Cisco Service and Application Module for IP User Guide

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Americas Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
http://www.cisco.com
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 527-0883

Text Part Number: OL-13003-06

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Cisco Service and Application Module for IP User Guide

CONTENTS

About this Guide

This preface discusses the objectives, audience, organization, and conventions of this document.

Note Use this document along with the documents listed in the "Related Documentation" section on page 9.

Audience

This user guide is written for network administrators and other people who are responsible for setting up, installing, configuring, and maintaining the Cisco Service Application Module for IP (SAMI).

Only trained and qualified service personal (as defined in IEC 60950 and AS/NZS3260) should install, replace, or service the equipment described in this user guide.

Documentation Objectives

This user guide provides an overview of the Cisco SAMI, including its physical and functional features. Instructions on how to install and remove the SAMI, how to load images onto the module, and how to complete the initial configuration required for the SAMI to operate in your Cisco 7600 Series Router are included.

Note This document does not include configuration information for the Cisco software application running on the SAMI processors. For configuration on this, see the documentation for that application and refer to the "Related Documentation" section on page 9.

Documentation Organization

This user guide is organized as follows:

Chapter	Chapter Title	Description
1	Cisco Service and Application Module for IP Overview	Describes the SAMI architecture, software and hardware features, and system requirements.
2	Installing the Cisco SAMI	Describes general safety recommendations, site preparations, required tools and equipment, and provides steps to install, remove, and verify the installation of a SAMI in your Cisco 7600 Series Router.
3	Configuring the Cisco SAMI	Describes how to complete the configuration required to for the SAMI to operate in the Cisco 7600 Series Router.
4	Maintaining and Monitoring the Cisco SAMI	Describes how to maintain and monitor the SAMI, including the steps on how to upgrade the SAMI software, and configure maintenance-related functions such as monitoring path health and allocating processor memory.
Appendix A	Using the Command-Line Interfaces	Provides basic information about using the various command-line interfaces (CLIs).
Appendix B	Supervisor Console Commands	Lists the commands supported at the Cisco Supervisor in support of the Cisco SAMI, including the command syntax, usage guidelines, and examples.
Appendix C	SAMI Cisco IOS PPC Commands	Lists the commands supported at the SAMI Cisco IOS PPC console in support of Cisco IOS software applications, including the command syntax, usage guidelines, and examples.
Appendix D	SAMI COSLI PPC Commands	Lists the commands supported at the SAMI COSLI PPC console in support of Cisco software applications, including the command syntax, usage guidelines, and examples.
Appendix E	SAMI LCP Commands	Lists the commands supported at the SAMI LCP console, including the command syntax, usage guidelines, and examples.

Documentation Conventions

This guide uses the following conventions:

Convention	Description
boldface font	Commands and keywords; user-entered text.
italic font	Variables for which you supply values.
[ ]	Keywords or arguments that appear within square brackets are optional.
{x | y | z}	A choice of required keywords appears in braces separated by vertical bars. You must select one.
`screen font`	Examples of information displayed on the screen.

Convention	Description
`boldface screen font`	Examples of information you must enter.
< >	Nonprinting characters (for example, passwords) appear in angle brackets.
[ ]	Default responses to system prompts appear in square brackets.

Note Means *take note*. Notes contain helpful suggestions or references to material not covered in the user guide.

Timesaver Means *the described action saves time*.

Tip Means *the following information will help you solve a problem*.

Caution Means *be careful* “to avoid any action” that could result in equipment damage or loss of data.

Safety Warnings

Safety warnings appear throughout this user guide in procedures that, if performed incorrectly, might harm you. A warning symbol precedes each warning statement. The safety warnings provide safety guidelines that you should follow when working with any equipment that connects to electrical power or telephone wiring. Included in the warnings are translations in several languages.

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

Waarschuwing

BELANGRIJKE VEILIGHEIDSINSTRUCTIES

Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient u op de hoogte te zijn van de standaard praktijken om ongelukken te voorkomen. Gebruik het nummer van de verklaring onderaan de waarschuwing als u een vertaling van de waarschuwing die bij het apparaat wordt geleverd, wilt raadplegen.

BEWAAR DEZE INSTRUCTIES

Varoitus

TÄRKEITÄ TURVALLISUUSOHJEITA

Tämä varoitusmerkki merkitsee vaaraa. Tilanne voi aiheuttaa ruumiillisia vammoja. Ennen kuin käsittelet laitteistoa, huomioi sähköpiirien käsittelemiseen liittyvät riskit ja tutustu onnettomuuksien yleisiin ehkäisytapoihin. Turvallisuusvaroitusten käännökset löytyvät laitteen mukana toimitettujen käännettyjen turvallisuusvaroitusten joukosta varoitusten lopussa näkyvien lausuntonumeroiden avulla.

SÄILYTÄ NÄMÄ OHJEET

Attention

IMPORTANTES INFORMATIONS DE SÉCURITÉ

Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant entraîner des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers liés aux circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents. Pour prendre connaissance des traductions des avertissements figurant dans les consignes de sécurité traduites qui accompagnent cet appareil, référez-vous au numéro de l'instruction situé à la fin de chaque avertissement.

CONSERVEZ CES INFORMATIONS

Warnung

WICHTIGE SICHERHEITSHINWEISE

Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu Verletzungen führen kann. Machen Sie sich vor der Arbeit mit Geräten mit den Gefahren elektrischer Schaltungen und den üblichen Verfahren zur Vorbeugung vor Unfällen vertraut. Suchen Sie mit der am Ende jeder Warnung angegebenen Anweisungsnummer nach der jeweiligen Übersetzung in den übersetzten Sicherheitshinweisen, die zusammen mit diesem Gerät ausgeliefert wurden.

BEWAHREN SIE DIESE HINWEISE GUT AUF.

Avvertenza **IMPORTANTI ISTRUZIONI SULLA SICUREZZA**

Questo simbolo di avvertenza indica un pericolo. La situazione potrebbe causare infortuni alle persone. Prima di intervenire su qualsiasi apparecchiatura, occorre essere al corrente dei pericoli relativi ai circuiti elettrici e conoscere le procedure standard per la prevenzione di incidenti. Utilizzare il numero di istruzione presente alla fine di ciascuna avvertenza per individuare le traduzioni delle avvertenze riportate in questo documento.

CONSERVARE QUESTE ISTRUZIONI

Advarsel **VIKTIGE SIKKERHETSINSTRUKSJONER**

Dette advarselssymbolet betyr fare. Du er i en situasjon som kan føre til skade på person. Før du begynner å arbeide med noe av utstyret, må du være oppmerksom på farene forbundet med elektriske kretser, og kjenne til standardprosedyrer for å forhindre ulykker. Bruk nummeret i slutten av hver advarsel for å finne oversettelsen i de oversatte sikkerhetsadvarslene som fulgte med denne enheten.

TA VARE PÅ DISSE INSTRUKSJONENE

Aviso **INSTRUÇÕES IMPORTANTES DE SEGURANÇA**

Este símbolo de aviso significa perigo. Você está em uma situação que poderá ser causadora de lesões corporais. Antes de iniciar a utilização de qualquer equipamento, tenha conhecimento dos perigos envolvidos no manuseio de circuitos elétricos e familiarize-se com as práticas habituais de prevenção de acidentes. Utilize o número da instrução fornecido ao final de cada aviso para localizar sua tradução nos avisos de segurança traduzidos que acompanham este dispositivo.

GUARDE ESTAS INSTRUÇÕES

¡Advertencia! **INSTRUCCIONES IMPORTANTES DE SEGURIDAD**

Este símbolo de aviso indica peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considere los riesgos de la corriente eléctrica y familiarícese con los procedimientos estándar de prevención de accidentes. Al final de cada advertencia encontrará el número que le ayudará a encontrar el texto traducido en el apartado de traducciones que acompaña a este dispositivo.

GUARDE ESTAS INSTRUCCIONES

Varning! **VIKTIGA SÄKERHETSANVISNINGAR**

Denna varningssignal signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på någon utrustning måste du vara medveten om farorna med elkretsar och känna till vanliga förfaranden för att förebygga olyckor. Använd det nummer som finns i slutet av varje varning för att hitta dess översättning i de översatta säkerhetsvarningar som medföljer denna anordning.

SPARA DESSA ANVISNINGAR

FONTOS BIZTONSÁGI ELOÍRÁSOK

Ez a figyelmezeto jel veszélyre utal. Sérülésveszélyt rejto helyzetben van. Mielott bármely berendezésen munkát végezte, legyen figyelemmel az elektromos áramkörök okozta kockázatokra, és ismerkedjen meg a szokásos balesetvédelmi eljárásokkal. A kiadványban szereplo figyelmeztetések fordítása a készülékhez mellékelt biztonsági figyelmeztetések között található; a fordítás az egyes figyelmeztetések végén látható szám alapján kereshető meg.

ORIZZE MEG EZEKET AZ UTASÍTÁSOKAT!

Предупреждение

ВАЖНЫЕ ИНСТРУКЦИИ ПО СОБЛЮДЕНИЮ ТЕХНИКИ БЕЗОПАСНОСТИ

Этот символ предупреждения обозначает опасность. То есть имеет место ситуация, в которой следует опасаться телесных повреждений. Перед эксплуатацией оборудования выясните, каким опасностям может подвергаться пользователь при использовании электрических цепей, и ознакомьтесь с правилами техники безопасности для предотвращения возможных несчастных случаев. Воспользуйтесь номером заявления, приведенным в конце каждого предупреждения, чтобы найти его переведенный вариант в переводе предупреждений по безопасности, прилагаемом к данному устройству.

СОХРАНИТЕ ЭТИ ИНСТРУКЦИИ

警告

重要的安全性说明

此警告符号代表危险。您正处于可能受到严重伤害的工作环境中。在您使用设备开始工作之前，必须充分意识到触电的危险，并熟练掌握防止事故发生的标准工作程序。请根据每项警告结尾提供的声明号码来找到此设备的安全性警告说明的翻译文本。

请保存这些安全性说明

警告

安全上の重要な注意事項

「危険」の意味です。人身事故を予防するための注意事項が記述されています。装置の取り扱い作業を行うときは、電気回路の危険性に注意し、一般的な事故防止策に留意してください。警告の各国語版は、各注意事項の番号を基に、装置に付属の「Translated Safety Warnings」を参照してください。

これらの注意事項を保管しておいてください。

주의

중요 안전 지침

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이 지시 사항을 보관하십시오.

Aviso

INSTRUÇÕES IMPORTANTES DE SEGURANÇA

Este símbolo de aviso significa perigo. Você se encontra em uma situação em que há risco de lesões corporais. Antes de trabalhar com qualquer equipamento, esteja ciente dos riscos que envolvem os circuitos elétricos e familiarize-se com as práticas padrão de prevenção de acidentes. Use o número da declaração fornecido ao final de cada aviso para localizar sua tradução nos avisos de segurança traduzidos que acompanham o dispositivo.

GUARDE ESTAS INSTRUÇÕES

Advarsel

VIGTIGE SIKKERHEDSANVISNINGER

Dette advarselssymbol betyder fare. Du befinder dig i en situation med risiko for legemesbeskadigelse. Før du begynder arbejde på udstyr, skal du være opmærksom på de involverede risici, der er ved elektriske kredsløb, og du skal sætte dig ind i standardprocedurer til undgåelse af ulykker. Brug erklæringsnummeret efter hver advarsel for at finde oversættelsen i de oversatte advarsler, der fulgte med denne enhed.

GEM DISSE ANVISNINGER

تحذير

إرشادات الأمان الهامة

يوضح رمز التحذير هذا وجود خطر. وهذا يعني أنك متواجد في مكان قد ينتج عنه التعرض لإصابات. قبل بدء العمل، احذر مخاطر التعرض للصدمات الكهربائية وكن على علم بالإجراءات القياسية للحيلولة دون وقوع أي حوادث. استخدم رقم البيان الموجود في أخر كل تحذير لتحديد مكان ترجمته داخل تحذيرات الأمان المترجمة التي تأتي مع الجهاز.

قم بحفظ هذه الإرشادات

Upozorenje

VAŽNE SIGURNOSNE NAPOMENE

Ovaj simbol upozorenja predstavlja opasnost. Nalazite se u situaciji koja može prouzročiti tjelesne ozljede. Prije rada s bilo kojim uređajem, morate razumjeti opasnosti vezane uz električne sklopove, te biti upoznati sa standardnim načinima izbjegavanja nesreća. U prevedenim sigurnosnim upozorenjima, priloženima uz uređaj, možete prema broju koji se nalazi uz pojedino upozorenje pronaći i njegov prijevod.

SAČUVAJTE OVE UPUTE

Upozornění

DŮLEŽITÉ BEZPEČNOSTNÍ POKYNY

Tento upozorňující symbol označuje nebezpečí. Jste v situaci, která by mohla způsobit nebezpečí úrazu. Před prací na jakémkoliv vybavení si uvědomte nebezpečí související s elektrickými obvody a seznamte se se standardními opatřeními pro předcházení úrazům. Podle čísla na konci každého upozornění vyhledejte jeho překlad v přeložených bezpečnostních upozorněních, která jsou přiložena k zařízení.

USCHOVEJTE TYTO POKYNY

Προειδοποίηση

ΣΗΜΑΝΤΙΚΕΣ ΟΔΗΓΙΕΣ ΑΣΦΑΛΕΙΑΣ

Αυτό το προειδοποιητικό σύμβολο σημαίνει κίνδυνο. Βρίσκεστε σε κατάσταση που μπορεί να προκαλέσει τραυματισμό. Πριν εργαστείτε σε οποιοδήποτε εξοπλισμό, να έχετε υπόψη σας τους κινδύνους που σχετίζονται με τα ηλεκτρικά κυκλώματα και να έχετε εξοικειωθεί με τις συνήθεις πρακτικές για την αποφυγή ατυχημάτων. Χρησιμοποιήστε τον αριθμό δήλωσης που παρέχεται στο τέλος κάθε προειδοποίησης, για να εντοπίσετε τη μετάφρασή της στις μεταφρασμένες προειδοποιήσεις ασφαλείας που συνοδεύουν τη συσκευή.

ΦΥΛΑΞΤΕ ΑΥΤΕΣ ΤΙΣ ΟΔΗΓΙΕΣ

אזהרה

הוראות בטיחות חשובות

סימן אזהרה זה מסמל סכנה. אתה נמצא במצב העלול לגרום לפציעה. לפני שתעבוד עם ציוד כלשהו, עליך להיות מודע לסכנות הכרוכות במעגלים חשמליים ולהכיר את הנהלים המקובלים למניעת תאונות. השתמש במספר ההוראה המסופק בסופה של כל אזהרה כד לאתר את התרגום באזהרות הבטיחות המתורגמות שמצורפות להתקן.

שמור הוראות אלה

Opomena

ВАЖНИ БЕЗБЕДНОСНИ НАПАТСТВИЈА

Симболот за предупредување значи опасност. Се наоѓате во ситуација што може да предизвика телесни повреди. Пред да работите со опремата, бидете свесни за ризикот што постои кај електричните кола и треба да ги познавате стандардните постапки за спречување на несреќни случаи. Искористете го бројот на изјавата што се наоѓа на крајот на секое предупредување за да го најдете неговиот период во преведените безбедносни предупредувања што се испорачани со уредот.

ЧУВАЈТЕ ГИ ОВИЕ НАПАТСТВИЈА

Ostrzeżenie

WAŻNE INSTRUKCJE DOTYCZĄCE BEZPIECZEŃSTWA

Ten symbol ostrzeżenia oznacza niebezpieczeństwo. Zachodzi sytuacja, która może powodować obrażenia ciała. Przed przystąpieniem do prac przy urządzeniach należy zapoznać się z zagrożeniami związanymi z układami elektrycznymi oraz ze standardowymi środkami zapobiegania wypadkom. Na końcu każdego ostrzeżenia podano numer, na podstawie którego można odszukać tłumaczenie tego ostrzeżenia w dołączonym do urządzenia dokumencie z tłumaczeniami ostrzeżeń.

NINIEJSZE INSTRUKCJE NALEŻY ZACHOWAĆ

Upozornenie

DÔLEŽITÉ BEZPEČNOSTNÉ POKYNY

Tento varovný symbol označuje nebezpečenstvo. Nachádzate sa v situácii s nebezpečenstvom úrazu. Pred prácou na akomkoľvek vybavení si uvedomte nebezpečenstvo súvisiace s elektrickými obvodmi a oboznámte sa so štandardnými opatreniami na predchádzanie úrazom. Podľa čísla na konci každého upozornenia vyhľadajte jeho preklad v preložených bezpečnostných upozorneniach, ktoré sú priložené k zariadeniu.

USCHOVAJTE SI TENTO NÁVOD

Related Documentation

For additional information that might be helpful when installing and configuring the Cisco SAMI in your Cisco 7600 Series Router, refer to the following:

- *Cisco Service and Application Module for IP Memory Upgrade Installation Note*
- Cisco 7600 Series Router platform:
  - *Release Notes for Cisco IOS Release 12.2SR for the Cisco 7600 Series Routers*
  - *Cisco 7600 Series Router Installation Guide*
  - *Cisco 7600 Series Router Module Installation Guide*
  - *Cisco 7600 Series Router Cisco IOS Command Reference*
  - *Cisco 7600 Series Router Cisco IOS System Message Guide*
  - For information about MIBs, refer to: http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml

  These documents are available at:

  - Cisco 7600 Series Router home page on Cisco.com

    Products & Solutions > Products > Routers and Routing Systems > 7600 Series Routers
  - Cisco 7600 Series Router technical documentation on Cisco.com

    Products & Solutions > Products > Routers and Routing Systems > 7600 Series Routers > in the Technical Documentation & Tools box on the right of the page, **Cisco 7600 Series Routers**
- Cisco mobile wireless software applications that are supported on the Cisco SAMI include:
  - Cisco Wireless Security Gateway

    *Cisco 7600 Wireless Security Gateway, Release 2.0 Configuration Guide (*and above)

    Release Notes for the Cisco 7600 Wireless Security Gateway, Release 2.0 (and above)
  - Cisco Broadband Wireless Gateway (formerly the Cisco ASN Gateway)

    Cisco Broadband Wireless Gateway for IOS Release 12.4(15)XL1 (and above)

    Cisco Broadband Wireless Gateway 1.1 Command Reference, IOS Release 12.4(15)XL1 (and above)
  - Cisco Content Services Gateway (2nd Generation CSG2)

    Release Notes for Cisco Content Services Gateway - 2nd Generation

    Cisco Content Services Gateway - 2nd Generation Installation and Configuration Guide
  - Cisco Gateway GPRS Support Node (GGSN)

    *Release Notes for Cisco GGSN Release 8.0 on the Cisco SAMI, Cisco IOS Release 12.4(15)XQ (*and above)

    *Cisco GGSN Release 8.0 Configuration Guide, Cisco IOS Release 12.4(15)XQ (*and above)

    *Cisco GGSN Release 8.0 Command Reference, Cisco IOS Release 12.4(15)XQ (*and above)

- Cisco Mobile Wireless Home Agent (HA)

  Cisco Mobile Wireless Home Agent Feature for IOS 12.4(15)XM

  Command Reference for Cisco Mobile Wireless Home Agent Feature for Cisco IOS Release 12.4(15)XM

  Release Notes for the Cisco Mobile Wireless Home Agent Feature for Cisco IOS Release 12.4(15)XM
- Cisco IP Transfer Point, Cisco IOS Release 12.2(25)IRA and above

  http://www.cisco.com/en/US/products/sw/wirelssw/ps1862/products_feature_guides_list.html
- Cisco Packet Data Serving Node (PDSN)

  Cisco Packet Data Serving Node (PDSN) Release 3.5 for Cisco IOS Release 12.4(15)XN

  Cisco PDSN Command Reference for IOS Release 12.4(15)XN

Obtaining Documentation, Obtaining Support, and Security Guidelines

For information on obtaining documentation, obtaining support, providing documentation feedback, security guidelines, and also recommended aliases and general Cisco documents, see the monthly *What's New* in Cisco Product Documentation, which also lists all new and revised Cisco technical documentation, at:

http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html

CHAPTER 1

Cisco Service and Application Module for IP Overview

This chapter describes the Cisco Service and Application Module for IP (SAMI).

Cisco Service and Application Module for IP Overview

The following versions of the Cisco SAMI are available:

- Cisco Service and Application Module for IP (WS-SVC-SAMI-BB-K9)
- spare Cisco Service and Application Module for IP (WS-SVC-SAMI-BB-K9=)

Additionally, a 4-GB memory option is available (MEM-SAMI-6P-4GB).

SAMI 4.0 will support 4GB DIMMs in addition to the presently supported 2GB DIMMs.

The SAMI hardware limits the number of ranks to 2.

Note Please reference the documentation for the Cisco software application you are using to determine if the 4-GB memory option is supported.

The Cisco SAMI, is a high-performance Cisco software application module that occupies one slot in the Cisco 7600 Series Router platform.

With an IXP2800 network processor flow-distributor running at 1.4 GHz, and six PowerPCs (PPC) running an instance of the same version of a Cisco software application at 1.25 GHz, the Cisco SAMI offers a parallel architecture for Cisco software applications such as the Cisco Content Services Gateway - 2nd Generation (CSG2), the Cisco Gateway GPRS Support Node (GGSN), the Cisco Mobile Wireless Home Agent (HA), the Cisco Wireless Security Gateway (WSG), the Cisco Broadband Wireless Gateway and Cisco IP Transfer Point (ITP), and the Cisco Long Term Evolution (LTE) Gateway products.

A session to each Cisco software application on a SAMI PCC can be established from the supervisor to configure, monitor, and troubleshoot the application.

Figure 1-1 illustrates the SAMI architecture:

Figure 1-1 SAMI Architecture

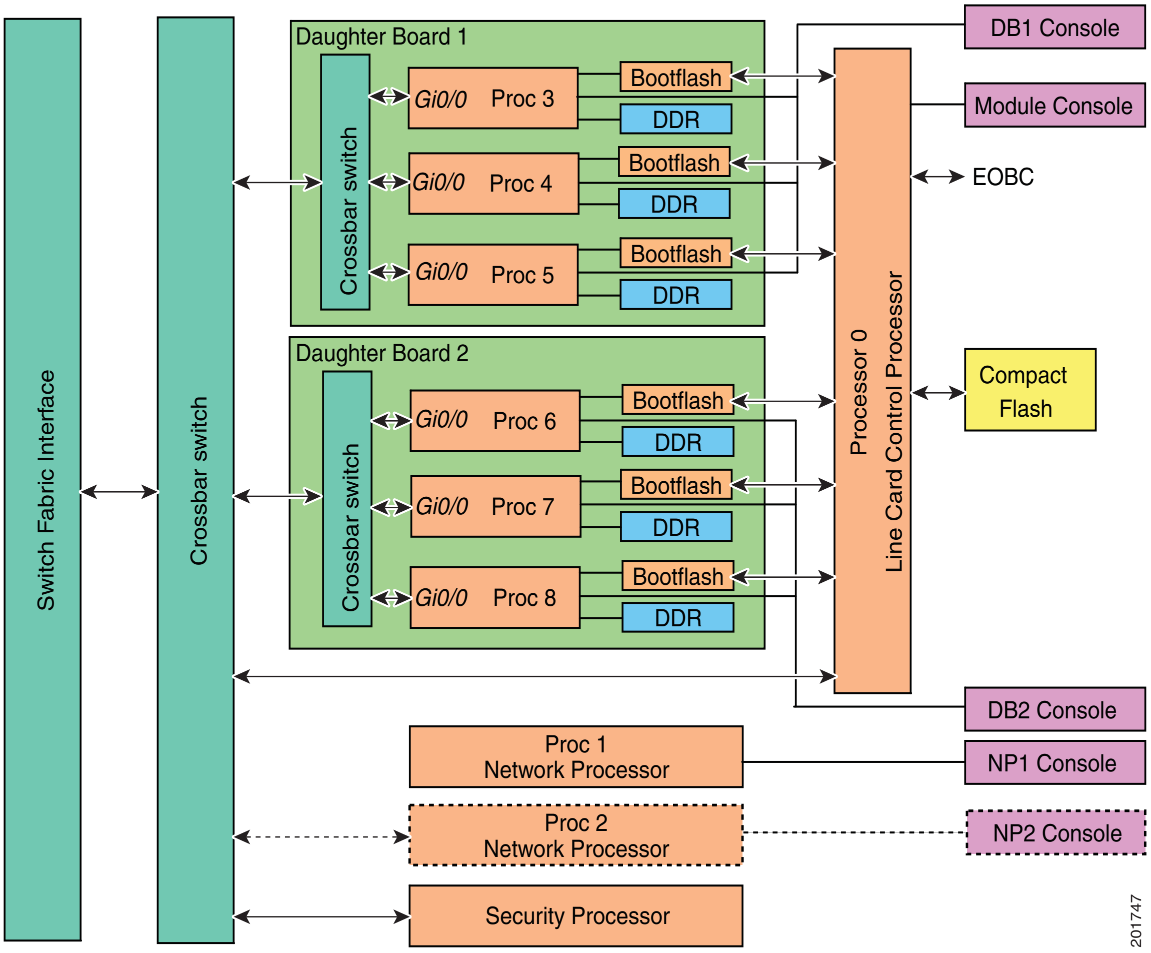
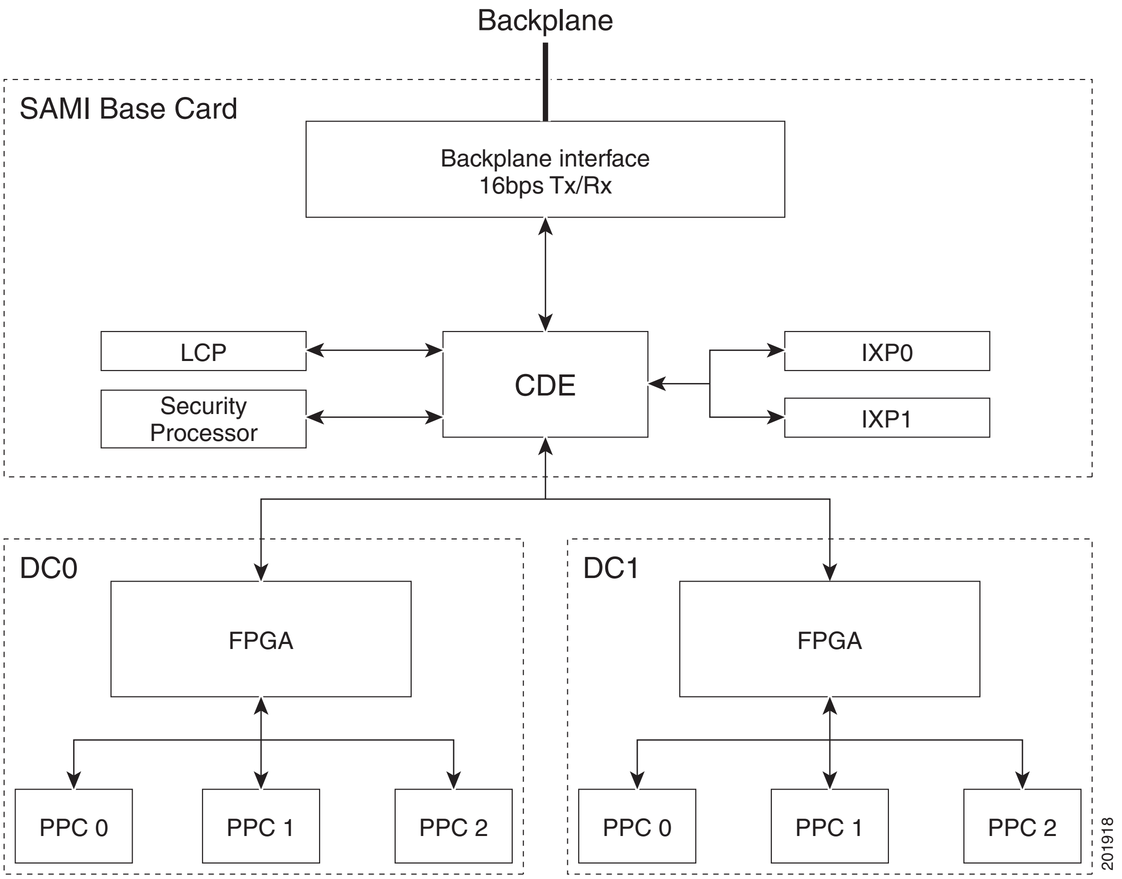


Figure 1-2 illustrates the flow of data on the SAMI.

Figure 1-2 SAMI Data Flow



The following sections describe the primary SAMI hardware and software features:

- Hardware Features, page 1-3
- Software/Firmware Features, page 1-6

Hardware Features

The SAMI provides the following hardware features:

- Backplane Interface, page 1-4
- Line Card Control Processor, page 1-4
- Classification and Distribution Engine, page 1-4
- Network Processor, page 1-4
- Daughter Cards, page 1-5

Backplane Interface

The SAMI backplane interface is a switch fabric-enabled interface, with a supported bandwidth of 16 Gbps TX/RX.

Line Card Control Processor

On the SAMI, a BCM1250 dualcore CPU running at 700 MHz provides the following functionality as the line card control processor (LCP):

- Brings up the module and various basecard elements and the SAMI daughter cards (DC0 and DC1).
- Interfaces with compact flash to store and retrieve daughter card images.
- Interfaces with supervisor engine during an image bundle upgrade, and automatically upgrades the PPC ROMMON images during the upgrade.
- Provides an Ethernet Out-of-Band Channel (EOBC) interface to the daughter card PPCs that supports features such as the **session** command, the **execute-on** command, and the remote console and logging (RCAL) feature.
- Monitors the module (for example, temperature and path health) and manages the various components on the module.
- Provides a 32-bit 33 MHz PCI interface to the network processor (IXP1) and daughter cards (DC0 and DC1).
- Sends error messages to the supervisor engine.

Classification and Distribution Engine

The SAMI classification and distribution engine (CDE) classifies and distributes packets to various source and destinations on the board and provides the Cisco 7600 Series Router chassis backplane interface.

The data flows (Figure 1-2 on page 1-3) are as follows:

- Backplane interface to the network processor (IXP0/1)—Ingress traffic is forwarded to IXPs based on the CDE VLAN destination configuration.
- Network processor (IXP0/1 to daughter card 1 (DC0) and daughter card 2 (DC1)—IXP0 classifies traffic and forwards to DC0/DC1 PPCs.
- DC0/DC1 to backplane interface—Egress traffic is forwarded to backplane interface. For some applications such as PDSN, LTE PGW and LTE SGW, and the CSG 2, DC0/DC1 also sends packets to Network Processor. Details are available in the respective applications guides.
- LCP to/from DC0/DC1—Control/management traffic.
- DC0 to DC1/DC1 to DC0—Inter-processor, inter-daughter card Cisco software application traffic.

Network Processor

A Intel IXP2800 network processor (IXP0/1) on the baseboard load balances which classifies ingress packets for forwarding to the PPCs on the daughter cards.

Daughter Cards

The two SAMI daughter cards (DC0 and DC1) provide the following primary components:

- First In, First Out (FIFO) queuing interfaces to the baseboard.
- Complex programmable logic device (CPLD) that provides peripheral access.
- Field programmable gate array (FPGA) that classifies and forwards ingress traffic from the network processor to the PPCs, and forwards of egress traffic from the PPCs to the backplane interface.
- Six PowerPC (PPC) SC8548H CPUs at 1.25 GHz that support:
  - 2 GB double data rate 2 (DDR2) synchronous dynamic RAM (SDRAM) per PPC at 250 megahertz (MHz), upgradable to one 4 GB dual in-line memory module (DIMM) each.
  - SAMI is enhanced with 4GB DRAM memory modules for each PPC giving a total of 24GB memory per card. But, the available memory is limited to 3264MB per PPC (19GB per card), due to the limitation of 32 bit architecture of the PPC.
  - 32 MB bootflash in which to store ROMMON, nonvolatile variables, crashinfo, and user filesystems.
  - One instance of the same Cisco software application image. (Six instances of the same image per SAMI.)

  Each PPC on a SAMI runs the same version of a Cisco software application image. This is the default installation during an image upgrade. Different Cisco software application images can run on separate SAMIs within the same Cisco 7600 chassis.

  There are two types PPC operating systems that can run on the Cisco SAMI PPCs - the Cisco IOS or the Common OS Services Linux Infra (COSLI) operating system. The Cisco software application determines the PPC operating system used.

  All PPCs can function together as one entity.

  The supervisor engine and the SAMI can be configured to store the running configuration of each PPC on the supervisor engine, enabling a SAMI to be replaced while retaining PPC configurations.
- Daughter card data path—32-bit FIFO at 125 MHz DDR (8 Gbps).
- PPC data path—16-bit FIFO at 125 MHz single data rate (SDR) (2 Gbps).

Security Processor

The Nitrox-II security processor is used for packet encryption and decryption, as well as encapsulation and decapsulation offload.

Compact Flash Memory

Configuration, software images, and core files are stored in the compact flash memory.

To generate core files from the TP, configure the **singleip tftp-baseport** *port* command. This command is available for single IP SAMI

Software/Firmware Features

Note Support for the following features is dependent upon the Cisco software application running on the Cisco SAMI PPCs. To determine if a Cisco SAMI feature is supported by the application, refer to the application documentation.

The SAMI provides the following software features:

- PCI Based IXP IPC
- Configuring Multiple IXPs
- Packet Egress Through IXP, page 1-6
- MAC Propagation to IXP for IPv4/IPv6 Addresses, page 1-6
- IXP Configuration Using Packet Trailers for CSG2 R5.0, page 1-6
- IPC Load Management, page 1-7
- PPC Configuration File Storage on the Supervisor Engine, page 1-7
- Remote Console and Logging, page 1-7
- Session Support, page 1-7
- Health Monitoring, page 1-8
- High Availability, page 1-8
- Hot Fabric Sync, page 1-8
- IEEE 802.1 Q-in-Q VLAN Tag Termination, page 1-9
- Cisco Software Application Support, page 1-9

Packet Egress Through IXP

This feature allows an enabled packet to go through IXP in the PPC egress path. Whether the packet goes through IXP is determined internally by the application running over the PPC.

MAC Propagation to IXP for IPv4/IPv6 Addresses

This feature enables propagation of MAC addresses to the IXP. In the IXP dataplane, when the IXP forwards the packet, it needs to know the MAC address of the next-hop. The MAC resolver helps by maintaining an updated record of IP to MAC mapping using the data from ARP/IPv6 ND. It shares this MAC information with the IXP, which in turn helps the IXP to pick up the destination MAC for the packet.

This feature is an internal feature used to facilitate datapath acceleration, and not configurable by the user.

IXP Configuration Using Packet Trailers for CSG2 R5.0

The Packet Trailers feature allows the CSG to add additional data at the end of an IP packet. The CSG may use this to share some data with the IXP to facilitate an acceleration path. This feature is an internal feature used to facilitate datapath acceleration, and not configurable by the user.

IPC Load Management

The IPC Management feature identifies and monitors resources that are critical for the IPC. The number of IPC messages on the Cisco CSG2 application is expected to be high, thus the need to manage those messages.

PPC Configuration File Storage on the Supervisor Engine

The PPC Configuration File Storage on the Supervisor feature enables the startup configuration file of each of the SAMI PPCs to be stored in the supervisor engine bootflash. This feature enables a SAMI in a specific slot to be replace without losing the configurations associated with each of the PPCs on the SAMI.

For information about enabling this feature, see "Enabling the Supervisor to Store PPC Startup Configuration Files" section on page 3-6.

Remote Console and Logging

Remote console and logging (RCAL) enables operators to use the supervisor engine console as a single connection point from which to access the LCP and the PPCs on the SAMI daughter cards to control debugging, display **show** commands, and view logging output for the PPCs on the SAMI.

For information about configuring RCAL support, see "Configuring Remote Console and Logging" section on page 3-20.

Session Support

From the supervisor engine console, sessions to the SAMI LCP, network processor (IXP0), and the PPCs can be established.

Note The Cisco software application running on the SAMI PPCs might not support a console connection. To determine if an application supports a connection, see the documentation for that application (see the "Related Documentation" section on page 9).

Specifically, the following sessions, listed by number, can be established:

Session #	Component
0	LCP
1	IXP0
2	IXP1 (for future use)
3	DC0, PPC0
4	DC0, PPC1
5	DC0, PPC2
6	DC1, PPC0
7	DC1, PPC1
8	DC1, PPC2

For information about establishing sessions, see "Establishing Console Sessions" section on page 3-2. For information on establishing a console connection, see "Establishing a Console Connection on the SAMI" section on page 4-23.

Health Monitoring

A SAMI PPC can be configured to send probes to monitor the health of its path to the network processor, or to monitor the health of all paths to the supervisor engine.

If a PPC does not receive a response to a probe that it has sent, it determines that there is an issue with a path. If this condition occurs, the PPC can be configured to send a notification to the LCP that instructs the LCP to reset the SAMI.

For more information about configuring health monitoring on the SAMI, see the "Configuring Health Monitoring" section on page 4-24.

High Availability

High availability is provided through a stateful switchover redundancy scheme on the supervisor engine.

For information on configuring redundancy on the Cisco 7600, refer to the Cisco 7600 router documentation in the "Related Documentation" section on page -9.

Hot Fabric Sync

The switch fabric module functionality is built into the Supervisor Engine 720 and the RSP720. When a supervisor engine switchover occurs, a fabric switchover also occurs. During this process, the line cards must resynchronize with the new active switch fabric. The Hot Fabric Sync feature, which is enabled by default, keeps both the active and standby fabric in sync at the same time, minimizing the switchover time and thereby minimizing any impact on switch fabric traffic. To verify the fabric sync status of active and standby supervisors, enter the show fabric status command.

With Cisco IOS 12.2(33)SRC on the supervisor, this feature is supported on the Cisco 7603-S, Cisco 7604, Cisco 7606-S, and Cisco 7609-S routers. With Cisco IP Transfer Point, Cisco IOS Release 12.2(25)IRA or later, the Hot Fabric Sync feature is supported on the SAMI.

For more information about the Hot Fabric Sync feature, refer to the Cisco 7600 documentation in the "Related Documentation" section on page -9.

IEEE 802.1 Q-in-Q VLAN Tag Termination

The Cisco SAMI supports IEEE 802.1Q-in-Q VLAN Tag Termination.

Encapsulating IEEE 802.1Q VLAN tags within 802.1Q enables service providers to use a single VLAN to support customers who have multiple VLANs. The IEEE 802.1Q-in-Q VLAN Tag Termination feature on the subinterface level preserves VLAN IDs and keeps traffic in different customer VLANs segregated.

For information about configuring IEEE 802.1Q-in-Q VLAN Tag Termination support, see the *Cisco IOS LAN Switching Configuration Guide, Release 12.2SR*.

Cisco Software Application Support

Each of the PPCs on a SAMI runs an instance of the same version of a Cisco software application image. Multiple SAMIs running a different Cisco software application on its PPCs can be implemented within the same chassis.

Note There are two types PPC operating systems that can run on the Cisco SAMI PPCs - the Cisco IOS or the Common OS Services Linux Infra (COSLI) operating system. The Cisco software application determines the PPC operating system used.

The list of Cisco software applications supported on SAMI includes, but is not limited to, the following Cisco software applications:

- Cisco Wireless Security Gateway, Release 1.0 or later.
- Cisco Broadband Wireless Gateway, Cisco IOS Release 12.4(15)XL1 or later.
- Cisco Content Services Gateway 2, Cisco IOS Release 12.3(11)MD or later.
- Cisco GPRS Gateway Support Node, Cisco IOS Release 12.4(15)XQ or later.
- Cisco Home Agent, Cisco IOS Release 12.4(15)XM or later.
- Cisco IP Transfer Point, Cisco IOS Release 12.2(25)IRA or later.
- Cisco Packet Data Serving Node, Cisco IOS Release 12.4(15)XR or later.

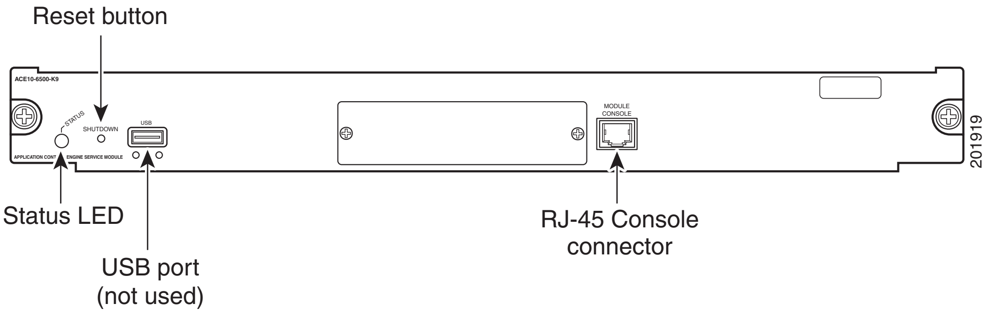
Note The features supported on the Cisco SAMI PPC are dependent on the Cisco software application running on the SAMI PPCs. Refer to the Cisco software application documentation to determine if a feature is supported by the SAMI for the application.

See the "Related Documentation" section on page 9 for a list of documents related to the Cisco software applications.

Front Panel Description

Figure 3 illustrates the front panel of the SAMI.

Figure 3 SAMI Front Panel



This section describes the following components on the front panel:

- Status LED, page 1-10
- Reset Button, page 1-11
- USB Port, page 1-12
- RJ-45 Console Connector, page 1-12

Status LED

When you power on the SAMI, it initializes various hardware components and communicates with the supervisor engine. The status LED indicates supervisor engine operations and initialization results. During the normal initialization sequence, the status LED changes from off to red, orange, and green.

Note For information about supervisor engine LEDs, see the *Cisco 7600 Series Router Module Installation Guide*.

Table 1 describes status LED operation.

Table 1 Status LED Description

LED Color	Description
Off	Indicates one of the following conditions: • The SAMI is waiting for the supervisor engine to provide power. • The SAMI is offline. • The SAMI is not receiving power, which may be caused by one of the following: – Power is not available to the module. – Module temperature is over the limit. Enter the **show environment temperature mod** command at the supervisor engine command-line interface (CLI) to display the temperature of each of the four sensors on the module.
Red	Indicates one of the following conditions: • The SAMI is released from reset by the supervisor engine and is booting. • The boot code failed to run.
Orange	Indicates one of the following conditions: • The SAMI is initializing hardware or communicating with the supervisor engine. • A fault occurred during the initialization sequence. • The SAMI failed to download its Field Programmable Gate Arrays (FPGAs) at startup. The module continues with the remainder of the initialization sequence and provides the module online status from the supervisor engine. • The SAMI has not received the module online status from the supervisor engine. This problem may be caused by the supervisor engine detecting a failure in an external loopback test that it issued to the module.
Green	The SAMI is operational; the supervisor engine has provided module online status.
Green to Orange	The SAMI is disabled through the supervisor engine CLI using the **no power enable module** command.

Reset Button

Caution Do not remove the SAMI from the Cisco 7600 Series Router until the module has shut down completely and the status LED is orange. To avoid damaging the SAMI, you must correctly shut down the module before you remove it from the chassis or before you disconnect the power. You may damage the SAMI if you remove it from the switch before it completely shuts down.

The Reset button manually shuts down the SAMI. To properly shut down the SAMI to prevent data loss, enter the **no power enable** module command in configuration mode at the router CLI.

If the SAMI fails to respond to this command, shut down the module by using a small pointed object (such as a paper clip) to access the Reset button on the front panel of the SAMI. The shutdown procedure may take several minutes. The Status LED turns off when the module shuts down.

USB Port

The USB port is not used.

RJ-45 Console Connector

In general, the SAMI RJ-45 console port is not used except for possibly some specific cases of troubleshooting and recovery that might require accessing the LCP through the external console port.

System Requirements and Specifications

The following sections describe the system requirements and specifications for the SAMI:

- System Requirements, page 1-12
- Power Requirements, page 1-13
- Memory Requirements, page 1-13
- Environmental Requirements, page 1-13
- Physical Specifications, page 1-13
- Agency Approvals, page 1-14

System Requirements

Note The supervisor engine module and its Cisco IOS software image is dependent on the supervisor engine being used and the Cisco software application running on the Cisco SAMI processors.

For the hardware and software requirements of the Cisco software application you are running on the Cisco SAMI, refer to the documentation for that application.

Before you install the SAMI with preloaded software in the Cisco 7600 series router chassis, ensure that the chassis contains the following:

- Any module that has ports to connect to the server and client networks.
- Supervisor Engine 720, with a Multilayer Switch Feature Card, running Cisco IOS Release 12.2(33)SRB1 and later.

  or

  Cisco 7600 Series Supervisor Engine 32, with a Multilayer Switch Feature Card, running Cisco IOS Release 12.2(33)SRC and later. Supervisor Engine 32 support requires LCP ROMMON Version 12.2[121] and later on the Cisco SAMI.

  For details on upgrading the Cisco IOS release running on the supervisor engine, refer to the "Upgrading to a New Software Release" section in the Release Notes for Cisco IOS Release 12.2SR.

  For information about verifying and upgrading the LCP ROMMON image on the Cisco SAMI, see the "Manually Upgrading an LCP ROMMON Image" section on page 4-9.

The SAMI occupies a single slot in the Cisco 7600 Series Router chassis.

The maximum number of SAMIs supported in one chassis is dependent on the Cisco software application running on the SAMI PPCs. Therefore, for the maximum number of SAMIs supported in a chassis, refer to the application documentation (see the “Related Documentation” section on page 9).

For more information on the Cisco 7600 Series Router, see the *Cisco 7600 Series Router Installation Guide*:

http://www.cisco.com/en/US/products/hw/routers/ps368/prod_installation_guides_list.html

Power Requirements

The SAMI operates on power supplied by the Cisco 7600 Series Router. The SAMI power consumption is 300 watts (1024 BTU/hr).

Memory Requirements

The SAMI memory is not configurable.

Environmental Requirements

Table 1-2 lists the environmental requirements for the SAMI.

Table 1-2 SAMI Environmental Requirements

Item	Specification
Temperature, ambient operating	0° to 40°C (32° to 104.5°F)
Temperature, ambient nonoperating	–40° to 70°C (40° to 158°F)
Humidity (RH), ambient (noncondensing) operating	10% to 90%
Nonoperating relative humidity (noncondensing)	5% to 97%
Altitude	15,000 ft. above sea level (non-operational) 9,800 ft. above sea level (operational)
Airflow	350 LFM

Physical Specifications

Table 1-3 lists the physical specifications of the SAMI.

Table 1-3 SAMI Physical Specifications

Item	Specification
Dimensions (H x W x D)	1.2 x 14.4 x 16 in (3.0 x 35.6 x 40.6 cm)
Weight	12.15 lb.

Agency Approvals

Emissions:

- CE marking
- EN 55022, 1998, class A
- CISPR22, 1997, class A
- AS/NZS CISPR 22 class A
- CFR47, Part 15, class A
- ICES 003 class A
- VCCI Class A
- EN61000-3-2 Harmonic Current Emission
- EN61000-3-3 Voltage Fluctuation and Flicker

Immunity:

- CE Marking
- CISPR24, ITE-Immunity characteristics, Limits and methods of measurement
- EN 55024, ITE-Immunity characteristics, Limits and methods of measurement
- EN50082-1, Electromagnetic compatibility - Generic immunity standard
- EN 300 386 Telecommunications Network Equipment (EMC)
- EN61000-6-1 Generic Immunity Standard

CHAPTER 2

Installing the Cisco SAMI

This chapter provides information on installing the Cisco Service and Application Module for IP (SAMI) in a Cisco 7600 Series Router chassis and includes the following topics:

- Preparing to Install the SAMI, page 2-1
- Installing the SAMI, page 2-6
- Removing a SAMI, page 2-11

Preparing to Install the SAMI

This section provides information about preparing your site for installation. It includes the following sections:

- Safety Guidelines, page 2-1
- Verifying System and Site Requirements, page 2-4
- Unpacking and Checking the Contents of your Shipment, page 2-5
- Required Tools, page 2-5
- Reviewing Safety Recommendations, page 2-5

Safety Guidelines

Before you begin installing the SAMI, review the safety guidelines in this section to avoid injuring yourself or damaging the SAMI.

Follow the "Reviewing Safety Recommendations" section on page 2-5 for specific safety information when installing the SAMI in a Cisco 7600 Series Router chassis.

Caution The SAMI is *not* hot-swappable. Do *not* remove the SAMI from the chassis until the SAMI has shut down completely and the status LED is orange or off. If you remove the SAMI from the chassis before it completely shuts down, you can damage the SAMI.

Safety with Equipment

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

The following guidelines help ensure your safety and protect the equipment. This list is not all- inclusive of all potentially hazardous situations, so be *alert*.

- Always disconnect all power cords and interface cables before moving the system.
- Never assume that power is disconnected from a circuit; *always* check.
- Keep the chassis area clear and dust-free during, before, and after installation.
- Keep tools and assembly components away from walk areas where you or others could fall over them.
- Do not work alone if potentially hazardous conditions exist.
- Do not perform any action that creates a potential hazard to people or makes the equipment unsafe.
- Carefully examine your work area for possible hazards, such as moist floors, ungrounded power extension cables, and missing safety grounds.
- Do not wear loose clothing that may get caught in the chassis.
- Wear safety glasses when working under conditions that may be hazardous to your eyes.

Safety with Electricity

Warning **Before performing any of the following procedures, ensure that power is removed from the DC circuit.** Statement 1003

Warning **This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of a special tool, lock and key, or other means of security.** Statement 1017

Warning **Before working on equipment that is connected to power lines, remove jewelry (including rings, necklaces, and watches). Metal objects will heat up when connected to power and ground and can cause serious burns or weld the metal object to the terminals.** Statement 43

Warning **Before working on a chassis or working near power supplies, unplug the power cord on AC units; disconnect the power at the circuit breaker on DC units.** Statement 12

Warning **Do not work on the system or connect or disconnect cables during periods of lightning activity.** Statement 1001

Follow these guidelines when working on equipment powered by electricity:

- Locate the room's emergency power-off switch. Then, if an electrical accident occurs, you can quickly turn off the power.
- Before working on the system, turn off the DC main circuit breaker and disconnect the power terminal block cable.
- Disconnect all power before doing the following:
  - Working on or near power supplies
  - Installing or removing a router chassis or network processor module
  - Performing most hardware upgrades
- Never install equipment that appears damaged.
- Carefully examine your work area for possible hazards, such as moist floors, ungrounded power extension cables, and missing safety grounds.
- Never assume that power is disconnected from a circuit; *always* check.
- Never perform any action that creates a potential hazard to people or makes the equipment unsafe.
- If an electrical accident occurs, proceed as follows:
  - Use caution, and do not become a victim yourself.
  - Turn off power to the router.
  - If possible, send another person to get medical aid. Otherwise, determine the condition of the victim, and then call for help.
  - Determine whether the person needs rescue breathing or external cardiac compressions; then take appropriate action.

In addition, use the following guidelines when working with any equipment that is disconnected from a power source, but still connected to telephone wiring or network cabling:

- Never install telephone wiring during a lightning storm.
- Never install telephone jacks in wet locations unless the jack is specifically designed for it.
- Never touch un-insulated telephone wires or terminals unless the telephone line is disconnected at the network interface.
- Use caution when installing or modifying telephone lines.

Preventing Electrostatic Discharge Damage

Electrostatic discharge (ESD) can damage equipment and impair electrical circuitry. ESD can occur when electronic printed circuit cards are improperly handled and can cause complete or intermittent failures. Always follow ESD prevention procedures when removing and replacing modules:

- Ensure that the router chassis is electrically connected to earth ground.
- Wear an ESD-preventive wrist strap, ensuring that it makes good skin contact. Connect the clip to an unpainted surface of the chassis frame to channel unwanted ESD voltages safely to ground. To guard against ESD damage and shocks, the wrist strap and cord must operate effectively.
- If no wrist strap is available, ground yourself by touching a metal part of the chassis.

⚠ **Caution** For the safety of your equipment, periodically check the resistance value of the antistatic wrist strap. It should be between 1 and 10 Mohm.

Verifying System and Site Requirements

Before you install the SAMI:

- Verify that the system requirements for the SAMI, including hardware, software, and environmental requirements, are met—See the "System Requirements and Specifications" section on page 1-12).
- Prepare the site (as defined in the site requirements) and review the installation plans or method of procedures (MOPs)—See the "Site Requirements" section on page 2-4.
- Unpack and inspect the module—See the "Unpacking and Checking the Contents of your Shipment" section on page 2-5.
- Gather tools and test equipment required to properly install the module—See the "Required Tools" section on page 2-5.

Site Requirements

Typically, you should have prepared the installation site beforehand. As described previously, part of your preparation includes reviewing installation plans or MOPs. An example of a MOP (pre-installation checklist of tasks and considerations that must be addressed and agreed upon before proceeding with the installation) is as follows:

Note The example assumes that you are installing the Cisco 7600 Series Router chassis as well as the SAMI at the same time. However, the example MOP can be simplified to accommodate just the SAMI.

1. Assign personnel.
2. Determine protection requirements for personnel, equipment, and tools.
3. Evaluate potential hazards that may affect service (Cisco 7600 Series Router chassis).
4. Schedule time for installation.
5. Determine any space requirements (Cisco 7600 Series Router chassis).
6. Determine any power requirements (Cisco 7600 Series Router chassis).
7. Identify any required procedures or tests.
8. On an equipment plan, make a preliminary decision that locates each SAMI that you plan to install.
9. Read this user guide.
10. Modify the preliminary plan, if necessary.
11. Verify the list of replaceable parts for installation (screws, bolts, washers, and so on) so that the parts are identified (Cisco 7600 Series Router chassis).
12. Check the required tools list to make sure the necessary tools and test equipment are available (see the "Required Tools" section on page 2-5).
13. Perform installation.

Unpacking and Checking the Contents of your Shipment

The shipping package for the SAMI is designed to reduce the possibility of product damage associated with routine handling experienced during shipment. To reduce the potential damage to the product, transport the SAMI in its Cisco specified packaging. Failure to do so may result in damage to the SAMI. Also do not remove the SAMI from its shipping container until you are ready to install it.

Note Do not discard the packaging materials used in shipping your SAMI. You will need the packaging materials in the future if you move or ship your SAMI.

Required Tools

Use the following tools to install the SAMI.

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

Note Before installing the SAMI, you must install the Cisco 7600 Series Router chassis and at least one supervisor engine. For information on installing the switch chassis, refer to the appropriate Cisco 7600 Series Router documentation listed in the "Related Documentation" section on page 9.

These tools are required to install the SAMI into the Cisco 7600 Series Router chassis:

- Flat-blade screwdriver
- Phillips-head screwdriver
- Wrist strap or other grounding device
- Antistatic mat or antistatic foam

Reviewing Safety Recommendations

As described in the "Safety Warnings" section on page 3, safety warnings appear throughout this *user guide* in procedures that, if performed incorrectly, may harm you. A warning symbol precedes each warning statement (see the "Safety Guidelines" section on page 2-1 for general safety information for installing your SAMI in a Cisco 7600 Series Router chassis).

The following safety recommendations are specific to your SAMI installation.

Warning **Before you install, operate, or service the system, read the *Site Preparation and Safety Guide*. This guide contains important safety information you should know before working with the system.** Statement 200

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

Warning **Invisible laser radiation may be emitted from disconnected fibers or connectors. Do not stare into beams or view directly with optical instruments.** Statement 1051

Warning **During this procedure, wear grounding wrist straps to avoid ESD damage to the SAMI. Do not directly touch the backplane with your hand or any metal tool, or you could shock yourself.** Statement 181

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 SAMIs, faceplates, front covers, and rear covers are in place.** Statement 1029

Installing the SAMI

This section describes how to install the SAMI into a Cisco 7600 Series Router chassis.

Caution The Cisco 7600 Series Router supports hotswapping. However, the SAMI does *not* support hot swapping. Do *not* remove the SAMI from the chassis until the module has shut down completely and the status LED is orange or off. If you remove the SAMI from the chassis before it completely shuts down, you can damage the SAMI.

Caution To prevent ESD damage, handle the SAMI by the edges only.

Caution During this procedure, wear grounding wrist straps to avoid ESD damage to the modules.

Caution Do not directly touch the backplane with your hand or any metal tool, or you may shock yourself.

To install the SAMI into Cisco 7600 Series Router chassis, perform these steps:

Step 1 Choose a slot for the SAMI.

The Cisco 7600 Series Routers include the Cisco 7604, Cisco 7606, Cisco 7609, and Cisco 7613 routers. In these router chassis, the slots can be used as follows:

- Cisco 7604 (four horizontal slots)
  - Slot 1, the top-most slot, is reserved for the Supervisor 720 engine.
  - Slot 2 can be used for a redundant supervisor engine.
  - If a redundant supervisor engine is not required, slots 2 through 4 are available for modules. If a redundant supervisor is required, slots 3 and 4 are available for modules.
- Cisco 7606 (six horizontal slots) and the Cisco 7609 (nine vertical slots)
  - Slot 5 is reserved for the Supervisor 720 engine.
  - Slot 6 can be used for a redundant supervisor engine.
  - If a redundant supervisor engine is not required, the following slots are available for modules:

    Slots 1 through 4 and slot 6 on the 6-slot chassis

    Slots 1 through 4 and slots 6 through 9 on the 9-slot chassis
  - If a redundant supervisor engine is required, the following slots are available for modules:

    Slots 1 through 4 on the 6-slot chassis

    Slots 1 through 4 and slots 7 through 9 on the 9-slot chassis
- Cisco 7613 (13 horizontal slots)
  - Slot 7 is reserved for the Supervisor 720 engine.
  - Slot 8 can be used for a redundant supervisor engine.
  - If a redundant supervisor engine is not required, slots 1 through 6 and slots 8 through 13 are available for modules. If a redundant supervisor engine is required, slots 1 through 6 and slots 9 through 13 are available for modules.
- Empty slots on all Cisco 7600 Series Router chassis require filler panels to maintain consistent airflow through the chassis.

Step 2 Verify that there is enough clearance to accommodate any interface equipment that you will connect directly to the module ports. If possible, place the modules between empty slots that contain only the module filler panels.

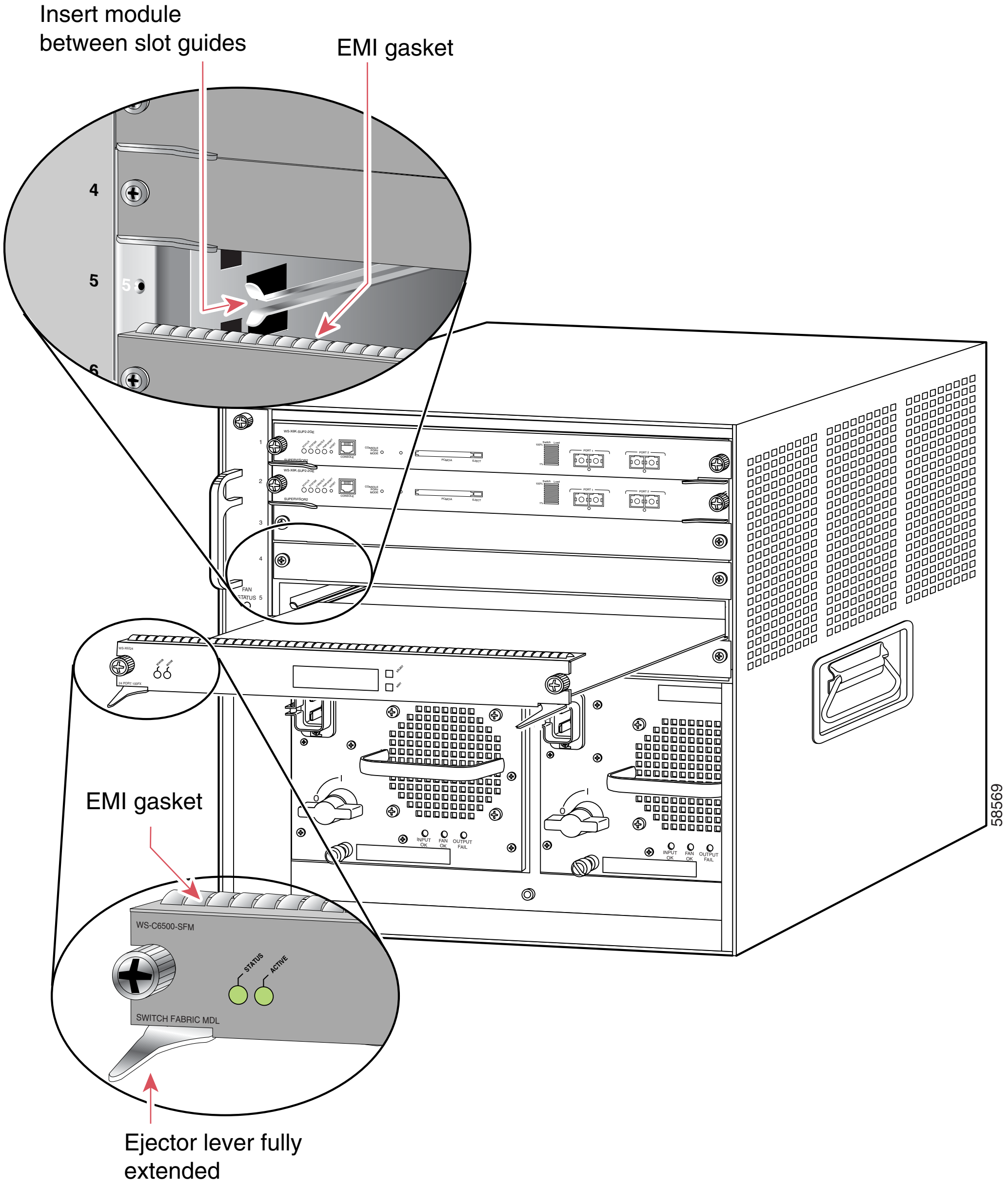
Step 3 Verify that the captive installation screws are tightened on all modules installed in the chassis. This action ensures that the EMI gaskets on all modules are fully compressed to maximize the opening space for the new or replacement module.

Note If the captive installation screws are loose, the EMI gaskets on the installed modules push adjacent modules towards the open slot, reducing the opening size and making it difficult to install the replacement module.

Step 4 Remove the filler panel by removing the two Phillips pan-head screws from the filler panel.

Step 5 Open both ejector levers fully on the module (Figure 2-1 on page 2-8).

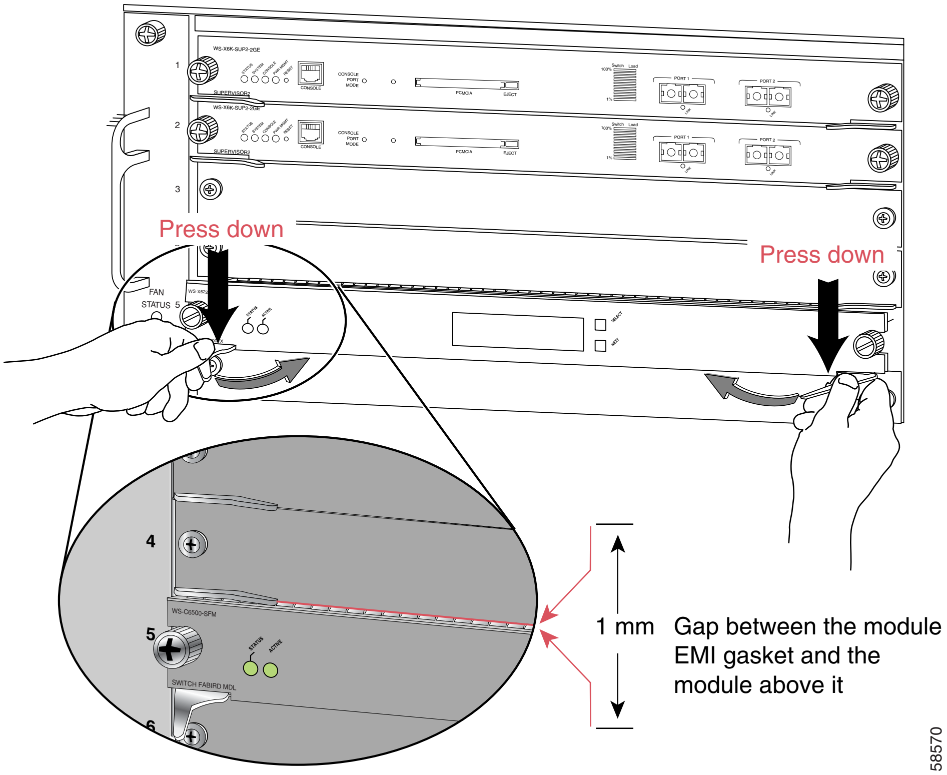
Figure 2-1 Positioning the Module in a Horizontal Slot Chassis



Step 6 Position the modules in the slot (Figure 2-1). Make sure that you align the sides of the module carrier with the slot guides on each side of the slot.

Step 7 Carefully slide the module into the slot until the EMI gasket along the top edge of the module makes contact with the module in the slot above it and both ejector levers have closed to approximately 45 degrees with respect to the module faceplate (Figure 2-2).

Figure 2-2 Clearing the EMI Gasket in a Horizontal Slot Chassis

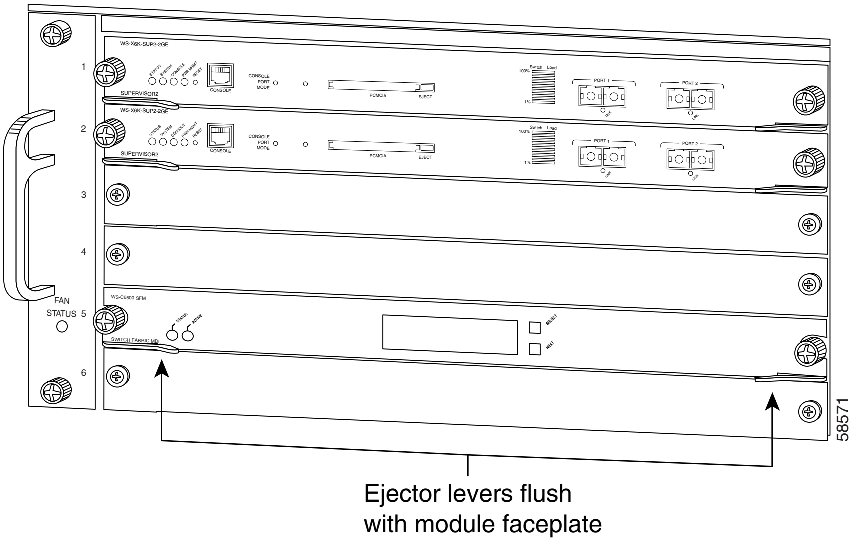


Step 8 Using the thumb and forefinger of each hand, grasp the two ejector levers and press down to create a small (0.040 inch [1 mm]) gap between the EMI gasket and the module above it (Figure 2-2).

⚠ **Caution** Do not press down too hard on the levers because you might bend or damage them.

Step 9 While pressing down, simultaneously close the left and right ejector levers to fully seat the module in the backplane connector. The ejector levers are fully closed when they are flush with the module faceplate (see Figure 2-3).

Figure 2-3 Ejector Levers Fully Closed in a Horizontal Slot Chassis



Note Failure to fully seat the module in the backplane connector can result in error messages.

Step 10 Tighten the two captive installation screws on the module. Make sure the ejector levers are fully closed before tightening the captive installation screws.

When you install a SAMI into the router chassis, it runs a startup sequence that requires no intervention. At the successful conclusion of the startup sequence, the green status LED lights and remains on. If the status LED is not green or is off, see "Status LED" section on page 1-10 to determine the module status.

This completes the SAMI installation procedure.

Removing a SAMI

This section describes how to remove an existing module from a Cisco 7600 Series Router chassis.

Caution The SAMI is *not* hot-swappable. Do *not* remove the SAMI from the chassis until the SAMI has shut down completely and the status LED is orange or off. If you remove the SAMI from the chassis before it completely shuts down, you can damage the SAMI.

Warning **During this procedure, wear grounding wrist straps to avoid ESD damage to the SAMI. Do not directly touch the backplane with your hand or any metal tool, or you could shock yourself.** Statement 181

Warning **Before you install, operate, or service the system, read the *Site Preparation and Safety Guide*. This guide contains important safety information you should know before working with the system.** Statement 200

Warning **Invisible laser radiation may be emitted from disconnected fibers or connectors. Do not stare into beams or view directly with optical instruments.** Statement 1051

To remove a module from the router chassis, perform these steps:

Step 1 Shut down the SAMI by completing the following tasks:

a. Enter the **show module** command and verify the SAMI status is OK.

b. Shut down the SAMI using the **hw-module module** *mod-num* **shutdown** command in privileged EXEC mode. Verify that the SAMI shuts down using the **show module** command to verify the module status is `ShutDown` and the status LED is orange. Shutdown might take several minutes.

c. Power down the SAMI using the **no power enable module** *slot* command in global configuration mode. Verify that the SAMI powers down using the **show module** command to verify the module status is `PwrDown` and the status LED is off. Do not remove the SAMI from the switch until the status LED is off.

Caution When you enter the **no power enable module** *slot* command to power down a module, the module configuration files are not saved. Therefore, ensure all configuration files are saved before issuing the **no power enable module** *slot* command.

Step 2 Verify that the captive installation screws on all of the modules in the chassis are tight. This step assures that the space created by the removed module is maintained.

Note If the captive installation screws are loose, the electromagnetic interference (EMI) gaskets on the installed modules will push the modules toward the open slot, reducing the opening size and making it difficult to remove the module.

Step 3 Loosen the two captive installation screws on the module.

Caution Use grounding wrist straps connected to a captive installation screw on an installed module or power supply when removing a module. At all other times (shipping, storage, and so on) keep the modules in their static-shielding protective bags.

Step 4 Place your thumbs on the left and right ejector levers, and simultaneously rotate the levers outward to unseat the module from the backplane connector.

Step 5 Grasp the front edge of the module and slide the module part all the way out of the slot. Place your other hand under the module to support the weight of the module. Do not touch the module circuitry.

Step 6 Place the SAMI on an antistatic mat or antistatic foam, or immediately reinstall it in another slot.

Warning **Blank faceplates (filler 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 modules and faceplates are in place.** Statement 1051

Step 7 If the slot is to remain empty, install a module filler panel to keep dust out of the chassis and to maintain proper airflow through the chassis.

CHAPTER 3

Configuring the Cisco SAMI

This chapter describes how to configure the Cisco Service and Application Module for IP (SAMI). It includes the following sections:

- Before You Begin, page 3-1
- Establishing Console Sessions, page 3-2
- Enabling the Supervisor to Store PPC Startup Configuration Files, page 3-6 (Required)
- Configuring VLAN Support, page 3-10 (Required)
- Configuring Network Clock Synchronization, page 3-19
- Configuring Remote Console and Logging, page 3-20
- Configuring the Cisco Software Application on a SAMI PPC, page 3-27 (Required)
- 4GB DRAM Support, page 3-29
- SAMI Coredump, Crashinfo and Debuginfo Support, page 3-29

For a description of some of the commands used in this chapter, see Appendix A, "Using the Command-Line Interfaces."

To locate documentation about other commands that appear in this chapter, refer to the *Cisco 7600 Series Internet Router IOS Software Configuration Guide*.

Before You Begin

Before configuring the SAMI, ensure that you have reviewed the following sections:

- System Requirements and Specifications, page 1-12
- Using the Command-Line Interfaces, page A-1
- Establishing Console Sessions, page 3-2

Establishing Console Sessions

When configuring the SAMI in your Cisco 7600 Series Router, you establish a console session with the SAMI LCP and PPCs and enter commands.

To establish a session with a SAMI LCP or PPC, complete the tasks in the following sections:

- Configuring a Virtual Terminal Line Settings, page 3-2
- Establishing a Console Session with the SAMI LCP, page 3-2
- Establishing a Session with a SAMI PPC, page 3-4

Configuring a Virtual Terminal Line Settings

Line configuration mode commands allow you to configure the virtual terminal line settings which are used solely to control inbound Telnet connections.

Note Typically, vty0 and line 66 are used for **session** command support from supervisor.

To configure the virtual terminal line settings for the **session** command to a remote console, use the following commands from the supervisor console:

Step 1	`Sup> enable`	Enables privileged EXEC mode.
Step 2	`Sup# line vty line-number [ending-line-number]`	Identifies a specific line for configuration and enters line configuration collection mode where: • *line-number*—Relative number of the terminal line (or the first line in a contiguous group) that you want to configure when the line type is specified. Numbering begins with zero. • *ending-line-number*—(Optional) Relative number of the last line in a contiguous group that you want to configure. If you omit any keyword, then line-number and ending-line-number are absolute rather than relative line numbers.

Establishing a Console Session with the SAMI LCP

Establishing a console session with the SAMI LCP is not required to set up the SAMI in the Cisco 7600 Series Router chassis, however, you can establish a session to perform various maintenance tasks (manage files or issue **show** commands), and you can configure a hostname for the SAMI LCP that assists you in keeping track when you have sessions to multiple SAMIs open. From the SAMI LCP console, you can also configure the amount of time that a session can remain inactive before it is closed (inactivity timeout).

A session to the LCP console can be established from the supervisor or from a serial console connected to the front panel of the SAMI. For information about establishing a session using a connected serial console, see the "Establishing a Console Connection on the SAMI" section on page 4-23.

To establish a console session to the SAMI LCP from the supervisor, use the following commands:

Step 1	`Sup> enable`	Enables privileged EXEC mode.
Step 2	`Sup# session slot slot_number processor 0`	Establishes a session to the LCP on the SAMI, where: • *slot_number*—Number of the slot in which the SAMI is installed. • *proc_number*—Number of the LCP, which is **0**. **Note** One session per processor can be established.

Assigning a Hostname to the SAMI LCP

The hostname is used for the command line prompts and default configuration filenames. If you establish sessions to multiple devices, the hostname helps you keep track of where you enter commands. By default, the hostname for the the SAMI LCP is "switch."

To configure a hostname for the SAMI LCP, from the LCP console, use the following commands:

Step 1	`switch# configure`	Enables configuration mode.
Step 2	`switch(config)# hostname name`	New hostname for the SAMI LCP. Enter a case sensitive text string that contains from 1 to 32 alphanumeric characters.

For example, to change the hostname of the SAMI LCP from switch to host1, enter:

```
switch# configure
switch(config)# hostname host1

host1(config)#
```

Configuring the SAMI Inactivity Timeout

By default, the inactivity timeout value is 5 minutes. You can modify the length of time that can occur before the SAMI automatically logs off an inactive session by using the **login timeout** command in configuration mode.

To specify the length of time a session can be idle before the SAMI logs off the inactive session, use the **login timeout** command in configuration mode, from the LCP console:

Step 1	`switch# configure`	Enables configuration mode.
Step 2	`switch(config)# login timeout minutes`	Length of time a session can be idle before the SAMI terminates the session. Valid entries are 0 to 60 minutes. A value of 0 instructs the never to timeout. The default is 5 minutes. To restore the default timeout value, use the **no** form of the command.

To display the value configured for the inactivity timer, use the **show login timeout** command in EXEC mode from the LCP console:

Step 1	`switch# show login timeout`	Displays the value configured for the inactivity timer.

For example, to specify a timeout period of 10 minutes, enter:

```
switch# configure
switch(config)# login timeout 10
```

To display the configured login time value, use the **show login timeout** command in EXEC mode. For example, enter:

```
switch# show login timeout

Login Timeout 10 minutes.
```

Establishing a Session with a SAMI PPC

Note Under certain conditions such as low processor memory, a session to the SAMI might fail. If this occurs, you will need to use the physical front-panel console connections to access the SAMI (see "Establishing a Console Connection on the SAMI" section on page 4-23).

To establish a session with a SAMI PPC from the supervisor engine console, use the following commands:

Step 1	`Sup> enable`	Enables privileged EXEC mode.
Step 2	`Sup# session slot slot_number processor proc_number`	Establishes a session to a PPC on the SAMI, where: • *slot_number*—Number of the slot in which the SAMI is installed. • *proc_number*—Number of the PPC on the SAMI. Valid values are 3 through 8. **Note** One session per processor can be established.

When you establish a session with a Cisco IOS PPC, the default session prompt is "router."

When you establish a session with a COSLI PPC, the default session prompt is "switch."

Assigning a Hostname to a SAMI PPC

Assigning a hostname to the SAMI PPCs helps you keep track of the PPC sessions.

To assign a hostname to a Cisco IOS PPC, use the following command, in global configuration mode:

Step 1	Sup# **session slot** *slot_number* **processor** *proc_number*	Establishes a session to a PPC on the SAMI, where: • *slot_number*—Number of the slot in which the SAMI is installed. • *proc_number*—Number of the PPC on the SAMI. Valid values are 3 through 8. One session per processor can be established.
Step 2	Router> **enable**	Enters privilege EXEC mode.
Step 3	Router# **config**	Enters global configuration mode.
Step 4	Router(config)# **hostname** *name*	New hostname for the PPC. Enter a case sensitive text string that contains from 1 to 32 alphanumeric characters.

In the following example, a session with Cisco IOS PPC 3 on a SAMI in slot 6 is established, and the hostname is changed to "PPC3."

```
Sup> enable
Sup# session slot slot_number processor proc_number

Router# enable
Router# configure
Router(config)# hostname PPC3

PPC3(config)#
```

To assign a hostname to a COSLI PPC, use the following command, in global configuration mode:

Step 1	Sup# **session slot** *slot_number* **processor** *proc_number*	Establishes a session to a PPC on the SAMI, where: • *slot_number*—Number of the slot in which the SAMI is installed. • *proc_number*—Number of the PPC on the SAMI. Valid values are 3 through 8. One session per processor can be established.
Step 2	switch# **config**	Enters global configuration mode.
Step 3	switch(config)# **hostname** *name*	New hostname for the PPC. Enter a case sensitive text string that contains from 1 to 32 alphanumeric characters.

In the following example, a session with Cisco COSLI PPC 3 on a SAMI in slot 6 is established, and the hostname is changed to “PPC3.”

```
Sup> enable
Sup# session slot slot_number processor proc_number

switch# config
switch(config)# hostname PPC3

PPC3(config)#
```

Enabling the Supervisor to Store PPC Startup Configuration Files

The Configuration File Storage on Supervisor feature enables you to configure the supervisor engine to save and store the startup configuration file of each of the PPCs on the SAMI in the supervisor’s bootflash memory.

Note The Configuration File Storage on Supervisor feature only stores the PPC startup configuration files. Crypto configurations, such as RSA key generation for Secure Shell (SSH) is stored locally on nvram:private-config. Therefore, if a SAMI card containing crypto configuration needs to be replaced, the crypto configuration must be reapplied by either by manually reconfiguring it on the new card, or by exporting the crypto configuration to the supervisor and then importing the configuration onto the new card. For information on exporting and importing the crypto configuration, see “Configuring, Exporting, and Importing RSA Keys on a SAMI PPC” section on page 4-20.

Note For information about using the bootflash on a supervisor engine, see the *Cisco 7600 Series Cisco IOS Software Configuration Guide*.

The ability to store PPC startup configuration files on the supervisor enables a SAMI to be replaced while retaining the configurations associated with each of the PPCs on the module.

When a SAMI is inserted into the Cisco 7600 Series Router chassis, an empty configuration file is automatically created for each of the PPCs with the following naming convention:

```
SLOTxSAMICy.cfg
```

where *x* is the number of the chassis slot in which the SAMI is installed and *y* is the PPC number (numbers 3 through 8) on the SAMI.

When a PPC comes up, it copies its configuration file from the supervisor bootflash and uses it. When you save the configuration changes on a PPC using the **write memory** command, the configuration file in the supervisor bootflash is updated.

The following example shows the configuration files stored on the supervisor module for PPCs of a SAMI installed in slot 9 of a Cisco 7600 Series Router chassis:

```
Sup# dir bootflash:
Directory of bootflash:/
  172  -rw-          42   Mar 8 2007 12:30:07 -07:00  SLOT9SAMIC3.cfg
  173  -rw-          42   Mar 8 2007 12:30:07 -07:00  SLOT9SAMIC4.cfg
  174  -rw-          42   Mar 8 2007 12:30:07 -07:00  SLOT9SAMIC5.cfg
  175  -rw-          42   Mar 8 2007 12:30:07 -07:00  SLOT9SAMIC6.cfg
  176  -rw-          42   Mar 8 2007 12:30:07 -07:00  SLOT9SAMIC7.cfg
  177  -rw-          42   Mar 8 2007 12:30:07 -07:00  SLOT9SAMIC8.cfg
```

Note If a standby supervisor engine is installed, the bootflash on the standby supervisor engine backs up the SAMI PPC configuration files that are on the active supervisor. If a difference is detected between corresponding files on the active and standby supervisor engines, the file in the bootflash of the active supervisor engine is copied over the file in the bootflash of the standby supervisor engine. This compare and copy operation occurs after a SAMI is replaced or when the active supervisor engine detects that a standby supervisor engine has been installed.

Caution If a standby supervisor engine does not exist, periodically copy the SAMI PPC configuration files from the bootflash of the active supervisor engine to a TFTP server. Failure to take this precaution might result in the loss of the SAMI PPC configuration files if a supervisor engine failure should occur.

Configuration File Storage and the Remote Copy Protocol

The remote copy protocol (RCP) is used to read and write the PPC configuration files between the SAMI and the supervisor.

The RCP server, configured on the supervisor, accepts the RCP requests from the RCP client, which is configured on each the PPCs on the SAMI. The PPCs use their internal Ethernet Out of Band Channel (EOBC) IP address (address format 127.0.0.*slot_num proc_num*) when sending read/write requests to the RCP server.

To enable PPC configuration files to be stored on the supervisor, on the supervisor, you must first enable RCP support for each of the SAMI PPCs using the **ip rcmd remote-host enable** global configuration command—six **ip rcmd remote-host enable** configuration statements for each SAMI installed in the router chassis.

Note To facilitate the process of enabling RCP support for each of the PPCs, we recommend that you create an access list on the supervisor engine that permits RCP requests from all IP addresses that begin with the internal EOBC IP address of the PPCs (127*), and specify the access list when configuring the **ip rcmd remote host enable** command on the supervisor.

To configure an access list permitting the RCP requests from all SAMI PPCs, use the following commands from the supervisor engine console:

	Command	Purpose
Step 1	`Sup> enable`	Enables privileged EXEC mode.
Step 2	`Sup# configure terminal`	Enters global configuration mode.

	Command	Purpose
Step 3	`Sup(config)#` **`access-list`** *`access-list-number`* **`permit`** *`source`*	Configures the access list mechanism for filtering frames where: • *access-list-number* is the number that identifies the access list. • **permit** is the keyword option to specify to permit the frames if conditions are matched. • source is the number of the network or host from which the packet is being sent. There are two alternative ways to specify the source: – Use a 32-bit quantity in four-part, dotted-decimal format. – Use the any keyword as an abbreviation for a source and source-wildcard of 0.0.0.0 255.255.255.255.
Step 4	`Sup(config-ip-acl)` **`exit`**	Exits access-list configuration mode.

To enable RCP and apply the access list when configuring the remote hosts (the Cisco software application running on the SAMI PPCs) that can execute commands using RCP, use the following commands from the supervisor engine console:

	Command	Purpose
Step 1	`Sup>` **`enable`**	Enables privileged EXEC mode. Enter your password if prompted.
Step 2	`Sup#` **`configure terminal`**	Enters global configuration mode.
Step 3	`Sup(config)#` **`ip rcmd rcp-enable`**	Configures the supervisor engine to allow remote hosts to copy files to and from using RCP.

	Command	Purpose
Step 4	Sup(config)# **ip rcmd remote-host** *local-username* {*ip-address* | *host-name* | *access-list*} *remote-username* [**enable** [*level*]]	Creates an entry for a remote host in a local authentication database so that the remote host can execute commands using RCP where: • *local-username* is the name of the SAMI PPC on the local router. • *ip-address* is the IP address of the remote host from which the local router will accept remotely executed commands. • *host-name* is the name of the remote host. • *access-list* is the name of an access list of remote hosts. • *remote-username* is the name of the SAMI PPC on the remote host. • **enable** enables the PPC to execute privileged EXEC commands using rsh, or to copy files to the router using rcp. • *level* is the privilege level assigned to the PPC. The default is 15, the highest level.
Step 5	Sup(config-ip-acl) **exit**	Exits global configuration mode.

For example:

- To create an access-list that when applied will permit RCP requests from all SAMI PPCs, enter the following commands on the supervisor:

```
Sup> enable
Sup# configure terminal
Sup(config)# access-list 24 permit 127.0.0.0 0.0.0.255
Sup(config)# exit
```

- To configure the supervisor engine to allow remote hosts to copy files to and from using RCP, and to define the remote hosts allowed to use RCP, enter the following commands on the supervisor:

```
Sup> enable
Sup# configure terminal
Sup(config)# ip rcmd rcp-enable
Sup(config)# ip rcmd remote-host * 24 * enable
Sup(config)# exit
```

Note The asterisks (*) are specified for the **ip rcmd remote-host** command *local-username* and *remote-user name* to enable any user for the 127.0.0.*xy* addresses so that all SAMIs are supported.

Configuring VLAN Support

The SAMI does not include any external physical interfaces to receive traffic from clients and servers. Instead, it uses internal VLAN interfaces.

Before configuring VLAN support, note the following:

- You must configure virtual LANs (VLANS) on the Cisco 7600 Series Router and assign physical interfaces to the VLAN before you configure VLANs for the SAMI PPCs. The VLAN IDs for the router and for the PPCs must be the same. For details on configuring VLANs on the Cisco 7600 Series Router, refer to the *Cisco 7600 Series Cisco IOS Software Configuration Guide*.
- If the Multilayer Switch Function Card (MSFC) (Supervisor Engine 720 only) is used as the next-hop router on either the subscriber-side VLAN or the network-side VLAN, then a corresponding Layer 3 VLAN interface must be configured.

To enable VLAN traffic, you must complete the following:

- On the supervisor:
  - Configure a VLAN and VLAN interface for each PPC.
  - Assign the VLANs to a VLAN group.
  - Associate the group to a SAMI installed in the chassis.
  - Configure a default gateway VLAN
- On the SAMI PPCs:
  - Configure the corresponding VLAN interfaces. (All VLAN interfaces are routed mode interfaces.)
  - Define the default gateway on each SAMI PPC
  - Configure a static route

To configure VLAN support between the supervisor engine and the SAMI PPCs, complete tasks in the following sections:

- Permitting VLAN Traffic to Cisco SAMI, page 3-10 (Required)
- Configuring a Switched Virtual Interface on the MSFC, page 3-13 (Optional)
- Configuring the VLAN Interfaces on the SAMI PPCs, page 3-14 (Required)

Permitting VLAN Traffic to Cisco SAMI

In order for the PPCs on the SAMI to receive traffic from the supervisor engine, complete the following tasks on the supervisor engine:

- Configure a VLAN for each SAMI PPC
- Assign the VLANs to a VLAN group
- Determine which VLAN groups you want to allow to which SAMI
- Assign the VLAN groups to the SAMIs
- Configure a default gateway VLAN

After the VLAN configuration has been completed on the supervisor engine, establish a session with each of the PPCs on the SAMI, and configure the corresponding VLAN interface on the PPC.

Configuring VLANs for the SAMI PPCs

To configure the VLANs for each SAMI PPC on the supervisor, use the following commands on the supervisor engine console:

	Command	Purpose
Step 1	`Sup> enable`	Enables privileged EXEC mode. Enter your password if prompted.
Step 2	`Sup# configure terminal`	Enters global configuration mode.
Step 3	`Sup(config)# vlan vlan-id`	Configures a VLAN where *vlan-id* is the number of the VLAN. Valid values are from 1 to 4094.
Step 4	`Sup(config-vlan)# description interface_description`	(Optional) Provides a description for the VLAN.
Step 5	`Sup(config-vlan)# end`	Exits VLAN configuration mode.

For example:

- To create VLANs 71 to 76 on the supervisor, enter the following commands:

```
Sup> enable
Sup# configure terminal
Sup(config)# vlan 71
Sup(config-vlan) exit
Sup(config)# vlan 72
Sup(config-vlan) exit
Sup(config)# vlan 73
Sup(config-vlan) exit
Sup(config)# vlan 74
Sup(config-vlan) exit
Sup(config)# vlan 75
Sup(config-vlan) exit
Sup(config)# vlan 76
Sup(config-vlan) exit
```

Creating and Assigning VLANs Groups to the SAMI

The PPC VLANs on a SAMI must be assigned to the same VLAN group. You cannot assign the same VLAN to multiple groups, however, you can assign a group to multiple SAMIs.

By default, one switched virtual interface (SVI) (required if the supervisor participates in Layer-3 forwarding) can exist between an MSCFC and a SAMI. However, on the SAMI, you must create multiple SVIs, therefore you must enable multiple SVIs to be configured using the **svclc multiple-vlan-interfaces** command.

To assign VLANs to a SAMI, use the following commands at the supervisor engine console:

Step 1	`Sup> enable`	Enables privileged EXEC mode.
Step 2	`Sup# configure terminal`	Enters global configuration mode.

Step 3	Sup(config)# **svclc vlan-group** *vlan_group_number vlan_range*	Assigns the VLANs to a group. • *vlan_group_number*—Number of the VLAN group. • *vlan_range*—Number of the VLAN or VLANs identified as a single number (*n*), as a range of numbers (*n-x*), or as separate numbers, or range of numbers, separated by commas (for example, 5,7-10,13,45-100).
Step 4	Sup(config)# **svclc module** *slot_num* **vlan-group** *group_number_range*	Assigns VLAN groups to the SAMI, where: • *slot_number*—Number of the slot in which the SAMI is installed. To display slot numbers and modules in the chassis, use the **show module** privilege EXEC command. • *group_number_range*—VLAN group number identified as a single number (n), as a range of numbers (n-x), or as separate numbers, or range of numbers, separated by commas (for example, 3,5,7-10). Only VLAN groups created using the **svclc vlan-group** global configuration command can specified. **Note** One VLAN group can be assigned to multiple SAMIs.

For example:

- To create a VLAN group, group 50, with a VLAN range of 71 to 76, enter the following commands:

```
Sup> enable
Sup# configure terminal
Sup(config)# svclc vlan-group 50 71-76
```

- To assign VLAN group 50 to the SAMI in slot 5, enter:

```
Sup(config)# svclc module 5 vlan-group 50
```

- To enable multiple SVIs to be configured for a SAMI, enter:

```
Sup(config)# svclc multiple-vlan-interfaces
```

- To view the group configuration for the SAMI and the associated VLANs, enter:

```
Sup(config)# exit
Sup# show svclc vlan-group
```

- To view VLAN group numbers for all modules, enter:

```
Sup# show svclc module
```

Configuring a Switched Virtual Interface on the MSFC

Note For Layer-2 forwarding, configuring a switched virtual interface (SVI) is not required for allowing VLAN traffic to the SAMI PPCs. Configuring a SVI is only required if the supervisor engine participates in Layer-3 forwarding.

The SVI configuration defines the Layer 3 instance on the MSFC (the router). If you assign the VLAN used for the SVI to a SAMI PPC, then the MSFC routes between the SAMI PPC and other Layer 3 VLANs.

By default, only one SVI can exist between a MSFC and a SAMI. However, on each SAMI, you need to configure multiple SVIs for unique VLANs.

To configure the SVI and enable multiple SVIs to be configured for a SAMI, use the following commands at the supervisor engine console:

	Command	Purpose
Step 1	`Sup> enable`	Enables privileged EXEC mode.
Step 2	`Sup# configure terminal`	Enters global configuration mode.
Step 1	`Sup(config)# svclc multiple-vlan-interfaces`	Enables multiple SVIs to be configured for a SAMI.
Step 2	`Sup(config)# interface vlan vlan_number`	Creates or accesses a dynamic SVI where *vlan-number* is the number of the VLAN. Valid values are from 1 to 4094.
Step 3	`Sup(config-if)# ip address ip_address vlan vlan_number`	IP address and IP subnet for this interface.
Step 4	`Sup(config-if)# no shutdown`	Enables the interface.

For example:

- To enable multiple SVIs to be configured for a SAMI and to configure the SVI on the MSFC, enter the following commands:

```
Sup> enable
Sup# configure terminal
Sup(config)# svclc multiple-vlan-interfaces
Sup(config)# interface vlan 100
Sup(config-if)# ip address 127.0.0.0 255.255.255.0
Sup(config-if)# no shutdown
```

- To view the SVI configuration, enter:

```
Sup(config-if)# exit
Sup(config)# exit
Sup# show interface vlan 100
```

Configuring the VLAN Interfaces on the SAMI PPCs

The way you configure the VLAN interfaces on the SAMI PPCs is dependent on the PPC operating system being used by the Cisco software application.

If your application is using Cisco IOS, see "Configuring Cisco IOS PPCs" section on page 3-14.

If you application is using COSLI, see "Configuring COSLI PPCs" section on page 3-16.

Configuring Cisco IOS PPCs

To complete the configuration tasks for VLAN support, on each SAMI PPC, complete the following:

- Configure an interface to the PPCs corresponding VLAN created on the supervisor engine.
- Enable IEEE 802.1Q encapsulation on the interface.
- Configure a static route for traffic to the PPC.

To configure a SAMI Cisco IOS PPC, use the following commands beginning in privilege EXEC mode at the supervisor engine console:

	Command	Purpose
Step 1	`Sup> `**`enable`**	Enables privileged EXEC mode.
Step 2	`Sup# `**`configure terminal`**	Enters global configuration mode.

Step 3	`Sup# `**`session slot`**` `*`slot_number`*
	`processor`` `*`proc_number`*
		Establishes a session to a PPC on the SAMI, where:
		• *slot_number*—Number of the slot in which the SAMI is installed.
		• *proc_number*—Number of the PPC on the SAMI. Valid values are 3 through 8.
		One session per processor can be established.

Step 4	`Router> `**`enable`**	Enables privileged EXEC mode.
Step 5	`Router# `**`configure terminal`**	Enters global configuration mode.

	Command	Purpose
Step 6	`Router(config)#` **`interface gigabitethernet`**	Specifies a subinterface on which IEEE 802.1Q is used.
Step 7	`Router(config-if)#` **`encapsulation dot1Q`** *`vlan_id`*	Defines the encapsulation format as IEEE 802.1Q (dot1q), and specifies the VLAN identifier (configured on the supervisor engine).
Step 8	`Router(config-if)#` **`ip address`** *`ip-address mask`*	Sets a primary IP address for the interface.
Step 9	`Router(config-if)#` **`exit`**	Exits interface configuration mode.
Step 10	`Router(config)#` **`ip route`**	Creates a static route for traffic to the PPC.

For example:

- To create two interfaces on PPC3 (on a SAMI in slot 5) on which IEEE 802.1Q is enabled, enter the following commands:

```
Sup# session 5 processor 3
Router> enable
Router(config)# interface GigabitEthernet0/0
Router(config-if)# no ip address
Router(config-if)# exit
Router(config)#
Router(config)# interface GigabitEthernet0/0.310
Router(config-if)# encapsulation dot1Q 310
Router(config-if)# ip address 10.3.10.1 255.255.255.0
Router(config-if)# exit
Router(config)#
Router(config)# interface GigabitEthernet0/0.401
Router(config-if)# encapsulation dot1Q 401
Router(config-if)# ip address 10.4.1.1 255.255.255.0
Router(config-if)# exit
Router(config)#
```

- To verify the interface configurations, enter:

```
Router(config)# exit
Router# show interface
```

Configuring COSLI PPCs

To complete the configuration tasks for VLAN support, on each of the SAMI PPCs, complete the following tasks:

- Configure an interface to the corresponding VLAN created on the supervisor engine
- Configure a default gateway.

To configure a SAMI COSLI PPCs, use the following commands beginning in privilege EXEC mode at the supervisor engine console:

	Command	Purpose
Step 1	Sup> **enable**	Enables privileged EXEC mode.
Step 2	Sup# **configure terminal**	Enters global configuration mode.
Step 3	Sup# **session slot** *slot_number* **processor** *proc_number*	Establishes a session to a PPC on the SAMI, where: • *slot_number*—Number of the slot in which the SAMI is installed. • *proc_number*—Number of the PPC on the SAMI. Valid values are 3 through 8. One session per processor can be established.
Step 4	switch# **config**	Enters configuration mode.
Step 5	switch(config)# **interface vlan** *number*	Creates a VLAN interface for the specified VLAN, and enters interface configuration mode.
Step 6	switch(config-if)# **description** *interface_description*	(Optional) Provides a description for the interface.
Step 7	switch(config-if)# **ip address** *ipv4-addr*	Assigns an IPv4 address to the VLAN interface for connectivity. This IP address will be used by the IKE and ESP traffic from the end points.
Step 8	switch(config-if)# **no shutdown**	Enables the VLAN interface.
Step 9	switch(config-if)# **do show interface vlan** *number*	Verifies that the VLAN is active. **Note** When you are in a configuration mode, you can use the **do** command to use a **show** command or any other command that is only available in EXEC mode.
Step 10	switch(config-if)# **do ping** *ip_address*	Verifies network connectivity.
Step 11	switch(config-if)# **do show arp**	Displays the ARP table.
Step 12	switch(config-if)# **exit**	Exit interface configuration mode.
Step 13	switch(config)#**ip default-gateway** *ip-addr*	Defines a default gateway (router) when IP routing is disabled.

For example:

- To create a VLAN interface on PPC3 on a SAMI in slot 5, enter the following commands:

```
Sup# session slot 5 processor 3
switch> config
switch(config)# interface vlan71
switch(config-if)# ip address 10.22.22.2/32
switch(config-if)# exit
```

- To configure a default gateway, enter the following commands:

```
Sup# session slot 5 processor 3
switch> config
switch(config)# ip default-gateway 88.88.38.100
```

- To verify the interface configuration of VLAN71, enter:

```
switch# show interface vlan71
```

Verifying the Configuration

To verify the configuration on the supervisor engine, use the following **show** commands:

Note In the following examples, the SAMI is installed in slot 2 of the chassis.

- **show spanning-tree vlan**

  The following example shows how to display the spanning tree state for the specified VLAN.

```
Sup> show spanning-tree vlan 46

VLAN0046
  Spanning tree enabled protocol rstp
  Root ID    Priority    32814
             Address     0011.5ddb.fc00
             This bridge is the root
             Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec
Bridge ID   Priority    32814  (priority 32768 sys-id-ext 46)
             Address     0011.5ddb.fc00
             Hello Time   2 sec  Max Age 20 sec  Forward Delay 15 sec
             Aging Time 300
Interface           Role Sts Cost      Prio.Nbr Type
------------------- ---- --- --------- -------- --------------------------------
Te2/1               Desg FWD 2         128.257  Edge P2p
Sup>
```

- **show sami module**

  The following example shows how to display the trunk and VLAN configuration.

```
Sup> show sami module 2 port 1 state
SAMI module 2 data-port 1:

Switchport: Enabled
Administrative Mode: trunk
Operational Mode: trunk
Administrative Trunking Encapsulation: dot1q
Operational Trunking Encapsulation: dot1q
Negotiation of Trunking: Off
Access Mode VLAN: 1 (default)
```

```
Trunking Native Mode VLAN: 1 (default)
Trunking VLANs Enabled: 1,10,46,220,250,301,501,1100,2066
Pruning VLANs Enabled: 2-1001
Vlans allowed on trunk:1,10,46,220,250,301,501,1100,2066
Vlans allowed and active in management domain: 1,10,46,220,250,301,501,1100,2066
Vlans in spanning tree forwarding state and not pruned:
1,10,46,220,250,301,501,1100,2066
Sup>
```

The following example shows how to display SAMI port traffic:

```
Sup> show sami module 2 port 1 traffic
Specified interface is up line protocol is up (connected)
Hardware is c7600 10Gb 802.3, address is 0030.f275.c3de (bia 0030.f275.c3de)
MTU 1500 bytes, BW 10000000 Kbit, DLY 10 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive set (10 sec)
  Full-duplex, 10Gb/s
  input flow-control is on, output flow-control is unsupported
  Last input never, output 00:00:47, output hang never
  Last clearing of "show interface" counters 1d02h
  Input queue: 0/2000/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: fifo
  Output queue: 0/40 (size/max)
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     730149 packets input, 0 bytes, 0 no buffer
     Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
     0 input packets with dribble condition detected
     22035 packets output, 0 bytes, 0 underruns
     0 output errors, 0 collisions, 0 interface resets
     0 babbles, 0 late collision, 0 deferred
     0 lost carrier, 0 no carrier
     0 output buffer failures, 0 output buffers swapped out
Sup>
```

- **show svclc module**

  The following example shows how to display the SVCLC module traffic:

```
Sup> show svclc module 2 traffic
Module 4:

Specified interface is up line protocol is up (connected)
  Hardware is C6k 10000Mb 802.3, address is 001f.ca08.892c (bia 001f.ca08.892c)
  MTU 1500 bytes, BW 10000000 Kbit, DLY 10 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive set (10 sec)
  Full-duplex, 10Gb/s
  input flow-control is on, output flow-control is unsupported
  Last input never, output 00:00:57, output hang never
  Last clearing of "show interface" counters 1d02h
  Input queue: 0/2000/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: fifo
  Output queue: 0/40 (size/max)
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
     732861 packets input, 0 bytes, 0 no buffer
     Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
     0 input packets with dribble condition detected
     22116 packets output, 0 bytes, 0 underruns
     0 output errors, 0 collisions, 0 interface resets
     0 babbles, 0 late collision, 0 deferred
     0 lost carrier, 0 no carrier
     0 output buffer failures, 0 output buffers swapped out
Sup>
```

This example shows how to display SVCLC module VLAN group configuration:

```
Sup> show svclc module 2 vlan-group
Module Vlan-groups
------ -----------
  02   100,101,102

Sup>
```

Configuring Network Clock Synchronization

If the supervisor engine is not already configured as a Cisco Network Time Protocol (NTP) client, configure it as an NTP master clock to which the applications running on the SAMI PPCs can synchronize themselves.

To configure the supervisor engine as an NTP client, use the following commands in global configuration mode at the supervisor engine console:

Step 1	Sup(config)# **ntp master**	Configures an NTP master clock to which peers synchronize themselves.
Step 2	Sup(config)# **ntp update-calendar**	Periodically updates the hardware clock (calendar) from an NTP time source.

To enable a Cisco software application running on a SAMI PPC to synchronize its software clock with the one in the supervisor engine, use the following commands beginning in privileged EXEC mode at the supervisor engine console:

Step 1	Sup# **session slot** *slot_number* **processor** *proc_number*	Establishes a session to a PPC on the SAMI, where: • *slot_number*—Number of the slot in which the SAMI is installed. • *proc_number*—Number of the PPC on the SAMI. Valid values are 3 through 8. One session per processor can be established.
Step 2	Router> **enable** **Note** If establishing a session to a COSLI PPC, skip this step and proceed to Step 3.	Enters privilege EXEC mode.

Step 3	`Router# config`	Enters global configuration mode.
Step 4	`Router(config)# ntp server 127.0.0.xy`	Enables the software clock to be synchronized by a Network Time Protocol (NTP) time server where: - *x* is the slot in which the supervisor engine is installed. - *y* identifies the supervisor engine—1 for Supervisor Engine 720.

Note For NTPv4, the NTP synchronization takes more time to complete unlike NTPv3, which synchronizes in seconds or in a maximum of 1 to 2 minutes. The acceptable time for synchronization in case of NTPv4 is 15 to 20 minutes.

To achieve faster NTP synchronization, enable the burst or iburst mode by using the burst or iburst keyword. With the **burst** or **iburst** mode configured, NTP synchronization takes about 1 to 2 minutes to sync.

Step 1	`Sup# ntp server [burst] [iburst]`	**burst** enables burst mode. Burst mode allows the exchange of eight NTP messages (instead of two) during each poll interval in order to reduce the effects of network jitter. **iburst** enables initial burst (iburst) mode. Iburst mode triggers the immediate exchange of eight NTP messages (instead of two) when an association is first initialized. This feature allows rapid time setting at system startup or when an association is configured.

For further details, please refer to the *Cisco IOS Network Management Command Reference* for NTP commands.

Configuring Remote Console and Logging

The command line interface (CLI) is the primary interface for configuring and managing the SAMI processors. The CLI is designed for a single processor system, therefore, on a multiprocessor system such as the SAMI, managing and monitoring the processors on a module requires that you establish a session with each processor.

For a description of the various Cisco SAMI CLIs, see "Using the Command-Line Interfaces" section on page A-1.

Establishing a session with each PPC on each SAMI in a Cisco 7600 Series Router chassis. can be a cumbersome task. To facilitate the management and monitoring of the multiple SAMI processors, the remote console and logging (RCAL) feature enables you to use the supervisor console as a single connection point, from which you can control debugging, display **show** command output, and view logging output from all the PPCs on a SAMI (and/or all SAMIs in a chassis) without having to establish a session with each PPC.

To use RCAL to manage and monitor SAMI processors, complete the tasks in the following sections:

- Configuring RCAL Support on the Supervisor, page 3-21

- Configuring RCAL Support on a SAMI PPC, page 3-23
- Using RCAL, page 3-24

Configuring RCAL Support on the Supervisor

The supervisor functions as the RCAL client—receiving messages sent by the SAMI processors. When configuring a supervisor as an RCAL client, you specify the port on which to receive system messages from the SAMI processors, and configure the level of messages to receive and display (levels below are filtered).

To configure the supervisor as an RCAL client, use the following commands beginning in global configuration mode at the supervisor console:

	Command	Purpose
Step 1	`Sup#` **`configure terminal`**	Enters global configuration mode.
Step 2	`Sup(config)#` **`logging listen`** *`udp_port`*	Configures the port on which the supervisor listens for system messages from the SAMI processors on which RCAL is enabled. **Note** The UDP port specified must match the port specified on the SAMI processors using the **logging main-cpu** global configuration command. We recommend that you use port 4000. If a port other than 4000 is used, RCAL to SAMI processor 0 does not work.
Step 3	`Sup(config)#` **`sami module`** `{`*`mod_num`* `|` **`all`** `{`**`cpu`** `{`*`cpu_num`* `|` **`all`**`}` **`logging`** *`severity`*	Specifies the RCAL server (or servers) from which to receive system messages, and configures the level of system messages to receive on the supervisor, where: • *mod_num*—Number of the slot in which the SAMI is installed. • **all**—Specifies all SAMIs installed in the chassis. • **cpu** {*cpu-num* | **all**} – *cpu_num*—Number of the processor (0 for LCP and 3 through 8 for PPCs) – **all**—Specifies all processors. • **logging** *severity*—Specifies the severity level for which the supervisor receives and displays messages. Messages of lower severity than the configured level are filtered. By default, the supervisor receives all system messages sent by SAMI processors. To define the level of messages sent by a processor to the supervisor, establish a session with the processor and use the **logging main-cpu** global configuration command. For a list of severity levels, see Table 3-1.
Step 4	`Sup(config)#` **`exit`**	Exits global configuration mode.

Table 3-1 lists the logging levels.

Table 3-1 Severity Level Definitions

Level	Description
0—emergencies	System unusable
1—alerts	Immediate action required
2—critical	Critical condition
3—errors	Error conditions
4—warnings	Warning conditions
5—notifications	Normal bug significant condition
6—informational	Informational messages
7—debugging	Debugging messages

Configuring RCAL Support on a SAMI PPC

Note By default, RCAL support is enabled on SAMI COSLI PPCs. Therefore, to use RCAL, no configuration tasks are required on the SAMI COSLI PPC.

When RCAL is enabled on a SAMI PPC, the SAMI PPC functions as an RCAL server. When configuring a SAMI PPC to function as an RCAL server, you can define the level of system messages to send to the RCAL client.

By default, RCAL is enabled on PPCs 3 through 8 using port 4000 for severity level errors (level 3) and the EXEC command.

Note The log level defined on the supervisor when specifying an RCAL client (**sami module** global configuration command) can be used to filter out all of the messages below a certain severity level.

To configure RCAL support on a SAMI PPCs 3 through 8, use the following commands beginning in privileged EXEC mode at the supervisor console:

	Command	Purpose
Step 1	Sup# **session slot** *slot_number* **processor** *proc_number*	Establishes a session to a SAMI PPC.
Step 2	Router> **enable**	Enters privilege EXEC mode.
Step 3	Router# **configure**	Enters global configuration mode.
Step 4	Router(config)# **logging main-cpu** *udp_port* [*log_level*] *ip_address*	Enables logs to be generated and sent to the supervisor at and above the specified level. By default, RCAL is enabled on a processor and the processor sends messages for level 3 and above. For a list of severity levels, see Table 3-1. **Note** The UDP port specified must match the port specified on the supervisor. By default, port 4000 is used. Optionally, a VLAN IP address can be specified for transporting this traffic from PPCs 3-8.
Step 5	Router(config)# **exit**	Exits global configuration mode.

Configuring RCAL Support on the SAMI LCP

To configure RCAL support on the SAMI LCP (processor 0), use the following commands beginning in privileged EXEC mode at the supervisor console:

	Command	Purpose
Step 1	`Sup# session slot slot_number processor 0`	Establishes a session to the SAMI LCP.
Step 2	`switch# config`	Enters global configuration mode.
Step 3	`switch(config)# logging enable`	Enables logging to send syslog messages to one or more output locations.
Step 4	`switch(config)# logging supervisor level`	Sets the severity level at which syslog messages are sent to the supervisor. The default is level 3.

Using RCAL

After the supervisor and SAMI processors are enabled for RCAL, you can execute certain commands to the SAMI LCP or SAMI PPC directly from the supervisor console. The command set that you can issue depends on whether you are executing the commands remotely to a SAMI LCP or SAMI PPC.

Table 3-2 lists the command sets that you can execute remotely from the supervisor to a SAMI PPC (processor numbers 3 through 8).

Table 3-2 PPC RCAL Command Set

Command	Description
`clear`	Clears counters and statistics
`debug`	Enables debugging functions
`dir`	Lists files in a file system
`log dir`	Logs the **dir** command to syslog
`log show`	Logs the **show** command to syslog
`log systat`	Logs the **systat** command to syslog
`ping ip_address`	Executes a ping on a remote processor
`set memory`	Executes the **set memory debug** command
`show`	Displays running system information
`systat`	Displays information about terminal lines
`undebug`	Disables debugging functions

Table 3-3 lists the command sets that you can execute remotely from the supervisor to a SAMI LCP (processor number 0).

Table 3-3 LCP RCAL Command Set

Command	Description
clear	Clears counters and statistics
confreq	Sets the config register for processors
console-select	Specifies console selection for front panel consoles DB1 and DB2
reload	Reloads the entire SAMI or SAMIs
show	Displays system information

To execute a command to a SAMI PCC from the supervisor, use the following commands beginning in privileged EXEC mode from the supervisor console:

Step 1	`Sup>` **`enable`**	Enables privileged EXEC mode.
Step 2	`Sup#` **`configure terminal`**	Enters global configuration mode.
Step 3	`Sup(config)#` **`execute-on`** `{{`*`slot_num`*` [, `*`slot_number`*`] |` **`all-mwams`** `|` **`all-samis`**`} {`*`cpu_number`*` [,`*`cpu_num`*`] |` **`all`** `|` **`all-ppc`**`}` *`command`*`}}`	Executes commands remotely when RCAL is enabled, where: • *slot_num*—Specifies the number of the slot in which the module is installed. Optionally, you can specify additional slot numbers, separated by a comma (,). • **all-mwam**—Specifies all Cisco Multiprocessor WAN Application Modules (MWAMs) in the chassis. • **all-sami**—Specifies all SAMIs in the router chassis. • *cpu_num*—Specifies the processor number. Valid values for a SAMI are 0 for the LCP and 3 through 8 for the PPCs. Valid values for an MWAM are 1 for the control CPU and 2 through 7 for the processors. • **all**—Executes the command on all processors. • **all-ppc**—Executes the command on all SAMI processors 3 through 8. • *command*—Specifies the command to execute on the processor remotely. Table 3-2 lists commands supported for the PPC. Table 3-3 lists supported LCP commands.

Note When you specify a keyword option that applies to multiple processors (**all-mwam**, **all-sami**, **all**, and **all-ppc**), the command is executed on active processors but is not executed on processors that are inactive. To show the processor state, use the **show logging slot** command.

Logs received by the supervisor are prefixed with hostname information that identifies which PPC generated the log.

For example:

- Processor 5 on a SAMI in slot 6 generates the following error message:

  ```
  SAMI 06/5: 00:02:05: %SNMP-5-MODULETRAP: Module 6 [Up] Trap
  ```

- Processor 4 on a SAMI in slot 2 generates the following debug message:

  ```
  SAMI 02/4: 00:03:42: ICMP: echo reply sent, src 10.10.10.2, dst 10.10.10.1
  ```

At the supervisor, the logs can be directed to one or more destinations including console, buffer, or syslog.

Usage Notes

When using RCAL, note the following:

- To prevent the supervisor CPU from being overloaded when the command output is expected to exceed more than 100 lines, two options are available:
  - **a.** Ensure that the logging console feature is configured as follows:

    ```
    no logging console guaranteed
    ```

    This configuration allows the output to be dropped when the console backs up. This is the default configuration.
  - **b.** Configure the logging console debug as follows:

    ```
    no logging console debug
    ```

    This configuration directs the output to other logging endpoints, such as buffer or syslog.
- To display logging information for all PPCs on all SAMIs in a router chassis with one command from the supervisor:
  - **a.** Configure the PPCs to locally store logs (in each processor).
  - **b.** Set the buffer logging level on each processor to include the required level of information (the default setting is the debug level).
  - **c.** Display the logs for all the PPCs for all SAMIs in the router chassis, enter the following commands:

    ```
    Sup# execute-on all-samis all-ppc show logging
    ```

- To display the software image versions running on all the PPCs in a chassis with one command from the supervisor, use the following command:

```
Sup# execute-on all-samis all-ppc show version

----------- Slot 3/CPU 3, show ver-------------
Cisco Internetwork Operating System Software
IOS (tm) SAMI Software (SAMI-G7IS-M), Experimental Version

----------- Slot 3/CPU 4, show ver-------------
Cisco Internetwork Operating System Software
IOS (tm) SAMI Software (SAMI-G7IS-M), Experimental Version
```

Tip To minimize command output, you can use the pipe (**|**) support to include only lines of text that match the regular expression following the pipe. For example:

```
Sup# execute-on |
```

To display logging status and counters for all processors on a SAMI using RCAL, use the **show logging slot** command.

Configuring the Cisco Software Application on a SAMI PPC

To configure a Cisco software application on a SAMI PPC, use the following commands beginning in global configuration mode at the supervisor console:

	Command	Purpose
Step 1	`Sup# session slot slot_number processor proc_number`	Establishes a session to a PPC on the SAMI, where: • *slot_number*—Number of the slot in which the SAMI is installed. • *proc_number*—Number of the PPC on the SAMI. Valid values are 3 through 8. One session per processor can be established.
Step 2	`Router> enable` **Note** If establishing a session to a COSLI PPC, skip this step and proceed to Step 3.	Enters privilege EXEC mode.
Step 3	`Router# config`	Enters global configuration mode.
Step 4	`Router(config)#` Configure the application as outlined in the application documentation.	Refer to the Cisco software application documentation (see the "Related Documentation" section on page 9).
Step 5	`Router(config)# exit`	Exits global configuration mode.
Step 6	`Router# copy running-config startup-config`	Copies the running configuration to NVRAM on the SAMI (if in local mode) or supervisor bootflash (if in supervisor mode).

The following example shows how to establish a session to a SAMI Cisco IOS PPC and begin configuring a Cisco software application:

```
Sup> enable
Sup# session slot 6 processor 4
The default escape character is Ctrl-^, then x.
You can also type 'exit' at the remote prompt to end the session
Trying 127.0.0.64 ... Open

Router> enable
Router# config
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#
```

Enter application configuration commands. For information on configuring your application, see the documentation for the application list in "Related Documentation" section on page -9.

```
Router(config)# exit
```

Note In the example above, the "64" part of IP address indicates slot 6, processor 4.

The following example shows how to make a backup of the configuration after the application is configured.

```
Router# copy running-config startup-config
Destination filename [startup-config]?
```

L2 Connectivity Between SAMIs

SAMI does not support L2 connectivity among processors of the same card. The only exception to this is if the SAMI is running the Cisco Broadband Wireless Gateway 2.0 image, and the Supervisor is running SRE.

If you require connectivity among processors of the same card, then it needs to be provided at L3, with the Supervisor routing packets between the different SAMI processors. This requires the following configurations on the Supervisor and the SAMI processors.

1. The IP addresses used for inter-processor connectivity have to be from different IP subnets.
2. Each processor needs to have a different VLAN (i.e., different Gi0/0 sub-interface) for the purpose of inter-processor connectivity. In order to force the inter-processor traffic to be routed at L3 by the Supervisor, each processor should only contain the sub-interface corresponding to its own VLAN.
3. On the Supervisor, L3 VLAN interfaces need to be configured corresponding to each of the 6 VLANs configured on the SAMI processors in the previous step.
4. IP connectivity between the SAMI processor sub-interface and the corresponding L3 VLAN interfaces on the Supervisor needs to be verified for all SAMI processors.
5. Either static routes need to be configured on the Supervisor, or a dynamic routing protocol needs to be run on the Supervisor, and each of the SAMI processors to enable the Supervisor to route traffic between the subnets corresponding to each SAMI processor.

4GB DRAM Support

The SAMI platform supports 4GB DIMMs. Refer to your specific Cisco software application documentation to determine if the application supports 4GB DIMMs.

- Changes are downward compatible—the same image supports 2GB and 4GB configurations.
- Because of the larger available memory, the IOS "Check heaps" process requires higher usage of the CPU. This is reflected as a higher average use of the CPU depending on the heap usage.
- There is no upgrade procedure for 4GB DIMMS. You will have to order and install new cards to upgrade to the 4GB.

SAMI Coredump, Crashinfo and Debuginfo Support

When any of the processors crash (PPC or IXP), the LCP collects the crashinfo and debuginfo files from each of the processors and bundles it together in a tar file. The tar file is stored in the directory core: in the LCP. Execute command **dir core**: from the LCP to check for the crashinfo files.

The .tar file contains the following information:

- Crashinfo of the PPC crashed and debuginfo of the rest.
- LCP debuginfo.
- Crashinfo of IXP1 and IXP2.
- IXP coredumps (see the"exception ixp" section on page E-17 to enable coredump collection for IXPs).

The tar filename will have the following format

crashinfo_collection-%Y%m%d-%H%M%S.tar

So, for example, crashinfo_collection-20100506-160941.tar means the tar file was created on May 6, 2010 at 16:09:41 hours

The following list identifies the contents of the above example tar file. In this instance, processor 3 reloads. Additionally, IXP coredump collection is enabled for both IXPs

crashinfo_proc3_20100506-160534

debuginfo_proc4_20100506-160535

debuginfo_proc5_20100506-160535

debuginfo_proc6_20100506-160535

debuginfo_proc7_20100506-160536

debuginfo_proc8_20100506-160536

debuginfo_proc0-20100506-160941

coredump_proc1-20100506-160941.gz

coredump_proc2-20100506-160941.gz

qnx_1_mecore_ucdump

qnx_2_mecore_ucdump

Note Please ensure that you have enough space in LCP core:/ directory to store the tar file.

- To find out how much free space is available, use the **dir core**: command from the LCP console.
- To delete files from LCP core use the **delete core**: *filename* command.
- To delete all the files at once use the **clear core** command.

Debug Info Generation During RF-Induced Reload

An RF-Induced reload occurs when the redundancy facility identifies a failure in the system. For example, when there is a communication issues between the redundant systems. Previously, the SAMI would simply reload, and the information about the condition of the system before the SAMI reloaded were lost. Now, the SAMI can write debug info during RF-Induced reload. This provides information regarding the state of the system before the SAMI reloaded. Debuginfo generation will lead to a slower reload of the SAMI.

Singleip

Redundancy-Facility induced reloads cause the PPCs and LCP to write debuginfo, and the IXP to write crashinfo and coredump if configured. All of the debuginfo, crashinfo and coredump files are collected and stored together as **crashinfo_collection.tar** in the LCP core directory. This behaviour is similar to the behaviour seen in the case of PPC - IXP Health-monitoring failure.

CHAPTER 4

Maintaining and Monitoring the Cisco SAMI

The following sections describe procedures you can use to maintain and monitor a Cisco Service and Application Module for IP (SAMI):

Upgrading the SAMI Software

The SAMI is shipped preloaded with the operating system software. However, to take advantage of new features and enhancements, you can upgrade your SAMI with later versions of software as they become available.

The SAMI software is delivered as a bundle of images for the SAMI base card and daughter card components. Each image in the bundle has its own version and release number that is used during the upgrade process to determine if an image needs to be installed or not.

Note The SAMI image bundle is named c7svcsami-*feature*-mz, where feature is the name of the Cisco software application.

Specifically, the SAMI bundle includes the following software and firmware images:

- Line control processor (LCP) operating system and ROMMON image
- Network processor (IXP/XScale) QNX image and IXP microcode image
- Classification and distribution engine (CDE) field programmable gate array (FPGA) images (CDE1 and CDE2)
- Cisco software application image (running on the PPC) and ROMMON image
- Daughter card ROMMON image
- Daughter card FPGA image
- Nitrox II microcode

When an upgrade is initiated, the version and release numbers of the images in the newer bundle are compared to the versions currently running. If the version of an existing image is different than that in the new bundle, the image only is automatically upgraded.

Upgrading in a Redundant Configuration

To minimize any disruption to existing network traffic during a software upgrade or downgrade, deploy your SAMIs in a redundant configuration.

The following steps provide an overview of the upgrade process in a redundant configuration.

1. Upgrade the active SAMI first.
2. Reboot the active SAMI after the software installation. When you reboot the active SAMI, it fails over to the standby module and existing traffic continues without interruption.
3. Upgrade the new active SAMI.
4. Reload the active SAMI after the redundant module is up and the high availability (HA) state is hot. When you reboot this SAMI, a similar failover occurs and again, the existing traffic continues. The original, active SAMI is active again.

Verifying the SAMI Software Versions

To verify the version of the SAMI software from the supervisor console, use the **show module** command:

```
Sup# show module

Mod Ports Card Type                              Model              Serial No.
--- ----- -------------------------------------- ------------------ -----------
  4    1  SAMI Module (CSG2)                     WS-SVC-SAMI-BB-K9  SAD1140096M
  6    2  Supervisor Engine 720 (Active)         WS-SUP720-3BXL     SAD083400U3
  7   48  SFM-capable 48-port 10/100 Mbps RJ45   WS-X6548-RJ-45     SAD0611007M
  9    1  SAMI Module (GENERIC)                  WS-SVC-SAMI-BB-K9  SAD095003X1

Mod MAC addresses                       Hw    Fw           Sw           Status
--- ---------------------------------- ------ ------------ ------------ -------
  4  001d.45f9.0922 to 001d.45f9.0929   2.2   8.7(0.5-Eng) 3.0(0)W1(0.0 Ok
  6  0011.21b9.ac20 to 0011.21b9.ac23   4.0   8.1(3)       12.2(2007052 Ok
  7  0002.7ee1.f010 to 0002.7ee1.f03f   4.2   6.3(1)       8.7(0.22)FW6 Ok
  9  0001.0002.0003 to 0001.0002.000a   1.0   8.7(0.5-Eng) 3.0(0)W1(0.0 Ok

Mod  Sub-Module                  Model              Serial       Hw     Status
---- --------------------------- ------------------ ----------- ------- -------
  4  SAMI Daughterboard 1        SAMI-DC-BB         SAD113909PZ  1.1    Ok
  4  SAMI Daughterboard 2        SAMI-DC-BB         SAD113909U5  1.1    Ok
  6  Policy Feature Card 3       WS-F6K-PFC3BXL     SAD083903ML  1.3    Ok
  6  MSFC3 Daughterboard         WS-SUP720          SAD083606TK  2.1    Ok
  9  SAMI Daughterboard 1        SAMI-DC-BB         SAD110709TS  0.701  Ok
  9  SAMI Daughterboard 2        SAMI-DC-BB         SAD110709SF  0.701  Ok

Mod  Online Diag Status
---- -------------------
  4  Pass
  6  Pass
  7  Pass
  9  Pass
Sup#
```

To verify the version of the SAMI image from the LCP console, use the **show version** command:

```
switch# show version
> Cisco Application Control Software (ACSW) TAC support:
> http://www.cisco.com/tac Copyright (c) 2002-2006, Cisco Systems, Inc.
> All rights reserved.
> The copyrights to certain works contained herein are owned by other
> third parties and are used and distributed under license.
> Some parts of this software are covered under the GNU Public License.
> A copy of the license is available at
> http://www.gnu.org/licenses/gpl.html.
>
> Software
>   loader:    Version 12.2[121]
```

Note The **show version** command displays the software version of the LCP image, not the version of the SAMI bundle.

Upgrading the SAMI Bundle from the Supervisor Engine

To upgrade the SAMI image bundle, perform the following tasks on the supervisor engine console:

	Command	Purpose
Step 1	Sup> **enable**	Enters privileged EXEC mode.
Step 2	Sup# **upgrade hw-module slot** *slot_num* **software** *url/filename*	Copies the bundle from the specified URL to the compact flash on the SAMI in the specified slot and sets the initialization parameters.
Step 3	Sup# **hw-module module** *slot_num* **reset**	Reloads the entire SAMI (turns off the power and then on) from the new source file. **Note** The SAMI automatically boots from the new source file.
Step 4	Sup# **show upgrade software progress**	Displays status of the image upgrades that are occurring.

For example, to upgrade the image bundle on a SAMI in slot 2 of a Cisco 7600 Series Router chassis, enter the following commands from the supervisor engine.

```
Sup> enable

Sup# upgrade hw-module slot 2 software tftp://10.1.1.1/c7svcsami-ipbase-mz.bouncer.070724

Loading c7svcsami-ipbase-mz.bouncer.070724 from <TFTP SERVER IPADDRESS> (via Vlan10):
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 34940891 bytes]

Sup# hw-module module 2 reset
Proceed with reload of module?[confirm]
% reset issued for module 2
Sup#

Sup# show upgrade software progress
Slot     Software File
9        c7svcsami-ipbase-mz.bouncer.070724
```

When an upgrade is initiated using the **upgrade hw-module** command, many processes occur automatically, including configuring the SAMI to automatically boot using the new image.

(You can use the **show running-config** command and the **show start up config** commands from the LCP console to view this boot line configuration).

Additionally, the following commands can be used manage SAMI image files.

Managing the SAMI LCP Software

This section provides a brief overview on how to manage the software running on the SAMI LCP.

This section includes the following topics:

- Saving and Viewing the LCP Configuration File, page 4-4
- Using the SAMI LCP File System, page 4-5
- Viewing, Deleting, and Copying Core Dump Files, page 4-8

Saving and Viewing the LCP Configuration File

Upon startup, the SAMI LCP loads the startup-configuration file stored in flash memory (nonvolatile memory) to the running-configuration stored in RAM (volatile memory).

Use the **show startup-config** command in EXEC mode to display the contents of the startup-config file (see the "Viewing the LCP Configuration File" section on page 4-5).

When you make configuration changes, the LCP places those changes in a virtual running-configuration file called the running-config. When you enter a CLI command, the change is made only to the running-configuration file in volatile memory. Before you log out or reboot the SAMI, copy the contents of the running-config file to the startup-config file (startup-config) to save configuration changes to flash memory. The LCP uses the startup-configuration file on subsequent reboots.

This section includes the following topics:

- Saving the LCP Configuration File in Flash Memory, page 4-5
- Viewing the LCP Configuration File, page 4-5

Saving the LCP Configuration File in Flash Memory

After you create or update the running-configuration file in RAM (volatile memory), save the contents to the startup-configuration file in flash memory (non-volatile memory) on the SAMI LCP. To copy the contents of the running-configuration file to the startup-configuration file, use the **copy running-config startup-config** command from EXEC mode.

The syntax for the command is:

copy running-config startup-config

For example, to save the running-configuration file to the startup-configuration file in flash memory, enter:

```
switch# copy running-config startup-config
```

You can also use the **write memory** command to copy the contents of the running-configuration file to the startup-configuration file. The **write memory** command is equivalent to the **copy running-config startup-config** command.

The syntax for the command is:

write memory

Viewing the LCP Configuration File

To display the running-configuration file, use the **show running-config** command in EXEC mode. The SAMI LCP does not display default configurations in the running-configuration file.

Note The **write terminal** command can also be used to display the running-configuration file. The **write terminal** command is equivalent to the **copy running-config** command.

Use the following commands to view the content of the running- and startup-configuration file:

- To view the running-configuration file, use the **show running-config** command.
- To view the startup-configuration file, use the **show startup-config** command.

The syntax for the **show startup-config** command is as follows:

show startup-config

Using the SAMI LCP File System

Flash memory stores the operating system, startup-configuration file, core dump files, system message log files, for example, on the SAMI LCP. Flash memory comprises a number of individual file systems, or partitions, that include this data.

The file systems, or partitions, contained in the LCP include:

- **disk0:**—Contains all startup-configuration files, software licenses, system message log files, SSL certificates and keys, and user-generated data for all existing contexts on the LCP.
- **image:**—Contains the system software images.
- **core:**—Contains the core files generated after each time the LCP becomes unresponsive.
- **volatile:**—Contains the files residing in the temporary (volatile:) directory. The volatile directory provides temporary storage; files in temporary storage are erased when the LCP reboots.

The LCP provides a number of useful commands to help you manage software configuration and image and files.This section provides a series of procedures to help you manage files on the LCP. It includes the following procedures:

- Listing the Files in a Directory
- Deleting Files

Listing the Files in a Directory

To display the directory contents of a specified file system, use the **dir** command in EXEC mode. This command displays a detailed list of directories and files contained within the specified file system on the LCP, including names, sizes, and time created. You may optionally specify the name of a directory to list.

The syntax for this command is:

dir {**core:** | **disk0:**[*directory/*][*filename*] | **image:**[*filename*] | **volatile:**[*filename*]}

The keywords and arguments are:

- **core:**—Displays the contents of the core: file system.
- **disk0:**—Displays the contents of the disk0: file system.
- **image:**—Displays the contents of the image: file system.
- **volatile:**—Displays the contents of the volatile: file system.
- *directory/*—(Optional) Displays the contents of the specified directory.
- *filename*—(Optional) Displays information relating to the specified file, such as file size and the date it was created. You can use wildcards in the filename. A wildcard character (*) matches all patterns. Strings after a wildcard are ignored.

For example, to list the files in the disk0: file system, enter:

```
switch# dir disk0:

     7465  Jan 03 00:13:22 2000 C2_dsb
     2218  Mar 07 18:38:03 2006 ECHO_PROBE_SCRIPT4
  1654692  Feb 27 21:42:07 2006 c6ace-t1k9_dplug-mzg.3.0.0_A0_2.44.bin
     1024  Feb 16 12:47:24 2006 core_copies_dsb/
     1024  Jan 01 00:02:07 2000 cv/
     1024  Mar 13 13:53:08 2006 dsb_dir/
       12  Jan 30 17:54:26 2006 messages
     7843  Mar 09 22:19:56 2006 running-config
     4320  Jan 05 14:37:52 2000 startup-config
     1024  Jan 01 00:02:28 2000 www/

           Usage for disk0: filesystem
                    4254720 bytes total used
                    6909952 bytes free
```

For example, to list the core dump files in flash memory, enter:

```
switch# dir core:

253151   Mar 14 21:23:33 2006 0x401_vsh_log.8249.tar.gz
262711   Mar 15 21:22:18 2006 0x401_vsh_log.15592.tar.gz
250037   Mar 15 18:35:27 2006 0x401_vsh_log.16296.tar.gz

        Usage for core: filesystem
                 1847296 bytes total used
                64142336 bytes free
                65989632 bytes available
```

Alternately, you can list files in a SAMI directory from the supervisor console using the **dir sami#** privileged EXEC command.

The syntax for this command is:

dir sami#*slot_num* {**-fs:image/** | **-fs:core/**}

The keywords and arguments are:

- *slot_num*—Number of the slot in which the SAMI is installed.
- **image:**—Displays the contents of the SAMI image: file system.
- **core:**—Displays the contents of the SAMI core: file system.

Deleting Files

To delete a file from a specific file system in the SAMI LCP, use the **delete** command in EXEC mode. When you delete a file, the SAMI erases the file from the specified file system.

The syntax for this command is:

delete {**core:***filename* | **disk0:**[*directory/*]*filename* | **image:***filename* | **volatile:***filename*}

The keywords and arguments are:

- **core:***filename*—Deletes the specified file from the core: file system (see the "Viewing, Deleting, and Copying Core Dump Files" section on page 4-8).
- **disk0:**[*directory/*]*filename*— Deletes the specified file from the disk0: file system (for example, a packet capture buffer file or system message log).
- **image:***filename*—Deletes the specified file from the image: file system.
- **volatile:***filename*—Deletes the specified file from the volatile: file system.

For example, to delete a copy of the running-configuration file called MY_RUNNING-CONFIG1 from the MYSTORAGE directory on the disk0: file system, enter:

```
switch# delete disk0:MYSTORAGE/MY_RUNNING-CONFIG1
```

Alternately, you can delete files from a SAMI directory from the supervisor console using the **delete sami#** privileged EXEC command.

The syntax for this command is:

delete sami#*slot_num* **{-fs:image/ | -fs:core/}***filename*

The keywords and arguments are:

- *slot_num*—Number of the slot in which the SAMI is installed.
- **image:**—Deletes the specified file from the SAMI image: file system.
- **core:**—Deletes the specified file from the SAMI core: file system.
- *filename*—Name of the file that you want to delete. You can use wildcards in the filename. A wildcard character (*) matches all patterns. Strings after a wildcard are ignored.

Viewing, Deleting, and Copying Core Dump Files

A core dump occurs when the SAMI experiences a fatal error. The SAMI LCP writes information about the fatal error to the core: file system in flash memory before a switchover or reboot occurs. The core: file system is the storage location for all core files generated during a fatal error. Three minutes after the SAMI reboots, the saved last core is restored from the core: file system back to its original RAM location. This restoration is a background process and is not visible to the user.

You can view the list of core files in the core: file system by using the **dir core:** command in EXEC mode.

Note Core dump information is for Cisco Technical Assistance Center (TAC) use only. If the SAMI becomes unresponsive, you can view the dump information in the core through the **show cores** command. We recommend contacting TAC for assistance in interpreting the information in the core dump.

The timestamp on the restored last core file displays the time when the SAMI booted up, not when the last core was actually dumped. To obtain the exact time of the last core dump, check the corresponding log file with the same process identifier (PID).

To delete a core dump file from the core: file system in flash memory, use the **delete core:** command. To view the core dump files available in flash memory, use the **dir core:** command.

The syntax for the command is:

delete core:*filename*

The *filename* argument specifies the name of a core dump file located in the core: file system.

For example, to delete the file 0x401_VSH_LOG.25256.TAR.GZ from the core: file system, enter:

```
switch# delete core:0x401_VSH_LOG.25256.TAR.GZ
```

To copy a core dump file from the core: file system from the supervisor console, use the **copy sami#** privileged EXEC command.

The syntax for the command is:

copy sami#*slot_number*{**-fs:core/***filename dest-file*}

The keywords and arguments are:

- *slot_num*—Number of the slot in which the SAMI is installed.
- **core:/***filename*—Name of the core dump file in the core directory.
- *dest-file*—Name of the destination file.

Manually Upgrading an LCP ROMMON Image

If the Cisco SAMI bundle contains an LCP ROMMON image, you can use the **reprogram bootflash fur-image** command to upgrade the LCP ROMMON image with the one in the bundle.

Note The LCP ROMMON image might not be bundled in earlier versions of the Cisco SAMI image.

Caution The **reprogram bootflash** command is for use by trained Cisco personnel only. Entering this command may cause unexpected results. Do not attempt to use the **reprogram bootflash** command without guidance from Cisco support personnel.

This section includes the following procedures:

- Verifying the LCP Software Version, page 4-9
- Upgrading the LCP ROMMON Image When Using a Sup720/RSP720, page 4-9
- Upgrading the LCP ROMMON Image When Using a Sup32, page 4-11

Verifying the LCP Software Version

To verify the version of the LCP image currently installed on your SAMI, use the **show version** command at the LCP console:

```
switch# show version
  Cisco Application Control Software (ACSW) TAC support:
  http://www.cisco.com/tac Copyright (c) 2002-2006, Cisco Systems, Inc.
  All rights reserved.
  The copyrights to certain works contained herein are owned by other
  third parties and are used and distributed under license.
  Some parts of this software are covered under the GNU Public License.
  A copy of the license is available at
  http://www.gnu.org/licenses/gpl.html.

  Software
    loader:    Version 12.2[120]
```

Upgrading the LCP ROMMON Image When Using a Sup720/RSP720

To reprogram the Field Upgradable (FUR) partition of the LCP ROMMON image when using a Sup720/RSP720, use the **reprogram bootflash fur-image** command at the LCP console:

```
switch# reprogram bootflash fur-image


Warning: This command will affect rommon image and can render the machine unbootable

Continue? [y/n]: y

Warning: DO NOT power down or reboot system while programming ...

Upgrading rommon. Please wait ....
Validating Image Header -  OK
```

```
itasca_reprogram_erase_magic: erasing rommon magic Erase from 0x2e42f000 to 0x2e42f01f
   In blocks of 131072 bytes
Erase flash addr: 0x2e42f000
Begin Programming FLASH: 4 bytes
Programming
Programming leftover bytes 4
Read leftover bytes 4
padded size = 4


Flash Program Done!
itasca_reprogram_erase_magic: erase succesful!
Erase from 0x2e30f000 to 0x2e40efff
   In blocks of 131072 bytes
Erase flash addr: 0x2e30f000
Erase flash addr: 0x2e32f000
Erase flash addr: 0x2e34f000
Erase flash addr: 0x2e36f000
Erase flash addr: 0x2e38f000
Erase flash addr: 0x2e3af000
Erase flash addr: 0x2e3cf000
Erase flash addr: 0x2e3ef000
Begin Programming FLASH: 1048576 bytes
Programming
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!

Flash Program Done!
upgrd FUR: Check sum passed: bootflash = 0, expected = 0
itasca_reprogram_erase_magic: stamp rommon magic Erase from 0x2e42f000 to 0x2e42f01f
   In blocks of 131072 bytes
Erase flash addr: 0x2e42f000
Begin Programming FLASH: 4 bytes
Programming
Programming leftover bytes 4
Read leftover bytes 4
padded size = 4


Flash Program Done!
itasca_reprogram_stamp_magic: write succesful!
Upgrading done.  Next boot will run desired rommon.
switch#
```

Upgrading the LCP ROMMON Image When Using a Sup32

To reprogram the Field Upgradable (FUR) partition of the LCP ROMMON image when using a Sup32 when the current LCP ROMMON is Version 12.2[120] or earlier, complete the following steps:

Step 1 Bring up the SAMI.

Scenario 1: The SAMI PPCs came up fine from the LCP console. This scenario applies to most of the Cisco applications.

Verify that the state of the processors is UP.

```
Sup(config)# session slot slot-num processor 0
login: admin
login: admin

switch# show sami processors

Processor number  STATUS
3   UP   (0x00010000)
4   UP   (0x00010000)
5   UP   (0x00010000)
6   UP   (0x00010000)
7   UP   (0x00010000)
8   UP   (0x00010000)
```

Scenario 2: The SAMI is reloading by itself. Wait for the following message to display on the supervisor that indicates that the LCP (processor 0) is in safe mode (PPCs are kept in reset). This scenario applies to Cisco applications such as the Cisco Content Services Gateway - 2nd Generation (CSG2).

```
%SAMI-1-SAMI_SYSLOG_ALERT: SAMI 3/0: %SAMI-1-730207: SAMI User Space: ALERT: Exceeded
maximum boot retries forbooting daughter cards,Now processor 0 is in safe mode for
debugging only
```

Verify that the state of the processors is UNKNOWN.

```
Sup# session slot slot-num processor 0
login: admin
Password: admin
switch# show sami processors

Processor number  STATUS
===========================================
3   UNKNOWN   (0x00000000)
4   UNKNOWN   (0x00000000)
5   UNKNOWN   (0x00000000)
6   UNKNOWN   (0x00000000)
7   UNKNOWN   (0x00000000)
8   UNKNOWN   (0x00000000)
```

Scenario 3: The SAMI is not reloading by itself. This scenario might apply to non-CSG2 applications.

Verify that the state of the processors is UNKNOWN.

```
Sup# session slot slot-num processor 0
login: admin
Password: admin
switch# show sami processors

Processor number  STATUS
===========================================
3   UNKNOWN   (0x00000000)
4   UNKNOWN   (0x00000000)
```

```
5    UNKNOWN    (0x00000000)
6    UNKNOWN    (0x00000000)
7    UNKNOWN    (0x00000000)
8    UNKNOWN    (0x00000000)
```

Step 2 Reprogram the Field Upgradable (FUR) partition of the LCP ROMMON image using the **reprogram bootflash fur-image** command at the LCP console.

```
switch# reprogram bootflash fur-image
```

Manually Upgrading a PPC ROMMON Image

Caution Typically, there is no need to manually upgrade the SAMI PPC ROMMON images. The images are upgraded automatically during the SAMI upgrade process (see the "Upgrading the SAMI Software" section on page 4-1). However, if an automatic upgrade fails, you can upgrade the PPC ROMMON manually.

Caution Do *not* try this process on a live network. ROMMON upgrade procedures causes the PPCs to be reloaded.

During the SAMI image upgrade process, the version of an image included in the bundle is compared to the version currently running on the SAMI component. If the two versions differ, then the image is automatically upgraded to the new image in the bundle.

To manually upgrade a PPC ROMMON image, complete the following tasks, beginning in privileged EXEC mode on the supervisor engine console:

	Command	Purpose
Step 1	Sup# **copy tftp://***tftp ip_address***/rommon-image** *sami-image***/rommon-image**	Copies the ROMMON image to the LCP image directory on the SAMI.
Step 2	Sup# **session slot** *slot_number* **processor** *proc_number*	Establishes a session with the LCP on the SAMI, where: • *slot_number*—Number of the slot in which the SAMI is installed. • *proc_number*—Number of the LCP (PPC0).
Step 3	switch# **upgrade-rommon** *rommon-image-name* **all-ppc**	Executes a ROMMON upgrade on all of the PPCs on the SAMI where the *rommon-image-name* is the name of the ROMMON image in the SAMI software bundle.

For example, to perform a PPC ROMMON image upgrade, use the following commands:

```
Sup> enable

Sup# copy tftp://10.1.1.1/rommon-image sami#2-fs:image/rommon-image

Sup# session 2 processor PPC0

switch# upgrade-rommon rommon-image all-ppc
```

Reallocating SAMI PPC IO Memory

Note Reallocating SAMI PPC IO Memory is supported on SAMI Cisco IOS PPCs only.

Each of the PPCs on a SAMI has 2GB or 4GB DRAM. In PPCs with 2GB DRAM, 64 MB is allocated for IO memory by default. For SAMIs with 4GB DRAM, the default iomem size is specific to application. However, you can use the **memory-size iomem** command to reallocate the IO memory from the total available DRAM space. The **no** form of the iomem command returns to the default memory allocation.

Note Each application has different IO memory requirements. Please consult the application configuration and user guides for recommendations on IO memory and minimum DRAM required.

Caution It is *not* recommended that you change the IO memory allocation without careful consideration of the network requirements.

To reallocate memory on each of the PPCs (processors 3 through 8), use the **memory-size iomem** command to reallocate memory on each of the PPCs (processors 3 through 8). The **memory-size iomem** command cannot be used to configure the memory allocation on the LCP (processor 0).

After the I/O memory is configured using the **memory-size iomen** command, the remaining DRAM memory is used for processor memory.

After you configure the memory allocation, the configuration must be saved and the PPC reloaded for the configuration to take effect.

To reallocate the IO memory on a PPC, use the following commands:

	Command	Purpose
Step 1	`Sup> enable`	Enters privileged EXEC mode.
Step 2	`Sup# session slot slot_num processor proc_number`	Establishes a session with a PPC on the SAMI, where: • *slot_number*—Number of the slot in which the SAMI is installed. • *proc_number*—Number of the PPC on the SAMI. Valid values are 3 through 8. One session per processor can be established. To end a session, enter **exit**.
Step 3	`Router> enable`	Enters privilege EXEC mode.
Step 4	`Router# configure`	Enters global configuration mode.
Step 5	`Router(config)# memory-size iomem 64`	Allocates 64 MB of the DRAM memory to I/O memory and the remaining to processor memory.
Step 6	`Router(config)# exit`	Exits global configuration mode.

	Command	Purpose
Step 7	`Router# write memory`	Saves the changes to the running configuration to the startup configuration file.
Step 8	`Router# reload`	Reloads the PPC or the entire SAMI. Depending on the requirements of the Cisco software application running on the SAMI PPCs, the **reload** command might reload the single PPC or the entire module. For example, when issued from the PPC running a distributed application such as the Cisco Content Services Gateway - 2nd Generation (CSG2), the **reload** command reloads the entire module.

Recovering the SAMI

This section includes the following recovery procedures:

- Recovering from a PPC Lockout, page 4-14
- Recovering—Session Loss, page 4-17
- Recovering—LCP ROMMON or an Unstable LCP Image, page 4-17

Recovering from a PPC Lockout

Occasionally, you might be unable to log into a SAMI PPC, either because of a configuration mistake, or because you have forgotten the password.

You can recover from this condition using the Break key during the boot process. This is the standard password recovery method supplied by the Cisco software running on the PPC. Additionally, because the SAMI PPC configuration files are stored on the supervisor, password recovery is also possible by modifying the configuration file of a PPC on supervisor.

Using Break to Recover from PPC Lockout

To recover from a lockout by sending the Break key, complete the following steps:

	Command	Purpose
Step 1	`telnet>` **`send break`**	Connects to the console and sends the Break key as the supervisor engine boots from ROMMON to Cisco application software. **Note** Break is enabled for 60 seconds after boot up is initiated. The ROMMON breaks out of the booting process and provides the ROMMON prompt.
Step 2	`rommon#` **`confreg`**	Sets the **config-register** and forces the supervisor engine to produce a configuration dialog. This method assures that you do not see the existing configurations or passwords without knowing the password. After the supervisor is up, use cut and paste or the **tftp** command to copy the configurations to the supervisor engine and then to NVRAM.
Step 3	`rommon#` **`reset`**	Resets (or power cycles) to enable the new configuration to take effect.

The following example illustrates using a break to recover from a PPC lockout:

```
Router#
System Bootstrap, Version 12.3(20070512:064259) [BLD-bouncer.nightly 101], DEVELOPMENT
SOFTWARE
Copyright (c) 1994-2007 by cisco Systems, Inc.
BOUNCER platform with 1048576 Kbytes of main memory
Image:c7svcsami-ipbase-mz.bouncer.070724.p1p3
Self decompressing the image : ##########################################################
[OK]

telnet> send break

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Rights clause at FAR sec. 52.227-19 and subparagraph
(c) (1) (ii) of the Rights in Technical Data and Computer
Software clause at DFARS sec. 252.227-7013.

           cisco Systems, Inc.
           170 West Tasman Drive
           San Jose, California 95134-1706

Cisco IOS Software, SAMI Software (SAMI-M), Version 12.4(nightly.2070512) NIGHTLY BUILD,
synced to bouncer BOUNCER_NIGHTLY_061020
Copyright (c) 1986-2007 by Cisco Systems, Inc.
Compiled Sat 12-May-07 03:03 by userA
Image text-base: 0x400120D4, data-base: 0x40FCB5E0

hw_version is 3, 256 sectors, 32M flash used.
```

```
Initializing flashfs...

*** System received an abort due to Break Key ***
signal= 0x3, code= 0x500, context= 0x434b62f8
PC = 0x40cf5878, Vector = 0x500, SP = 0x43199ad4
rommon 1 > confreg 0x2142

You must reset or power cycle for new config to take effect
rommon 2 > reset
```

Modifying the Configuration File to Recover from a PPC Lockout

To recover from a PPC lockout by modifying the configuration file stored on the supervisor engine, complete the following steps:

	Command	Purpose
Step 1	Sup# **dir bootflash:***filename***.cfg**	Copies the configuration file from supervisor engine to a UNIX machine to edit it.
Step 2	Sup# **copy tftp:***dir* **tftpboot/***username***/configs/***filename***.cfg bootflash:***filename***.cfg**	Copies the configuration file back to the supervisor engine after editing it.
Step 3	Sup# **hw-module module** *mod_num* **reset**	Reloads the entire SAMI.

The following example illustrates modifying a configuration file to recover from a PPC lockout:

```
Sup# dir bootflash:SLOT1SAMIC3.cfg
Directory of bootflash:/SLOT1SAMIC3.cfg

  151  -rw-      265291  May 13 2007 22:48:31 +00:00  SLOT1SAMIC3.cfg

65536000 bytes total (11841704 bytes free)

Sup# copy bootflash:/SLOT1SAMIC3.cfg
tftp://1o.10.0.254/auto/tftp-blr-users3/username/configs/SLOT1SAMIC3.cfg
Address or name of remote host [9.10.0.254]?
Destination filename [auto/tftp-blx-users3/username/configs/SLOT1SAMIC3.cfg]?
!!!
265291 bytes copied in 0.416 secs (637719 bytes/sec)

Sup# copy tftp://10.10.0.254/tftpboot/username/configs/SLOT1SAMIC3.cfg
bootflash:SLOT1SAMIC3.cfg

Destination filename [SLOT1SAMIC3.cfg]?
%Warning:There is a file already existing with this name
Do you want to over write? [confirm]

Accessing tftp://10.10.0.254/auto/tftp-blx-users3/username/configs/SLOT1SAMIC3.cfg...
Loading auto/tftp-blx-users3/username/configs/SLOT1SAMIC3.cfg from 9.10.0.254 (via
Vlan10): !!
[OK - 265271 bytes]
265271 bytes copied in 1.308 secs (202807 bytes/sec)
Sup#
```

```
sup# dir bootflash:SLOT1SAMIC3.cfg
Directory of bootflash:/SLOT1SAMIC3.cfg

  152  -rw-      265271  May 14 2007 02:41:03 +00:00  SLOT1SAMIC3.cfg

65536000 bytes total (11576304 bytes free)
Sup#
Sup# hw-module module 1 reset
Sup#
```

Recovering—Session Loss

If the session between the supervisor engine and a SAMI PPC fails, you can use the following steps to try to recover the session and collect information that can be useful in determining the cause of the session loss.

When a session is lost, the following error message displays:

```
sami: No response from IOS processor x, resetting processor
```

To try to recover a PPC session and collect troubleshooting information, use the following command in privileged EXEC mode from the supervisor engine console:

Command	Purpose
Sup# **hw-module module** *mod-num* **reset**	Resets the SAMI by powering it down and up.

The following example illustrates powering down and resetting a SAMI in slot 5 of the router chassis:

```
Sup> enable
Sup# hw-module module 5 reset
Sup#
```

Recovering—LCP ROMMON or an Unstable LCP Image

If the SAMI LCP (processor 0) is in ROMMON, the **upgrade** command from the supervisor is failing, or when there is not a usable image on the SAMI, you can use the following procedure to recover the SAMI.

If the output from the **show module** command issued from the supervisor indicates the SAMI status is "other," and the module is not coming out of this state, first verify that the LCP is in ROMMON by issuing the following commands from the supervisor:

	Command	Purpose
Step 1	Sup# **remote login switch**	Accesses the switch processor.
Step 2	Sup-sp# **svclc console** *sami_slot_num*	Establishes a session with the LCP console if the LCP is in ROM-monitor state.

The following example illustrates accessing the switch processor:

```
Sup> remote login switch
processor
Trying switch...
Entering CONSOLE for Switch
Type "^C^C^C" to end this session
```

The following example illustrates establishing a session with an LCP console that is not in ROMMON. If the LCP is not in ROMMON, the LCP should be functioning properly and you can use the **session slot** command to access the LCP console.

```
Sup-sp# svclc console 3
processor 0 console
Card in slot 3 is not in ROMMON.
```

The following example illustrates establishing a session with an LCP console that is in ROMMON. If the LCP is in ROMMON, proceed to loading a SAMI using an image on the supervisor:

```
Sup-sp# svclc console 3
Entering svclc ROMMON of slot 3 ...
Type “end” to end the session.
processor 0 is in ROMMON.

rommon 2> end
processor 0 ROMMON tunneling session
End of tunneling command.

Sup-sp#exit
Supervisor RP processor
Sup#
```

If an image uploaded to the LCP is failing, the following procedure can be used to recover the LCP by rebooting it from a stable image on the supervisor.

If an image uploaded to the SAMI using **upgrade** command is failing, or if the SAMI does not have a valid usable image, or to reboot a SAMI whose LCP in ROMMON, complete the following steps to reboot using a stable image loaded directly from supervisor engine.

To reboot an LCP using a stable image on the supervisor engine, complete the following steps:

	Command	Purpose
Step 1	`Sup#` **`boot device module`** *`slot_num`* **`disk0:`***`image_name`*	Sets the boot variable for the SAMI LCP.
Step 2	`Sup#` **`hw-module module`** `slot_`*`num`* **`boot eobc`**	Boots using the image downloaded through EOBC.
Step 3	`Sup#` **`hw-module module`** *`slot_num`* **`reset`**	Resets the module by turning the power off and then on.
Step 4	`Sup#` **`upgrade hw-module slot`** *`sami_slot_num`* **`software disk0:`***`image_name`*	Copies the bundle from the specified URL to the compact flash on the SAMI in the specified slot and sets the initialization parameters. **Note** This command is required to ensure that future reboots of the SAMI will automatically come up with the specified image.

The following example illustrates rebooting a SAMI in slot 3 using an image on the supervisor:

```
Sup> boot device module 3 disk0:c7svcsami-ipbase-mz.bouncer.070724.p1p3
Sup# hw-module module 3 boot eobc
Sup# hw-module module 3 reset:
Sup# upgrade hw-module slot sami_slot_num software disk0:image_name
```

To display the software image on the LCP, use the **show version** command in EXEC mode.

```
switch# show version
```

Recovering—No Usable Image on the SAMI CF:

If the SAMI LCP (PPC 0) is in ROMMON, the upgrade command from the supervisor is failing, or when there is not a usable image on the SAMI, the following procedure can be used to recover the SAMI.

1. If the output from the show module command issued from the supervisor indicates the SAMI status is “other,” and the module is not coming out of this state, first verify that the LCP is in ROMMON by issuing the following commands from the supervisor:

   ```
   Sup# remote login switch
   processor
   Trying switch...
   Entering CONSOLE for Switch
   Type "^C^C^C" to end this session
   ```

   The following example illustrates establishing a session with an LCP console that is not in ROMMON. If the LCP is not in ROMMON, the LCP should be functioning properly and you can use the **session slot** command to access the LCP console.

   ```
   Sup-sp# svclc console 3
   processor 0 console
   Card in slot 3 is not in ROMMON.

   The following example illustrates establishing a session with an LCP console that is
   in ROMMON. If the LCP is in ROMMON, proceed to loading a SAMI using an image on the
   supervisor:

   Sup-sp# svclc console 3
   Entering svclc ROMMON of slot 3 ...
   Type “end” to end the session.
   processor 0 is in ROMMON.

   rommon 1> end
   processor 0 ROMMON tunneling session
   End of tunneling command.

   Sup-sp#exit
   Supervisor RP processor
   Sup#
   ```

2. To reboot an LCP using a stable image on the supervisor engine, complete the following steps:

   The following example illustrates rebooting a SAMI in slot 3 using an image on the supervisor:

   ```
   Sup(config)# boot device module 3
   disk0:c7svcsami-ipbase-mz.bouncer.070724.p1p3
   Sup# hw-module module 3 boot eobc
   Sup# hw-module module 3 reset:
   Sup# upgrade hw-module slot 3 software disk0:image_name
   ```

Configuring, Exporting, and Importing RSA Keys on a SAMI PPC

Note The Configuring, Exporting, and Importing RSA Keys feature is supported only on the SAMI Cisco IOS PPCs.

The Configuration File Storage on Supervisor feature only stores the PPC startup configuration files. Crypto configurations, such as the RSA key generation for Secure Shell (SSH) is stored locally on nvram:private-config. Therefore, if a SAMI card that contains crypto configuration needs to be replaced, the crypto configuration must reapplied by either by manually reconfiguring it on the new card, or by exporting the crypto configuration to the supervisor and then importing the configuration onto the new card.

For information about the Configuration File Storage on Supervisor feature, see the "Enabling the Supervisor to Store PPC Startup Configuration Files" section on page 3-6.

The following steps configure, export, and import RSA keys on a SAMI PPC (PPC3):

Step 1 Complete the required configuration for SSH on the PPC.

```
Router(config)#hostname PPC3
PPC3(config)#interface gigabitEthernet 0/0.11
PPC3(config-if)#encapsulation dot1Q 11
```

Note If the interface doesn't support baby giant frames maximum MTU of the interface has to be reduced by 4 bytes on both sides of the connection to properly transmit or receive large packets. Please refer to Cisco IOS documentation on configuring IEEE 802.1Q VLANs.

```
PPC3(config-if)#ip address 1.1.1.13 255.255.255.0
PPC3(config-if)#no shut
PPC3(config-if)#exit
PPC3(config)#ip ssh
PPC3(config)#ip ssh version 2

Please create RSA keys (of atleast 768 bits size) to enable SSH v2.

PPC3(config)#crypto key generate rsa  exportable label sshkeys ?
  encryption    Generate a general purpose RSA key pair for signing and
                encryption
  general-keys  Generate a general purpose RSA key pair for signing and
                encryption
  modulus       Provide number of modulus bits on the command line
  signature     Generate a general purpose RSA key pair for signing and
                encryption
  storage       Store key on specified device
  usage-keys    Generate separate RSA key pairs for signing and encryption
  <cr>

PPC3(config)#crypto key generate rsa  exportable label sshkeys modulus 1024
The name for the keys will be: sshkeys

% The key modulus size is 1024 bits
% Generating 1024 bit RSA keys, keys will be exportable...[OK]

PPC3(config)#
SAMI 1/3: *Mar  1 00:02:43.419: %SSH-5-ENABLED: SSH 2.99 has been enabled
PPC3(config)#
```

```
PPC3(config)#username username password 0 password
PPC3(config)#enable password 0 lab
PPC3(config)#aaa new-model
PPC3(config)#end
```

Step 2 Verify that SSH is enabled.

```
PPC3#show crypto key mypubkey rsa
% Key pair was generated at: 00:02:43 UTC Mar 1 2002
Key name: sshkeys
 Storage Device: private-config
 Usage: General Purpose Key
 Key is exportable.
 Key Data:
  30819F30 0D06092A 864886F7 0D010101 05000381 8D003081 89028181 00A4B01C
  6494169A 94419B29 5E99C04E FB7DD3D3 534F5FD5 E26CAB01 DF7F2582 C8763CAE
  7DE3D94A 770CAE9A A1B73F1D 16CF283C 6C68C023 78B1DC3A BB7021A7 75ECD3A8
  AE2F9591 1AF03D63 DE31A35C 8B41EB4C EAD3C1C9 528FD804 DF5032A6 A9EE53FF
  87816716 9CC746D9 79597478 842BED0D CDE8F77A E1E0D535 ABD478B9 E5020301 0001
% Key pair was generated at: 00:00:03 UTC Mar 1 2002
Key name: sshkeys.server
Temporary key
 Usage: Encryption Key
 Key is not exportable.
 Key Data:
  307C300D 06092A86 4886F70D 01010105 00036B00 30680261 00C96B2B 768F0C3B
  6810BFE7 9211CB43 7671E7A1 BC51C393 076FEF75 1ADE8114 03293B1A F2A1ECD0
  F31AFC90 791342C0 3E9F3C1D AB5058B1 8B08698F AAF79D43 7469DDEB A1A1D3E8
  33708E1B 0AA5F8D8 54364C8A E184A61C 203C2265 2C6FFA66 C3020301 0001
PPC3#
PPC3#show ip ssh
SSH Enabled - version 2.99
Authentication timeout: 120 secs; Authentication retries: 3
```

Step 3 Save the configuration using the **write memory** command so that the startup configuration is stored on the supervisor, and the crypto configuration is stored on NVRAM.

```
PPC3#dir nvram:
Directory of nvram:/

  126  -rw-         580                    <no date>  startup-config
  127  ----           5                    <no date>  private-config
    1  -rw-           0                    <no date>  ifIndex-table
    2  ----           4                    <no date>  rf_cold_starts

131072 bytes total (128387 bytes free)

% Unknown command or computer name, or unable to find computer address
PPC3#

PPC3#write memory
Writing bootflash:SLOT1SAMIC3.cfg !
Writing slavebootflash:SLOT1SAMIC3.cfg %rcp: slavebootflash:SLOT1SAMIC3.cfg: No such file
or directory

%Error opening rcp://*****@127.0.0.61/slavebootflash:SLOT1SAMIC3.cfg (Undefined error)
Building configuration...
[OK]

PPC3#
SAMI 1/3: *Mar  1 00:08:46.151: %C6K_SAMI_CENTRALIZED_CONFIG-6-UPLD_SUCCESS: Success:
config uploaded to supervisor bootflash:
SAMI 1/3: *Mar  1 00:08:46.175: %C6K_SAMI_CENTRALIZED_CONFIG-4-UPLD_FAILURE_STDBY: Failed
to upload config to rcp://sami@127.0.0.61/slavebootflash:SLOT1SAMIC3.cfg.
```

```
slavebootflash: is hosted on the standby supervisor engine. Failure to write to
slavebootflash: or  slavebootdisk: may be safely ignored when there is no standby
supervisor engine. Otherwise, this should be considered as an error, check for space on
standby supervisor engine, squeeze standby supervisor engine's slavebootflash: if needed.
SAMI 1/3: *Mar  1 00:08:46.175: %C6K_SAMI_CENTRALIZED_CONFIG-6-UPLOAD_SUCCEEDED: config
uploaded to 1 supervisor file system(s)

PPC3#

PPC3#dir nvram:
Directory of nvram:/

  126  -rw-         580                    <no date>  startup-config
  127  ----        1906                    <no date>  private-config
    1  -rw-           0                    <no date>  ifIndex-table
    2  ----           4                    <no date>  rf_cold_starts

131072 bytes total (126486 bytes free)
PPC3#
```

Step 4 Export the RSA keys to the supervisor using RCP:

```
PPC3(config)# crypto key export rsa sshkeys pem url
rcp://sami@127.0.0.61/bootflash:SLOT1SAMIC3PRIV.cfg 3des myrsakeys
% Key name: sshkeys
   Usage: General Purpose Key
Exporting public key...
Address or name of remote host [127.0.0.61]?
Destination username [sami]?
Destination filename [bootflash:SLOT1SAMIC3PRIV.cfg.pub]?
% File 'bootflash:SLOT1SAMIC3PRIV.cfg.pub' already exists.
% Do you really want to overwrite it? [yes/no]: yes
Writing bootflash:SLOT1SAMIC3PRIV.cfg.pub Writing file to
rcp://sami@127.0.0.61/bootflash:SLOT1SAMIC3PRIV.cfg.pub!
Exporting private key...
Address or name of remote host [127.0.0.61]?
Destination username [sami]?
Destination filename [bootflash:SLOT1SAMIC3PRIV.cfg.prv]?
% File 'bootflash:SLOT1SAMIC3PRIV.cfg.prv' already exists.
% Do you really want to overwrite it? [yes/no]: yes
Writing bootflash:SLOT1SAMIC3PRIV.cfg.prv Writing file to
rcp://sami@127.0.0.61/bootflash:SLOT1SAMIC3PRIV.cfg.prv!

PPC3(config)#
```

Step 5 Replace the SAMI as necessary. Verify that the startup-config is restored and no crypto configurations are present:

```
PPC3#show crypto key mypubkey rsa

PPC3#
```

Step 6 Import the keys stored on supervisor:

```
PPC3(config)# crypto key import rsa sshkeys exportable url
rcp://sami@127.0.0.61/bootflash:SLOT1SAMIC3PRIV.cfg myrsakeys

% Importing public General Purpose key or certificate PEM file...
Address or name of remote host [127.0.0.61]?
Source username [sami]?
Source filename [bootflash:SLOT1SAMIC3PRIV.cfg.pub]?
Reading file from rcp://sami@127.0.0.61/bootflash:SLOT1SAMIC3PRIV.cfg.pub!
% Importing private General Purpose key PEM file...
Address or name of remote host [127.0.0.61]?
```

```
Source username [sami]?
Source filename [bootflash:SLOT1SAMIC3PRIV.cfg.prv]?
Reading file from rcp://sami@127.0.0.61/bootflash:SLOT1SAMIC3PRIV.cfg.prv!
% Key pair import succeeded.

PPC3(config)#
SAMI 1/3: *Mar  1 00:06:42.323: %SSH-5-ENABLED: SSH 2.99 has been enabled
PPC3(config)#
```

Step 7 Verify that the crypto configurations have imported successfully:

```
PPC3#show crypto key mypubkey rsa
% Key pair was generated at: 00:06:42 UTC Mar 1 2002
Key name: sshkeys
 Storage Device: not specified
 Usage: General Purpose Key
 Key is exportable.
 Key Data:
  30819F30 0D06092A 864886F7 0D010101 05000381 8D003081 89028181 00A4B01C
  6494169A 94419B29 5E99C04E FB7DD3D3 534F5FD5 E26CAB01 DF7F2582 C8763CAE
  7DE3D94A 770CAE9A A1B73F1D 16CF283C 6C68C023 78B1DC3A BB7021A7 75ECD3A8
  AE2F9591 1AF03D63 DE31A35C 8B41EB4C EAD3C1C9 528FD804 DF5032A6 A9EE53FF
  87816716 9CC746D9 79597478 842BED0D CDE8F77A E1E0D535 ABD478B9 E5020301 0001
% Key pair was generated at: 00:06:42 UTC Mar 1 2002
Key name: sshkeys.server
Temporary key
 Usage: Encryption Key
 Key is not exportable.
 Key Data:
  307C300D 06092A86 4886F70D 01010105 00036B00 30680261 009D6B6B AF9B407C
  A4C8CBAC 6F2E5BBF E724229B 17B607F8 069AA2C7 67DEB599 DD47D2C8 E6F29884
  662ABF9D B871E087 9808E1CB BA361F44 439940BC 3D6129BA B6F0EB30 7747DF42
  22DB2A11 DF26632E 54B36C0F 8205EF14 80B1ED6C BC3FFF81 81020301 0001

PPC3#show ip ssh
SSH Enabled - version 2.99
Authentication timeout: 120 secs; Authentication retries: 3
PPC3#
```

Step 8 Verify SSH:

```
7600#ssh -v 2 -l <username> 1.1.1.13

Password:

PPC3>enable
Password:
PPC3#
```

Establishing a Console Connection on the SAMI

You can establish a direct serial connection between your terminal and the SAMI LCP by making a serial connection to the console port on the front of the SAMI. The console port is an asynchronous RS-232 serial port with an RJ-45 connector. Any device connected to this port must be capable of asynchronous transmission. Connection requires a terminal configured as 9600 baud, 8 data bits, 1 stop bit, no parity.

After connected, use any terminal communications application to establish a session with a SAMI PPC. A connection to a SAMI PPC requires that the PPC be configured to be accessible from the console port using the **console-select db1** or **console-select db2** command. For information on the console-select commands, see the "SAMI LCP Commands" section on page E-1.

The following procedure uses HyperTerminal for Windows to establish a session with the SAMI:

1. Launch HyperTerminal. The Connection Description window appears.
2. In the Name field, enter a name for your session.
3. Click **OK**. The Connect To window appears.
4. From the drop-down list, choose the **COM** port to which the device is connected.
5. Click **OK**. The Port Properties window appears.
6. Set the port properties:
   - Baud Rate = 9600
   - Data Bits = 8
   - Flow Control = none
   - Parity = none
   - Stop Bits = 1

7. To connect, click **OK**.

8. To access the CLI prompt, press **Enter**.

```
switch login:
```

After a session is established, choose **Save As** from the File menu to save the connection description. Saving the connection description has the following two advantages:

- The next time you launch HyperTerminal, the session is listed as an option under Start > Programs > Accessories > HyperTerminal > Name_of_session. This option lets you reach the CLI prompt directly without going through the configuration steps.
- You can connect your cable to a different device without configuring a new HyperTerminal session. If you use this option, make sure that you connect to the same port on the new device as was configured in the saved HyperTerminal session. Otherwise, a blank window appears without a prompt.

Configuring Health Monitoring

The following sections discuss the two types of health monitoring on the Cisco SAMI:

- PPC Health Monitoring, page 4-24
- LCP Health Monitoring, page 4-27

PPC Health Monitoring

Note By default, health monitoring is enabled on SAMI COSLI PPCs. Therefore, to use the Health Monitoring feature, no configuration tasks are required on the SAMI COSLI PPC.

PPC health monitoring is configured on the SAMI PPCs. When configured, the PPC monitors the health of a path by sending probes to a destination and waiting for a response. If the PPC does not receive a response to a probe that it has sent, it determines that the path is not healthy and sends a notification to the SAMI LCP, which then initiates a module reload.

The PPC uses the following two categories to identify the health of a path:

- Passed—The PPC receives a valid response to a probe that it has sent.
- Failed—The PPC does not receive a valid response to a probe or is unable to reach a destination for a specified number of retries.

To enable health monitoring on the Cisco IOS PPC, complete the following steps:

	Command	Purpose
Step 1	`Sup# session slot slot_number processor proc_number`	Establishes a session to a PPC on the SAMI, where: • *slot_number*—Number of the slot in which the SAMI is installed. • *proc_number*—Number of the PPC on the SAMI. Valid values are 3 through 8. One session per processor can be established.
Step 2	`Router> enable`	Enters privilege EXEC mode.
Step 1	`Router# sami health-monitoring {ixp1 | ixp2}`	Enables health monitoring on the paths between the PPC and IXP1 and IXP2 (future). By default, health monitoring is enabled for IXP1 and disabled for IXP2.
Step 2	`Router# sami health-monitoring probe ip-address [interval seconds] [retries number]`	Enables health monitoring on all of the paths between the PPC and the supervisor, where: • *ip-address*—Destination IP address on the supervisor. The IP address must be in the global vrf table and a suitable local ip address will be used to reach the remote probe address on supervisor • **interval** *seconds*—Interval, in seconds, between probes. A valid value is a number between 1 and 600. • **retries** *number*—Number of times a probe can be resent before it is marked as failed. A valid value is a number between 10 and 100.
Step 3	`Router# sami health-monitoring {ixp1 | ixp2 | probe} reset`	Configures the module to be reset when a path has failed, where: • **ixp1**—Resets the module if a check to IXP1 fails. • **ixp2**—Resets the module if a check to IXP2 fails (future). • **probe**—Resets the module if a check to the supervisor fails.

To display health monitoring status and counters on a Cisco IOS PPC, use the following command in privilege EXEC mode:

	Command	Purpose
Step 1	`Router# show sami health-monitoring`	Displays health monitoring status and counters for the path to IXP1, IXP2 (future), and the supervisor.

For example:

- To enable a Cisco IOS PPC, hostname "PPC4" to monitor the health of the path to IXP1, monitor the health of the path to the supervisor, and to reset the module if the sanity check to the supervisor module fails, enter the following commands:

```
PPC4# sami health-monitoring ixp1
PPC4# sami health-monitoring probe ip-address [interval seconds] [retries number]
PPC4# sami health-monitoring probe reset
```

- To show health monitoring-related counters and status, enter the following command:

```
PPC4#show sami health-monitoring
IXP1: DISABLED
0/0 Missed/Rcvd consecutive responses
0/0 Missed/Rcvd cumulative responses
0 Failed to send
IXP2: DISABLED
0/0 Missed/Rcvd consecutive responses
0/0 Missed/Rcvd cumulative responses
0 Failed to send
ICMP PROBE: PROBING
0/0 Missed/Rcvd consecutive responses
10/8 Missed/Rcvd cumulative responses
40 Failed to send
```

When you view the **show sami health-monitoring** command output, note that:

  - IXP1, IXP2, ICMP PROBE status can be one of the following:

    - PROBING—Health monitoring is enabled, no responses received or failed to send a message on previous resend expiration.
    - ACTIVE—Response to probe received from peer.
    - FAILED—No response received. Communication failed with peer.
    - DISABLED—Health monitoring is disabled.

  - Missed consecutive responses—Indicates the consecutive number of responses missed. This counter starts at 0 and is incremented each time a response is missed until timeout expiry. This counter is reset each time a response is received or if the PPC fails to send a message.
  - Rcvd consecutive responses—Indicates the consecutive number of messages sent. This counter starts at 0 and is incremented each time a valid response is received. It is reset each time a response is missed until timeout expiry or if the PPC fails to send a message.
  - Missed/Rcvd cumulative responses—Free running counter of total responses missed or received until timeout expiry.
  - Failed to send counter—Incremented each time a message cannot be sent upon resend timer expiration and if the health monitoring is administratively enabled. This can happen due to no IO memory, no suitable local IP address, and so on.

LCP Health Monitoring

LCP health monitoring is not configurable. It is a default function performed on the LCP.

When a PPC fails, LCP health monitoring either reloads the PPC or the entire SAMI depending on the application running on the SAMI PPCs. For example, if the Cisco Content Services Gateway - 2nd Generation (CSG2) application is running on the SAMI PPCs, the LCP reloads the entire module if a PPC fails. If a mobile wireless gateway such as the Cisco Gateway GPRS Support Node (GGSN) is running on the SAMI PPCs, the LCP reloads only the PPC that is failing.

Additionally, when a PPC has not booted for a specific amount of time (the default is 15 minutes), LCP health monitoring reloads that PPC (or the entire module if running the Cisco CSG2 application). If a PPC never comes up, the LCP notes that the PPC does not come up, and upon the next reload of the LCP, if another PPC never comes up, the LCP increments a *safe counter*. When the safe counter reaches 3, the LCP will not start the PPCs and enters safe mode. When the SAMI enters safe mode, a message displays that indicates the SAMI is running in safe mode. When in safe mode, you can perform debugging.

When the LCP enters safe mode, it resets the safe counter to zero so that on next reboot, the SAMI PPCs will boot as normal.

Monitoring the SAMI

Use the following list of **show** commands to monitor the SAMI.

For a description of these commands, their keywords and variables, see Appendix A, “Using the Command-Line Interfaces.”

Monitoring a SAMI from the Supervisor Console

The following privilege EXEC commands can be used to monitor SAMI activity from the supervisor engine console:

Command	Description
clear sami module	Clears SAMI traffic counters.
show inventory	Displays the product inventory list of all Cisco products that are installed in a networking device.
show logging slot	Displays logging status and counters for all processors on a SAMI using RCAL.
show logging summary	Displays logging status and counters for all processors on all SAMIs in a chassis using RCAL.
show login timeout	Displays the login session idle timeout value.
show module	Displays module status and information.
show sami module	Displays traffic counters for a SAMI.
show svclc module	Displays all VLAN groups associated with a module.
show svclc vlan-group	Displays the group configuration for the SAMI and the associated VLANs.
show upgrade software progress	Displays information about the progress of software upgrades.

Monitoring the SAMI from the LCP Console

The following privilege EXEC commands can be used to monitor SAMI activity from the SAMI LCP console:

Command	Description
show cde health	Displays the CDE health.
show cde stats {cumulative | delta}	Displays either cumulative CDE counters or the delta counters from previous invocation of the **show cde stats** command.
show cde vlan *vlan_id*	Provides VLAN mapping for the specified VLAN ID. This is either IXP0 or CP. CP indicates LCP.
show daughtercard registers	Displays the field programmable gate array (FPGA) or complex programmable logic device (CPLD) registers for a daughter card on the SAMI.
show daughtercard statistics	Displays the field programmable gate array (Kabob) statistics for one of the daughter cards on the SAMI.
show login timeout	Displays the login session idle timeout value.
show running-config	Displays the running configuration information.
show startup-config	Displays information about the startup configuration.
show tech-support	Displays information that is useful to technical support when reporting a problem.
show version	Displays information about the currently loaded software version along with hardware and device information.

Monitoring SAMI from the Cisco IOS PPC Console

The following privilege EXEC commands can be used to monitor SAMI activity from a SAMI Cisco IOS PPC console:

Command	Description
show platform	Displays platform information.
show sami health monitoring	Displays health monitoring status and counters for the paths to the IXP1, IXP2 (future), and the supervisor.
show sami info	Displays information about the startup configuration.
show sami ipcp ipc	Display counters specific to IPCP interprocessor communication (IPC) for the IXP or PPCs.
show sami ipcp statistics	Displays the counters for IPCP packet counters processed to and from IPCP peers.

Monitoring SAMI from the COSLI PPC Console

The following privilege EXEC commands can be used to monitor SAMI activity from a SAMI COSLI PPC console:

Command	Description
show arp	Displays the current active IP address-to-MAC address mapping in the Address Resolution Protocol (ARP) table, statistics, or inspection or timeout configuration.
show buffer	Displays the contents of the trace buffer.
show bufferlist	Displays the names of all trace buffers.
show clock	Displays the current date and time settings of the system clock.
show copyright	Displays the software copyright information for the PPC.
show crashinfo	Displays the contents of the crash file stored in Flash memory.
show debug	Displays debug flags.
show eventlog	Displays the event log.
show gfastats	Displays the current gianfar Ethernet driver traffic counters.
show hosts	Displays the hosts on a PPC.
show icmp statistics	Displays the Internet Control Message Protocol (ICMP) statistics.
show interface	Displays interface information.
show ip interface brief	Displays a brief configuration and status summary of all interfaces or a specified VLAN.
show ip interface vlan	Displays a configuration and status summary of a specified VLAN.
show ixpstats	Displays the contents of the IXP stastistics file.
show logging	Displays the current syslog configuration and syslog messages.
show processes	Displays general information about all of the processes running on the PPC.
show running-config	Displays the running configuration of a PPC.
show snmp	Displays the Simple Network Management Protocol (SNMP) statistics and configured SNMP information.
show startup-config	Displays the startup configuration of a PPC.
show system	Displays the system information of a PPC.
show tcp statistics	Displays Transmission Control Protocol (TCP) statistics.
show tech-support	Displays information that is useful to technical support when reporting a problem with your PPC.
show telnet	Displays information about the Telnet session
show terminal	Displays the console terminal settings.

Command	Description
show udp statistics	Display UDP statistics.
show version	Displays the version information of system software that is loaded in flash memory and currently running on the PPC.
show vlans	Displays the VLANs on the PPC downloaded from the supervisor engine.

APPENDIX A

Using the Command-Line Interfaces

This appendix describes how to use the various command-line interfaces (CLI) from which you configure and monitor the SAMI.

To implement and maintain a Cisco SAMI in your Cisco 7600 Series Router, and configure the Cisco IOS mobile wireless application running on the SAMI PPCs, you use the command-line interfaces of the following components:

- Supervisor
- SAMI LCP
- SAMI Cisco IOS PPC
- SAMI COSLI PPC

Note The CLI of the supervisor and SAMI PPCs is the standard Cisco IOS software CLI. The CLI of the SAMI LCP and the SAMI COSLI PPC is a line-oriented user interface that uses similar syntax and other conventions to the Cisco IOS CLI, but the SAMI LCP and COSLI PPC operating system is not a version of Cisco IOS software. Therefore, do not assume that a Cisco IOS command works or has the same function when executed from the SAMI LCP console.

For information about establishing a session with each of these CLIs, see the "Establishing Console Sessions" section on page 3-2.

For overview information on using various CLIs, see the following sections:

- Using the Supervisor and SAMI Cisco IOS PPC CLI, page A-2
- Using the Cisco SAMI LCP and COSLI PPC CLIs, page A-5
- Using the ROM-Monitor CLI, page A-8

Using the Supervisor and SAMI Cisco IOS PPC CLI

This section is intended as a quick reference, not as a step-by-step explanation of using the Cisco IOS software command line interface on the supervisor console, and the Cisco IOS PPC console.

For a list of the Cisco IOS supervisor and SAMI Cisco IOS PPC commands, see Appendix B, "Supervisor Console Commands" and Appendix C, "SAMI Cisco IOS PPC Commands."

This section includes the following topics about using the Supervisor and SAMI Cisco IOS PPC consoles:

- Getting Help, page A-2
- Understanding Cisco IOS Command Modes, page A-2
- Command-Line Completion, page A-4
- Undoing a Command or Feature, page A-4
- Saving Configuration Changes, page A-5

If you have never used the Cisco IOS software, or need a refresher, take a few minutes to read this section before you proceed to the command reference section. Understanding these concepts saves you time as you begin to use the CLI.

Getting Help

Use the question mark (?) and arrow keys to help you enter commands:

- For a list of available commands, enter a question mark:

  ```
  Sup> ?
  ```

- To complete a command (see the "Command-Line Completion" section on page A-4), enter a few known characters followed by a question mark (with no space):

  ```
  Sup> s?
  ```

- For a list of command variables, enter the command followed by a space and a question mark:

  ```
  Sup> show ?
  ```

- To re-display a command you previously entered, press the up arrow key. You can continue to press the up arrow key for more commands.

Note If a hostname is already configured, the hostname appears at the prompt instead of router or sup.

Understanding Cisco IOS Command Modes

Two primary modes of operation exist within the Cisco IOS software (running on the supervisor and SAMI PPC): user EXEC mode and privileged EXEC mode. When you first connect to the router, you are placed in the user EXEC mode.

The show commands in user EXEC mode are limited to a few basic levels. You cannot edit or view configurations at this stage; you can only view the router status and other miscellaneous information.

Editing the router's configuration requires you to be in privileged EXEC mode. To enter this mode, use the **enable** command (Table A-1 on page A-3).

You can always tell whether you are in user EXEC mode or privileged EXEC mode by looking at the router prompt. User EXEC mode has a `>` at the end; privileged EXEC mode prompt has a `#` at the end.

In privileged EXEC mode, the user interface is further divided into different submodes. Each command mode permits you to configure different components on your router. The commands available at any given time depend on which mode you are currently in. Entering a question mark (**?**) at the prompt displays a list of commands available for each command mode.

Tip If you are familiar with UNIX, you can equate privileged EXEC mode to "root" access. You could also equate it to the administer level in Windows 2000/NT. In this mode, you have permission to access information inside the router, including configuration commands. However, you cannot type configuration commands directly. Before you can change the router's configuration, you must enter the global configuration mode of privileged EXEC mode by entering the command **configure terminal** (Table A-1 on page A-3).

Table A-1 Common Command Modes

Command Mode	Access Method	Router Prompt Displayed	Exit Method
User EXEC	Log in.	`Router>`	Use the **logout** command.
Privileged EXEC	From user EXEC mode, enter the **enable** command.	`Router#`	To exit to user EXEC mode, use the **disable**, **exit**, or **logout** command.
Global configuration	From the privileged EXEC mode, enter the **configure terminal** command.	`Router(config)#`	To exit to privileged EXEC mode, use the **exit** or **end** command, or press **Ctrl-Z**.
Interface configuration	From the global configuration mode, enter the **interface** *type number* command, such as **interface serial 0/0**.	`Router(config-if)#`	To exit to global configuration mode, use the **exit** command. To exit directly to privileged EXEC mode, press **Ctrl-Z**.

Timesaver Each command mode restricts you to a subset of commands. If you experience trouble entering a command, check the prompt, and enter the question mark (**?**) for a list of available commands. You might be in the incorrect command mode, or using the incorrect syntax.

In the following example, notice how the prompt changes after each command to indicate a new command mode:

```
Sup> enable
Password: <enable password>
Sup# configure terminal
Enter configuration commands one per line. End with CNTL/Z.
Sup(config)# interface gigabitEthernet 0/0
Sup(config-if)# no shutdown
Sup(config-if)# exit
Sup(config)# exit
Sup# DEC 24 07:16:15:079 %SYS-5-CONFIG_I: Configured from console by console
```

The last message is normal and does not indicate an error. Press **Return** to get the `Router#` prompt.

Note You can press **Ctrl-Z** in any mode to immediately return to privileged EXEC mode (`Router#`), instead of entering **exit**, which returns you to the previous mode.

Command-Line Completion

Command-line completion makes the Cisco IOS software CLI more user-friendly. It saves you keystrokes and assists if you cannot remember a command syntax.

In the following example, notice how the command **configure terminal** is done:

```
Sup> enable
Password: <enable password>
Sup# config t
Sup(config)#
```

The Cisco IOS software expands the command **config t** to **configure terminal**.

Another form of command-line completion is the use of the Tab key. If you start a command by entering the first few characters, you can press the Tab key. As long as there is only one match, the Cisco IOS software completes the command: for example, if you key in **sh** and press **Tab**, the Cisco IOS software completes the **sh** with **show**. If Cisco IOS software does not complete the command, you can enter a few more letters and try again.

Undoing a Command or Feature

To undo a command you entered or to disable a feature, enter the keyword **no** before most commands; for example, **no ip routing**.

Saving Configuration Changes

To save your configuration changes to a configuration file stored on the supervisor, so the changes are not lost if a system reload or power outage occurs, you must enter the **copy running-config startup-config** or **write memory** commands .

For example:

```
Sup# copy running-config startup-config
Building configuration...
or
Sup# write memory
Building configuration...
```

It might take a minute or two to save the configuration to the supervisor. After the configuration is saved, the following appears:

```
[OK]
Sup#
```

Now that you have learned some Cisco IOS software basics, you can begin to configure SAMI in your router using the Cisco IOS software CLI on the supervisor engine and the SAMI PPCs.

Remember that:

- You can use the question mark (**?**) and arrow keys to help you enter commands.
- Each command mode restricts you to a set of commands. If you have difficulty entering a command, check the prompt and then enter the question mark (**?**) for a list of available commands. You might be in the wrong command mode or using the wrong syntax.
- To disable a feature, enter the keyword **no** before the command; for example, **no ip routing**.
- You must save your configuration changes to NVRAM so the changes are not lost if there is a system reload or power outage.

To begin configuring the SAMI, proceed to the "Configuring the Cisco SAMI" chapter.

Using the Cisco SAMI LCP and COSLI PPC CLIs

Note For a list of the Cisco SAMI COSLI LCP commands, see Appendix D, "SAMI COSLI PPC Commands." For a list of Cisco SAMI PPC commands, see Appendix E, "SAMI LCP Commands."

When you log in to the SAMI LCP or a SAMI COSLI PPC, by default you are in EXEC mode. The EXEC mode prompt begins with the hostname, followed by the pound sign (#).

```
switch#
```

EXEC mode has a set of commands allowing you to perform maintenance procedures. To access configuration mode, use the **configure** command. This mode is identified by a (config) prompt. For example:

```
switch# configure
switch(config)#
```

Configuration mode has a set of commands allowing you to configure the SAMI LCP or COSLI PPC, and access subordinate configuration modes. When you access any of the subordinate configuration modes, the mode name is appended to the (config) prompt. For example, when you access interface configuration mode from configuration mode, the prompt changes to (config-if).

To exit a configuration mode and access the previous mode, use the **exit** command. To exit any configuration mode and return to EXEC mode, press **Ctrl-Z** or use the **end** command.

Using the SAMI LCP and COSLI PPC CLI Commands

Table A-2 lists CLI keyboard shortcuts to help you enter and edit command lines on the SAMI LCP or SAMI COSLI PPCs. For further information on using the CLI commands, see the following sections:

- Editing the Command Line, page A-7
- Using EXEC Mode Commands in a Configuration Mode, page A-7
- Understanding CLI Syntax Checking and Error Messages, page A-7
- Using the Question Mark (?), page A-8
- Using the Tab Key, page A-8

Table A-2 CLI Command Keyboard Shortcuts

Action		Keyboard Shortcut
Cancel the current operation, additional display of MORE output, or delete the current line.		**Ctrl-C**
Change	The word at the cursor to lowercase.	**Esc-L**
	The word at the cursor to uppercase.	**Esc-U**
Delete	A character to the left of the cursor.	**Ctrl-H**, **Delete**, or **Backspace**
	All characters from the cursor to the beginning of the line.	**Ctrl-U**
	All characters from the cursor to the end of the line.	**Ctrl-K**
	All characters from the cursor to the end of the word.	**Esc-D**
	The word to left of the cursor.	**Ctrl-W** or **Esc-Backspace**
Display the buffers	Next line.	**Ctrl-N** or **Down-Arrow**
	Previous line.	**Ctrl-P** or **Up-Arrow**
Display MORE output	Exit from MORE output.	**q**, **Q**, or **Ctrl-C**
	Next additional screen. The default is one screen. To display more than one screen, enter a number before pressing the **Spacebar**.	**Spacebar**
	Next line. The default is one line. To display more than one line, enter the number before pressing the **Enter** key.	**Enter**
Enter an **Enter** or **Return** key character.		**Ctrl-M**
Expand the command or abbreviation.		**Ctrl-I** or **Tab**

Table A-2 CLI Command Keyboard Shortcuts (continued)

Action		Keyboard Shortcut
Move the cursor	One character to the left (back).	**Ctrl-B** or **Left Arrow**
	One character to the right (forward).	**Ctrl-F** or **Right Arrow**
	One word to the left (back), to the beginning of current or previous word.	**Esc-B**
	One word to the right (forward), to the end of the current or next word.	**Esc-F**
	To the beginning of the line.	**Ctrl-A**
	To the end of the line.	**Ctrl-E**
Redraw screen at the prompt.		**Ctrl-L** or **Ctrl-R**
Return to the EXEC mode from any configuration mode.		**Ctrl-Z**
Return to the previous mode or exit from the CLI from EXEC mode.		**exit** command
Transpose a character at the cursor with a character to left of the cursor.		**Ctrl-T**

Editing the Command Line

The SAMI LCP or SAMI COSLI CLI allows you to view all previously entered commands with the up arrow. After you examine a previously-entered command, you can move forward in the list using the down arrow.

When you view a command you wish to reuse, you can edit it or press the **Enter** key to execute it.

Using EXEC Mode Commands in a Configuration Mode

When you are in a configuration mode, you may need to use a **show** command or any other command that is only available in EXEC mode. To enter an EXEC command in any configuration mode, use the **do** command. The syntax for this command is:

do *exec_command_string*

The *exec_command_string* argument is the EXEC mode command you want to execute.

For example, to display the running configuration in configuration mode, enter:

```
switch(config)# do show running-config
```

Understanding CLI Syntax Checking and Error Messages

If you enter an invalid or incomplete command, the CLI responds with a pointer (^) and an error message. The following example shows the CLI response when you enter an invalid command:

```
switch# test
            ^
% invalid command detected at '^' marker.
```

The following example shows the CLI response when you enter an incomplete command:

```
switch(config)# interface
                         ^
% incomplete command detected at '^' marker.
```

Getting CLI Help

The CLI provides several types of context-sensitive help, as described in the following sections:

- Using the Question Mark (?)
- Using the Tab Key

Using the Question Mark (?)

The question mark (?) character allows you to get the following type of help about a command at the command line:

Question Mark Usage	Command Help Type
? at command prompt	All commands for that mode
command **?**	Any keywords, options, or object names for a command
command keyword **?**	Any keywords, options, or object names for a command
command-abbrev **?**	All commands that begin with specific letters

Using the Tab Key

When you press the **Tab** key or **Ctrl-I** at the end of a unique command or option abbreviation, the CLI completes the command or options for you. For example:

```
switch# sh<Tab>
switch# show
```

Pressing the **Tab** key or **Ctrl-I** keys also completes an option up to the point where it is unique. If multiple commands have the same abbreviation that you entered, the CLI lists all of these commands.

Using the ROM-Monitor CLI

The ROM-monitor is a ROM-based program that executes upon platform power-up, reset, or when a fatal exception occurs. The router enters ROM-monitor mode if it does not find a valid software image, if the NVRAM configuration is corrupted, or if the configuration register is set to enter ROM-monitor mode. From the ROM-monitor mode, you can load a software image manually from flash memory, from a network server file, or from bootflash.

You can also enter ROM-monitor mode by restarting and pressing the **Break** key during the first 60 seconds of startup.

Note The **Break** key is always enabled for 60 seconds after rebooting, regardless of whether the Break key is configured to be off by configuration register settings.

After you are in ROM-monitor mode, the prompt changes to rommon 1>. Enter a question mark (?) to see the available ROM-monitor commands.

APPENDIX B

Supervisor Console Commands

Note Additional Cisco IOS commands used with this product (those that already exist and have not been modified) are documented in the Cisco IOS Release 12.2 command reference publications.

The following commands, listed in alphabetical order, are introduced or modified in Cisco IOS Release 12.2(33)SRC and later to support the SAMI platform, and are supported at the supervisor engine console:

- svclc console, page B-52
- svclc module, page B-53
- svclc multiple-vlan-interfaces, page B-54
- svclc vlan-group, page B-56
- upgrade hw-module, page B-57

The following Cisco IOS software commands, listed in alphabetical order, are not new or modified. They are included in this reference section because they are useful for configuring and managing the SAMI.

- hw-module reset, page B-21
- ip rcmd rcp-enable, page B-23
- ip rcmd remote-host, page B-24
- show inventory, page B-31
- show module, page B-41

boot device module

To set the boot variable for the SAMI LCP, use the **boot device module** command in global configuration mode:

boot device module *slot_num* {**disk0:** | **disk1:** | **sup-:**}*image_name*

Syntax Description

slot_num	Number of the slot in which the module resides.
disk0:	Sets the boot variable to disk0:.
disk1:	Sets the boot variable to disk1:.
sup-bootflash:	Sets the boot variable to sup-bootflash:.
image_name	Name of the SAMI image bundle.

Defaults

This command has no default setting.

Command Modes

Global configuration

Command History

Release	Modification
12.2(33)SRB1	This command was integrated into Cisco IOS Release 12.2(33)SRB1.
12.2(33)SRC	This command was integrated into Cisco IOS Release 12.2(33)SRC.
12.2(33)SRD	This command was integrated into Cisco IOS Release 12.2(33)SRD.

Usage Guidelines

To set the boot variable for the LCP and the image using the **boot device module** command, the SAMI LCP must be at the ROM-monitor prompt. This command does not work with the supervisor bootflash: file system.

Examples

The following example shows how to set the boot variable if the LCP is in slot 3:

```
Router(config)#boot device module 3 disk0:c6ace-t1k9-mz.3.0.0_A1_4.bin

Device BOOT variable = disk0:c6ace-t1k9-mz.3.0.0_A1_4.bin

Warning: Device list is not verified

Router#
```

Related Commands

Command	Description
boot eobc:	Boots the SAMI from the image on the supervisor engine. (This is a SAMI LCP ROM monitor command.)
hw-module boot eobc	Boots using an image downloaded through EOBC.

bouncer-program-summit

To program all registers to increase the tolerance band for voltage fluctuations, use the **bouncer-program-summit** privileged EXEC command.

bouncer-program-summit

Syntax Description

There are no keywords or arguments for this command.

Defaults

There are no default values.

Command Modes

Privileged EXEC.

Command History

Release	Modification
12.4(24)MD, 12.4(24)MDA, 12.4(24)MDB, 12.4(24)YE, 12.4(24)T4A	This command was introduced as a workaround in the listed releases.

Usage Guidelines

Use this command only if the SAMI reloads or fails to bootup citing FRU power failure errors.

Caution You should only execute this command under the supervision of TAC during a maintenance window. Execute the command on processor 0 of the affected SAMI cards .

Examples

Here is an example configuration.

Load the image with the fix:

```
ABHV-SUP# upgrade hw-module slot 2 software
tftp://202.153.144.25/abhv/c7svcsami-noapp-mz-3_2
Loading abhv/c7svcsami-csg-mz from 202.153.144.25 (via Vlan75):
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!
[OK - 28823127 bytes]

% Waiting for upgrade to be committed..
% Sofware upgrade completed.
% Please reset hw-module to load the upgraded software.

ABHV-SUP#hw-module module 2 reset

Proceed with reload of module?[confirm]
ABHV-SUP#
```

Session to processor 0 of SAMI (username: admin password: admin):

```
ABHV-SUP#session slot 2 processor 0
The default escape character is Ctrl-^, then x.
You can also type 'exit' at the remote prompt to end the session
Trying 127.0.0.20 ... Open

ABHV-LCP-2 login: admin
Password:admin
Bad terminal type: "network". Will assume vt100.
Cisco Application Control Software (ACSW)
TAC support: http://www.cisco.com/tac
Copyright (c) 2002-2008, by Cisco Systems, Inc. All rights reserved.
The copyrights to certain works contained herein are owned by
other third parties and are used and distributed under license.
Some parts of this software are covered under the GNU Public
License. A copy of the license is available athttp://www.gnu.org/licenses/gpl.html.

Service and Application Module for IP (SAMI)
Utility Console

ABHV-LCP-2#
```

Execute the **bouncer-program-summit** command:

```
ABHV-LCP-2# bouncer-program-summit
This must be performed only in a maintenance window with assistance from TAC. Are you sure
you want to continue? [no] yes
ABHV-LCP-2#
```

Note In rare cases, if the programming or verification of summit registers fails for some reason, a message will be printed asking you to execute the command again. Please retry the same command.

Exit and reload the card:

```
ABHV-LCP-2# exit

Connection to 127.0.0.20 closed by foreign host
ABHV-SUP#hw-module module 2 reset
Proceed with reload of module?[confirm]
ABHV-SUP#
```

clear logging slot

To clear logging status counters from the logging buffer, use the **clear logging slot** command in privileged EXEC mode.

clear logging slot *slot_number* **counts**

Syntax Description

slot_number	Number of the slot in which the SAMI is installed.
counts	Clears the logging status counters.

Defaults

No default behaviors or values exist.

Command Modes

Global configuration

Command History

Release	Modification
12.2(14)ZA4	This command was introduced.
12.2(33)SRB1	This command was integrated into Cisco IOS Release 12.2(33)SRB1.
12.2(33)SRC	This command was integrated into Cisco IOS Release 12.2(33)SRC.
12.2(33)SRD	This command was integrated into Cisco IOS Release 12.2(33)SRD.

Usage Guidelines

Use this command to clear the logging status counters that display when you use the **show logging** command.

Note that the **clear logging slot** command only clears the counters displayed by the **show logging** command. The **clear logging slot** command does not clear the control information displayed in the s**how logging** command output, such as send and receive sequence numbers.

Specifically, the **clear logging slot** command clears the following counters displayed by the **show logging** command:

- kpa_missed
- cmd_timeouts
- logger_events
- bad_info
- seq_errors
- reset_count

Examples

The following example illustrates the results of issuing the No default**clear logging slot counts** command to clear the counters for a module in slot 5:

```
Sup# clear logging slot 5 counts

Clear logging buffer [confirm]
Sup#
```

Related Commands

Command	Description
logging buffered	Logs messages to an internal buffer.
show logging	Displays the state of logging (syslog).

clear sami module

To clear the counters displayed by the show interface privileged EXEC command, use the **clear sami module** in privileged EXEC mode.

clear sami module *slot_number* **[port** *port_number***] traffic**

Syntax Description

slot_number	Number of the slot in which the SAMI is installed.
port *port_number*	(Optional) Number of the data port on the SAMI.
traffic	Clears traffic counters.

Defaults

No default behavior or values exist.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(33)SRC	This command was introduced.
12.2(33)SRD	This command was integrated into Cisco IOS Release 12.2(33)SRD.

Usage Guidelines

Use this command to clear the traffic counters displayed by the **show sami module** privileged EXEC command.

Examples

The following example illustrates how to use the **clear sami module** command:

```
Sup#show sami module 2 port 1 traffic
Specified interface is up line protocol is up (connected)
  Hardware is c7600 10Gb 802.3, address is 0030.f276.41e4 (bia 0030.f276.41e4)
  MTU 1500 bytes, BW 10000000 Kbit, DLY 10 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Full-duplex, 10Gb/s
  input flow-control is on, output flow-control is unsupported
     202 packets input
     0 input errors,
     0 CRC
     6 packets output

Sup#clear sami module 2 port 1 traffic
Clear "show interface" counters on this interface [confirm]
Sup#
Sup#show sami module 2 port 1 traffic
Specified interface is up line protocol is up (connected)
  Hardware is c7600 10Gb 802.3, address is 0030.f276.41e4 (bia 0030.f276.41e4)
  MTU 1500 bytes, BW 10000000 Kbit, DLY 10 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
```

```
Full-duplex, 10Gb/s
input flow-control is on, output flow-control is unsupported
   0 packets input
   0 input errors,
   0 CRC
   0 packets output
```

Related Commands

Command	Description
show sami module	Displays traffic counters on the SAMI.

copy sami#

To copy a SAMI coredump file from the core directory on a SAMI, use the **copy sami#** command in privileged EXEC mode.

copy sami#*slot_number*{**-fs:core/***file-name dest-file*}

Syntax Description

slot_number	Number of the slot in which the SAMI is installed.
core/*file-name*	Name of the file containing crash information in the core directory on the SAMI.
dest-file	Name of the destination file.

Defaults

No default behavior or values exist.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(33)SRB1	This command was introduced.
12.2(33)SRC	This command was integrated into Cisco IOS Release 12.2(33)SRC.
12.2(33)SRD	This command was integrated into Cisco IOS Release 12.2(33)SRD.

Usage Guidelines

Use this command to copy the coredump file from the core directory to a destination file.

Examples

The following example illustrates how to use the **copy sami#** command:

```
Sup# copy sami#7-fs:core/crashinfo tftp://64.102.16.25/operatorA/
Address or name of remote host [64.102.16.25]?
Destination filename [operatorA/crashinfo]?
!!!!!!
1048576 bytes copied in 2.568 secs (408324 bytes/sec)
```

Related Commands

Command	Description
delete sami#	Deletes files in the SAMI image: or core directory.
dir sami#	Lists the files in the image: or core: directories on a SAMI.

delete sami#

To delete the files the image: or core: directories on a SAMI, use the **dir sami#** command in privileged EXEC mode.

delete sami#*slot_number*{**-fs:image/** | **-fs:core/**}*file-name*

Syntax Description

slot_number	Number of the slot in which the SAMI is installed.
image/	Specifies the file is located in the image directory.
core/	Specifies the file is located in the core directory.
file_name	Name of the file to delete.

Defaults

No default behavior or values exist.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(33)SRB1	This command was introduced.
12.2(33)SRC	This command was integrated into Cisco IOS Release 12.2(33)SRC.
12.2(33)SRD	This command was integrated into Cisco IOS Release 12.2(33)SRD.

Usage Guidelines

Use this command to delete a file in the image: or core directory of a SAMI.

Examples

The following example illustrates how to use the **delete sami#** command:

```
Sup# delete sami#7-fs:image/sb-csg2-mzg.bin
Delete filename [image/sb-csg2-mzg.bin]?
Delete sami#7-fs:image/sb-csg2-mzg.bin? [confirm]

Sup# delete sami#7-fs:core/crashinfo
Delete filename [core/crashinfo]?
Delete sami#7-fs:core/crashinfo? [confirm]
```

Related Commands

Command	Description
copy sami#	Copies a SAMI coredump file from the core directory.
dir sami#	Lists the files in the image: or core: directories on a SAMI.

dir sami#

To list the files in the image: or core: directories on a SAMI, use the **dir sami#** command in privileged EXEC mode.

dir sami#*slot_number*{**-fs:image/** | **-fs:core/**}

Syntax Description

slot_number	Number of the slot in which the SAMI is installed.
image/	Lists the SAMI image directory.
core/	Lists the SAMI core directory.

Defaults

No default behavior or values exist.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(33)SRB1	This command was introduced.
12.2(33)SRC	This command was integrated into Cisco IOS Release 12.2(33)SRC.
12.2(33)SRD	This command was integrated into Cisco IOS Release 12.2(33)SRD.

Usage Guidelines

Use this command to list the image: or core directory files of a SAMI.

Examples

The following example illustrates how to use the **dir sami#-fs:image** command:

```
Sup# dir sami#7-fs:image/
Directory of sami#7-fs:image/
16 ---- 36514563 Jan 1 2000 00:23:56 +00:00 itasca_diag33.mz
17 ---- 27281352 Jan 1 2000 00:25:12 +00:00 c6ace-t1k9-mz.3.0.0_A1_1a.bin
18 ---- 35067659 Nov 10 2006 16:26:52 +00:00 sb-csg2-mzg.shyeh.bin
19 ---- 34592592 Nov 9 2006 21:21:52 +00:00 sb-csg2-mzg.csg2-bundle.061108.nvfix
20 ---- 8230260 Nov 8 2006 17:31:26 +00:00 svcsami-csg-mz.unit_test
21 ---- 393216 Nov 8 2006 18:32:08 +00:00 BOUNCER_RM.bin_061108
22 ---- 1654432 Oct 25 2006 18:11:46 +00:00 sb-csg2_dplug-mzg.bin.061025
1024000000 bytes total (496435200 bytes free)

Sup# dir sami#7-fs:core/
Directory of sami#7-fs:core/
13 ---- 1048576 Nov 4 2006 04:51:25 +00:00 crashinfo
12 ---- 1048576 Nov 4 2006 04:45:33 +00:00 crashinfo.old
14 ---- 27691 Nov 10 2006 16:44:55 +00:00 0x701_ppc_dnld_daemon_log.995.tar.gz
15 ---- 27725 Nov 10 2006 17:54:01 +00:00 0x801_ppc_dnld_daemon_log.995.tar.gz
19 ---- 70793 Oct 25 2006 01:15:37 +00:00 0x901_ppc_dnld_daemon_log.995.tar.gz
21 ---- 71707 Oct 25 2006 16:12:30 +00:00 0x901_ppc_dnld_daemon_log.997.tar.gz
203097088 bytes total (199715840 bytes free)
```

Related Commands

Command	Description
copy sami#	Copies a SAMI coredump file from the core directory.
delete sami#	Deletes files in the SAMI image: or core directory.

encapsulation dot1q

To enable IEEE 802.1Q encapsulation of traffic on a specified subinterface in a virtual LAN (VLAN), use the **encapsulation dot1q** command in subinterface configuration modes. To disable IEEE 802.1Q encapsulation, use the **no** form of this command.

encapsulation dot1q *vlan-id* **second-dot1q** {**any** | *vlan-id* | *vlan-id* | *vlan-id-vlan-id*[,*vlan-id-vlan-id*]}

no encapsulation dot1q *vlan-id* **second-dot1q** {**any** | *vlan-id* | *vlan-id* | *vlan-id-vlan-id*[,*vlan-id-vlan-id*]}

Syntax Description

any	Sets the inner VLAN ID value to a number that is not configured on any other subinterface.
vlan-id	Virtual LAN identifier. The allowed range is from 1 to 4094. For the IEEE 802.1Q-in-Q VLAN Tag Termination feature, the first instance of this argument defines the outer VLAN ID, and the second and subsequent instances define the inner VLAN ID.
second-dot1q	Supports the IEEE 802.1Q-in-Q VLAN Tag Termination feature by allowing an inner VLAN ID to be configured.
-	Hyphen must be entered to separate inner and outer VLAN ID values that are used to define a range of VLAN IDs.
,	(Optional) Comma must be entered to separate each VLAN ID range from the next range.

Defaults

IEEE 802.1Q encapsulation is disabled.

Command Modes

Subinterface configuration

Command History

Release	Modification
12.0(1)T	This command was introduced.
12.1(3)T	The **native** keyword was added.
12.2(2)DD	Support was added for this command in interface range configuration mode.
12.2(4)B	This command was integrated into Cisco IOS Release 12.2(4)B.
12.2(8)T	This command was integrated into Cisco IOS Release 12.2(8)T.
12.3(7)T	The **second-dot1q** keyword was added to support the IEEE 802.1Q-in-Q VLAN Tag Termination feature.
12.3(7)XI1	This command was integrated into Cisco IOS Release 12.3(7)XI and implemented on the Cisco 10000 series routers.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2.

Release	Modification
12.2SX	This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware.
12.2(33)SRC	This command was integrated into Cisco IOS Release 12.2(33)SRC.
Cisco IOS XE Release 2.2	This command was integrated into Cisco IOS XE Release 2.2.
12.2(33)SRD	This command was integrated into Cisco IOS Release 12.2(33)SRD.

Usage Guidelines

Subinterface Configuration Mode

After a subinterface is defined, use the **encapsulation dot1q** command to add outer and inner VLAN ID tags to allow one VLAN to support multiple VLANs. You can assign a specific inner VLAN ID to the subinterface; that subinterface is unambiguous. Or you can assign a range or ranges of inner VLAN IDs to the subinterface; that subinterface is ambiguous.

Use the **second-dot1q** keyword to configure the IEEE 802.1Q-in-Q VLAN Tag Termination feature. 802.1Q in 802.1Q (Q-in-Q) VLAN tag termination adds another layer of 802.1Q tag (called "metro tag" or "PE-VLAN") to the 802.1Q tagged packets that enter the network. Double tagging expands the VLAN space, allowing service providers to offer certain services such as Internet access on specific VLANs for some customers and other types of services on other VLANs for other customers.

Examples

The following example shows how to terminate a Q-in-Q frame on an unambiguous subinterface with an outer VLAN ID of 100 and an inner VLAN ID of 200:

```
Router(config)# interface gigabitethernet1/0/0.1

Router(config-subif)# encapsulation dot1q 100 second-dot1q 200
```

The following example shows how to terminate a Q-in-Q frame on an ambiguous subinterface with an outer VLAN ID of 100 and an inner VLAN ID in the range from 100 to 199 or from 201 to 600:

```
Router(config)# interface gigabitethernet1/0/0.1

Router(config-subif)# encapsulation dot1q 100 second-dot1q 100-199,201-600
```

execute-on

To execute a command on a processor remotely when the remote console and logging (RCAL) feature is enabled, use the **execute-on** command in privileged EXEC mode.

execute-on {{*slot_number* [, *slot_number*] | **all-mwams** | **all-samis**} {*cpu_number* [,*cpu_num*] | **all** | **all-ppc**} *remote-command*}

Syntax Description

slot_number	Number of the slot in which the module is installed. Optionally, you can specify additional slot numbers, separated by a comma (,).
all-mwams	Specifies all Cisco Multiprocessor WAN Application Modules (MWAMs) in the chassis.[1]
all-samis	Specifies all SAMIs in the chassis.
cpu_number	Number of the processor. Valid values for a SAMI are 0 for the LCP and 3 through 8 for the PPCs. Valid values for an MWAM are 1 for the control CPU and 2 through 7 for the processors.
all	Specifies all processors.
all-ppc	Specifies all PPC processors 3 through 8.
remote-command	The remote command to execute on the processor. The following commands are supported: • **debug** • **dir** • **sami** (SAMI only) • **show** • **systat** • **undebug** • **ping** • **log** {**show** | **systat** | **dir**}

[1] When using the **all** option, the command is executed on all active processors but is not executed on processors that are inactive. To show the processor state, use the **show logging slot** command.

Defaults

No default behavior or values exist.

Command Modes

Privileged EXEC

Command History

Release	Modification
11.2(14)ZA4	This command was introduced.
12.3(5a)B	This command was integrated into Cisco IOS Release 12.3(5a)B and RCAL support for processor control commands was added.
12.2(33)SRB1	This command was integrated into Cisco IOS Release 12.2(33)SRB1.

Release	Modification
12.2(33)SRC	This command was integrated into Cisco IOS Release 12.2(33)SRC.
12.2(33)SRD	This command was integrated into Cisco IOS Release 12.2(33)SRD.

Usage Guidelines

Use this command to execute a command on one or all processors of one or all SAMIs or MWAMs in a chassis, and to monitor and maintain information. The RCAL feature allows you to issue commands remotely without having to log in to a processor directly.

Table B-1 lists the command sets that you can execute remotely from the supervisor to a SAMI PPC (processor number 3 through 8).

Table B-1 PPC RCAL Command Set

Command	Description
debug	Enables debugging functions
dir	Lists files in a file system
log dir	Logs the **dir** command to syslog
log show	Logs the **show** command to syslog
log systat	Logs the **systat** command to syslog
ping *ip_address*	Executes a ping on a remote processor
show	Displays running system information
systat	Displays information about terminal lines
undebug	Disables debugging functions

Table B-2 lists the command sets that you can execute remotely from the supervisor to a SAMI LCP (processor number 0).

Table B-2 LCP RCAL Command Set

Command	Description
clear	Clears counters and statistics
console-select	Specifies console selection for front panel consoles DB1 and DB2
reload	Reloads the entire SAMI or SAMIs
command show	Displays SAMI remote commands

When the **execute-on** command is issued with an **all** keyword option specified, the specified command is executed on active processors. Inactive processors are ignored.

To determine if the processor is active, use the **show logging** command.

To determine the escape sequence for your console/vty connection, use the **show line** *line_number* command.

This command requires that the RCAL feature be enabled.

Examples

The following example illustrates how to use the **execute-on** command:

```
Sup# execute-on all-samis all-ppc show proc cpu | inc CPU
----------- Slot 2/CPU 3, show proc cpu | inc CPU-------------
----------- Slot 2/CPU 3, show processes cpu -------------
CPU utilization for five seconds: 0%/0%; one minute: 0%; five minutes: 0%
----------- Slot 2/CPU 4, show processes cpu -------------
CPU utilization for five seconds: 16%/15%; one minute: 15%; five minutes: 15%
----------- Slot 2/CPU 5, show processes cpu -------------
CPU utilization for five seconds: 0%/0%; one minute: 0%; five minutes: 0%
----------- Slot 2/CPU 6, show processes cpu -------------
CPU utilization for five seconds: 0%/0%; one minute: 0%; five minutes: 0%
----------- Slot 2/CPU 7, show processes cpu -------------
CPU utilization for five seconds: 0%/0%; one minute: 0%; five minutes: 0%
----------- Slot 2/CPU 8, show processes cpu -------------
CPU utilization for five seconds: 0%/0%; one minute: 0%; five minutes: 0%

Sup# execute-on 2 3 show version
----------- Slot 2/CPU 3, show version-------------
Cisco IOS Software, SAMI Software (SAMI-CSG-M), Version 12.4(nightly.CSG2070509) NIGHTLY
BUILD, synced to bouncer BOUNCER_NIGHTLY_061020
Copyright (c) 1986-2007 by Cisco Systems, Inc.
Compiled Wed 09-May-07 03:11 by user

ROM: System Bootstrap, Version 12.3(20070509:064827) [BLD-bouncer_csg.nightly 101],
DEVELOPMENT SOFTWARE

SAMI2 uptime is 5 hours, 22 minutes
System returned to ROM by reload at 08:21:10 EDT Wed May 9 2007
System restarted at 08:26:03 EDT Wed May 9 2007
System image file is "c7svcsami-csg-mz.bouncer_csg.070509.p1p3"

Cisco Systems SAMI (MPC8500) processor (revision 0.702) with 983040K/65536K bytes of
memory.
Processor board ID SAD1042040X
FS8548H CPU at 1250MHz, Rev 2.0, 512KB L2 Cache
1 Gigabit Ethernet interface
65536K bytes of processor board system flash (AMD S29GL256N)

Configuration register is 0x1

Sup#
```

hw-module boot

To specify the boot options for the module through the power management bus control register, use the **hw-module boot** command in privileged EXEC mode.

hw-module module *num* **boot** [*value*] {**config-register** | **eobc** | **flash** *image* | **rom-monitor**}

Syntax Description

module *num*	Specifies the number of the module to apply the command.
boot *value*	(Optional) Literal value for the module's boot option; valid values are from 0 to 15. See the "Usage Guidelines" section for additional information.
config-register	Boots using the module's config-register value.
eobc	Boots using an image downloaded through EOBC.
flash *image*	Specifies the image number in the module's internal flash memory for the module's boot option; valid values are 1 and 2.
rom-monitor	Stays in ROM-monitor mode after the module resets.

Defaults

This command has no default settings.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(18)SXF	Support for this command was introduced on the Supervisor Engine 720.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(33)SRB1	This command was integrated into Cisco IOS Release 12.3(22)SRB1.
12.2(33)SRC	This command was integrated into Cisco IOS Release 12.2(33)SRC.
12.2(33)SRD	This command was integrated into Cisco IOS Release 12.2(33)SRD.

Usage Guidelines

The valid values for the **boot** *value* argument are as follows:

0—Specifies the module's config-register value.

1—Specifies the first image in the flash memory.

2—Specifies the second image in the flash memory.

3—Stays in ROM-monitor mode after the module reset.

4—Specifies the download image through EOBC.

Examples

This example shows how to reload the module in slot 6 using the module's config-register value:

```
Sup# hw-module module 1 boot config-register
Sup#
```

This example shows how to reload the module in slot 3 using an image downloaded through EOBC:

```
Sup# hw-module module 1 boot eobc
Sup#
```

Related Commands

Command	Description
show module	Displays the module status and information for all modules in the chassis.

hw-module reset

To reset the entire module by turning the power off and then on, use the **hw-module reset** command in privileged EXEC mode.

hw-module module *slot_number* **reset**

Syntax Description

module *num*	Number of the slot in which the module that you want to reset is installed. Valid values depend on the chassis that is used. For example, in a 13-slot chassis, valid values for the module number are from 1 to 13.

Defaults

No default behavior or values exist.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(33)SRB1	This command was integrated into Cisco IOS Release 12.3(22)SRB1.
12.2(33)SRC	This command was integrated into Cisco IOS Release 12.2(33)SRC.
12.2(33)SRD	This command was integrated into Cisco IOS Release 12.2(33)SRD.

Usage Guidelines

The **hw-module reset** command resets the module by turning the power off and then on. The reset process requires several minutes.

This command is typically used in the upgrade process to switch between Application Partition (AP) and Maintenance Partition (MP) images or to recover from a shutdown.

Examples

The following example illustrates how to reset a module in slot 3:

```
Sup# hw-module rmodule 3 reset
```

hw-module shutdown

To shut down the module, use the **hw-module shutdown** command in privileged EXEC mode.

hw-module module *slot_number* **shutdown**

Syntax Description

module *slot_number*	Number of the slot in which the module that you want to shut down is installed. Valid values depend on the chassis that is used. For example, if you have a 13-slot chassis, valid values for the module number are from 1 to 13.

Defaults

No default behavior or values exist.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(33)SRB1	This command was integrated into Cisco IOS Release 12.3(22)SRB1.
12.2(33)SRC	This command was integrated into Cisco IOS Release 12.2(33)SRC.
12.2(33)SRD	This command was integrated into Cisco IOS Release 12.2(33)SRD.

Usage Guidelines

If you enter the **hw-module shutdown** command to shut down the module, you will have to enter the **no power enable module** command and the **power enable module** command to restart (power off and then power on) the module.

Examples

This example shows how to shut down and restart a module in slot 3:

```
Sup# hw-module module 3 shutdown

Sup# no power enable module 3

Sup# power enable module 3
```

ip rcmd rcp-enable

To configure the Cisco IOS software to allow remote users to copy files to and from the router using remote copy protocol (RCP), use the **ip rcmd rcp-enable** command in global configuration mode. To disable RCP on the device, use the **no** form of this command.

ip rcmd rcp-enable

no ip rcmd rcp-enable

Syntax Description

This command has no arguments or keywords.

Defaults

To ensure security, RCP is not enabled by default.

Command Modes

Global configuration

Command History

Release	Modification
10.1	This command was introduced.

Usage Guidelines

To allow a remote user to execute RCP commands on the router, you must also create an entry for the remote user in the local authentication database using the **ip rcmd remote-host** command.

The **no ip rcmd rcp-enable** command does not prohibit a local user from using RCP to copy system images and configuration files to and from the router.

To protect against unauthorized users copying the system image or configuration files, the router is not enabled for RCP by default.

Examples

The following example illustrates how to use the **ip rcmd rcp-enable** command:

```
Sup# ip rcmd rcp-enable
```

Related Commands

Command	Description
ip rcmd remote-host	Creates an entry for the remote user in a local authentication database so that remote users can execute commands on the router using remote shell protocol (RSH) or remote shell protocol (RCP).

ip rcmd remote-host

To create an entry for the remote user in a local authentication database so that remote users can execute commands on the router using remote shell protocol (rsh) or remote copy protocol (rcp), use the **ip rcmd remote-host** command in global configuration mode. To remove an entry for a remote user from the local authentication database, use the **no** form of this command.

ip rcmd remote-host *local-username* {*ip-address* | *host-name*} *remote-username* [**enable** [*level*]]

no ip rcmd remote-host *local-username* {*ip-address* | *host-name*} *remote-username* [**enable** [*level*]]

Syntax Description

local-user-name	Name of the user on the local router. You can specify the router name as the username. This name must be communicated to the network administrator or to the user on the remote system. To be allowed to remotely execute commands on the router, the remote user must specify this value correctly.
ip-address	IP address of the remote host from which the local router accepts remotely executed commands. Either the IP address or the hostname is required.
host-name	Name of the remote host from which the local router accepts remotely executed commands. Either the hostname or the IP address is required.
remote-username	Name of the user on the remote host from which the router accepts remotely executed commands.
enable [*level*]	(Optional) Specifies to enable the remote user to execute privileged EXEC commands using rsh or to copy files to the router using rcp. The range is from 1 to 15. The default is 15. For information on the enable level, refer to the privilege level global configuration command in the Release 12.2 Cisco IOS Security Command Reference.

Defaults

No entries are in the local authentication database.

Command Modes

Global configuration

Command History

Release	Modification
10.1	This command was introduced.

Usage Guidelines

A TCP connection to a router is established using an IP address. Using the hostname is valid only when you are initiating an rcp or rsh command from a local router. The hostname is converted to an IP address using DNS or host-name aliasing.

To allow a remote user to execute rcp or rsh commands on a local router, you must create an entry for the remote user in the local authentication database. You must also enable the router to act as an rsh or rcp server.

To enable the router to act as an:

- RSH server—Issue the **ip rcmd rsh-enable** command.
- RCP server—Issue the **ip rcmd rcp-enable** command.

The router cannot act as a server for either of these protocols unless you explicitly enable the capacity.

A local authentication database, which is similar to a UNIX .rhosts file, is used to enforce security on the router through access control. Each entry that you configure in the authentication database identifies the local user, the remote host, and the remote user. To permit a remote user of rsh to execute commands in privileged EXEC mode or to permit a remote user of rcp to copy files to the router, specify the **enable** keyword and level. For information on the enable level, refer to the privilege level global configuration command in the Release 12.2 Cisco IOS Security Command Reference.

An entry that you configure in the authentication database differs from an entry in a UNIX .rhosts file. Because the .rhosts file on a UNIX system resides in the home directory of a local user account, an entry in a UNIX .rhosts file need not include the local username; the local username is determined from the user account. To provide equivalent support on a router, specify the local username along with the remote host and remote username in each authentication database entry that you configure.

For a remote user to be able to execute commands on the router in its capacity as a server, the local username, host address or name, and remote username sent using the remote client request must match values configured in an entry in the local authentication file.

A remote client host should register with DNS. The Cisco IOS software uses DNS to authenticate the remote hostname and address. Because DNS can return several valid IP addresses for a hostname, the Cisco IOS software checks the address of the requesting client against all of the IP addresses for the named host returned by DNS. If the address sent by the requester is considered invalid, that is, it does not match any address listed with DNS for the hostname, the software rejects the remote-command execution request.

If no DNS servers are configured for the router, then that device cannot authenticate the host. In this case, the Cisco IOS software sends a broadcast request to attempt to gain access to DNS services on another server. If DNS services are not available, you must use the **no ip domain-lookup** command to disable the attempt to gain access to a DNS server by sending a broadcast request.

If DNS services are not available and, therefore, you bypass the DNS security check, the software accepts the request to remotely execute a command only if all three values sent with the request match exactly the values configured for an entry in the local authentication file.

Examples

The following example illustrates how to use the **ip rcmd remote-host enable** command:

```
Sup# ip rcmd remote-host * 24 * enable
```

Related Commands

Command	Description
ip rcmd rcp-enable	Configures the Cisco IOS software to allow remote users to copy files to and from the router.

logging listen

To configure the port on which the supervisor receives system messages from SAMI processors when using the remote console and logging (RCAL) feature, use the **logging listen** command in global configuration mode. To remove this configuration, use the **no** form of the command.

logging listen *udp_port*

no logging listen *udp_port*

Syntax Description

udp_port	UDP port on the supervisor on which to listen for system messages from the SAMI processors. The UDP port must match the port specified on the processors using the **logging main-cpu** command. We recommend that you use port 4000. If a port other than 4000 is used, RCAL to the SAMI LCP (processor 0) will not work.

Defaults

No default behavior or values exist.

Command Modes

Global configuration

Command History

Release	Modification
12.2(14)ZA4	This command was introduced.
12.2(33)SRB1	This command was integrated into Cisco IOS Release 12.2(33)SRB1.
12.2(33)SRC	This command was integrated into Cisco IOS Release 12.2(33)SRC.
12.2(33)SRD	This command was integrated into Cisco IOS Release 12.2(33)SRD.

Usage Guidelines

The UDP port must be in the range of 4000 to 10000 and be a multiple of 100.

The UDP port must match the port specified on the processors using the **logging main-cpu** command. We recommend that you use port 4000.

If a port other than 4000 is used, RCAL to the SAMI LCP (processor 0) does not work.

Examples

The following example illustrates how to use the **logging listen** command:

```
Sup# logging listen 4000
```

power enable

To power on the modules, use the **power enable** command in global configuration mode. To power off a module, use the **no** form of this command.

power enable module *slot*

Syntax Description

slot	Number of the slot in which the module is installed. Valid values are 1 to 13, depending on the chassis being used.

Defaults

No default behavior or values exist.

Command Modes

Global configuration

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Supervisor Engine 720.
12.2(33)SRB1	This command was integrated into Cisco IOS Release 12.2(33) SRB1.
12.2(33)SRC	This command was integrated into Cisco IOS Release 12.2(33)SRC.
12.2(33)SRD	This command was integrated into Cisco IOS Release 12.2(33)SRD.

Usage Guidelines

When you enter the:

- **no power enable** command to power off a module, the module's configuration is not saved.
- **no power enable** to power off an empty slot, the configuration is saved.

The *slot* argument designates the number of the slot in which the module is installed. Valid values for slot depend on the chassis that is used. For example, in a 13-slot chassis, valid values for the module number are from 1 to 13.

Examples

This example shows how to power on a module that was previously powered off:

```
Sup(config)# power enable module 5
Sup(config)#
```

This example shows how to power off a module:

```
Sup(config)# no power enable module 5
Sup(config)#
```

sami module

To define a remote console and logging (RCAL) server (or servers), and to specify the level of messages to receive and display system message, use the **sami module logging** command in global configuration mode. To remove the configuration, use the **no** form of the command.

sami module {*mod_num* | **all** {**cpu** {*cpu_num* | **all**} **logging** *severity*

no sami module {*mod_num* | **all** {**cpu** {*cpu_num* | **all**} **logging** *severity*

Syntax Description

mod_num	Number of the slot in which the SAMI is installed.
all	Specifies all SAMIs installed in the chassis.
cpu {*cpu-num* | **all**}	Defines the RCAL server, where • *cpu-num*—Number of the processor (0 for LCP and 3 through 8 for PPCs) • **all**—Specifies all processors.
logging severity	Specifies the severity level for which the supervisor receives and displays messages. Messages of lower severity than the configured level are filtered.

Defaults

By default, the supervisor receives all system messages sent by SAMI processors.

Command Modes

Global configuration

Command History

Release	Modification
12.2(33)SRB1	This command was introduced.
12.2(33)SRC	This command was integrated into Cisco IOS Release 12.2(33)SRC.
12.2(33)SRD	This command was integrated into Cisco IOS Release 12.2(33)SRD.

Usage Guidelines

Use this command to define RCAL servers and specify the severity level for which messages are received and displayed.

The level of messages sent by a processor to the supervisor is defined on the processor using the **logging main-cpu** global configuration command.

Table B-3 lists and defines the severity levels of the messages.

Table B-3 Message Severity Level Definitions

Level	Description
0—emergencies	System unusable
1—alerts	Immediate action required
2—critical	Critical condition

Table B-3 Message Severity Level Definitions (continued)

Level	Description
3—errors	Error conditions
4—warnings	Warning conditions
5—notifications	Normal bug significant condition
6—informational	Informational messages
7—debugging	Debugging messages

Examples

The following example illustrates how to use the **sami module cpu logging** command set for debugging:

```
Sup# sami module 5 | cpu 3 logging 7
```

session slot

To establish a session with a processor on the SAMI, use the **session slot** command in privileged EXEC mode.

session slot *mod_num* **processor** *processor_num*

Syntax Description

mod_num	Number of the slot in which the module is installed.
processor_num	ID of the processor with which you want to establish a session. For the SAMI, valid values are 0 (the LCP), and 3 through 8.

Defaults

No default behavior or values exist.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(9)ZA	This command was introduced.
12.2(33)SRB1	This command was integrated into Cisco IOS Release 12.2(33)SRB1.
12.2(33)SRC	This command was integrated into Cisco IOS Release 12.2(33)SRC.
12.2(33)SRD	This command was integrated into Cisco IOS Release 12.2(33)SRD.

Usage Guidelines

Use the **session slot** command to establish a console session with a processor (line control processor [LCP] or PowerPC [PPC]) on the SAMI.

To end the session, enter the **exit** command.

Examples

The following example shows how to open a session with PPC3 on a SAMI installed in slot 2 of the chassis:

```
Sup# session slot 2 processor 3
The default escape character is Ctrl-^, then x.
You can also type 'exit' at the remote prompt to end the session
Trying 127.0.0.23 ... Open

PPC3> enable
Password:
PPC3# exit

[Connection to 127.0.0.23 closed by foreign host]
Sup#
```

show inventory

To display the product inventory list of all Cisco products that are installed in a networking device, use the **show inventory** command in privileged EXEC mode.

show inventory [*entity*]

Syntax Description

entity	(Optional) Name of a Cisco entity (for example, chassis, backplane, module, or slot).

Defaults

No default behavior or values exist.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.3(4)T	This command was introduced.
12.2(33)SRB1	This command was integrated into Cisco IOS Release 12.3(33)SRB1.
12.2(33)SRC	This command was integrated into Cisco IOS Release 12.2(33)SRC.
12.2(33)SRD	This command was integrated into Cisco IOS Release 12.2(33)SRD.

Usage Guidelines

The **show inventory** command retrieves and displays inventory information about each Cisco product in the form of a Cisco Unique Device Indentifier (UDI).

The UDI is a combination of three separate data elements:

- product identifier (PID)—Name by which the product can be ordered. The PID is also called the Product Name or Part Number. You can use this identifier to order a replacement part.
- version identifier (VID)—Version of the product. Each time a product is revised, the VID is incremented.
- serial number (SN)—Vendor-unique serialization of the product.

  Each manufactured product has a unique serial number assigned at the factory; this number identifies a specific instance of a product. This number cannot be changed.

The UDI refers to each product as an entity. Some entities, such as a chassis, have subentities, such as slots. Each entity displays on a separate line.

Examples

The following is sample output from the **show inventory** command without any arguments specified.

```
Sup# show inventory

NAME: "CISCO7613", DESCR: "Cisco Systems Cisco 7600 13-slot Chassis System"
PID: CISCO7613         , VID:    , SN: SAL083014CF

NAME: "WS-C6K-VTT 1", DESCR: "VTT FRU 1"
```

```
PID: WS-C6K-VTT        , VID:    , SN: SMT0829G582

NAME: "WS-C6K-VTT 2", DESCR: "VTT FRU 2"
PID: WS-C6K-VTT        , VID:    , SN: SMT0829B510

NAME: "WS-C6K-VTT 3", DESCR: "VTT FRU 3"
PID: WS-C6K-VTT        , VID:    , SN: SMT0829B486

NAME: "WS-C6513-CL 1", DESCR: "CXXXX Clock FRU 1"
PID: WS-C6513-CL       , VID:    , SN: SMT0827B366

NAME: "WS-C6513-CL 2", DESCR: "CXXXX Clock FRU 2"
PID: WS-C6513-CL       , VID:    , SN: SMT0827B234

NAME: "module 1", DESCR: "WS-SVC-CSG-1 4 ports Content Services Gateway Rev. 1.4"
PID: WS-SVC-CSG-1      , VID:    , SN: SAD0846034C

NAME: "module 2", DESCR: "WS-SVC-SAMI-BB 1 ports Service and Application Module for IP
(SAMI) Rev. 0.702"
PID: WS-SVC-SAMI-BB    , VID: VXX, SN: SAD1042040X

NAME: "module 6", DESCR: "Cisco 7600 / Catalyst 6500 Services SPA Carrier Card-400 Rev.
1.0"
PID: 7600-SSC-400      , VID: V01, SN: JAB100900CF

NAME: "SPA subslot 6/1", DESCR: "IPSec Shared Port Adapter with 2 Gbps DES/3DES/AES"
PID: SPA-IPSEC-2G      , VID: V01, SN: JAB100605N7

NAME: "module 7", DESCR: "WS-SUP720-3BXL 2 ports Supervisor Engine 720 Rev. 3.0"
PID: WS-SUP720-3BXL    , VID:    , SN: SAD08320GDX

NAME: "msfc sub-module of 7", DESCR: "WS-SUP720 MSFC3 Daughterboard Rev. 2.1"
PID: WS-SUP720         , VID:    , SN: SAD08270B3S

NAME: "switching engine sub-module of 7", DESCR: "WS-F6K-PFC3BXL Policy Feature Card 3
Rev. 1.3"
PID: WS-F6K-PFC3BXL    , VID:    , SN: SAD0832014M

NAME: "module 8", DESCR: "WS-SUP720-3BXL 2 ports Supervisor Engine 720 Rev. 3.0"
PID: WS-SUP720-3BXL    , VID:    , SN: SAD081402MM

NAME: "msfc sub-module of 8", DESCR: "WS-SUP720 MSFC3 Daughterboard Rev. 2.0"
PID: WS-SUP720         , VID:    , SN: SAD08130CE8

NAME: "switching engine sub-module of 8", DESCR: "WS-F6K-PFC3BXL Policy Feature Card 3
Rev. 1.1"
PID: WS-F6K-PFC3BXL    , VID:    , SN: SAD08130EH1

NAME: "module 10", DESCR: "WS-SVC-MWAM-1 3 ports MWAM Module Rev. 4.0"
PID: WS-SVC-MWAM-1     , VID:    , SN: SAD083904YM

NAME: "module 11", DESCR: "WS-SVC-MWAM-1 3 ports MWAM Module Rev. 4.0"
PID: WS-SVC-MWAM-1     , VID:    , SN: SAD08340BTT

NAME: "module 12", DESCR: "WS-X6748-GE-TX CEF720 48 port 10/100/1000mb Ethernet Rev. 2.0"
PID: WS-X6748-GE-TX    , VID:    , SN: SAL08342NZP

NAME: "switching engine sub-module of 12", DESCR: "WS-F6700-CFC Centralized Forwarding
Card Rev. 2.0"
PID: WS-F6700-CFC      , VID:    , SN: SAL08280AK9
```

```
NAME: "module 13", DESCR: "WS-X6408A-GBIC 8 port 1000mb GBIC Enhanced QoS Rev. 3.1"
PID: WS-X6408A-GBIC    , VID:    , SN: SAL08342N59

NAME: "PS 1 WS-CAC-3000W", DESCR: "AC power supply, 3000 watt 1"
PID: WS-CAC-3000W      , VID:    , SN: SNI0812AL43

NAME: "PS 2 WS-CAC-3000W", DESCR: "AC power supply, 3000 watt 2"
PID: WS-CAC-3000W      , VID:    , SN: AZS09250H6G

Sup#
```

Table 4 describes the fields shown in the show inventory command output.

Table 4 show inventory Field Descriptions

Field	Description
Name	Name of the component
Description	Description of the component
PID	Product identifier
VID	Version identifier
SN	Serial number

show logging slot

To display logging status and counters for all processors on a SAMI using the remote command and logging (RCAL) feature, use the **show logging slot** command in privileged EXEC mode.

show logging slot *slot_number*

Syntax Description

slot_number	Number of the slot in which the SAMI is installed. A valid value is a number between 3 and 8.

Defaults

No default behavior or values exist.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(14)ZA4	This command was introduced.
12.2(14)ZA5	This command was integrated into Cisco IOS 12.2(14)ZA5.
12.2(33)SRB1	This command was integrated into Cisco IOS 12.3(33)SRB1.
12.2(33)SRC	This command was integrated into Cisco IOS Release 12.2(33)SRC.
12.2(33)SRD	This command was integrated into Cisco IOS Release 12.2(33)SRD.

Usage Guidelines

Use the **show logging slot** command to collect logging status and counters for all PPCs on a SAMI using the RCAL feature (without having to establish a session with a PPC).

Examples

The following example shows how to collect status and counters for the processors on a SAMI installed in slot 2 of a chassis:

```
Sup# show logging slot 2

CPU: 02/0      State: ACTIVE         Command Active: No
  ttynum: -1                  Logging Level: emergencies
  timeouts:                 0 logevents:            0
  sequence errors:          0 reset count:          7 KPA_missed:            0
  send seq:               226 tty recv seq:         0 log recv seq:          0
  Current queue count:      0 IP addr: 127.0.0.20

  CPU: 02/1      State: INIT           Command Active: No
  ttynum: -1                  Logging Level: emergencies
  timeouts:                 0 logevents:            0
  sequence errors:          0 reset count:          0 KPA_missed:            0
  send seq:                 0 tty recv seq:         0 log recv seq:          0
  Current queue count:      0 IP addr: 0.0.0.0

  CPU: 02/2      State: INIT           Command Active: No
  ttynum: -1                  Logging Level: emergencies
  timeouts:                 0 logevents:            0
```

```
sequence errors:          0 reset count:           0 KPA_missed:             0
send seq:                 0 tty recv seq:          0 log recv seq:           0
Current queue count:      0 IP addr: 0.0.0.0


CPU: 02/3      State: ACTIVE        Command Active: No
ttynum: -1                  Logging Level: emergencies
timeouts:                 0 logevents:             0
sequence errors:          0 reset count:           8 KPA_missed:            20
send seq:               221 tty recv seq:          0 log recv seq:           0
Current queue count:      0 IP addr: 127.0.0.23

CPU: 02/4      State: INIT          Command Active: No
ttynum: -1                  Logging Level: emergencies
timeouts:                 0 logevents:             0
sequence errors:          0 reset count:           0 KPA_missed:             0
send seq:                 0 tty recv seq:          0 log recv seq:           0
Current queue count:      0 IP addr: 0.0.0.0

CPU: 02/5      State: INIT          Command Active: No
ttynum: -1                  Logging Level: emergencies
timeouts:                 0 logevents:             0
sequence errors:          0 reset count:           0 KPA_missed:             0
send seq:                 0 tty recv seq:          0 log recv seq:           0
Current queue count:      0 IP addr: 0.0.0.0

CPU: 02/6      State: INIT          Command Active: No
ttynum: -1                  Logging Level: emergencies
timeouts:                 0 logevents:             0
sequence errors:          0 reset count:           0 KPA_missed:             0
send seq:                 0 tty recv seq:          0 log recv seq:           0
Current queue count:      0 IP addr: 0.0.0.0

CPU: 02/7      State: INIT          Command Active: No
ttynum: -1                  Logging Level: emergencies
timeouts:                 0 logevents:             0
sequence errors:          0 reset count:           0 KPA_missed:             0
send seq:                 0 tty recv seq:          0 log recv seq:           0
Current queue count:      0 IP addr: 0.0.0.0

CPU: 02/8      State: INIT          Command Active: No
ttynum: -1                  Logging Level: emergencies
timeouts:                 0 logevents:             0
sequence errors:          0 reset count:           0 KPA_missed:             0
send seq:                 0 tty recv seq:          0 log recv seq:           0
Current queue count:      0 IP addr: 0.0.0.0
```

Table 5 describes the fields that display in the show logging slot command output.

Table 5 show logging slot Field Descriptions

Field	Description
CPU	Number of the processor on the SAMI. Valid values are 0 through 8, where 0 is the LCP, 1 and 2 are IXP1 and IXP2, and 3 through 8 are the six PPCs.
State	Current state of the processor. Valid values are: • ACTIVE • INIT
Command Active	RCAL is active.

Table 5 show logging slot Field Descriptions (continued)

Field	Description
ttynum	Line number of the user with an active command on the processor. A value of -1 indicates no user.
Logging Level	Indicates the maximum severity level at which the supervisor displays logger messages from an SAMI.
timeouts	Number of occurrences of remote command execution time-out.
logevents	Serial number.
sequence errors	Protocol sequence errors caused by an overrun or a time-out.
reset count	
KPA_missed	
send seq	
tty recv seq	
log recv seq	
Current queue count	Number of messages received at the supervisor and queued to be processed (logged/displayed).
IP addr	IP address of the SAMI processor.

show logging summary

To display logging status and counters for all processors on all SAMIs in a chassis using the remote console and logging (RCAL) feature, use the **show logging summary** command in privileged EXEC mode.

show logging summary

Syntax Description

This command has no arguments or keywords.

Defaults

No default behavior or values exist.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(14)ZA4	This command was introduced.
12.2(14)ZA5	This command was integrated into Cisco IOS 12.2(14)ZA5.
12.2(33)SRB1	This command was integrated into Cisco IOS 12.3(33)SRB1.
12.2(33)SRC	This command was integrated into Cisco IOS Release 12.2(33)SRC.
12.2(33)SRD	This command was integrated into Cisco IOS Release 12.2(33)SRD.

Usage Guidelines

Use this command to collect logging status and counters for all PPCs on all SAMIs in a chassis using the RCAL feature (without establishing a session).

Examples

The following example shows how to collect status and counters for the processors on all SAMIs installed in a chassis:

```
Sup# show logging summary
  CPU: 02/0      State: ACTIVE         Command Active: No
  ttynum: -1                  Logging Level: emergencies
  timeouts:                 0 logevents:             0
  sequence errors:          0 reset count:           7 KPA_missed:            0
  send seq:               232 tty recv seq:          0 log recv seq:          0
  Current queue count:      0 IP addr: 127.0.0.20

  CPU: 02/1      State: INIT           Command Active: No
  ttynum: -1                  Logging Level: emergencies
  timeouts:                 0 logevents:             0
  sequence errors:          0 reset count:           0 KPA_missed:            0
  send seq:                 0 tty recv seq:          0 log recv seq:          0
  Current queue count:      0 IP addr: 0.0.0.0

  CPU: 02/2      State: INIT           Command Active: No
  ttynum: -1                  Logging Level: emergencies
  timeouts:                 0 logevents:             0
  sequence errors:          0 reset count:           0 KPA_missed:            0
```

```
send seq:                 0 tty recv seq:          0 log recv seq:          0
Current queue count:      0 IP addr: 0.0.0.0

CPU: 02/3      State: ACTIVE         Command Active: No
ttynum: -1                  Logging Level: emergencies
timeouts:                 0 logevents:             0
sequence errors:          0 reset count:           8 KPA_missed:           20
send seq:               227 tty recv seq:          0 log recv seq:          0
Current queue count:      0 IP addr: 127.0.0.23

CPU: 02/4      State: INIT           Command Active: No
ttynum: -1                  Logging Level: emergencies
timeouts:                 0 logevents:             0
sequence errors:          0 reset count:           0 KPA_missed:            0
send seq:                 0 tty recv seq:          0 log recv seq:          0
Current queue count:      0 IP addr: 0.0.0.0

CPU: 02/5      State: INIT           Command Active: No
ttynum: -1                  Logging Level: emergencies
timeouts:                 0 logevents:             0
sequence errors:          0 reset count:           0 KPA_missed:            0
send seq:                 0 tty recv seq:          0 log recv seq:          0
Current queue count:      0 IP addr: 0.0.0.0

CPU: 02/6      State: INIT           Command Active: No
ttynum: -1                  Logging Level: emergencies
timeouts:                 0 logevents:             0
sequence errors:          0 reset count:           0 KPA_missed:            0
send seq:                 0 tty recv seq:          0 log recv seq:          0
Current queue count:      0 IP addr: 0.0.0.0

CPU: 02/7      State: INIT           Command Active: No
ttynum: -1                  Logging Level: emergencies
timeouts:                 0 logevents:             0
sequence errors:          0 reset count:           0 KPA_missed:            0
send seq:                 0 tty recv seq:          0 log recv seq:          0
Current queue count:      0 IP addr: 0.0.0.0

CPU: 02/8      State: INIT           Command Active: No
ttynum: -1                  Logging Level: emergencies
timeouts:                 0 logevents:             0
sequence errors:          0 reset count:           0 KPA_missed:            0
send seq:                 0 tty recv seq:          0 log recv seq:          0
Current queue count:      0 IP addr: 0.0.0.0

CPU: 10/1      State: ACTIVE         Command Active: No
ttynum: -1                  Logging Level: emergencies
timeouts:                 0 logevents:             0
sequence errors:          0 reset count:           4 KPA_missed:            0
send seq:               232 tty recv seq:          0 log recv seq:          0
Current queue count:      0 IP addr: 127.0.0.101

CPU: 10/2      State: ACTIVE         Command Active: No
ttynum: -1                  Logging Level: emergencies
timeouts:                 0 logevents:             0
sequence errors:          0 reset count:           4 KPA_missed:            0
send seq:               226 tty recv seq:          0 log recv seq:          0
Current queue count:      0 IP addr: 127.0.0.102

CPU: 10/3      State: ACTIVE         Command Active: No
ttynum: -1                  Logging Level: emergencies
timeouts:                 0 logevents:             0
sequence errors:          0 reset count:           4 KPA_missed:            0
send seq:               227 tty recv seq:          0 log recv seq:          0
```

```
  Current queue count:      0 IP addr: 127.0.0.103

CPU: 10/4      State: ACTIVE         Command Active: No
  ttynum: -1                  Logging Level: emergencies
  timeouts:                 0 logevents:             0
  sequence errors:          0 reset count:           4 KPA_missed:            0
  send seq:               226 tty recv seq:          0 log recv seq:          0
  Current queue count:      0 IP addr: 127.0.0.104

  CPU: 10/5      State: ACTIVE         Command Active: No
  ttynum: -1                  Logging Level: emergencies
  timeouts:                 0 logevents:             0
  sequence errors:          0 reset count:           4 KPA_missed:            0
  send seq:               227 tty recv seq:          0 log recv seq:          0
  Current queue count:      0 IP addr: 127.0.0.105

  CPU: 10/6      State: ACTIVE         Command Active: No
  ttynum: -1                  Logging Level: emergencies
  timeouts:                 0 logevents:             1
  sequence errors:          0 reset count:           4 KPA_missed:            0
  send seq:               226 tty recv seq:          0 log recv seq:          0
  Current queue count:      0 IP addr: 127.0.0.106

  CPU: 10/7      State: INIT           Command Active: No
  ttynum: -1                  Logging Level: emergencies
  timeouts:                 0 logevents:             0
  sequence errors:          0 reset count:           0 KPA_missed:            0
  send seq:                 0 tty recv seq:          0 log recv seq:          0
  Current queue count:      0 IP addr: 0.0.0.0

  CPU: 11/1      State: ACTIVE         Command Active: No
  ttynum: -1                  Logging Level: emergencies
  timeouts:                 0 logevents:             0
  sequence errors:          0 reset count:           4 KPA_missed:            0
  send seq:               231 tty recv seq:          0 log recv seq:          0
  Current queue count:      0 IP addr: 127.0.0.111

  CPU: 11/2      State: ACTIVE         Command Active: No
  ttynum: -1                  Logging Level: emergencies
  timeouts:                 0 logevents:             0
  sequence errors:          0 reset count:           4 KPA_missed:            0
  send seq:               226 tty recv seq:          0 log recv seq:          0
  Current queue count:      0 IP addr: 127.0.0.112

  CPU: 11/3      State: ACTIVE         Command Active: No
  ttynum: -1                  Logging Level: emergencies
  timeouts:                 0 logevents:             0
  sequence errors:          0 reset count:           4 KPA_missed:            0
  send seq:               227 tty recv seq:          0 log recv seq:          0
  Current queue count:      0 IP addr: 127.0.0.113

  CPU: 11/4      State: ACTIVE         Command Active: No
  ttynum: -1                  Logging Level: emergencies
  timeouts:                 0 logevents:             0
  sequence errors:          0 reset count:           4 KPA_missed:            0
  send seq:               226 tty recv seq:          0 log recv seq:          0
  Current queue count:      0 IP addr: 127.0.0.114

  CPU: 11/5      State: ACTIVE         Command Active: No
  ttynum: -1                  Logging Level: emergencies
  timeouts:                 0 logevents:             0
  sequence errors:          0 reset count:           4 KPA_missed:            0
  send seq:               227 tty recv seq:          0 log recv seq:          0
  Current queue count:      0 IP addr: 127.0.0.115
```

```
CPU: 11/6      State: ACTIVE         Command Active: No
  ttynum: -1                  Logging Level: emergencies
  timeouts:                 0 logevents:             1
  sequence errors:          0 reset count:           4 KPA_missed:            0
  send seq:               227 tty recv seq:          0 log recv seq:          0
  Current queue count:      0 IP addr: 127.0.0.116

  CPU: 11/7      State: INIT           Command Active: No
  ttynum: -1                  Logging Level: emergencies
  timeouts:                 0 logevents:             0
  sequence errors:          0 reset count:           0 KPA_missed:            0
  send seq:                 0 tty recv seq:          0 log recv seq:          0
  Current queue count:      0 IP addr: 0.0.0.0

Sup#
```

Table 6 describes the fields shown in the **show logging slot** command display.

Table 6   show logging slot Field Descriptions

Field	Description
CPU	Number of the processor on the SAMI. Valid values are 0 through 8, where 0 is the LCP, 1 and 2 are IXP1 and IXP2 (future), and 3 through 8 are the six PPCs.
State:	Current state of the processor. Valid values are: • ACTIVE • INIT
Command Active	Whether remote console and logging (RCAL) is enabled. Possible values are Active or No.
ttynum	Line number of the user with an active command on the processor. A value of -1 indicates no user.
Logging Level	Indicates the maximum severity level at which the supervisor displays logger messages from an SAMI.
timeouts	Number of occurrences of remote command execution time-out.
logevents	Serial number.
sequence errors	Protocol sequence errors caused by an overrun or a time-out.
reset count	
KPA_missed	
send seq	
tty recv seq	
log recv seq	
Current queue count	Number of messages received at the supervisor and queued to be processed (logged/displayed).
IP addr	IP address of the SAMI processor.

show module

To display module status and information, use the **show module** command in privileged EXEC mode.

show module [*mod-num* | **all** | **power** | **provision** | **version**]

Syntax Description

mod-num	(Optional) Number of the module.
all	(Optional) Displays information for all modules.
power	(Optional) Displays administration and operating status.
provision	(Optional) Displays status about the module processing.
version	(Optional) Displays version information.

Defaults

No default behavior or values exist.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(14)SX	Support for this command was introduced on the Cisco Supervisor Engine 720.
12.2(17d)SXB	This command was integrated into Cisco IOS Release 12.2(17d)SXB.
12.2(18)SXF5	This command was integrated into Cisco IOS Release 12.2(18)SXF5 and the **power** keyword was added.
12.2(33)SRB1	This command was integrated into Cisco IOS Release 12.2(33)SRB1.
12.2(33)SRC	This command was integrated into Cisco IOS Release 12.2(33)SRC.
12.2(33)SRD	This command was integrated into Cisco IOS Release 12.2(33)SRD.

Usage Guidelines

In the Mod Sub-Module fields, the **show module** command displays the supervisor engine number, with the uplink daughter card's module type and information appended.

If a SAMI is installed in the router chassis, the slot number in which the SAMI is installed will also display in the Mod Sub-Module fields, with the SAMI daughter cards’ model type and information appended.

Note When the SAMI status and the sub-module status for both daughter cards display as “Ok,” the SAMI module is online.

Entering the **show module** command with no arguments is the same as entering the **show module all** command.

Examples

This example shows how to display information for all modules on a router that is configured with a Cisco Supervisor Engine 720:

```
Sup# show module

Mod Ports Card Type                              Model              Serial No.
--- ----- -------------------------------------- ------------------ -----------
  4    1  SAMI Module (CSG2)                     WS-SVC-SAMI-BB-K9  SAD1140096M
  6    2  Supervisor Engine 720 (Active)         WS-SUP720-3BXL     SAD083400U3
  7   48  SFM-capable 48-port 10/100 Mbps RJ45   WS-X6548-RJ-45     SAD0611007M
  9    1  SAMI Module (GENERIC)                  WS-SVC-SAMI-BB-K9  SAD095003X1

Mod MAC addresses                       Hw    Fw           Sw           Status
--- ---------------------------------- ------ ------------ ------------ -------
  4  001d.45f9.0922 to 001d.45f9.0929   2.2   8.7(0.5-Eng) 3.0(0)W1(0.0 Ok
  6  0011.21b9.ac20 to 0011.21b9.ac23   4.0   8.1(3)       12.2(2007052 Ok
  7  0002.7ee1.f010 to 0002.7ee1.f03f   4.2   6.3(1)       8.7(0.22)FW6 Ok
  9  0001.0002.0003 to 0001.0002.000a   1.0   8.7(0.5-Eng) 3.0(0)W1(0.0 Ok

Mod  Sub-Module                  Model              Serial       Hw     Status
---- --------------------------- ------------------ ----------- ------- -------
  4  SAMI Daughterboard 1        SAMI-DC-BB         SAD113909PZ  1.1    Ok
  4  SAMI Daughterboard 2        SAMI-DC-BB         SAD113909U5  1.1    Ok
  6  Policy Feature Card 3       WS-F6K-PFC3BXL     SAD083903ML  1.3    Ok
  6  MSFC3 Daughterboard         WS-SUP720          SAD083606TK  2.1    Ok
  9  SAMI Daughterboard 1        SAMI-DC-BB         SAD110709TS  0.701  Ok
  9  SAMI Daughterboard 2        SAMI-DC-BB         SAD110709SF  0.701  Ok

Mod  Online Diag Status
---- -------------------
  4  Pass
  6  Pass
  7  Pass
  9  Pass
Sup#
```

This example shows how to display information for a specific module:

```
Sup# show module 2

Mod Ports Card Type                              Model              Serial No.
--- ----- -------------------------------------- ------------------ -----------
  5     2 Supervisor Engine 720 (Active)         WS-SUP720-BASE     SAD0644030K

Mod MAC addresses                       Hw    Fw           Sw           Status
--- ---------------------------------- ------ ------------ ------------ -------
  5 00e0.aabb.cc00 to 00e0.aabb.cc3f   1.0    12.2(2003012 12.2(2003012 Ok

Mod Sub-Module                 Model           Serial           Hw     Status
--- -------------------------- --------------- --------------- ------- -------
  5 Policy Feature Card 3       WS-F6K-PFC3     SAD0644031P     0.302   Ok
  5 MSFC3 Daughtercard          WS-SUP720       SAD06460172     0.701

Mod Online Diag Status
--- -------------------
  5 Not Available

Sup#
```

This example shows how to display module version information:

```
Sup# show module version

Mod Port Model              Serial #    Versions
--- ---- ------------------ ----------- --------------------------------------

  2 0    WS-X6182-2PA                   Hw : 1.0
                     Fw : 12.2(20030125:231135)
                     Sw : 12.2(20030125:231135)

  4 16   WS-X6816-GBIC      SAD04400CEE Hw : 0.205

         WS-F6K-DFC3A       SAD0641029Y Hw : 0.501
                     Fw : 12.2(20020828:202911)
                     Sw : 12.2(20030125:231135)

  6 2    WS-X6K-SUP3-BASE   SAD064300GU Hw : 0.705
                     Fw : 7.1(0.12-Eng-02)TAM
                     Sw : 12.2(20030125:231135)
                     Sw1: 8.1(0.45)KIS

         WS-X6K-SUP3-PFC3   SAD064200VR Hw : 0.701
                     Fw : 12.2(20021016:001154)
                     Sw : 12.2(20030125:231135)

         WS-F6K-PFC3        SAD064300M7 Hw : 0.301

  9 48   WS-X6548-RJ-45     SAD04490BAC Hw : 0.301
                     Fw : 6.3(1)
                     Sw : 7.5(0.30)CFW11
Sup#
```

This example shows how to display administration and operating status of modules:

```
Sup# show module power

 Mod Card Type                              Admin Status  Oper Status
 --- -------------------------------------- ------------  ------------
  1  SFM-capable 48-port 10/100 Mbps RJ45   on            on
  4  SFM-capable 16 port 1000mb GBIC        on            on
  5  Supervisor Engine 720 (Active)         on            on

Sup#
```

This example shows how to display module provisioning information:

```
Sup# show module provision

Module Provision
  1    dynamic
  2    dynamic
  3    dynamic
  4    dynamic
  5    dynamic
  6    dynamic
  7    dynamic
  8    dynamic
  9    dynamic
 10    dynamic
 11    dynamic
 12    dynamic
 13    dynamic

Sup#
```

show sami module

To display SAMI traffic counters, use the **show sami module** command in privileged EXEC mode.

show sami module *slot_number* **[port** *port_number*] **traffic**

Syntax Description

slot_number	Number of the slot in which the SAMI is installed.
port *port_number*	(Optional) Number of the data port on the SAMI.
traffic	Displays traffic counters.

Defaults

No default behavior or values exist.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(33)SRC	This command was introduced.
12.2(33)SRD	This command was integrated into Cisco IOS Release 12.2(33)SRD.

Usage Guidelines

Use this command to display the traffic counters of a SAMI.

Examples

The following example illustrates how to use the counters displayed by the **show sami module** command:

```
Sup#show sami module 2 port 1 traffic
Specified interface is up line protocol is up (connected)
  Hardware is c7600 10Gb 802.3, address is 0030.f276.41e4 (bia 0030.f276.41e4)
  MTU 1500 bytes, BW 10000000 Kbit, DLY 10 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Full-duplex, 10Gb/s
  input flow-control is on, output flow-control is unsupported
     202 packets input
     0 input errors,
     0 CRC
     6 packets output
```

Related Commands

Command	Description
clear sami module	Clears traffic counters on the SAMI.

show svclc module

To view the state or traffic statistics for the backplane port of the module, use the **show svclc module** command in privileged EXEC mode.

show svclc module *module_number* {**state** | **traffic** | **vlan-group**}

Syntax Description

module_number	Number of the slot in which the module is installed.
state	Displays state-related statistics.
traffic	Displays traffic-related statistics.
vlan-group	Displays the group configuration for the SVCLC module, and the associated VLANs.

Defaults

No default behavior or values exist.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(33)SRB1	This command was integrated into Cisco IOS Release 12.2(33)SRB1.
12.2(33)SRC	This command was integrated into Cisco IOS Release 12.2(33)SRC.
12.2(33)SRD	This command was integrated into Cisco IOS Release 12.2(33)SRD.

Usage Guidelines

Use this command to display the state or traffic statistics for the backplane port of the module.

Note If the module is running a software application that supports Layer 2 Transparent Bridging, the **show svclc module** command displays SVCLC traffic information for the seven TenGigabitEthernet interfaces that are automatically created by the supervisor engine module for Layer 2 Transparent Bridging-enabled applications.

Examples

The following example illustrates how to use the **show svclc module** command to display the SVCLC module traffic:

```
Sup> show svclc module 4 traffic
SAMI Module 4:

Specified interface is up line protocol is up (connected)
Hardware is c7600 10Gb 802.3, address is 0030.f275.c3de (bia 0030.f275.c3de)
MTU 1500 bytes, BW 10000000 Kbit, DLY 10 usec,
reliability 255/255, txload 1/255, rxload 1/255
Encapsulation ARPA, loopback not set
Full-duplex, 10Gb/s
input flow-control is on, output flow-control is unsupported
123 packets input
```

```
0 input errors, 0 CRC
7 packets output
svclc module 4:

Sup>
```

This example shows how to display SVCLC module VLAN group configuration:

```
Sup> show svclc module 2 vlan-group
Module Vlan-groups
------ -----------
  02   100,101,102

Sup>
```

show upgrade software progress

To display information about the progress of a software upgrade, use the **show upgrade software progress** command in privileged EXEC mode.

show upgrade software progress

Syntax Description

This command has no arguments or keywords.

Defaults

No default behavior or values exist.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(33)SRB1	This command was integrated into Cisco IOS Release 12.2(33)SRB1.
12.2(33)SRC	This command was integrated into Cisco IOS Release 12.2(33)SRC.
12.2(33)SRD	This command was integrated into Cisco IOS Release 12.2(33)SRD.

Usage Guidelines

Use this command to display the status of any software upgrades in progress.

Examples

The following example illustrates the results of issuing the **show upgrade software process** command:

```
Sup# show upgrade software progress
% There is no software upgrade in progress.

Sup# show upgrade software progress
Slot     Software File
9        sb-csg2-mzg.bin
```

Related Commands

Command	Description
upgrade hw-module	Upgrades the software image on a module.

show vlans dot1q

To display statistics about 802.1Q VLAN subinterfaces, use the **show vlans dot1q** command in privileged EXEC mode.

show vlans dot1q [**internal** | *interface-type interface-number*.*subinterface-number* [**detail**] | *outer-id* [*interface-type interface-number* | **second-dot1q** [*inner-id* | **any**]] [**detail**]]

Syntax Description

internal	(Optional) Displays internal QinQ VLAN tag termination information. Used for troubleshooting purposes. The QinQ VLAN Tag Termination feature on the subinterface level preserves VLAN IDs and keeps traffic in different customer VLANs segregated.
interface-type	(Optional) Interface type.
interface-number	(Optional) Interface number.
.*subinterface-number*	(Optional) Subinterface number in the range 1 to 4294967293. A period (**.**) must be entered between the *interface-number* argument and the *subinterface-number* argument.
detail	(Optional) Displays detailed information.
outer-id	(Optional) Outer VLAN identifier. The allowed range is from 1 to 4095.
second-dot1q	(Optional) Displays inner VLAN subinterface information.
inner-id	(Optional) Inner VLAN identifier. The allowed range is from 1 to 4095.
any	(Optional) Displays information for all the inner VLAN subinterfaces configured as “any.” **Note** The **any** keyword is not supported on a subinterface configured for IPoQinQ because IP routing is not supported on ambiguous subinterfaces.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.3(7)T	This command was introduced.
12.3(7)XI7	This command was integrated into Cisco IOS Release 12.3(7)XI7 and implemented on the Cisco 10000 series routers.
12.2(31)SB2	This command was integrated into Cisco IOS Release 12.2(31)SB2.
12.2(33)SRC	This command was integrated into Cisco IOS Release 12.2(33)SRC.
12.2(33)SRD	This command was integrated into Cisco IOS Release 12.2(33)SRD.

Usage Guidelines

If no arguments or keywords are entered, statistics for all of the 802.1Q VLAN IDs are displayed.

The **any** keyword is not supported for IPoQinQ because IP routing is not supported on ambiguous subinterfaces. However, the **second-dot1q** *inner-id* keyword and argument can be used on IPoQinQ for a specific inner VLAN ID that is not an ambiguous subinterface.

Examples

The output from the **show vlans dot1q** command displays the statistics for all the 802.1Q VLAN IDs. Only the outer VLAN IDs are displayed here.

```
Router# show vlans dot1q

Total statistics for 802.1Q VLAN 1:
   441 packets, 85825 bytes input
   1028 packets, 69082 bytes output
Total statistics for 802.1Q VLAN 101:
   5173 packets, 510384 bytes input
   3042 packets, 369567 bytes output
Total statistics for 802.1Q VLAN 201:
   1012 packets, 119254 bytes input
   1018 packets, 120393 bytes output
Total statistics for 802.1Q VLAN 301:
   3163 packets, 265272 bytes input
   1011 packets, 120750 bytes output
Total statistics for 802.1Q VLAN 401:
   1012 packets, 119254 bytes input
   1010 packets, 119108 bytes output
```

Table 7 describes the significant fields shown in the display.

Table 7 show vlans dot1q Field Descriptions

Field	Description
Total statistics for 802.1Q VLAN 1	Statistics are shown for the VLAN ID with the specified outer ID.
packets	Number of packets encapsulated by the 802.1Q QinQ VLAN.
bytes input	Number of bytes input.
bytes output	Number of bytes output.

The following sample output from the **show vlans dot1q** command displays the statistics for the 802.1Q VLAN subinterface configured on Gigabit Ethernet interface 5/0:

```
Router# show vlans dot1q GigabitEthernet 5/0.1011001

GigabitEthernet5/0.1011001 (101/1001)
   1005 packets, 122556 bytes input
   1023 packets, 125136 bytes output
```

Table 8 describes the significant fields shown in the display.

Table 8 show vlans dot1q (subinterface) Field Descriptions

Field	Description
GigabitEthernet5/0.1011001 (101/1001)	Statistics are shown for subinterface Gigabit Ethernet 5/0.1011001 with an outer VLAN ID of 101 and an inner VLAN ID of 1001.
packets	Number of packets encapsulated by the 802.1Q QinQ VLAN.
bytes input	Number of bytes input.
bytes output	Number of bytes output.

The following sample output from the **show vlans dot1q** command displays the summary statistics for all of the VLAN subinterfaces under the physical interface Gigabit Ethernet 5/0 that have an outer VLAN ID of 101:

```
Router# show vlans dot1q 101 GigabitEthernet 5/0

Total statistics for 802.1Q VLAN 101 on GigabitEthernet5/0:
   5218 packets, 513444 bytes input
   3042 packets, 369567 bytes output
```

The following sample output from the **show vlans dot1q** command displays the individual subinterface statistics and summary statistics for all the VLAN subinterfaces under the physical interface Gigabit Ethernet 5/0 that have an outer VLAN ID of 101:

```
Router# show vlans dot1q 101 GigabitEthernet 5/0 detail

GigabitEthernet5/0.101 (0)
   3220 packets, 269148 bytes input
   1008 packets, 119622 bytes output
GigabitEthernet5/0.1019999 (101/1-1000,1003-2000)
   0 packets, 0 bytes input
   3 packets, 1143 bytes output
GigabitEthernet5/0.1011001 (101/1001)
   1005 packets, 122556 bytes input
   1023 packets, 125136 bytes output
GigabitEthernet5/0.1011002 (101/1002)
   1005 packets, 122556 bytes input
   1008 packets, 123666 bytes output
Total statistics for 802.1Q VLAN 101 on GigabitEthernet5/0:
   5230 packets, 514260 bytes input
   3042 packets, 369567 bytes output
```

The following sample output from the **show vlans dot1q** command displays the statistics for an outer VLAN and inner VLAN ID combination. This is a summary that displays the total for all the subinterfaces on the router that are configured with the specified IDs.

Note When multiple inner VLANs are used, the statistics displayed are at subinterface-level granularity, not VLAN-ID granularity. For example, when a range of inner VLAN IDs is assigned to a subinterface, the statistics are reported only at the subinterface level. Statistics are not available for each inner VLAN ID.

```
Router# show vlans dot1q 101 second-dot1q 1001 detail

GigabitEthernet5/0.1011001 (101/1001)
   1005 packets, 122556 bytes input
   1023 packets, 125136 bytes output
Total statistics for Outer/Inner VLAN 101/1001:
   1005 packets, 122556 bytes input
   1023 packets, 125136 bytes output
```

The following sample output from the **show vlans dot1q** command displays the statistics for a specific outer VLAN ID of 301 and an inner VLAN ID of any. This is a summary that displays the total for all of the subinterfaces on the router that are configured with the specified IDs.

```
Router# show vlans dot1q 301 second-dot1q any

GigabitEthernet5/0.301999 (301/any)
   0 packets, 0 bytes input
   3 packets, 1128 bytes output
```

```
Total statistics for Outer/Inner VLAN 301/"any":
   0 packets, 0 bytes input
   3 packets, 1128 bytes output
```

The following sample output from the **show vlans dot1q** command displays some internal information about the QinQ subsystem and is used for troubleshooting purposes (typically by Cisco engineers):

```
Router# show vlans dot1q internal

Internal VLAN representation on FastEthernet0/0:
VLAN Id: 1    (.1Q, Fa0/0)
VLAN Id: 201  (.1Q-in-.1Q tree, 3 elements)
  Inner VLAN Id: (0   -0   ) Fa0/0.201
  dot1q software subblock bitlist missing
  Inner VLAN Id: (2001-2001) Fa0/0.2012001
  2001
  Inner VLAN Id: (2002-2002) Fa0/0.2012002
  2002
  "any" Fa0/0.201999
VLAN Id: 401  (.1Q-in-.1Q tree, 3 elements)
  Inner VLAN Id: (0   -0   ) Fa0/0.401
  dot1q software subblock bitlist missing
  Inner VLAN Id: (100 -900 ) Fa0/0.4019999
  100-900,1001-2000
  Inner VLAN Id: (1001-2000) Fa0/0.4019999
  100-900,1001-2000
Internal VLAN representation on GigabitEthernet5/0:
VLAN Id: 1    (.1Q, Gi5/0)
VLAN Id: 101  (.1Q-in-.1Q tree, 5 elements)
  Inner VLAN Id: (0   -0   ) Gi5/0.101
  dot1q software subblock bitlist missing
  Inner VLAN Id: (1   -1000) Gi5/0.1019999
  1-1000,1003-2000
  Inner VLAN Id: (1001-1001) Gi5/0.1011001
  1001
  Inner VLAN Id: (1002-1002) Gi5/0.1011002
  1002
  Inner VLAN Id: (1003-2000) Gi5/0.1019999
  1-1000,1003-2000
VLAN Id: 301  (.1Q-in-.1Q tree, 1 elements)
  Inner VLAN Id: (0   -0   ) Gi5/0.301
  dot1q software subblock bitlist missing
  "any" Gi5/0.301999
```

svclc console

To establish a session with the LCP console when the LCP is in ROM-monitor state, use the **svclc console** command in privileged EXEC mode.

svclc console *slot*

Syntax Description

slot	Number of the slot in which the module is installed.

Defaults

No default behavior or values exist.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(33)SRB1	This command was integrated into Cisco IOS Release 12.2(33)SRB1.
12.2(33)SRC	This command was integrated into Cisco IOS Release 12.2(33)SRC.
12.2(33)SRD	This command was integrated into Cisco IOS Release 12.2(33)SRD.

Usage Guidelines

To establish a session with the LCP when the LCP is in ROM-monitor state, use the **svclc console** command.

If the LCP is in ROM-monitor state, the module status displays as other in the **show module** command output.

Examples

The following example illustrates how to use the **svclc console** command:

```
Sup# svclc console 3
```

svclc module

To assign a VLAN group to a SAMI, use the **svclc module** command in global configuration mode. To remove the VLAN assignment, use the **no** form of the command.

svclc module *module_number* **vlan-group** *group_number_range*

no svclc module *module_number* **vlan-group** *group_number_range*

Syntax Description

module_number	Number of the slot in which the SAMI is installed.
vlan-group *group_number_range*	VLAN group number identified as a single number (n), as a range of numbers (n-x), or as separate numbers, or range of numbers, separated by commas (for example, 3,5,7-10). Only VLAN groups created using the **svclc vlan-group** global configuration command can be specified.

Defaults

No default behavior or values exist.

Command Modes

Global configuration

Command History

Release	Modification
12.2(33)SRB1	This command was integrated into Cisco IOS Release 12.2(33)SRB1.
12.2(33)SRC	This command was integrated into Cisco IOS Release 12.2(33)SRC.
12.2(33)SRD	This command was integrated into Cisco IOS Release 12.2(33)SRD.

Usage Guidelines

Use this command to apply a VLAN group created using the **svclc module** command to a SAMI. This is the allowed VLAN.

One VLAN group can be assigned to multiple SAMIs.

Examples

The following example shows how to assign VLAN groups 50 and 52 to a SAMI installed in slot 5 of the chassis:

```
Sup(config)# svclc module 5 vlan-group 50,52
```

Related Commands

Command	Description
svclc vlan-group	Assigns VLANs to a VLAN groups.
svclc multiple-vlan-interfaces	Enables multiple SVIs to be configured for a SAMI.

svclc multiple-vlan-interfaces

To enable multiple switched virtual interfaces (SVIs) to be configured for a SAMI, use the **svclc multiple-vlan-interfaces** command in global configuration mode. To remove this configuration, use the **no** form of the command.

svclc multiple-vlan-interfaces

no svclc multiple-vlan-interfaces

Syntax Description

This command has no keywords or arguments.

Defaults

No default behavior or values exist.

Command Modes

Global configuration

Command History

Release	Modification
12.2(33)SRB1	This command was integrated into Cisco IOS Release 12.2(33)SRB1.
12.2(33)SRC	This command was integrated into Cisco IOS Release 12.2(33)SRC.
12.2(33)SRD	This command was integrated into Cisco IOS Release 12.2(33)SRD.

Usage Guidelines

The SVI configuration defines the Layer 3 instance on the MSFC (the router). If you assign the VLAN used for the SVI to a SAMI PPC, then the MSFC routes between the SAMI PPC and other Layer 3 VLANs.

By default, only one SVI can exist between the MSFC and a SAMI. However, you must configure multiple SVIs for unique VLANs on each SAMI.

Note For Layer 2 forwarding, configuring a switched virtual interface (SVI) is not required for allowing VLAN traffic to the SAMI PPCs. Configuring a SVI is only required if the supervisor participates in Layer 3 forwarding.

Examples

The following example illustrates how to use the **svclc multiple-vlan-interfaces** command:

```
Sup> enable
Sup# configure terminal
Sup(config)# svclc multiple-vlan-interfaces
Sup(config)# interface vlan 100
Sup(config-if)# ip address 127.0.0.0 255.255.255.0
Sup(config-if)# no shutdown
```

Related Commands

Command	Description
svclc module vlan-group	Assigns a VLAN group to a SAMI.
svclc vlan-group	Assigns VLANs to a VLAN group.

svclc vlan-group

To assign VLANs to a group, use the **svclc vlan-group** command in global configuration mode. To remove the configuration, use the **no** form of this command.

svclc vlan-group *group_number vlan_range*

no svclc vlan-group *group_number vlan_range*

Syntax Description

group_number	Number of the group.
vlan_range	Number of the VLAN or VLANs identified as a single number (*n*), as a range of numbers (*n-x*), or as separate numbers, or range of numbers, separated by commas (for example, 5,7-10,13,45-100).

Defaults

No default behavior or values exist.

Command Modes

Global configuration

Command History

Release	Modification
12.2(33)SRB1	This command was integrated into Cisco IOS Release 12.2(33)SRB1.
12.2(33)SRC	This command was integrated into Cisco IOS Release 12.2(33)SRC.
12.2(33)SRD	This command was integrated into Cisco IOS Release 12.2(33)SRD.

Usage Guidelines

Use this command to assign VLANs to a group.

You can create one or more VLAN groups, and then assign the groups to the SAMI. You cannot assign the same VLAN to multiple groups; however, you can assign multiple groups to a SAMI. VLANs that you want to assign to multiple SAMIs, for example, can reside in a separate group from VLANs that are unique to each SAMI.

Examples

The following example illustrates how to assign VLANs 50, 56, and 57 to VLAN group 50:

```
Sup(config)# svclc vlan-group 50 55-57
```

Related Commands

Command	Description
svclc multiple-vlan-interfaces	Enables multiple SVIs to be configured for a SAMI.
svclc module vlan-group	Assigns a VLAN group to a SAMI.

upgrade hw-module

To upgrade the software image on a module, use the **upgrade hw-module** command in privileged EXEC mode.

upgrade hw-module slot *slot_number* **software** *url/filename*

Syntax Description

slot *slot_number*	Number of the slot in which the SAMI is installed.
software	Specifies that a software file will be downloaded
url/file-name	Location and name of the file you want to use to upgrade the SAMI.

Defaults

No default behavior or values exist.

Command Modes

Privileged EXEC

Command History

Release	Modification
12.2(33)SRB1	This command was integrated into Cisco IOS Release 12.2(33)SRB1.
12.2(33)SRC	This command was integrated into Cisco IOS Release 12.2(33)SRC.
12.2(33)SRD	This command was integrated into Cisco IOS Release 12.2(33)SRD.

Usage Guidelines

Use this command to copy a bundle image from a specified URL to the compact flash of a SAMI installed in a specific slot of the router chassis.

Note This command is required to ensure that future reboots of the SAMI will automatically come up with the specified image.

Examples

The following example illustrates how to use the **upgrade hw-module** command:

```
Sup# upgrade hw-module slot 9 software tftp.10.102.16.25/sb-csg2-mzg.bin
Loading sb-csg2-mzg.bin from 64.102.16.25 (via FastEthernet2/6):
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 37541640 bytes
```

Related Commands

Command	Description
show upgrade software progress	Displays the progress of module upgrades.

APPENDIX C

SAMI Cisco IOS PPC Commands

The following commands, listed in alphabetical order, are introduced or modified for the Cisco SAMI Cisco IOS PPCs and are supported at the SAMI Cisco IOS PPC console:

Note This section does not contain commands specific to the Cisco software application image bundled with the SAMI software. For a description of the commands supported by the Cisco software application image on your SAMI, see the documentation for the Cisco software application you are using.

clear sami ixp statistics egress

To clear the statistics corresponding to number of packets forwarded to IXP in the egress path, use the **clear sami ixp statistics egress** privileged EXEC command.

clear sami ixp statistics egress

Syntax Description

This command has no keywords or arguments.

Defaults

No default behavior or values exist.

Command Modes

Privileged EXEC

Command History

Release	Modification
SAMI Release 3.4	This command was introduced in the Cisco CSG2 Release 5.0.

Usage Guidelines

Use this command to clear the statistics corresponding to number of packets forwarded to IXP in the egress path.

Examples

This example shows how to clear the statistics forwarded to IXP in the egress path:

```
Router# clear sami ixp statistics egress
```

clear sami pci ipc statistics

To clear the statistics corresponding to PCI-based IXP IPC, use the **clear sami pci ipc statistics** privileged EXEC command.

clear sami pci ipc statistics

Syntax Description

This command has no keywords or arguments.

Defaults

No default behavior or values exist.

Command Modes

Privileged EXEC

Command History

Release	Modification
SAMI Release 3.4	This command was introduced in conjunction with the CSG2 Release 5.0.

Examples

This example shows how to clear the PCI statistics for IPC with IXP:

```
Router#clear sami pci ipc statistics
```

config-register

To change the configuration register settings, use the **config-register** command in global configuration mode.

config-register *value*

Syntax Description

value	Hexadecimal or decimal value that represents the 16-bit configuration register value that you want to use the next time the router is restarted. The value range is from 0x0 to 0xFFFF (0 to 65535 in decimal).

Defaults

The default is 0x2102, which causes the processor to boot from flash memory and the Break key to be ignored.

Command Modes

Global configuration

Command History

Release	Modification
Release 1.0	This command was integrated into Cisco SAMI Release 1.0.

Usage Guidelines

Use the **config-register** command to change the configuration register settings for a PPC.

The following bits of the configuration register are supported:

Bit No.	Hex Value	Meaning
00-03	0x00	Stays at the system ROM monitor prompt.
00-03	0x02	Upon crash/reload, gets the Cisco software application image from LCP bundle for booting.
05	0x200	Front panel UART acts as auxiliary and on-board UART acts as console. (ROM monitor supports console only. Cisco IOS supports both console and auxiliary.)
06	0x0040	Ignores NVRAM contents
08	0x0100	Ignores send break
11-12	0x0800-0x1000	Console line speed

Examples

In the following example, the configuration register is set to boot the system image from flash memory:

```
Router(config)# config-register 0x2102
```

confreg

To change the configuration register settings from ROM monitor, use the **config-register** command.

confreg *value*

Syntax Description

value	Hexadecimal or decimal value that represents the 16-bit configuration register value that you want to use the next time the router is restarted. The value range is from 0x0 to 0xFFFF (0 to 65535 in decimal).

Defaults

The default is 0x2102, which causes the processor to boot from flash memory and the Break key to be ignored.

Command Modes

ROM monitor

Command History

Release	Modification
Release 1.0	This command was integrated into Cisco SAMI Release 1.0.

Usage Guidelines

The following bits of the configuration register are supported:

Bit No.	Hex Value	Meaning
00-03	0x00	Stays at the system ROM monitor prompt.
00-03	0x02	Upon crash/reload, gets the Cisco software application image from LCP bundle for booting.
05	0x200	Front panel UART acts as auxiliary and on-board UART acts as console. (ROM monitor supports console only. Cisco IOS supports both console and auxiliary.)
06	0x0040	Ignores NVRAM contents
08	0x0100	Ignores Send Break
11-12	0x0800-0x1000	Console line speed

Examples

In the following example, the configuration register is set to boot the system image from flash memory:

```
rommon 1> confreg 0x2102
```

debug ethernet-interface

To debug Ethernet interface events, use the **debug ethernet-interface** command in privileged EXEC mode. Use the **no** form of this command to disable debugging output.

debug ethernet-interface

no debug ethernet-interface

Syntax Description

This command has no keywords or arguments.

Defaults

No default behavior or values exist.

Command Modes

Privileged EXEC

Command History

Release	Modification
Release 1.0	This command was integrated into Cisco SAMI Release 1.0.

Usage Guidelines

Use this command to provide non-IP control protocol (IPCP) packet level debugs at the First In First Out (FIFO) interface.

Examples

This example shows how to enable debugging of Ethernet interface events and provides a sample of the output:

```
Router# debug ethernet-interface

Ethernet network interface debugging is on

Router# RX:(D)b000.0000.0ffc (S)0000.0000.0000 (T)0x4000 (L)92 (IP)0.0.0.80 (TL)6

RX:(D)b800.0000.0ffc (S)0000.0000.0000 (T)0x4000 (L)92 (IP)0.0.255.255 (TL)57344

RX:(D)c800.0008.0000 (S)0000.0000.0000 (T)0x6000 (L)124 (IP)0.0.255.255 (TL)3225

<... output truncated ...>

Router#
```

debug sami health-monitoring

To display information health-monitoring processing (from the PPC to IXP path or all paths from the PPC to the supervisor), use the **debug sami health-monitoring** command in privileged EXEC mode. To remove this configuration, use the no form of the command.

debug sami health-monitoring [probe | IXP]

no debug sami health-monitoring [probe | IXP]

Syntax Description

probe	Enables debugging of health-monitoring events occurring on the path between the PPC and the IXP.
IXP	Enables debugging of health-monitoring events occurring on all paths between the PPC and the supervisor.

Defaults

Disabled.

Command Modes

Privileged EXEC

Command History

Release	Modification
Release 1.0	This command was introduced.

Usage Guidelines

Use this command to enable debugging related to data path sanity monitoring sent to probe the path to an IXP or to probe all paths between the PPC and the supervisor.

Examples

The following example illustrates how to use the **debug sami health-monitoring** command.

```
Router# debug sami health-monitoring IXP
```

debug sami health-monitoring

To display message-level debugging related to health-monitoring processing (from the PPC to IXP path or all paths from the PPC to the supervisor), use the **debug sami health-monitoring** command in privileged EXEC mode. To remove this configuration, use the no form of the command.

debug sami health-monitoring [probe | IXP] message

no debug sami health-monitoring [probe | IXP] message

Syntax Description

probe	Enables message-level debugging of health-monitoring events occurring on the path between the PPC and the IXP.
IXP	Enables message-level debugging of health-monitoring events occurring on all paths between the PPC and the supervisor.

Defaults

Disabled.

Command Modes

Privileged EXEC

Command History

Release	Modification
Release 1.0	This command was introduced.

Usage Guidelines

Use this command to enable message-level debugging related to data path sanity monitoring sent to probe the path to an IXP or to probe all paths between the PPC and the supervisor.

Examples

The following example illustrates how to use the **debug sami health-monitoring** command.

```
Router# debug sami health-monitoring probe message
```

debug sami ipcp

To information about IP control protocol (IPCP) communication used for Ethernet Out of Band Channel (EOBC) and inter-processor traffic, use the **debug sami ipcp** command in privileged EXEC mode. To disable debugging, use the **no** form of this command.

debug sami ipcp {**errors** | **events** | **packet**} [**src** *0x1-0x3f* | **ixp** | *ppc#* | **bcm** >] [**dstn** *0x1-0x3f* | **ixp** | *ppc*# | **bcm**>] [**ssap** *0-255*] [**dsap** *0-255*]

Syntax Description

errors	Specifies error messages.
events	Specifies event information.
packet	Specifies packet information.
src *0x1-0x3f*	(Optional) Specifies to display information about source communication where: • **ipx**—Specifies the network processor • *ppc_num*—Specifies a PPC. • **bcm**—Specifies the LCP.
dstn *0x1-0x3f*	(Optional) Specifies to display information about destination communication where: • **ipx**—Specifies the network processor • *ppc_num*—Specifies a PPC. • **bcm**—Specifies the LCP.
ssap *0-255*	source service access point (SSAP).
dsap *0-255*	destination service access point (DSAP).

Defaults

No default behavior or values exist.

Command Modes

Privileged EXEC

Command History

Release	Modification
Release 1.0	This command was introduced.

Usage Guidelines

Use this command to enable debugging for IPCP communication used for EOBC and inter processor traffic

Examples

The following example illustrates how to use the **debug sami ipcp** command.

```
Router# debug sami ipcp
```

debug sami ip hidden

To enabling debugging for traffic processing to/from the 127.0.0.0 network use the **debug sami ip hidden** command in privileged EXEC mode. To turn off the debug function, use the **no** form of this command.

debug sami ip hidden

no debug sami ip hidden

Syntax Description

This command has no keywords or arguments.

Defaults

No default behavior or values exist.

Command Modes

Privileged EXEC

Command History

Release	Modification
Release 1.0	This command was introduced.

Usage Guidelines

Use this command to enable the RCAL feature debugging for the127.0.0.0 network.

Examples

The following example illustrates how to use the **debug sami ip hidden** command.

```
Router# debug sami ip hidden
```

debug sami mac-resolver

To enable debugging for MAC-resolver feature, use the **debug sami mac-resolver** privileged EXEC command.

debug sami mac-resolver {errors | events}

Syntax Description

errors	Enable error level logs for mac resolver.
events	Enable logs corresponding to mac-resolver processing.

Defaults

If no keyword is provided, both **error** and **events** logs are enabled.

Command Modes

Privileged EXEC

Command History

Release	Modification
SAMI Release 3.4	This command was introduced in conjunction with the Cisco LTE Release 1.0.

Usage Guidelines

This command enables debugging capabilities of MAC resolver feature. MAC resolver is an important feature that facilitates datapath forwarding capabilities in IXP.

Examples

Here is an example of the **debug sami mac-resolver** command:

```
Router#debug sami mac-resolver errors
Router#debug sami mac-resolver events
Router#debug sami mac-resolver
```

debug sami pci ipc

To enable logging for the PCI-based IPC with IXP, use the **debug sami pci ipc** privileged EXEC command.

debug sami pci ipc {errors | events | msgs}

Syntax Description

errors	Enables error level logs for PCI based IXP IPC.
events	Enables logs corresponding to PCI based IXP IPC processing.
msgs	Enable logs to dump messages received over PCI for IXP IPC.

Defaults

If no keyword is provided, both **error** and **events** logs are enabled.

Command Modes

Privileged EXEC

Command History

Release	Modification
SAMI Release 3.4	This command was introduced in conjunction with the CSG2 Release 5.0, and the Cisco LTE Release 1.0.

Examples

Here is an example of the **debug sami pci ipc** command:

```
Router#debug sami pci ipc errors
Router#debug sami pci ipc events
Router#debug sami pci ipc msgs
```

debug sami pkttrailer

To enable debugging capabilities in packet trailer processing, use the **debug sami pkttrailer** privilieged EXEC command.

debug sami pkttrailer {errors | events | *cr* **}**

Syntax Description

errors	Enables error logs in packet trailer processing.
events	Enables logs corresponding to packet trailer processing in platform driver.

Defaults

If no keyword is provided, logs for both **error** and **events** are enabled.

Command Modes

Privileged EXEC

Command History

Release	Modification
SAMI Release 3.4	This command was introduced in conjunction with the CSG2 Release 5.0.

Usage Guidelines

This command enables debugging capabilities in packet trailer processing. Packet trailer is an integral part of CSG2 Release 5.0, where additional data is send to the IXP at the end of the packet to configure acceleration parameters for a flow.

This command would have an impact on the datapath performance of the SAMI processors. You should only use the command when directed to do so by Cisco Technical Assistance Center (TAC) engineers.

Examples

Here is an example of the **debug sami pkttrailer** command:

```
Router#debug sami pkttrailer errors
Router#debug sami pkttrailer events
Router#debug sami pkttrailer
```

debug sami pkttrailer dump

To dump packet trailer data in the ingress and egress directions for IXP, use the **debug sami pkttrailer dump** privileged EXEC command.

debug sami pkttrailer dump [{ingress | egress | *cr* **}]**

Syntax Description

ingress	Dumps packet trailer data received in ingress.
events	Dumps packet trailer data received in egress.

Command Default

If no keyword is provided, packet trailer dump is enabled in both **egress** and **ingress** directions.

Command Modes

Privileged Exec

Command History

Release	Modification
SAMI Release 3.4	This command was introduced in conjunction with the CSG2 Release 5.0.

Usage Guidelines

This command impacts the datapath performance of the SAMI processors. You should only use this command when directed to do so by Cisco Technical Assistance Center (TAC) engineers.

Examples

Here is an example of the **debug sami pkttrailer dump** command:

```
Router#debug sami pkttrailer dump
Router#debug sami pkttrailer dump ingress
Router#debug sami pkttrailer dump egress
```

debug sami rcal-client

To enable client-related remote console and logging (RCAL) debugging, use the **debug sami rcal-client** command in privileged EXEC mode.

debug sami rcal-client

no debug sami rcal-client

Syntax Description

This command has no keywords or arguments.

Defaults

No default behavior or values exist.

Command Modes

Privileged EXEC

Command History

Release	Modification
Release 1.0	This command was introduced.

Usage Guidelines

Use this command to enable/disable server-related RCAL debugging.

Examples

The following example illustrates how to use the **debug sami rcal-client** command.

```
Router# debug sami rcal-client
```

logging main-cpu

To enable logs to be generated and sent to the supervisor for all events at and above the specified log-level, use the **logging-main-cpu** command in privileged EXEC mode. To turn off log generation, use the **no** form of this command.

logging-main-cpu *udp-port log-level* [*ip-addr*]

no logging-main-cpu *udp-port log-level* [*ip-addr*]

Syntax Description

udp-port	UDP port number from which to send messages.
log-level	Level of messages to send to the supervisor.
ip-addr	(Optional) VLAN IP address for transporting this traffic from processors 3 through 8.

Defaults

The RCAL feature is enabled on a processor and the processor sends messages for level 3 and above.

Command Modes

Privileged EXEC

Command History

Release	Modification
Release 1.0	This command was integrated into Cisco SAMI Release 1.0.

Usage Guidelines

This command enables log generation to the supervisor for all events at and above the log-level value.

The UDP port specified must match the port specified on the supervisor. By default, port 4000 is used. This is the recommended port. Optionally, a VLAN IP address can be specified for transporting this traffic from PPCs 3-8.

The following table defines the severity levels:

Table C-1 Severity Level Definitions

Level	Description
0—emergencies	System unusable
1—alerts	Immediate action required
2—critical	Critical condition
3—errors	Error conditions
4—warnings	Warning conditions
5—notifications	Normal bug significant condition
6—informational	Informational messages
7—debugging	Debugging messages

Examples

The following example illustrates how to use the **logging main-cpu** command.

```
Router# logging main-cpu 4000
```

sami health-monitoring

To enables health monitoring on the paths between the PPC and IXP1 and IXP2 (future), use the **sami health-monitoring** command in privilege EXEC mode. To remove the configuration, use the **no** form of this command.

sami health-monitoring {ixp1 | ixp2}

no sami health-monitoring {ixp1 | ixp2}

Syntax Description

ixp1	Specifies to monitor the health of the path to IXP1.
ixp2	Specifies to monitor the health of the path to IXP1. **Note** This keyword option is intended for future use.

Defaults

By default, health monitoring is enabled for IXP1 and disabled for IXP2.

Command Modes

Global configuration

Command History

Release	Modification
Release 1.0	This command was introduced.

Usage Guidelines

Use this command to enable sanity monitoring on the path from the PPC to IXP1.

Health monitoring is configured on the SAMI PPC. The PPC tracks the health of a path by sending probes to a destination and waiting for a response. If the PPC does not receive a response to a probe, it determines that the path is not healthy and sends a notification to the SAMI LCP, which then initiates a module reload.

The PPC identifies the health of a path in the following categories:

- Passed—The PPC returns a valid response.
- Failed—The PPC did not receive a valid response to a probe or was unable to reach a destination for a specified number of retries.

When a PPC is configured for health monitoring, it sends active probes periodically to determine the state of a path.

Examples

The following example illustrates how to use the **sami health-monitoring** command.

```
Router(config)# sami health-monitoring ipx1
```

sami health-monitoring probe

To enable health monitoring on all paths between the PPC and the supervisor, use the **sami health-monitoring probe** command. To remove the configuration, use the **no** form of the command.

sami health-monitoring probe *ip address* [**interval** *seconds*] [**retries** *number*}

Syntax Description

ip address	Destination IP address on the supervisor. The IP address must be in the global vrf table and there will need to be a suitable local ip address that can be used to reach the remote probe address on supervisor.
interval *seconds*	Interval, in seconds, between probes. A valid value is a number between 1 and 600.
retries *number*	Number of times a probe can be resent before it is marked as failed. A valid value is a number between 10 and 100.

Defaults

No default behavior or values exist.

Command Modes

Global Configuration

Command History

Release	Modification
Release 1.0	This command was introduced.

Usage Guidelines

Use this command to enable health monitoring on all the paths between the PPC and the supervisor.

Health monitoring is configured on the SAMI PPC. The PPC tracks the health of a path by sending probes to a destination and waiting for a response. If the PPC does not receive a response to a probe, it determines that the path is not healthy and sends a notification to the SAMI LCP, which then initiates a module reload.

The PPC identifies the health of a path in the following categories:

- Passed—The PPC returns a valid response.
- Failed—The PPC did not receive a valid response to a probe or was unable to reach a destination for a specified number of retries.

When a PPC is configured for health monitoring, it sends active probes periodically to determine the state of a path.

Examples

The following example illustrates how to use the **sami health-monitoring probe** command.

```
Router(config)# sami health-monitoring probe 10.1.1.14 interval 250 retries 25
```

sami health-monitoring reset

To configure the module to be reset when a path failure has occurred, use the **sami health-monitoring probe reset** command in privileged EXEC mode. To remove this configuration, use the **no** form of the command.

sami health-monitoring {**ipx1** | **ixp2** | **probe**} **reset**

Syntax Description

ixp1	Resets the module when a check to IXP1 fails.
ixp2	Resets the module when a check to IXP2 fails. This keyword option is intended for future use.
probe	Resets the module when a check to the supervisor fails.

Defaults

No default behavior or values exist.

Command Modes

Global configuration

Command History

Release	Modification
Release 1.0	This command was introduced.

Usage Guidelines

Use this command to configure the module to be reset when a path failure has occurred.

Health monitoring is configured on the SAMI PPC. The PPC tracks the health of a path by sending probes to a destination and waiting for a response. If the PPC does not receive a response to a probe, it determines that the path is not healthy and sends a notification to the SAMI LCP, which then initiates a module reload.

The PPC identifies the health of a path in the following categories:

- Passed—The PPC returns a valid response.
- Failed—The PPC did not receive a valid response to a probe or was unable to reach a destination for a specified number of retries.

When a PPC is configured for health monitoring, it sends active probes periodically to determine the state of a path.

Examples

The following example illustrates how to use the **sami health-monitoring reset** command.

```
Router(config)# sami health-monitoring probe reset
```

show interface

To display the statistics of the two IXP interface on the SAMI, use the **show interface** command in privileged EXEC mode.

show interface

Syntax Description

This command has no keywords or arguments.

Defaults

No default behavior or values exist.

Command Modes

Privileged EXEC

Command History

Release	Modification
CSG2 Release 6.0 and LTE Release 2.0	This command was introduced.

Usage Guidelines

show interface will also show the IXP interaface's packet count, byte count , packet rate, and data rate.

Examples

The following example displays the output for the **show interface** command:

```
Router#show interfaces
Interface-IXP1 is up, line protocol is up
  Hardware is Bouncer IXP1, address is 0023.5e25.9a32 (bia 0023.5e25.9a32)
  MTU 0 bytes, BW 10000000 Kbit/sec, DLY 0 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Last input never, output never, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
  5 minute input rate 0 bits/sec, 19 packets/sec
  5 minute output rate 0 bits/sec, 19 packets/sec
     346569 packets input, 0 bytes, 0 no buffer
     Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
     0 input packets with dribble condition detected
     345883 packets output, 0 bytes, 0 underruns
     0 output errors, 0 collisions, 0 interface resets
     0 unknown protocol drops
     0 unknown protocol drops
     0 babbles, 0 late collision, 0 deferred
     0 lost carrier, 0 no carrier
     0 output buffer failures, 0 output buffers swapped out
Interface-IXP2 is up, line protocol is up
  Hardware is Bouncer IXP2, address is 0023.5e25.9a32 (bia 0023.5e25.9a32)
  MTU 0 bytes, BW 10000000 Kbit/sec, DLY 0 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Last input never, output never, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
  5 minute input rate 0 bits/sec, 11 packets/sec
  5 minute output rate 0 bits/sec, 11 packets/sec
     200341 packets input, 0 bytes, 0 no buffer
     Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
     0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
     0 input packets with dribble condition detected
     200341 packets output, 0 bytes, 0 underruns
     0 output errors, 0 collisions, 0 interface resets
     0 unknown protocol drops
     0 unknown protocol drops
     0 babbles, 0 late collision, 0 deferred
     0 lost carrier, 0 no carrier
     0 output buffer failures, 0 output buffers swapped out
GigabitEthernet0/0 is up, line protocol is up
  Hardware is MPC8500_FIFO_ETSEC, address is 0023.5e25.9a32 (bia 0023.5e25.9a32)
  MTU 1500 bytes, BW 2000000 Kbit/sec, DLY 10 usec,
```

show platform

To display platform information, use the **show platform** command.

show platform [cookie | fpga | cpld]

Syntax Description

cookie	Displays information provided by the dump.
fpga	Displays field programmable gate array (FPGA)-related registers.
cpld	Displays complex programmable logic device (CPLD)-related registers.

Defaults

No default behavior or values exist.

Command Modes

Privileged EXEC

Command History

Release	Modification
Release 1.0	This command was introduced.

Usage Guidelines

Use this command to provide a dump of various registers and other platform specific information.

Examples

The following example illustrates how to use the initial part of the **show platform** command.

```
Router# show platform
 Interrupt Throttling:
  Throttle Count = 00000000   Timer Count      = 00000000
  Netint usec    = 00001000   Netint Mask usec = 00000200
  Active         =        0   Configured       =        1
  Longest IRQ    = 00000367
```

The following example illustrates how to use the IXP0 part of the **show platform** command.

```
CDE IXP0 INTERFACE
======================
Packets received                                                0
Packets transmitted                                             0
Num bad pkts recvd on fast spi channel0                         0
Num bad pkts recvd on slow spi channel8                         0
Num bad pkts recvd on fast spi channel2                         0
Num bad pkts recvd on slow spi channel4                         0
IXP0 Fast VOQ status                      [empty]      [not full]
IXP0 BRCM VOQ status                      [empty]      [not full]
IXP0 pull status                                        [pulling]
IXP0 spi src status                                     [healthy]
IXP0 spi snk status                                     [healthy]
```

show sami config-mode

To display the configuration mode of a PowerPC (PPC), use the **show sami config-mode** command.

show sami config-mode

Syntax Description

This command has no keywords or arguments.

Defaults

No default behavior or values exist.

Command Modes

Privileged EXEC

Command History

Release	Modification
Release 1.0	This command was introduced.

Usage Guidelines

Use the **show sami config-mode** command to display the configuration mode of the PPC.

Supervisor is currently the only supported configuration mode.

Examples

The following example illustrates how to use the **show sami config-mode** command.

```
Router# show sami config-mode
sami config-mode supervisor
===========================================================
```

show sami health-monitoring

To display health monitoring status and counters for the path to IXP1, IXP2 (future), and the supervisor, use the **show sami health-monitoring** command.

show sami health-monitoring [ixp | processor]

Syntax Description

ixp	Displays health monitoring status and counters for the path to IXP1 or IXP2 (future).
processor	Displays health monitoring status and counters for the path to the supervisor.

Defaults

No default behavior or values exist.

Command Modes

Privileged EXEC

Command History

Release	Modification
Release 1.0	This command was introduced.

Usage Guidelines

Use this command to display counters specific to health monitoring for the path to the IXPs or the path to the supervisor.

Examples

The following example shows how to display health monitoring-related counters and status:

```
Router#show sami health-monitoring
IXP1: DISABLED
0/0 Missed/Rcvd consecutive responses
0/0 Missed/Rcvd cumulative responses
0 Failed to send
IXP2: DISABLED
0/0 Missed/Rcvd consecutive responses
0/0 Missed/Rcvd cumulative responses
0 Failed to send
ICMP PROBE: PROBING
0/0 Missed/Rcvd consecutive responses
10/8 Missed/Rcvd cumulative responses
40 Failed to send
```

Table 2 describes the fields shown in the display.

Table 2 show sami health monitoring Field Descriptions

Field	Description
IXP1: IXP2: ICMP PROBE:	Indicates the status of health monitoring. Possible values are: • PROBING—Health monitoring is enabled, no responses received or failed to send a message on previous resend expiration. • ACTIVE—Response to probe received from peer. • FAILED—No response received. Communication failed with peer. • DISABLED—Health monitoring is disabled.
Missed consecutive responses	Consecutive number of responses missed. This counter starts at 0 and is incremented whenever a response is missed until timeout expiry. This counter is reset whenever a response is received or when the PPC fails to send a message.
Rcvd consecutive responses	Consecutive number of messages sent. This counter starts at 0 and is incremented whenever a valid response is received. It is reset whenever a response is missed until timeout expiry or when the PPC fails to send a message.
Missed/Rcvd cumulative responses	Free running counter of total responses missed or received until timeout expiry.
Failed to send counter	Number of times a message cannot be sent upon resend timer expiration and when the health monitoring is administratively enabled. This can happen due to no IO memory, no suitable local IP address, etc.

show sami info

To display detailed information about the SAMI, use the **show sami info** command.

show sami info

Syntax Description

This command has no keywords or arguments.

Defaults

No default behavior or values exist.

Command Modes

Privileged EXEC

Command History

Release	Modification
Release 1.0	This command was introduced.

Usage Guidelines

Use the **show sami info** command to display information about the SAMI.

Examples

The following examples illustrates how to use the **show sami info** command.

```
Router# show sami info
Slot Number:                    4
Daughtercard Number:            1
Processor/Session Number:       3
PPC Number:                     1
Active Supervisor EOBC address: 127.0.0.71
Active PPC EOBC address:        127.0.0.43
Daughter Board Identifier:      P3  (2GB)
Daughter Board Hardware Version:10000
```

show sami ipcp statistics

To display the counters for IP control protocol (IPCP) packets processed to and from IPCP peers, use the **show sami ipcp statistics** command.

show sami ipcp statistics

Syntax Description

This command has no keywords or arguments.

Defaults

No default behavior or values exist.

Command Modes

Privileged EXEC

Command History

Release	Modification
Release 1.0	This command was introduced.

Usage Guidelines

Use the **show sami ipcp statistics** command to display counters of IPCP packets received and sent to IPCP peers.

Examples

The following examples illustrate the **show sami ipcp statistics** command.

```
Router# show sami ipcp statistics
 IPCP Statistics Summary:    Tx    Tx-ERR    Rx    Rx-ERR
 ===========================================================
                           303681    0       452316    0
 ===========================================================
Router#
```

show sami ixp

To display the counters of IP control protocol (IPCP) packets processed to and from a SAMI daughter card, use the **show sami ixp** command in privileged EXEC mode.

show sami ixp {1 | 2}

Syntax Description

ixp	Displays IPC counters for the IXP.
processor	Displays IPC counters for the PPC.

Defaults

No default behavior or values exist.

Command Modes

Privileged EXEC

Command History

Release	Modification
Release 1.0	This command was introduced.
	This command is enhanced to display inband packets forwarded and received to and from IXP1 and IXP2 with trailer.

Usage Guidelines

Use the **show sami ixp** command to display counters of IXP packets received and sent to the IXP.

Examples

The following examples illustrate the **show sami ipcp statistics** command.

```
Router# show sami ixp 1
 IPCP Statistics Summary:    Tx    Tx-ERR    Rx    Rx-ERR
 ===========================================================
                            303681    0       452316    0
 ===========================================================
Router#
```

show sami ixp statistics

To display IPC statistics for IXP, and also display important tables of the IXPs, use the **show sami ixp statistics** privileged EXEC command.

show sami ixp statistics

Syntax Description

There are no keywords or arguments for this command.

Defaults

No default behavior or values exist.

Command Modes

Privileged EXEC

Command History

Release	Modification
SAMI 1.0	This command was introduced.
SAMI 3.4	This command was modified in conjunction with CSG2 Release 5.0 to display statistics for packets forwarded to IXP in the egress path.
SAMI 4.0	This command was modified in conjunction with CSG2 Release 6.0 to display number of Async messages received from IXP and interface statistics of the IXP in 64bit format (**show interfaces statistics** shows IXP interface statistics in 32bit format). This provides more accurate statistics. The output also displays the number of messages queued to process path and NETS interrupt path for processing.

Usage Guidelines

This command displays IPC statistics for IXP and also displays important tables of the IXPs.

Examples

The following example illustrates the **show sami ixp statistics** command.

```
SAMI-PPC3#show sami ixp statistics
------------------------------
       IPC IXP 1 Stats
------------------------------
SAMI-PPC3#show sami ixp statistics
------------------------------

 Interface - IXP1
------------------------------
Pkts rx  = 733325
Pkts tx0 = 83087
Pkts tx1 = 0
Bytes rx  = 0
Bytes tx0 = 0
Bytes tx1 = 0
------------------------------

 Interface - IXP2
```

```
------------------------------
Pkts rx  = 650249
Pkts tx0 = 0
Pkts tx1 = 0
Bytes rx  = 0
Bytes tx0 = 0
Bytes tx1 = 0

------------------------------
       IPC IXP 1 Stats
------------------------------
 ixp communications
    ixp sends = 73, retries = 0 send failures = 0
      ixp info sem fail = 0
      get buffer fail = 0, timeout = 0
    ixp packets received = 73
      out of sequence = 0
      with unknown error id = 0
    ixp response code:
      no error = 56
      unknown command = 0
      no resource = 0
      bad parameter = 0
      already existed = 1
      not found for deletion = 1
      unknown error = 0
    ixp input trace messages = 0
    pkts egress through ixp = 20
    async messages from ixp = 100
      queued to nets = 60
      queued to process = 40

------------------------------
       IPC IXP 2 Stats
------------------------------
 ixp communications
    ixp sends = 73, retries = 0 send failures = 0
      ixp info sem fail = 0
      get buffer fail = 0, timeout = 0
    ixp packets received = 73
      out of sequence = 0
      with unknown error id = 0
    ixp response code:
      no error = 56
      unknown command = 0
      no resource = 0
      bad parameter = 0
      already existed = 1
      not found for deletion = 1
      unknown error = 0
    ixp input trace messages = 0
    pkts egress through ixp = 0
    async messages from ixp = 100
      queued to nets = 70
      queued to process = 30


------------------------------
   IXP Stats Update Counters
```

show sami ixp trailerstats

To show statistics corresponding to the packet trailers (these statistics are cumulative of IXP1 and IXP2), use the **show sami ixp trailerstats** command in Privileged EXEC mode.

show sami ixp trailerstats

Syntax Description

There are no keywords or arguments for this command.

Defaults

No default behavior or values exist.

Command Modes

Privileged EXEC

Command History

Release	Modification
	This command was introduced.

Usage Guidelines

Use the **show sami ixp trailersets** command to display statistics corresponding to the packet trailers. These statistics are cumulative of IXP1 and IXP2. The following list identifies the statistics that are displayed:

- Number of packet received with trailer.
- Number of packet on which trailer was written by application.
- Number of packets transmitted with trailer.
- Number of packets for which trailer write failed due to space not available in data buffer.
- Number of packets for which trailer write failed due to trailer size > MAX_BOUNCER_TRAILER_BYTES.
- Number of packets for which trailer write failed due to insufficient pak subblock resources.

Examples

The following example illustrates the **show sami ixp trailersets** command.

show sami mac-resolver dest-addr-list

To display all the address(es) registered by the application along with the VRF tableid, callback functions address, callback parameters address, next hop IP and ref count, use the **show sami mac-resolver dest-addr-list** command in privileged EXEC mode.

show sami mac-resolver dest-addr-list [**ip**]

Syntax Description

ip	(optional) IPv4/IPv6 address for which data is required.

Defaults

If no keyword is provided, the mac resolver entries for all the registered IP's are dumped.

Command Modes

Privileged EXEC

Command History

Release	Modification
SAMI Release 3.4	This command was introduced in conjunction with the Cisco LTE 1.0 Release.

Usage Guidelines

If given, the **ip** keyword displays only those entries whose destination IP matches with the given IP.

Examples

Here is an example of the

```
SAMI#show sami mac-resolver dest-addr-list
Table Id  Ref-Count  Dest IP
                     via Nexthop IP

0         1          20.20.20.51
                     via 20.20.20.51
0         1          2001::10
                     via 2001::10
0         1          100.0.0.1
                     via 20.20.20.51
```

There are 3 elements in the list

```
show sami mac-resolver dest-addr-list 2001::10
Table Id  Ref-Count  Dest IP
                     via Nexthop IP

0         1          2001::10
                     via 2001::10
```

There are 1 elements in the list with IP 2001::10

```
show sami mac-resolver dest-addr-list 20.20.20.51
Table Id  Ref-Count  Dest IP
                     via Nexthop IP

0         1          20.20.20.51
                     via 20.20.20.51
```

There are 1 elements in the list with IP 20.20.20.51

show sami mac-resolver next-hop list

To display the next-hop IP, ref count, mac address, table ID and the encapsulation type, use the s**how sami mac-resolver next-hop list** in privileged EXEC mode.

show sami mac-resolver next-hop list [**ip**]

Syntax Description

ip	(optional) IPv4/IPv6 address for which data is required.

Defaults

If no keyword is provided, the mac resolver entries for all the registered IP's are dumped.

Command Modes

Privileged EXEC

Command History

Release	Modification
Release 3.4	This command was introduced in conjunction with the Cisco LTE 1.0 Release.

Usage Guidelines

If given, displays the entries whose next-hop IP matches to the given IP.

Examples

Here is an example of the **show sami mac-resolver next-hop list** command:

```
SAMI#show sami mac-resolver next-hop-list
TableId IP Address                               MAC Addr         Enctype  Ref-count

0       20.20.20.51                           0200.0200.0200   1        2
0       2001::10                                 0200.0200.0200   1        1
```

There are 2 elements in the list

```
show sami mac-resolver next-hop-list 2001::10

TableId IP Address                               MAC Addr         Enctype  Ref-count

0       2001::10                                 0200.0200.0200   1        1
```

There are 1 elements in the list with IP 2001::10

show sami pci ipc statistics

To display statistics corresponding to IPC with IXP using PCI, use the **show sami pci ipc statistics** privileged EXEC command.

show sami pci ipc statistics

Syntax Description

There are no keywords or arguments for this command.

Defaults

There are no default values.

Command Modes

Privileged EXEC

Command History

Release	Modification
SAMI Release 3.4	This command was introduced in conjunction with the CSG2 Release 5.0.
SAMI Release 4.0	This command was modified for LTE Release 2.0 to include some new counters.

Examples

Here is an example of the **show sami pci ipc statistics** command:

```
SAMI#show sami pci ipc statistics
----------- Slot 2/CPU 3, show sami pci ipc statistics -------------

From PROC 3 To IXP1:

         Tx-fn = 132             Rx-fn = 132
         Msgs sent = 132         Msgs received  = 140
         Msgs over I2R = 132     Msgs over I2P  = 8
         DMA Attempts = 10        DMA Success = 10
         Tx-ring full = 0        Rx-ring empty = 0
         DMA ctx failures = 0    Invalid data = 0
         No Rx Buffers = 0

         Backpressure triggered= 0      Backpressure state = INACTIVE
         Num of msgs requeued for backpressure = 0

From PROC 3 To IXP2:

         Tx-fn = 132             Rx-fn = 132
         Msgs sent = 132         Msgs received  = 132
         Msgs over I2R = 132     Msgs over I2P  = 0
         DMA Attempts = 0        DMA Success = 0
         Tx-ring full = 0        Rx-ring empty = 0
         DMA ctx failures = 0    Invalid data = 0
         No Rx Buffers = 0

         Backpressure triggered= 0      Backpressure state = INACTIVE
         Num of msgs requeued for backpressure = 0

----------- Slot 2/CPU 4, show sami pci ipc statistics -------------
```

```
From PROC 4 To IXP1:

         Tx-fn = 132            Rx-fn = 132
         Msgs sent = 132        Msgs received  = 140
         Msgs over I2R = 132    Msgs over I2P  = 8
         DMA Attempts = 10       DMA Success = 10
         Tx-ring full = 0       Rx-ring empty = 0
         DMA ctx failures = 0   Invalid data = 0
         No Rx Buffers = 0

         Backpressure triggered= 0      Backpressure state = INACTIVE
         Num of msgs requeued for backpressure = 0

From PROC 4 To IXP2:

         Tx-fn = 132            Rx-fn = 132
         Msgs sent = 132        Msgs received  = 132
         Msgs over I2R = 132    Msgs over I2P  = 0
         DMA Attempts = 0       DMA Success = 0
         Tx-ring full = 0       Rx-ring empty = 0
         DMA ctx failures = 0   Invalid data = 0
         No Rx Buffers = 0

         Backpressure triggered= 0      Backpressure state = INACTIVE
         Num of msgs requeued for backpressure = 0

----------- Slot 2/CPU 5, show sami pci ipc statistics -------------

From PROC 5 To IXP1:

         Tx-fn = 132            Rx-fn = 132
         Msgs sent = 132        Msgs received  = 140
         Msgs over I2R = 132    Msgs over I2P  = 8
         DMA Attempts = 10       DMA Success = 10
         Tx-ring full = 0       Rx-ring empty = 0
         DMA ctx failures = 0   Invalid data = 0
         No Rx Buffers = 0

         Backpressure triggered= 0      Backpressure state = INACTIVE
         Num of msgs requeued for backpressure = 0

From PROC 5 To IXP2:

         Tx-fn = 132            Rx-fn = 132
         Msgs sent = 132        Msgs received  = 132
         Msgs over I2R = 132    Msgs over I2P  = 0
         DMA Attempts = 0       DMA Success = 0
         Tx-ring full = 0       Rx-ring empty = 0
         DMA ctx failures = 0   Invalid data = 0
         No Rx Buffers = 0

         Backpressure triggered= 0      Backpressure state = INACTIVE
         Num of msgs requeued for backpressure = 0

----------- Slot 2/CPU 6, show sami pci ipc statistics -------------

From PROC 6 To IXP1:

         Tx-fn = 132            Rx-fn = 132
         Msgs sent = 132        Msgs received  = 140
         Msgs over I2R = 132    Msgs over I2P  = 8
         DMA Attempts = 10       DMA Success = 10
         Tx-ring full = 0       Rx-ring empty = 0
         DMA ctx failures = 0   Invalid data = 0
         No Rx Buffers = 0

         Backpressure triggered= 0      Backpressure state = INACTIVE
         Num of msgs requeued for backpressure = 0

From PROC 6 To IXP2:

         Tx-fn = 132            Rx-fn = 132
         Msgs sent = 132        Msgs received  = 132
         Msgs over I2R = 132    Msgs over I2P  = 0
         DMA Attempts = 0       DMA Success = 0
         Tx-ring full = 0       Rx-ring empty = 0
         DMA ctx failures = 0   Invalid data = 0
         No Rx Buffers = 0

         Backpressure triggered= 0      Backpressure state = INACTIVE
         Num of msgs requeued for backpressure = 0

----------- Slot 2/CPU 7, show sami pci ipc statistics -------------

From PROC 7 To IXP1:

         Tx-fn = 132            Rx-fn = 132
         Msgs sent = 132        Msgs received  = 140
         Msgs over I2R = 132    Msgs over I2P  = 8
         DMA Attempts = 10       DMA Success = 10
         Tx-ring full = 0       Rx-ring empty = 0
         DMA ctx failures = 0   Invalid data = 0
         No Rx Buffers = 0

         Backpressure triggered= 0      Backpressure state = INACTIVE
         Num of msgs requeued for backpressure = 0

From PROC 7 To IXP2:

         Tx-fn = 132            Rx-fn = 132
         Msgs sent = 132        Msgs received  = 132
         Msgs over I2R = 132    Msgs over I2P  = 0
         DMA Attempts = 0       DMA Success = 0
         Tx-ring full = 0       Rx-ring empty = 0
         DMA ctx failures = 0   Invalid data = 0
         No Rx Buffers = 0

         Backpressure triggered= 0      Backpressure state = INACTIVE
         Num of msgs requeued for backpressure = 0

----------- Slot 2/CPU 8, show sami pci ipc statistics -------------

From PROC 8 To IXP1:

         Tx-fn = 132            Rx-fn = 132
         Msgs sent = 132        Msgs received  = 140
         Msgs over I2R = 132    Msgs over I2P  = 8
         DMA Attempts = 10       DMA Success = 10
         Tx-ring full = 0       Rx-ring empty = 0
         DMA ctx failures = 0   Invalid data = 0
         No Rx Buffers = 0

         Backpressure triggered= 0      Backpressure state = INACTIVE
         Num of msgs requeued for backpressure = 0
```

```
From PROC 8 To IXP2:

         Tx-fn = 132            Rx-fn = 132
         Msgs sent = 132        Msgs received  = 132
         Msgs over I2R = 132    Msgs over I2P  = 0
         DMA Attempts = 0       DMA Success = 0
         Tx-ring full = 0       Rx-ring empty = 0
         DMA ctx failures = 0   Invalid data = 0
         No Rx Buffers = 0

         Backpressure triggered= 0      Backpressure state = INACTIVE
         Num of msgs requeued for backpressure = 0
```

APPENDIX D

SAMI COSLI PPC Commands

The following commands, listed in alphabetical order by mode, are introduced for the Cisco SAMI Common OS Services Linux Infra (COSLI) and are supported at the SAMI PPC console.

clear cores

To clear all of the core dumps stored in the core: file system, use the **clear cores** command.

clear cores

Syntax Description

This command has no keywords or arguments.

Command Modes

EXEC

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

To view the list of core files in the core: file system, use the **dir core:** command.

To delete a specific core dump file from the core: file system, use the **delete core:** command.

Note The PPC creates a core dump when it experiences a fatal error. Core dump information is for Cisco Technical Assistance Center (TAC) use only. We recommend that you contact TAC for assistance in interpreting the information in the core dump.

Examples

To clear all core dumps, enter:

```
switch# clear cores
```

Related Commands

delete
dir

clear crashinfo:

To clear crash files, use the **clear crashinfo:** command.

clear crashinfo: [*filename*]

Syntax Description

filename	(Optional) Name of the crash file. Valid value is a file name up to 80 characters.

Command Modes

EXEC

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

To delete files containing crash information, use the **clear crashinfo:** command. To clear a specific file, use the **clear crashinfo:** command with a file name specified.

Examples

To clear all crashinfo files, enter:

```
switch# clear crashinfo:
```

Related Commands

delete
dir

clear eventlog

To clear the event log, use the **clear eventlog** command.

clear eventlog

Syntax Description

This command has no keywords or arguments.

Command Modes

EXEC

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

Use the **clear eventlog** command to clear the event log.

Examples

To clear the display screen, enter:

```
switch# clear eventlog
```

Related Commands

This command has no related commands.

clear screen

To clear the display screen, use the **clear screen** command.

clear screen

Syntax Description

This command has no keywords or arguments.

Command Modes

EXEC

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

Use the **clear screen** command to clear the display screen.

Examples

To clear the display screen, enter:

```
switch# clear screen
```

Related Commands

This command has no related commands.

clock summer-time

To configure a COSLI PPC to change the time automatically to summer time (daylight saving time), use the **clock summer-time** command. Use the **no** form of this command to remove the clock summer-time setting.

clock summer-time {*daylight_timezone_name start_week start_day start_month start_time end_week end_day end_month end_time daylight_offset* | **standard** *time_zone*}

no clock summer-time

Syntax Description

daylight_timezone_name	8-letter name of the time zone (for example, PDT) to be displayed when summer time is in effect.
start_week	Start week for summer time, ranging from 1 through 5.
start_day	Start day for summer time, ranging from Sunday through Saturday.
start_month	Start month for summer time, ranging from January through December.
start_time	Start time (military time) in hours and minutes.
end_week	End week for summer time, ranging from 1 through 5.
end_day	End day for summer time, ranging from Sunday through Saturday.
end_month	End month for summer time, ranging from January through December.
end_time	End time (military format) in hours and minutes.
daylight_offset	Number of minutes to add during summer time. Valid entries are from 1 to 1440. The default is 60.
standard *time_zone*	Sets the daylight time to a standard time zone that includes an applicable daylight time start and end range along with a daylight offset. Enter one of the following well-known time zones: • **ADT**—Atlantic Daylight Time: 2 a.m. first Sunday in April—2 a.m. last Sunday in October, + 60 minutes • **AKDT**—Alaska Standard Daylight Time: 2 a.m. first Sunday in April—2 a.m. last Sunday in October, + 60 minutes • **CDT**—Central Daylight Time: 2 a.m. first Sunday in April—2 a.m. last Sunday in October, + 60 minutes • **EDT**—Eastern Daylight Time: 2 a.m. first Sunday in April—2 a.m. last Sunday in October, + 60 minutes • **MDT**—Mountain Daylight Time: 2 a.m. first Sunday in April—2 a.m. last Sunday in October, + 60 minutes • **PDT**—Pacific Daylight Time: 2 a.m. first Sunday in April—2 a.m. last Sunday in October, + 60 minutes

Command Modes

Configuration mode

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

The first part of the command specifies when summer time begins, and the second part of the command specifies when summer time ends. All times are relative to the local time zone; the start time is relative to standard time and the end time is relative to summer time. If the starting month is after the ending month, the COSLI PPC assumes that you are located in the southern hemisphere.

Examples

To specify that summer time begins on the first Sunday in April at 02:00 and ends on the last Sunday in October at 02:00, with a daylight offset of 60 minutes, enter:

```
switch(config)# clock summer-time Pacific 1 Sun Apr 02:00 5 Sun Oct 02:00 60
```

To remove the clock summer-time setting, enter:

```
switch(config)# no clock summer-time
```

Related Commands

show clock
clock timezone

clock timezone

To set the time zone, use the **clock timezone** command. Use the **no** form of this command to configure independent server groups of Terminal Access Controller Access Control System Plus (TACACS+), Remote Authentication Dial-In User Service (RADIUS), or Lightweight Directory Access Protocol (LDAP) servers.

clock timezone {*zone_name* {**+** | **–**} *hours minutes*} | {**standard** *time_zone*}

no clock timezone

Syntax Description

zone_name	8-letter name of the time zone (for example, PDT) to be displayed when the time zone is in effect.
hours	Hours offset from Coordinated Universal Time (UTC).
minutes	Minutes offset from UTC. Range is from 0 to 59 minutes.
standard *time_zone*	Sets the time to a standard time zone that include an applicable UTC hours offset. Enter one of the following well-known time zones: • **ACST**—Australian Central Standard Time as UTC + 9.5 hours • **AKST**—Alaska Standard Time as UTC –9 hours • **AST**—Atlantic Standard Time as UTC –4 hours • **BST**—British Summer Time as UTC + 1 hour • **CEST**—Central Europe Summer Time as UTC + 2 hours • **CET**—Central Europe Time as UTC + 1 hour • **CST**—Central Standard Time as UTC –6 hours • **EEST**—Eastern Europe Summer Time as UTC + 3 hours • **EET**—Eastern Europe Time as UTC + 2 hours • **EST**—Eastern Standard Time as UTC –5 hours • **GMT**—Greenwich Mean Time as UTC • **HST**—Hawaiian Standard Time as UTC –10 hours • **IST**—Irish Summer Time as UTC + 1 hour • **MSD**—Moscow Summer Time as UTC + 4 hours • **MSK**—Moscow Time as UTC + 3 hours • **MST**—Mountain Standard Time as UTC –7 hours • **PST**—Pacific Standard Time as UTC –8 hours • **WEST**—Western Europe Summer Time as UTC + 1 hour • **WST**—Western Standard Time as UTC + 8 hours

Command Modes

Configuration mode

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

The COSLI PPC keeps time internally in Universal Time Coordinated (UTC) offset, so this command is used only for display purposes and when the time is set manually.

Table 4-1 lists common time zone acronyms used for the *zone_name* argument.

Table 4-1 Time Zone Acronyms

Acronym	Time Zone Name and UTC Offset
Europe	
BST	British Summer Time as UTC + 1 hour
CET	Central Europe Time as UTC + 1 hour
CEST	Central Europe Summer Time as UTC + 2 hours
EET	Eastern Europe Time as UTC + 2 hours
EEST	Eastern Europe Summer Time as UTC + 3 hours
GMT	Greenwich Mean Time as UTC
IST	Irish Summer Time as UTC + 1 hour
MSK	Moscow Time as UTC + 3 hours
MSD	Moscow Summer Time as UTC + 4 hours
WET	Western Europe Time as UTC
WEST	Western Europe Summer Time as UTC + 1 hour
United States and Canada	
AST	Atlantic Standard Time as UTC –4 hours
ADT	Atlantic Daylight Time as UTC –3 hours
CT	Central Time, either as CST or CDT, depending on the place and time of the year
CST	Central Standard Time as UTC –6 hours
CDT	Central Daylight Saving Time as UTC –5 hours
ET	Eastern Time, either as EST or EDT, depending on the place and time of the year
EST	Eastern Standard Time as UTC –5 hours
EDT	Eastern Daylight Saving Time as UTC –4 hours
MT	Mountain Time, either as MST or MDT, depending on the place and time of the year
MDT	Mountain Daylight Saving Time as UTC –6 hours
MST	Mountain Standard Time as UTC –7 hours
PT	Pacific Time, either as PST or PDT, depending on the place and time of the year
PDT	Pacific Daylight Saving Time as UTC –7 hours

Table 4-1 Time Zone Acronyms (continued)

Acronym	Time Zone Name and UTC Offset
PST	Pacific Standard Time as UTC –8 hours
AKST	Alaska Standard Time as UTC –9 hours
AKDT	Alaska Standard Daylight Saving Time as UTC –8 hours
HST	Hawaiian Standard Time as UTC –10 hours
Australia	
CST	Central Standard Time as UTC + 9.5 hours
EST	Eastern Standard/Summer Time as UTC + 10 hours (+11 hours during summer time)
WST	Western Standard Time as UTC + 8 hours

Examples

To set the time zone to PST and to set an UTC offset of –8 hours, enter:

```
switch(config)# clock timezone PST -8 0
```

To remove the clock time-zone setting, enter:

```
switch(config)# no clock timezone PST -8 0
```

Related Commands

show clock
clock summer-time

config

To enter configuration mode while in EXEC mode, use the **configure** command.

config [**terminal**]

Syntax Description

terminal	(Optional) Enables you to configure the system from the terminal.

Defaults

No default behavior or values.

Command Modes

EXEC

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

To return to the EXEC mode from the configuration mode, use the **exit** command.

To execute an EXEC mode command from any of the configuration modes, use the **do** version of the command.

Examples

To enter configuration mode from EXEC mode, enter:

```
switch# config
switch(config)#
```

Related Commands

exit

copy core:

To copy a core file to a remote server, use the **copy core:** command.

copy core:*filename* {**disk0:**[*path/*]*filename* | **tftp://***server*[**:***port*]**/***path*[*/filename*]}

Syntax Description

filename1	Filename of the core dump residing on the PPC in flash memory. Use the **dir core:** command to view the core dump files available in the core: file system.
disk0:[*path/*]*filename2*	Specifies that the file destination is the disk0: directory of the current context and the filename for the core. If you do not provide the optional path, the PPC copies the file to the root directory on the disk0: file system.
tftp://*server*[**:***port*]**/***path*[*/filename*]	Specifies the Trivial File Transfer Protocol (TFTP) network server and optional renamed core dump.

Command Modes

EXEC

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

To display the list of available core files, use the **dir core:** command. Copy the complete filename (for example, 0x401_vsh_log.25256.tar.gz) into the **copy core:** command.

When you select a destination file system using **tftp:**, the PPC does the following:

- Prompts you for your username and password if the destination file system requires user authentication.
- Prompts you for the server information if you do not provide the information with the command.
- Copies the file to the root directory of the destination file system if you do not provide the path information.

Examples

To copy a core file from the PPC to a remote TFTP server, enter:

```
switch# copy core:ppc3_crash.txt tftp://192.168.1.2
Enter the destination filename[]? [ppc3_crash.txt]
Enter username[]? user1
Enter the file transfer mode[bin/ascii]: [bin]
Password:
Passive mode on.
Hash mark printing on (1024 bytes/hash mark).
```

Note The **bin** (binary) file transfer mode is intended for transferring compiled files (executables). The **ascii** file transfer mode is intended for transferring text files, such as config files. The default selection of **bin** should be sufficient in all cases when copying files to a remote FTP server.

Related Commands

dir

copy crashinfo:

To copy a crash file to a remote server, use the **copy crashinfo:** command.

copy crashinfo:*filename* {**disk0:**[*path/*]*filename* | **tftp://***server*[**:***port*]**/***path*[*/filename*]}

Syntax Description

filename1	Filename of the crash file residing on the PPC in flash memory. Use the **dir crashinfo:** command to view the crash files available in the crashinfo: file system.
disk0:[*path/*]*filename2*	Specifies that the file destination is the disk0: directory of the current context and the filename for the core. If you do not provide the optional path, the PPC copies the file to the root directory on the disk0: file system.
tftp://*server*[**:***port*]**/***path*[*/filename*]	Specifies the Trivial File Transfer Protocol (TFTP) network server and optional renamed crash file.

Command Modes

EXEC

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

To display the list of available crash files, use the **dir crashinfo:** command. Copy the complete filename (for example, 0x401_vsh_log.25256.tar.gz) into the **copy crashinfo:** command.

When you select a destination file system using **tftp:**, the PPC does the following:

- Prompts you for your username and password if the destination file system requires user authentication.
- Prompts you for the server information if you do not provide the information with the command.
- Copies the file to the root directory of the destination file system if you do not provide the path information.

Examples

To copy a crash file from the PPC to a remote TFTP server, enter:

```
switch# copy crashinfo:ppc3_crash.txt tftp://192.168.1.2
Enter the destination filename[]? [ppc3_crash.txt]
Enter username[]? user1
Enter the file transfer mode[bin/ascii]: [bin]
Password:
Passive mode on.
Hash mark printing on (1024 bytes/hash mark).
```

Note The **bin** (binary) file transfer mode is intended for transferring compiled files (executables). The **ascii** file transfer mode is intended for transferring text files, such as config files. The default selection of **bin** should be sufficient in all cases when copying files to a remote FTP server.

Related Commands

dir

copy disk0:

To copy a file from one directory in the disk0: file system of flash memory to another directory in disk0: or a network server, use the **copy disk0:** command.

copy disk0:[*path/*]*filename1* {**disk0:**[*path/*]*filename2* | **tftp://***server*[**:***port*]**/***path*[**/***filename*] | **running-config** | **startup-config**}

Syntax Description

disk0:[*path/*]*filename1*	Specifies the name of the file to copy in the disk0: file system. Use the **dir disk0:** command to view the files available in disk0:. If you do not provide the optional path, the PPC copies the file from the root directory on the disk0: file system.
disk0:[*path/*]*filename2*	Specifies that the file destination is the disk0: directory of the current context and the filename for the core. If you do not provide the optional path, the PPC copies the file to the root directory on the disk0: file system.
tftp://*server*[**:***port*]**/***path*[**/***filename*]	Specifies the Trivial File Transfer Protocol (TFTP) network server and optional renamed file.
running-config	Specifies to replace the running-configuration file that currently resides on the PPC in volatile memory.
startup-config	Specifies to replace the startup-configuration file that currently resides on the PPC in flash memory.

Command Modes

EXEC

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

When you select a destination file system using **tftp:**, the PPC does the following:

- Prompts you for your username and password if the destination file system requires user authentication.
- Prompts you for the server information if you do not provide the information with the command.
- Copies the file to the root directory of the destination file system if you do not provide the path information.

Examples

To copy the file called SAMPLEFILE to the MYSTORAGE directory in flash memory, enter:

```
switch# copy disk0:samplefile disk0:MYSTORAGE/SAMPLEFILE
```

Related Commands

dir

copy running-config

To copy the contents of the running configuration file in RAM (volatile memory) to the startup configuration file in flash memory (nonvolatile memory) or a network server, use the **copy running-config** command.

copy running-config {**disk0:**[*path/*]*filename* | **startup-config** |
tftp://*server*[**:***port*]**/***path*[*/filename*]}

Syntax Description

disk0:[*path/*]*filename*	Specifies that the running configuration is copied to a file on the disk0: file system. If you do not provide the optional path, the PPC copies the file to the root directory on the disk0: file system.
startup-config	Copies the running configuration file to the startup configuration file.
tftp://*server*[**:***port*]**/***path*[*/filename*]	Specifies the Trivial File Transfer Protocol (TFTP) network server and optional renamed file.

Command Modes

EXEC

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

When you select a destination file system using **tftp:**, the PPC does the following:

- Prompts you for your username and password if the destination file system requires user authentication.
- Prompts you for the server information if you do not provide the information with the command.
- Copies the file to the root directory of the destination file system if you do not provide the path information.

Examples

To save the running-configuration file to the startup-configuration file in flash memory on the PPC, enter:

```
switch# copy running-config startup-config
```

Related Commands

show running-config
show startup-config

copy startup-config

To merge the contents of the startup configuration file into the running configuration file or copy the startup configuration file to a network server, use the **copy startup-config** command.

copy startup-config {**disk0:**[*path/*]*filename* | **running-config** |
tftp://*server*[**:***port*]**/***path*[**/***filename*]}

Syntax Description

disk0:[*path/*]*filename*	Specifies that the startup configuration is copied to a file on the disk0: file system. If you do not provide the optional path, the PPC copies the file to the root directory on the disk0: file system.
running-config	Merges contents of the startup configuration file into the running configuration file.
tftp://*server*[**:***port*]**/***path*[**/***filename*]	Specifies the Trivial File Transfer Protocol (TFTP) network server and optional renamed file.

Command Modes

EXEC

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

When you select a destination file system using **tftp:**, the PPC does the following:

- Prompts you for your username and password if the destination file system requires user authentication.
- Prompts you for the server information if you do not provide the information with the command.
- Copies the file to the root directory of the destination file system if you do not provide the path information.

Examples

To merge the contents of the startup-configuration file into the running-configuration file in flash memory, enter:

```
switch# copy startup-config running-config
```

Related Commands

show startup-config

copy-sup

To copy files and running configurations to and from the SUP, use the **copy-sup** command in privileged EXEC mode.

copy-sup *src_file dst_file*

Syntax Description

src_file	Specifies the source file.
dst_file	Specifies the destination file.

Command Default

This command is disabled by default.

Command Modes

Privileged EXEC

Command History

Release	Modification
WSG Release 3.0	This command was introduced.

Usage Guidelines

You can run the **copy-sup** command in single entity mode.

If the source file is the running-config or a file from one of the following PPC filesystems:

log:
core:
disk0:

Then the destination file is a file at one of the following SUP filesystems:

bootdisk-sup:
bootflash-sup:
disk0-sup:

If the source file is a file from one of the following SUP filesystems:

bootdisk-sup:
bootflash-sup:
disk0-sup:

Then the destination file can be the running-config or a file at one of the following PPC filesystems:

log:
core
disk0:

This command will attach the *slot#ppc#* tag for either entity **all** or entity **none** modes (i.e. SLOT3SAMIC3_) to the front of the file name saved at the SUPs. The commmand will also attach the “.cfg” tag to the end of the file name when you save the running configuration file to the SUPs.

You do not need to type in the tags when you specifiy the source or destination file names for **copy-sup**. The tags are automatically generated by the command.

The directory names used by this command that refer to the SUP filesystems are:

disk0-sup:
bootdisk-sup:
bootflash-sup:

Examples

Here are examples of the **copy-sup** command:

```
copy-sup ?
  bootdisk-sup:   Select source file system at the SUP
  bootflash-sup:  Select source file system at the SUP
  core:           Select source file system
  disk0-sup:      Select source file system at the SUP
  disk0:          Select source file system
  log:            Select source file system
  running-config  Copy running configuration to destination
switch#  copy-sup running-config ?
  bootdisk-sup:   Select destination file system at the SUP
  bootflash-sup:  Select destination file system at the SUP
  disk0-sup:      Select destination file system at the SUP
switch#  copy-sup running-config disk0-sup: ?
  <cr>  Carriage return.
switch#  copy-sup running-config disk0-sup:
```

Copy File to the Sup

A file at the PPC can be copied to the SUP's disk0, bootflash (or bootdisk) directory:

```
switch# copy-sup src_file sup-disk0:filename | sup-bootflash:filename |
sup-bootdisk:filename
```

If the remote filename is not specified, this command will prompt you for the remote file name to be used on the SUP.

Example 1 (entity none mode):

```
switch# copy-sup log:messages sup-disk0:myLogMessages
Copying operation succeeded.
switch#
```

Example 2 (entity node mode):

```
switch# copy-sup log:messages sup-bootflash:
Enter the destination filename[]?myLogMessages
Copying operation succeeded.
switch#
```

The following file on the SUP will be created as the result of above command:

```
bootflash:myLogMessages
```

Example 3 (entity all mode):

```
Switch(mode-all)#copy-sup log:messages sup-bootflash:myLogMessages
```

The following example files are created on the SUP:

```
SLOT3SAMIC3_myLogMessages
SLOT3SAMIC4_myLogMessages
```

```
SLOT3SAMIC5_myLogMessages
SLOT3SAMIC6_myLogMessages
SLOT3SAMIC7_myLogMessages
SLOT3SAMIC8_myLogMessages
```

Copy Running Config File to the Sup

Here are examples of the **copy-sup** command used to copy running configurations to the SUP:

```
switch# copy-sup running-config sup-disk0:filename | sup-bootflash:filename |
sup-bootdisk:filename
```

If the remote filename is not specified, this command prompts you for the remote file name to be used on the SUP. The configuration files at the SUP have the ".cfg." attached.

Example 1 (entity none mode):

```
switch# copy-sup running-config sup-bootflash:myconfig
Copying operation succeeded.
switch#
```

The following file is created on the SUP as the result of the previous command (for example, the command is entered from slot#3/ppc#5):

```
bootflash:SLOT3SAMIC5_myconfig.cfg
```

Example 2 (entity all mode):

```
switch# copy-sup running-config sup-bootflash:myconfig
Copying operation succeeded.
switch#
```

The following files are created on the SUP as the result of the previous command:

```
bootflash:SLOT3SAMIC3_myconfig.cfg
bootflash:SLOT3SAMIC4_myconfig.cfg
bootflash:SLOT3SAMIC5_myconfig.cfg
bootflash:SLOT3SAMIC6_myconfig.cfg
bootflash:SLOT3SAMIC7_myconfig.cfg
bootflash:SLOT3SAMIC8_myconfig.cfg
```

Copy File from the Sup

Here are examples of the **copy-sup** command used to copy files from the SUP:

If the remote or local file names are not specified, this command prompt you for the local and remote file names to be copied.

Example 1 (entity none mode),

```
switch# copy-sup sup-bootflash:myFileAtSup disk0:myFile
Copying operation succeeded.
```

The following file from the SUP is copied as the result of the previous command:

```
bootflash:myFileAtSup
```

Example 2 (entity all mode),

```
switch# copy-sup sup-bootflash:myFileAtSup disk0:myFile
Copying operation succeeded.
```

The following file from the SUP will be copied as the result of above command:

```
bootflash:myFileAtSup
```

Each PPC will have the file disk0:myFile.

Copy Running Config file from the Sup

Here are examples of the **copy-sup** command used to copy running configuration files from the SUP:

```
switch# copy-sup sup-disk0:filename | sup-bootflash:filename | sup-bootdisk:filename
running-config
```

If the remote file name is not specified, this command will prompt the user for the remote config file name to be copied.

Example 1 (entity none mode),

```
switch# copy-sup sup-bootflash:myConfig running-config
Copying operation succeeded.
```

As the result of issuing the previous command, the following file from the SUP is copied (for example, the command is entered from slot#3/ppc#5), and the current running configuration is replaced with it:

```
bootflash:SLOT3SAMIC5_myConfig.cfg
```

Example 2 (entity all mode),

```
switch# copy-sup sup-bootflash:myConfig running-config
Copying operation succeeded.
```

The following files from the SUP will be copied as the result of above command:

```
bootflash:SLOT3SAMIC3_myConfig.cfg
bootflash:SLOT3SAMIC4_myConfig.cfg
bootflash:SLOT3SAMIC5_myConfig.cfg
bootflash:SLOT3SAMIC6_myConfig.cfg
bootflash:SLOT3SAMIC7_myConfig.cfg
bootflash:SLOT3SAMIC8_myConfig.cfg
```

The running configuration of each of the PPCs is replaced by the corresponding file.

copy tftp:

To copy a file, software image, running-configuration file, or startup-configuration file from a remote Trivial File Transfer Protocol (TFTP) server to a location on the PPC, use the **copy tftp:** command.

copy tftp://*server*[**:***port*]**/***path*[**/***filename*] {**disk0:**[*path/*]*filename* | **image:**[*image_name*] | **running-config** | **startup-config**}

Syntax Description

tftp://*server*[**:***port*]**/***path*[**/***filename*]	Specifies the TFTP network server and optional renamed file.
disk0:[*path/*]*filename*	Specifies that the file destination is the disk0: directory of the current context and the filename. If you do not provide the optional path, the PPC copies the file to the root directory on the disk0: file system.
image: [*image_name*]	Specifies to copy a system software image to flash memory. Use the **boot system** command in configuration mode to specify the BOOT environment variable. The BOOT environment variable specifies a list of image files on various devices from which the PPC can boot at startup. The *image_name* argument is optional. If you do not enter a name, the PPC uses the source filename.
running-config	Specifies to replace the running-configuration file that currently resides on the PPC in RAM (volatile memory).
startup-config	Specifies to replace the startup-configuration file that currently resides on the PPC in flash memory (nonvolatile memory).

Command Modes

EXEC

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

Use the **copy tftp:** command to copy a file from a remote TFTP server to a location on the PPC.

Examples

To copy a startup-configuration file from a remote TFTP server to the PPC, enter:

```
switch# copy tftp://192.168.1.2/startup_config_PPC3 startup-config
```

Related Commands

show running-config
show startup-config

debug

To enable syslog debugging functions on a PPC, use the **debug** command.

debug logging level *num*

Syntax Description

level *num*	Specifies the level of syslog debugging. Valid value is a number 1 to 9.

Defaults

No default behavior or values.

Command Modes

EXEC

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

Because debugging output is assigned high priority in the CPU process, it can diminish the performance of the router or even render it unusable. For this reason, use **debug** commands only to troubleshoot specific problems or during troubleshooting sessions with Cisco technical support staff. Moreover, it is best to use **debug** commands during periods of lower network traffic and fewer users. Debugging during these periods decreases the likelihood that increased **debug** command processing overhead will affect system use.

Examples

To enable syslog debugging to level 5, enter:

```
switch# debug logging level 5
```

Related Commands

show debug

delete

To delete a specified file in the PPC file system, use the **delete** command.

delete {**core:***filename* | **disk0:**[*path/*]*filename*}

Syntax Description

core:*filename*	Deletes the specified file from the core: file system.
disk0:[*path/*]*filename*	Deletes the specified file from the disk0: file system. If you do not specify the optional path, the PPC looks for the file in the root directory of the disk0: file system.

Defaults

No default behavior or values.

Command Modes

EXEC

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

If you do not specify a filename with the file system keyword, you will be prompted for a filename.

To display the list of files that reside in a file system, use the **dir** command.

Examples

To delete the file 0x401_VSH_LOG.25256.TAR.GZ from the core: file system, enter:

```
switch# delete core:0x401_VSH_LOG.25256.TAR.GZ
```

Related Commands

dir

dir

To display the contents of a specified PPC file system, use the **dir** command.

dir {**core:** | **crashinfo:** | **disk0:** | **log:**}

Syntax Description

core:	Displays the contents of the core: file system.
crashinfo:	Displays the contents of the crashinfo: file system.
disk0:	Displays the contents of the disk0: file system.
log:	Displays the contents of the log: file system.

Defaults

No default behavior or values.

Command Modes

EXEC

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

To delete a file from a file system, use the **delete** command.

To delete all core dumps, use the **clear cores** command.

Examples

To display the contents of the drive0: file system, enter:

```
switch# dir disk0:
```

Related Commands

clear cores
delete

dumpcore process

To manually generate a core dump for a PPC process, use the **dumpcore process** command in EXEC mode.

dumpcore process *process-name* **pid** *pid*

Syntax Description

process *process-name*	Name of the process for which you want to manually generate a core dump. Enter the name of a process up to 80 characters.
pid *pid*	Process instance identifier (PID).

Defaults

No default behavior or values.

Command Modes

EXEC

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

Use the **dumpcore process** command to manually generate a core dump for PPC process.

Examples

To manually generate a debug core file for PPC processes, enter:

```
switch# dumpcore process bash pid 419
```

Related Commands

clear cores
delete
show processes

end

To exit from configuration mode and return to EXEC mode, use the **end** command.

end

Syntax Description

This command has no keywords or arguments.

Command Modes

Configuration mode

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

You can also press **Ctrl-Z** or enter the **exit** command to exit configuration mode.

Examples

To exit from configuration mode and return to EXEC mode, enter:

```
switch(config)# end
switch#
```

Related Commands

This command has no related commands.

exit

To exit from the current mode and return to the previous mode, use the **exit** command.

exit

Syntax Description

This command has no keywords or arguments.

Command Modes

All configuration modes

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

In configuration mode, the **exit** command transitions to the EXEC mode.

In EXEC mode, logs out of the CLI session.

In all other configuration modes, the **exit** command transitions to the previous configuration mode.

You can also press **Ctrl-Z**, enter the **end** command, or enter the **exit** command to exit configuration mode.

Examples

To exit from configuration mode and return to EXEC mode, enter:

```
switch(config)# exit
switch#
```

To exit from interface configuration mode and return to configuration mode, enter:

```
switch(config-if)# exit
switch(config)#
```

Related Commands

This command has no related commands.

hostname

To specify a hostname for the COSLI PPC, use the **hostname** command. The hostname is used for the command line prompts and default configuration filenames. If you establish sessions to multiple devices, the hostname helps you track where you enter commands. Use the **no** form of this command to reset the hostname to the default of switch.

hostname *name*

no hostname [*name*]

Syntax Description

name	New hostname for the COSLI PPC. Enter a case-sensitive text string that contains from 1 to 32 alphanumeric characters.

Command Modes

Configuration mode

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

By default, the hostname for the COSLI PPC is switch.

The hostname is used for the command line prompts and default configuration filenames. If you establish sessions to multiple devices, the hostname helps you track where you enter commands.

Examples

To change the hostname of the COSLI PPC from switch to PPC_5, enter:

```
switch(config)# hostname PPC_5
PPC_5(config)#
```

Related Commands

This command has no related commands.

interface

To create a VLAN interface, use the **interface** command. The CLI prompt changes to (config-if). Use the **no** form of this command to remove the interface.

interface vlan *number*

no interface vlan *number*

Syntax Description

number	Assigns the VLAN to the context and accesses interface configuration mode commands for the VLAN. The *number* argument is the number for a VLAN assigned to the PPC. Valid value is a number between 2 and 4094.

Command Modes

Global configuration

Command History

Release	Modification
COSLI 1.0	This command was introduced.
WSG Release 3.0	The **ipv6 address** and **alias** keywords were added.

Usage Guidelines

Use the **interface vlan** command to configure a VLAN interface on a PPC.

Cisco WSG Release 3.0 and above allows you to configure an IPv6 address and alias on the interface. Each interface is allowed to have one or both IPv4 address/alias and IPv6 address/alias.

While in interface configuration mode, you can use the following commands:

- **alias**—Alias IPv4 address for the interface
- **do**—Issue EXEC mode command from configuration mode
- **end**—Exit configuration mode
- **description**—Description for the interface
- **ip address**—IPv4 address for the interface
- **ipv6 address**—IPv6 address for the interface
- **ipv6 alias**—Alias IPv6 address for the interface
- **mtu**—Maximum Transmission Unit (MTU) for the interface
- **no**—Negate an interface configuration command or return it to its default value
- **shutdown**—Shut down the interface
- **vrf**—Specify the VRF for the interface

Note This CLI is a node-specific command and cannot be executed under entity-all mode.

Examples

To create VLAN interface 100 and access interface configuration mode, enter:

```
switch(config)# interface vlan 100
switch(config-if)# ipv6 ?
        address    IPv6 address of interface
        alias         IPv6 alias address of interface

wsg(config-if)# ipv6 address ?
        <X:X:X::X/n> Enter an IPv6 prefix

wsg(config-if)# ipv6 address 2001:88:88:94::/96 ?
        <cr>            Carriage return
        autoconfig   Obtain address using auto configuration

wsg(config-if)# ipv6 alias ?
        <X:X:X::X/n> Enter an IPv6 prefix
```

Each interface is allowed to have one or both IPv4 address/alias and IPv6 address/alias. For example,

```
interface vlan 10
        ip address 10.10.10.3 255.255.255.0
        alias 10.10.10.1 255.255.255.0
        ipv6 address 2001:88:88:94::4/96
        ipv6 alias   2001:88:88:94::1/96
```

Related Commands

show interface

ip address

To set or modify an IP address for an interface, use the **ip address** command in interface configuration mode. To remove an IP address or disable IP processing, use the **no** form of this command.

ip address *ip-address mask*

no ip address

Syntax Description

ip-address	IPv4 address.
mask	Mask for the associated IP subnet.

Defaults

No IP address is defined for the interface.

Command Modes

Interface configuration

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

To configure an IPv4 address for the VLAN interface on a PPC, use the **ip address** interface configuration command.

Examples

To configure an IP address for interface VLAN 100, enter the following commands:

```
switch(config)# interface vlan 100
switch(config-if)# ip address ip address
```

Related Commands

show interface

ip default gateway

To define or change a default gateway (router), use the **ip default gateway** command. To disable this function, use the **no** form of this command.

ip default gateway *ip-address*

no ip default gateway *ip-address*

Syntax Description

ip-address	IPv4 address of the default gateway.

Command Modes

Configuration mode

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

Define default gateway using the **ip default gateway** command.

Examples

For example, to configure a default gateway with 192.31.7.18 as its IP address, enter:

```
switch(config)# ip default gateway 192.31.7.18
```

Related Commands

show running-config

ip domain-list

To configure a domain name search list, use the **ip domain-list** command. The domain name list can contain a maximum of three domain names. Use the **no** form of this command to remove a domain name from the list.

ip domain-list *name*

no ip domain-list *name*

Syntax Description

name	Domain name. Enter an unquoted text string with no spaces and a maximum of 85 alphanumeric characters.

Command Modes

Configuration mode

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

You can configure a Domain Name System (DNS) client on the SAMI COSLI PPC to communicate with a DNS server to provide hostname-to-IP-address translation for hostnames in CRLs for the client authentication feature. For unqualified hostnames (hostnames that do not contain a domain name), you can configure a default domain name or a list of domain names that the PPC can use to:

- Complete the hostname
- Attempt a hostname-to-IP-address resolution with a DNS server

If you configure both a domain name list and a default domain name, the PPC uses only the domain name list and not the single default name. After you have enabled domain name lookups and configured a domain name list, the PPC uses each domain name in turn until it can resolve a single domain name into an IP address.

Examples

For example, to configure a domain name list, enter:

```
switch(config)# ip domain-list cisco.com
switch(config)# ip domain-list abc.com
switch(config)# ip domain-list xyz.com
```

To remove a domain name from the list, enter:

```
switch(config)# no ip domain-list xyz.com
```

Related Commands

show running-config
ip domain-lookup
ip domain-name

ip domain-lookup

To enable the PPC to perform a domain lookup (host-to-address translation) with a DNS server, use the **ip domain-lookup** command. By default, this command is disabled. Use the **no** form of this command to return the state of domain lookups to the default value of disabled.

ip domain-lookup

no ip domain-lookup

Syntax Description

This command has no keywords or arguments.

Command Modes

Configuration mode

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

You can configure a Domain Name System (DNS) client on the PPC to communicate with a DNS server to provide hostname-to-IP-address translation for hostnames in CRLs for the client authentication feature.

Before you configure a DNS client on the PPC, ensure that one or more DNS name servers are properly configured and are reachable. Otherwise, translation requests (domain lookups) from the DNS client will be discarded. You can configure a maximum of three name servers. The PPC attempts to resolve the hostnames with the configured name servers in order until the translation succeeds. If the translation fails, the PPC reports an error.

For unqualified hostnames (hostnames that do not contain a domain name), you can configure a default domain name or a list of domain names that the PPC can use to do the following:

- Complete the hostname
- Attempt a hostname-to-IP-address resolution with a DNS server

Examples

For example, to enable domain lookups, enter:

```
switch(config)# ip domain-lookup
```

To return the state of domain lookups to the default value of disabled, enter:

```
switch(config)# no ip domain-lookup
```

Related Commands

show running-config
ip domain-list
ip domain-name
ip name-server

ip domain-name

To configure a default domain name, use the **ip domain-name** command. The domain name list can contain a maximum of three domain names. Use the **no** form of this command to remove a domain name from the list.

ip domain-name *name*

no ip domain-name *name*

Syntax Description

name	Default domain name. Enter an unquoted text string with no spaces and a maximum of 85 alphanumeric characters.

Command Modes

Configuration mode

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

The DNS client feature allows you to configure a default domain name that the PPC uses to complete unqualified hostnames. An unqualified hostname does not contain a domain name (any name without a dot). When domain lookups are enabled and a default domain name is configured, the PPC appends a dot (.) and the configured default domain name to the unqualified host name and attempts a domain lookup.

Examples

For example, to specify a default domain name of cisco.com, enter:

```
switch(config)# ip domain-name cisco.com
```

In the above example, the PPC appends cisco.com to any unqualified host name in a CRL before the PPC attempts to resolve the host name to an IP address using a DNS name server.

To remove the default domain from the configuration, enter:

```
switch(config)# no ip domain-name cisco.com
```

Related Commands

show running-config
ip domain-list
ip domain-lookup

ip name-server

To configure a DNS name server on the PPC, use the **ip name-server** command. You can configure a maximum of three DNS name servers. Use the **no** form of this command to remove a name server from the list.

ip name-server *ip_address*

no ip name-server *ip_address*

Syntax Description

ip_address	IPv4 address of a name server. Enter the address in dotted decimal notation (for example, 192.168.12.15). You can enter up to three name server IP addresses in one command line.

Command Modes

Configuration mode

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

To translate a hostname to an IP address, you must configure one or more (maximum of three) existing DNS name servers on the PPC. Ping the IP address of each name server before you configure it to ensure that the server is reachable.

Examples

For example, to configure three name servers for the DNS client feature, enter:

```
switch(config)# ip name-server 192.168.12.15 192.168.12.16 192.168.12.17
```

To remove a name server from the list, enter:

```
switch(config)# no ip name-server 192.168.12.15
```

Related Commands

show running-config
(config) ip domain-lookup

logging

To configure the IP address of the external logging server, use the **logging** command in global configuration mode. Use the **no** form of the command to remove the IP address.

logging {ip *A.B.C.D* **| ipv6** *X:X:X::X* **| lineread}**

no logging {ip *A.B.C.D* **| ipv6** *X:X:X::X* **| lineread}**

Syntax Description

A.B.C.D	Specifies the IPv4 address of the external logging server.
X:X:X::X	Specifies the IPv6 address of the external logging server.
lineread	Configures the number of lines to read from the log. Value between 1 to 100000.

Defaults

By default, this command is not configured.

Command Modes

Global configuration

Command History

Release	Modification
COSLI 1.0	This command was introduced.
WSG Release 3.0	Added support for IPv6.

Usage Guidelines

None.

Examples

The following example configures 5000 lines to be read:

```
switch(config)# logging lineread 5000
```

Related Commands

show logging

mkdir

To create a new directory in disk0:, use the **mkdir disk0:** command.

mkdir disk0:[*path/*]*directory_name*

Syntax Description

[*path/*]*directory_name*	Name that you assign to the new directory. Specify the optional path if you want to create a directory within an existing directory.

Defaults

No default behavior or values.

Command Modes

EXEC

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

If a directory with the same name already exists, the PPC does not create the new directory and a “Directory already exists” message appears.

Examples

To create a directory in disk0: called TEST_DIRECTORY, enter:

```
switch# mkdir disk0:TEST_DIRECTORY
```

Related Commands

dir
rmdir

move

To move a file between directories in the disk0: file system, use the **move disk0:** command.

move disk0:[/*file_path*/][*filename*] **disk0:**[/*destination_path*/][*filename*]

Syntax Description

disk0:	Indicates the disk0: file system of the current context.
file_path	(Optional) Path of the source directory.
filename	(Optional) Name of the file to move in the disk0: file system.
destination_path	(Optional) Path of the destination directory.
filename	(Optional) Name of the file in the destination directory.

Defaults

No default behavior or values.

Command Modes

EXEC

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

If a file with the same name already exists in the destination directory, that file is overwritten by the file that you move.

Examples

To move the file called SAMPLEFILE in the root directory of disk0: to the MYSTORAGE directory in disk0:, enter:

```
switch# move disk0:SAMPLEFILE disk0:MYSTORAGE/SAMPLEFILE
```

Related Commands

dir

mtu

To adjust the maximum packet size or maximum transmission unit (MTU) size, use the **mtu** command in interface configuration mode. To restore the MTU value to its original default value, use the **no** form of this command.

mtu *bytes*

no mtu

Syntax Description

mtu	MTU size, in bytes. Configures the MTU size, in bytes. The valid values are from 64 to 9216.

Defaults

1500

Command Modes

Interface configuration

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

To configure am MTU size for the VLAN interface on a PPC, use the **mtu** interface configuration command.

Examples

The following example specifies an MTU of 1976 for VLAN 100:

```
switch(config)# interface vlan 100
switch(config-if)# mtu 1976
```

Related Commands

show interface

ping

To verify the connectivity of a remote host or server by sending echo messages from the PPC, use the **ping** command.

ping [*A.B.C.D* [**vrf** *vrfname*] | *X:X:X::X*] [**count** *count*] [**size** *size*]

Syntax Description

A.B.C.D	IPv4 address of the remote host to ping.
vrfname	Specifies the name of the VRF to ping.
X:X:X::X	IPv6 address of the remote host to ping.
count	Specifies the number of echo messages to sent from the PPC.
size	Specifies the size of the messages sent.

Defaults

None.

Command Modes

EXEC

Command History

Release	Modification
COSLI 1.0	This command was introduced.
WSG Release 3.0	Added support IPv6 and VRF.

Usage Guidelines

The **ping** command sends an echo request packet to an address from the PPC and then awaits a reply. The ping output can help you evaluate path-to-host reliability, delays over displaying the name of the current directory and the path, and whether the host can be reached or is functioning.

To terminate a ping session before it reaches its timeout value, press **Ctrl-C**.

Enter the **ping** command without specifying an IP address to customize the ping session by entering values such as the repeat count, datagram size, etc.

Examples

To ping a server with an IP address of 196.168.1.2 using the default ping session values, enter:

```
switch# ping 196.168.1.2
```

To ping a server and change the ping session values, enter:

```
switch# ping
Target IP address: 172.5.31.152
Repeat count [5]:
Datagram size [100]:
PING 1.5.31.152 (1.5.31.152): 100 data bytes
ping: sendto: Network is unreachable
```

In WSG Release 3.0 and above, you can ping an IPv4 or IPv6 address:

```
switch# ping ?
            <A.B.C.D>|<X:X:X::X>  Enter an IP address

switch# ping 2001:88:88:94::1 count 3
     PING 2001:88:88:94::1 (2001:88:88:94::1): 56 data bytes
     64 bytes from 2001:88:88:94::1: seq=0 ttl=64 time=0.7 ms
     64 bytes from 2001:88:88:94::1: seq=1 ttl=64 time=0.5 ms
     64 bytes from 2001:88:88:94::1: seq=2 ttl=64 time=0.6 ms
```

You can also ping a specific IPv4 VRF:

```
switch# ping 196.168.1.2 vrf red
```

Related Commands

There are no related commands.

show arp

To display the current active IP address-to-MAC address mapping in the Address Resolution Protocol (ARP) table, statistics, or inspection or timeout configuration, use the **show arp** command.

show arp [|] [>]

Syntax Description

<table>
<tr><td>|</td><td>(Optional) Pipe character (|) for enabling an output modifier that filters the command output. For a complete description of the options available for filtering the command output, see the <b>show</b> command.</td></tr>
<tr><td>></td><td>(Optional) Greater-than character (>) for enabling an output modifier that redirects the command output to a file. For a complete description of the options available for redirecting the command output, see the <b>show</b> command.</td></tr>
</table>

Defaults

No default behavior or values.

Command Modes

EXEC

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

The **show arp** command without options displays the active IP address-to-MAC address mapping in the ARP table.

Examples

To display the current active IP address-to-MAC address mapping in the ARP table, enter:

```
switch# show arp

Context Admin
========================================================================================
IP ADDRESS               HWTYPE  MAC-ADDRESS         FLAG  MASK            InterfaceType
========================================================================================
127.0.0.28               ether   00:01:02:03:04:05   CM                    eth0
127.0.0.27               ether   00:01:02:03:04:05   CM                    eth0
127.0.0.51               ether   00:01:02:03:04:05   CM                    eth0
127.0.0.24               ether   00:01:02:03:04:05   CM                    eth0
127.0.0.26               ether   00:01:02:03:04:05   CM                    eth0
127.0.0.25               ether   00:01:02:03:04:05   CM                    eth0
========================================================================================
```

Table 2 describes the fields in the **show arp** command output.

Table 2 show arp Command Field Descriptions

Field	Description
Context	The current context—Admin.
IP ADDRESS	The IP address of the system for ARP mapping
HWTYPE	
MAC-ADDRESS	The MAC address of the system mapped to the IP address.
FLAG	
MASK	
InterfaceType	The type of ARP entry. The possible types are LEARNED, GATEWAY, INTERFACE, VSERVER, RSERVER, and NAT.

Related Commands

There are no related commands.

show buffer

To display the contents of the trace buffer, use the **show buffer** command.

show buffer *name*

Syntax Description

name	Name of the trace buffer to display.

Defaults

No default behavior or values.

Command Modes

EXEC

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

The **show buffer** command is intended for use by trained Cisco personnel for troubleshooting purposes only.

Examples

To display the control plane buffer event history, enter:

```
switch# show buffer
```

Related Commands

This command has no related commands.

show bufferlist

To displays the names of all trace buffers, use the **show buffer** command.

show bufferlist [|] [>]

Syntax Description

|	(Optional) Pipe character (|) for enabling an output modifier that filters the command output. For a complete description of the options available for filtering the command output, see the **show** command.
>	(Optional) Greater-than character (>) for enabling an output modifier that redirects the command output to a file. For a complete description of the options available for redirecting the command output, see the **show** command.

Defaults

No default behavior or values.

Command Modes

EXEC

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

The **show bufferlist** command is intended for use by trained Cisco personnel for troubleshooting purposes only.

Examples

To display the control plane buffer event history, enter:

```
switch# show bufferlist
======================
   Buffer Name List
======================
```

Related Commands

This command has no related commands.

show clock

To display the current date and time settings of the system clock, use the **show clock** command.

show clock [|] [>]

Syntax Description

|	(Optional) Pipe character (|) for enabling an output modifier that filters the command output. For a complete description of the options available for filtering the command output, see the **show** command.
>	(Optional) Greater-than character (>) for enabling an output modifier that redirects the command output to a file. For a complete description of the options available for redirecting the command output, see the **show** command.

Defaults

No default behavior or values.

Command Modes

EXEC

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

To configure the system clock setting, use the **clock** command in the EXEC mode.

Examples

To display the current clock settings, enter:

```
switch# show clock
Fri Feb 13 19:18:13 UTC 2009
```

Related Commands

clock summer-time
clock timezone

show copyright

To display the software copyright information for the PPC, use the **show copyright** command.

show copyright [|] [>]

Syntax Description

|	(Optional) Pipe character (|) for enabling an output modifier that filters the command output. For a complete description of the options available for filtering the command output, see the **show** command.
>	(Optional) Greater-than character (>) for enabling an output modifier that redirects the command output to a file. For a complete description of the options available for redirecting the command output, see the **show** command.

Defaults

No default behavior or values.

Command Modes

EXEC

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

Use the **show copyright** command to display the copyright information for the SAMI PPC.

Examples

To display the PPC software copyright information, enter:

```
switch# show copyright
```

Related Commands

This command has no related commands.

show crashinfo

To display the contents of the crash file stored in Flash memory, enter the **show crashinfo** command in EXEC mode.

show crashinfo [*filename*]

Syntax Description

filename	(Optional) Name of the crash file.

Defaults

No default behavior or values.

Command Modes

EXEC

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

The first string of the crash file is ": Saved_Crash" and the last string is ": End_Crash".

If there is no crash data saved in flash, or if the crash data has been cleared by entering the **clear crashinfo** command, the **show crashinfo** command displays an error message.

Examples

To display the PPC software copyright information, enter:

```
switch# show crashinfo
```

Related Commands

This command has no related commands.

show debug

To display debugging flags that have been set on a PPC, use the **show debug** command.

show debug [|] [>]

Syntax Description

|	(Optional) Pipe character (|) for enabling an output modifier that filters the command output.
>	(Optional) Greater-than character (>) for enabling an output modifier that redirects the command output to a file.

Defaults

No default behavior or values

Command Modes

EXEC

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

The **show debug** command lists debugging flags that have been set on the PPC.

Examples

To display the debug flags set on a PPC, enter:

```
switch# show debug
No debug flag set
```

Related Commands

This command has no related commands.

show eventlog

To display the event log, use the **show eventlog** command in EXEC mode.

show eventlog [|] [>]

Syntax Description

|	(Optional) Pipe character (|) for enabling an output modifier that filters the command output.
>	(Optional) Greater-than character (>) for enabling an output modifier that redirects the command output to a file.

Defaults

No default behavior or values

Command Modes

EXEC

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

The **show eventlog** command lists system events that have occurred on the PPC.

Examples

To display a list of events that have occurred on a PPC, enter:

```
switch# show eventlog
Feb 13 06:40:06 cpu0 notice syslog-ng[380]: syslog-ng starting up; version=\'2.0.9\'
Feb 13 06:40:06 cpu0 info kernel: Using MPC8548 BOUNCER machine description
Feb 13 06:40:06 cpu0 info kernel: Memory CAM mapping: CAM0=1024Mb, CAM1=0Mb, CAM2=0Mb
residual: 0Mb
Feb 13 06:40:06 cpu0 notice kernel: Linux version
2.6.21_mvlcge500-octeon-mips64_octeon_v2_be (vvaidhya@srg-mcs-3) (gcc version 4.2.0
(MontaVista 4.2.0-16.0.23.custom 2008-07-02)) #1 Mon Feb 9 16:03:50 PST 2009
Feb 13 06:40:06 cpu0 debug kernel: Found legacy serial port 0 for
/soc8548@f7000000/serial@4500
Feb 13 06:40:06 cpu0 debug kernel: mem=f7004500, taddr=f7004500, irq=0, clk=500000000,
speed=9600
Feb 13 06:40:06 cpu0 debug kernel: Found legacy serial port 1 for
/soc8548@f7000000/serial@4600
Feb 13 06:40:06 cpu0 debug kernel: mem=f7004600, taddr=f7004600, irq=0, clk=500000000,
speed=9600
Feb 13 06:40:06 cpu0 debug kernel: Entering add_active_range(0, 262144, 524288) 0 entries
of 256 used
Feb 13 06:40:06 cpu0 debug kernel: Top of RAM: 0x80000000, Total RAM: 0x40000000
Feb 13 06:40:06 cpu0 debug kernel: Memory hole size: 1024MB
Feb 13 06:40:06 cpu0 warning kernel: Zone PFN ranges:
Feb 13 06:40:06 cpu0 warning kernel: DMA        262144 ->   524288
Feb 13 06:40:06 cpu0 warning kernel: Normal     524288 ->   524288
Feb 13 06:40:06 cpu0 warning kernel: early_node_map[1] active PFN ranges
Feb 13 06:40:06 cpu0 warning kernel: 0:   262144 ->   524288
Feb 13 06:40:06 cpu0 debug kernel: On node 0 totalpages: 262144
Feb 13 06:40:06 cpu0 debug kernel: DMA zone: 2048 pages used for memmap
Feb 13 06:40:06 cpu0 debug kernel: DMA zone: 0 pages reserved
Feb 13 06:40:06 cpu0 debug kernel: DMA zone: 260096 pages, LIFO batch:31
Feb 13 06:40:06 cpu0 debug kernel: Normal zone: 0 pages used for memmap
Feb 13 06:40:06 cpu0 warning kernel: Built 1 zonelists.  Total pages: 260096
Feb 13 06:40:06 cpu0 notice kernel: Kernel command line:
Feb 13 06:40:06 cpu0 info kernel: mpic: Setting up MPIC \" OpenPIC  \" version 1.2 at
f7040000, max 1 CPUs
Feb 13 06:40:06 cpu0 info kernel: mpic: ISU size: 80, shift: 7, mask: 7f
Feb 13 06:40:06 cpu0 info kernel: mpic: Initializing for 80 sources
Feb 13 06:40:06 cpu0 warning kernel: PID hash table entries: 4096 (order: 12, 16384 bytes)
Feb 13 06:40:06 cpu0 debug kernel: time_init: decrementer frequency = 62.500000 MHz
Feb 13 06:40:06 cpu0 debug kernel: time_init: processor frequency   = 1250.000000 MHz
Feb 13 06:40:06 cpu0 warning kernel: Dentry cache hash table entries: 131072 (order: 7,
524288 bytes)
Feb 13 06:40:06 cpu0 warning kernel: Inode-cache hash table entries: 65536 (order: 6,
262144 bytes)
Feb 13 06:40:06 cpu0 info kernel: Memory: 989056k/1048576k available (49876k kernel code,
59168k reserved, 92k data, 127k bss, 47140k init)
Feb 13 06:40:06 cpu0 debug kernel: Calibrating delay loop... 124.92 BogoMIPS (lpj=249856)
Feb 13 06:40:06 cpu0 info kernel: Security Framework v1.0.0 initialized
Feb 13 06:40:06 cpu0 info kernel: SELinux:  Initializing.
Feb 13 06:40:06 cpu0 debug kernel: SELinux:  Starting in enforcing mode
Feb 13 06:40:06 cpu0 warning kernel: Mount-cache hash table entries: 512
Feb 13 06:40:06 cpu0 info kernel: NET: Registered protocol family 16
```

Related Commands

This command has no related commands.

show gfarstats

To display the current gianfar Ethernet driver traffic counters, use the **show gfarstats** command in EXEC mode.

show gfarstats [|] [>]

Syntax Description

|	(Optional) Pipe character (|) for enabling an output modifier that filters the command output.
>	(Optional) Greater-than character (>) for enabling an output modifier that redirects the command output to a file.

Defaults

No default behavior or values

Command Modes

EXEC

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

The **show gfarstats** command lists gianfar Ethernet driver traffic counters.

Examples

To display a list of counters, enter:

```
switch# show gfarstats
Detailed stats:
rx-dropped-by-kernel             = 0
rx-large-frame-errors            = 0
rx-short-frame-errors            = 0
rx-non-octet-errors              = 0
rx-crc-errors                    = 0
rx-overrun-errors                = 0
rx-busy-errors                   = 0
rx-babbling-errors               = 0
rx-truncated-frames              = 0
ethernet-bus-error               = 0
tx-babbling-errors               = 0
tx-underrun-errors               = 0
rx-skb-missing-errors            = 0
tx-timeout-errors                = 0
rx-packets-in-ring0              = 16652586
rx-packets-in-ring1              = 0
tx-rx-64-frames                  = 0
tx-rx-65-127-frames              = 250478
tx-rx-128-255-frames             = 2117440
tx-rx-256-511-frames             = 2793415
tx-rx-512-1023-frames            = 28
tx-rx-1024-1518-frames           = 20
```

```
tx-rx-1519-1522-good-vlan        = 0
rx-bytes                         = 478941470
rx-packets                       = 4069674
rx-fcs-errors                    = 0
receive-multicast-packet         = 0
receive-broadcast-packet         = 0
rx-control-frame-packets         = 0
rx-pause-frame-packets           = 0
rx-unknown-op-code               = 0
rx-alignment-error               = 0
rx-frame-length-error            = 0
rx-code-error                    = 0
rx-carrier-sense-error           = 0
rx-undersize-packets             = 15061
rx-oversize-packets              = 0
rx-fragmented-frames             = 0
rx-jabber-frames                 = 0
rx-dropped-frames                = 0
tx-byte-counter                  = 197681758
tx-packets                       = 1515087
tx-multicast-packets             = 0
tx-broadcast-packets             = 0
tx-pause-control-frames          = 0
tx-deferral-packets              = 0
tx-excessive-deferral-packets    = 0
tx-single-collision-packets      = 0
tx-multiple-collision-packets    = 0
tx-late-collision-packets        = 0
tx-excessive-collision-packets   = 0
tx-total-collision               = 0
reserved                         = 0
tx-dropped-frames                = 0
tx-jabber-frames                 = 0
tx-fcs-errors                    = 0
tx-control-frames                = 0
tx-oversize-frames               = 43
tx-undersize-frames              = 2773
tx-fragmented-frames             = 0
```

Related Commands

This command has no related commands.

show hosts

To display the hosts on a PPC, use the **show hosts** in EXEC mode.

show hosts

Syntax Description

This command has no arguments or keywords.

Defaults

No default behavior or values

Command Modes

EXEC

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

The **show hosts** command lists the name servers and their corresponding IP addresses. It also lists the hostnames, their corresponding IP addresses, and their corresponding aliases (if applicable) in a host table summary.

Examples

To display a list of hosts on a PPC, enter:

```
switch# show hosts
Entering func dns_show_config at line [734]
==== Param info ====
No flag: FALSE, CMI mesg type: 0, Shell_type: 1, Submode_context: 0
Parameter Count: 1, Command Id: 104, MTS Q: 3
Session id: , Username: , Debug_flag: 0, filter: 0 Prc_mode: 3
Sup state: 1, User mode state: 1, Is_admin: 1
Exec_filter_mode: 0, Script_mode: 0
Vty ID: /dev/pts/0 User Perms Mask:0
Permitted vsans: 0-4095

Ascii Gen: FALSE
Ascii command:  Info flags: 0x0

Param Arg [0]. Token id: 104 NULL
command line of pinfo has value [show hosts]
Default domain is not set
Name/address lookup uses domain service
Name servers are 255.255.255.255
```

Related Commands

This command has no related commands.

show icmp statistics

To display the Internet Control Message Protocol (ICMP) statistics, use the **show icmp statistics** command.

show icmp statistics [|] [>]

Syntax Description

|	(Optional) Pipe character (|) for enabling an output modifier that filters the command output.
>	(Optional) Greater-than character (>) for enabling an output modifier that redirects the command output to a file.

Command Modes

EXEC

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

Use the **show icmp-statistics** command to view ICMP statistics.

Examples

To display ICMP statistics, enter:

```
switch# show icmp statistics

-----------------------------------------------
ICMP Statistics :
-----------------------------------------------
                           Rx         Tx
Total Messages    :         0          0
Errors            :         0          0
Echo Request      :         0          0
Echo Reply        :         0          0
Unreachable       :         0          0
TTL Expired       :         0          0
Redirect          :         0          0
Address Mask      :         0          0
Param problem     :         0          0
Source quench     :         0          0
Time stamp        :         0          0

-----------------------------------------------
```

Related Commands

There are no related commands.

show interface

To display interface information, use the **show interface** command.

show interface [**vlan** *number*] [|] [>]

Syntax Description

vlan *number*	(Optional) Displays the statistics for the specified VLAN.
|	(Optional) Pipe character (|) for enabling an output modifier that filters the command output. For a complete description of the options available for filtering the command output, see the **show** command.
>	(Optional) Greater-than character (>) for enabling an output modifier that redirects the command output to a file. For a complete description of the options available for redirecting the command output, see the **show** command.

Defaults

No default behavior or values.

Command Modes

EXEC

Command History

Release	Modification
WSG Release 1.0	This command was introduced.
WSG Release 3.0	IPV6 statistics were added.

Usage Guidelines

To display all of the interface statistical information, enter the **show interface** command without using **vlan** optional keyword.

Examples

To display all of the interface statistical information, enter:

```
switch# show interface
eth0      Link encap:Ethernet  HWaddr 00:1F:CA:08:89:2E
          inet addr:127.0.0.23  Bcast:127.0.0.255  Mask:255.255.255.0
          UP BROADCAST RUNNING MULTICAST  MTU:9560  Metric:1
          RX packets:376394 errors:0 dropped:0 overruns:0 frame:0
          TX packets:35455 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:109038474 (103.9 MiB)  TX bytes:4452754 (4.2 MiB)
          Base address:0x4000

eth0.121  Link encap:Ethernet  HWaddr 00:1F:CA:08:89:2E
          inet addr:1.5.31.122  Bcast:1.5.255.255  Mask:255.255.0.0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:5405 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:0 (0.0 b)  TX bytes:324300 (316.6 KiB)
```

To display the details, statistics, or IP information for all or a specified VLAN interface (51 in this example), enter:

```
wsg# show interface vlan 51
    vlan [51] is administratively up
    Hardware type: VLAN
    MODE: UNKNOWN
    IPv4 Address = [51.51.51.4] netmask = [255.255.255.0]
    IPv6 Address = fe80::21b:2aff:fe65:fa56/64
    VRF: global
    FT Status: non redundant
    Description:
    MTU: 1500 bytes

    295165 unicast packets input, 23950072 bytes
    0 multicast, 84326 broadcast
    0 input errors, 0 unknown, 0 ignored
    6 unicast packets output, 468 bytes
    0 multicast, 0 broadcast
    0 output errors, 0 ignored
```

Table 4-3 describes the fields in the **show interface** command output.

Table 4-3 show interface vlan Command Field Descriptions

Field	Description
VLAN_name	Status of the specified VLAN: either up or down.
Hardware type is	Hardware type of the interface: VLAN.
Mode	Mode associated with the VLAN. A bridge-group VLAN is displayed as transparent. A routed VLAN is displayed as routed. Otherwise, this field displays the value "unknown."
IP Address	IPv4 address of the interface.
Netmask	Interface netmask.
FT status	Status of whether the interface is redundant.
Description	Description for the VLAN.
MTU	Configured MTU in bytes.
# unicast packets input, # bytes	Total number of incoming unicast packets and number of bytes.
# multicast, # broadcast	Total number of incoming multicast and broadcast packets.
# input errors, # unknown, # ignored	Total number of errors for incoming packets, including numbers for packets that are unknown, and ignored.
# unicast packets output, # bytes	Total number of outgoing unicast packets and number of bytes.
# multicast, # broadcast	The total number of outgoing multicast and broadcast packets.
# output errors, # unknown	Number of errors for outgoing packets, including unknown packets.

Related Commands

There are no related commands.

show ip interface brief

To display a brief configuration and status summary of all interfaces or a specified VLAN, enter:

show ip interface brief [**vlan** *number*]

Syntax Description

number	Displays the statistics for the specified VLAN.

Defaults

None.

Command Modes

EXEC

Command History

Release	Modification
WSG Release 1.0	This command was introduced.
WSG Release 3.0	Added support for IPv6.

Usage Guidelines

Use the **show ip interface brief** command to display a brief configuration and status summary of all the interfaces or a specified VLAN.

Examples

To display a brief configuration and status summary of all the interfaces, enter:

```
switch# show ip interface brief
Interface    IP-Address                   Status                  Protocol
vlan   51    51.51.51.4                   administratively up     up
             fe80::21b:2aff:fe65:fa56/64
```

Table 4-4 describes the fields in the **show ip interface brief** command output.

Table 4-4 show ip interface brief Command Field Descriptions

Field	Description
Interface	VLAN number.
IP Address	IPv4/IPv6 address(es) for the VLAN interface.
Status	Status of the specified VLAN—either up or down.
Protocol	Status of the line protocol—either up or down.

Related Commands

There are no related commands.

show ip interface vlan

To display a configuration and status summary of a specified VLAN, enter:

show ip interface vlan *number*

Syntax Description

number	Displays the statistics for the specified VLAN.

Defaults

None.

Command Modes

EXEC

Command History

Release	Modification
WSG Release 1.0	This command was introduced.
WSG Release 3.0	Added IPv6 statistics.

Usage Guidelines

Use the **show ip interface vlan** command to display a configuration and status summary of a specified VLAN.

Examples

To display a brief configuration and status summary of all the interfaces, enter:

```
switch# sh ip interface vlan 51
   Vlan51 is up, line protocol is up
   IP Address is 51.51.51.4
   IPv6 address is fe80::21b:2aff:fe65:fa56/64
   Broadcast Address is 255.255.255.0
   Address determined by setup command
   MTU is 1500 bytes
```

Related Commands

There are no related commands.

show ixpstats

To display the contents of the IXP stastistics file, use the **show ixpstats** command in EXEC mode.

show ixpstats [|] [>]

Syntax Description

|	(Optional) Pipe character (|) for enabling an output modifier that filters the command output.
>	(Optional) Greater-than character (>) for enabling an output modifier that redirects the command output to a file.

Command Modes

EXEC

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

Use the **show ixpstats** command to view the contents of the IXP statistics file.

Examples

To display IXP statistics, enter:

```
switch# show ixpstats
Statistics at the IXP processor
---------------------------------

Statistics for Module: RX
Output Packets                                          13856661
Missing SOP                                                    0
Incorrect Port Number                                          0
Unexpected SOP                                                 0
Drops - No Buffer                                              0
SPI4 Length Error                                              0
SPI4 Parity Error                                              0
SPI4 Aborts                                                    0

Statistics for Module: TX0
Input Packets                                            1349186
Table 0 (Port 2) TX'ed                                    674596
Table 1 (Port 4) TX'ed                                    674581
Table 2 (Port 8) TX'ed                                         9
Table 3 TX'ed (unused)                                         0
SPI-4 flow control                                             0

....
```

Related Commands

There are no related commands.

show logging

To display the current syslog configuration and syslog messages, use the **show logging** command.

show logging {**config** [|] [>] | **message** {**all cpuid** *cpu-id* | **module** *mod-id*}}

Syntax Description

config	Displays syslog configuration.
message	Displays syslog messages.
cpu-id	Displays syslog messages for a specific CPU ID.
mod-id	Displays sysog messages for a specific module ID.
|	Pipe character (|) for enabling an output modifier that filters the command output. For a complete description of the options available for filtering the command output, see the **show** command.
>	Greater-than character (>) for enabling an output modifier that redirects the command output to a file. For a complete description of the options available for redirecting the command output, see the **show** command.

Defaults

None.

Command Modes

EXEC

Command History

Release	Modification
COSLI 1.0	This command was introduced.
WSG Release 3.0	Added external IPv6 logging information.

Usage Guidelines

To enable system logging, use the **logging** configuration command. The **show logging** command lists the current syslog messages and identifies which **logging** command options are enabled.

Examples

To display the syslog configuration, enter:

```
wsg# show logging config
    Ext logging server IP: 1.1.1.1
    Ext logging server IPv6: 2001:88:88:94::1
    Number of lines read log: 100
```

Related Commands

logging

show processes

To display general information about all of the processes running on the PPC, use the **show processes** command. The **show processes** command displays summary CPU information for the SiByte 1250 Processor.

show processes [|] [>]

Syntax Description

This command has no arguments or keywords.

Defaults

No default behavior or values.

Command Modes

EXEC

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

The displayed system processes information is at the CPU system level (the total CPU usage) and is not on a per-context level.

Examples

To display information about the memory processes for the SiByte Processor, enter:

```
switch# show processes
PID    State  PC        TTY   Process
-----  -----  --------  ----  -------------
    1      S  1f89b7b0     -  (init)
    2      S         0     -  (posix_cpu_timer)
    3      S         0     -  (softirq-high/0)
    4      S         0     -  (softirq-timer/0)
    5      S         0     -  (softirq-net-tx/)
    6      S         0     -  (softirq-net-rx/)
    7      S         0     -  (softirq-block/0)
    8      S         0     -  (softirq-tasklet)
    9      S         0     -  (softirq-sched/0)
   10      S         0     -  (softirq-rcu/0)
   11      S         0     -  (watchdog/0)
   12      S         0     -  (desched/0)
   13      S         0     -  (events/0)
   14      S         0     -  (khelper)
   15      S         0     -  (kthread)
   38      S         0     -  (kblockd/0)
...
```

Related Commands

show tech-support

show running-config

To display the running configuration of a PPC, use the **show running-config** command.

show running-config [|] [>]

Syntax Description

This command has no keywords or arguments.

Defaults

No default behavior or values.

Command Modes

EXEC

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

Use the **show running-config** command to display the running configuration of a PPC.

Examples

To display the entire running configuration, enter:

```
switch# show running-config
Generating configuration........
hostname PPC3
interface vlan 121
  ip address 172.5.31.122 255.255.0.0
interface vlan 2
  no ip address
  shutdown
ip default-gateway 172.5.31.21

snmp-server community private rw
snmp-server location  "san"
snmp-server contact "abc"
ipsec local-identity id-type fqdn id wsg.cisco.com
```

Related Commands

show startup-config

show snmp

To display the Simple Network Management Protocol (SNMP) statistics and configured SNMP information, use the **show snmp** command.

show snmp [**community** | **host**] [|] [>]

Syntax Description

community	Displays SNMP community strings.
host	Displays the configured SNMP notification recipient host, the User Datagram Protocol (UDP) port number, the user, and the security model.
|	Pipe character (|) for enabling an output modifier that filters the command output. For a complete description of the options available for filtering the command output, see the **show** command.
>	Greater-than character (>) for enabling an output modifier that redirects the command output to a file. For a complete description of the options available for redirecting the command output, see the **show** command.

Defaults

PPC community strings display.

Command Modes

EXEC

Command History

Release	Modification
WSG Release 1.0	This command was introduced.
WSG Release 3.0	Added IPv6 statistics.

Usage Guidelines

By default, this command displays the PPC contact, the PPC location, the packet traffic information, community strings, and the user information. You can configure the PPC to display specific SNMP information by including the appropriate keyword.

Examples

To display SNMP statistics and configured SNMP information, enter:

```
switch# show snmp
sys contact: cis
sys location: san
0 SNMP packets input
        0 Bad SNMP versions
        0 Unknown community name
        0 Illegal operation for community name supplied
        0 Encoding errors
        0 Number of requested variables
        0 Number of altered variables
        0 Get-request PDUs
        0 Get-next PDUs
        0 Set-request PDUs
0 SNMP packets output
```

```
        0 Too big errors
        0 No such name errors
        0 Bad values errors
        0 General errors
        0 Response PDUs
        0 Trap PDUs

switch# show snmp host
    Host                            Port   Version  Type   CommName
    ____                            ____   _______  ____   ______
   2001:88:88:94::1            162          v1       trap          v2
```

Related Commands

snmp-server community
snmp-server host

show startup-config

To display the PPC startup configuration, use the **show startup-config** command in EXEC mode.

show startup-config [|] [>]

Syntax Description

<table>
<tr><td>|</td><td>(Optional) Pipe character (|) for enabling an output modifier that filters the command output. For a complete description of the options available for filtering the command output, see the <b>show</b> command.</td></tr>
<tr><td>&gt;</td><td>(Optional) Greater-than character (>) for enabling an output modifier that redirects the command output to a file. For a complete description of the options available for redirecting the command output, see the <b>show</b> command.</td></tr>
</table>

Defaults

No default behavior or values.

Command Modes

EXEC

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

To clear the startup configuration, use the **clear startup-config** command.

To copy the running configuration to the startup configuration, or copy the startup configuration to the running configuration, use the **copy running-config** command.

Examples

To display information about the startup configuration, enter:

```
switch# show startup-config
hostname PPC3
interface vlan 121
  ip address 172.5.31.122 255.255.0.0
interface vlan 2
  no ip address
  shutdown
ip default-gateway 172.5.31.21
snmp-server community private rw
snmp-server location  "san"
snmp-server contact "abc"
ipsec local-identity id-type fqdn id wsg.cisco.com
```

Related Commands

show running-config

show system

To display the PPC system information, use the **show system** command.

show system {**internal sysmgr service** {**all** [**details**] | **local [details]** | **name** *service* | **not-running [details]** | **pid** *service-pid* | **running [details]** | **uuid** *service-uuid*} | **resources** | **uptime**} [|] [>]

Syntax Description

internal sysmgr service	Displays Cisco internal system-related functions. The **internal sysmgr service** keywords and related keywords, options, and arguments are intended for use by trained Cisco personnel for troubleshooting purposes only.
resources	Displays system-related CPU and memory statistics.
uptime	Displays how long the PPC has been up and running.
|	(Optional) Pipe character (|) for enabling an output modifier that filters the command output.
>	(Optional) Greater-than character (>) for enabling an output modifier that redirects the command output to a file.

Command Modes

EXEC

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

The **show system internal sysmgr service** keyword option, and its related keywords, options, and arguments are intended for use by trained Cisco personnel for troubleshooting purposes only.

Examples

To display system-related and CPU and memory statistics, enter:

```
switch# show system resources
Load average:   1 minute: 1.15   5 minutes: 1.09   15 minutes: 1.02
Total number of processes   :   77 total, 2 running
CPU states  :   0.0% user,   0.0% kernel,   100.0% idle
Memory usage:      1012K total,       330K used,       682K free
                      0K buffers,     141K cache
```

To display how long the PPC has been up and running, enter:

```
switch# show system uptime
System start time:          Fri Feb 13 06:40:39 2009

System uptime:              4 days, 8 hours, 25 minutes, 0 seconds
Kernel uptime:              4 days, 8 hours, 25 minutes, 46 seconds
PPC3#
```

Related Commands

This command has no related commands.

show tcp statistics

To display Transmission Control Protocol (TCP) statistics, use the **show tcp statistics** command.

show tcp statistics [|] [>]

Syntax Description

|	(Optional) Pipe character (|) for enabling an output modifier that filters the command output.
>	(Optional) Greater-than character (>) for enabling an output modifier that redirects the command output to a file.

Command Modes

EXEC

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

To display TCP statistics, use the **show tcp statistics** command.

Examples

To display TCP statistics, enter:

```
switch# show tcp statistics
-----------------------------------------------
 TCP Statistics :
 -------------------------------------------------
 Rcvd    : 3996 total , 0 errors
  Sent    : 2958 total , 0 RST flag segment
  7 active opens , 4 passive opens
 Connections : 4 attempts-failed , 0 established resets , 1 currently established
-----------------------------------------------
```

Related Commands

There are no related commands.

show tech-support

To display information that is useful to technical support when reporting a problem with your PPC, use the **show tech-support** command.

show tech-support [**details**] [|] [>]

Syntax Description

details	(Optional) Provides detailed information for each of the **show** commands described below in the "Usage Guidelines" section.
|	(Optional) Pipe character (|) for enabling an output modifier that filters the command output.
>	(Optional) Greater-than character (>) for enabling an output modifier that redirects the command output to a file.

Command Modes

EXEC

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

The **show tech-support** command is useful when collecting a large amount of information about your PPC for troubleshooting purposes with Cisco technical support. The output of this command can be provided to technical support representatives when reporting a problem.

The **show tech-support** command displays the output of several **show** commands at once. The output from this command varies depending on your configuration. The default output of the **show tech-support** command includes the output of the following commands:

- **show version**—See the **show version** command.
- **show clock**—See the **show clock** command.
- **show running-config**—See the **show running-config** command.
- **show startup-config—**See the **show startup-config** command.

Explicitly set the terminal length command to 0 (zero) to disable autoscrolling and enable manual scrolling. Use the **show terminal** command to view the configured terminal size. After obtaining the output of this command, reset your terminal length as required.

You can save the output of this command to a file by appending > *filename* to the **show tech-support** command. If you save this file, verify that you have sufficient space to do so as each of these files may take about 1.8 MB.

Examples

To display the summary version of the technical support report, enter:

```
switch# show tech-support
```

Related Commands

show clock
show running-config
show startup-config
show version

show telnet

To display the information about the Telnet session, use the **show telnet** command.

show telnet [**maxsessions**] [\|] [>]

Syntax Description

maxsessions	(Optional) Displays the maximum number of enabled Telnet sessions.
|	(Optional) Pipe character (|) for enabling an output modifier that filters the command output. For a complete description of the options available for filtering the command output, see the **show** command.
>	(Optional) Greater-than character (>) for enabling an output modifier that redirects the command output to a file. For a complete description of the options available for redirecting the command output, see the **show** command.

Command Modes

EXEC

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

If you do not include the optional **maxsessions** keyword, the PPC displays the following Telnet information:

- Session ID—Unique session identifier for the Telnet session
- Remote host—IP address and port of the remote Telnet client
- Active time—Time since the Telnet connection request was received by the PPC

Examples

To display the current Telnet information, enter:

```
switch# show telnet
Max Sessions not configured
-----------------------------------------------------------
SessionId        Host:Port           Active-Time
-----------------------------------------------------------
  29965       127.0.0.51:28673     0 Yrs 0 Days 00:19:59
```

Related Commands

telnet

show terminal

To display the console terminal settings, use the **show terminal** command.

show terminal [**internal info**] [|] [>]

Syntax Description

internal info	(Optional) Displays terminal internal information.
|	(Optional) Pipe character (|) for enabling an output modifier that filters the command output. For a complete description of the options available for filtering the command output, see the **show** command.
>	(Optional) Greater-than character (>) for enabling an output modifier that redirects the command output to a file. For a complete description of the options available for redirecting the command output, see the **show** command.

Command Modes

EXEC

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

Use the show terminal command to display the console terminal settings.

Examples

To display the console terminal settings, enter:

```
switch# show terminal
TTY: /dev/pts/0 Type: "vt100"
Length: 27 lines, Width: 80 columns
Session Timeout: None
```

Related Commands

terminal

show udp statistics

To display User Datagram Protocol (UDP) statistics, use the **show udp statistics** command.

show udp statistics [|] [>]

Syntax Description

|	(Optional) Pipe character (|) for enabling an output modifier that filters the command output.
>	(Optional) Greater-than character (>) for enabling an output modifier that redirects the command output to a file.

Command Modes

EXEC

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

Use the **show udp statistics** command to display UDP statistics.

Examples

To display UDP statistics, enter:

```
swtich# show udp statistics
```

Related Commands

There are no related commands.

show version

To display the version information of system software that is loaded in flash memory and currently running on the PPC, use the **show version** command.

show version[|] [>]

Syntax Description

|	(Optional) Pipe character (|) for enabling an output modifier that filters the command output. For a complete description of the options available for filtering the command output, see the **show** command.
>	(Optional) Greater-than character (>) for enabling an output modifier that redirects the command output to a file. For a complete description of the options available for redirecting the command output, see the **show** command.

Command Modes

EXEC

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

The **show version** command also displays information related to the following PPC hardware components:

- Slot number—Slot number that the SAMI occupies on the Catalyst 6500 series chassis.
- CPU—Number of CPUs and type and model
- Memory—Total and shared volatile memory
- Flash memory—Total and used flash memory

Use the **show version** command to verify the software version on the PPC before and after an upgrade.

Examples

To display the software version information, enter:

```
switch# show version
Image Version

Image version:
1.0.0


Software Version

Linux version 2.6.21_mvlcge500-octeon-mips64_octeon_v2_be (vvaidhya@srg-mcs-3) (gcc
version 4.2.0 (MontaVista 4.2.0-16.0.23.custom 2008-07-02)) #1 Mon Feb 9 16:03:50 PST 2009


Hardware Version
Hardware version:
processor       : 0
cpu             : e500v2
clock           : 1250.000000MHz
revision        : 2.0 (pvr 8021 0020)
bogomips        : 124.92
timebase        : 62500000
platform        : MPC8548 BOUNCER
Machine         : Bouncer - MPC8548
clock           : 1250MHz
PVR             : 0x80210020
SVR             : 0x80390020
PLL setting     : 0x5
Memory          : 1024 MB
MemTotal:      1036548 kB
MemFree:        863888 kB
Buffers:             0 kB
Cached:         143456 kB
SwapCached:          0 kB
Active:          24500 kB
Inactive:       120816 kB
SwapTotal:           0 kB
SwapFree:            0 kB
Dirty:               0 kB
Writeback:           0 kB
AnonPages:        1880 kB
Mapped:           2396 kB
Slab:             6928 kB
SReclaimable:     3372 kB
SUnreclaim:       3556 kB
PageTables:        188 kB
NFS_Unstable:        0 kB
Bounce:              0 kB
CommitLimit:    518272 kB
Committed_AS:    31056 kB
VmallocTotal:  2048000 kB
VmallocUsed:     18148 kB
VmallocChunk:  2029796 kB
Procnum:
3
Slotnum:
2


Application Versions

No application.
Linux version 2.6.21_mvlcge500-octeon-mips64_octeon_v2_be (vvaidhya@srg-mcs-3) (gcc
version 4.2.0 (MontaVista 4.2.0-16.0.23.custom 2008-07-02)) #1 Mon Feb 9 16:03:50 PST 2009


Kernel uptime:              4 days, 8 hours, 29 minutes, 44 seconds
```

Related Commands

show tech-support

show vlans

To display the VLANs on the PPC downloaded from the supervisor engine, use the **show vlans** command.

show vlans [|] [>]

Syntax Description

|	(Optional) Pipe character (|) for enabling an output modifier that filters the command output. For a complete description of the options available for filtering the command output, see the **show** command.
>	(Optional) Greater-than character (>) for enabling an output modifier that redirects the command output to a file. For a complete description of the options available for redirecting the command output, see the **show** command.

Command Modes

EXEC

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

Use the **show vlans** command to display a list of VLANs downloaded from the supervisor engine on the SAMI PPC.

Examples

To display the VLANs on the PPC downloaded from the supervisor engine, enter:

```
switch# show vlans
Vlans configured on SUP for this module
    vlan192-193 vlan333
```

Related Commands

This command has no related commands.

snmp-server community

To create or modify Simple Network Management Protocol (SNMP) community names and access privileges, use the **snmp-server community** command. Each SNMP device or member is part of a community. An SNMP community determines the access rights for each SNMP device. SNMP uses communities to establish trust between managers and agents. Use the **no** form of this command to remove an SNMP community.

snmp-server community *community_name* [**ro** | **rw**]

no snmp-server community *community_name* [**ro** | **rw**]

Syntax Description

community_name	SNMP community name for this system. Enter an unquoted text string with no space and a maximum of 32 alphanumeric characters.
ro	(Optional) Allows read-only access for this community.
rw	(Optional) Allows read and write access for this community.

Command Modes

Configuration mode

Caution If you change the SNMP engine ID, all configured SNMP users become invalid. You must recreate all SNMP users by using the **snmp-server community** command in configuration mode.

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

After you create or modify a community, all SNMP devices assigned to that community as members have the same access rights (as described in RFC 2576). The COSLI PPC supports read-only access to the MIB tree for devices included in this community.

Examples

To specify an SNMP community called SNMP_Community1, which is a member of the user group, with read-only access privileges for the community, enter:

```
switch(config)# snmp-server community SNMP_Community1
```

To remove an SNMP community, enter:

```
swtich(config)# no snmp-server community SNMP_Community1
```

Related Commands

snmp-server host

snmp-server contact

To specify the contact information for the Simple Network Management Protocol (SNMP) system, use the **snmp-server contact** command. You can specify information for only one contact name. Use the **no** form of this command to remove an SNMP contact.

snmp-server contact *contact_information*

no snmp-server contact

Syntax Description

contact_information	SNMP contact information for this system. Enter a text string with a maximum of 240 alphanumeric characters, including spaces. If the string contains more than one word, enclose the string in quotation marks (“ ”). You can include information on how to contact the person; for example, you can include a phone number or an e-mail address.

Command Modes

Configuration mode

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

You can specify only one contact name per SNMP system.

Examples

To specify SNMP system contact information, enter:

```
switch(config)# snmp-server contact “User1 user1@cisco.com”
```

To remove the specified SNMP contact information, enter:

```
switch(config)# no snmp-server contact
```

Related Commands

snmp-server host

snmp-server enable traps

To enable the COSLI PPC to send Simple Network Management Protocol (SNMP) traps and informs to the network management system (NMS), use the **snmp-server enable traps** command. This command enables both traps and inform requests for the specified notification types. Use the **no** form of this command to disable the sending of SNMP traps and inform requests.

snmp-server enable traps [**interface** | **snmp authentication** | **syslog**]

no snmp-server enable traps [**interface** | **snmp authentication** | **syslog**]

Syntax Description

interface	Enables the sending of SNMP interface traps. If no type is specified, the COSLI PPC sends all notifications.
snmp authentication	Enables the sending of SNMP agent authentication traps.
syslog	Enables the sending of SNMP syslog traps.

Command Modes

Configuration mode

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

To configure the COSLI PPC to send the SNMP notifications, specify at least one **snmp-server enable traps** command. To enable multiple types of notifications, you must enter a separate **snmp-server enable traps** command for each notification type.

If you enter the **snmp-server enable traps** command without any keywords, the COSLI PPC enables all notification types and traps.

The **snmp-server enable traps** command is used with the **snmp-server host** command. The **snmp-server host** command specifies which host receives the SNMP notifications. To send notifications, you must configure at least one SNMP server host.

Examples

To enable the COSLI PPC to send interface traps to the SNMP host “myhost,” enter:

```
switch(config)# snmp-server host myhost.cisco.com
switch(config)# snmp-server enable traps interface
```

To disable SNMP server interface notifications, enter:

```
switch(config)# no snmp-server enable traps interface
```

Related Commands

snmp-server host

snmp-server host

To specify which host receives Simple Network Management Protocol (SNMP) notifications, use the **snmp-server host** command. To send notifications, you must configure at least one SNMP host using the **snmp-server host** command. Use the **no** form of this command to remove the specified host.

snmp-server host *host_address* {*community-string_username* | **informs** | **traps** | **version** {**1** {**udp-port**} | **2c** {**udp-port**}}}

no snmp-server host *host_address* {*community-string_username* | **informs** | **traps** | **version** {**1** {**udp-port**} | **2c** {**udp-port**}}}

Syntax Description

host_address	IP address of the host (the targeted recipient). Enter the address in dotted-decimal IP notation (for example, 192.168.11.1).
community-string_username	SNMP community string or username with the notification operation to send. Enter an unquoted text string with no space and a maximum of 32 alphanumeric characters.
informs	Sends SNMP inform requests to the identified host, which allows for manager-to-manager communication. Inform requests can be useful when you need more than one NMS in the network.
traps	Sends SNMP traps to the identified host. An agent uses a trap to tell the NMS that a problem has occurred. The trap originates from the agent and is sent to the trap destination, as configured within the agent itself. The trap destination is typically the IP address of the NMS.
version	Specifies the version of SNMP used to send the traps. SNMPv3 is the most secure model because it allows packet encryption with the **priv** keyword.
1	Specifies SNMPv1. This option is not available for use with SNMP inform requests. SNMPv1 has one optional keyword (**udp-port**) that specifies the port UDP port of the host to use. The default is 162.
2c	Specifies SNMPv2C. SNMPv2C has one optional keyword (**udp-port**) that specifies the port UDP port of the host to use. The default is 162.

Command Modes

Configuration mode

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

None.

Examples

To specify the recipient of an SNMP notification, enter:

```
switch(config)# snmp-server host 172.168.1.1 traps version 2c abcddsfsf udp-port 500
```

To remove the specified host, enter:

```
switch(config)# no snmp-server host 192.168.1.1 traps version 2c abcddsfsf udp-port 500
```

Related Commands

snmp-server enable traps

snmp-server location

To specify the Simple Network Management Protocol (SNMP) system location, use the **snmp-server location** command. You can specify only one location. Use the **no** form of this command to remove the SNMP system location.

snmp-server location *location*

no snmp-server location

Syntax Description

location	Physical location of the system. Enter a text string with a maximum of 240 alphanumeric characters, including spaces. If the string contains more than one word, enclose the string in quotation marks (“ ”).

Command Modes

Configuration mode

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

You can specify only one location per SNMP system.

Examples

To specify SNMP system location information, enter:

```
switch(config)# snmp-server location “RTP, NC”
```

To remove the specified SNMP system location information, enter:

```
switch(config)# no snmp-server location
```

Related Commands

snmp-server community

terminal

To configure the terminal display settings, use the **terminal** command.

terminal {**length** *lines* | **no** | **session-timeout** *minutes* | **terminal-type** *text* | **width** *characters*}

Syntax Description

length *lines*	Sets the number of lines displayed on the current terminal screen. This command is specific to the console port only. Telnet and Secure Shell (SSH) sessions set the length automatically. Valid entries are from 0 to 511. The default is 24 lines. A value of 0 instructs the COSLI PPC to scroll continuously (no pausing) and overrides the terminal width value. If you later change the terminal length to any other value, the originally configured terminal width value takes effect.
no	Negates a command or sets it back to its default value.
session-timeout *minutes*	Specifies the session timeout value in minutes to configure the automatic logout time for the current terminal session on the PPC. When you exceed the time limit configured by this command, the PPC closes the session and exits. The range is 0 to 525600. The default value is inherited from the value that is configured for the **login timeout** command. If you do not configure a value for the **login timeout** command, the default for both commands is 5 minutes. You can set the **terminal session-timeout** value to 0 to disable this feature so that the terminal remains active until you choose to exit the PPC. The PPC does not save this change in the configuration file.
terminal-type *text*	Specifies the name and type of the terminal used to access the PPC. If a Telnet or SSH session specifies an unknown terminal type, the PPC uses the VT100 terminal by default. Specify a text string from 1 to 80 alphanumeric characters.
width *characters*	Sets the number of characters displayed on the current terminal screen. This command is specific to only the console port. Telnet and SSH sessions set the width automatically. Valid entries are from 24 to 512**.** The default is 80 columns.

Command Modes

EXEC

Command History

Release	Modification
COSLI 1.0	This command was introduced.

Usage Guidelines

Use the **show terminal** command to display the current terminal settings.

All terminal parameter-setting commands are set locally and do not remain in effect after you end a session. You must perform this task at the EXEC prompt at each session to see the debugging messages.

Examples

To specify the VT100 terminal, set the number of screen lines to 35, and set the number of characters to 250, enter:

```
switch# terminal terminal-type vt220
switch# terminal length 35
switch# terminal width 250
```

To specify a terminal timeout of 600 minutes for the current session, enter

```
switch# terminal session-timeout 600
```

To set the width to 100 columns, enter:

```
switch# terminal width 100
```

To set the width to its default of 80 columns, enter:

```
switch# terminal no width
```

Related Commands

show terminal

telnet maxsessions

To control the maximum number of Telnet sessions allowed for each context, use the **telnet maxsessions** command. By default, a PPC supports 16 concurrent Telnet management sessions. Use the **no** form of this command to revert to the default number of Telnet sessions.

telnet maxsessions *sessions*

no telnet maxsessions

Syntax Description

sessions	Maximum number of concurrent Telnet sessions allowed for the associated context. The range is from 1 to 16 Telnet sessions. The default is 16.

Command Modes

Configuration mode

Command History

Release	Modification
COSLI 1.0	This command was introduced.
WSG Release 3.0	This command was modified to include IPv6 addresses.

Usage Guidelines

A PPC supports a total maximum of 256 concurrent Telnet sessions.

Examples

To set the maximum number of concurrent Telnet sessions to 3 in the Admin context, enter:

```
switch(config)# telnet maxsessions 3
```

To revert to the default of 16 Telnet sessions for the Admin context, enter:

```
switch(config)# no telnet maxsessions
```

Related Commands

show telnet

traceroute

To discover the route that packets actually take when traveling to their destination address, use the **traceroute** command in user EXEC or privileged EXEC mode.

traceroute [*A.B.C.D* [**vrf** *vrfname*] | *X:X:X::X*] [**size** *size*]

Syntax Description

A.B.C.D	IPv4 address of the remote destination.
vrfname	Specifies the name of the destination VRF.
X:X:X::X	IPv6 address of the remote destination.
size	Specifies the size of the messages sent.

Command Modes

EXEC

Command History

Release	Modification
WSG Release 3.0	Added support for IPv6 and VRF.

Usage Guidelines

The traceroute command works by taking advantage of the error messages generated by routers when a datagram exceeds its hop limit value.

The traceroute command starts by sending probe datagrams with a hop limit of 1. Including a hop limit of 1 with a probe datagram causes the neighboring routers to discard the probe datagram and send back an error message. The traceroute command sends several probes with increasing hop limits and displays the round-trip time for each.

The traceroute command sends out one probe at a time. Each outgoing packet might result in one or more error messages. A time-exceeded error message indicates that an intermediate router has seen and discarded the probe. A destination unreachable error message indicates that the destination node has received and discarded the probe because the hop limit of the packet reached a value of 0. If the timer goes off before a response comes in, the traceroute command prints an asterisk (*).

The traceroute command terminates when the destination responds, when the hop limit is exceeded, or when the user interrupts the trace with the escape sequence. By default, to invoke the escape sequence, type Ctrl-^ X—by simultaneously pressing and releasing the Ctrl, Shift, and 6 keys, and then pressing the X key.

When not specified, the protocol argument is determined by the software examining the format of the destination argument. For example, if the software finds a destination argument in IP format, the protocol value defaults to IP.

Examples

To trace the route to the IPv6 address:

```
switch# traceroute 2001:88:88:94::1
traceroute to 2001:88:88:94::1 (2001:88:88:94::1) from 2001:88:88:94::4, 30 hops max, 16
byte packets
 1  2001:88:88:94::1 (2001:88:88:94::1)  0.668 ms  0.385 ms  0.319 ms
```

To define an IPv4 address in a specific VRF:

```
switch# traceroute 192.168.2.1 vrf red
```

username

To configure the SSH username, use the **username** configuration command. Use the **no** form of the command to remove a user.

username *name* **password 0** *unencrypted*

username *name* **password 5** *encrypted*

no username *name*

Syntax Description

name	The name of the user. Maximum number of characters is 32.
unencrypted	The unencrypted password. Maximum number of characters is 32.
encrypted	The encrypted password. Maximum number of characters is 64.

Command Modes

Global configuration

Command History

Release	Modification
WSG 3.0	This command was introduced.

Usage Guidelines

The first variant of the command takes an unencrypted password and subsequently encrypts it. When it is displayed using the **show running-configuration** command, the console displays the encrypted version.

The second variant requires an encrypted password, and is used mainly to transfer a login/password to a different card. Unencrypted passwords will never be displayed.

The **no** form of this command does not require including the password.

The maximum length for the *name* is 32 characters. The maximum length for the unencrypted password is also 32 characters. The maximum length for the encrypted password is 64 characters. For all of these fields, permitted characters are standard alphanumeric characters with the exception of “]”, “?”, “$”, TAB, and spaces.

Examples

Here is an example of the **username** command:

```
switch(config)# username test1 password 5 f2500a1a1dJID.4KVT0YvcPR.E98f/
```

APPENDIX E

SAMI LCP Commands

The following commands, listed in alphabetical order, are introduced or modified for the Cisco SAMI, and are supported at a SAMI LCP console:

- boot eobc:, page E-3 (LCP ROM monitor command)
- clear cde, page E-4
- clear cores, page E-5
- clear daughtercard fpga statistics, page E-6
- confreg (LCP ROM monitor), page E-8
- console-select, page E-9
- debug sami bouncer_svc, page E-10
- debug sami dc_health, page E-11
- debug sami ppc_download, page E-12
- debug sami session_agent, page E-13
- delete, page E-14
- dir, page E-15
- erase ppc-flash, page E-16
- exception ixp, page E-17
- hostname, page E-18
- interface, page E-19
- ip route, page E-21
- processor config-register, page E-22 (LCP ROM monitor command)
- processor config-register, page E-22
- reload, page E-24
- reload sami processor, page E-25
- reprogram bootflash, page E-26
- set cde destindex, page E-27
- set cde vlan, page E-28
- show cde, page E-30
- show cde destindex, page E-32

boot eobc:

To boot the SAMI from the image on the supervisor engine, use the **boot eobc:** ROM-monitor command.

boot eobc:

Syntax Description

This command has no keywords or arguments.

Defaults

No default behavior or values exist.

Command Modes

ROM monitor

Command History

Release	Modification
Release 1.0	This command was integrated into Cisco SAMI Release 1.0.

Usage Guidelines

Use the **boot eobc:** command to boot the SAMI using the image on the supervisor engine.

Examples

The following example shows how to boot the SAMI from the image on the supervisor engine:

```
rommon 1> boot eobc:
```

Related Commands

Command	Description
boot device module	Sets the boot variable for the SAMI LCP. (This is supervisor console command.)

clear cde

To clear the classification and distribution engine (CDE) statistics and interrupt counts, use the **clear cde** command.

clear cde {**interrupt** | **stats**}

Syntax Description

interrupt	Clears the CDE interrupt counts.
stats	Clears the CDE statistics.

Defaults

No default behavior or values exist.

Command Modes

EXEC

Command History

Release	Modification
Release 1.0	This command was integrated into Cisco SAMI Release 1.0.

Usage Guidelines

This command clears the statistics and counts that display using the **show cde** command.

Note This command is for use by trained personnel for troubleshooting purposes only.

Examples

To clear the CDE interrupt counts, enter:

```
switch# clear cde interrupt
```

Related Commands

Command	Description
show cde	Displays CDE statistics and counts.

clear cores

To clear all of the core dumps stored in the core file system, use the **clear cores** command.

clear cores

Syntax Description

This command has no keywords or arguments.

Defaults

No default behavior or values exist.

Command Modes

EXEC

Command History

Release	Modification
Release 1.0	This command was integrated into Cisco SAMI Release 1.0.

Usage Guidelines

To view the list of core files in the core file system, use the **dir core** command.

To save a copy of a core dump to a remote server before clearing it, use the **copy capture** command.

To delete a specific core dump file from the core file system, use the **delete core** command.

Note The SAMI creates a core dump when it experiences a fatal error. Core dump information is for Cisco Technical Assistance Center (TAC) use only. We recommend that you contact TAC for assistance in interpreting information in a core dump.

Examples

To clear all core dumps, enter:

```
switch# clear cores
```

Related Commands

Command	Description
delete	Deletes core dumps stored in the core.
dir	Displays core dumps stored in the core.

clear daughtercard fpga statistics

To clear all field programmable gate array (FPGA) statistics for a SAMI daughter card, use the **clear daughtercard fpga statistics** command.

clear daughtercard *card_number* **fpga statistics**

Syntax Description

card number	Number of the card for which you want to clear FPGA-related statistics. A valid value is 1 or 2.

Defaults

No default behavior or values exist.

Command Modes

EXEC

Command History

Release	Modification
Release 1.0	This command was introduced.

Usage Guidelines

This command clears the statistics displayed by the **show daughtercard fpga statistics** command.

Examples

To clear all FPGA statistics on SAMI daughter card 1, enter:

```
switch# clear daughtercard 1 fpga statistics
```

Related Commands

Command	Description
show daughtercard fpga statistics	Displays the FPGA statistics for a SAMI daughter card.

config-register

To change the configuration register settings of the SAMI LCP, use the **config-register** command.

config-register *value*

Syntax Description

value	Configuration register value that you want to use next time you restart the SAMI LCP. The supported values are: • 0—Upon reboot, the SAMI LCP boots to ROM monitor and remains in ROM monitor mode at startup. • 1—Upon reboot, the SAMI LCP boots the system image identified in the Boot environment variable.

Defaults

This command has no default.

Command Modes

Configuration

Command History

Release	Modification
Release 1.0	This command was integrated into Cisco SAMI Release 1.0.

Usage Guidelines

The **config-register** command affects only the configuration register bits that control the boot field and leaves the remaining bits unaltered.

To configure the SAMI LCP to autoboot the system image identified in the boot environment variable, use the **config-register** command and set the configuration register to 1.

Examples

The following example sets the boot field in the configuration register to boot the system image identified in the Boot environment variable upon reboot:

```
switch(config)# config-register 1
```

Command History

Command	Description
boot system image	Specifies the system image that the router loads at startup.
processor config-register	Sets the configuration register for the SAMI PPCs.

confreg (LCP ROM monitor)

To change the configuration register settings while in ROM monitor mode, use the **confreg** command in ROM monitor mode.

confreg *value*

Syntax Description

value	Configuration register value that you want to use next time you restart the SAMI LCP. The supported values are: • 0—Upon reboot, the SAMI LCP boots to ROM monitor and remains in ROM monitor mode at startup. • 1—Upon reboot, the SAMI LCP boots the system image identified in the BOOT environment variable.

Defaults

This command has no default.

Command Modes

ROM monitor

Command History

Release	Modification
Release 1.0	This command was integrated into Cisco SAMI Release 1.0.

Usage Guidelines

The **config-register** command affects only the configuration register bits that control the boot field and leaves the remaining bits unaltered.

Examples

The following example sets the boot field in the configuration register to boot the system image identified in the Boot environment variable upon reboot:

```
rommon 1># confreg 1
```

Related Commands

Command	Description
boot eobc:	Boots the SAMI from the image on the supervisor engine.

console-select

To configure a SAMI powerPC (PPC) on daughter card 1 to be accessible from the console port on the SAMI front panel, use the **console-select db1** command.

console-select {**db1** *processor_number* | **db2** *processor_number*}

Syntax Description

db1 *processor_number*	Number of the PPC on daughter card 1 to be connected to the console port on daughter card 1. A valid value is a number between 3 and 5.
db2 *processor_number*	Number of the PPC on daughter card 2 to be connected to the console port on daughter card 2. A valid value is a number between 6 and 8.

Defaults

Daughter card 1—Console 3 is connected to the daughter card 1 console port on the SAMI front panel.

Daughter card 2—Console 6 is connected to the daughter card 2 console port on the SAMI front panel.

Command Modes

Configuration

Command History

Release	Modification
Release 1.0	This command was introduced.

Usage Guidelines

Use this command to configure one of the three PPCs on daughter card 1 of a SAMI to be accessible externally using the daughter card console port on the SAMI front panel.

By default, PPC 3 can be accessed by console port for db1 and PPC 6 can be accessed by console port of db2. After a different PPC is configured to be accessible from the console port on the SAMI front panel using the **console-select** commands, the newly configured PPC will continue to be accessible across router reloads.

Examples

To configure the PPC4 on daughter card 1 to be accessible from the daughter 1 console port on the SAMI front panel, enter:

```
switch(config)# console-select db1 4
```

debug sami bouncer_svc

To display information on bouncer svc daemon processing, use the **debug sami bouncer_sv**c command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

debug sami bouncer {**errors** | **events** | **packets**}

no debug sami bouncer {**errors** | **events** | **packets**}

Syntax Description

errors	Displays errors.
events	Displays events.
packet	Displays information per-packet.

Defaults

No default behavior or values exist.

Command Modes

EXEC

Command History

Release	Modification
Release 1.0	This command was introduced.

Usage Guidelines

Use the **debug sami bouncer_svc** command to view bouncer svc daemon debugging information.

Examples

The following example shows events that occur during bouncer svc daemon processing.

```
switch# debug sami bouncer_svc events
```

debug sami dc_health

To display information on sami cd health daemon processing, use the **debug sami dc_health** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

debug sami dc_health {**errors** | **events**}

no debug sami dc_health {**errors** | **events**}

Syntax Description

errors	Displays errors.
events	Displays events.

Defaults

No default behavior or values exist.

Command Modes

EXEC

Command History

Release	Modification
Release 1.0	This command was introduced.

Usage Guidelines

Use the **debug sami dc_health** command to view sami cd health daemon debugging information.

Examples

The following example shows events that occur during sami cd health processing.

```
switch# debug sami dc_health events
```

debug sami ppc_download

To display information on ppc download daemon processing, use the **debug sami ppc_download** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

debug sami ppc_download {**errors** | **events**}

no debug sami ppc_download {**errors** | **events**}

Syntax Description

errors	Displays errors.
events	Displays events.

Defaults

No default behavior or values exist.

Command Modes

EXEC

Command History

Release	Modification
Release 1.0	This command was introduced.

Usage Guidelines

Use the **debug sami ppc_download** command to view ppc download daemon debugging information.

Examples

The following example shows errors that occur during ppc download daemon processing.

```
switch# debug sami ppc_download errors
```

debug sami session_agent

To display information on session agent daemon processing, use the **debug sami session_agent** command in privileged EXEC mode. To disable debugging output, use the **no** form of this command.

debug sami session-agent {**errors** | **events** | **packets**}

no debug sami session-agent {**errors** | **events** | **packets**}

Syntax Description

errors	Displays errors.
events	Displays events.
packet	Displays information per-packet.

Defaults

No default behavior or values exist.

Command Modes

EXEC

Command History

Release	Modification
Release 1.0	This command was introduced.

Usage Guidelines

Use the **debug sami session-agent** command to view session agent daemon debugging information.

Examples

The following example shows errors that occur during session agent processing.

```
switch# debug sami session_agent errors
```

delete

To delete a specific file in the LCP file system, use the **delete** command.

delete {**core:***filename* | **disk0:**[*path/*]*filename* | **image:***filename* | **volatile:***filename*}

Syntax Description

core:*filename*	Deletes the specified file from the core file system.
disk0:[*path/*]*filename*	Deletes the specified file from the disk0 file system. If you do not specify the optional path, the LCP looks for the file in the root directory of the disk0 file system.
image:*filename*	Deletes the specified file from the image file system.
volatile:*filename*	Deletes the specified file from the volatile file system.

Defaults

No default behavior or values exist.

Command Modes

EXEC

Command History

Release	Modification
Release 1.0	This command was integrated into Cisco SAMI Release 1.0.

Usage Guidelines

To delete a specific file from the LCP file system, use the **delete** command.

If you do not specify a filename with the file system keyword, the SAMI LCP prompts you for a filename.

To display the list of files that reside in a file system, use the **dir sami#** command.

Examples

The following example shows how to delete a file named “0x401_VSH_LOG.25256.TAR.GZ” from the core file system:

```
switch# delete core:0x401_VSH_LOG.25256.TAR.GZ
```

Related Commands

Command	Description
dir	Displays the contents of a specified SAMI LCP file system.

dir

To list files in the various file systems on the LCP, use the **dir** command.

dir {**core:** | **disk0:** | **image:** | **volatile**}

Syntax Description

core:	Displays the contents of the core: file system.
disk0:	Displays the contents of the disk0: file system.
image:	Displays the contents of the image: file system.
volatile:	Displays the contents of the volatile: file system.

Defaults

No default behavior or values exist.

Command Modes

EXEC

Command History

Release	Modification
Release 1.0	This command was integrated into Cisco SAMI Release 1.0.

Usage Guidelines

Use the **dir** command to list the files in the various file systems on the SAMI LCP.

To delete a file from a file system, use the **delete** command. To delete all core dumps, use the **clear cores** command.

Examples

The following example shows how to display the contents of the disk0 file system:

```
switch# dir disk0:
```

Related Commands

Command	Description
delete	Deletes a specified file in the SAMI LCP file system.
more	Displays the contents of a file.

erase ppc-flash

To erase the ROM monitor area of a SAMI powerPC (PPC) boot flash and program ROM monitor using the default image in the SAMI software bundle, use the **erase ppc-flash** command.

erase ppc-flash [*image_name***:**] {*ppc_number* | **all-ppc**}

Syntax Description

*image_name***:**	Name of the ROM monitor image in the SAMI software bundle.
ppc_number	Erases the ROM monitor area of the PCC boot flash and programs ROM monitor with the default image on a specific PCC. Enter a between value 3 and 8.
all-ppc	Erases the ROM monitor area of the PCC boot flash and programs ROM monitor with the default image on all the SAMI PPCs.

Defaults

No default behavior or values exist.

Command Modes

EXEC

Command History

Release	Modification
Release 1.0	This command was introduced.

Usage Guidelines

Use the **erase ppc-flash** command to erase the ROM monitor area of the PPC boot flash and program ROM monitor using the default image in the SAMI software bundle.

Examples

To erase the ROM monitor area of the boot flash on PCC 6 and program ROM monitor using the image in the SAMI software bundle, enter:

```
switch# erase ppc-flash image_name 6
```

Related Commands

This command has no related commands.

exception ixp

To enable a coredump to be collected from IXP, use the **exception ixp** command in configuration mode. Use the **no** form of the command to disable collecting coredump information.

exception ixp *IXP-Proc*

no exception ixp

Syntax Description

IXP-Proc	IXP processor number (1 or 2).

Defaults

none

Command Modes

Configuration

Command History

Release	Modification
SAMI Release 4.0	This command was introduced in conjunction with Cisco CSG2 Release 6.0, and LTE Release 2.0.

Usage Guidelines

The coredump gets stored under "crashinfo_collection-XXXXX-YYYY.tar", which resides on LCP "dir:core". The naming convention for the coredump file is as below :-

coredump_proc<*Num*>- XXXXX-YYYY.gz

where

Num -- Represents either 1 or 2 depending on IXP1 or IXP2 respectively

XXXXX-YYYY-- Represents the timestamp

Caution Collecting IXP coredump will increase reboot time by an average of 4 to 5 minutes.

Examples

To change the hostname of the SAMI LCP from host1 to SAMI1-LCP, enter:

```
switch(config)# hostname SAMI1-LCP
SAMI_LCP(config)# exception ixp 1
                 exception ixp 2
```

hostname

To change the hostname of the SAMI LCP, use the **hostname** command. Use the **no** form of this command to reset the hostname to the default of switch.

hostname *name*

no hostname *name*

Syntax Description

name	New hostname for the SAMI LCP. Enter a case-sensitive text string that contains from 1 to 32 alphanumeric characters.

Defaults

The hostname is host1.

Command Modes

Configuration

Command History

Release	Modification
Release 1.0	This command was integrated into Cisco SAMI Release 1.0.

Usage Guidelines

By default, the hostname for the SAMI LCP is host1.

The hostname is used for the command line prompts and default configuration filenames. If you establish sessions to multiple devices, the hostname helps you track where you enter commands.

Examples

To change the hostname of the SAMI LCP from host1 to SAMI1-LCP, enter:

```
switch(config)# hostname SAMI1-LCP
SAMI_LCP(config)#
```

Related Commands

This command has no related commands.

interface

To create a bridge-group virtual interface (BVI) or VLAN interface, use the **interface** command. To remove the interface, use the **no** form of this command.

interface {**bvi** *group_number* | **vlan** *number*}

no interface {**bvi** *group_number* | **vlan** *number*}

Note If a VLAN interface is configured on the LCP, then a sub-interface for the same VLAN should not be configured on the PPCs.

Syntax Description

bvi *group_number*	Creates a BVI for a bridge group and accesses interface configuration mode commands for the BVI. The *group_number* argument is the bridge-group number configured on a VLAN interface.
vlan *number*	Assigns the VLAN to the context and accesses interface configuration mode commands for the VLAN. The *number* argument is the number for a VLAN assigned to the SAMI LCP.

Defaults

No default behavior or values exist.

Command Modes

Configuration

Command History

Release	Modification
Release 1.0	This command was integrated into Cisco SAMI Release 1.0.

Usage Guidelines

Use the **interface** command to create a BVI or VLAN interface.

When entered, the command prompt changes to (config-if).

Examples

To assign VLAN interface 100 to the Admin context and access interface configuration mode, enter:

```
switch(config)# interface vlan 100
switch(config-if)#
```

Related Commands

Command	Description
clear interface	Resets the hardware logic on an interface.
show interface	Displays statistics for all interfaces configured on the router or access server.

ip route

To configure a default or static IP route, use the **ip route** command. Use the **no** form of this command to remove a default or static IP route from the configuration.

ip route *dest_ip_prefix netmask gateway_ip_address*

no ip route *dest_ip_prefix netmask gateway_ip_address*

Syntax Description

dest_ip_prefix	IP address for the route. The address that you specify for the static route is the address that is in the packet before entering the SAMI LCP and performing network address translation.
netmask	Subnet mask for the route.
gateway_ip_address	IP address of the gateway router (the next-hop address for this route). The gateway address must be in the same network as specified in the **ip address** command for a VLAN interface.

Defaults

No default behavior or values exist.

Command Modes

Configuration

Command History

Release	Modification
Release 1.0	This command was integrated into Cisco SAMI Release 1.0.

Usage Guidelines

The default route identifies the router IP address to which the SAMI LCP sends all IP packets for which it does not have a route.

Dynamic routing is not supported. You must use static routes for any networks to which the SAMI LCP is not directly connected; for example, use a static route when there is a router between a network and the SAMI LCP.

The SAMI LCP supports up to eight equal cost routes on the same interface for load balancing.

Routes that identify a specific destination address take precedence over the default route.

Examples

To configure a default route, set the IP address and the subnet mask for the route to 0.0.0.0. For example, if the SAMI LCP receives traffic that it does not have a route, it sends the traffic out the interface to the router at 192.168.4.8, enter:

```
switch(config)# ip route 0.0.0.0 255.255.255.0 192.168.4.8
```

processor config-register

To change the configuration register settings of a SAMI PPC, use the **processor config-register** configuration command.

processor {*proc_number* | **all-ppc**} **config-register** *value*

no processor {*proc_number* | **all-ppc**} **config-register** *value*

Syntax Description

proc_number	Number of the PPC on the SAMI for which you want to change the configuration register settings. Valid values are 3 through 8.
all-ppc	Sets the configuration register settings for all of the PPCs.
config-register *value*	Hexadecimal value that represents the 16-bit configuration register value that you want to use the next time the router is restarted. The value range is from 0x0 to 0xFFFF.

Defaults

0—The front panel connection rather than the on-the-board connection will make the PPCs automatically load the Cisco software application image upon startup.

Command Modes

Configuration

Command History

Release	Modification
Release 1.0	This command was integrated into Cisco SAMI Release 1.0.

Usage Guidelines

You can modify the boot method that a SAMI PPC uses at the next startup by setting the boot field in the software configuration register. The configuration register identifies how the PPC should boot and where the system image is stored. You can modify the boot field to force a PPC to boot a particular system image at startup instead of using the default system image.

The **processor config-register** command affects only the configuration register bits that control the boot field and leaves the remaining bits unaltered.

Examples

The following example sets the boot field in the configuration register to boot the system image identified in the BOOT environment variable upon reboot for PPC 5:

```
switch(config)# processor 5 config-register 1
```

Related Commands

Command	Description
confreg	Set the configuration register settings of a SAMI PPC.

reload

To reload the configuration on the SAMI LCP, use the **reload** command.

reload

Syntax Description

This command has no keywords or arguments.

Defaults

No default behavior or values exist.

Command Modes

EXEC

Command History

Release	Modification
Release 1.0	This command was integrated into Cisco SAMI Release 1.0.

Usage Guidelines

The **reload** command reboots the SAMI LCP and performs a full power cycle of both the hardware and software. The reset process can take several minutes. Any open connections with the SAMI are dropped after you enter the **reload** command.

Caution Configuration changes that have not been written to flash memory are lost during a reload. Before reloading, enter the **copy running-conf startup-config** command to save a copy of the running configuration to the startup configuration in flash memory. If you fail to save your running configuration changes, the SAMI LCP reverts to the last saved version of the startup configuration when restarted.

Examples

To execute a soft reboot, enter:

```
switch# reload
This command will reboot the system
Save configurations for all the contexts. Save? [yes/no]: [yes]
```

Related Commands

Command	Description
show running-config	Displays the running configuration information on the SAMI LCP.
show startup-config	Displays information about the startup configuration on the SAMI LCP

reload sami processor

To reload a specific SAMI powerPC (PPC), use the **reload sami processor** command.

reload sami processor {*ppc_num* | **all-ppc**}

Syntax Description

ppc_num	Specifies the specific PPC. Enter a value 3 through 8.
all-ppc	Specifies that the ROM monitor image on all PPCs be upgraded.

Defaults

No default behavior or values exist.

Command Modes

EXEC

Command History

Release	Modification
Release 1.0	This command was introduced.

Usage Guidelines

The **reload sami processor** command reboots a single SAMI PPC. The reload process can take several minutes. Any open connections with the SAMI PPC are dropped after you enter the **reload sami processor** command.

Caution Configuration changes that have not been written to flash memory are lost during a reload. Therefore, before reloading, enter the **copy running-conf startup-config** command to save a copy of the running configuration to the startup configuration in flash memory. If you fail to save your running configuration changes, the PPC reverts to the last saved version of their startup configuration when restarted.

Note This command is not available for distributed Cisco software applications such as the Cisco Content Services Gateway - 2nd Generation.

Examples

To reload processor 4 on a SAMI, enter:

```
switch# reload sami processor 4
```

Related Commands

Command	Description
show running-config	Displays the running configuration information on the SAMI LCP.
show startup-config	Displays information about the startup configuration on the SAMI LCP

reprogram bootflash

To reprogram the Field Upgradable (FUR) partition of the rommon image on the LCP, use the **reprogram bootflash** command with the **fur-image** keyword specified.

reprogram bootflash fur-image

Syntax Description

fur-image	Reprograms the rommon image FUR partition.

Command Modes

EXEC

Command History

Release	Modification
Release 2.0	This command was introduced.

Usage Guidelines

The **reprogram bootflash** command is for use by trained Cisco personnel only. Entering this command may cause unexpected results. Do not attempt to use the **reprogram bootflash** command without guidance from Cisco support personnel.

Examples

To reprogram the rommon image FUR partition on the image: file system, enter:

```
switch# reprogram bootflash fur-image
```

Related Commands

This command has no related commands.

set cde destindex

To set the destination index table from index *x* to *y* to one of several options, use the **set cde destindex** command in EXEC configuration mode. Use the **no** form of the command to disable this feature.

set cde destindex *x* [**to** *y*] [**cp** | **ixp0** | **ixp1** | **nitrox** | **dc1** | **dc2** | **invalid**]

no set cde destindex

Syntax Description

cp	Sets CDE destination for packets in the VLAN to Proc 0 (LCP).
ixp0	Sets CDE destination for packets in the VLAN to IXP0.
ixp1	Sets CDE destination for packets in the VLAN to IXP1.
nitrox	Sets CDE destination for packets in the VLAN to Nitrox (Used only in specific SAMI applications).
dc1	SAMI daughtercard 1.
dc2	SAMI daughtercard 2.
invalid	No destination.

Command Default

The default value is **invalid.**.

Command Modes

This command is available in Processor 0 (LCP) console, and not under configuration mode.

Command History

Release	Modification
Release 3.4	This command was introduced.

Usage Guidelines

This command is only available with the debug plugin for the LCP.

Examples

Here is an example of the **set cde destindex** command:

```
SAMI-slot8# set cde destindex 0 to 4 dc2
dest index 3 lsb 0 - 4 dest dc2
```

set cde vlan

To configure vlan destinations for packets in a VLAN(s) to one of several options, use the **set cde vlan** command in privileged EXEC mode.

set cde vlan *x* [**cp** | **ixp0** | **ixp1** | **nitrox** | **dc1** | **dc2** | **invalid** | **gtpipdesthash** | **ipsrchash**]

Syntax Description

vlan id	VLAN id or a range of VLAN ids.
cp	Sets CDE destination for packets in the VLAN to Proc 0 (LCP).
ixp0	Sets CDE destination for packets in the VLAN to IXP0.
ixp1	Sets CDE destination for packets in the VLAN to IXP1.
nitrox	Sets CDE destination for packets in the VLAN to Nitrox (Used only in specific SAMI applications).
dc1	SAMI Daughtercard 1.
dc2	SAMI Daughtercard 2.
invalid	No destination.
gtpipdesthash	CDE Destination is set to IXP. The destination IXP (IXP0/IXP1) to which CDE would send packets in the VLAN is identified by doing a hash in destination IP address in the packet and in case of GTP packet, hash over GTP port.
ipsrchash	CDE Destination is set to IXP. The destination IXP (IXP0/IXP1) to which CDE would send packets in the VLAN is identified by doing a hash in source IP address in the packet.

Command Default

By default, CDE destinations in enhanced CDE (version 406 onwards) is set to gtpipdesthash. For previous versions of CDE, the CDE destination is set to ixp0 by default.

Command Modes

EXEC

Command History

Release	Modification
SAMI Release 3.4	This command was introduced in conjunction with the CSG2 Release 5.0, and the Cisco LTE Release 1.0.

Usage Guidelines

Caution This command has a direct impact on the packet processing in SAMI PPC and IXP processors. You should only use this command when directed by Cisco Technical Assistance Center (TAC) engineers.

Examples

Here is an example of the **set cde vlan** command:

```
SAMI-LCP# set cde vlan 100 ixp1
This can drastically affect the way system behaves.Are you sure? [yes/no] [no] yes
vlan 100 dest ixp1
```

```
SAMI-LCP# set cde vlan 101 gtpipdesthash
This can drastically affect the way system behaves.Are you sure? [yes/no] [no] yes
vlan 101 dest gtpipdesthash

SAMI-LCP#set cde vlan 102 to 105 ipsrchash
This can drastically affect the way system behaves.Are you sure? [yes/no] [no] yes
vlan 102 - 105 dest ipsrchash
```

If a vlan in the range is being used by the LCP (proc 0), a warning is issued that the particular vlan is being used by the LCP and that VLAN is dropped from the configuration. The sample output of the command is as follows:

```
    SAMI-LCP# set cde vlan 7 to 12 ixp1
vlan 7 - 12 dest ixp1
Warning: vlan 10 is being used by proc 0 and this CLI will not update it.
Please use 'set cde vlan 10' to override.

SAMI-LCP# set cde vlan 10 ixp1
```

show cde

To display the classification and distribution engine (CDE) register values, use the **show cde** command.

show cde {**all** | **count** | **dist** | **hash** *index_number* | **health** | **interrupts** | **reg** *cde_number register* | **stats** {**cumulative** | **stats**} | **vlan** *vlan_number*} [|] [>]

Syntax Description

all	Displays all CDE register values.
count	Displays the cumulative count of the CDE interrupts.
dist	Displays the CDE distribution type.
hash *index_number*	Displays the hash distribution table. Enter a value from 0 to 31.
health	Displays the CDE health.
interrupts	Displays the CDE interrupts.
reg	Displays the specified CDE register.
cde_number	CDE number.
register	Register value. Enter a hexadecimal value from 0x0 to 0x1d9.
stats	Displays the specified CDE statistics.
cumulative	Displays the cumulative CDE statistics from the last invocation of the **show cde** command.
stats	Displays the delta CDE statistics from the last invocation of the **show cde** command.
vlan *vlan_number*	Displays the VLAN distribution table for the specified VLAN. For SAMI, this will be either IXP0 or CP (the LCP). Enter the desired VLAN number.
|	(Optional) Pipe character (|) for enabling an output modifier that filters the command output. For a complete description of the options available for filtering the command output, see the **show** command.
>	(Optional) Greater-than character (>) for enabling an output modifier that redirects the command output to a file. For a complete description of the options available for redirecting the command output, see the **show** command.

Defaults

No default behavior or values exist.

Command Modes

EXEC

Command History

Release	Modification
Release 1.0	This command was integrated into Cisco SAMI Release 1.0.

Usage Guidelines

This command is for use by trained Cisco personnel for troubleshooting purposes only. You can also use the **show cde vlan** command to verify if the CDE is programmed correctly for the subscriber VLAN.

Examples

To display all of the CDE register values, enter:

```
switch# show cde all
```

Related Commands

Command	Description
clear cde	Clear the CDE statistics and interrupt counts.

show cde destindex

To display the destination index table for all indices *x* to *y*, use the **show cde destindex** command in EXEC mode.

show cde vlan *x* [**to** *y*]

Syntax Description

There are no arguments or keywords.

Defaults

0 <= x <= y <= 7

Command Modes

EXEC

Command History

Release	Modification
SAMI Release 3.4	This command was introduced in conjunction with the CSG2 Release 5.0, and the Cisco LTE Release 1.0.

Usage Guidelines

Examples

To display destinations for all vlans from *x* to *y* enter:

```
slot8# show cde destindex 0 to 7
Destination index & 0x7 == 0 --> daughter card 2
Destination index & 0x7 == 1 --> daughter card 2
Destination index & 0x7 == 2 --> daughter card 2
Destination index & 0x7 == 3 --> daughter card 2
Destination index & 0x7 == 4 --> daughter card 2
Destination index & 0x7 == 5 --> ixp1
Destination index & 0x7 == 6 --> ixp0
Destination index & 0x7 == 7 --> ixp1
```

show cde vlan

To display destinations for the specified VLANs, use the **show cde vlan** command in EXEC mode.

show cde vlan *vlan_id* [*to vlan_id*]

Syntax Description

vlan_id	VLAN id, or a range of VLAN ids for which output is needed.

Defaults

No default behavior or values exist.

Command Modes

EXEC

Command History

Release	Modification
SAMI Release 3.4	This command was introduced in conjunction with the CSG2 Release 5.0, and the Cisco LTE Release 1.0.

Usage Guidelines

Examples

To display destinations for all vlans from *x* to *y* enter:

```
SAMI-LCP# show cde vlan 7 to 12
Vlan 7 --> ixp1
Vlan 8 --> ixp0
Vlan 9 --> gtpipdesthash
Vlan 10 --> ipsrchash
Vlan 11 --> cp
Vlan 12 --> ixp1
```

show daughtercard fpga statistics

To display the field programmable gate array (FPGA) statistics for a daughter card on the SAMI, use the **show daughtercard fpga statistics** command.

show daughtercard *card_number* **fpga statistics**

Syntax Description

card number	Number of the daughter card for which you want to display FPGA-related statistics. A valid value is 1 or 2.

Defaults

No default behavior or values exist.

Command Modes

EXEC

Command History

Release	Modification
Release 1.0	This command was introduced.

Usage Guidelines

If a daughter card number is not specified, the FPGA statistics for both daughter cards will display.

Examples

To display the FPGA statistics for daughter card 2, enter:

```
switch# show daughtercard 2 fpga statistics
```

Related Commands

Command	Description
clear daughtercard fpga statistics	Clears all FPGA statistics for a SAMI daughter card
show daughtercard registers	Displays FPGA or complex programmable logic device (CPLD) registers for a SAMI daughter card.

show daughtercard registers

To display the field programmable gate array (FPGA) or complex programmable logic device (CPLD) registers for a daughter card on the SAMI, use the **show daughtercard registers** command.

show daughtercard *card_number* [**fpga | cpld**] **registers**

Syntax Description

card number	Daughter card for which you want to display registers. Enter 1 or 2.
fpga	(Optional) Displays FPGA-related registers.
cpld	(Optional) Displays CPLD registers.

Defaults

No default behavior or values exist.

Command Modes

EXEC

Command History

Release	Modification
Release 1.0	This command was introduced.

Usage Guidelines

If a daughter card number is not specified, the FPGA and/or CPLD registers for both daughter cards will display.

Examples

To display the FPGA counters for daughter card 2, enter:

```
switch# show daughtercard 2 fpga registers
```

Related Commands

Command	Description
clear daughtercard fpga statistics	Clears all FPGA statistics for a SAMI daughter card
show daughtercard fpga statistics	Displays FPGA statistics for a SAMI daughter card.

show login timeout

To display the amount of time, a session can remain inactive before it is ended (the login session idle timeout value), use the **show login timeout** command.

show login timeout

Syntax Description

This command has no keywords or arguments.

Defaults

No default behavior or values exist.

Command Modes

EXEC

Command History

Release	Modification
Release 1.0	This command was integrated into Cisco SAMI Release 1.0.

Usage Guidelines

To configure the login timeout value, use the **login timeout** command in configuration mode.

Examples

To display the login timeout value, enter:

```
switch# show login timeout
```

Related Commands

Command	Description
login timeout	Modifies the length of time that a user can be idle before the LCP terminates the console, Telnet, or SSH session.

show running-config

To display the running configuration information on the SAMI LCP, use the **show running-config** command.

show running-config [**aaa** | **access-list** | **action-list** | **class-map** | **context** | **dhcp** | **domain** | **ft** | **interface** | **object-group** | **parameter-map** | **policy-map** | **probe** | **resource-class** | **role** | **rserver** | **serverfarm** | **sticky**] [|] [>]

Syntax Description

aaa	(Optional) Displays authentication, authorization, and accounting (AAA) information.
action-list	(Optional) Displays action list information.
access-list	(Optional) Displays access control list (ACL) information.
class-map	(Optional) Displays the list of all class maps configured for the current context. The SAMI LCP also displays configuration information for each class map listed.
context	(Optional) Displays the list of contexts configured on the SAMI LCP. The SAMI LCP also displays the resource class (member) assigned to each context. The **context** keyword only works from within the admin context.
dhcp	(Optional) Displays Dynamic Host Configuration Protocol (DHCP) information.
domain	(Optional) Displays the list of domains configured for the current context. The SAMI LCP also displays configuration information for each domain listed.
ft	(Optional) Displays the list of redundancy or fault-tolerance (ft) configurations configured for the current context. The SAMI LCP also displays configuration information for each ft configuration listed.
interface	(Optional) Displays interface information.
object-group	(Optional) Displays object group information.
parameter-map	(Optional) Displays parameter map information.
policy-map	(Optional) Displays policy map information.
probe	(Optional) Displays probe information.
resource-class	(Optional) Displays resource class information.
role	(Optional) Displays the list of roles configured for the current context. The SAMI LCP also displays configuration information for each role on the list.
rserver	(Optional) Displays rserver information.
serverfarm	(Optional) Displays server farm information.
sticky	(Optional) Displays sticky information.
|	(Optional) Pipe character (|) for enabling an output modifier that filters the command output. For a complete description of the options available for filtering the command output, see the **show** command.
>	(Optional) Greater-than character (>) for enabling an output modifier that redirects the command output to a file. For a complete description of the options available for redirecting the command output, see the **show** command.

Defaults

No default behavior or values exist.

Command Modes

EXEC

Command History

Release	Modification
Release 1.0	This command was integrated into Cisco SAMI Release 1.0.

Usage Guidelines

The **show running-config** command is a context-sensitive command.

Use the **copy capture** command to do the following:

- Save a copy of the running configuration to a file on one or more destination locations.
- Save the running configuration as the startup configuration.
- Save the startup configuration as the running configuration.

Examples

To display the entire running configuration, enter:

```
switch# show running-config
```

Related Commands

Command	Description
show startup config	Displays information about the startup configuration on the SAMI LCP
show tech-support	Displays information that is useful to technical support when reporting a problem with your SAMI LCP
write	Manages persistent and nonpersistent configuration information

show startup-config

To display information about the startup configuration on the SAMI LCP, use the **show startup-config** command.

show startup-config [|] [>]

Syntax Description

|	(Optional) Pipe character (|) for enabling an output modifier that filters the command output. For a complete description of the options available for filtering the command output, see the **show** command.
>	(Optional) Greater-than character (>) for enabling an output modifier that redirects the command output to a file. For a complete description of the options available for redirecting the command output, see the **show** command.

Defaults

No default behavior or values exist.

Command Modes

EXEC

Command History

Release	Modification
Release 1.0	This command was integrated into Cisco SAMI Release 1.0.

Usage Guidelines

To clear the startup configuration, use the **clear startup-config** command. To copy the running configuration to the startup configuration, or copy the startup configuration to the running configuration, use the **copy running-config** command.

Examples

To display information about the startup configuration, enter:

```
switch# show start-config
```

Related Commands

Command	Description
clear startup-config	Clears the startup configuration.
show running-config	Displays information about the running configuration on the SAMI LCP.

show tech-support

To display information that is useful to technical support when reporting a problem with your SAMI LCP, use the **show tech-support** command.

show tech-support [**details**] [|] [>]

Syntax Description

details	(Optional) Provides detailed information for each of the **show** commands described below in the "Usage Guidelines" section.
|	(Optional) Pipe character (|) for enabling an output modifier that filters the command output. For a complete description of the options available for filtering the command output, see the **show** command.
>	(Optional) Greater-than character (>) for enabling an output modifier that redirects the command output to a file. For a complete description of the options available for redirecting the command output, see the **show** command.

Defaults

No default behavior or values exist.

Command Modes

EXEC

Command History

Release	Modification
Release 1.0	This command was integrated into Cisco SAMI Release 1.0.

Usage Guidelines

The **show tech-support** command is useful when collecting a large amount of information about your SAMI LCP for troubleshooting purposes with Cisco technical support. The output of this command can be provided to technical support representatives when reporting a problem.

The **show tech-support** command displays the output of several **show** commands at once. The output from this command varies depending on your configuration. The default output of the **show tech-support** command includes the output of the following commands:

- **show environment**—See the **show environment** command.
- **show hardware**—See the **show hardware** command.
- **show interface**—See the **show interface** command.
- **show process**—See the **show processes** command.
- **show running-config**—See the **show running-config** command.
- **show version**—See the **show version** command.

Explicitly set the terminal length command to 0 (zero) to disable autoscrolling and enable manual scrolling. Use the **show terminal** command to view the configured terminal size. After obtaining the output of this command, reset your terminal length as required.

You can save the output of this command to a file by appending > *filename* to the **show tech-support** command. If you save this file, verify that you have sufficient space to do so as each of these files may take about 1.8 MB.

Examples

To display the summary version of the technical support report, enter:

```
switch# show tech-support
```

Related Commands

Command	Description
show interface	Displays the statistics for all interfaces configured on the SAMI LCP.
show running-config	Displays information about the running configuration on the SAMI LCP
show version	Displays information about the currently loaded software version along with hardware and device information.

show version

To display the version information of system software that is loaded in flash memory and currently running on the SAMI LCP, use the **show version** command.

show version| >

Syntax Description

|	(Optional) Pipe character (|) for enabling an output modifier that filters the command output. For a complete description of the options available for filtering the command output, see the **show** command.
>	(Optional) Greater-than character (>) for enabling an output modifier that redirects the command output to a file. For a complete description of the options available for redirecting the command output, see the **show** command.

Defaults

No default behavior or values exist.

Command Modes

EXEC

Command History

Release	Modification
Release 1.0	This command was integrated into Cisco SAMI Release 1.0.

Usage Guidelines

The **show version** command also displays information related to the following SAMI hardware components:

- Slot number—Slot number that the SAMI LCP occupies on the Cisco 7600 series chassis.
- CPU—Number of CPUs and type and model
- Memory—Total and shared volatile memory
- Flash memory—Total and used flash memory

Use the **show version** command to verify the software version on the SAMI LCP before and after an upgrade.

Examples

To display the software version information, enter:

```
switch# show version
```

upgrade-rommon

To upgrade the ROM monitor of one or more of the SAMI PPCs with a specific ROM monitor image, use the **upgrade-rommon** command.

upgrade-rommon *rommon_image* {*ppc_num* | **all-ppc**}

Syntax Description

rommon_image	Name of the ROM monitor image available in the SAMI software bundle.
ppc_num	Specifies the specific PPC. Enter a value 3 through 8.
all-ppc	Specifies that the ROM monitor image on all PPCs be upgraded.

Defaults

No default behavior or values exist.

Command Modes

EXEC

Command History

Release	Modification
Release 1.0	This command was introduced.

Usage Guidelines

Use this command to upgrade the ROM monitor of one or more of the SAMI PPCs with a specific ROM monitor image.

Examples

To upgrade the ROM monitor image on SAMI PPC 3, enter:

```
switch# upgrade-rommon image_name 3
```

Related Commands

This command has no related commands.

write

To manage persistent and nonpersistent configuration information, use the **write** command.

write {**erase** | **memory** [**all**] | **terminal**}

Syntax Description

erase	Erases the entire startup configuration with the exception of any configuration that affects the loader functionality. The startup configuration then reverts back to the factory-default values. The running configuration is not affected.
memory	Writes the running configuration to the startup configuration.
all	(Optional) Writes configurations for all existing contexts. This keyword is available only in the Admin context.
terminal	Writes the running configuration to the terminal.

Defaults

No default behavior or values exist.

Command Modes

EXEC

Command History

Release	Modification
Release 1.0	This command was integrated into Cisco SAMI Release 1.0.

Usage Guidelines

The different versions of this command require the following user role or feature in your user role:

- **write erase**—Admin user
- **write mem**—config-copy feature
- **write all**—Admin user

To write the running configuration to the startup configuration, you can also use the **copy running-config startup-config** command. To erase the startup configuration, you can also use the **clear startup-config** command. To display the running configuration, you can also use the **show running-config** command.

Examples

To write running configuration to the startup configuration, enter:

```
switch# write memory
```

Related Commands

Command	Description
clear startup-config	Command to clear the startup configuration.
show running-config	Command to display information about the running configuration on the SAMI LCP

Network Processor Console Command

The following command is supported at the IXP console:

- shutdown, page E-46

shutdown

To shut down the network processor (IXP) on the SAMI, use the **shutdown** command.

shutdown

Syntax Description

shutdown	Specifies shutdown.

Defaults

No default behavior or values exist.

Command Modes

Command History

Release	Modification
Release 1.0	This command was introduced.

Usage Guidelines

Use this command to shutdown the network processor (IXP) on the SAMI.

Examples

The following examples illustrates how to use the **shutdown** command.

```
shutdown
```

GLOSSARY

A

AAA Authentication, Authorization, and Accounting. Network security services that provide the primary framework to set up access control on a router or access server. AAA is an architectural framework and modular means of configuring three independent, but closely related security functions in a consistent manner. It is flexible, scalable, and supports multiple authentication methods.

B

BCM Broadcom.

C

CCIE Cisco Certified Internetwork Expert. The CCIE program offers various CCIE certification in lab testing centers worldwide. This certification gives you an excellent opportunity to demonstrate your technical expertise, and can serve as an alternative to other CCIE designations toward fulfilling Cisco partner requirements.

CDE Classification and Distribution Engine.

CDMA Code Division Multiple Access. An access technology that combines each phone call with a code that only one cellular phone extracts from the air.

CLI Command Line Interface. An interface that uses commands entered on a command line to configure and maintain network elements. You use the CLI to access the Cisco IOS software.

CP CSG2 Control Processor.

CPLD Complex Programmable Logic Device.

CSG2 Content Services Gateway - version 2.

D

DDR Double Data Rate (RAM).

E

ECC Error-Correcting Code. Memory that corrects errors on the fly.

EOBC Ethernet Out of Band Channel.

ETSI European Telecommunications Standards Institute. The European Telecommunications Standards Institute (ETSI) is an independent, non-profit organization, whose mission is to produce telecommunications standards for today and for the future. ETSI is officially responsible for standardization of Information and Communication Technologies (*ICT*) within Europe. These technologies include telecommunications, broadcasting, and related areas, such as intelligent transportation and medical electronics.

F

FIFO First In First Out.

FPGA Field Programmable Gate Array.

FUR Field-Upgradeable ROMMON.

G

GGSN Gateway *GPRS* Support Node. A wireless gateway that allows mobile cell phone users to access the public data network.

GPRS General Packet Radio Service. A service designed for GSM networks. GPRS is standardized by the European Telecommunications Standards Institute (*ETSI*). Cisco Systems' GPRS solution enables mobile wireless service providers to supply their mobile subscribers with packet data services. A GPRS network has two essential elements: Serving GPRS Support Node (*SGSN*) and Gateway GPRS Support Node (*GGSN*).

H

HA Home Agent. The Home Agent maintains mobile user registrations and tunnels packets destined for the mobile to the PDSN/FA (Packet Data Serving Node/Foreign Agent). It supports reverse tunneling, and can securely tunnel packets to the *PDSN* using *IPSec*. Broadcast packets are not tunneled. Additionally, the HA performs dynamic home address assignment for the mobile. Home address assignment can be from address pools configured locally, through either DHCP server access, or from the *AAA* (Authentication, Authorization, and Accounting) server

HSRP Hot Standby Router Protocol. A Cisco routing protocol for fault-tolerant IP routing that enables a set of routers to work together to present the appearance of a single virtual router to the hosts on a LAN; used in environments where critical applications are running and fault-tolerant networks have been designed.

I

ICMP Internet Control Message Protocol. A protocol that supports packets containing error, control, and informational messages.

ICT Information and Communication Technologies. Through its core activities, working groups, and regional nodes, successfully served as a multi-stakeholder mechanism to facilitate and promote collaborative initiatives at the regional, subregional, and national levels and to mobilize new public and private resources to support information and communication technologies-for-development programs and projects. The ICT Task Force facilitated the pooling of relevant experience of both developed and developing countries and the sharing of lessons learned in introducing and promoting ICT.

IOS or Cisco IOS Cisco Internet 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.

IPSec Internet Protocol Security. IPSec is the network layer crypto platform for Cisco's security platforms (Cisco IOS Software, PIX, and so on). Originally described in RFCs 1825-1829, which are now obsolete, IPSec is currently discussed in a number of documents presented by the IETF IP Security Working Group. IPSec currently supports IP version 4 unicast packets. IPv6 and multicast support is coming later.

IPSec has the following strengths over current Cisco crypto offerings:

> **Multivendor**: Since the IPSec framework is standardized, customers are not locked into any specific vendor's product. You will find IPSec on routers, firewalls, and client desktops (Windows, Mac, and so on).
>
> **Scalability**: IPSec was designed with large enterprises in mind and therefore, it has "built-in" key management.

IXP Intel IXP2800 Network Processor.

M

MIB Management Information Base.

MSFC2 Multilayer Switch Feature Card 2. The Multilayer Switch Feature Card 2 quadruples the control plane and software forwarding performance of a Multilayer Switch Feature Card. The Multilayer Switch Feature Card 2 adds the following enhancements to the features already offered by the Multilayer Switch Feature Card:

- Four times the control plane and forwarding performance of the MSFC
- Support for Error-Correcting Code (*ECC*) DRAM with option to upgrade to 256 or 512 MB
- Full Internet routing-table support
- Support for 1000 terminated virtual LANs (VLANs)
- Field-replaceable unit for Supervisor Engine 1A already equipped with MSFC
- Enhanced Web Cache Control Protocol Version 2 (WCCPv2) and Cisco IOS server load balancing (SLB) performance
- Enhanced multicast performance

MWAM Multi-processor Wan Application Module.

MWG Mobile Wireless Group.

N

NE Network Element. A single piece of telecommunications equipment used to perform a function or service integral to the underlying network.

NTP Network Time Protocol. NTP is a utility for synchronizing system clocks over the network, providing a precise time base for networked workstations and servers. In the NTP model, a hierarchy of primary and secondary servers pass timekeeping information by way of the Internet to cross-check and correct errors arising from equipment or propagation failures.

P

PDSN Packet Data Serving Node. A node that provides the primary wireless mobile data access to the Internet and intranets using the CDMA2000 Radio Access Network environment.

PPC Power PC.

Q

QoS Quality of Service. Measure of performance for a transmission system that reflects its transmission quality and service availability.

R

RCAL Remote CLI And Logging.

RCP Route Processor Redundancy.

ROMMON ROM-monitor. The ROM-monitor is a ROM-based program that is involved at power-up or reset, or when a fatal exception error occurs. The switch enters ROMMON mode if the switch does not find a valid software image, if the NVRAM configuration is corrupted, or if the configuration register is set to enter ROMMON mode. From the ROMMON mode, you can load a software image manually from Flash memory, from a network server file, or from bootflash. You can also enter ROMMON mode by restarting the switch and pressing Ctrl-C during the first five seconds of startup. When you enter ROMMON mode, the prompt changes to `rommon 1>`. Use the **?** command to see the available ROMMON commands.

RPR+ Route Processor Redundancy Plus. A redundant processor module that contains the CPU, system software, and most of the memory components that are used in a router. Sometimes called a *supervisory processor*. The RPR+ has the following additional benefits over an RPR: reduced switchover time, installed module are not reloaded, allows OIR (On-line Insertion and Removal) for maintenance, synchronization of OIR events, and manual user-initiated switchover using the **redundancy force-switchover** command.

S

SAMI Service Application Module for IP.

SANOS Linux based Storage Area Network Operation System .

SEEPROM Serial Electrically Erasable Programmable Read Only Memory.

SLB Server Load Balancing. The Server Load Balancing feature is a Cisco IOS-based solution that provides server load balancing. This feature allows you to define a virtual server that represents a cluster of real servers, known as a server farm. When a client initiates a connection to the virtual server, the IOS SLB load balances the connection to a chosen real server, depending on the configured load balance algorithm or predictor.

SNMP Simple Network Management Protocol. A common method by which network management applications can query a management agent using a supported management information base.

SP Switch Processor.

SSA Super Santa Ana Asic.

SSG Service Selection Gateway. A Cisco product that provides flexible service selection, connectivity to multiple networks, and RADIUS proxy capability.

SSO Stateful Switch Over.

SUP Supervisor.

Supervisor Hardware complex/card responsible for controlling and managing the system.

SVCLC SerViCe Line Card.

T

TCB Transmission Control Block or Transaction Control Block. It remembers incoming and outgoing requests, providing reliable retransmission of proxied requests and returning the best final response or responses back upstream. One transaction encompasses the received request, the request or requests (if forked) forwarded downstream, responses received from downstream hosts, and the best response returned upstream.

TP CSG2 Traffic Processor.

U

UDP User Datagram Protocol. A layer 4 IP protocol that provides for exchange of datagrams without acknowledgements or guaranteed delivery.

V

VLAN Virtual Local Area Network.

W

WCCPv2

Web Cache Control Protocol Version 2. The Web Cache Communication Protocol (WCCP) feature allows you to use a Cisco Cache Engine to handle web traffic, reducing transmission costs and downloading time. This traffic includes user requests to view pages and graphics on World Wide Web servers, whether internal or external to your network, and the replies to those requests. When you request a page from a web server (located in the Internet), the router sends the request to a cache engine. If the cache engine has a copy of the requested page in storage, the cache engine sends you that page. Otherwise, the cache engine retrieves the requested page and the objects on that page from the web server, stores a copy of the page and its objects, and forwards the page and objects to you.

WCCP transparently redirects Hypertext Transfer Protocol (HTTP) requests from the intended server to a cache engine. You do not know that the page came from the cache engine rather than the originally requested web server.

WCCP v2 now contains the following new features:

- Multiple router support
- Improved security
- Faster throughput
- Redirection of multiple TCP port-destined traffic
- Load distributing applications capability
- Client IP addressing transparency