   **Hazardous network voltages are present in WAN ports regardless of whether power to the router is OFF or ON. To avoid electric shock, use caution when working near WAN ports. When detaching cables, detach the end away from the router first.** Statement 1026

Warning   **Before opening the chassis, disconnect the telephone-network cables to avoid contact with telephone-network voltages.** Statement 1041

Warning   **This equipment must be installed and maintained by service personnel as defined by AS/NZS 3260. Incorrectly connecting this equipment to a general-purpose outlet could be hazardous. The telecommunications lines must be disconnected 1) before unplugging the main power connector or 2) while the housing is open, or both.** Statement 1043

Installing E-Series Servers in Cisco ISR G2 Routers

This section describes the tasks for installing the E-Series Servers on Cisco ISR G2 routers, and contains the following subsections:

> **Note** Cisco 2900 series do not support online insertion and removal (OIR) of the E-Series Servers.
>
> To avoid damaging the router, turn off the electrical power on the router and disconnect network cables before inserting or removing the E-Series Servers into the Cisco 2900 routers.

Tools and Equipment Required During E-Series Servers Installation

You will need the following tools and equipment while working with E-Series Servers:

- Number 1 Phillips screwdriver or a small flat-blade screwdriver
- ESD-preventive wrist strap
- (For routers using DC power) Tape to secure DC circuit breaker handle

Summary of Installation Tasks

When installing the E-Series Servers in a Cisco ISR G2 router, perform the following tasks:

> **Warning** **Only trained and qualified personnel should be allowed to install, replace, or service this equipment.** Statement 1030

> **Warning** **To avoid electric shock, do not connect safety extra-low voltage (SELV) circuits to telephone-network voltage (TNV) circuits. LAN ports contain SELV circuits, and WAN ports contain TNV circuits. Some LAN and WAN ports both use RJ-45 connectors. Use caution when connecting cables.** Statement 1021

> **Warning** **Hazardous network voltages are present in WAN ports regardless of whether power to the unit is OFF or ON. To avoid electric shock, use caution when working near WAN ports. When detaching cables, detach the end away from the unit first.** Statement 1026

> **Caution** To prevent damage to the E-Series Servers, handle the E-Series module by the chassis or frame.

Cisco UCS E-Series Server Module Hardware Installation Tasks

Step 1   Connect the wrist strap clip to an unpainted portion of the chassis frame to channel unwanted ESD voltages to ground.

Step 2   Turn off power to the router.

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>
> **Note**   Alternatively, the Cisco 3900 series routers support OI R for similar server modules and network modules. (See the "Online Insertion and Removal on a Cisco ISR G2 Router" section on page 22)

Step 3   Remove blank faceplates from the slots you plan to use. (See the "Removing Blank Faceplates from Cisco ISR G2 Routers" section on page 18)

Step 4   Install the E-Series Servers. (See the "Installing the E-Series Servers" section on page 20)

> ✎
>
> **Note**   Be sure to install a blank faceplate on the other side of the slot when installing a single-wide E-Series Server. (See the "Installing Blank Faceplates on Cisco ISR G2 Routers" section on page 18)

Installing and Removing Blank Faceplates

All empty chassis slots on the Cisco ISR G2 router must be covered with blank faceplates to ensure proper cooling airflow and to prevent electromagnetic interference.

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>
> **Warning**   **Blank faceplates and cover panels serve three important functions: they prevent exposure to hazardous voltages and currents inside the chassis; they contain electromagnetic interference (EMI) that might disrupt other equipment; and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards, faceplates, front covers, and rear covers are in place.** Statement 1029

Preparing to Install Blank Service Module Faceplates on a Double-Wide Slot

To install a faceplate on a Cisco ISR G2 Router service module (SM) slot, perform the following steps:

Step 1   Install a slot divider in the SM slot. (See the "Installing Slot Dividers" section on page 19)

Step 2   Install one blank faceplate over each slot. (See the "Installing Blank Faceplates on Cisco ISR G2 Routers" section on page 18)

Installing Blank Faceplates on Cisco ISR G2 Routers

To install a blank faceplate, perform the following steps:

Step 1   Install the blank faceplate. See Figure 6.

- (For blank faceplates with mounting screws) Align the captive screws with the screw holes on the chassis. Using either a number 1 Phillips screwdriver or a small flat-blade screwdriver, tighten the captive screws until the blank faceplate is flush with the chassis.

- (For blank faceplates with tabs) Align the blank faceplate tabs with the slots on the chassis. Press the blank faceplate against the chassis until the tabs pop into place. The blank faceplate is flush with the chassis when properly installed.

Figure 6   Service Module Blank Panel

Step 2   Continue with hardware installation tasks.

Removing Blank Faceplates from Cisco ISR G2 Routers

To remove the faceplates from blank SM slot, perform the following steps:

Step 1   Using either a number 1 Phillips screwdriver or a small flat-blade screwdriver, unscrew the captive screws and remove the blank faceplate from the chassis slot you plan to use.

Tip   Save blank faceplates for future use.

Step 2   Continue with hardware installation tasks.

Preparing Cisco Router Slots for Server Module Installation

Several Cisco ISR G2 routers have flexible SM slots to support various Cisco service module and server module factors. Before installing a module, you may need to prepare the slot for the module's particular form factor.

Installing Slot Dividers

Slot dividers (see Figure 7) are used to customize service module slots for the different form factors (Single-wide and Double-wide). Slot dividers are used on the following Cisco ISR G2 routers:

- Cisco 2911, 2921, and 2951
- Cisco 3900 series

Figure 7   Slot Divider for Service Module Slots (shown without retention screw)

To install a slot divider, perform the following steps:

Step 1   Remove any installed service modules, blank faceplates, and slot adapters from the router slot you plan to use.

Step 2   Insert the top rails of the slot divider between the two guide rails in the top of the module slot. (See Figure 8)

Figure 8   Inserting a Slot Divider into a Service Module Slot (with retention screw)

Step 3   Push the slot divider in until it is fully seated. Service module dividers have a long retention screw that slides into the divider. (See Figure 8)

Step 4   Tighten the retention screw on the front of the slot divider with a number 1 Phillips screwdriver. (See Figure 9) When the slot divider is fully inserted, its front surface is flush with the panel of the router. (See Figure 9)

Figure 9   *Tightening the Slot Divider in a Service Module Slot*

Step 5   Proceed with hardware configuration tasks.

Removing Slot Dividers

Slot dividers are removed to permit use of double-wide E-Series Servers in modular router slots.

To remove slot dividers from module slots, perform the following steps:

Step 1   Remove any installed service modules, blank faceplates, and slot adapters from the router slot you plan to use.

Step 2   Loosen the retention screw on the front of the slot divider.

Step 3   Pull the slot divider straight out of the module slot.

Step 4   Proceed with hardware configuration tasks.

Installing the E-Series Servers

Note   For Cisco 3900 ISR G2—If you are using PoE, and you want to install one double-wide E-Series Server and any number of server modules in a a Cisco 3900 ISR G2, you must use a second AC and PoE supply to support this configuration.

For example, you have a Cisco 3900 ISR G2 that has a PoE capable switch providing power to phones, and you want to install a double-wide E-Series Server in one slot and one or two single-wide servers in the other slots, then you must use a second AC and PoE supply to support this configuration.

E-Series Servers can be installed either before or after mounting the router, whichever is more convenient. To install a E-Series Server, follow these steps:

Step 1   Turn off electrical power to the router. Leave the power cable plugged in to channel ESD voltages to ground.

Note Alternatively, the Cisco 3900 series routers support OIR for similar server modules and network modules. (See the "Online Insertion and Removal on a Cisco ISR G2 Router" section on page 22.)

Step 2 Remove the blank faceplates installed over the slot you intend to use. (See the "Installing and Removing Blank Faceplates" section on page 17.)

Tip Save blank faceplates for future use.

Step 3 Prepare the slot for the module form factor you are installing. (See the "Preparing Cisco Router Slots for Server Module Installation" section on page 18.)

Step 4 Align the module with the guides in the chassis walls or slot divider and slide it gently into the slot. Figure 10 shows the installation of a single-wide E-Series Server. Figure 11 shows the installation of a double-wide E-Series Server.

Figure 10   *Installing a Single-Wide E-Series Server in a Cisco ISR G2 Router*

1	Single-wideE-Series Server	**2**	Slot Divider
3	Router chassis		

Figure 11   Installing a Double-Wide E-Series Server in a Cisco ISR G2 Router

1	Double-wideE-Series Server	2	Router chassis

Step 5   Push the module into place until you feel the edge connector seat securely into the connector on the router backplane. The module faceplate should contact the chassis rear panel.

Step 6   Using a number 1 Phillips or flat-blade screwdriver, tighten the captive mounting screws on the module faceplate.

Step 7   Proceed with connecting the module to the network and power up the router and server module.

Tip   See the "Where to Go Next" section on page 33 for information on locating additional hardware documentation.

Online Insertion and Removal on a Cisco ISR G2 Router

Online insertion and removal provides uninterrupted network operation, maintains routing information, and ensures session preservation on the Cisco ISR G2 Router. You can use online insertion and removal to install or replace hardware on the Cisco 3900 series routers without affecting system operations.

OIR procedures require some interaction with Cisco IOS software. For more information on Cisco IOS software-related tasks, see documents listed in the "Where to Go Next" section on page 33.

Removing the E-Series Server

To shut down a server module on the Cisco ISR G2 router, perform the following steps:

SUMMARY STEPS

1. **enable**

2. **ucse** *slot* **shutdown**

3. **hw-module sm** *slot* **oir-stop**

DETAILED STEPS

	Command or Action	Purpose

Step 1	`enable`
	
	Example:
	`Router> enable`
		Enables privileged EXEC mode.
		
		Enter your password if prompted.

Step 2	`ucse` *slot* `shutdown`
	
	Example:
	`Router# ucse 4 shutdown`
		Shuts down the E-Series Server gracefully.
		
		Note Before proceeding with the next command, verify that the E-Series Server has shutdown. The Power LED turns orange when the UCSE server has shut down or use the Cisco Integrated Management Controller to verify that the UCSE server has powered down.

Step 3	`hw-module sm` *slot* `oir-stop`
	
	Example:
	`Router# hw-module sm 4 oir-stop`
	
	`SM Hardware slot 4 can be removed`
		Shuts down power to the specified module to prepare it for removal.
		
		The router displays a message similar to the following example when it is safe to remove the module.
		
		Note Before removing the E-Series Server, verify that power to the slot has been removed. The power LED should be off.

Restarting the E-Series Server

If the **oir-stop** command was issued and the module was not physically removed from the slot, you can restart the E-Series Server with the **oir-start** command. From a console terminal issue the **hw-module sm {slot} oir-start** command. The console displays a output showing the module changing states. See the following output:

```
Router# hw-module sm 2 oir-start
Router#
*Mar  8 05:40:19.195: %LINK-3-UPDOWN: Interface ucse2/0, changed state to up
*Mar  8 05:40:20.195: %LINEPROTO-5-UPDOWN: Line protocol on Interface ucse2/0, changed
state to up
```

Inserting the E-Series Server

The Cisco ISR G2 router that is up and running can detect when a device is inserted in the SM slot and will automatically provide power to the E-Series Server.

Installing or Replacing Hard Disk Drives on the E-Series Servers

The double-wide E-Series Servers can be ordered with two or three hard disk drives (HDD) or solid-state drive (SSD) installed. The double-wide E-Series Servers support the following Redundant Array of Independent Disks (RAID) configuration:

- RAID 0 (data striping): Data is stored evenly in stripe blocks across all disks in the array, providing fast throughput. There is no data redundancy, and all data is lost if any disk fails.

- RAID 1 (disk mirroring): Data is written to two disks, where the data in both disk drives is identical This provides complete data redundancy if one disk fails.

- RAID 5 (disk striping with distributed parity): Data and parity information is striped and distributed across all disks in the array with distributed parity information. RAID 5 requires three hard disk and provides limited fault tolerance.

The double-wide E-Series Servers support adding a hot spare drive under RAID 1. If one of the disk drives under RAID 1 fails and there is a hot spare drive installed, the system will automatically rebuild the disk image onto the hot spare drive. The hot spare drive will replace the failed drive as the mirrored drive under RAID 1. To maintain fault tolerance, you must install another hard disk drive.

The single-wide E-Series Servers come with two HDDs or SSDs installed. The single-wide E-Series Servers support RAID 0 and RAID 1.

Warning **Only trained and qualified personnel should be allowed to install or replace this equipment.** Statement 1030

Warning **Ultimate disposal of this product should be handled according to all national laws and regulations.** Statement 1040

Warning **No user-serviceable parts insideFCS DRAFT - CISCO CONFIDENTIALo not open.** Statement 1073

Warning **This unit might have more than one power supply connection. All connections must be removed to de-energize the unit.** Statement 1028

Warning **Blank faceplates and cover panels serve three important functions: they prevent exposure to hazardous voltages and currents inside the chassis; they contain electromagnetic interference (EMI) that might disrupt other equipment; and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards, faceplates, front covers, and rear covers are in place.** Statement 1029

To install or replace a hard disk drive on the E-Series Servers, perform the following steps:

Note The hard disk drives should be installed in order—HDD0, HDD1, and then HDD2.

Step 1 Connect the wrist strap clip to an unpainted portion of the chassis frame to channel unwanted ESD voltages to ground.

Step 2 Turn off power to the router.

The Cisco 3900 series routers support OIR. (See the "Online Insertion and Removal on a Cisco ISR G2 Router" section on page 22)

Step 3 Using either a number 1 Phillips screwdriver or a small flat-blade screwdriver, unscrew the captive screws on the faceplate and remove the cover faceplate. See Figure 12 and Figure 13.

*Figure 12*   *Replacing a Hard Disk Drive on the Single-Wide E-Series Server*

| 1 | Captive Screws | 2 | Hard Disk Drive Assembly |

Figure 13   Replacing a Hard Disk Drive on the Double-Wide E-Series Server

1	Hard Disk Drives	**2**	Hard Disk Drive Assembly
3	Cover Faceplate	**4**	Captive Screws on Hard Disk Drive Assembly

Step 4   (Optional) If the slot is empty, use the screwdriver to loosen the screws on the bracket to remove the bracket that is attached to the slot. See Figure 14. Go to Step 7.

Figure 14   Empty HDD2 Slot
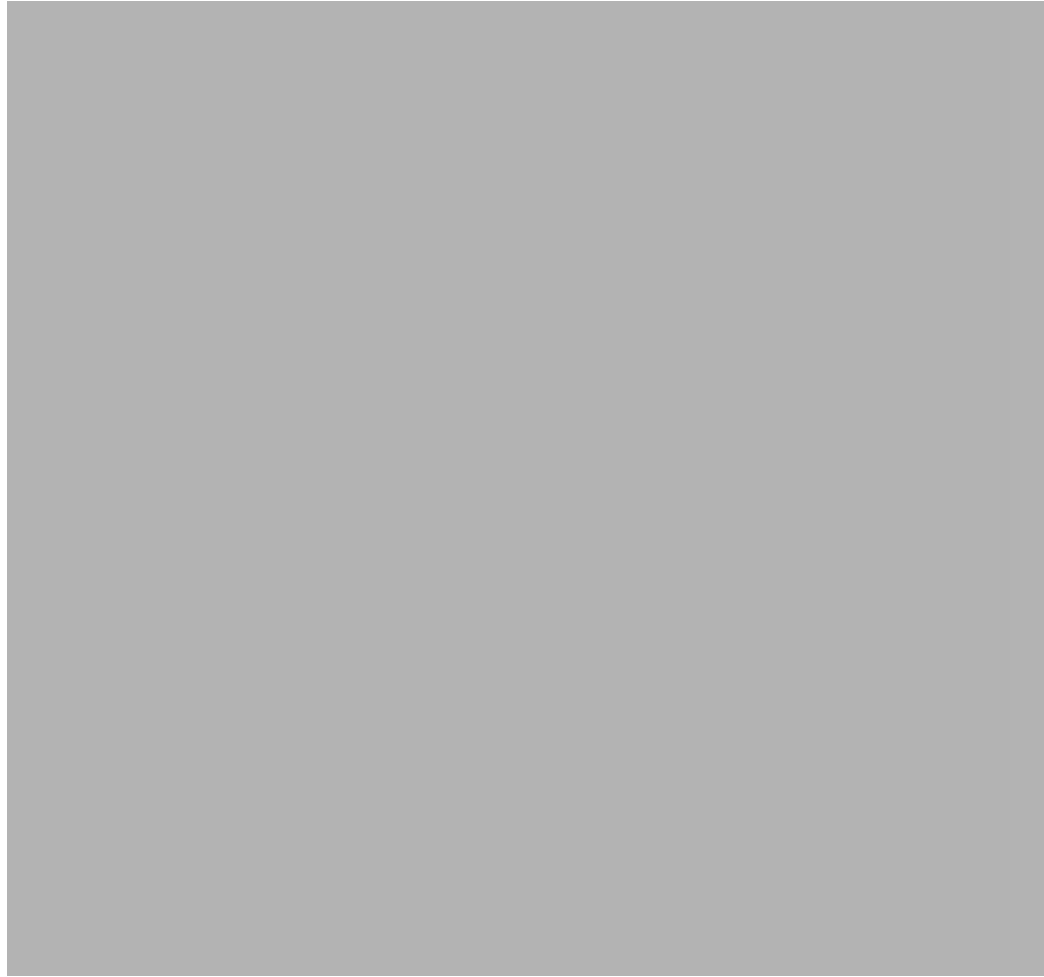
1	Bracket	**2**	Captive Screws on Hard Disk Drive Assembly

Step 5 (Optional) If there is a hard disk drive, use the screwdriver to loosen the captive screws on the hard disk drive assembly.

Step 6 (Optional) To remove the faulty hard disk, pull the handle of the hard disk drive assembly and slide out the hard disk drive.

Step 7 Slide the new hard disk drive into the E-Series Serveruntil it clicks into place.

Step 8 Tighten the captive screws on the new hard disk drive assembly. Make sure the HDDs are firmly secure to the carrier to avoid rattling during operating.

Step 9 Replace the faceplate.

Step 10 Restart the E-Series Server.

Step 11 Configure the new HDD as the new hotspare disk drive. Refer to the *Cisco UCS E-Series Servers Integrated Management Controller GUI Configuration Guide.*

Installing and Replacing the PCIe Assembly on the Double-Wide E-Series Servers

PCIe Assembly

Figure 15 shows the PCIe Assembly, which consists of a PCIe card, a flex assembly which connects the PCIe slot to the motherboard, and a plastic bracket which slides over the end of the PCIe card.

Figure 15   PCIe Assembly

1	Plastic Bracket	2	Flex Assembly
3	PCIe Card		

Removing the PCIe Assembly

Follow these steps to remove the PCIe Assembly:

Step 1   Connect the wrist strap clip to an unpainted portion of the chassis frame to channel unwanted ESD voltages to ground.

Step 2   Turn off power to the router.

The Cisco 3900 series routers support OIR. (See the "Online Insertion and Removal on a Cisco ISR G2 Router" section on page 22).

Step 3   Using either a number 1 Phillips screwdriver or a small flat-blade screwdriver, unscrew the captive screws on the faceplate. Loosen the cover faceplate and remove it. See Figure 16. Save the screws.

Figure 16   Replacing the PCIe Assembly

1	Captive Screws on the Face Plate	2	Flex Assembly Screw
3	Plastic Bracket screw	4	PCIe Assembly

Step 4   Remove the screw holding the flex assembly in place

Step 5   Remove the two screws connecting the plastic bracket to the motherboard.

Step 6   Disconnect the flex assembly connector from the motherboard.

Step 7   Remove the PCIe assembly.

Step 8   Slide the plastic bracket off the end of the PCIe card and save the bracket for future use.

Installing the PCIe Assembly

Follow these steps to install the PCIe Assembly:

Step 1   Connect the wrist strap clip to an unpainted portion of the chassis frame to channel unwanted ESD voltages to ground.

Step 2   Turn off power to the router.

The Cisco 3900 series routers support OIR. (See the "Online Insertion and Removal on a Cisco ISR G2 Router" section on page 22)

Step 3   Connect the flex assembly onto the PCIe connector on the PCIe Card. See Figure 16.

Step 4 Slide the plastic bracket over the end of the PCIe card.

Step 5 Slide the PCIe assembly into the server module.

Step 6 Connect the flex assembly onto the motherboard. Be careful not to place any stress on the connector contacts.

Step 7 Replace the screw that secures the flex assembly in place and tighten.

Step 8 Replace the two screws that secure the plastic bracket to the motherboard and tighten

Step 9 Tighten the captive screws on the faceplate.

Installing and Replacing DIMMS

The single-wide E-Series Servers support up to 16 GB DDR3 DIMMs and the double-wide E-Series Servers support up to 48 GB DDR3 DIMMs.

⚠ **Caution** Always wear an ESD-preventive wrist strap and ensure that it makes good contact with your skin when you remove or install DIMMs. Connect the equipment end of the wrist strap to the metal part of the chassis.

⚠ **Caution** Handle DIMMs by the edges only. DIMMs are ESD-sensitive components and can be damaged by mishandling.

⚠ **Warning** **Only trained and qualified personnel should be allowed to install or replace this equipment.** Statement 1030

⚠ **Warning** **Ultimate disposal of this product should be handled according to all national laws and regulations.** Statement 1040

⚠ **Warning** **No user-serviceable parts inside. Do not open.** Statement 1073

⚠ **Warning** **This unit might have more than one power supply connection. All connections must be removed to de-energize the unit.** Statement 1028

⚠ **Warning** **Blank faceplates and cover panels serve three important functions: they prevent exposure to hazardous voltages and currents inside the chassis; they contain electromagnetic interference (EMI) that might disrupt other equipment; and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards, faceplates, front covers, and rear covers are in place.** Statement 1029

Removing a DRAM DIMM

Follow these steps to remove a DRAM DIMM:

Step 1   Connect the wrist strap clip to an unpainted portion of the chassis frame to channel unwanted ESD voltages to ground.

Step 2   Turn off power to the router.

Alternatively, the Cisco 3900 series routers support OIR. (See the "Online Insertion and Removal on a Cisco ISR G2 Router" section on page 22)

Step 3   Locate the DRAM DIMM on the E-Series Server.

Step 4   Pull the latches away from the DIMM at both ends to lift the DIMM slightly.

⚠
Caution   Take care not to dislodge the battery that is adjacent to the DIMM connectors.

Step 5   Pull the DIMM out of the socket as shown in Figure 17.

Figure 17   Removing a DRAM DIMM

Step 6   Place the DIMM in an antistatic bag to protect it from ESD damage.

Installing a DRAM DIMM

Follow these steps to install a DRAM DIMM:

✎
Note   You should start installing the DIMM memory from the innermost slot to the outermost slot.

Step 1   Connect the wrist strap clip to an unpainted portion of the chassis frame to channel unwanted ESD voltages to ground.

Step 2   Turn off power to the router.

Alternatively, the Cisco 3900 series routers support OIR. (See the "Online Insertion and Removal on a Cisco ISR G2 Router" section on page 22)

Step 3   Locate the DIMM connector.

✎
Note   The DIMM connectors on the double-wide E-Series Servers are positioned at an angle and the DIMM should be inserted at approximately the same angle.

Step 4   Make sure that both latches on the DIMM connector are in the open position.

Step 5   Orient the DIMM so that the polarization notch on the DIMM lines up with the notch on the connector. See Figure 18.

Figure 18   DRAM DIMM Showing Polarization Notch

1	Polarization notch		

Step 6   Insert the DIMM into the connector.

Step 7   Carefully and firmly press the DIMM into the connector until the latches close onto the DIMM. Make sure that both latches snaps to the closed position against the DIMM. See Figure 19.

Figure 19   *Installing a DRAM DIMM*

Step 8   Replace the E-Series Server.

Removing the COA

In the event that you need to RMA your module, make sure that you retain the original Certificate of Authenticity (COA) label. The COA is the label from Microsoft with the code that enables their windows software. After you return the module, Cisco Systems cannot retrieve the COA label from the returned module.

The COA label is attached to the inside half of a plastic pull out label tray. To remove the COA label, cut away half of the label that contains the COA label and save it. Return the unit with the other half of the label tray that contains the units CLEI code, Serial Number, and other important unit labels back to Cisco Systems or your licensed reseller.

Figure 20   COA Label Placement

1	Plastic pull label tray		

> ✎
> **Note**   The COA label from Microsoft is single layer and not foldable.

Cisco Integrated Management Controller

Cisco Integrated Management Controller (CIMC) is a separate management module built into the motherboard. CIMC is the management service for the E-Series Servers. You can use a web-based GUI or SSH-based CLI to access, configure, administer, and monitor the server. For more information on CIMC, see *GUI Configuration Guide for Cisco UCS E-Series Server Modules Integrated Management Controller.*

Related Documentation

For more information about configuring the Cisco UCS E-Series Servers, see he following related documentation available for E-Series Servers:

- *Documentation Guide for Cisco UCS E-Series Servers, Release 1.0* (provides links to all documents)

- *Release Notes for Cisco UCS E-Series Servers, Release 1.0*

- *Getting Started Guide for Cisco UCS E-Series Servers, Release 1.0*

- *Cisco Network Modules, Server Modules, and Interface Cards Regulatory Compliance and Safety Information*

- *GUI Configuration Guide for Cisco UCS E-Series Servers Integrated Management Controller, Release 1.0*

- *CLI Configuration Guide for Cisco UCS E-Series Servers Integrated Management Controller, Release 1.0*

- *Troubleshooting Guide for Cisco UCS E-Series Servers*

- *Open Source Used in Cisco UCS E-Series Servers, Release 1.0*

For more information about installing and connecting a Cisco 2900 series and Cisco 3900 series routers, see
http://www.cisco.com/en/US/docs/routers/access/2900/hardware/installation/guide/Hardware_Installation_Guide.html.

For regulatory compliance and safety information, see the *Cisco Network Modules and Interface Cards Regulatory Compliance and Safety Information* document.