ASN SERVICE GATEWAY

USER MANUAL

VERSION V13.0

RN-ASN-SG 9U

RN-ASN-SG 1U

Version: V1.0

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ABOUT THIS MANUAL

INTRODUCTION

This manual applies to FCS's Service Gateway (SG) system, hereafter referred to as "ASN-SG." This document includes an overview of the platform, installation procedures, and an ASN-SG commands reference.

ORGANIZATION

This manual includes the following chapters:

Chapter	Description
Overview	Details features and pre-installation requirements for the ASN-SG platform, including site requirements for power and cabling.
: Installation	Provides detailed procedures for installing ASN-SG.
: Command-Line Interface (CLI)	Describes the ASN-SG Command-Line Interface (CLI), the steps to access the CLI, and the steps to perform initial configuration using the CLI.
Accessing the Command Line Interface	Details how to log on locally to an SCC or rear I/O port (if a rear I/O card option is used) and set an IP address to allow for remote management via a Telnet session.
Using the Command Line Interface	Describes how to access the command-line interface; it also directs you to other manuals for administering, configuring, and managing the ASN-SG.
Using the Command Line Interface	Defines the commands available at the first command level of each SCC.
Using the Command Line Interface	Defines commands available at the second command level.
Appendix : A	Describes the vendor-specific attributes related to ASN-SG EDS architecture.
Appendix : B	Explains how FCS's product redirects all peers' HTTP requests to their personal sites as predefined in the Radius Server.
Appendix : C	Provides information on how to contact the FCS Technical Support.
Glossary	Defines abbreviations and acronyms for the ASN-SG Service Gateway system.

INTENDED AUDIENCE

This manual is intended for anyone needing to operate, administer, or maintain FCS's line of Service Creation Gateway products.

CONVENTIONS

The following style conventions and terminology are used throughout this guide.

Element	Meaning
Bold font	Text that you must input exactly as shown (e.g., type **1** for card 1), menu buttons (e.g., **ACCEPT SHELF OPTIONS**) or menu screen options (e.g., **ALARMS** screen) that you must select
Italic font	Variables that you must determine before inputting the correct value (e.g., *Password*)
Monospace font	References to screen prompts (e.g., Invalid Password...Try Again:.)
Reader Alert	**Meaning**
	Alerts you to supplementary information
	Alerts you to supplementary information that is essential to the completion of a task
	Alerts you to possible equipment damage from electrostatic discharge
	Alerts you to possible data loss, service-affecting procedures, or other similar type problems
	Alerts you that failure to take or avoid a specific action might result in hardware damage or loss of service
	Alerts you that failure to take or avoid a specific action might result in personal harm

EU COMPLIANCE

This product has been CE marked in accordance with the requirements of European Directive 73/23/EEC; the following mentioned product is in conformity with Low Voltage Directive 73/23/EEC in order to comply with the requirements in the Council Directive 73/23/EEC relating to electrical equipment designed for use within certain voltage limits and the Amendment Directive 93/68/EEC.

For safety evaluation of the compliance with this Directive 73/23/EEC, these standards were applied: IEC 60950:1999, EN 60950:2000.

INSPECTING YOUR SHIPMENT

Upon receipt of the equipment:

- Unpack each container and visually inspect the contents for signs of damage. If the equipment has been damaged in transit, immediately report the extent of damage to the transportation company and to FCS. Order replacement equipment, if necessary.
- Check the packing list to ensure complete and accurate shipment of each listed item. If the shipment is short or irregular, contact FCS as described in Color FC-Redppendix : Product Support on page -221. If you must store the equipment for a prolonged period, store the equipment in its original container.

Chapter 1

OVERVIEW

The ASN-SG is a service creation platform optimized for delivering differentiated services to residential, mobile, and private subscribers. The ASN-SG enables service providers to offer attractive new services that can be selected dynamically and automatically by their wireless, dial-up and broadband users.

The ASN-SG can provide services over existing infrastructure, integrating smoothly with leading network access servers, RADIUS servers, databases, and billing systems.

The ASN-SG can be deployed to meet the requirements of Internet Service Providers (ISPs), Digital Subscriber Loop (DSL) providers, cable providers, or "hot spot" (802.11) wireless Local Area Network (LAN) providers.

FEATURES

Designed to easily integrate into operations of existing and emerging service providers, the ASN-SG has the following features:

1 **Network Centric and Scalable Architecture:** is designed for a service provider network, scales to carrier class requirements, and allows for a more easily maintained solution because it is deployed in a centralized location. This minimizes the number of systems and makes service changes faster and more economical. As part of this network centric architecture, Customer Premises Equipment (CPE) software, "cookies", and local service points can be eliminated.

Note: Not all can be eliminated. For example, CPE equipment (such as, DSL modem, etc.) will still be needed. Cookies may still be needed depending on the application.

1 **Dynamic Provisioning:** allows users to change a service package or user profile "on the fly" without forcing the user to disconnect and then reconnect. This vital feature enables streamlined service provisioning without involvement of a service provider's personnel and immediate service creation following the user's service- selection decision.

2 **Flexible Network Integration:** can be easily operated with existing access infrastructure, requiring minor changes in network and billing servers.

3 **Universal Platform:** the processing engines support different access types: WiMAX, xDSL, cable, wireless, and dial- up. It handles Gigabit Ethernet.

4 **Flexible Scalability:** is available in a range of capacities, with varying configurations up to 64,000 virtual ports per chassis. As a result, service providers can easily scale ASN-SG's capacity to meet their changing needs.

5 **Hot Swappable Cards:** has redundancies built in including the ability of cards to be mixed and matched.

6 **Subscriber Redirection:** subscribers can be redirected to selected web sites or portals, regardless of their individual Uniform Resource Locator (URL) selection. This feature enables increased traffic to specific sites and personalized communications with individual users. It also enables a service provider to control and authorize access to incidental users that are not regular subscribers to the network. Subscriber redirection is

a key building block for customized services that can be easily created using ASN-SG including walled gardens, selective and targeted promotional activities, anti-virus protection, and other services and applications.

7 **Anti-Spoofing Mechanism:** supplies an anti-spoofing prevention mechanism, which blocks an unauthorized user's computer from pretending to have a different IP address than it really has.

8 **Billing and Accounting:** provides accounting information for each selected service using the standard RADIUS protocol. This enables network providers to bill their users based on the actual services used. Unique accounting capabilities are provided to simplify billing including those required for Session accounting and Service accounting using simple RADIUS commands.

9 **Carrier Class:** supports telecom standards including WiMAX standard interfaces, Point-to-Point Protocol (PPP), Layer 2 Tunneling protocol (L2TP), SNMP, and others.

The ASN-SG comprises two types of system chassis: 1U and 10U. The 1U chassis (or Mini System Chassis) has 2 service creation slots and 1 power supply slot built into the chassis. The 10U chassis (or Full-Size System Chassis) has 16 service creations slots and 4 power supply slots for load sharing redundancy (see).

SG-10

BEFORE YOU BEGIN

Before installing the ASN-SG chassis and its associated modules, it is important to prepare for installation by:

- Preparing the site (site preparations) and reviewing the installation plans.
- Establish a Method of Procedure (MOP).
- Unpacking and inspecting the system components.
- Gathering the tools to properly install the ASN-SG chassis and its associated modules.

SITE PREPARATIONS

Typically, you will have prepared the installation site beforehand. As part of your preparation, obtain a plan of the site or Telco environment where the ASN-SG chassis will be installed. All personnel involved in the installation of the ASN-SG chassis, including installers, engineers, and supervisors, will participate in the preparation of a MOP for approval by the customer.

Method of Procedure

An example of a pre-installation checklist of tasks and considerations (Method of Procedure) that needs to be addressed and agreed upon before proceeding with the installation is given below:

- Assign personnel.
- Determine protection requirements for personnel, equipment, and tools.
- Evaluate potential hazards that may affect service.
- Schedule time for installation.
- Determine any power and space requirements.
- Identify any required procedures and tests.
- On an equipment plan, make a preliminary decision that locates each of the ASN-SG chassis that you plan to install.
- Read this manual, whether you are replacing or adding a ASN-SG chassis that is being installed.
- Verify the list of replaceable parts for the installation (screws, bolts, washers, and so on) so that the parts are identified (see Color FC-Redable on page -20).
- Check the required tools list to make sure the necessary tools are available (see Color FC-Red\xd2 Required Tools and Equipment" on page -22Default ¶ Font).
- Purchase necessary parts.
- Identify work steps and any necessary notifications to CO personnel or engineers before work begins.
- Perform the installation (see Chapter : Installation).

UNPACKING AND CHECKING THE CONTENTS OF YOUR SHIPMENT

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

> Note: Do not discard the packaging materials used in shipping your ASN-SG chassis. You will need the packaging materials in the future if you move or ship your ASN-SG chassis.

Table ?20 provides a list of required and optional components that may not be included in the ASN-SG chassis kit, but are either required or recommended for the ASN-SG. A notes section has been provided to document any components not listed.

Packing List

Item		Catalog/Part Number
ASN-SG Service Gateway System Chassis		
ASN-SG Service Gateway System User Manual		
ASN-SG Service Gateway System Installation Kit		
• Ten (10) 6-32 x 3/16 screws: • Two (2) 8-32 x 5/16 screws: • Eight (8) 12-24 x 3/8 screws: • Two (2) mounting brackets • One (1) #6 ground cable • DB-9/RJ-45 “F” connector	 	

Notes:

System Installation Notes

Required Tools and Equipment

The following tools are required to install the ASN-SG chassis:

- Grounding or ESD-preventive wrist strap
- No. 2 Phillips-head screwdriver
- Multimeter (for continuity testing)
- Wire stripper
- Wire-wrap tool
- Box cutter
- #26 AWG wire

Specific ASN-SG Chassis Installation Requirements

The ASN-SG chassis dimensions are:

- Height of 17.50 inches (44.4 cm) (10U)
- Width of 19.0 inches (44.8 cm) without rack adapters attached to the left and right side of the unit
- Depth of 11.4 inches (28.9 cm)

Observe the clearances specified below in to provide proper air flow for chassis cooling.

To install the chassis in an equipment room or central office:

- Install in a 19-inch, 23-inch, 24-inch, or 600 mm rack using the customer provided rack adapter brackets.
- Allow a 1-inch minimum clearance between the chassis to provide for proper air flow for cooling.

Use the following card types in the ASN-SG chassis:

- Fast Ethernet card in slots 1 through 16
- Gigabit Ethernet card in slots 1 through 16
- Rear I/O card on the rear of the chassis in slots 1 through 16

When selecting system components, consider future expansion of your ASN-SG with items in Color FC-Redable as possible options.

Possible ASN-SG Options

If you want to add:	Then:
ASN-SG chassis	Consider installing the first chassis in the top position of a rack to allow for further expansion below it.
Ethernet Port	Add a Rear I/O card on the corresponding rear slot of an SCC that Ethernet access is desired.
Service Creation Cards:	
VRRP	Use an SCC of the same type in any slot (1 through 16). Consider placing cards participating in functional groups in adjacent slots for ease of identification.

Redundancy	Add an additional SCC, of the same type, in slots 1 through 16 to have an additional card that provides the same service in the event of a card or connectivity failure.

Power Requirements

The following specifies the power versions available for the SG1 chassis, then specifies the power requirements for your facility relative to the SG1 power version you selected.

ASN-SG Chassis

The ASN-SG chassis provides four 100 to 240 Vac (50 to 60 Hz) power supplies with AC power connectors. You must install one power supply for every five Service Creation Cards installed in a chassis (three power supplies are required for a chassis having slots 1 through 16 fully populated). If you want redundant power, install an additional power supply in an open power module slot. It is recommended to have one power module above the minimum to provide uninterrupted service will a power module fail.

Facility Requirements for AC Power

Verify that the facility AC power source for the primary connection falls within the recommended voltage range of 110 to 220 Vac with a maximum current of 10 amps for 110 Vac and 5 amps for 220 Vac.

Blank Faceplate Requirement

When slots in an ASN-SG chassis do not contain a card, the slot must be covered with a blank faceplate to prevent personnel contact with back panel connectors and to maintain proper air flow within the chassis.

Environmental Requirements

The ASN-SG chassis has an ambient operating temperature range of +32 to +104°F (0 to +40°C) with a maximum humidity of 95% when installed according to the instructions in this installation manual.

The storage temperature range is from -4 to +158°F (-20 to +70°C).

System Cabling Requirements

You will complete only the cabling appropriate for the cards installed in the chassis.

Chassis Ground and Power Cabling

The recommended cabling to ground the ASN-SG chassis is 6 AWG (minimum) stranded copper wire.

For the ASN-SG chassis, the recommended cabling is 14 AWG (1.88 mm diameter) stranded copper or 14 AWG (1.628 mm diameter) solid wire to connect the DC terminal block to the facility provided power.

For the ASN-SG chassis power cable, use one of the following:

- PC US for North America
- PC EURO for Europe
- PC UK for the United Kingdom

Network Cabling

Network connectors interface the ASN-SG to a LAN, or a WAN.

Configuration Port Cabling

In addition to the RJ-45 craft port provided on the front panel of each SCC card, each card may have a rear access RS-232 interface through a RJ-45 connector for craft access and configuration if a Rear I/O card is installed. There are two Ethernet ports located on the Rear I/O card.

Note The Rear I/O card is optional when used with Gigabit SCC.

Chapter 2

INSTALLATION

This chapter provides detailed information about installing the ASN-SG.

MOUNTING THE ASN-SG CHASSIS

Complete the following procedure to mount the ASN-SG chassis.

Step	Action
1	If required, securely attach the customer provided rack adapters to the left and right sides of the rack in which the ASN-SG chassis will be installed.
2	Position the chassis in the rack.
3	Align the chassis adapter holes with the vertical rack mounting holes.
4	Secure the rack adapters to the rack using a Phillips screwdriver and four 12-24 x ½ inch pan head screws for each rack adapter.

CONNECTING THE ASN-SG CHASSIS GROUND

To connect the ASN-SG chassis ground, complete the following procedure.

The recommended copper wire is a minimum 6AWG stranded copper wire with a maximum length of 5 feet (1.52 m).

Step	Action
1	Use the vendor provided cable.
2	Attach one end of the ground wire to the chassis ground lug and tighten the screw. Make sure the ground

	wire has a secure connection.
3	Connect the other end of the ground wire to the CO ground termination point or building earth ground. Make sure the ground wire has a secure connection.

You must wear an antistatic wrist strap connected to the ESD jack on the ASN-SG chassis to perform the installation procedures. You must also observe normal ESD precautions when handling electronic equipment. Do not hold electronic plugs by their edge. Do not touch components or circuitry.

Attach your antistatic wrist strap to the ESD ground jack on the ASN-SG chassis.

Procedures marked with an ESD symbol require you to use the antistatic wrist strap to complete the step.

CONNECTING THE POWER SOURCE

The ASN-SG AC chassis (SG1-400-005) supports 110 to 240 Vac (50 to 60 Hz) power. Connect facility power to the chassis as described in the following section.

Connecting AC Power to an ASN-SG AC Chassis

Connect an AC power cord(s) to AC power connectors, as required.

Step	Action
1	Turn off the AC power switch on the back of the ASN-SG AC chassis.
2	Plug the power cord into the chassis power connector.
3	Connect the AC power cord from the power supply to the facility power source. Do not turn on the power switches at this time. You will turn on the power switches when you power up the chassis (as described in Color FC-Red\xd2 Powering Up the ASN-SG Electrical and mechanical shock hazards are present throughout the system; be aware of this possibility when power is applied to the chassis. Only qualified personnel should service the system. ” on page -27Default ¶ Font) and install the cards (as described in Color FC-Red\xd2 Installing Cards and Blank Faceplates” on page -28Default ¶ Font).

INSTALLING INTERFACE CABLES

This section provides procedures for installing the cabling for the network, subscriber, and management interfaces.

Connecting Network Cards

Connect the ASN-SG system, through a network card interface, to WAN, or LAN for a network uplink.

Refer to the following sections to complete cabling for the network interface connectors for these network cards:

- LAN GEthernet

Connecting the Ethernet Interface

The Rear I/O card provides two back panel access 10/100Base-T Ethernet interfaces.

Note: The Rear I/O is required for Ethernet.

The Rear I/O card connector is MDI. Use one of the following cables as described below:

- Straight through cable to connect to a device with an MDI X port such as a hub, repeater, bridge, or router
- Cross over cable to connect to a device that also has an MDI port such as a PC with an Ethernet Network Interface Card (NIC)

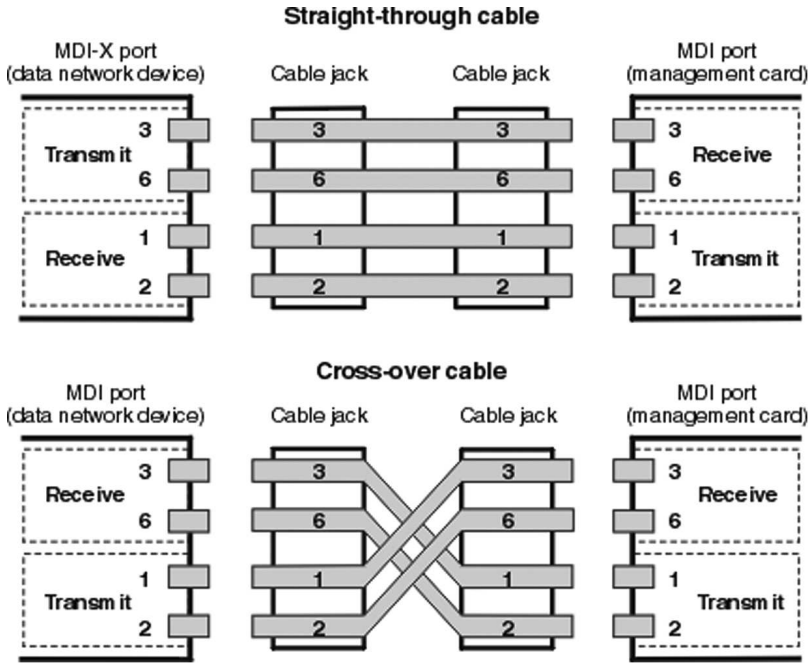
Table ? shows the pin-outs for the RJ-45 connectors.

RJ-45 Pin-Outs

MDI Pin Number	MDI-X Pin Number	Signal[1]	Symbol	Direction
1	3	Transmit Data (+)	TX+ (TX0+)	Out(Bidirect)
2	6	Transmit Data (-)	TX-(TX0-)	Out(Bidirect)
3	1	Receive Data (+)	RX+(TX1+)	In(Bidirect)
4	4	NC	(TX2+)	(Bidirect)
5	5	NC	(TX2-)	(Bidirect)
6	2	Receive Data (-)	RX-(TX1-)	In(Bidirect)
7	7	NC	(TX3-)	(Bidirect)
8	8	NC	(TX3+)	(Bidirect)
case	case	Chassis Ground		

Figure ? shows the pin-outs for straight-through and cross-connect cabling.

1 NC = no connection.



Straight-Through and Cross-Over Cable Pin-Outs

Connecting to an Ethernet Port

Step	Action
1	Plug the RJ-45 connector of the Ethernet cable into the FAST E-NET port on the ASN-SG chassis back panel.
2	Connect the other end of the cable into the Ethernet port on the PC, hub, or other Ethernet device.

Connecting the Craft Port Interface

In situations where a Rear I/O card is installed, the default craft port is on the Rear I/O card. Moving a jumper on the Rear I/O card is required if you wish to use the front craft port.

Powering Up the ASN-SG

Electrical and mechanical shock hazards are present throughout the system; be aware of this possibility when power is applied to the chassis. Only qualified personnel should service the system.

Connect to facility power using an AC power cord and confirm proper function of the AC power supplies.

Step	Action
1	Connect the power cord from the AC power connector on the ASN-SG AC chassis back panel to the facility power source. Turn on the power switch.
2	Verify that all cabling is securely terminated.
3	On each AC power supply, verify that the power LED lights green, indicating that the power supply is receiving power.

INSTALLING CARDS AND BLANK FACEPLATES

Install ASN-SG cards in the appropriate slots in the ASN-SG chassis as indicated below. When slots do not have cards installed, use blank faceplates as indicated below.

Installing Cards

Note ASN-SG cards are inserted under power (hot inserted).

When inserting the cards, make sure the cards are properly aligned on the tracks to prevent equipment damage or personal injury.

Once you've powered up the chassis, as described in ColorRed\xd2 ***Powering Up the ASN-SG***

Electrical and mechanical shock hazards are present throughout the system; be aware of this possibility when power is applied to the chassis. Only qualified personnel should service the system.

," Default ¶ Font you can begin to install cards in the ASN-SG chassis.

Refer to guidelines for Color FC-Red\xd2 Site Preparations" on page -20Default ¶ Font to select the appropriate slot for a card, or refer to the applicable card installation manual to select the appropriate slot and for detailed information on the card.

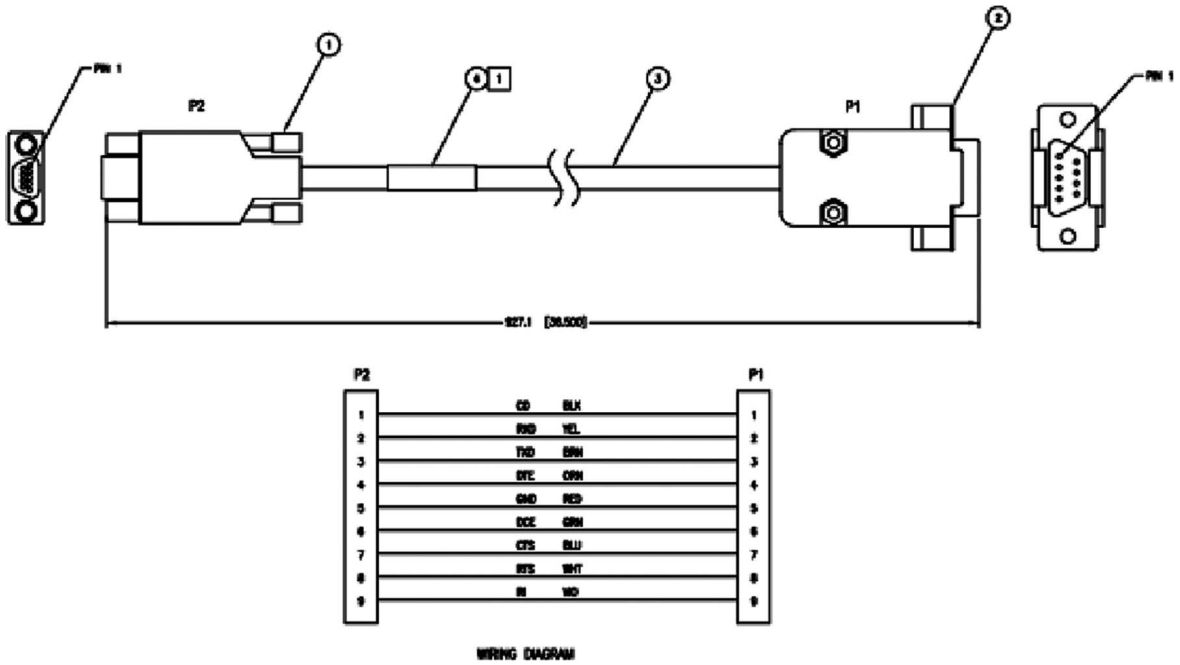
Installing Blank Faceplates

Use the blank faceplate identified in the Color FC-Red\xd2 Blank Faceplate Requirement" on page -23Default ¶ Font.

Install blank faceplates in the ASN-SG chassis to cover unused slots. Unused slots must be covered to prevent personnel contact with back panel connectors under power and to maintain proper airflow within the chassis.

Step	Action
1	Slide the blank faceplate into the empty slot. Ensure the retaining latches are lifted.
2	Push the blank faceplate in until the retaining latches touch the ASN-SG chassis.
3	Gently close the retaining latches until they snap into place.
4	Tighten the captive screw on the top and bottom retaining latches.

SERIAL CABLE



Serial Cable

Chapter 3

COMMAND-LINE INTERFACE (CLI)

This chapter describes the ASN-SG Command-Line Interface (CLI), the steps to access the CLI, and the steps to perform initial configuration using the CLI.

OVERVIEW

The ASN-SG Service Gateway System management interface is accessed using a CLI, which provides comprehensive ASN-SG system management including configuration, performance monitoring, and system maintenance and administration. An ASN-SG Service Gateway System comprises an ASN-SG 10U Chassis with associated Service Creation Cards (10/100/1000 SCC) and rear I/O cards.

The command-line interface is accessed through the SCC (or rear I/O card if installed) COM port using either a terminal connected directly to the COM port or over a network using a Telnet session. You can connect your Telnet session from:

1 A PC connected on the ASN-SG Ethernet Local Area Network (LAN).

OR

1 A remote PC connected over a router to the ASN-SG Ethernet port.

This chapter provides an introduction to the command-line interface structure and then provides information on how to use it.

UNDERSTANDING THE INTERFACE STRUCTURE

The command-line interface has four system management menus:

1 Administration

2 Configuration

3 Display

4 Diagnostics

These four system management menus comprise four sub-menus:

1 Configuration

2 Main

3 Debug

4 Configuration-Debug

Table ? provides a description of these sub-menus and their associated commands.

ASN-SG Sub-Menus and Associated Commands

Menu	Types of Commands
Configuration	Use the commands in this second level menu to configure: • port configuration • system passwords • default authentication service type • RADIUS parameters • ACL permissions • Tunnel server parameters • PPP and LCP configuration • service parameters • system parameters • native IP parameters • VRRP parameters • IP parameters • debug message levels
Main	Use the commands in this menu to access other command levels and perform system updates, system reloading, and network troubleshooting.
Debug	Use the commands in this first level menu to display system parameters suchas: • Memory allocation • Network/tunnel connections
Configuration-Debug	Use the commands in this third level menu to configure system debug messages such as:

	• Error and event level • Time server IP address • Log server IP address

COMMANDS AND NAVIGATION

Navigate the command-line interface by entering a command name or a command string to move to the appropriate command level. The command level is indicated by the prompt. You can abbreviate command-line interface commands if the abbreviations are distinct; however, you must use at least two letters of the command. Also, the commands are not case sensitive. The following general and navigation commands are available from each prompt (see Color FC-Redable below and Color FC-Redable on page -31, respectively).

General Commands

Enter the following command:	To:
?	Display a list of commands available from the current prompt.
command name? (for example, show?)	Display an explanation of a particular command.
Exit	Leave the current level and return to the upper level.

Command Path Navigation

For each command that provides configuration or management of a ASN-SG system, a path is provided in the applicable section of the user document to help locate that command in the command-line interface structure. The path will be displayed in a box before the description of the command.

COMMAND-LINE EDITING

The command-line interface provides a DOS-like environment for editing. It provides special key functions and other special functions developed for a VT100-type terminal.

> Note Commands may not be recognized under some vendor's versions of Telnet. With Microsoft® Windows® HyperTerminal, or other terminal emulation programs, you may need to set the terminal preferences to VT100 arrows to use these functions (see Color FC-Redable).

Navigation Commands

Use This Feature:	To:
Up arrow key	Provide the capability to scroll backward through a list to retrieve information.
Down arrow key	Provide the capability to scroll forward through a list to retrieve information.
Tab key	Allows the completion of a command given the input of at least two characters and no other ambiguous commands occur.

Chapter 4

ACCESSING THE COMMAND LINE INTERFACE

The initial step for managing the ASN-SG Service Gateway System is to log on locally to an SCC or rear I/O port (if a rear I/O card option is used) and set an IP address to allow for remote management via a Telnet session. This IP address should place the ASN-SG system on the same subnet as a router or other device to which it connects upstream through its Ethernet port.

CONNECTING TO THE CRAFT PORT

Complete the following procedure to connect to the Craft port.

Step	Action
1	Connect one end of a straight-thru Ethernet cable to the front of the SCC or the COM1 port of a rear I/O, if a rear I/O card is installed. Connect the other end of the straight-thru Ethernet cable to the DB-9/RJ-45 connector (provided in the ASN-SG shipment) and then to the PC's COM1 or COM2 port.
2	Power up the ASCII terminal or PC.

Refer to the appropriate SCC installation manual for more detailed installation instructions, including the location of the respective SCC Craft port and a description of the SCC Craft port connector pin-outs.

LOGGING ON TO THE CRAFT PORT

Complete the following procedure to log on to the Craft port.

> Note If the keyboard remains inactive for five minutes, the command-line interface Inactivity Timer automatically logs the current user off. If this happens, log on to the command-line interface again. If debugging is activated, you may have to press **CTRL+C** to access the login prompt.

Default Username/Password

Username	Password	Authority
technician/te	ggcon	Full-access read/write
supervisor/su	sg1	Read/write to second level
operator/op	popgate	Read-only to first level with user drop capability
viewer/vi	popgate	First-level show capabilities

If you are using a PC as a terminal, use a terminal emulation program such as HyperTerminal or Procomm™. Refer to your terminal emulation program's documentation for instructions.

Step	Action

1	Configure the terminal or the PC terminal emulation program as follows: • Baud rate: **19200 bps** • Data bits: **8** • Parity: **none** • Stop bits: **1** • Flow control: **none**
2	When using a PC, select the COM setting of the port to which the RS-232 cable is connected (for example, **COM1** or **COM2**) using the terminal emulation program.
3	Press **ENTER** to initiate the terminal session.
4	Enter your **user name** at the `Username:` prompt.

5	Enter your **password** at the `Password:` prompt.
	The system will display the `Host>` prompt:
	
	`Welcome to ASN-SG System`
	
	`Username: technician`
	`Password: *****`
	
	`Login Successful`
	
	`Host>`

SETTING THE IP ADDRESS

```
Host> configure terminal
Host(config)# interface ethernet
```

Set the management card IP address, subnet mask, and default gateway (if a gateway exists) to enable communication with external networks and to enable access to the ASN-SG CLI for Telnet sessions.

To set a new IP address and subnet mask for the SCC, do the following.

Step	Action
1	From the `Host(config)#` prompt, enter the **interface** command in the following format: **`interface ethernet <slot number>\<port number> <ipaddr> <netmask> mode <ethernet mode> [mtu <1500|1544>]`**
2	From the `Host(config)#` prompt, enter the **ip default-gateway** command in the following format: **`ip default-gateway <ipaddr>`**
3	For this change to become permanent, the user must perform a **write memory** command from the `Host>` first level prompt to save this change to NVRAM (when the **save** command is issued, it saves all systems parameters): **`write memory`**

Parameter(s)

`<slot number>\<port number>`

The SCC and rear I/O interfaces have specific designations as shown in Color FC-Redable .

Interface Identification

Card/Type	Slot/Port 1	Slot/Port 2
Rear I/O	1/1	1/2
Gigabit Ethernet	1/1	1/2
GiG-E Card		
GiG-E	1/1	1/2

`<ipaddr>`

The SCC IP address for interface in question. This address is set up to be on the same subnet as the Ethernet network to which the ASN-SG system is attached (format xxx.xxx.xxx.xxx).

`<netmask>`

The subnet mask associated with the SCC IP address. This address is based on the Ethernet network to which the ASN-SG system is attached (format xxx.xxx.xxx.xxx).

`<mode>`

Ethernet Mode

Value	Explanation
10H	10M half-duplex
10F	10M full-duplex
100H	100M half-duplex
100F	100M full-duplex
1000H	1000M half-duplex
1000F	1000M full-duplex
Auto	Auto select mode

```
Host> configure terminal
Host(config)# interface ethernet 0 \ 2 12.3.66.211 255.255.255.0 auto mtu 1500

Added Item
```

Displaying the IP Address

```
Host> show configuration
```

From the `Host>` prompt, enter the **show configuration** command to verify your configuration.

Example(s)

```
Host> show configuration
…
  interface ethernet 0\1 192.168.0.1 255.255.255.0 mode auto
 ip default-gateway 192.168.0.253
…
```

When the **show configuration** command is entered, A screen similar to the one above displays the ASN-SG SCC card's Ethernet port IP address, subnet mask, and default gateway (if applicable).

Chapter 5

USING THE COMMAND LINE INTERFACE

There are multiple ways to access an ASN-SG for management. Also, there are rules that determine the number of accesses that can be made at one time to an ASN-SG system. Once you have access, you can complete the configuration and management of the ASN-SG.

CONFIGURING THE ASN-SG

The operational software for an SCC resides on each individual card. The software is accessed through a command-line interface to configure and manage an ASN-SG.

The command-line interface can be accessed on an ASN-SG locally through a serial interface to the Craft port on the SCC (or rear I/O card) or through a Telnet session as shown below. The command-line interface modifies and views the ASN-SG Management Information Base (MIB) objects to implement system configuration and management.

Additionally, ASN-SG can also be configured and managed through a customer-provided Element Management System (EMS). The EMS uses SNMP to modify and view the ASN-SG MIB objects.

LOGGING ON

In addition to logging on to an ASN-SG locally through the Craft port, up to four additional remote users can log on through a Telnet session.

The following example shows how to access the ASN-SG CLI using a Telnet session from a remote system. Specify the IP address previously designated for this purpose:

```
C:\users\default>telnet 192.168.0.1
```

You receive a Welcome prompt when you successfully log on to the ASN-SG CLI. Log on with the user account information assigned to you.

```
Welcome to ASN-SG System
```

```
Username: technician
Password: *****


Host>
```

LOGGING OFF

To log off, enter the **exit** command at the first level `Host>` prompt.

```
Host> exit
```

Note The CLI Inactivity Timer automatically logs the current user off the system if the keyboard remains inactive for five minutes.

WHAT TO DO NEXT

From the command-line interface, use the procedures in this manual to (among other things):

- Configure the network card ports, followed by services for the network connections.
- Configure terminated access technology.
- Configure other network interfaces such as AAA, WEB and etc.
- Configure internal profiles if AAA is not used.

Use ? on page -30 to navigate command menus and perform the necessary actions.

Chapter 6

FIRST LEVEL COMMANDS

This chapter describes the commands available at the first command level of each SCC.

You can enter the entire command or the first two letters of most commands and command-line arguments. If there are two commands with the same first two letters, enter enough letters to differentiate between the two commands. The remaining letters can be displayed, if you wish to see the complete command, by pressing **TAB** after the first two letters. If a command-line argument is missing, the system responds by displaying the words `Incomplete command` or `illegal command` directly below the position of the missing argument.

Previously used command lines can be retrieved by pressing the **Up** and **Down** arrow keys to browse the list of these command lines. Any of the command lines can be executed by pressing **ENTER** when it appears on the screen.

You can view the command options and command-line argument options by typing **?** at any point before a command line is complete. For example, typing ? right after the prompt will provide a list of available commands, and typing ? after a command will display a list of options for the next command-line argument. Similarly, typing ? after an option will display a list of options for the following command-line argument.

The help facility can be used to obtain a list of the first level commands and their functions by typing **?** immediately after the first level prompt. The question mark does not appear on the screen, but the system responds by displaying the information requested.

To verify the functionality of the initial configuration of the SCC, the commands at the first level may be used to:

1. Show hardware, software, and license versions
2. Show running configuration and port status
3. Show system information
4.

Write to and Load from the system configuration on a TFTP server

Access the configuration menu

Disconnect users

Confirm network connectivity

View debug parameters

SHOWING A LIST OF AVAILABLE PARAMETERS

Using the GREP command

The GREP command may be operated on any of the system commands.

The command may be operated on any of the system command.

The command displays only the output lines that match a defined string.

The “|” sign should separate between the grep command and the command it works on.

The system should present the grep option description on any relevant help command. The help line should be:<| grep> - print lines matching a pattern. Format: | grep “match string”

<Cntl C> action command stops immediately the “grep” execution.

Usage

system-command | grep "string"

Example1

```
Host> show users | grep "moshe" <cr>

1    ANet  PPPmoshe            192.168.2.12     00:04:23  9568432


Host>
```

Example 2

```
Host> write terminal |grep "interface" <cr>

interface loopback 1 10.1.208.1 255.255.255.0
interface ethernet 0\2 1.1.1.1 255.255.255.0 auto
Host>
```

Example 3:

```
Host# write terminal ?
  <cr> -
  <| grep> - print lines matching a pattern. Format: | grep “match string”
Host#
```

Using the ? command

```
Host> ?
```

The list of available parameters can be viewed by typing **?** at the first level prompt.

Example(s)

```
Host> ?
  show                    - Display running configuration and status
  write                   - Write running configuration
  copy-TFTP               - copy-TFTP file from server
  ping                    - Ping command
  reload                  - Reload the system
```

```
  clear                    - Disconnect line
  traceroute               - Traceroute command
  exit                     - Exit ASN-SG management session
  configure                - Modify running configuration
  debug                    - Show debug information
Host>
```

Using the show ? command

```
Host> show ?
```

From the first level `Host>` prompt, enter **show ?** to view a list of available commands.

Example(s)

```
Host> show ?


  version                  - Display versions
  configuration            - Display non-volatile configuration
  ethernet                 - Display ethernet interface status and configuration
  port                     - Port
  users                    - Display connected users
  ip-route                 - Display routing table
  telnet-users             - Display active telnet users
  system                   - Display system information
  license                  - Display the system license
  vrrp                     - Show VRRP parameters
  tunnel                   - Display active tunnels information
  ip-tunnel                - Display active tunnels information
  availability             - Display availability parameters
```

These commands are discussed below.

Using the show version command

```
Host> show version
```

Enter **show version** to see version levels of hardware and software.

Usage

show version <software|hardware|pack>

show version software <SCC>

show version hardware <2>

Parameter(s)

<software|hardware|pack>

The first level parameter has three options:

- **software**–Displays the software version of the SCC in question.
- **hardware**–Displays hardware information of the SCC in question.
- **pack**–Displays detailed information of the installed software version.

The second-level parameter has three options:

<software> <SCC>

The software version for the Service Creation Card in question

<hardware> <2>

Module number.

Example(s)

```
Host> show version hardware

 Module         Num     Part No.                Serial No.      Slot
 _________      ___     ____________________    __________      ____

 Backplane      1       710-200   -0    Rev 0   0

 SCC-GEth       2       650-045         Rev     0               1

Host>
```

```
Host> show version software SCC

 1st stage:   11.0T1p May 20 2007 11:13:37
 2nd stage:   11.0T1p May 20 2007 11:14:28
 Application: 11.0T205 Sep 8 2007 17:25:51
```

```
Host> show version software

 Module      Num   Application
 ______      ___   ___________

 SCC-GEth      1   13.0T1.017 Sep 06 2011 11:16:00

Host>
```

```
Host> show version hardware 2
cPCI-7055 SCC Gigabit Ethernet with 2x1000 Base T Copper RJ45 connectors


 Module         Num     Part No.                Serial No.      Slot
 _________      ___     ____________________    __________      ____

 SCC            1       650-043         Rev     0               1


 GigaEth        2       650-016                 0               1

Host>
```

Displaying the configuration in NVRAM

```
Host> show configuration
```

Usage

show configuration

Example(s)

```
Host> show configuration
# version: 10.0T2.05 Jun 08 2006 17:25:51
 interface ethernet 0\1 172.16.1.13 255.255.255.128 auto
 interface ethernet 0\2 172.16.13.193 255.255.255.128 auto
 password viewer Tw)wtx-
 password operator Tw)wtx-
 password superuser +5z!#r-MGA
 password technician Koz!#
 password pre-authentication +k(~#i+^#43\,6
 def-service-auth ppp-auto
 multilink-mode multi-cage
 radius-server host 172.16.1.15 auth-port 1812 acct-port 1813 m priority 3
 radius-server key netix
 access-list SNMP-permit 0.0.0.0 0.0.0.0
 access-list SNMP-permit 10.0.0.0 255.0.0.0
 access-list SNMP-permit 172.16.0.0 255.255.0.0
 access-list SNMP-permit 192.168.1.1 255.255.0.0
 access-list EDS-permit 10.0.1.203 255.255.255.255
 access-list EDS-permit 162.10.1.0 255.255.255.0
 access-list EDS-permit 172.16.1.2 255.255.255.255
```

```
 access-list EDS-permit 172.16.1.15 255.255.255.255
 access-list native-ip 172.16.13.0 255.255.255.0
SNMP-server community get T}y||g
 SNMP-server community set T}y||g
 tunnel-server host 0.0.0.0 mask 0.0.0.0
 pppoe enable interface 0\1 0
 router id 172.16.1.13
 hostname Mankali
 banner BannerString
 session-timeout 500000
 idle-timeout 1800
 lcp renegotiate
service cache off
 service internal  framed-PPP
 native-ip dhcp pre-auth-mode mac
 native-ip def-service-auth Guest
 native-ip enable  interface  Ethernet  0\2
 ip local-pool pool1 162.10.1.1 162.10.1.254 internal
 ip domain-name ASN-SG
 ip primary-name-server 62.90.133.233
 ip secondary-name-server 0.0.0.0
 ip default-gateway 172.16.1.1
 ip tcp adjust-mss  on
 ip dhcp relay server Ethernet 0\2   1 172.16.1.15
 debug
 watchdog-TimeValue 60
 time-server-ip 0.0.0.0
 error-level default 3 output-device console
 event-level default 5 output-device console
 trace default off
 sysLog-server-ip 192.168.1.1

Host>
```

Displaying Ethernet Port Statistics

```
Host> show ethernet 0 \ 1
```

Use the **show ethernet** command to display the Ethernet port parameters for the Rear I/O Ethernet port.

Note When keying in the command, the backward slash '\' is optional. The command will work with just a space between the slot number and port number.

Usage

show ethernet <slot number> <port number>

Parameter(s)

<slot number>

The slot number refers to *0* (for the Rear I/O) card and *1* for a Gigabit Ethernet port on the SCC card itself.

<port number>

The port number refers to a value of *1* to *3* for the card in question.

Example(s)

```
Host> show ethernet 0 \ 1
Interface Slot 0 Port 1 is up, line protocol is up
 Hardware address is 008042195FB7
 Internet address is 10.0.1.220 Mask is 255.255.255.0
 Gateway IP address is 10.0.1.253
 Duplex mode sensed by auto-negotiation is full-duplex
 Ethernet speed is 1 Gbps
 MTU 1500 bytes, BW 1000 Mbps
 23778 packets input, 1997552 bytes
 Received 5473 broadcast
, 0 runts, 0 giants, 0 CRC
Input frame discard = 0
 Assign Rx buffers failure = 0
 Free Rx buffers = 1005
13879 packets output, 1386325 bytes
 0 output errors,  0 output late collisions, 0 retry
 0 re-transmission limit
 Output discards = 0
Redundancy status:  redundancy is not configured



Host>
```

The “show Ethernet” command without any parameters will display all system configured interfaces.

Example: show Ethernet command (all interfaces) in ASN-SG

```
Host# sh ethernet
 Interface 0/1 is up, line protocol is up
 Hardware address is 00-50-6F-10-20-30
 Internet address is 10.6.1.61 Mask is 255.255.0.0
 Duplex mode sensed by auto-negotiation is half-duplex
 Ethernet speed is 1000 Mb
```

```
 MTU 1500 bytes, BW 1000
 1492223 packets input, 112238772 bytes,
 Received 3323 broadcasts
 1000 input errors, 20 runts, 10 giants, 300 non-octet, 200 CRC,
 100 input collisions,
 Input frame discard = 0
 Assign Rx buffers failure = 0
 Free Rx buffers = 1006
 79764263 packets output, 1653333845 bytes,
 600 output errors, 20 output collisions, 100 deferrals, 10 retry,
 5 re-transmission limit, 100 carrier sense loss
 Redundancy status: protected
 Current backup port status: UP
 Link sense counter: 8Link Down Counter: 1


Interface 0/2 is up, line protocol is up
 Hardware address is 00-50-6F-10-20-40
 Internet address is 10.7.1.61 Mask is 255.255.0.0
 Duplex mode sensed by auto-negotiation is half-duplex
 Ethernet speed is 1000 Mb
 MTU 1500 bytes, BW 10,000,000,000
 1492223 packets input, 112238772 bytes,
 Received 3323 broadcasts
 1000 input errors, 20 runts, 10 giants, 300 non-octet, 200 CRC,
 100 input collisions,
 Input frame discard = 0
 Assign Rx buffers failure = 0
 Free Rx buffers = 1006
 79764263 packets output, 1653333845 bytes,
 600 output errors, 20 output collisions, 100 deferrals, 10 retry,
 5 re-transmission limit, 100 carrier sense loss
 Redundancy status: protected
 Current backup port status: UP
 Link sense counter: 8Link Down Counter: 1

Host#
```

Using show port ethernet

```
Host> show port ethernet
```

The command displays the existing Ethernet ports and their status.

Example: Show Ethernet port on Gigabit Ethernet SCC

```
Host# show port ethernet <cr>
 Slot Port Status       Max CapacityType

 ---- ---- ------------ ------------ -----------
  0    1     UP          1000M      Copper
  0    2     UP          1000M      Copper
  0    2     No-Conf     1000M      Copper
  1    1     Down        1000M      Fiber
  1    2     Down        1000M      Fiber
Host#
```

Displaying User Status

```
Host> show user
```

Usage

show users <cr> <number>

Requirements Specifications

Show User and Show User Specific User Commands

In G-Connect System

Parameter(s)

[<number>]
The line number of the user to be viewed.

Example(s)

```
Host> show users

 Line Line  User User Name         IP Address      Duration  Calling
      Type  Type                                   hh:mm:ss  Number
 ____ ____  ____ __________        __________      ________  _______

 52   Eth   PPP  status            155.226.20.50   00:01:00  0010A4C15AFB

Total number of Network connected lines: 1
  ANet (Analog source) lines: 0, INet (ISDN source) lines: 0
  Eth (Ethernet source) lines: 1
  PPP (PPP source) lines: 1
Total number of Framed users: 1
  PPP users: 1, MLP users: 0
```

```
Total number of tunnel switch users: 0
Total number of native IP users: 0
  NIPP (radius-proxy triggered) users: 0
  NIPD (dhcp-proxy triggered) users: 0
  NIPI (ip triggered) users: 0

Host>
```

```
Host> show users 704
Line number: 702  Line type: ANet  User type: PPP
 User name: 0_220
 IP address: 10.220.3.191, IP pool name: 1
 Next Hop:  10.0.1.253
 Tunnel ID(in): 4798 Tunnel Session ID(in): 21182 LAC source IP  10.0.1.64
 Session duration/timeout: 00:00:39 / 17:59:21
 Idle duration/timeout: 00:00:35 / 00:30:00
 Slot: 0 Port: 1
 Calling number: <N/A>   Called number: 0
 Input packets/Octets: 3 / 30,
 Output packets/Octets: 3 / 42,
 Used Data Quota: 0
 PPP Native IP Pipe: Off
 Redirect Gateway:  <N/A> Accounting Type:  Standard
 User Group: 0 DHCP Server IP:   <N/A>
 Service name: Original-Service
 Service duration: 00:00:40

Host>
```

Displaying Routing Tables

```
Host> show ip-route
```

Use this command to display the configured routes.

Usage

show ip-route

Parameter(s)

None.

Example(s)

```
Host> show ip-route
```

```
 Network          NetMask          Gateway          Interface
 Address                            Address
 ____________     ______________   ____________     ____________________

 155.226.21.0     255.255.255.0    0.0.0.0          Ethernet [   0\2   ]
 155.226.22.128   255.255.255.128  0.0.0.0          Ethernet [   0\2   ]


Host>
```

Displaying System Administrators

```
Host> show telnet-users
```

Usage

Use this command to display the system administrators that are logged onto the system.

Parameter(s)

None.

Example(s)

```
Host> show telnet-users

 Number   User Level   Duration   Source

 ______   __________   ________   ______
 1        Technician   00:01:07   Console
 2        Technician   00:00:08   Network

Host>
```

Displaying System Parameters

```
Host> show system
```

Usage

```
show system
show system <load>
```

Parameter(s)

```
<load>
```

Calculates the throughput through each interface in Mbps.

Example(s)

```
Host> show system
Up-time: 1 Hours, 56 Minutes, 58 Seconds
 Total number of network incoming calls: 702
 Total number of network connected calls: 702
 Current number of Network connected lines: 1
ANet (Analog source) lines: 1, INet (ISDN source) lines: 0
Eth (Ethernet source) lines:  0
Current number of PPP (PPP source) lines:  0
Current number of connected Framed users: 1
PPP users: 1, MLP users: 0
Current number of connected native IP users: 0


Host>
```

```
Host> show system load
Calculating load ...
 Total current connected users: 0
 Total sessions' capacity: 2000
 System load: 0%
 CPU usage: 1%

Interface 0/2
Throughput [5 sec. Avg.]: 0.0 Mbit/s In, 0.0 Mbit/sec Out
Total available throughput: 100 Mbit/s In, 100 Mbit/sec Out
Traffic Usage: In 0.0%, Out 0.0%
Interface 1/1
Throughput [6 sec. Avg.]: 0.0 Mbit/s In, 0.0 Mbit/sec Out
Total available throughput: 1000 Mbit/s In, 1000 Mbit/sec Out
Traffic Usage: In 0.0%, Out 0.0%
Interface 2/1
Throughput [6 sec. Avg.]: 0.0 Mbit/s In, 0.0 Mbit/sec Out
Total available throughput: 155 Mbit/s In, 155 Mbit/sec Out
Traffic Usage: In 0.0%, Out 0.0%

Host>
```

Displaying License Attributes

```
Host> show license
```

This command displays the system license information.

Usage

show license

Parameter(s)

None.

Example(s)

```
Host> show license


Type: permanent

[CREATION]
DATE=September 05 2007 15:46:05
[VERSION]
MAJOR=11
[SN]
SNSOURCE=1
SNNUM=1
SN1=517715
[MAGIC]
Magic String=C000000067
MaxAllowedDays=0
[OPTIONS]
Allow Maximum 4000 Users=on
Gigabit Ethernet=on
Pre Paid=on
Bandwidth Control=on
Hierarchical Bandwidth Control=on
Customized Guided Entry=on
Dynamic COS=on
Differentiated Routing=on
Filter Redirection=on
Location Based Service=on
Service Selection=on
Native IP=on
Native IP Roaming=on
Dynamic IP Changing=on
Application Awareness=on
```

```
Smart Client=on
Radius Plus=on
```

Displaying VRRP attributes

```
Host> show vrrp interface
```

Use this command to display the configured Virtual Router Redundancy Protocol (VRRP) status on the specified interfaces.

Usage

show vrrp interface (<ethernet>|<vlan>) <slot number> <port number> <number>

Parameter(s)

(<ethernet>|<vlan>)
The interface will be either an Ethernet or VLAN interface.

<slot number>
Slot number; valid values are 0 to 3.

<port number>
Defines the port; valid values are 1 or 2.

<sub-interface number>
Defines the sub-interface number ; valid values are 1- 4095

<number>
Defines the Virtual Router ID number (VRID); valid values are 1 to 15.

Example(s)

For the master:

```
Host> show vrrp interface ethernet 0\1
 Ethernet 0\1 - Group 1
 State is Master
 Virtual IP address is 192.168.1.1
 Master router is 192.168.1.2 (local)
 Virtual MAC address is 00-00-5E-00-01-01
 Advertisement interval is 1 seconds
 Priority 254
 Preemption mode: off
Host>
```

For the backup:

```
Host> show vrrp interface ethernet 0\1
 Ethernet 0\1 - Group 1
 State is Backup
 Virtual IP address is 192.168.1.1
 Master router is 192.168.1.2
 Virtual MAC address is 00-00-5E-00-01-01
 Advertisement interval is 1 seconds
 Priority 100
 Preemption mode: on
Host>
```

Displaying active GRE and IP-in-IP tunnels

```
Host> show ip-tunnel
```

This command displays the active GRE and IP-in-IP tunnels in the system.

Usage

```
show ip-tunnel [gre | ip-in-ip [<remote endpoint ip address> <tunnel direction>]]
```

Parameter(s)

None

Example(s)

```
Host> show ip-tunnel <cr>

 Tunnel IP       Tunnel      Total    Tunnel  Tunnel
                 Endpoint    Sessions Status  Type
 --------------- ---------- --------  ------- ------
 192.168.1.1     remote       20      unknown gre
 10.10.2.234     remote       11      up      ip-in-ip
 10.10.1.20      remote       7       down    ip-in-ip

Host>
```

```
Host> show ip-tunnel ip-in-ip <cr>

Tunnel IP   Tunnel      Total Tunnel      Tunnel
      Endpoint    Sessions    Status      Type
--------------- ---------- -------- ------- ------
 10.10.2.234     remote       11     unknown ip-in-ip
 10.10.1.20      remote       7      up      ip-in-ip

Host>
```

```
Host> show ip-tunnel ip-in-ip 10.10.1.20 remote <cr>

 Line Line User User-name           IP address
      Type Type
 ---- ---- ---- --------------- ---------------
  2   Eth  NIPI test1           212.168.1.4
  5   Eth  NIPI test2           212.168.1.5
  56  Eth  NIPI test3           212.168.1.6

Host>
```

Using the show availability command

```
Host> show availability
```

It displays the current availability status

This command displays the availability current status.

Usage

show availability

Parameter(s)

None.

Example:

```
Host# show availability
Id    Module   Redundancy triggering trigger Status
               Module      ID
----- -------- --------------------- ------- -------
1     pppoe    vrrp                    3     Master
Host#

Should be replaced with the following


Host> show availability

 Id    Module    Redundancy  Trigger Status
                 Triggering  ID
                 Module
 ____ __________ ____________ ________ __________
```

```
 1     vlan      vrrp        2        master
 2     pppoe     vrrp        3        backup
```

Disaply internal services command

```
Host> show internal-service
```

This command displays the internal services information. When the **stored** option is selected the system displays the internal services file content (as is) on the screen and when **active** option is selected it presents the internal services database

Usage

show internal-service [<stored I active>]

Parameter(s)

<stored I active>

Stored displays the internal services file content and active displays the active read services.

Example:

```
Host# show internal services active
<wimaxDS>
        Filter-Id = "wiacl in permit 0.0.0.0 0.0.0.0"
        Filter-Id = "wiacl out permit 0.0.0.0 0.0.0.0"
        SG-Acl-Down-Mean-Rate = "wiacl;30000"
        SG-Acl-Up-Mean-Rate = "wiacl;30000"
        SG-Wimax-Acl-Schedule-Type = "wiacl;up;nrtPS"
        SG-Wimax-Acl-Min-Reserved-Traffic-Rate = "wiacl;up;64000"
        SG-Wimax-Acl-Unsolicited-Polling-Int = "wiacl;up;60"
        SG-Wimax-Acl-Maximum-Latency = "wiacl;up;40"
        SG-Node-Dynamic-Service = "NIP_OPEN"
        SG-Node-Default-Service = "NIP_OPEN"
        Token-Pool = "cpe_pool"
        SG-Service-Name = "wimaxDS"

<NIP_OPEN>
        Filter-Id = "wiacl in permit 0.0.0.0 0.0.0.0"
        Filter-Id = "wiacl out permit 0.0.0.0 0.0.0.0"
        Token-Pool = "user_pool"
        SG-Service-Name = "NIP_OPEN"

<CPE_ERTPS>
        Filter-Id = "wiacl1 in permit 0.0.0.0 0.0.0.0"
```

```
        Filter-Id = "wiacl1 out permit 0.0.0.0 0.0.0.0"
        SG-Wimax-Acl-Schedule-Type = "wiacl1;up;ErtPS"
        SG-Wimax-Acl-Min-Reserved-Traffic-Rate = "wiacl2;up;1000000"
        SG-Acl-Down-Mean-Rate = "wiacl1;12000"
 -- More --
```

Displaying a list of available write commands

```
Host> write ?
```

This command shows the available write commands enabled on the SCC.

Usage

```
write [<memory>] | [<network><ip address><alpha numeric string>] | [<terminal>]
```

Parameter(s)

`<memory>`
Writes running configuration (volatile memory) to start-up configuration (non-volatile).

`<network>`
Writes running configuration to a TFTP server.

`<ip address>`
IP address of TFTP server.

`<alpha numeric string>`
Name to be used for configuration saved to a TFTP server.

`<terminal>`
Writes running configuration to terminal screen.

Example(s)

```
Host> write terminal

# version: 10 May 21 2006 15:14:31
 password viewer Tw)wtx-
 password operator Tw)wtx-
 password superuser +5z!#r-MGA
 password technician Koz!#
 password pre-authentication +k(~#i+^#43\,6
 def-service-auth ppp-auto
 multilink-mode multi-cage
 radius-server key netix
 SNMP-server community get T}y||g
 SNMP-server community set T}y||g
```

```
 banner BannerString
 session-timeout 64800
 idle-timeout 1800
 service cache on aging-time 10
 service internal  framed-PPP
 ip domain-name SG1
 ip tcp adjust-mss  off
 debug
 watchdog-TimeValue 600
 time-server-ip 0.0.0.0
 trace off
 sysLog-server-ip 0.0.0.0

Host>
```

```
Host> write network 155.226.20.250 test
Preparing configuration file...............................
Done.
Starting the TFTP upload.......
Done.
Host> write terminal
```

Using the copy command

```
Host> copy
```

It copies files from the system to a tftp server.

When no destined file name is configured the system set a default file name as listed in the bellow table.

Usage

copy <startup-config | running-config | dictionary <vsa-extended | vsa-freeware | all> | snmp-mib | debug-info <dump | watchdog> | internal-services > <IP address> [<file name>]

Parameter(s)

<IP address>
TFTP server IP address, is a valid address

<file name>
Destined file name, 64 characters alpha numeric file name

<startup-config | running-config | dictionary <vsa | all> | snmp-mib | debug-info <dump | watchdog>

The file that should be copy to TFTP server.

Values:

startup-config – Stored configuration (startup.conf)

running-config – Running configuration (running.conf)

dictionary vsa-extended – Vendor Specific dictionary in standard format (dictionary-ext.sg1)

dictionary vsa-freeware – Vendor Specific dictionary in freeware format (dictionary-free.sg1)

dictionary all – All attributes dictionary (dictionary-all.sg1)

snmp-mib – System external MIB (sg1.mib)

debug-info dump – Debug dump file (sg1.dump)

debug-info watchdog – Debug watchdog file (sg1.watch)

internal-services – System internal-services file

Example:

```
Host># copy startup-config 192.168.1.2

Preparing for upload.
  Upload in progress

  100% Completed.
 Closing the upload process.
 File uploaded successfully.

Host>#
```

Using copy command in manufacturer mode

```
Host> copy
```

Usage

copy <local file-name> **<Flash |Ram>** <IP address> **[**<destined file name>**]**

Parameter(s)

<local file name>

Local file name (output of dir command), 64 characters alpha numeric file name

<IP address>

TFTP server IP address, valid IP address

<file name>

Destined file name64 characters alpha numeric file name

Example:

```
Host(debug)> Manufacturer
Host> Password: ********
Host(manufacturer)# copy GOS.ini Flash 192.168.1.2

Preparing for upload.
  Upload in progress

  100% Completed.
 Closing the upload process.
 File uploaded successfully.

Host(manufacturer)#
```

Using dir command

```
Host> dir
```

It lists the files located in the flash and in the RAM.

Usage

dir flash-file

Example:

```
Host(Manufacturer)# dir flash-file
Contnet of volume: b0000
appl            <FILE>    2525379 Thu Jan  1 00:01:57 1998
MngConfig       <FILE>       1780 Tue Jan  6 06:35:07 1998
CrashInfo       <FILE>        184 Thu Jan  1 00:00:00 1998
WatchDogInfo    <FILE>         24 Thu Jan  1 00:00:00 1998
MngConfigLic    <FILE>        584 Thu Jan  1 00:03:35 1998
IMAGE.INI       <FILE>         36 Thu Jan  1 00:01:23 1970
GOS.ini         <FILE>       3294 Thu Jan  1 00:03:53 1998
PackInfo.ini    <FILE>        297 Thu Jan  1 00:01:57 1998
FLIST.SYS       <FILE>       8192 Thu Jan  1 00:00:28 1970
BITMAP.SYS      <FILE>       8192 Thu Jan  1 00:00:28 1970
Contnet of volume: 30000
dictionary      <FILE>       6046 Thu Jan  1 00:00:49 1998
FLIST.SYS       <FILE>       8192 Thu Jan  1 00:00:00 1998
BITMAP.SYS      <FILE>       8192 Thu Jan  1 00:00:00 1998
```

Using the copy-tftp command

```
Host> copy-tftp flash
```

Use this command to copy a new application software (image) or license file from a TFTP server to the flash memory of the SCC-ETH card.

Usage

copy-tftp flash [<IP address> | license | internal-service] <ip address> <file name>

Note The ASN-SG as a service creation machine uses a license mechanism, which enables the activation and deactivation of specific services. Use the `[license]` parameter to upgrade the current version of the license file running on the SCC.

Parameter(s)

`<ip address>`

This is the IP address of the TFTP server to be used for the software or license upgrade.

`license`

This parameter will allow the upgrading of a license file on the SCC.

`internal-service`

This parameter will allow the upgrading of a services file on the SCC.

`<file name>`

This is the file name used for the software or license upgrade or internal services file (the file name is 1 to 64 alphanumeric characters).

Example(s)

```
Host> copy-tftp flash 192.168.0.1 V10_PM
 Download in progress
  99%
 Closing the download process.
 Pack loaded successfully.

 In order to use new software, please reload the system

Host>
```

```
Host> copy-tftp flash license 192.168.1.2  lic101.lic
```

```
Host> copy-tftp flash internal-service 192.168.1.2  services.txt
```

Using the ping command to test network connectivity

Use the Ping command to elicit an ICMP ECHO_RESPONSE from a host or gateway.

Usage

ping <ip address> [-c <number>| -i <number> | -s <number>] [source-interface [**source-interface** <**<ethernet** | **vlan** | **loopback** **>** <slot number>/<port number>/[<sub-interface number>]>]

Parameter(s)

`<ip address>`

The destination ip address to ping.

`[-c <number>]`

The number of echoes.

[-i <number>]
The number of wait seconds.

[-s <number>]
The number of bytes.

source-interface
The source interface IP to be used in the ICMP ECHO_REQUEST messages

<ethernet | vlan | loopback>
Interface type

<slot number>
Slot number (0-2)

<port number>
Physical port number (1-2)

<sub-interface number>
Sub interface number (1 - 4095)

Example(s)

```
Host> ping -c 5 -i 5 -s 500 155.226.20.250
 Press <Ctrl C> to abort.
 508 bytes from 155.226.20.250:icmp_seq=1 ttl=63 time<20 ms
 508 bytes from 155.226.20.250:icmp_seq=2 ttl=63 time<10 ms
 508 bytes from 155.226.20.250:icmp_seq=3 ttl=63 time<10 ms
 508 bytes from 155.226.20.250:icmp_seq=4 ttl=63 time<10 ms
 508 bytes from 155.226.20.250:icmp_seq=5 ttl=63 time<20 ms
Host> ping 155.226.20.250 source-interface ethernet 0\1
 64 bytes from 155.226.20.250:icmp_seq=1 ttl=64 time<12 ms
```

Using reload command

```
Host> reload [non-graceful | graceful]
```

The command enables to reload the system graceful and non-graceful.

The system default is **non-graceful**.

The system will send the following messages in the following reload modes:

non-graceful – Reloading the system now...

graceful - The system will automatically reload when all users are disconnected...]

Usage

reload [non-graceful | graceful]

Parameter(s)

<non-graceful | graceful>

Reload system operation mode. There are two option:

non-graceful – reset the system immediately

graceful – Reset the system after all the users have disconnected

Values:

non-graceful (1), graceful (2)

Default value: non-graceful Using the reload command to restart the system

Example 1:

```
Host# reload non-graceful <cr>
 Reloading the system now...
```

Example 2:

```
Host# reload graceful <cr>
 The system will reload automatically when all users are disconnected...
Host#
```

Using the reload command to restart the system

```
Host> reload non-graceful
```

Use the reload non-graceful command to reset the system and reload the software. Using this command will terminate all sessions.

Usage

reload non-graceful

Parameter(s)

None.

Example(s)

```
Host> reload non-graceful



Resetting the system in 10 seconds...
```

Using clear users command

```
Host> clear users
```

The command disconnects connected users.

When executing **clear user all** command the system, will verify that the administrator wants to clear all users by prompting are you sure (Y/N) message. A “Y” prompt will execute the command; otherwise no action will be taken.

The system shouldwill prompt the following message when disconnecting all users:

Disconnecting all users process started …

Usage

clear users <<user id**> | all>**

Parameter(s)

<user id>
The user Id as being presented in show users command. The value is User ID

Example 1:

```
Host# clear users all <cr>
 Are you sure (Y/N)? Y <cr>
 Disconnecting all users process started ...
Host#
```

Example 2:

```
Host# clear users all <cr>
 Are you sure (Y/N)? N <cr>
Host#
```

Example 3:

```
Host# clear users 5 <cr>
Host#
```

Clearing Users

```
Host> clear user
```

A specific user can be disconnected from the ASN-SG by writing the **clear user** command followed by its line

number.

Usage

clear user <line number>

Note: You can use the **show user** command to determine the list of connected users.

Note: If the user is a multi-link user, the following message will appear: `Note that multi-link users may have other lines that are still connected.`

Parameter(s)

<line number>

The line number of the user to be cleared.

Example(s)

```
Host> clear user 22

 Note that multi-link users may have other lines that are still connected
```

Using the Traceroute Command

```
Host> traceroute
```

Use the traceroute command to track the route a packet takes to a network host.

Usage

traceroute <ip address> [-h <number>| -i <seconds>]

Parameter(s)

<ip address>

The IP address to which the trace is to be performed.

[-h <number>]

The maximum number of hops to be attempted (max = 30).

[-i <seconds>]

The max. number of seconds to wait for a response.

Example(s)

```
Host> traceroute 155.226.10.200

 Press <Ctrl C> to abort.
 1    < 20 ms   < 10 ms   < 10 ms  155.226.20.240
 2    < 10 ms   < 10 ms   < 10 ms  155.226.248.14
```

```
 3     < 10 ms    < 10 ms    < 10 ms   155.226.1.2
 4     < 10 ms    < 10 ms    < 10 ms   155.226.10.200

 Traceroute completed successfully


Host>
```

Using the exit command

```
Host> exit
```

This command exits the user from the current configuration level. When used at the first level, the user is logged out of the session.

Usage

exit

Parameter(s)

None.

Example(s)

```
Host> (config-debug)# exit

Host> (config)#

Host> (config)# exit

Host> exit
```

Using Debug Mode

This section provides information on the commands and options available in debug mode.

Switching to Debug Mode

```
Host> debug
```

Use the **debug** command at the first level prompt (`Host>`) to switch the system to the second-level debug prompt: `Host(debug)#`. This prompt indicates that the user is now in the second-level debug mode and has access to the five second-level commands in the debug menu.

Usage

Step	Action
1	Use the **show** command to display memory, system and fragmentation information.
2	At this level, the **exit** and **end** commands will return the user to the first configuration level.
3	From the `Host>` prompt, enter the debug command in the following format: **`debug`**

Parameter(s)

None.

Example(s)

```
Host(debug)# ?
show                    - Display debug parameters
  port                    - Select a port to configure
  port-ethernet           - Port ethernet interface
  radius-server           - radius server command
  clear                   - Clear arp table
  exit                    - Exit current level
  end                     - Return to first level

Host(debug)#
```

Using the show command in debug mode

```
Host(debug)# show
```

Use the **show** command to display memory, system, and fragmentation information.

Usage

`show` `[memory | system |log-modules | statistics | arp]`

`[memory]`
Display memory allocation.

`[system]`
Display connection information.

`[log-modules]`
Display system log modules.

`[statistics]`

Display fragmentation information.

[arp]
Display ARP information table.

Example(s)

```
Host(debug)# show memory

 Free memory:
    region 0: 9583616
    region 1: 56918016
 Largest memory    :
    region 0 buffer: 9583616
    region 1 buffer: 56901632

 pNA statistics:
 Number of classes:    8 -  blocks:   15000  free:  12492  wait:    0  drops:
 0
 Buffer size    0 -  blocks:    9000  free:   6500  wait:    0  drops:    0
 Buffer size   32 -  blocks:    2048  free:   2043  wait:    0  drops:    0
 Buffer size   64 -  blocks:     512  free:    512  wait:    0  drops:    0
 Buffer size  128 -  blocks:     768  free:    766  wait:    0  drops:    0
 Buffer size  256 -  blocks:     512  free:    512  wait:    0  drops:    0
 Buffer size  512 -  blocks:     128  free:    128  wait:    0  drops:    0
 Buffer size 1024 -  blocks:     256  free:    256  wait:    0  drops:    0
 Buffer size 2048 -  blocks:      48  free:     47  wait:    0  drops:    0


 pSOS statistics:
 Buffer size    8 -  blocks:  450000  free: 429307  wait:    0  drops:    0
 Buffer size   20 -  blocks:   60000  free:  39843  wait:    0  drops:    0
 Buffer size   24 -  blocks:   90000  free:  86428  wait:    0  drops:    0
 Buffer size   32 -  blocks:  550000  free: 535673  wait:    0  drops:    0
 Buffer size   44 -  blocks:  330000  free: 325103  wait:    0  drops:    0
 Buffer size   48 -  blocks:  800000  free: 798995  wait:    0  drops:    0
 Buffer size   52 -  blocks:  260000  free: 186211  wait:    0  drops:    0
 Buffer size   56 -  blocks:   96000  free:  94486  wait:    0  drops:    0
 Buffer size   68 -  blocks:   45000  free:  35440  wait:    0  drops:    0
 Buffer size   72 -  blocks:   10000  free:   9879  wait:    0  drops:    0
 Buffer size   76 -  blocks:   12000  free:  11771  wait:    0  drops:    0
 Buffer size   80 -  blocks:   70000  free:  69802  wait:    0  drops:    0
 Buffer size   92 -  blocks:   10000  free:   9116  wait:    0  drops:    0
 Buffer size   96 -  blocks:   10000  free:   8781  wait:    0  drops:    0
 Buffer size  104 -  blocks:   11000  free:  10084  wait:    0  drops:    0
 Buffer size  128 -  blocks:   10000  free:   9159  wait:    0  drops:    0
 Buffer size  160 -  blocks:    6000  free:   5756  wait:    0  drops:    0
```

```
 Buffer size  192 -  blocks:    6000  free:   5607  wait:    0  drops:    0
 Buffer size  244 -  blocks:   15000  free:  14783  wait:    0  drops:    0
 Buffer size  272 -  blocks:   10000  free:   9597  wait:    0  drops:    0
 Buffer size  304 -  blocks:    4000  free:   3895  wait:    0  drops:    0
 Buffer size  348 -  blocks:    8000  free:   7992  wait:    0  drops:    0
 Buffer size  528 -  blocks:   24000  free:  23442  wait:    0  drops:    0
 Buffer size  636 -  blocks:    7000  free:   6536  wait:    0  drops:    0
 Buffer size  684 -  blocks:    5000  free:   4896  wait:    0  drops:    0
 Buffer size  800 -  blocks:    5000  free:   4893  wait:    0  drops:    0
 Buffer size  908 -  blocks:    4000  free:   3949  wait:    0  drops:    0
 Buffer size 1064 -  blocks:    8100  free:   7783  wait:    0  drops:    0
 Buffer size 2048 -  blocks:    6200  free:   6011  wait:    0  drops:    0
 Buffer size 2304 -  blocks:    2018  free:   1912  wait:    0  drops:    0

Host(debug)#
```

```
Host(debug)# show statistics fragmentation

Total number of packets that were fragmented:  0

Total number of packets that were reassembled:  0

Total number of upstream packets in which the MSS field was adjusted:  0

Total number of downstream packets in which the MSS field was adjusted:  0

Host(debug)#
```

```
Host(debug)# show system

 Up-time: 4 Days, 20 Hours, 56 Minutes, 12 Seconds

Total number of:
 Network incoming calls: 0
 Network calls in which PPP was established: 0
 Network calls in which PPP established via LCP options: 0
 Network calls in which link was authenticated: 0
 Network connected calls: 0

 Current number of Network connected lines: 0
    ANet (Analog source) lines: 0, INet (ISDN source) lines: 0
    Eth (Ethernet source) lines:  0
Current number of PPP (PPP source) lines:  0:
 Current number of connected Framed users: 0
```

```
    PPP users: 0, MLP users: 0
 Current number of connected native IP users: 0

 Total connected LNS tunnels: 0
 Total connected PPPoE tunnels: 0
 Total connected PPPoA tunnels: 0
 Total connected LAC tunnels: 0
 Maximum used of tunnel sessions: 0

Host(debug)#
```

```
Host(debug)# show log-modules
GroupErrorErrorEventEventTrace
Name            Min             Max             Min             Max
AAA 0             DEF             0               DEF             DEF
User0             DEF             0               DEF             DEF
IP0             DEF             0               DEF             DEF
Route0             DEF             0               DEF             DEF
System0             DEF             0               DEF             DEF
PPP0             DEF             0               DEF             DEF
Service0             DEF             0               DEF             DEF
NativeIP0             DEF             0               DEF             DEF
Interface0             DEF             0               DEF             DEF
L2TP0             DEF             0               DEF             DEF
```

Module	Group	Error	Error	Event	Event	Trace
Name	**Name**	**Min**	**Max**	**Min**	**Max**	
ABM	User	0	DEF	0	DEF	DEF
AbmFSM	User	0	DEF	0	DEF	DEF
AbmIpPool	User	0	DEF	0	DEF	DEF
AbmMlPPP	User	0	DEF	0	DEF	DEF
AbmRadius	AAA	0	DEF	0	DEF	DEF
AbmService	User	0	DEF	0	DEF	DEF
AbmRadiusProxy	AAA	0	DEF	0	DEF	DEF
EDS	Service	0	DEF	0	DEF	DEF
PPP	PPP	0	DEF	0	DEF	DEF
PPPWrapper	PPP	0	DEF	0	DEF	DEF
PPPService	PPP	0	DEF	0	DEF	DEF
NativeIP	NativeIP	0	DEF	0	DEF	DEF
L2TP	L2TP	0	DEF	0	DEF	DEF
Telnet	IP	0	DEF	0	DEF	DEF
CPM	User	0	DEF	0	DEF	DEF
System	System	0	DEF	0	DEF	DEF

```
DataPoller              System        0        DEF        0        DEF        DEF
BSP                     Interface     0        DEF        0        DEF        DEF
ARP                     Interface     0        DEF        0        DEF        DEF
DHCP                    NativeIP      0        DEF        0        DEF        DEF
Router                  Route         0        DEF        0        DEF        DEF
OSPFv2                  Route         0        DEF        0        DEF        DEF
IPMgr                   IP            0        DEF        0        DEF        DEF
IPinIP                  IP            0        DEF        0        DEF        DEF
ICMP                    IP            0        DEF        0        DEF        DEF
POPUDP                  IP            0        DEF        0        DEF        DEF
RsmFrgm                 IP            0        DEF        0        DEF        DEF
VRRP                    Route         0        DEF        0        DEF        DEF
NetIf                   Interface     0        DEF        0        DEF        DEF
SysLogger               System        0        DEF        0        DEF        DEF
Timer                   System        0        DEF        0        DEF        DEF

Default Max Error Level: 3
 Default Max Event Level: 5
 Default Trace Setting: Off
```

show arp command

This command displays the arp table information.

```
Host(debug)# show arp
```

Usage

Show arp [<index><NextAddress>]

Parameter(s)

<index>

The interface on which this entry's equivalence is effective. Numbers are 1 to 65,000.

<NextAddress>

This is the IP address corresponding to the media-dependent "physical address. It should be a legal IP address.

Example

```
Host(debug)# show arp
IfIndex        PhyAddress          NetAddress          MediaType
  1           000000000000        127.0.0.1           static
  4004        00D0B715A7E3        172.16.1.1          non-volatile
  4004        0001AF0A1CB3        172.16.1.13         static
  4004        00D0B7174CF7        172.16.1.15         dynamic
```

```
  4005        0001AF0A1CB2        172.16.13.193       static
```

Clear arp command

It clears the arp table entry (only dynamic entries), the clear arp specific, clears any entry except the static ones.

Note: when deleting a non-volatile arp entry the system might re-creates it as a dynamic entry.

Usage

Clear arp [**arp-specific** <ifindex><NetAddress>]

Parameter(s)

<ifindex>
This is the interface on which this entry's equivalence is effective. Numbers are 1 to 65,000.

<NetAddress>
This is the IP address corresponding to the media-dependent "physical" address. It should be a legal IP address.

Example

```
Host(debug)# clear arp-specific 4004 172.16.1.1 <cr>
```

Defining port-ethernet redundancy-mode command

Host(debug)# port-ethernet redundancy-mode

It immediately activates the Ethernet redundancy operation.

Usage

port-ethernet redundancy-mode <working slot>\<working port> [<auto | force-protecting | force-working |restart>]

Parameter(s)

[working slot]
It is the working, Ethernet interface slot number; legal values include 0 and 1.

[working port]
It is the working, Ethernet interface physical port number; legal values include 1 and 2.

[auto | force-protecting | force-working | rstart]

2 auto – set redundancy mode to auto causing a normal redundancy behavior

3 force-protecting – force traffic through the protecting interface

4 force-working – force traffic through the working interface

5 restart – Restart the redundancy status to its initial state

Example(s)

```
Host(debug)# port-ethernet redundancy-mode 1\1 force-protecting
```

Checking the system RADIUS interface

```
Host(debug)# radius-server check
```

This command checks the system RADIUS interface, by authenticating user-name and password the same way the system authenticates a connected call (including retries and RADIUS redundancy).

It checks the system RADIUS interface, by authenticating user-name and password the same way the system authenticates a connected call (that's include retries and RADIUS redundancy).

The system default authentication type is **PAP**.

The command output includes the radius IP address, the authentication status (**Accept**, **Reject** or **Timeout** and the number of sent retries.

Using <Ctrl C> causes the radius check command to abort.

The command is operated from all telnet sessions (4 telnet + 1 console).

Usage

radius-server check <user-name> <password> [**auth-type** <**CHAP** | **PAP**>]

Parameter(s)

<user-name>
Username to be validated at the RADIUS server.

<password>
Password to be validated at the RADIUS server.

<CHAP | PAP>
Protocol used for authentication.

Example(s)

Example: PAP Authentication check success with the first radius server

```
CS_ASN(debug)# radius-server check NIP_OPEN GconnectDS
 Press <Ctrl C> to abort.
Radius IP        Status
---------        ------
212.199.47.226   Accept

        Filter-Id = "in permit 0.0.0.0 0.0.0.0"
        Filter-Id = "out permit 0.0.0.0 0.0.0.0"
        SG-Service-Name = "NIP_OPEN"
        SG-User-Group = 2
        Class = "Group=24,Svc=103"

CS_ASN(debug)#
```

Example: PAP Authentication check reject with the second available radius server

```
CS_ASN(debug)# radius-server check NIP_OPEN GconnectDSS
 Press <Ctrl C> to abort.
Radius IP        Status
---------        ------
10.0.1.3         Time Out
10.0.1.3         Time Out
10.0.1.3         Time Out
212.199.47.226   Reject

CS_ASN(debug)#
```

Example: PAP Authentication check success with the second available radius server

```
CS_ASN(debug)# radius-server check NIP_OPEN GconnectDS
 Press <Ctrl C> to abort.
Radius IP        Status
---------        ------
10.0.1.3         Time Out
10.0.1.3         Time Out
10.0.1.3         Time Out
212.199.47.226   Accept

        Filter-Id = "in permit 0.0.0.0 0.0.0.0"
        Filter-Id = "out permit 0.0.0.0 0.0.0.0"
        SG-Service-Name = "NIP_OPEN"
        SG-User-Group = 2
        Class = "Group=24,Svc=103"

CS_ASN(debug)#
```

Example : CHAP Authentication check success with the first radius server

```
CS_ASN(debug)# radius-server check NIP_OPEN GconnectDS auth-type CHAP
 Press <Ctrl C> to abort.
Radius IP        Status
---------        ------
212.199.47.226   Accept

        Filter-Id = "in permit 0.0.0.0 0.0.0.0"
        Filter-Id = "out permit 0.0.0.0 0.0.0.0"
        SG-Service-Name = "NIP_OPEN"
        SG-User-Group = 2
        Class = "Group=24,Svc=103"

CS_ASN(debug)#
```

Chapter 7

SECOND LEVEL COMMANDS

This chapter describes the primary commands available at the second command level. For additional second level commands, refer to Appendix : ASN-SG Vendor-Specific Attributes?.

Note Some non-applicable information was removed from sample screens for ease of viewing.

Using the configure command

Use the **configure terminal** command at the first level prompt to switch the system to the second-level configuration prompt, `Host(config)#`. This indicates that the user is now in the second level configuration mode and has access to the second level commands in the configuration menu. These commands change the parameters only in RAM. You can save a new configuration in the flash memory by returning to the first level prompt and using the **write memory** command.

Note Use the help facility to view a list of the second level configuration commands and their functions by typing **?** immediately after the second level configuration prompt.

Usage

configure [<network> <ip address> <alpha numeric string]
configure [<terminal>]

Note Using the **write memory** command following the use of the configure parameter will overwrite the configuration loaded from the TFTP server.

Parameter(s)

[<network>]
Copies a previously saved configuration from a TFTP server to NVRAM.

[<ip address>]
The IP address of the TFTP server to which the running configuration will be written.

[<alpha numeric string>]
The filename of the running configuration to be saved.

[<terminal>]
Places the user in the second level command level.

Example(s)

```
Host> configure network 155.226.20.250 filename
```

```
Loading file ...

Preparing TFTP download...Done.

Starting the TFTP download....completed(downloaded size is  892  ).

Converting file ...

File loaded successfully

Host>
```

```
Host> configure terminal

Host(config)#
```

BANNER COMMAND

Creating a Login Banner

You may create a greeting message or banner, to be displayed on the user's terminal when they log in. The banner may be a string of up to 32 alphanumeric characters.

To set "Welcome to ASN-SG" as a banner:

At the second level command prompt, type: **`banner Welcome to ASN-SG`** (then press **ENTER**).

Configuring Banner command

```
Host(config)# banner command
```

Usage

`Host(config)# banner` `<Alpha numeric string>`

Parameter

`<Alpha numeric string>`
It is the Terminal greeting (maximum 32 characters).

Example

```
Host(config)# banner FCS
```

ETHERNET COMMANDS

This section contains instructions for configuring service for Gigabit Ethernet cards installed in a SCG1664A/D.

Configuring Gigabit Ethernet ports

```
Host(config)# interface ethernet
```

Use this command to configure service for Ethernet cards.

Usage

```
interface ethernet <port> \ <slot> <ip address> <mask> <ethernet mode> (mtu
<1500|1544)> [mac-group <number>]
```

Parameter(s)

`<port>`
The port number that you want to configure.

`<slot>`
`The slot number that you want to configure (see table 7-1)<ip address>`
The ip address to be assigned to the interface.

`<mask>`
The valid subnet mask for the configured ip address.

`<ethernet mode>`
The operating mode of the interface to be configured (see Color FC-Redable).

`(mtu)`
The maximum transmission unit. Select either:

- 1500 (default)
- 1544

`(mac-group)`
……

Example 1

```
Host(config)# interface ethernet 0 \ 2 12.3.66.211 255.255.255.0 auto mtu 1500
interface ethernet 0 \ 2 12.3.66.211 255.255.255.0 auto mtu 1500 mac-group..
```

Note The system shouldwill refuse to assign an address to an Ethernet interface which is in the subnet of the other Ethernet interface and indicates the reason.

Example 2

```
Host(config)# interface ethernet 0\2 192.168.3.5. 255.255.255.0
Operation Error:
ethernet address is not valid
```

Note The system willignore the **interface ethernet** command if the system is in Ethernet redundancy mode. It will indicate a command failure to the system log and to the user interface (telnet).

Card Type	Slot\Port	Slot\Port 2
Gigabit Front I/O	0\1	
Gigabit Rear I/O	0\2	0\3
Gigabit Front (PMC) I/O	1\1	1\2

Configure Ethernet Ports

Table

Value	Explanation
10 H	10M half-duplex
10 F	10M full-duplex
100 H	100M half-duplex
100 F	100M full-duplex
1000 H	1000M half-duplex
1000 F	1000M full-duplex
auto	auto sensing

Ethernet Operating Mode

```
Host(config)# no interface ethernet
```

Usage

no interface ethernet `<slot number>\<port number>`

Parameter(s)

`<slot number>`

This is the interface slot number you want to configure.

`<port number>`

This is the physical port number you want to configure.

Example(s)

```
Host(config)# no interface ethernet 0\1
```

Configuring Ethernet Redundancy

The system supports redundancy between 0\1 and 0\2 ethernet interface or between 1\1 or 1\2 Ethernet interface. The system, automatically while detects a malfunction in the working Ethernet (for example link down), switches to the protecting (redundant) Ethernet interface.

Using the port-ethernet redundancy-enable command

```
Host(config)# port-ethernet redundancy-enable
```

Use this command to configure Ethernet port redundancy.

Usage

port-ethernet redundancy-enable <working slot>\<working port> <protection slot>\<protection port> <non-revertive | revertive>

Parameter(s)

<working slot>
This is the working Ethernet interface slot number; valid values include 1 or 2.

<working port>
This is the working Ethernet interface physical port number; the value range is 1 to 3.

<protecting slot>
This is the protecting Ethernet interface slot number; valid values include 1 or 2.

<protecting port>
This is the protecting Ethernet interface physical port number; the value range is 1 to 3.

<non-revertive>
This configures non-revertive mode.

<revertive>
This configures revertive mode.

The slot number that you want to configure (see Color FC-Redable).

Configure Ethernet ports

Card Type	Slot\Port	Slot\Port 2
Gigabit Front I/O	0\1	
Gigabit Rear I/O	0\2	
Gigabit Front (PMC) I/O	1\1	1\2

Example(s)

```
Host (config) # port-ethernet redundancy-enable 1\1 1\2 non-revertive
```

The system will refuse to enable Ethernet redundancy mode in case the protecting Ethernet interface is configured. It will indicate such kind of command failure to the system log and to the user interface (telnet/console).

```
Host(config) # port-ethernet redundancy-enable 1\1 1\2 non-revertive
Operation Error:
Protecting interface is configured
```

Note The system will refuse to enable the Ethernet redundancy mode in case the protecting Ethernet interface is not the associated redundant interface (0/2 to 0/1 and 1/2 to 1/1). It will indicate such kind of command failure to the system log and to the user interface (telnet/console).

```
Host(config) # port-ethernet redundancy-enable 0\1 0\2
Operation Error:
Protecting interface is not the associated redundant interface
```

Using the no port-ethernet redundancy-enable command

```
Host(config)# no port-ethernet redundancy-enable
```

This command disables redundancy between the two Ethernet interfaces.

Usage

no port-ethernet redundancy-enable <working slot>\<working port> <protecting slot> \<protecting port>

Parameter(s)

<working slot>
This is the working Ethernet interface slot; valid values include 0 or 1.

<working port>
This is the working Ethernet interface physical port; valid values include 1 or 2.

<protecting slot>
This is the protecting Ethernet interface slot; valid values include 0 or 1.

<protecting port>
This is the protecting Ethernet interface physical port; valid values include 1 or 2.

Example(s)

```
Host(config)# no port-ethernet redundancy-enable 1\1 1\2
```

LOOPBACK COMMANDS

Configuring interface loopback

```
Host(config)# interface loopback
```

This command enables the administrator to either add or change the loopback interface.

Note The loopback interface can be part of the IP route lines/commands.

Usage

interface loopback <interface number> <IP address> <mask>

Parameter(s)

<interface number>
This is the interface number of the loopback; the valid range is 1 to 200.

<IP address>
This is the loopback IP address; it must be a valid IP address.

<mask>
This is the loopback mask address.

Example(s)

```
Host(config)# interface loopback 1 192.168.3.4 255.255.255.255
```

Note When assigning the loopback interface an address that is in the subnet of one of the system interfaces the system will ignore the command and indicates the reason.

```
Host(config)# interface loopback 1 192.168.3.4 255.255.255.0
The loopback address is not valid.
```

Using the no interface loopback command

```
Host(config)# no interface loopback
```

This command deletes the loopback interface.

Usage

no interface loopback <interface number>

Parameter(s)

<interface number>
This is the loopback interface number to be deleted; valid range is 1 to 200.

Example(s)

```
Host(config)# no interface loopback 1
```

Note The system will refuse to delete a loopback interface if an application source-interface is configured to the loopback.

VLAN COMMANDS

Configuring the VLAN

```
Host(config)# interface vlan
```

The following command enables to configure VLAN on Gigabit Ethernet interface, as well as QinQ encapsulation with correspondence to IEEE 802.1Q

When mac-group option is defined the system overwrite the underlined Ethernet interface MAC address according to the following format: 00-50-6F-FE-FE-XX

Interface VLAN command with no mac-group option uses the original underlined Ethernet interface MAC address.

Note The default name value is *NULL*.

Usage

interface vlan <slot number> \<port number> \<vlan id> [QinQ <QinQ tag>]
<VLAN IP address> <VLAN mask> [**name** <VLAN name> [mac-group <mac group number]

Parameter(s):

<slot number>
Slot number of the physical card.

<port number>
Port number of the card (1 or 2).

<vlan id>
VLAN interface identifier; valid number range is 1 to 4095.

<QinQ tag>
VLAN QinQ interface identifier; valid number range is 2 to 4095.

<IP address>
IP address for the VLAN.

<mask>
Subnet mask for the VLAN.

[VLAN name]
It is a unique alphanumeric name assigned to the VLAN (it is 1 ÷ 64 alphabetic characters).

[mac group number]
Interface MAC group number, that being used to build the virtual MAC of the VLAN interface 1-255

Example 1:

```
Host(config)# interface vlan 1\2\32 192.168.3.4 255.255.255.0 name ADC-R
Host(config)# interface vlan 1\2\233 24.36.1.12 255.255.255.0 name Kenvelo
Host(config)# interface vlan 3 1\1 192.168.1.1  255.255.255.0 QinQ 20 100
```

Example 2:

```
Host(config)# vlan 3 1\1 192.168.1.1 255.255.255.0 mac-group 1 <cr>
Host(config)# end
Host#write terminal
...
 vlan 3 1\1 192.168.1.1 255.255.255.0 mac-group 1
...
```

Note The system will refuse the VLAN command when wrong slot\port parameters are configured.

```
Host(config)# vlan 3 1\3
Operation error
Wrong slot\port
```

Using no interface VLAN command

```
Host(config)# no interface vlan
```

This command deletes a VLAN definition for the Ethernet interface.

Usage

no interface vlan <slot number> \ <port number> < id>

Parameter(s)

<slot number>

This is the slot number of the physical card.

<port number>

This is the port number of the card (1 or 2).

<id>

This is the VLAN interface identifier; valid number range is 1 to 4095.

Example(s)

```
Host(config)#  no vlan 3 1\1
```

AUTHENTICATION COMMANDS

Using the password pre-authentication command

```
Host(config)# password pre-authentication
```

This command defines the system pre-authentication password.

Usage

password pre-authentication <password>

For <password> options, see Color FC-Redable , " Default Username/Password

Username	Password	Authority
technician/te	ggcon	Full-access read/write
supervisor/su	sg1	Read/write to second level
operator/op	popgate	Read-only to first level with user drop capability
viewer/vi	popgate	First-level show capabilities

," on page 32Default ¶ Font.

Setting the default-service authentication mode

```
Host(config)# def-service-auth
```

When using authentication by username and password two protocols are available:

- **PAP** (Password Authentication Protocol)–the most basic form of authentication. In PAP, a user's name and

password are transmitted over the network and compared to a table of name-password pairs. The main disadvantage of PAP is that both the username and password are transmitted without encryption.

- **CHAP** (Challenge Handshake Authentication Protocol)–a type of authentication in which the network server sends the client program a key to encrypt the username and password. This enables the username and password to be transmitted in encrypted form to protect them against eavesdroppers.

The **def-service-auth** command is used to set the type of authentication for PPP connections in the default step. Five options may be typed on the command line after this command, as shown in Color FC-Redable .

Usage

def-service-auth no-service | ppp-auto | ppp-none | ppp-pap | ppp-chap | auto-select

def-service-auth command parameters

Parameter	Description
no-service	Disables authentication in the default step, even if authentication by caller ID is enabled.
ppp-none	Allows PPP access without authentication in the final step if authentication by caller ID was enabled.
ppp-pap	Authentication in the default step by the PAP authentication method, even if authentication by caller ID was enabled.
ppp-chap	Authentication in the default step by the CHAP authentication method, even if authentication by caller ID was enabled.
auto-select auth-retry on / off	Enables PPP authentication by PAP, CHAP or terminal + enables 3 more retries through an after dialing window if the user inserted wrong username or password (auth-retry on).

Example(s):

```
Host(config)# def-service-auth ppp-auto
```

Changing domain authentication settings

```
Host(config)# domain-authentication
```

In ASN-SG system, virtual private tunnels (VPNs) are created upon RADIUS request. The tunneling service is always enabled within the ASN-SG (there is no configuration command for turning it on or off). The domain-authentication configuration command is used to enable and disable authentication of the user's domain.

The domain-authentication separator command defines a list of characters that will be regarded as separators within usernames. The ASN-SG can then extract the domain name by discarding the portion of the username before the separator. This command also enables the domain authentication process. The valid separators are !, @, #, $, %, and -.

To define @ and # as separators and enable domain authentication, type:

domain-authentication separator @# (then press **ENTER**).

To turn off the domain authentication process, type:

no domain-authentication (then press **ENTER**).

SETTING THE DEFAULT WEB AUTHENTICATION MODE

```
Host(config)# authentication web-auth-method
```

- The authentication web-auth-method command defines the system authentication method to be used in WEB authentication (when authenticating a user via WEB authentication process).
- The system default value is PAP. When configured to its default values the system does not present it in write terminal command.
- The authentication methods are PAP or CHAP. The system will authenticate a WEB authenticated user based on this configuration. When CHAP is configured the system will process all necessary attributes for CHAP authentication (produce challenge, calculate the response based on the challenge and the password and communicate with the RADIUS as defined in the RFC).

Usage:

```
authentication web-auth-method [<PAP | CHAP>]
```

Parameter(s)

```
<PAP | CHAP>
```

Set the system WEB authentication method.

PAP – Authenticate the user using PAP

CHAP – Authenticate the user using CHAP

Example 1:

```
Host(config)# authentication web-auth-method CHAP <cr>
Host(config)# end <cr>
Host # write terminal.
authentication web-auth-method CHAP
...
```

The “no” command set the system web authentication mode to PAP.

```
Host(config)# no authentication web-auth-method
```

Example 2:

```
Host(config)# no authentication web-auth-method <cr>
Host(config)# end <cr>
Host # write terminal
...
```

WiMAX Commands

Using asn ? command

This command displays all asn available command.

Example:

```
Host(config)# asn ? <cr>
  enable                    - Enable ASN functionality
  bs                        - Set allowed base station parameters
  def-service-auth          - Set ASN service and authentication Parameters
  map-learning              - Set BS-ID to IP automatic learning mode
  next-hop-learning         - Set next-hop learning mode
  r6                        - Set R6 Parameters
Host(config)#
```

Using asn enable command

This command enables ASN gateway functionality. It allows the system to listen to the WiMax control protocol port and by that enables ASN functionality. The "no" command disables it.

Usage

[no] asn enable

Parameter(s)

Example:

```
Host(config)# asn enable <cr>
Host(config)# end
Host# write terminal
...
 asn enable
...
Host# config term
Host(config)# no asn enable <cr>
Host(config)# end
Host# write terminal
...
```

Using asn bs command

This command defines the base station IP address that allows communicating with the system. It allows definition of one BS or a subnet of BSs. The local-endpoint can be defined per each BS and should include one of the system IP addresses.

Usage

[no] asn bs <BS IP address> [local-endpoint <ASN gateway IP> | bsid <BS id> | mask <<BS subnet mask> [local-endpoint <ASN gateway IP>]>]

Parameter(s)

<BS IP address>
Base station IP address or BS network
<gateway IP address>
ASN gateway local IP address towards the BS. The default value is the router id.
<BS ID>
Base station identity (Hexadecimal format 12 characters 0-9, a-f, A-F)
<BS subnet mask>
Base station subnet mask

Example 1 (router id set used as the local endpoint):

```
Host(config)# asn bs 192.168.0.20 <cr>
Host(config)# end
Host# write terminal
...
interface 1\1 10.0.1.1 255.255.255.0 auto
interface 1\2 192.168.0.3 255.255.255.0 auto
...
asn bs 192.168.0.20 local-endpoint 10.0.1.1
...
router-id 10.0.1.1
...
Host#
```

Example 2:

```
Host(config)# asn bs 192.168.0.20 local-endpoint 192.168.0.3 <cr>
Host(config)# end
Host# write terminal
...
interface 1\1 10.0.1.1 255.255.255.0 auto
interface 1\2 192.168.0.3 255.255.255.0 auto
...
asn bs 192.168.0.20 local-endpoint 192.168.0.3
...
router-id 10.0.1.1
...
Host#
```

Example 3 (Assign statically the BSID):

```
Host(config)# asn bs 192.168.0.20 bsid 000000000001 <cr>
Host(config)# end
Host# write terminal
...
 interface 0\1 192.168.0.3 255.255.255.0 auto
...
 asn bs 192.168.0.20 bsid 000000000001
...
 router-id 192.168.0.3
...
Host#
```

Example 4 (Allow all BS from subnet 192.168.1.0):

```
Host(config)# asn bs 192.168.1.2 mask 255.255.255.0 <cr>
Host(config)# end
Host# write terminal
...
 asn bs 192.168.1.2 mask 255.255.255.0
...
Host#
```

Using asn def-serve-auth command

The command defines the ASN gateway default authentication mode. There are two main operation modes **none** and **eap**. The system default authentication value is **eap**. The command doesn't present the value, in write terminal command, when configured to its default value (**eap**). In **eap** operation mode the system allows connectivity only for EAP authenticated user. In **none** operation mode the system allows simultaneously connectivity for both unauthenticated (NULL authentication) and EAP authenticated users. For **none** authentication mode the system automatically provides the session with the **configured** default service name similar to native-ip default service operation (authenticates the default service name with default password - GconnectDS). The no option set default authentication mode to its default value (**eap).**

Usage

[no] asn def-service-auth [<**none default-service-name** <service name>> | **eap** | **auto**>]

Parameter(s)

<service name>
ASN default service name Alpha numeric string (maximum 64 characters)

Example 1 (set def-service-auth to none with guest as the default service name):

```
Host(config)# asn def-service-auth none default-service-name guest <cr>
Host(config)# end
Host# write terminal
...
 asn def-service-auth none default-service-name guest
...
Host#
```

Example 2 (set def-service-auth to default value using no command):

```
Host(config)# no asn def-service-auth <cr>
Host(config)# end
Host# write terminal
...
Host#
```

Example 3 (set def-service-auth to its default value):

```
Host(config)# no asn def-service-auth <cr>
Host(config)# asn def-service-auth eap <cr>
Host(config)# end
Host# write terminal
...
Host#
```

Using asn map-learning command

This command enables the BS-ID to IP automatic learning mode using the R6 Spare_Capacity_Req. An entry can be resolved (BS ID, BS IP and ASN GW IP known), either by automatic learning, by incoming call or by keep-alive mechanism. The Spare_Capacity_Req message should not be issued if entry was updated from one of events during aging timeout. The aging-time default value is 60 minutes and when aging period is finish the system re-start the automatic learning mode. The **no** command set the aging time to zero, which means not configured.

Usage

[no] asn map-learning [aging-time <number of minutes>**]**

Parameter(s)

<number of minutes>
Aging-time in minutes

Example 1:

```
Host(config)# asn map-learning <cr>
Host(config)# end <cr>
Host # write terminal
...
 asn map-learning aging-time 60
...
```

Example 2:

```
Host(config)# asn map-learning aging-time 120 <cr>
Host(config)# end <cr>
Host # write terminal
...
 asn map-learning aging-time 120
...
```

Using asn next-hop-learning command

This command enables the next-hop learning capability where ASN-SG automatically asks the AAA server for next-hop address per BS-ID. When the first BS-ID query arrives to the system it sends Access-Request message with the BS-ID (in string format) as user name and “BSID_Resolve” as password. The RADIUS should response with VSA that contains the BSID next-hop IP address (see wimax:bsid-next-hop VSA). This resolving is kept for the aging time period. The aging-period default value is 60 minutes. The **no** command sets the aging time to zero, which means not configured.

Usage

[no] asn next-hop-learning [aging-time <number of minutes>]

Parameter(s)

<number of minutes>
Aging-time in minutes

Example 1:

```
Host(config)# asn next-hop-learning 20 <cr>
Host(config)# end <cr>
Host # write terminal
...
 asn next-hop-learning aging-time 20
...
```

Using asn r6 flavour command

The command defines which R6 flavor the system supports. It sets the system R6 flavor and system default flavor is **standard**. The command does't present the value, in write terminal command, when configured to its default value. The **no** option set the R6 flavor to standard.

Usage

[no] asn r6 flavor < C >

Parameter(s)

< C >
ASN R6 flavor. There are two flavors standard and C.

Example 1 (set R6 C flavor):

```
Host(config)# asn R6 flavor C <cr>
Host(config)# end
Host# write terminal
...
 asn R6 flavor C
...
Host#
```

Example 2 (set R6 flavor to default value):

```
Host(config)# no asn R6 flavor <cr>
Host(config)# end
Host# write terminal
...
Host#
```

Using asn r6 keep-alive command

The command configures r6 keep-alive parameters, so the ASN-GW can automatically check the status of the configured BSs. The keep alive BS status is presented in show **asn bs** command. The keep-alive mechanism is needed for the following reasons:

1) In failure scenarios, both, the ASN-SG and the BS will know that the other has failed and can then take action to either disconnect user sessions or to redirect users to other stations.
2) The ASN-SG and the BS can both learn the ID of the other and set their IP to ID mapping tables automatically.

Usage

[no] asn r6 keep-alive [<keep alive gateway id> <keep alive interval> <retries> [<down interval>]]

Parameter(s)

`<keep alive gateway id>`

The gateway ID (represented by a valid IP address) to be used by the keep-alive messages. The default value is the system primary interface IP address.

`<keep alive interval>`

R6 keep alive interval in second that defines the interval between each beat to BS. The default value is 1 second.

`<retries>`

R6 keep alive retries value that defines the number of beat retries before BS is considered down.

`<down interval>`

R6 keep alive down interval period in second. It represents the time period the system doesn't send any keep-alive requests after BS is detected as down.

`[no]`

The no command sets the keep-alive interval to zero value, which reflects the keep alive is not active.

Example 1 (set keep-alive mechanism parameters):

```
Host(config)# asn r6 keep-alive <cr>
Host(config)# end
Host# write terminal
...
asn r6 keep-alive 10.0.1.1 1 2 120
...
Host#
```

Example 2 (set keep-alive mechanism parameters to default):

```
Host(config)# asn r6 keep-alive 10.0.2.2 2 4 <cr>
Host(config)# end
Host# write terminal
...
asn r6 keep-alive 10.0.2.2 2 4 120
...
Host# configure terminal
Host(config)# asn r6 keep-alive <cr>
Host(config)# end
Host# write terminal
...
asn r6 keep-alive 10.0.1.1 1 2 120
...
Host#
```

Using asn r6 next-gateway command

This command defines the next ASN gateway IP address the system should redirect a new WiMAX session when it is overloaded. When the next-gateway is configured, the system when overloaded responds to an MS_PreAttachment_Req with an MS_PreAttachment_Rsp in which the Authenticator ID IE is the configured next-gateway (ASN gateway) IP address. The no option set the next-gateway value to 0.

Usage

[no] asn r6 next-gateway <Next gateway IP address> **threshold** <Active users>

Parameter(s)

<Next gateway IP address>
The next gateway IP address, to redirect incoming WiMAX sessions when the system is overloaded
<Active users>
The number of active users that triggers the redirection

Example 1 (set the next ASN gateway):

```
Host(config)# asn r6 next-gateway 10.0.1.2 <cr>
Host(config)# end
Host# write terminal
...
 asn r6 next-gateway 10.0.1.2 threshold 4000
...
Host#
```

asn r6 idle-mode notification command

This command defines the system notification mode when session enters idle mode. There are two notification modes interim and stop-start. On interim the system sends interim update message with the Idle-Mode-Transition attribute when the MS enters or exists the idle mode. On stop-start notification mode the system sends Acct-Stop message when session enters idle mode and Acct-Start when session exit idle mode. This is true only whenever a session is configured to send accounting messages. The system default idle-mode notification mode is interim. The system uses in Acct-Stop indication Port Administratively Disabled (22) as the termination-cause.

Usage

[no] asn r6 idle-mode notification [<interim | stop-start>]

Parameter(s)

<interim | stop-start>
Defines idle notification mode (interim or stop-start)

Example 1:

```
Host(config)# asn r6 idle-mode notification stop-start <cr>
Host(config)# end
Host# write terminal
...
 asn r6 idle-mode notification stop-start
...
Host# config terminal
Host(config)# no asn r6 idle-mode notification <cr>
Host(config)# end
Host# write terminal
...

...
Host#
```

Using show asn map-learning command

The command presents the map-learning table. BSIP field of BS lines that were learned by the RADIUS server and still didn't received data path registration request are presented the IP in the following format: 0.0.#.# . The IP is updated when data path registration occurs.

Usage

show asn map-learning

Parameter(s)

Example 1:

```
Host# show asn map-learning <cr>

 BSIP           BSID              ASN-GW IP
 _______________ _________________ _________________
 192.168.1.1    0x000000000001    <N/A>
 192.168.1.2    0x000000000002    <N/A>
 192.168.1.3    0x000000000003    <N/A>
 192.168.1.4    0x000000000004    <N/A>
 192.168.1.5    0x000000000005    <N/A>

Host#
```

Example 2:

```
Host# show asn map-learning <cr>

 BSIP            BSID                ASN-GW IP
 ________________ __________________ ________________
 192.168.1.1                         <N/A>
 192.168.1.2                         <N/A>
 192.168.1.3                         <N/A>
 192.168.1.4                         <N/A>
 192.168.1.5                         <N/A>

Host#
```

Using show asn bs command

The command presents the connected base stations status.

Usage

show asn bs

Parameter(s)

Example 1:

```
Host# show asn bs <cr>

 BSIP            BSID              Users  Status
 ________________ __________________ _______ _________
 192.168.1.1     0x000000000001  10      Up
 192.168.1.2     0x000000000002  20      Up
 192.168.1.3     0x000000000003  0       Unknown
 192.168.1.4     0x000000000004  4       Up
 192.168.1.5     0x000000000005  8       Up

Host#
```

RADIUS COMMANDS

Configuring the RADIUS server

```
Host(config)# radius-server
```

Each RADIUS server will be configured in the system. The radius-server command is used to configure the RADIUS server settings.

Usage

```
radius-server <host | key>
```

Parameter(s)

There are two options for the first command-line argument:

- **host - to configure the RADIUS server host parameters (see "Configuring the RADIUS server host**

```
Host(config)# radius-server host
```

- **key –** to define an alphanumeric string, which serves as a password for communicating with the RADIUS server **(see "Configuring the RADIUS server host**

```
Host(config)# radius-server host
```

Configuring the RADIUS server host

```
Host(config)# radius-server host
```

The host parameters include the IP address of the RADIUS server, the authentication port, the accounting port, and the type of RADIUS server. The RADIUS server can be defined as one of three types.

- Merit
- Standard (default)

Usage

To set the host parameters of the RADIUS server:

radius-server host <IP address> **auth-port** <port address> **acct-port** <port number> <m or s> **priority** <radius priority> <cr>

To set the RADIUS server key:

radius-server key <alphanumeric string> <cr>

Parameter(s)

<port address>

The authentication port number can be any number between 0 and 65535. The default value is 1812.

<port number>
The accounting port number can be any number between 0 and 65535. The acct-port default value is 1813.

<m, i, or s>
m (Merit), i (Infovia) or s (Standard) are the three types of RADIUS server.

<radius priority>
The RADIUS priority can be any number from 1 to 5.

> Note From Version 4.2 and above, it is possible to define different authentication servers and different accounting servers.

Example(s)

```
Host(config)# radius-server host 12.3.22.63 auth-port 1865 acct-port 45 s priority
2
Host(config)# radius-server key aserwep
```

Using the radius-server vsa command

```
Host(config)# radius-server vsa
```

The **radius-server vsa** command defines the vendor specific method in the system.

There are two vendor specific methods supported - freeware which is the default and extended.

- **Freeware** – System support the radius freeware format - sending and receiving the vendor-specific attributes as string, including the attribute string before the value (Current behavior).
- **Extended** – System will send and receive the vendor-specific attributes according to their value types (IP address, Integer, string and etc). In this mode the string before the value MUST not be used in sending and receiving (see RFC 2865 section 5.26 - String).

Usage

radius-server vsa <host-ip> [**freeware** | **extended**]

Parameter(s)

<host-ip>
Radius host IP address, Valid IP address

Example 1: Defining vsa extended format.

```
Host(config)# radius-server 192.168.1.11 vsa extended <cr>
Host(config)# exit
Host# write terminal
...
 radius-server 192.168.1.11 vsa extended
...
```

Using the access-node vsa command

```
Host(config)# access-node vsa
```

The command enables storing access nodes' VSAs as a user session information that can be used for EDS queries and for radius messages after the intial user authentication.

Usage

access-node vsa <vendor id> <Vendor type> <attribute type>

Parameter(s)

<vendor id>
4 octets that represent the vendor ID

<Vendor type>
1 octet representing the attribute code

<attribute type>
Vendor Specific attribute type, Value: string, integer, IP address, date

Example 1: Configure Cisco vendor specific attribute 23 providing Remote-Gateway-ID.

```
Host(config)# access-node vsa 9 23 ipaddress <cr>
Host(config)# exit
Host# write terminal
...
 access-node vsa 9 23 ipaddress
...
```

Using the no access-node vsa command

```
Host(config)# no access-node vsa
```

The command deletes a configured access nodes vendor specific line.

Usage

```
No access-node vsa <vendor id> <Vendor type>
```

Parameter(s)

`<vendor id>`
4 octets that represent the vendor ID

`<Vendor type>`
1 octet representing the attribute code

Example 1: Deleting configured Cisco vendor specific attribute 23 providing Remote-Gateway-ID.

```
Host(config)# no access-node vsa 9 23 <cr>
```

Configuring the RADIUS proxy for native IP

```
Host(config)# radius-proxy client
```

The proxy RADIUS capability is part of the Native IP support in the ASN-SG. It enables the ASN-SG to serve users being terminated by different access devices (such as, AP or GGSN), and to enable for them the ASN-SG services. The ASN-SG acts as a RADIUS server to the access devices and proxy the RADIUS requests to its configured RADIUS server. This feature supports as well users using 802.1x dialers and SIM cards.

Something about part 1 of the command

The acct-proxy defines whether to proxy account messages coming from access nodes.

Off – System sends an accounting response (ack) to the access nodes, keeps the incoming information but does not proxy the account messages to the radius-server.

On – System sends an accounting response (ack) to the access nodes, keeps the information and also proxy the account messages to the radius-server.

The vsa-mode option defines what action the system will take when receiving the clients' (access-node) vendor specific attributes(VSAs). The system default **vsa-mode** mode is **none.** There are two main options while off is the default:

- **off** – System doesn't keep the incoming vendor specific attributes.
- **on** – System keeps the incoming vendor specific attributes.

The **vsa-transmit** option is relevant only for **vsa-mode on** option. The system default **vsa-transmit** mode is **none**. It defines in what type of radius messages the system will use the already stored VSAs (done using **access- node vsa command)** coming originally from the access nodes.

none – No access-node VSAs will be sent although they had kept (for EDS or SNMP queries)

auth – The access-node VSAs will be added to all radius system authentication messages.

acct – The access-node VSAs will be added to all radius system accounting messages.

all – The access-node VSAs will be added to all Radius system messages.

The system default **vsa-transmit** mode is **none**.

Usage

```
radius-proxy client <ip address> <mask> key <secret> [[auth-port <auth port-number>]
| [acct-port <acct port-number> [acct-proxy <on | off>]]] [vsa-mode <off | on
[vsa-transmit [none | auth | acct | all]]>]
```

Parameter(s)

radius-proxy client parameters

Parameter	Description	Values
<ip address>	Client radius IP address	Valid IP address
<mask>	Client radius mask	Valid mask
<secret>	Destined Radius secret key	1 to 64 alphanumeric characters
<auth port-number>	Authentication port number	0-65535 (Default is 1812)
<acct port-number>	Accounting port number	0-65535 (Default is 1813)
<on | off>	The acct-proxy modes.	**On** Proxy the account messages **Off** Don't proxy the account messages still send ACK. Default: **Off**
<off | on>	VSA operation mode.	off Do not keep access-node VSA attributes on Keep access-node VSA attributes
<none | auth | acct | all>	VSA transmission mode.	**none** Do not transmit access-node VSA attributes **auth** Transmit access-node VSA attributes on all radius authentication messages **acct** Transmit access-node VSA attributes on **all** radius accounting messages all - Transmit access-node VSA attributes on all radius messages Default: none

Example 1: Configuring the system to act as proxy radius for authentication request only.

```
Host(config)# radius-proxy client 192.168.1.0 255.255.255.0 key test auth-port 1645
<cr>
Host(config)# exit
Host# write terminal
...
 radius-proxy client 192.168.1.0 255.255.255.0 key test auth-port 1645
```

```
...
```

Example 2: Configuring the system to act as proxy radius for authentication and accounting requests.

```
Host(config)# radius-proxy client 192.168.1.0 255.255.255.0 key test auth-port 1645
acct-port 1646 <cr>
Host(config)# exit
Host# write terminal
...
 radius-proxy client 192.168.1.0 255.255.255.0 key test auth-port 1645 acct-port
1646
...
```

Example 3: Configuring access-node VSA.

```
Host(config)# radius-proxy client 192.168.1.0 255.255.255.0 key test vsa-mode on
<cr>
Host(config)# exit
Host# write terminal
...
 radius-proxy client 192.168.1.0 255.255.255.0 key test auth-port 1812 acct-port
1813 vsa-mode on
...
```

Example 4: Configuring access-node VSA.

```
Host(config)# radius-proxy client 192.168.1.0 255.255.255.0 key test vsa-mode on
vsa-transmit auth <cr>
Host(config)# exit
Host# write terminal
...
 radius-proxy client 192.168.1.0 255.255.255.0 key test auth-port 1812 acct-port
1813 vsa-mode on vsa-transmit auth
...
```

Example 5: Configuring access-node VSA.

```
Host(config)# radius-proxy client 192.168.1.0 255.255.255.0 key test auth-port 1812
vsa-mode on vsa-transmit acct <cr>
Host(config)# exit
Host# write terminal
...
radius-proxy client 192.168.1.0 255.255.255.0 key test auth-port 1812 vsa-mode on
vsa-transmit acct
...
```

Example 6: Configuring access-node VSA.

```
Host(config)# radius-proxy client 192.168.1.0 255.255.255.0 key test auth-port 1812
acct-port 1813 proxy-mode off vsa-mode on vsa-transmit acct <cr>
Host(config)# exit
Host# write terminal
```

```
...
radius-proxy client 192.168.1.0 255.255.255.0 key test auth-port 1812 acct-port
1813 proxy-mode off vsa-mode on vsa-transmit acct
...
```

Using radius-server service-acct command

The command sets the accounting status type values for service start and stop to their VSE (Vendor Specific Emulations) values.

The **VSE** values represent Acct-Status-Type 0x09960001 for Service Start and Acct-Status-Type 0x09960002 for Service Stop.

The system default values are 7 (Accounting-On) for Service Start and 8 (Accounting-Off) for Service Stop.

The **no** command sets the service accounting values to default.

In the system dictionary those values should be presented as followed:

VALUE Acct-Status-Type SG1-Service-Start 0x09960001

VALUE Acct-Status-Type SG1-Service-Stop 0x09960002

Usage

```
[no] radius-server service-acct <VSE>
```

Parameter(s)

<VSE>

VSE – Use system Vendor Specific Enumeration

The value is VSE

Example(s)

```
Host(config)# radius-server service-acct VSE <cr>
Host(config)# exit
Host# write terminal...
 radius-server service-acct VSE...
```

```
Host(config)# no radius-server service-acct <cr>
Host(config)# exit
Host# write terminal
...
...
```

Using the service cache command

```
Host(config)# service cache
```

The ASN-SG is able to cache each received service's information based on a configured aging time. Operating this capability via the **service cache** command causes the system to authenticate a service once during the specified aging period. The caching key is the service name, while the maximum number of cached services in the system is 200. The system does not cache new services when its reached its caching limit. This is beneficial because it substantially reduces the number of RADIUS access request messages.

Usage

service cache off|[on [**aging-time**] < minutes>]

Parameter(s)

<minutes>
Aging-time in minutes (valid values are 1 - 9999; the default value is 10).

Example(s)

```
Host(config)# service cache on aging-time 32
```

Using the ip radius source-interface command

```
Host(config)# ip radius source-interface
```

This command is used to define the radius source interface. It enables configuration of the radius source-interface. Only one source interface may be defined.

The system default radius source interface type is "default," which indicates the primary interface. When configured to its default value, the **write terminal** command does not present the ip radius source interface command line.

Usage

ip radius source-interface [**ethernet** <slot>\<port number> | vlan <slot>\<port number> \ <id> | **loopback** <loopback interface number> | session-interface | **Default**]

Parameter(s)

ip radius source-interface parameters

Parameter	Description	Values
<Interface type>	Interface type.	Optional Values: Ethernet, Loopback and Default. Default value: Default Session-interface: it is the session incoming interface IP address.
<slot>	PMC slot number.	0 - 2
<port number>	Physical port number.	1 - 2
<sub-interface number>	Sub interface number.	1- 2000
<Loopback Interface number>	Loopback interface number.	1 - 200

Example(s)

```
Host(config)# ip radius source-interface ethernet 0 \ 2
```

Note The following command is used to configure the ASN-SG to issue requests to the RADIUS via the loopback interface (the source address of the packet shall be ASN-SG's address).

```
Host(config)# ip radius source-interface loopback 1
```

Note While assigning an undefined Interface to an application the system will ignore the command and indicates the reason.

```
Host(config)# ip radius source-interface loopback 4
    Operation error
    Interface is not defined
```

Using the no ip radius source-interface command

```
Host(config)# no ip radius source-interface
```

This command deletes the radius source-interface configuration by setting it to its default value.

Usage

no ip radius source-interface

Example(s)

```
Host(config)# no ip radius source-interface
```

ACCESS LIST COMMANDS

```
Host(config)# access list
```

An access list is a mechanism that filters the requests to the ASN-SG, by reading the source IP address and its net mask. This mechanism allows you to grant certain workstations access to a ASN-SG for administrative purposes. The access list command is used to create and modify access lists.

Usage

To allow SNMP access, at the second-level command prompt type one of the following (see "Parameter(s)" below for details):

```
access-list Telnet-permit <source IP address> <cr>
access-list SNMP-permit  <source IP address> <mask> <cr>
access-list EDS-permit <source IP address> <mask> <cr>
access-list native-ip <source IP address> <mask> <cr>
native-ip-pass-through <source IP address> <mask> <cr>
```

After keying in one of the above commands, the system responds by displaying `Added item`.

Parameter(s)

There are two options for the first command line argument following the access list command:

- **Telnet-permit** – to allow Telnet access to a ASN-SG from a certain IP address. If no Telnet access list exists, the IP address is added to it. This command must be followed by the IP address.
- **SNMP-permit** – to allow SNMP (Simple Network Management Protocol) access to a ASN-SG from a certain IP address. If no SNMP access list exists, the IP address is added to it. This command must be followed by the source IP address and mask.
- **EDS-permit** – to allow access to a ASN-SG from a certain IP address. If no EDS-permit access list exists, the IP address is added to it. This command must be followed by the source IP address and mask.
- **native-ip** – to allow native-ip access to a ASN-SG from a certain IP address. If no nativ-ip access list exists, the IP address is added to it. This command must be followed by the source IP address and mask.
- **native-ip-pass-through** – to allow native-ip pass trough the ASN-SG from a certain IP address. If no native-ip- pass-through access list exists, the IP address is added to it. This command must be followed by the source IP address and mask.

Example(s)

```
Host(config)# access-list SNMP-permit 25.3.2.251 255.255.255.255
```

Using the access-list native-ip command

```
Host(congfig)# access-list native-ip
```

The access-list native-ip command defines the allowed static native IP networks in the system. It defines the allowed static native IP networks as native-ip potential users. The maximum number of access list line is 200.

Usage

access-list native-ip <source ip address> <source mask>

Parameter(s)

<source ip address>
This is the allowed network source IP; it must be a legal network IP address.

<source mask>
This is the allowed network source mask; it must be a legal network IP address.

Example(s)

```
Host(config)# access-list native-ip 192.168.1.0  255.255.255.0
```

Using the no access-list native-ip command

```
Host(congfig)# no access-list native-ip
```

This command deletes the native IP access list configuration. It deletes the static native-ip access list configuration.

Usage

no access-list native-ip <source ip address>

Parameter(s)

<source ip address>
This is the allowed network source IP; it must be a legal network IP address.

Example(s)

```
Host(config)# no access-list native-ip 192.168.1.0
```

Using the access-list native-ip-pass-through command

```
Host(congfig)# access-list native-ip-pass-through
```

The **access-list native-ip-pass-through** command defines the source IP addresses arrived from a native-ip pipe willnot pass through the standard native ip path. Those IP addresses will not be considered as arriving from a native-ip pipe. This access-list is precedent to the native-ip access-list. The maximum number of access list line is 200.

Usage

access-list native-ip-pass-through <source ip address> <source mask>

Parameter(s)

`<source ip address>`

This is the allowed network source IP; it must be a legal network IP address.

`<source mask>`

This is the allowed network source mask; it must be a legal network IP address.

Example(s)

Note: In the following example the whole network 192.168.1.0 is configured as native-ip potential users except for 192.168.1.1, which is probably a server in this network and not a potential user.

```
Host(config)# access-list native-ip 192.168.1.0 255.255.255.0
Host(config)# access-list native-ip-pass-through 192.168.1.1 255.255.255.255
```

Note In order to activate the **native-ip-pass-through**, IP forward command should be defined.

Using the no access-list native-ip-pass-through command

```
Host(congfig)# no access-list native-ip-pass-through
```

The **no access-list native-ip-path-through** command deletes a path through native IP access list configuration. It deletes the static native-ip access list configuration.

Usage

`no access-list native-ip-pass-through` `<source ip address>`

Parameter(s)

`<source ip address>`

This is the allowed network source IP; it must be a legal network IP address.

Example(s)

```
Host(config)# no access-list native-ip-pass-through 192.168.1.1
```

Using the native-ip fast-roaming command

Host(congfig)# native-ip fast-roaming command

The **native-ip fast-roaming** command enables fast roaming for mobile users between SCCs.

It defines IP networks within a “roamed” system that should be fast reroute to the “home” system. When the “home” system IP address is one of the system interfaces that means that the user session should be terminated internally within the current system.

The system should check first the fast-roaming table for the “home” system, before executing its searching mechanism for NIPI calls. When no match found the system should continue with its regular search mechanism.

The maximum fast IP networks (command rows) is 200.

The command is relevant, only, when roaming is enabled.

Usage

[no] native-ip fast-roaming ip <network> <mask**>** <forwarding system**>**

PARAMETER

<network>

The network which should be fast roamed, it should be legal IP address.

<mask>

The network mask which should be fast roamed, it should be a legal IP address

<Forwarding system>

The home SCC IP address, The home SCC IP address

Example 1:

```
Host(config)# native-ip roaming <cr>
Host(config)# native-ip fast-roaming 10.0.1.0 255.255.255.0 192.168.1.1 <cr>
Host(config)# native-ip fast-roaming 10.0.2.0 255.255.255.0 192.168.1.2 <cr>
Host(config)# native-ip fast-roaming 10.0.3.0 255.255.255.0 192.168.1.3 <cr>
Host(config)# end
Host# write terminal...
 native-ip roaming
 native-ip fast-roaming 10.0.1.0 255.255.255.0 192.168.1.1
 native-ip fast-roaming 10.0.2.0 255.255.255.0 192.168.1.2
 native-ip fast-roaming 10.0.3.0 255.255.255.0 192.168.1.3
...
```

Example 2:

```
Host(config)# no native-ip roaming <cr>
Host(config)# no native-ip fast-roaming 10.0.1.0 255.255.255.0 <cr>
Host(config)# no native-ip fast-roaming 10.0.2.0 255.255.255.0  <cr>
Host(config)# no native-ip fast-roaming 10.0.3.0 255.255.255.0 <cr>
Host(config)# end
Host# write termina...
...
```

SNMP COMMANDS

Using the SNMP-server community

```
Host(config)# SNMP-server community
```

The SNMP-server command is used to modify the settings for the SNMP server.

Usage

```
SNMP-server community <get | set> <Alpha numeric string>
SNMP-server host <ip> <Alpha numeric string>
SNMP-server group <aaa | network | security> <ip>
```

Parameter(s)

When using the community parameter, there are two options for the first command line argument:

- **get**–to define the get SNMP community key
- **set**–to define the set SNMP community key

When using the group parameter, there are three options for the first command line argument:

- **aaa**–Major alarm. Any defined RADIUS server marked in the system DB as dead (inactive) will be reported via SNMP. Any defined RADIUS server marked in the system as ALIVE after being DEAD sends trap indication and log indication.
- **network**–Major alarm. Occurs when Ethernet link is down. When the Ethernet connection becomes available, system sends a trap indication only in a clear event and sends a log indication.
- **security**–Warning Alarm. First time that IP spoofing is detected, the system can manually send a trap indication/log indication.

Note The SNMP key for get and set is encrypted.

Using the snmp-server trap-source-int

```
Host(config)# snmp-server trap-source-int
```

This command defines the source of the snmp traps. The system default snmp trap source interface type is "Default," which indicates the primary interface is in use.

Usage

snmp-server trap-source-int [**ethernet** <slot>\<port number> I **vlan** <slot>\<port number>\<sub-interface number> I **loopback** <loopback interface number> I **Default**]

Parameters:

Parameter	Description	Values

Interface type		Optional Values: Ethernet, Loopback, VLAN, Default. Default value: Default
<slot>	PMC slot number.	0 – 2
<port number>	Physical port number.	1 – 2
<sub-interface number>	Sub interface number.	1 – 4095
<Loopback Interface number>	Loopback interface number.	1 – 200

Example(s)

```
Host(config)# snmp-server trap-source-int ethernet 0 \ 1
Host(config)# snmp-server trap-source-int loopback 12
Host(config)# snmp-server trap-source-int vlan 1 \ 1 \ 12
Host(config)# snmp-server trap-source-int default
```

TUNNEL COMMANDS

`Host(config)# interface tunnel`

This command defines a remote (the tunnel initiator) tunnel endpoint IP address, which allowed opening ip-in-ip or GRE tunnels to the system.

The local tunnel endpoint ip address (tunnel destination) is one of the system IP addresses (Ethernet, VLAN, Loopback).

Usage

interface tunnel <interface number> <remote tunnel endpoint ip address> <local tunnel endpoint ip address> <tunnel type>[<tunnel mode>]

Parameter(s)

`<interface number>`
Tunnel interface number; valid number range is 1 to 500.

`<remote tunnel endpoint ip address>`
Remote tunnel endpoint IP address; it must be a system legal IP address.

`<local tunnel endpoint ip address>`
Local tunnel endpoint IP address; it must be a system legal IP address which is one of the system interfaces (Ethernet, or Loopback).

`<tunnel type>`
System tunnel types: ip-in-ip or GRE.

<tunnel mode>

Tunnel operation mode

roamed – Roamed tunnel mode to support WiFi roaming

standard – Standard tunnel mode

wimax – Wimax tunnel mode to be used as R6 payload

The system default is tunnel mode is **standard**.

Example 1

```
Host(config)#  interface tunnel 1 192.168.0.1 10.0.1.7 ip-in-ip
Operation error:
Local tunnel endpoint IP address should be on of the system interfaces
```

```
Host(config)# interface tunnel 1 192.168.1.8 10.0.1.7 gre roamed <cr>
Host(config)# native-ip enable interface tunnel 1 <cr>
Host(config)# end <cr>
Host# write terminal
...
interface tunnel 1 192.168.1.8 10.0.1.7 gre roamed
native-ip enable interface tunnel 1
...
```

Note The system will refuse changing a tunnel interface parameter that is already carrying user data.

Example 2

```
Host(config)# interface tunnel 1 192.168.0.1 10.0.1.7 ip-in-ip
Operation error:
The tunnel interface parameters cannot be changed since users already using it. You
should delete it first
```

Setting the no interface tunnel command

```
Host(config)# no interface tunnel
```

The **no interface tunnel** command deletes the interface tunnel and all related tunnel interface configuration from the GRE and ip-in-ip tables.

Usage

no interface tunnel <interface number>

Parameter(s)

<interface number>

This is the system interface number; valid number range is 1 to 500.

Example(s)

```
Host(config)# no interface tunnel 1
```

Note The system will refuse the **interface tunnel** command when an existing interface already includes the same remote tunnel endpoint IP address, local tunnel IP address, and tunnel type.

```
Host(config)# interface tunnel 1 192.168.0.1 10.0.1.7 ip-in-ip
Operation error:
A tunnel interface with the same parameters already configured
```

Using the ip tunnel echo command

```
Host(config)# ip tunnel echo
```

This command defines the source IP address to be used for the ICMP echo message in the redundancy operation.

Usage

ip tunnel echo <echo source IP address>

Parameter(s)

<echo source ip address>

It is the source IP address to be used in the ICMP (ping) echo message for tunnel redundancy.

TIMEOUTS COMMANDS

Timeouts are a used to stop activities if the ASN-SG recognizes a problem with data transfer. session-Timeout command

Setting the Session-Timeout

The session timeout is used to disconnect a user after a specified number of seconds.

Usage

session-timeout <number>

Parameter

<number>

It is the seconds number, session timeout in seconds 0 - 4250000 (0 = unlimited).

Example

To set the session timeout to 64800 seconds:

```
Host(config)# session-timeout 64800 <cr>
```

Setting the Idle-Timeout

The idle timeout is used to disconnect a connection without any traffic from the user to the network (upstream). The user will be disconnected if the ASN-SG doesn't detect any data traffic after the specified number of seconds.

Host(config)# idle-timeout command

Usage

idle-timeout <number>

Parameter

<number>

It is the seconds number, idle timeout in seconds 0 - 4250000 (0 = unlimited).

Example

To set the idle timeout of 1800 seconds:

```
Host(config)# idle-timeout 1800 <cr>
```

Using Telnet command

The command set telnet parameters.

Telnet idle timeout default value is 5 minutes.

Using telnet timeout command

```
Host(config)# telnet timeout
```

The command set telnet parameters. Telnet idle timeout default value is 5 minutes

Usage

telnet timeout <number>

Parameter(s)

<number>

Number of minutes that a Telnet session can be idle before being disconnected. Valid values are from 1 to 60 minutes.

Example:

```
Host(config)# telnet timeout 60 <cr>
Host(config)# end
Host# write terminal
...
 telnet timeout 60
...
```

NATIVE IP COMMANDS

Using the native-ip dhcp pre-auth-mode command

```
Host(config)# native-ip dhcp pre-auth-mode
```

The system will enable upon configuration to pre-authenticate a Native IP session, which uses DHCP (DHCP discover) for IP allocation based on its MAC address. A successful pre-authentication will forward the DHCP discover message to the DHCP server.

This command defines the system pre-authentication method in a DHCP request for native IP tunnels. The system default pre-authentication value is *none*. When the system **native-ip dhcp pre-auth-mode** is configured to none it will not appear via the write terminal command.

Usage

native-ip dhcp pre-auth-mode <mode> <none | MAC | reject-MAC>

Parameter(s)

<mode>
Pre-authentication mode. Valid values are: none, MAC, or reject-MAC:

- **none**–No pre-authentication mode.
- **MAC**–Auth by MAC (on auth-reject, grant default service).
- **reject-MAC**–Auth by MAC (on auth-accept, grant default service).

Example(s):

```
Host(config)# native-ip dhcp pre-auth-mode none
Host(config)# native-ip dhcp pre-auth-mode mac
Host(config)# native-ip dhcp pre-auth-mode reject-MAC
```

Using native-ip def-service-auth command

```
Host(config)# native-ip def-service-auth
```

The **native-ip def-service-auth** command instructs that the default native IP service be granted to the connected native IP sessions. It defines the system default native-ip service name.

The default native IP service name is "GNativeIP". When configured to its default value, the **write terminal** command does not present the command line.

Usage

native-ip def-service-auth [<service name>]

Parameter(s)

<service name>
Default native IP service name. Alpha-numeric string of up to 32 characters.

Example(s)

```
Host(config)# native-ip def-service-auth werbcvxsaq
```

Using the native-ip enable command

```
Host(config)# native-ip enable interface
```

This command enables native ip service on a specific interface.

It enables the native IP for a specific VLAN or interface.

Usage

native-ip enable interface <ethernet<slot\port> | vlan <slot\port\identifier> | tunne <tunnel interface id>

Parameter(s)

<slot\port>
This is the Ethernet slot number (valid number range is 0 to 2) and Ethernet port number (1 or 2).

<slot\port\identifier>
This is the Ethernet slot number (valid numbers 0 to 2), Ethernet port number (1 or 2), and VLAN identifier (1 to ?).

<slot\port\sub-interface>
This is the Ethernet slot number (valid number range is 0 to 2), Ethernet port number (1 or 2), and VLAN identifier (sub-interface valid number 1 to 4095).

<tunnel interface id>
This is the tunnel interface identifier. Valid number range is 1 to 300.

Example(s)

```
Host(config)# native-ip enable  interface  ethernet  0 \ 1
Host(config)# native-ip enable  interface  vlan 0 \ 1 \ 45
```

The system will disable the native-ip enable command in case Native IP capability is not licensed (set to *off*). The system will report an operation error with the following message format:

```
Host(config)# native-ip enable interface 0\2
    Operation Error:
    License is required
```

Using the no native-ip enable command

```
Host(config)# no native-ip enable interface
```

It deletes a native ip enabled configuration.

Usage

no native-ip enable interface <**ethernet**<slot\port> | **vlan** <slot\port\identifier> | **tunnel** <tunnel interface id>

Parameter(s)

<slot\port>
This is the Ethernet slot number (valid number range is 0 to 2). This is the Ethernet port number (1 or 2).

<slot\port\sub-interface>
This is the Ethernet slot number (valid number range is 0 to 2), Ethernet port number (1 or 2), and VLAN identifier, sub-interface (valid number range is 1 to 4095).

<tunnel interface id>
This is the tunnel interface identifier (valid number range is 1 to 300).

```
Host(config)# no native-ip enable vlan 1\1\9
```

Using native-ip realm command

```
Host(config)# native-ip realm
```

The **native-ip realm** command specifies the realm string the system will use in the native-ip authenticating, accounting, and service operations.

The realm will be added to the user-name field in all native-ip user's authentication and accounting radius messages, except for web-authentication, regardless of its native-ip type (DHCP, Proxy radius, Plain IP).

The realm string will include the realm separator (such as, the @ symbol).

Usage

native-ip realm <realm string>

Parameter(s)

<realm string>
This is the native-ip realm string; it is an alpha-numeric string of up to 32 characters.

Example(s)

```
Host(config)# native-ip realm @nipnew
```

Using no native-ip realm command

```
Host(config)# no native-ip realm
```

The **no native-ip realm** command disables the native IP realm operation. The no operation will set the native IP realm value to *null*.

Usage

no native-ip realm

Example(s)

```
Host(config)# no native-ip realm
```

Using native-ip roaming command

```
Host(config)# native-ip raoming
```

The native-ip roaming command enables seamless roaming of users between SCCs. It enables the native-ip roaming between SCCs share the same subnet.

Usage

native-ip roaming interface <<**ethernet** <slot\port> | **vlan** <slot\port\sub-interface> | Primary>

Parameter(s)

<slot\port>
The Ethernet slot number (valid number range is 0 to 2). The Ethernet port number (1 or 2).

<slot\port\sub-interface>
The Ethernet slot number (valid number range is 0 to 2), The Ethernet port number (1 or 2), and VLAN identifier, sub-interface (valid number range is 1 to 4095).

Example 1:

```
Host(config)# native-ip roaming
```

Example 2:

```
Host(config)# native-ip roaming interface ethernet 0\2
```

```
Host(config)# no native-ip roaming
```

The native-ip roaming command enables seamless roaming of users between SCCs. It enables the native-ip roaming between SCCs share the same subnet.

Usage

no native-ip roaming

Example:

```
Host(config)# no native-ip roaming
```

MAXIMUM SEGMENT SIZE (MSS) CHANGING

Using the ip tcp adjust-mss command

```
HOST(CONFIG)# IP TCP ADJUST-MSS
```

The system, when configured so that **ip tcp adjust-mss** is set to *on*, will adjust the TCP MSS option value on SYN packets to *1436* (for MSS option larger than 1436) in both directions for each connected user. (**Note:** When the mtu is configured to 1544, there is no need to adjust the mss.)

- The system will extract 64 from the MTU=1500 because of the TCP header (20 bytes).
- This command configures the system to work in adjust-mss mode.
- The system default adjust-mss value is *on*.
- When the system adjust-mss is configured to *off* it will not appear in the **write terminal** command.

Usage

ip tcp adjust-mss <on | off>

Example(s)

Host(config)# ip tcp adjust-mss on

Term Descriptions

- **MTU:** The maximum transmission unit is a link layer restriction on the maximum number of bytes of data in a single transmission.

• **Path MTU:** The smallest MTU of any link on the current path between two hosts. This may change over time since the route between two hosts, especially on the Internet, may change over time. It is not necessarily symmetric and can even vary for different types of traffic from the same host.

• **MSS:** The MSS is the maximum segment size. It can be announced during the establishment of a TCP connection to indicate to the other end the largest amount of data in one packet that will be sent by the remote system. Normally the packet generated will be 40 bytes larger than this: 20 bytes for the IP header and 20 for the TCP header. Most systems announce an MSS determined from the MTU on the interface that traffic to the remote system passes out through.

L2TP AND PPP COMMANDS

The L2TP commands are used for configuring the L2tp source-address. When the l2tp source-address is configured, the system sets the l2tp source address in the response packets regardless of the original l2tp LAC request.

Only one source interface may be defined.

Using the ip l2tp source-address command

```
Host(config)# ip l2tp source-address
```

This command deletes the radius source-interface configuration by setting it to its default value.

Usage

ip l2tp source-address <IP address>

Parameter(s)

<IP address>
This is the l2tp source IP address; it must be a legal IP address.

Example(s)

```
Host(config)# ip l2tp source-address 192.168.1.2
```

Using the no ip l2tp source-address command

```
Host(config)# no ip l2tp source-address
```

This command deletes the L2TP source-address configuration.

Usage

no ip l2tp source-address

Example(s)

```
Host(config)# no ip l2tp source-address
```

Defining the domain name

```
Host(config)# ip domain-name
```

Usage

ip domain-name <valid domain name>

Example(s)

```
Host(config)# ip domain-name My-Company
```

Configuring the primary DNS

```
Host(config)# ip primary-name-server
```

Usage

ip primary-name-server <IP address>

Example(s)

```
Host(config)# ip primary-name-server 55.12.1.24
```

Configuring the secondary DNS

```
Host(config)# ip secondary-name-server
```

Usage

ip secondary-name-server <IP address>

Example(s)

```
Host(config)# ip secondary-name-server 55.12.1.24
```

Setting tunnel servers

```
Host(config)# tunnel-server
```

Each IAS (Internet Access Switch) which will send its users to the ASN-SG must be configured in the ASN-SG (or several IAS which are in the same Mask and use the same tunnel password). The **tunnel-server host** command is used to configure the tunnel server (IAS) settings.

Usage

tunnel-server host <IP address> **mask** <mask> [**password** <alpha-numeric string>]

After keying in the above string, the tunnel password is encrypted.

Parameter(s)

<IP address>

The LAC machine IP address.

<mask>

The mask of the network allowed connecting the LNS.

<alpha-numeric string>

Password used for authenticating between LAC and LNS.

Example(s)

```
Host(config)# tunnel-server host 12.25.3.15 mask 255.255.255.0 password rewed
```

Setting multi-link mode

```
Host(config)# multilink-mode
```

The ASN-SG allows the user to use higher bandwidth by using ML-PPP. Typically ML-PPP is used to combine the speed of a few ISDN BRI B-Channels to get 128 Kbps or other N x 64 Kbps of virtual bandwidth, depending on the RADIUS database and the ASN-SG configuration.

Usage

multilink-mode <multi-cage | single-cage | none>

Parameter(s)

This command has the following options:

- **multi-cage** – ML-PPP uses PPP projection to call master method. The port limit is received from the RADIUS. If no port limit is defined, the system default is 1 (according to the RFC). This means 64 Kbps is the maximum bandwidth (none mode behavior). This is for a scenario of various ASN-SGSCC cards in a POP.
- **single-cage –** ML-PPP uses PPP projection to call master method. The port limit is received from the RADIUS. If no port limit is defined, the system default is 1 (according to the RFC). This means 64 Kbps is the maximum bandwidth (none mode behavior). The difference with the Multi-Cage option is the efficiency of the bundling (in this scenario there is only one SCC card).
- **none –** no Multi link operation is allowed in the ASN-SG. All the PPP links port limit definitions are 1. This means the MLP protocol negotiation is allowed (MLP user), but only one link is available.

Defining an address pool

```
Host(config)# ip local-pool
```

The **ip local pool** command allows you to define IP pools for all the incoming sessions. There are three required command line arguments-the pool name, the starting IP address in the pool, and the last IP address in the pool.

Usage

ip local-pool <pool_name>
email them to find this

Parameter(s)

<pool_name>
The IP pool name (an alpha-numeric string).

<starting_IP>
Starting IP address.

<last_IP>
Ending IP address.

<internal | external>
This fourth command-line argument is optional and has two options:

- **internal**–For internal use only.
- **external**–Only when specifically requested. For users receiving their IP addresses from the RADIUS using the Token-Pool RADIUS attribute.

Example(s)

```
Host(config)# ip local-pool pool1 12.2.3.56 12.2.3.240
```

Using the lcp renegotiate command

```
Host(config)# lcp renegotiate
```

In some cases, there is a need to renegotiate the LCP with all the connected peers. The **lcp renegotiate** command enables this request.

Usage

lcp renegotiate (or **no lcp renegotiate**)

Term Description

LCP: In the Point-to-Point Protocol (PPP), the Link Control Protocol (LCP) establishes, configures, and tests data-link Internet connections. Before establishing communications over a point-to-point link, each end of the PPP link must send out LCP packets. The LCP packet either accepts or rejects the identity of its linked peer, agrees upon packet size limits, and looks for common misconfiguration errors. Basically, the LCP packet checks the telephone line connection to see whether the connection is good enough to sustain data transmission at the intended rate. Once the LCP packet accepts the link, traffic can be transported on the network; if the LCP packet determines the link is not functioning properly, it terminates the link.

LCP packets are divided into three classes:

- Link configuration packets used to establish and configure a link
- Link termination packets used to terminate a link
- Link maintenance packets used to manage and debug a link

Using the lcp echo command

```
Host(config)# lcp echo
```

This command configures the LCP echo behavior in all PPP sessions.

- The system default LCP configuration is off.
- The system LCP echo retries value is 3.
- The lcp on default is 30 seconds. In this mode the LCP echo is active for all PPP sessions.

Usage

lcp echo [on [<lcp echo period>] | off]

Parameter(s)

[on]
This sets lcp echo to active.

[off]
This sets lcp echo to inactive.

<lcp echo period>
This is the lcp echo period in seconds; valid number range is 2 to 32767.

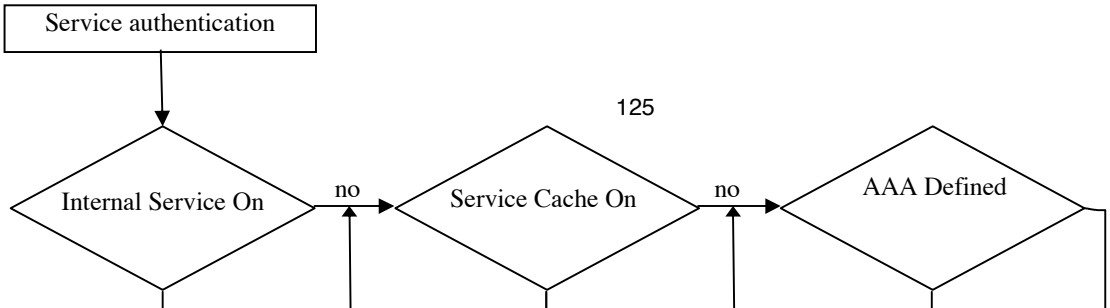
Example(s)

```
Host(config)# lcp echo on 89
```

Using the service internal command

```
Host(config)# service internal
```

This command defines the internal service parameters. The system default internal service session-type is Framed-PPP. When configured to the default value, write terminal does not present the configuration line. When the system internal service auth is configured to local the system checks first for service definitions in the local services database. The system authenticates the service name with the AAA server only if no internal service was match and RADIUS server is configured (although local authentication is defined). The no service internal auth command set the auth mode to it default value (AAA). The flow chart below describes the system logic when authenticating a service.



Usage

[no] service internal <session-type <Framed-PPP | VPDN <tunnel id> <l2tp tunnel password> <Primary IP address> [Secondary IP address]> | auth <local> >

Parameter(s)

<Tunnel id>
The tunnel ID (Alpha numeric string; up to 64 characters)
<L2tp tunnel password>
The password used to authenticate to a remote server (Alpha numeric string; up to 64 characters)
<Primary IP address>
The internal service line definition, as defined in VSA
<Secondary IP address>
The internal service line definition, as defined in VSA
<local>
Acquire service parameters from local services database first (internal services file)

Example 1:

```
Host(config)# service internal vpdn popgate netix 9.22.4.12 10.9.8.33
```

Example 2:

```
Host(config)# service internal auth local
Host(config)# end
Host# write terminal
...
service internal auth local
...
```

PPPoE support

ASN-SG PPP over Ethernet (PPPoE) support enables multiple hosts at a remote site to connect through the same customer premise access device. It also provides access control and billing functionality in a manner similar to dial- up services using PPP. In many access technologies, the most cost effective method to attach multiple hosts to the customer premise access device, is via Ethernet. In addition, it is desirable to keep the cost of this device as low as possible while requiring little or no configuration.

This feature of the ASN-SG, provides the ability to connect a network of hosts over a simple bridging access device to a remote Access Concentrator. With this model, each host utilizes its own PPP stack and the user is presented with a familiar user interface. Access control, billing and type of service can be done on a per-user, rather than a per-site, basis. To provide a point-to-point connection over Ethernet, each PPP session must learn the Ethernet address of the remote peer, as well as establish a unique session identifier. The PPPoE protocol includes a discovery protocol that provides this.

The main aim of this feature is to provide ISPs with xDSL support with an easy consumer end adoption. This model is preserving the point-to point session, which is familiar to both the end-user and to the ISP.

A PPPoE session establishment performs the following scenario:

- Discovery stage:
  - Host broadcasts a PPPoE Active Discovery Initiation (PADI) packet.
  - When ASN-SG receives a PADI, it replies by sending a PPPoE Active Discovery Offer (PADO) packet to the host.
  - The host then sends a single PPPoE Active Discovery Request (PADR) packet to the ASN-SG.
  - When the ASN-SG receives a PADR packet, it prepares to begin a PPP session. It generates a unique SESSION_ID for the PPPoE session and replies to the host with a PPPoE Active Discovery Session-confirmation (PADS) packet
  - PPP session stage

Usage Scenarios

In this scenario, a PPP session is initiated on an Ethernet-connected client through a standard ADSL modem. The session is transported over the Ethernet and terminated by the ASN-SG, which is acting as an xDSL aggregator. Scenario highlights:

- The ASN-SG terminates the PPPoE sessions initiated at users PCs and grants a service.
- User packets are passed as follows:

– The user PC, which runs PPP client, encapsulates the PPP packet with Ethernet.
– The PPPoE packet is being sent from the user PC to the xDSL modem.
– The xDSL modem encapsulates it with DSL.
– The DSLAM de-encapsulates the DSL header and send the Ethernet packets including broadcasts.
– The ASN-SG de-encapsulates the Ethernet and terminates the PPP session.

```
Host(config)# pppoe enable interface
```

The PPPoE enable interface command enables PPPoE negotiation for a specific interface in the system. The PPPoE discovery mode default value is **on**. When configured to its default value the system will not present it.

Usage

pppoe enable interface <slot number>\<port number\[sub-interface number] [discovery [on | off]]>

Parameter(s)

```
<slot number>
Slot number (0-2)
<port number>
Physical port number (1-2)
<sub-interface number>
Sub interface number (1 - 4095)
[on | off]
Discovery functionality operation mode:
      on - Answer to PPPoE discovery message
      off - Ignore PPPoE discovery message
```

Example(s)

```
Host(config)# pppoe enable interface 1/1 <cr>
Host(config)# end
Host# write terminal
...
 pppoe enable interface 1/1
...
```

Using the no pppoe enable command

```
Host(config)# no pppoe enable interface
```

The no pppoe enable interface command disables PPPoE negotiation for a specific interface in the system.

Usage

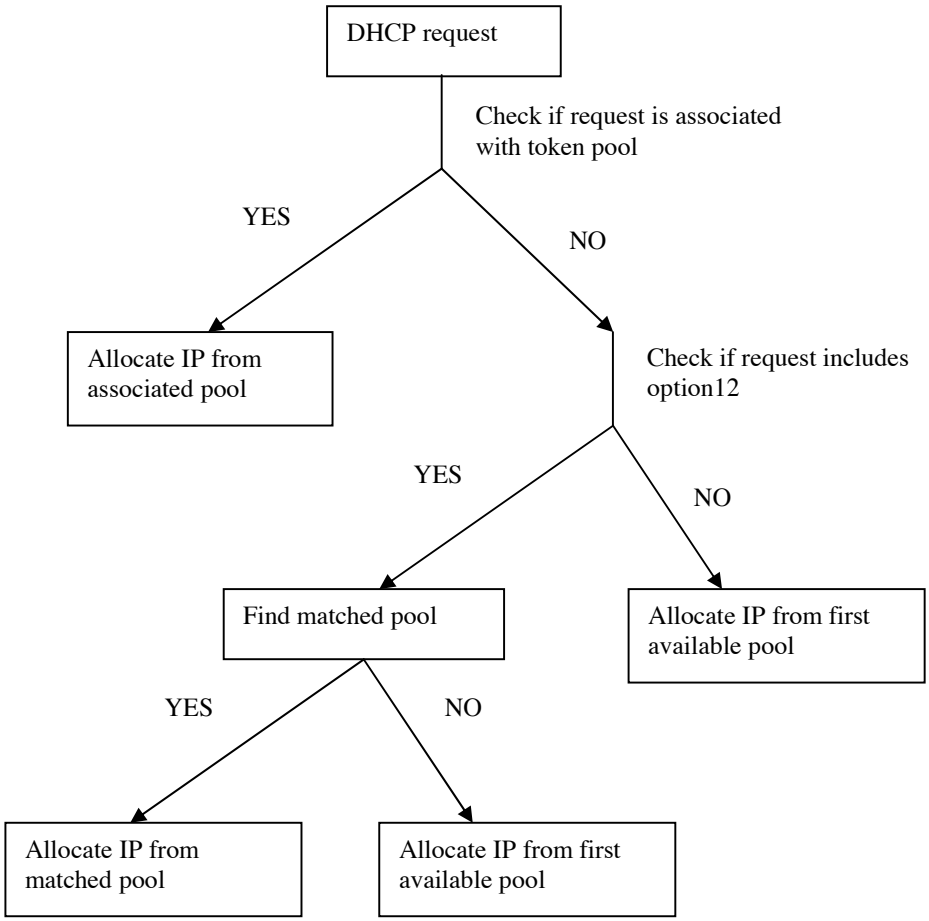
no pppoe enable interface <slot number>\<port number\[sub-interface number]>
For parameters and examples, refer to ColorRed\xd2 Using the pppoe enable command

```
Host(config)# pppoe enable interface
```

DHCP COMMANDS

Dynamic Host Configuration Protocol (DHCP) is a communications protocol that lets network administrators manage centrally and automate the assignment of Internet Protocol (IP) addresses in an organization's network. Using the Internet Protocol, each machine that can connect to the Internet needs a unique IP address. When an organization sets up its computer users with a connection to the Internet, an IP address must be assigned to each machine. Without DHCP, the IP address must be entered manually at each computer and, if computers move to another location in another part of the network, a new IP address must be entered. DHCP lets a network administrator supervise and distribute IP addresses from a central point and automatically sends a new IP address when a computer is plugged into a different place in the network.

The ASN-SG enables in this feature the DHCP relay and internal server capabilities. It acts as a DHCP relay agent and forwards the DHCP request to a DHCP server, which handles the IP-addresses allocation for the connected peers. It also can act as DHCP server and allocate connected users with IP addresses from its internal IP pools. The internal DHCP server logic is represented in the bellow diagram.



Using the ip dhcp relay server command

```
Host(config)# ip dhcp relay server interface
```

The **ip dhcp relay server** command enables the DHCP relay capabilities and defines the ip-address of the DHCP server. The DHCP relay forwards the DHCP messages to the DHCP server.

The source-interface option enables to define the DHCP server source-interface IP to be used in the relay operation (only when communicating with the DHCP server). This functionality is important for the centralized architecture since it enables to configure the users' side entities (RAS/AP) with one global IP address as the DHCP server, while a load balancer balances between the different SCCs.

Note:

The configured source DHCP address is not being used when the system answers back to the relay agent. It uses the original IP address destination value.

The system default DHCP source interface is the interface on which the DHCP was configured. When configured to its default value the system should not present the source-interface command.

The DHCP relay requests should be sent based on the DHCP server priority (1 is highest while 10 is the lowest). In case the first DHCP server is not responding for 3 continuance times for DHCP discover message, the system should set the next priority DHCP server and relays to it the requests. When DHCP server is responding the system should set it as the user session DHCP server. To configure an internal DHCP server use ip dhcp relay server command with loopback IP address 127.0.0.1

Use the following command to define the DHCP relay server.

Usage

```
ip dhcp relay server interface <Ethernet | VLAN | default> <slot>\<port
number>\[<sub-interface number>] <priority> <ip address> [source-interface
<<Ethernet | VLAN > <slot>/<port number>/[<sub-interface number>]> | default]
```

Parameter(s)

```
Slot number (0-2)
<port number>
Physical port number (1-2)
<sub-interface number>
Sub interface number (1- 4095)
<priority>
DHCP server priority (1-10 while 1 is the highest priority)
<ip address>
IP address of the DHCP relay server. Relay IP address of 127.0.0.1 directs the
requests to the internal DHCP server.
[source-interface]
Source interface type (Ethernet, VLAN or default>
```

Example 1:

```
Host(config)# ip dhcp relay server ethernet 0 \ 1 7 12.1.44.55
Host(config)# ip dhcp relay server vlan 1 \ 2 32 4 1.3.2.4
```

Example 2:

```
Host(config)# ip dhcp relay server interface  default 0\0\0 1 192.168.1.8  <cr>
Host(config)# end <cr>
Host# write terminal
...
 ip dhcp relay server interface default 0\0\0 1 192.168.1.8...
```

Example 3:

```
Host(config)# ip dhcp relay server interface Ethernet 0\2 1 192.168.1.8 source-
interface Ethernet 0\1 <cr>
Host(config)# end <cr>
Host# write terminal
...
ip dhcp relay server interface Ethernet 0\2 1 192.168.1.8 source-interface
Ethernet 0\1...
```

Using the no ip dhcp relay server command

```
Host(config)# no ip dhcp relay server
```

Use this command to define DHCP relay servers.

Usage

ip dhcp relay server interface <Ethernet | VLAN | default> <slot>\<port number>\[<sub-interface number>] <priority>

For parameters and examples, see Color FC-Redable on page **Error! Bookmark not defined.**Default ¶ Font.

Using the ip dhcp relay information option interface command

```
Host(config)# ip dhcp relay information option interface
```

The ip dhcp relay information option command enables the system to insert a DHCP relay agent information option in forwarded BOOT REQUEST messages to the DHCP server.

Usage

ip dhcp relay information option <**ethernet** | **vlan** | default> <slot>\<port number>\[sub-interface number] <priority> [**append**]

Parameter(s)

Slot number (0-2)
<port number>
Physical port number (1-2)
<sub-interface number>
Sub interface number (1- 4095)
<priority>

DHCP server priority (1-10 while 1 is the highest priority)
append
Append the system option 82 information to the received one and if not exist add it.

Example(s)

```
Host(config)# no ip dhcp relay server ethernet 0 \ 1 2
Host(config)# no ip dhcp relay server vlan 1 \ 2 3 5
Host(config)# no ip dhcp relay server default 0 \ 1 \ 4 8
```

Using the no ip dhcp relay information option command

```
Host(config)# no ip dhcp relay information option
```

Usage

no ip dhcp relay information option <ethernet | vlan | default> <slot>\<port number>\[sub-interface number] <priority>

For parameters and examples, see Color FC-Redable

DHCP Agent ID Overwrite

When configured, the ASN-SG will overwrite the DHCP agent ID and the server identifier to its ID (IP address) in the DHCP reply messages. The system does not overwrite the DHCP agent ID in its default behavior.

Using the ip dhcp relay agent-id-overwrite command

```
Host(config)# ip dhcp relay agent-id-overwrite interface
```

Usage

ip dhcp relay agent-id-overwrite interface <ethernet | vlan | default> <slot>\<port number>\[sub-interface number] <priority> [replace]

Parameter(s)

<slot>
PMC slot number (0-2; Default value 0)
<port number>
Physical port number (1-2; Default value 0)
<sub-interface number>
Sub interface number (1-4095; Default value 0)
<priority>
DHCP server priority (1-10; Values according to the order)
<ethernet | vlan | default>
Interface format (Ethernet, VLAN)

Example(s)

```
Host(config)# ip dhcp relay agent-id-overwrite interface vlan 1 \ 2 34
```

```
Host(config)# ip dhcp relay agent-id-overwrite interface vlan 1 \ 2 34 5 replace
Host(config)# ip dhcp relay agent-id-overwrite interface default 0 \ 1 \ 1
Host(config)# ip dhcp relay agent-id-overwrite interface default 0 \ 1 \ 1 2 replace
```

Using the ip dhcp relay advertise-protocol command

This command defines the default protocol the system is using to advertise the user's DHCP allocated IP address.

Usage

ip dhcp relay advertise-protocol <rip | ospf>

Example1 (Set DHCP advertized proptocol to rip):

```
Host(config)# ip dhcp relay advertise-protocol rip
```

Using the ip dhcp local-pool command

This command defines IP pools for the local DHCP server and is located under the "configure terminal" menu.

Usage

[no] ip dhcp local-pool <pool name> < <start address> <end address> <subnet mask> <default gateway IP address> >
|
[lease-time <lease time> | <pri-dns <Primary DNS address> [sec-dns <Secondary DNS address>]> | exp-period <Binding expiration period> | option12 <option 12 string>]

Parameter(s)

```
<Pool name>
IP Pool name (Alphanumeric string; Maximum 64 characters; Maximum IP pools are 100)
<Start address>
Starting IP address
<End address>
End IP address (Maximum IPs per IP pool is 4096)
<Subnet mask>
Subnet pool mask
<Default gateway IP address>
Default gateway IP address
<Lease time>
IP address lease time in seconds, where 0 determines infinite (0 – 2^32-1)
<Primary DNS address>
Secondary DNS server IP address (if not defined uses the global one)
<Secondary DNS address>
Secondary DNS server IP (if not defined uses the global one)
<Binding expiration period>
Binding expiration period in seconds (0 – 2^32-1). It defines the time period to
keep an allocated IP address after lease time expiration.
<option 12 string>
String to partially matched with received option 12 (Alphanumeric string; Maximum 64
characters)
```

Example 1 (internal DHCP server definition with one local pool):

```
Host(config)# ip dhcp relay server interface default 0\0\0 1 127.0.0.1 <cr>
Host(config)# ip dhcp local-pool pool1 10.0.1.2 10.0.1.255 255.255.255.0 10.0.1.1
<cr>
Host(config)# end <cr>
Host# write terminal
...
 ip dhcp relay server interface default 0\0\0 1 127.0.0.1
 ip dhcp local-pool pool1 10.0.1.2 10.0.1.255 255.255.255.0 10.0.1.1
...
```

Example 2 (internal DHCP server definition with one local pool and specific DNS, lease time and experation period):

```
Host(config)# ip dhcp relay server interface default 0\0\0 1 127.0.0.1 <cr>
Host(config)# ip dhcp local-pool pool1 10.0.1.2 10.0.1.255 255.255.255.0 10.0.1.1
<cr>
Host(config)# ip dhcp local-pool pool1 lease-time 7200 <cr>
Host(config)# ip dhcp local-pool pool1 pri-dns 172.168.1.2 sec-dns 172.168.1.3 <cr>
Host(config)# ip dhcp local-pool pool1 exp-period 900 <cr>
Host(config)# end <cr>
Host# write terminal
...
 ip dhcp relay server interface default 0\0\0 1 127.0.0.1
 ip dhcp local-pool pool1 10.0.1.2 10.0.1.255 255.255.255.0 10.0.1.1
 ip dhcp local-pool pool1 lease-time 7200
 ip dhcp local-pool pool1 pri-dns 172.168.1.2 sec-dns 172.168.1.3
 ip dhcp local-pool pool1 exp-period 900

...
```

Example 3:

```
Host(config)# ip dhcp relay server interface default 0\0\0 1 127.0.0.1
Host(config)# ip dhcp local-pool bs_pool 192.168.0.4 192.168.0.30 255.255.255.224
192.168.0.3 <cr>
Host(config)# ip dhcp local-pool bs_pool option12 Pico <cr>
Host(config)# ip dhcp local-pool cpe_pool 10.0.2.2 10.0.2.254 255.255.255.0 10.0.2.1
<cr>
Host(config)# ip dhcp local-pool user_pool 10.0.3.2 10.0.3.254 255.255.255.0 10.0.3.1
<cr>
Host(config)# end <cr>
Host# write terminal
...
 ip dhcp relay server interface default 0\0\0 1 127.0.0.1
 ip dhcp local-pool bs_pool 192.168.0.4 192.168.0.30 255.255.255.224 192.168.0.3
 ip dhcp local-pool bs_pool option12 Pico
 ip dhcp local-pool cpe_pool 10.0.2.2 10.0.2.254 255.255.255.0 10.0.2.1
 ip dhcp local-pool user_pool 10.0.3.2 10.0.3.254 255.255.255.0 10.0.3.1
...
```

Using the show dhcp ip-pool command

This command describes the IP pools status and is located under the main menu.

Usage

show dhcp ip-pool [<pool name>]

Parameter(s)

<Pool name>
IP Pool name (Alphanumeric string; Maximum 64 characters)

Example 1 (show IP pools summary information):

```
Host# show dhcp ip-pool

 Pool Name                        Used IPs  Free IPs  Status
 __________                       ________  ________  ______

 bs_pool                                 0        14  active
 cpe_pool                                0       253  active
 user_pool                               0        13  active

Host#
```

Example 2 (show detailed IP pool information):

```
Host# show dhcp-ip-pool Pool3

Name: Pool3

 IP Address     Status  Lease    Remain
                                 Lease
 -------------- ------- -------- --------
 192.168.1.2    Used    3600     3254
 192.168.1.3    Used    3600     2360
 192.168.1.4    Used    3600     2200
 192.168.1.5    Used    3600     1850
 192.168.1.6    Bind    3600     223
...
Host#
```

IGMP COMMANDS

Using the ip igmp proxy command

```
Host(config)# ip igmp proxy upstream-interface
```

The **ip igmp proxy upstream-interface** command enables the IGMP Proxy capabilities on a specific upstream interface. When the upstream interface is not configured, the system does not support the IGMP proxy capability. Additionally, the command enables you to add or change the IGMP Proxy upstream interface.

Usage

ip igmp proxy upstream-interface <Ethernet | VLAN> <slot>\<port number> [\sub-interface]

ip igmp proxy command parameters

Parameter	Description	Legal values/range
<slot>	PMC slot number.	0-1
<port number>	Physical port number.	1-2
<sub-interface number>	Sub interface number.	1-4095; Default value 0

Example(s)

```
Host(config)# ip igmp proxy upstream-interface ethernet 0 \ 1
Host(config)# ip igmp proxy upstream-interface vlan 1 \ 2 54
```

Using the no ip igmp proxy command

```
Host(config)# no ip igmp proxy upstream-interface
```

The no igmp proxy upstream-interface command disables the IGMP Proxy capabilities.

Usage

no igmp proxy upstream-interface <ethernet | vlan> <slot>\<port number> [\sub-interface]

For parameters see Color FC-Redable .

ROUTING COMMAND

Using the ip forward command

```
Host(config)# ip forward
```

This command enables IP forwarding between the Ethernet interfaces. The system's default setting does not use IP forwarding.

Usage

ip forward

```
Host(config)# no ip forward
```

This command disables IP forwarding between the Ethernet interfaces.

Usage

no ip forward

Using the IP route command

```
Host(config)# ip route
```

The **ip route** command is used for establishing static routes. A static route is appropriate when the ASN-SG is not dynamically building the routes to the destinations.

Usage

```
ip route <[nip <destination prefix> <destination prefix mask> <forwarding router's>]
| [<destination prefix> <destination prefix mask> <[<forwarding router's>] |
[<<Ethernet interface> <slot number>\<port number>\[<sub-interface number]>>|
<loopback interface>]>]>
```

Parameter(s)

ip route command parameters

Parameter	Description	Values
<destination prefix>	Destination IP or Network	Valid IP or Network
<destination prefix mask>	Network mask	Valid Mask (Except to 0.0.0.0)
<forwarding router's>	Next-hop IP address	Valid IP address
<Ethernet interface>	Interface type	Interface type: Ethernet
<slot number>	PMC slot number	0-1
<port number>	Physical port number	1-2
<sub-interface number>	Sub interface number	1-4095
<loopback interface>	Loopback interface number	1-200
<tunnel interface ip>	Tunnel interface identifier	1-500

Example(s)

Add an IP route:

```
Host(config)#ip route 192.168.3.0 255.255.255.0 194.90.1.12 <cr>
Host(config)# end
Host> write terminal
. . .
 ip route 192.168.3.0 255.255.255.0 194.90.1.12
. . .
```

Modify an Existing IP route:

```
Host(config)# ip route 192.168.3.0 255.255.255.0 194.90.1.22 <cr>
Host(config)# end
Host> write terminal
...
 ip route 192.168.3.0 255.255.255.0 194.90.1.22 Ethernet 0\1
...
```

Route network 192.168.4.0 to Ethernet interface 2:

```
Host(config)# ip route 192.168.4.0 255.255.255.0 194.90.1.22 ethernet 2 <cr>
Host(config)# end
Host> write terminal
...
 ip route 192.168.4.0 255.255.255.0 194.90.1.22 ethernet 0\2
...
```

Route network 192.168.4.0 to Loopback interface 2:

```
Host(config)# ip route 192.168.4.0 255.255.255.0 194.90.1.22 loopback 3 <cr>
Host(config)# end
Host> write terminal
...
 ip route 192.168.4.0 255.255.255.0 194.90.1.22 loopback 3
...
```

Route network 192.168.4.0 to Ethernet interface 0\2:

```
Host(config)# ip route 192.168.4.0 255.255.255.0 ethernet 0\2 <cr>
Host(config)# end
Host> write terminal
...
 ip route 192.168.4.0 255.255.255.0 Ethernet 0\2
...
```

Route native IP user side network 192.168.4.0 to 192.168.1.1:

```
Host(config)# ip route nip 192.168.4.0  255.255.255.0  192.168.1.1 <cr>
Host(config)# end
Host> write terminal
...
 ip route nip 192.168.4.0 255.255.255.0 192.168.1.1
...
```

Route network 10.0.4.0/24 to tunnel interface 3:

```
Host(config)# ip route 10.0.4.0 255.255.255.0 tunnel 3 <cr>
Host(config)# end
Host> write terminal
...
 ip route nip 10.0.4.0 255.255.255.0 tunnel 3
...
```

Note When assigning a next-hop address which is not in the interfaces subnet, the system will ignore the command and indicate the reason.

```
Host(config)# ip route 192.168.4.0 255.255.255.0 194.90.1.22 <cr>
    Operation Error:
    Next-hop is not valid to this interface
```

Note It is not valid to add an ip route when the destination address is already in the subnet of the system interfaces.

```
Host(config)# ip route 192.168.1.0. 255.255.255.0 192.168.1.2
```

Deleting an IP route line

```
Host(config)# no ip route
```

This command deletes the existing route.

Usage

no ip route [nip] <destination prefix> <network mask> <next-hop IP-address>

Parameter(s)

no ip route command parameters

Parameter	Description	Values
[nip]	Native IP	Valid IP or Network
<destination prefix>	Destination IP or network	Valid IP or Network
<network mask>	Network mask	Valid Mask (Except to 0.0.0.0)
<next-hop IP-address>	Next-hop IP address	Valid IP address

Example(s)

```
Host(config)# no ip route 192.168.0.0 255.255.0.0 192.168.0.1
```

Using the ip default-gateway command

```
Host(config)# ip default-gateway
```

Use this command to specify the system's default gateway.

Usage

ip default-gateway <gateway IP address>

Parameter(s)

<gateway IP address>
The IP address of the default gateway.

Example(s)

```
Host(config)# ip default-gateway 12.3.11.56
```

Using the no ip default-gateway command

```
Host(config)# no ip default-gateway
```

Use this command to specify the system's default gateway.

Usage

no ip default-gateway

Example(s)

```
Host(config)# no ip default-gateway
```

When assigning a default-gateway that is not in the subnet of the primary or secondary Ethernet interfaces, the system provides a warning.

```
Host(config)# ip default-gateway 194.90.2.1
    Operation Warning:
    The default gateway is out of subnet
```

Using the router command

```
Host(config)# router
```

This command defines the system default routing process. In cases where advertisement takes place and there is no other higher priority definition, the system uses this definition. The routing modes include Routing Information Protocol Version 2 (RIPv2) and Open Shortest Path First protocol (OSPF).

Usage

router <ripv2 | ospf>

Example(s)

```
Host(config)# router ripv2
Host(config)# router ospf
```

Using the router id command

```
Host(config)# router id
```

This command defines the system router id.

Usage

router id < router ip>

Parameter(s)

<router ip>
OSPF router ID in IP address format.

Example(s)

```
Host(config)# router id 10.33.21.88
```

```
Host(config)# no router
```

This command disables the system default routing process.

Usage

no router

Using the IP rip authentication key command

```
Host(config)# ip rip authentication key
```

The **ip rip** command is located beneath the "configure terminal" menu. It is used to define the password for the Router Information Protocol (RIP) authentication process.

Usage

ip rip authentication key <key name>

Parameter(s)

<key name>
This is the authentication key.

Using the ip ospf interface command

```
Host(config)# ip ospf interface ... area
```

This command defines an interface on which OSPF runs and defines the area ID for that interface.

Usage

ip ospf interface <ethernet | vlan> <slot number>\<port number>
[\<sub-interface>] **area** <area-id>

Parameter(s)

<area-id>
The area ID for the interface on which OSPF is running.

For additional parameters, refer to Color FC-Red\xd2 Using the ip igmp proxy command

```
Host(config)# ip igmp proxy upstream-interface
```

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Example(s)

```
Host(config)# ip  ospf interface ethernet 1 \ 2 area 12.3.5.6
Host(config)# ip  ospf interface vlan 1 \ 2 \ 33 area 44.55.2.15
```

Using the no ip ospf interface command

```
Host(config)# no ip ospf interface
```

This command disables OSPF on an interface.

Usage

no ip ospf interface <ethernet | vlan > <slot number>\<port number> [\<sub-interface>]

For parameters and examples, refer to Color FC-Red\xd2 Using the ip ospf interface command

```
Host(config)# ip ospf interface ... area
```

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Using the ip ospf interface hello-interval command

```
Host(config)# ip ospf interface ... hello-interval
```

This command specifies the interval time in seconds between hello packets.

Usage

ip ospf interface <ethernet | vlan> <slot number>\<port number> [\<sub-interface>] **hello-interval** <seconds>

Parameter(s)

<seconds>

The time interval between hello packets.

For additional parameters, refer to Color FC-Red\xd2 Using the ip igmp proxy command

```
Host(config)# ip igmp proxy upstream-interface
```

Example(s)

```
Host(config)# ip ospf interface ethernet 1 \ 2 hello-interval 22
Host(config)# ip ospf interface vlan 1 \ 2 \ 33 hello-interval 23
```

Using the no ip ospf interface hello-interval command

```
Host(config)# no ip ospf interface ... hello-interval
```

The command sets the interval time between hello packets to its default value.

Usage

no ip ospf interface <ethernet | vlan > <slot number>\<port number> [\<sub-interface>] **hello-interval**

For parameters and examples, refer to Color FC-Red\xd2 Using the ip ospf interface hello-interval command

```
Host(config)# ip ospf interface ... hello-interval
```

Using the ip ospf interface dead-interval command

```
Host(config)# ip ospf interface ... dead-interval
```

The command specifies the number of seconds that a device's hello packets must not have been seen before its neighbor declares the OSPF router down.

Usage

```
ip ospf interface <ethernet | vlan > <slot number>\<port number>
[\<sub-interface>] dead-interval <seconds>
```

Parameter(s)

<seconds>
Interval a device's hello packets must not have been seen before its neighbor declares the OSPF router down.

For additional parameters, refer to Color FC-Red\xd2 Using the ip igmp proxy command

```
Host(config)# ip igmp proxy upstream-interface
```

Example(s)

```
Host(config)# ip ospf interface ethernet 1 \ 2 dead-interval 33
Host(config)# ip ospf interface vlan 1 \ 2 \ 88 dead-interval 78
```

Using the no ip ospf interface dead-interval command

```
Host(config)# no ip ospf interface ... dead-interval
```

The command set the number of seconds that a device's hello packets must not have been seen before its neighbor declares the OSPF router down to its default value.

Usage

```
no ip ospf interface <ethernet | vlan> <slot number>\<port number>
[\<sub-interface>] dead-interval
```

For parameters and examples, refer to Color FC-Red\xd2 Using the ip ospf interface dead-interval command

```
Host(config)# ip ospf interface ... dead-interval
```

Using the ip ospf interface authentication command

```
Host(config)# no ip ospf interface ... authentication
```

This command is used to set the type of authentication (simple password, MD5, or none) used by neighboring OSPF routers.

Usage

```
ip ospf interface <ethernet | vlan> <slot number>\<port number>
[\<sub-interface>] authentication <simple-pass | message-digest | null>
```

Parameter(s)

```
<simple-pass | message-digest | null>
```

This is the authentication type specified for neighboring OSPF routers. Options include:

simple-pass – using simple password authentication; to configure see Color FC-Red\xd2 Using the ip ospf interface authentication-key command

Host(config)# ip ospf interface ... authentication-key

message-digest – using Message Digest 5 (MD5) authentication; to configure see Color FC-Red\xd2 Using the ip ospf interface message-digest-key command

Host(config)# no ip ospf interface ... message-digest-key

null – no authentication. (Note: If no value is keyed in, the system assumes the default value, which is null).

For additional parameters, refer to Color FC-Red\xd2 Using the ip igmp proxy command

Host(config)# ip igmp proxy upstream-interface

Example(s)

```
Host(config)# ip ospf interface ethernet 1 \ 2 authentication simple-pass
Host(config)# ip ospf interface ethernet 1 \ 2 authentication message-digest
Host(config)# ip ospf interface ethernet 1 \ 2 authentication null
```

Using the ip ospf interface authentication-key command

```
Host(config)# ip ospf interface ... authentication-key
```

This command configures the password to be used by neighboring OSPF routers on a network segment that is using the OSPF simple password authentication.

Usage

```
ip ospf interface <ethernet | vlan> <slot number>\<port number>
[\<sub-interface>] authentication-key <key>
```

Parameter(s)

<key>
The password used by neighboring OSPF routers for simple password authentication (password is 1 to 16 alpha-numeric characters).

For additional parameters, refer to Color FC-Red\xd2 Using the ip igmp proxy command

Host(config)# ip igmp proxy upstream-interface

Example(s)

```
Host(config)# ip ospf interface ethernet 0 \ 1 authentication-key jkljlll
Host(config)# ip ospf interface vlan 1 \ 1 \ 44 authentication-key jkjkjk
```

Using the no ip ospf interface authentication-key command

```
Host(config)# no ip ospf interface ... authentication-key
```

On a network segment using the OSPF simple password authentication, this command sets the password used by neighboring OSPF routers to its default value.

Usage

no ip ospf interface <ethernet | vlan> <slot number>\<port number> [\<sub-interface>] **authentication-key**

For parameters and examples, refer to ColorRed\xd2 Using the ip ospf interface authentication-key command

Host(config)# ip ospf interface ... authentication-key

Using the ip ospf interface message-digest-key command

```
Host(config)# no ip ospf interface ... message-digest-key
```

This command configures the OSPF MD5 (Message Digest 5) authentication parameters.

Usage

ip ospf interface <ethernet | vlan> <slot number>\<port number> [\<sub-interface>] **message-digest-key** <keyid> **md5** <key>

Parameter(s)

<keyid>
This is the MD5 identifier to be used by neighboring OSPF routers.

<key>
This is the MD5 password (1 to 16 alphanumeric characters).

For additional parameters, refer to Color FC-Red\xd2 Using the ip igmp proxy command

```
Host(config)# ip igmp proxy upstream-interface
```

Example(s)

```
Host(config)# ip ospf interface ethernet 1 \ 2 message-digest-key 25 md5 jkljlll
```

Using the no ip ospf interface message-digest-key command

```
Host(config)# no ip ospf interface ... message-digest-key
```

This command removes the OSPF MD5 (Message Digest 5) authentication parameters.

Usage

no ip ospf interface <ethernet | vlan> <slot number>\<port number> [\<sub-interface>] **message-digest-key**

For parameters and examples, refer to Color FC-Red\xd2 Using the ip ospf interface message-digest-key command

```
Host(config)# no ip ospf interface ... message-digest-key
```

Using the ip ospf area stub command

```
Host(config)# ip ospf area
```

This command configures an OSPF area as a stub area. The system default stubbing option is *no-stub* and the system default advertisement behavior is *summary*.

Usage

ip ospf area <area-id> [stub | no-stub] [no-summary | summary]

Parameter(s)

<area-id>
OSPF identifier of the area the identifier specified (as a value or an IP address).

Example(s)

```
Host(config)# ip ospf area 1.2.3.5 stub no-summary
Host(config)# ip ospf area 1.2.3.5 stub summary
```

Using the no ip ospf area stub command

```
Host(config)# no ip ospf area ... stub
```

The command disables OSPF stub area functionality.

Usage

no ip ospf area <area-id> **stub**
For parameters and examples, refer to Color FC-Red\xd2 Using the ip ospf area stub command

```
Host(config)# ip ospf area
```

Using the ip ospf advertise network command

```
Host(config)# ip ospf advertise network
```

This command defines advertisement of an entire network per area.

Usage

ip ospf advertise-network <area-id> <network> <mask>[<metric>]

Parameter(s)

ip ospf advertise network command

Parameter	Description	Legal values/range
<area-id>	OSPF Identifier of the area specified as an IP address.	IP address
<network>	Advertised network.	IP address
<mask>	Network mask.	Mask
<metric>	The advertisement metric value	0 – 16777215 (0x00ffffff) Default value: 20

Example 1

```
Host(config)# ip ospf advertise-network 1.2.3.4 22.32.55.4 255.255.255.0
```

Example 2:

```
Host(config)# ip ospf advertise network 10.3.2.1 192.168.1.0 255.255.255.0 40<cr>
Host(config)# end <cr>
Host# write terminal...
 ip ospf advertise network 10.3.2.1 192.168.1.0 255.255.255.0 40
...
```

Using the no ip ospf advertise network command

```
Host(config)# no ip ospf advertise network
```

This command deletes advertisement of a network.

Usage

no ip ospf advertise network <area-id> <Network>

For parameters and examples, refer to Color FC-Red\xd2 Using the ip ospf advertise network command

```
Host(config)# ip ospf advertise network
```

REDUNDANCY AND AVAILABILITY COMMANDS

Using the vrrp command

```
Host(config)# vrrp interface
```

The SCC redundancy mechanism is based on the Virtual Router2 Redundancy Protocol (VRRP RFC-2338), which is designed to eliminate the single point of failure inherent in the static default routed environment. VRRP specifies an election protocol that dynamically assigns responsibility for a virtual router to one of the VRRP routers on a LAN. The VRRP router controlling the IP address(es) associated with a virtual router is called the Master, and forwards packets sent to these IP addresses. The election process provides dynamic fail-over in the forwarding responsibility is the Master become unavailable. Any of the virtual router's IP addresses on a LAN can then be used as the default first hop router by end-hosts.

This is beneficial because VRRP is a higher availability default path without requiring configuration of dynamic routing or router discovery protocols on every end-host.

Usage

vrrp interface <ethernet | vlan> <slot number>\<port number>[\VLAN ID>] <number> ip <IP address> priority <priority value> [preempt-mode <on | off>]

Note The virtual router IP is belong to the same subnet as the protected interface. The VRRP preempt mode default value is *off*. The **write terminal** command will not present the preempt-mode when set to its default value.

vrrp command parameters

Parameter	Description	Legal values/range
<ethernet | vlan>	The interface is Ethernet or VLAN.	ethernet, vlan
<slot number>	Slot number.	0, 1
<port number>	Physical port number.	1 to 3
<VLAN ID>	VLAN ID number.	
<number>	Virtual Router Group Number (VRID).	1 to 15
IP address	IP address of the virtual router.	Legal IP address
<priority value>	VRRP router priority value.	1 to 254
<on | off>	VRRP preemptive mode.	On or off (default value is off)

The following examples use two SCCs (Service Creation Cards):

Example 1 (SCC1 configuration):

```
Host(config)# vrrp interface ethernet 0\1 1 ip 192.168.1.3 priority 200
```

Example 2 (SCC2 configuration):

```
Host(config)# vrrp interface ethernet 0\1 1 ip 192.168.1.3 priority 100
```

The following two examples show the configuration with preemption capabilities:

Example 1 (SCC1 configuration):

```
Host(config)# vrrp interface ethernet 0\1 1 ip 192.168.1.100 priority 200
preempt-mode on
Host(config)# vrrp interface ethernet 0\1 2 ip 192.168.1.101 priority 201
preempt-mode on
```

Example 2 (SCC2 configuration):

```
Host(config)# vrrp interface ethernet 0\1 1 ip 192.168.1.101 priority 200
preempt-mode on

Host(config)# vrrp interface ethernet 0\1 2 ip 192.168.1.100 priority 201
preempt-mode on
```

Note The system will refuse virtual router IP address that is the same as the real interface IP address.

```
Host(config)# vrrp interface Ethernet 0\1 1 ip 192.168.1.2 priority 1
    Operation Error:
    Virtual router IP address is equal to the real interface IP address
```

Note The system will refuse virtual router IP address that does not belong to the same subnet as the protected interface, or belong to one of the system IP pools.

```
Host(config)# vrrp interface Ethernet 0\1 1 ip 192.168.1.2 priority 1
    Operation Error:
    Wrong virtual router IP address
```

Note The system will refuse assignment of different virtual router priority for the same VRID value.

```
Host> write terminal
```

```
....
    Interface ethernet 0\1 192.168.1.2  255.255.255.0 auto
    Vrrp interface ethernet 0\1 1 ip 10.1.1.1  priority 99
```

```
....
Host(config)# vrrp interface ethernet 0\1 1 ip 10.1.1.1 priority 150
    Operation Error:
    Different virtual router priority for the same group number (VRID)
```

Using the no vrrp command

```
Host(config)# no vrrp interface
```

This command deletes the virtual router configuration in the system.

Usage

no vrrp interface <Ethernet | VLAN> <slot number> \ <port number> [\ <VLAN ID>] <number>

Parameter(s)

no vrrp command parameters

Parameter	Description	Legal values/range
<ethernet | vlan>	The interface is Ethernet or VLAN.	Ethernet, VLAN
<slot number>	Slot number.	0, 1
<port number>	Physical port number.	1 to 3
<VLAN ID>	VLAN ID number.	
<number>	Virtual Router Group Number (VRID).	1 to 15

Example(s)

```
Host(config)# no vrrp interface Ethernet 0\1 1
```

Using the vrrp preempt command

```
Host(config)# vrrp preempt interface
```

- Executing the **vrrp preempt interface** command orders a backup system to become active (become the master) if it is configured to the highest virtual router priority.

- Executing the **vrrp preempt interface** command on a backup system, which is in a lower priority than the master, does not change the master and backup activity.

Usage

```
vrrp preempt interface <Ethernet | VLAN> <slot number>\<port number> <priority>
enable
```

vrrp preempt command parameters

Parameter	Description	Legal values/range
<Ethernet | VLAN>	The interface is Ethernet or VLAN.	Ethernet, VLAN
<slot number>	Slot number.	1, 1
<port number>	Physical port number.	1 to 3
<priority>	VRRP router priority value.	1 to 254

Example(s)

```
Host(config)# vrrp preempt interface vlan 1\2  7 enable
```

Using the availability command

```
Host(config)# availability
```

This command configures the SCC availability mechanism parameters.

Once availability is configured for a specific module (e.g. VLAN) it corresponds with the configured redundancy mechanism status (i.e. a trigger ID of VRRP) set for this module - the module is enabled once the redundancy mechanism status is set to **Master** and disabled once it set to **Backup.**

Usage

```
availability <availability identifier> <availability module> <redundancy triggering
module> <trigger ID> [<slot number>\<port number>[\<sub-interface>][\<qinq tag>]]
```

Parameter(s)

<availability identifier>
Availability identifier index, Anumber 1 to 32,000

<availability module>
The module on which availability will be set.

The pppoe availability functionality is to answer for PPPoE discover messages.

The dhcp availability functionality is to answer for dhcp discover requests.

The vlan availability functionality is to allow all system applications traffic. When disabled it blocks all traffic except for the VRRP one.

Legal values are: PPPoE , DHCP, VLAN

`<redundancy triggering module>`
Legal value is VRRP

`<trigger ID>`
The trigger ID, which is relevant for the redundancy-triggering module. For VRRP the Virtual Router Id

`[<slot number> <port number> <sub-interface> <qinq tag>]`
Module interface identifier, which represents the interface the module affect.

Values: Slot: 0-2, Port: 1 – 3, Sub-interface: 0 – 4095, Qinq tag: 0 – 4095, For PPPoE and DHCP modules only 0 values are allowed representing default values.

Example 1:

```
Host(Config)# availability 1 pppoe vrrp 3
Host(Config)# end
Host# write terminal
availability 1 pppoe vrrp 3
...
```

Example 2:

```
Host(Config)# availability 1 vlan vrrp 3 0\2\7
Host(Config)# end
Host# write terminal
...
 availability 1 vlan vrrp 3 0\2\7
...
```

Using the no availability command

```
Host(config)# no availability
```

It deletes the module availability configuration.

Usage

no availability `<availability identifier>`

Parameters

`<availability id>`
Availability identifier

DEBUG COMMANDS

Use the commands at the second level prompt to switch the system to the second-level debug prompt, `Host(config-debug)#`. This indicates that the user is now in the second level debug mode and has access to the commands in the debug menu.

There are three types of messages sent by the ASN-SG/ASN-SG system to its logger. They are: Error Log, Event Log and Trace Log.

Error Log

An Error Log is a message sent by the system when an error that requires an operator's attention occurs. It can be either an internal error in the system's operation (usually this would be a high-level error) or an error caused from outside the system (like wrong data sent to the system).

Trace Log

A Trace Log is a message that outputs the contents of some buffer or some area in the memory, as a result of a certain event. It can be either when an error occurs, or when it is important to view a certain stream of bytes, like an important received packet.

Event Log

An Event Log is a message-documenting occurrence of an event in the system.

Configure watchdog

```
(config-debug)# watchdog-TimeValue
```

Usage

```
(config-debug)# watchdog-TimeValue  <number>
```

Parameter

`<number>`
It is the timeout in seconds (0 = unlimited)

Example

```
(config-debug)# watchdog-TimeValue 60  (cr)
(config-debug)#
```

Configure time server

```
(config-debug)# time-server-ip
```

Usage

```
(config-debug)# time-server-ip <IP address> [sntp | tp]
```

Parameter

`<IP address>`
It is timer host IP address, legal IP address.
`sntp`
Simple network time protocol (command default)
`tp`
Time protocol

Example

```
(config-debug)# time-server-ip 10.6.1.71 (cr)
(config-debug)#
```

Configure error level commands

```
(config-debug)# error-level
```

(config-debug)# **error-level** < default | Module | Group>

Parameters

<default>
System's Default maximum error level

<Module>
System's error log by Module

<Group>
System's error log by Module

Example

```
(config-debug)# error-level default
```

(config-debug)# **error-level default** [**set-all** <number>]

Parameters

set-all
Will set all modules back to default

<number>
value of default maximum error level , numbers are ….

Examples

```
(config-debug)# error-level default 4 output-device console
(config-debug)#
(config-debug)# error-level default 3 output-device console
(config-debug)#
```

```
(config-debug)# error-level
```

Usage

(config-debug)# **error-level** < default | Module | Group >

Parameters

<default>

System's Default maximum error level

<Module>

System's error log by Module

<Group>

System's error log by Module

Debug modules

```
(config-debug)# error-level module ?
  ABM                     - (User)
  AbmFSM                  - (User)
  IP                      - (IP)
  Radius                  - (AAA)
  NIPProxy                - (NativeIP)
  EDS                     - (Service)
  PPPService              - (PPP)
  PPPoE                   - (PPP)
  IPService               - (Service)
  NativeIP                - (NativeIP)
  L2TP                    - (L2TP)
  Telnet                  - (IP)
  CPM                     - (User)
  System                  - (System)
  SNMP                    - (Manage)
  DataPoller              - (System)
  BSP                     - (Interface)
  ARP                     - (Interface)
  DHCP                    - (NativeIP)
  Router                  - (Route)
  OSPFv2                  - (Route)
  IPMgr                   - (IP)
  IPinIP                  - (IP)
  ICMP                    - (IP)
  IGMP                    - (IP)
  POPUDP                  - (IP)
  RsmFrgm                 - (IP)
  VRRP                    - (Route)
  NetIf                   - (Interface)
  WiMAX                   - (NativeIP)
  SysLogger               - (System)
  Timer                   - (System)
```

Usage

(config-debug)# **error-level module** ABM < max | min | default >

Parameters

<max>

Maximum level

<min>

Minimum level

<default>

Set module's levels to default

Examples

```
(config-debug)# error-level module ABM default (cr)
(config-debug)#
(config-debug)# error-level module ABM max 3 (cr)
(config-debug)#
```

Usage

(config-debug)# **error-level group** AAA <max | min | default>

<max>

Maximum level

<min>

Minimum level

<default>

Set module's levels to default

Examples

```
(config-debug)# error-level group AAA max 2
(config-debug)#
(config-debug)# error-level group AAA default
(config-debug)#
```

Debug groups

```
(config-debug)# error-level group ?
AAA                      - Radius
 User                     - ABM, AbmFSM, CPM
 IP                       - IP, Telnet, IPMgr, IPinIP, ICMP, IGMP, POPUDP,
                            RsmFrgm
```

```
Route                    - Router, OSPFv2, VRRP
System                   - System, DataPoller, SysLogger, Timer
PPP                      - PPPService, PPPoE
Service                  - EDS, IPService
NativeIP                 - NIPProxy, NativeIP, DHCP, WiMAX
Interface                - BSP, ARP, NetIf
L2TP                     - L2TP
Manage                   - SNMP
```

Examples

```
(config-debug)# event-level default 2 output-device console (cr)
(config-debug)#
(config-debug)# error-level default set-all (cr)
(config-debug)#
(config-debug)# event-level default set-all (cr)
(config-debug)#
```

Trace commands

```
(config-debug)# trace
```

Usage

```
(config-debug)# trace < <default < set-all | off  |  on > | Module | Group >>
```

Parameters

`<default>`
System's Default trace setting

`<Module>`
System's trace log by Module

`<Group>`
System's trace log by Module

Usage

```
(config-debug)# trace default  < set-al | off | on>
```

Parameters

`<set-all>`
Set all modules back to default

`< off >`

without trace

< on >
with trace

Examples

```
(config-debug)# trace default on (cr)
(config-debug)#

(config-debug)# trace default off (cr)
(config-debug)#
```

Configure

```
(config-debug)# sysLog-server-ip
```

Usage

```
(config-debug)# sysLog-server-ip <IP address>
```

Parameter

<IP address >
It is the SysLogger IP address.

```
(config-debug)# exit
```

Usage

(config-debug)# exit
This command will cause exit current configuration level.

Example

```
Host(config-debug)# exit
Host(config)#
```

Usage

(config-debug)# end
This command will cause Return to first configuration level.

Example

```
Host(config-debug)# end
Host#
```

APPENDIX A

ASN-SG VENDOR-SPECIFIC ATTRIBUTES

This appendix describes the vendor-specific attributes related to ASN-SG EDS architecture.

OVERVIEW

The vendor-specific attributes are based on RFC-2865 RADIUS recommendation. The first 4 octets are the vendor id (supported vendor ID 2454, 2014). The next two octets are the vendor-type and length as recommended in the RFC.

The attributes are split into the following groups:

- User
- DHCP
- protocol
- service
- route
- vpdn
- qos
- DNS

Vendor-Specific Attributes Table

When the system sends a vendor-specific attribute to the radius, it sets the vendor type with the attribute internal number, as specified below in the vendor-specific attribute list (Color FC-Redable).

Vendor-Specific Attribute List

Num	Attribute Name	Attribute Group	Attribute Value	First introduced	Description
1	accounting	user	10	V5.0 disable V7.0 lastpacket enable-on-ip-update V8.0 enable interim-update V9.0 reset-acct-session-id	Allows defining the session accounting operation mode and methodology
2	orig-name	user	12	V5.0	Contains the original user name as received during PPP negotiation

Num	Attribute Name	Attribute Group	Attribute Value	First introduced	Description
3	auth-type	user	13	V5.0	Contains the authentication type of the Access Request message. It provides the RADIUS with additional information regarding the purpose of the authentication.
4	action	user	14	V5.0 Reject V7.0 echo macantispoof V9.0 user_space_overwrite user_space_overwrite_on_next_service	Defines the action that should be taken by the system.
5	SSC-host	user	15	V5.0	Contains the SSC (Service Selection Center) host IP address at which the user activated the service.
6	service-name	user	16	V5.0	Contains the information of the service name, which was given to the connected peer or the peer requested service name.
7	personal-site	user	17	V5.0	Contains the personal site to which the user should be redirected.
8	mac-address	user	18	V7.0	Contains the MAC address information of a connected user as learned by the DHCP relay or by the proxy RADIUS.
9	group	user	19	V7.0	Contains the user group number (1 to 1000) as defined in the RADIUS server.
10	max-allowed-sessions	user	20	V7.0	Defines the maximum number of sessions allowed in a single blade per username.
11	class	user	21	V8.0	Contains the user class information, a string of maximum size of 256 characters.
12	eds-enc-key	user	22	V8.0	The user:eds-enc-key sub-attribute contains an encryption key for EDS operation.

Num	Attribute Name	Attribute Group	Attribute Value	First introduced	Description
13	eds-cookie	user	23	V9.0	Contains a user eds cookie data information, a string of maximum size of 64haracters.
14	original-url-prefix	user	24	V9.0	Contains a string that should be prefixed by the RDS to the user original requested url when redirecting the user to its personal site.
15	max-allowed-nodes	user	25	V12.0	Defines the maximum allowed nodes per connected session
16	parent-username	user	26	V12.0	Includes the parent session username for a node session
17	node-group	user	27	V12.0	Defines the group value that should be provided to a node on its creation
18	node-default-service	user	28	V12.0	Defines the default service name that should be provided to a node on its creation
19	node-dynamic-service	user	29	V12.0	Defines the dynamic service name that should be provided to a connected node
20	node-acct-user-name	user	130	V12.0	Defines the user name that should be provided to a node on its creation
21	dhcp-server	dhcp	30	V7.0	Defines the DHCP server IP address, which the system should relay the user's DHCP requests
22	opt82-relay-remote-id	dhcp	31	V7.0	Contains the received option 82 relay remote ID sub-option, while each byte information is in hexadecimal format.
23	discover-action	dhcp	32	V7.0	Defines the action to be taken when a new dhcp discover message is transmitted in a connected session
24	type	protocol	40	V5.0	Contains a hint of the protocol negotiated with the peer.
25	service-timeout	service	50	V5.0	Defines the service session timeout measured in seconds.

Num	Attribute Name	Attribute Group	Attribute Value	First introduced	Description
26	next-service-name	service	51	V5.0	Defines the name of the next service to provide when a service "session timeout" expires.
27	auto-service-name	service	52	V5.0	Defines the service name to be automatically provided when the user is redirected by the RDS.
28	auth-source	service	53	V7.0	Defines the source name to be used when the system authorizes or authenticates a service with the RADIUS.
29	data-quota	service	54	V7.0	Defines the service session data quota measured in bytes.
30	acl-data-quota	service	55	V7.0	Defines the service session data quota per a specified access-list measured in bytes.
31	service-cache	service	56	V7.0	Contains the service caching operation mode of the received service.
32	data-quota-used	service	57	V7.0	Contains the session's used quota in bytes.
33	acl-data-quota-used	service	58	V7.0	Contains the session's access list used quota in bytes.
34	acl-packet-quota	service	59	V9.0	Defines the service session packet quota for a time period per a specified access-list measured in number of packets (total packets of both upstream and downstream user's traffic that were permitted by the filter).
35	acl-packet-quota-used	service	60	V9.0	Contains the session's used packet quota along with the time period since the quota had been reset.
36	acl-eds-detect	service	62	V11.0	Enables EDS detection on a specific ACL for connected user's session.
37	remote-filter-redirect-gw	route	70	V5.0	Defines the remote redirection gateway for packets that do not pass the defined filters.

Num	Attribute Name	Attribute Group	Attribute Value	First introduced	Description
38	next-hop	route	71	V5.0	Defines the next-hop router for the user upstream traffic.
39	nip-pipe-next-hop	route	72	V7.0	Defines the next-hop router to be used for the traffic destined to a native IP user.
40	advertise-protocol	route	73	V7.0	Defines the routing protocol to be use to advertise the session IP address.
41	forward-addr	route	74	V9.0	Defines the OSPF forwarding address.
42	acl-tcp-nat-redirect	route	75	V9.0	Defines a destination IP address to which the system should TCP redirect all session packets.
43	acl-next-hop	route	76	V12.0	Defines the next-hop router to be used for a specific user's ACL upstream traffic.
44	tunnel-id	vpdn	80	V5.0	Defines the tunnel ID, used for LAC purpose.
45	l2tp-tunnel-password	vpdn	81	V5.0	Contains a password to be used to authenticate to a remote server.
46	ip-address	vpdn	82	V5.0	Contains the address of the server end of the tunnel.
47	tunnel-assignment-id	vpdn	83	V5.0	Indicate to the tunnel initiator the particular tunnel to which a session is to be assigned.
48	tunnel-client-ip-address	vpdn	84	V5.0	Contains the address of the initiator end of the tunnel (LAC IP address).
49	nativeip	vpdn	85	V7.0	Defines a session as a native IP pipe, means the session acts as tunnel for native IP traffic.
50	ip-tunnel	vpdn	86	V7.0	Defines the tunneling protocol and the destination tunneling server IP address, which all the session data should be tunneled to.
51	up-mean-rate	qos	90	V5.0	Specifies the average number of bits per second allowed by the user in the upstream direction.

Num	Attribute Name	Attribute Group	Attribute Value	First introduced	Description
52	down-mean-rate	qos	91	V5.0	Specifies the average number of bits per second allowed by the user in the downstream direction.
53	acl-up-mean-rate	qos	92	V7.0	Specifies the average number of bits per second allowed to the user in the upstream direction per a specified access list.
54	acl-down-mean-rate	qos	93	V7.0	Specifies the average number of bits per second allowed to the user in the downstream direction per a specified access list.
55	cos	qos	94	V7.0	Defines the class of service that should be set for a specified access list.
56	acl-priority	qos	95	V8.0	Specifies the Q.o.S priority that should be set for an access list.
57	burst-size	qos	96	V11.0	Specifies the allowed burst size value in Kbytes for a connected user session.
58	ip-primary	dns	100	V5.0	Defines the primary DNS server to be used by the connected peer.
59	ip-secondary	dns	101	V5.0	Defines the secondary DNS server to be used by the connected peer.
60	reduced-resource	wimax	110	V12.0	Defines the reduced resources status.
61	acl-schedule-type	wimax	111	V12.0	Defines the Uplink Granted Scheduling Type as defined in IEEE802.16e
62	acl-minimum-reserved-traffic-rate	wimax	112	V12.0	Defines the Minimum Reserved Traffic Rate as defined in IEEE802.16e.
63	acl-maximum-traffic-burst	wimax	113	V12.0	Defines the Maximum Traffic Burst in bytes per second as defined in IEEE802.16e.
64	acl-tolerated-jitter	wimax	114	V12.0	Defines the Tolerated Jitter as defined in IEEE802.16e.
65	acl-maximum-latency	wimax	115	V12.0	Defines the maximum latency in milliseconds.
66	acl-unsolicited-grant-interval	wimax	116	V12.0	Defines the nominal interval between successive data grant opportunities for this service flow in milliseconds.

Num	Attribute Name	Attribute Group	Attribute Value	First introduced	Description
67	acl-sdu-size	wimax	117	V12.0	Defines the number of bytes in the fixed size SDU.
68	acl-unsolicited-polling-interval	wimax	118	V12.0	Defines the maximal nominal interval between successive polling grants opportunities for this Service Flow in milliseconds.
69	msk-lLifetime	wimax	119	V12.0	Defines the MSK lifetime in seconds
70	dm-action-code	wimax	120	V12.0	Specifies the action code to be used in the de-registration request sent by the system to the BS when session is terminated
71	acl-arq-enable	wimax	121	V12.0	Indicates whether ARQ is enabled or not for the corresponding service flow as defined in IEEE802.16e
72	bsid-next-hop	wimax	122	V12.0	Contains the ASN gateway IP address, which the BS is linked to
73	mobility-features-supported	wimax	123	V12.0	Indicates whether or not the MS should support mobility handover, sleep mode and idle mode

Most of the EDS attributes are operated in hierarchy mode. In this mode, each session includes per each attribute three hierarchy-operating level spaces. The first level space is the system default that is being configured, either by management or statically. The second is the user space that is initially being filled in the user authentication phase, and the third is the service space that is being re-filled on each user service change.

The user space level defines the session's “basic” configuration; whereas the service space level is “layered” above it upon a successful dynamic service change. In each level space, the system keeps a set of relevant configurations for that level. The “lifetime” of operation in a service level space is from a successful authentication of that service until a successful authentication of a new service. The “lifetime” of operation in a user level space is the entire period in which the user is authenticated for the session. The effective value of a hierarchy attribute is the most updated value in the highest level space (the highest level for which there is a value defined for the attribute).

User Group

user:accounting sub-attribute

The user:accounting sub-attribute defines the session accounting operation mode and allows the operator to define per each user the accounting methodology. The attribute may be included more than once in request or accept messages. The following operation may be configured:

• **disable** – some operations like symmetric multi-link, VPN, or unbilled services do not need the accounting information sent to the RADIUS. This accounting operation mode disables the sending of the accounting information.

The user:accounting sub-attribute is sent as a response to service authentication. It configures the accounting behavior on the received respond. The service default behavior is not to send any accounting records unless the respond includes the enable accounting option.

Accounting information is sent as followed:

Authentication Response Type	Accounting Behavior
Session Authentication Access Accept message includes the **user:accounting=disable** sub-attribute	Accounting Start and Stop are disabled
Service Authentication Access Accept message does not include the **user:accounting** sub-attribute	Accounting On and Off are disabled

Scenario Examples:

Scenario	Action	RADIUS definition	Accounting Behavior
1	A user is connecting to the network	User definition in the RADIUS includes the **user:accounting=disable** sub-attribute.	No accounting information is sent (Start and Stop).
	A service is selected by the user	Service definition in the RADIUS includes the **user:accounting=enable** sub-attribute.	Only accounting on and off for the selected service are sent.
2	A user is connecting to the network	User definition in the RADIUS does not include the **user:accounting=disable** sub-attribute.	Accounting Start and Stop are sent.
	A service is selected by the user	Service definition in the RADIUS does not include the **user:accounting** sub-attribute.	No accounting on and off are sent.
	A service is selected by the user	Service definition in the RADIUS includes the **user:accounting=enable** sub-attribute.	Accounting on and off are sent for the selected service.

• **enable** – Enables the sending of the accounting information.

• **lastpacket** – This accounting operation mode enables last packet accounting session time, which is based

on the last user's packet timestamps. The last packet accounting calculating method is operated in all session disconnections (such as, "clear user", idle timeout, echo, etc.). Note that this accounting method is relevant for accounting stop and accounting off RADIUS messages.

- **enable-on-ip-update** – This accounting operation mode enables the session accounting on session IP address updating regardless of the current accounting status.
- **interim-update** – Enables the sending of the interim update accounting information for a connected session. In this accounting type, the system sends an accounting message with Acct-Status-Type value 3 (Interim- Update) that includes the same attributes as being sent in accounting stop and off messages, except for the termination cause. The accounting information is being sent every time period that was configured in the received accounting attribute. The accounting:interim-update attribute is operated in hierarchy mode and supports both user and service levels. When received in service authentication it operates only in the service lifetime and sends the service accounting update. When received in user authentication it operates during the whole session lifetime and sends the session accounting update.
- **General**:

Operation Mode:	Access-Accept message Service-Accept message
Vendor-type:	10
Vendor-length =	2 + name length + (7 I 10)

Format:

```
fcs-avpair = "user:accounting=[disable | enable | lastpacket |enable-on-ip-update |
interim-update;<accounting update in seconds>]",
```

Example 1:

```
fcs-avpair = "user:accounting=disable",
```

Example 2:

```
fcs-avpair = "user:accounting=interim-update;600",
```

user:orig-name sub-attribute

The **user:orig-name** sub-attribute contains the original user name as received during PPP negotiation. The sub-attribute is sent in Access Request messages, only in operation modes that overwrite or that do not send the original user name. It is used in the following modes:

- domain separator
- service authentication

General:

Operation Mode:	Access-Request message Service-Request message
Vendor-type:	12
Vendor-length =	2 + name length + 1-128

Format:

```
fcs-avpair = "user:orig-name=<original user name>",
```

Example:

```
fcs-avpair = "user:orig-name=test",
```

user:auth-type sub-attribute

The user:auth-type sub-attribute contains the authentication type of the Access Request message sent by the system to the RADIUS. It provides the RADIUS with additional information regarding the purpose of the authentication. There are several irregular reasons for RADIUS authentication: pre-authentication, service selection, and web-authentication.

- **pre-authentication** – the system authenticates the peer using the CLI before proceeding with the user connection.
- **service selection** – the system authenticates the requested service in order to receive its definition from the RADIUS.
- **WEB authentication** – the system authenticates the received user-name and password (using the USER-PASS EDS field) with its configured RADIUS.

  The system sends this sub-attribute to the RADIUS and not vice versa.

General:

Operation Mode:	Access Request message Service-Request message
Vendor-type:	13
Vendor-length =	2 + name length + (23 I 32)

Format:

```
fcs-avpair = "user:auth-type=<pre-auth | service-selection | web-auth>",
```

Example:

```
fcs-avpair = "user:auth-type=pre-auth",
```

user:action sub-attribute

The user:action sub-attribute defines the action that will be taken by the system.

The actions are:

1. **Reject** – Reject an authenticated peer or disconnect a connected peer.
2. **echo** – The system sends echo messages to the connected session. It disconnects the session after 33 seconds if it is not responding for the echo messages. In case the echo did not get any response during

the session lifetime the system is not disconnecting the session and is setting the echo status to disable. The echo action is relevant only for native IP sessions and is being ignored in other session types.

3. **macantispoof** – The system is allowing only one IP address per MAC address. The MAC is the user MAC address as learned by the DHCP relay or by the proxy RADIUS. In case the call trigger is not DHCP or proxy RADIUS the system is setting the mac-anti-spoofing status to disable.
4. **user_space_overwrite** – The system will update the user space (and not the service space) with all attributes received when this sub-attribute appears. This action is relevant only for Service-Accept messages (service authentication response) and is being ignored when received in session authentication respond. The action may be included once in access accept messages, and the system ignores all other instances.
5. **user_space_overwrite_on_next_service** – The system will update once the user space (and not the service space) with all next-service attributes when it is being invoked. The system then resets this sub-attribute. When the next-service parameters includes user:action=user_space_overwrite the system will ignore it. The action may be included once in access accept messages, and the system ignores all other instances. This sub-attribute is not working in hierarchy mode.

General:

Operation Mode:	Access-Accept message Service-Accept message
Vendor-type:	14
Vendor-length =	2 + 11 + (4-12)

Format:

fcs-avpair = "user:action=`<Reject | echo | macantispoof | user_space_overwrite | user_space_overwrite_on_next_service >">",`

Example:

fcs-avpair = "user:action=`Reject",`

user: SSC-host sub-attribute

This vendor-specific sub-attribute contains the SSC (Service Selection Center) host IP address at which the user activated the service. By sending this information, the system gives the RADIUS a hint as to the SSC IP address. This is used for authorization purposes. This sub-attribute is used only in service authentication requests.

General:

Operation Mode:	Access-Request message Service-Request message
Vendor-type:	15
Vendor-length =	2 + name length + 7-15

Format:

fcs-avpair = "user:SSC-host=<SSC host IP address>,

Example:

fcs-avpair = "user:SSC-host=194.90.1.15",

user: service-name sub-attribute

This vendor-specific sub-attribute contains the service name given to the connected peer. The user:service-name sub-attribute represents the service of the currently received attributes. It is a hint given by the RADIUS. When sent by the ASN-SG in an access-request message it implies the service requested by the user.

General:

Operation Mode:	Access-Accept message Access-Request message
Vendor-type:	16
Vendor-length =	2 + name length + (1-128)

Format:

fcs-avpair = "user:service-name=<service name>,

Example:

fcs-avpair = "user:service-name=SRV1",

user:personal-site sub-attribute

The user:personal-site sub-attribute contains the personal site information of a connected user. The system keeps this vendor-specific Radius attribute for use in EDS query response. The personal-site information maximum size is 256 characters.

General:

Operation Mode:	Access-Accept message Service-Accept message
Vendor-type:	17
Vendor-length =	2 + name length + (1 - 256)

Format:

fcs-avpair = "user:personal-site=<site URL>",

Example:

fcs-avpair = "user:personal-site=www.walla.co.il",

user:mac-address sub-attribute

The user:mac-address sub-attribute contains the MAC address information of a connected user as learned by the DHCP relay or by the proxy RADIUS.

General:

Operation Mode:	Access-Request message Service-Request message Accounting-Stop Request message Accounting-Off Request message
Vendor-type:	18
Vendor-length =	2 + name length + 12

Format:

fcs-avpair = "user:mac-address=<User MAC address>",

Example:

fcs-avpair = "user:mac-address=00022d386dbe",

user:group sub-attribute

The user:group sub-attribute represents the user group number (1 to 1000), as defined in the RADIUS server. This information is sent by the system to the DHCP server via the relay remote ID Sub-option (option 82). The default user group is *1*. It may be activated dynamically, enabling the change of the user:group of a connected session on the fly. This sub-attribute when received in service-access accept message, updates both the service and the session user:group.

General:

Operation Mode:	Access-Accept message Service-Accept message
Vendor-type:	19
Vendor-length =	2 + name length + (1 - 4)

Format:

fcs-avpair = "user:group=<group number>",

Example:

fcs-avpair = "user:group=12",

user:max-allowed-sessions sub-attribute

The user:max-allowed-sessions sub-attribute defines the maximum number of sessions allowed in a single blade per username. When the system receives this attribute in the authentication process, it checks for the number of concurrent sessions containing the authenticated user-name. If the number of sessions including the current authenticated one, exceeds the number of allowed sessions the system rejects the new incoming session, causing an immediate disconnection.

General:

Operation Mode:	Access-Accept message
Vendor-type:	20
Vendor-length =	2 + 4 + attribute-name length

Format:

fcs-avpair = "user:max-allowed-sessions=<maximum number of sessions per blade>",

Example:

fcs-avpair = "user:max-allowed-sessions=1",

user:class sub-attribute

The user:class sub-attribute contains the user class information, a string of maximum size of 256 characters. It is available to be sent by the Radius server to the system in an Access-Accept or Service-Accept messages. The system sends it unmodified to the Radius server as part of the Authentication and Accounting-Requests packets. The user:class sub-attribute operates in hierarchy mode and supports both user and service levels. When received in service authentication, it operates only in the service lifetime and being reset while service is changing. When received in user authentication, it operates during the whole session lifetime.

General:

Operation Mode:	Access-Accept message Service-Request message Service-Accept message

Accounting on, off, start and stop messages, interim

Vendor-type:	21
Vendor-length =	2 + (1-256) + attribute-name length

Format:

fcs-avpair = "user:class=<user class data>",

Example:

fcs-avpair = "user:class=belong to security group",

user:eds-enc-key sub-attribute

The user:eds-enc-key sub-attribute contains an encryption key for EDS operation. The encryption key will be exactly 16 characters long, comprised solely of characters from the set (“0 - 9”, “a - f”, “A - F”). Every two characters in the key represent a hexadecimal byte. The bytes will be DES key legal, i.e. each containing an odd number of '1' bits. This key is being used in DES encryption and decryption of the EDS USERPASS field, and overwrites the configured EDS encryption key. The encryption key maximum length is 64 characters. This key is being used in the EDS encryption and decryption and overwrites the configured EDS encryption key. The user:eds-enc-key sub- attribute is operated in hierarchy mode and supports both user and service levels.

General:

Operation Mode:	Access-Accept message Service-Accept message
Vendor-type:	22
Vendor-length =	2 + (1-64) + attribute-name length

Format:

fcs-avpair = "user:eds-enc-key=`<EDS encryption key>",`

Example:

fcs-avpair = "user:eds-enc-key=`02f804fea90102f8",`

user:eds-cookie sub-attribute

The user:eds-cookie sub-attribute contains a user eds cookie data information, a string of maximum size of 64haracters. It is available to be sent by the Radius server to the system in an Access-Accept or Service-Accept messages. The system will send it unmodified to the Radius server as part of the Authentication and Accounting-Requests packets. This sub-attribute is operated in hierarchy mode and supports both user and service levels. This attribute can also be updated by the SSC (see EDS architecture document).

Operation Mode:	Access-Accept message Service-Request message
Vendor-type:	23
Vendor-length =	2 + (1-64) + attribute-name length

Format:

```
fcs-avpair = "user:eds-cookie=<user eds cookie>",
```

Example:

```
fcs-avpair = "user:eds-cookie=rt123456",
```

user:original-url-prefix sub-attribute

The user:original-url-prefix sub-attribute contains a string that will be prefixed by the RDS to the user original requested url when redirecting the user to its personal site. This sub-attribute indicates the RDS that the user original url will be concatenated on the tail of the personal site URL when redirecting the user. The original-url-prefix information maximum size is 64 characters. This sub-attribute is operated in hierarchy mode and supports both user and service levels with one exception. The hierarchy operation mode is not relevant is case a service authentication respond includes user:personal-site attribute without user:original-url-prefix. In this case the system will assume there is no original-url-prefix although the user space includes such information.

Note This feature is implemented in the RDS as well.

Example:

1. The user's session attributes are:
   a. user:personal-site=www.cnn.com
   b. user:original-url-prefix=?url=
2. The user tries to connect to www.yahoo.com.

   The user is being redirected to:www.cnn.com?url=www.yahoo.com

Operation Mode:	Access-Accept message Service-Accept message
Vendor-type:	24
Vendor-length =	up to 64 + attribute-name length

Format:

```
fcs-avpair = "user:original-url-prefix=<prefixed string>",
```

Example:

```
fcs-avpair = "user:original-url-prefix=?url=",
```

DHCP GROUP

dhcp:dhcp-server sub-attribute

The dhcp:dhcp-server attribute defines the DHCP server IP address, which the system will relay the user's DHCP requests. It may be activated dynamically, enabling the change of DHCP server IP of a connected user on the fly. This dynamic capability is allowed when the agent-id override mode is enabled. This sub-attribute when received

in service-access accept message, updates both, the service and the session user:group.

General:

Operation Mode:	Access-Accept message Service-Accept message
Vendor-type:	30
Vendor-length =	2 + name length + (7 + 15)

Format:

fcs-avpair = "dhcp:dhcp-server=`<DHCP Server IP>"`**,**

Example:

fcs-avpair = "dhcp:dhcp-server=194.90.1.5",

dhcp:opt82-relay-remote-id sub-attribute

The dhcp:opt82-relay-remote-id attribute contains the received option 82 relay remote ID sub-option, while each byte information is in hexadecimal format.

General:

Operation Mode:	Access-Accept message Service-Accept message
Vendor-type:	31
Vendor-length =	2 + name length + (1 - 255)

Format:

fcs-avpair = "dhcp:opt82-relay-remote-id=`<Option 82 relay remote ID sub-option>"`**,**

Example:

fcs-avpair = "dhcp:opt82-relay-remote-id=`01844400660300"`**,**

dhcp:discover-action sub-attribute

The dhcp:discover-action attribute defines the action to be taken when a new dhcp discover message is transmitted in a connected session. The discover actions are:

a. **Update** – The system is not disconnecting the session on a new dhcp discover message and updates it with the new configured IP address.

b. **Normal** – The system disconnects the session on a new dhcp discover message, which is the system normal behavior.

General:

Operation Mode:	Access-Accept message

	Service-Accept message
Vendor-type:	32
Vendor-length =	2 + 6 + name length

Format:

fcs-avpair = "dhcp:discover-action=<normal I update>",

Example:

fcs-avpair = "dhcp:discover-action=update",

PROTOCOL GROUP

protocol:type sub-attribute

There is a need in Access Request messages to receive a hint of the protocol negotiated with the peer. The protocol:type sub-attribute fulfills this need and enables the operator to manage the connections. The system sends this sub-attribute to the RADIUS when detecting a connection-negotiating multi-link.

Note In multi-link calls, this sub-attribute is sent per each link.

General:

Operation Mode:	Access-Request message
Vendor-type:	40
Vendor-length =	2 + name length + 3

Format:

fcs-avpair = "protocol:type=[mlp]",

Example:

fcs-avpair = "protocol:type=mlp",

SERVICE GROUP

service:service-timeout

This sub-attribute defines the service session timeout measured in seconds. When a service session timeout event occurs the system activates the next-service-name as defined in the next-service-name sub-attribute (section 2.3.2). A service:service-timeout attribute with a zero value indicates the ASN-SG that the connected session will be logged off. The attribute may be included only once in access-accept message. When appearing more than once the system will consider the last attribute appearance.

General:

Operation Mode:	Access-Accept message Service-Accept message
Vendor-type:	50
Vendor-length =	2 + name length + (1 - 10)

Format:

fcs-avpair = "service:service-timeout=`<timeout in seconds>"`**,**

Example:

fcs-avpair = "service:service-timeout=500",

service:next-service-name

This vendor specific sub-attribute defines the name of the next service to use when a service "session timeout" expires. The system then checks if the authentication base is of service type and a next service is configured for the session. In that case it activates the next service. It would do so in the same way it would activate a new service received directly from a service selection center. If no next service name is configured the system activates a static service called "GServiceTimeout". If no service timeout is configured, the system immediately activates the received next service. The attribute may be included only once in access-accept message. When appearing more than once the system will consider the last attribute appearance.

Note

1. After activating the next-service the system has no configured next service. This is true unless the activated next-service includes the next-service-name sub-attribute as well.
2. The service timeout sub-attribute is defined per link.

General:

Operation Mode:	Access-Accept message Service-Accept message
Vendor-type:	51
Vendor-length =	2 + name length + (1 - 128)

Format:

fcs-avpair = "service:next-service-name=<service name>",

Example:

fcs-avpair = "service:next-service-name=SRV12",

service:auto-service-name

The service:auto-service-name sub-attribute contains the service name to be automatically activated when the user is redirected by the RDS. The system keeps the auto-service-name information for use in EDS query response. The system deletes the auto-service-name information after sending the query response, since it will be used only once. The attribute may be included only once in access-accept message. When appearing more than once the system will consider the last attribute appearance.

General:

Operation Mode:	Access-Accept message Service-Accept message
Vendor-type:	52
Vendor-length =	2 + name length + (1-128)

Format:

fcs-avpair = "service:auto-service-name=<service name>",

Example:

fcs-avpair = "service:auto-service-name=SRV12",

service:auth-source

This sub-attribute defines the source name to be used when the ASN-SG authorizes or authenticates a service with the RADIUS. The ASN-SG performs a RADIUS access request when a service is activated. The service:auth-source attribute defines the source name to be used as the user-name in this request. The authentication source can have one of the following values: user, service, or CLI. When the value is not service, the ASN-SG includes the requested service name in the RADIUS access request message (see user:service-name attribute). The authentication source default value is service. The attribute may be included only once in access-accept message. When appearing more than once, the system will consider the last attribute appearance.

General:

Operation Mode:	Access-Accept message Service-Accept message
Vendor-type:	53
Vendor-length =	2 + name length + (3 - 7)

Format:

fcs-avpair = "service:auth-source=<service | user | CLI>",

Example:

fcs-avpair = "service:auth-source=CLI",

service:data-quota

This sub-attribute defines the service session data quota measured in bytes. The ASN-SG monitors the session to

track the data quota usage. When a service runs out of quota (session quota termination event occurs), the system activates the next-service-name if defined (see next-service-name definition). This is true in case that the service authentication base is set to be service. Otherwise the ASN-SG activates reauthorization according to the configured service:auth-base value (see service:auth-base definition). A service:data-quota attribute with a zero value indicates the ASN-SG that the connected session has no data credit left and will be logged off. The ASN-SG then disconnects the session. When a session is disconnected or when the service is exchanged, the ASN-SG includes the service:data-quota attribute in the accounting message with the remainder data credit. The attribute may be included only once in access-accept message. When appearing more than once the system will consider the last attribute appearance.

General:

Operation Mode:	Access-Accept message
	Access-Request message
	Service-Accept message
	Service-Request message
	Accounting-Request messages
Vendor-type:	54
Vendor-length =	2 + name length + (1 - 10)

Format:

fcs-avpair = "service:data-quota=`<data quota in bytes>"`**,**

Example:

fcs-avpair = "service:data-quota=5000000",

service:acl-data-quota

The service:acl-data-quota sub-attribute defines the service session data quota per a specified access-list measured in bytes. This attribute enables to define different data quota per each access-list of a session. The ASN-SG monitors the session to track the data quota usage for the defined access lists. When a service runs out of quota (access-list quota termination event occurs) the ASN-SG activates the next-service-name if defined (see next-service-name definition). This is true in case that the service authentication base is set to be service. Otherwise the ASN-SG activates reauthorization according to the configured service:auth-base value (see service:auth-base definition). The authorization requests include the service:acl-data-quota with the remainder quota. A service:accessl-list-data- quota attribute with a zero value indicates to the ASN-SG that the connected session has no access-list data credit left. The ASN-SG then redirects all the session packets that match the specific access-list, to the redirection server if one is configured. Otherwise, it discards the packets. When a session is disconnected or when the service is exchanged, the ASN-SG includes all the service:acl-data-quota attributes in the accounting messages with the remainder data credit. The attribute may be included more than once in request or accept messages.

General:

Operation Mode: Access-Accept message Access-

	Request message Service-Accept message Service-Request message Accounting-Request messages
Vendor-type:	55
Vendor-length =	2 + name length + (1 - 10)
Values:	Min = -1; Max = 2^63 - 1

Format:

fcs-avpair = "service:acl-data-quota=`<access-list number>;<data quota in bytes>",`

Example:

fcs-avpair = "service:acl-data-quota=101;5000000",

service:service-cache

The service:service-cache sub-attribute contains the service caching operation mode of the received service. The system when receiving this attribute along with the service definition clears the service cached information if exists. The system ignores this attribute when received in session authentication respond.

General:

Operation Mode:	Service-Accept message
Vendor-type:	56
Vendor-length:	24

Format:

fcs-avpair = "service:service-cache=<off>",

Example:

fcs-avpair = "service:service-cache=off",

service:data-quota-used

The service:data-quota-used contains the session's used quota in bytes. It is being sent only if a quota has been established for the session. It is being sent in authorization requests and Accounting-Stop and Accounting-Off messages.

General:

Operation Mode:	Access-Request message Accounting-Stop message Accounting-Off message
Vendor-type:	57
Vendor-length:	1 - 19 + attribute-name length

Values: Min = 0; Max = 2^63 - 1

Format:

fcs-avpair = "service:data-quota-used=`<used data quota in bytes>",`

Example:

fcs-avpair = "service:data-quota-used=`5000000",`

service:acl-data-quota-used

The service:acl-data-quota-used attribute contains the session's used quota in bytes. It is being sent only if a quota has been established for a specific session access list. It is being sent in authorization requests and Accounting- Stop and Accounting-Off messages.

General:

Operation Mode:	Access-Request message Service Request message Accounting-Stop Accounting-Off, interim request message
Vendor-type:	58
Vendor-length:	1 - 19 + attribute-name length
Values:	Min = 0; Max = 2^63 - 1

Format:

fcs-avpair = "service:acl-data-quota-used=[access-list name;]<used data quota in bytes>",

Example:

fcs-avpair = "service:acl-data-quota-used=video;5000000",

service:acl-packet-quota

The service:acl-list-packet-quota sub-attribute defines the service session packet quota for a time period per a specified access-list measured in number of packets (total packets of both upstream and downstream user's traffic that were permitted by the filter).This attribute enables to define different packet quota per each access-list of a session.

1. The system monitors the session to track the packet quota usage in a certain time period for the defined access lists.
2. When a service runs out of packet quota within the configured period (access-list quota termination event occurs) the system activates the next-service-name if defined (see next-service-name definition). This is true in case that the service authentication base is set to be service. Otherwise the system activates reau-

thorization according to the configured service:auth-source value (see service:auth-source definition).

3. When a service runs out of packet quota after the configured period the system resets the quota for it's initial value.

All authorization requests include the service:acl-packet-quota with the remainder quota in the current interval.

4. A service:accessl-list-packet-quota attribute with a zero value indicates to the ASN-SG that the connected session has no access-list packet credit left.

5. The ASN-SG then redirects all the session packets that match the specific access-list, to the redirection server if one is configured. Otherwise, it discards the packets.

6. The attribute may be included more than once in request or accept messages. The system does not consider packets that were denied.

General:

Operation Mode:	Access-Request message Service-Request message
Vendor-type:	59
Vendor-length:	1 - 19 + attribute-name length
Values quota:	Min = -1; Max = 2^23 - 1
Time:	Min = 0; Max = 2^32 - 1

Format:

Gconnect-avpair = "service:acl-packet-quota=*<access-list name>;<packet quota>;<quota period in seconds>*",

Example:

Gconnect-avpair = "service:acl-packet-quota=mail;100;300",

service:acl-packet-quota-used

This sub-attribute contains the session's used packet quota along with the time period since the quota had been reset.

1. The service:acl-packet-quota-used attribute is being sent only if quota have been established for the session.
2. The attribute is being sent in ASN-SG authorization requests, Accounting-Stop, Accounting-Off and interim messages.
3. It will include the access-list name for access-list-packet-quota attributes.

4. The sent time period is the time since the last packet arriving on that ACL.

General:

Operation Mode:	Access-Request message Service-Request message Accounting-Stop, off and interim request messages
Vendor-type:	60
Vendor-length:	1 - 19 + attribute-name length
Values quota:	Min = 0; Max = 2^31 - 1
Time:	Min = 0; Max = 2^32 - 1

Format:

fcs-avpair = "service:acl-packet-quota-used=*access-list name;<used packet quota>;<time period since last ACL packet>*",

Example:

fcs-avpair = "service:acl-packet-quota-used=mail;100;245",

service:roaming

This sub-attribute defines the roaming state that will be set to a connected session. It overwrites the system-roaming configuration. The attribute is operated in hierarchy mode and supports both user and service levels.

General:

Operation Mode:	Access-Request message Service-Accept message
Vendor-type:	61
Vendor-length:	1 - 197+ attribute-name length

Format:

fcs-avpair = "service:roaming=*<disable>*",

Example:

fcs-avpair = "service:roaming=*disable*",

ROUTE GROUP

route:remote-filter-redirect-gw

This vendor specific sub-attribute defines the remote redirection gateway for redirecting the packets that did not pass the defined filters. It also works dynamically and allows changing the user-redirected gateway on the fly.

Upon receipt of this sub-attribute the system tunnels the user data to the remote Redirection Gateway using the IP in IP tunnel protocol. When a redundant RDS is configured the system uses it, if the first prioritized RDS is not responding.

General:

Operation Mode:	Access-Accept message Service-Accept message
Vendor-type:	70
Vendor-length =	2 + name length + (7-15)

Format:

fcs-avpair = "route:remote-filter-redirect-gw=`<gateway IP address>[,<redundant gateway IP address]>",`

Example:

fcs-avpair = "route:remote-filter-redirect-gw=192.168.1.23,192.168.1.24",

route:next-hop

This sub-attribute defines the next-hop router to be used for the user connection upstream traffic. It may be activated dynamically, enabling the change of the next-hop router of a connected user on the fly.

General:

Operation Mode:	Access-Accept message Service-Accept message
Vendor-type:	71
Vendor-length =	2 + name length + (7-15)

Format:

fcs-avpair = "route:next-hop=<Next-hopIP address>",

Example:

fcs-avpair = "route:next-hop=192.168.1.23",

route:nip-pipe-next-hop

The route:nip-pipe-next-hop attribute defines the next-hop router to be used for the traffic destined to a native IP user. The system when receiving this attribute directs the traffic through the native IP PIP to the defined next-hop. The attribute may be sent in Access-Accept message and operated during the session lifetime and it overwrites the current native IP pipe next-hop of the user session. It may be included once in access accept messages, and the system ignores all other instances. Note that the next hop must be directly connected otherwise the packets will be discarded.

Note The attribute is relevant only for native IP traffic over Ethernet.

General:

Operation Mode:	Access-Accept message Service-Accept message
Vendor-type:	72
Vendor-length =	2 + attribute length + (1-15)

Format:

fcs-avpair = "route:nip-pipe-next-hop=<Next-hop IP address>",

Example:

fcs-avpair = "route:nip-pipe-next-hop=192.168.1.23",

route:advertise-protocol attribute

The route:advertise-protocol sub-attribute defines the routing protocol to be use to advertise the session IP address. The system when receiving this attribute advertises the session IP address via the received protocol regardless to the system default routing definition.

General:

Operation Mode:	Access-Accept message Service-Accept message
Vendor-type:	73
Vendor-length =	4-5 + attribute length

Format:

fcs-avpair = "route:advertise-protocol=<ripv2 I ospf>",

Example:

fcs-avpair = "route:advertise-protocol=ospf

route:forward-addr attribute

The route:forward-addr sub-attribute defines the forwarding address. This address is indicating that packets for the external destination (user IP address) will be forwarded to the specified forwarding address by the downstream router (not to the system). This attribute may be received dynamically during the session lifetime – It supports hierarchy operation mode. It may be included once in access accept messages, and the system ignores all other instances. This attribute is valid only when route:advertise-protocol attribute is defined, otherwise the system will ignore it. The forward-addr default value is 0.0.0.0. This attribute is supported only for OSPF advertising protocol.

General:

Operation Mode:	Access-Accept message Service-Accept message
Vendor-type:	74
Vendor-length =	2 + 7-15 + attribute length

Format:

fcs-avpair = "route:forward-addr=*<IP address>*",

Example:

fcs-avpair = "route:forward-addr=*192.168.1.4"*

route:acl-tcp-nat-redirect attribute

The route:acl-tcp-nat-redirect attribute defines a destination IP address to which the system will TCP redirect all session packets. In this case the system will perform NAT redirection for all TCP packets that meet the access-list definition (replacing the destination IP for upstream traffic and replacing it back for the downstream traffic). The network address translation is performed on the last destination of an upstream packet belonging to this access list flow. This sub-attribute is operated in hierarchy mode and supports both user and service levels.

General:

Operation Mode:	Access-Accept message Service-Accept message
Vendor-type:	75
Vendor-length =	2 + 7-15 + attribute length

Format:

fcs-avpair = "route:acl-tcp-nat-redirect=*<access list name>;<IP address>*",

Example:

fcs-avpair = "route:acl-tcp-nat-redirect=*SMTP;192.168.1.4"*

VPDN GROUP

vpdn:tunnel-id attribute

This attribute defines the tunnel ID, used for LAC purpose. This attribute is mandatory for opening a tunnel session.

General:

Operation Mode: Access- Accept message

Vendor-type: 80

Vendor-length = 2 + name length + (1 - 64)

Format:

fcs-avpair = "vpdn:tunnel-id=<username>",

Example:

fcs-avpair = "vpdn:tunnel-id=test",

vpdn:l2tp-tunnel-password attribute

This attribute contains a password to be used to authenticate to a remote server. This attribute is mandatory for opening a tunnel session.

General:

Operation Mode: Access- Accept message

Vendor-type: 81

Vendor-length = 2 + name length + (1-64)

Format:

fcs-avpair = "vpdn:l2tp-tunnel-password=<password>",

Example:

fcs-avpair = "vpdn:l2tp-tunnel-password=test",

vpdn:ip-address attribute

This attribute indicates the address of the server end of the tunnel. This attribute is mandatory for opening a tunnel session. Attribute type is string.

General:

Operation Mode: Access- Accept message

Vendor-type: 82

Vendor-length = 2 + name length + (7-15)

Format:

fcs-avpair = "vpdn:ip-address=<x.x.x.x>",

Example:

fcs-avpair = "vpdn:ip-address=192.168.4.3",

vpdn:tunnel-assignment-id attribute

This attribute is used to indicate to the tunnel initiator the particular tunnel to which a session is to be assigned. The system when receiving this attribute checks if the assigned tunnel exists, if not the tunnel is created. Termination of the last session in the tunnel causes the closing of the tunnel. This attribute is optional, while not used a new tunnel will be open per each session. The values used for tunnel-assignment-id are 1 to 10,000. When receiving a tunnel- assignment-id grater that 10,000 the system ignores it and sends a warning message to the log.

General:

Operation Mode: Access-Accept message

Vendor-type: 83

Vendor-length = 2 + (7-15)+attribute-name length

Format:

```
fcs-avpair = "vpdn:tunnel-assignment-id=<id>",
```

Example:

```
fcs-avpair = "vpdn:tunnel-assignment-id=2",
```

vpdn:tunnel-client-ip-address

This attribute contains the address of the initiator end of the tunnel (LAC IP address). It enables the operator to distinguish between users that accessed the network from different access servers.

General:

Operation Mode: Access-Request message

Vendor-type: 84

Vendor-length = 2 + name length + (7-15)

Format:

```
fcs-avpair = "vpdn:tunnel-client-ip-address-=<tunnel client ip address>",
```

Example:

```
fcs-avpair = "vpdn:tunnel-server-client-ip-address=192.168.3.5",
```

vpdn:nativeip sub-attribute

This attribute defines a session as a native IP pipe, meaning the session acts as a tunnel for native IP traffic. It is currently used for PPP sessions only. It may be activated dynamically, enabling the change of a connected PPP session Native IP status on the fly.

General:

Operation Mode: Access-Accept message
Service-Accept message

Vendor-type: 85

Vendor-length = 2 + name length + 3

Format:

```
fcs-avpair = "vpdn:nativeip=<ppp>",
```

Example:

```
fcs-avpair = "vpdn:nativeip=ppp",
```

vpdn:ip-tunnel sub attribute

The vpdn:ip-tunnel sub attribute defines the tunneling protocol and the destination tunneling server IP address, which all the session data will be tunneled to. It may be activated dynamically, enabling to change the session tunneling protocol and destination on the fly. The attribute may be included once in access accept messages, and the system ignores all other instances.

General:

Operation Mode: Access-Accept message

Service-Accept message

Vendor-type: 86

Vendor-length = 2 + 7-15 + attribute-name length

Format:

```
fcs-avpair = "vpdn:ip-tunnel=<gre;IP address[,redundant IP address]|ip-in-ip;IP
address [,redundant IP address]>",
```

Example 1:

```
fcs-avpair = "vpdn:ip-tunnel=gre;192.168.1.34",
```

Example 2:

```
fcs-avpair = "vpdn:ip-tunnel=gre;192.168.1.34,192.168.4.1",
```

QOS GROUP

qos:up-mean-rate

The qos:up-mean-rate sub-attribute specifies the average number of bits per second allowed by the user in the upstream direction. It is sent in an Access-Accept message and it overwrites the current upstream rate allocated to the user. This attribute may be activated during a session lifetime.

General:

Operation Mode: Access-Accept message Service-Accept message

Vendor-type: 90

Vendor-length = 2 + name length + (1-128)

Format:

```
fcs-avpair = "qos:up-mean-rate=<up mean rate in Kbits>",
```

Example:

```
fcs-avpair = "qos:up-mean-rate=128",
```

qos:down-mean-rate

The qos:down-mean-rate sub-attribute specifies the average number of bits per second allowed by the user in the downstream direction. It is sent in an Access-Accept message and it overwrites the current downstream rate allocated to the user. This attribute may be activated during a session lifetime.

General:

Operation Mode: Access-Accept message Service-Accept message

Vendor-type: 91

Vendor-length = 2 + name length + (1-64)

Format:

```
fcs-avpair = "qos:down-mean-rate=<down mean rate in Kbits>",
```

Example:

```
fcs-avpair = "qos:down-mean-rate=256",
```

qos:acl-up-mean-rate sub attribute

The qos:acl-up-mean-rate sub-attribute specifies the average number of bits per second allowed to the user in the upstream direction per a specified access list. It is sent in Access-Accept message and it overwrites the current access list upstream rate of the user. This attribute may be operated during the session lifetime (EDS).

General:

Operation Mode: Access-Accept message Service-Accept message

Vendor-type: 92

Vendor-length: 1-128 + attribute-name length

Format:

```
fcs-avpair = "qos:acl-up-mean-rate=<access list name>;<up mean rate in Kbits>",
```

Example:

```
fcs-avpair = "qos:acl-up-mean-rate=acl1;128",
```

qos:acl-down-mean-rate sub attribute

The qos:acl-down-mean-rate sub-attribute specifies the average number of bits per second allowed to the user in the downstream direction per a specified access list. It is sent in Access-Accept message and overwrites the current access list downstream rate of the user. This attribute may be operated during the session lifetime (EDS).

General:

Operation Mode:	Access-Accept message Service-Accept message
Vendor-type:	93
Vendor-length:	1-128 + attribute-name length

Format:

```
fcs-avpair = "qos:acl-down-mean-rate=<access list name>;<down mean rate in Kbits>",
```

Example:

```
fcs-avpair = "qos:acl-down-mean-rate=acl1;256",
```

qos:cos

The qos:cos sub-attribute defines the class of service that will be set for a specified access list. The system sets the defined COS value for all the session's packets that matched the access list. This attribute may be included more than once in request or accept messages. The attribute is being ignored and not being saved by the system, whenever a specified access list does not exist in the session's definitions.

General:

Operation Mode:	Access-Accept message
Vendor-type:	94
Vendor-length:	1-16 + attribute-name length

Format:

```
fcs-avpair = "qos:cos=<access-list name>;<COS value>",
```

Parameter	Description	Values
<access list name>	Access list name	Up to 16 alphanumeric characters.

<COS>	Class of service	
Mandatory	Number - 0 to 63	

Example:

The system sets DIFFSERV field to 12 of all the packets that passed access-list video.

```
Filter-Id = "video out permit 192.168.1.0 255.255.255.0 12", fcs-avpair =
"qos:cos=video;12"
```

qos:acl-priority sub attribute

The qos:acl-priority sub-attribute specifies the Q.o.S priority that will be set for an access list within a session. A default access list priority is 0. The system precedes the high priority packets on the low priority ones. The priority is being activated only if the qos:down-mean-rate or/and qos:up-mean-rate are defined for the connected session, otherwise it is being ignore.

> **Note:** If the higher priority traffic is exceeding the session bandwidth limitation, then starvation of lower priority traffic may occur. To prevent lower priority traffic starvation, the higher priority access list bandwidth limitation will be smaller that the session one.

General:

Operation Mode:	Access-Accept message Service-Accept message
Vendor-type:	95
Vendor-length:	1-128 + attribute-name length

Format:

fcs-avpair = "qos:acl-priority=<access list name>;<priority number>,

Parameter	Description	Values
<access list name>	Access list name	Up to 16 alphanumeric characters.
<Priority value>	Access list priority, while 0 is the lowest priority and 10 is the highest	
Mandatory	Number - 0 to 10	

Example:

```
fcs-avpair = "qos:acl-priority=acl1;1",
```

qos:burst-size sub attribute

The qos:burst-size sub-attribute specifies the allowed burst size value in Kbytes for a connected user session. It is sent in Access-Accept message and overwrites the current burst-size value. This attribute may be operated during the session lifetime. This sub-attribute is not working in hierarchy mode.

General:

Operation Mode:	Access-Accept message Service-Accept message
Vendor-type:	96
Vendor-length:	1-32 + attribute-name length

DNS GROUP

dns:ip-primary

The dns:ip-primary attribute defines the primary DNS server to be used by the connected peer.

General:

Operation Mode:	Access-Accept message
Vendor-type:	100
Vendor-length =	2 + name length + (7-15)

Format:

fcs-avpair = "dns:ip-primary=<Primary DNS IP>",

Example:

fcs-avpair = "dns:ip-primary=194.90.1.5",

dns:ip-secondary

The dns:ip-secondary attribute defines the secondary DNS server to be used by the connected peer.

General:

Operation Mode:	Access-Accept message
Vendor-type:	101
Vendor-length =	2 + name length + (7-15)

Format:

fcs-avpair = "dns:ip-primary=<Primary DNS IP>",

Example:

fcs-avpair = "dns:ip-primary=194.90.1.5",

Appendix B

REDIRECTION SERVER

The Redirection Server (RDS) is an FCS's product that redirects all peers' Http requests to their personal-sites as pre-defined in the Radius server. The RDS uses FCS's EDS (Enhanced Dynamic Services) policy to redirect the connected peers and it actually acts as a sophisticated SSC.

The RDS is usually located at the ISP/Carrier network but it is not mandatory. When the RDS is located outside the access subnet the ASN-SG uses an IP in IP tunnel to transfer the redirected data.

Using the system event logging information includes the Http URL requests.

Usage

```
<Date>|<Source IP>|<Requested URL>|<URL type>
```

Parameter(s)

`<Date>`
The date will be in the following format: DD/MM/YYYY HH:MM

`<Source IP>`
The source IP address of the requestor

`<Requested URL>`
The redirected URL string

`<URL type>`
May be PS or DEFAULT

Example:

01/03/2001 21:54|192.168.5.8|http://www.yahoo.com|PS

Using password command

The password command modifies the login password:

- It is located at the “configure terminal” menu.
- Technician user may change all passwords. The operator user may change its own password only.
- The password is encrypted using DES algorithm. Write terminal command displays the encrypted values.

Usage

`password <user type> <password>`

Parameter(s)

`<user type>`

It is the user type to change the password by operator or technician.

`<password>`

It is the new password, 6 to 64 alphanumeric characters.

Example:

```
RDSHost> configure terminal <cr>
RDSHost(config)# password operator test11
```

Using default-redirection-site command

- The default-redirection-site command defines the site to which the user will be directed when the personal-site information is not available.
- Initial value for this field is “http://<RDS IP address>/RDS.html”. When RDS IP address is not configured the initial value is “http://RDS.html”.
- The command located at the “configure terminal” menu.

Usage

`default-redirection-site <URL name>`

Parameter:

`<URL name>`

Full URL name to use as default redirection site, it is 1 to 255 alphanumeric characters.

Example:

```
RDSHost> configure terminal <cr>
RDSHost(config)# default-redirection-site
http://www.yahoo.com
```

ORUP COMMANDS

Using ORUP (Original Requested URL Prefix)

Usage

```
<user personal site><ORUP field><original URL request>
```

Parameter:

```
<ORUP field>
```

This is the ORUP field value.

Example

- The ORUP field value is: **?url=**
- The user tries to connect to www.yahoo.com
- The user personal site is: www.cnn.com

The user is being redirected to: www.cnn.com?url=www.yahoo.com

Using orup-active command

- The orup-active command activates the ORUP (Original Requested URL Prefix) functionality.
- The command located at the “configure terminal” menu.

Usage

orup-active

Example:

```
RDSHost> configure terminal <cr>
RDSHost(config)# orup-activate
```

Using no orup-active command

- The no orup-active command de-activates the ORUP (Original Requested URL Prefix) functionality.
- The command located at the “configure terminal” menu.

Usage

no orup-active

Example:

```
RDSHost> configure terminal <cr>
RDSHost(config)# no orup-activate
```

SERVICE NAME COMMANDS

Using service-name command

- The service-name command defines the service to be operated for all sessions.
- The command located at the “configure terminal” menu.

Usage

```
service-name <service name>
```

Example:

```
RDSHost> configure terminal <cr>
RDSHost(config)# service-name srv17
```

Using no service-name command

- The no service-name command disables the operating of a service for all the sessions.
- The command located at the “configure terminal” menu.

Usage

no service-name

Example:

```
RDSHost> configure terminal <cr>
RDSHost(config)# no service-name
```

Using event-level command

- This command defines the event level to log and the media to use for logging.
- The command is located at the “configure terminal” menu.

Usage

event-level <NUM> **output-device** <Logging media>

Parameter(s)

`<NUM>`
It is the event level number. It is a number between 0-1000 Initial value 0.

`<Logging media>`
The media to use for logging, console: sys-Logger none, Initial value **none**

Example:

```
RDSHost> configure terminal <cr>
RDSHost(config)# Event-level 1 output-device log-file
```

TFTP COMMANDS

Using copy-TFTP command

- The copy-TFTP command enables the upgrading of new RDS software.
- The new upgraded software is affecting after reloading the system.

- It is located at the “main” menu.
- It upgrades only standard RDS pack files.
- Download process reports the following errors:
  1. Download timeout
  2. File not found
  3. Download hardware problem
  4. Download pack file is corrupted

Usage

copy-TFTP flash <IP address> <File name>

Parameter(s):

<IP address>
This is the IP address of the TFTP server.

<File name>
This is the file name to download. Valid name: 1 to 255 alphanumeric characters.

Example 1: Successful software download

```
RDSHost> copy-TFTP flash 192.168.1.4 RDS.pack <cr>
Download in progress ...

Pack loaded successfully
In order to use new software, please reload the system

RDSHost>
```

Example 2: Unsuccessful software download

```
RDSHost> copy-TFTP flash 192.168.1.4 test.doc <cr>
Download in progress ...

Pack loaded unsuccessfully due to: Download pack file is corrupted
RDSHost>
```

Using copy-TFTP flash def-redirection-page command

- The copy-TFTP flash def-red-page command enables the updating of the default redirection page (RDS.HTML).
- It is located at the “FCS_Mode” menu.
- Download process reports the following errors:
  a. Download timeout
  b. File not found

c. Download hardware problem

Usage

copy-TFTP flash def-redirection-page <IP address> <File name>

Parameter(s)

<IP address>
This is the IP address of the TFTP server.

<File name>
This is the file name to download. Valid name: 1 to 255 alphanumeric characters.

Example 1: Successful software download

```
RDSHost> copy-TFTP flash def-redirection-page 192.168.1.4 RDS.pack <cr>
Download in progress ...

File loaded successfully
RDSHost>
```

Example 2: Unsuccessful software download

```
RDSHost> copy-TFTP flash def-redirection-page 192.168.1.4 test.doc <cr>
Download in progress ...

File loaded unsuccessfully due to: Download pack file is corrupted
RDSHost>
```

Using sysLog-server-ip command

- The sysLog-server-ip command defines the IP address of the sysLog server.
- It is located at the “configure terminal” menu.
- SysLog server IP initial value is 0.0.0.0.

Usage

sysLog-server-ip <sysLog server IP>

Parameter

<sysLog server IP>
This is the IP address of the sysLog server.

Example:

```
RDSHost> sysLog-server-ip 192.168.1.8 <cr>
RDSHost>
```

SHOW COMMANDS

Using show version command

- The show version command displays the software and hardware versions.
- It is located at the “main” menu.

Usage

show version <software | hardware | pack>

Parameter(s)

<software>
It shows the current system software version.

<hardware>
It shows the current system hardware version.

<pack>
It shows the current system software pack.

Example 1:

```
RDSHost> show version hardware <cr>
Module Num Part No. Serial No. Version
------ --- -------- ---------- ----------------

RDS     1  780-002  1234567    V1.0_RDS_1000_128
RDSHost>
```

Example 2:

```
RDSHost> show version software <cr>
Module       Num   Version
-------     -----  --------------------------------

EDS           1    V1.0_RDS October 29 2001 19:49:43
Kernel        2    V2.4   October 29 2001 15:00:10
```

Example 3:

```
RDSHost> show version pack <cr>
Pack Image Name: V1.0_RDS_pack
Version: V1.0_RDS October 29 2001 19:53:37
Size: 1537790 byte
Pack Components:
Kernel Version: V2.4  October 29 2001 15:00:10
EDS.php Version: V1.0 October 29 2001 19:49:43
RDSHost>
```

Using show configuration command

- The show configuration command displays RDS configuration.

- It is located at the “main” menu.

Usage

show configuration

Example:

```
RDSHost>
RDSHost> show config <cr>
# version: V1.0_RDS Apr 25 2002 15:44:56
# Last saved: 25 May 2002 10:10:30

event-level 1 output-device sys-logger
default-redirection-site http://192.168.1.5/RDS.html
interface Ethernet 1 192.168.1.4 255.255.255.03
ip default-gateway 192.168.1.1

RDSHost>
```

Using show system command

- The show system command displays the system information of the RDS.
- It is located at the “main” menu.
- The command presents the following information:

1. System time
2. Http hits statistics
3. RDS current CPU usage

Usage

show system

Example:

```
RDSHost>
RDSHost> show system
Up-time: 0 Hours, 38 Minutes, 23 Seconds
CPU usage: 50 %
Average Http hits per minute:8681
Accumulated Http hits on port 80:19993456
Accumulated Http hits on EDS port:39986912
RDSHost>
```

ETHERNET COMMANDS

Using interface Ethernet command

- The Ethernet command is used for configuring the RDS IP address.
- It is located at the “configure terminal” menu.
- The change is affecting immediately.

Usage

interface Ethernet 1 <RDS IP address> <RDS mask> [**mode** <Ethernet mode>]

Parameter(s)

`<RDS IP address>`
This is the IP address of the Ethernet interface of the Redirection Server.

`<RDS mask>`
This is the mask of the Ethernet interface of the Redirection Server.

`<Ethernet mode>`
This is the Ethernet mode and it is one of the following: Auto, 10H, 10F, 100H, 100F, 1000H(negotiate), 1000F (negotiate). The default mode is Auto.

Example:

```
RDSHost>
RDSHost> config termin <cr>
RDSHost(config)> interface Ethernet 1 192.168.2.5 255.255.255.0 <cr>
RDSHost(config)>
```

Using no interface Ethernet command

- The command is located at the “configure terminal” menu.
- It deletes the configured interface.
- The change is affecting immediately.

Usage

no interface Ethernet <Interface number>

Parameter

`<Interface number>`
It is the interface number 1.

Example:

```
Host(config)# no interface Ethernet 1 <cr>
Host(config)#
```

The system will warn when configuring the Ethernet interface with subnet, which contradicts the default gateway.

Example 1:

```
Host(config)# interface Ethernet 1 192.168.2.5
255.255.255.0 <cr>

        Operation Warning:
        The default gateway is out of subnet
```

```
Host(config)# end
Host# write terminal
Interface Ethernet 1 192.168.2.5 255.255.255.0
...
```

DEFAULT GATEWAY COMMANDS

Using ip default-gateway command

- The command is located at the “configure terminal” menu.
- It configures the system default gateway.
- The change is affecting immediately.

Usage

ip default-gateway <gateway IP address>

Parameter

<gateway IP address>
It is the IP address of the Default gateway.

Using no ip default-gateway command

- The command is located at the “configure terminal” menu.
- It deletes the system default gateway.
- The change is affecting immediately.

Usage

no ip default-gateway

Example:

```
Host(config)# no ip default-gateway <cr>
Host(config)#
```

When assigning a default-gateway that is not in the subnet of the Ethernet interface, the system will ignore the command and indicates the reason.

Format

Operation Error:

Default-gateway is out of subnet.

Example 1:

```
Host(config)# ip default-gateway 194.90.2.1 <cr>
        Operation Error:#
        The default gateway is out of subnet
```

Using Reload Command

- The reload command restarts the RDS.
- The command is located at the “main” menu.

Usage

reload <non-graceful>

Parameter

<non-graceful>
It is for reset the Machine (RDS).

Example:

```
RDSHost>
RDSHost> reload non-graceful
```

Write Commands

Using write terminal command

- The write terminal command displays the running RDS configuration.
- It is located at the “main” menu.

Usage

write terminal

Example 1:

```
RDSHost>
RDSHost> write terminal <cr>
# version: V1.0_RDS Apr 25 2002 15:44:56
password operator r^dfit
password technician ^-e3t
event-level 1 output-device sys-logger
default-redirection-site http://www.yahoo.com
interface Ethernet 1 192.168.1.4 255.255.255.0
ip default-gateway 192.168.1.1
sysLog-server-ip 192.168.1.3
RDSHost>
```

Example 2: Write terminal command performed before configuring the RDS

```
RDSHost> write terminal <cr>
# version: V1.0_RDS Apr 25 2002 15:44:56
# version: V1.0_RDS Apr 25 2002 15:44:56
password operator r^dfit
```

```
password technician ^-e3t
event-level 0 output-device none
default-redirection-site http://RDS.html
sysLog-server-ip 0.0.0.0
RDSHost>
```

Using write memory command

- The write memory command writes the running RDS configuration to the NV memory.
- It is located at the “main” menu.

Usage

write memory

Example:

```
RDSHost>
RDSHost> write memory <cr>
RDSHost>
```

Using Poweroff Command

- The poweroff command brings the system down in a secure way.
- It is located at the “main” menu.

Usage

poweroff

Example:

```
RDSHost>
RDSHost> poweroff
RDSHost> system is shutting
down...
```

SNMP Commands

Usage access-list SNMP-permit command

- The access-list SNMP-permit command enables SNMP access command.
- It is located at the “configure terminal” menu.

Usage

access-list SNMP-permit <IP address> <source mask>

Parameter(s)

`<IP address>`
It is the Permitted source IP address.

`<source mask>`
It is the Permitted source mask.

Example:

```
RDSHost(config)> access-list SNMP-permit 192.168.1.0 255.255.255.0 <cr>
RDSHost(config)> end
RDSHost> write terminal <cr>
...
access-list SNMP-permit 192.168.1.0 255.255.255.0
...
```

Using no access-list SNMP-permit command

- The no access-list SNMP-permit command deletes SNMP access definitions.
- It is located at the “configure terminal” menu.

Usage

`no access-list SNMP-permit` `<IP address>`

Parameter

`<IP address>`
It is the permitted source IP address/Network.

Example:

```
RDSHost(config)> no access-list SNMP-permit 192.168.1.0 255.255.255.0 <cr>
RDSHost(config)> end
RDSHost>
```

Using SNMP-server community command

- The SNMP-server community command defines get and set SNMP community.
- It is located at the “configure terminal” menu.
- The default community is “public”.

Usage

SNMP-server community <get | set> <community string>

Parameter

<community string>

It is an Alpha community numeric string.

Example:

```
RDSHost(config)> SNMP-server community set test <cr>
RDSHost(config)> end
RDSHost> write terminal <cr>
...
SNMP-server community set test
...
```

Using Reset Configuration Command

- The reset configuration command deletes the RDS stored configuration.
- It is located at the “G-Connect” menu.

Usage

reset configuration

HTTP Commands

Using http-proxy-server port command

- The http-proxy-server port command defines the supported Http-proxy server posts in the system.
- The command is located in the “configure terminal” menu.
- The total available http-proxy-server ports are 3.

Usage

http-proxy-server port <port number>

Parameter

<port number>

It is the supported HTTP proxy port number. Legal port number (1 – 65,000).

Example:

```
RDSHost(config)> http-proxy-server port 8080 <cr>
RDSHost(config)> http-proxy-server port 8090 <cr>
RDSHost(config)> end
RDSHost> write terminal <cr>
...
http-proxy-server port 8080
```

```
http-proxy-server port 8090
...
```

Using no http-proxy-server port command

- The no http-proxy-server port command deletes configured Http-proxy server posts in the system.
- The command is located in the “configure terminal” menu.

Usage

```
no http-proxy-server port <port number>
```

Parameter

```
<port number>
```

It is the supported HTTP proxy port number. Legal port number (1 – 65,000).

Example:

```
RDSHost(config)> no http-proxy-server port 8080 <cr>
RDSHost(config)> no http-proxy-server port 8090 <cr>
RDSHost(config)> end
RDSHost> write terminal <cr>
...
```

NAME SERVER

Using ip primary-name-server command

- The ip primary-name-server command defines the primary DNS server IP address the RDS will use for the Http proxy functionality.
- The command is located in the “configure terminal” menu.

Usage

```
ip primary-name-server <IP address>
```

Parameter

```
<IP address>
```

It is the DNS IP address.

Example:

```
RDSHost(config)> ip dns server 192.168.1.4 <cr>
RDSHost> write terminal <cr>
...
ip dns server 192.168.1.4
...
```

Using no ip primary-name-server command

- The no ip primary-name-server command deletes the DNS server IP address definition (set the OBI to 0.0.0.0).
- The command is located in the “configure terminal” menu.

Usage

no ip primary-name-server

Example:

```
RDSHost(config)> no ip primary-name-server <cr>
RDSHost> write terminal <cr>
...
```

Using ip remote-proxy command

- The ip remote-proxy command defines the Http proxy and port to be used in the Http proxy functionality.
- The command is located in the “configure terminal” menu.

Usage

ip remote-proxy <IP address> <port number>

Parameter

<IP address>
It is the DNS IP address.

<port number>
It is the DNS port number.

Example:

```
RDSHost(config)> ip remote-proxy 192.168.1.4 8080 <cr>
RDSHost> write terminal <cr>
...
ip remote-proxy 192.168.1.4 8080
...
```

Using no ip remote-proxy command

- The no ip remote-proxy command deletes the Http proxy definition.
- The command is located in the “configure terminal” menu.

Usage

no ip remote-proxy

Example:

```
RDSHost(config)> no ip remote-proxy <cr>
RDSHost> write terminal <cr>
...
```

USING HOSTNAME COMMAND

- The hostname command defines the system hostname name.
- The command is located in the “configure terminal” menu.
- The default hostname is “RDSHost”.

Usage

hostname <host name>

Parameter

<host name>

Example:

```
RDSHost(config)> hostname rds_test <cr>
RDSHost> write terminal <cr>
...
hostname rds_test
...
```

USING EDS-URL-IDENTITY COMMAND

- The eds-url-identity command defines the eds name to be used in the EDS URL.
- The command is located in the “configure terminal” menu.
- The default eds identity is the system primary IP address.

Usage

eds-url-identity <eds url name>

Example:

```
RDSHost(config)> eds-url-identity redirect_test
RDSHost> write terminal <cr>
...
eds-url-identity redirect_test
```

USING NO EDS-URL-IDENTITY COMMAND

- The no eds-url-identity command deletes the eds name configuration to be used in the EDS URL. The system uses its default value (system primary IP address).
- The command is located in the “configure terminal” menu.

Usage

no eds-url-identity

Example:

```
RDSHost(config)> no eds-url-identity redirect_test
RDSHost> write terminal <cr>
...
```

IP-IN-IP COMMANDS

Using remote-ip-in-ip command

- The remote-ip-in-ip command defines the remote endpoints in which the system will return the traffic through an ip-in-ip tunnel.
- The command is located in the “configure terminal” menu.
- The maximum number of remote ip-in-ip endpoints is 32.

  Note When the remote-ip-in-ip is not defined, the system returns the traffic to the users without ip-in-ip encapsulation (as done today).

Usage

remote-ip-in-ip <IP address>

Parameter

<IP address>
It is the remote ip-in-ip endpoint IP address.

Example:

```
RDSHost(config)> remote-ip-in-ip 192.168.1.4 <cr>
RDSHost(config)> remote-ip-in-ip 192.168.1.5 <cr>
RDSHost(config)> remote-ip-in-ip 192.168.1.6 <cr>
RDSHost> write terminal <cr>
...
remote-ip-in-ip 192.168.1.4
remote-ip-in-ip 192.168.1.4
remote-ip-in-ip 192.168.1.4
...
```

Using no remote-ip-in-ip command

- The no remote-ip-in-ip command deletes the remote endpoint definition.
- The command is located in the “configure terminal” menu.

Usage

```
no remote-ip-in-ip <IP address>
```

Parameter

```
<IP address>
```

It is the remote ip-in-ip endpoint IP address.

Example:

```
RDSHost(config)> no remote-ip-in-ip 192.168.1.4 <cr>
RDSHost(config)> no remote-ip-in-ip 192.168.1.5 <cr>
RDSHost(config)> no remote-ip-in-ip 192.168.1.6 <cr>
RDSHost> write terminal <cr>
...
```

SHOW USER COMMANDS

Using show users command

- The command displays connected users information.
- The command is located at G-Connect menu.

Usage

show users

Output format:

Default of Linux w command.

Using show proc command

- The command display running processes information.
- The command is located at G-Connect menu.

Usage

show proc

Output format:

Default of Linux ps ax command.

Using show memory command

- The command display memory information.
- The command is located at G-Connect menu.

Usage

show memory

Output format:

Default of Linux cat /proc/meminfo command.

Using show cpu command

- The command display cpu information.
- The command is located at G-Connect menu.

Usage

show cpu

Output format:

Default of Linux cat /proc/cpuinfo command.

Using Debug Protocol Command

- The command enables the sniffing of tcp, udp, ether, fddi, ip, arp, rarp, decent, lat, sca, moprc, mopdl, icmp, igrp, nd.
- The command is located at G-connect menu.

Usage

debug protocol [[<protocol name>] [source | dest <IP>]]

Parameter(s)

<protocol name>
It is the Sniffed protocol, and can be one of the following protocols: tcp, udp, ether, fddi, ip, arp, rarp, decent, lat, sca, moprc, mopdl, icmp, igrp, nd.

<IP>
It is the IP address.

Output format:

Default of Linux tcpdump command.

Using Rest Web Command

- The command resets RDS http demon.
- The command is located at G-Connect menu.

Usage

reset web

Example 1: Successful software download

```
RDSHost> copy-TFTP flash certificate server 192.168.1.4 server.crt <cr>
  Download in progress...
```

```
File downloaded successfully.
RDSHost> copy-TFTP flash certificate private-key 192.168.1.4 server.key <cr>
  Download in progress...

File downloaded successfully.
RDSHost>
```

Example 2: Unsuccessful software download

```
RDSHost> copy-TFTP flash certificate server 192.168.1.4 server.crt <cr>
  Download in progress...

File downloaded unsuccessfully due to: Download file is corrupted
RDSHost>
```

USING SHOW CERTIFICATE COMMAND

The show certificate command display the current system certificate information as being present by following openssl command: openssl x509 -in /etc/httpd/conf/ssl.crt/server.crt -text –noout command.

Usage

show certificate

Example 1: Successful software download

```
RDSHost> show certificate <cr>


Certificate:
    Data:
        Version: 3 (0x2)
        Serial Number:
            1b:60:82:0d:fa:b5:82:c1:ac:6a:ff:59:18:2c:8c:21
        Signature Algorithm: sha1WithRSAEncryption
        Issuer: C=US, O=VeriSign, Inc., OU=For Test Purposes Only.  No assurances., OU=Terms of use at https://www.veri
sign.com/cps/testca (c)05, CN=VeriSign Trial Secure Server Test CA
        Validity
            Not Before: Feb 25 00:00:00 2007 GMT
            Not After : Mar 11 23:59:59 2007 GMT
        Subject: C=IL, ST=Herzliya, L=Herzliya, O=ADC, OU=ADC-Unit, OU=Terms of use at www.verisign.com/cps/testca
(c)05, CN=adclab.selfip.org
        Subject Public Key Info:
            Public Key Algorithm: rsaEncryption
            RSA Public Key: (1024 bit)
                Modulus (1024 bit):
                    00:ce:4f:76:bf:16:12:3b:34:51:6d:3f:3f:5b:53:
                    6d:9c:58:6c:d6:cf:18:0b:61:98:4f:22:00:ae:40:
                    ef:d8:50:a6:3a:f1:f8:76:e2:85:bc:41:7e:ed:6d:
```

```
                    a5:b3:0f:8f:5e:e3:85:6f:f2:d8:b2:b9:3d:94:b8:
                    bb:e8:4c:66:5e:c3:a9:68:0c:07:ab:b7:d4:da:c6:
                    0b:d7:09:a0:ef:11:4d:df:40:34:7b:d8:3f:9a:2b:
                    aa:63:51:82:e5:eb:51:e7:f5:f4:f2:50:d7:f9:65:
                    53:5e:b2:c1:24:63:38:12:43:5c:d5:a6:fb:9d:18:
                    69:f6:39:e7:98:ba:a3:55:c1
                Exponent: 65537 (0x10001)
        X509v3 extensions:
            X509v3 Basic Constraints:
                CA:FALSE
            X509v3 Key Usage:
                Digital Signature, Key Encipherment
            X509v3 CRL Distribution Points:
                URI:http://SVRSecure-crl.verisign.com/SVRTrial2005.crl

            X509v3 Certificate Policies:
                Policy: 2.16.840.1.113733.1.7.21
                  CPS: https://www.verisign.com/cps/testca

            X509v3 Extended Key Usage:
                TLS Web Server Authentication, TLS Web Client Authentication
            X509v3 Authority Key Identifier:
                keyid:66:22:8E:81:E0:31:59:DD:2A:7F:AB:46:C5:36:02:06:70:27:87:5A

            Authority Information Access:
                OCSP - URI:http://ocsp.verisign.com
                CA Issuers - URI:http://SVRSecure-aia.verisign.com/SVRTrial2005-aia.cer

            1.3.6.1.5.5.7.1.12:
                0`.^.\0Z0X0V..image/gif0!0.0...+......Kk.(.....R8.).K..!..0&.$http://logo.verisign.com/vslogo1.gif
    Signature Algorithm: sha1WithRSAEncryption
        81:5f:93:a3:53:e4:00:e6:e7:b8:28:f9:a3:64:bd:76:1e:6e:
        ce:7e:55:0d:a7:0d:d0:b1:18:02:1c:a5:9d:aa:1e:bc:80:34:
        10:b6:30:72:86:cb:de:df:3f:52:5e:fb:21:a6:b4:f8:a2:57:
        14:77:8c:0a:39:6c:80:44:bc:87:3e:94:8f:e3:6c:db:91:e8:
        22:6b:9b:41:aa:ba:87:9b:e7:cb:2e:24:c6:cf:08:43:44:01:
        55:7d:d5:d9:b9:99:ef:25:96:24:42:bb:6a:69:70:ac:0c:4d:
        ad:cc:36:42:7c:cd:44:e1:a4:f9:fc:8e:d4:14:6e:44:94:4b:
        b3:4d:e1:c8:73:30:94:91:f1:7e:de:80:2a:f5:f9:22:a7:5d:
        56:f7:ca:a9:34:2c:cb:3f:78:eb:5f:da:1e:f4:5b:90:52:d1:
        30:15:e6:e8:51:86:0d:ea:f8:ea:76:38:b2:13:bf:5d:d5:e9:
        fc:3f:fe:88:86:f2:29:0b:78:ff:1c:59:74:e7:10:84:a9:f6:
        dd:bb:f3:cf:20:f4:fb:28:70:fd:db:bd:8a:72:8d:53:c9:16:
        17:68:7d:9a:c6:7d:5d:ae:f7:7a:c1:cf:0d:49:bc:80:16:ea:
        51:a8:2e:04:32:93:7b:b0:14:27:3a:fd:fe:8c:56:10:34:fb:
        6c:69:7e:5b


RDSHost>
```

USING EDS KEY SMART-CLIENT COMMAND

The command defines the EDS key to be used in smart clients authentication.

The **no eds key smart-client** command deletes the configured EDS key by setting the key to blank.

Usage

[no] eds key smart-client <key>

Parameter(s)

<key>
The key for secured EDS (8 octets). Alpha numeric string of 16 characters representing 8 octets in hexadecimal format and is DES valid (each octet contains an odd number of on bits). Key default value is NULL.

Example 1: EDS key definition

```
RDSHost(config)> eds key smart-client 02f804fea90102f8 <cr>
RDSHost(config)> end
RDSHost> write terminal
...
 eds key smart-client 02f804fea90102f8 <cr>
...
RDSHost> conf term
RDSHost(config)> no eds key smart-client
RDSHost(config)> end
RDSHost> write terminal
...
```

USING DATE COMMAND

- The command sets RDS date.
- The command is located at G-Connect menu.

Usage

date <time> <date>

Parameter(s)

<time>
It is Time of the day in H24:MM:SS format.

<date>
It is the Date in DD/MM/YYYY format.

Example:

```
RDSHost(G-Connect)> date 18:07:30 10/02/2002 <cr>
RDSHost(G-Connect)>
```

Appendix C

PRODUCT SUPPORT

FCS Customer Service provides expert pre-sales support and training for all of its products. Technical support is available 24 hours a day, 7 days a week by contacting the FCS Technical Assistance Center.

Sales Assistance:	Quotation Proposals, Ordering and Delivery General, and Product Information
Systems Integration:	Complete Solutions (from concept to installation), Network Design and Integration Testing, System Turn-Up and Testing, Network Monitoring (upstream or downstream), Power Monitoring and Remote Surveillance, Service/Maintenance Agreements, and Systems Operation
FCS Technical Assistance Center:	Technical Information, System/Network Configuration, Product Specification and Application, Training (product-specific), Installation and Operation Assistance, and Troubleshooting and Repair/Field Assistance
Product Return Department:	FCS Return Material Authorization (RMA) number and instructions must be obtained before returning products.

Glossary

GLOSSARY

A

ACL – Access Control List

APS – Automatic Protection System

C

CBR – Constant Bit Rate

CLEI – Common Language Equipment Identifier

CLI – Command Line Interface

D

DS3 – Digital Signal, Level 3

E

EMS – Element Management System

F

FTP – File Transfer Protocol

I

IDSL – ISDN Digital Subscriber Line

IP – Internet Protocol

L

LAN – Local Area Network

LCP – Link Control Protocol

M

MIB – Management Information Base

O

OC3 – Optical Carrier Level 3 (155.52 Mbps)

P

PNNI – Private Network to Node Interface

PPP – Point-to-Point Protocol

PVC – Permanent Virtual Circuit

S

SCC – Service Creation Cards

ASN-SG – Service Gateway System (FCS product)

SNMP – Simple Network Management Protocol

SPVC – Semi-Permanent Virtual Circuit

T

TFTP – Trivial File Transport Protocol

V

VRRP – Virtual Router Redundancy Protocol