20614 Cisco Installing and Maintaining Routers Part 4: 12000 GSR Series and XS5032 Modules

Course Reference Material

Cisco Installing and Maintaining Routers Part 4: 12000 GSR Series and XS5032 Modules

NETg course 20614

Contents

Objectives

Procedures

Glossary

Objectives

Total number of objectives = 41

Note: (ULT) is the unit, lesson, topic ID.

Cisco 12000 Series GSR Routers

Major Components and Optional Modules

- 12000 Series Routers: Overview (ULT 112): Identify the 12000 series Gigabit Switch Routers (GSRs).
- GRP (ULT 113): Identify the characteristics of the 12000 series Gigabit Route Processor (GRP).
- Alarm Card (ULT 114): Identify the functions and features of the alarm card.
- Switch Fabric (ULT 115): Identify the characteristics of the switch fabric.
- Power Supplies (ULT 116): Identify the Cisco 12000 power supplies.
- Blower Modules (ULT 117): Identify the features of the Cisco 12000 series cooling system.

2

Cisco 12000 Router Installation

- Preinstallation Guidelines (ULT 121): Identify preinstallation guidelines for the Cisco 12000 router.
- AC–Input Power Supply: Installing (ULT 122): Sequence the steps involved in installing an AC–input power supply.
- DC–Input Power Supply: Installing (ULT 123): Sequence the steps involved in installing a DC–input power supply.
- System Startup (ULT 124): Sequence the steps involved in starting the Cisco 12012 system.
- Installed Interfaces: Configuring (ULT 125): Identify the function of the setup command in configuring installed interfaces.

Cisco 12008 GSR

- Cisco 12008 GSR: Overview (ULT 131): Identify the characteristics of the Cisco 12008 Gigabit Switch Router (GSR).
- Power and Airflow Guidelines (ULT 132): Identify guidelines for power and airflow safety.
- Cable Management System (ULT 133): Identify the functions and features of the cable management system.

Cisco 12008 GSR: Installation

- Upper Card Cage: Removing Cards (ULT 141): Identify the steps involved in removing cards from the upper card cage.
- Power Supply: Removing (ULT 142): Sequence the steps involved in removing a 12008 GSR power supply.
- CSC Alarm–Monitoring Facilities (ULT 143): Identify the functions of the Cisco Systems Capital (CSC) alarm–monitoring facility.

Cisco 12004 GSR

- Cisco 12004 GSR: Overview (ULT 151): Identify the characteristics of the Cisco 12004 Gigabit Switch Router.
- Power Supply and Fan Tray (ULT 152): Identify the characteristics of the Cisco 12004 GSR power supply and fan tray.
- Cable Management (ULT 153): Identify the characteristics of the Cisco GSR cable management system.
- Maintenance Bus (ULT 154): Identify the features of the Cisco 12004 maintenance bus.

Cisco 12000 Series GSR Line Cards

- Quad OC–3c/STM–1c Line Card (ULT 161): Identify the characteristics of the Quad OC–3c/STM–1c POS line card.
- OC–12c/STM–4c POS Line Card (ULT 162): Identify the characteristics of the OC–12c/STM–4c POS line card.
- OC–12c/STM–4c ATM Line Card (ULT 163): Identify the characteristics of the OC–12c/ STM–4c ATM line card.
- Line Card Memory (ULT 164): Identify the characteristics of line card onboard memory for Cisco 12000 routers.

3

Cisco 12000 Series GSR: Troubleshooting

- Startup Problems: Identifying (ULT 171): Identify Cisco 12000 Series Gigabit Switch Router (GSR) startup problems.
- Power Subsystem: Troubleshooting (ULT 172): Identify guidelines for troubleshooting the power subsystem.
- Processor Subsystem: Troubleshooting (ULT 173): Identify guidelines for troubleshooting the processor subsystem.
- Cooling Subsystem: Troubleshooting (ULT 174): Identify the guidelines for troubleshooting the 12000 series GSR cooling subsystem.
- Cisco 12012: Running Diagnostics (ULT 175): Identify the steps involved in loading and running diagnostics.

Catalyst 3000 and 5000 Router Modules

Catalyst 3000 Router: Installation

- WS–X3011 Router Module: Overview (ULT 212): Identify the characteristics of the WS–X3011 router module.
- Router Card: Installing (ULT 213): Sequence the steps involved in connecting to the router console after installing the router card.
- Router Card: Network Connection (ULT 214): Identify the methods for connecting the router card to a network.
- Router Card: Configuring (ULT 215): Identify the steps involved in configuring the router card.

Catalyst 5000 RSM: Installation

- Catalyst 5000 Series Switch Architecture (ULT 221): Identify the characteristics of Catalyst 5000 series switch architecture.
- RSM: Installing (ULT 222): Identify the steps involved in installing the Route Switch Module (RSM).
- RSM: Configuring for Inter–VLAN Routing (ULT 223): Identify guidelines for configuring the Route Switch Module (RSM) for Inter–VLAN routing.
- User Interface: RSM Command Modes (ULT 224): Identify each of the Route Switch Module (RSM) command modes and their access methods.

Catalyst 5000 RSM: Configuring

- Session Command: Using (ULT 231): Identify the functions of the session command.
- RSM: Booting for the First Time (ULT 232): Identify the phases involved in booting the Route Switch Module (RSM) for the first time.
- RSM: Configuration Task List (ULT 233): Identify the different Route Switch Module (RSM) configuration tasks for Inter–VLAN routing.

Procedures

Cisco 12000 Series GSR Routers

Cisco 12000 Router Installation

AC−Input Power Supply: Installing

- Attach an antistatic wrist strap to yourself and to one of the two ESD connection sockets.
- Verify that the power supply power switch is in the STANDBY position.
- Slide the power supply into the vacant bay, using two hands to support it.
- Tighten the captive screw on the power supply faceplate.
- Check that the AC power cord shipped with the power supply is the correct type for your site.
- Plug the AC power cord into the power supply AC receptacle.
- Clip the spring clip over the power cord plug to secure the plug in place.
- Connect the other end of the AC power cord to the source AC receptacle.
- Check that the source AC circuit breaker servicing the source AC receptacle is switched on.
- Repeat the previous steps for the rest of the AC−input power supplies.
- Turn the power supply switch on.

DC−Input Power Supply: Installing

- Attach an antistatic wrist strap to yourself and to one of the two ESD connection sockets on the front edges of the upper card cage.
- Check that the DC−input power supply switch is turned OFF (O).
- Remove the front cover of the power supply from the power supply faceplate.
- Remove the DC power cable bracket from the power supply faceplate.
- Thread the source DC power cable leads up underneath the power supply handle.
- Remove the nut and locking washer from the power supply threaded terminals and attach the source DC power cable lug to the terminals.
- Thread the circuit breaker external alarm leads up through the handle and attach them to the circuit breaker alarm terminal block.
- Position the source DC power cable leads underneath the power supply handle on the power supply faceplate.
- Place the DC power cable bracket over the power cable leads and secure the cable leads and the cable bracket to the power supply faceplate.
- Verify that the source DC wiring from the source DC breaker to the power supply is correct.
- Replace the power supply front cover on the power supply faceplate.
- Slide the power supply into the power supply bay.
- Turn the captive jackscrew on the power supply faceplate clockwise to seat the power supply into the backplane power connector.
- Turn on the source DC circuit breakers servicing each DC−input power supply.

System Startup

- Turn each system power switch to the ON position.
- Check that the blower modules are operating by listening for them.
- As the GRP boots, observe the GRP alphanumeric LED displays.
- As the line cards boot, observe the alphanumeric LED indicators on each line card. Line cards boot from left to right.
- Boot the Cisco IOS software image you want to use by entering the appropriate b command at the ROM monitor prompt (>).
- Proceed with the setup facility or exit from setup and use configuration commands to configure global and interface−specific parameters.

Cisco 12008 GSR: Installation

Upper Card Cage: Removing Cards

- Attach an antistatic ESD wrist strap to your wrist.
- Insert the banana jack into the ESD connection socket.
- Write down each card type and card location.
- Loosen the captive screws.
- Pivot the two card ejector levers away from the faceplate to unseat the card.
- Slide the card out of its slot.
- Stack the removed card on an antistatic mat for ESD protection.

Power Supply: Removing

- Set the power to the off position.
- Turn the captive screw on the power supply faceplate.
- Pull the power supply unit halfway out of its bay.
- Pull the power supply unit out completely.
- Set the power supply unit aside in a safe place.

Catalyst 3000 and 5000 Router Modules

Catalyst 3000 Router: Installation

6

Router Card: Installing

- Connect the switch to a computer or other data terminal equipment (DTE) device.
- Connect the EIA–232 cable to the console, the DB–9 connector, on the switch.
- Use the console configuration default settings for communication with the switch.
- Power up the switch.
- At the Greeting screen, press Return to enter the switch Main menu.
- Press Ctrl and R from the switch Main menu to access the router card command–line interface (CLI).

Router Card: Configuring

- Connect an auxiliary terminal to the auxiliary port on your switch.
- Turn on the power switch.
- The switch Greeting screen appears. To access the router card from the Main menu, you press Ctrl and R.
- Select Configuration from the Main menu.
- Select Router Configuration from the Configuration menu.
- Enter the box and port numbers and press the Enter key.
- Select the required option from the Router Configuration menu.

Catalyst 5000 RSM: Installation

RSM: Installing

- Connect an ASCII terminal to a computer running terminal emulation software to the console port on the Catalyst switch.
- Use a screwdriver to loosen the captive installation screws and remove the module filler plate or the existing module from the slot that you want to use.
- Guide the RSM into the slot, aligning the sides of the RSM with the guides in the slot.
- While keeping the module oriented horizontally, carefully slide it into the slot until its front panel makes contact with the ejector levers.
- Simultaneously push the left lever and the right lever in to fully seat the module in the backplane connector.
- Tighten the captive installation screws on the left and right sides of the module.
- Check the status of the module.
- After verifying that the RSM is operational, enter the session mod/num command at the Cat5k>prompt.

Glossary

Alphabetical List of Terms

(DTE) Data Terminal Equipment

7

data terminal equipment. Device at the user end of a user−network interface that serves as a data source, destination, or both. DTE connects to a data network through a DCE device (for example, a modem) and typically uses clocking signals generated by the DCE. DTE includes such devices as computers, protocol translators, and multiplexers.

10BaseT

10−Mbps baseband Ethernet specification using two pairs of twisted−pair cabling (Category 3, 4, or 5): one pair for transmitting data and the other for receiving data. 10BaseT, which is part of the IEEE 802.3 specification, has a distance limit of approximately 328 feet (100 meters) per segment.

ASIC

Application Specific Integrated Circuit, a chip designed for a particular application. ASICs are built by connecting existing circuit building blocks in new ways

ATM

Asynchronous Transfer Mode. International standard for cell relay in which multiple service types (such as voice, video, or data) are conveyed in fixed−length (53−byte) cells. Fixed−length cells allow cell processing to occur in hardware, thereby reducing transit delays. ATM is designed to take advantage of high−speed transmission media such as E3, SONET, and T3.

Attachment Unit Interface (AUI)

attachment unit interface. IEEE 802.3 interface between an MAU and a NIC. The term AUI can also refer to the rear panel port to which an AUI cable might attach. Also called transceiver cable.

AUI

Attachment Unit Interface

AWG

American Wire Gauge

Basic Rate Interface (BRI)

Basic Rate Interface. ISDN interface composed of two B channels and one D channel for circuit−switched communication of voice, video, and data.

BNC

BNC coonector. Standard connector used to connect IEEE 802.3 10Base2 coaxial cable to an MAU.

BRI

Basic Rate Interface

BTU

British thermal unit

buffer

A temporary storage area, usually in RAM.

C.S.C

Cisco Systems Capital

cage

a piece of hardware into which cards are installed

CEF

Cisco express forwarding

Challenge Handshake Authentication Protocol (CHAP)

Challenge Handshake Authentication Protocol. Security feature supported on lines using PPP encapsulation that prevents unauthorized access. CHAP does not itself prevent unauthorized access, it merely identifies the remote end. The router or access server then determines whether that user is allowed access.

Channel Service Unit (CSU)

channel service unit. Digital interface device that connects end–user equipment to the local digital telephone loop. Often referred to together with DSU, as CSU/DSU.

channelized

Channelized modules are modules that can be broken down into time slots.

chassis

a box that houses main electonic components

Command Line Interface (CLI)

command line interface. Interface that allows the user to interact with the operating system by entering commands and optional arguments. The UNIX operating system and DOS provide CLIs.

Compressed Serial Link Internet Protocol (CSLIP)

Compressed Serial Link Internet Protocol. Extension of SLIP that, when appropriate, allows just header information to be sent across a SLIP connection, reducing overhead and increasing packet throughput on SLIP lines.

CRC

9

Cyclic redundancy check. Error−checking technique in which the frame recipient calculates a remainder by dividing frame contents by a prime binary divisor and compares the calculated remainder to a value stored in the frame by the sending node.

CSC

Clock and scheduler card

CSU

Channel Service Unit. Digital interface device that connects end−user equipment to the local digital telephone loop. Often referred to together with DSU, as CSU/DSU.

CxBus

Cisco Extended Bus. Data bus for interface processors on Cisco 7000 series routers.

Data Circuit−terminating Equipment (DCE)

data circuit−terminating equipment (ITU−T expansion). Devices and connections of a communications network that comprise the network end of the user−to−network interface. The DCE provides a physical connection to the network, forwards traffic, and provides a clocking signal used to synchronize data transmission between DCE and DTE devices. Modems and interface cards are examples of DCE.

Data Service Unit (DSU)

data service unit. Device used in digital transmission that adapts the physical interface on a DTE device to a transmission facility such as T1 or E1. The DSU is also responsible for such functions as signal timing. Often referred to together with CSU, as CSU/DSU.

DB−25 connector

A 25−pin connector used by parellel ports data bus connector

dBus

Diagnostic bus

dial−on−demand routing (DDR)

dial−on−demand routing. Technique whereby a router can automatically initiate and close a circuit−switched session as transmitting stations demand. The router spoofs keepalives so that end stations treat the session as active. DDR permits routing over ISDN or telephone lines using an external ISDN terminal adaptor or modem.

DIMM

dual in−line memory module

DRAM

dynamic random−access memory. RAM that stores in capacitors that must be periodically refreshed.

DSU

Data Service Unit. Device used in digital transmission that adapts the physical interface on a DTE device to a transmission facility such as T1 or E1. The DSU is also responsible for such functions as signal timing. Often referred to together with CSU, as CSU/DSU.

DTE

data terminal equipment.

Dynamic Random−Access Memory (DRAM)

dynamic random−access memory. RAM that stores information in capacitors that must be periodically refreshed. Delays can occur because DRAMs are inaccessible to the processor when refreshing their contents. However, DRAMs are less complex and have greater capacity than SRAMs.

EDO

Extended data output

Electrically Erasable Programmable Read−Only Memory (EEPROM)

electrically erasable programmable read−only memory. EPROM that can be erased using electrical signals applied to specific pins. See also EPROM.

EMI

Electromagnetic interference

EPROM

erasable programmable read−only memory

ESD

Electrostatic discharge. The rapid discharge of static electricity from one conductor to another of a different potential.

Extended Industry−Standard Architecture (EISA)

Extended Industry−Standard Architecture. 32−bit bus interface used in PCs, PC−based servers, and some UNIX workstations and servers.

FDDI

Fiber Distributed Data Interface. LAN standard, defined by ANSI X3T9.5, specifying a 100−Mbps token−passing network using fiber−optic cable, with transmission distances of up to 2 km. FDDI uses a dual−ring architecture to provide redundancy.

FRU

Field Replaceable Unit

Gbps

gigabits per second

Gigabit Switch Router

The Cisco 12000 Gigabit Switch Router is Cisco's high−performance, carrier−class routing platform for tier 1 Internet Service Providers (ISPs).

GRP

Gigabit Route Processor

GSR

Gigabit Switch Router

HSSI

High−Speed Serial Interface. Network standard for high−speed (up to 52 Mbps) serial connections over WAN links.

Hz

Abbreviation for Hertz, a measure of frequency, usually cyles per second

ID−EEPROM

electrically erasable programmable read−only memory. a special type of PROM that can be erased by exposing it to an electrical charge.

IEC

International Electrotechnical Commission

Industry−Standard Architecture (ISA)

Industry−Standard Architecture. 16−bit bus used for Intel−based personal computers.

IOS

Cisco Internetwork Operating System. Cisco system software that provides common functionality, scalability, and security for all products under the CiscoFusion architecture. Cisco IOS allows centralized, integrated, and automated installation and management of internetworks, while ensuring support for a wide variety of protocols, media, services, and platforms.

ISDN

12

Integrated Services Digital Network.

ISP

Internet Service Provider

LAN

Local Area Network

LED

light emitting diode

MAC

Media Access Control

MAU

Media Attachment Unit

Mbus

Maintenance bus. A router's monitoring system.

Network Termination (NT1)

network termination 1. In ISDN, a device that provides the interface between customer premises equipment and central office switching equipment.

NFPA

National Fire Protection Association

nm

nanometer

Nonvolatile Random−Access Memory (NVRAM)

nonvolatile RAM. RAM that retains its contents when a unit is powered off.

NPM

network processor module

NVRAM

nonvolatile RAM

OC

optical carrier

Ohm

Ohm's Law is the mathematical relationship among electric current, resistance, and voltage.

OSI

Open Systems Interconnection

Packet over SONET (POS)

Packet over Synchronous Optical Network. See SONET.

PCMCIA

Personal Computer Memory Card International Association

Personal Compurt Memory Card International Association (PCMCIA)

Initially it was a standard for laptop cards, now it is used to store flash on cisco routers.

PFC

power factor connector

Point To Point Protocol (PPP)

Point–to–Point Protocol. Successor to SLIP that provides router–to–router and host–to–network connections over synchronous and asynchronous circuits. Whereas SLIP was designed to work with IP, PPP was designed to work with several network layer protocols, such as IP, IPX, and ARA. PPP also has built–in security mechanisms, such as CHAP and PAP. PPP relies on two protocols: LCP and NCP. See also CHAP, LCP, NCP, PAP, and SLIP.

POS

Packet–over–SONET

Power–On Self –Test (POST)

power–on self test. Set of hardware diagnostics that runs on a hardware device when that device is powered up.

PRI

Primary Rate Interface.

RISC

reduced instruction set computing

ROM

read−only memory

Route/Switch Processor (RSP)

Route/Switch Processor. Processor module in the Cisco 7500 series routers that integrates the functions of the RP and the SP.

RPS

Redundant Power System

RSM

Route Switch Module

SDH

Synchronous Digital Hierarchy, which is an international standard for synchronous data transmission over fiber optic cables.

SDRAM

Synchronous dynamic random access memory

SELV

Safety extra−low voltage

Serial Line Internet Protocol (SLIP)

Serial Line Internet Protocol. Standard protocol for point−to−point serial connections using a variation of TCP/IP. Predecessor of PPP.

SFC

switch fabric cards

SIMM

Single Inline Memory Module

Simple Network Management Protocol (SNMP)

Simple Network Management Protocol. Network management protocol used almost exclusively in TCP/IP networks. SNMP provides a means to monitor and control network devices, and to manage configurations, statistics collection, performance, and security.

SONET

Synchronous Optical Network, a standard for connecting fiber−optic transmission systems.

Static Random−Access Memory (SRAM)

Type of RAM that retains its contents for as long as power is supplied. SRAM does not require constant refreshing, like DRAM.

STM

Synchronous Transport Module

Synchronous Optical Network (SONET)

Synchronous Optical Network. High−speed (up to 2.5 Gbps) synchronous network specification developed by Bellcore and designed to run on optical fiber. STS−1 is the basic building block of SONET. Approved as an international standard in 1988.

telco

abbreviation for telephone company

Token Ring

this term is always used in capitals when referring to Token Ring networks etc.

transceiver

short for transmitter−receiver − a device that both transmits and receives analog or digital signals.

Trivial File Transfer Protocol (TFTP)

Trivial File Transfer Protocol. Simplified version of FTP that allows files to be transferred from one computer to another over a network.

UPS

uninterruptible power supply

UTP

Unshielded Twisted−Pair

VAC

volts alternating current

VDC

volts direct current

VIP

Versatile Interface Processor. Interface card used in Cisco 7000 and Cisco 7500 series routers. The VIP provides multilayer switching and runs Cisco IOS. The most recent version of the VIP is VIP2.

WAN

wide area network

WCS

writable control store

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