Administration of the

Avaya G350 Media Gateway

555-245-501
Issue 2
June 2004

Notice

Every effort was made to ensure that the information in this document was complete and accurate at the time of printing. However, information is subject to change.

Warranty

Avaya Inc. provides a limited warranty on this product. Refer to your sales agreement to establish the terms of the limited warranty. In addition, Avaya's standard warranty language as well as information regarding support for this product, while under warranty, is available through the following Web site: http://www.avaya.com/support.

Preventing Toll Fraud

"Toll fraud" is the unauthorized use of your telecommunications system by an unauthorized party (for example, a person who is not a corporate employee, agent, subcontractor, or is not working on your company's behalf). Be aware that there may be a risk of toll fraud associated with your system and that, if toll fraud occurs, it can result in substantial additional charges for your telecommunications services.

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How to Get Help

For additional support telephone numbers, go to the Avaya support Web site: http://www.avaya.com/support. If you are:

- Within the United States, click the *Escalation Management* link. Then click the appropriate link for the type of support you need.
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Providing Telecommunications Security

Telecommunications security (of voice, data, and/or video communications) is the prevention of any type of intrusion to (that is, either unauthorized or malicious access to or use of) your company's telecommunications equipment by some party.

Your company's "telecommunications equipment" includes both this Avaya product and any other voice/data/video equipment that could be accessed via this Avaya product (that is, "networked equipment").

An "outside party" is anyone who is not a corporate employee, agent, subcontractor, or is not working on your company's behalf. Whereas, a "malicious party" is anyone (including someone who may be otherwise authorized) who accesses your telecommunications equipment with either malicious or mischievous intent.

Such intrusions may be either to/through synchronous (time-multiplexed and/or circuit-based), or asynchronous (character-, message-, or packet-based) equipment, or interfaces for reasons of:

- Utilization (of capabilities special to the accessed equipment)
- Theft (such as, of intellectual property, financial assets, or toll facility access)
- Eavesdropping (privacy invasions to humans)
- Mischief (troubling, but apparently innocuous, tampering)
- Harm (such as harmful tampering, data loss or alteration, regardless of motive or intent)

Be aware that there may be a risk of unauthorized intrusions associated with your system and/or its networked equipment. Also realize that, if such an intrusion should occur, it could result in a variety of losses to your company (including but not limited to, human/data privacy, intellectual property, material assets, financial resources, labor costs, and/or legal costs).

Responsibility for Your Company's Telecommunications Security

The final responsibility for securing both this system and its networked equipment rests with you - Avaya's customer system administrator, your telecommunications peers, and your managers. Base the fulfillment of your responsibility on acquired knowledge and resources from a variety of sources including but not limited to:

- Installation documents
- System administration documents
- Security documents
- Hardware-/software-based security tools
- Shared information between you and your peers
- Telecommunications security experts

To prevent intrusions to your telecommunications equipment, you and your peers should carefully program and configure:

- Your Avaya-provided telecommunications systems and their interfaces
- Your Avaya-provided software applications, as well as their underlying hardware/software platforms and interfaces
- Any other equipment networked to your Avaya products

TCP/IP Facilities

Customers may experience differences in product performance, reliability and security depending upon network configurations/design and topologies, even when the product performs as warranted.

Standards Compliance

Avaya Inc. is not responsible for any radio or television interference caused by unauthorized modifications of this equipment or the substitution or attachment of connecting cables and equipment other than those specified by Avaya Inc. The correction of interference caused by such unauthorized modifications, substitution or attachment will be the responsibility of the user. Pursuant to Part 15 of the Federal Communications Commission (FCC) Rules, the user is cautioned that changes or modifications not expressly approved by Avaya Inc. could void the user's authority to operate this equipment.

Product Safety Standards

This product complies with and conforms to the following international Product Safety standards as applicable:

Safety of Information Technology Equipment, IEC 60950, 3rd Edition, or IEC 60950-1, 1st Edition, including all relevant national deviations as listed in Compliance with IEC for Electrical Equipment (IECEE) CB-96A.

Safety of Information Technology Equipment, CAN/CSA-C22.2 No. 60950-00 / UL 60950, 3rd Edition, or CAN/CSA-C22.2 No. 60950-1-03 / UL 60950-1.

Safety Requirements for Customer Equipment, ACA Technical Standard (TS) 001 - 1997.

One or more of the following Mexican national standards, as applicable: NOM 001 SCFI 1993, NOM SCFI 016 1993, NOM 019 SCFI 1998.

The equipment described in this document may contain Class 1 LASER Device(s). These devices comply with the following standards:

- EN 60825-1, Edition 1.1, 1998-01
- 21 CFR 1040.10 and CFR 1040.11.

The LASER devices used in Avaya equipment typically operate within the following parameters:

Typical Center Wavelength	Maximum Output Power
830 nm - 860 nm	-1.5 dBm
1270 nm - 1360 nm	-3.0 dBm
1540 nm - 1570 nm	5.0 dBm

Luokan 1 Laserlaite

Klass 1 Laser Apparat

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposures. Contact your Avaya representative for more laser product information.

Electromagnetic Compatibility (EMC) Standards

This product complies with and conforms to the following international EMC standards and all relevant national deviations:

Limits and Methods of Measurement of Radio Interference of Information Technology Equipment, CISPR 22:1997 and EN55022:1998.

Information Technology Equipment – Immunity Characteristics – Limits and Methods of Measurement, CISPR 24:1997 and EN55024:1998, including:

- Electrostatic Discharge (ESD) IEC 61000-4-2
- Radiated Immunity IEC 61000-4-3
- Electrical Fast Transient IEC 61000-4-4
- Lightning Effects IEC 61000-4-5
- Conducted Immunity IEC 61000-4-6
- Mains Frequency Magnetic Field IEC 61000-4-8
- Voltage Dips and Variations IEC 61000-4-11

Power Line Emissions, IEC 61000-3-2: Electromagnetic compatibility (EMC) – Part 3-2: Limits – Limits for harmonic current emissions.

Power Line Emissions, IEC 61000-3-3: Electromagnetic compatibility (EMC) – Part 3-3: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems.

Federal Communications Commission Statement

Part 15:

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Part 68: Answer-Supervision Signaling

Allowing this equipment to be operated in a manner that does not provide proper answer-supervision signaling is in violation of Part 68 rules. This equipment returns answer-supervision signals to the public switched network when:

- answered by the called station,
- answered by the attendant, or
- routed to a recorded announcement that can be administered by the customer premises equipment (CPE) user.

This equipment returns answer-supervision signals on all direct inward dialed (DID) calls forwarded back to the public switched telephone network. Permissible exceptions are:

- A call is unanswered.
- A busy tone is received.
- A reorder tone is received.

Avaya attests that this registered equipment is capable of providing users access to interstate providers of operator services through the use of access codes. Modification of this equipment by call aggregators to block access dialing codes is a violation of the Telephone Operator Consumers Act of 1990.

REN Number

For MCC1, SCC1, CMC1, G600, and G650 Media Gateways:

This equipment complies with Part 68 of the FCC rules. On either the rear or inside the front cover of this equipment is a label that contains, among other information, the FCC registration number, and ringer equivalence number (REN) for this equipment. If requested, this information must be provided to the telephone company.

For G350 and G700 Media Gateways:

This equipment complies with Part 68 of the FCC rules and the requirements adopted by the ACTA. On the rear of this equipment is a label that contains, among other information, a product identifier in the format US:AAAEQ##TXXXX. The digits represented by ## are the ringer equivalence number (REN) without a decimal point (for example, 03 is a REN of 0.3). If requested, this number must be provided to the telephone company.

For all media gateways:

The REN is used to determine the quantity of devices that may be connected to the telephone line. Excessive RENs on the telephone line may result in devices not ringing in response to an incoming call. In most, but not all areas, the sum of RENs should not exceed 5.0. To be certain of the number of devices that may be connected to a line, as determined by the total RENs, contact the local telephone company.

REN is not required for some types of analog or digital facilities.

Means of Connection

Connection of this equipment to the telephone network is shown in the following tables.

For MCC1, SCC1, CMC1, G600, and G650 Media Gateways:

Manufacturer's Port Identifier	FIC Code	SOC/REN/ A.S. Code	Network Jacks
Off premises station	OL13C	9.0F	RJ2GX, RJ21X, RJ11C
DID trunk	02RV2-T	0.0B	RJ2GX, RJ21X
CO trunk	02GS2	0.3A	RJ21X
	02LS2	0.3A	RJ21X
Tie trunk	TL31M	9.0F	RJ2GX
Basic Rate Interface	02IS5	6.0F, 6.0Y	RJ49C
1.544 digital interface	04DU9-BN	6.0F	RJ48C, RJ48M
	04DU9-IKN	6.0F	RJ48C, RJ48M
	04DU9-ISN	6.0F	RJ48C, RJ48M
120A4 channel service unit	04DU9-DN	6.0Y	RJ48C

For G350 and G700 Media Gateways:

Manufacturer's Port Identifier	FIC Code	SOC/REN/ A.S. Code	Network Jacks
Ground Start CO trunk	02GS2	1.0A	RJ11C
DID trunk	02RV2-T	AS.0	RJ11C
Loop Start CO trunk	02LS2	0.5A	RJ11C
1.544 digital interface	04DU9-BN	6.0Y	RJ48C
	04DU9-DN	6.0Y	RJ48C
	04DU9-IKN	6.0Y	RJ48C
	04DU9-ISN	6.0Y	RJ48C
Basic Rate Interface	02IS5	6.0F	RJ49C

For all media gateways:

If the terminal equipment (for example, the media server or media gateway) causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice is not practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the operation of the equipment. If this happens, the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.

If trouble is experienced with this equipment, for repair or warranty information, please contact the Technical Service Center at 1-800-242- 2121 or contact your local Avaya representative. If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect the equipment until the problem is resolved.

A plug and jack used to connect this equipment to the premises wiring and telephone network must comply with the applicable FCC Part 68 rules and requirements adopted by the ACTA. A compliant telephone cord and modular plug is provided with this product. It is designed to be connected to a compatible modular jack that is also compliant. It is recommended that repairs be performed by Avaya certified technicians.

The equipment cannot be used on public coin phone service provided by the telephone company. Connection to party line service is subject to state tariffs. Contact the state public utility commission, public service commission or corporation commission for information.

This equipment, if it uses a telephone receiver, is hearing aid compatible.

Canadian Department of Communications (DOC) Interference Information

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

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

This equipment meets the applicable Industry Canada Terminal Equipment Technical Specifications. This is confirmed by the registration number. The abbreviation, IC, before the registration number signifies that registration was performed based on a Declaration of Conformity indicating that Industry Canada technical specifications were met. It does not imply that Industry Canada approved the equipment.

Installation and Repairs

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be coordinated by a representative designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Declarations of Conformity

United States FCC Part 68 Supplier's Declaration of Conformity (SDoC)

Avaya Inc. in the United States of America hereby certifies that the equipment described in this document and bearing a TIA TSB-168 label identification number complies with the FCC's Rules and Regulations 47 CFR Part 68, and the Administrative Council on Terminal Attachments (ACTA) adopted technical criteria.

Avaya further asserts that Avaya handset-equipped terminal equipment described in this document complies with Paragraph 68.316 of the FCC Rules and Regulations defining Hearing Aid Compatibility and is deemed compatible with hearing aids.

Copies of SDoCs signed by the Responsible Party in the U. S. can be obtained by contacting your local sales representative and are available on the following Web site: http://www.avaya.com/support.

All Avaya media servers and media gateways are compliant with FCC Part 68, but many have been registered with the FCC before the SDoC process was available. A list of all Avaya registered products may be found at: http://www.part68.org by conducting a search using "Avaya" as manufacturer.

European Union Declarations of Conformity

Avaya Inc. declares that the equipment specified in this document bearing the "CE" (*Conformité Europeénne*) mark conforms to the European Union Radio and Telecommunications Terminal Equipment Directive (1999/5/EC), including the Electromagnetic Compatibility Directive (89/336/EEC) and Low Voltage Directive (73/23/EEC).

Copies of these Declarations of Conformity (DoCs) can be obtained by contacting your local sales representative and are available on the following Web site: http://www.avaya.com/support.

Japan

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

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For the most current versions of documentation, go to the Avaya support Web site: http://www.avaya.com/support.

Contents

About this Book

Overview

Administration of the Avaya G350 Media Gateway describes how to configure and manage the G350 Media Gateway after it is already installed. For installation instructions, see *Installation of the Avaya G350 Media Gateway,* 555-245-104.

Audience

The information in this book is intended for use by Avaya technicians, provisioning specialists, business partners, and customers.

Downloading this book and updates from the Web

You can download the latest version of the *Administration of the Avaya G350 Media Gateway* from the Avaya Web site. You must have access to the Internet, and a copy of Acrobat Reader must be installed on your personal computer.

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   — **PDF Format** to download the book in regular PDF format
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Related resources

For more information on the Avaya G350 Media Gateway and related features, see the following books:

Title	Number
Overview of the Avaya G350 Media Gateway	555-245-201
Quick Start for Hardware Installation	03-300148
Installation of the Avaya G350 Media Gateway	555-245-104
Maintenance of the Avaya G350 Media Gateway	555-245-105
Upgrade and Service Guide for the Avaya G350 Media Gateway	555-245-106
Avaya G350 Media Gateway CLI Reference	555-245-202
Avaya G350 Media Gateway Glossary	555-245-301

Technical assistance

Avaya provides the following resources for technical assistance.

Within the US

For help with:

- Feature administration and system applications, call the Avaya DEFINITY Helpline at 1-800-225-7585
- Maintenance and repair, call the Avaya National Customer Care Support Line at 1-800-242-2121
- Toll fraud, call Avaya Toll Fraud Intervention at 1-800-643-2353

International

For all international resources, contact your local Avaya authorized dealer for additional help.

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  1-303-538-1741

Mention the name and number of this book, *Administration of the Avaya G350 Media Gateway*, 555-245-501.

1 Introduction

The Avaya G350 Media Gateway is a high-performance converged networking and telephony device. The G350 provides networking and telephony services for up to 40 endpoint stations. The G350 contains:

- an advanced router
- a high-performance switch
- a Voice over IP (VoIP) engine
- a fax and modem over IP engine
- preservation of calls in progress when switching from one server to another (applicable to all connections except ISDN BRI)
- support for contact closure
- Emergency Transfer Relay (ETR)

When you add plug-in media modules to the G350, the G350 also supports:

- Power over Ethernet (PoE) IP telephones
- DCP digital telephones
- Analog telephones and trunks
- E1/T1 trunks
- ISDN PRI trunks
- ISDN BRI trunks
- E1/T1 WAN data lines
- on board ports
- USP ports

This guide explains how to configure the Avaya G350 Media Gateway and contains the following chapters:

- Configuration overview — overview of G350 configuration tasks
- Accessing the Avaya G350 Media Gateway — how to access the G350 CLI and manage login permissions
- Basic device configuration — how to identify the G350 to other devices, view device status, configure event logging, and manage files
- Configuring logging — how to configure G350 system logging
- Configuring Ethernet ports — how to configure Ethernet ports on the G350
- Configuring VoIP QoS — how to configure VoIP parameters and register call controllers on the G350
- Configuring a WAN — how to configure an E1/T1 or USP WAN line on the G350
- Configuring PoE — how to configure PoE on the G350
- Configuring the G350 for modem use — how to configure the G350 console port and USB port for modem use
- Configuring contact closure — how to configure contact closure on the G350

- Configuring Emergency Transfer Relay (ETR) — how to configure ETR on the G350
- Configuring SNMP — how to configure SNMP on the G350
- Configuring advanced switching — how to configure advanced switching features on the G350
- Configuring RMON monitoring — how to configure RMON monitoring of the G350
- Configuring the router — how to configure advanced features of the G350 router
- Configuring policy — how to configure access control and QoS policy lists on the G350
- Configuring policy-based routing — how to configure policy-based routing lists on the G350
- Setting synchronization — how to configure synchronization for digital trunks
- Traps and MIBs — SNMP traps and MIBs on the G350
- Configuring the G350 using the Avaya IW — how to configure the G350 using the Avaya IW
- Configuring the G350 using the GIW — how to configure the G350 using the GIW

2 Configuration overview

This chapter provides an overview of the Avaya G350 Media Gateway configuration process and contains the following sections:

- Installation and setup overview — overview of the G350 installation and setup process
- Configuration using CLI — overview of CLI, a command prompt interface for entering configuration commands
- Configuration using GUI applications — overview of GUI applications that can be used for some configuration tasks
- Saving configuration changes — instructions on how to save configuration changes
- Firmware version control — overview of firmware version control

Installation and setup overview

A new Avaya G350 Media Gateway comes with default configuration settings. There are certain items that you must configure, according to your system specifications, before using the G350. Configuration of other items depends on the specifications of your network.

A new G350 has a two IP interfaces for management (SNMP, telnet). These are the console interface and the USB interface. By default, the IP address of the console interface is 10.3.0.1 with a subnet mask of 255.255.255.0. The first thing you should do when configuring a new G350 is to assign a new IP address to the console interface. To do this:

1. Use the **interface console** command to enter the console context.
2. Use the **ip address** command to define a new IP address for the console interface.

> **NOTE:**
> For more detailed installation instructions, including information on obtaining IP addresses, refer to *Installation of the Avaya G350 Media Gateway*, 555-245-104.

The following example assigns to the console interface an IP address of 10.3.3.1 with a subnet mask of 255.255.255.0:

```
G350-???(super)# interface console
G350-???(super-if:Console)# ip address 10.3.3.1 255.255.255.0
Done!
```

If you intend to use a USB modem to connect to the G350, you should also assign a new IP address to the USB interface. By default, the IP address of the USB interface is 10.3.0.3 with a subnet mask of 255.255.255.0. To assign a new IP address to the USB interface:

1. Use the **interface USB** command to enter the USB context.
2. Use the **ip address** command to define a new IP address for the USB interface.

The following example assigns to the USB interface an IP address of 10.3.3.2 with a subnet mask of 255.255.255.0:

```
G350-???(super)# interface USB
G350-???(super-if:USB)# ip address 10.3.3.2 255.255.255.0
Done!
```

You must also make sure the G350 is properly configured for whichever methods you intend to use for accessing the G350. For information on accessing the G350, see Accessing the Avaya G350 Media Gateway on page 25.

Your next step should be to define the other interfaces required by your system specifications. See Defining an interface on page 39.

Once you have defined your interfaces, you can define a Primary Management IP address (PMI). The PMI is the IP address which the G350 uses to identify itself when communicating with other devices, particularly the Media Gateway Controller (MGC). Management data intended for the G350 is routed to the interface defined as the PMI. You can use any interface as the PMI. For instructions on how to define the PMI, see Configuring the Primary Management Interface (PMI) on page 40.

Once you have defined a PMI, you must register the G350 with an MGC. The MGC is a media server that controls telephone services on the G350. The MGC can be internal or external. See The Media Gateway Controller (MGC) on page 42.

Once you have performed these steps, the G350 is ready for use. Other configuration tasks may also have to be performed, but these steps depend on the individual specifications of your G350 and your network.

Most G350 configuration tasks are performed using the Avaya G350 Media Gateway Command Line Interface (CLI). However, Avaya provides two GUI interfaces that are designed to perform the basic configuration tasks described in this section. These are the Avaya Installation Wizard (Avaya IW) and the Avaya Gateway Installation Wizard (GIW). You can use the Avaya IW or the GIW to set a PMI, enable the console or USB port for modem use, upgrade firmware, and register the G350 with an MGC. You can then use the CLI to perform ongoing administration.

Configuration using CLI

You can use the Avaya G350 Media Gateway Command Line Interface (CLI) to manage the G350. The CLI is a command prompt interface that enables you to type commands and view responses. For instructions on how to access the G350 CLI, see Accessing the CLI on page 25.

This guide contains information and examples about how to use CLI commands to configure the Avaya G350 Media Gateway. For more information about the G350 CLI and a complete description of each CLI command, see the *Avaya™ G350 Media Gateway CLI Reference*, 555-245-202.

Configuration using GUI applications

Several Avaya GUI applications enable you to perform some configuration tasks on the Avaya G350 Media Gateway.

The Avaya Installation Wizard (Avaya IW) is a web-based installation wizard that leads the user through the key configuration steps of a G350 installation. The Avaya IW can be used for initial configuration of a G350 with an S8300 installed as the G350's primary (ICC) or backup (LSP) call controller. For instructions on how to access the Avaya IW, see Accessing Avaya IW on page 29. For step-by-step instructions on how to configure the G350 using the Avaya IW, see Configuring the G350 using the Avaya IW on page 249.

The Avaya Gateway Installation Wizard (GIW) is a standalone application that allows the user to perform certain basic G350 configuration tasks. The GIW can be used for initial configuration of a G350 that does not have an S8300 installed as either the G350's primary (ICC) or backup (LSP) call controller. For instructions on how to access the GIW, see Accessing GIW on page 30. For step-by-step instructions on how to configure the G350 using the GIW, see Configuring the G350 using the GIW on page 283.

You can also use the Avaya G350 Manager to configure most features of the G350. The Avaya G350 Manager is a GUI application. You can access the Avaya G350 Manager from Avaya Integrated Management software or from a web browser. Most of the commands that are available through the G350 CLI are also available through the Avaya G350 Manager. For more information about the Avaya G350 Manager, see the *Avaya G350 Manager User Guide*, 650-100-709.

Saving configuration changes

When you make changes to the configuration of the Avaya G350 Media Gateway, you must save your changes to make them permanent. The G350 has two sets of configuration information:

- Running configuration
- Startup configuration

The G350 operates according to the running configuration. When the G350 is reset, the G350 erases the running configuration and loads the startup configuration as the new running configuration. When you change the configuration of the G350, your changes affect only the running configuration. Your changes are lost when the G350 resets if you do not save your changes.

Use the **copy running-config startup-config** command to save changes to the configuration of the G350. A copy of the running configuration becomes the new startup configuration.

You can back up either the running configuration or the startup configuration to an FTP or TFTP server on your network. You can restore a backup copy of the configuration from the FTP or TFTP server. When you restore the backup copy of the configuration, the backup copy becomes the new running configuration on the G350. For more information, see Managing configuration files on page 48.

Firmware version control

Firmware is the software that runs the Avaya G350 Media Gateway. The Avaya G350 Media Gateway has two firmware banks:

- Bank A
- Bank B

Each firmware bank contains a version of the G350 firmware. These may be different versions. The purpose of this feature is to provide redundancy of firmware. You can save an old version of the firmware in case you need to use it later. If it becomes necessary to use the older version, you can reset the G350 using the older version. This is particularly important when uploading new versions.

For more information on using the two firmware banks, see Software and firmware upgrades on page 46.

3 Accessing the Avaya G350 Media Gateway

This chapter provides information about the various ways of configuring the Avaya G350 Media Gateway and contains the following sections:

- Accessing the CLI — instructions on how to access the CLI
- Accessing Avaya IW — instructions on how to access the Avaya IW
- Accessing GIW — instructions on how to access the GIW
- Accessing Avaya Communication Manager — instructions on how to access the Avaya Communication Manager
- Managing login permissions — instructions on using and configuring usernames and passwords, and on configuring the G350 to use SSH, SCP, and RADIUS authentication
- Special security features — instructions on how to enable and disable the recovery password, and the G350's ability to establish incoming and outgoing telnet connections

Accessing the CLI

This section explains how to access the CLI and includes the following topics:

- CLI Overview — basic instructions on how to use the CLI
- Accessing the CLI locally — instructions on how to access the CLI locally via a local network or a console device
- Accessing CLI via modem — instructions on how to access the CLI from a remote location using a modem

CLI Overview

The CLI is a textual command prompt interface that you can use to configure the Avaya G350 Media Gateway and media modules. You can access the CLI with any of the following:

- Telnet through the network
- A console device
- Telnet through dialup:
  - Telnet through serial modem
  - Telnet through USB modem
  - Telnet through USB modem via the S8300

Log in to the CLI with a username and password that your system administrator provides. If your network has a RADIUS server, you can use RADIUS authentication. For more information, see Managing login permissions on page 32.

NOTE:
You can disconnect a telnet session by typing **<Ctrl>+]**. This is particularly useful if the normal telnet logout does not work.

CLI contexts

The CLI is divided into various contexts from which sets of related commands can be entered. Contexts are nested in a hierarchy, with each context accessible from another context, called the parent context. The top level of the CLI tree is called the general context. Each command has a context in which the command must be used. You can only use a command in its proper context.

For example, in order to configure a Loopback interface, you must first enter the Loopback context from General context. Enter the Loopback context using the **interface** command with an interface identifier such as **interface loopback 1**. Once you are in the Loopback context, you can enter Loopback interface commands.

CLI help

You can display a list of commands for the context you are in by typing **help** or **?**. The **help** command displays a list of all CLI commands that you can use within the current context, with a short explanation of each command.

If you type **help** or **?** before or after the first word or words of a command, the CLI displays a list of all commands in the current context that begin with this word or words. For example, to display a list of IP commands available in general context, type **help ip**, **ip help**, **? ip**, or **ip ?**.

If you type **help** or **?** before or after a full command, the CLI displays the command's syntax and parameters, and an example of the command. You must be in the command's context in order to use the **help** command to display information about the command. In the following example, the user enters the context of the Vlan 1 interface and displays help for the **bandwidth** command.

```
G350-???(super)# interface vlan 1
G350-???(super-if:Vlan 1)# bandwidth ?
Bandwidth commands:
---------------------------------------------------------------------------
Syntax: bandwidth <kilobytes size>
                  <kilobytes size> : integer (1-10000000)
Example: bandwidth 1000
```

Accessing the CLI locally

There are two ways you can access the CLI locally:

- Accessing CLI via local network
- Accessing CLI with a console device

Accessing CLI via local network

You can access the CLI from a computer on the same local network as the Avaya G350 Media Gateway by using any standard telnet program. For the host address, you can use the IP address of any G350 interface.

Accessing CLI with a console device

To access the CLI with a console device, use one of the following types of console devices:

- Serial terminal
- Laptop with serial cable and terminal emulator software

Connect the console device to the console port (CONSOLE) on the front panel of the Avaya G350 Media Gateway. Use only an approved Avaya serial cable. For more information about approved Avaya serial cables, see *Overview of the Avaya G350 Media Gateway,* 555-245-201.

For more information about the console port, see Configuring the console port for modem use on page 68.

Accessing CLI via modem

You can access the CLI from a remote location using any standard telnet program. Use a dialup PPP network connection from a modem at the remote location to either a USB or a serial modem connected to the console port on the front panel of the G350. Use only an approved Avaya serial cable. For more information about approved Avaya serial cables, see *Overview of the Avaya G350 Media Gateway,* 555-245-201.

> **NOTE:**
> You can disconnect a telnet session by typing **<Ctrl>+]**. This is particularly useful if the normal telnet logout does not work.

Accessing CLI via a USB modem

To access the CLI with telnet through dialup from a remote location using a USB modem:

1. Connect a modem to the USB port on the front panel of the Avaya G350 Media Gateway. Use a USB cable to connect the modem. It is recommended to use a Multitech MultiModem USB, MT5634ZBA-USB-V92.
2. Make sure the USB port is properly configured for modem use. For details, see Configuring the USB port for modem use on page 67.
3. From the remote computer, create a dialup network connection to the Avaya G350 Media Gateway. Use the TCP/IP and PPP protocols to create the connection. Configure the connection according to the configuration of the COM port of the remote computer. By default, The G350 uses PAP authentication. If your network has a RADIUS server, you can use RADIUS authentication for the PPP connection. For more information, see Managing login permissions on page 32.
4. Open any standard telnet program on the remote computer.
5. Open a telnet session to the IP address of the USB port on the G350. The default IP address of the USB port is 10.3.0.3 with subnet mask 255.255.255.0. For instructions on how to change the IP address of the USB port (i.e., the USB interface), see Configuring the USB port for modem use on page 67.
6. Configure the serial connection on the remote computer to match the configuration of the USB port on the G350. The USB port uses the following settings:
    - baud — 9600
    - data bits — 8

- parity — none
- stop bits — 1
- flow control — hardware

Accessing CLI via a serial modem

To access the CLI with telnet through dialup from a remote location using a serial modem:

1. Connect a modem to the console port (CONSOLE) on the front panel of the Avaya G350 Media Gateway. Use an RJ-45 serial cable to connect the modem. It is recommended to use a Multitech MultiModem ZBA, MT5634ZBA-V92.
2. Make sure the console port is properly configured for modem use. For details, see Configuring the console port for modem use on page 68.
3. From the remote computer, create a dialup network connection to the Avaya G350 Media Gateway. Use the TCP/IP and PPP protocols to create the connection. Configure the connection according to the configuration of the COM port of the remote computer. By default, The G350 uses PAP authentication. If your network has a RADIUS server, you can use RADIUS authentication for the PPP connection. For more information, see Managing login permissions on page 32.
4. Open any standard telnet program on the remote computer.
5. Open a telnet session to the IP address of the console port on the G350. The default IP address of the console port is 10.3.0.1 with subnet mask 255.255.255.0. For instructions on how to change the IP address of the console port (i.e., the console interface), see Configuring the console port for modem use on page 68.
6. Configure the serial connection on the remote computer to match the configuration of the console port on the G350. The console port uses the following settings:
   - baud — 9600
   - data bits — 8
   - parity — none
   - stop bits — 1
   - flow control — hardware

Accessing CLI via a modem connection to the S8300

If the Avaya G350 Media Gateway includes an S8300 Media Server, you can access the CLI from a remote location by establishing a PPP network connection from a modem at the remote location to a USB modem connected to the one of the USB ports on the front panel of the S8300.

NOTE:
In order to access the CLI via the S8300, the PMI of the G350 must be configured. See Configuring the Primary Management Interface (PMI) on page 40.

To access the G350 CLI via telnet through a dialup connection from a remote location via the S8300:

1. Connect a USB modem to either of the two USB ports on the Avaya S8300 Media Server. It is recommended to use a Multitech MultiModem USB, MT5634ZBA-USB-V92.

2. Use the Avaya Maintenance Web Interface (MWI) to configure the USB port on the S8300 for modem use. For instructions, see the *Upgrade and Service Guide for the Avaya G350 Media Gateway*, 555-245-106.
3. From a remote computer, create a dialup network connection to the S8300. Use the TCP/IP and PPP protocols to create the connection.
4. Open any standard telnet program on the remote computer.
5. Enter the command **telnet**, followed by the IP address of the S8300 USB port to which the modem is connected.
6. Enter the command **telnet**, followed by the PMI of the G350.

Accessing Avaya IW

The Avaya Installation Wizard (Avaya IW) is a web-based installation wizard that is used with the Avaya G350 Media Gateway to perform initial configuration tasks and to upgrade software and firmware. The Avaya IW is designed for use with systems that include an S8300 Media Server, operating in either ICC or LSP mode. See The Media Gateway Controller (MGC) on page 42.

Specifically, you can perform the following tasks with the Avaya IW:

- Configure PMI information — see Configuring the Primary Management Interface (PMI) on page 40
- Configure SNMP information — see Configuring SNMP on page 97
- Configure Ethernet interfaces — see Configuring Ethernet ports on page 57
- Configure primary and secondary Media Gateway Controllers — see The Media Gateway Controller (MGC) on page 42
- Install license and password files
- Install software and firmware upgrades — see Software and firmware upgrades on page 46
- Enable and configure the USB ports of the S8300 for modem use
- Enable the G350 for modem use — see Configuring the G350 for modem use on page 67
- Configure G350 telephony and trunk parameters
- Configure alarms
- Change your password

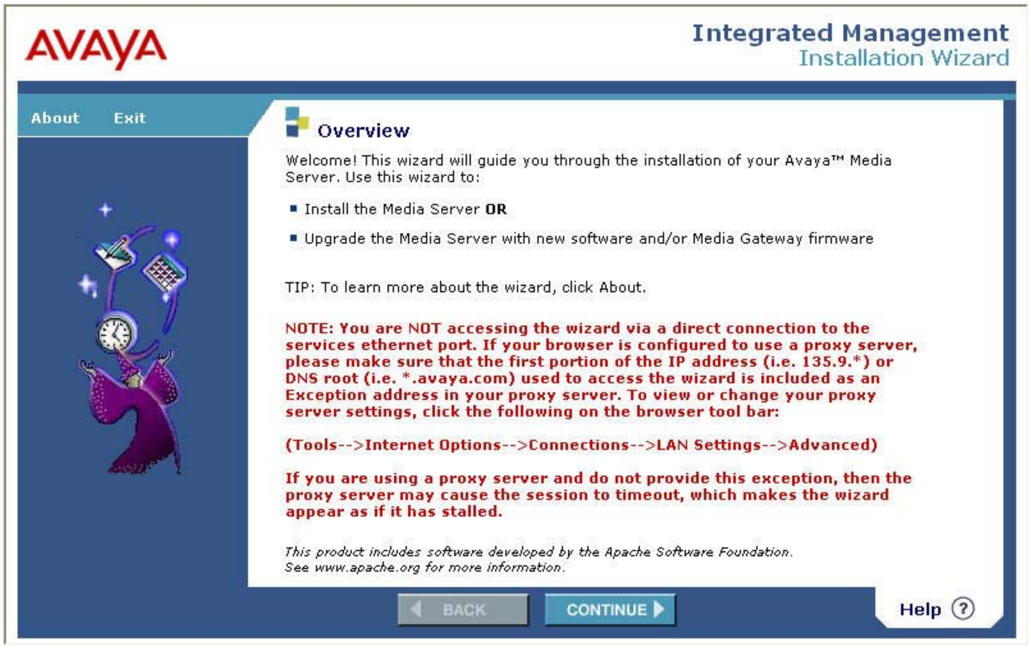
When performing initial configuration of the G350, you can access and run the Avaya IW using a laptop computer. To access the Avaya IW:

1. Connect a laptop computer to the Services port of the S8300, using a crossover cable.
2. Make sure the laptop is configured as follows:
    - IP Address: 192.11.13.5
    - NetMask: 255.255.255.252
    - Disable DNS
    - Clear the primary WINS and secondary WINS IP Addresses
    - Disable the Proxy Server in the Internet Explorer

3 Launch Internet Explorer on the laptop and type the following URL to access the S8300 Media Server Home Page: http://192.11.13.6

4 Enter the appropriate login name and password.

5 Select the Launch Installation Wizard link from the home page. The Overview screen appears:



Overview

Welcome! This wizard will guide you through the installation of your Avaya™ Media Server. Use this wizard to:

- Install the Media Server **OR**
- Upgrade the Media Server with new software and/or Media Gateway firmware

TIP: To learn more about the wizard, click About.

NOTE: You are NOT accessing the wizard via a direct connection to the services ethernet port. If your browser is configured to use a proxy server, please make sure that the first portion of the IP address (i.e. 135.9.*) or DNS root (i.e. *.avaya.com) used to access the wizard is included as an Exception address in your proxy server. To view or change your proxy server settings, click the following on the browser tool bar:

(Tools-->Internet Options-->Connections-->LAN Settings-->Advanced)

If you are using a proxy server and do not provide this exception, then the proxy server may cause the session to timeout, which makes the wizard appear as if it has stalled.

This product includes software developed by the Apache Software Foundation. See www.apache.org for more information.

For step-by-step instructions how to configure the G350 using the Avaya IW, see Appendix B, "Configuring the G350 using the Avaya IW" .

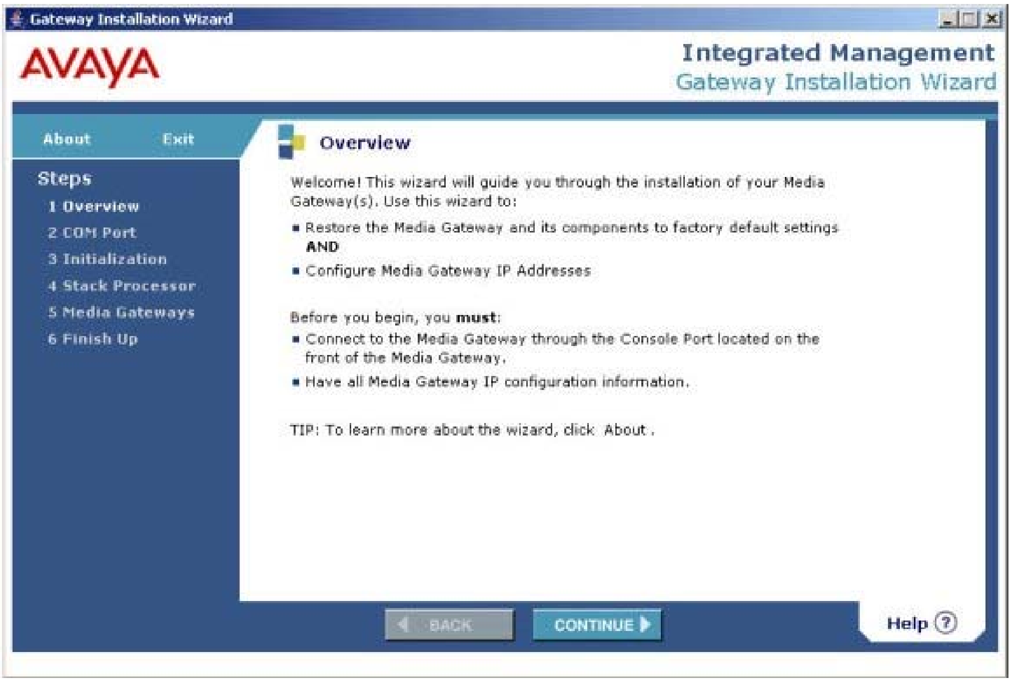
Accessing GIW

The Gateway Installation Wizard (GIW) is an automated tool that allows you to perform a streamlined installation and configuration of a standalone G350. You can use the GIW to perform initial configuration of the G350 and to upgrade software and firmware. Specifically, you can perform the following tasks with the GIW:

- Configure PMI information — see Configuring the Primary Management Interface (PMI) on page 40
- Configure SNMP information — see Configuring SNMP on page 97
- Configure primary and secondary Media Gateway Controllers — see The Media Gateway Controller (MGC) on page 42
- Check connectivity between the G350 and its Media Gateway Controller
- Display information on the G350 and media modules installed on the G350
- Enable the G350 for modem use — see Configuring the G350 for modem use on page 67
- Install software and firmware upgrades — see Software and firmware upgrades on page 46

To access the GIW:

1. Install GIW on a laptop computer from the CD provided by Avaya. The laptop should be running Windows 2000 or Windows XP.
2. Plug one end of an RJ-45 to RJ-45 cable into a DB-9 adapter.
3. Plug the RJ-45 connector at the other end of the cable into the console port (CONSOLE) of the G350.
4. Plug the DB-9 end of the cable into the COM port of the laptop computer.
5. From your laptop computer, double-click the GIW icon to run GIW. The Overview screen appears:



Overview

Welcome! This wizard will guide you through the installation of your Media Gateway(s). Use this wizard to:

- Restore the Media Gateway and its components to factory default settings
  AND
- Configure Media Gateway IP Addresses

Before you begin, you **must**:

- Connect to the Media Gateway through the Console Port located on the front of the Media Gateway.
- Have all Media Gateway IP configuration information.

TIP: To learn more about the wizard, click About .

For step-by-step instructions on how to configure the G350 using the GIW, see Appendix C, "Configuring the G350 using the GIW" .

Accessing Avaya Communication Manager

Use Avaya Communication Manager software to control telephone services that the Avaya G350 Media Gateway provides. Avaya Communication Manager software runs on a media server. There might be several media servers on your network that can control the Avaya G350 Media Gateway. You can access Avaya Communication Manager on any media server that is a Media Gateway Controller (MGC) for the Avaya G350 Media Gateway. For more information, see The Media Gateway Controller (MGC) on page 42.

You can access Avaya Communication Manager with any of the following:

- Avaya Site Administration (ASA). ASA provides wizards and other tools that help you to use Avaya Communication Manager effectively. For more information, see *Administrator's Guide for Avaya Communication Manager*, 555-233-506.

- Telnet to port 5023 on the media server, using the following syntax: **telnet <IP address of the media server> <5023>**. For more information, see *Administrator's Guide for Avaya Communication Manager*, 555-233-506.
- Avaya G350 Media Gateway CLI. See Accessing the registered MGC on page 44.

Managing login permissions

This section explains how to manage login permissions and contains the following topics:

- Security overview — overview of the G350's internal security mechanism and how it can operate in conjunction with a RADIUS authentication system
- Managing users and passwords — explanation of the users, passwords, and access privileges, and instructions on how to define new users
- SSH protocol support — explanation of SSH authentication and instructions on how to configure SSH authentication parameters
- SCP protocol support — explanation of SCP authentication and instructions on how to configure SCP authentication parameters
- RADIUS authentication — instructions on how to configure the G350 to work with an external RADIUS server

Security overview

The Avaya G350 Media Gateway includes a security mechanism through which the system administrator defines users and assigns each user and username and a password. Each user is assigned a privilege level. The user's privilege level determines which commands the user can perform.

In addition to its basic security mechanism, the G350 supports secure data transfer via SSH and SCP.

The G350 can be configured to work with an external RADIUS server to provide user authentication. When RADIUS authentication is enabled on the G350, the RADIUS server operates in conjunction with the G350 security mechanism. When the user enters a username, the G350 first searches its own database for the username. If the G350 does not find the username in its own database, it establishes a connection with the RADIUS server, and the RADIUS server provides the necessary authentication services.

Managing users and passwords

You must provide a username and password when you perform any of the following actions:

- When you access the CLI. For more information, see Accessing the CLI on page 25.
- When you connect to the console port modem with dialup PPP. For more information, see Accessing CLI via modem on page 27.
- When you open Avaya G350 Manager.

When you use Avaya G350 Manager or the CLI, your username determines your privilege level. The commands that are available to you during the session depend on your privilege level.

If your network has a RADIUS server, you can use RADIUS authentication instead of a username and password. A RADIUS server provides centralized authentication service for many devices on a network. For more information, see RADIUS authentication on page 35.

Privilege level

When you start to use Avaya G350 Manager or the CLI, you must enter a username. The username that you enter sets your privilege level. The commands that are available to you during the session depend on your privilege level. If you use RADIUS authentication, the RADIUS server sets your privilege level.

The G350 provides the following three privilege levels:

- **Read-only** — You can use Read-only privilege level to view configuration parameters.
- **Read-write** — You can use Read-write privilege level to view and change all configuration parameters except those related to security. For example, you cannot change a password with Read-write privilege level.
- **Admin** — You can use Admin privilege level to view and change all configuration parameters, including parameters related to security. Use Admin privilege level only when you need to change configuration that is related to security, such as adding new user accounts and setting the device policy manager source.

The default username has Admin privilege level. For security reasons, the network administrator usually changes the password of the default username. For more information about privilege levels, see *Avaya™ G350 Media Gateway CLI Reference*, 555-245-202.

Configuring usernames

To create a username, use the **username** command. To remove a username, use the **no username** command. To change the password or the privilege level for a username, remove the username and add it again. You need an Admin privilege level to use the **username** and **no username** commands.

When you create a new user, you must define the user's password and privilege level. The following example creates a user named John with the password johnny and a Read-write privilege level:

```
G350-001> username john password johnny access-type read-write
```

SSH protocol support

SSH (Secure Shell) protocol is a security protocol that enables you to establish a remote session over a secured tunnel, also called a remote shell. SSH accomplishes this by creating a transparent, encrypted channel between the local and remote devices. In addition to the remote shell, SSH provides secure file transfer between the local and remote devices. SSH is used for telnet file transfers. The G350 supports two concurrent SSH users.

There are two ways to establish an SSH session:

- RSA authentication
- Password authentication

Use the **ssh enable** command to determine which of these ways is used on the G350. See SSH Configuration on page 34.

RSA authentication works as follows:

- The G350 generates a key of variable length (512-2048 bits) using the DSA encryption method. This is the private key.
- The G350 calculates an MD5 Hash of the private key, called a fingerprint (the public key). The fingerprint is always 16 bytes long. This fingerprint is displayed.
- The G350 sends the public key (the fingerprint) to the client computer. This public key is used by the client to encrypt the data it sends to the G350. The G350 decrypts the data using the private key.
- Both sides negotiate and must agree on the same chipper type. The G350 only supports 3DES-CBC encryption. The user on the client side accepts the fingerprint. The client maintains a cache containing a list of fingerprints per server IP address. If the information in this cache changes, the client notifies the user.
- The client chooses a random number that is used to encrypt and decrypt the information sent.
- This random number is sent to the G350, after encryption based on the G350's public key.
- When the G350 receives the encrypted random number, it decrypts it using the private key. This random number is now used with the 3DES-CBC encryption method for all encryption and decryption of data. The public and private keys are no longer used.

Password authentication works as follows:

- Before any data is transferred, the G350 requires the client to supply a user name and password. This authenticates the user on the client side to the G350.

SSH Configuration

Use the ip **ssh enable** command to enable SSH authentication and set the SSH parameters. Use the **no** form of this command to disable the SSH server. Disabling the server disconnects all active SSH sessions. By default, SSH is enabled.

You can set the following SSH parameters using the **ssh enable** command:

- ***timeout*** — sets the time interval (in seconds) that the SSH server waits for the SSH client to respond. If this time elapses with no response, the session's SSH server disconnects. The timeout can be from 20 to 400 seconds. The default value is 120.

  NOTE:
  This parameter applies to the SSH negotiation phase. Once an SSH session is established, the CLI timeout applies.

- ***authentication-retries*** — the number of connection attempts after which the SSH server disconnects. This parameter can be from 1 to 5. The default value is 3.
- ***rsa-authentication*** — enables (yes) or disables (no) the public key authentication method. By default, public key authentication is disabled.
- ***password-authentication*** — enables (yes) or disables (no) the password authentication method. By default, password authentication is enabled.
- ***port*** — changes the default value of the SSH port. Changing the port number does not interrupt active connections. The default value is 22.

Use the **ssh-client known-hosts** command to clear the client's list of server fingerprints. Each client maintains a list of server fingerprints. If a key changes, the client's verification of the server's fingerprint will fail, thereby preventing the client's access to the server. If this happens, you can use the **ssh-client known-hosts** command to erase the client's server fingerprint list. This enables the client to access the server and begin to recreate its list of fingerprints with the server's new fingerprint.

Use the **crypto key generate dsa** command to generate an SSH host key pair.

Use the **disconnect ssh** command to disconnect an existing SSH session.

Use the **show ip ssh** command to display a list of active SSH sessions.

SCP protocol support

In addition to data transfer via an SSH session, the SSH protocol is also used to support SCP for secure file transfer. When using SCP, the G350 is the client, and an SCP server must be installed on the management station. After users are defined on the SCP server, the G350 acts as an SCP client.

The process of establishing an SCP session is the same process as described in SSH protocol support on page 33, except that the roles of the G350 and the client computer are reversed.

To perform file transfers secured by SCP, the G350 launches a local SSH client via the CLI. This establishes a secured channel to the secured file server. The G350 authenticates itself to the server by providing a user name and password. With a Windows-based SSH server (WinSSHD), the user name provided must be a defined user on the Windows machine with read/write privileges. The files transferred via SCP are saved in the *C:\Documents and Settings\username* directory.

The network element performs file transfer in unattended mode.

RADIUS authentication

If your network has a RADIUS server, you can configure the G350 to use RADIUS authentication. A RADIUS server provides centralized authentication service for many devices on a network. When you use RADIUS authentication, you do not need to configure usernames and passwords on the G350. When you try to access the G350, the G350 searches for your username and password in its own database first. If it does not find them, it activates RADIUS authentication.

To use RADIUS authentication:

1. Configure your RADIUS server with the usernames, passwords, and privilege levels that you want to use on the G350.
2. Configure RADIUS authentication on the G350, as described below.

Use the following commands to configure RADIUS authentication on the G350. For more information about these commands, see the *Avaya™ G350 Media Gateway CLI Reference*, 555-245-202.

1. Use the **set radius authentication enable** command to enable RADIUS authentication.
2. Use the **set radius authentication secret** command to set the shared secret for the authentication. This command must be followed by a text string. For example:

   ```
   set radius authentication secret hush
   ```

3 Use the **set radius authentication server** command to set the IP address of the primary or secondary RADIUS Authentication server.

You can use the following commands to change the RADIUS parameters. These commands are optional.

- Use the **set radius authentication retry-number** command to set the number of times to resend an access request when there is no response.
- Use the **set radius authentication retry-time** command to set the time to wait before resending an access request.
- Use the **set radius authentication udp-port** command to set the RFC 2138 approved UDP port number. Normally, the UDP port number should be set to its default value of 1812. Some early implementations of the RADIUS server used port number 1645.

To disable RADIUS authentication on the G350, use the **set radius authentication disable** command.

To display the RADIUS parameters, use the **show radius authentication** command. Shared secrets are not displayed.

Special security features

This section describes the following special security features:

- Enabling and disabling recovery password — instructions on how to enable and disable the recovery password, which provides emergency access to the G350 via a direct connection to the console port
- Enabling and disabling telnet access — instructions on how to enable and disable telnet access to and from the G350

Enabling and disabling recovery password

The G350 includes a special recovery password. The purpose of the recovery password is to enable the system administrator to access the G350 in the event that the regular password is forgotten. You can only use the recovery password when accessing the G350 via a direct connection to the console port. See Accessing CLI with a console device on page 27.

You can use the **set terminal recovery password** command to enable or disable the recovery password. You can only use this command when accessing the G350 via a direct connection to the console port.

Enabling and disabling telnet access

You can enable and disable the G350's ability to establish incoming and outgoing telnet connections, using the following commands. You can only use these commands when accessing the G350 via a direct connection to the console port. See Accessing CLI with a console device on page 27.

- Use the **ip telnet** command to enable the G350 to establish an incoming telnet connection. Use the **no** form of this command to disable the G350's ability to establish an incoming telnet connection.
- Use the **ip telnet client** command to enable the G350 to establish an outgoing telnet connection. Use the **no** form of this command to disable the G350's ability to establish an outgoing telnet connection.

4 Basic device configuration

This chapter provides information about basic configuration of the Avaya G350 Media Gateway and contains the following sections:

- Defining an interface — instructions on how to define a new interface and its IP address
- Configuring the Primary Management Interface (PMI) — instructions on how to configure parameters that identify the G350 to other devices
- Defining the default gateway — instructions on how to define a G350 interface as the G350's default gateway
- Configuring the Media Gateway Controller (MGC) — instructions on how to configure an MGC to work with the G350
- Viewing the status of the device — instructions on how to view the status of the G350
- Version management — instructions on how to manage and upgrade software, firmware, configuration, and other files on the G350

Defining an interface

In a new Avaya G350 Media Gateway, only the console and USB interfaces are defined. All other interfaces must be defined by the administrator, after installation of the G350.

To define an interface:

1. Use the **interface** command to enter the interface context. Some types of interfaces require an identifier as a parameter. Other types of interfaces require the interface's module and port number as a parameter. For example:

   ```
   interface vlan 1
   interface serial 2/1
   ```

   For more information on the various types of interfaces, see Router interface concepts on page 134.
2. Use the **ip address** command, followed by an IP address and subnet mask, to assign an IP address to the interface.
3. Use the **load-interval** command to set the load calculation interval for the interface.
4. For a list and descriptions of other interface configuration commands, see Configuring interfaces on page 134. For interface configuration examples, see WAN configuration example on page 85.

Configuring the Primary Management Interface (PMI)

The Primary Management Interface (PMI) address is the IP address of an interface that you can specify on the Avaya G350 Media Gateway. The first IP address you configure on the G350 automatically becomes the PMI. You can subsequently assign any IP interface to be the PMI.

The PMI is used as the IP address of the G350 for the following management functions:

- Registration of the G350 to an MGC
- Sending SNMP traps
- Opening telnet sessions from the G350
- Sending messages from the G350 using FTP and TFTP protocol

You can designate any of the G350's interfaces to serve as the G350's PMI. The PMI must be an IP address that the MGC recognizes. If you are not sure which interface to use as the PMI, check with your system administrator.

To set the PMI of the G350:

1. Use the **interface** command to enter the context of the interface to which you want to set the PMI. For example, to use the VLAN 1 interface as the PMI, type **interface vlan 1**.

   NOTE:
   If the interface has not been defined, you must define it now. See Defining an interface on page 39.

2. Type the **pmi** command.
3. Type **exit** to return to general context.
4. Type the **copy running-config startup-config** command. This saves the new PMI in the startup configuration file.
5. Use the **reset** command to reset the G350.

   NOTE:
   Most configuration changes take effect as soon as you make the change, but must be saved to the startup configuration file in order to remain in effect after you reset the G350. The PMI address is an exception. A change to the PMI does not take effect at all until you reset the G350.

6. To verify the new PMI, type the **show pmi** command in general context. If you use this command before you reset the G350, it displays two different PMIs:

   - **Active PMI** — the PMI the G350 is currently using, as defined in the running configuration file
   - **Configured PMI** — the PMI that the G350 is configured to use after reset, as defined in the startup configuration file

   If you use this command after you reset the G350, both the Active and the Configured PMI should be the same IP address.

Use the following commands to configure other identification information:

- Use the **set system contact** command to set the contact information for the G350.
- Use the **set system location** command to set the location information for the G350.
- Use the **set system name** command to specify the name of the G350.

Defining the default gateway

The G350 uses a default gateway to connect to outside networks that are not listed on the G350's routing table. To define a default gateway, use the **ip default-gateway** command, followed by either the IP address or name (type and number) of the interface you want to define as the default gateway.

The following example defines the interface with the IP address 132.55.4.45 as the default gateway:

```
ip default-gateway 132.55.4.45
```

The following example defines Serial interface 5/1:1 as the default gateway:

```
ip default-gateway Serial 5/1:1
```

Configuring the Media Gateway Controller (MGC)

This section provides information about configuring a Media Gateway Controller (MGC) to work with the G350 and includes the following topics:

- The Media Gateway Controller (MGC) — an overview of the types of MGCs that can be used with the G350
- Configuring the MGC list — instructions on how to register primary and backup MGCs for the G350
- Setting reset times — instructions on how to set time-outs for when the G350 has to reestablish a connection with its MGC
- Accessing the registered MGC — instructions on how to access the registered MGC using the CLI
- Monitoring the ICC or LSP — instructions on how to monitor the connection between the G350 and its registered MGC using the CLI

The Media Gateway Controller (MGC)

The Media Gateway Controller (MGC) controls telephone services on the Avaya G350 Media Gateway. You can use a media server with Avaya Communication Manager software as an MGC. The G350 supports both External Call Controllers (ECC) and Internal Call Controllers (ICC). An ICC is an Avaya S8300 Media Server that you install in the G350 as a media module. An ECC is an external media server that communicates with the G350 over the network.

NOTE:
When the G350 uses an ECC, it can use a local S8300 as a backup controller. The S8300 functions in Local Survivable Processor (LSP) mode. If the ECC stops serving the G350, the S8300 takes over the service.

Table 1, Media servers supported by the Avaya G350 Media Gateway, on page 42 lists the media servers that can be used with the G350.

Table 1: Media servers supported by the Avaya G350 Media Gateway

Media server	Type	Usage
Avaya S8300 Media Server	Media module	ECC, ICC, or LSP
Avaya S8500 Media Server	External	ECC
Avaya S8700 Media Server	External	ECC

To register the G350 with an MGC, you need the G350's serial number. You can find this serial number in one of the following ways:

- Use the **show system** command.
- Look for a 12-character string located on a label on the back panel of the G350.

For more information, see *Overview of the Avaya G350 Media Gateway*, 555-245-201.

Configuring the MGC list

The G350 must be registered with an MGC in order to provide telephone service. Use the **set mgc list** command to set the G350's MGC. You can enter the IP addresses of up to four MGCs with the **set mgc list** command. The first MGC on the list is the primary MGC. The Avaya G350 Media Gateway searches for the primary MGC first. If it cannot connect to the primary MGC, it searches for the other MGCs on the list.

NOTE:
To register an S8500 or S8700 media server as the MGC, use the IP address of the media server's Control-LAN card (CLAN) rather than the IP address of the media server itself.

The following is an example of the **set mgc list** command:

```
G350-001> set mgc list 132.236.73.2, 132.236.73.3, 132.236,73.4, 132.236.73.5
```

If the media server with the IP address 132.236.73.2 is available, that media server becomes the G350's MGC. If that server is not available, the G350 searches for the next media server on the list, and so on.

To determine the result of the **set mgc list** command, use the **show mgc** command. This command has the following output:

- **Registered** — indicates whether or not the G350 is registered with an MGC (YES or NO).
- **Active Controller** — displays the IP address of the active MGC. If there is no active MGC (i.e., if the **set mgc list** command failed to configure an MGC), this field displays 255.255.255.255.
- **H248 Link Status** — indicates whether the communication link between the G350 and the MGC is up or down.
- **H248 Link Error Code** — if there is a communication failure between the G350 and the MGC, this field displays the error code.

To show the current MGC list, use the **show mgc list** command. This command shows the IP addresses of the MGCs on the MGC list.

To remove one or more MGCs from the MGC list, use the **clear mgc list** command. Type the IP address of the MGC you want to remove as an argument to remove that MGC. You can remove more than one MGC with one command by typing the IP addresses of all the MGCs you want to remove, separated by commas. To remove all the MGCs on the list, use the **clear mgc list** command with no arguments.

To change the G350's MGC list:

1. Use the **clear mgc list** command with no arguments to clear the MGC list.
2. Use the **set mgc list** command with a different set of IP addresses.

NOTE:
If you use the **set mgc list** command without first clearing the MGC list, the G350 simply adds the new MGCs to the end of the MGC list.

Setting reset times

If the connection between the G350 and its registered MGC is lost, the G350 attempts to recover the connection. Use the **set reset-times primary-search** command and the **set reset-times total-search** command to set the time-out for the G350's search for the primary MGC and the other MGC's on its MGC list, respectively. Use the **set reset-times transition-point** command to configure the point at which the primary MGCs in the list end and the LSPs begin. For example, if there are three IP addresses in the MGC list and the third address is the LSP, the transition point should be 2.

The default time for the primary search is 1 minute. The default time for the total search is 30 minutes. The default transition point is 1.

For example:

```
G350-001> set reset-times primary-search 20
G350-001> set reset-times total-search 40
350-001> set reset-times transition-point 1
```

In this example, in the event of a loss of connection with the registered MGC, the G350 searches for the primary MGC on its MGC list for 20 minutes. If the G350 does not establish a connection with the primary MGC within this time, it searches for the other MGCs on the list for a total of 40 minutes.

Use the **show recovery** command to show the status of MGC and ICC monitoring and recovery setup.

Accessing the registered MGC

To access the G350’s registered MGC through the G350:

- If the MGC is an S8300 media server, use the **session mgc** command
- If the MGC is an S8500 or S8700 media server, use the **set mediaserver** command to manually define the MGC’s IP address, then use the **session mgc** command to access the MGC

If the G350 includes an S8300, use the **session icc** command to access the S8300. You can use this command whether or not the local S8300 is the G350’s registered MGC.

> **NOTE:**
> Both the **session mgc** command and the **session icc** command open a telnet connection to the MGC.

To open a connection directly to the Avaya Communication Manager System Access Terminal (SAT) application in the MGC, add **sat** to the command. For example:

```
G350-001> session mgc sat
```

To open a connection to the MGC’s LINUX operating system, do not add **sat** to the command. For example:

```
G350-001> session mgc
```

Monitoring the ICC or LSP

When an MGC controls telephone services on the Avaya G350 Media Gateway in ICC or LSP mode, the G350 monitors the connection with the MGC. If the connection with the MGC is lost, the G350 starts a recovery process. Use the following commands to configure MGC monitoring:

- Use the **set icc-monitoring** command to control heartbeat monitoring of an ICC or LSP. The **enable** parameter enables heartbeat monitoring. The **disable** parameter disables heartbeat monitoring.
- Use the **show icc-monitoring** command to display the status of the ICC/LSP monitoring process.

Viewing the status of the device

To view the status of the Avaya G350 Media Gateway, use the following commands. For more information about these commands, see *Avaya G350 Media Gateway CLI Reference*, 555-245-202.

- Use the **show faults** command to view information about currently active faults.
- Use the **show mgc** command to view information about the Media Gateway Controller with which the G350 is registered. For more information, see Configuring the Media Gateway Controller (MGC) on page 41.

- Use the **show mm** command to view information about media modules that are installed on the G350. To view information about a specific media module, include the slot number of the media module as an argument. For example, to view information about the media module in slot 2, enter **show mm v2**. The output of the command shows the following information:
  - Slot number
  - Uptime
  - Type of media module
  - Description
  - Serial number and other hardware identification numbers
  - Firmware version
  - Number of ports
  - Fault messages
- Use the **show module** command or the **show mg list** command to view brief information about media modules that are installed in the G350. To view brief information about a specific media module, include the slot number of the media module as an argument. For example, to view information about the media module in slot 2, enter **show module v2**. The output of the command shows the following information:
  - Slot number
  - Firmware version
  - Type of media module
  - Media module code
- Use the **show system** command to display the serial number of the G350, the G350's uptime, the firmware version number, MAC addresses, and other system information.
- Use the **show restart-log** command to view information about the last time that the G350 was reset.
- Use the **show temp** command to view the temperature of the G350 CPU. This command also displays the high and low temperatures that will trigger a temperature warning.
- Use the **show voltages** command to view the power supply voltages of the G350.
- Use the **show utilization** command to display information about CPU and memory usage on the G350.

  NOTE:
  Before using this command, you must first use the **set utilization cpu** command to enable CPU utilization measurements.

- Use the **test led** command to test the system ALM and MDM and system CPU LEDs on the front panel of the G350. The CPU and media module LEDs blink for five seconds.

Version management

This section provides information about managing and upgrading software, firmware, configuration, and other files on the Avaya G350 Media Gateway and contains the following sections:

- File transfer — overview of transferring software and firmware files to the G350
- Software and firmware upgrades — instructions on how to upgrade software and firmware
- Managing configuration files — instructions on how to manage configuration files
- Listing the files on the Avaya G350 Media Gateway — instructions on how to display a list of G350 files and their version numbers

File transfer

The Avaya G350 Media Gateway can be a client for the FTP and TFTP protocols. Use the FTP or TFTP protocols to transfer files between the Avaya G350 Media Gateway and other devices. You can use file transfer to:

- Install software and firmware upgrades on the G350
- Install firmware upgrades on media modules
- Back up and restore configuration settings

To use file transfer, you need to have an FTP server or TFTP server on your network.

NOTE:
If you use an FTP server, the G350 prompts you for a username and password when you enter a command to transfer a file. Also, when opening an FTP connection to the S8300, all anonymous FTP file transfers are restricted to the /pub directory. Permission for anonymous FTP users to create files in other directories is denied.

Software and firmware upgrades

You can upgrade software on the Avaya G350 Media Gateway. Software used to control the Avaya G350 Media Gateway itself and media modules installed on the G350 is called firmware. Use the FTP or TFTP protocol to upload a new version of software or firmware. You can upgrade the following types of software and firmware:

- Firmware for the Avaya G350 Media Gateway
- Java applet for Avaya G350 Manager
- Firmware for media modules

Managing the firmware banks

The G350 has two firmware banks:

- Bank A
- Bank B

Each firmware bank contains a version of the G350 firmware. These may be different versions. The purpose of this feature is to provide software redundancy. If one of the versions becomes corrupted, you can reset the G350 using the other version. This is particularly important when uploading new versions.

By default, when you turn on or reset the G350, the G350 loads firmware from Bank B. To change the default bank from which firmware is loaded during startup, type the **set boot bank** command. For example, to configure the G350 to load firmware from Bank A on startup, type **set boot bank bank-A**. After typing the **set boot bank** command, you must type the **copy running-config startup-config** command to save the change. Now, when you reset the G350, it will load firmware from Bank A.

You can use the ASB button on the G350 front panel to load firmware from the bank other than the default bank during startup:

1. Press and hold the reset button.
2. Press and hold the ASB button.
3. Release the reset button.
4. Release the ASB button.

For example, if the G350 is configured to load firmware from Bank B, use the steps listed above to reset the G350 to load the firmware from Bank A instead.

To display the bank from which the G350 is currently set to load its firmware upon startup or reset, type the **show boot bank** command.

Upgrading software and firmware

To upgrade software or firmware, you must obtain an upgrade file from Avaya. Place the file on your FTP or TFTP server. Then, use one of the following commands to upload the file to the G350. For each of these commands, include the full path of the file and the IP address of the FTP or TFTP host as parameters. When you enter the command, the CLI prompts you for a username and password.

> **NOTE:**
> In addition to using the CLI to upgrade software and firmware, you can use the Avaya IW and the GIW. See Configuring the G350 using the Avaya IW on page 249 and Configuring the G350 using the GIW on page 283.

- Use the **copy ftp EW_archive** command to upgrade the Java applet for Avaya G350 Manager software from an FTP server.
- Use the **copy ftp module** command, followed by the module number of the module you want to upgrade, to upgrade the firmware on a media module from an FTP server.
- Use the **copy ftp SW_imageA** command to upgrade the G350 firmware into Bank A from an FTP server.
- Use the **copy ftp SW_imageB** command to upgrade the G350 firmware into Bank B from an FTP server.
- Use the **copy tftp EW_archive** command to upgrade the Java applet for Avaya G350 Manager software from a TFTP server.
- Use the **copy tftp module** command, followed by the module number of the module you want to upgrade, to upgrade the firmware on a media module from a TFTP server.
- Use the **copy tftp SW_imageA** command to upgrade the G350 firmware into Bank A from a TFTP server.

- Use the **copy tftp SW_imageB** command to upgrade the G350 firmware into Bank B from a TFTP server.
- Use the **copy ftp EW_archive** command to upgrade the Java applet for Avaya G350 Manager software from an FTP server.
- Use the **copy ftp module** command, followed by the module number of the module you want to upgrade, to upgrade the firmware on a media module from an FTP server.
- Use the **copy ftp SW_imageA** command to upgrade the G350 firmware into Bank A from an FTP server.
- Use the **copy ftp SW_imageB** command to upgrade the G350 firmware into Bank B from an FTP server.
- Use the **copy tftp EW_archive** command to upgrade the Java applet for Avaya G350 Manager software from a TFTP server.
- Use the **copy tftp module** command, followed by the module number of the module you want to upgrade, to upgrade the firmware on a media module from a TFTP server.
- Use the **copy tftp SW_imageA** command to upgrade the G350 firmware into Bank A from a TFTP server.
- Use the **copy tftp SW_imageB** command to upgrade the G350 firmware into Bank B from a TFTP server.

When using FTP or TFTP commands, you must use the specific path to the file on the FTP or TFTP server according to the home directory of the service (FTP or TFTP) that you are using. For example, to upgrade the firmware of an MM312 media module in slot 3 from a TFTP server with the IP address 192.1.1.10, where the home directory is c:\home\ftp\ and the upgrade file is located in the directory c:\home\ftp\version, use the following command:

```
copy tftp module \version\mm312v51.fdl 192.1.1.10 3
```

NOTE:
When uploading firmware from the S8300, use only the file name, without the directory path, in the command line. Otherwise, the procedure will fail. For instance, in the example above, you must use the following command:

```
copy tftp module mm312v51.fdl 192.1.1.10 3
```

NOTE:
When uploading firmware from the S8300 using TFTP, you may need to enable TFTP service in the Set LAN Security parameters of your web server.

The following example uploads a firmware version with the path and file name C:\g350.net from an FTP server with the IP address 149.49.134.153 to Bank A of the G350:

```
copy ftp SW_imageA C:\g350.net 149.49.134.153
```

Managing configuration files

A configuration file is a data file that contains a complete set of configuration settings for the Avaya G350 Media Gateway. You can use configuration files to back up and restore the configuration of the G350. Use the FTP or TFTP protocol to transfer a configuration file between the G350 and a server on the network. You can back up either the running configuration or the startup configuration to the server as a configuration file. When you restore a configuration file from a server, it becomes the startup configuration on the G350. For more information about running configuration and startup configuration, see Configuration using GUI applications on page 22.

To transfer a configuration file between the G350 and a server on the network, use one of the following commands:

- Use the **copy ftp startup-config** command to restore a configuration file from an FTP server. The configuration file becomes the startup configuration on the G350.
- Use the **copy tftp startup-config** command to restore a configuration file from a TFTP server. The configuration file becomes the startup configuration on the G350.
- Use the **copy running-config ftp** command to back up the running configuration on the G350 to an FTP server.
- Use the **copy running-config tftp** command to back up the running configuration on the G350 to a TFTP server.
- Use the **copy startup-config ftp** command to back up the startup configuration on the G350 to an FTP server.
- Use the **copy startup-config tftp** command to back up the startup configuration on the G350 to a TFTP server.

Listing the files on the Avaya G350 Media Gateway

Use the **dir** command to list all G350 files. When you list the files, you can see the version numbers of the software components. The **dir** command also shows the booter file, which cannot be changed.

5 Configuring logging

This chapter provides information on G350 system logging and contains the following sections:

- Logging overview — overview of the G350 logging process
- Syslog server — instructions on how to enable and disable Syslog servers
- Logging file — instructions on how to enable and disable message logging to non-volatile memory, and how to display and delete the log file
- Logging session — instructions on how to enable and disable the display of logging messages to your screen
- Filters and severity levels — instructions on how to filter logging messages

Logging overview

The Avaya G350 Media Gateway includes a logging package that collects system messages in several output types. Each of these types is called a sink. When the system generates a logging message, the message can be sent to each sink that you have enabled. You can define filters for each sink to limit the types of messages the sink receives.

Table 2: Logging sinks

Sink	Description
Session	Logging messages are sent to the terminal screen. This sink is disabled whenever a session ends, and remains disabled until the user enables it.
Log file	Logging data is saved in non-volatile memory (NVRAM). These files serve as the system logging database.
Syslog	Logging messages are sent to up to three configured servers, using Syslog protocol.

System messages do not always indicate problems. Some messages are informational, while others may help to diagnose problems with communications lines, internal hardware, and system software.

By default, all sinks are disabled. When you reset the G350, the Session sink is disabled, even if you enabled it during the session. The other sinks retain whatever setting they had before the reset. Filters are not disabled when you reset the G350.

Syslog server

A Syslog server is a remote server that receives logging messages using Syslog protocol. This enables storage of large log files, which you can use to generate reports. You can define up to three Syslog servers.

To define and configure a Syslog server:

1. To define the Syslog server, type the **set logging server** command, followed by the IP address of the server.
2. To enable the Syslog server, type the **set logging server enable command**, followed by the IP address of the Syslog server. When you define a new Syslog server, it is defined as disabled, so you must use this command in order to enable the server.
3. To define an output facility for the Syslog server, type the **set logging server facility** command, followed by the name of the output facility and the IP address of the Syslog server. (This step is optional.) The following is a list of possible facilities:

   auth (Authorization)
   daemon (Background System Process)
   clkd (Clock Daemon)
   clkd2 (Clock Daemon)
   mail (Electronic Mail)
   local0 – local7 (For Local Use)
   ftpd (FTP Daemon)
   kern (Kernel)
   alert (Log Alert)
   audi (Log Audit)
   ntp (NTP Subsystem)
   lpr (Printing)
   sec (Security)
   syslog (System Logging)
   uucp (Unix-to-Unix Copy Program)
   news (Usenet news)
   user (User Process)

   The following example defines the FTP Daemon as the output facility for Syslog reports generated by the Syslog server with the IP address 168.12.1.15:

   ```
   set logging server facility ftpd 168.12.1.15
   ```

4. To limit access to the Syslog server output, type the **set logging server access-level** command, followed by an access level (read-only, read-write, or admin). Only users with the appropriate access level can access the Syslog output.

To disable a Syslog server, type the **set logging server disable** command, followed by the IP address of the Syslog server.

To delete a Syslog server from the Syslog server table, type the **clear logging server** command, followed by the IP address of the Syslog server you want to delete.

To display the status of a Syslog server, use the **show logging server condition** command, followed by the IP address of the Syslog server. If you do not specify an IP address, the command displays the status of all Syslog servers defined for the G350. This command displays whether the server is enabled or disabled, and lists all filters defined on the server.

The Syslog sink has the following default settings:

- **Severity** — warning
- **Facility** — local 7
- **Access level** — read-write

Logging file

To enable the logging of system messages to a log file in non-volatile memory (NVRAM), type the **set logging file enable** command. To disable the logging of system messages to a log file, type the **set logging file disable** command.

To delete the current log file and open an empty log file, type the **clear logging file** command.

To display messages in the log file, type the **show logging file content** command. You can filter this command by severity per application. See Filters and severity levels on page 53. You can also limit the number of messages to display. The following example displays the 50 most recent QoS messages with a severity level of Critical or higher:

```
show logging file content qos critical 50
```

Logging session

To start the display of system messages to the terminal screen, type the **set logging session enable** command. To discontinue the display of system messages to the terminal screen, type the **set logging session disable** command.

To display how session logging is configured, type the **show logging session condition** command. This command displays whether session logging is enabled or disabled, and lists all filters defined for session logging.

Filters and severity levels

You can use filtering options to reduce the number of collected and transmitted messages. The filtering options are based on message classification by application and severity. For a specified sink, you can define the threshold severity for message output for each application. Messages with a severity lower than the defined threshold are not sent to the specified sink.

Table 3, Severity levels, on page 54 lists the eight available severity levels.

Table 3: Severity levels

Severity level	Code	Description
Emergency	0	System is unusable
Alert	1	Immediate action required
Critical	2	Critical condition
Error	3	Error condition
Warning	4	Warning condition
Notification	5	Normal but significant condition
Informational	6	Informational message only
Debugging	7	Message that only appears during debugging

To configure a filter that will eliminate all messages for the specified application, type **none** instead of a severity level.

The sinks have the following default severity levels:

- **Session** — warning
- **Log file** — informational
- **Syslog** — warning

Filters are defined per application. Table 4, Logging applications, on page 54 lists the applications for which you can define filters.

Table 4: Logging applications

Application	Description
boot	System startup failures
system	Operating system failures
router	Core routing system failures
config	Configuration changes
temp	Temperature messages
filesys	File system problem (flash)
fan	Cooling system
supply	Power supply system
security	Authentication failure
cascade	Stack CASCADE mechanism
qos	QoS messages
	1 of 2

Table 4: Logging applications

Application	Description
switchfabric	Switch fabric failures
lag	Link Aggregation package
vlan	VLAN package
ospf	OSPF routing package
rip	RIP routing package
ldap	LDAP client
snmp	SNMP agent
policy	Policy package
cli	CLI
stp	Spanning tree package
atm	ATM expansion
wan	WAN plugged-in expansion
threshold	RMON alarms
	2 of 2

To define a filter that applies to every application, type **all** instead of the application.

Use the **set logging file condition** command to create a filter for system messages that are logged to a log file. The following example defines a filter in which QoS messages with a severity level of Critical or higher are sent to the log file:

```
set logging file condition qos critical
```

Use the **set logging session condition** command to create a filter for system messages that are displayed on the terminal screen. The following example defines a filter in which all messages with a severity level of Warning or higher are displayed on the screen:

```
set logging session condition all warning
```

Use the **set logging server condition** command to create a filter for system messages that are logged to the specified Syslog server. In addition to the application and severity level, you must specify the IP address of the Syslog server to which you want to apply the filter. The following example defines a filter in which no RIP messages are sent to the Syslog server with the IP address 175.5.16.33:

```
set logging server condition rip none 175.5.16.33
```

6 Configuring Ethernet ports

This chapter provides information about configuring Ethernet ports on the Avaya G350 Media Gateway and contains the following sections:

- Ethernet ports on the G350 — a description of the Ethernet ports on the G350
- Configuring switch Ethernet ports — instructions on how to configure Ethernet ports on the G350 switch
- Configuring the WAN Ethernet port — instructions on how to configure the Ethernet port on the G350 router

Ethernet ports on the G350

The switch on the Avaya G350 Media Gateway has the following Ethernet ports:

- The 10/100 mbps fixed switch port on the front panel (port 10/3)
- The 10/100 mbps ports on the Avaya MM314 media module (ports 6/1 through 6/24)
- The Gigabit port on the Avaya MM314 media module (port 6/51)

NOTE:
The ports on the Avaya MM314 media module are only available if your G350 includes this media module.

The router on the Avaya G350 Media Gateway has the following Ethernet port:

- The 10/100 mbps fixed router port on the front panel (port 10/2)

Use a standard network cable when you connect one of the following devices to the fixed router port:

- WAN endpoint device
- Switch
- Router

Use a crossover network cable when you connect a computer or other endpoint device to the fixed router port. For all other Ethernet ports on the G350, you can use either a standard network cable or a crossover network cable to connect any device.

Configuring switch Ethernet ports

For basic configuration of a switch Ethernet port, use the commands listed below. You can also configure the following features on a switch Ethernet port:

- Advanced switching features, including VLANs. For more information, see Chapter 13, "Configuring advanced switching".
- VoIP queuing. To configure VoIP queuing on a switch port, configure a VLAN for the port. Then configure VoIP queuing on the VLAN. For more information about VoIP queuing, see Configuring QoS parameters on page 63.
- Access control policy lists and QoS policy lists. To configure policy lists on a switch port, configure a VLAN for the port. Then configure policy on the VLAN. For more information on policy lists, see Chapter 17, "Configuring policy".
- SNMP Link Up and Link Down traps. For more information, see Configuring SNMP traps on page 102.

Switch Ethernet port commands

Use the following commands for basic configuration of switch Ethernet ports. For more information about these commands, see *Avaya G350 Media Gateway CLI Reference*, 555-245-202.

- Use the **set port auto-negotiation-flowcontrol-advertisement** command to set the flowcontrol advertisement for the specified port when performing auto-negotiation. This command is only applicable to the Gigabit Ethernet port.
- Use the **set port disable** command to disable a port or range of ports.
- Use the **set port duplex** command to configure the duplex type of an Ethernet or Fast Ethernet port or range of ports.You can configure Ethernet and Fast Ethernet interfaces to either full duplex or half duplex. The duplex status of a port in auto-negotiation mode is determined by auto-negotiation. When auto-negotiation is enabled, an error message is generated if you attempt to set the transmission type of auto-negotiation Fast Ethernet ports to half-duplex or full-duplex mode.
- Use the **set port edge admin state** command to set the administrative state the specified port is assumed to be in.
- Use the **set port enable** command to enable a port or a range of ports.
- Use the **set port level** command to set the priority level of a port or range of ports on the switching bus. Packets traveling through a port set at normal priority should be served only after packets traveling through a port set at high priority are served.
- Use the **set port name** command to configure a name for a port.
- Use the **set port negotiation** command to enable or disable the link negotiation protocol on the specified port. This command applies to Fast Ethernet or Gigabit Ethernet ports. When negotiation is enabled, the speed and duplex of the Fast Ethernet ports are determined by auto-negotiation. If negotiation is disabled, the user can set the speed and duplex of the Fast Ethernet ports.

- Use the **set port point-to-point admin status** command, followed by the module and port number of the port, to manage the connection type of the port. Use one of the following arguments with this command:
  - — ***force-true*** — the port is treated as if it were connected point-to-point
  - — ***force-false*** — the port is treated as if it were connected to shared media
  - — ***auto*** — the G350 tries to automatically detect the connection type of the port
- Use the **set port speed** command to configure the speed of a port or range of ports. In auto-negotiation mode, the port's speed is determined by auto-negotiation. An error message is generated if you attempt to set the speed when auto-negotiation is enabled

Configuring the WAN Ethernet port

For basic configuration of the WAN Ethernet port:

1. Use the **interface FastEthernet 10/2** command to enter the context of the port interface.
2. Perform basic configuration of the interface. For more information, see Configuring interfaces on page 134.
3. Use the Ethernet WAN port configuration commands in the context of the port interface. See WAN Ethernet port commands on page 60.

You can also configure the following features on the WAN Ethernet port:

- Primary Management Interface (PMI). For more information, see Configuring the Primary Management Interface (PMI) on page 40.
- Advanced router features. For more information, see Chapter 16, "Configuring the router".
- VoIP queuing. For more information, see Configuring QoS parameters on page 63.
- Access control policy lists and QoS policy lists. For more information, see Chapter 17, "Configuring policy".
- SNMP Link Up and Link Down traps. For more information, see Configuring SNMP traps on page 102.

WAN Ethernet port traffic shaping

You can use traffic shaping to determine the data transfer rate on the WAN Ethernet port. To set traffic shaping, use the **traffic-shape rate** command in the interface context. Traffic shaping works in tandem with the configured bandwidth. If you change the traffic shape rate, this automatically changes the bandwidth. Similarly, if you change the bandwidth, this automatically changes the traffic shape rate.

NOTE:
The traffic shape rate is determined in bits. The bandwidth is determined in kilobytes.

To disable traffic shaping, use the **no** form of the **traffic-shape rate** command.

For information on traffic shaping in general, see Configuring QoS parameters on page 63.

Backup interfaces

You can configure backup relations between a pair of any Layer 2 serial interfaces, including the Fast Ethernet interface. For instructions on how to configure backup interfaces, see Backup interfaces on page 80.

WAN Ethernet port commands

Use the following commands in FastEthernet 10/2 context for basic Ethernet configuration of the WAN Ethernet port:

- Use the **autoneg** command to set the port speed and duplex to auto-negotiation mode for the external FastEthernet port. Use the **no** form of this command to disable the auto-negotiation mode.
- Use the **duplex** command to control the duplex setting for the interface.
- Use the **shutdown** command to set the administrative status of the current interface to down. Use the **no** form of this command to restore the administrative status of the interface to up.
- Use the **speed** command to set the port speed.

7 Configuring VoIP QoS

This chapter provides information about configuring VoIP on the G350 and contains the following sections:

- VoIP overview — an overview of G350 VoIP configuration
- Configuring RTP and RTCP — instructions on how to configure RTP and RTCP protocols on the G350
- Configuring QoS parameters — instructions on how to configure MGP QoS parameters on the G350
- Configuring RTCP QoS parameters — instructions on how to configure RTP QoS parameters on the G350
- Configuring RSVP parameters — instructions on how to configure RSVP protocol on the G350
- Configuring Weighted Fair Queuing (WFQ) — instructions on how to configure the Weighted Fair Queuing (WFQ) feature

VoIP overview

The Avaya G350 Media Gateway provides voice services over IP data networks using VoIP. VoIP is a group of protocols for transmitting and receiving various types of voice data over an IP network. VoIP includes protocols for transmitting and receiving the following types of information:

- Digitally encoded voice data
- Call signalling information
- Call routing information
- QoS information

VoIP uses the RTP and RTCP protocols to transmit and receive digitally encoded voice data. For more information about configuring RTP and RTCP on the Avaya G350 Media Gateway, see Configuring RTP and RTCP on page 62.

You can use many types of telephones and trunks that do not directly support VoIP. The Avaya G350 Media Gateway translates voice and signalling data between VoIP and the system used by the telephones and trunks.

Configuring RTP and RTCP

VoIP uses the RTP and RTCP protocols to transmit and receive digitally encoded voice data. RTP and RTCP are the basis of common VoIP traffic. RTP and RTCP run over UDP and incur a 12-byte header on top of other (IP, UDP) headers. Running on PPP or Frame-Relay, these protocols can be compressed.

Use the **ip rtp port-range** command to configure the range of UDP ports for RTP.

NOTE:
This range should match the range configured in the IP_network region to which the G350 is assigned in the ACM.

Configuring RTP header compression

Use RTP header compression to reduce the amount of bandwidth needed for voice data. The G350 RTP Header Compression process is based on the following:

- The packet order on a PPP and Frame Relay link is preserved.
- After transmitting full headers, usually only the deltas from the full packet's header need to be sent, and not the full header itself. This is due to the IP, UDP, and RTP header structure.
- Since the deltas are often constant, the second order delta is 0 and does not need to be transmitted.

You can configure how often the full header is transmitted, either as a function of time or transmitted compressed packets.

RTP Header Compression can reduce the size of all three headers (IP+UDP+RTP~40 bytes) to 2-4 bytes.

The G350 can only compress RTP packets. Any UDP packet with an even destination port within a user-configurable range of ports, is considered an RTP packet.

The G350 can decompress any type of compressed packets. Decompression is enabled whenever RTP compression is enabled.

Use the following commands to configure RTP header compression:

- Use the **clear ip rtp header-compression** command to clear RTP header compression statistics either for all enabled interfaces or for a specific interface. To clear RTP compression statistics for all enabled interfaces, do not enter an interface type and number. There is no renegotiation of parameters.
- Use the **ip rtp compression-connections** command to control the number of RTP connections supported on this interface. Use the **no** form of this command to restore the default. This command also sets the number of connections in the non-TCP space, not just RTP.

  NOTE:
  This command automatically enables TCP header decompression on this interface.

- Use the **ip rtp max-period** command to set the maximum number of compressed headers that can be sent between full headers.
- Use the **ip rtp max-time** command to set the maximum number of seconds between full headers.

- Use the **ip rtp non-tcp-mode** command to set the header compression mode. When set to **ietf**, the command performs IP header compression according to IPHC RFCs. When set to **non-ietf**, the command performs IP header compression compatible with other vendors, which do not strictly follow the RFCs.

  NOTE:
  IETF mode is not compatible with non-IETF mode.

- Use the **ip rtp port-range** command to configure the range of UDP ports for RTP.
- By default, the G350 decompresses up to 16 compressed TCP connections. You can modify this number (within the range of 3-256) using the **ip tcp decompression-connections** command. Use the **no** form of this command to restore the default. This command only exists in a PPP encapsulated interface.

  NOTE:
  The G350 is currently not capable of actively compressing TCP connections. It decompresses TCP connections compressed on the other side of the link.

- Use the **show ip rtp header-compression** command to display the RTP header compression statistics for a specific interface. If no interface is specified, statistics for all interfaces are displayed.

Configuring QoS parameters

The G350 uses MGCP (H248) protocol for call signalling and call routing information. Use the following commands to configure QoS for signalling and VoIP traffic. For more information about these commands, including parameters and default settings, see *Avaya™ G350 Media Gateway CLI Reference*, 555-245-202.

- Use the **set qos control** command to define the source for QoS control parameters. The source can be either **local** where the user configures the values locally on the G350, or **remote** in which case the values are obtained from the G350's registered MGC.
- Use the **set qos bearer** command to provide the means to set up QoS parameters for the VoIP bearer.

  NOTE:
  The parameters you define using the **set qos bearer** command may conflict with the default QoS list (400). This causes the 801.2p for VoIP packets to differ from settings configured in the QoS list. To avoid this problem, perform the following steps:

  1. Create a new QoS list.
  2. In the new QoS list, either
     - Set the default IP rule composite operation to No Change

       OR

     - Configure the DSCP map according to the QoS parameters you defined using the **set qos bearer** command.

  For instructions on creating a QoS list, see QoS lists on page 160.

- Use the **set qos signal** command to provide the means to set up QoS parameters for MGCP (H248) communication with the MGC.
- Use the **voip-queue** command to select custom queueing and queue sizes for VoIP traffic. By default, VoIP queueing is off.

  NOTE:
  The **voip-queue** command and the **fair-voip-queue** command are mutually exclusive, and cannot both be used in the same configuration script. See Configuring Weighted Fair Queuing (WFQ) on page 65. The recommended queuing mode is Weighted Fair Queuing (**fair-voip-queue**).

- Use the **voip-queue-delay** command to set the maximum queue delay for which to estimate the high priority queue size necessary to meet the queuing delay for a specific VoIP codec. To determine the queue size you currently have, use the **show queueing** command.

  NOTE:
  Codec is a DSP software algorithm used to compress and decompress speech or audio signals in VoIP and other voice transmission protocols.

- Use the **show qos** command to display the local and downloaded QoS parameters.

Configuring RTCP QoS parameters

Use the following commands to configure QoS monitoring for RTCP:

- Use the **set qos rtcp** command to permit the setup of RTCP parameters. The parameters that can be set are enabling or disabling RTCP reporting capability, setting the IP address of the monitor, setting the reporting period (the default is 5 sec.), and defining the listening port number.
- Use the **show qos-rtcp** command to display QoS, RSVP, and RTCP parameters.

Configuring RSVP parameters

VoIP uses the RSVP protocol to reserve network resources for voice data while communicating with other media gateways and other VoIP entities, such as IP phones and softphones.

- Use the **set qos rsvp** command to set the current values for the RSVP parameters of the VoIP engines. The parameters that can be set are enabled/disabled, refresh rate (seconds), failure retry (y or n), and service profile (Guaranteed or Controlled).
- Use the **show qos-rtcp** command to display QoS, RSVP, and RTCP parameters.

Configuring Weighted Fair Queuing (WFQ)

Weighted Fair Queuing (WFQ) provides more balanced distribution of data packets and improved response time for interactive data applications such as telnet. WFQ accomplishes this by improving bandwidth allocation among the different streams of data traffic and giving preference to interactive traffic. WFQ does not cause any degradation to voice service.

To enable WFQ, use the **fair-voip-queue** command in interface context. You can configure WFQ in Serial and Fast Ethernet interfaces. Use the **no** form of this command to disable WFQ on the interface. By default, WFQ is disabled.

NOTE:
The **fair-voip-queue** command and the **voip-queue** command are mutually exclusive, and cannot both be used in the same configuration script. The recommended queuing mode is WFQ (**fair-voip-queue**). See Configuring QoS parameters on page 63.

- Use the **voip-queue-delay** command to set the maximum query delay. To determine the queue size you currently have, use the **show queueing** command.
- Use the **fair-queue-limit** command to specify the maximum number of packets that can be queued in the weighted fair queue. The upper and lower limits of this command depend on the amount of bandwidth configured for the interface.

NOTE:
This command should generally be used only for troubleshooting.

8 Configuring the G350 for modem use

You can connect either a USB or a serial modem to the Avaya G350 Media Gateway. A USB modem must be connected to the USB port on the G350 chassis. A serial modem must be connected to the console port (CONSOLE) on the G350 chassis.

Both the USB port and the CONSOLE port require configuration for modem use. You can configure the ports for modem use via the Avaya IW (see Configuring the G350 using the Avaya IW on page 249) or the GIW (see Configuring the G350 using the GIW on page 283). For details on using a modem with the G350, see *Installation of the Avaya G350 Media Gateway*, 555-245-104.

This chapter explains how to use the CLI to configure the console and USB ports for modem use.

Configuring the USB port for modem use

By default, the USB port is not enabled. To enable the USB port, you must enable the USB interface. Use the **interface usb-modem** command to enable the USB interface. Use the **no** form of this command to disable the USB interface. The **no** form of the **interface usb-modem** command also resets the interface to its default parameter values. These values are:

- **Interface status** — down
- **IP address** — 10.3.0.3
- **Netmask** — 255.255.255.0
- **PPP timeout** — None
- **PPP speed** — 38,400 bps

To set the USB port's parameters, use the following commands in USB interface context:

- Use the **async reset-modem** command to reset the connected modem. You can use this command from within an active PPP session over the USB modem.
- Use the **speed** command to set the PPP baud rate to be used by the USB port when connected to a modem (in bits per second). Options are 9600, 19200, and 38400.
- Use the **ip address** command to assign an IP address and mask to the USB port. This is the IP address to which a remote user can connect using telnet. For example, to assign the IP address 192.168.22.33 with mask 255.255.255.0 to the USB port, use the following command:

  ```
  G350-001(if:USB)# ip address 192.168.22.33 255.255.255.0
  ```

  The default IP address of the USB port is 10.3.0.3 with the mask 255.255.255.0.
- Use the **ppp authentication** command to decide the authentication method used when starting a client session on the PPP server. Use this command with one of the following parameters:
  - ***pap*** — Password Authentication Protocol. An unencrypted password is sent for authentication.
  - ***chap*** — Challenge Handshake Authentication Protocol. An encrypted password is sent for authentication. To configure this password, use the **ppp chap-secret** command.

- — ***none*** — no password is sent.

  NOTE:
  The **ppp authentication** command changes the PPP authentication parameters of the console port as well as the USB port, even if you use the command in USB interface context.

- Use the **shutdown** command to disconnect a session.
- Use the **timeout absolute** command to set the number of minutes until the system automatically disconnects an idle PPP incoming session. By default, there is no timeout.
- Use the **show interface usb-modem** command to display the USB interface parameters, the current status of the USB port, and the identity of any USB modem connected to the USB port.

Configuring the console port for modem use

The console port is labeled CONSOLE. The console port is an RJ-45 socket that functions as a serial port. You can connect a console device or serial modem to the console port to access the CLI. For more information, see Accessing the CLI on page 25.

You can set the console port so that it automatically detects whether a console device or a modem is connected to it. Use the **async mode interactive** command to set the console port to use modem mode every time an Avaya proprietary modem cable is plugged into the console port. If you do not want the console port to automatically detect when a modem is connected to it, use the **async mode terminal** command to disable interactive mode.

NOTE:
By default, async mode is set to ***terminal***.

Use the following commands to configure the console port for use with a modem:

- Use the **async reset-modem** command to reset the connected modem.
- Use the **speed** command to set the PPP baud rate to be used by the console port when connected to a modem (in bits per second). Options are 9600, 19200, and 38400.
- Use the **async modem-type** command to configure the console port for the modem type you want to use. By default, the console port is set to work with MultiTech modems. Set this command to **null** to use any modem type other than MultiTech.
- Use the **interface console** command to enter the console interface configuration mode. Use the **no** form of this command to set the console parameters to their default values.
- Use the **ip address** command to assign an IP address and mask to the console port. This is the IP address to which a remote user can connect using telnet. For example, to assign the IP address 192.168.22.33 with mask 255.255.255.0 to the console port, use the following command:

  ```
  G350-001(if:Console)# ip address 192.168.22.33 255.255.255.0
  ```

  The default IP address of the console port is 10.3.0.1 with the mask 255.255.255.0.
- Use the **ppp authentication** command to decide the authentication method used when starting a client session on the PPP server. Use this command with one of the following parameters:
  - — ***pap*** — Password Authentication Protocol. An unencrypted password is sent for authentication.

— ***chap*** — Challenge Handshake Authentication Protocol. An encrypted password is sent for authentication. To configure this password, use the **ppp chap-secret** command.

— ***none*** — no password is sent.

NOTE:
This command changes the PPP authentication parameters of the USB port as well as the CONSOLE port, even if you use the command in console interface context.

- Use the **shutdown** command to disconnect a session.
- Use the **timeout absolute** command to set the number of minutes until the system automatically disconnects an idle PPP incoming session. By default, there is no timeout.

When you use a console device to access the CLI through the console port, you must configure the serial connection on the console device to match the configuration of the console port. The console port uses the following settings:

- **baud** — 9600
- **data bits** — 8
- **parity** — none
- **stop bits** — 1
- **flow control** — hardware

9 Configuring a WAN

This chapter provides information about configuring WAN features on the Avaya G350 Media Gateway and contains the following sections:

- WAN overview — a description of the WAN features supported on the G350
- Serial interface overview — an overview of serial interfaces
- Initial WAN configuration — instructions on how to configure a WAN line on the G350
- Backup interfaces — a description of backup interfaces and how they work on the G350
- Extended Keepalive — a description of the keepalive feature for sending ping packets through an interface at defined intervals to determine if the interface is up or down
- Dynamic CAC — a description of dynamic CAC and how to configure dynamic CAC on a WAN interface
- Frame relay encapsulation — a description of the frame relay encapsulation features supported on the G350
- Priority DLCI — a description of class-based traffic assignment (priority DLCI) and how to configure priority DLCI on a WAN interface
- WAN configuration example — an example of a WAN configuration on the G350

WAN overview

When you add a WAN media module to the Avaya G350 Media Gateway, you can connect an E1/T1 or USP WAN line to the G350. The G350 is an endpoint device and router for the WAN. For more information about routing, see Configuring the router on page 133.

The G350 supports the following WAN features:

- PPP over channeled and fractional E1/T1 — the G350 has the ability to map several PPP sessions to a single E1/T1 interface
- PPP over USP
- Unframed E1 for enabling full 2.048 Mbps bandwidth usage.
- Point-to-Point frame relay encapsulation over channelized, fractional, or unframed E1/T1 ports or over a USP interface.
- Frame relay — the G350 supports the following LMI types:
  - ANSI (Annex D)
  - ITU-T:Q-933 (Annex A0)
  - LMI-Rev1
  - No LMI
- Backup functionality supported between any type of Serial Layer 2 interface. For more information, see Backup interfaces on page 80.
- Dynamic CAC for Fast Ethernet, Serial, and GRE tunnel interfaces. For more information, see Dynamic CAC on page 82.

- Quality of Service (QoS) — the G350 supports the ability to separate traffic into 4 strict priority queues per egress serial interface. The queue assignment is performed using Policy. For more information, see Configuring QoS parameters on page 63.
- Guaranteed delay for VoIP traffic — the G350 supports VoIP Queue mode in which traffic labeled as voice traffic receives preference over all other traffic. The G350 default VoIP queuing mode is optimized for the G.729 CODEC. For more information, see Configuring QoS parameters on page 63.
- Weighted Random Early Detection (WRED) — the G350 uses WRED on its ingress and egress queues in order to improve the performance of the network when overloaded. The purpose of WRED is to indicate to transmitting hosts to reduce their transmission speed when the G350 ingress queues are congested. For more information, see Configuring QoS parameters on page 63.
- Weighted Fair Queuing (WFQ) — the G350 supports WFQ mode, which provides improved bandwidth allocation among the different streams of data traffic and gives preference to interactive traffic without causing any degradation to voice service. For more information, see Configuring Weighted Fair Queuing (WFQ) on page 65.
- Policy — each interface on the G350 can have four active policy lists:
  - Ingress Access Control List
  - Ingress QoS List
  - Egress Access Control List
  - Egress QoS List

  Access control lists define which packets should be forwarded or denied access to the network. QoS lists change the DSCP and 802.1p priority of routed packets according to the packet characteristics. For more information, see Configuring policy on page 159.
- RTP Header Compression — use of RTP compression can save up to 60% of the interface's bandwidth. RTP compression also enhances the efficiency of voice transmission over the network by compressing the headers of Real Time Protocol (RTP) packets, thereby minimizing the overhead and delays involved in RTP implementation. For more information, see Configuring RTP header compression on page 62.

Serial interface overview

A serial interface is a virtual interface that is created over a portion of an E1/T1 or USP port on a WAN media module. Serial interfaces support PPP and frame relay encapsulation protocols.

Figure 1, Layer 1 T1 Port, on page 73 illustrates a Layer 1 T1 port with two Channel Groups defined. All data from each Channel Group is encapsulated using PPP protocol, and is distributed over the multiple IP interfaces defined for each Channel Group.

Figure 1: Layer 1 T1 Port

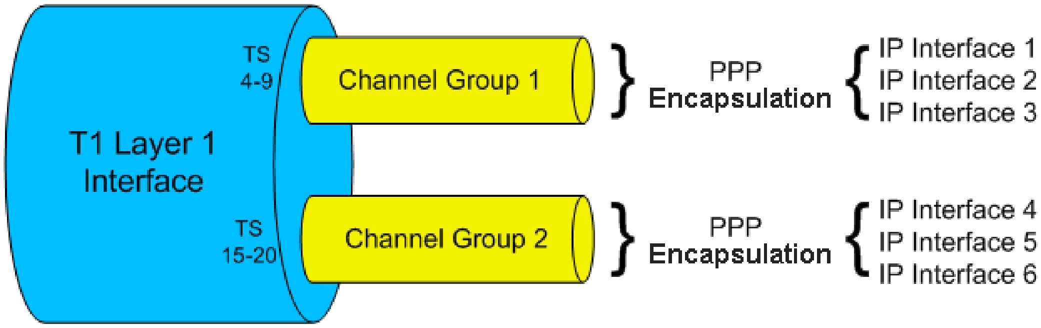


Figure 2, E1/T1 Port Channel Group, on page 73 illustrates an E1/T1 port Channel Group. All data from the Channel Group is encapsulated using frame relay protocol. The data is sent via a frame relay serial interface and Sub-interfaces over the multiple IP interfaces defined using Data Link Connection Identifier (DLCI).

Figure 2: E1/T1 Port Channel Group

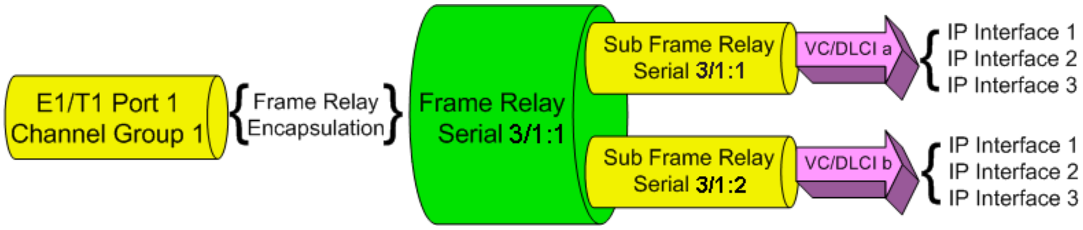


Figure 3, USP Port - Frame Relay Protocol., on page 73 illustrates a USP port. All data from the USP port is encapsulated using the frame relay protocol, and is sent via a frame relay serial interface and sub-interfaces over the single IP interfaces defined using DLCI.

Figure 3: USP Port - Frame Relay Protocol.

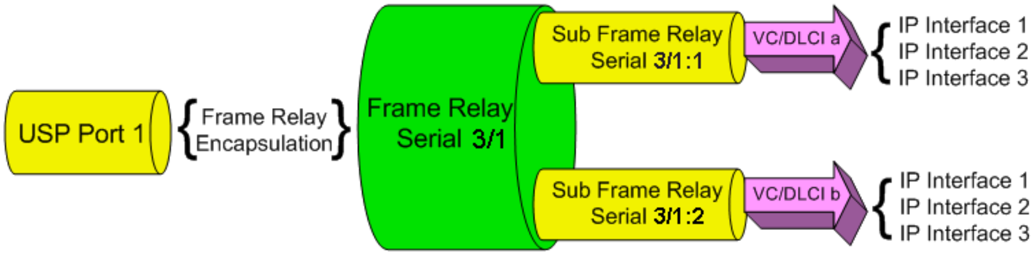
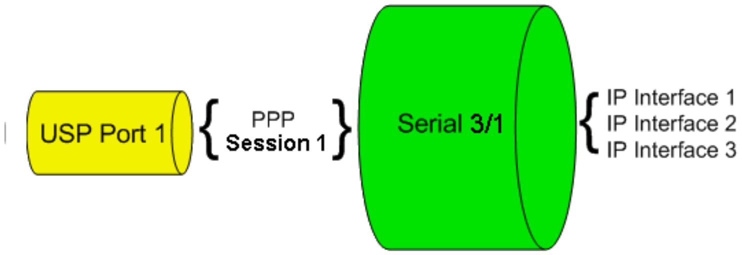


Figure 4, USP Port - PPP Protocol, on page 74 illustrates a USP port. All data from the USP port is encapsulated using the PPP protocol, and is sent via a serial interface over the multiple IP interfaces defined.

Figure 4: USP Port - PPP Protocol



Multipoint topology support

The Avaya G350 Media Gateway supports point-to-point frame relay connections. To enable you to use the G350 as an endpoint in a Point to Multi-Point (PTMP) topology, the G350 supports inverse ARP replies. The G350 responds to inverse ARP queries received on frame relay sub-interfaces with the proper inverse ARP replies.

When you connect the G350 as an endpoint in a PTMP configuration, you need to increase the OSPF timers manually. Use the **ip ospf network point-to-multipoint** command in Interface Serial context to increase the OSPF timers with the following values:

- Increase the OSPF Hello Interval to 30 seconds
- Increase the OSPF Dead Interval to 120 seconds

For more information on OSPF, see Configuring OSPF on page 152.

Initial WAN configuration

To configure the Avaya G350 Media Gateway to support a WAN:

1. Add one of the following WAN media modules:
   — Avaya MM340 E1/T1 media module
   — Avaya MM342 USP media module
2. Connect the WAN line to the media module. For more information, see *Upgrade and Service Guide for the Avaya G350 Media Gateway*, 555-245-106.
3. Configure the WAN interface on the WAN media module:
   — For the MM340, see Configuring the Avaya MM340 E1/T1 WAN media module on page 75.
   — For the MM342, see Configuring the Avaya MM342 USP WAN media module on page 77.

4 If you want frame relay encapsulation on the WAN, configure frame relay. See Configuring frame relay on page 78.

5 Test the WAN configuration. See Verifying the WAN configuration and testing connectivity on page 80.

6 Use the **copy running-config startup-config** command to save the configuration.

Configuring the Avaya MM340 E1/T1 WAN media module

For a list of G350 default settings, see E1/T1 default settings on page 77, or use the **show controllers** command to display the current settings.

To configure an E1 or T1 port:

1 Use the **show controllers** command to check if the mode of your controller is configured as E1 or T1.

2 Use the **ds-mode** command to set the mode of the controller to E1 or T1. Changing the line type requires resetting the module. The default value is T1.

3 Use the **controller slot/port** command to enter controller context for the port to be configured. The prompt changes to:

```
G350-N(controller:s/p)#
```

where `N` is the media gateway number, `s` is the slot number of the media module, and `p` is the port number.

4 Use the following commands to change the clock source, frame type, linecode, or cable length parameters from the default settings:

— For T1 mode:

clock source {line|internal} (default is line)

framing {sf|esf} (default is sf)

linecode {ami|b8zs} (default is ami)

cablelength {long|short} (default is long, Gain 26.0 db)

— For E1 mode:

clock source {line|internal} (default is line)

framing {crc4|no-crc4|unframed} (default is crc4)

linecode {ami|hdb3} (default is hdb3)

5 Use the **channel-group** command to specify the channel group and time slots to be mapped. For E1 mode, you also specify the DS0 speed. For example:

— For T1 mode:

channel-group 1 timeslots 1,3-5,7

configures time slots numbered 1, 3-5 and 7 to be mapped in channel-group number 1, and sets the DS0 speed to 64 kbps.

- For E1 mode:

  channel-group 1 timeslots 1,3-5,7 speed 64

  configures time slots numbered 1, 3-5, and 7 to be mapped in channel-group number 1, and sets the DS0 speed to 64 kbps.

  NOTE:
  The default DS0 speed is 56 kbps.

6 Type **exit** to return to general context. The prompt returns to:

```
G350-N#
```

7 Use the **interface Serial** command to enter the context of the interface. Specify the slot number of the media module, the port number, the channel group number, and optionally the IP interface number. For example:

- **interface Serial 4/1:1** enters a serial interface on the media module in slot number 4, on port number 1, with channel group number 1.
- **interface Serial 5/1:2.3** enters a serial interface on the media module in slot number 5, on port number 1, with channel group number 2, and with IP interface number 3.

You do not need to specify an IP interface number for the first serial interface that you define on a channel group. For each additional serial interface that you define on the channel group, use a different IP interface number.

NOTE:
If you use the **framing unframed** command in Step 3 for an E1 port, a channel group is automatically created on the entire E1 bandwidth. The channel group has the number 0. In Step 6, use the command **interface Serial *s*/*p*:0** where `s` is the slot number and `p` is the port number.

NOTE:
After the serial interface is created, its default encapsulation is PPP.

8 Configure the interface encapsulation:

- For PPP encapsulation, use the **ip address** command to set the IP address and subnet mask of the interface.
- For frame relay encapsulation, see Configuring frame relay on page 78.

9 Type **exit** to return to general context. The prompt returns to:

```
G350-N#
```

10 If needed, repeat Step 6 through Step 8 to configure additional IP interfaces on the same channel group.

11 If needed, repeat Step 5 through Step 9 to configure additional channel groups on the same E1 or T1 port.

12 Test the WAN configuration. See Verifying the WAN configuration and testing connectivity on page 80.

13 Use the **copy running-config startup-config** command to save the configuration.

E1/T1 default settings

Table 5, E1/T1 default settings, on page 77 shows the default settings for E1/T1 WAN lines on the G350:

Table 5: E1/T1 default settings

Function	Default setting
DS mode	T1
E1 framing	CRC4
T1 framing	SF
E1 linecode	HDB3
T1 linecode	AMI
Clock source	Line
T1 cable length	Long, Gain 26.0 db
Speed	56 kbps

Configuring the Avaya MM342 USP WAN media module

For a list of the USP default settings, see USP default settings on page 78.

To configure USP ports:

1. Use the **interface Serial** command to enter the context of the interface. Specify the slot number of the media module, the port number, and optionally the IP interface number. For example:
   - **interface Serial 4/1** enters a serial interface on the media module in slot number 4, on port number 1.
   - **interface Serial 5/1.2** enters a serial interface on the media module in slot number 5, on port number 1, with IP interface number 2.

   You do not need to specify an IP interface number for the first serial interface that you define on a port. For each additional serial interface that you define on the port, use a different IP interface number.
2. Use the following commands to change the idle characters, transmitter delay, encoding type, and bandwidth parameters from their default settings:
   - **idle characters {flags|marks}**
   - **transmitter-delay {number}**

     NOTE:
     The **transmitter-delay** command is usually used when the DCE equipment that is connected directly to the G350, or the router on the WAN have a receive buffer that is not large enough to hold the traffic sent by the G350. In this case, configure **transmitter-delay** on the DCE equipment or the remote router in order to preserve the high performance that you had when **transmitter-delay** was configured to 0 on the G350.

   - **nrzi-encoding**
   - **bandwidth {kilobits}**

3 Configure the interface encapsulation:

- For PPP encapsulation, use the **ip address** command to set the IP address and subnet mask of the interface.
- For frame relay encapsulation, see Configuring frame relay on page 78.

4 Type **exit** to return to general context. The prompt returns to:

```
G350-N#
```

5 Repeat Step 1 to configure additional serial interfaces on the USP port.

6 Test the WAN configuration. See Verifying the WAN configuration and testing connectivity on page 80.

7 Use the **copy running-config startup-config** command to save the configuration.

USP default settings

Table 6, USP default settings, on page 78 shows the default settings for USP WAN lines on the G350:

Table 6: USP default settings

Function	Default setting
Encoding	NRZ
Bandwidth	2048 kbps
Line-up indicator signal	DCD

Configuring frame relay

To configure frame relay encapsulation on a WAN port:

1 Ensure that the port is configured on the media module:

- For an E1/T1 port, see Configuring the Avaya MM340 E1/T1 WAN media module on page 75.
- For a USP port, see Configuring the Avaya MM342 USP WAN media module on page 77.

2 Ensure that you are in the context of a serial interface that is defined on the port. If you are not in the context of a serial interface, use the **interface Serial** command. To view all serial interfaces that are defined, use the **show interfaces Serial** command.

3 Use the **encapsulation frame-relay** command to change the encapsulation to frame relay.

4 If needed, use the **frame-relay lmi** commands to change the Local Management Interface (LMI) parameters from their default values, or use the **frame-relay traffic-shaping** command to activate traffic shaping on the frame relay interface. For more information on traffic shaping, see Traffic Shaping and Marking on page 84.

5 Type **exit** to return to general context.

6 Use the **interface Serial *if.fr-sub-if* point-to-point** command to create a frame relay sub-interface and enter the context of the interface. For example:

- **interface Serial 4/1:2.1 point-to-point**
  creates frame relay sub-interface number 1 on the E1/T1 media module in slot number 4, on port number 1, with channel group number 2
- **interface Serial 5/1:2.3.2 point-to-point**
  creates frame relay sub-interface number 2 on the E1/T1 media module in slot number 5, on port number 1, with channel group number 2, and with IP interface number 3
- **interface Serial 4/1.2 point-to-point**
  creates frame relay sub-interface number 2 on the USP media module in slot number 4, on port number 1
- **interface Serial 5/1.2.1 point-to-point**
  creates frame relay sub-interface number 1 on the USP media module in slot number 5, on port number 1, with IP interface number 2

NOTE:
Currently only point-to-point frame relay sub-interfaces are supported.

7 Use the **frame-relay interface-dlci DLCI-number** command to configure a Data Link Connection Identifier (DLCI) for the frame relay sub-interface.

8 If required, use the **frame-relay priority-dlci-group** command to configure a Priority DLCI group. The arguments for this command are the DLCIs you want to assign to high, medium, normal, and low priority traffic, respectively. For example, the command **frame-relay priority-dlci-group 17 18 19** assigns DLCI 17 to high priority traffic, DLCI 18 to medium priority traffic, and DLCI 19 to normal and low priority traffic. For more information, refer to Traffic Shaping and Marking on page 84.

9 Use the **ip address** command to configure an IP address and subnet mask for the frame relay sub-interface.

10 Type **exit** to return to general context.

11 If needed, repeat Step 6 through Step 10 to configure additional frame relay sub-interfaces on the same serial interface.

12 If needed, repeat Step 2 through Step 11 to configure frame relay encapsulation for other serial interfaces on the same WAN port.

13 Test the WAN configuration. See Verifying the WAN configuration and testing connectivity on page 80.

14 Use the **copy running-config startup-config** command to save the configuration.

Verifying the WAN configuration and testing connectivity

After configuring the new interface, you can perform the following tests to verify that the new interface is operating correctly.

- Use the **show controllers** command to view the status of the controllers for E1/T1 interfaces.
- Use the **show interfaces Serial** command to view information about all serial interfaces.
- Use the **show frame-relay pvc** command to view basic information about frame relay configuration. For more information about frame relay configuration, use the following commands:
  - **show frame-relay fragment**
  - **show frame-relay lmi**
  - **show frame-relay map**
  - **show frame-relay traffic**
  - **show map-class frame-relay**
- Use the **show ip interface** command to display information about IP interfaces. To display information about a specific interface, include the name of the interface as an argument. To display information about the interface of a specific IP address, include the IP address as an argument.
- Use the **show running-config** command to display the configuration running on the switch.
- Use the **show startup-config** command to display the configuration loaded at startup.
- Use the **ping** command to send ICMP echo request packets to another node on the network. Each node is periodically pinged and checked if an answer was received. This checks host reachability and network connectivity.

Backup interfaces

You can configure backup relations between a pair of any Layer 2 serial interfaces. A backup interface is activated when the primary interface fails. The backup interface is deactivated when the primary interface is restored. A PPP session, frame relay interface, frame relay sub-interface, or Fast Ethernet interface can serve as a backup interface to any other serial interface on the same module, including interfaces on different serial ports.

NOTE:
A frame relay interface in a primary or backup role overrides the role of its sub-interfaces.

Configurable activation and deactivation delays provide a damping effect on the backup interface pair. This eliminates primary-to-backup switching in case of fluctuating underlying Layer 2 interfaces. You can configure the following backup delays:

- **Failure delay** — The time in seconds between the primary interface going down and the backup interface activation. Default = 0 seconds, maximum = 3600 seconds.
- **Secondary Disable delay** — The time in seconds between the primary interface restoration and the backup interface deactivation. Default = 0 seconds, maximum = 3600 seconds. Both interfaces are active during this time to enable a smooth transition for the routing protocols.

The following rules govern the interface backup relations:

- Each interface can have only one backup interface.
- A backup interface can serve as a backup for only one other interface.
- Only one member of a primary and backup pair is active at any given time. An interface is automatically deactivated when configured as backup.
- The backup implementation does not protect against the failure of both interfaces. Therefore, if a backup interface fails while active, no switch to the primary interface is attempted.

When using frame relay encapsulation, the frame relay interface is considered down when its primary DLCI is down. The switch over back to the main interface occurs when the primary Data Link Connection Identifier (DLCI) is restored.

NOTE:
The backup interface is not activated when the primary interface is administratively disabled.

Backup commands

Use the following commands to configure a backup interface:

- Use the **backup interface** command, followed by the interface type and number, to set a backup interface. You must use this command from the context of the interface for which you are setting a backup interface.
- Use the **backup delay** command to set the time to wait before switching over to the backup interface, in case of failure. You can also use this command to set a delay before reverting back to the primary interface. For example, the following command causes the G350 to switch immediately to the backup interface in the event of primary interface failure, and to delay 60 seconds before reverting back to the primary interface once the primary interface is restored to service:

```
G350-???(super-if:FastEthernet 10/2)# backup delay 0 60
```

Extended Keepalive

The extended keepalive feature is available for WAN Fast Ethernet interfaces. Extended keepalive sends ping packets through the interface at defined intervals to determine whether the interface is up or down. This feature provides a quick means to determine whether the interface is up or down. This is especially important for policy-based routing, in which it is important to determine as quickly as possible whether the next hop is available. See Configuring policy-based routing on page 177.

Use the **extended-keepalive** command in the context of the interface to enable the extended keepalive feature. Use the **no** form of this command to deactivate the feature.

The **extended-keepalive** command includes the following parameters:

- ***destination ip address*** — the destination IP address for the keepalive packets.
- ***next hop MAC address*** — the next hop MAC address for the keepalive packets. This parameter is only relevant for the WAN Fast Ethernet port.

Use the following commands to define the extended keepalive parameters. For more information about these commands, see *Avaya G350 Media Gateway CLI Reference*, 555-245-202.

- Use the **extended-keepalive timeout** command to set the timeout (in seconds) for receiving the keepalive response. The default value is 1.
- Use the **extended-keepalive success-retries** command to set the number of consecutive successful keepalive packets necessary to set the interface's keepalive status as up. The default value is 1.
- Use the **extended-keepalive failure-retries** command to set the number of consecutive failed keepalive packets necessary to set the interface's keepalive status as down. The default value is 4.
- Use the **extended-keepalive interval** command to set the interval (in seconds) between keepalive packets. The default value is 5.
- Use the **extended-keepalive source-address** command to set the source IP address of the keepalive packets. The default value is the interface's primary IP address.
- Use the **show extended-keepalive** command to display the interface's extended keepalive status and parameters.

The following example configures extended keepalive on interface FastEthernet 10/2 to send keepalive packets to IP address 135.64.2.12 using MAC 11.22.33.44.55.66, at five second intervals. If a response is not received within one second, the keepalive packet is considered to have failed. After three consecutive failed packets, the interface is declared to be down. After two consecutive successful packets, the interface is declared to be up.

```
G350-???# interface FastEthernet 10/2
G350-???(super-if:FastEthernet 10/2)# extended-keepalive 135.64.2.12
11.22.33.44.55.66
G350-???(super-if:FastEthernet 10/2)# extended-keepalive interval 5
G350-???(super-if:FastEthernet 10/2)# extended-keepalive timeout 1
G350-???(super-if:FastEthernet 10/2)# extended-keepalive failure-retries 3
G350-???(super-if:FastEthernet 10/2)# extended-keepalive success-retries 2
Done!
```

A special version of the keepalive feature is available for GRE tunnels. See Tunnel keepalive on page 141.

Dynamic CAC

Dynamic Call Admission Control (CAC) provides enhanced control over WAN bandwidth. When Dynamic CAC is enabled on an interface, the G350 informs the MGC of the actual bandwidth of the interface and tells the MGC to block calls when the bandwidth is exhausted.

Dynamic CAC is especially useful in situations where a primary link is down and a backup link with less bandwidth than the primary link is active in its place. Without dynamic CAC, the MGC is unaware that the interface has switched over to the backup link. Thus, the MGC is unaware of the resulting changes in network topology and bandwidth available for the interface. Consequently, the MGC might allow calls through the interface that require more than the currently available bandwidth.

You can enable dynamic CAC on the following interface types:

- **Fast Ethernet**
- **Serial (PPP or frame-relay)**
- **GRE Tunnel**

Use the **dynamic-cac bbl** command in interface context to enable dynamic CAC on the interface and set the maximum bandwidth for the interface. The **dynamic-cac bbl** command includes the following parameters:

- ***bbl*** — The bearer bandwidth limit (kbps). The MGC enforces this as the maximum bandwidth for the interface. If you set the bbl to 0, the interface can only be used for signalling.
- ***activation priority*** (optional) — If dynamic CAC is activated on more than one active interface, the G350 reports the bearer bandwidth limit of the interface with the highest activation priority. You can set the activation priority to any number between 1 and 255. The default activation priority is 50.

The following example sets dynamic CAC on Fast Ethernet interface 10/2, with a bearer bandwidth limit of 128 and an activation priority of 100:

```
G350-???# interface FastEthernet 10/2
G350-???(super-if:FastEthernet 10/2)# dynamic-cac 128 100
```

Use the **show dynamic-cac** command to display bandwidth information about the interface. The **show dynamic-cac** command displays the following information:

- **Current RBBL** — The current actual bandwidth available on the interface.
- **Last event** — The amount of time since the most recent update by the CAC process.
- **Last event BBL** — The interface’s bandwidth at the time of the most recent update by the CAC process.

NOTE:
Dynamic CAC also requires configuration of the MGC. Refer to the MGC documentation for details.

Frame relay encapsulation

The Avaya G350 Media Gateway supports the following frame relay encapsulation features:

- Priority DLCI
- Traffic shaping and marking per Virtual Channel (VC)
- Priority queuing

NOTE:
The term Virtual Channel (VC) refers to the unidirectional flow of ATM cells between connecting (switching or end-user) points that share a common identifier number.

To improve voice quality using RTP, see Configuring RTP header compression on page 62.

Priority DLCI

To implement new priority mechanisms, ISPs rely on new classes of service. Traffic types and users are divided into these classes and treated differently during peak periods. A premium, or first class user or traffic stream receives higher priority than a general user. This rating system ensures that the critical Internet user maintains peak performance. It also provides a means for ISPs to enhance the cost structure of network operations.

The G350 supports class-based traffic assignment (priority DLCI). Priority DLCI is essentially a means for implementing QoS. The G350 separates traffic with different QoS levels to up to four different VCs on the same frame relay sub-interface. This feature enables you to assign unique Permanent VCs (PVC) for VoIP and non-VoIP traffic. You can set and adjust the priority using policy. For more information, see Configuring policy on page 159.

Configure Priority DLCI using the **frame-relay priority-dlci-group** command in the serial sub-interface context. Specify the DLCIs in this command from the highest to lowest priority. If you specify less than four DLCIs, the last DLCI specified is automatically used for the missing priorities.

When using Priority DLCI, the primary DLCI is used to determine the state of the sub frame relay interface. When the primary DLCI is up, the sub frame relay interface is up. When the primary DLCI is down, the sub frame relay interface is down. When using Priority DLCI, it is therefore recommended to verify that the primary DLCI is set as the High Priority DLCI in the Priority DLCI group.

On the Avaya G350 Media Gateway, OSPF is mapped by default to the High Priority DLCI. For better network reliability, it is recommended to verify that the same configuration exists on the other side of the frame relay connection.

If one of the Priority DLCIs is down, its traffic is dropped.

Map the PVC control protocol on the routers at all ends of a multi-VC point-to-point link. Map this VC to the highest priority DLCI.

Traffic Shaping and Marking

The policing function estimates the parameters of the incoming traffic and takes action if it measures traffic exceeding agreed parameters. The action could be to drop the packets or mark them as being high-drop priority.

The Avaya G350 Media Gateway supports the following traffic shaping parameters per PVC:

- **Committed Information Rate (CIR)** — the amount of committed bandwidth to which the customer is entitled
- **Discard Eligible (DE) pre-mark** — enables marking certain packets as DE
- **Link Fragmentation and Interleaving (LFI)** — enables fragmentation of large frame relay frames per PVC

You can configure the traffic shaping parameters within map classes. A map class is comprised of the following parameters:

- ***CIR*** — Default 56,000 bps
- ***Committed Burst (BC) size*** — default 7,000 bps
- ***Excess Burst (BE) size*** — default 0 bps
- ***DE pre-mark*** — Specifies the amount of non-high priority (0 to 5) packets over the BC and under the BE to label as DE. This amount is measured in percentage of CIR. The default is 100%, unconditionally dropping all packets above the BE.
- ***Fragmentation*** — Fragment size, in bytes. The default is No Fragmentation.

You can configure up to 128 different map classes using different combinations of traffic shaping parameters. You then apply these map classes to either the Primary VC or to the Priority DLCI group VCs.

NOTE:
You must configure the Primary VC before associating a DLCI map class to the Priority DLCI group VCs. Removing the Primary VC after associating a DLCI map class to the Priority LCI group VCs, removes their map class configuration.

You can enable traffic shaping on a frame relay interface using the **frame-relay traffic-shaping** command. After you enable traffic shaping, a default map class is applied to all currently configured PVCs. In this default map class, the BE is zero. All traffic above the BC is dropped.

Priority queuing

Priority queuing is designed to give all mission-critical programs higher priority than less critical traffic. Traffic is queued as high, normal, medium, or low. Using priority queuing, all high-priority traffic is serviced first, then normal, etc.

The frame relay ingress queuing mechanism functions the same as on PPP interfaces. The frame relay egress queuing mechanism also functions the same as on PPP interfaces, serving all PVCs configured on the interface, with an additional user-configurable DE buffer. The DE buffer contains all traffic marked as Discard Eligible, and has the lowest priority.

When using VoIP, the G350 enables a distinction within the high-priority queue between priorities 6 and 7. The G350 uses priority 6 for the voice-bearer traffic, and priority 7 for the voice-controller traffic. These two priorities are served on a round-robin basis. Within the high-priority queue, the priority 6 capacity is a maximum of 25% the size of the priority 7 capacity to reduce the delay of voice flow. The priority 6-7 distinction exists in data mode as well, where the queue is divided equally between both capacities.

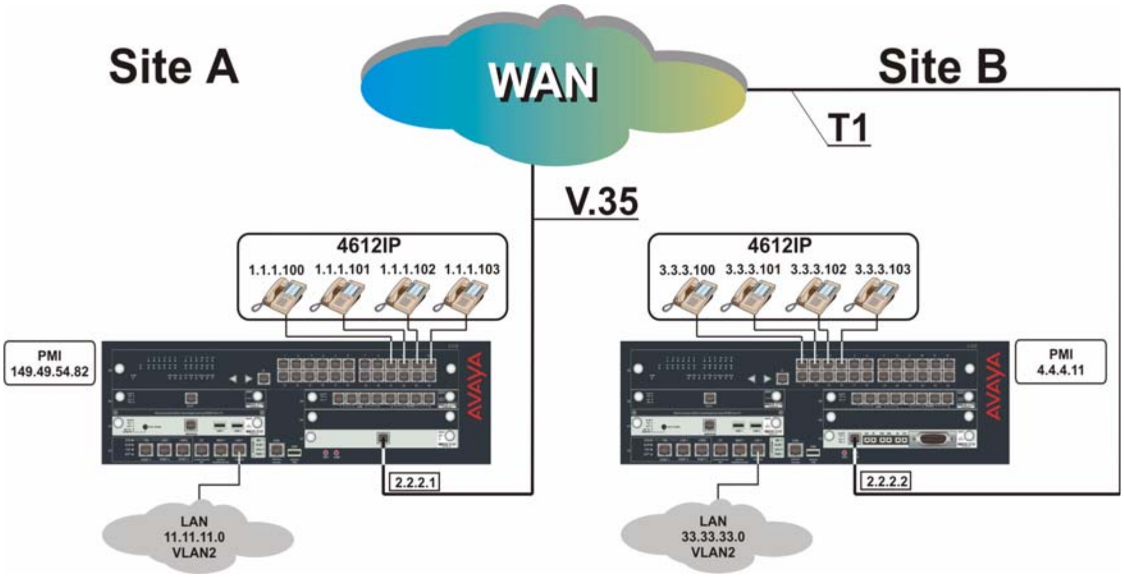
WAN configuration example

This section contains an example that illustrates a common PPP VoIP configuration between two sites connected over a WAN.

PPP VoIP configuration

The following figure illustrates a common PPP VoIP configuration between two sites connected over a WAN:

Figure 5: PPP VoIP configuration over WAN



Site A contains four IP phones and a G350 with S8300 and one MM342 media module. The MM342 media module connects the G350 to the WAN via a USP 128Kbps V.35 interface. Following are the connection details for Site A:

- The IP phones are configured with the following DSCP tagging:
  - Voice = DSCP 46
  - Voice control = DSCP 34

  NOTE:
  The policy list in the next configuration is based on the assumption that the Media Gateway, Media Server, and the IP phones send VoIP control packets with a DSCP value of 34 and voice with a DSCP value of 46. If any of the components of the topology are sending control or voice packets with other DSCP values, you must make changes in the policy list.

- The default RTP UDP port range is 2048 to 3028.

- Network IPs (24 bit subnet masks):
    - IP phones - 1.1.1.0 (VLAN 1)
    - Data - 11.11.11.0 (VLAN 2)
    - Serial - 2.2.2.1
    - S8300 - 149.49.54.81
    - G350 PMI - 149.49.54.82

Site B contains four IP phones and a G350 with S8300 and one MM340 media module. The MM340 media module connects the G350 to the WAN via a two-timeslot (128Kbps) T1 interface. The following are the connection details for Site B:

- IP phone are configured with DSCP tagging:
    - Voice = DSCP 46
    - Voice control = DSCP 34
- The default RTP UDP port range is 2048 to 3028.
- Network IPs (24 bit subnet masks):
    - IP phones - 3.3.3.0 (VLAN 1)
    - Data - 33.33.33.0 (VLAN 2)
    - Serial - 2.2.2.2
    - S8300 - 4.4.4.10
    - G350 PMI - 4.4.4.11

Configuration Example for Site A

The following is the configuration procedure for the G350, as shown in the figure above. Commands with footnotes are described at the end of the configuration procedure.

- Loopback and PMI interfaces configuration:

```
G350-001# interface Loopback 1
G350-001(if:Loopback 1)# ip address 149.49.54.82 24
Done!
G350-001(if:Loopback 1)# pmi
The Primary management interface has changed. Please copy the running
configuration to the start-up configuration file, and reset the device.
G350-001(if:Loopback 1)# exit
G350-001# copy running-config startup-config
G350-001# reset
```

- VLAN interface configuration:

```
G350-001# interface Vlan 1
G350-001(if:Vlan 1)# ip address 1.1.1.1 24
Done!
G350-001(if:Vlan 1)# exit
G350-001# interface Vlan 2
G350-001(if:Vlan 2)# ip address 11.11.11.1 24
Done!
G350-001(if:Vlan 2)# exit
```

- Configuration of a Policy list with the appropriate DSCP-CoS mappings:

```
G350-001# ip qos-list 401
G350-001(QoS 401)# name voice
Done!
G350-001(QoS 401)# dscp-table 34
G350-001(QoS 401/dscp 34)# operation fwd7     (1)
Done!
G350-001(QoS 401/dscp 34)# exit
G350-001(QoS 401)# dscp-table 46
G350-001(QoS 401/dscp 46)# operation fwd6     (2)
Done!
G350-001(QoS 401/dscp 46)# exit
G350-001(QoS 401)# trust-cos-dscp   (3)
Done!
G350-001(QoS 401)# exit
```

- Activating the Policy List on the VLAN 1 interface:

```
G350-001# interface Vlan 1
G350-001(if:Vlan 1)# ip access-group 401 in
Done!
G350-001(if:Vlan 1)# exit
```

- Serial interface configuration:

```
G350-001# interface Serial 5/1
G350-001(if:Serial 5/1)# ip address 2.2.2.1 24
G350-001(if:Serial 5/1)# mtu 300
```

NOTE:
Some LAN data applications do not support fragmented packets. In this case, do not change the MTU from its default of 1500.

```
G350-001(if:Serial 5/1)# bandwidth 128
```

- VoIP configuration:

```
G350-001(if:Serial 5/1)# fair-voip-queue
G350-001(if:Serial 5/1)# ip rtp header-compression
G350-001(if:Serial 5/1)# ip rtp compression-connections 20 (4)
G350-001(if:Serial 5/1)# ip rtp port-range 2048 3028       (5)
G350-001(if:Serial 5/1:1)# queue-limit 1 12                (6)
G350-001(if:Serial 5/1)# exit
```

- Static routes configuration:

```
G350-001# ip default-gateway 2.2.2.2
G350-001# ip route 3.3.3.0 24 serial 5/1
G350-001# ip route 33.33.33.0 24 serial 5/1
```

* Description of footnoted commands (also applies to identical stages in configuring Site B):

(1) At this stage you apply Priority 7 to Voice Control traffic.

(2) At this stage you apply Priority 6 to RTP traffic.

(3) At this stage you apply maximum trust between 802.1p priority and DSCP.

(4) At this stage the number of connections (20) depends on the number of phones.

(5) At this stage you are matching the RTP port range to that of the G350.

(6) At this stage the default queue size is 6, and since RTP is enabled you can double the VoIP queue size.

Configuration Example for Site B

The following is the configuration procedure for the G350:

- Loopback and PMI interfaces configuration:

```
G350-001# interface Loopback 1
G350-001(if:Loopback1)# ip address 4.4.4.11 32
Done!

G350-001(if:Loopback 1)# pmi
The Primary management interface has changed. Please copy the running
configuration to the start-up configuration file, and reset the device.
G350-001(if:Loopback1)# exit
G350-001# copy running-config startup-config
G350-001# reset
```

- VLAN interface configuration:

```
G350-001# interface Vlan 1
G350-001(if:Vlan 1)# ip address 3.3.3.1 24
G350-001(if:Vlan 1)# exit
G350-001# interface Vlan 2
G350-001(if:Vlan 1:2)# ip address 33.33.33.1 24
G350-001(if:Vlan 1:2)# exit
```

- Configuration of a Policy list with the appropriate DSCP-CoS mappings:

```
G350-001# ip qos-list 401
G350-001(QoS 401)# name voice
Done!
G350-001(QoS 401)# dscp-table 34
G350-001(QoS 401/dscp 34)# operation fwd7     (1)
Done!
G350-001(QoS 401/dscp 34)# exit
G350-001(QoS 401)# dscp-table 46
G350-001(QoS 401/dscp 46)# operation fwd6     (2)
Done!
G350-001(QoS 401/dscp 46)# exit
G350-001(QoS 401)# trust trust-cos-dscp   (3)
Done!
G350-001(QoS 401)# exit
```

- Activating the Policy List on the VLAN interface:

```
G350-001# interface Vlan 1
G350-001(if:Vlan 1)# ip access-group 100 in
G350-001(if:Vlan 1)# exit
```

- Serial interface configuration:

```
G350-001# controller t1 5/1
G350-001(controller:5/1)# channel-group 1 timeslots 1-2 speed 64
G350-001(controller:5/1)# exit
G350-001# interface Serial 5/1:1
G350-001(if:Serial 5/1:1)# ip address 2.2.2.2 24
G350-001(if:Serial 5/1:1)# mtu 300
```

NOTE:
Some LAN data applications do not support fragmented packets. In this case, do not change the MTU from its default of 1500.

- VoIP configuration:

```
G350-001(if:Serial 5/1:1)# fair-voip-queue
G350-001(if:Serial 5/1:1)# ip rtp header-compression
G350-001(if:Serial 5/1:1)# ip rtp compression-connections 20
G350-001(if:Serial 5/1:1)# ip rtp port-range 2048 3028
G350-001(if:Serial 5/1:1)# queue-limit 1 12
G350-001(if:Serial 5/1:1)# exit
```

- Static routes configuration:

```
G350-001# ip route 1.1.1.0 24 serial 5/1:1
G350-001# ip route 11.11.11.0 24 serial 5/1:1
```

10 Configuring PoE

This chapter provides information about Power over Ethernet (PoE) using the MM314 PoE media module, and contains the following sections:

- PoE overview — an overview of PoE on the MM314 media module
- PoE configuration CLI commands — a list and descriptions of CLI commands for PoE configuration
- PoE configuration examples — examples of PoE configurations

PoE overview

This section provides an overview of Power over Ethernet (PoE) on the MM314 PoE media module, and includes the following topics:

- Introduction
- Load detection
- Powering devices

Introduction

The Avaya G350 MM314 PoE media module provides Inline DC power over the signal pairs, in addition to switched Ethernet, on the existing LAN infrastructure for devices such as IP telephones and Wireless LAN access points. This allows you to deploy devices in the network that require power without installing standard power cables in hard-to-access areas. The MM314 PoE media module provides power over standard Category 3 and Category 5 cables.

The MM314 PoE media module is designed to comply to the specification of the latest draft of the IEEE 802.3af. For updates, see the Avaya Web site, www.avaya.com.

NOTE:
When you connect a non-powered device to a PoE port, the PoE port status alternates between Searching and Fault. Ignore the Fault status.

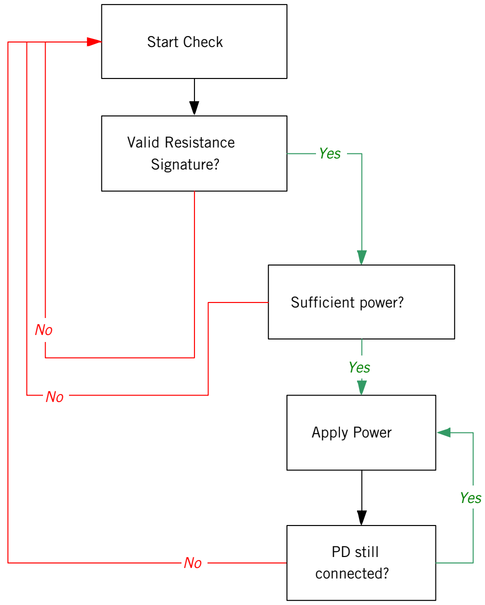
Load detection

The MM314 PoE media module periodically checks all ports, powered and non-powered, to check their status and the power status of connected devices. The module supplies power to a port only after it has detected that a suitable Powered Device (PD) is connected to the port. To check, the media module looks for a signature from the device that indicates that the device requires power.

How the G350 detects a powered device

The MM314 PoE media module uses specific resistance between the power feed pairs and PD connection verification to determine whether to supply power to a given port. The following figure shows the process.

Figure 6: Powered Device Detection



The MM314 PoE media module applies a low voltage to the power feed pairs and measures the current. A resistance of 19kΩ to 26.5kΩ is considered valid. If a valid signature is detected, power is supplied to the port.

Once power is provided to a port, it is checked periodically to see if a PD is still connected. If a PD is disconnected from a powered port, then power is denied to the port.

Hot swapping

You can add and remove powered devices without manually reconfiguring the switch, since it performs a periodic automatic load detection scan on non-powered ports.

- If a powered device that fits the above criteria is detected on a non-powered port, then power is applied to the port.
- If a powered device is removed from a port, then power is denied to that port. The disconnected port is then scanned as well.

In addition, if the PoE module is removed and replaced with module of the same type, the port power configuration of the module is retained.

Powering devices

The Avaya G350 MM314 PoE media module has its own power supply. Therefore, a full 210 W of power is available for PDs. Each port can supply up to 15.4 W by default. Since 210 W may not be enough for driving powered devices on all the ports simultaneously, Avaya has implemented a priority mechanism.

The priority mechanism determines the order in which ports are powered after the switch is booted, and powered down if the power resources of the switch are exhausted.

There are three user-configurable priority levels:

- Low
- High
- Critical

The default value for all ports is Low.

Power is automatically restored to PDs according to their priority when the power budget increases. If the power budget is exceeded, power is not provided to a new PD when you attach it, even if you define its priority as High or Critical.

PoE configuration CLI commands

Use the following commands to configure PoE on an Avaya G350 MM314 PoE media module:

- Use the **set port powerinline** command to enable or disable load detection on a port.
- Use the **set port powerinline priority** to configure the priority level of power over a port.
- Use the **show powerinline** command to display Power over Ethernet (PoE) information.

NOTE:
If a P333T-PWR switch is connected to a port, the **show powerinline** command may incorrectly show the port power status as Delivering Power. To disable inline power for a port connected to a P333T-PWR, use the command **set port powerinline disable**.

PoE configuration examples

This section provides PoE configuration examples.

The following example enables PoE on a port:

```
G350-003(super)# set port powerinline 6/12 enable
Load detection process on port 6/12 is enabled.
```

The following example disables PoE on a port:

```
G350-003(super)# set port powerinline 6/12 disable
Load detection process on port 6/12 is disabled.
```

The following example configures PoE priority on a port:

```
G350-003(super)# set port powerinline priority 6/14 high
Powering priority on port 6/14 was set to High.
```

The following example displays PoE information:

```
G350-003(super)# show powerinline
Port     Inline                Powering
         Operational           Priority
         Status
------   -----------------    ---------
6/1     Searching     Low
6/2     Searching     Low
6/3     Searching     Low
6/4     Searching     Low
6/5     Searching     Low
6/6     Searching     Low
6/7     Searching     Low
6/8     Searching     Low
6/9     Searching     Low
6/10    Searching     Low
6/11    Searching     Low
6/12    Disabled      Low
6/13    Searching     Low
6/14    Searching     High
6/15    Searching     Low
6/16    Searching     Low
6/17    Fault         Low
6/18    Fault         Low
6/19    Searching     Low
6/20    Searching     Low
6/21    Searching     Low
6/22    Fault         Low
6/23    Delivering Power   Low
6/24    Fault         Low
```

11 Configuring Emergency Transfer Relay (ETR)

This chapter provides information about configuring the G350’s Emergency Transfer Relay (ETR) feature and contains the following sections:

- ETR overview — an overview of the G350’s ETR feature
- Setting ETR state — instructions on how to set the ETR state
- Viewing ETR state — instructions on how to display the ETR state

ETR overview

The ETR feature provides basic telephone services in the event of system failure, such as a power outage or a failed connection to Avaya Communication Manager. ETR is activated automatically. When ETR is activated, the Avaya G350 Media Gateway connects the fixed analog trunk port (7/1) to the fixed analog line port (7/2). An outside telephone exchange can be connected to the trunk port and an analog telephone can be connected to the line port. All calls are then directed by the analog relay between the outside line and the analog telephone. A current-loop detection circuit prevents ongoing calls from being disconnected when normal functioning resumes. If a call is in progress on LINE 1 when the problem ends, the call continues. The fixed trunk port (7/1) and analog line ports (7/2 and 7/3) do not start to operate until the call ends.

When ETR is active and the G350 has power, the ETR front panel LED is lit.

Setting ETR state

By default, ETR is set to go into effect automatically in the event of power outage or failed connection to Avaya Communication Manager. There is rarely if ever a reason to change this setting. You can activate and deactivate ETR manually.

To activate ETR manually, use the following command. Generally, you should only use this command for testing since activating ETR shuts down your telephone system except for the connection between the analog trunk port (7/1) and the first analog line port (7/2).

```
set etr 7 manual-on
```

To deactivate ETR manually, use the following command. If the system fails, the trunk and port are automatically latched. ETR does not become active in the event of link failure unless you restore the ETR setting to **auto**.

```
set etr 7 manual-off
```

To restore ETR to automatic activation, use the following command:

```
set etr 7 auto
```

NOTE:
When a call is in progress, the gateway does not turn off ETR mode automatically. If you specify `manual-off`, the call terminates.

Viewing ETR state

You can use the **show etr** command to display ETR information. This information includes the following:

- ETR setting (auto, manual-off, or manual-on)
- Module status (in service, out of service, or out of service waiting for off-hook)
- Trunk number of the trunk connected to ETR
- Line number of the line connected to ETR
- Line status (**off hook** or **on hook**)

12 Configuring SNMP

This chapter provides information about configuring SNMP on the G350 and contains the following sections:

- SNMP configuration overview — an overview of SNMP configuration on G350 devices
- SNMP versions — a description of the SNMP versions supported by the G350
- Configuring SNMP traps — instructions on how to configure SNMP traps on G350 devices
- Configuring SNMP access — instructions on how to configure SNMP access on G350 devices
- Configuring dynamic trap manager — instructions on how to configure dynamic trap manager, a feature that ensures that traps are always sent to the G350's active MGC
- SNMP configuration examples — examples of SNMP configuration

SNMP configuration overview

SNMP uses software entities called managers and agents to manage network devices. The manager monitors and controls all other SNMP-managed devices or network nodes on the network. There must be at least one SNMP Manager in a managed network. The manager is installed on a workstation located on the network.

An agent resides in a managed device or network node. The agent receives instructions from the SNMP Manager, generates reports in response to requests from the SNMP Manager, and sends management information back to the SNMP Manager as events occur. The agent can reside on:

- Routers
- Bridges
- Hubs
- Workstations
- Printers
- Other network devices

There are many SNMP management applications, but all these applications perform the same basic task. They allow SNMP managers to communicate with agents to configure, get statistics and information, and receive alerts from network devices. You can use any SNMP-compatible network management system to monitor and control a G350.

There are several ways that the SNMP manager and the agent communicate. The manager can:

- Retrieve a value – a *get* action.
  The SNMP manager requests information from the agent, such as the number of users logged on to the agent device or the status of a critical process on that device. The agent gets the value of the requested Management Information Base (MIB) variable and sends the value back to the manager.

- Retrieve the value immediately after the variable you name — a *get-next* action.
  The SNMP manager retrieves values from the MIB tree. Using the get-next function, you do not need to know the exact variable name you are looking for. The SNMP manager takes the variable you name and then uses a sequential search to find the desired variable.
- Retrieve a number of values — a *get-bulk* action.
  The get-bulk operation retrieves the specified number of instances of the requested MIB variable. This minimizes the number of protocol exchanges required to retrieve a large amount of data.

  NOTE:
  Get-bulk is not supported in SNMPv1.

- Change a setting on the agent — a *set* action.
  The SNMP manager requests the agent to change the value of the MIB variable. For example, you can run a script or an application on a remote device with a set action.
- An agent can send an unsolicited message to the manager at any time if a significant, predetermined event takes place on the agent. This message is called a *trap*.
  When a trap condition occurs, the SNMP agent sends an SNMP trap message to the device specified as the trap receiver or trap host. The SNMP Administrator configures the trap host, usually the SNMP management station, to perform the action needed when a trap is detected.

  NOTE:
  For a list of traps and MIBS, see Traps and MIBs on page 191.

SNMP versions

There are currently three versions of SNMP:

- SNMPv1
- SNMPv2c
- SNMPv3

The Avaya G350 Media Gateway supports all three of these versions. The implementation of SNMPv3 on the G350 is backwards compatible. An agent that supports SNMPv3 will also support SNMPv1 and SNMPv2c.

SNMPv1

SNMPv1 uses community strings to limit access rights. Each SNMP device is assigned to a read community and a write community. To communicate with a device, you must send an SNMP packet with the relevant community name.

By default, if you communicate with a device using only the read community, you are assigned the security name *ReadCommN*. This security name is mapped to the *ReadCommG* group by default. This allows you to view the agent’s MIB tree, but you cannot change any of the values in the MIB tree.

If you communicate with a device using the write community, you are assigned the security name *WriteCommN*. This security name is mapped to the *WriteCommG* group by default. This allows you to view the agent's MIB tree and change any of the values in the MIB tree.

NOTE:
If you delete the ReadCommN or WriteCommN userrs, the ReadCommG or WriteCommG groups, or the SNMPv1View, you may not be able to access the device using SNMPv1 or SNMPv2c.

In addition, traps are sent to designated trap receivers. Packets with trap information also contain a trap community string.

SNMPv2c

SNMPv2c is very similar to SNMPv1. However, SNMPv2c adds support for the *get-bulk* action and supports a different trap format.

SNMPv3

SNMPv3 enables the following features over SNMPv1 or v2c:

- User authentication with a user name and password.
- Communication encryption between the Network Management Station (NMS) and the SNMP agent at the application level.
- Access control definition for specific MIB items available on the SNMP agent.
- Notification of specified network events directed toward specified users.
- Definition of roles using access control, each with unique access permissions and authentication and encryption requirements.

The basic components in SNMPv3 access control are users, groups, and views. In addition, SNMPv2 uses an SNMP engine ID to identify SNMP identity. An SNMP engine ID is assigned to each IP address of each device in the network. Each SNMP engine ID should be unique in the network.

Users

SNMPv3 uses the User-based Security Model (USM) for security, and the View-based Access Control Model (VACM) for access control. USM uses the HMAC-MD5-96 and HMAC-SHA-96 protocols for user authentication, and the CBC-DES56 protocol for encryption or privacy.

An unlimited number of uses can access SNMPv3 at the same time.

SNMP supports three security levels:

- **NoAuthNoPriv** — This is the lowest level of SNMPv3 security. No Message Authentication Code (MAC) is provided with the message, and no encryption is performed. This method maintains the same security level as SNMPv1, but provides a method for limiting the access rights of the user.

- **AuthNoPriv** — User authentication is performed based on MD5 or SHA algorithms. The message is sent with an HMAC that is calculated with the user key. The data part is sent unencrypted.
- **AuthPriv** — User authentication is performed based on MD5 or SHA algorithms. The message is sent in encrypted MAC that is calculated with the user key, and the data part is sent with DES56 encryption using the user key.

Use the **snmp-server user** command to create a user or to change the parameters of an existing user. This command includes the following parameters:

- ***Username*** — A string of up to 32 characters representing the name of the user.
- ***Groupname*** — A string of up to 32 characters representing the name of the group with which the user is associated.
- ***SecurityModel*** — The SNMP version functionality that the user is authorized to use. Possible values are: v1 (SNMPv1), v2c (SNMPv2c), and v3 (SNMPv3).
- ***Authentication Protocol*** — The authentication protocol to use. Possible values are: encrypted (no authentication), md5 (HMAC MD5), and sha (HMAC SHA-1).
- ***Authentication Password*** — A string of between 8 and 64 characters specifying the user's authentication password. The authentication password is transformed using the authentication protocol and the SNMP engine ID to create an authentication key.
- ***Privacy Protocol*** — The privacy protocol to use. Possible values are: No privacy, DES privacy.
- ***Privacy Password*** — A string of between 8 and 64 characters specifying the user's privacy password.
- ***Volatile*** — Specifies that the user configurations are only set temporarily, until the system is reset. After reset, the user settings return to their previous values.

Use the **no** form of the **snmp-server user** command to remove a user from a specified group. If you do not specify a group, the **no** form of the **snmp-server user** command removes the user from all groups.

Groups

In SNMPv3, each user is mapped to a group. The group maps its users to defined views. These views define sets of access rights, including read, write, and trap or inform notifications the users can receive.

The group maps its users to views based on the security mode and level with which the user is communicating with the G350. Within a group, the following combinations of security mode and level can be mapped to views:

- **SNMPv1** — Anyone with a valid SNMPv1 community name.
- **SNMPv2c** — Anyone with a valid SNMPv2c community name.
- **NoAuthNoPriv** — An SNMPv3 user using the NoAuthNoPriv security level.
- **AuthNoPriv** — An SNMPv3 user using the AuthNoPriv security level.
- **AuthPriv** — An SNMPv3 user using the AuthPriv security level.

If views are not defined for all security modes and levels, a user can access the highest level view below the user's security level. For example, if the SNMPv1 and SNMPv2c views are undefined for a group, anyone logging in using SNMPv1 and SNMPv2c cannot access the device. If the NoAuthNoPriv view is not defined for a group, SNMPv3 users with a NoAuthNoPriv security level can access the SNMPv2c view.

To create an SNMPv3 group, the following information must be provided:

- **GroupName** — A 32-character string representing the name of the group.
- **SNMPv1** — The name of the view for anyone communicating with the device via SNMPv1.
- **SNMPv2c** — The name of the view for anyone communicating with the device via SNMPv2c.
- **NoAuthNoPriv** — The name of the view for SNMPv3 NoAuthNoPriv users.
- **AuthNoPriv** — The name of the view for SNMPv3 AuthNoPriv users.
- **AuthPriv** — The name of the view for SNMPv3 AuthPriv users.

The G350 includes the following pre-configured groups:

Group Name	Security Model	Security Level	Read View Name	Write View Name	Trap View Name
ReadCommG	v1	1 (noAuthNoPriv)	snmpv1View		snmpv1View
ReadCommG	v2	1 (noAuthNoPriv)	snmpv1View		snmpv1View
WriteCommG	v1	1 (noAuthNoPriv)	snmpv1View	snmpv1View	snmpv1View
WriteCommG	v2	1 (noAuthNoPriv)	snmpv1View	snmpv1View	snmpv1View
v3ReadWriteG	v3 (USM)	3 (AuthPriv)	v3configview	v3configview	v3configview
v3ReadOnlyG	v3 (USM)	3 (AuthPriv)	v3configview		v3configview
initial	v3 (USM)	1 (noAuthNoPriv)	restricted	restricted	restricted
v3AdminViewG	v3 (USM)	3 (AuthPriv)	iso	iso	iso

Views

There are three types of views:

- **Read Views** — Allow read-only access to a specified list of Object IDs (OIDs) in the MIB tree.
- **Write Views** — Allow read-write access to a specified list of OIDs in the MIB tree.
- **Notify Views** — Allow SNMP notifications from a specified list of OIDs to be sent.

Each view consists of a list of OIDs in the MIB tree. This list can be created using multiple **snmp-server view** commands to either add OIDs to the list or exclude OIDs from a list of all of the OIDs in the G350's MIB tree. You can use wildcards to include or exclude an entire branch of OIDs in the MIB tree, using an asterisk instead of the specific node. For a list of MIBs and their OIDs, see G350 MIBs on page 202.

To create an SNMPv3 view, the following information must be provided:

- **ViewName** — A string of up to 32 characters representing the name of the view.
- **ViewType** — Indicates whether the specified OID is included or excluded from the view.
- **OIDs** — A list of the OIDs accessible using the view.

Configuring SNMP traps

When SNMP traps are enabled on the device, SNMP traps are sent to all IP addresses listed in the trap receivers table. You can add and remove addresses from the trap receivers table. In addition, you can limit the traps sent to specified receivers. You can also enable and disable link up/down traps on specified G350 interfaces. Use the following commands to configure the trap receivers table:

> **NOTE:**
> You need an Admin privilege level to use the SNMP commands.

- Use the **ip snmp-server enable notifications** command to enable SNMP traps and notifications. Use the **no** form of this command to disable SNMP traps and notifications.
- Use the **set snmp trap** command to define SNMPv1 trap receivers and configure SNMPv1 traps sent by the device.
- Use the **clear snmp trap** command to remove an SNMPv1 trap receiver.
- Use the **set port trap** command to enable and disable link-up and link-down notifications and traps.
- Use the **set snmp trap enable/disable auth** command to enable and disable authentication failure traps for all managers.
- Use the **set snmp trap enable frame-relay** command to enable frame-relay traps for all managers.
- Use the **show snmp** command to display SNMP information.
- Use the **snmp-server informs** command to configure the SNMPv3 timeout and retries for notifications.
- Use the **snmp-server host** command to define an SNMPv3 notification host. Use the **no** form of this command to remove an SNMPv3 notification host. You can define the following parameters with this command:
  - ***type*** — Determines whether to send traps or informs to the recipient. The default is traps.
  - ***version*** — Determines the SNMP security model (v1, v2c, v3). If the security model is v1, you must add the v1 community string to use in notifications. The default is v3. If you select v3, you must also specify the authentication method. Options are:
    - ***auth*** — authentication without encryption
    - ***noauth*** — no authentication
    - ***priv*** — authentication with encryption
  - ***community string*** — The v1 community string to use in notifications
  - ***user name*** — The v3 user name to use in notifications
  - ***udp port*** — Optional. A keyword and variable that specify which UDP port of the target host to use.
  - ***notification type*** — The type of traps to be sent. You can choose from the following:
    - ***all*** — all traps
    - ***generic*** — generic traps
    - ***config*** — configuration change notifications
    - ***eth-port-faults*** — Ethernet port fault notifications

- ***sw-redundancy*** — software redundancy notifications
- ***temperature*** — temperature warning notifications
- ***cam-change*** — changes in CAM notifications
- ***13-faults*** — duplicate IP, VLAN violations
- ***lag-events*** — link aggregation faults and configuration changes
- ***policy*** — policy change notifications
- ***link-down-faults*** — ITC proprietary link down notifications
- ***supply*** — main and backup power supply notifications
- ***fan*** — main and backup fan faults notification
- ***cascade*** — cascade connection fault notifications

NOTE:
There is no default value for the ***notification type*** parameter. Thus, you must enter a value in order to send traps.

- Use the **snmp trap link-status** command to enable Link Up and Link Down traps on an interface. You must use this command from an interface context.
- Use the **no snmp trap link-status** command to disable Link Up and Link Down traps on an interface. You must use this command from an interface context.

Configuring SNMP access

Use the following commands to configure SNMP access:

NOTE:
You need an Admin privilege level to use the SNMP commands.

- Use the **ip snmp-server enable** command to enable SNMP access to the G350. Use the **no** form of this command to disable SNMP access to the G350.
- Use the **snmp-server community** command to enable SNMPv1 access to the G350. Use the **no** form of this command to disable SNMPv1 access to the G350.
- Use the **snmp-server user** command to create an SNMPv3 user. Use the **no** form of this command to remove an SNMPv3 user.
- Use the **snmp-server group** command to create an SNMPv3 group. Use the **no** form of this command to remove an SNMPv3 group.
- Use the **snmp-server remote-user** command to create an SNMPv3 remote user for SNMP notifications. Use the **no** form of this command to remove an SNMPv3 remote user for SNMP notifications.
- Use the **set snmp community** command to create or modify an SNMPv1 community.
- Use the **snmp-server engineID** command to configure the SNMPv3 engine ID. Use the **no** form of this command to configure the engine ID to its default value. The SNMP engine ID is set automatically by a calculation based on the MAC address of the host device, but you can change the engine ID using this command. If the SNMP engine ID changes, all users other than the default user are invalid and must be redefined.

- Use the **snmp-server view** command to add or exclude OIDs from a view. Use the **no** form of this command to delete an SNMPv3 view.
- Use the **show snmp view** command to display a list of SNMPv3 views.
- Use the **show snmp userToGroup** command to display a table of SNMPv3 users and the groups to which they are mapped.
- Use the **show snmp engineID** command to display the SNMPv3 engine ID.
- Use the **show snmp group** command to display a list of SNMPv3 groups.
- Use the **show snmp user** command to display a list of SNMPv3 users.
- Use the **show snmp** command to display a list of SNMPv3 notification receivers and SNMPv1 trap receivers.

Configuring dynamic trap manager

Dynamic trap manager is a special feature that ensures that the G350 sends traps directly to the currently active MGC. If the MGC fails, dynamic trap manager ensures that traps are sent to the backup MGC.

Use the **snmp server dynamic-trap-manager** command to specify the parameters of the dynamic trap manager feature. You can configure the following parameters:

- ***type*** — Determines whether to send traps or informs to the recipient. The default is traps.
- ***version*** — Determines the SNMP security model (v1, v2c, v3). If the security model is v1, you must add the v1 community string to use in notifications. The default is v3.
- ***udp port*** — Optional. A keyword and variable that specify which UDP port of the target host to use.
- ***notification type*** — The type of traps to be sent. To send all types of traps, set this parameter to *all*. For a list of possible notification types, see Configuring SNMP traps on page 102.

NOTE:
There is no default value for the ***notification type*** parameter. Thus, you must enter a value in order for the dynamic trap manager to send traps.

The following example configures dynamic trap manager to send all traps:

```
G350-001(super)# snmp-server dynamic-trap-manager traps v1 public
udp-port 162 all
```

SNMP configuration examples

This section provides SNMP configuration examples:

The following example enables link up/down traps on an Ethernet interface:

```
G350-001(super)# interface FastEthernet 10/2
G350-001(super-if:FastEthernet 10/2)# snmp trap link-status
Done!
```

The following example adds an SNMPv1 trap receiver:

```
G350-001(super)# set snmp trap 192.36.44.18
SNMP trap receiver added.
```

The following example disables all traps for an SNMPv1 trap receiver:

```
G350-001(super)# set snmp trap 192.36.44.18 disable all
SNMP all traps disabled.
```

The following example enables config traps for an SNMPv1 trap receiver:

```
G350-001(super)# set snmp trap 192.36.44.18 enable config
SNMP config trap enabled.
```

The following example displays SNMP information:

```
G350-001(super)# show snmp
Authentication trap enabled

Community-Access     Community-String
----------------     ----------------
read-only            public
read-write           public
trap                 public
Trap-Rec-Address     Traps Enabled
----------------     ----------------
192.36.44.18         config
```

The following example deletes an SNMPv1 trap receiver:

```
G350-001(super)# clear snmp trap 192.36.44.18
SNMP trap receiver deleted.
```

The following example disables link up/down traps on an Ethernet interface:

```
G350-001(super-if:FastEthernet 10/2)# no snmp trap link-status
Done!
```

The following example creates a read-only user:

```
G350-001# snmp-server user <username> v3 ReadOnlyG v3 auth {md5|sha}
<authPassword> priv des56 <privPassword>
```

The following example creates a read-write user:

```
G350-001# snmp-server user <username> v3 ReadWriteG v3 auth {md5|sha}
<authPassword> priv des56 <privPassword>
```

The following example creates an admin user:

```
G350-001# snmp-server user <username> v3 v3AdminG v3 auth {md5|sha}
<authPassword> priv des56 <privPassword>
```

The following example sets the SNMPv1 read-only community:

```
G350-001(super)# set snmp community read-only read
SNMP read-only community string set.
```

The following example sets the SNMPv1 read-write community:

```
G350-001(super)# set snmp community read-write write
SNMP read-write community string set.
```

The following example sets the SNMPv1 trap community:

```
G350-001(super)# set snmp community trap trap
SNMP trap community string set
```

The following example enables link up/down trap on a LAN port (6/1):

```
.G350-001(super)# set port trap 6/1 enable
Port 6/1 up/down trap enabled
```

The following example disables link up/down trap on a LAN port:

```
G350-001(super)# set port trap 6/1 disable
Port 6/1 up/down trap disabled
```

13 Configuring advanced switching

This chapter provides information about configuring advanced switching on the switch ports of the Avaya MM314 media module and contains the following sections:

- Configuring VLANs — instructions on how to configure VLANs
- Configuring port redundancy — instructions on how to configure port redundancy
- Configuring port mirroring — instructions on how to configure port mirroring
- Configuring spanning tree — instructions on how to configure spanning tree
- Port classification — instructions on how to configure port classification

Configuring VLANs

This section contains information about VLAN configuration on the G350's switch ports and includes the following topics:

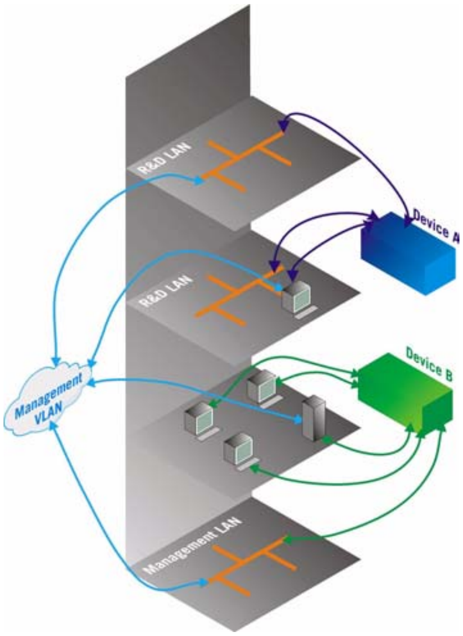
- VLAN overview — an overview of VLANs and how they can be used in a network
- VLAN tagging — an explanation of VLAN tagging
- Multi VLAN binding — an explanation of Multi VLAN binding, also known as Multiple VLANs per port
- G350 VLAN table — an explanation of the G350's VLAN table
- Ingress VLAN security — an explanation of the G350's ingress security mechanism
- ICC-VLAN — instructions on how to configure the ICC-VLAN
- VLAN CLI commands — a list and explanation of the CLI commands used to configure VLANs in the G350
- VLAN configuration examples — examples of how to use CLI commands to configure VLANs in the G350

VLAN overview

A VLAN is made up of a group of devices on one or more LANs that are configured so the devices operate as if they form an independent LAN. These devices can, in fact, be located on several different LAN segments. VLANs can be used to group together departments and other logical groups, thereby reducing network traffic flow and increasing security within the VLAN.

The following figure illustrates how a simple VLAN can connect several endpoints in different locations and attached to different hubs. In this example, the Management VLAN consists of stations on numerous floors of the building which are connected to both Device A and Device B.

Figure 7: VLAN Overview

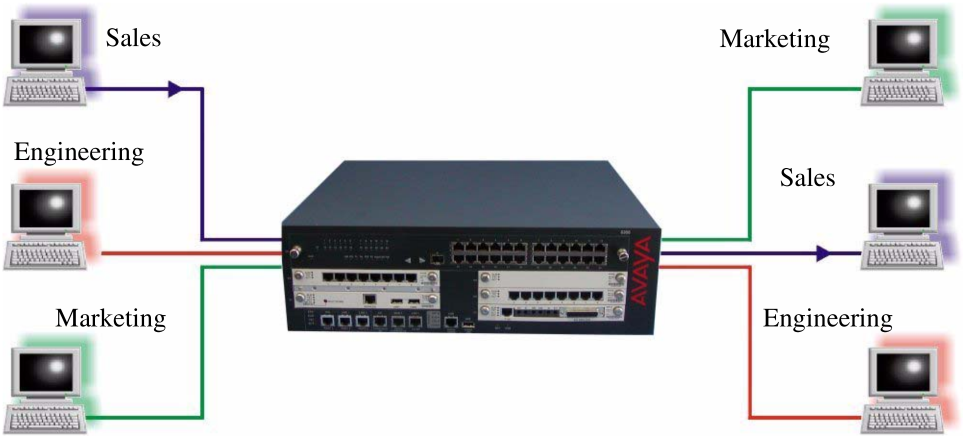


In virtual topological networks, the network devices can be located in diverse places around the LAN. These devices can be in different departments, on different floors, or in different buildings. Connection is achieved through software. Each network device is connected to a switch, and the network manager uses management software to assign each device to a virtual topological network. Elements can be combined into a VLAN even if they are connected to different devices.

You can use VLANs whenever there are one or more groups of network users that you want to separate from the rest of the network.

In the following figure, the switch has three separate VLANs: Sales, Engineering, and Marketing. Each VLAN has several physical ports assigned to it with PCs connected to those ports. When traffic flows from a PC on the Sales VLAN, for example, that traffic is *only* forwarded out the other ports assigned to that VLAN. Thus, the Engineering and Marketing VLANs are not burdened with processing that traffic.

Figure 8: VLAN Example.



VLAN tagging

VLAN Tagging is a method of controlling the distribution of information on the network. The ports on devices supporting VLAN Tagging are configured with the following parameters:

- Port VLAN ID
- Tagging Mode

The Port VLAN ID is the number of the VLAN to which the port is assigned.

> **NOTE:**
> You need to create a VLAN with the **set vlan** command before you can assign it to a port.

Untagged frames and frames tagged with VLAN 0 entering the port are assigned the port's VLAN ID. Tagged frames are unaffected by the port's VLAN ID.

The Tagging Mode determines the behavior of the port that processes outgoing frames:

- If Tagging Mode is set to **Clear**, the port transmits frames that belong to the port's VLAN table. These frames leave the device untagged.
- If Tagging Mode is set to **IEEE-802.1Q**, all frames keep their tags when they leave the device. Frames that enter the switch without a VLAN tag are tagged with the VLAN ID of the port they entered through.

Multi VLAN binding

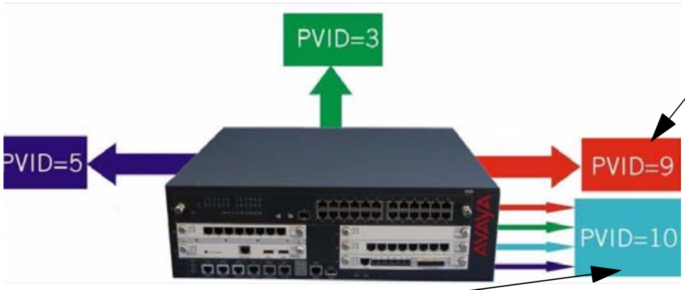
Multi VLAN binding, also known as Multiple VLANs per port, allows access to shared resources by stations that belong to different VLANs through the same port. This is useful in applications such as multi-tenant networks, where each user has his or her own VLAN for privacy. The whole building has a shared high-speed connection to the ISP.

In order to accomplish this, the G350 enables multiple VLANs per port. The available Port Multi-VLAN binding modes are:

- **Bound to Configured** - the port supports all the VLANs configured in the switch. These may be either PVIDs (Port VLAN IDs) or VLANs that were manually added to the switch.
- **Statically Bound** - the port supports VLANs manually configured on it

The following figure shows these binding modes.

Figure 9: Multi VLAN Binding



Static Binding

- The user manually specifies the list of VLAN IDs to be bound to the port, up to eight VLANs
- Default mode for all ports
- Only VLAN 9, and any other VLANs statically configured on the port will be allowed to access this port

Bind to Configured

- The VLAN table of the port will support all the Static VLAN entries and all the ports' VLAN IDs (PVIDs) present in the switch
- VLANs 1,3,5,9,10 coming from the bus are allowed access through this port
- All the ports in Bound to Configured mode support the same list of VLANs

G350 VLAN table

The G350 VLAN table lists all VLANs configured on the G350. You can configure up to eight VLANs. To display a list of VLANs, use the **show vlan** command.

When the VLAN table reaches its maximum capacity, you can not configure any more VLANs. If this occurs, use the **clear vlan** command, followed by the name or number of the VLAN you want to delete, to free space in the VLAN table.

Any new VLANs, either configured by you or learned from incoming traffic, are made known to all the modules in the system.

Ingress VLAN security

A port that is assigned to a VLAN only allows packets tagged for that VLAN to enter the through that port. Ingress VLAN Security therefore allows easy implementation of security.

ICC-VLAN

When the G350 includes an ICC, the ICC connects to the G350 via an internal switch. By default, the ICC is connected on Vlan 1. The VLAN to which the ICC connects is called the ICC-VLAN.

You can use the **icc-vlan** command to attach the ICC to a different VLAN. Enter the context of the VLAN interface to which you want to attach the ICC switch, and type the command the **icc-vlan** command.

To show the current ICC-VLAN, type the **show icc-vlan** command from the general context.

The following example sets Vlan 2 as the ICC-VLAN:

```
G350-???(super)# interface vlan 2
G350-???(super-if:Vlan 2)# icc-vlan
Done!
G350-???(super-if:Vlan 2)# exit
G350-???(super)# show icc-vlan
VLAN 2
G350-???(super)#
```

VLAN CLI commands

The following commands are used to configure VLANs. For more information about these commands, see *Avaya G350 Media Gateway CLI Reference*, 555-245-202.

- Use the **clear port static-vlan** command to delete VLANs statically configured on a port.
- Use the **clear vlan** command to delete an existing VLAN and its interface, and return ports from this VLAN to the default VLAN #1. When you clear a VLAN, all ports assigned to that VLAN are assigned to the default VLAN #1.
- Use the **interface vlan** command to create a VLAN interface and enter the Interface VLAN configuration mode.
- Use the **no interface vlan** command to delete a VLAN interface.
- Use the **set port static-vlan** command to assign static VLANs to ports.
- Use the **set port vlan** command to set the port VLAN ID (PVID). If adding a new VLAN, the VLAN number must be within the range.
- Use the **set port vlan-binding-mode** command to define the binding method used by ports.
- Use the **set trunk** command to configure the VLAN tagging mode of a port.
- Use the **set vlan** command to configure VLANs.
- Use the **show cam vlan** command to display all mac entries in the CAM table for a specific vlan.
- Use the **show interfaces vlan** command to display interface configuration and statistics for a particular VLAN or all VLANs.
- Use the **show port-vlan-binding** command to display port VLAN binding mode information. If no module number is specified then information for all ports on all modules is displayed. If no port number is specified, information for all ports on the specified module is displayed.
- Use the **show trunk** command to display VLAN tagging information for the switch.
- Use the **show vlan** command to display the VLANs configured in the switch.

VLAN configuration examples

This section provides VLAN configuration examples.

The following example deletes a statically bound VLAN from a port:

```
G350-001(super)# clear port static-vlan 10/3 34
VLAN 34 is unbound from port 10/3
```

The following example deletes a VLAN and its interface:

```
G350-001(super)# clear vlan 34

This command will assign all ports on VLAN 34 to their default in the entire
management domain — do you want to continue (Y/N)? y

All ports on VLAN-id assigned to default VLAN.
VLAN 34 was deleted successfully.
```

The following example sets the current VLAN as the ICC-VLAN:

```
G350-001(super)# interface Vlan 66
G350-001(super-if:Vlan 66)# icc-vlan
Done!
```

The following example enters configuration mode for a VLAN interface:

```
G350-001(super)# interface Vlan 66
G350-001(super-if:Vlan 66)#
```

The following example deletes a VLAN interface:

```
G350-001(super)# no interface vlan 66
Done!
```

The following example statically binds a VLAN to a port:

```
G350-001(super)# set port static-vlan 10/3 54
VLAN 54 is bound to port 10/3
```

The following example sets a port's VLAN ID:

```
G350-001(super)# set port vlan 54 10/3

VLAN 54 modified
VLAN     Mod/Ports

----     ---------------------------

 54      10/3
```

The following example sets a port's VLAN binding mode:

```
G350-001(super)# set port vlan-binding-mode 10/3 bind-to-configured
Set Port vlan binding method:10/3
```

The following example configures the VLAN tagging mode of a port:

```
G350-001(super)# set trunk 10/3 dot1q
Dot1Q VLAN tagging set on port 10/3.
```

The following example creates a VLAN:

```
G350-001(super)# set vlan 2121 name Training
VLAN id 2121, vlan-name Training created.
```

The following example displays a list of the MAC addresses in the CAM of a VLAN:

```
G350-001(super)# show cam vlan 54

Total Matching CAM Entries Displayed = 3
Dest MAC/Route Dest VLAN Destination Ports
------------------- ---- -----------------
00:01:02:dd:2f:9f     54      6/13
00:02:2d:47:00:6f      54      10/2
00:02:4b:5b:28:40    54      6/13
```

The following example displays the ICC-VLAN:

```
G350-001(super)# show icc-vlan
VLAN 1
```

The following example displays interface configuration and statistics for a VLAN:

```
G350-001(super)# show interfaces Vlan 1

VLAN 1 is up, line protocol is up
Physical address is 00.04.0d.29.c6.bd.
 MTU 1500 bytes. Bandwidth 100000 kbit.
 Reliability 255/255 txLoad 1/255 rxLoad 1/255
 Encapsulation ARPA, ICC-VLAN
 Link status trap disabled
 Full-duplex, 100Mb/s
 ARP type: ARPA, ARP Timeout 04:00:00
 Last input never, Last output never
 Last clearing of 'show interface' counters never.
 5 minute input rate 0 bits/sec, 0 packets/sec
 5 minute output rate 0 bits/sec, 0 packets/sec
 0 input drops, 0 output drops, 0 unknown protocols
 0 packets input, 0 bytes
 0 broadcasts received, 0 giants
 0 input errors, 0 CRC
 0 packets output, 0 bytes
 0 output errors, 0 collisions
```

The following example displays port VLAN binding information:

```
G350-001(super)# show port vlan-binding-mode 10
port 10/3 is bind to all configured VLANs
```

The following example displays VLAN tagging information:

```
G350-001(super)# show trunk

Port   Mode Binding mode              Native VLAN
------ ----- ------------------------ -----------
10/3   dot1q bound to configured VLANs 54
```

The following example displays the VLANs configured on the device:

```
G50-001(super)# show vlan

VLAN ID VLAN-name
------- --------------------------------
1       V1
54      Marketing
66      V66
2121    Training
Total number of VLANs: 4
```

Configuring port redundancy

This section contains information about port redundancy configuration on G350 switch ports and includes the following topics:

- Port redundancy overview — an overview of port redundancy on the G350
- Secondary port activation — a description of how the secondary port is activated
- Switchback — a description of how switchback occurs
- Port redundancy CLI commands — a list and description of the CLI commands used to configure port redundancy
- Port redundancy configuration examples — examples of port redundancy configurations

Port redundancy overview

Redundancy involves the duplication of devices, services, or connections, so, in the event of a failure, the redundant duplicate can take over for the one that failed.

Since computer networks are critical for business operations, it is vital to ensure that the network continues to function even if a piece of equipment fails. Even the most reliable equipment might fail on occasion, but a redundant component can ensure that the network continues to operate despite such failure.

To achieve port redundancy, you can define a redundancy relationship between any two ports in a switch. One port is defined as the primary port and the other as the secondary port. If the primary port fails, the secondary port takes over.

You can configure up to 25 pairs of ports per chassis. Each pair contains a primary and secondary port. You can configure any type of Ethernet port to be redundant to any other. You can configure redundant ports from among the Ethernet LAN port on the G350 front panel and the Ethernet ports (1-24) and the Gigabit Ethernet port (51) on the MM314 Media Module.

Secondary port activation

The secondary port takes over within one second and is activated when the Primary port link stops functioning. Subsequent switchovers take place after the minimum time between switchovers has elapsed. To set the minimum time between switchovers, use the **set port redundancy-intervals** command.

Switchback

If switchback is enabled and the Primary port recovers, a switchback takes place. Use the **set port redundancy-intervals** command to set the following switchback parameters:

- min-time-between-switchovers — the minimum time that is allowed to elapse before a Primary-Backup switchover
- switchback-interval — the minimum time the Primary port link has to be up before a switchback to the Primary port takes place. If you set this to **none**, there is no switchback to the Primary port when it recovers. In this case, switchback to the Primary port only takes place if the Secondary port fails.

Port redundancy CLI commands

The following commands are used to configure port redundancy. For more information about these commands, see *Avaya G350 Media Gateway CLI Reference*, 555-245-202.

- Use the **set port redundancy enable/disable** command to globally enable or disable the redundancy pairs you have defined. Using this command will not delete existing redundancy entries.
- Use the **set port redundancy on/off** command to define or remove redundancy pairs. Use the **show port redundancy** command to ensure that there is no redundancy scheme already defined on any of the links.
- Use the **set port redundancy-intervals** command to configure the two time constants that determine redundancy switchover parameters.
- Use the **show port redundancy** command to display information about software port redundancy schemes defined for the switch.

NOTE:
If you configure the Ethernet LAN port on the G350 front panel to be redundant with the Gigabit Ethernet port on the MM314 Media Module, the Ethernet LAN port becomes the primary port after resetting the G350 even if you configured the Gigabit Ethernet port to be primary. To prevent this, use the **set port redundancy-intervals** command with the switchback interval parameter set to 0. For example:

```
G350-003(super)# set port redundancy 6/3 6/5 on 1
Monitor: Port 6/5 is redundant to port 6/3.
Port redundancy is active - entry is effective immediately
```

Port redundancy configuration examples

This section provides port redundancy configuration examples.

The following example creates a port redundancy pair:

```
G350-003(super)# set port redundancy 6/3 6/5 on 1
Monitor: Port 6/5 is redundant to port 6/3.
Port redundancy is active - entry is effective immediately
```

The following example deletes a port redundancy pair:

```
G350-003(super)# set port redundancy 6/3 6/5 0
Entry Monitor removed: Port 6/5 is not redundant to port 6/3.
```

The following example enables all configured port redundancies:

```
G350-003(super)# set port redundancy enable
All redundancy schemes are now enabled
```

The following example disables all configured port redundancies:

```
G350-003(super)# set port redundancy disable
All redundancy schemes are disabled but not removed
```

The following example configures the switchback interval for all configured port redundancies:

```
G350-003(super)# set port redundancy-intervals 60 30
Done!
```

The following example displays port redundancy information:

```
G350-003(super)# show port redundancy

Redundancy Name     Primary Port        Secondary Port      Status
-----------------   --------------      ----------------    --------
Monitor               6/3                    6/5             primary
Minimum Time between Switchovers: 60
Switchback interval: 30
```

Configuring port mirroring

This section provides information about configuring port mirroring on G350 devices and includes the following topics:

- Port mirroring overview — an overview of port mirroring on the G350
- Port mirroring CLI commands — a list and description of the CLI commands used to configure port mirroring on the G350
- Port mirroring configuration examples — examples of port mirroring configurations

Port mirroring overview

Port Mirroring copies all received and transmitted packets (including local traffic) from a source port to a predefined destination port, in addition to the normal destination port of the packets. Port Mirroring, also known as “sniffing,” is useful in debugging network problems.

Port mirroring allows you to define a source port and a destination port, regardless of port type. For example, a 10 Mbps and a 100 Mbps port can form a valid source/destination pair. You cannot, however define the port mirroring source and destination ports as the same source and destination port.

You can define one source port and one destination port on each G350 chassis for received (Rx), transmitted (Tx), or transmitted and received (both) traffic.

Port mirroring constraints

You cannot use the LAN port or the WAN Fast Ethernet port in port mirroring.

Port mirroring CLI commands

The following commands are used to configure port mirroring on the G350. For more information about these commands, see *Avaya G350 Media Gateway CLI Reference*, 555-245-202.

- Use the **set port mirror** command to define a port mirroring pair in the switch.
- Use the **show port mirror** command to display mirroring information for the switch.
- Use the **clear port mirror** command to cancel port mirroring.

Port mirroring configuration examples

This section provides port mirroring configuration examples.

The following example creates a port mirroring pair:

```
G350-003(super)# set port mirror source-port 6/2 mirror-port 6/10 sampling
always direction rx
Mirroring rx packets from port 6/2 to port 6/10 is enabled
```

The following example displays port mirroring information:

```
G350-003(super)# show port mirror
port mirroring
Mirroring both Rx and Tx packets from port 6/2 to port 6/10 is enabled
```

The following example disables port mirroring:

```
G350-003(super)# clear port mirror
```

Configuring spanning tree

This section provides information about configuring spanning tree on the G350 and contains the following topics:

- Spanning tree overview — an overview of spanning tree protocol
- Spanning tree CLI commands — a list and description of CLI commands used to configure spanning tree protocol on the G350
- Spanning tree configuration examples — examples of spanning tree protocol configurations

Spanning tree overview

G350 devices support both common Spanning Tree protocol (802.1d) and the enhanced Rapid Spanning Tree protocol (802.1w). The 802.1w standard is a faster and more sophisticated version of the 802.1d (STP) standard. Spanning Tree makes it possible to recover connectivity after an outage within a minute or so. RSTP, with its "rapid" algorithm, can restore connectivity to a network where a backbone link has failed in much less time.

Spanning tree protocol

The Spanning Tree Algorithm ensures the existence of a loop-free topology in networks that contain parallel bridges. A loop occurs when there are alternate routes between hosts. If there is a loop in an extended network, bridges may forward traffic indefinitely, which can result in increased traffic and degradation in network performance.

The Spanning Tree Algorithm:

- Produces a logical tree topology out of any arrangement of bridges. The result is a single path between any two end stations on an extended network.
- Provides a high degree of fault tolerance. It allows the network to automatically reconfigure the spanning tree topology if there is a bridge or data-path failure.

The Spanning Tree Algorithm requires five values to derive the spanning tree topology. These are:

- A multicast address specifying all bridges on the extended network. This address is media-dependent and is automatically determined by the software.
- A network-unique identifier for each bridge on the extended network.
- A unique identifier for each bridge/LAN interface (a port).
- The relative priority of each port.
- The cost of each port.

After these values are assigned, bridges multicast and process the formatted frames (called Bridge Protocol Data Units, or BPDUs) to derive a single, loop-free topology throughout the extended network. The bridges exchange BPDU frames quickly, minimizing the time that service is unavailable between hosts.

Spanning tree per port

Spanning tree can take up to 30 seconds to open traffic on a port. This delay can cause problems on ports carrying time-sensitive traffic. You can therefore enable or disable spanning tree in the G350 on a per-port basis to minimize this effect.

Rapid Spanning Tree Protocol (RSTP)

About the 802.1w (RSTP) standard

The enhanced feature set of the 802.1w standard includes:

- Bridge Protocol Data Unit (BPDU) type 2
- New port roles: Alternate port, Backup port
- Direct handshaking between adjacent bridges regarding a desired topology change (TC). This eliminates the need to wait for the timer to expire.
- Improvement in the time it takes to propagate TC information. Specifically, TC information does not have to be propagated all the way back to the Root Bridge (and back) to be changed.
- Origination of BPDUs on a port-by-port basis

Port roles

At the center of RSTP — specifically as an improvement over STP (802.1d) — are the roles that are assigned to the ports. There are four port roles:

- Root port — port closest to the root bridge
- Designated port — corresponding port on the remote bridge of the local root port
- Alternate port — an alternate route to the root
- Backup port — an alternate route to the network segment

The RSTP algorithm makes it possible to change port roles rapidly through its fast topology change propagation mechanism. For example, a port in the blocking state can be assigned the role of alternate port. When the backbone of the network fails the port can rapidly be changed to forwarding.

Whereas the STA *passively* waited for the network to converge before turning a port into the forwarding state, RSTP *actively* confirms that a port can safely transition to forwarding without relying on any specific, programmed timer configuration.

RSTP provides a means of fast network convergence after a topology change. It does this by assigning different treatments to different port types. The port types and the treatment they receive follow:

- Edge ports — Setting a port to edge-port admin state indicates that this port is connected directly to end stations that cannot create bridging loops in the network. These ports transition quickly to forwarding state. However, if BPDUs are received on an Edge port, it’s operational state will be changed to non-edge-port and bridging loops will be avoided by the RSTP algorithm. The default admin state of all ports is edge-port.
- You must manually configure uplink and backbone ports to be non-edge ports, using the CLI command set port edge admin state.

- Point-to-point Link ports — This port type applies only to ports interconnecting RSTP compliant switches and is used to define whether the devices are interconnected using shared Ethernet segment or point-to-point Ethernet link. RSTP convergence is faster when switches are connected using point-to-point links. The default setting for all ports – automatic detection of point-to-point link – is sufficient for most networks.

Spanning tree CLI commands

Use the following commands to configure spanning tree. For more information about these commands, see *Avaya G350 Media Gateway CLI Reference*, 555-245-202.

- Use the **set port spantree** command to enable or disable the spanning tree mode for specific switch ports.
- Use the **set spantree default-path-cost** command to set the version of the spanning tree default path cost used by this bridge.
- Use the **set spantree enable/disable** command to enable or disable the spanning tree algorithm.
- Use the **set spantree forward-delay** command to specify the time used when transferring the state of a port to the forwarding state.
- Use the **set spantree hello-time** command to specify the time interval between the generation of configuration BPDUs by the root.
- Use the **set spantree max-age** command to specify the time to keep an information message before it is discarded.
- Use the **set spantree priority** command to set the bridge priority for STP.
- Use the **set spantree tx-hold-count** command to set the value in packets used by the spanning tree in order to limit the maximum number of BPDUs transmitted during a hello-time period.
- Use the **set spantree version** command to set the version of the spanning tree protocol.
- Use the **show spantree** command to display spanning-tree information.

Spanning tree configuration examples

This section provides spanning tree configuration examples.

The following example enables spanning tree on a port:

```
G350-003(super)# set port spantree enable 6/8
port 6/8 was enabled on spantree
```

The following example disables spanning tree on a port:

```
G350-003(super)# set port spantree disable 6/8
port 6/8 was disabled on spantree
```

The following example configures the version of the spanning tree default path cost used by this bridge:

```
G350-003(super)# set spantree default-path-cost common-spanning-tree
Spanning tree default path costs is set to common spanning tree.
```

The following example configures the time used when transferring the port to the forwarding state:

```
G350-003(super)# set spantree forward-delay 16
bridge forward delay is set to 16.
```

The following example configures the time interval between the generation of configuration BPDUs by the root:

```
G350-003(super)# set spantree hello-time 2
bridge hello time is set to 2.
```

The following example configures the amount of time an information message is kept before being discarded:

```
G350-003(super)# set spantree max-age 21
bridge max age is set to 21.
```

The following example configures the bridge priority for spanning tree:

```
G350-003(super)# set spantree priority 36864
Bridge priority set to 36864.
```

The following example sets the value in packets used by spanning tree in order to limit the maximum number of BPDUs transmitted during a hello-time period:

```
G350-003(super)# set spantree tx-hold-count 4
tx hold count is set to 4.
```

The following example configures the version of spanning tree to use on the device:

```
G350-003(super)# set spantree version rapid-spanning-tree
Spanning tree version is set to rapid spanning tree.
```

The following example displays spanning tree information:

```
G350-003(super)# show spantree

Spanning tree state is enabled
Designated Root:  00-40-0d-92-22-81
Designated Root Priority: 32768
Designated Root Cost: 19
Designated Root Port: 6/24
Root Max Age: 20   Hello Time: 2
Root Forward Delay: 15
Bridge ID MAC ADDR: 00-04-0d-29-c4-ca
Bridge ID priority: 36864
Bridge Max Age: 21        Bridge Hello Time: 2
Bridge Forward Delay: 16  Tx Hold Count 4
Spanning Tree Version is rapid spanning tree
Spanning Tree Default Path Costs is according to common spanning tree

Port   State         Cost       Priority
------ ------------- ---------- ------------
6 /1   not-connected 100        128
6 /2   not-connected 100        128
6 /3   not-connected 100        128
6 /4   not-connected 100        128
```

```
6 /5   not-connected 100       128
6 /6   not-connected 100       128
6 /7   not-connected 100       128
6 /8   not-connected 100       128
6 /9   not-connected 100       128
6 /10  not-connected 100       128
6 /11  not-connected 100       128
6 /12  not-connected 100       128
6 /13  Forwarding    19        128
6 /14  not-connected 100       128
6 /15  not-connected 100       128
6 /16  not-connected 100       128
6 /17  Forwarding    19        128
6 /18  Forwarding    19        128
6 /19  not-connected 100       128
6 /20  not-connected 100       128
6 /21  not-connected 100       128
6 /22  Forwarding    19        128
6 /23  Forwarding    19        128
6 /24  Forwarding    19        128
6 /51  not-connected 4         128
```

Port classification

This section provides information on configuring port classification on the G350 and includes the following topics:

- Port classification overview — an overview of port classification on the G350
- Port classification CLI commands — a list and description of the CLI commands used to configure port classification on the G350
- Port classification configuration examples — examples of port classification configurations

Port classification overview

With the G350, you can classify any port as either regular or valuable. Classifying a port as valuable means that a link fault trap is sent in the event of a link failure. The trap is sent even when the port is disabled. This feature is particularly useful for the port redundancy application, where you need to be informed about a link failure on the dormant port.

Port classification CLI commands

Use the following commands to configure port classification. For more information about these commands, see *Avaya G350 Media Gateway CLI Reference*, 555-245-202.

- Use the **set port classification** command to set the port classification to either regular or valuable. Any change in the Spanning Tree state from Forwarding for a valuable port will erase all learned MAC addresses in the switch.
- Use the **show port classification** command to display a port's classification.

Port classification configuration examples

This section provides port classification configuration examples.

The following example classifies a port as a valuable port:

```
G350-003(super)# set port classification 6/4 valuable
Port 6/4 classification has been changed.
```

The following example displays the port classification of all ports on the device:

```
G350-003(super)# show port classification
Port      Port Classification
--------  -------------------------
6/1       regular
6/2       regular
6/3       regular
6/4       valuable
6/5       regular
6/6       regular
6/7       regular
6/8       regular
6/9       regular
6/10      regular
6/11      regular
6/12      regular
6/13      regular
6/14      regular
6/15      regular
6/16      regular
6/17      regular
6/18      regular
6/19      regular
6/20      regular
6/21      regular
6/22      regular
6/23      regular
6/24      regular
6/51      valuable
10/3      regular
```

14 Configuring contact closure

This chapter provides information about configuring the G350's contact closure feature and contains the following sections:

- Contact closure overview — an overview of contact closure configuration on the G350
- Contact closure hardware configuration — instructions on how to configure the contact closure hardware
- Contact closure software configuration — instructions on how to configure the G350 to use contact closure
- Showing contact closure status — instructions on how to display the contact closure configuration

Contact closure overview

You can use contact closure to control up to two electrical devices remotely. With contact closure, you can dial feature access codes on a telephone to activate electrical devices such as electrical door locks. You can also activate and deactivate contact closure using CLI commands. You can only use feature access codes if you configure the Avaya G350 Media Gateway to use a media server with Avaya Communication Manager software. For more information, see Configuring the Media Gateway Controller (MGC) on page 41.

Use an Avaya Partner Contact Closure Adjunct™ for contact closure. For more information, see *Overview of the Avaya G350 Media Gateway*, 555-245-201. An Avaya Partner Contact Closure Adjunct contains two relays, one for each electrical device. You can configure each relay in any of the following ways:

- When you dial a code, the relay activates. When you dial another code, the relay returns to normal.
- When you dial a code, the relay activates. After an amount of time that you configure, the relay returns to normal.
- You can control each contact closure relay manually with CLI commands or with Avaya G350 Manager.

NOTE:
Configuration of the feature access code is performed through the Avaya Communication Manager. For more information, see *Administrator's Guide for Avaya Communication Manager*, 555-233-506.

Contact closure hardware configuration

To configure your hardware for contact closure:

1. Connect an Avaya Partner Contact Closure Adjunct to the Contact Closure port on the Avaya G350 Media Gateway front panel. The Contact Closure port is labeled CC. Use a telephone cable with standard RJ-11 connectors.
2. A qualified electrician should connect the electrical devices to the relays on the Avaya Partner Contact Closure Adjunct. For information on contact closure specifications, see *Overview of the Avaya G350 Media Gateway*, 555-245-201.

Contact closure software configuration

You can specify the following contact closure modes:

Mode	Description
mgc	The MGC controls contact closure. In mgc mode, the user dials feature access codes to activate and deactivate contact closure.
manual-trigger	Activates contact closure for the specified relay.
manual-off	Deactivates contact closure for the specified relay.

To configure the Avaya G350 Media Gateway to activate contact closure when the feature access code is dialed:

1. Enter the **set contact-closure admin** command. In the following example, the command sets contact closure to work in relay 1 of the Avaya Partner Contact Closure Adjunct when activated by the call controller.

   ```
   set contact-closure admin 10/1:1 call-controller
   ```

2. Use the **set contact-closure pulse-duration** command to set the length of time for the relay to return to normal after the call controller triggers it. In the following example, the command sets relay 2 of the Avaya Partner Contact Closure Adjunct to return to normal 5 seconds after the call controller triggers contact closure in the relay.

   ```
   set contact-closure pulse-duration 10/1:2 pulse-duration 5
   ```

3. To enable the user to return the relay to normal by dialing a feature access code, set the pulse duration to 0.

To activate contact closure manually, use the **set contact-closure admin** command with the parameter **manual-trigger**. In the following example, the command activates contact closure in relay 1 of the Avaya Partner Contact Closure Adjunct. Contact closure remains active until you deactivate it by using the **set contact-closure admin** command with the parameter **manual-off** or **auto**.

```
set contact-closure admin 10/1:1 manual-trigger
```

To deactivate contact closure manually, use the **set contact-closure admin** command with the parameter **manual-off**. In the following example, the command deactivates contact closure in relay 2 of the Avaya Partner Contact Closure Adjunct. Contact closure will not operate, even automatically, until you use the **set contact-closure admin** command to change the status of contact closure to mgc or manual-trigger.

```
set contact-closure admin 10/1:2 manual-off
```

Showing contact closure status

Use the **show contact-closure** command to display the status of one or more contact closure relays. The following example displays the contact closure status of relay 1 of the Avaya Partner Contact Closure Adjunct box.

```
G350-101(super)# show contact-closure

MODULE   PORT   RELAY   ADMIN             PULSE DURATION (secs)   STATUS
-------  -----  ------  ----------------  ---------------------  ----------
10       1      1       mgc               5 secs                 off
10       1      2       mgc               3 secs                 off
```

15 Configuring RMON monitoring

This chapter provides information on monitoring the G350 and includes the following sections:

- RMON overview — an overview of the RMON network monitoring standard
- RMON CLI commands — a list and description of the CLI commands used to configure RMON monitoring on the G350
- RMON configuration examples — examples of RMON configurations

RMON overview

RMON, the internationally recognized network monitoring standard, is a network management protocol that allows network information to be gathered at a single workstation. You can use RMON probes to monitor and analyze a single segment only. When you deploy a switch on the network, there are additional components in the network that cannot be monitored using RMON. These components include the switch fabric, VLAN, and statistics for all ports.

RMON is the internationally recognized and approved standard for detailed analysis of shared Ethernet media. It ensures consistency in the monitoring and display of statistics between different vendors.

RMON's advanced remote networking capabilities provide the tools needed to monitor and analyze the behavior of segments on a network. In conjunction with an RMON agent, RMON gathers details and logical information about network status, performance and users running applications on the network.

An RMON agent is a probe that collects information about segments, hosts and traffic and sends the information to a management station. You use specific software tools to view the information collected by the RMON agent on the management station.

You can configure Remote Monitoring (RMON) for switching on the Avaya G350 Media Gateway. The G350 uses RMON I, which analyzes the MAC layer (Layer 2 in the OSI seven-layer model). You can also configure a port to raise an SNMP trap whenever the port fails.

RMON CLI commands

Use the following commands to configure RMON. For more information about these commands, see *Avaya G350 Media Gateway CLI Reference*, 555-245-202.

- Use the **rmon alarm** command to create an RMON alarm entry.
- Use the **rmon event** command to create an RMON event entry.
- Use the **rmon history** command to create an RMON history entry.
- Use the **show rmon alarm** command to display all RMON alarm entries.
- Use the **show rmon event** command to display RMON event entries.
- Use the **show rmon history** command to display RMON alarm entries.
- Use the **show rmon statistics** command to display RMON statistics.

RMON configuration examples

This section provides RMON configuration examples.

The following example creates an RMON alarm entry:

```
G350-003(super)# rmon alarm 1 1.3.6.1.2.1.16.1.1.1.5.16777216 20 delta rising-
threshold 10000 32 falling-threshold 1000 32 risingOrFalling root
alarm 1 was created successfully
```

The following example creates an RMON event entry:

```
G350-003(super)# rmon event 32 log description “Change of device” owner root
event 32 was created successfully
```

The following example creates an RMON history entry with an index of 80 on port 24 of the module in slot 6, recording activity over 60 intervals (buckets) of 20 seconds each.

```
G350-003(super)# rmon history 80 6/24 interval 20 buckets 60 owner root
history index 80 was created successfully
```

The following example displays information about an RMON alarm entry:

```
G350-003(super)# show rmon alarm 1

alarm
alarm 1 is active, owned by root
Monitors ifEntry.1.16777216 every 20 seconds
Taking delta samples, last value was 0
Rising threshold is 10000, assigned to event # 32
Falling threshold is 1000, assigned to event # 32
On startup enable rising or_falling alarms
```

The following example displays information about an RMON event entry:

```
G350-003(super)# show rmon event 32

event

Event 32 is active, owned by root
Description is Change of device
Event firing causes log,last fired 12:36:04
```

The following example displays information about an RMON history entry:

```
G350-003(super)# show rmon history 80

history

Entry 80 is active, owned by root
Monitors the port 6/24 every 20 seconds
Requested # of time intervals, ie buckets, is 60
Granted # of time intervals, ie buckets, is 60
Sample # 2 began measuring at 0:21:16
Received 4081 octets, 41 packets,
0 broadcast and 10 multicast packets,
0 undersize and 0 oversize packets,
0 fragments and 0 jabbers,
0 CRC alignment errors and 0 collisions,
# of dropped packet events (due to a lack of resources): 0
Network utilization is estimated at 0
```

The following example displays RMON statistics for a port:

```
G350-003(super)# show rmon statistics 6/24

Statistics for port 6/24 is active, owned by Monitor
Received 6952909 octets, 78136 packets,
26 broadcast and 257 multicast packets,
0 undersize and 0 oversize packets,
0 fragments and 0 jabbers,
0 CRC alignment errors and 0 collisions,
# of dropped packet events (due to a lack of resources): 0
# of packets received of length (in octets):
64:18965, 65-127:295657, 128-255:4033,
256-511:137, 512-1023:156, 1024-1518:0,
```

16 Configuring the router

This chapter provides information about configuring the G350 router and contains the following sections:

- Overview of the G350 router — a list of features supported on the G350 router, along with instructions for enabling and disabling the router
- Configuring interfaces — instructions on how to configure Fast Ethernet, Loopback, Serial, and VLAN interfaces on the router
- Configuring the routing table — instructions on how to configure the routing table
- Configuring GRE tunneling — instructions on how to configure GRE tunnels on the router
- Configuring DHCP and BOOTP relay — instructions on how to configure DHCP and BOOTP relays for routing on the G350
- Configuring broadcast relay — instructions on how to configure broadcast relay for routing on the G350
- Configuring the ARP table — instructions on how to configure the ARP table
- Enabling proxy ARP — instructions on how to enable proxy ARP on an interface
- Configuring ICMP errors — instructions on how to configure whether the router sends ICMP error messages
- Configuring RIP — instructions on how to configure RIP parameters for each interface on the router
- Configuring OSPF — instructions on how to configure OSPF parameters for each interface on the router
- Route redistribution — instructions on how to configure route redistribution among multiple routing protocols
- Configuring VRRP — instructions on how to configure the VRRP protocol so as to support redundancy of LAN routers and load balancing
- Configuring fragmentation — instructions on how to configure IP fragmentation and reassembly on the G350 router

Overview of the G350 router

The Avaya G350 Media Gateway has an internal router. You can configure the following routing features on the router:

- Interfaces
- Routing table
- GRE tunneling
- DHCP and BOOTP relay
- Broadcast relay
- ARP table
- ICMP errors

- RIP
- OSPF
- Route redistribution
- VRRP
- Fragmentation

Use the **ip routing** command to enable the router. Use the **no** form of this command to disable the router.

Configuring interfaces

This section provides information about configuring interfaces on the router and includes the following topics:

- Router interface concepts — a description of the types of interfaces that you can configure on the G350 router
- IP Interface configuration commands — a list and descriptions of the CLI commands used to configure interfaces on the G350 router
- Interface configuration examples — examples of router interface configurations

Router interface concepts

The router in the Avaya G350 Media Gateway includes the following interface categories:

- physical
- Layer 2 virtual
- Layer 3 routing

Physical router interfaces

The following are the physical interfaces of the G350 router:

- **WAN Interfaces** — When you add a WAN media module to the Avaya G350 Media Gateway, the media module provides a WAN interface. You can add one of the following types of WAN media modules:
  - — The Avaya MM340 media module provides an E1/T1 WAN interface.
  - — The Avaya MM342 media module provides a USP WAN interface.
- **Fast Ethernet Interface** — The 10/3 Fast Ethernet port on the front panel of the G350 provides a Fast Ethernet interface. This interface is an autosensing 10/100Mbps Fast Ethernet port. It can be used to connect to a LAN, an external firewall, an external Virtual Private Network (VPN), or a DeMilitarized Zone (DMZ).

- **Switching Interface** — An internal 100Mbps connection to the G350 internal switch provides a switching interface. The switching interface supports VLANs. By default, the switching interface is associated with the first VLAN (Vlan 1).

  When you configure the G350 without an external VPN or firewall, Vlan 1 is used to connect the internal G350 router to the internal G350 switch. If an external firewall or VPN is connected to the Fast Ethernet port, it is important to disable Vlan 1 to prevent a direct flow of packets from the WAN to the LAN.

Layer 2 virtual interfaces

- **Loopback** — The Loopback interface is a virtual Layer 2 interface over which Loopback IP addresses are configured. The Loopback interface represents the router by an IP address that is always available, a feature necessary mainly for network troubleshooting.

  Since the Loopback interface is not connected to any physical interface, an entry in the routing table can not have the Loopback interface's subnet as its next hop.
- **GRE tunnel** — A GRE tunnel is a virtual point-to-point link between two routers at two ends of an Internet cloud. GRE tunneling encapsulates packets and sends them over a GRE tunnel. At the end of the GRE tunnel, the encapsulation is removed and the packet is sent to its destination in the network at the far end of the GRE tunnel. For more information, see Configuring GRE tunneling on page 139.

Layer 2 logical interfaces

- **VLAN (on the Switching Interface)** — The G350 switch can have multiple VLANs defined within its switching fabric. The G350 router supports up to eight VLANs that can be configured over its internal switching interface connection.
- **Serial Interface** — A serial interface is a virtual interface that is created over a portion of an E1/T1 or USP port. Serial interfaces support PPP and frame relay encapsulation protocols. For more information about configuring serial interfaces for a WAN, see Initial WAN configuration on page 74.

  NOTE:
  One or more IP interfaces can be defined over each serial, Fast Ethernet, switching, and Loopback interface.

IP Interface configuration commands

To configure an interface:

1. To create an interface, type the **interface** command, followed by the type of interface you want to create. Some types of interfaces require an identifier as a parameter. Other types of interfaces require the interface's module and port number as a parameter. For example:

   ```
   interface vlan 1
   interface serial 2/1
   ```
2. Use the **ip address** command, followed by an IP address and subnet mask, to assign an IP address to the interface. Use the **no** form of this command to delete the IP interface.

Use the following commands to configure the interface parameters. For more information about these commands, see *Avaya G350 Media Gateway CLI Reference*, 555-245-202.

- Use the **ip admin-state** command to set the administrative state of the IP interface. The default state is up.
- Use the **ip broadcast-address** command to update the interface broadcast address.

Interface configuration examples

Use the following commands to configure the fixed router port with IP address 10.20.30.40 and subnet mask 255.255.0.0:

```
G350-001# interface FastEthernet 10/2
G350-001(if:FastEthernet 10/2)# ip address 10.20.30.40 255.255.0.0
Done!
```

Use the following commands to create VLAN 2 on the Switching Interface and configure it with IP address 10.30.50.70 and subnet mask 255.255.0.0:

```
G350-001# interface Vlan 2
G350-001(if:Vlan 2)# ip address 10.30.50.70 255.255.0.0
Done!
```

Configuring the routing table

This section provides information about configuring the routing table and includes the following topics:

- Overview of the routing table — an overview of the routing table and the types of routes you can configure on the routing table
- Via interface static route — instructions on how to configure a via interface static route
- Permanent static route — instructions on how to configure a permanent static route
- Discard route — instructions on how to configure a discard route
- Routing table commands — a list and descriptions of CLI commands used to configure the routing table

Overview of the routing table

When you configure the routing table, you can:

- View information about the routing table
- Add entries to the routing table
- Delete entries from the routing table

NOTE:
To change an entry in the routing table, delete it and then add it.

The routes in the routing table are static routes. They are never timed-out, and can only be removed manually. If you delete the interface, all static routes on the interface are also deleted.

A static route becomes inactive whenever the underlying Layer 2 interface is down, except for permanent static routes. You can disable the interface manually using the **IP admin-state down** command. For more information, see Permanent static route on page 138. When the underlying Layer 2 interface becomes active, the static route enters the routing table again.

Static routes can be configured with the following as next-hops:

- **Via interface route** — specifies a serial interface as the next-hop, without a specific next-hop IP address. See Via interface static route on page 138.
- **Next-hop IP address** — specifies the IP address of a router as a next-hop. The next-hop router must belong to one of the directly attached networks for which the Avaya G350 Media Gateway has an IP interface.

Two kinds of static routes can be configured:

- **High Preference static routes** — preferred to routes learned from any routing protocol
- **Low Preference static routes** — used temporarily until the route is learned from a routing protocol.

By default, a static route has low preference.

Static routes can be advertised by routing protocols, such as RIP and OSPF. For more information, see Route redistribution on page 154. Static routes also support load-balancing similar to OSPF. You can configure up to three next-hops for each static route in one of the following manners:

- Enter all of the next-hops using a single **ip route** command. To add a new next-hop to an existing static route, enter the new next-hop individually, as in the following option.
- Enter each next-hop individually with it's own **ip route** command.

Using the **no ip route** command deletes the route including all of its next-hops, whether entered individually or with a single command. For example, to specify next-hops 149.49.54.1 and 149.49.75.1 as a static route to the network 10.1.1.0, perform one of the following:

- Use the single **ip route 10.1.1.0 24 149.49.54.1 149.49.75.1** command specifying all next-hops together,

Or

- Use the individual **ip route 10.1.1.0 24 149.49.54.1** and **ip route 10.1.1.0 24 149.49.75.1** commands.

Next-hops can only be added to an existing static route if they have the same preference and metric as the currently defined next-hops.

NOTE:
Metrics are used to choose between routes of the same protocol. Preferences are used to choose between routes of different protocols.

The Avaya G350 Media Gateway supports the following Static Route configurations:

- Via interface static route
- Permanent static route
- Discard route

Via interface static route

PPP and frame relay allow for a Layer 3 interface to be established without knowing in advance the next-hop on the other side of a serial link. In this case you can specify a Serial Layer 2 interface or a GRE tunnel as a next-hop instead of providing a specific next-hop IP address. This is equivalent to specifying the node on the other side of the serial link as the next-hop when its IP address is unknown. The via interface option is configured by specifying the type and the number of the serial interface using the **ip route** command.

> **NOTE:**
> The interface used in the via route must have an IP address attached to it.

For example, the command **ip route 193.168.10.0 24 serial 2/1:1** creates a static route to the network 193.168.10.0 24 via the Serial 2/1:1 interface.

A static route can have both via interface and IP addressed next-hops, with a maximum of three next-hops. If such a combination is required, separate **ip route** commands should be used for the via interface static route and the IP addressed next-hop routes. Also, if more than one via interface next-hops are required, each must be configured by separate **ip route** commands.

Permanent static route

The Avaya G350 Media Gateway enables you to configure a static route as a permanent route. Configuring this option prevents the static route from becoming inactive when the underlying Layer 2 interface is down. This prevents routing table updates from being sent each time an interface goes up or down when there is a fluctuating Layer 2 interface on the static route. Configure the permanent option using the **ip route** command.

For example, the command **ip route 193.168.10.0 24 serial 2/1:1 permanent** creates a permanent static route to the network 193.168.10.0 24 via the Serial 2/1:1 interface.

Permanent static routes should not be configured over Serial Layer 2 interfaces that participate in a Primary-Backup pair. For more information on Backup interfaces, see Backup interfaces on page 80.

Discard route

Discard route enables you to prevent forwarding traffic to specific networks. You can configure a static route that drops all packets destined to the route. This is called a discard route, indicated by the null0 parameter, and is configured using the **ip route <network> <mask> null0** command.

For example, the command **ip route 134.66.0.0 16 Null0** configures the network 134.66.0.0 16 as a discard route.

Routing table commands

Use the following commands to configure the routing table. For more information about these commands, see *Avaya G350 Media Gateway CLI Reference*, 555-245-202.

- Use the **clear ip route** command to delete all dynamic routing entries from the routing table.
- Use the **ip default-gateway** command to define a default gateway for the router. Use the **no** form of this command to remove the default gateway.
- Use the **ip route** command to establish a static route. Use the **no** form of this command to remove a static route.
- Use the **show ip route** command to display information about the IP routing table.
- Use the **show ip route best-match** command to display a routing table for a destination address.
- Use the **show ip route static** command to display static routes.
- Use the **show ip route summary** command to display the number of routes known to the device.
- Use the **traceroute** command, followed by an IP address, to trace the route an IP packet would follow to the specified IP address. The G350 traces the route by launching UDP probe packets with a small time to live (TTL), then listening for an ICMP time exceeded reply from a gateway.

Configuring GRE tunneling

This section provides information about configuring GRE tunnels and contains the following topics:

- GRE tunneling overview — an overview of GRE tunneling
- Setting up a GRE tunnel — instructions on how to configure a GRE tunnel
- Routing packets to a GRE tunnel — instructions on how to route packets to a GRE tunnel
- Preventing loops in GRE tunnels — instructions on how to prevent GRE tunnels from causing loops
- Optional GRE tunnel features — a description of optional features you can configure on GRE tunnels
- Additional GRE tunnel parameters — a list and description of additional GRE tunnel parameters

GRE tunneling overview

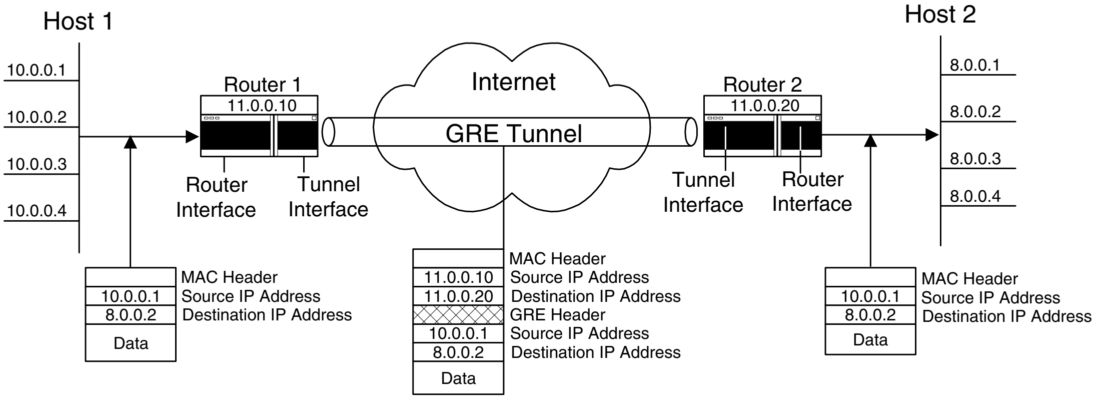
Generic Routing Encapsulation (GRE) is a multi carrier protocol that encapsulates packets with an IP header and enables them to pass through the Internet via a GRE tunnel. A GRE tunnel is a virtual interface consisting of two routers. The first router encapsulates the packet and sends it over the Internet to a router at the far end of the GRE tunnel. The second router removes the encapsulation and sends the packet towards its destination.

GRE tunneling is similar to VPN (Virtual Private Network), except that a GRE tunnel is set up as an IP interface, which allows you to use the GRE tunnel as a routing destination. A GRE tunnel can send multicast packets, which allows it to work with routing protocols such as RIP.

To set up a GRE tunnel, you must assign the following to the tunnel interface: an IP address, a tunnel source address, and a tunnel destination address. GRE tunnels can be configured as next hops on static routes and policy-based routing next-hop lists. Packets can also be routed to GRE tunnels dynamically.

The following diagram illustrates an example of a GRE tunneling application:

Figure 10: GRE tunneling application example



The main application for GRE tunneling is to allow packets that use protocols not supported on the Internet, or packets that use private IP addresses that cannot be routed on the Internet, to travel across the Internet. In the example shown in Figure 10, GRE tunneling application example, on page 140, Host 1 and Host 2 are private networks using a GRE tunnel to connect them via the Internet. A packet originating from 10.0.0.1 on Host 1 is sent to the destination 8.0.0.2 on Host 2. Since the destination IP address is a private IP address, the packet cannot be routed as is over the Internet. Instead, the packet is sent to the starting point of the GRE tunnel, which is Router 1. Router 1 encapsulates the packet with a GRE header that assigns the IP address of Router 2 as the destination IP address and the IP address of Router 1 as the source IP address. When the packet arrives at Router 2, which is the end point of the GRE tunnel, Router 2 removes the GRE header and sends the packet to its original destination at IP address 8.0.0.2.

NOTE:
You can also configure a GRE tunnel to serve as a backup interface.

Setting up a GRE tunnel

To set up a GRE tunnel:

1. Use the **interface tunnel** command, followed by a number identifying the tunnel, to create the new tunnel interface. If you are changing the parameters of an existing tunnel, use the **interface tunnel** command to enter the context of the tunnel.
2. Use the **tunnel source** command, followed by the IP address of the router at the beginning of the tunnel, to set the source interface of the tunnel.
3. Use the **tunnel destination** command, followed by the IP address of the router at the end of the tunnel, to set the destination interface of the tunnel.

NOTE:
The Avaya G350 Media Gateway does not check whether the configured tunnel source IP address is an existing IP address registered with the G350 router.

For a list of optional GRE tunnel features, refer to Optional GRE tunnel features on page 141. For a list of additional GRE tunnel CLI commands, refer to Additional GRE tunnel parameters on page 142.

Routing packets to a GRE tunnel

Packets can be routed to a GRE tunnel in the following ways:

- The tunnel interface is configured as the next hop in a static route. See Configuring the routing table on page 136.
- The packet is routed to the tunnel interface dynamically by the router protocol.
- The packet is routed to the tunnel interface via policy-based routing. See Configuring policy-based routing on page 177.

Preventing loops in GRE tunnels

It is strongly recommended that you assign a high route preference to the destination address of each GRE tunnel. This is to reduce the possibility of nested tunneling. Nested tunneling takes place when a router tries to send a packet to the tunnel by way of the tunnel interface, thereby creating a loop. If a loop occurs, the G350 displays a message that the tunnel is down because of nested tunneling.

To assign a high route preference to the destination address of a GRE tunnel, use the **ip route** command in the following syntax:

```
ip route [destination] [next hop] high
```

where ***destination*** is the IP address of the tunnel destination interface, and ***next hop*** is the IP address of a local router.

Optional GRE tunnel features

You can configure the following optional features in GRE tunnels:

- Tunnel keepalive — enables periodic checking to determine if the tunnel is up or down.
- Dynamic MTU discovery — enables periodic checking to determine and update the lowest MTU on the current route through the tunnel.

Tunnel keepalive

The tunnel keepalive feature sends keepalive packets through the tunnel interface to determine whether the tunnel is up or down. This feature enables the tunnel's source interface to inform the host if the tunnel is down. When the tunnel keepalive feature is not active, if the tunnel is down, the tunnel's source interface continues to attempt to send packets over the tunnel without informing the host that the packets are failing to reach their destination.

Use the **tunnel keepalive** command in the context of the GRE tunnel interface to enable the tunnel keepalive feature. Use the **no** form of this command to deactivate the feature.

The **tunnel keepalive** command includes the following parameters:

- ***seconds*** — the length, in seconds, of the interval at which the source interface sends keepalive packets. The default value is 10.
- ***retries*** — the number of retries after which the source interface declares that the tunnel is down. The default value is 3.

The following example configures Tunnel 1 to send keepalive packets every 20 seconds. If the tunnel's destination interface fails to respond to three consecutive packets, the tunnel's source interface concludes that the tunnel is down. The source interface continues to send keepalive packets, but until it receives a response from the tunnel's destination interface, the tunnel informs hosts that send packets to the tunnel that the tunnel is down.

```
G350-001# interface Tunnel 1
G350-001(if:Tunnel 1)# tunnel keepalive 20 3
Done!
```

NOTE:
You do not have to configure tunnel keepalive on both sides of the tunnel.

Dynamic MTU discovery

The size of packets that can travel through a GRE tunnel is limited by the lowest MTU of any router along the route through the tunnel. When dynamic MTU discovery is enabled, the tunnel maintains an MTU limit. At defined intervals, the tunnel's source interface sends a packet greater than this limit over the tunnel to determine if the limit has changed, and updates the tunnel's MTU limit accordingly. When a packet larger than the MTU arrives at the tunnel, if the packet is marked *do not fragment*, the tunnel's source interface sends the packet back to the host requesting the host to fragment the packet. When dynamic MTU discovery is disabled, the tunnel's source interface marks each packet as *may be fragmented*, even if the packet's original setting is *do not fragment*. For more information on MTU and fragmentation, refer to Overview of fragmentation on page 158.

Use the **tunnel path-mtu-discovery** command in the context of the GRE tunnel interface to enable dynamic MTU discovery by the tunnel. Use the **no** form of this command to deactivate the feature.

The **tunnel path-mtu-discovery** command includes the following parameters:

- ***minutes*** — the length, in minutes, of the interval at which the source interface sends a packet larger than the tunnel's current MTU limit through the tunnel to update the tunnel's MTU limit.

Additional GRE tunnel parameters

Use the following commands to configure additional GRE tunnel parameters. For more information about these commands, see *Avaya G350 Media Gateway CLI Reference*, 555-245-202.

- Use the **tunnel checksum** command in the context of the GRE tunnel interface to add a checksum to the GRE header of packets traveling through the tunnel. When a checksum is included, the tunnel's destination interface must perform checksum validation on incoming packets. Packets without a valid checksum are discarded. Use the **no** form of this command to disable checksums.

- Use the **tunnel key** command in the context of the GRE tunnel interface to enable and set an ID key for the tunnel. Tunnel ID keys are used as a security device. The key is set for the same value at each of the tunnel endpoints. Packets without the configured key must be discarded. Use the **no** form of this command to disable key checking.
- Use the **tunnel DSCP** command in the context of the GRE tunnel interface to assign a DSCP value to packets traveling through the tunnel. The DSCP value is placed in the packet's Carrier IP header. You can assign a DSCP value between 0 and 63. If you do not assign a DSCP value, the DSCP value is copied from the packet's original IP header.

  NOTE:
  The Carrier IP header identifies the source and destination IP address of the tunnel.

- Use the **tunnel TTL** command in the context of the GRE tunnel interface to assign a TTL value to packets traveling through the tunnel. The TTL value is placed in the packet's Carrier IP header. You can assign a TTL value between 1 and 255. The default tunnel TTL value is 255.
- Use the **show interface tunnel** command to show interface configuration and statistics for a particular tunnel or all GRE tunnels.

  NOTE:
  If the tunnel interface is down, the **show interface tunnel** command displays an MTU value of 0.

Configuring DHCP and BOOTP relay

When you configure Dynamic Host Configuration Protocol (DHCP) and BOOTstrap Protocol (BOOTP) relay, you can control how the router relays DHCP and BOOTP packets. The router can relay DHCP and BOOTP client broadcasts to a server on a different segment of the network. The router also relays replies from the server back to the client.

DHCP

DHCP assigns dynamic IP addresses to devices on a network. With dynamic addressing, a device can have a different IP address whenever the device connects to the network. In some systems, the device's IP address can even change while it is still connected. DHCP also supports a mix of static and dynamic IP addresses.

Dynamic addressing simplifies network administration because the software keeps track of IP addresses rather than requiring an administrator to manage the task. This means you can add a new computer to a network without the hassle of manually assigning a unique IP address. Many ISPs use dynamic IP addressing for dial-up users. However, dynamic addressing may not be desirable for a network server.

BOOTP

BOOTP is an Internet protocol that allows a diskless workstation to discover the following:

- Its own IP address
- The IP address of a BOOTP server on the network
- A file to be loaded into memory to boot the workstation

BOOTP allows the workstation to boot without requiring a hard disk or diskette drive. It is used when the user or station location changes frequently. The protocol is defined by RFC 951.

DHCP/BOOTP relay

The Avaya G350 Media Gateway supports the DHCP/BOOTP relay agent function. This is an application that accepts DHCP/BOOTP requests that are broadcast on one VLAN. The application sends them to a DHCP/BOOTP server. That server connects to another VLAN or a server that might be located across one or more routers that might otherwise not get the broadcast request. The relay agent handles the DHCP/BOOTP replies as well. The relay agent transmits the replies to the client directly or as broadcast, according to a flag in the reply message.

NOTE:
The same DHCP/BOOTP relay agent serves both the BOOTP and DHCP protocols.

When there is more than one IP interface on a VLAN, the G350 chooses the lowest IP address on this VLAN when relaying DHCP/BOOTP requests. The DHCP/BOOTP server then uses this address to decide the network from which to allocate the address. When there are multiple networks configured, the G350 performs a round-robin selection process.

When the DHCP/BOOTP server is configured to allocate addresses only from a single subnetwork among the different subnetworks defined on the VLAN, you might need to configure the G350 with the relay address on that subnet so the DHCP/BOOTP server can accept the request.

DHCP/BOOTP Relay in G350 is configurable per VLAN and allows for two DHCP/BOOTP servers to be specified. In this case, the G350 duplicates each request, and sends it to both servers. This duplication provides redundancy and prevents the failure of a single server from blocking hosts from loading. You can enable or disable DHCP/BOOTP Relay in G350.

DHCP/BOOTP relay commands

Use the following commands to configure DHCP relay and BOOTP relay:

- Use the **ip bootp-dhcp network** command to select the network from which the BOOTP/DHCP server should allocate an address. This command is required only when there are multiple IP interfaces over the VLAN. Use the **no** form of this command to restore the default value. You must be in interface context to use this command.
- Use the **ip bootp-dhcp relay** command to enable relaying of BOOTP and DHCP requests to the BOOTP/DHCP server. Use the **no** form of this command to disable relaying of BOOTP and DHCP requests. You must be in general context to use this command.
- Use the **ip bootp-dhcp server** command to add a BOOTP/DHCP server to handle BOOTP/DHCP requests received by this interface. A maximum of two servers can be added to a single interface. Use the **no** form of this command to remove a server. You must be in interface context to use this command.

Configuring broadcast relay

When you configure broadcast relay, the router forwards broadcast packets across interfaces. You can configure the following types of broadcast relay:

- Directed broadcast forwarding
- NetBIOS rebroadcast
- DHCP and BOOTP client broadcast

For more information about DHCP and BOOTP client broadcast, see Configuring DHCP and BOOTP relay on page 143.

Directed broadcast forwarding

A directed broadcast is an IP packet whose destination address is the broadcast address of a network or subnet. A directed broadcast causes every host on the network to respond. You can use directed broadcasts to obtain a list of all active hosts on the network. A hostile user can exploit directed broadcasts to launch a denial-of-service attack on the network. For each interface on the Avaya G350 Media Gateway, you can configure whether the G350 forwards directed broadcast packets to the network address or subnet mask address of the interface.

Use the **ip directed-broadcast** command to enable directed broadcast forwarding on an interface. Use the **no** form of this command to disable directed broadcast forwarding on an interface.

NetBIOS rebroadcast

Network Basic Input Output System (NetBIOS) is a protocol for sharing resources among desktop computers on a LAN. You can configure the Avaya G350 Media Gateway to relay NetBIOS UDP broadcast packets. This feature is used for applications such as WINS that use broadcast but might need to communicate with stations on other subnetworks or VLANs.

Configuration is performed on a per-interface basis. A NetBIOS broadcast packet arrives from an interface on which NetBIOS rebroadcast is enabled. The packet is distributed to all other interfaces configured to rebroadcast NetBIOS.

If the NetBIOS packet is a net-directed broadcast, for example, 149.49.255.255, the packet is relayed to all other interfaces on the list, and the IP destination of the packet is replaced by the appropriate interface broadcast address.

If the NetBIOS broadcast packet is a limited broadcast, for example, 255.255.255.255, it is relayed to all VLANs on which there are NetBIOS-enabled interfaces. In that case, the destination IP address remains the limited broadcast address.

Use the **ip netbios-rebroadcast both** command to enable NetBIOS rebroadcasts on an interface. Use the **ip netbios-rebroadcast disable** command to disable NetBIOS rebroadcasts on an interface.

Configuring the ARP table

When you configure the ARP table, you can:

- View information about the ARP table
- Add entries to the ARP table
- Delete entries from the ARP table
- Configure the ARP timeout

NOTE:
To change an entry in the ARP table, delete the entry and add it back with revised parameters.

Overview of ARP

IP logical network addresses are independent of physical addresses. The physical address must be used to convey data in the form of a frame from one device to another. Therefore, a mechanism is required to acquire a destination device hardware address from its IP address. This mechanism is called ARP (Address Resolution Protocol).

The ARP table

The ARP table stores pairs of IP and MAC addresses. This storage saves time and communication costs, since the host looks in the ARP table first when transmitting a packet. If the information is not there, then the host sends an ARP Request.

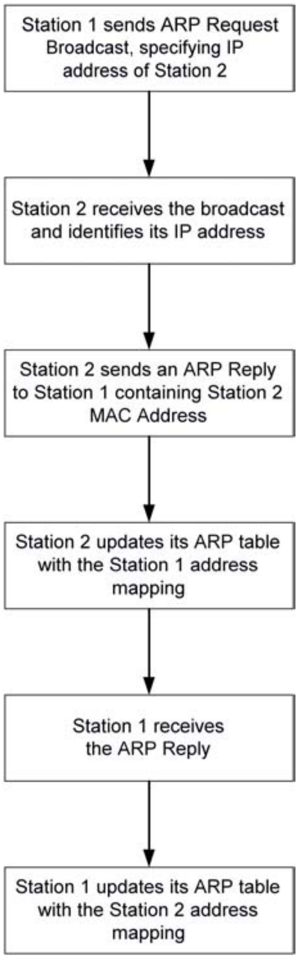
There are two types of entries in the ARP table:

- Static ARP table entries
- Dynamic ARP table entries

Static ARP table entries do not expire. You add static ARP table entries manually with the **arp** command. For example, to add a static ARP table entry for station 192.168.7.8 with MAC address 00:40:0d:8c:2a:01, use the following command:

```
G350-001# arp 192.168.7.8 00:40:0d:8c:2a:01
```

Dynamic ARP table entries are mappings between IP addresses and MAC addresses that the switch used recently. Dynamic ARP table entries expire after an amount of time that you can configure. The following figure shows how a switch adds dynamic ARP table entries:


Station 1 sends ARP Request Broadcast, specifying IP address of Station 2
Station 2 receives the broadcast and identifies its IP address
Station 2 sends an ARP Reply to Station 1 containing Station 2 MAC Address
Station 2 updates its ARP table with the Station 1 address mapping
Station 1 receives the ARP Reply
Station 1 updates its ARP table with the Station 2 address mapping

You can remove static and dynamic entries from the ARP table. Use the **no arp** command. For example, to remove the ARP table entry for the station 192.168.13.76:

```
G350-001# no arp 192.168.13.76
```

ARP table commands

Use the following commands to configure the ARP table. For more information about these commands, see *Avaya G350 Media Gateway CLI Reference*, 555-245-202.

- Use the **arp** command to add a permanent entry to the Address Resolution Protocol (ARP) table. Use the **no** form of this command to remove either a static entry or a dynamically learned entry from the ARP table.
- Use the **arp timeout** command to configure the amount of time, in seconds, that an entry remains in the ARP table. Entering the **arp timeout** command without a time parameter will display the current timeout value. Use the **no** form of this command to restore the default value (four hours).

- Use the **clear arp-cache** command to delete all dynamic entries from the ARP table and the IP route cache.
- Use the **ip max-arp-entries** command to specify the maximum number of ARP table entries allowed in the ARP table. Use the **no** form of this command to restore the default value.
- Use the **show ip arp** command to display a list of the ARP resolved MAC to IP addresses in the ARP table.
- Use the **show ip reverse-arp** command to display the IP address of a host, based on a known MAC address.

Enabling proxy ARP

The G350 supports proxy ARP. Proxy ARP is a technique by which a router provides a false identity when answering ARP requests intended for another device. By falsifying its identify, the router accepts responsibility for routing packets to their true destination.

Proxy ARP can help devices on a subnet to reach remote subnets without the need to configure routing or a default gateway.

To enable proxy ARP on a G350 interface, use the **ip proxy-arp** command. Use the **no** form of this command to disable proxy ARP on an interface.

Configuring ICMP errors

You can control whether the router sends Internet Control Message Protocol (ICMP) error messages. The router sends an ICMP error message to the source of a packet if the router rejects the packet. Use the following commands to configure ICMP errors:

- Use the **ip icmp-errors** command to set ICMP error messages to ON. Use the **no** form of this command to set ICMP error messages to OFF.
- Use the **show ip icmp** command to display the status (enabled or disabled) of ICMP error messages.

Configuring RIP

This section provides information about configuring RIP parameters for router interfaces and contains the following topics:

- RIP overview — an overview of the RIP protocol
- Preventing routing loops in RIP — instructions on how to use RIP features to prevent routing loops
- RIP distribution access lists — instructions on how to configure RIP distribution access lists
- RIP limitations — a description of the limitations on the use of RIP on the G350
- RIP commands — a list and description of CLI commands used to configure RIP

RIP overview

The Routing Information Protocol (RIP) enables routers to compute the path that an IP packet should follow. Routers exchange routing information using RIP to determine routes that other routers are connected to. OSPF is a newer protocol that serves a similar purpose. For more information about OSPF, see Overview of OSPF on page 152.

You can configure route redistribution between OSPF, RIP, and static routes. With route redistribution, you can configure the G350 to redistribute routes learned from one protocol into the domain of the other routing protocol. For more information, see Route redistribution on page 154.

RIP is a distance vector protocol. The router decides which path to use on distance or the number of intermediate hops. In order for this protocol to work correctly, all the routers, and possibly the nodes, need to gather information on how to reach each destination in the Internet. The very simplicity of RIP has a disadvantage however. This protocol does not take into account network bandwidth, physical cost, and data priority. The Avaya G350 Media Gateway supports two versions of RIP:

- RIPv1
- RIPv2

RIPv1

RIPv1 is the original version of the RIP protocol. The RIPv1 protocol imposes some limitations on the network design with regard to subnetting. When operating RIPv1, you must not configure variable length subnetwork masks (VLMS). Each IP network must have a single mask, implying that all subnetworks in a given IP network are of the same size. Also, when operating RIPv1, you must not configure supernets. RIPv1 is defined in RFC 1058.

RIPv2

RIPv2 is a newer version of the RIP routing protocol. RIPv2 solves some of the problems associated with RIPv1. The most important change in RIPv2 is the addition of a subnetwork mask field which allows RIPv2 to support variable length subnetworks. RIPv2 also includes an authentication mechanism similar to the one used in OSPF. RIPv2 is defined in RFC 2453. Table 7, RIPv1 vs. RIPv2, on page 149 summarizes the differences between RIP and RIP2.

Table 7: RIPv1 vs. RIPv2

RIPv1	RIPv2
Broadcast addressing	Multicast addressing
Timer-based – updated every 30 seconds	Timer-based – updated every 30 seconds
Fixed subnetwork masks	VLSM support – subnet information transmitted
No security	Security (authentication)
No provision for external protocols	Provision for EGP/BGP (Route tag)

Preventing routing loops in RIP

You can use the following features in RIP to help avoid routing loops:

- Split-horizon
- Poison-reverse

The split-horizon technique prevents information about routes from exiting the router interface through which the information was received. This prevents small routing loops. Use the **ip rip split-horizon** command to enable the split-horizon mechanism. Use the **no** form of this command to disable the split-horizon mechanism. By default, split-horizon is enabled.

Poison-reverse updates explicitly indicate that a network or subnet is unreachable. Poison-reverse updates are sent to defeat large routing loops. Use the **ip rip poison-reverse** command to enable split-horizon with poison-reverse on an interface. Use the **no** form of this command to disable the poison-reverse mechanism.

RIP distribution access lists

RIP distribution access lists consist of rules that specify how a router distributes and accepts RIP routing information from other routers. Before sending an update, the router consults an access list to determine if it should include specific routes in the update. When receiving an update, the router first checks a set of rules which apply to incoming updates to determine if it should insert those routes into its routing table. You can assign the rules per interface and per direction.

Up to 99 RIP distribution access lists can be configured on the Avaya G350 Media Gateway.

For example: To configure RIP distribution access list number 10 permitting distribution and learning of network 10.10.0.0:

1. Enter the command: **ip distribution access-list 10 1 permit 10.10.0.0 0.0.255.255**

   The default action of the access list is deny and can be changed using the **ip distribution access-default-action** command.

   NOTE:
   Whenever at least one permit rule exists, distributing and learning of all the remaining networks is denied, unless specifically permitted by another rule.

2. Apply the distribution list created in Step 1 by performing the following procedure within the **router rip** context:

   — Enter the **distribution-list 10 in** command to apply list number 10 created in Step 1 on all updates received on all interfaces.

   — Enter the **distribution-list 10 in FastEthernet 6/1** command to apply Access List 10 on updates received on interface ‘FastEthernet 6/1’.

   — Enter the **distribution-list 10 out** command to apply Access List 10 to all advertised updates.

   — Enter the **distribution-list 10 out ospf** command to apply Access List 10 to all advertised updates that were learned from OSPF (redistributed from OSPF into RIP).

If no distribution access list is defined, learning and advertising is allowed for all of the routing information. This is the default.

RIP limitations

Configuration of RIPv1 and RIPv2 is per IP interface. Configuration must be homogeneous on all routers on each subnetwork. That is, RIPv1 and RIPv2 routers should not be configured on the same subnetwork. However, you can configure different IP interfaces of the G350 with different RIP versions. This configuration is valid as long as all routers on the subnet are configured with the same version.

RIPv2 and RIPv1 are considered the same protocol with regard to redistribution to and from OSPF and static route preferences.

RIP commands

Use the following commands to configure RIP. For more information about these commands, see *Avaya G350 Media Gateway CLI Reference*, 555-245-202.

- Use the **default-metric** command to set the interface RIP route metric value. Use the **no** form of this command to restore the default value.
- Use the **distribution-list** command to apply a distribution policy rule for incoming or outgoing routing information in route updates. Use the **no** form of this command to deactivate the rule.
- Use the **ip rip authentication key** command to set the authentication string used on the interface. Use the **no** form of this command to clear the password.
- Use the **ip rip authentication mode** command to specify the type of authentication used in RIP Version 2 packets. Use the **no** form of this command to restore the default value, none.
- Use the **ip rip default-route-mode** command to enable learning of the default route received by the RIP protocol. The default state is talk-listen. Use the **no** form of this command to disable listening to default routes.
- Use the **ip rip poison-reverse** command to enable split-horizon with poison-reverse on an interface. Use the **no** form of this command to disable the poison-reverse mechanism.
- Use the **ip rip rip-version** command to specify the RIP version running on the interface.
- Use the **ip rip send-receive-mode** command to set the RIP send and receive modes on an interface. Use the **no** form of this command to set the RIP to talk, that is, to send reports.
- Use the **ip rip split-horizon** command to enable the split-horizon mechanism. Use the **no** form of this command to disable the split-horizon mechanism. By default split-horizon is enabled.
- Use the **network** command to specify a list of networks on which the RIP is running. Use the **no** form of this command to remove an entry from the list of networks.
- Use the **redistribute** command to redistribute routing information from other protocols into RIP. Use the **no** form of this command to restore the default value, disable redistribution by RIP.
- Use the **router rip** command to enable RIP and to enter the router configuration context. Use the **no** form of this command to restore the default value, disabling RIP.
- Use the **timers basic** command to set RIP timers. Use the **no** form of this command to set the RIP timers to their default values.

Configuring OSPF

This section provides information about configuring OSPF parameters for router interfaces and contains the following topics:

- Overview of OSPF — an overview of OSPF
- OSPF dynamic cost — a description of OSPF cost calculation, with instructions on how to manually configure the cost of an OSPF interface
- OSPF limitations — a description of the limitations on the use of OSPF on the G350
- OSPF commands — a list and descriptions of CLI commands used to configure OSPF on the G350

Overview of OSPF

The Open Shortest Path First (OSPF) protocol enables routers to compute the path that an IP packet should follow. Routers exchange routing information with OSPF to determine where to send each IP packet on its next hop. RIP is an older protocol that serves a similar purpose. For more information about RIP, see RIP overview on page 149.

OSPF is based on the shortest-path-first or link-state algorithm. It was introduced to overcome the limitations of RIP in increasingly complex network designs. OSPF uses the cost of a path as the criterion for comparing paths. In contrast, RIP uses the number of hops as the criterion for comparing paths. Also, updates are sent when there is a topological change in the network, rather than every 30 seconds as with RIP.

The advantage of shortest-path-first algorithms is that under stable conditions, there are less frequent updates (thereby saving bandwidth). They converge quickly, thus preventing such problems as routing loops and Count-to-Infinity, when routers continuously increment the hop count to a particular network. These algorithms make a stable network. The disadvantage of shortest-path-first algorithms is that they require a lot of CPU power and memory.

In OSPF, routers use link-state updates to send routing information to all nodes in a network by calculating the shortest path to each node. This calculation is based on a topography of the network constructed by each node. Each router sends that portion of the routing table that describes the state of its own links, and it also sends the complete routing structure (topography).

You can configure route redistribution between OSPF, RIP, and static routes. With route redistribution, you can configure the G350 to redistribute routes learned from one protocol into the domain of the other routing protocol. For more information, see Route redistribution on page 154.

OSPF dynamic cost

An OSPF interface on the G350 can dynamically set a Cost. The Cost represents the price assigned to each interface for purposes of determining the shortest path.

By default the OSPF interface Cost is calculated based on the interface bandwidth, according to the following formula:

Cost = 100,000/bandwidth (in kbps)

The result is that the higher the bandwidth, the lower the Cost.

To manually configure the Cost of an OSPF interface, use the **ip ospf cost** command from the interface context. By using this option, dynamic bandwidth updates do not change the Cost. Use the **no ip ospf cost** command to return to dynamic cost calculation on an interface.

Use the **bandwidth** command from the Interface context to manually adjust the interface's bandwidth If Cost is being determined dynamically, this configured bandwidth and not the actual interface bandwidth, is used to calculate Cost.

OSPF limitations

You can configure the G350 as an OSPF Autonomous System Boundary Router (ASBR) using route redistribution. The G350 can be installed in the OSPF backbone area (area 0.0.0.0) or in any OSPF area that is part of a multiple areas network. However, the G350 cannot be configured to be an OSPF area border router itself.

The G350 supports the ECMP equal-cost multipath (ECMP) feature which allows load balancing by splitting traffic between several equivalent paths.

While you can activate OSPF with default values for each interface using a single command, you can configure many of the OSPF parameters.

OSPF commands

Use the following commands to configure OSPF. For more information about these commands, see *Avaya G350 Media Gateway CLI Reference*, 555-245-202.

- Use the **area** command to configure the OSPF area id of the router. Use the **no** form of the command to delete the OSPF area id.
- Use the **default-metric** command to set the interface OSPF route metric value. Use the **no** form of this command to restore the default value.
- Use the **ip ospf authentication-key** command to configure the interface authentication password. Use the **no** form of this command to remove the OSPF password.
- Use the **ip ospf cost** command to configure the interface metric. Use the **no** form of this command to set the cost to its default value.
- Use the **ip ospf dead-interval** command to configure the interval before declaring the neighbor as dead. Use the **no** form of this command to set the dead-interval to its default value.
- Use the **ip ospf hello-interval** command to specify the time interval between hello packets sent by the router. Use the **no** form of this command to set the hello-interval to its default value.
- Use the **ip ospf network point-to-multipoint** command to specify the network type for the interface. Use the **no** form of the command to return the interface to the default value.
- Use the **ip ospf priority** command to configure interface priority used in DR election. Use the **no** form of this command to set the OSPF priority to its default value.
- Use the **ip ospf router-id** command to configure the router ID. Use the **no** form of this command to return the router ID to its default value.
- Use the **network** command to enable OSPF in a network. Use the **no** form of this command to disable OSPF in a network. The default value is disabled.

- Use the **passive-interface** command to suppress OSPF routing updates on an interface. This is used to allow interfaces to be flooded into the OSPF domain as OSPF routes rather than external routes.

  NOTE:
  You must also use the **network** command, in conjunction with the **passive-interface** command, to make the network passive.

- Use the **redistribute** command to redistribute routing information from other protocols into OSPF. Use the **no** form of this command to disable redistribution by OSPF.
- Use the **router ospf** command to enable OSPF protocol on the system and to enter the router configuration context. Use the **no** form of this command to restore the default value, disable OSPF globally.
- Use the **show ip ospf** command to display general information about OSPF routing.
- Use the **show ip ospf database** command to display lists of information related to the OSPF database for a specific router.
- Use the **show ip ospf interface** command to display the OSPF-related interface information.
- Use the **show ip ospf neighbor** command to display OSPF neighbor information on a per-interface basis.
- Use the **timers spf** command to configure the delay between runs of OSPF's (SPF) calculation. Use the **no** form of this command to restore the default value.

Route redistribution

Route redistribution is the interaction of multiple routing protocols. OSPF and RIP can be operated concurrently in the G350. In this case, you can configure the G350 to redistribute routes learned from one protocol into the domain of the other routing protocol. Similarly, static routes can be redistributed to RIP and OSPF.

NOTE:
Take care when you configure route redistribution. It involves metric changes and might cause routing loops in the presence of other routes with incompatible schemes for route redistribution and route preferences.

The G350 scheme for metric translation in route redistribution is as follows:

- Static to RIP metric configurable (default 1)
- OSPF internal metric N to RIP metric (default 1)
- OSPF external type 1 metric N to RIP metric (default 1)
- OSPF external type 2 metric N to RIP metric (default 1)
- Static to OSPF external type 2, metric configurable (default 20)
- RIP metric N to OSPF external type 2, metric (default 20)
- Direct to OSPF external type 2, metric (default 20)

By default, the G350 does not redistribute routes between OSPF and RIP. Redistribution from one protocol to the other can be configured. Static routes are, by default, redistributed to RIP and OSPF. The

G350 allows the user to globally disable redistribution of static routes to RIP, and separately to globally disable redistribution of static routes to OSPF. In addition you can configure, on a per static route basis, whether the route is to be redistributed to RIP and OSPF, and what metric to use (in the range of 1-15). The default state is to allow the route to be redistributed at metric 1. When static routes are redistributed to OSPF, they are always redistributed as external type 2.

Use the **redistribute** command in the Router RIP context to configure route redistribution into RIP. Use the **redistribute** command in the Router OSPF context to configure route redistribution into OSPF.

Export default metric

The Avaya G350 Media Gateway enables you to configure the metric to be used in updates that are redistributed from one routing protocol to another.

In RIP, the default is 1 and the maximum value is 16. In OSPF, the default is 20.

Set this value before redistribution using the **default-metric** command from within the Router RIP or Router OSPF contexts. This value is used for all types of redistributed routes, regardless of the protocol from which the route was learned.

Configuring VRRP

This section provides information about configuring VRRP to provide router redundancy and load balancing and includes the following topics:

- Overview of VRRP — an overview of the VRRP protocol
- VRRP configuration example — an example of a VRRP configuration with one main router and one backup router
- VRRP commands — a list and descriptions of CLI commands used to configure VRRP

Overview of VRRP

Virtual Router Redundancy Protocol (VRRP) is an IETF protocol designed to support redundancy of routers on the LAN and load balancing of traffic. VRRP is open to host stations, making it an ideal option when redundancy, load balancing, and ease of configuration are required.

The concept underlying VRRP is that a router can backup other routers, in addition to performing its primary routing functions. This redundancy is achieved by introducing the concept of a virtual router. A virtual router is a routing entity associated with multiple physical routers. One of the physical routers with which the virtual router is associated performs the routing functions. This router is known as the master router. For each virtual router, VRRP selects a master router. If the selected master router fails, another router is selected as master router.

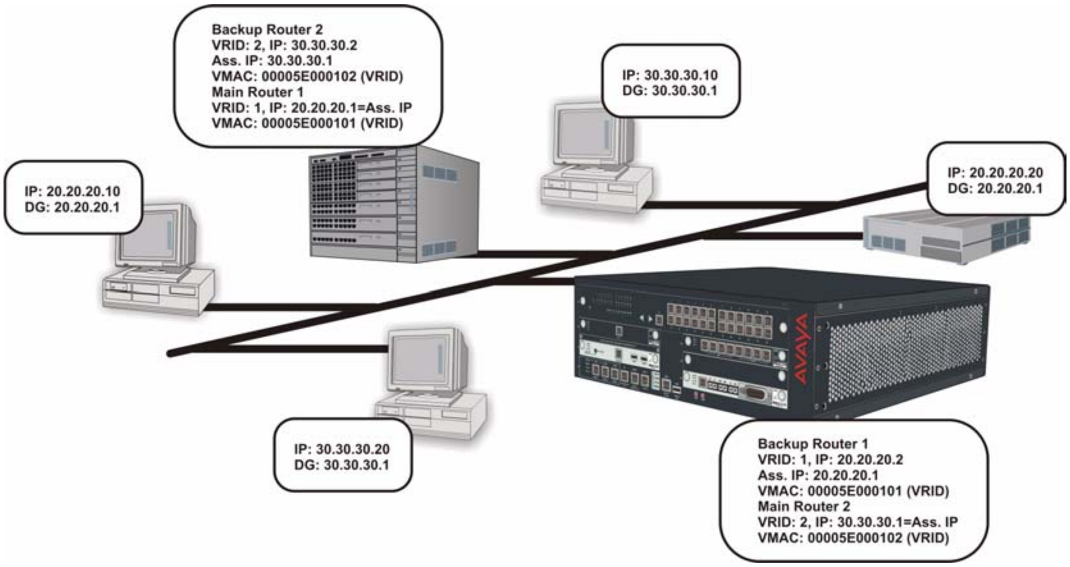
In VRRP, two or more physical routers can be associated with a virtual router, thus achieving extreme reliability. In a VRRP environment, host stations interact with the virtual router. The stations are not aware that this router is a virtual router, and are not affected when a new router takes over the role of master router. Thus, VRRP is fully interoperable with any host station.

You can activate VRRP on an interface using a single command while allowing for the necessary fine-tuning of the many VRRP parameters. For a detailed description of VRRP, see VRRP standards and published literature.

VRRP configuration example

The following diagram illustrates an example of a VRRP configuration:

Figure 11: VRRP configuration example



There is one main router on IP subnet 20.20.20.0, such as a G350, P333R, C460, or any router that supports VRRP, and a backup router. You can configure more backup routers.

- The G350 itself must have an interface on the IP subnetwork, for example, 20.20.20.2
- Configure all the routers under the same VRID, for example,1.
  You must configure the routers per VLAN.
- An assigned VRID must not be used in the network, even in a different VLAN
- When router configuration is complete and the network is up, the main router for each virtual router is selected according to the following order of preference:
  - The virtual router IP address is also the router's interface IP address.
  - It has the highest priority (you can configure this parameter).
  - It has the highest IP address if the previous conditions do not apply.
- The virtual router IP address needs to be configured as the default gateway on the stations.
- The Main router advertises a six-byte Virtual MAC address in the format 00.00.5E.00.01.02 VRID as a response to the stations' ARP requests.
- The redundant router uses a VRRP polling protocol to check the Main router integrity at one second intervals (default). Otherwise, it is idle.

- If the Main router fails, the redundant router that does not receive a response from four consecutive polling requests (default) takes over and starts to advertise the same Virtual MAC for ARP requests. Therefore the stations will not sense any change either in the configured default gateway or at the MAC level.
- VRRP has no provisions for routing database synchronization among the redundant routers. You need to perform this manually if needed.

VRRP commands

Use the following commands to configure VRRP. For more information about these commands, see *Avaya G350 Media Gateway CLI Reference*, 555-245-202.

- Use the **ip vrrp** command to create a virtual router on an interface. Use the **no** form of this command to delete a virtual router.
- Use the **ip vrrp address** command to assign an IP address to a virtual router. Use the **no** form of this command to remove an IP address from a virtual router.
- Use the **ip vrrp auth-key** command to set the virtual router simple password authentication key for the virtual router ID. Use the **no** form of this command to disable simple password authentication for the virtual router instance.
- Use the **ip vrrp override addr owner** command to accept packets addressed to the IP addresses associated with the virtual router, such as ICMP, SNMP, and telnet (if it is not the IP address owner). Use the **no** form of this command to discard these packets.
- Use the **ip vrrp preempt** command to configure a router to preempt a lower priority master for the virtual router ID. Use the **no** form of this command to disable preemption for a virtual router instance. By default, preemption is enabled.
- Use the **ip vrrp primary** command to set the primary address used as the source address of VRRP packets for the virtual router ID. Use the **no** form of this command to restore the default primary address for a virtual router instance. By default, the primary address is selected automatically by the device.
- Use the **ip vrrp priority** command to set the virtual router priority value used when selecting a master router. Use the **no** form of this command to restore the default value.
- Use the **ip vrrp timer** command to set the virtual router advertisement timer value for the virtual router ID. Use the **no** form of this command to restore the default value.
- Use the **router vrrp** command to enable VRRP routing. Use the **no** form of this command to disable VRRP routing.
- Use the **show ip vrrp** command to display VRRP information.

Configuring fragmentation

This section provides information about configuring fragmentation on the G350 router and contains the following topics:

- Overview of fragmentation — an overview of fragmentation and reassembly on the G350 router
- Reassembly parameters — a description of the fragmentation parameters you can configure
- Fragmentation commands — a list and descriptions of CLI commands used to configure fragmentation

Overview of fragmentation

The G350 supports IP fragmentation and reassembly. The G350 router can fragment and reassemble IP packets according to RFC 791. This feature allows the router to send and receive large IP packets where the underlying data link protocol constrains the Maximum Transport Unit (MTU).

IP fragmentation involves breaking a datagram into a number of pieces that can be reassembled later. The IP source, destination, identification, total length, and fragment offset fields, along with the more fragment and don't fragment flags in the IP header, are used for IP fragmentation and reassembly.

IP fragmentation works as follows:

- Each IP packet is divided into fragments.
- Each fragment becomes its own IP packet.
- Each packet has same identifier, source, and destination address.

Fragments are usually not reassembled until final destination. The G350 supports fragmentation of IP packets according to RFC 791, and reassembly of IP packets destined only to its interfaces.

Reassembly parameters

Reassembly is associated with the following user-configurable parameters:

- **Fragment Size** — The maximum number of concurrently reassembled packets:
  Range: 0 to 200. Default: 100.
- **Fragment Timeout** — The maximum time, in seconds, to wait for a packet to be reassembled:
  Range: 5 to 120. Default: 10.
- **Fragment Chain** — The maximum number of fragments allowed per packet:
  Range: 2 to 2048. Default: 64.

Fragmentation commands

Use the following commands to configure fragmentation and reassembly. For more information about these commands, see *Avaya G350 Media Gateway CLI Reference*, 555-245-202.

- Use the **clear fragment** command to clear the fragment database and restore its default values.
- Use the **fragment chain** command to set the maximum number of fragments that can comprise a single IP packet destined to the router. Use the **no** form of this command to set the fragment chain to its default value.
- Use the **fragment size** command to set the maximum number of fragmented IP packets destined to the router to reassemble at any given time. Use the **no** form of this command to set the fragment size to its default value.
- Use the **fragment timeout** command to set the maximum number of seconds to reassemble a fragmented IP packet destined to the router. Use the **no** form of this command to set the fragment timeout to its default value.
- Use the **fragments** command to set the treatment for IP fragmentation packets entering on an interface.
- Use the **show fragment** command to display information regarding fragmented IP packets that are destined to a router.

17 Configuring policy

This chapter provides information about configuring QoS policy on the G350 and contains the following sections:

- Policy overview — an overview of QoS policy configuration
- Defining policy lists — instructions on how to configure policy lists
- Attaching policy lists to an interface — instructions on how to attach a policy list to an interface
- Device-wide policy lists — instructions on how to attach a policy list to all interfaces
- Defining global rules — instructions on how to configure rules that are executed before the list is evaluated
- Defining rules — instructions on how to configure rules, including an overview of rule criteria
- Composite operations — a description of composite operations and instructions on how to configure composite operations
- DSCP table — a description of the DSCP table, with examples
- Displaying and testing policy lists — instructions on how to view the configuration of policy lists and test their effects on simulated IP packets

Policy overview

This section provides an overview of policy lists on the G350 and includes the following topics:

- Access control lists — a description of access control lists, which control which packets are authorized to pass through an interface
- QoS lists — a description of QoS lists, which can change the value of the QoS field in a packet
- Policy-based routing — an overview of policy-based routing, which is described in more detail in Configuring policy-based routing on page 177
- Managing policy lists — an overview of how to manage policy lists on the G350

Access control lists

You can use access control lists to control which packets are authorized to pass through an interface. When a packet matches a rule on the access control list, the rule specifies whether the G350:

- Accepts the packet or drops the packet
- Sends an ICMP error reply if it drops the packet
- Sends an SNMP trap if it drops the packet

Access lists have the following parts:

- **Global rules** — a set of rules that are executed before the list is evaluated
- **Rule list** — a list of filtering rules and actions for the G350 to take when a packet matches the rule. Match actions on this list are pointers to the composite operation table.

- **Actions (composite operation table)** — a table that describes actions to be performed when a packet matches a rule. The table includes pre-defined actions such as permit and deny. You can configure more complex rules. See Composite operations on page 170.

QoS lists

You can use QoS lists to change the DSCP and Ethernet IEEE 802.1p CoS fields in packets. When a packet matches a rule on the QoS list, the G350 sets one or both of the QoS fields in the packet. The following table shows these QoS fields:

Layer	QoS field	Allowed values
2	802.1p	0–7
3	DSCP	0–63

Each QoS list also includes a DSCP table. The DSCP table enables you to set one or both of the QoS fields in a packet based on the previous value of the DSCP field in the packet.

QoS lists have the following parts:

- **Rule list** — a list of filtering rules and actions for the G350 to take when a packet matches the rule. Match actions on this list are pointers to the composite operation table.
- **Actions (composite operation table)** — a table that describes actions to be performed when a packet matches a rule. The table includes pre-defined actions such as permit and deny. You can configure more complex rules. See Composite operations on page 170.
- **DSCP map** — a table that contains DSCP code points and match action pairs. Match actions are pointers to the composite operation table.

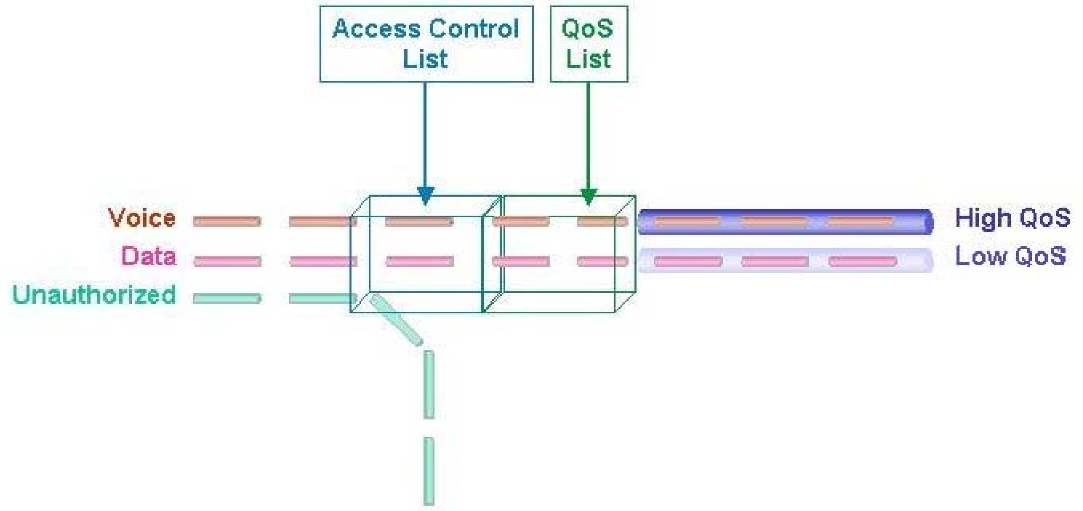
Policy-based routing

You can use policy-based routing to determine the routing path a packet takes based on the type of packet or the packet's source or destination IP addresses or DSCP field. This enables you to route different types of traffic over different routes or interfaces. For example, you use policy-based routing to route voice traffic over a WAN interface and data traffic over the Internet. Policy-based routing is implemented by means of policy-based routing (PBR) lists. PBR lists are similar in many respects to access control lists and QoS lists. However, since there are also some key differences, policy-based routing is explained in a separate chapter. Refer to Configuring policy-based routing on page 177.

Managing policy lists

You can manage policy lists on the Avaya G350 Media Gateway with CLI commands. You can also manage policy lists throughout your network with Avaya QoS Manager. Avaya QoS Manager is part of Avaya Integrated Management. Figure 12, Policy lists, on page 161 illustrates the operation of policy lists on the Avaya G350 Media Gateway:

Figure 12: Policy lists



Defining policy lists

This section provides information on how to define policy lists and includes the following topics:

- Creating and editing a policy list — instructions on how to create or edit a policy list
- Defining list identification attributes — instructions on how to configure the attributes of a policy list, such as a list name, owner, and cookie
- Default actions — lists the default action the G350 takes when no rule in the policy list matches the packet
- Deleting a policy list — instructions on how to delete a policy list

Creating and editing a policy list

To create or edit a policy list, you must enter the context of the list. If the list already exists, you can edit the list from the list context. If the list does not exist, entering the list context creates the list.

To create or edit an access control list, type **ip access-control-list**, followed by a list number in the range 300-399. The G350 includes one pre-configured access control list. The pre-configured access control list is list number 300. Thus, to create a new access control list, you can type the following command:

```
ip access-control-list 301
```

To create or edit a QoS list, type **ip qos-list**, followed by a list number in the range 400-499. The G350 includes one pre-configured QoS list. The pre-configured QoS list is list number 400. Thus, to create a new QoS list, you can type the following command:

```
ip qos-list 401
```

Once you have entered the list context, you can perform the following actions:

- **Configure rules** — see Defining rules on page 165
- **Configure composite operations** — see Composite operations on page 170
- **Configure DSCP mapping (Qos lists only)** — see DSCP table on page 172

Defining list identification attributes

The following policy list attributes are used by Avaya QoS Manager software to identify policy lists:

- Name
- Owner
- Cookie

To define these attributes:

1. Enter the context of the policy list in which you want to define the attribute.
2. Enter one of the following commands, followed by a text string or integer:
   - **name** — defines a list name (text string). The default value is *owner*.
   - **owner** — defines a list owner (text string). The default value is *list#<listnumber>*.
   - **cookie** — defines a list cookie (integer). The Avaya QoS Manager uses the cookie attribute internally. Normally, you should not change this attribute.

To set a policy list attribute to its default setting, use the **no** form of the appropriate command. For example, to set a list to its default name, use the command **no name**.

To view the attributes, use the **show list** command in the context of the list.

Default actions

When no rule matches a packet, the G350 applies the default action for the list. The following table shows the default action for each type of policy list:

List	Default action
Access control list	Accept all packets
QoS list	No change to the priority or DSCP

Deleting a policy list

To delete an access control list, type **no ip access-control-list**, followed by the number of the list you want to delete. To delete a QoS list, type no **ip qos-list**, followed by the number of the list you want to delete.

Attaching policy lists to an interface

The following policy lists are attached to each interface on the Avaya G350 Media Gateway:

- Ingress Access Control List
- Ingress QoS List
- Egress Access Control List
- Egress QoS List

NOTE:
You can also attach PBR lists to certain interfaces, but PBR lists are not attached to any interface by default.

When a packet enters the G350 through an interface, the G350 applies the policy lists in the following order:

1. Apply the Ingress Access Control List.

   If the Ingress Access Control List does not drop the packet:
2. Apply the Ingress QoS List.
3. Apply the PBR list (if any).
4. The packet enters the G350 through the interface.

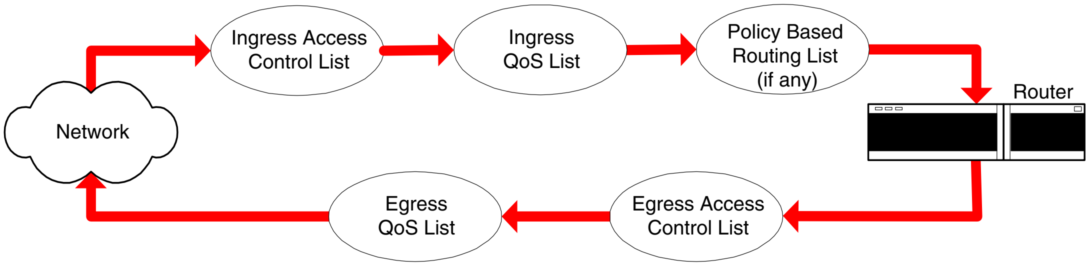
When a packet exits the G350 through an interface, the G350 applies the policy lists in the following order:

1. Apply the Egress Access Control List.

   If the Egress Access Control List does not drop the packet:
2. Apply the Egress QoS List.
3. The packet exits the G350 through the interface.

Figure 13, Applying Policy Lists to Packets, on page 163 illustrates the order in which the G350 applies policy lists to packets.

Figure 13: Applying Policy Lists to Packets


Ingress Access Control List
Ingress QoS List
Policy Based Routing List (if any)
Router
Network
Egress QoS List
Egress Access Control List

You can configure which policy lists are attached to each interface. You can choose the Ingress Access Control List and the Egress Access Control List from among the access control lists that are configured on the G350. You can choose the Ingress QoS List and the Egress QoS List from among the QoS lists that are configured on the G350.

To attach an access control list to an interface as its Ingress Access Control List, enter the interface context and type **ip access-group <list number> in**. To attach an access control list to an interface as its Egress Access Control List, enter the interface context and type **ip access-group <list number> out**.

To attach a QoS list to an interface as its Ingress QoS List, enter the interface context and type **ip qos-group <list number> in**. To attach an access control list to an interface as its Egress QoS List, enter the interface context and type **ip qos-group <list number> out**.

For example, the following sequence of commands attach policy lists to the VLAN 2 interface. Access control list 301 becomes the Ingress Access Control List for VLAN 2. QoS list 401 becomes the Egress QoS List for VLAN 2.

```
G350-001# interface Vlan 2
G350-001(if:Vlan 2)# ip access-group 301 in
Done!
G350-001(if:Vlan 2)# ip qos-group 401 out
Done!
```

To remove a list from an interface, use the **no** form of the appropriate command. For example, if the Ingress Access Control List for the VLAN 1 interface is list number 302, you can remove the list from the interface by typing the following commands:

```
G350-???(super)# interface Vlan 1
G350-???(super-if:Vlan 1)# no ip access-group in
Done!
```

NOTE:
You cannot change or delete a default list. You cannot change or delete any list when it is attached to an interface. In order to change or delete a list that is attached to an interface, you must first remove the list from the interface. You can then change or delete the list. After changing the list, you can reattach the list to the interface.

Device-wide policy lists

You can attach a policy list (other than a policy-based routing list) to every interface on the G350 using one command. To do this, attach a list to the Loopback 1 interface. For more information, see Attaching policy lists to an interface on page 163.

NOTE:
If you attach a policy list to a Loopback interface other than Loopback 1, the policy list has no effect.

When you attach a policy list to the Loopback 1 interface, thereby creating a device-wide policy list, and you also attach policy lists to specific interfaces, the G350 applies the lists in the following order:

- Incoming packets:
  - **a** Apply the ingress policy lists that are attached to the interface.
  - **b** Apply the device-wide ingress policy lists.

- Outgoing packets:
  - **a** Apply the device-wide egress policy lists.
  - **b** Apply the egress policy lists that are attached to the interface.

Defining global rules

In an access control list, you can define global rules for packets that contain IP fragments and IP options. These rules apply to all packets. This is in contrast to individual rules, which apply to packets that match certain defined criteria. See Defining rules on page 165.

The G350 applies global rules before applying individual rules.

To define a global rule:

1. Enter the context of the access control list in which you want to define the rule.
2. Enter one of the following commands, followed by the name of a composite command:
   - — **ip-fragments-in** — applies to incoming packets that contain IP fragments
   - — **ip-fragments-out** — applies to outgoing packets that contain IP fragments
   - — **ip-options-in** — applies to incoming packets that contain IP options
   - — **ip-options-out** — applies to outgoing packets that contain IP options

The composite command can be any command defined in the composite operation list. These commands are case-sensitive. To view the composite operation list for the access control list you are working with, type the command **show composite-operation** in the context of the access control list.

The following example defines a rule in Access Control List 301 that denies access to all incoming packets that contain IP fragments:

```
G350-???(super)# ip access-control-list 301
G350-???(super/ACL 301)# ip-fragments-in Deny
Done!
```

Defining rules

This section provides information on how to configure rules in a policy list and contains the following topics:

- Overview of rule criteria — an overview of the criteria that can be used in configuring policy rules
- Editing and creating rules — instructions on how to edit or create a policy rule
- Rule criteria — instructions on how to configure a policy rule's criteria

Overview of rule criteria

You can configure policy rules to match packets based on one or more of the following criteria:

- Source IP address, or a range of addresses
- Destination IP address or a range of addresses
- IP protocol, such as TCP, UDP, ICMP, IGMP
- Source TCP or UDP port or a range of ports
- Destination TCP or UDP port or a range of ports
- ICMP type and code

Use IP wildcards to specify a range of source or destination IP addresses. The zero bits in the wildcard correspond to bits in the IP address that remain fixed. The one bits in the wildcard correspond to bits in the IP address that can vary. Note that this is the opposite of how bits are used in a subnet mask.

For access control lists, you can require the packet to be part of an established TCP session. If the packet is a request for a new TCP session, the packet does not match the rule. You can also specify whether an access control list accepts packets that have an IP option field.

Editing and creating rules

To create or edit a policy rule, you must enter the context of the rule. If the rule already exists, you can edit the rule from the rule context. If the rule does not exist, entering the rule context creates the rule.

To enter a rule context:

1. Enter the context of the list in which you want to create or edit a rule.
2. Type the command **ip-rule**, followed by the number of the rule you want to create or edit. For example, to create rule 1, type **ip-rule 1**.

To view the existing rules in a list, enter the list's context and type **ip show-rule**. Each list starts with a default rule. Each new rule has the same default parameters as the default rule. The default rule appears as follows:

```
Index Protocol     IP               Wildcard        Port         Operation
----- -------- --- ---------------- --------------- ------------ -------
Deflt Any     Src      Any                            Any         Permit
              Dst      Any                            Any
```

This rule permits all packets.

Rule criteria

This section describes the rule criteria you can define and includes the following topics:

- IP protocol — instructions on how to define the protocol to which the rule applies
- Source and destination IP address — instructions on how to define the source and destination IP addresses to which the rule applies
- Source and destination port range — instructions on how to define the source and destination port ranges to which the rule applies

- ICMP type and code — instructions on how to define packet matching by ICMP type or code
- TCP Establish bit (access control lists only) — instructions on how to define packet matching for TCP packets by whether the ack bit is burned on

IP protocol

To specify the IP protocol to which the rule applies, use the **ip-protocol** command, followed by the name of an IP protocol. If you want the rule to apply to all protocol, use **any** with the command. If you want the rule to apply to all protocols except for one, use the no form of the command, followed by the name of the protocol to which you do not want the rule to apply.

The following command specifies the UDP protocol for rule 1 in QoS list 401:

```
G350-001(QoS 401/rule 1)# ip-protocol udp
```

The following command specifies any IP protocol except IGMP for rule 3 in access control list 302:

```
G350-001(ACL 302/ip rule 3)# no ip-protocol igmp
```

Source and destination IP address

To specify a range of source and destination IP addresses to which the rule applies, use the commands **source-ip** and **destination-ip**, followed by the IP range criteria. The IP range criteria can be any of the following:

- a range — type two IP addresses to set a range of IP addresses to which the rule applies
- a single address — type **host**, followed by an IP address, to set a single IP address to which the rule applies.
- wildcard — type **host**, followed by an IP address using wildcards, to set a range of IP addresses to which the rule applies
- any — type **any** to apply the rule to all IP addresses

Use the **no** form of the appropriate command to specify that the rule does not apply to the IP address or addresses defined by the command.

The following command specifies a source IP address of 10.10.10.20 for rule 1 in access control list 301:

```
G350-001(ACL 301/ip rule 1)# source-ip host 10.10.10.20
```

The following command allows any destination IP address for rule 3 in QoS list 404:

```
G350-001(QoS 404/rule 3)# destination-ip any
```

The following command specifies a source IP address in the range 10.10.0.0 through 10.10.255.255 for rule 1 in access control list 301:

```
G350-001(ACL 301/ip rule 1)# source-ip 10.10.0.0 0.0.255.255
```

The following command specifies a source IP address outside the range 64.236.24.0 through 64.236.24.255 for rule 7 in access control list 308:

```
G350-001(ACL 308/ip rule 7)# no source-ip 64.236.24.0 0.0.0.255
```

The following command specifies a source IP address in the range 64.<any>.24.<any> for rule 6 in access control list 350:

```
G350-001(ACL 350/ip rule 6)# source-ip 64.*.24.*
```

Source and destination port range

To specify a range of source and destination ports to which the rule applies, use the following commands, followed by either port name or port number range criteria:

- **tcp source-port** — the rule applies to TCP packets from ports that match the defined criteria
- **tcp destination-port** — the rule applies to TCP packets to ports that match the defined criteria
- **udp source-port** — the rule applies to UDP packets from ports that match the defined criteria
- **udp destination-port** — the rule applies to UDP packets to ports that match the defined criteria

This command also sets the IP protocol parameter to TCP or UDP.

The port name or number range criteria can be any of the following:

- a range — type **range**, followed by two port numbers, to set a range of port numbers to which the rule applies
- equal — type **eq**, followed by a port name or number, to set a port name or port number to which the rule applies
- greater than — type **gt**, followed by a port name or port number, to apply the rule to all ports with a name or number greater than the specified name or number
- less than — type **lt**, followed by a port name or port number, to apply the rule to all ports with a name or number less than the specified name or number
- any — type **any** to apply the rule to all port names and port numbers

Use the **no** form of the appropriate command to specify that the rule does not apply to the ports defined by the command.

The following command specifies a source TCP port named *telnet* for rule 1 in access control list 301:

```
G350-001(ACL 301/ip rule 1)# tcp source-port eq telnet
```

The following command specifies any destination UDP port less than 1024 for rule 3 in QoS list 404:

```
G350-001(QoS 404/rule 3)# udp destination-port lt 1024
```

The following command specifies any destination TCP port in the range 5000 through 5010 for rule 1 in access control list 301:

```
G350-001(ACL 301/ip rule 1)# tcp destination-port range 5000 5010
```

The following command specifies any source TCP port except a port named *http* for rule 7 in access control list 304:

```
G350-001(ACL 304/ip rule 7)# no tcp source-port eq http
```

ICMP type and code

To apply the rule to a specific type of ICMP packet, use the **icmp** command. This command sets the IP protocol parameter to ICMP, and specifies an ICMP type and code to which the rule applies. You can specify the ICMP type and code by integer or text string, as shown in the examples below. To apply the rule to all ICMP packets except the specified type and code, use the **no** form of this command.

The following command specifies an ICMP echo reply packet for rule 1 in QoS list 401:

```
G350-001(QoS 401/rule 1)# icmp Echo-Reply
```

The following command specifies any ICMP packet except type 1 code 2 for rule 5 in access control list 321:

```
G350-001(ACL 321/ip rule 5)# no icmp 1 2
```

TCP Establish bit (access control lists only)

Use the **tcp established** command to specify that the rule only applies to packets that are part of an established TCP session. Use the **no** form of this command to specify that the rule applies to all TCP packets. In either case, the command also sets the IP protocol parameter to TCP.

The following command specifies that rule 6 in access control list 301 only matches packets that are part of an established TCP session:

```
G350-001(ACL 301/ip rule 6)# tcp established
```

Operation

Use the **operation** command, followed by the name of a composite operation, to specify an operation for the G350 to perform on a packet when the packet matches the rule. For an explanation of composite operations, see Composite operations on page 170.

The operation field for access control lists has a default value of *Permit*. See Pre-configured composite operations for access control lists on page 170.

The operation field for QoS lists has a default value of *Trust-DSCP-CoS*. See Pre-configured composite operations for QoS lists on page 171.

The following command specifies that rule 4 in access control list 302 drops packets that match the rule, and causes the G350 to send a trap and reset the connection when the packet is dropped:

```
G350-001(ACL 304/ip rule 4)# operation Deny-Notify-Rst
```

NOTE:
Composite operation names are case-sensitive.

Composite operations

This section describes composite operations and includes the following topics:

- Overview of composite operations — an overview of composite operations and how they are used
- Pre-configured composite operations for access control lists — a list and descriptions of the pre-configured composite operations that you can use in access control list rules
- Pre-configured composite operations for QoS lists — a list and descriptions of the pre-configured composite operations that you can use in QOS list rules
- Configuring composite operations — instructions on how to configure additional composite operations
- Composite operation example — an example of configuring a composite operation and attaching it to a rule

Overview of composite operations

A composite operation is a set of operations that the G350 can perform when a rule matches a packet. Every rule in a policy list has an operation field that specifies a composite operation. The operation field determines how the G350 handles a packet when the rule matches the packet.

There are different composite operations for access control list rules and QoS list rules. For each type of list, the G350 includes a pre-configured list of composite operations. You cannot change or delete pre-configured composite operations. You can define additional composite operations.

Pre-configured composite operations for access control lists

The following table lists the pre-configured entries in the composite operation table for rules in an access control list:

No	Name	Access	Notify	Reset Connection
0	Permit	forward	no trap	no reset
1	Deny	deny	no trap	no reset
2	Deny-Notify	deny	trap all	no reset
3	Deny-Rst	deny	no trap	reset
4	Deny-Notify-Rst	deny	trap all	reset

Each column represents the following:

- **No** — a number identifying the operation
- **Name** — a name identifying the operation. Use this name to attach the operation to a rule.
- **Access** — determines whether the operation forwards (forward) or drops (deny) the packet
- **Notify** — determines whether the operation causes the G350 to send a trap when it drops a packet
- **Reset Connection** — determines whether the operation causes the G350 to reset the connection when it drops a packet

Pre-configured composite operations for QoS lists

Table 8, Pre-configured QoS list composite operations, on page 171 lists the pre-configured entries in the composite operation table for rules in a QoS list:

Table 8: Pre-configured QoS list composite operations

No	Name	CoS	DSCP	Trust
0	CoS0	cos0	no change	No
1	CoS1	cos1	no change	No
2	CoS2	cos2	no change	No
3	CoS3	cos3	no change	No
4	CoS4	cos4	no change	No
5	CoS5	cos5	no change	No
6	CoS6	cos6	no change	No
7	CoS7	cos7	no change	No
9	No-Change	no change	no change	No
10	Trust-DSCP	-	-	DSCP
11	Trust-DSCP-CoS	-	-	DSCP and CoS

Each column represents the following:

- **No** — a number identifying the operation
- **Name** — a name identifying the operation. Use this name to attach the operation to a rule.
- **CoS** — the operation sets the Ethernet IEEE 802.1p CoS field in the packet to the value listed in this column
- **DSCP** — the operation sets the DSCP field in the packet to the value listed in this column
- **Trust** — determines how to treat packets that have been tagged by the originator or other network devices. If the composite operation is set to Trust-DSCP, the packet's CoS tag is set to 0 before the QoS list rules and DSCP map are executed. If the composite operation is set to CoSX, the DSCP map is ignored, but the QoS list rules are executed on the Ethernet IEEE 802.1p CoS field. (For example, the composite operation CoS3 changes the CoS field to 3). If the composite operation is set to Trust-DSCP-CoS, the operation uses the great of the CoS or the DSCP value. If the composite operation is set to No Change, the operation makes no change to the packet's QoS tags.

Configuring composite operations

You can configure additional composite operations for QoS lists. You can also edit composite operations that you configured. You cannot edit pre-configured composite operations.

NOTE:
You cannot configure additional composite operations for access control lists, since all possible composite operations are pre-configured.

To create or edit a composite operation:

1. Enter the context of a QoS list.
2. Type the **composite-operation** command, followed by an index number. The number must be 12 or higher, since numbers 1 through 11 are assigned to pre-configured lists.
3. Use one or more of the following commands to set the parameters of the composite operation:
   - **dscp** — determines the value to which the rule resets the packet's DSCP field. To ignore the DSCP field, use the argument **no change**, or use the command **no dscp**.
   - **cos** — determines the value to which the rule resets the packet's CoS field. To ignore the CoS field, use the argument **no change**, or use the command **no cos**.
4. Use the **name** command, followed by a text string, to assign a name to the composite operation. You must assign a name to the composite operation, because when you attach the composite operation to a rule, you use the name, not the index number, to identify the composite operation.

Composite operation example

The following commands create a new composite operation called dscp5 and assign the new composite operation to rule 3 in QoS list 402. If the packet matches a rule, the G350 changes the value of the DSCP field in the packet to 5.

```
G350-001# ip qos-list 402
G350-001(QoS 402)# composite-operation 12
G350-001(QoS 402/cot 12)# name dscp5
Done!
G350-001(QoS 402/cot 12)# dscp 5
Done!
G350-001(QoS 402/cot 12)# cos no-change
Done!
G350-001(QoS 402/cot 12)# exit
G350-001(QoS 402)# ip-rule 3
G350-001(QoS 402/rule 3)# composite-operation dscp5
Done!
```

DSCP table

Each QoS list includes a DSCP table. A DSCP lists each possible DSCP value, from 0 to 63. For each value, the list specifies a composite operation. See Pre-configured composite operations for QoS lists on page 171.

QoS rules on the list take precedence over the DSCP table. If a QoS rule other than the default matches the packet, the G350 does not apply the DSCP table to the packet. The G350 applies only the operation specified in the QoS rule.

To change an entry in the DSCP table:

1. Enter the context of a QoS list.
2. Type the command **dscp-table**, followed by the number of the DSCP value for which you want to change its composite operation.
3. Type the command **composite-operation**, followed by the name of the composite operation you want to execute for packets with the specified DSCP value.

The following commands specify the pre-configured composite operation CoS5 for DSCP table entry 33 in QoS list 401. Every packet with DSCP equal to 33 is assigned CoS priority 5.

```
G350-001# ip qos-list 401
G350-001(QoS 401)# dscp-table 33
G350-001(QoS 401/dscp 33)# composite-operation CoS5
Done!
```

The following commands create a new composite operation called dscp5 and assign the new composite operation to DSCP table entry 7 in QoS list 402. Every packet with DSCP equal to 7 is assigned a new DSCP value of 5.

```
G350-???(super)# ip qos-list 402
G350-???(super/QoS 402)# composite-operation 12
G350-???(super/QoS 402/CompOp 12)# name dscp5
Done!
G350-???(super/QoS 402/CompOp 12)# dscp 5
Done!
G350-???(super/QoS 402/CompOp 12)# cos No-Change
Done!
G350-???(super/QoS 402/CompOp 12)# exit
G350-???(super/QoS 402)# dscp-table 7
G350-???(super/QoS 402/dscp 7)# composite-operation dscp5
Done!
```

Displaying and testing policy lists

To verify access control lists and QoS lists, you can view the configuration of the lists. You can also test the effect of the lists on simulated IP packets.

Displaying policy lists

To view information about policy lists and their components, use the following commands. Many of these commands produce different results in different contexts.

- In general context:
  - **show ip access-control-list** — displays a list of all configured access control lists, with their list numbers and owners
  - **show ip access-control-list <list number> detailed** — displays all the parameters of the specified access control list
  - **show ip qos-list** — displays a list of all configured QoS lists, with their list numbers and owners
  - **show ip qos-list detailed** — displays all the parameters of the specified QoS list
- In access control list context:
  - **show composite-operation** — displays a list of all composite operations configured for the list
  - **show ip-rule** — displays a list of all rules configured for the list
  - **show list** — displays the parameters of the current list, including its rules

- In access control list rule context:
  - — **show composite-operation** — displays the parameters of the composite operation assigned to the current rule
  - — **show ip-rule** — displays the parameters of the current rule
- In QoS list context:
  - — **show composite-operation**— displays a list of all composite operations configured for the list
  - — **show dscp-table** — displays the current list's DSCP table
  - — **show ip-rule** — displays a list of all rules configured for the list
  - — **show list** — displays the parameters of the current list, including its rules
- In QoS list rule context:
  - — **show composite-operation** — displays the parameters of the composite operation assigned to the current rule
  - — **show dscp-table** — displays the current list's DSCP table
  - — **show ip-rule** — displays the parameters of the current rule
- In QoS list DSCP table context:
  - — **show dscp-table** — displays the parameters of the current DSCP table entry
- In QoS list composite operation context:
  - — **show composite-operation** — displays the parameters of the current composite operation

Simulating packets

Use the **ip simulate** command in the context of an interface to test a policy list. The command tests the effect of the policy list on a simulated IP packet in the interface. You must specify the number of a policy list, the direction of the packet (in or out), and a source and destination IP address. You may also specify other parameters. For a full list of parameters, see *Avaya™ G350 Media Gateway CLI Reference*, 555-245-202.

The following command simulates the effect of applying QoS list number 401 to a packet entering the G350 through interface VLAN 2:

```
G350-001(if:Vlan 2)# ip simulate 401 in CoS1 dscp46 10.1.1.1  10.2.2.2
tcp 1182 20
```

The simulated packet has the following properties:

- CoS priority is 1
- DSCP is 46
- source IP address is 10.1.1.1.
- destination IP address is 10.2.2.2.
- IP protocol is TCP
- source TCP port is 1182
- destination TCP port is 20

When you run the **ip simulate** command, the G350 displays the effect of the policy rules on the simulated packet. For example:

```
G350-???(super-if:Vlan 2)# ip simulate 401 in CoS1 dscp46 10.1.1.1  10.2.2.2
tcp 1182 20
Rule match for simulated packet is the default rule
Composite action for simulated packet is CoS6
New priority value is fwd6
Dscp value is not changed
```

18 Configuring policy-based routing

This chapter provides information about configuring policy-based routing on the G350 and contains the following sections:

- Policy-based routing overview — an overview of policy-based routing
- Applications — a description of common policy-based routing applications
- Defining PBR lists — instructions on how to configure policy-based routing (PBR) lists
- Attaching a PBR list to an interface — instructions on how to attach a PBR list to an interface, including a description of how PBR lists interact with other policy lists
- Defining Rules — instructions on how to configure rules
- Defining Next Hop Lists — instructions on how to configure next hop lists
- Displaying PBR lists — instructions on how to view the configuration of PBR lists
- Application example — an example of a policy-based routing application

Policy-based routing overview

Policy-based routing uses the policy list structure described in Configuring policy on page 159 to implement a routing scheme based on traffic source, destination, type, and other characteristics. You can use policy-based routing (PBR) lists to determine the routing of packets that match the rules defined in the list. Each PBR list includes a set of rules, and each rule includes a next hop list. Each next hop list contains up to 20 next hop destinations to which the G350 sends packets that match the rule. A destination can be either an IP address or an interface.

Applications

There are many possible applications for policy-based routing. This section describes some of those applications, including:

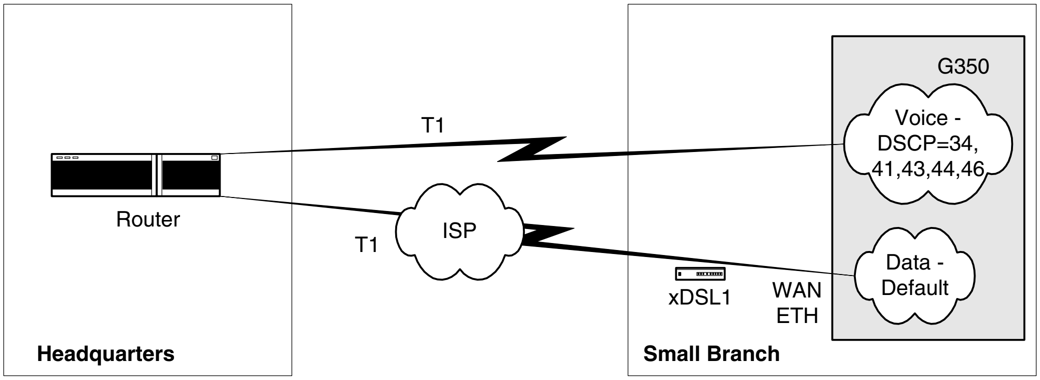
- Separate routing of voice and data traffic
- Source-based transit provider selection
- Backup

Separate routing of voice and data traffic

Although there are many possible applications for policy-based routing, the most common application is to create separate routing for voice and data traffic.

For example, the application shown in Figure 14, Policy-based routing — Voice/Data Division By DSCP, on page 178 uses the DSCP field to identify VoIP control packets (DSCP=34, 41), VoIP Bearer RESV packets (DSCP = 43, 44), and VoIP Bearer packets (DSCP = 46). Policy-based routing sends these packets over the WAN, and sends other packets over the Internet.

Figure 14: Policy-based routing — Voice/Data Division By DSCP



Source-based transit provider selection

Internet service providers and other organizations can use policy-based routing to route traffic originating from different sets of users through different Internet connections across policy routers.

Backup

You can utilize policy-based routing to define backup routes for defined classes of traffic. If the first route on the list fails, the packets can be routed to another hop. When necessary, you can use the NULL interface to drop packets when the primary next hop fails. For example, voice packets are usually sent over a WAN interface, and not the Internet. You can configure a PBR list to drop voice packets when the WAN interface is down.

Defining PBR lists

To create or edit a PBR list, you must enter the context of the list. If the list already exists, you can edit the list from the list context. If the list does not exist, entering the list context creates the list.

To create or edit a PBR list, type **ip pbr-list**, followed by a list number in the range 800-899. There are no pre-configured PBR lists.

PBR lists have the following attributes:

- **Name**
- **Owner**

To define these attributes:

1. Enter the context of the PBR list in which you want to define the attribute.
2. Enter one of the following commands, followed by a text string or integer:
   — **name** — defines a list name (text string). The default value is *owner.*
   — **owner** — defines a list owner (text string). The default value is *list#<listnumber>*.

The following example creates PBR list 802 and assigns it the name *Data*:

```
G350-001# ip pbr-list 802
G350-001(if:pbr-list 802)# name "Data"
```

PBR lists do not have a default next hop list. If you do not define a next hop list for the PBR list, or if no rule matches the packet, the packet is routed according to destination-based routing (DBR).

To delete a PBR list, type **no ip pbr-list**, followed by the number of the list you want to delete.

NOTE:
You cannot delete or modify a PBR list when it is attached to an interface. In order to change or delete a list that is attached to an interface, you must first remove the list from the interface. You can then change or delete the list. After changing the list, you can reattach the list to the interface.

Attaching a PBR list to an interface

Policy-based routing takes place only when the packet enters the interface, not when it leaves. Policy-based routing takes place after the packet is processed by the Ingress Access Control List and the Ingress QoS list. Thus, the PBR list evaluates the packet after the packet's DSCP field has been modified by the Ingress QoS List. See Figure 13, Applying Policy Lists to Packets, on page 163.

When no PBR list is assigned to the interface, or when the rules defined in the PBR list do not match the packet, the packet is routed according to DBR.

To attach a PBR list to an interface, enter the interface context and type **ip pbr-group <list-number>**.

For example, the following sequence of commands attaches PBR list 801 to VLAN 2:

```
G350-001# interface Vlan 2
G350-001(if:Vlan 2)# ip pbr-group 801
Done!
```

NOTE:
It is strongly recommended to enable extended keepalive on any interface that is using policy-based routing. Extended keepalive provides the interface with the ability to determine whether a next hop is or is not available more quickly than by ordinary routing protocols. See Extended Keepalive on page 81.

To remove a list from an interface, use the **no** form of the **ip pbr-group** command. For example, you can remove the PBR list from the VLAN interface by typing the following commands:

```
G350-001# interface Vlan 1
G350-001(if:Vlan 1)# no ip pbr-group
Done!
```

Defining Rules

Each PBR list can have up to 1,500 rules. The first rule that matches the packet specifies the routing for the packet. If no rule matches the packet, the packet is routed according to DBR.

This section provides information on how to configure rules in a PBR list and contains the following topics:

- Overview of rule criteria — an overview of the criteria that can be used in configuring PBR rules
- Creating and editing rules — instructions on how to create and edit a PBR rule
- Rule criteria — instructions on how to configure a PBR rule's criteria

Overview of rule criteria

You can configure policy rules to match packets based on one or more of the following criteria:

- Source IP address, or a range of addresses
- Destination IP address or a range of addresses
- IP protocol, such as TCP, UDP, ICMP, IGMP
- Source TCP or UDP port or a range of ports
- Destination TCP or UDP port or a range of ports
- ICMP type and code
- DSCP field

Use IP wildcards to specify a range of source or destination IP addresses. The zero bits in the wildcard correspond to bits in the IP address that remain fixed. The one bits in the wildcard correspond to bits in the IP address that can vary. Note that this is the opposite of how bits are used in a subnet mask.

Creating and editing rules

To create or edit a policy-based routing rule, you must enter the context of the rule. If the rule already exists, you can edit the rule from the rule context. If the rule does not exist, entering the rule context creates the rule.

To enter a rule context:

1. Enter the context of the PBR list in which you want to create or edit a rule.
2. Type the command **ip-rule**, followed by the number of the rule you want to create or edit. For example, to create rule 1, type **ip-rule 1**.

To view the existing rules in a PBR list, enter the list's context and type **ip show-rule**.

Rule criteria

The rule criteria for PBR rules are largely the same as the rule criteria for other policy list rules. Refer to Rule criteria on page 166.

In addition, PBR rules can use the packet's DSCP field as a rule criteria. Use the **dscp** command, followed by a DSCP value (from 0 to 63) to apply the rule to all packets with the specified DSCP value.

Unlike other policy lists, PBR lists do not use composite operations. Thus, there is no **operation** command in the context of a PBR rule. Instead, PBR lists use next hop lists. For an explanation of next hop lists, see Defining Next Hop Lists on page 181.

Use the **next-hop list** command, followed by the list number of a next hop list, to specify a next hop list for the G350 to apply to packets that match the rule. You can specify *Destination Based Routing* instead of a next hop list, in which case the G350 applies DBR to a packet when the packet matches the rule.

If the next hop list specified in the rule does not exist, the G350 applies DBR to packets that match the rule.

Defining Next Hop Lists

PBR rules include a next hop list. When the rule matches a packet, the G350 routes the packet according to the specified next hop list.

This section provides information on how to configure next hop lists and contains the following topics:

- Next hop list overview — an overview of next hop lists
- Creating and editing next hop lists — instructions on how to create, edit, and add entries to a next hop list
- Assigning attributes to next hop lists — instructions on how to assign attributes to a next hop list

Next hop list overview

Each next hop list can include up to 20 entries. An entry in a next hop list can be either an IP address or an interface. The G350 attempts to route the packet to the first available destination on the next hop list. If every destination on the list is unavailable, the G350 routes the packet according to DBR.

> **NOTE:**
> You cannot use a Fast Ethernet interface as an entry on a next hop list. However, you can use a GRE tunnel as an entry on a next hop list. See Configuring GRE tunneling on page 139.

A next hop list can include the value NULL. When the next hop is NULL, the G350 drops the packet.

Creating and editing next hop lists

To create or edit a next hop list, you must enter the context of the next hop list. If the list already exists, you can edit the list from the list context. If the list does not exist, entering the list context creates the list.

To enter a next hop list context, type the command **ip next-hop-list**, followed by the number of the list you want to create or edit. For example, to create next hop list 1, type **ip next-hop-list 1**.

To show the next hops in an existing list, enter the context of the next hop list and type **show next-hop**.

To add entries to a next hop list:

1. Enter the context of the next hop list.
2. Use one of the following commands:
   - To enter an IP address as a next hop, use the **next-hop-ip** command, followed by the index number of the entry and the IP address. For example, the command **next-hop-ip 2 149.49.200.2** sets the IP address 149.49.200.2 as the second entry on the next hop list.
   - To enter an interface as a next hop, use the **next-hop-interface** command, followed by the index number of the entry and the name if the interface. For example, the command **next-hop-interface 3 Vlan 2** sets VLAN 2 as the third entry on the next hop list.

To delete an entry from a next hop list:

1. Enter the context of the next hop list.
2. Use one of the following commands:
   - To delete an IP address, use the **no next-hop-ip** command, followed by the index number of the entry you want to delete. For example, the command **no next-hop-ip 2** deletes the second entry from the next hop list.
   - To delete an interface, use the **no next-hop-interface** command, followed by the index number of the entry you want to delete. For example, the command **no next-hop-interface 3** deletes the third entry from the next hop list.

Assigning attributes to next hop lists

You can assign a name attribute to a next hop list. To assign a name attribute to a next hop list:

1. Enter the context of the next hop list in which you want to define the attribute.
2. Enter the **name** command, followed by a text string or integer.

Displaying PBR lists

To view information about PBR lists and their components, use the following commands. Many of these commands produce different results in different contexts.

- In general context:
  - **show ip pbr-list** — displays a list of all configured PBR lists, with their list numbers and names
  - **show ip pbr-list <list number>** — displays the list number and name of the specified PBR list
  - **show ip pbr-list detailed** — displays all the parameters of all configured PBR lists
  - **show ip pbr-list <list number> detailed** — displays all the parameters of the specified PBR list
  - **show ip active-lists** — displays a list of each G350 interface to which a PBR list is attached, along with the number and name of the PBR list
  - **show ip active-lists <list number>** — displays a list of each G350 interface to which the specified PBR list is attached, along with the number and name of the PBR list

  - **show ip next-hop-list** — displays the number and name of all next hop lists
  - **show ip next-hop-list <list number>** — displays the number and name of the specified next hop list
  - **show ip next-hop-list details** — displays the parameters of all next hop lists, including a list of all next hops on each list and their current status
  - **show ip next-hop-list details <list number>** — displays the parameters of the specified next hop list, including all next hops on the list and their current status
- In PBR list context:
  - **show list** — displays the list number and name of the current PBR list
  - **show list detailed** — displays all the parameters of the current PBR list
  - **show rule** — displays a list of all rules configured for the current list
  - **show rule <rule number>** — displays the parameters of the specified rule
  - **show ip next-hop-list** — displays the number and name of all next hop lists
  - **show ip next-hop-list <list number>** — displays the number and name of the specified next hop list
  - **show ip next-hop-list details** — displays the parameters of all next hop lists, including a list of all next hops on each list and their current status
  - **show ip next-hop-list details <list number>** — displays the parameters of the specified next hop list, including all next hops on the list and their current status
- In next hop list context:
  - **show next-hop** — displays the next hop entries in the current next hop list and their current status

Application example

The following example creates a policy-based routing scheme in which:

- Voice traffic is routed over a serial interface. If the interface is down, the traffic is dropped.
- Data traffic is routed over an Internet modem. If the modem connection is down, the traffic is dropped.

The following commands create PBR list 801, named *Voice*.

```
ip pbr-list 801
name "Voice"
```

The following commands create, in PBR list 801, policy-based routing rules 1, 10, 20, 30, and 40. These rules match packets with a source IP address between 6.0.0.0. and 6.255.255.255, or the DSCP value 34, 41, 43, 44, or 46, and route these packets in accordance with next hop list 1.

```
ip-rule 1
next-hop list 1
source-ip 6.0.0.0. 0.255.255.255
dscp 34
exit
```

```
ip-rule 10
next-hop list 1
source-ip 6.0.0.0. 0.255.255.255
dscp 41
exit

ip-rule 20
next-hop list 1
source-ip 6.0.0.0. 0.255.255.255
dscp 43
exit

ip-rule 30
next-hop list 1
source-ip 6.0.0.0. 0.255.255.255
dscp 44
exit

ip-rule 40
next-hop list 1
source-ip 6.0.0.0. 0.255.255.255
dscp 46
exit
exit
```

The following commands create PBR list 802, named *Data_To_H.Q*.

```
ip pbr-list 802
name "Data_To_H.Q."
```

The following commands create, in PBR list 802, policy-based routing rules 1 and 10. These rules match packets with any of the following:

- TCP protocol
- Source IP address between 5.0.0.0. and 5.255.255.255
- Destination IP address 149.49.43.188 or 149.49.43.189
- Destination TCP port 20, 21, or HTTP

These rules route packets matching one of the rules to next hop list 2.

```
ip-rule 1
next-hop list 2
ip-protocol tcp
source-ip 5.0.0.0. 0.255.255.255
destination-ip host 149.49.43.189
tcp destination-port range 20 21
exit

ip-rule 10
next-hop list 2
ip-protocol tcp
source-ip 5.0.0.0. 0.255.255.255
destination-ip host 149.49.43.188
tcp destination-port eq Http
exit
exit
```

The following commands create PBR list 810, named *list #810*.

```
ip pbr-list 810
name "list #810"
```

The following commands create, in PBR list 810, policy-based routing rules 10, 20, 30, 40, and 50. These rules match packets with the source IP address 6.0.0.254, or the DSCP value 34, 41, 43, 44, or 46, and routes these packets in accordance with next hop list 1.

```
ip-rule 10
next-hop list 1
source-ip host 6.0.0.254
dscp 34
exit

ip-rule 20
next-hop list 1
source-ip host 6.0.0.254
dscp 41
exit

ip-rule 30
next-hop list 1
source-ip host 6.0.0.254
dscp 43
exit

ip-rule 40
next-hop list 1
source-ip host 6.0.0.254
dscp 44
exit

ip-rule 50
next-hop list 1
source-ip host 6.0.0.254
dscp 46
exit
exit
```

The following commands attach PBR list 802 to the interface VLAN 5.

```
interface Vlan 5
ip pbr-group 802
ip address 5.0.0.254 255.0.0.0
exit
```

The following commands create VLAN 6, designate it as the VLAN connecting the G350 to the ICC, and assign PBR list 801 to the VLAN.

```
interface Vlan 6
icc-vlan
ip pbr-group 801
exit
```

The following commands create and assign an IP address to VLAN 6, and designate VLAN 6 as the G350's PMI.

```
interface Vlan 6
ip address 6.0.0.254 255.0.0.0
pmi
exit
```

The following commands create and assign an IP address to VLAN 6.122.

```
interface Vlan 6.122
ip address 122.123.0.9 255.255.0.0
exit
```

The following commands attach PBR list 810 to the Loopback interface.

```
interface Loopback 1
ip pbr-group 810
exit
```

The following commands create and assign an IP address to the interface Serial 4/1.

```
interface Serial 4/1
ip address 134.1.159.1 255.0.0.0
encapsulation ppp
mtu 300
exit
```

The following commands create next hop list 1, with the name *Voice_To_H.Q.* The first next hop on the list is the interface Serial 4/1. Next hop number 10 is Null0. Thus, packets matching rules to which this list is assigned are routed to serial interface 4/1. If that interface is down, the packets are dropped.

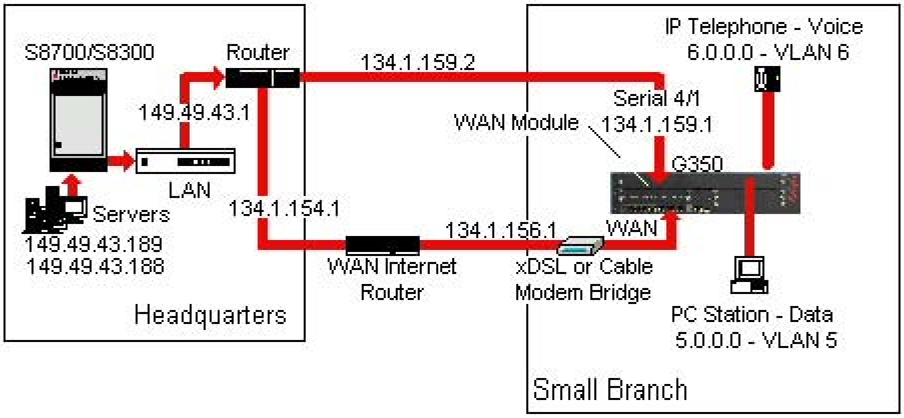
```
ip next-hop-list 1
name "Voice_To_H.Q."
ip next-hop-interface 1 Serial 4/1
next-hop-interface 10 Null0
exit
```

The following commands create next hop list 2, with the name *Data.* Next hop number 10 is the IP address 134.1.156.1. Next hop number 20 is Null0. Thus, packets matching rules to which this list is assigned are routed to 134.1.156.1. If that address is unavailable, the packets are dropped.

```
ip next-hop-list 2
name "Data"
next-hop-ip 10 134.1.156.1
next-hop-interface 20 Null0
exit
```

Figure 15, Sample policy-based routing application, on page 187 illustrates the sample application described above.

Figure 15: Sample policy-based routing application



19 Setting synchronization

If the Avaya G350 Media Gateway contains an MM710 T1/E1 media module, it is advisable to define the MM710 as the primary synchronization source for the G350. In so doing, clock synchronization signals from the Central Office (CO) are used by the MM710 to synchronize all operations of the G350. If no MM710 is present, it is not necessary to set synchronization.

Use the **set sync interface {primary|secondary} {*mmID*|[*portID*]}** command to define a potential stratum clock source (T1/E1 Media Module, ISDN-BRI), where:

- `mmID` is the Media Module ID of an MM stratum clock source of the form vn, where n is the MM slot number.
- `portID` is the port number for an ISDN clock source candidate. The port ID consists of the slot number of the media module and the number of the port. You can set more than one port. For example: v2 1,3,5-8

NOTE:
The port ID parameter only applies if the source is a BRI module.

By setting the clock source to primary, normal failover will occur. The identity of the current synchronization source is not stored in persistent storage. Persistent storage is used to preserve the parameters set by this command.

NOTE:
Setting the source to secondary overrides normal failover, generates a trap, and asserts a fault. Thus, it is not recommended to set the clock source to secondary except for testing purposes.

To determine which reference source is the active source, use the **set sync source {primary|secondary}** command. If you choose secondary, the secondary source becomes active, and the primary source goes on standby. In addition, fallback to the primary source does not occur even when the primary source becomes available.

If neither primary nor secondary sources are identified, the local clock becomes the active source.

The following example sets the MM710 media module located in slot 2 of the G350 chassis as the primary clock synchronization source for the Avaya G350 Media Gateway.

```
set sync interface primary v2
set sync source primary
```

If the G350 includes a second MM710 media module, enter the following additional command:

```
set sync interface secondary v3
set sync source secondary
```

If, for any reason, the primary MM710 media module cannot function as the clock synchronization source, the system uses the MM710 media module located in slot 3 of the G350 chassis as the clock synchronization source. If neither MM710 media module can function as the clock synchronization source, the system defaults to the local clock running on the S8300 Media Server.

The yellow ACT LED on the front of the MM710 media module displays the synchronization status of that module.

- If the yellow ACT LED is solidly on or off, it has not been defined as a synchronization source. If it is on, one or more channels is active. If it is an ISDN facility, the D-channel counts as an active channel and causes the yellow ACT LED to be on.
- When the MM710 is operating as a clock synchronization source, the yellow ACT LED indicates that the MM710 is the clock synchronization source by flashing at three second intervals.
  - — The yellow ACT LED is on for 2.8 seconds and off for 200 milliseconds if the MM710 media module has been specified as a clock synchronization source and is receiving a signal that meets the minimum requirements for the interface.
  - — The yellow ACT LED is on for 200 milliseconds and off for 2.8 seconds if the MM710 media module has been specified as a synchronization source and is not receiving a signal, or is receiving a signal that does not meet the minimum requirements for the interface.

Displaying synchronization status

Use the **show sync timing** command to display the status of the primary, secondary, and local clock sources. The status can be Active, Standby, or Not Configured. The status is Not Configured when a source has not been defined, for example, when there are no T1 cards installed.

A Traps and MIBs

This appendix contains the following sections:

- G350 traps — a list of all G350 traps.
- G350 MIBs — a list of all G350 MIBs.

G350 traps

The following table provides a list of all G350 traps with important information about each trap:

Name	Parameters (MIB variables)	Class	Msg Facility	Severity	Trap Name/ Mnemonic	Format	Description
coldStart		STD	Boot	Warning	coldStart	Agent Up with Possible Changes (coldStart Trap) enterprise:$E ($e) args($#):$*	A coldStart trap indicates that the entity sending the protocol is reinitializing itself in such a way as to potentially cause the alteration of either the agent's configuration or the entity's implementation.
warmStart		STD	Boot	Warning	warmStart	Agent Up with No Changes (warmStart Trap) enterprise:$E ($e) args($#):$*	A warmStart trap indicates that the entity sending the protocol is reinitializing itself in such a way as to keep both the agent configuration and the entity's implementation intact.

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Name	Parameters (MIB variables)	Class	Msg Facility	Severity	Trap Name/ Mnemonic	Format	Description
LinkUp	ifIndex, ifAdminStatus, ifOperStatus	STD	System	Warning	LinkUp	Agent Interface Up (linkUp Trap) enterprise:$E ($e) on interface $1	A linkUp trap indicates that the entity sending the protocol recognizes that one of the communication links represented in the agent's configuration has come up. The data passed with the event is 1) The name and value of the ifIndex instance for the affected interface. The name of the interface can be retrieved via an snmpget of .1.3.6.1.2.1.2.2.1.2.INST, where INST is the instance returned with the trap.
linkDown	ifIndex, ifAdminStatus, ifOperStatus	STD	System	Warning	linkDown	Agent Interface Down (linkDown Trap) enterprise:$E ($e) on interface $1	A linkDown trap indicates that the entity that is sending the protocol recognizes a failure in one of the communication links represented in the agent's configuration. The data passed with the event is 1) The name and value of the ifIndex instance for the affected interface. The name of the interface can be retrieved via an snmpget of .1.3.6.1.2.1.2.2.1.2.INST, where INST is the instance returned with the trap.
SNMP_Authen_ Failure		P330	SECURITY	Notification	authentic Failure	Incorrect Community Name (authentication Failure Trap) enterprise:$E ($e) args($#):$*	An authentication failure trap indicates that the protocol is not properly authenticated.
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Name	Parameters (MIB variables)	Class	Msg Facility	Severity	Trap Name/ Mnemonic	Format	Description
risingAlarm	alarmIndex, alarmVariable, alarmSample Type, alarmValue, alarmRising Threshold	RMON	THRES HOLD	Warning	rising Alarm	Rising Alarm: $2 exceeded threshold $5; value = $4. (Sample type = $3; alarm index = $1)	The SNMP trap that is generated when an alarm entry crosses its rising threshold and generates an event that is configured for sending SNMP traps
fallingAlarm	alarmIndex, alarmVariable, alarmSample Type, alarmValue, alarmRising Threshold, alarmFalling Threshold	RMON	THRES HOLD	Warning	falling Alarm	Falling Alarm: $2 fell below threshold $5; value = $4. (Sample type = $3; alarm index = $1)	The SNMP trap that is generated when an alarm entry crosses its falling threshold and generates an event that is configured for sending SNMP traps
deleteSW Redundancy Trap	soft Redundancy Status	P330	SWITCH FABRIC	Info	deleteSWRedundancyTrap	Software Redundancy $1 definition deleted	The trap notifies the manager of the deletion of the specified redundant link, which is identified by the softRedundancyId. It is enabled/disabled by chLntAgConfigChangeTraps.
createSW Redundancy Trap	soft Redundancy Status	P330	SWITCH FABRIC	Info	createSWRedundancyTrap	Software Redundancy $1 definition created	The trap is generated on the creation of the redundant links for the specified ports. It gives the logical name of the redundant link the identification of the main and secondary ports and the status of the link. The softRedundancyId defines the instances of the above-mentioned variables. The trap is enabled/disabled by chLntAgConfigChangeTraps.
lseIntPortCAMLastChange Trap	lseIntPortCAMLastChange	P330	SWITCH FABRIC	Info	lseIntPort CAMLast Change Trap	CAM Change at $1	This trap reports of the occurred configuration changes. It is enabled/disabled by chLntAgCAMChangeTraps.

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Name	Parameters (MIB variables)	Class	Msg Facility	Severity	Trap Name/ Mnemonic	Format	Description
duplicateIP Trap	ipNetToMediaPhysAddress, ipNetToMediaNetAddress	P330	ROUTER	Warning	duplicateIPTrap	Duplicate IP address $2 detected; MAC address $1	This trap reports to the Management station on Duplicate IP identification. CRP identify the new IP on the network. If it similar to one of its IP interfaces, the CRP will issue a SNMP trap, containing the MAC of the intruder.
lntPolicy ChangeEvent	ipPolicy Activation EntID, ipPolicy ActivationList, ipPolicy Activationif Index, ipPolicy ActivationSub Context	P330	POLICY	Info	lntPolicyChange Event	Module $1 - Active policy list changed to $2	The trap reports a change in the active list specific for a policy-enabled box or module.
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Name	Parameters (MIB variables)	Class	Msg Facility	Severity	Trap Name/ Mnemonic	Format	Description
lntPolicy AccessControlViolationFlt	ipPolicy AccessControl ViolationEntID, ipPolicy AccessControlViolationSrc Addr, ipPolicy AccessControl ViolationDst Addr, ipPolicy AccessControl Violation Protocol, ipPolicy AccessControl Violation L4SrcPort, ipPolicy AccessControl ViolationL4DstPort, ipPolicy AccessControlViolation Established, ipPolicyRuleID, ipPolicyRule ListID, ipPolicy AccessControlViolationIf Index, ipPolicy AccessControl ViolationSub Ctxt, ipPolicy AccessControl ViolationTime	P330	POLICY	Warning	lntPolicy Access Control ViolationFlt	IP PolicyAccess Control violation, if-index$9 ip-protocol=$4 src-ip=$2 dst-ip=$3 src-port=$5 dst-port=$6 rule-id=$8 rule-list=$$9	This trap reports to the Management station on IP PolicyAccess Control violation. The trap includes in its varbind information about the slot where the event occurred. The id of the rule that was violated in the current rules table, and the quintuplet that identifies the faulty packet. A management application would display this trap and the relevant information in a log entry. This trap will not be sent at intervals smaller than one minute for identical information in the varbinds list variables.
DormantPort Fault	genPortSWRdFault, genPortGroup Id, genPortId	P330	SWITCH FABRIC	Warning	Dormant PortFault	Dormant Port Connection Lost on Module $2 Port $3;	This trap reports the loss of connection on a dormant port.
DormantPort Ok	genPortSWRdFault, genPortGroup Id, genPortId	P330	SWITCH FABRIC	Notification	Dormant PortOk	Dormant Port Connection Returned to Normal on Module $2 Port $3;	This trap reports the return of connection on a dormant port.

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Name	Parameters (MIB variables)	Class	Msg Facility	Severity	Trap Name/ Mnemonic	Format	Description
InlinePwrFlt	genGroup FaultMask, genGroupId, genGroup BUPSActivity Status	P330	POE	Error	InlinePwr Flt	Module $2 Inline Power Supply failure	This trap reports the failure of an inline power supply.
InlinePwrFltOK	genGroup FaultMask, genGroupId, genGroup BUPSActivity Status	P330	POE	Notification	InlinePwr FltOK	Module $2 Inline Power Supply failure was cleared	This trap reports the correction of a failure on an inline power supply.
WanPhysical AlarmOn	ifIndex, ifAdminStatus, ifOperStatus, ifName, ifAlias, dsx1Line Status	WAN	WAN	Critical	Wan Physical AlarmOn	Cable Problem on port $4	An E1/T1/Serial cable was disconnected.
wanPhysical AlarmOff	ifIndex, ifAdminStatus, ifOperStatus, ifName, ifAlias, dsx1Line Status	WAN	WAN	Notification	wan Physical AlarmOff	Cable Problem on port $4 was cleared	An E1/T1/Serial cable was reconnected.
wanLocal AlarmOn	ifIndex, ifAdminStatus, ifOperStatus, ifName, ifAlias, dsx1Line Status	WAN	WAN	Error	wanLocal AlarmOn	Local Alarm on interface $4	Local alarms, such as LOS.
wanLocal AlarmOff	ifIndex, ifAdminStatus, ifOperStatus, ifName, ifAlias, dsx1Line Status	WAN	WAN	Notification	wanLocal AlarmOff	Local Alarm on interface $4 was cleared	Local alarms, such as LOS, was cleared.

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Name	Parameters (MIB variables)	Class	Msg Facility	Severity	Trap Name/ Mnemonic	Format	Description
wanRemote AlarmOn	ifIndex, ifAdminStatus, ifOperStatus, ifName, ifAlias, dsx1Line Status	WAN	WAN	Error	wan Remote AlarmOn	Remote Alarm on interface $4	Remote alarms, such as AIS.
wanRemote AlarmOff	ifIndex, ifAdminStatus, ifOperStatus, ifName, ifAlias, dsx1Line Status	WAN	WAN	Notification	wan Remote AlarmOff	Remote Alarm on interface $4 was cleared	Remote alarms, such as AIS, was cleared.
wanMinor AlarmOn	ifIndex, ifAdminStatus, ifOperStatus, ifName, ifAlias, dsx1Line Status	WAN	WAN	Warning	wanMinor AlarmOn	Minor Alarm on interface $4	Low BER.
wanMinorAlarm Off	ifIndex, ifAdminStatus, ifOperStatus, ifName, ifAlias, dsx1Line Status	WAN	WAN	Notification	wanMinor AlarmOff	Minor Alarm on interface $4 was cleared	Normal BER.
AvEntFanFlt	entPhysical Index, entPhysical Descr, entPhySensorValue, avEntPhy SensorLo Warning	AVAYA-ENTITY	TEMP		AvEntFan Flt	Fan $2 is Faulty	This trap reports a faulty fan.
AvEntFanOk	entPhysical Index, entPhysical Descr, entPhySensor Value, avEntPhy SensorLo Warning	AVAYA-ENTITY	TEMP	Notification	AvEntFanOk	Fan $2 is OK	This trap reports the return to function of a faulty fan.

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Name	Parameters (MIB variables)	Class	Msg Facility	Severity	Trap Name/ Mnemonic	Format	Description
avEnt48vPwr Flt	entPhysical Index, entPhysical Descr, entPhySensor Value, avEntPhy SensorHi Warning, avEntPhy SensorLo Warningent Physical ParentRelPos	AVAYA-ENTITY	SUPPLY		avEnt48v PwrFlt	48V power supply Fault	This trap reports a problem with a 48V power supply.
avEnt5vPwrFlt	entPhysical Index, entPhysical Descr, entPhySensor Value, avEntPhy SensorHi Warning, avEntPhy SensorLo Warningent Physical ParentRelPos	AVAYA-ENTITY	SUPPLY		avEnt5v PwrFlt	5V power supply Fault	This trap reports a problem with a 5V power supply.
avEnt3300mv PwrFlt	entPhysical Index, entPhysical Descr, entPhySensor Value, avEntPhy SensorHi Warning, avEntPhy SensorLo Warningent Physical ParentRelPos	AVAYA-ENTITY	SUPPLY		avEnt3300mv PwrFlt	3.3V (3300mv) power supply Fault	This trap reports a problem with a 3.3V power supply.

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Name	Parameters (MIB variables)	Class	Msg Facility	Severity	Trap Name/ Mnemonic	Format	Description
avEnt2500mv PwrFlt	entPhysical Index, entPhysical Descr, entPhySensor Value, avEntPhy SensorHi Warning, avEntPhy SensorLo Warningent Physical ParentRelPos	AVAYA-ENTITY	SUPPLY		avEnt2500mv PwrFlt	2.5V (2500mv) power supply Fault	This trap reports a problem with a 2.5V power supply.
avEnt1800mv PwrFlt	entPhysical Index, entPhysical Descr, entPhySensor Value, avEntPhy SensorHi Warning, avEntPhy SensorLo Warningent Physical ParentRelPos	AVAYA-ENTITY	SUPPLY		avEnt1800mv PwrFlt	1.8V (1800mv) power supply Fault	This trap reports a problem with a 1.8V power supply.
avEnt1600mv PwrFlt	entPhysical Index, entPhysical Descr, entPhySensor Value, avEntPhy SensorHi Warning, avEntPhy SensorLo Warningent Physical ParentRelPos	AVAYA-ENTITY	SUPPLY		avEnt1600mv PwrFlt	1.6V (1600mv) power supply Fault	This trap reports a problem with a 1.6V power supply.

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Name	Parameters (MIB variables)	Class	Msg Facility	Severity	Trap Name/ Mnemonic	Format	Description
avEnt48vPwr FltOk	entPhysical Index, entPhysical Descr, entPhySensor Value, avEntPhy SensorHi Warning, avEntPhy SensorLo Warningent Physical ParentRelPos	AVAYA-ENTITY	SUPPLY	Notification	avEnt48v PwrFltOk	48V power supply Fault Cleared	This trap reports the correction of a problem with a 48V power supply.
avEnt5vPwrFltOk	entPhysical Index, entPhysical Descr, entPhySensor Value, avEntPhy SensorHi Warning, avEntPhy SensorLo Warningent Physical ParentRelPos	AVAYA-ENTITY	SUPPLY	Notification	avEnt5v PwrFltOk	5V power supply Fault Cleared	This trap reports the correction of a problem with a 5V power supply.
avEnt3300mv PwrFltOk	entPhysical Index, entPhysical Descr, entPhySensor Value, avEntPhy SensorHi Warning, avEntPhy SensorLo Warningent Physical ParentRelPos	AVAYA-ENTITY	SUPPLY	Notification	avEnt3300mv PwrFlt Ok	3.3V (3300mv) power supply Fault Cleared	This trap reports the correction of a problem with a 3.3V power supply.

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Name	Parameters (MIB variables)	Class	Msg Facility	Severity	Trap Name/ Mnemonic	Format	Description
avEnt2500mv PwrFltOk	entPhysical Index, entPhysical Descr, entPhySensor Value, avEntPhy SensorHi Warning, avEntPhy SensorLo Warningent Physical ParentRelPos	AVAYA-ENTITY	SUPPLY	Notification	avEnt2500mvP wrFlt Ok	2.5V (2500mv) power supply Fault Cleared	This trap reports the correction of a problem with a 2.5V power supply.
avEnt1800mv PwrFltOk	entPhysical Index, entPhysical Descr, entPhySensor Value, avEntPhy SensorHi Warning, avEntPhy SensorLo Warningent Physical ParentRelPos	AVAYA-ENTITY	SUPPLY	Notification	avEnt1800mvP wrFlt Ok	1.8V (1800mv) power supply Fault Cleared	This trap reports the correction of a problem with a 1.8V power supply.
avEnt1600mv PwrFltOk	entPhysical Index, entPhysical Descr, entPhySensor Value, avEntPhy SensorHi Warning, avEntPhy SensorLo Warningent Physical ParentRelPos	AVAYA-ENTITY	SUPPLY	Notification	avEnt1600mv PwrFlt Ok	1.6V (1600mv) power supply Fault Cleared	This trap reports the correction of a problem with a 1.6V power supply.

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Name	Parameters (MIB variables)	Class	Msg Facility	Severity	Trap Name/ Mnemonic	Format	Description
avEntAmbient TempFlt	entPhysical Index, entPhysical Descr, entPhySensor Value, avEntPhy SensorHi Warning, entPhysical ParentRelPos	AVAYA-ENTITY	TEMP		avEnt Ambient TempFlt	Ambient Temperature fault ($3)	This trap reports that the ambient temperature in the device is not within the acceptable temperature range for the device.
avEntAmbient TempOk	entPhysical Index, entPhysical Descr, entPhySensor Value, avEntPhy SensorHi Warning, entPhysical ParentRelPos	AVAYA-ENTITY	TEMP	Notification	avEnt Ambient TempOk	Ambient Temperature fault ($3) cleared	This trap reports that the ambient temperature in the device has returned to the acceptable range for the device.
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G350 MIBs

The following table provides a list of the MIB files and their associated modules that are supported by the G350:

MIB File	MIB Module
Load.MIB	LOAD-MIB
RFC1315-MIB.my	RFC1315-MIB
Q-BRIDGE-MIB.my	Q-BRIDGE-MIB
ENTITY-MIB.my	ENTITY-MIB
IP-FORWARD-MIB.my	IP-FORWARD-MIB
VRRP-MIB.my	VRRP-MIB
UTILIZATION-MANAGEMENT-MIB.my	UTILIZATION-MANAGEMENT-MIB
ENTITY-SENSOR-MIB.my	ENTITY-SENSOR-MIB
RSTP-MIB.my	RSTP-MIB
APPLIC-MIB.MY	APPLIC-MIB
DS1-MIB.my	DS1-MIB
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MIB File	MIB Module
PPP-IP-NCP-MIB.my	PPP-IP-NCP-MIB
RFC1213-MIB.my	RFC1213-MIB
AVAYA-ENTITY-MIB.MY	AVAYA-ENTITY-MIB
Rnd.MIB	RND-MIB
XSWITCH-MIB.MY	XSWITCH-MIB
CROUTE-MIB.MY	CROUTE-MIB
RS-232-MIB.my	RS-232-MIB
RIPv2-MIB.my	RIPv2-MIB
IF-MIB.my	IF-MIB
DS0BUNDLE-MIB.my	DS0BUNDLE-MIB
RFC1406-MIB.my	RFC1406-MIB
DS0-MIB.my	DS0-MIB
POLICY-MIB.MY	POLICY-MIB
BRIDGE-MIB.my	BRIDGE-MIB
CONFIG-MIB.MY	CONFIG-MIB
G700-MG-MIB.MY	G700-MG-MIB
FRAME-RELAY-DTE-MIB.my	FRAME-RELAY-DTE-MIB
IP-MIB.my	IP-MIB
Load12.MIB	LOAD-MIB
PPP-LCP-MIB.my	PPP-LCP-MIB
WAN-MIB.MY	WAN-MIB
SNMPv2-MIB.my	SNMPv2-MIB
USM-MIB.my	USM-MIB
VACM-MIB.my	VACM-MIB
OSPF-MIB.my	OSPF-MIB
Tunnel-MIB.my	TUNNEL-MIB
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The following table provides a list of the MIBs in the Load.MIB file that are supported by the G350 and their OIDs:

Object	OID
genOpModuleId	1.3.6.1.4.1.1751.2.53.1.2.1.1
genOpIndex	1.3.6.1.4.1.1751.2.53.1.2.1.2
genOpRunningState	1.3.6.1.4.1.1751.2.53.1.2.1.3
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Object	OID
genOpSourceIndex	1.3.6.1.4.1.1751.2.53.1.2.1.4
genOpDestIndex	1.3.6.1.4.1.1751.2.53.1.2.1.5
genOpServerIP	1.3.6.1.4.1.1751.2.53.1.2.1.6
genOpUserName	1.3.6.1.4.1.1751.2.53.1.2.1.7
genOpPassword	1.3.6.1.4.1.1751.2.53.1.2.1.8
genOpProtocolType	1.3.6.1.4.1.1751.2.53.1.2.1.9
genOpFileName	1.3.6.1.4.1.1751.2.53.1.2.1.10
genOpRunningStateDisplay	1.3.6.1.4.1.1751.2.53.1.2.1.11
genOpLastFailureIndex	1.3.6.1.4.1.1751.2.53.1.2.1.12
genOpLastFailureDisplay	1.3.6.1.4.1.1751.2.53.1.2.1.13
genOpLastWarningDisplay	1.3.6.1.4.1.1751.2.53.1.2.1.14
genOpErrorLogIndex	1.3.6.1.4.1.1751.2.53.1.2.1.15
genOpResetSupported	1.3.6.1.4.1.1751.2.53.1.2.1.16
genOpEnableReset	1.3.6.1.4.1.1751.2.53.1.2.1.17
genOpNextBootImageIndex	1.3.6.1.4.1.1751.2.53.1.2.1.18
genOpLastBootImageIndex	1.3.6.1.4.1.1751.2.53.1.2.1.19
genOpFileSystemType	1.3.6.1.4.1.1751.2.53.1.2.1.20
genOpReportSpecificFlags	1.3.6.1.4.1.1751.2.53.1.2.1.21
genOpOctetsReceived	1.3.6.1.4.1.1751.2.53.1.2.1.22
genAppFileId	1.3.6.1.4.1.1751.2.53.2.1.1.1
genAppFileName	1.3.6.1.4.1.1751.2.53.2.1.1.2
genAppFileType	1.3.6.‘1.4.1.1751.2.53.2.1.1.3
genAppFileDescription	1.3.6.1.4.1.1751.2.53.2.1.1.4
genAppFileSize	1.3.6.1.4.1.1751.2.53.2.1.1.5
genAppFileVersionNumber	1.3.6.1.4.1.1751.2.53.2.1.1.6
genAppFileLocation	1.3.6.1.4.1.1751.2.53.2.1.1.7
genAppFileDateStamp	1.3.6.1.4.1.1751.2.53.2.1.1.8
genAppFileRowStatus	1.3.6.1.4.1.1751.2.53.2.1.1.9
	2 of 2

The following table provides a list of the MIBs in the RFC1315-MIB.my file that are supported by the G350 and their OIDs:

Object	OID
frDlcmiIfIndex	1.3.6.1.2.1.10.32.1.1.1
frDlcmiState	1.3.6.1.2.1.10.32.1.1.2
frDlcmiAddress	1.3.6.1.2.1.10.32.1.1.3
frDlcmiAddressLen	1.3.6.1.2.1.10.32.1.1.4
frDlcmiPollingInterval	1.3.6.1.2.1.10.32.1.1.5
frDlcmiFullEnquiryInterval	1.3.6.1.2.1.10.32.1.1.6
frDlcmiErrorThreshold	1.3.6.1.2.1.10.32.1.1.7
frDlcmiMonitoredEvents	1.3.6.1.2.1.10.32.1.1.8
frDlcmiMaxSupportedVCs	1.3.6.1.2.1.10.32.1.1.9
frDlcmiMulticast	1.3.6.1.2.1.10.32.1.1.10
frCircuitIfIndex	1.3.6.1.2.1.10.32.2.1.1
frCircuitDlci	1.3.6.1.2.1.10.32.2.1.2
frCircuitState	1.3.6.1.2.1.10.32.2.1.3
frCircuitReceivedFECNs	1.3.6.1.2.1.10.32.2.1.4
frCircuitReceivedBECNs	1.3.6.1.2.1.10.32.2.1.5
frCircuitSentFrames	1.3.6.1.2.1.10.32.2.1.6
frCircuitSentOctets	1.3.6.1.2.1.10.32.2.1.7
frCircuitReceivedFrames	1.3.6.1.2.1.10.32.2.1.8
frCircuitReceivedOctets	1.3.6.1.2.1.10.32.2.1.9
frCircuitCreationTime	1.3.6.1.2.1.10.32.2.1.10
frCircuitLastTimeChange	1.3.6.1.2.1.10.32.2.1.11
frCircuitCommittedBurst	1.3.6.1.2.1.10.32.2.1.12
frCircuitExcessBurst	1.3.6.1.2.1.10.32.2.1.13
frCircuitThroughput	1.3.6.1.2.1.10.32.2.1.14
frErrIfIndex	1.3.6.1.2.1.10.32.3.1.1
frErrType	1.3.6.1.2.1.10.32.3.1.2
frErrData	1.3.6.1.2.1.10.32.3.1.3
frErrTime	1.3.6.1.2.1.10.32.3.1.4
frTrapState	1.3.6.1.2.1.10.32.4.1

The following table provides a list of the MIBs in the Q-BRIDGE-MIB.my file that are supported by the G350 and their OIDs:

Object	OID
dot1qVlanVersionNumber	1.3.6.1.2.1.17.7.1.1.1
dot1qMaxVlanId	1.3.6.1.2.1.17.7.1.1.2
dot1qMaxSupportedVlans	1.3.6.1.2.1.17.7.1.1.3
dot1qNumVlans	1.3.6.1.2.1.17.7.1.1.4
dot1qGvrpStatus	1.3.6.1.2.1.17.7.1.1.5
dot1qVlanTimeMark	1.3.6.1.2.1.17.7.1.4.2.1.1
dot1qVlanIndex	1.3.6.1.2.1.17.7.1.4.2.1.2
dot1qVlanFdbId	1.3.6.1.2.1.17.7.1.4.2.1.3
dot1qVlanCurrentEgressPorts	1.3.6.1.2.1.17.7.1.4.2.1.4
dot1qVlanCurrentUntaggedPorts	1.3.6.1.2.1.17.7.1.4.2.1.5
dot1qVlanStatus	1.3.6.1.2.1.17.7.1.4.2.1.6
dot1qVlanCreationTime	1.3.6.1.2.1.17.7.1.4.2.1.7
dot1qVlanStaticName	1.3.6.1.2.1.17.7.1.4.3.1.1
dot1qVlanStaticEgressPorts	1.3.6.1.2.1.17.7.1.4.3.1.2
dot1qVlanForbiddenEgressPorts	1.3.6.1.2.1.17.7.1.4.3.1.3
dot1qVlanStaticUntaggedPorts	1.3.6.1.2.1.17.7.1.4.3.1.4
dot1qVlanStaticRowStatus	1.3.6.1.2.1.17.7.1.4.3.1.5
dot1qNextFreeLocalVlanIndex	1.3.6.1.2.1.17.7.1.4.4
dot1qPvid	1.3.6.1.2.1.17.7.1.4.5.1.1
dot1qPortAcceptableFrameTypes	1.3.6.1.2.1.17.7.1.4.5.1.2
dot1qPortIngressFiltering	1.3.6.1.2.1.17.7.1.4.5.1.3
dot1qPortGvrpStatus	1.3.6.1.2.1.17.7.1.4.5.1.4
dot1qPortGvrpFailedRegistrations	1.3.6.1.2.1.17.7.1.4.5.1.5
dot1qPortGvrpLastPduOrigin	1.3.6.1.2.1.17.7.1.4.5.1.6

The following table provides a list of the MIBs in the ENTITY-MIB.my file that are supported by the G350 and their OIDs:

Object	OID
entPhysicalIndex	1.3.6.1.2.1.47.1.1.1.1.1
entPhysicalDescr	1.3.6.1.2.1.47.1.1.1.1.2
entPhysicalVendorType	1.3.6.1.2.1.47.1.1.1.1.3
	1 of 2

Object	**OID**
entPhysicalContainedIn	1.3.6.1.2.1.47.1.1.1.1.4
entPhysicalClass	1.3.6.1.2.1.47.1.1.1.1.5
entPhysicalParentRelPos	1.3.6.1.2.1.47.1.1.1.1.6
entPhysicalName	1.3.6.1.2.1.47.1.1.1.1.7
entPhysicalHardwareRev	1.3.6.1.2.1.47.1.1.1.1.8
entPhysicalFirmwareRev	1.3.6.1.2.1.47.1.1.1.1.9
entPhysicalSoftwareRev	1.3.6.1.2.1.47.1.1.1.1.10
entPhysicalSerialNum	1.3.6.1.2.1.47.1.1.1.1.11
entPhysicalMfgName	1.3.6.1.2.1.47.1.1.1.1.12
entPhysicalModelName	1.3.6.1.2.1.47.1.1.1.1.13
entPhysicalAlias	1.3.6.1.2.1.47.1.1.1.1.14
entPhysicalAssetID	1.3.6.1.2.1.47.1.1.1.1.15
entPhysicalIsFRU	1.3.6.1.2.1.47.1.1.1.1.16
	2 of 2

The following table provides a list of the MIBs in the IP-FORWARD-MIB.my file that are supported by the G350 and their OIDs:

Object	**OID**
ipCidrRouteNumber	1.3.6.1.2.1.4.24.3
ipCidrRouteDest	1.3.6.1.2.1.4.24.4.1.1
ipCidrRouteMask	1.3.6.1.2.1.4.24.4.1.2
ipCidrRouteTos	1.3.6.1.2.1.4.24.4.1.3
ipCidrRouteNextHop	1.3.6.1.2.1.4.24.4.1.4
ipCidrRouteIfIndex	1.3.6.1.2.1.4.24.4.1.5
ipCidrRouteType	1.3.6.1.2.1.4.24.4.1.6
ipCidrRouteProto	1.3.6.1.2.1.4.24.4.1.7
ipCidrRouteAge	1.3.6.1.2.1.4.24.4.1.8
ipCidrRouteInfo	1.3.6.1.2.1.4.24.4.1.9
ipCidrRouteNextHopAS	1.3.6.1.2.1.4.24.4.1.10
ipCidrRouteMetric1	1.3.6.1.2.1.4.24.4.1.11
ipCidrRouteMetric2	1.3.6.1.2.1.4.24.4.1.12
ipCidrRouteMetric3	1.3.6.1.2.1.4.24.4.1.13
	1 of 2

Object	OID
ipCidrRouteMetric4	1.3.6.1.2.1.4.24.4.1.14
ipCidrRouteMetric5	1.3.6.1.2.1.4.24.4.1.15
ipCidrRouteStatus	1.3.6.1.2.1.4.24.4.1.16
	2 of 2

The following table provides a list of the MIBs in theVRRP-MIB.my file that are supported by the G350 and their OIDs:

Object	OID
vrrpNodeVersion	1.3.6.1.2.1.68.1.1.1
vrrpOperVrId	1.3.6.1.2.1.68.1.1.3.1.1
vrrpOperVirtualMacAddr	1.3.6.1.2.1.68.1.1.3.1.2
vrrpOperState	1.3.6.1.2.1.68.1.1.3.1.3
vrrpOperAdminState	1.3.6.1.2.1.68.1.1.3.1.4
vrrpOperPriority	1.3.6.1.2.1.68.1.1.3.1.5
vrrpOperIpAddrCount	1.3.6.1.2.1.68.1.1.3.1.6
vrrpOperMasterIpAddr	1.3.6.1.2.1.68.1.1.3.1.7
vrrpOperPrimaryIpAddr	1.3.6.1.2.1.68.1.1.3.1.8
vrrpOperAuthType	1.3.6.1.2.1.68.1.1.3.1.9
vrrpOperAuthKey	1.3.6.1.2.1.68.1.1.3.1.10
vrrpOperAdvertisementInterval	1.3.6.1.2.1.68.1.1.3.1.11
vrrpOperPreemptMode	1.3.6.1.2.1.68.1.1.3.1.12
vrrpOperVirtualRouterUpTime	1.3.6.1.2.1.68.1.1.3.1.13
vrrpOperProtocol	1.3.6.1.2.1.68.1.1.3.1.14
vrrpOperRowStatus	1.3.6.1.2.1.68.1.1.3.1.15
vrrpAssoIpAddr	1.3.6.1.2.1.68.1.1.4.1.1
vrrpAssoIpAddrRowStatus	1.3.6.1.2.1.68.1.1.4.1.2

The following table provides a list of the MIBs in theUTILIZATION-MANAGEMENT-MIB.my file that are supported by the G350 and their OIDs:

Object	OID
genCpuIndex	1.3.6.1.4.1.6889.2.1.11.1.1.1.1.1
genCpuUtilizationEnableMonitoring	1.3.6.1.4.1.6889.2.1.11.1.1.1.1.2
genCpuUtilizationEnableEventGeneration	1.3.6.1.4.1.6889.2.1.11.1.1.1.1.3
	1 of 2

Object	OID
genCpuUtilizationHighThreshold	1.3.6.1.4.1.6889.2.1.11.1.1.1.1.4
genCpuAverageUtilization	1.3.6.1.4.1.6889.2.1.11.1.1.1.1.5
genCpuCurrentUtilization	1.3.6.1.4.1.6889.2.1.11.1.1.1.1.6
genCpuUtilizationHistorySampleIndex	1.3.6.1.4.1.6889.2.1.11.1.1.2.1.1
genCpuHistoryUtilization	1.3.6.1.4.1.6889.2.1.11.1.1.2.1.2
genMemUtilizationTotalRAM	1.3.6.1.4.1.6889.2.1.11.1.2.1
genMemUtilizationOperationalImage	1.3.6.1.4.1.6889.2.1.11.1.2.2
genMemUtilizationDynAllocMemUsed	1.3.6.1.4.1.6889.2.1.11.1.2.3.1
genMemUtilizationDynAllocMemMaxUsed	1.3.6.1.4.1.6889.2.1.11.1.2.3.2
genMemUtilizationDynAllocMemAvailable	1.3.6.1.4.1.6889.2.1.11.1.2.3.3
genMemUtilizationAllocationFailures	1.3.6.1.4.1.6889.2.1.11.1.2.4
genMemUtilizationID	1.3.6.1.4.1.6889.2.1.11.1.2.6.1.1
genMemUtilizationPhyRam	1.3.6.1.4.1.6889.2.1.11.1.2.6.1.2
genMemUtilizationPercentUsed	1.3.6.1.4.1.6889.2.1.11.1.2.6.1.3
	2 of 2

The following table provides a list of the MIBs in the ENTITY-SENSOR-MIB.my file that are supported by the G350 and their OIDs:

Object	
OID	
entPhySensorType	1.3.6.1.2.1.99.1.1.1.1
entPhySensorScale	1.3.6.1.2.1.99.1.1.1.2
entPhySensorPrecision	1.3.6.1.2.1.99.1.1.1.3
entPhySensorValue	1.3.6.1.2.1.99.1.1.1.4
entPhySensorOperStatus	1.3.6.1.2.1.99.1.1.1.5
entPhySensorUnitsDisplay	1.3.6.1.2.1.99.1.1.1.6
entPhySensorValueTimeStamp	1.3.6.1.2.1.99.1.1.1.7
entPhySensorValueUpdateRate	1.3.6.1.2.1.99.1.1.1.8

The following table provides a list of the MIBs in the RSTP-MIB.my file that are supported by the G350 and their OIDs:

Object	OID
dot1dStpVersion	1.3.6.1.2.1.17.2.16
dot1dStpTxHoldCount	1.3.6.1.2.1.17.2.17
dot1dStpPathCostDefault	1.3.6.1.2.1.17.2.18
dot1dStpPortProtocolMigration	1.3.6.1.2.1.17.2.19.1.1
dot1dStpPortAdminEdgePort	1.3.6.1.2.1.17.2.19.1.2
dot1dStpPortOperEdgePort	1.3.6.1.2.1.17.2.19.1.3
dot1dStpPortAdminPointToPoint	1.3.6.1.2.1.17.2.19.1.4
dot1dStpPortOperPointToPoint	1.3.6.1.2.1.17.2.19.1.5
dot1dStpPortAdminPathCost	1.3.6.1.2.1.17.2.19.1.6

The following table provides a list of the MIBs in the APPLIC-MIB.my file that are supported by the G350 and their OIDs:

Object	OID
lseIntPortGroupId	1.3.6.1.4.1.81.19.1.2.1.1.1
lseIntPortId	1.3.6.1.4.1.81.19.1.2.1.1.2
lseIntPortCAMLastChange	1.3.6.1.4.1.81.19.1.2.1.1.39
lseIntPortMACAddGroupId	1.3.6.1.4.1.81.19.1.2.2.1.1.1
lseIntPortMACAddPortId	1.3.6.1.4.1.81.19.1.2.2.1.1.2
lseIntPortMACAddLAId	1.3.6.1.4.1.81.19.1.2.2.1.1.3
lseIntPortMACAddList	1.3.6.1.4.1.81.19.1.2.2.1.1.4

The following table provides a list of the MIBs in the DS1-MIB.my file that are supported by the G350 and their OIDs:

Object	OID
dsx1LineIndex	1.3.6.1.2.1.10.18.6.1.1
dsx1IfIndex	1.3.6.1.2.1.10.18.6.1.2
dsx1TimeElapsed	1.3.6.1.2.1.10.18.6.1.3
dsx1ValidIntervals	1.3.6.1.2.1.10.18.6.1.4
dsx1LineType	1.3.6.1.2.1.10.18.6.1.5
dsx1LineCoding	1.3.6.1.2.1.10.18.6.1.6
	1 of 3

Object	OID
dsx1SendCode	1.3.6.1.2.1.10.18.6.1.7
dsx1CircuitIdentifier	1.3.6.1.2.1.10.18.6.1.8
dsx1LoopbackConfig	1.3.6.1.2.1.10.18.6.1.9
dsx1LineStatus	1.3.6.1.2.1.10.18.6.1.10
dsx1SignalMode	1.3.6.1.2.1.10.18.6.1.11
dsx1TransmitClockSource	1.3.6.1.2.1.10.18.6.1.12
dsx1Fdl	1.3.6.1.2.1.10.18.6.1.13
dsx1InvalidIntervals	1.3.6.1.2.1.10.18.6.1.14
dsx1LineLength	1.3.6.1.2.1.10.18.6.1.15
dsx1LineStatusLastChange	1.3.6.1.2.1.10.18.6.1.16
dsx1LineStatusChangeTrapEnable	1.3.6.1.2.1.10.18.6.1.17
dsx1LoopbackStatus	1.3.6.1.2.1.10.18.6.1.18
dsx1Ds1ChannelNumber	1.3.6.1.2.1.10.18.6.1.19
dsx1Channelization	1.3.6.1.2.1.10.18.6.1.20
dsx1CurrentIndex	1.3.6.1.2.1.10.18.7.1.1
dsx1CurrentESs	1.3.6.1.2.1.10.18.7.1.2
dsx1CurrentSESs	1.3.6.1.2.1.10.18.7.1.3
dsx1CurrentSEFSs	1.3.6.1.2.1.10.18.7.1.4
dsx1CurrentUASs	1.3.6.1.2.1.10.18.7.1.5
dsx1CurrentCSSs	1.3.6.1.2.1.10.18.7.1.6
dsx1CurrentPCVs	1.3.6.1.2.1.10.18.7.1.7
dsx1CurrentLESs	1.3.6.1.2.1.10.18.7.1.8
dsx1CurrentBESs	1.3.6.1.2.1.10.18.7.1.9
dsx1CurrentDMs	1.3.6.1.2.1.10.18.7.1.10
dsx1CurrentLCVs	1.3.6.1.2.1.10.18.7.1.11
dsx1IntervalIndex	1.3.6.1.2.1.10.18.8.1.1
dsx1IntervalNumber	1.3.6.1.2.1.10.18.8.1.2
dsx1IntervalESs	1.3.6.1.2.1.10.18.8.1.3
dsx1IntervalSESs	1.3.6.1.2.1.10.18.8.1.4
dsx1IntervalSEFSs	1.3.6.1.2.1.10.18.8.1.5
dsx1IntervalUASs	1.3.6.1.2.1.10.18.8.1.6
dsx1IntervalCSSs	1.3.6.1.2.1.10.18.8.1.7
dsx1IntervalPCVs	1.3.6.1.2.1.10.18.8.1.8
dsx1IntervalLESs	1.3.6.1.2.1.10.18.8.1.9
	2 of 3

Object	OID
dsx1IntervalBESs	1.3.6.1.2.1.10.18.8.1.10
dsx1IntervalDMs	1.3.6.1.2.1.10.18.8.1.11
dsx1IntervalLCVs	1.3.6.1.2.1.10.18.8.1.12
dsx1IntervalValidData	1.3.6.1.2.1.10.18.8.1.13
dsx1TotalIndex	1.3.6.1.2.1.10.18.9.1.1
dsx1TotalESs	1.3.6.1.2.1.10.18.9.1.2
dsx1TotalSESs	1.3.6.1.2.1.10.18.9.1.3
dsx1TotalSEFSs	1.3.6.1.2.1.10.18.9.1.4
dsx1TotalUASs	1.3.6.1.2.1.10.18.9.1.5
dsx1TotalCSSs	1.3.6.1.2.1.10.18.9.1.6
dsx1TotalPCVs	1.3.6.1.2.1.10.18.9.1.7
dsx1TotalLESs	1.3.6.1.2.1.10.18.9.1.8
dsx1TotalBESs	1.3.6.1.2.1.10.18.9.1.9
dsx1TotalDMs	1.3.6.1.2.1.10.18.9.1.10
dsx1TotalLCVs	1.3.6.1.2.1.10.18.9.1.11
	3 of 3

The following table provides a list of the MIBs in the PPP-IP-NCP-MIB.my file that are supported by the G350 and their OIDs:

Object	OID
pppIpOperStatus	1.3.6.1.2.1.10.23.3.1.1.1
pppIpLocalToRemoteCompressionProtocol	1.3.6.1.2.1.10.23.3.1.1.2
pppIpRemoteToLocalCompressionProtocol	1.3.6.1.2.1.10.23.3.1.1.3
pppIpRemoteMaxSlotId	1.3.6.1.2.1.10.23.3.1.1.4
pppIpLocalMaxSlotId	1.3.6.1.2.1.10.23.3.1.1.5
pppIpConfigAdminStatus	1.3.6.1.2.1.10.23.3.2.1.1
pppIpConfigCompression	1.3.6.1.2.1.10.23.3.2.1.2

The following table provides a list of the MIBs in the RFC1213-MIB.my file that are supported by the G350 and their OIDs:

Object	OID
sysDescr	1.3.6.1.2.1.1.1
sysObjectID	1.3.6.1.2.1.1.2
	1 of 4

Object	OID
sysUpTime	1.3.6.1.2.1.1.3
sysContact	1.3.6.1.2.1.1.4
sysName	1.3.6.1.2.1.1.5
sysLocation	1.3.6.1.2.1.1.6
sysServices	1.3.6.1.2.1.1.7
ifNumber	1.3.6.1.2.1.2.1
ifIndex	1.3.6.1.2.1.2.2.1.1
ifDescr	1.3.6.1.2.1.2.2.1.2
ifType	1.3.6.1.2.1.2.2.1.3
ifMtu	1.3.6.1.2.1.2.2.1.4
ifSpeed	1.3.6.1.2.1.2.2.1.5
ifPhysAddress	1.3.6.1.2.1.2.2.1.6
ifAdminStatus	1.3.6.1.2.1.2.2.1.7
ifOperStatus	1.3.6.1.2.1.2.2.1.8
ifLastChange	1.3.6.1.2.1.2.2.1.9
ifInOctets	1.3.6.1.2.1.2.2.1.10
ifInUcastPkts	1.3.6.1.2.1.2.2.1.11
ifInNUcastPkts	1.3.6.1.2.1.2.2.1.12
ifInDiscards	1.3.6.1.2.1.2.2.1.13
ifInErrors	1.3.6.1.2.1.2.2.1.14
ifInUnknownProtos	1.3.6.1.2.1.2.2.1.15
ifOutOctets	1.3.6.1.2.1.2.2.1.16
ifOutUcastPkts	1.3.6.1.2.1.2.2.1.17
ifOutNUcastPkts	1.3.6.1.2.1.2.2.1.18
ifOutDiscards	1.3.6.1.2.1.2.2.1.19
ifOutErrors	1.3.6.1.2.1.2.2.1.20
ifOutQLen	1.3.6.1.2.1.2.2.1.21
ifSpecific	1.3.6.1.2.1.2.2.1.22
ipForwarding	1.3.6.1.2.1.4.1
ipDefaultTTL	1.3.6.1.2.1.4.2
ipInReceives	1.3.6.1.2.1.4.3
ipInHdrErrors	1.3.6.1.2.1.4.4
ipInAddrErrors	1.3.6.1.2.1.4.5
ipForwDatagrams	1.3.6.1.2.1.4.6
	2 of 4

Object	OID
ipInUnknownProtos	1.3.6.1.2.1.4.7
ipInDiscards	1.3.6.1.2.1.4.8
ipInDelivers	1.3.6.1.2.1.4.9
ipOutRequests	1.3.6.1.2.1.4.10
ipOutDiscards	1.3.6.1.2.1.4.11
ipOutNoRoutes	1.3.6.1.2.1.4.12
ipReasmTimeout	1.3.6.1.2.1.4.13
ipReasmReqds	1.3.6.1.2.1.4.14
ipReasmOKs	1.3.6.1.2.1.4.15
ipReasmFails	1.3.6.1.2.1.4.16
ipFragOKs	1.3.6.1.2.1.4.17
ipFragFails	1.3.6.1.2.1.4.18
ipFragCreates	1.3.6.1.2.1.4.19
ipAdEntAddr	1.3.6.1.2.1.4.20.1.1
ipAdEntIfIndex	1.3.6.1.2.1.4.20.1.2
ipAdEntNetMask	1.3.6.1.2.1.4.20.1.3
ipAdEntBcastAddr	1.3.6.1.2.1.4.20.1.4
ipAdEntReasmMaxSize	1.3.6.1.2.1.4.20.1.5
ipRouteDest	1.3.6.1.2.1.4.21.1.1
ipRouteIfIndex	1.3.6.1.2.1.4.21.1.2
ipRouteMetric1	1.3.6.1.2.1.4.21.1.3
ipRouteMetric2	1.3.6.1.2.1.4.21.1.4
ipRouteMetric3	1.3.6.1.2.1.4.21.1.5
ipRouteMetric4	1.3.6.1.2.1.4.21.1.6
ipRouteNextHop	1.3.6.1.2.1.4.21.1.7
ipRouteType	1.3.6.1.2.1.4.21.1.8
ipRouteProto	1.3.6.1.2.1.4.21.1.9
ipRouteAge	1.3.6.1.2.1.4.21.1.10
ipRouteMask	1.3.6.1.2.1.4.21.1.11
ipRouteMetric5	1.3.6.1.2.1.4.21.1.12
ipRouteInfo	1.3.6.1.2.1.4.21.1.13
ipNetToMediaIfIndex	1.3.6.1.2.1.4.22.1.1
ipNetToMediaPhysAddress	1.3.6.1.2.1.4.22.1.2
ipNetToMediaNetAddress	1.3.6.1.2.1.4.22.1.3
	3 of 4

Object	OID
ipNetToMediaType	1.3.6.1.2.1.4.22.1.4
ipRoutingDiscards	1.3.6.1.2.1.4.23
snmpInPkts	1.3.6.1.2.1.11.1
snmpOutPkts	1.3.6.1.2.1.11.2
snmpInBadVersions	1.3.6.1.2.1.11.3
snmpInBadCommunityNames	1.3.6.1.2.1.11.4
snmpInBadCommunityUses	1.3.6.1.2.1.11.5
snmpInASNParseErrs	1.3.6.1.2.1.11.6
snmpInTooBigs	1.3.6.1.2.1.11.8
snmpInNoSuchNames	1.3.6.1.2.1.11.9
snmpInBadValues	1.3.6.1.2.1.11.10
snmpInReadOnlys	1.3.6.1.2.1.11.11
snmpInGenErrs	1.3.6.1.2.1.11.12
snmpInTotalReqVars	1.3.6.1.2.1.11.13
snmpInTotalSetVars	1.3.6.1.2.1.11.14
snmpInGetRequests	1.3.6.1.2.1.11.15
snmpInGetNexts	1.3.6.1.2.1.11.16
snmpInSetRequests	1.3.6.1.2.1.11.17
snmpInGetResponses	1.3.6.1.2.1.11.18
snmpInTraps	1.3.6.1.2.1.11.19
snmpOutTooBigs	1.3.6.1.2.1.11.20
snmpOutNoSuchNames	1.3.6.1.2.1.11.21
snmpOutBadValues	1.3.6.1.2.1.11.22
snmpOutGenErrs	1.3.6.1.2.1.11.24
snmpOutGetRequests	1.3.6.1.2.1.11.25
snmpOutGetNexts	1.3.6.1.2.1.11.26
snmpOutSetRequests	1.3.6.1.2.1.11.27
snmpOutGetResponses	1.3.6.1.2.1.11.28
snmpOutTraps	1.3.6.1.2.1.11.29
snmpEnableAuthenTraps	1.3.6.1.2.1.11.30
	4 of 4

The following table provides a list of the MIBs in the AVAYA-ENTITY-MIB.my file that are supported by the G350 and their OIDs:

Object	OID
avEntPhySensorHiShutdown	1.3.6.1.4.1.6889.2.1.99.1.1.1
avEntPhySensorHiWarning	1.3.6.1.4.1.6889.2.1.99.1.1.2
avEntPhySensorHiWarningClear	1.3.6.1.4.1.6889.2.1.99.1.1.3
avEntPhySensorLoWarningClear	1.3.6.1.4.1.6889.2.1.99.1.1.4
avEntPhySensorLoWarning	1.3.6.1.4.1.6889.2.1.99.1.1.5
avEntPhySensorLoShutdown	1.3.6.1.4.1.6889.2.1.99.1.1.6
avEntPhySensorEventSupportMask	1.3.6.1.4.1.6889.2.1.99.1.1.7

The following table provides a list of the MIBs in the Rnd.MIB file that are supported by the G350 and their OIDs:

Object	OID
genGroupHWVersion	1.3.6.1.4.1.81.8.1.1.24
genGroupConfigurationSymbol	1.3.6.1.4.1.81.8.1.1.21
genGroupHWStatus	1.3.6.1.4.1.81.8.1.1.17

The following table provides a list of the MIBs in the XSWITCH-MIB.my file that are supported by the G350 and their OIDs:

Object	OID
scGenPortGroupId	1.3.6.1.4.1.81.28.1.4.1.1.1
scGenPortId	1.3.6.1.4.1.81.28.1.4.1.1.2
scGenPortVLAN	1.3.6.1.4.1.81.28.1.4.1.1.3
scGenPortPriority	1.3.6.1.4.1.81.28.1.4.1.1.4
scGenPortSetDefaults	1.3.6.1.4.1.81.28.1.4.1.1.5
scGenPortLinkAggregationNumber	1.3.6.1.4.1.81.28.1.4.1.1.9
scGenPortGenericTrap	1.3.6.1.4.1.81.28.1.4.1.1.15
scGenPortLagCapability	1.3.6.1.4.1.81.28.1.4.1.1.20
scGenPortCapability	1.3.6.1.4.1.81.28.1.4.1.1.21
scGenSwitchId	1.3.6.1.4.1.81.28.1.5.1.1.1
scGenSwitchSTA	1.3.6.1.4.1.81.28.1.5.1.1.13
scEthPortGroupId	1.3.6.1.4.1.81.28.2.1.1.1.1
	1 of 2

Object	OID
scEthPortId	1.3.6.1.4.1.81.28.2.1.1.1.2
scEthPortFunctionalStatus	1.3.6.1.4.1.81.28.2.1.1.1.27
scEthPortMode	1.3.6.1.4.1.81.28.2.1.1.1.28
scEthPortSpeed	1.3.6.1.4.1.81.28.2.1.1.1.29
scEthPortAutoNegotiation	1.3.6.1.4.1.81.28.2.1.1.1.30
scEthPortAutoNegotiationStatus	1.3.6.1.4.1.81.28.2.1.1.1.31
scEthPortPauseCapabilities	1.3.6.1.4.1.81.28.2.1.1.1.44
scEthPortFlowControl	1.3.6.1.4.1.81.28.2.1.1.1.47
	2 of 2

The following table provides a list of the MIBs in the CROUTE-MIB.my file that are supported by the G350 and their OIDs:

Object	OID
ipGlobalsBOOTPRelayStatus	1.3.6.1.4.1.81.31.1.1.1
ipGlobalsICMPErrMsgEnable	1.3.6.1.4.1.81.31.1.1.2
ipGlobalsARPInactiveTimeout	1.3.6.1.4.1.81.31.1.1.3
ipGlobalsPrimaryManagementIPAddress	1.3.6.1.4.1.81.31.1.1.4
ipGlobalsNextPrimaryManagementIPAddress	1.3.6.1.4.1.81.31.1.1.5
ipInterfaceAddr	1.3.6.1.4.1.81.31.1.2.1.1
ipInterfaceNetMask	1.3.6.1.4.1.81.31.1.2.1.2
ipInterfaceLowerIfAlias	1.3.6.1.4.1.81.31.1.2.1.3
ipInterfaceType	1.3.6.1.4.1.81.31.1.2.1.4
ipInterfaceForwardIpBroadcast	1.3.6.1.4.1.81.31.1.2.1.5
ipInterfaceBroadcastAddr	1.3.6.1.4.1.81.31.1.2.1.6
ipInterfaceProxyArp	1.3.6.1.4.1.81.31.1.2.1.7
ipInterfaceStatus	1.3.6.1.4.1.81.31.1.2.1.8
ipInterfaceMainRouterAddr	1.3.6.1.4.1.81.31.1.2.1.9
ipInterfaceARPServerStatus	1.3.6.1.4.1.81.31.1.2.1.10
ipInterfaceName	1.3.6.1.4.1.81.31.1.2.1.11
ipInterfaceNetbiosRebroadcast	1.3.6.1.4.1.81.31.1.2.1.12
ipInterfaceIcmpRedirects	1.3.6.1.4.1.81.31.1.2.1.13
ipInterfaceOperStatus	1.3.6.1.4.1.81.31.1.2.1.14
ipInterfaceDhcpRelay	1.3.6.1.4.1.81.31.1.2.1.15
	1 of 3

Object	OID
ripGlobalsRIPEnable	1.3.6.1.4.1.81.31.1.3.1
ripGlobalsLeakOSPFIntoRIP	1.3.6.1.4.1.81.31.1.3.2
ripGlobalsLeakStaticIntoRIP	1.3.6.1.4.1.81.31.1.3.3
ripGlobalsPeriodicUpdateTimer	1.3.6.1.4.1.81.31.1.3.4
ripGlobalsPeriodicInvalidRouteTimer	1.3.6.1.4.1.81.31.1.3.5
ripGlobalsDefaultExportMetric	1.3.6.1.4.1.81.31.1.3.6
ripInterfaceAddr	1.3.6.1.4.1.81.31.1.4.1.1
ripInterfaceMetric	1.3.6.1.4.1.81.31.1.4.1.2
ripInterfaceSplitHorizon	1.3.6.1.4.1.81.31.1.4.1.3
ripInterfaceAcceptDefaultRoute	1.3.6.1.4.1.81.31.1.4.1.4
ripInterfaceSendDefaultRoute	1.3.6.1.4.1.81.31.1.4.1.5
ripInterfaceState	1.3.6.1.4.1.81.31.1.4.1.6
ripInterfaceSendMode	1.3.6.1.4.1.81.31.1.4.1.7
ripInterfaceVersion	1.3.6.1.4.1.81.31.1.4.1.8
ospfGlobalsLeakRIPIntoOSPF	1.3.6.1.4.1.81.31.1.5.1
ospfGlobalsLeakStaticIntoOSPF	1.3.6.1.4.1.81.31.1.5.2
ospfGlobalsLeakDirectIntoOSPF	1.3.6.1.4.1.81.31.1.5.3
ospfGlobalsDefaultExportMetric	1.3.6.1.4.1.81.31.1.5.4
relayVlIndex	1.3.6.1.4.1.81.31.1.6.1.1
relayVlPrimaryServerAddr	1.3.6.1.4.1.81.31.1.6.1.2
relayVlSeconderyServerAddr	1.3.6.1.4.1.81.31.1.6.1.3
relayVlStatus	1.3.6.1.4.1.81.31.1.6.1.4
relayVlRelayAddr	1.3.6.1.4.1.81.31.1.6.1.5
ipRedundancyStatus	1.3.6.1.4.1.81.31.1.9.1
ipRedundancyTimeout	1.3.6.1.4.1.81.31.1.9.2
ipRedundancyPollingInterval	1.3.6.1.4.1.81.31.1.9.3
ipShortcutARPServerStatus	1.3.6.1.4.1.81.31.1.10.1
distributionListRoutingProtocol	1.3.6.1.4.1.81.31.1.12.1.1
distributionListDirection	1.3.6.1.4.1.81.31.1.12.1.2
distributionListIfIndex	1.3.6.1.4.1.81.31.1.12.1.3
distributionListRouteProtocol	1.3.6.1.4.1.81.31.1.12.1.4
distributionListProtocolSpecific1	1.3.6.1.4.1.81.31.1.12.1.5
distributionListProtocolSpecific2	1.3.6.1.4.1.81.31.1.12.1.6
distributionListProtocolSpecific3	1.3.6.1.4.1.81.31.1.12.1.7
	2 of 3

Object	OID
distributionListProtocolSpecific4	1.3.6.1.4.1.81.31.1.12.1.8
distributionListProtocolSpecific5	1.3.6.1.4.1.81.31.1.12.1.9
distributionListAccessListNumber	1.3.6.1.4.1.81.31.1.12.1.10
distributionListEntryStatus	1.3.6.1.4.1.81.31.1.12.1.11
ipVRRPAdminStatus	1.3.6.1.4.1.81.31.1.14.1
iphcIfIndex	1.3.6.1.4.1.81.31.1.15.1.1.1
iphcControlTcpAdminStatus	1.3.6.1.4.1.81.31.1.15.1.1.2
iphcTcpSessions	1.3.6.1.4.1.81.31.1.15.1.1.3
iphcNegotiatedTcpSessions	1.3.6.1.4.1.81.31.1.15.1.1.4
iphcControlRtpAdminStatus	1.3.6.1.4.1.81.31.1.15.1.1.5
iphcRtpSessions	1.3.6.1.4.1.81.31.1.15.1.1.6
iphcNegotiatedRtpSessions	1.3.6.1.4.1.81.31.1.15.1.1.7
iphcControlNonTcpAdminStatus	1.3.6.1.4.1.81.31.1.15.1.1.8
iphcNonTcpSessions	1.3.6.1.4.1.81.31.1.15.1.1.9
iphcNegotiatedNonTcpSessions	1.3.6.1.4.1.81.31.1.15.1.1.10
iphcMaxPeriod	1.3.6.1.4.1.81.31.1.15.1.1.11
iphcMaxTime	1.3.6.1.4.1.81.31.1.15.1.1.12
iphcControRtpMinPortNumber	1.3.6.1.4.1.81.31.1.15.1.1.13
iphcControRtpMaxPortNumber	1.3.6.1.4.1.81.31.1.15.1.1.14
iphcControlRtpCompressionRatio	1.3.6.1.4.1.81.31.1.15.1.1.15
iphcControlNonTcpMode	1.3.6.1.4.1.81.31.1.15.1.1.16
ospfXtndIfIpAddress	1.3.6.1.4.1.81.31.1.16.1.1
ospfXtndIfAddressLessIf	1.3.6.1.4.1.81.31.1.16.1.2
ospfXtndIfPassiveMode	1.3.6.1.4.1.81.31.1.16.1.3
vlConfIndex	1.3.6.1.4.1.81.31.3.1.1.1
vlConfAlias	1.3.6.1.4.1.81.31.3.1.1.2
vlConfStatus	1.3.6.1.4.1.81.31.3.1.1.3
	3 of 3

The following table provides a list of the MIBs in the RS-232-MIB.my file that are supported by the G350 and their OIDs:

Object	OID
rs232Number	1.3.6.1.2.1.10.33.1
rs232PortIndex	1.3.6.1.2.1.10.33.2.1.1
rs232PortType	1.3.6.1.2.1.10.33.2.1.2
rs232PortInSigNumber	1.3.6.1.2.1.10.33.2.1.3
rs232PortOutSigNumber	1.3.6.1.2.1.10.33.2.1.4
rs232PortInSpeed	1.3.6.1.2.1.10.33.2.1.5
rs232PortOutSpeed	1.3.6.1.2.1.10.33.2.1.6
rs232PortInFlowType	1.3.6.1.2.1.10.33.2.1.7
rs232PortOutFlowType	1.3.6.1.2.1.10.33.2.1.8
rs232SyncPortIndex	1.3.6.1.2.1.10.33.4.1.1
rs232SyncPortClockSource	1.3.6.1.2.1.10.33.4.1.2
rs232SyncPortFrameCheckErrs	1.3.6.1.2.1.10.33.4.1.3
rs232SyncPortTransmitUnderrunErrs	1.3.6.1.2.1.10.33.4.1.4
rs232SyncPortReceiveOverrunErrs	1.3.6.1.2.1.10.33.4.1.5
rs232SyncPortInterruptedFrames	1.3.6.1.2.1.10.33.4.1.6
rs232SyncPortAbortedFrames	1.3.6.1.2.1.10.33.4.1.7
rs232SyncPortRole	1.3.6.1.2.1.10.33.4.1.8
rs232SyncPortEncoding	1.3.6.1.2.1.10.33.4.1.9
rs232SyncPortRTSControl	1.3.6.1.2.1.10.33.4.1.10
rs232SyncPortRTSCTSDelay	1.3.6.1.2.1.10.33.4.1.11
rs232SyncPortMode	1.3.6.1.2.1.10.33.4.1.12
rs232SyncPortIdlePattern	1.3.6.1.2.1.10.33.4.1.13
rs232SyncPortMinFlags	1.3.6.1.2.1.10.33.4.1.14
rs232InSigPortIndex	1.3.6.1.2.1.10.33.5.1.1
rs232InSigName	1.3.6.1.2.1.10.33.5.1.2
rs232InSigState	1.3.6.1.2.1.10.33.5.1.3
rs232InSigChanges	1.3.6.1.2.1.10.33.5.1.4
rs232OutSigPortIndex	1.3.6.1.2.1.10.33.6.1.1
rs232OutSigName	1.3.6.1.2.1.10.33.6.1.2
rs232OutSigState	1.3.6.1.2.1.10.33.6.1.3
rs232OutSigChanges	1.3.6.1.2.1.10.33.6.1.4

The following table provides a list of the MIBs in the RIPv2-MIB.my file that are supported by the G350 and their OIDs:

Object	OID
rip2GlobalRouteChanges	1.3.6.1.2.1.23.1.1
rip2GlobalQueries	1.3.6.1.2.1.23.1.2
rip2IfStatAddress	1.3.6.1.2.1.23.2.1.1
rip2IfStatRcvBadPackets	1.3.6.1.2.1.23.2.1.2
rip2IfStatRcvBadRoutes	1.3.6.1.2.1.23.2.1.3
rip2IfStatSentUpdates	1.3.6.1.2.1.23.2.1.4
rip2IfStatStatus	1.3.6.1.2.1.23.2.1.5
rip2IfConfAddress	1.3.6.1.2.1.23.3.1.1
rip2IfConfDomain	1.3.6.1.2.1.23.3.1.2
rip2IfConfAuthType	1.3.6.1.2.1.23.3.1.3
rip2IfConfAuthKey	1.3.6.1.2.1.23.3.1.4
rip2IfConfSend	1.3.6.1.2.1.23.3.1.5
rip2IfConfReceive	1.3.6.1.2.1.23.3.1.6
rip2IfConfDefaultMetric	1.3.6.1.2.1.23.3.1.7
rip2IfConfStatus	1.3.6.1.2.1.23.3.1.8
rip2IfConfSrcAddress	1.3.6.1.2.1.23.3.1.9

The following table provides a list of the MIBs in the IF-MIB.my file that are supported by the G350 and their OIDs:

Object	OID
ifNumber	1.3.6.1.2.1.2.1
ifIndex	1.3.6.1.2.1.2.2.1.1
ifDescr	1.3.6.1.2.1.2.2.1.2
ifType	1.3.6.1.2.1.2.2.1.3
ifMtu	1.3.6.1.2.1.2.2.1.4
ifSpeed	1.3.6.1.2.1.2.2.1.5
ifPhysAddress	1.3.6.1.2.1.2.2.1.6
ifAdminStatus	1.3.6.1.2.1.2.2.1.7
ifOperStatus	1.3.6.1.2.1.2.2.1.8
ifLastChange	1.3.6.1.2.1.2.2.1.9
ifInOctets	1.3.6.1.2.1.2.2.1.10
	1 of 2

Object	OID
ifInUcastPkts	1.3.6.1.2.1.2.2.1.11
ifInNUcastPkts	1.3.6.1.2.1.2.2.1.12
ifInDiscards	1.3.6.1.2.1.2.2.1.13
ifInErrors	1.3.6.1.2.1.2.2.1.14
ifInUnknownProtos	1.3.6.1.2.1.2.2.1.15
ifOutOctets	1.3.6.1.2.1.2.2.1.16
ifOutUcastPkts	1.3.6.1.2.1.2.2.1.17
ifOutNUcastPkts	1.3.6.1.2.1.2.2.1.18
ifOutDiscards	1.3.6.1.2.1.2.2.1.19
ifOutErrors	1.3.6.1.2.1.2.2.1.20
ifOutQLen	1.3.6.1.2.1.2.2.1.21
ifSpecific	1.3.6.1.2.1.2.2.1.22
ifName	1.3.6.1.2.1.31.1.1.1.1
ifInMulticastPkts	1.3.6.1.2.1.31.1.1.1.2
ifInBroadcastPkts	1.3.6.1.2.1.31.1.1.1.3
ifOutMulticastPkts	1.3.6.1.2.1.31.1.1.1.4
ifOutBroadcastPkts	1.3.6.1.2.1.31.1.1.1.5
ifHCInOctets	1.3.6.1.2.1.31.1.1.1.6
ifHCInUcastPkts	1.3.6.1.2.1.31.1.1.1.7
ifHCInMulticastPkts	1.3.6.1.2.1.31.1.1.1.8
ifHCInBroadcastPkts	1.3.6.1.2.1.31.1.1.1.9
ifHCOutOctets	1.3.6.1.2.1.31.1.1.1.10
ifHCOutUcastPkts	1.3.6.1.2.1.31.1.1.1.11
ifHCOutMulticastPkts	1.3.6.1.2.1.31.1.1.1.12
ifHCOutBroadcastPkts	1.3.6.1.2.1.31.1.1.1.13
ifLinkUpDownTrapEnable	1.3.6.1.2.1.31.1.1.1.14
ifHighSpeed	1.3.6.1.2.1.31.1.1.1.15
ifPromiscuousMode	1.3.6.1.2.1.31.1.1.1.16
ifConnectorPresent	1.3.6.1.2.1.31.1.1.1.17
ifAlias	1.3.6.1.2.1.31.1.1.1.18
ifCounterDiscontinuityTime	1.3.6.1.2.1.31.1.1.1.19
	2 of 2

The following table provides a list of the MIBs in the DS0BUNDLE-MIB.my file that are supported by the G350 and their OIDs:

Object	OID
dsx0BundleIndex	1.3.6.1.2.1.10.82.3.1.1
dsx0BundleIfIndex	1.3.6.1.2.1.10.82.3.1.2
dsx0BundleCircuitIdentifier	1.3.6.1.2.1.10.82.3.1.3
dsx0BundleRowStatus	1.3.6.1.2.1.10.82.3.1.4

The following table provides a list of the MIBs in the RFC1406-MIB.my file that are supported by the G350 and their OIDs:

Object	OID
dsx1LineIndex	1.3.6.1.2.1.10.18.6.1.1
dsx1IfIndex	1.3.6.1.2.1.10.18.6.1.2
dsx1TimeElapsed	1.3.6.1.2.1.10.18.6.1.3
dsx1ValidIntervals	1.3.6.1.2.1.10.18.6.1.4
dsx1LineType	1.3.6.1.2.1.10.18.6.1.5
dsx1LineCoding	1.3.6.1.2.1.10.18.6.1.6
dsx1SendCode	1.3.6.1.2.1.10.18.6.1.7
dsx1CircuitIdentifier	1.3.6.1.2.1.10.18.6.1.8
dsx1LoopbackConfig	1.3.6.1.2.1.10.18.6.1.9
dsx1LineStatus	1.3.6.1.2.1.10.18.6.1.10
dsx1SignalMode	1.3.6.1.2.1.10.18.6.1.11
dsx1TransmitClockSource	1.3.6.1.2.1.10.18.6.1.12
dsx1Fdl	1.3.6.1.2.1.10.18.6.1.13
dsx1CurrentIndex	1.3.6.1.2.1.10.18.7.1.1
dsx1CurrentESs	1.3.6.1.2.1.10.18.7.1.2
dsx1CurrentSESs	1.3.6.1.2.1.10.18.7.1.3
dsx1CurrentSEFSs	1.3.6.1.2.1.10.18.7.1.4
dsx1CurrentUASs	1.3.6.1.2.1.10.18.7.1.5
dsx1CurrentCSSs	1.3.6.1.2.1.10.18.7.1.6
dsx1CurrentPCVs	1.3.6.1.2.1.10.18.7.1.7
dsx1CurrentLESs	1.3.6.1.2.1.10.18.7.1.8
dsx1CurrentBESs	1.3.6.1.2.1.10.18.7.1.9
dsx1CurrentDMs	1.3.6.1.2.1.10.18.7.1.10
	1 of 2

Object	OID
dsx1CurrentLCVs	1.3.6.1.2.1.10.18.7.1.11
dsx1IntervalIndex	1.3.6.1.2.1.10.18.8.1.1
dsx1IntervalNumber	1.3.6.1.2.1.10.18.8.1.2
dsx1IntervalESs	1.3.6.1.2.1.10.18.8.1.3
dsx1IntervalSESs	1.3.6.1.2.1.10.18.8.1.4
dsx1IntervalSEFSs	1.3.6.1.2.1.10.18.8.1.5
dsx1IntervalUASs	1.3.6.1.2.1.10.18.8.1.6
dsx1IntervalCSSs	1.3.6.1.2.1.10.18.8.1.7
dsx1IntervalPCVs	1.3.6.1.2.1.10.18.8.1.8
dsx1IntervalLESs	1.3.6.1.2.1.10.18.8.1.9
dsx1IntervalBESs	1.3.6.1.2.1.10.18.8.1.10
dsx1IntervalDMs	1.3.6.1.2.1.10.18.8.1.11
dsx1IntervalLCVs	1.3.6.1.2.1.10.18.8.1.12
dsx1TotalIndex	1.3.6.1.2.1.10.18.9.1.1
dsx1TotalESs	1.3.6.1.2.1.10.18.9.1.2
dsx1TotalSESs	1.3.6.1.2.1.10.18.9.1.3
dsx1TotalSEFSs	1.3.6.1.2.1.10.18.9.1.4
dsx1TotalUASs	1.3.6.1.2.1.10.18.9.1.5
dsx1TotalCSSs	1.3.6.1.2.1.10.18.9.1.6
dsx1TotalPCVs	1.3.6.1.2.1.10.18.9.1.7
dsx1TotalLESs	1.3.6.1.2.1.10.18.9.1.8
dsx1TotalBESs	1.3.6.1.2.1.10.18.9.1.9
dsx1TotalDMs	1.3.6.1.2.1.10.18.9.1.10
dsx1TotalLCVs	1.3.6.1.2.1.10.18.9.1.11
	2 of 2

The following table provides a list of the MIBs in the DS0-MIB.my file that are supported by the G350 and their OIDs:

Object	OID
dsx0Ds0ChannelNumber	1.3.6.1.2.1.10.81.1.1.1
dsx0RobbedBitSignalling	1.3.6.1.2.1.10.81.1.1.2
dsx0CircuitIdentifier	1.3.6.1.2.1.10.81.1.1.3
dsx0IdleCode	1.3.6.1.2.1.10.81.1.1.4
	1 of 2

Object	OID
dsx0SeizedCode	1.3.6.1.2.1.10.81.1.1.5
dsx0ReceivedCode	1.3.6.1.2.1.10.81.1.1.6
dsx0TransmitCodesEnable	1.3.6.1.2.1.10.81.1.1.7
dsx0Ds0BundleMappedIfIndex	1.3.6.1.2.1.10.81.1.1.8
dsx0ChanMappedIfIndex	1.3.6.1.2.1.10.81.3.1.1
	2 of 2

The following table provides a list of the MIBs in the POLICY-MIB.MY file that are supported by the G350 and their OIDs:

Object	OID
ipPolicyListSlot	1.3.6.1.4.1.81.36.1.1.1
ipPolicyListID	1.3.6.1.4.1.81.36.1.1.2
ipPolicyListName	1.3.6.1.4.1.81.36.1.1.3
ipPolicyListValidityStatus	1.3.6.1.4.1.81.36.1.1.4
ipPolicyListChecksum	1.3.6.1.4.1.81.36.1.1.5
ipPolicyListRowStatus	1.3.6.1.4.1.81.36.1.1.6
ipPolicyListDefaultOperation	1.3.6.1.4.1.81.36.1.1.7
ipPolicyListCookie	1.3.6.1.4.1.81.36.1.1.8
ipPolicyListTrackChanges	1.3.6.1.4.1.81.36.1.1.9
ipPolicyListOwner	1.3.6.1.4.1.81.36.1.1.10
ipPolicyListErrMsg	1.3.6.1.4.1.81.36.1.1.11
ipPolicyListTrustedFields	1.3.6.1.4.1.81.36.1.1.12
ipPolicyListScope	1.3.6.1.4.1.81.36.1.1.13
ipPolicyListIpOptionOperation	1.3.6.1.4.1.81.36.1.1.14
ipPolicyListIpFragmentationOperation	1.3.6.1.4.1.81.36.1.1.15
ipPolicyListType	1.3.6.1.4.1.81.36.1.1.16
ipPolicyListEtherTypeDefaultOperation	1.3.6.1.4.1.81.36.1.1.17
ipPolicyRuleSlot	1.3.6.1.4.1.81.36.2.1.1
ipPolicyRuleListID	1.3.6.1.4.1.81.36.2.1.2
ipPolicyRuleID	1.3.6.1.4.1.81.36.2.1.3
ipPolicyRuleSrcAddr	1.3.6.1.4.1.81.36.2.1.4
ipPolicyRuleSrcAddrWild	1.3.6.1.4.1.81.36.2.1.5
ipPolicyRuleDstAddr	1.3.6.1.4.1.81.36.2.1.6
	1 of 5

Object	OID
ipPolicyRuleDstAddrWild	1.3.6.1.4.1.81.36.2.1.7
ipPolicyRuleProtocol	1.3.6.1.4.1.81.36.2.1.8
ipPolicyRuleL4SrcPortMin	1.3.6.1.4.1.81.36.2.1.9
ipPolicyRuleL4SrcPortMax	1.3.6.1.4.1.81.36.2.1.10
ipPolicyRuleL4DestPortMin	1.3.6.1.4.1.81.36.2.1.11
ipPolicyRuleL4DestPortMax	1.3.6.1.4.1.81.36.2.1.12
ipPolicyRuleEstablished	1.3.6.1.4.1.81.36.2.1.13
ipPolicyRuleOperation	1.3.6.1.4.1.81.36.2.1.14
ipPolicyRuleApplicabilityPrecedence	1.3.6.1.4.1.81.36.2.1.15
ipPolicyRuleApplicabilityStatus	1.3.6.1.4.1.81.36.2.1.16
ipPolicyRuleApplicabilityType	1.3.6.1.4.1.81.36.2.1.17
ipPolicyRuleErrMsg	1.3.6.1.4.1.81.36.2.1.18
ipPolicyRuleStatus	1.3.6.1.4.1.81.36.2.1.19
ipPolicyRuleDSCPOperation	1.3.6.1.4.1.81.36.2.1.20
ipPolicyRuleDSCPFilter	1.3.6.1.4.1.81.36.2.1.21
ipPolicyRuleDSCPFilterWild	1.3.6.1.4.1.81.36.2.1.22
ipPolicyRuleIcmpTypeCode	1.3.6.1.4.1.81.36.2.1.23
ipPolicyRuleSrcAddrNot	1.3.6.1.4.1.81.36.2.1.24
ipPolicyRuleDstAddrNot	1.3.6.1.4.1.81.36.2.1.25
ipPolicyRuleProtocolNot	1.3.6.1.4.1.81.36.2.1.26
ipPolicyRuleL4SrcPortNot	1.3.6.1.4.1.81.36.2.1.27
ipPolicyRuleL4DestPortNot	1.3.6.1.4.1.81.36.2.1.28
ipPolicyRuleIcmpTypeCodeNot	1.3.6.1.4.1.81.36.2.1.29
ipPolicyRuleSrcPolicyUserGroupName	1.3.6.1.4.1.81.36.2.1.30
ipPolicyRuleDstPolicyUserGroupName	1.3.6.1.4.1.81.36.2.1.31
ipPolicyControlSlot	1.3.6.1.4.1.81.36.3.1.1
ipPolicyControlActiveGeneralList	1.3.6.1.4.1.81.36.3.1.2
ipPolicyControlAllowedPolicyManagers	1.3.6.1.4.1.81.36.3.1.3
ipPolicyControlCurrentChecksum	1.3.6.1.4.1.81.36.3.1.4
ipPolicyControlMinimalPolicyManagmentVersion	1.3.6.1.4.1.81.36.3.1.5
ipPolicyControlMaximalPolicyManagmentVersion	1.3.6.1.4.1.81.36.3.1.6
ipPolicyControlMIBversion	1.3.6.1.4.1.81.36.3.1.7
ipPolicyDiffServSlot	1.3.6.1.4.1.81.36.4.1.1
ipPolicyDiffServDSCP	1.3.6.1.4.1.81.36.4.1.2
	2 of 5

Object	OID
ipPolicyDiffServOperation	1.3.6.1.4.1.81.36.4.1.3
ipPolicyDiffServName	1.3.6.1.4.1.81.36.4.1.4
ipPolicyDiffServAggIndex	1.3.6.1.4.1.81.36.4.1.5
ipPolicyDiffServApplicabilityPrecedence	1.3.6.1.4.1.81.36.4.1.6
ipPolicyDiffServApplicabilityStatus	1.3.6.1.4.1.81.36.4.1.7
ipPolicyDiffServApplicabilityType	1.3.6.1.4.1.81.36.4.1.8
ipPolicyDiffServErrMsg	1.3.6.1.4.1.81.36.4.1.9
ipPolicyQuerySlot	1.3.6.1.4.1.81.36.5.1.1
ipPolicyQueryListID	1.3.6.1.4.1.81.36.5.1.2
ipPolicyQuerySrcAddr	1.3.6.1.4.1.81.36.5.1.3
ipPolicyQueryDstAddr	1.3.6.1.4.1.81.36.5.1.4
ipPolicyQueryProtocol	1.3.6.1.4.1.81.36.5.1.5
ipPolicyQueryL4SrcPort	1.3.6.1.4.1.81.36.5.1.6
ipPolicyQueryL4DestPort	1.3.6.1.4.1.81.36.5.1.7
ipPolicyQueryEstablished	1.3.6.1.4.1.81.36.5.1.8
ipPolicyQueryDSCP	1.3.6.1.4.1.81.36.5.1.9
ipPolicyQueryOperation	1.3.6.1.4.1.81.36.5.1.10
ipPolicyQueryRuleID	1.3.6.1.4.1.81.36.5.1.11
ipPolicyQueryDSCPOperation	1.3.6.1.4.1.81.36.5.1.12
ipPolicyQueryPriority	1.3.6.1.4.1.81.36.5.1.13
ipPolicyQueryIfIndex	1.3.6.1.4.1.81.36.5.1.14
ipPolicyQuerySubContext	1.3.6.1.4.1.81.36.5.1.15
ipPolicyQueryEtherTypeType	1.3.6.1.4.1.81.36.5.1.16
ipPolicyQueryEtherTypeTrafficType	1.3.6.1.4.1.81.36.5.1.17
ipPolicyQueryIcmpTypeCode	1.3.6.1.4.1.81.36.5.1.18
ipPolicyDiffServControlSlot	1.3.6.1.4.1.81.36.6.1.1
ipPolicyDiffServControlChecksum	1.3.6.1.4.1.81.36.6.1.2
ipPolicyDiffServControlTrustedFields	1.3.6.1.4.1.81.36.6.1.3
ipPolicyDiffServControlValidityStatus	1.3.6.1.4.1.81.36.6.1.4
ipPolicyDiffServControlErrMsg	1.3.6.1.4.1.81.36.6.1.5
ipPolicyAccessControlViolationEntID	1.3.6.1.4.1.81.36.7.1.1
ipPolicyAccessControlViolationSrcAddr	1.3.6.1.4.1.81.36.7.1.2
ipPolicyAccessControlViolationDstAddr	1.3.6.1.4.1.81.36.7.1.3
ipPolicyAccessControlViolationProtocol	1.3.6.1.4.1.81.36.7.1.4
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Object	OID
ipPolicyAccessControlViolationL4SrcPort	1.3.6.1.4.1.81.36.7.1.5
ipPolicyAccessControlViolationL4DstPort	1.3.6.1.4.1.81.36.7.1.6
ipPolicyAccessControlViolationEstablished	1.3.6.1.4.1.81.36.7.1.7
ipPolicyAccessControlViolationDSCP	1.3.6.1.4.1.81.36.7.1.8
ipPolicyAccessControlViolationIfIndex	1.3.6.1.4.1.81.36.7.1.9
ipPolicyAccessControlViolationSubCtxt	1.3.6.1.4.1.81.36.7.1.10
ipPolicyAccessControlViolationTime	1.3.6.1.4.1.81.36.7.1.11
ipPolicyAccessControlViolationRuleType	1.3.6.1.4.1.81.36.7.1.12
ipPolicyCompositeOpEntID	1.3.6.1.4.1.81.36.8.1.1
ipPolicyCompositeOpListID	1.3.6.1.4.1.81.36.8.1.2
ipPolicyCompositeOpID	1.3.6.1.4.1.81.36.8.1.3
ipPolicyCompositeOpName	1.3.6.1.4.1.81.36.8.1.4
ipPolicyCompositeOp802priority	1.3.6.1.4.1.81.36.8.1.5
ipPolicyCompositeOpAccess	1.3.6.1.4.1.81.36.8.1.6
ipPolicyCompositeOpDscp	1.3.6.1.4.1.81.36.8.1.7
ipPolicyCompositeOpRSGQualityClass	1.3.6.1.4.1.81.36.8.1.8
ipPolicyCompositeOpNotify	1.3.6.1.4.1.81.36.8.1.9
ipPolicyCompositeOpRowStatus	1.3.6.1.4.1.81.36.8.1.10
ipPolicyCompositeOpErrorReply	1.3.6.1.4.1.81.36.8.1.11
ipPolicyCompositeOpKeepsState	1.3.6.1.4.1.81.36.8.1.12
ipPolicyDSCPmapEntID	1.3.6.1.4.1.81.36.9.1.1
ipPolicyDSCPmapListID	1.3.6.1.4.1.81.36.9.1.2
ipPolicyDSCPmapDSCP	1.3.6.1.4.1.81.36.9.1.3
ipPolicyDSCPmapOperation	1.3.6.1.4.1.81.36.9.1.4
ipPolicyDSCPmapName	1.3.6.1.4.1.81.36.9.1.5
ipPolicyDSCPmapApplicabilityPrecedence	1.3.6.1.4.1.81.36.9.1.6
ipPolicyDSCPmapApplicabilityStatus	1.3.6.1.4.1.81.36.9.1.7
ipPolicyDSCPmapApplicabilityType	1.3.6.1.4.1.81.36.9.1.8
ipPolicyDSCPmapErrMsg	1.3.6.1.4.1.81.36.9.1.9
ipPolicyActivationEntID	1.3.6.1.4.1.81.36.10.1.1
ipPolicyActivationifIndex	1.3.6.1.4.1.81.36.10.1.2
ipPolicyActivationSubContext	1.3.6.1.4.1.81.36.10.1.3
ipPolicyActivationSubContextName	1.3.6.1.4.1.81.36.10.1.4
ipPolicyActivationList	1.3.6.1.4.1.81.36.10.1.5
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Object	OID
ipPolicyActivationAclList	1.3.6.1.4.1.81.36.10.1.6
ipPolicyActivationQoSList	1.3.6.1.4.1.81.36.10.1.7
ipPolicyActivationSourceNatList	1.3.6.1.4.1.81.36.10.1.8
ipPolicyActivationDestinationNatList	1.3.6.1.4.1.81.36.10.1.9
ipPolicyActivationAntiSpoofignList	1.3.6.1.4.1.81.36.10.1.10
ipPolicyActivationPBRList	TBD
ipPolicyValidListEntID	1.3.6.1.4.1.81.36.11.1.1.1
ipPolicyValidListIfIndex	1.3.6.1.4.1.81.36.11.1.1.2
ipPolicyValidListSubContext	1.3.6.1.4.1.81.36.11.1.1.3
ipPolicyValidListListID	1.3.6.1.4.1.81.36.11.1.1.4
ipPolicyValidListStatus	1.3.6.1.4.1.81.36.11.1.1.5
ipPolicyValidListErrMsg	1.3.6.1.4.1.81.36.11.1.1.6
ipPolicyValidListIpOption	1.3.6.1.4.1.81.36.11.1.1.7
ipPolicyValidListIpFragmentation	1.3.6.1.4.1.81.36.11.1.1.8
ipPolicyValidRuleEntID	1.3.6.1.4.1.81.36.11.2.1.1
ipPolicyValidRuleIfIndex	1.3.6.1.4.1.81.36.11.2.1.2
ipPolicyValidRuleSubContext	1.3.6.1.4.1.81.36.11.2.1.3
ipPolicyValidRuleListID	1.3.6.1.4.1.81.36.11.2.1.4
ipPolicyValidRuleRuleID	1.3.6.1.4.1.81.36.11.2.1.5
ipPolicyValidRuleStatus	1.3.6.1.4.1.81.36.11.2.1.6
ipPolicyValidRuleApplicabilityType	1.3.6.1.4.1.81.36.11.2.1.7
ipPolicyValidRuleErrMsg	1.3.6.1.4.1.81.36.11.2.1.8
ipPolicyValidDSCPEntID	1.3.6.1.4.1.81.36.11.3.1.1
ipPolicyValidDSCPIfIndex	1.3.6.1.4.1.81.36.11.3.1.2
ipPolicyValidDSCPSubContext	1.3.6.1.4.1.81.36.11.3.1.3
ipPolicyValidDSCPListID	1.3.6.1.4.1.81.36.11.3.1.4
ipPolicyValidDSCPvalue	1.3.6.1.4.1.81.36.11.3.1.5
ipPolicyValidDSCPStatus	1.3.6.1.4.1.81.36.11.3.1.6
ipPolicyValidDSCPApplicabilityType	1.3.6.1.4.1.81.36.11.3.1.7
ipPolicyValidDSCPErrMsg	1.3.6.1.4.1.81.36.11.3.1.8
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The following table provides a list of the MIBs in the BRIDGE-MIB.my file that are supported by the G350 and their OIDs:

Object	OID
dot1dBaseBridgeAddress	1.3.6.1.2.1.17.1.1
dot1dBaseNumPorts	1.3.6.1.2.1.17.1.2
dot1dBaseType	1.3.6.1.2.1.17.1.3
dot1dBasePort	1.3.6.1.2.1.17.1.4.1.1
dot1dBasePortIfIndex	1.3.6.1.2.1.17.1.4.1.2
dot1dBasePortCircuit	1.3.6.1.2.1.17.1.4.1.3
dot1dBasePortDelayExceededDiscards	1.3.6.1.2.1.17.1.4.1.4
dot1dBasePortMtuExceededDiscards	1.3.6.1.2.1.17.1.4.1.5
dot1dStpProtocolSpecification	1.3.6.1.2.1.17.2.1
dot1dStpPriority	1.3.6.1.2.1.17.2.2
dot1dStpTimeSinceTopologyChange	1.3.6.1.2.1.17.2.3
dot1dStpTopChanges	1.3.6.1.2.1.17.2.4
dot1dStpDesignatedRoot	1.3.6.1.2.1.17.2.5
dot1dStpRootCost	1.3.6.1.2.1.17.2.6
dot1dStpRootPort	1.3.6.1.2.1.17.2.7
dot1dStpMaxAge	1.3.6.1.2.1.17.2.8
dot1dStpHelloTime	1.3.6.1.2.1.17.2.9
dot1dStpHoldTime	1.3.6.1.2.1.17.2.10
dot1dStpForwardDelay	1.3.6.1.2.1.17.2.11
dot1dStpBridgeMaxAge	1.3.6.1.2.1.17.2.12
dot1dStpBridgeHelloTime	1.3.6.1.2.1.17.2.13
dot1dStpBridgeForwardDelay	1.3.6.1.2.1.17.2.14
dot1dStpPort	1.3.6.1.2.1.17.2.15.1.1
dot1dStpPortPriority	1.3.6.1.2.1.17.2.15.1.2
dot1dStpPortState	1.3.6.1.2.1.17.2.15.1.3
dot1dStpPortEnable	1.3.6.1.2.1.17.2.15.1.4
dot1dStpPortPathCost	1.3.6.1.2.1.17.2.15.1.5
dot1dStpPortDesignatedRoot	1.3.6.1.2.1.17.2.15.1.6
dot1dStpPortDesignatedCost	1.3.6.1.2.1.17.2.15.1.7
dot1dStpPortDesignatedBridge	1.3.6.1.2.1.17.2.15.1.8
dot1dStpPortDesignatedPort	1.3.6.1.2.1.17.2.15.1.9
	1 of 2

Object	OID
dot1dStpPortForwardTransitions	1.3.6.1.2.1.17.2.15.1.10
dot1dTpAgingTime	1.3.6.1.2.1.17.4.2
dot1dTpFdbAddress	1.3.6.1.2.1.17.4.3.1.1
dot1dTpFdbPort	1.3.6.1.2.1.17.4.3.1.2
dot1dTpFdbStatus	1.3.6.1.2.1.17.4.3.1.3
	2 of 2

The following table provides a list of the MIBs in the CONFIG-MIB.MY file that are supported by the G350 and their OIDs:

Object	OID
chHWType	1.3.6.1.4.1.81.7.1
chNumberOfSlots	1.3.6.1.4.1.81.7.2
chReset	1.3.6.1.4.1.81.7.7
chLntAgMaxNmbOfMngrs	1.3.6.1.4.1.81.7.9.3.1
chLntAgPermMngrId	1.3.6.1.4.1.81.7.9.3.2.1.1
chLntAgPermMngrAddr	1.3.6.1.4.1.81.7.9.3.2.1.2
chLntAgMngrTraps	1.3.6.1.4.1.81.7.9.3.2.1.3
chLntAgTrapsPermMngrId	1.3.6.1.4.1.81.7.9.3.7.1.1
chLntAgTrapsId	1.3.6.1.4.1.81.7.9.3.7.1.2
chLntAgTrapsEnableFlag	1.3.6.1.4.1.81.7.9.3.7.1.3
chLntAgMaxTrapsNumber	1.3.6.1.4.1.81.7.9.3.100
chGroupList	1.3.6.1.4.1.81.7.18
chLogFileGroupId	1.3.6.1.4.1.81.7.22.1.1
chLogFileIndex	1.3.6.1.4.1.81.7.22.1.2
chLogFileName	1.3.6.1.4.1.81.7.22.1.3
chLogFileAbsoluteTime	1.3.6.1.4.1.81.7.22.1.4
chLogFileMessage	1.3.6.1.4.1.81.7.22.1.5
chLogFileEncryptedMessage	1.3.6.1.4.1.81.7.22.1.6
genGroupId	1.3.6.1.4.1.81.8.1.1.1
genGroupSWVersion	1.3.6.1.4.1.81.8.1.1.2
genGroupKernelVersion	1.3.6.1.4.1.81.8.1.1.3
genGroupType	1.3.6.1.4.1.81.8.1.1.4
genGroupDescr	1.3.6.1.4.1.81.8.1.1.5
	1 of 4

Object	OID
genGroupNumberOfPorts	1.3.6.1.4.1.81.8.1.1.6
genGroupNumberOfIntPorts	1.3.6.1.4.1.81.8.1.1.7
genGroupReset	1.3.6.1.4.1.81.8.1.1.8
genGroupAutoMan	1.3.6.1.4.1.81.8.1.1.9
genGroupFullConfig	1.3.6.1.4.1.81.8.1.1.10
genGroupRedun12	1.3.6.1.4.1.81.8.1.1.11
genGroupRedun34	1.3.6.1.4.1.81.8.1.1.12
genGroupStandAloneMode	1.3.6.1.4.1.81.8.1.1.14
genGroupInterProcCommStatus	1.3.6.1.4.1.81.8.1.1.15
genGroupCommStatus	1.3.6.1.4.1.81.8.1.1.16
genGroupHWStatus	1.3.6.1.4.1.81.8.1.1.17
genGroupSupplyVoltageFault	1.3.6.1.4.1.81.8.1.1.18
genGroupIntTemp	1.3.6.1.4.1.81.8.1.1.19
genGroupSpecificOID	1.3.6.1.4.1.81.8.1.1.20
genGroupConfigurationSymbol	1.3.6.1.4.1.81.8.1.1.21
genGroupLastChange	1.3.6.1.4.1.81.8.1.1.22
genGroupRedunRecovery	1.3.6.1.4.1.81.8.1.1.23
genGroupHWVersion	1.3.6.1.4.1.81.8.1.1.24
genGroupHeight	1.3.6.1.4.1.81.8.1.1.25
genGroupWidth	1.3.6.1.4.1.81.8.1.1.26
genGroupIntrusionControl	1.3.6.1.4.1.81.8.1.1.27
genGroupThresholdStatus	1.3.6.1.4.1.81.8.1.1.28
genGroupEavesdropping	1.3.6.1.4.1.81.8.1.1.29
genGroupMainSWVersion	1.3.6.1.4.1.81.8.1.1.30
genGroupMPSActivityStatus	1.3.6.1.4.1.81.8.1.1.31
genGroupBUPSActivityStatus	1.3.6.1.4.1.81.8.1.1.32
genGroupPrepareCounters	1.3.6.1.4.1.81.8.1.1.33
genGroupPortLastChange	1.3.6.1.4.1.81.8.1.1.34
genGroupIntPortLastChange	1.3.6.1.4.1.81.8.1.1.35
genGroupFaultMask	1.3.6.1.4.1.81.8.1.1.36
genGroupTypeName	1.3.6.1.4.1.81.8.1.1.37
genGroupAgentSlot	1.3.6.1.4.1.81.8.1.1.38
genGroupMngType	1.3.6.1.4.1.81.8.1.1.39
genGroupNumberOfLogicalPorts	1.3.6.1.4.1.81.8.1.1.40
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Object	OID
genGroupNumberOfInterfaces	1.3.6.1.4.1.81.8.1.1.41
genGroupCascadUpStatus	1.3.6.1.4.1.81.8.1.1.42
genGroupCascadDownStatus	1.3.6.1.4.1.81.8.1.1.43
genGroupSTARootPortID	1.3.6.1.4.1.81.8.1.1.44
genGroupCopyPortInstruction	1.3.6.1.4.1.81.8.1.1.45
genGroupLicenseKey	1.3.6.1.4.1.81.8.1.1.46
genGroupLogFileClear	1.3.6.1.4.1.81.8.1.1.47
genGroupBootVersion	1.3.6.1.4.1.81.8.1.1.48
genGroupResetLastStamp	1.3.6.1.4.1.81.8.1.1.49
genGroupSerialNumber	1.3.6.1.4.1.81.8.1.1.50
genGroupShowModuleInformation	1.3.6.1.4.1.81.8.1.1.51
genGroupCascadingUpFault	1.3.6.1.4.1.81.8.1.1.52
genGroupCascadingDownFault	1.3.6.1.4.1.81.8.1.1.53
genGroupPortClassificationMask	1.3.6.1.4.1.81.8.1.1.54
genGroupPSUType	1.3.6.1.4.1.81.8.1.1.55
genGroupPolicyType	1.3.6.1.4.1.81.8.1.1.56
genPortGroupId	1.3.6.1.4.1.81.9.1.1.1
genPortId	1.3.6.1.4.1.81.9.1.1.2
genPortFunctionality	1.3.6.1.4.1.81.9.1.1.3
genPortType	1.3.6.1.4.1.81.9.1.1.4
genPortDescr	1.3.6.1.4.1.81.9.1.1.5
genPortAdminStatus	1.3.6.1.4.1.81.9.1.1.10
genPortFaultMask	1.3.6.1.4.1.81.9.1.1.14
genPortSWRdFault	1.3.6.1.4.1.81.9.1.1.15
genPortVLANMode	1.3.6.1.4.1.81.9.1.1.19
genPortAdminPermission	1.3.6.1.4.1.81.9.1.1.20
genPortName	1.3.6.1.4.1.81.9.1.1.21
genPortClassification	1.3.6.1.4.1.81.9.1.1.22
genPortVLANBindingMode	1.3.6.1.4.1.81.9.1.1.23
softRedundancyId	1.3.6.1.4.1.81.11.1.1.1
softRedundancyName	1.3.6.1.4.1.81.11.1.1.2
softRedundancyGroupId1	1.3.6.1.4.1.81.11.1.1.3
softRedundancyPortId1	1.3.6.1.4.1.81.11.1.1.4
softRedundancyGroupId2	1.3.6.1.4.1.81.11.1.1.5
	3 of 4

Object	OID
softRedundancyPortId2	1.3.6.1.4.1.81.11.1.1.6
softRedundancyStatus	1.3.6.1.4.1.81.11.1.1.7
softRedundancyGlobalStatus	1.3.6.1.4.1.81.11.2
softRedundancyMinTimeBetweenSwitchOvers	1.3.6.1.4.1.81.11.4
softRedundancySwitchBackInterval	1.3.6.1.4.1.81.11.5
	4 of 4

The following table provides a list of the MIBs in the G700-MG-MIB.MY file that are supported by the G350 and their OIDs:

Object	OID
cmgHWType	1.3.6.1.4.1.6889.2.9.1.1.1
cmgModelNumber	1.3.6.1.4.1.6889.2.9.1.1.2
cmgDescription	1.3.6.1.4.1.6889.2.9.1.1.3
cmgSerialNumber	1.3.6.1.4.1.6889.2.9.1.1.4
cmgHWVintage	1.3.6.1.4.1.6889.2.9.1.1.5
cmgHWSuffix	1.3.6.1.4.1.6889.2.9.1.1.6
cmgStackPosition	1.3.6.1.4.1.6889.2.9.1.1.7
cmgModuleList	1.3.6.1.4.1.6889.2.9.1.1.8
cmgReset	1.3.6.1.4.1.6889.2.9.1.1.9
cmgHardwareFaultMask	1.3.6.1.4.1.6889.2.9.1.1.10.12
cmgHardwareStatusMask	1.3.6.1.4.1.6889.2.9.1.1.10.13
cmgModuleSlot	1.3.6.1.4.1.6889.2.9.1.1.11.1.1.1
cmgModuleType	1.3.6.1.4.1.6889.2.9.1.1.11.1.1.2
cmgModuleDescription	1.3.6.1.4.1.6889.2.9.1.1.11.1.1.3
cmgModuleName	1.3.6.1.4.1.6889.2.9.1.1.11.1.1.4
cmgModuleSerialNumber	1.3.6.1.4.1.6889.2.9.1.1.11.1.1.5
cmgModuleHWVintage	1.3.6.1.4.1.6889.2.9.1.1.11.1.1.6
cmgModuleHWSuffix	1.3.6.1.4.1.6889.2.9.1.1.11.1.1.7
cmgModuleFWVersion	1.3.6.1.4.1.6889.2.9.1.1.11.1.1.8
cmgModuleNumberOfPorts	1.3.6.1.4.1.6889.2.9.1.1.11.1.1.9
cmgModuleFaultMask	1.3.6.1.4.1.6889.2.9.1.1.11.1.1.10
cmgModuleStatusMask	1.3.6.1.4.1.6889.2.9.1.1.11.1.1.11
cmgModuleReset	1.3.6.1.4.1.6889.2.9.1.1.11.1.1.12
	1 of 4

Object	OID
cmgModuleNumberOfChannels	1.3.6.1.4.1.6889.2.9.1.1.11.1.1.13
cmgGatewayNumber	1.3.6.1.4.1.6889.2.9.1.2.1.1
cmgMACAddress	1.3.6.1.4.1.6889.2.9.1.2.1.2
cmgFWVersion	1.3.6.1.4.1.6889.2.9.1.2.1.3
cmgCurrentIpAddress	1.3.6.1.4.1.6889.2.9.1.2.1.4
cmgMgpFaultMask	1.3.6.1.4.1.6889.2.9.1.2.1.15
cmgQosControl	1.3.6.1.4.1.6889.2.9.1.2.2.1
cmgRemoteSigDscp	1.3.6.1.4.1.6889.2.9.1.2.2.2
cmgRemoteSig802Priority	1.3.6.1.4.1.6889.2.9.1.2.2.3
cmgLocalSigDscp	1.3.6.1.4.1.6889.2.9.1.2.2.4
cmgLocalSig802Priority	1.3.6.1.4.1.6889.2.9.1.2.2.5
cmgStatic802Vlan	1.3.6.1.4.1.6889.2.9.1.2.2.6
cmgCurrent802Vlan	1.3.6.1.4.1.6889.2.9.1.2.2.7
cmgPrimaryClockSource	1.3.6.1.4.1.6889.2.9.1.2.3.1
cmgSecondaryClockSource	1.3.6.1.4.1.6889.2.9.1.2.3.2
cmgActiveClockSource	1.3.6.1.4.1.6889.2.9.1.2.3.3
cmgRegistrationState	1.3.6.1.4.1.6889.2.9.1.3.1
cmgActiveControllerAddress	1.3.6.1.4.1.6889.2.9.1.3.2
cmgH248LinkStatus	1.3.6.1.4.1.6889.2.9.1.3.3
cmgH248LinkErrorCode	1.3.6.1.4.1.6889.2.9.1.3.4
cmgUseDhcpForMgcList	1.3.6.1.4.1.6889.2.9.1.3.5
cmgStaticControllerHosts	1.3.6.1.4.1.6889.2.9.1.3.6
cmgDhcpControllerHosts	1.3.6.1.4.1.6889.2.9.1.3.7
cmgVoipEngineUseDhcp	1.3.6.1.4.1.6889.2.9.1.4.1
cmgVoipQosControl	1.3.6.1.4.1.6889.2.9.1.4.2
cmgVoipRemoteBbeDscp	1.3.6.1.4.1.6889.2.9.1.4.3.1.1
cmgVoipRemoteEfDscp	1.3.6.1.4.1.6889.2.9.1.4.3.1.2
cmgVoipRemote802Priority	1.3.6.1.4.1.6889.2.9.1.4.3.1.3
cmgVoipRemoteMinRtpPort	1.3.6.1.4.1.6889.2.9.1.4.3.1.4
cmgVoipRemoteMaxRtpPort	1.3.6.1.4.1.6889.2.9.1.4.3.1.5
cmgVoipRemoteRtcpEnabled	1.3.6.1.4.1.6889.2.9.1.4.3.2.1
cmgVoipRemoteRtcpMonitorIpAddress	1.3.6.1.4.1.6889.2.9.1.4.3.2.2
cmgVoipRemoteRtcpMonitorPort	1.3.6.1.4.1.6889.2.9.1.4.3.2.3
cmgVoipRemoteRtcpReportPeriod	1.3.6.1.4.1.6889.2.9.1.4.3.2.4
	2 of 4

Object	**OID**
cmgVoipRemoteRsvpEnabled	1.3.6.1.4.1.6889.2.9.1.4.3.3.1
cmgVoipRemoteRetryOnFailure	1.3.6.1.4.1.6889.2.9.1.4.3.3.2
cmgVoipRemoteRetryDelay	1.3.6.1.4.1.6889.2.9.1.4.3.3.3
cmgVoipRemoteRsvpProfile	1.3.6.1.4.1.6889.2.9.1.4.3.3.4
cmgVoipLocalBbeDscp	1.3.6.1.4.1.6889.2.9.1.4.4.1.1
cmgVoipLocalEfDscp	1.3.6.1.4.1.6889.2.9.1.4.4.1.2
cmgVoipLocal802Priority	1.3.6.1.4.1.6889.2.9.1.4.4.1.3
cmgVoipLocalMinRtpPort	1.3.6.1.4.1.6889.2.9.1.4.4.1.4
cmgVoipLocalMaxRtpPort	1.3.6.1.4.1.6889.2.9.1.4.4.1.5
cmgVoipLocalRtcpEnabled	1.3.6.1.4.1.6889.2.9.1.4.4.2.1
cmgVoipLocalRtcpMonitorIpAddress	1.3.6.1.4.1.6889.2.9.1.4.4.2.2
cmgVoipLocalRtcpMonitorPort	1.3.6.1.4.1.6889.2.9.1.4.4.2.3
cmgVoipLocalRtcpReportPeriod	1.3.6.1.4.1.6889.2.9.1.4.4.2.4
cmgVoipLocalRsvpEnabled	1.3.6.1.4.1.6889.2.9.1.4.4.3.1
cmgVoipLocalRetryOnFailure	1.3.6.1.4.1.6889.2.9.1.4.4.3.2
cmgVoipLocalRetryDelay	1.3.6.1.4.1.6889.2.9.1.4.4.3.3
cmgVoipLocalRsvpProfile	1.3.6.1.4.1.6889.2.9.1.4.4.3.4
cmgVoipSlot	1.3.6.1.4.1.6889.2.9.1.4.5.1.1
cmgVoipMACAddress	1.3.6.1.4.1.6889.2.9.1.4.5.1.2
cmgVoipStaticIpAddress	1.3.6.1.4.1.6889.2.9.1.4.5.1.3
cmgVoipCurrentIpAddress	1.3.6.1.4.1.6889.2.9.1.4.5.1.4
cmgVoipJitterBufferSize	1.3.6.1.4.1.6889.2.9.1.4.5.1.5
cmgVoipTotalChannels	1.3.6.1.4.1.6889.2.9.1.4.5.1.6
cmgVoipChannelsInUse	1.3.6.1.4.1.6889.2.9.1.4.5.1.7
cmgVoipAverageOccupancy	1.3.6.1.4.1.6889.2.9.1.4.5.1.8
cmgVoipHyperactivity	1.3.6.1.4.1.6889.2.9.1.4.5.1.9
cmgVoipAdminState	1.3.6.1.4.1.6889.2.9.1.4.5.1.10
cmgVoipDspFWVersion	1.3.6.1.4.1.6889.2.9.1.4.5.1.11
cmgVoipDspStatus	1.3.6.1.4.1.6889.2.9.1.4.5.1.12
cmgVoipEngineReset	1.3.6.1.4.1.6889.2.9.1.4.5.1.13
cmgVoipFaultMask	1.3.6.1.4.1.6889.2.9.1.4.5.1.14
cmgCcModule	1.3.6.1.4.1.6889.2.9.1.6.1.1.1
cmgCcPort	1.3.6.1.4.1.6889.2.9.1.6.1.1.2
cmgCcRelay	1.3.6.1.4.1.6889.2.9.1.6.1.1.3
	3 of 4

Object	OID
cmgCcAdminState	1.3.6.1.4.1.6889.2.9.1.6.1.1.4
cmgCcPulseDuration	1.3.6.1.4.1.6889.2.9.1.6.1.1.5
cmgCcStatus	1.3.6.1.4.1.6889.2.9.1.6.1.1.6
cmgEtrModule	1.3.6.1.4.1.6889.2.9.1.7.1.1.1
cmgEtrAdminState	1.3.6.1.4.1.6889.2.9.1.7.1.1.2
cmgEtrNumberOfPairs	1.3.6.1.4.1.6889.2.9.1.7.1.1.3
cmgEtrStatus	1.3.6.1.4.1.6889.2.9.1.7.1.1.4
cmgEtrCurrentLoopDetect	1.3.6.1.4.1.6889.2.9.1.7.1.1.5
cmgDynCacStatus	1.3.6.1.4.1.6889.2.9.1.8.1
cmgDynCacRBBL	1.3.6.1.4.1.6889.2.9.1.8.2
cmgDynCacLastUpdate	1.3.6.1.4.1.6889.2.9.1.8.3
	4 of 4

The following table provides a list of the MIBs in the FRAME-RELAY-DTE-MIB.my file that are supported by the G350 and their OIDs:

Object	OID
frDlcmiIfIndex	1.3.6.1.2.1.10.32.1.1.1
frDlcmiState	1.3.6.1.2.1.10.32.1.1.2
frDlcmiAddress	1.3.6.1.2.1.10.32.1.1.3
frDlcmiAddressLen	1.3.6.1.2.1.10.32.1.1.4
frDlcmiPollingInterval	1.3.6.1.2.1.10.32.1.1.5
frDlcmiFullEnquiryInterval	1.3.6.1.2.1.10.32.1.1.6
frDlcmiErrorThreshold	1.3.6.1.2.1.10.32.1.1.7
frDlcmiMonitoredEvents	1.3.6.1.2.1.10.32.1.1.8
frDlcmiMaxSupportedVCs	1.3.6.1.2.1.10.32.1.1.9
frDlcmiMulticast	1.3.6.1.2.1.10.32.1.1.10
frDlcmiStatus	1.3.6.1.2.1.10.32.1.1.11
frDlcmiRowStatus	1.3.6.1.2.1.10.32.1.1.12
frCircuitIfIndex	1.3.6.1.2.1.10.32.2.1.1
frCircuitDlci	1.3.6.1.2.1.10.32.2.1.2
frCircuitState	1.3.6.1.2.1.10.32.2.1.3
frCircuitReceivedFECNs	1.3.6.1.2.1.10.32.2.1.4
frCircuitReceivedBECNs	1.3.6.1.2.1.10.32.2.1.5
	1 of 2

Object	OID
frCircuitSentFrames	1.3.6.1.2.1.10.32.2.1.6
frCircuitSentOctets	1.3.6.1.2.1.10.32.2.1.7
frCircuitReceivedFrames	1.3.6.1.2.1.10.32.2.1.8
frCircuitReceivedOctets	1.3.6.1.2.1.10.32.2.1.9
frCircuitCreationTime	1.3.6.1.2.1.10.32.2.1.10
frCircuitLastTimeChange	1.3.6.1.2.1.10.32.2.1.11
frCircuitCommittedBurst	1.3.6.1.2.1.10.32.2.1.12
frCircuitExcessBurst	1.3.6.1.2.1.10.32.2.1.13
frCircuitThroughput	1.3.6.1.2.1.10.32.2.1.14
frCircuitMulticast	1.3.6.1.2.1.10.32.2.1.15
frCircuitType	1.3.6.1.2.1.10.32.2.1.16
frCircuitDiscards	1.3.6.1.2.1.10.32.2.1.17
frCircuitReceivedDEs	1.3.6.1.2.1.10.32.2.1.18
frCircuitSentDEs	1.3.6.1.2.1.10.32.2.1.19
frCircuitLogicalIfIndex	1.3.6.1.2.1.10.32.2.1.20
frCircuitRowStatus	1.3.6.1.2.1.10.32.2.1.21
frErrIfIndex	1.3.6.1.2.1.10.32.3.1.1
frErrType	1.3.6.1.2.1.10.32.3.1.2
frErrData	1.3.6.1.2.1.10.32.3.1.3
frErrTime	1.3.6.1.2.1.10.32.3.1.4
frErrFaults	1.3.6.1.2.1.10.32.3.1.5
frErrFaultTime	1.3.6.1.2.1.10.32.3.1.6
frTrapState	1.3.6.1.2.1.10.32.4.1
frTrapMaxRate	1.3.6.1.2.1.10.32.4.2
	2 of 2

The following table provides a list of the MIBs in the IP-MIB.my file that are supported by the G350 and their OIDs:

Object	OID
ipForwarding	1.3.6.1.2.1.4.1
ipDefaultTTL	1.3.6.1.2.1.4.2
ipInReceives	1.3.6.1.2.1.4.3
ipInHdrErrors	1.3.6.1.2.1.4.4
	1 of 2

Object	OID
ipInAddrErrors	1.3.6.1.2.1.4.5
ipForwDatagrams	1.3.6.1.2.1.4.6
ipInUnknownProtos	1.3.6.1.2.1.4.7
ipInDiscards	1.3.6.1.2.1.4.8
ipInDelivers	1.3.6.1.2.1.4.9
ipOutRequests	1.3.6.1.2.1.4.10
ipOutDiscards	1.3.6.1.2.1.4.11
ipOutNoRoutes	1.3.6.1.2.1.4.12
ipReasmTimeout	1.3.6.1.2.1.4.13
ipReasmReqds	1.3.6.1.2.1.4.14
ipReasmOKs	1.3.6.1.2.1.4.15
ipReasmFails	1.3.6.1.2.1.4.16
ipFragOKs	1.3.6.1.2.1.4.17
ipFragFails	1.3.6.1.2.1.4.18
ipFragCreates	1.3.6.1.2.1.4.19
ipAdEntAddr	1.3.6.1.2.1.4.20.1.1
ipAdEntIfIndex	1.3.6.1.2.1.4.20.1.2
ipAdEntNetMask	1.3.6.1.2.1.4.20.1.3
ipAdEntBcastAddr	1.3.6.1.2.1.4.20.1.4
ipAdEntReasmMaxSize	1.3.6.1.2.1.4.20.1.5
ipNetToMediaIfIndex	1.3.6.1.2.1.4.22.1.1
ipNetToMediaPhysAddress	1.3.6.1.2.1.4.22.1.2
ipNetToMediaNetAddress	1.3.6.1.2.1.4.22.1.3
ipNetToMediaType	1.3.6.1.2.1.4.22.1.4
ipRoutingDiscards	1.3.6.1.2.1.4.23
	2 of 2

The following table provides a list of the MIBs in the Load12-MIB.my file that are supported by the G350 and their OIDs:

Object	OID
genOpModuleId	1.3.6.1.4.1.1751.2.53.1.2.1.1
genOpIndex	1.3.6.1.4.1.1751.2.53.1.2.1.2
genOpRunningState	1.3.6.1.4.1.1751.2.53.1.2.1.3
	1 of 2

Object	OID
genOpSourceIndex	1.3.6.1.4.1.1751.2.53.1.2.1.4
genOpDestIndex	1.3.6.1.4.1.1751.2.53.1.2.1.5
genOpServerIP	1.3.6.1.4.1.1751.2.53.1.2.1.6
genOpUserName	1.3.6.1.4.1.1751.2.53.1.2.1.7
genOpPassword	1.3.6.1.4.1.1751.2.53.1.2.1.8
genOpProtocolType	1.3.6.1.4.1.1751.2.53.1.2.1.9
genOpFileName	1.3.6.1.4.1.1751.2.53.1.2.1.10
genOpRunningStateDisplay	1.3.6.1.4.1.1751.2.53.1.2.1.11
genOpLastFailureIndex	1.3.6.1.4.1.1751.2.53.1.2.1.12
genOpLastFailureDisplay	1.3.6.1.4.1.1751.2.53.1.2.1.13
genOpLastWarningDisplay	1.3.6.1.4.1.1751.2.53.1.2.1.14
genOpErrorLogIndex	1.3.6.1.4.1.1751.2.53.1.2.1.15
genOpResetSupported	1.3.6.1.4.1.1751.2.53.1.2.1.16
genOpEnableReset	1.3.6.1.4.1.1751.2.53.1.2.1.17
genOpNextBootImageIndex	1.3.6.1.4.1.1751.2.53.1.2.1.18
genOpLastBootImageIndex	1.3.6.1.4.1.1751.2.53.1.2.1.19
genOpFileSystemType	1.3.6.1.4.1.1751.2.53.1.2.1.20
genOpReportSpecificFlags	1.3.6.1.4.1.1751.2.53.1.2.1.21
genOpOctetsReceived	1.3.6.1.4.1.1751.2.53.1.2.1.22
genAppFileId	1.3.6.1.4.1.1751.2.53.2.1.1.1
genAppFileName	1.3.6.1.4.1.1751.2.53.2.1.1.2
genAppFileType	1.3.6.1.4.1.1751.2.53.2.1.1.3
genAppFileDescription	1.3.6.1.4.1.1751.2.53.2.1.1.4
genAppFileSize	1.3.6.1.4.1.1751.2.53.2.1.1.5
genAppFileVersionNumber	1.3.6.1.4.1.1751.2.53.2.1.1.6
genAppFileLocation	1.3.6.1.4.1.1751.2.53.2.1.1.7
genAppFileDateStamp	1.3.6.1.4.1.1751.2.53.2.1.1.8
genAppFileRowStatus	1.3.6.1.4.1.1751.2.53.2.1.1.9
	2 of 2

The following table provides a list of the MIBs in the PPP-LCP-MIB.my file that are supported by the G350 and their OIDs:

Object	OID
pppLinkStatusPhysicalIndex	1.3.6.1.2.1.10.23.1.1.1.1.1
pppLinkStatusBadAddresses	1.3.6.1.2.1.10.23.1.1.1.1.2
pppLinkStatusBadControls	1.3.6.1.2.1.10.23.1.1.1.1.3
pppLinkStatusPacketTooLongs	1.3.6.1.2.1.10.23.1.1.1.1.4
pppLinkStatusBadFCSs	1.3.6.1.2.1.10.23.1.1.1.1.5
pppLinkStatusLocalMRU	1.3.6.1.2.1.10.23.1.1.1.1.6
pppLinkStatusRemoteMRU	1.3.6.1.2.1.10.23.1.1.1.1.7
pppLinkStatusLocalToPeerACCMap	1.3.6.1.2.1.10.23.1.1.1.1.8
pppLinkStatusPeerToLocalACCMap	1.3.6.1.2.1.10.23.1.1.1.1.9
pppLinkStatusLocalToRemoteACCompression	1.3.6.1.2.1.10.23.1.1.1.1.12
pppLinkStatusRemoteToLocalACCompression	1.3.6.1.2.1.10.23.1.1.1.1.13
pppLinkStatusTransmitFcsSize	1.3.6.1.2.1.10.23.1.1.1.1.14
pppLinkStatusReceiveFcsSize	1.3.6.1.2.1.10.23.1.1.1.1.15
pppLinkConfigInitialMRU	1.3.6.1.2.1.10.23.1.1.2.1.1
pppLinkConfigReceiveACCMap	1.3.6.1.2.1.10.23.1.1.2.1.2
pppLinkConfigTransmitACCMap	1.3.6.1.2.1.10.23.1.1.2.1.3
pppLinkConfigMagicNumber	1.3.6.1.2.1.10.23.1.1.2.1.4
pppLinkConfigFcsSize	1.3.6.1.2.1.10.23.1.1.2.1.5

The following table provides a list of the MIBs in the WAN-MIB.MY file that are supported by the G350 and their OIDs:

Object	OID
ds0BundleMemmbersList	1.3.6.1.4.1.6889.2.1.6.1.1.2.1.1
ds0BundleSpeedFactor	1.3.6.1.4.1.6889.2.1.6.1.1.2.1.2
ds1DeviceMode	1.3.6.1.4.1.6889.2.1.6.2.1.1
ifTableXtndIndex	1.3.6.1.4.1.6889.2.1.6.2.2.1.1.1
ifTableXtndPeerAddress	1.3.6.1.4.1.6889.2.1.6.2.2.1.1.2
ifTableXtndVoIPQueue	1.3.6.1.4.1.6889.2.1.6.2.2.1.1.3
ifTableXtndCableLength	1.3.6.1.4.1.6889.2.1.6.2.2.1.1.4
ifTableXtndGain	1.3.6.1.4.1.6889.2.1.6.2.2.1.1.5
ifTableXtndDescription	1.3.6.1.4.1.6889.2.1.6.2.2.1.1.6
	1 of 3

Object	OID
ifTableXtndKeepAlive	1.3.6.1.4.1.6889.2.1.6.2.2.1.1.7
ifTableXtndMtu	1.3.6.1.4.1.6889.2.1.6.2.2.1.1.8
ifTableXtndInvertTxClock	1.3.6.1.4.1.6889.2.1.6.2.2.1.1.9
ifTableXtndDTELoopback	1.3.6.1.4.1.6889.2.1.6.2.2.1.1.10
ifTableXtndIgnoreDCD	1.3.6.1.4.1.6889.2.1.6.2.2.1.1.11
ifTableXtndIdleChars	1.3.6.1.4.1.6889.2.1.6.2.2.1.1.12
ifTableXtndBandwidth	1.3.6.1.4.1.6889.2.1.6.2.2.1.1.13
ifTableXtndEncapsulation	1.3.6.1.4.1.6889.2.1.6.2.2.1.1.14
ifTableXtndOperStatus	1.3.6.1.4.1.6889.2.1.6.2.2.1.1.15
ifTableXtndBackupCapabilities	1.3.6.1.4.1.6889.2.1.6.2.2.1.1.16
ifTableXtndBackupIf	1.3.6.1.4.1.6889.2.1.6.2.2.1.1.17
ifTableXtndBackupEnableDelay	1.3.6.1.4.1.6889.2.1.6.2.2.1.1.18
ifTableXtndBackupDisableDelay	1.3.6.1.4.1.6889.2.1.6.2.2.1.1.19
ifTableXtndPrimaryIf	1.3.6.1.4.1.6889.2.1.6.2.2.1.1.20
ifTableXtndCarrierDelay	1.3.6.1.4.1.6889.2.1.6.2.2.1.1.21
ifTableXtndDtrRestartDelay	1.3.6.1.4.1.6889.2.1.6.2.2.1.1.22
ifTableXtndDtrPulseTime	1.3.6.1.4.1.6889.2.1.6.2.2.1.1.23
ifTableXtndLoadInterval	1.3.6.1.4.1.6889.2.1.6.2.2.1.1.24
ifTableXtndInputRate	1.3.6.1.4.1.6889.2.1.6.2.2.1.1.25
ifTableXtndOutputRate	1.3.6.1.4.1.6889.2.1.6.2.2.1.1.26
ifTableXtndInputLoad	1.3.6.1.4.1.6889.2.1.6.2.2.1.1.27
ifTableXtndOutputLoad	1.3.6.1.4.1.6889.2.1.6.2.2.1.1.28
ifTableXtndReliability	1.3.6.1.4.1.6889.2.1.6.2.2.1.1.29
ifTableXtndCacBBL	1.3.6.1.4.1.6889.2.1.6.2.2.1.1.31
ifTableXtndCacPriority	1.3.6.1.4.1.6889.2.1.6.2.2.1.1.32
ifTableXtndCacifStatus	1.3.6.1.4.1.6889.2.1.6.2.2.1.1.33
frDlcmiXtndIndex	1.3.6.1.4.1.6889.2.1.6.2.4.1.1.1
frDlcmiXtndLMIAutoSense	1.3.6.1.4.1.6889.2.1.6.2.4.1.1.2
frStaticCircuitSubIfIndex	1.3.6.1.4.1.6889.2.1.6.2.4.2.1.1
frStaticCircuitDLCI	1.3.6.1.4.1.6889.2.1.6.2.4.2.1.2
frStaticCircuitDLCIrole	1.3.6.1.4.1.6889.2.1.6.2.4.2.1.3
frStaticCircuitStatus	1.3.6.1.4.1.6889.2.1.6.2.4.2.1.4
frSubIfDlcmiIndex	1.3.6.1.4.1.6889.2.1.6.2.4.3.1.1
	2 of 3

Object	OID
frSubIfSubIndex	1.3.6.1.4.1.6889.2.1.6.2.4.3.1.2
frSubIfType	1.3.6.1.4.1.6889.2.1.6.2.4.3.1.3
frSubIfStatus	1.3.6.1.4.1.6889.2.1.6.2.4.3.1.4
	3 of 3

The following table provides a list of the MIBs in the SNMPv2-MIB.my file that are supported by the G350 and their OIDs:

Object	OID
sysDescr	1.3.6.1.2.1.1.1
sysObjectID	1.3.6.1.2.1.1.2
sysUpTime	1.3.6.1.2.1.1.3
sysContact	1.3.6.1.2.1.1.4
sysName	1.3.6.1.2.1.1.5
sysLocation	1.3.6.1.2.1.1.6
sysServices	1.3.6.1.2.1.1.7
snmpInPkts	1.3.6.1.2.1.11.1
snmpInBadVersions	1.3.6.1.2.1.11.3
snmpInBadCommunityNames	1.3.6.1.2.1.11.4
snmpInBadCommunityUses	1.3.6.1.2.1.11.5
snmpInASNParseErrs	1.3.6.1.2.1.11.6
snmpEnableAuthenTraps	1.3.6.1.2.1.11.30
snmpOutPkts	1.3.6.1.2.1.11.2
snmpInTooBigs	1.3.6.1.2.1.11.8
snmpInNoSuchNames	1.3.6.1.2.1.11.9
snmpInBadValues	1.3.6.1.2.1.11.10
snmpInReadOnlys	1.3.6.1.2.1.11.11
snmpInGenErrs	1.3.6.1.2.1.11.12
snmpInTotalReqVars	1.3.6.1.2.1.11.13
snmpInTotalSetVars	1.3.6.1.2.1.11.14
snmpInGetRequests	1.3.6.1.2.1.11.15
snmpInGetNexts	1.3.6.1.2.1.11.16
snmpInSetRequests	1.3.6.1.2.1.11.17
snmpInGetResponses	1.3.6.1.2.1.11.18
	1 of 2

Object	OID
snmpInTraps	1.3.6.1.2.1.11.19
snmpOutTooBigs	1.3.6.1.2.1.11.20
snmpOutNoSuchNames	1.3.6.1.2.1.11.21
snmpOutBadValues	1.3.6.1.2.1.11.22
snmpOutGenErrs	1.3.6.1.2.1.11.24
snmpOutGetRequests	1.3.6.1.2.1.11.25
snmpOutGetNexts	1.3.6.1.2.1.11.26
snmpOutSetRequests	1.3.6.1.2.1.11.27
snmpOutGetResponses	1.3.6.1.2.1.11.28
snmpOutTraps	1.3.6.1.2.1.11.29
	2 of 2

The following table provides a list of the MIBs in the OSPF-MIB.my file that are supported by the G350 and their OIDs:

Object	OID
ospfRouterId	1.3.6.1.2.1.14.1.1
ospfAdminStat	1.3.6.1.2.1.14.1.2
ospfVersionNumber	1.3.6.1.2.1.14.1.3
ospfAreaBdrRtrStatus	1.3.6.1.2.1.14.1.4
ospfASBdrRtrStatus	1.3.6.1.2.1.14.1.5
ospfExternLsaCount	1.3.6.1.2.1.14.1.6
ospfExternLsaCksumSum	1.3.6.1.2.1.14.1.7
ospfTOSSupport	1.3.6.1.2.1.14.1.8
ospfOriginateNewLsas	1.3.6.1.2.1.14.1.9
ospfRxNewLsas	1.3.6.1.2.1.14.1.10
ospfExtLsdbLimit	1.3.6.1.2.1.14.1.11
ospfMulticastExtensions	1.3.6.1.2.1.14.1.12
ospfExitOverflowInterval	1.3.6.1.2.1.14.1.13
ospfDemandExtensions	1.3.6.1.2.1.14.1.14
ospfAreaId	1.3.6.1.2.1.14.2.1.1
ospfAuthType	1.3.6.1.2.1.14.2.1.2
ospfImportAsExtern	1.3.6.1.2.1.14.2.1.3
ospfSpfRuns	1.3.6.1.2.1.14.2.1.4
	1 of 3

Object	OID
ospfAreaBdrRtrCount	1.3.6.1.2.1.14.2.1.5
ospfAsBdrRtrCount	1.3.6.1.2.1.14.2.1.6
ospfAreaLsaCount	1.3.6.1.2.1.14.2.1.7
ospfAreaLsaCksumSum	1.3.6.1.2.1.14.2.1.8
ospfAreaSummary	1.3.6.1.2.1.14.2.1.9
ospfAreaStatus	1.3.6.1.2.1.14.2.1.10
ospfLsdbAreaId	1.3.6.1.2.1.14.4.1.1
ospfLsdbType	1.3.6.1.2.1.14.4.1.2
ospfLsdbLsid	1.3.6.1.2.1.14.4.1.3
ospfLsdbRouterId	1.3.6.1.2.1.14.4.1.4
ospfLsdbSequence	1.3.6.1.2.1.14.4.1.5
ospfLsdbAge	1.3.6.1.2.1.14.4.1.6
ospfLsdbChecksum	1.3.6.1.2.1.14.4.1.7
ospfLsdbAdvertisement	1.3.6.1.2.1.14.4.1.8
ospfIfIpAddress	1.3.6.1.2.1.14.7.1.1
ospfAddressLessIf	1.3.6.1.2.1.14.7.1.2
ospfIfAreaId	1.3.6.1.2.1.14.7.1.3
ospfIfType	1.3.6.1.2.1.14.7.1.4
ospfIfAdminStat	1.3.6.1.2.1.14.7.1.5
ospfIfRtrPriority	1.3.6.1.2.1.14.7.1.6
ospfIfTransitDelay	1.3.6.1.2.1.14.7.1.7
ospfIfRetransInterval	1.3.6.1.2.1.14.7.1.8
ospfIfHelloInterval	1.3.6.1.2.1.14.7.1.9
ospfIfRtrDeadInterval	1.3.6.1.2.1.14.7.1.10
ospfIfPollInterval	1.3.6.1.2.1.14.7.1.11
ospfIfState	1.3.6.1.2.1.14.7.1.12
ospfIfDesignatedRouter	1.3.6.1.2.1.14.7.1.13
ospfIfBackupDesignatedRouter	1.3.6.1.2.1.14.7.1.14
ospfIfEvents	1.3.6.1.2.1.14.7.1.15
ospfIfAuthKey	1.3.6.1.2.1.14.7.1.16
ospfIfStatus	1.3.6.1.2.1.14.7.1.17
ospfIfMulticastForwarding	1.3.6.1.2.1.14.7.1.18
ospfIfDemand	1.3.6.1.2.1.14.7.1.19
ospfIfAuthType	1.3.6.1.2.1.14.7.1.20
	2 of 3

Object	OID
ospfIfMetricIpAddress	1.3.6.1.2.1.14.8.1.1
ospfIfMetricAddressLessIf	1.3.6.1.2.1.14.8.1.2
ospfIfMetricTOS	1.3.6.1.2.1.14.8.1.3
ospfIfMetricValue	1.3.6.1.2.1.14.8.1.4
ospfIfMetricStatus	1.3.6.1.2.1.14.8.1.5
ospfNbrIpAddr	1.3.6.1.2.1.14.10.1.1
ospfNbrAddressLessIndex	1.3.6.1.2.1.14.10.1.2
ospfNbrRtrId	1.3.6.1.2.1.14.10.1.3
ospfNbrOptions	1.3.6.1.2.1.14.10.1.4
ospfNbrPriority	1.3.6.1.2.1.14.10.1.5
ospfNbrState	1.3.6.1.2.1.14.10.1.6
ospfNbrEvents	1.3.6.1.2.1.14.10.1.7
ospfNbrLsRetransQLen	1.3.6.1.2.1.14.10.1.8
ospfNbmaNbrStatus	1.3.6.1.2.1.14.10.1.9
ospfNbmaNbrPermanence	1.3.6.1.2.1.14.10.1.10
ospfNbrHelloSuppressed	1.3.6.1.2.1.14.10.1.11
ospfExtLsdbType	1.3.6.1.2.1.14.12.1.1
ospfExtLsdbLsid	1.3.6.1.2.1.14.12.1.2
ospfExtLsdbRouterId	1.3.6.1.2.1.14.12.1.3
ospfExtLsdbSequence	1.3.6.1.2.1.14.12.1.4
ospfExtLsdbAge	1.3.6.1.2.1.14.12.1.5
ospfExtLsdbChecksum	1.3.6.1.2.1.14.12.1.6
ospfExtLsdbAdvertisement	1.3.6.1.2.1.14.12.1.7
	3 of 3

The following table provides a list of the MIBs in the TUNNEL-MIB.my file that are supported by the G350 and their OIDs:

Object	OID
tunnelIfLocalAddress	1.3.6.1.2.1.10.131.1.1.1.1.1
tunnelIfRemoteAddress	1.3.6.1.2.1.10.131.1.1.1.1.2
tunnelIfEncapsMethod	1.3.6.1.2.1.10.131.1.1.1.1.3
tunnelIfTOS	1.3.6.1.2.1.10.131.1.1.1.1.4
tunnelIfHopLimit	1.3.6.1.2.1.10.131.1.1.1.1.5
	1 of 2

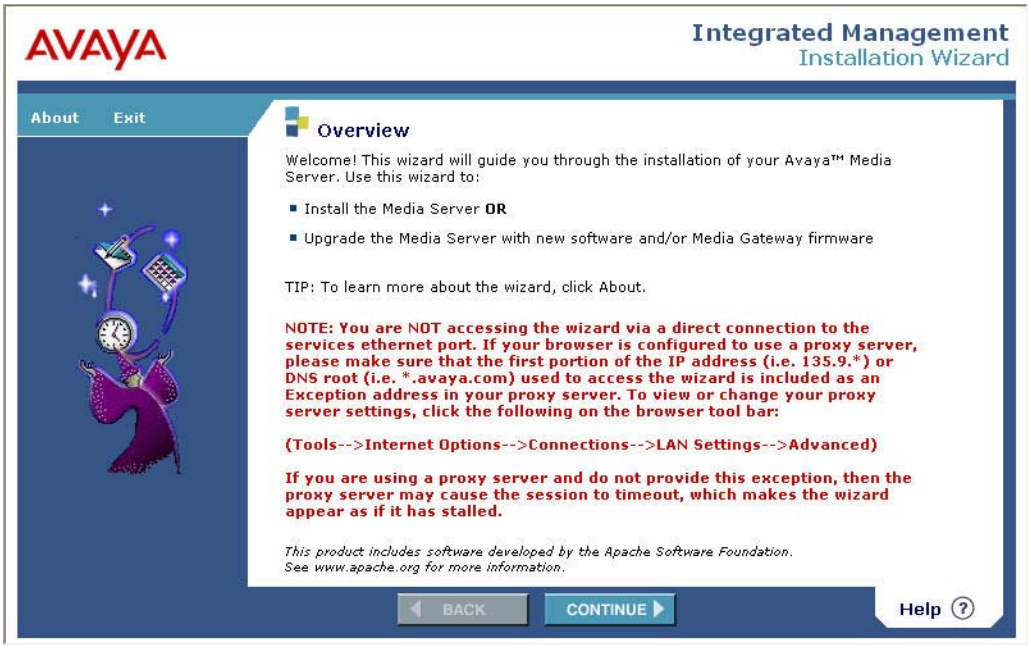
Object	OID
tunnelConfigLocalAddress	1.3.6.1.2.1.10.131.1.1.2.1.1
tunnelConfigRemoteAddress	1.3.6.1.2.1.10.131.1.1.2.1.2
tunnelConfigEncapsMethod	1.3.6.1.2.1.10.131.1.1.2.1.3
tunnelConfigID	1.3.6.1.2.1.10.131.1.1.2.1.4
tunnelConfigStatus	1.3.6.1.2.1.10.131.1.1.2.1.5
ipTunnelIfIndex	1.3.6.1.4.1.81.31.8.1.1.1
ipTunnelIfChecksum	1.3.6.1.4.1.81.31.8.1.1.2
ipTunnelIfKey	1.3.6.1.4.1.81.31.8.1.1.3
ipTunnelIfkeyMode	1.3.6.1.4.1.81.31.8.1.1.4
ipTunnelIfAgingTimer	1.3.6.1.4.1.81.31.8.1.1.5
ipTunnelIfMTUDiscovery	1.3.6.1.4.1.81.31.8.1.1.6
ipTunnelIfMTU	1.3.6.1.4.1.81.31.8.1.1.7
ipTunnelIfKeepaliveRate	1.3.6.1.4.1.81.31.8.1.1.8
ipTunnelIfKeepaliveRetries	1.3.6.1.4.1.81.31.8.1.1.9
	2 of 2

B Configuring the G350 using the Avaya IW

This chapter explains how to configure the Avaya G350 Media Gateway using the Avaya Installation Wizard (Avaya IW). The Avaya IW is a web-based installation wizard that is used with the Avaya G350 Media Gateway to perform initial configuration tasks and to upgrade software and firmware. The Avaya IW is designed for use with systems that contain an S8300 Media Server, operating in either ICC or LSP mode. For instructions on accessing the Avaya IW, see Accessing Avaya IW on page 29.

Preliminary screens

1 When you access the Avaya IW, the first screen that appears is the Overview screen:



Overview

Welcome! This wizard will guide you through the installation of your Avaya™ Media Server. Use this wizard to:

- Install the Media Server **OR**
- Upgrade the Media Server with new software and/or Media Gateway firmware

TIP: To learn more about the wizard, click About.

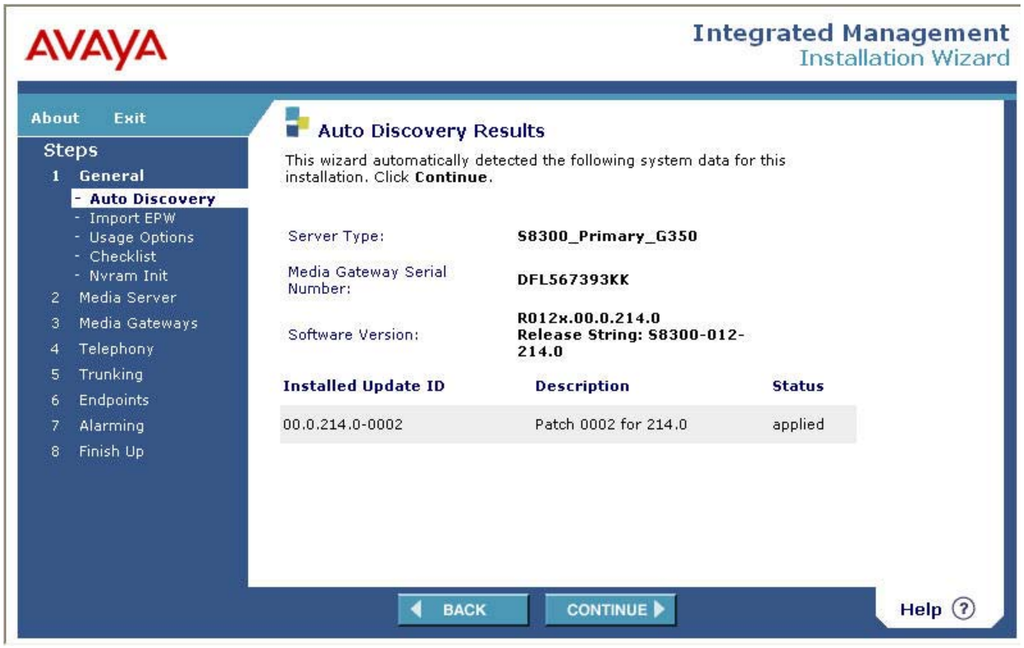
NOTE: You are NOT accessing the wizard via a direct connection to the services ethernet port. If your browser is configured to use a proxy server, please make sure that the first portion of the IP address (i.e. 135.9.*) or DNS root (i.e. *.avaya.com) used to access the wizard is included as an Exception address in your proxy server. To view or change your proxy server settings, click the following on the browser tool bar:

(Tools-->Internet Options-->Connections-->LAN Settings-->Advanced)

If you are using a proxy server and do not provide this exception, then the proxy server may cause the session to timeout, which makes the wizard appear as if it has stalled.

This product includes software developed by the Apache Software Foundation. See www.apache.org for more information.

2 Click **Continue**. The Avaya IW performs system auto-discovery and displays the results on the following screen:



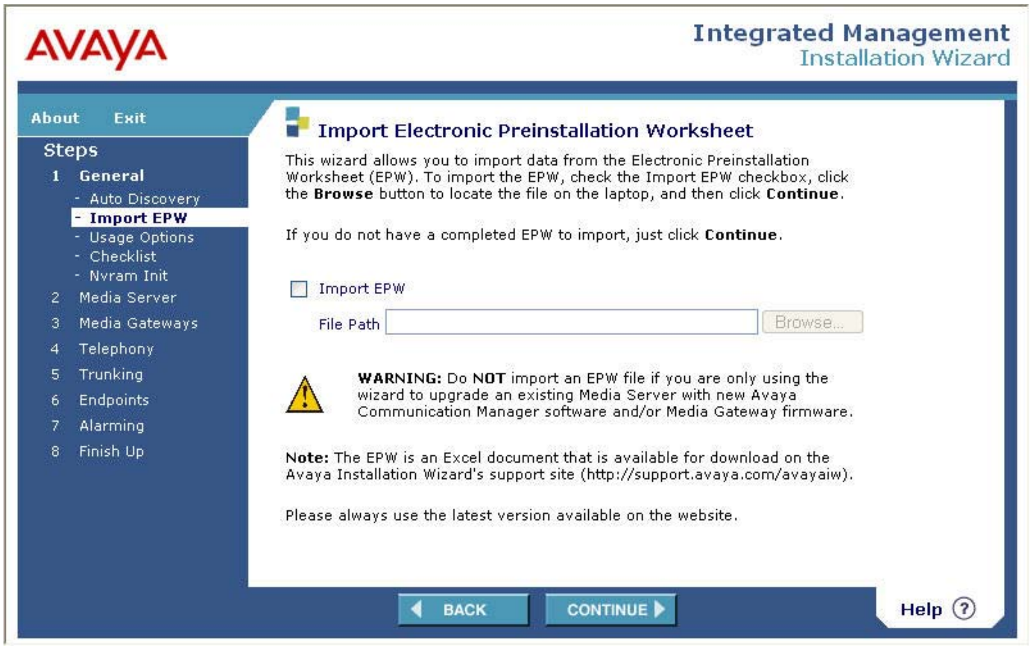
Auto Discovery Results

This wizard automatically detected the following system data for this installation. Click **Continue**.

Server Type:	**S8300_Primary_G350**
Media Gateway Serial Number:	**DFL567393KK**
Software Version:	**R012x.00.0.214.0** **Release String: S8300-012-214.0**

Installed Update ID	Description	Status
00.0.214.0-0002	Patch 0002 for 214.0	applied

3 Click **Continue**. The Import Electronic PreInstallation Worksheet screen appears. This screen allows you to import system data from the Electronic PreInstallation Worksheet (EPW). The EPW is described in *Installation of the Avaya G350 Media Gateway*, 555-245-104.



Import Electronic Preinstallation Worksheet

This wizard allows you to import data from the Electronic Preinstallation Worksheet (EPW). To import the EPW, check the Import EPW checkbox, click the **Browse** button to locate the file on the laptop, and then click **Continue**.

If you do not have a completed EPW to import, just click **Continue**.

☐ Import EPW

File Path

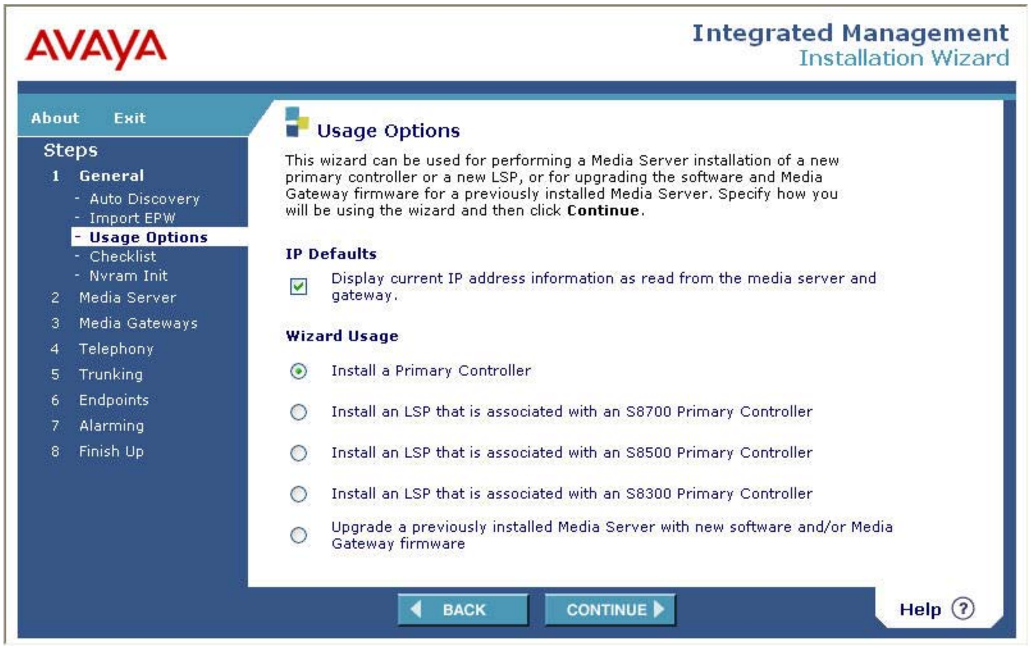
WARNING: Do **NOT** import an EPW file if you are only using the wizard to upgrade an existing Media Server with new Avaya Communication Manager software and/or Media Gateway firmware.

Note: The EPW is an Excel document that is available for download on the Avaya Installation Wizard's support site (http://support.avaya.com/avayaiw).

Please always use the latest version available on the website.

MGC configuration and upgrade

4 Click **Continue**. The Usage Options screen appears. This screen allows you to initiate the process of configuring an S8300 media server that is installed on the G350 as a Media Gateway Controller (MGC). You can configure the S8300 as either the primary MGC (ICC configuration) or as a backup MGC (LSP configuration). See Configuring the Media Gateway Controller (MGC) on page 41. You can also initiate a software or firmware upgrade. See Software and firmware upgrades on page 46.



Usage Options

This wizard can be used for performing a Media Server installation of a new primary controller or a new LSP, or for upgrading the software and Media Gateway firmware for a previously installed Media Server. Specify how you will be using the wizard and then click **Continue**.

IP Defaults

☑ Display current IP address information as read from the media server and gateway.

Wizard Usage

● Install a Primary Controller

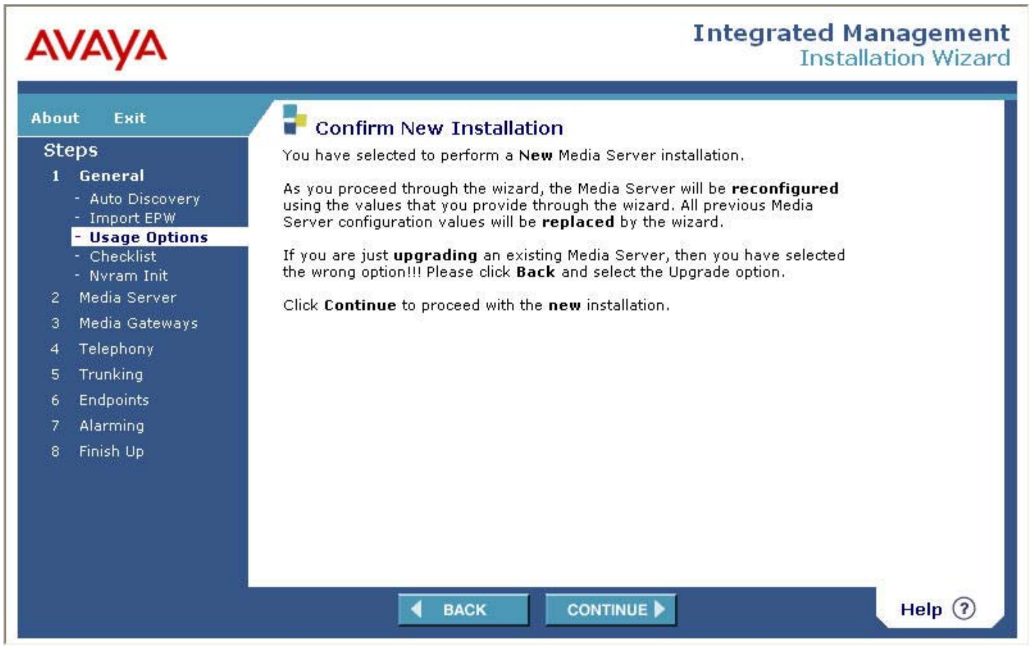
○ Install an LSP that is associated with an S8700 Primary Controller

○ Install an LSP that is associated with an S8500 Primary Controller

○ Install an LSP that is associated with an S8300 Primary Controller

○ Upgrade a previously installed Media Server with new software and/or Media Gateway firmware

5 Click **Continue**. If you are configuring a new MGC, the Confirm New Installation screen appears as shown below. If you are upgrading an existing MGC, the Avaya Communication Manager Software screen appears. See Upgrading an existing MGC on page 254.



Confirm New Installation

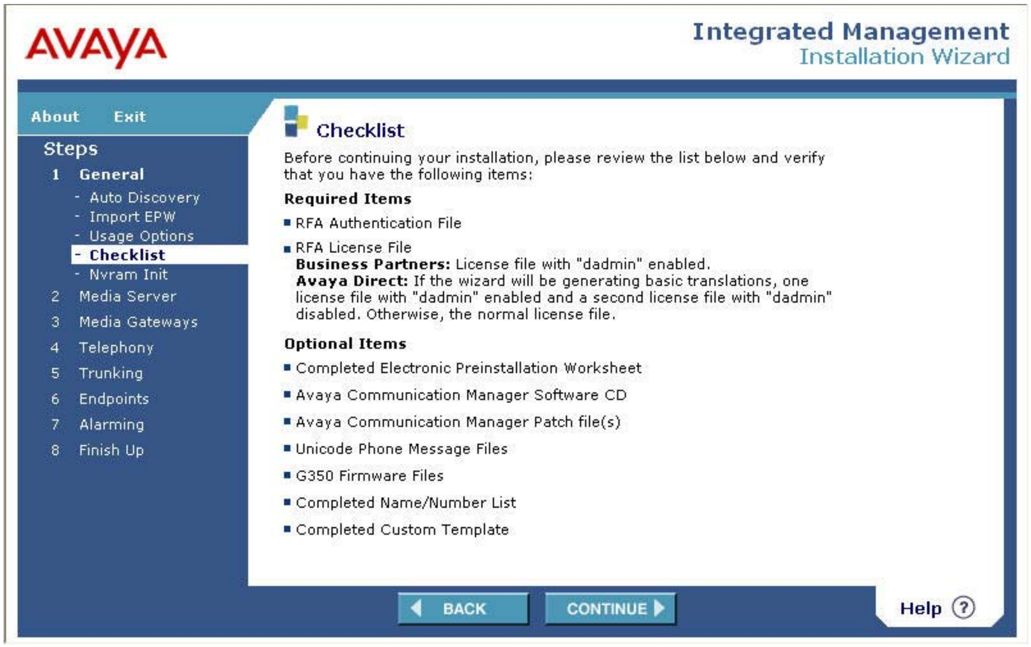
You have selected to perform a **New** Media Server installation.

As you proceed through the wizard, the Media Server will be **reconfigured** using the values that you provide through the wizard. All previous Media Server configuration values will be **replaced** by the wizard.

If you are just **upgrading** an existing Media Server, then you have selected the wrong option!!! Please click **Back** and select the Upgrade option.

Click **Continue** to proceed with the **new** installation.

6 Click **Continue**. The Checklist screen appears. The Checklist screen displays a list of required and optional items you need to configure the G350. For details, see *Installation of the Avaya G350 Media Gateway*, 555-245-104.



Checklist

Before continuing your installation, please review the list below and verify that you have the following items:

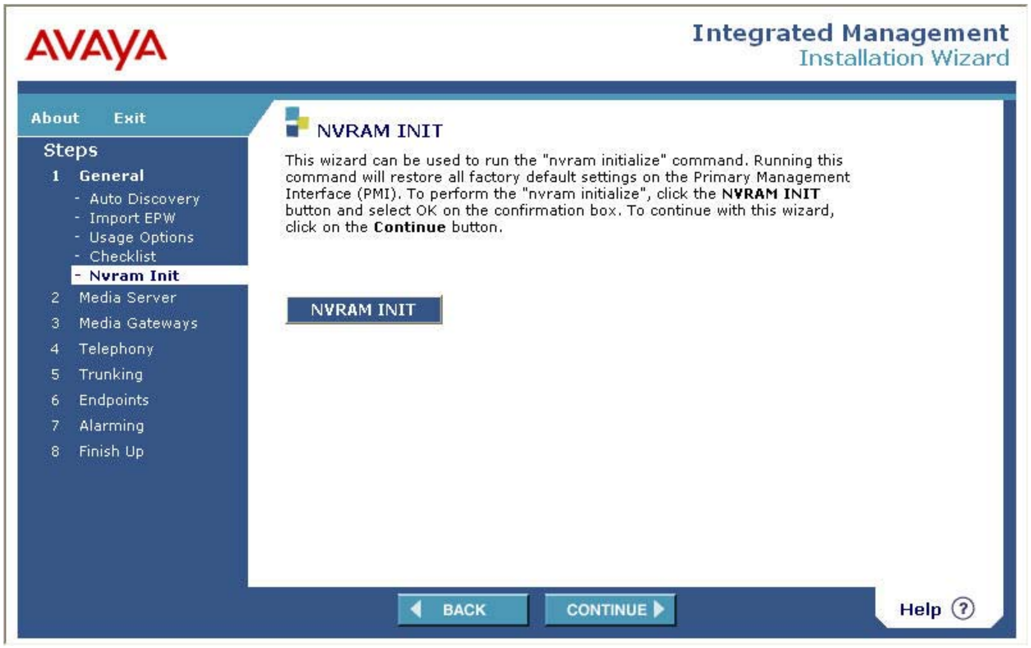
Required Items

- RFA Authentication File
- RFA License File
  Business Partners: License file with "dadmin" enabled.
  Avaya Direct: If the wizard will be generating basic translations, one license file with "dadmin" enabled and a second license file with "dadmin" disabled. Otherwise, the normal license file.

Optional Items

- Completed Electronic Preinstallation Worksheet
- Avaya Communication Manager Software CD
- Avaya Communication Manager Patch file(s)
- Unicode Phone Message Files
- G350 Firmware Files
- Completed Name/Number List
- Completed Custom Template

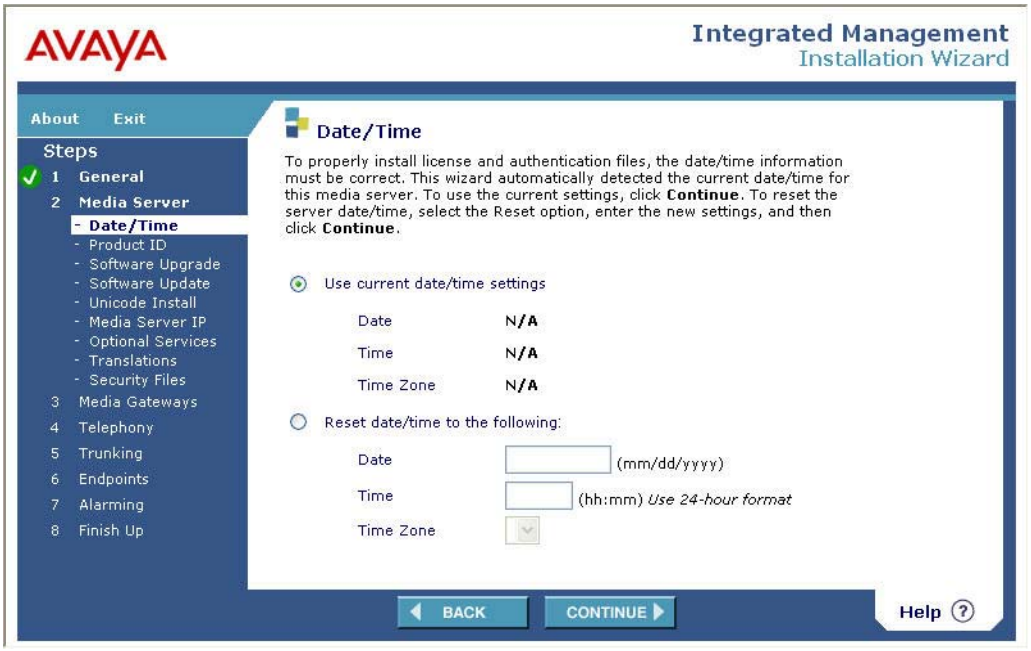
7 Click **Continue**. The NVRAM INIT screen appears. This screen allows you to restore all factory default settings on the Primary Management Interface (PMI). For a description of the PMI, see Configuring the Primary Management Interface (PMI) on page 40.



NVRAM INIT

This wizard can be used to run the "nvram initialize" command. Running this command will restore all factory default settings on the Primary Management Interface (PMI). To perform the "nvram initialize", click the **NVRAM INIT** button and select OK on the confirmation box. To continue with this wizard, click on the **Continue** button.

8 Click **Continue**. The Date/Time screen appears. This screen allows you to reset the G350's date and time.



Date/Time

To properly install license and authentication files, the date/time information must be correct. This wizard automatically detected the current date/time for this media server. To use the current settings, click **Continue**. To reset the server date/time, select the Reset option, enter the new settings, and then click **Continue**.

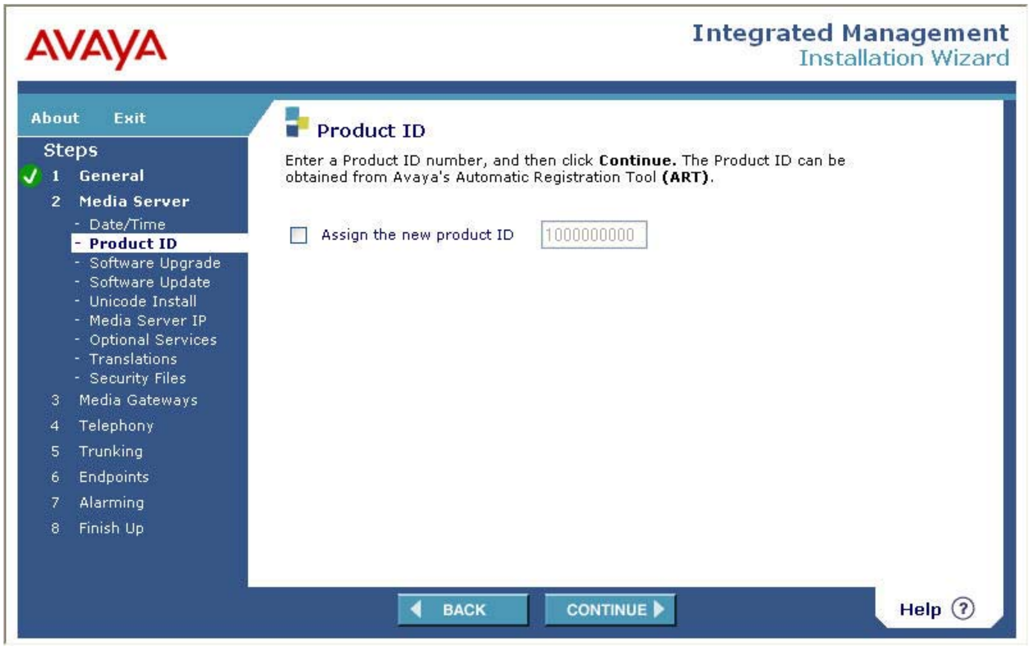
● Use current date/time settings

Date	N/A
Time	N/A
Time Zone	N/A

○ Reset date/time to the following:

Date	(mm/dd/yyyy)
Time	(hh:mm) *Use 24-hour format*
Time Zone	

9 Click **Continue**. The Product ID screen appears. If you are configuring a new G350, enter the product ID in the ID field and select **Assign the new product ID**.



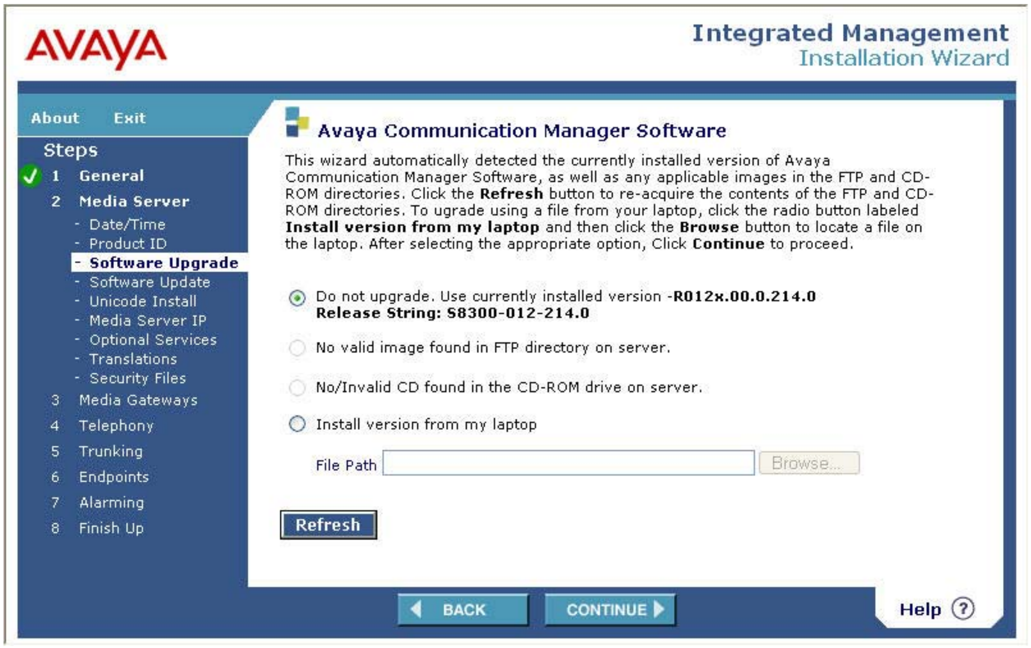
Product ID

Enter a Product ID number, and then click **Continue.** The Product ID can be obtained from Avaya's Automatic Registration Tool **(ART)**.

□ Assign the new product ID 1000000000

Upgrading an existing MGC

10 Click **Continue**. The Avaya Communication Manager Software screen appears. This screen allows you to upgrade the Communication Manager software on the S8300 installed in the G350. For instructions on upgrading Communication Manager software, see Software and firmware upgrades on page 46.



Avaya Communication Manager Software

This wizard automatically detected the currently installed version of Avaya Communication Manager Software, as well as any applicable images in the FTP and CD-ROM directories. Click the **Refresh** button to re-acquire the contents of the FTP and CD-ROM directories. To ugrade using a file from your laptop, click the radio button labeled **Install version from my laptop** and then click the **Browse** button to locate a file on the laptop. After selecting the appropriate option, Click **Continue** to proceed.

● Do not upgrade. Use currently installed version -**R012x.00.0.214.0**
Release String: S8300-012-214.0

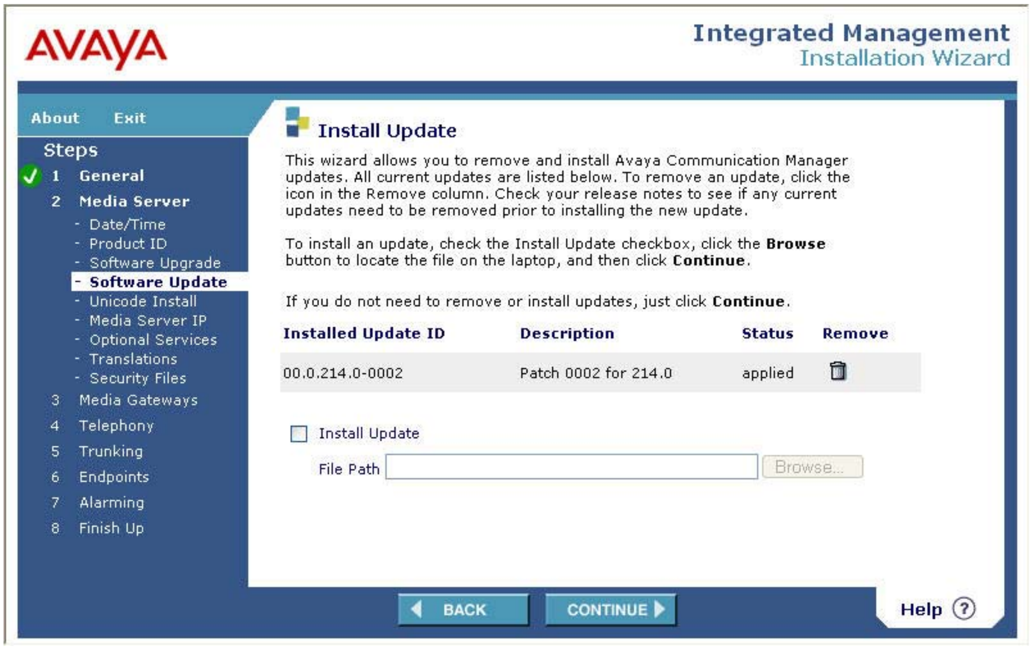
○ No valid image found in FTP directory on server.

○ No/Invalid CD found in the CD-ROM drive on server.

○ Install version from my laptop

File Path [ ] Browse...

11 Click **Continue**. The Install Update screen appears. This screen allows you to install or remove Avaya Communication Manager updates.



Install Update

This wizard allows you to remove and install Avaya Communication Manager updates. All current updates are listed below. To remove an update, click the icon in the Remove column. Check your release notes to see if any current updates need to be removed prior to installing the new update.

To install an update, check the Install Update checkbox, click the **Browse** button to locate the file on the laptop, and then click **Continue**.

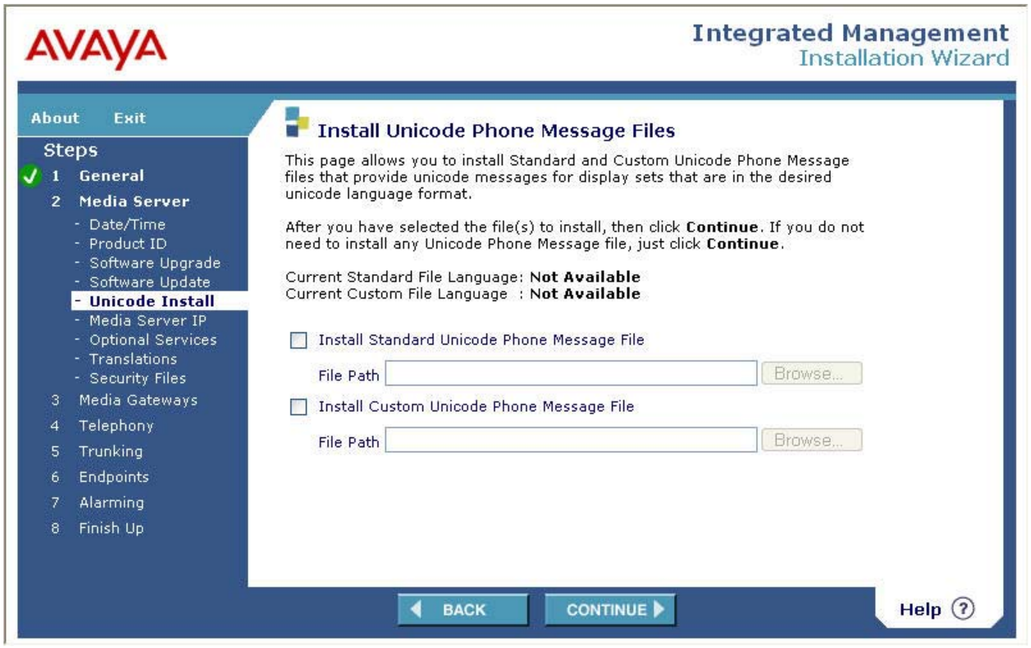
If you do not need to remove or install updates, just click **Continue**.

Installed Update ID	Description	Status	Remove
00.0.214.0-0002	Patch 0002 for 214.0	applied	🗑

□ Install Update

File Path

12 Click **Continue**. The Install Unicode Phone Message Files screen appears. This screen allows you to install files that provide unicode messages for display sets that are in the desired unicode language format.



Install Unicode Phone Message Files

This page allows you to install Standard and Custom Unicode Phone Message files that provide unicode messages for display sets that are in the desired unicode language format.

After you have selected the file(s) to install, then click **Continue**. If you do not need to install any Unicode Phone Message file, just click **Continue**.

Current Standard File Language: **Not Available**
Current Custom File Language : **Not Available**

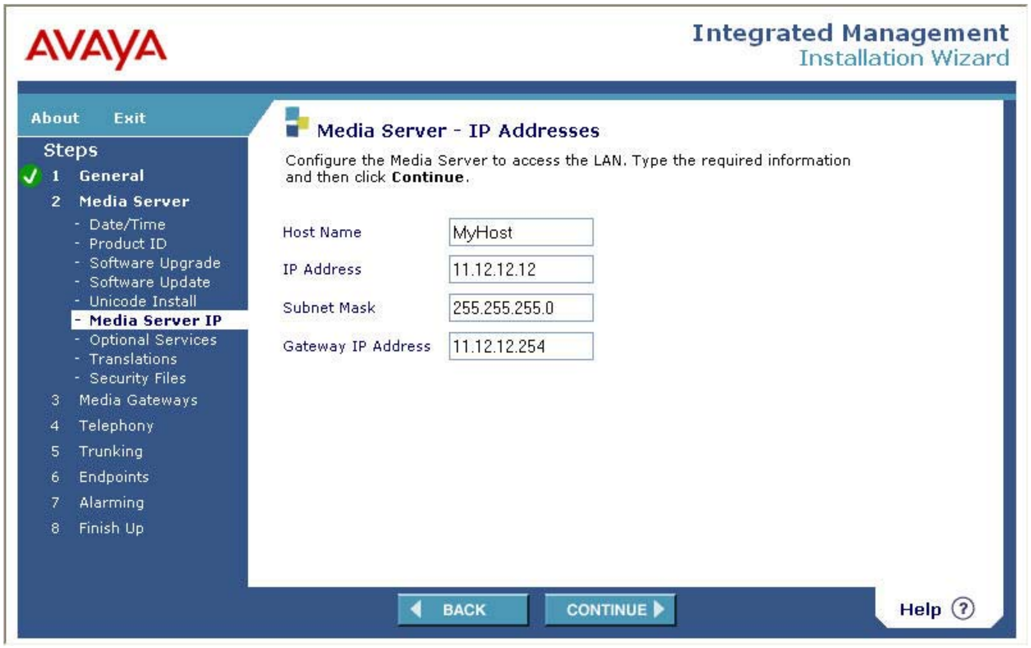
□ Install Standard Unicode Phone Message File

File Path

□ Install Custom Unicode Phone Message File

File Path

13 Click **Continue**. The Media Server - IP Addresses screen appears. If your S8300 media server is already configured, the Avaya IW should detect and display its address information in this screen. If not, you must enter the required information.

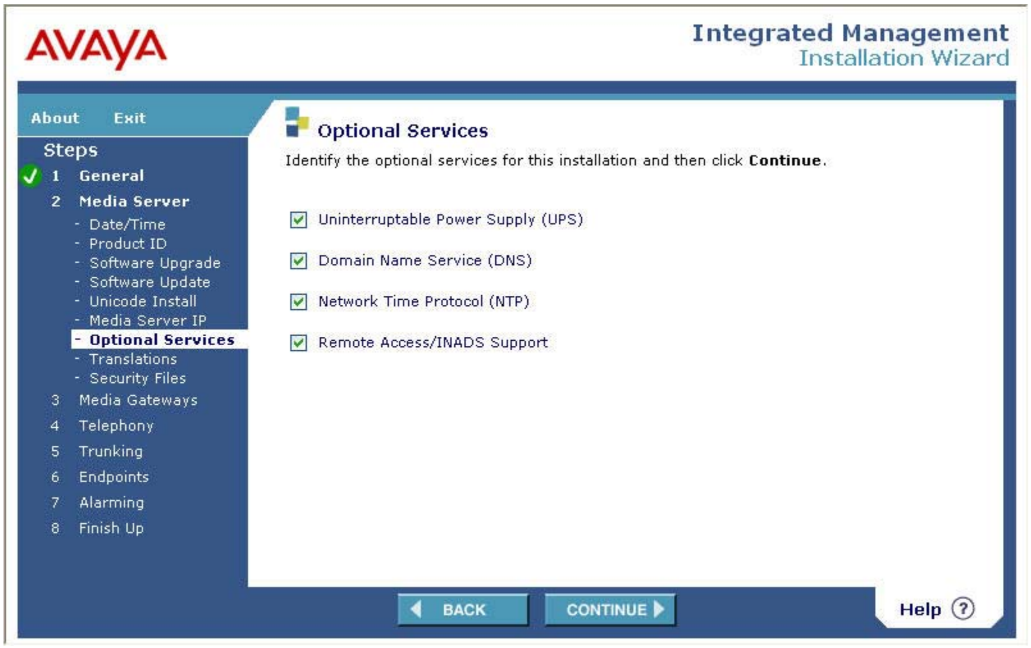


Media Server - IP Addresses

Configure the Media Server to access the LAN. Type the required information and then click **Continue**.

Host Name: MyHost
IP Address: 11.12.12.12
Subnet Mask: 255.255.255.0
Gateway IP Address: 11.12.12.254

14 Click **Continue**. The Optional Services screen appears. Select the services you want.

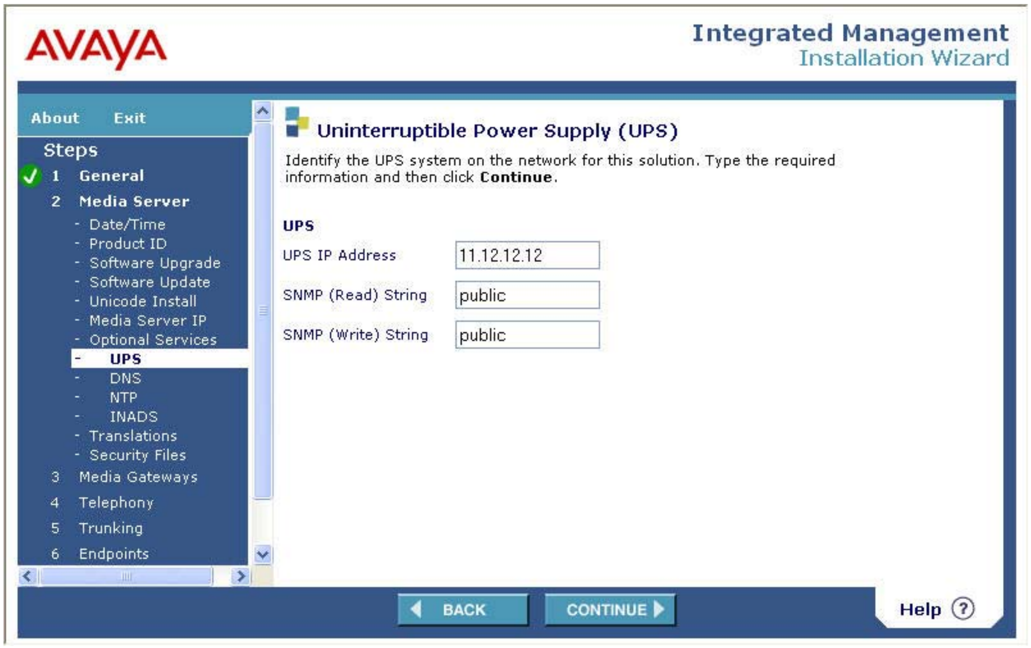


Optional Services

Identify the optional services for this installation and then click **Continue**.

☑ Uninterruptable Power Supply (UPS)
☑ Domain Name Service (DNS)
☑ Network Time Protocol (NTP)
☑ Remote Access/INADS Support

15 Click **Continue**. If you selected Uninteruptable Power Supply (UPS) in the Optional Services screen, the Uninteruptable Power Supply (UPS) screen appears. Enter the required information.



Uninterruptible Power Supply (UPS)

Identify the UPS system on the network for this solution. Type the required information and then click **Continue**.

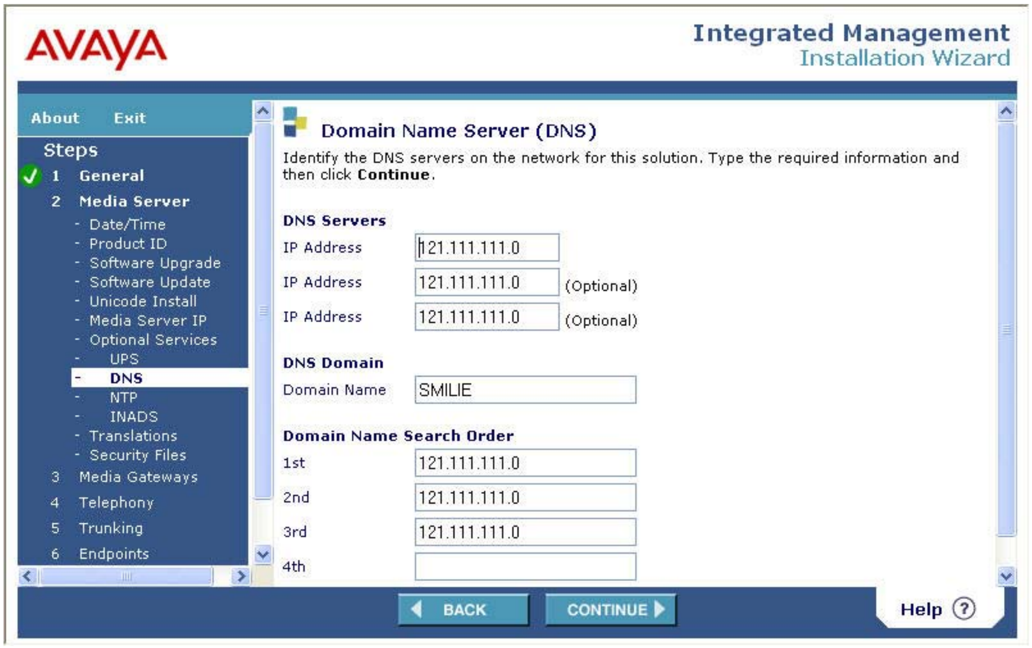
UPS

UPS IP Address: 11.12.12.12

SNMP (Read) String: public

SNMP (Write) String: public

16 Click **Continue**. If you selected Domain Name Service (DNS) in the Optional Services screen, the Domain Name Service (DNS) screen appears. Enter the required information.



Domain Name Server (DNS)

Identify the DNS servers on the network for this solution. Type the required information and then click **Continue**.

DNS Servers

IP Address: 121.111.111.0

IP Address: 121.111.111.0 (Optional)

IP Address: 121.111.111.0 (Optional)

DNS Domain

Domain Name: SMILIE

Domain Name Search Order

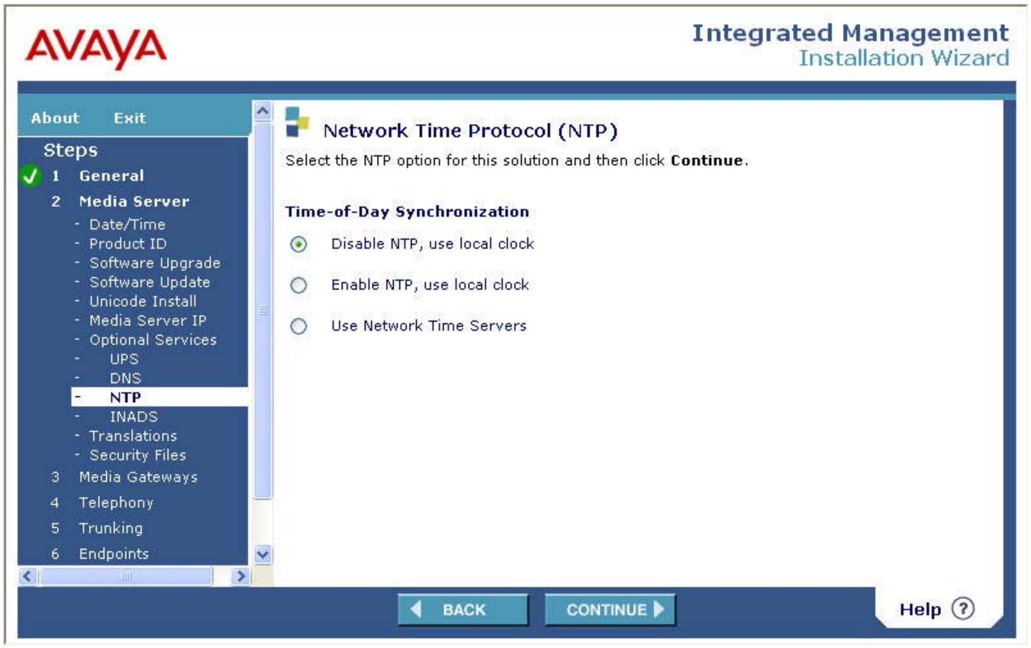
1st: 121.111.111.0

2nd: 121.111.111.0

3rd: 121.111.111.0

4th:

17 Click **Continue**. If you selected Network Time Protocol (NTP) in the Optional Services screen, the Network Time Protocol (NTP) screen appears. Select an NTP option.



Network Time Protocol (NTP)

Select the NTP option for this solution and then click **Continue**.

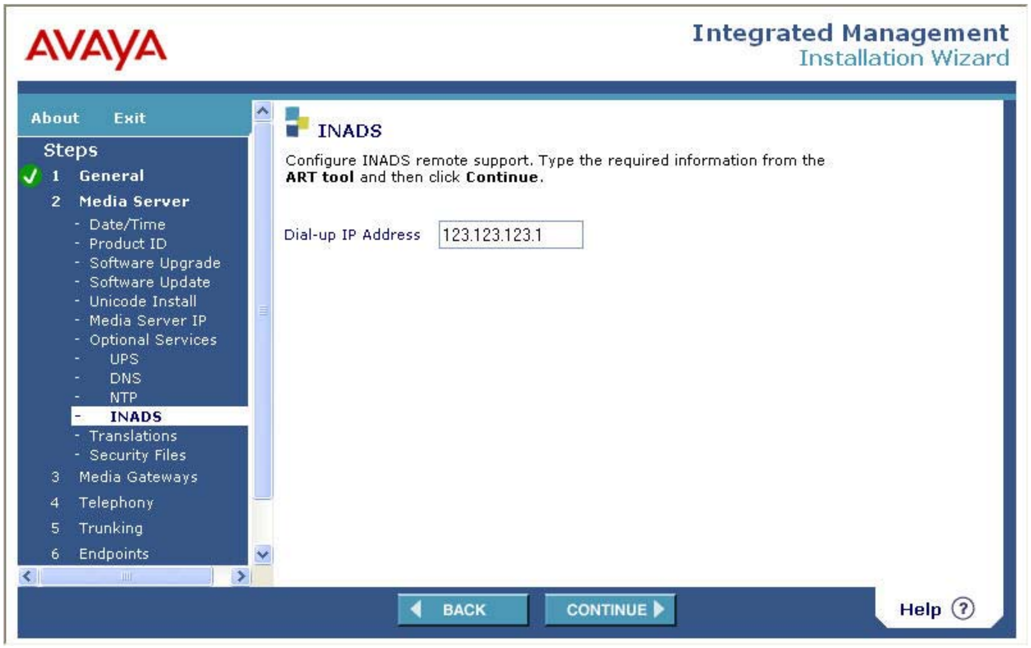
Time-of-Day Synchronization

● Disable NTP, use local clock

○ Enable NTP, use local clock

○ Use Network Time Servers

18 Click **Continue**. If you selected Remote Access/INADS Support in the Optional Services screen, the INADS screen appears. Enter a dialup IP address for INADS remote support. For instructions on how to obtain the INADS IP address, see *Installation of the Avaya G350 Media Gateway*, 555-245-104.

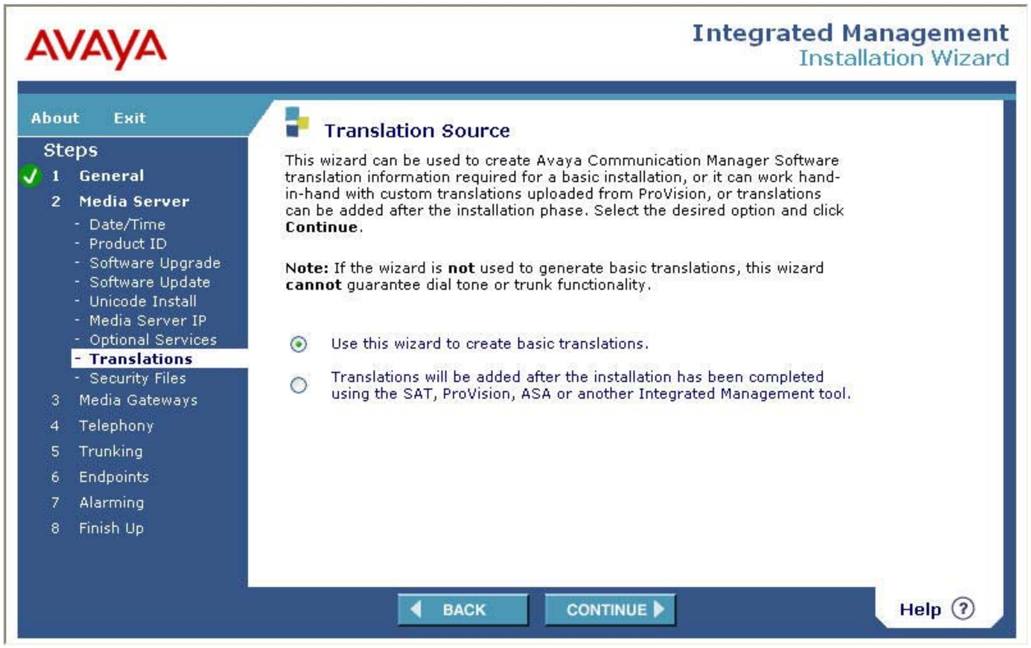


INADS

Configure INADS remote support. Type the required information from the **ART tool** and then click **Continue**.

Dial-up IP Address 123.123.123.1

19 Click **Continue**. The Translation Source screen appears. This screen allows you to generate Avaya Communication Manager translation information. This feature provides basic translations for administration of extension ranges, trunk types, routes, class of service, feature access codes, trunk access codes, station button assignment, and several other parameters.



Translation Source

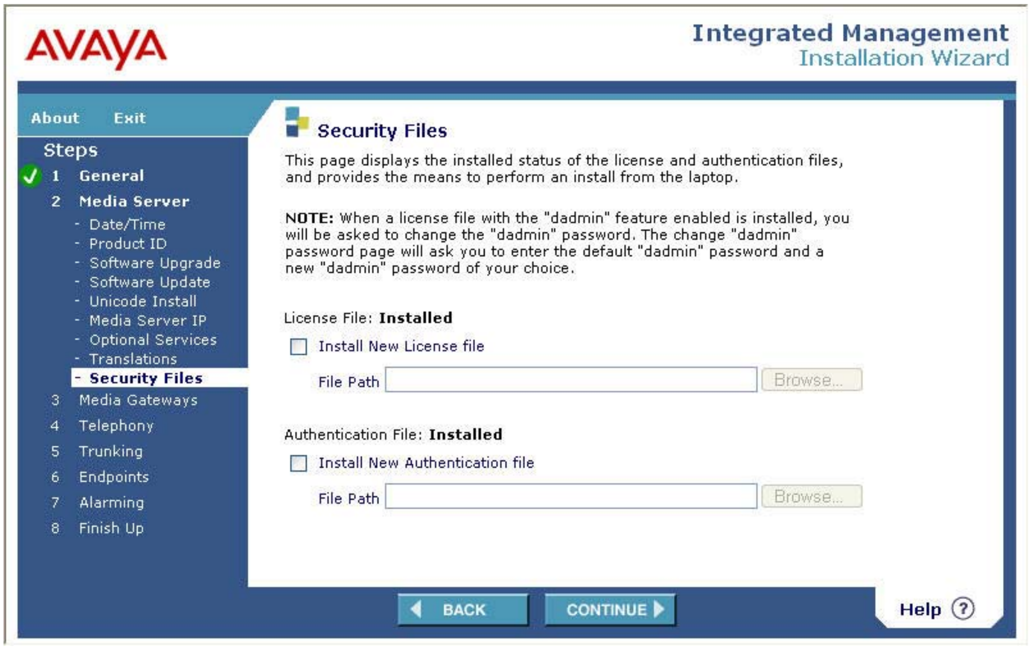
This wizard can be used to create Avaya Communication Manager Software translation information required for a basic installation, or it can work hand-in-hand with custom translations uploaded from ProVision, or translations can be added after the installation phase. Select the desired option and click **Continue**.

Note: If the wizard is **not** used to generate basic translations, this wizard **cannot** guarantee dial tone or trunk functionality.

● Use this wizard to create basic translations.

○ Translations will be added after the installation has been completed using the SAT, ProVision, ASA or another Integrated Management tool.

20 Click **Continue**. The Security Files screen appears. This screen displays the status of your license and authentication files, and allows you to install these files from a laptop. For information on these files, see *Installation of the Avaya G350 Media Gateway*, 555-245-104.



Security Files

This page displays the installed status of the license and authentication files, and provides the means to perform an install from the laptop.

NOTE: When a license file with the "dadmin" feature enabled is installed, you will be asked to change the "dadmin" password. The change "dadmin" password page will ask you to enter the default "dadmin" password and a new "dadmin" password of your choice.

License File: **Installed**

□ Install New License file

File Path

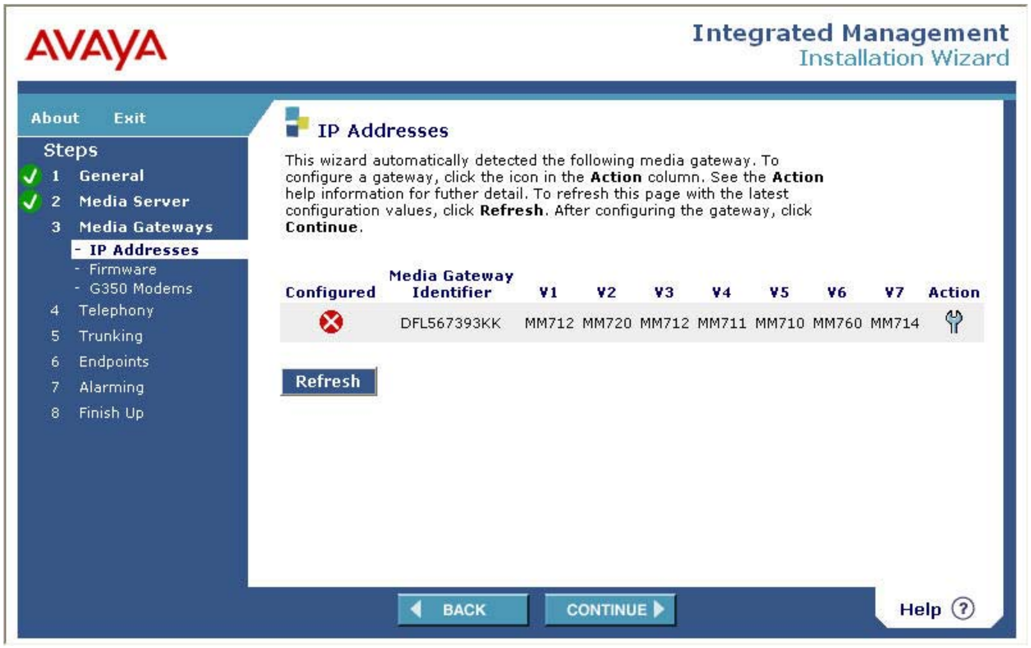
Authentication File: **Installed**

□ Install New Authentication file

File Path

Gateway configuration

21 To configure the basic G350 parameters, click **Media Gateways**. The IP Addresses screen appears. This screen displays the G350's ID, as well as the type of media module residing in each slot of the G350's chassis. To continue, click the icon corresponding to the G350 in the **Action** column.

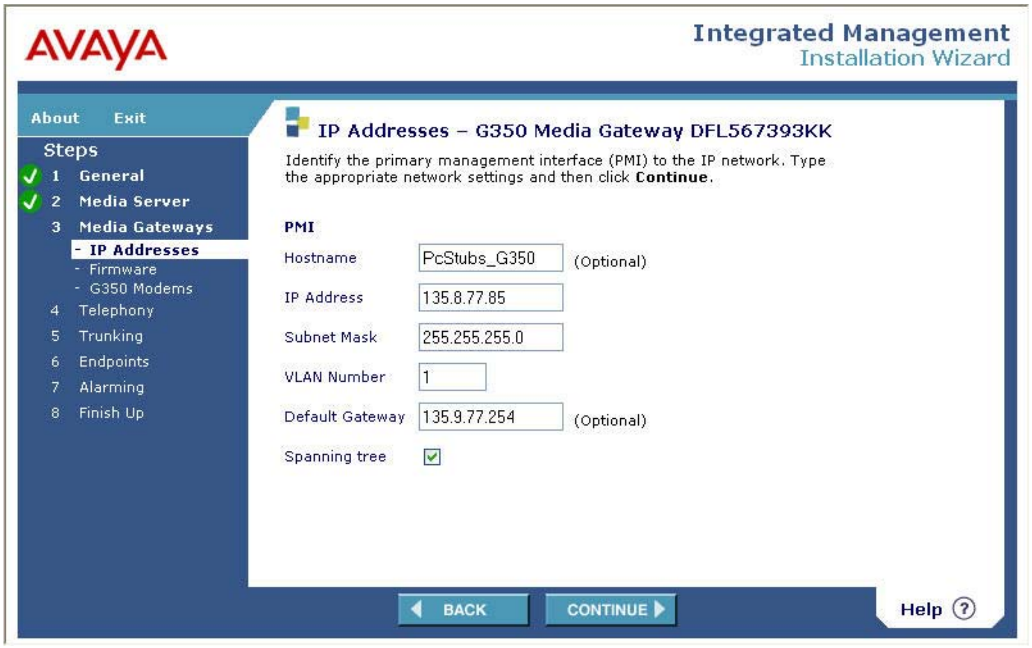


IP Addresses

This wizard automatically detected the following media gateway. To configure a gateway, click the icon in the **Action** column. See the **Action** help information for futher detail. To refresh this page with the latest configuration values, click **Refresh**. After configuring the gateway, click **Continue**.

Configured	Media Gateway Identifier	V1	V2	V3	V4	V5	V6	V7	Action
☒	DFL567393KK	MM712	MM720	MM712	MM711	MM710	MM760	MM714	🔧

22 Click **Continue**. The PMI configuration screen appears. The IP address and subnet mask of the PMI should appear in this screen. Change this IP address and subnet mask in accordance with your system specifications. For information on the PMI, see Configuring the Primary Management Interface (PMI) on page 40.



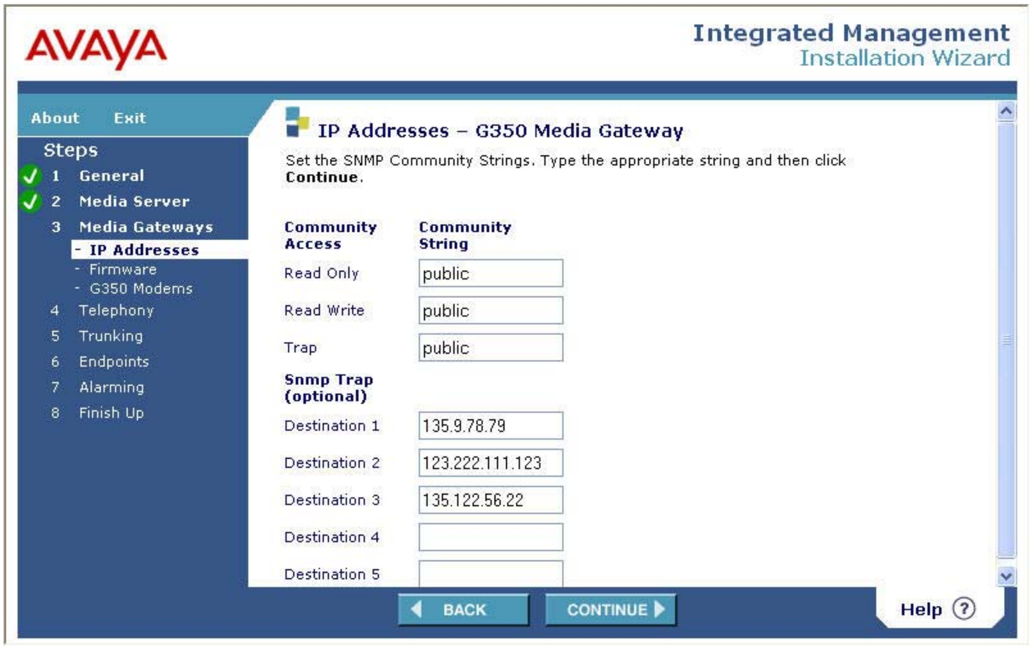
IP Addresses – G350 Media Gateway DFL567393KK

Identify the primary management interface (PMI) to the IP network. Type the appropriate network settings and then click **Continue**.

PMI

Hostname	PcStubs_G350	(Optional)
IP Address	135.8.77.85	
Subnet Mask	255.255.255.0	
VLAN Number	1	
Default Gateway	135.9.77.254	(Optional)
Spanning tree	☑	

23 Click **Continue**. The SNMP screen appears. For information on configuring SNMP settings, see Configuring SNMP on page 97.

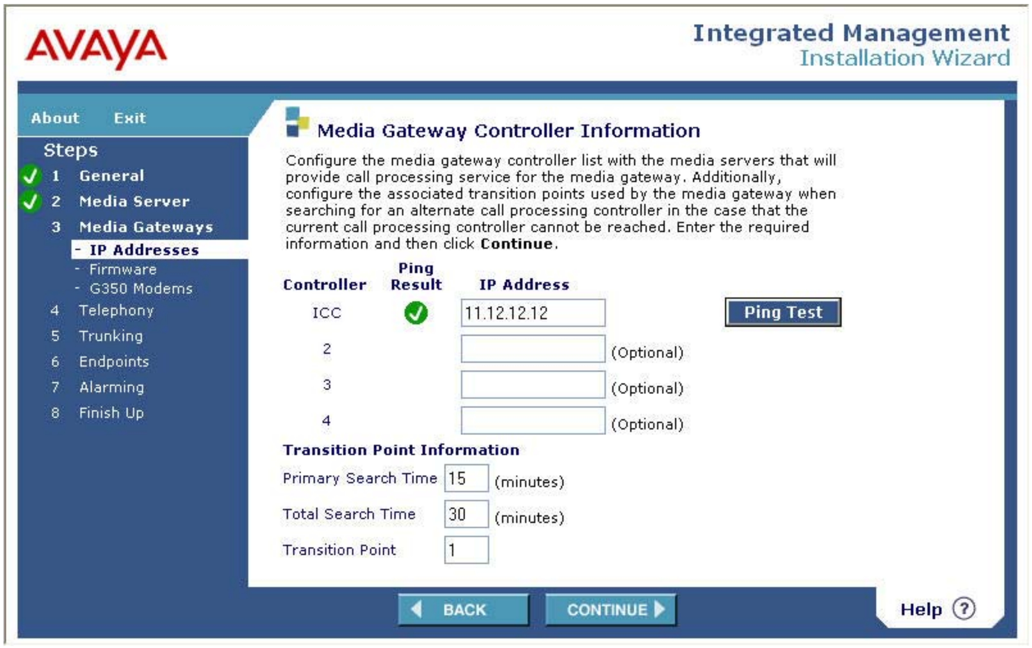


IP Addresses – G350 Media Gateway

Set the SNMP Community Strings. Type the appropriate string and then click **Continue**.

Community Access	Community String
Read Only	public
Read Write	public
Trap	public
Snmp Trap (optional)	
Destination 1	135.9.78.79
Destination 2	123.222.111.123
Destination 3	135.122.56.22
Destination 4	
Destination 5	

24 Click **Continue**. The Media Gateway Controller Information screen appears. The IP addresses of the primary MGC appears in the first IP address box. The IP addresses of up to three additional MGCs may appear in the subsequent boxes. For information on configuring MGCs, see Configuring the Media Gateway Controller (MGC) on page 41.



Media Gateway Controller Information

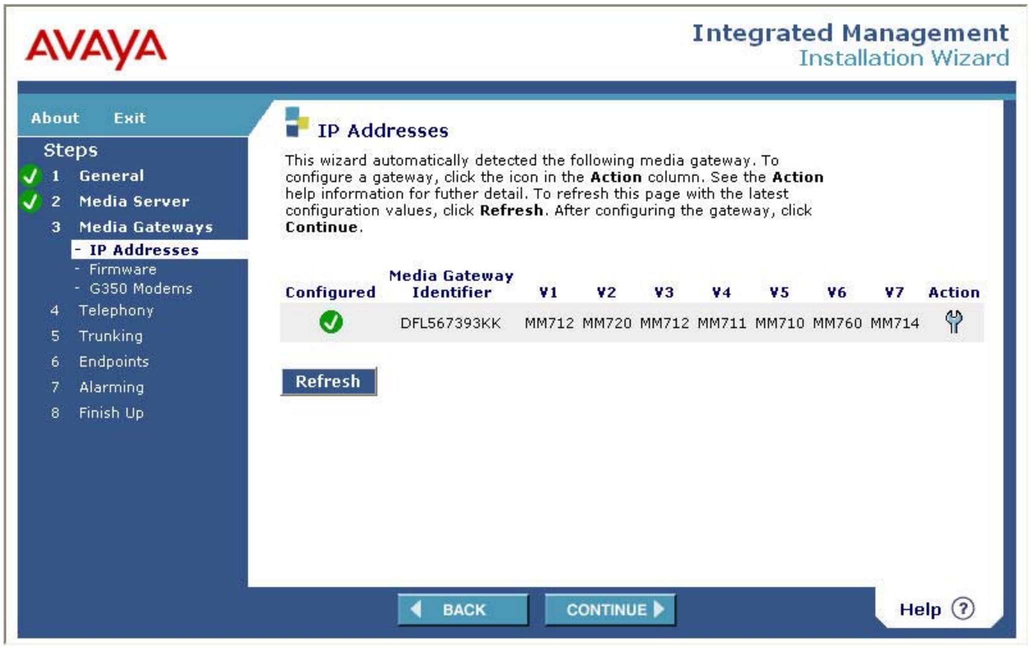
Configure the media gateway controller list with the media servers that will provide call processing service for the media gateway. Additionally, configure the associated transition points used by the media gateway when searching for an alternate call processing controller in the case that the current call processing controller cannot be reached. Enter the required information and then click **Continue**.

Controller	Ping Result	IP Address	
ICC	✓	11.12.12.12	
2			(Optional)
3			(Optional)
4			(Optional)

Transition Point Information

Primary Search Time	15	(minutes)
Total Search Time	30	(minutes)
Transition Point	1	

25 Click **Continue**. The IP Addresses screen appears. This screen displays the G350's ID, as well as the type of media module residing in each slot of the G350's chassis. To continue, click the icon corresponding to the G350 in the **Action** column. To update this information, click **Refresh**.



IP Addresses

This wizard automatically detected the following media gateway. To configure a gateway, click the icon in the **Action** column. See the **Action** help information for futher detail. To refresh this page with the latest configuration values, click **Refresh**. After configuring the gateway, click **Continue**.

Configured	Media Gateway Identifier	V1	V2	V3	V4	V5	V6	V7	Action
✓	DFL567393KK	MM712	MM720	MM712	MM711	MM710	MM760	MM714	

Firmware configuration

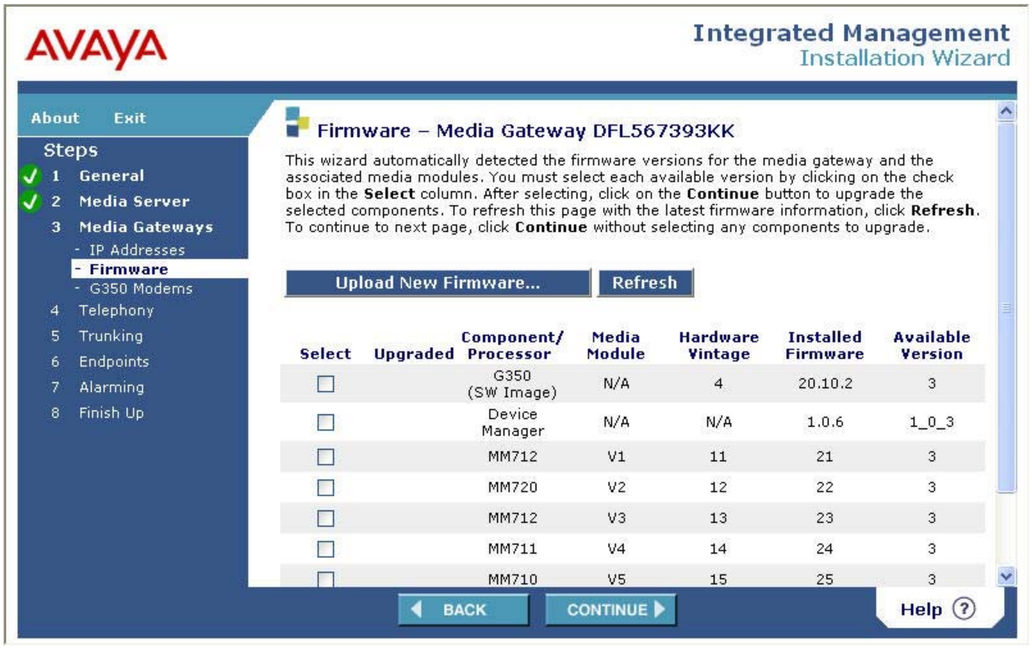
26 To upgrade the G350 firmware, do one of the following:

- From the IP Addresses screen, click **Continue**, or
- Click **Media Gateways** from the main menu.

The Firmware screen appears. This screen displays the currently installed firmware versions on the G350 and its media modules, as well as the most recent available versions.

- To upgrade firmware, select the modules you want to upgrade and click **Upload New Firmware**.
- To upload a new firmware version from a laptop, clear all the boxes in the Select column and click **Continue**. The Firmware File Upload screen appears.

- To proceed without upgrading any firmware, clear all the boxes in the **Select** column and click **Continue** twice.

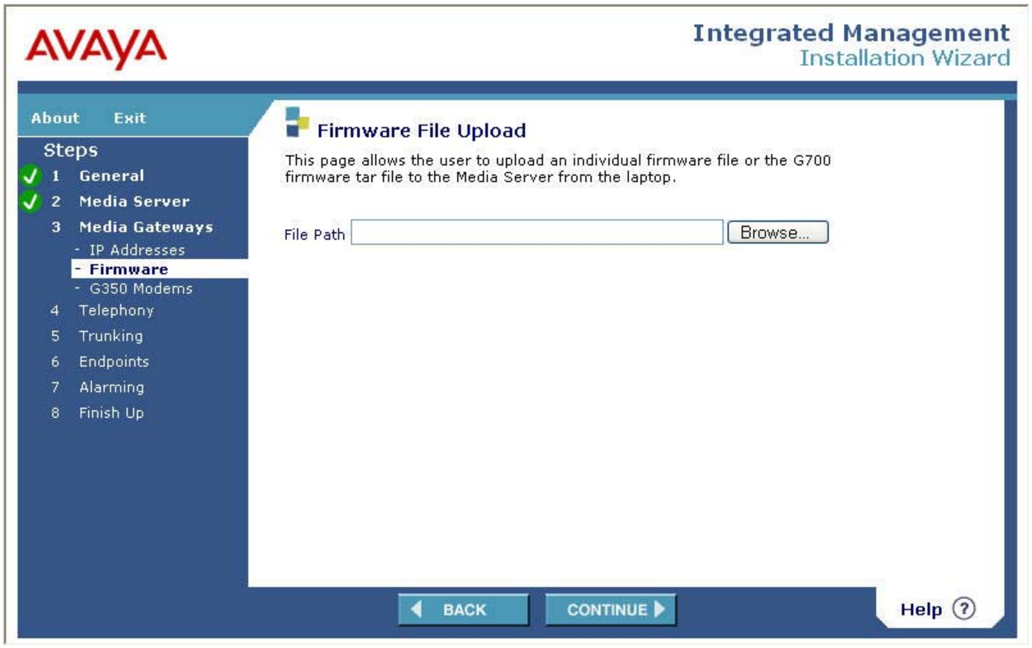


Firmware – Media Gateway DFL567393KK

This wizard automatically detected the firmware versions for the media gateway and the associated media modules. You must select each available version by clicking on the check box in the **Select** column. After selecting, click on the **Continue** button to upgrade the selected components. To refresh this page with the latest firmware information, click **Refresh**. To continue to next page, click **Continue** without selecting any components to upgrade.

Select	Upgraded	Component/ Processor	Media Module	Hardware Vintage	Installed Firmware	Available Version
□		G350 (SW Image)	N/A	4	20.10.2	3
□		Device Manager	N/A	N/A	1.0.6	1_0_3
□		MM712	V1	11	21	3
□		MM720	V2	12	22	3
□		MM712	V3	13	23	3
□		MM711	V4	14	24	3
□		MM710	V5	15	25	3

27 The Firmware File Upload screen allows you to upload a new firmware file from a laptop. Enter the file path of the file you want to upload, or use the **Browse** button to locate the file. Then, click **Continue** to upload the file.



Firmware File Upload

This page allows the user to upload an individual firmware file or the G700 firmware tar file to the Media Server from the laptop.

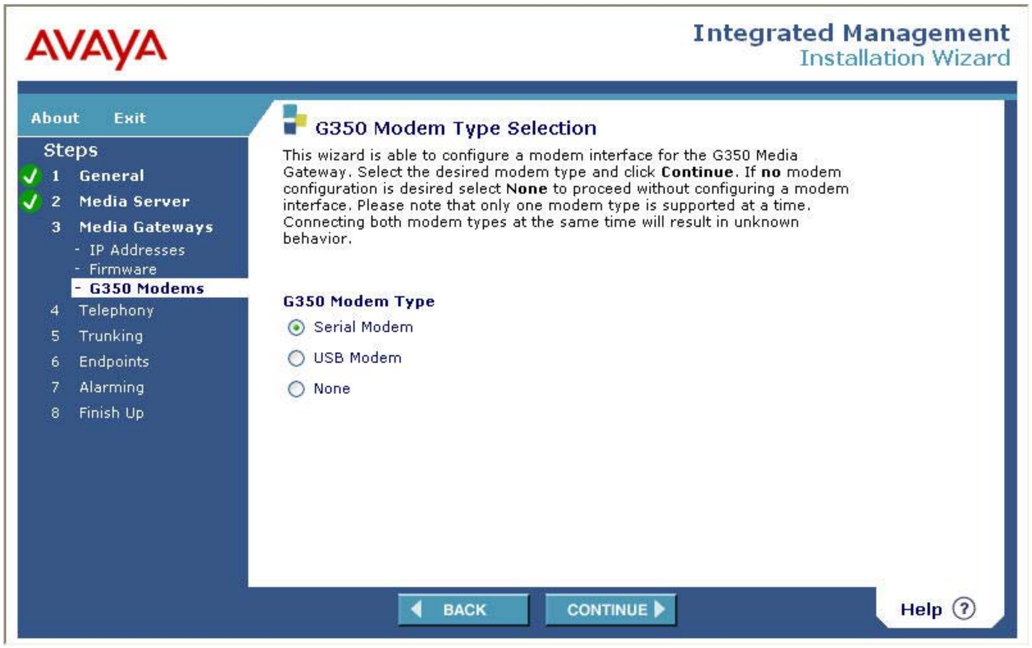
File Path

Modem configuration

28 To configure the G350 for modem use, do one of the following:

- From the Firmware File Upload screen, click **Continue**, or
- Click **Media Gateways>G350 Modems** from the main menu.

The G350 Modem Type Selection screen appears. Select the modem type you want to use. For more information on using a modem with the G350, see Configuring the G350 for modem use on page 67.



G350 Modem Type Selection

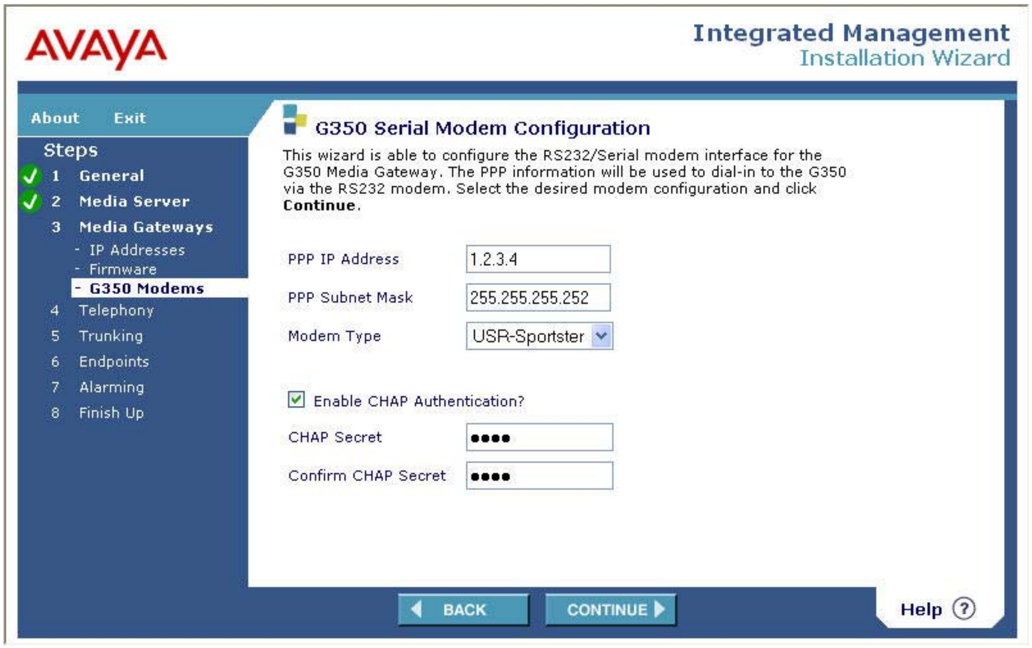
This wizard is able to configure a modem interface for the G350 Media Gateway. Select the desired modem type and click **Continue.** If **no** modem configuration is desired select **None** to proceed without configuring a modem interface. Please note that only one modem type is supported at a time. Connecting both modem types at the same time will result in unknown behavior.

G350 Modem Type

● Serial Modem
○ USB Modem
○ None

29 Click **Continue**. If you selected **Serial Modem**, the G350 Serial Modem Configuration screen appears. If you selected **USB Modem**, the G350 USB Modem Configuration screen appears. If you selected **None**, the Country screen appears. See Telephony configuration on page 266.

30 If you selected **Serial Modem**, enter the required information in the G350 Serial Modem Configuration screen, then click **Continue**.



G350 Serial Modem Configuration

This wizard is able to configure the RS232/Serial modem interface for the G350 Media Gateway. The PPP information will be used to dial-in to the G350 via the RS232 modem. Select the desired modem configuration and click **Continue**.

PPP IP Address: 1.2.3.4

PPP Subnet Mask: 255.255.255.252

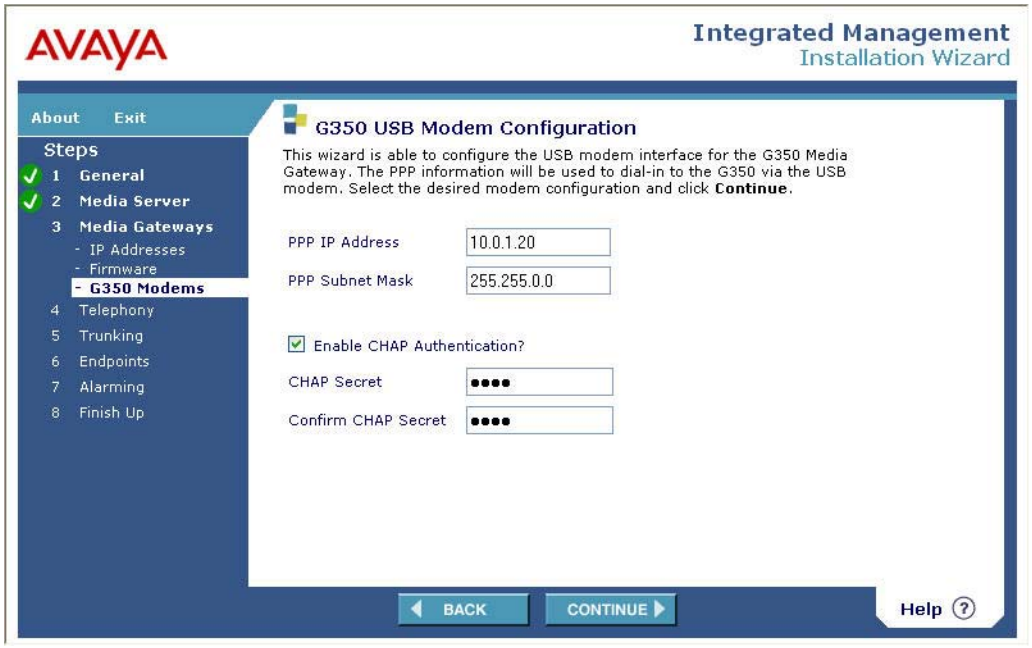
Modem Type: USR-Sportster

☑ Enable CHAP Authentication?

CHAP Secret: ●●●●

Confirm CHAP Secret: ●●●●

31 If you selected **USB Modem**, enter the required information in the G350 USB Modem Configuration screen, then click **Continue**.



G350 USB Modem Configuration

This wizard is able to configure the USB modem interface for the G350 Media Gateway. The PPP information will be used to dial-in to the G350 via the USB modem. Select the desired modem configuration and click **Continue**.

PPP IP Address: 10.0.1.20

PPP Subnet Mask: 255.255.0.0

☑ Enable CHAP Authentication?

CHAP Secret: ●●●●

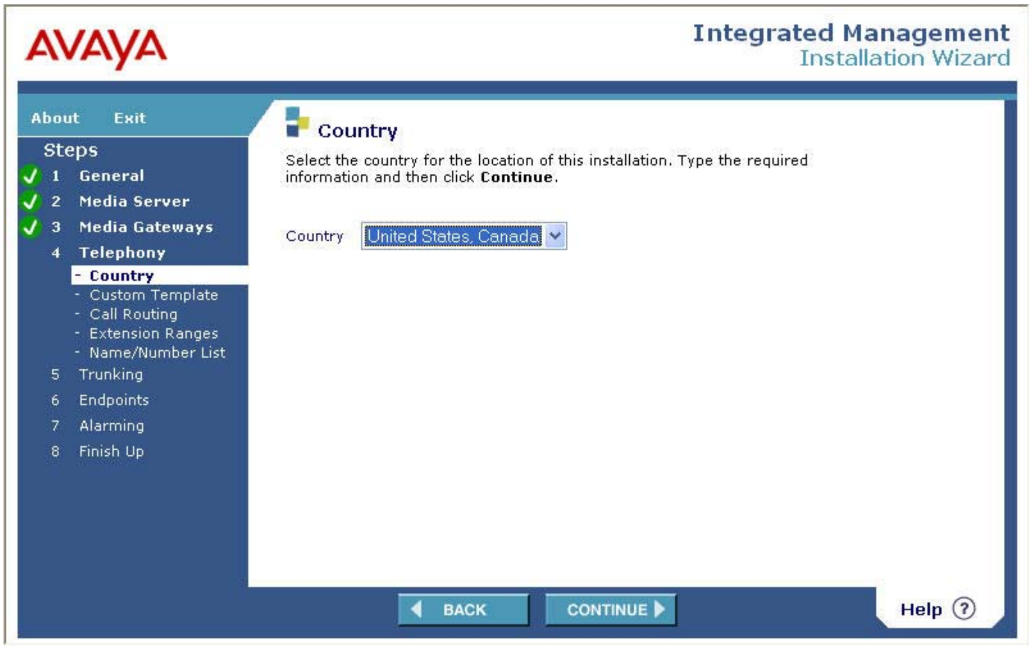
Confirm CHAP Secret: ●●●●

Telephony configuration

32 To configure the G350's telephony parameters, do one of the following:

- From the applicable modem configuration screen, click **Continue**, or
- Click **Telephony** from the main menu.

The Country screen appears. Select the country in which the installation is taking place.

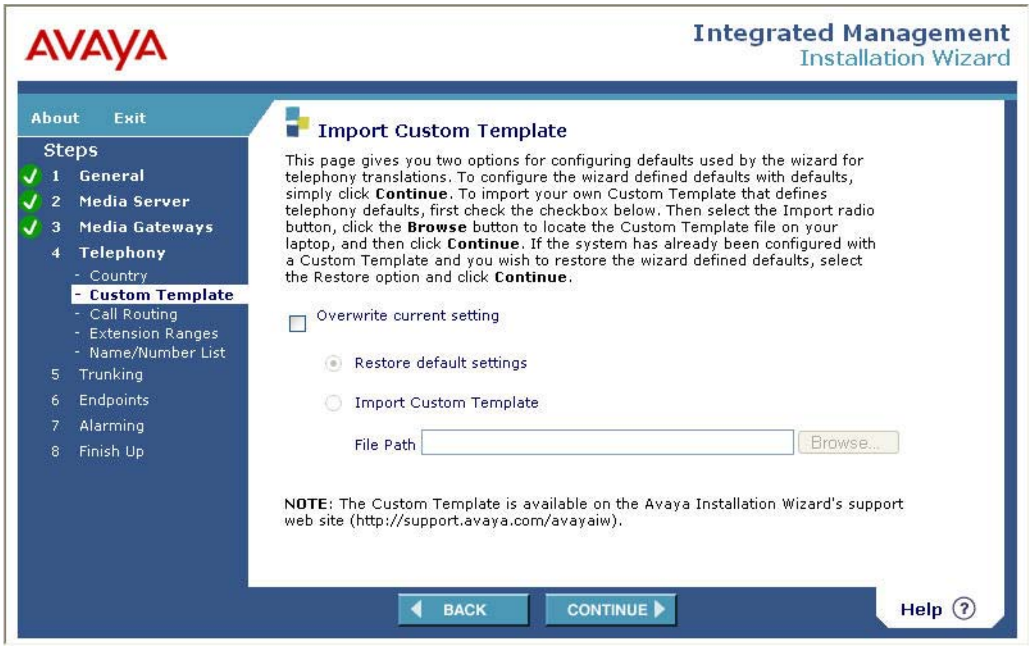


Country

Select the country for the location of this installation. Type the required information and then click **Continue**.

Country: United States, Canada

33 Click **Continue**. The Import Custom Template screen appears. This screen allows you to configure telephony translation defaults for the Avaya IW.



Import Custom Template

This page gives you two options for configuring defaults used by the wizard for telephony translations. To configure the wizard defined defaults with defaults, simply click **Continue**. To import your own Custom Template that defines telephony defaults, first check the checkbox below. Then select the Import radio button, click the **Browse** button to locate the Custom Template file on your laptop, and then click **Continue**. If the system has already been configured with a Custom Template and you wish to restore the wizard defined defaults, select the Restore option and click **Continue**.

□ Overwrite current setting

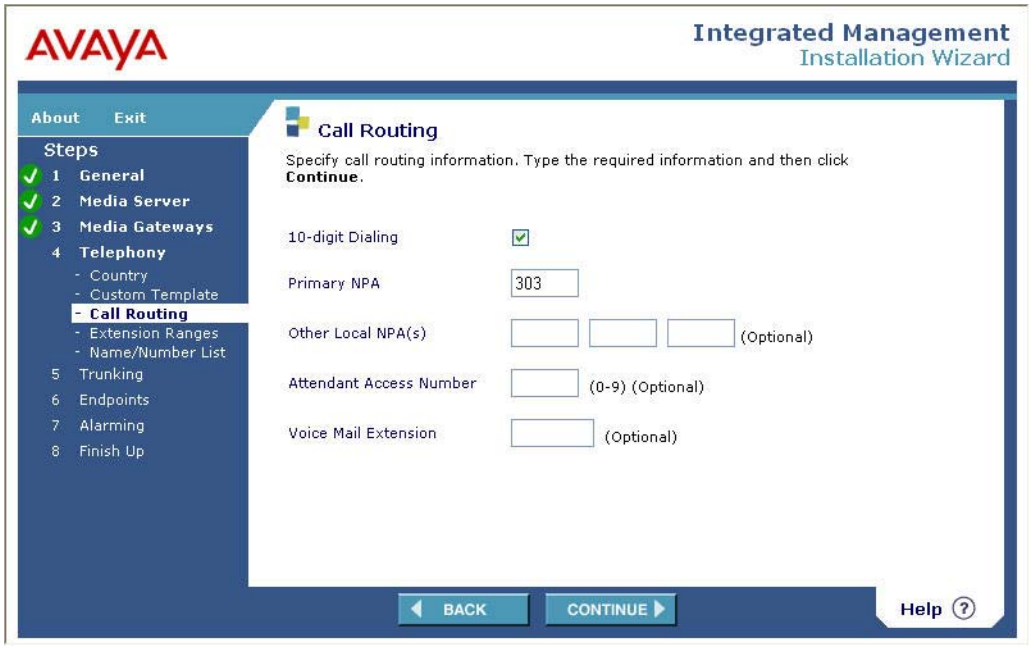
● Restore default settings

○ Import Custom Template

File Path

NOTE: The Custom Template is available on the Avaya Installation Wizard's support web site (http://support.avaya.com/avayaiw).

34 Click **Continue**. The Call Routing screen appears. Enter the required call routing information.

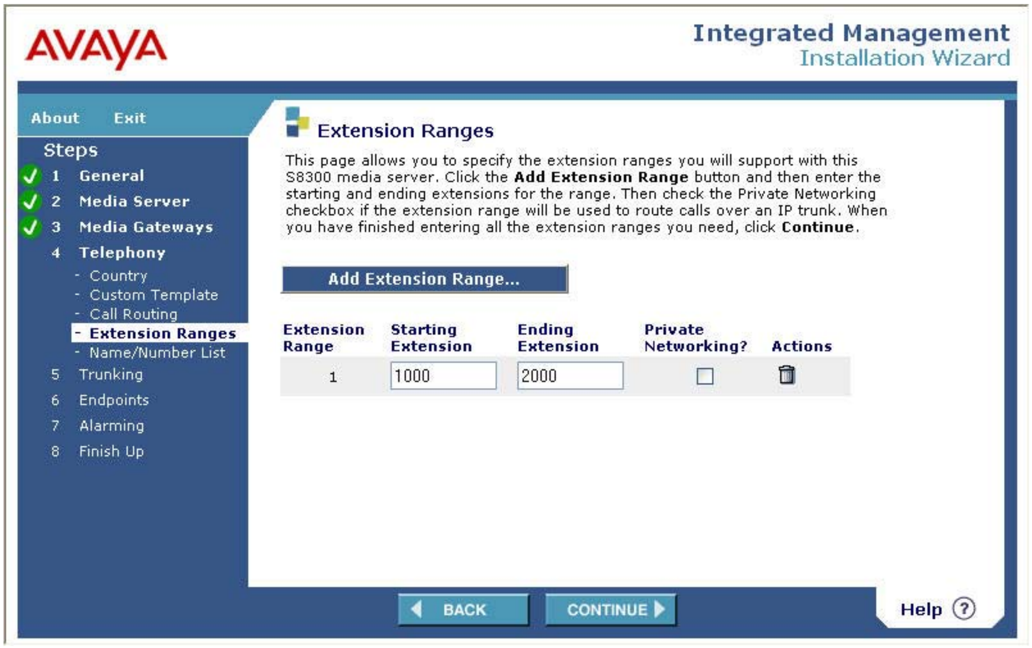


Call Routing

Specify call routing information. Type the required information and then click **Continue**.

10-digit Dialing	☑	
Primary NPA	303	
Other Local NPA(s)		(Optional)
Attendant Access Number		(0-9) (Optional)
Voice Mail Extension		(Optional)

35 Click **Continue**. The Extension Ranges screen appears. To add a range, click **Add Extension Range** and enter the starting and ending extensions for the range. If you want this range to be used to route calls over an IP trunk, select **Private Networking**. To add additional extension ranges, repeat these steps. When you are finished, click **Continue**.



Extension Ranges

This page allows you to specify the extension ranges you will support with this S8300 media server. Click the **Add Extension Range** button and then enter the starting and ending extensions for the range. Then check the Private Networking checkbox if the extension range will be used to route calls over an IP trunk. When you have finished entering all the extension ranges you need, click **Continue**.

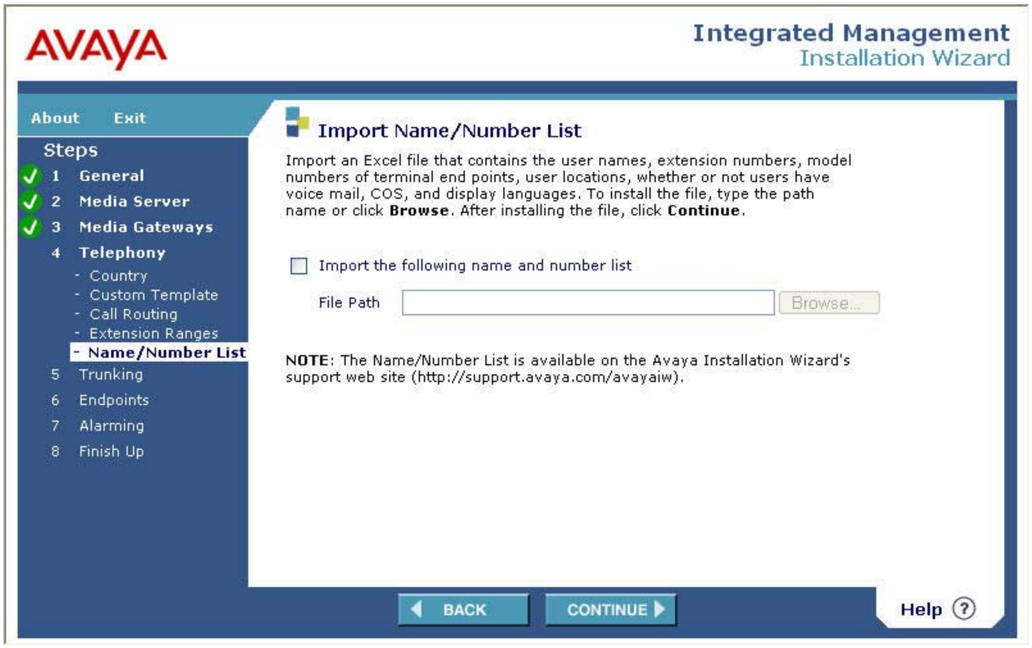
Extension Range	Starting Extension	Ending Extension	Private Networking?	Actions
1	1000	2000	□	🗑

36 Click **Continue**. The Import Name/Number List screen appears. This screen allows you to import an Excel file that contains user names, extension numbers, and other information. To import this file:

a Select **Import the following name and number list**.

b Enter the file path of the file you want to import, or use the **Browse** button to locate the file.

c Click **Continue**.



Import Name/Number List

Import an Excel file that contains the user names, extension numbers, model numbers of terminal end points, user locations, whether or not users have voice mail, COS, and display languages. To install the file, type the path name or click **Browse**. After installing the file, click **Continue**.

☐ Import the following name and number list

File Path [ ] Browse...

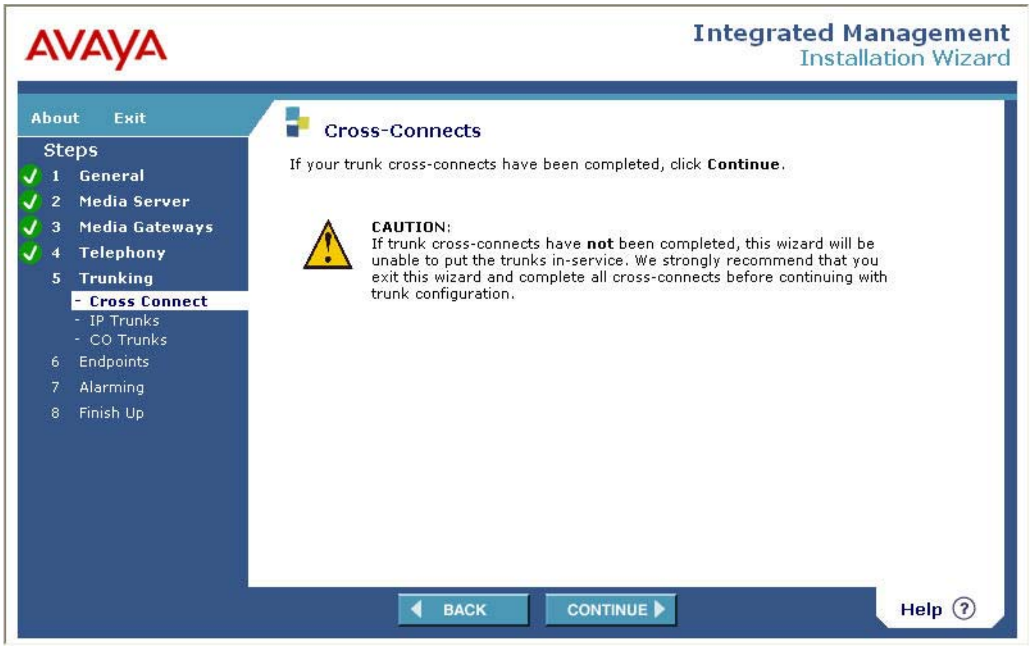
NOTE: The Name/Number List is available on the Avaya Installation Wizard's support web site (http://support.avaya.com/avayaiw).

Trunk configuration

37 To configure the G350's trunk parameters, do one of the following:

- From the Import Name/Number List screen, click **Continue**, or
- Click **Trunking** from the main menu.

The Cross-Connects screen appears. If your trunk cross-connects have been completed, click **Continue** to proceed with trunk configuration. If your trunk cross-connects have not been completed, it is strongly recommended to exit the Avaya IW and complete all cross-connects before proceeding with trunk configuration.

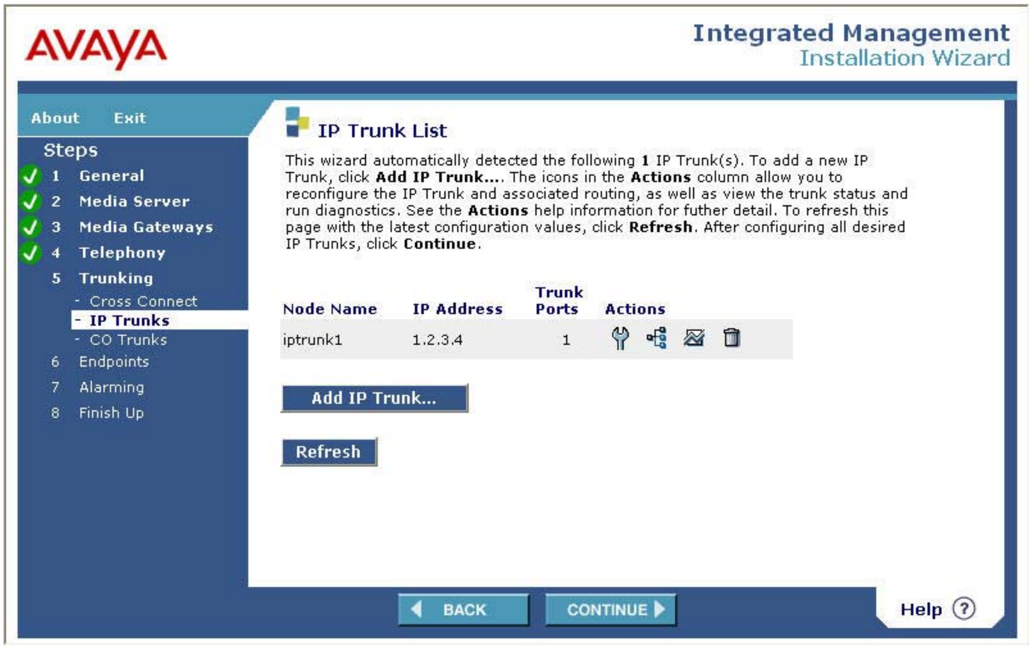


Cross-Connects

If your trunk cross-connects have been completed, click **Continue**.

CAUTION:
If trunk cross-connects have **not** been completed, this wizard will be unable to put the trunks in-service. We strongly recommend that you exit this wizard and complete all cross-connects before continuing with trunk configuration.

38 Click **Continue**. The IP Trunk List screen appears. This screen displays all IP trunks configured on the G350. To refresh this list, click **Refresh**.



IP Trunk List

This wizard automatically detected the following **1** IP Trunk(s). To add a new IP Trunk, click **Add IP Trunk...**. The icons in the **Actions** column allow you to reconfigure the IP Trunk and associated routing, as well as view the trunk status and run diagnostics. See the **Actions** help information for futher detail. To refresh this page with the latest configuration values, click **Refresh**. After configuring all desired IP Trunks, click **Continue**.

Node Name	IP Address	Trunk Ports	Actions
iptrunk1	1.2.3.4	1	

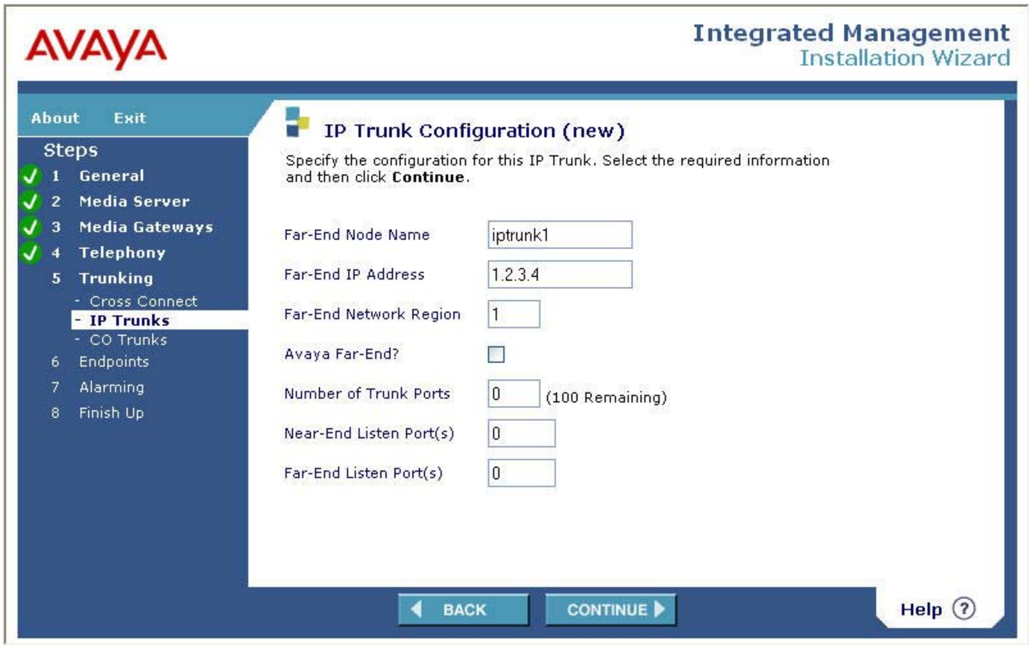
39 You can perform the following actions in the IP Trunk List screen:

- Adding a trunk
- Modifying trunk parameters
- Modifying IP route configuration
- Displaying trunk status
- Removing a trunk

To proceed to the CO Trunk List screen for configuring a trunk media module, click **Continue**. See Configuring a trunk media module on page 274.

Adding a trunk

40 To add a new trunk click **Add IP Trunk**. The IP Trunk Configuration screen appears.



IP Trunk Configuration (new)

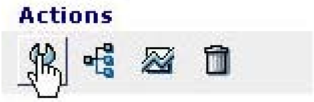
Specify the configuration for this IP Trunk. Select the required information and then click **Continue**.

Far-End Node Name	iptrunk1
Far-End IP Address	1.2.3.4
Far-End Network Region	1
Avaya Far-End?	□
Number of Trunk Ports	0 (100 Remaining)
Near-End Listen Port(s)	0
Far-End Listen Port(s)	0

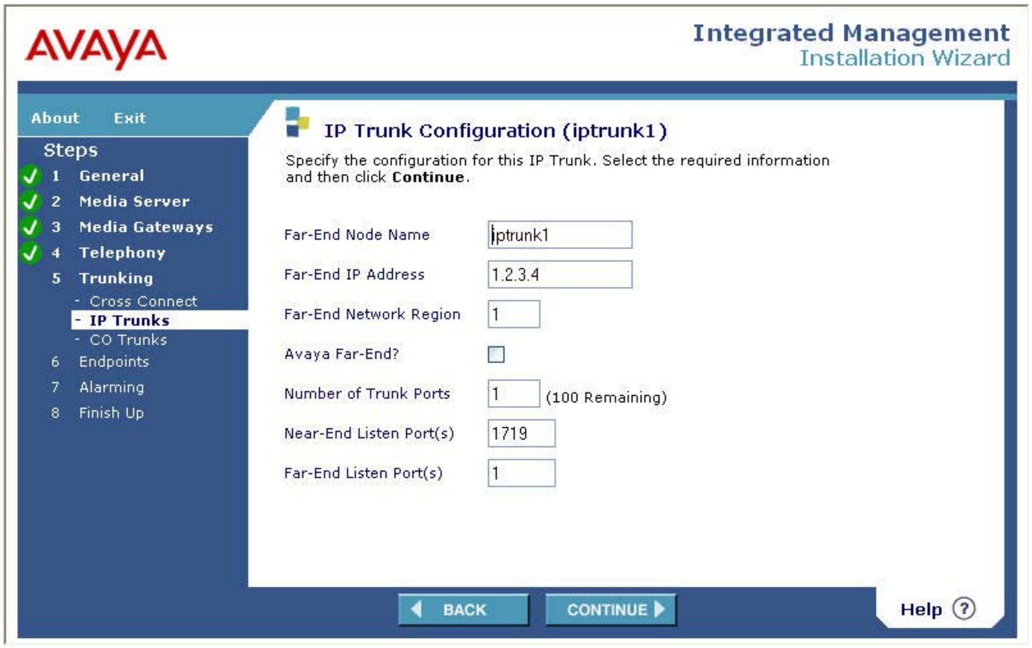
41 Enter the required information in the IP Trunk Configuration screen and click **Continue**. The IP Trunk List appears, with the new trunk included in the list of trunks. To add an additional trunk, click **Add IP Trunk** and repeat this step. When you are finished adding trunks, click **Continue** or select an action from the **Actions** column to modify an existing trunk.

Modifying trunk parameters

42 To modify the trunk's parameters, click the configuration icon in the **Actions** column of the IP Trunk List screen.



The IP Trunk Configuration screen appears, with the trunk’s current parameters displayed.



IP Trunk Configuration (iptrunk1)

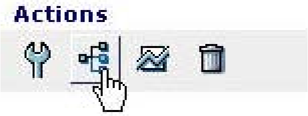
Specify the configuration for this IP Trunk. Select the required information and then click **Continue**.

Far-End Node Name	iptrunk1
Far-End IP Address	1.2.3.4
Far-End Network Region	1
Avaya Far-End?	□
Number of Trunk Ports	1 (100 Remaining)
Near-End Listen Port(s)	1719
Far-End Listen Port(s)	1

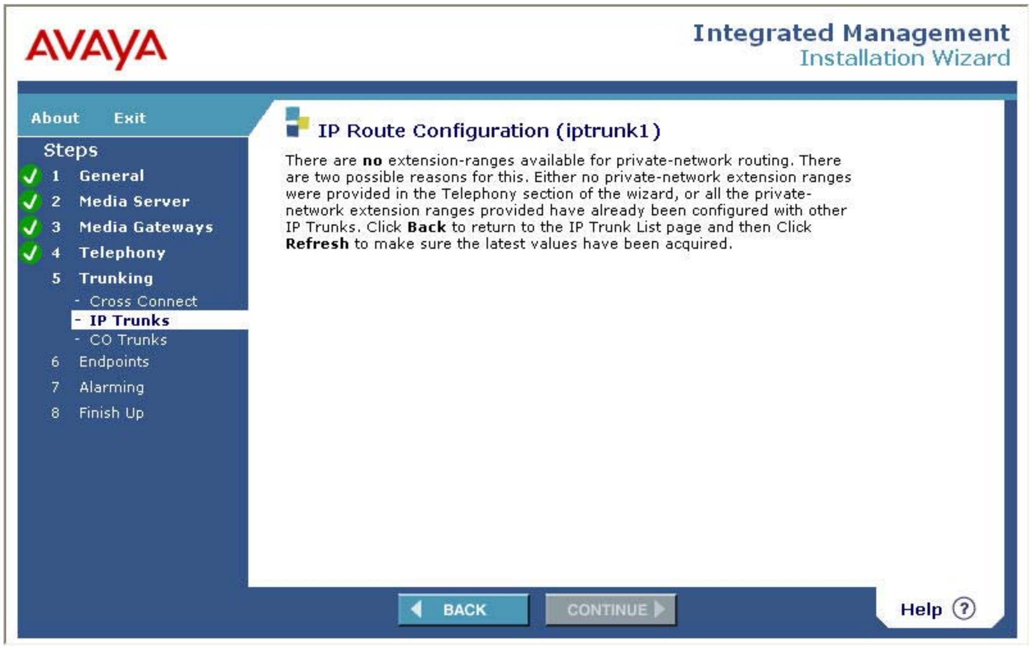
43 Modify the trunk parameters and click **Continue**. The IP Trunk List appears. Select an additional action from the **Actions** column, or click **Continue** to proceed to the CO Trunk List screen. See Configuring a trunk media module on page 274.

Modifying IP route configuration

44 To modify the trunk’s IP route configuration, click the IP route icon in the **Actions** column of the IP Trunk List screen.



The IP Route Configuration screen appears.



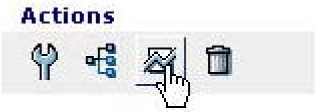
IP Route Configuration (iptrunk1)

There are **no** extension-ranges available for private-network routing. There are two possible reasons for this. Either no private-network extension ranges were provided in the Telephony section of the wizard, or all the private-network extension ranges provided have already been configured with other IP Trunks. Click **Back** to return to the IP Trunk List page and then Click **Refresh** to make sure the latest values have been acquired.

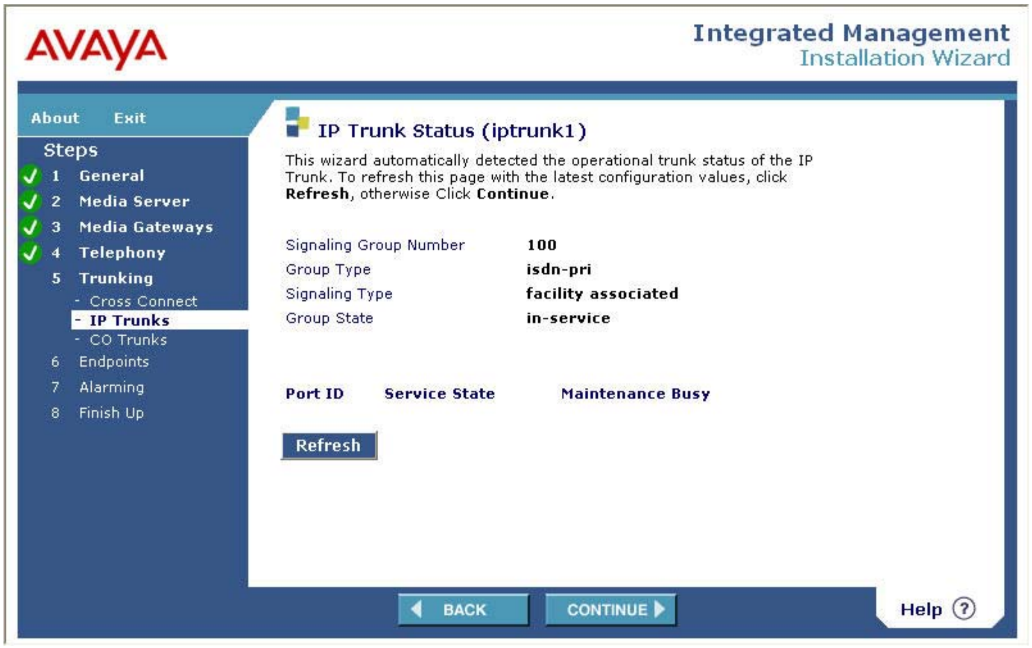
45 The IP Route Configuration screen displays the extension ranges available for private-network routing. Modify these ranges, if any, and click **Continue**. The IP Trunk List appears. Select an additional action from the **Actions** column, or click **Continue** to proceed to the CO Trunk List screen. See Configuring a trunk media module on page 274.

Displaying trunk status

46 To display the trunk's IP route configuration, click the trunk status icon in the **Actions** column of the IP Trunk List screen.



The IP Trunk Status screen appears.



IP Trunk Status (iptrunk1)

This wizard automatically detected the operational trunk status of the IP Trunk. To refresh this page with the latest configuration values, click **Refresh**, otherwise Click **Continue**.

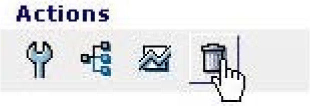
Signaling Group Number	100
Group Type	isdn-pri
Signaling Type	facility associated
Group State	in-service

Port ID	Service State	Maintenance Busy

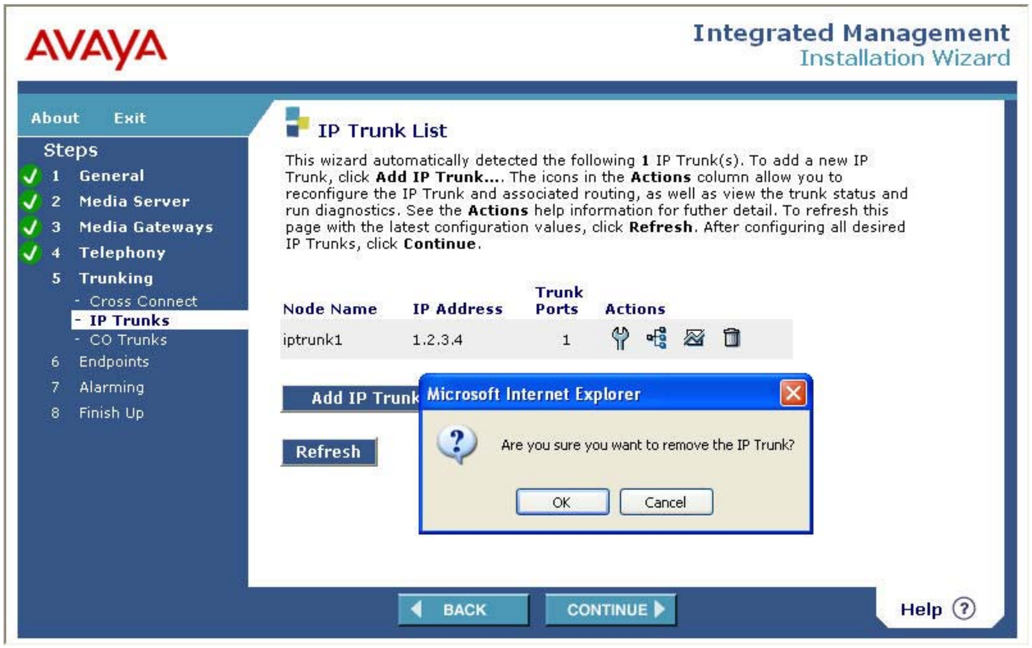
47 The IP Trunk Status screen displays the operational status of the trunk. To refresh the information, click **Refresh**. Otherwise, click **Continue**. The IP Trunk List appears. Select an additional action from the **Actions** column, or click **Continue** to proceed to the CO Trunk List screen. See Configuring a trunk media module on page 274.

Removing a trunk

48 To remove a trunk, click the trunk's remove icon in the **Actions** column of the IP Trunk List screen.



A message appears asking if you want to remove the trunk.



This wizard automatically detected the following **1** IP Trunk(s). To add a new IP Trunk, click **Add IP Trunk...**. The icons in the **Actions** column allow you to reconfigure the IP Trunk and associated routing, as well as view the trunk status and run diagnostics. See the **Actions** help information for futher detail. To refresh this page with the latest configuration values, click **Refresh**. After configuring all desired IP Trunks, click **Continue**.

Node Name	IP Address	Trunk Ports	Actions
iptrunk1	1.2.3.4	1	

Are you sure you want to remove the IP Trunk?

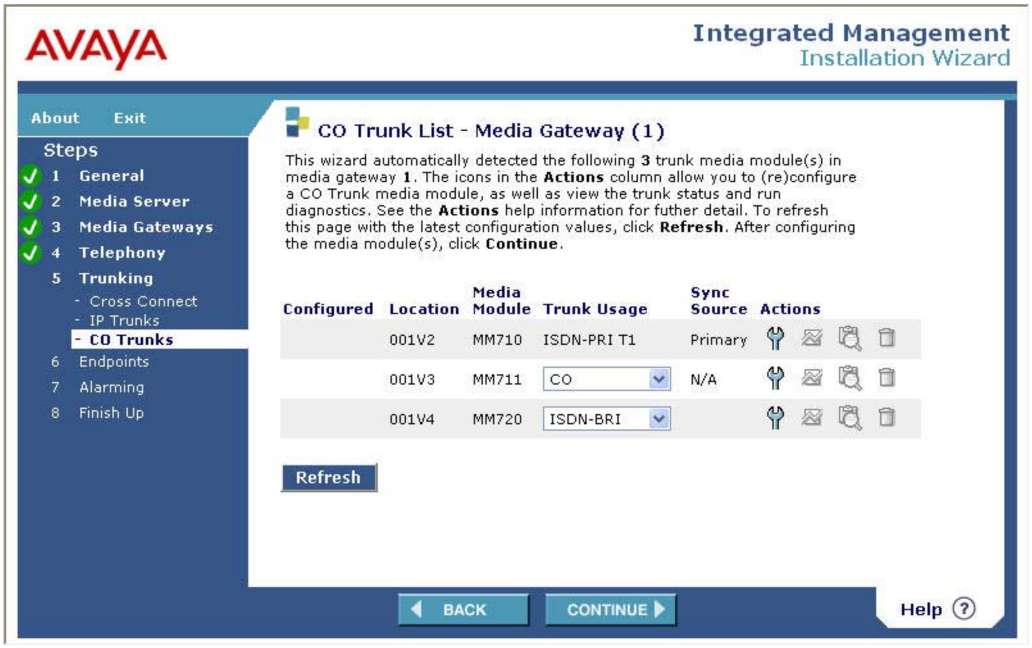
49 Click **OK** to remove the trunk. Select an additional action from the **Actions** column, or click **Continue** to proceed to the CO Trunk List screen.

Configuring a trunk media module

50 To configure a trunk media module, do one of the following:

- Click **Continue** from the IP Trunk List screen, or
- Click **Trunking>CO Trunks** from the main menu.

The CO Trunk List screen appears. This screen lists trunk media modules detected in the G350 and allows you to configure a media module and run diagnostics. To configure or run diagnostics on a trunk media module, click the Actions icon for the module.



CO Trunk List - Media Gateway (1)

This wizard automatically detected the following **3** trunk media module(s) in media gateway **1**. The icons in the **Actions** column allow you to (re)configure a CO Trunk media module, as well as view the trunk status and run diagnostics. See the **Actions** help information for futher detail. To refresh this page with the latest configuration values, click **Refresh**. After configuring the media module(s), click **Continue**.

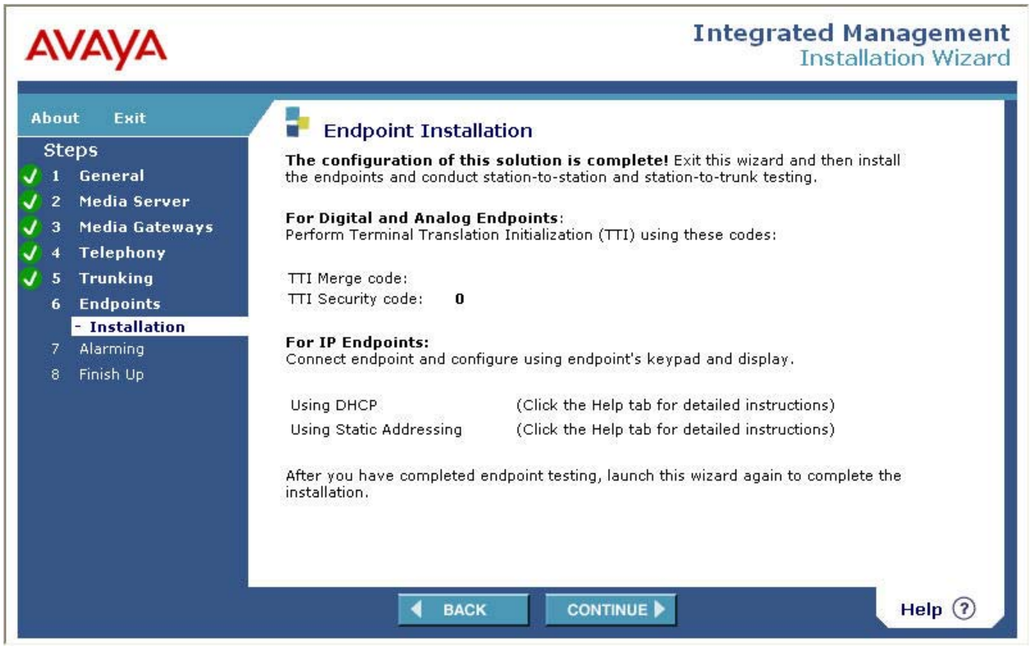
Configured	Location	Media Module	Trunk Usage	Sync Source	Actions
	001V2	MM710	ISDN-PRI T1	Primary	
	001V3	MM711	CO	N/A	
	001V4	MM720	ISDN-BRI		

Endpoint installation

51 For instructions on endpoint installation, do one of the following:

- Click **Continue** from the CO Trunk List screen, or
- Click **Endpoints** from the main menu.

The Endpoint Installation screen appears. You can access endpoint installation information from this screen.



Endpoint Installation

The configuration of this solution is complete! Exit this wizard and then install the endpoints and conduct station-to-station and station-to-trunk testing.

For Digital and Analog Endpoints:
Perform Terminal Translation Initialization (TTI) using these codes:

TTI Merge code:
TTI Security code: **0**

For IP Endpoints:
Connect endpoint and configure using endpoint's keypad and display.

Using DHCP (Click the Help tab for detailed instructions)
Using Static Addressing (Click the Help tab for detailed instructions)

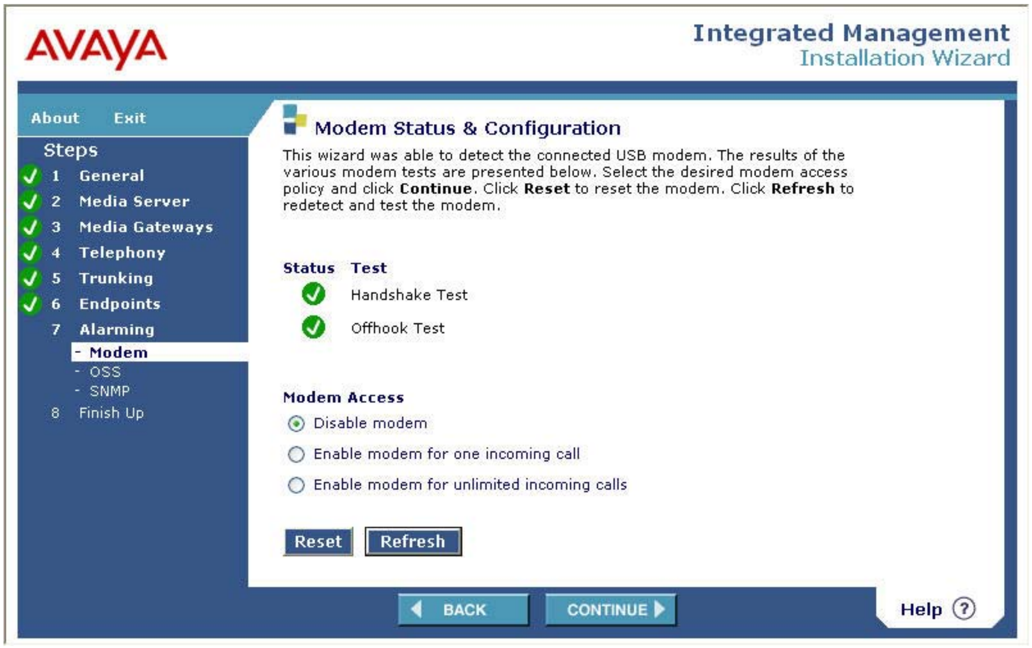
After you have completed endpoint testing, launch this wizard again to complete the installation.

Alarm configuration

52 To display modem status and configure alarms, click **Alarming** from the main menu. The Modem Status & Configuration screen appears. This screen detects any modem connected to the G350. The screen also displays the results of tests performed on the modem. You can perform the following actions from this screen:

- Click **Reset** to reset the modem.
- Click **Refresh** to re-detect and test the modem.

- Select the appropriate modem access policy in the **Modem Access** area and click **Continue**.



Modem Status & Configuration

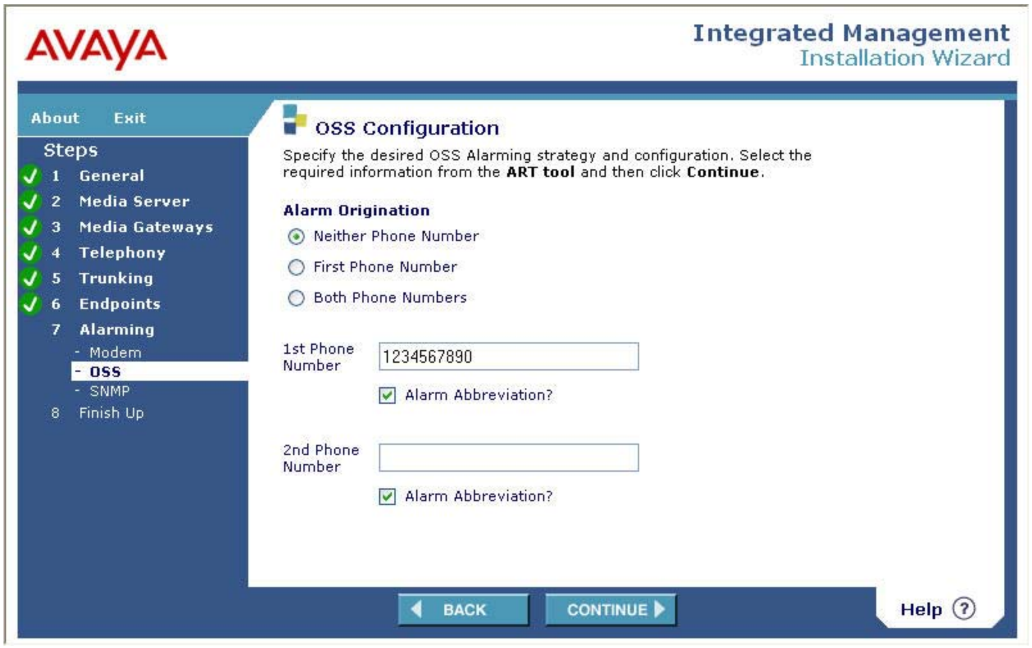
This wizard was able to detect the connected USB modem. The results of the various modem tests are presented below. Select the desired modem access policy and click **Continue**. Click **Reset** to reset the modem. Click **Refresh** to redetect and test the modem.

Status	Test
✓	Handshake Test
✓	Offhook Test

Modem Access

● Disable modem
○ Enable modem for one incoming call
○ Enable modem for unlimited incoming calls

53 Click **Continue**. The OSS Configuration screen appears. Enter the required information from the ART tool. For information on using the ART tool, see *Installation of the Avaya G350 Media Gateway*, 555-245-104.



OSS Configuration

Specify the desired OSS Alarming strategy and configuration. Select the required information from the **ART tool** and then click **Continue**.

Alarm Origination

● Neither Phone Number
○ First Phone Number
○ Both Phone Numbers

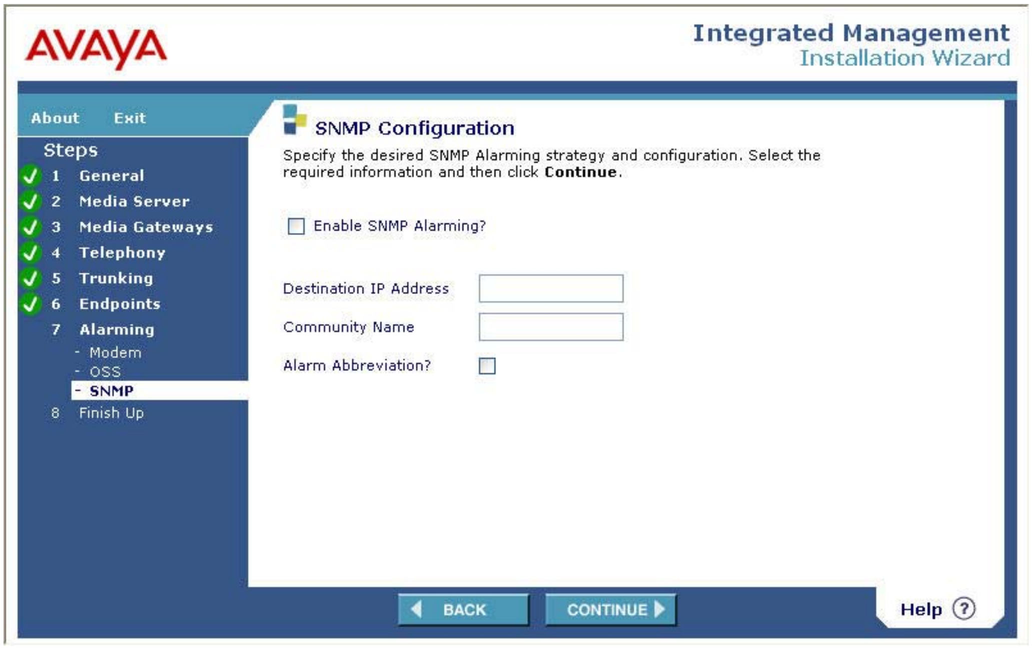
1st Phone Number: 1234567890

☑ Alarm Abbreviation?

2nd Phone Number:

☑ Alarm Abbreviation?

54 Click **Continue**. The SNMP Configuration screen appears. For information on SNMP configuration, see Configuring SNMP on page 97.



SNMP Configuration

Specify the desired SNMP Alarming strategy and configuration. Select the required information and then click **Continue**.

□ Enable SNMP Alarming?

Destination IP Address

Community Name

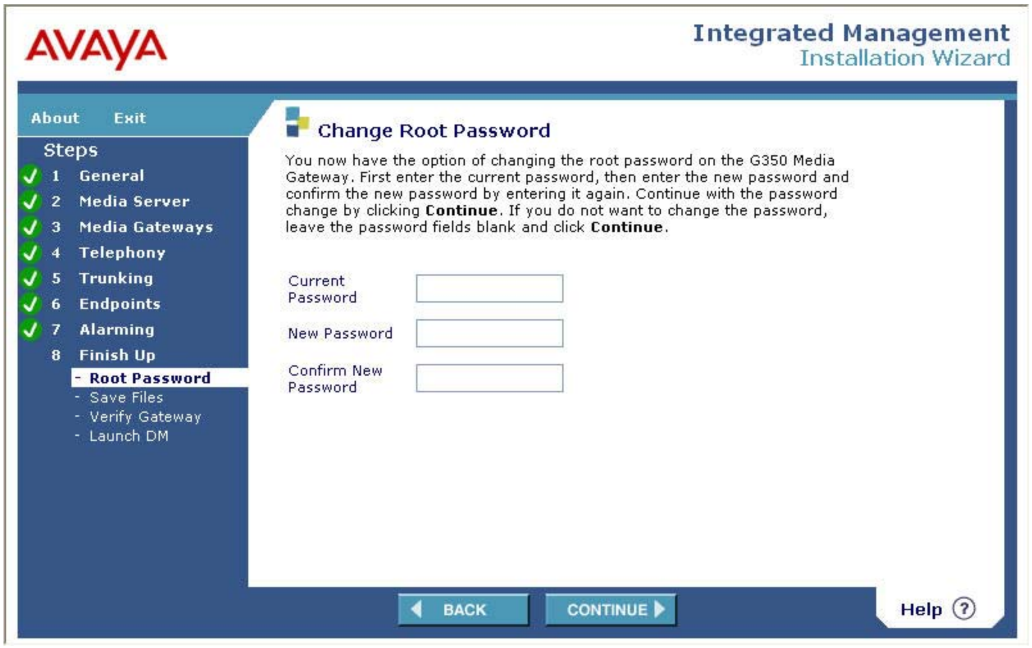
Alarm Abbreviation? □

Password and final screens

55 To change your password (optional) and complete the installation, do one of the following:

- Click **Continue** from the SNMP Configuration screen, or
- Click **Finish Up** from the main menu.

The Change Root Password screen appears. This screen allows you to change the root password on the G350.



Change Root Password

You now have the option of changing the root password on the G350 Media Gateway. First enter the current password, then enter the new password and confirm the new password by entering it again. Continue with the password change by clicking **Continue**. If you do not want to change the password, leave the password fields blank and click **Continue**.

Current Password	
New Password	
Confirm New Password	

56 Click **Continue**. The Finish Up screen appears. This screen allows you to save the installation log file to your laptop. To save the installation log file:

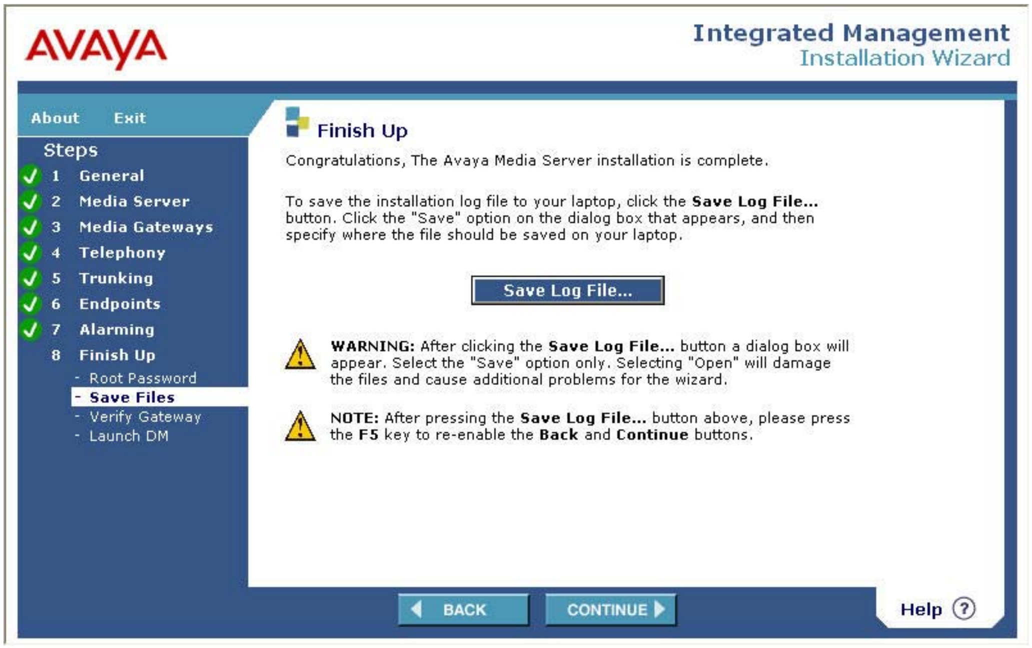
a Click **Save Log File**. A dialog box appears.

b Click **Save**.

WARNING:

Do not click **Open**. Clicking **Open** will damage the log file and may cause other problems to the Avaya IW.

c Press **<F5>** to restore the **Back** and **Continue** buttons to the Finish Up screen.



Finish Up

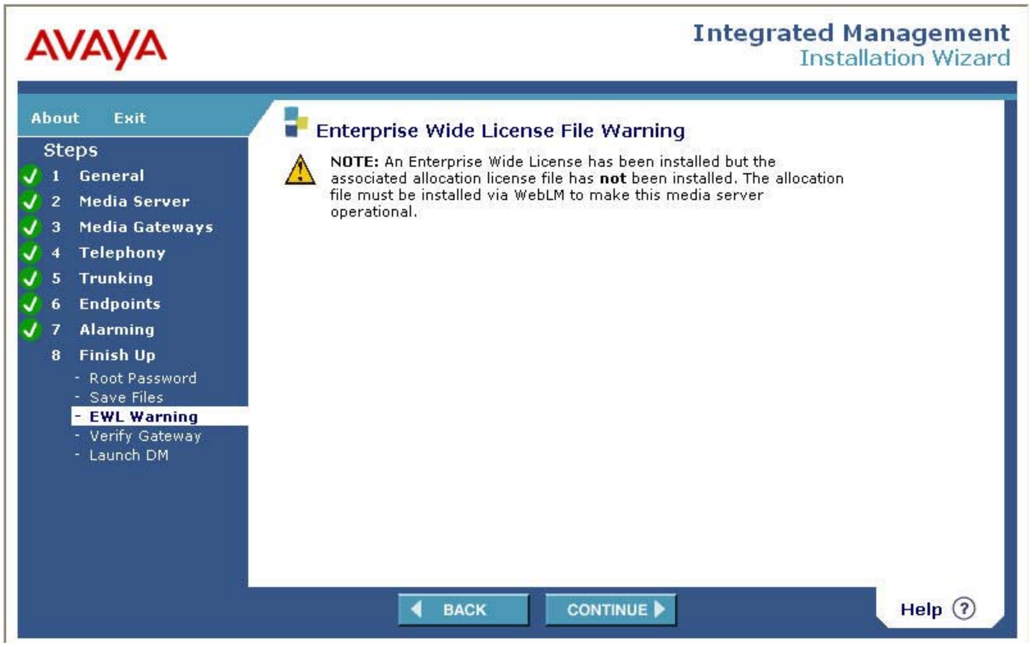
Congratulations, The Avaya Media Server installation is complete.

To save the installation log file to your laptop, click the **Save Log File...** button. Click the "Save" option on the dialog box that appears, and then specify where the file should be saved on your laptop.

⚠ **WARNING:** After clicking the **Save Log File...** button a dialog box will appear. Select the "Save" option only. Selecting "Open" will damage the files and cause additional problems for the wizard.

⚠ **NOTE:** After pressing the **Save Log File...** button above, please press the **F5** key to re-enable the **Back** and **Continue** buttons.

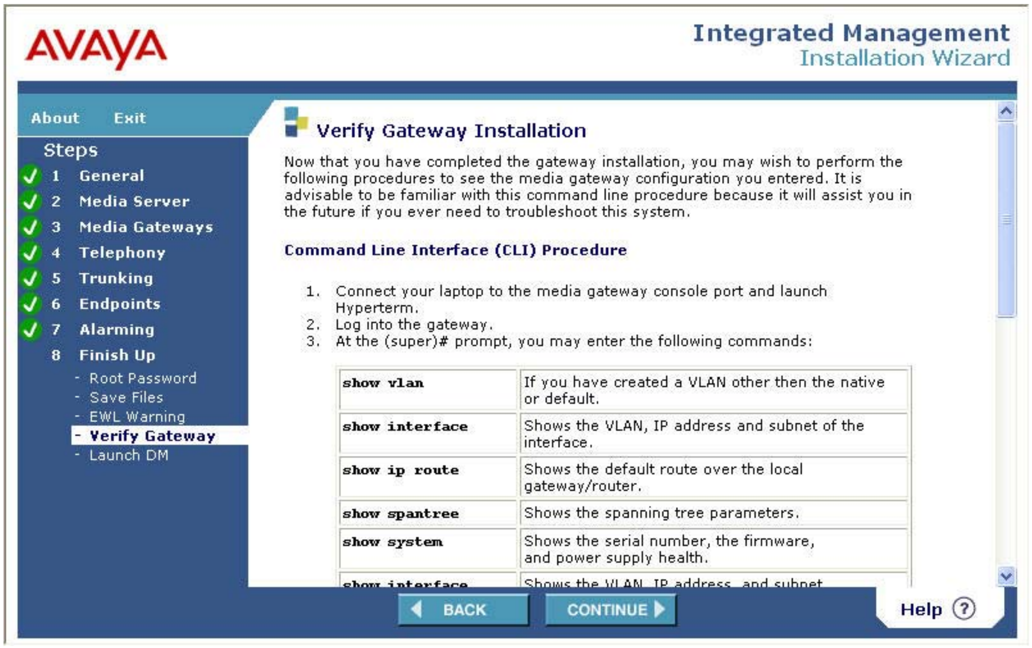
57 Click **Continue**. If you have not installed an allocation license file, a warning appears reminding you to install this file.



Enterprise Wide License File Warning

⚠ **NOTE:** An Enterprise Wide License has been installed but the associated allocation license file has **not** been installed. The allocation file must be installed via WebLM to make this media server operational.

58 Click **Continue**. The Verify Gateway Installation screen appears. This screen displays a list of CLI commands that you can use to verify the G350 configuration. The following figure shows a portion of the Verify Gateway Installation screen.



Verify Gateway Installation

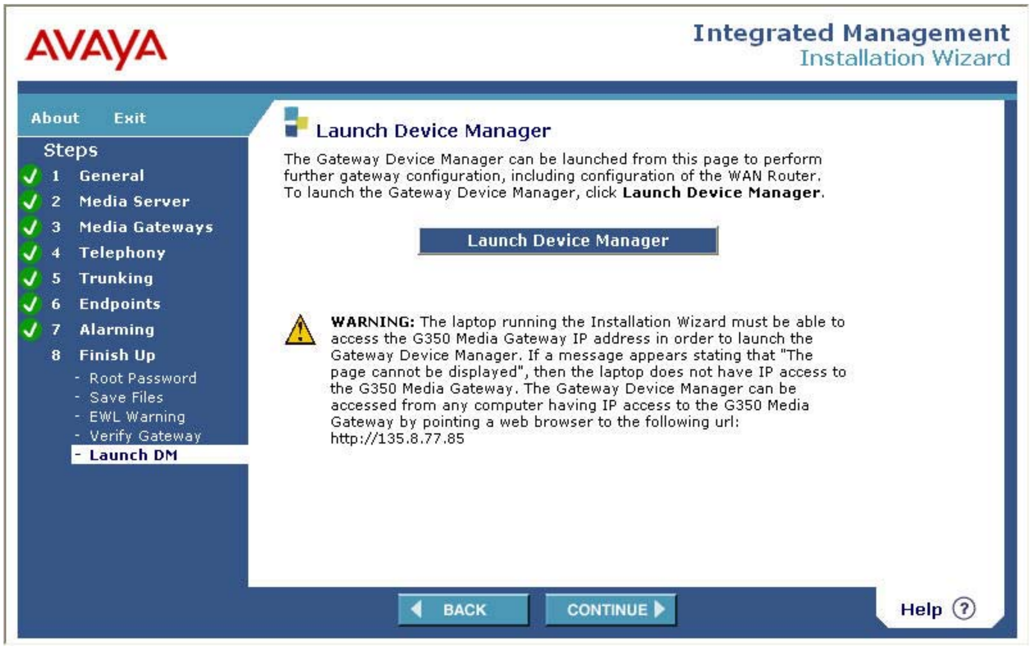
Now that you have completed the gateway installation, you may wish to perform the following procedures to see the media gateway configuration you entered. It is advisable to be familiar with this command line procedure because it will assist you in the future if you ever need to troubleshoot this system.

Command Line Interface (CLI) Procedure

1. Connect your laptop to the media gateway console port and launch Hyperterm.
2. Log into the gateway.
3. At the (super)# prompt, you may enter the following commands:

show vlan	If you have created a VLAN other then the native or default.
show interface	Shows the VLAN, IP address and subnet of the interface.
show ip route	Shows the default route over the local gateway/router.
show spantree	Shows the spanning tree parameters.
show system	Shows the serial number, the firmware, and power supply health.
show interface	Shows the VLAN, IP address, and subnet

59 Click **Continue**. The Launch Device Manager screen appears. This screen allows you to launch the Gateway Device Manager, an application that allows you to configure the WAN Router and perform other advanced configuration tasks.

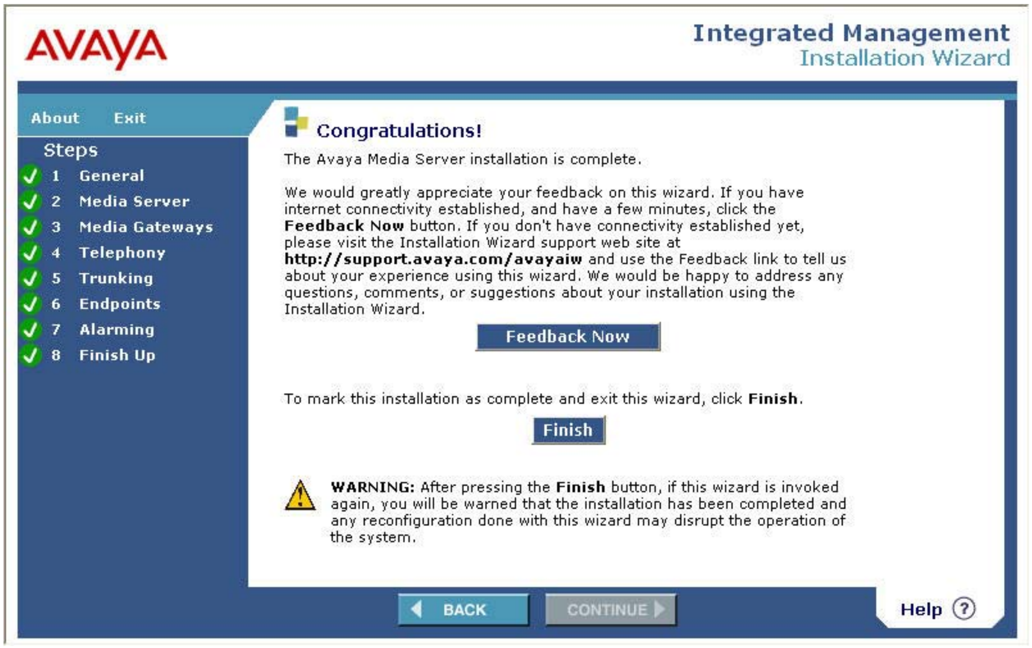


Launch Device Manager

The Gateway Device Manager can be launched from this page to perform further gateway configuration, including configuration of the WAN Router. To launch the Gateway Device Manager, click **Launch Device Manager**.

⚠ **WARNING:** The laptop running the Installation Wizard must be able to access the G350 Media Gateway IP address in order to launch the Gateway Device Manager. If a message appears stating that "The page cannot be displayed", then the laptop does not have IP access to the G350 Media Gateway. The Gateway Device Manager can be accessed from any computer having IP access to the G350 Media Gateway by pointing a web browser to the following url: http://135.8.77.85

60 Click **Continue**. The Congratulations! screen appears to inform you that the installation is complete. To exit the Avaya IW, click **Finish**.



Congratulations!

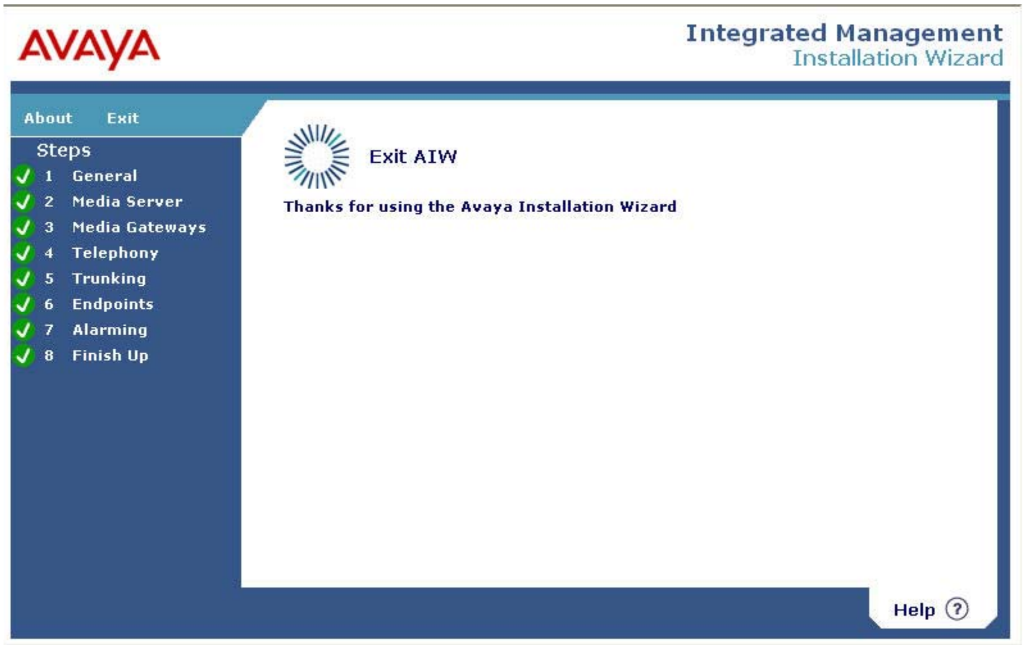
The Avaya Media Server installation is complete.

We would greatly appreciate your feedback on this wizard. If you have internet connectivity established, and have a few minutes, click the **Feedback Now** button. If you don't have connectivity established yet, please visit the Installation Wizard support web site at **http://support.avaya.com/avayaiw** and use the Feedback link to tell us about your experience using this wizard. We would be happy to address any questions, comments, or suggestions about your installation using the Installation Wizard.

To mark this installation as complete and exit this wizard, click **Finish**.

WARNING: After pressing the **Finish** button, if this wizard is invoked again, you will be warned that the installation has been completed and any reconfiguration done with this wizard may disrupt the operation of the system.

61 The Exit AIW screen appears.



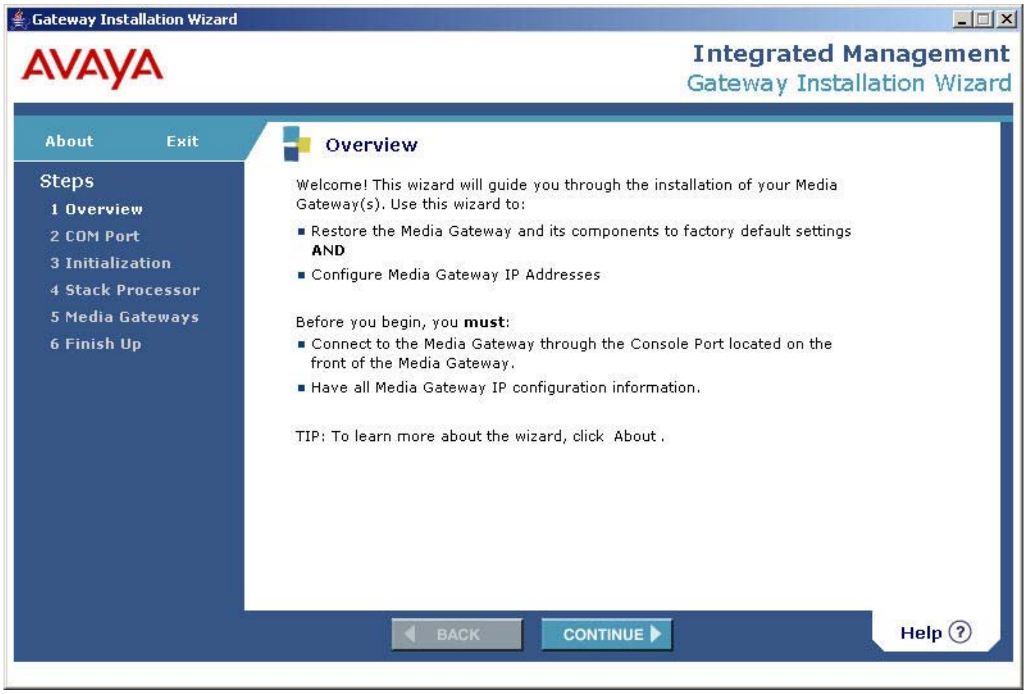
Exit AIW

Thanks for using the Avaya Installation Wizard

C Configuring the G350 using the GIW

This chapter explains how to configure the Avaya G350 Media Gateway using the Gateway Installation Wizard (GIW). The GIW is an automated tool that allows you to perform a streamlined installation and configuration of a standalone G350. You can use the GIW to perform initial configuration of the G350 and to upgrade software and firmware. For instructions on accessing the GIW, see Accessing GIW on page 30.

1 When you access the GIW, the first screen that appears is the Overview screen.



Overview

Welcome! This wizard will guide you through the installation of your Media Gateway(s). Use this wizard to:

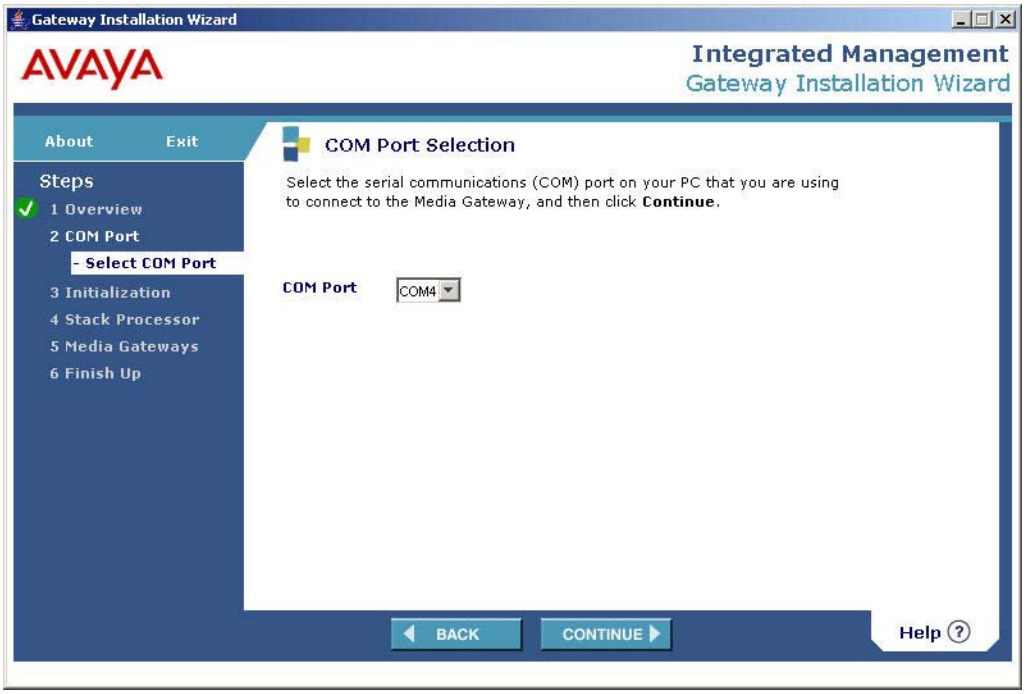
- Restore the Media Gateway and its components to factory default settings **AND**
- Configure Media Gateway IP Addresses

Before you begin, you **must**:

- Connect to the Media Gateway through the Console Port located on the front of the Media Gateway.
- Have all Media Gateway IP configuration information.

TIP: To learn more about the wizard, click About .

2 Click **Continue**. The COM Port Selection screen appears.



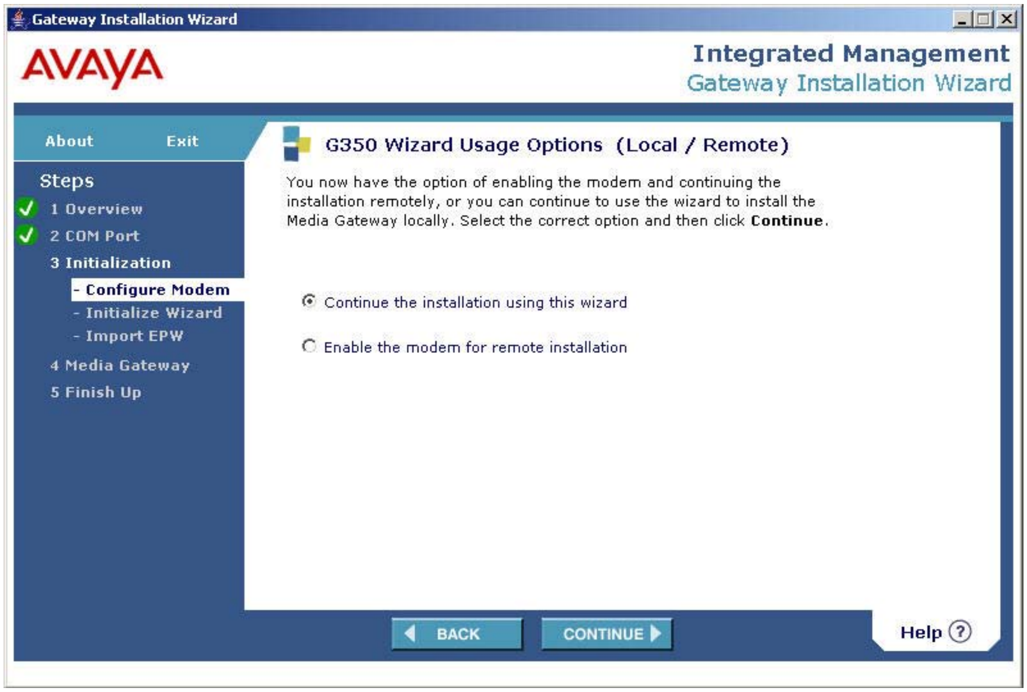
COM Port Selection

Select the serial communications (COM) port on your PC that you are using to connect to the Media Gateway, and then click **Continue**.

COM Port: COM4

3 Select the COM port on the laptop that you are using the connect to the G350.

4 Click **Continue**. The G350 Wizard Usage Options screen appears.



G350 Wizard Usage Options (Local / Remote)

You now have the option of enabling the modem and continuing the installation remotely, or you can continue to use the wizard to install the Media Gateway locally. Select the correct option and then click **Continue**.

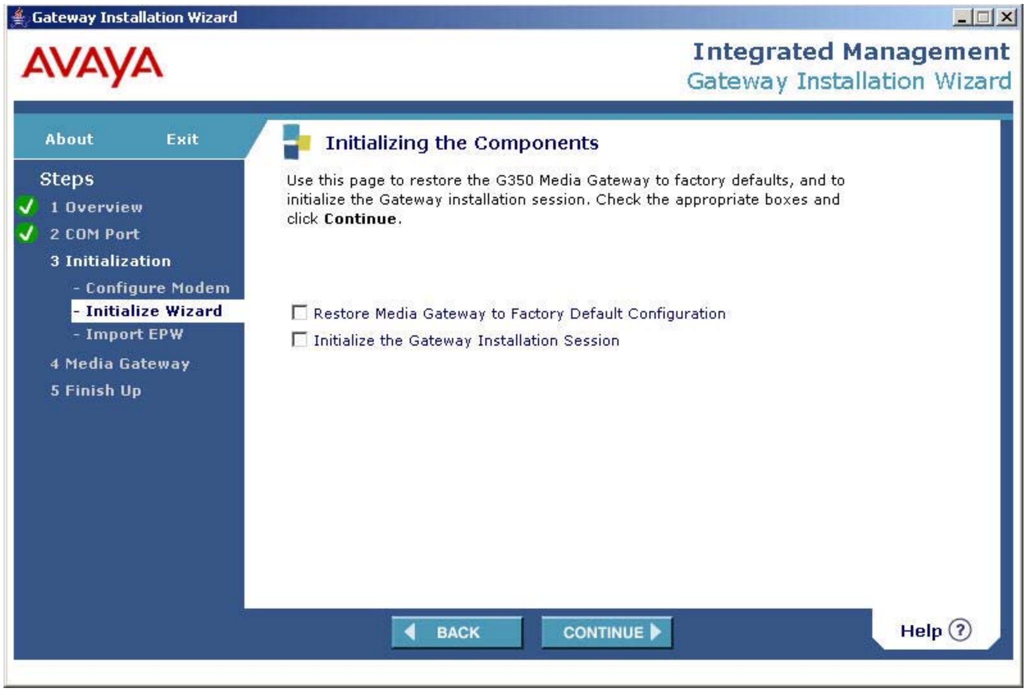
● Continue the installation using this wizard

○ Enable the modem for remote installation

5 Select one of the following options:

- To configure the G350 via remote configuration, select **Enable the modem for remote installation**, then click **Continue**. The Connect Modem screen appears.

- If you wish to continue the configuration using GIW, select **Continue the installation using this wizard**, then click **Continue**. The Initializing the Components screen appears.



Initializing the Components

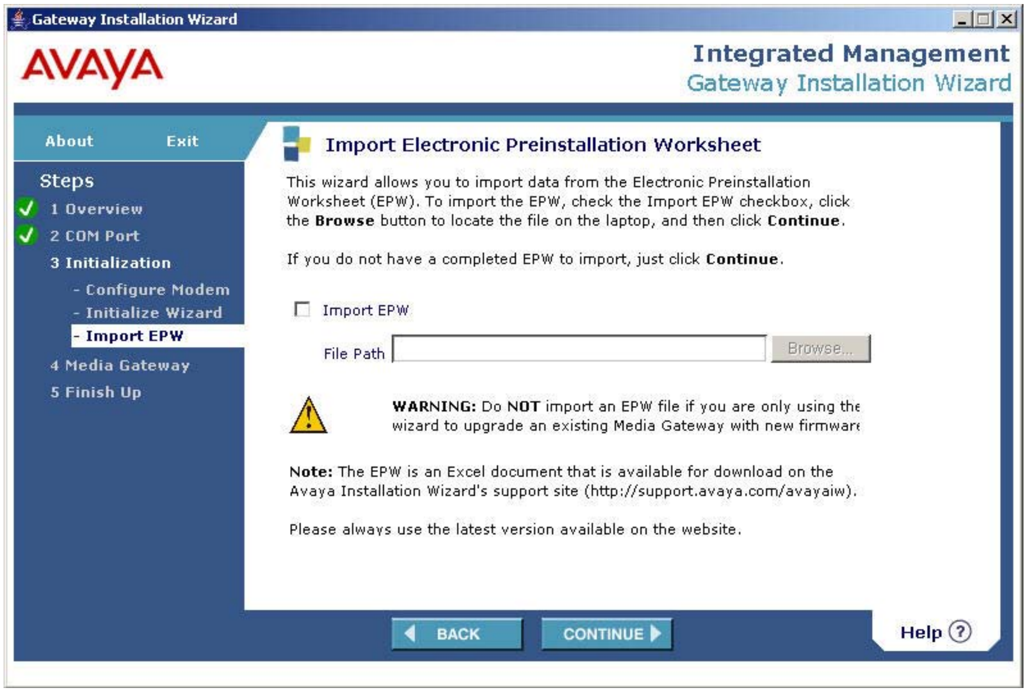
Use this page to restore the G350 Media Gateway to factory defaults, and to initialize the Gateway installation session. Check the appropriate boxes and click **Continue**.

□ Restore Media Gateway to Factory Default Configuration

□ Initialize the Gateway Installation Session

6 Select **Initialize the Gateway Installation Session**.

7 Click **Continue**. The Import Electronic Preinstallation Worksheet screen appears:



Import Electronic Preinstallation Worksheet

This wizard allows you to import data from the Electronic Preinstallation Worksheet (EPW). To import the EPW, check the Import EPW checkbox, click the **Browse** button to locate the file on the laptop, and then click **Continue**.

If you do not have a completed EPW to import, just click **Continue**.

□ Import EPW

File Path

WARNING: Do **NOT** import an EPW file if you are only using the wizard to upgrade an existing Media Gateway with new firmware

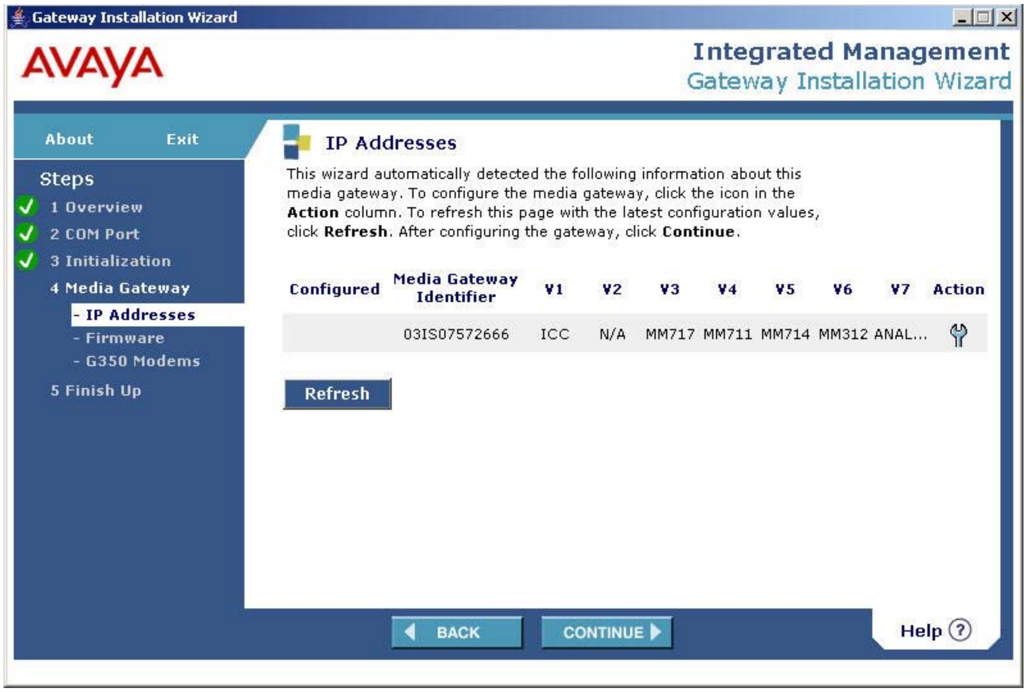
Note: The EPW is an Excel document that is available for download on the Avaya Installation Wizard's support site (http://support.avaya.com/avayaiw).

Please always use the latest version available on the website.

8 If you have an EPW on your laptop, select **Import EPW**. For information on the EPW, see *Installation of the Avaya G350 Media Gateway*, 555-245-104.

9 Browse to the EPW file on your laptop. Any values that are included in the EPW will appear as default values from now on as you move through this wizard.

10 Click **Continue**. The IP Addresses screen appears. The IP Addresses screen displays automatically detected information about the G350, such as what media modules are installed in the media modules slots.



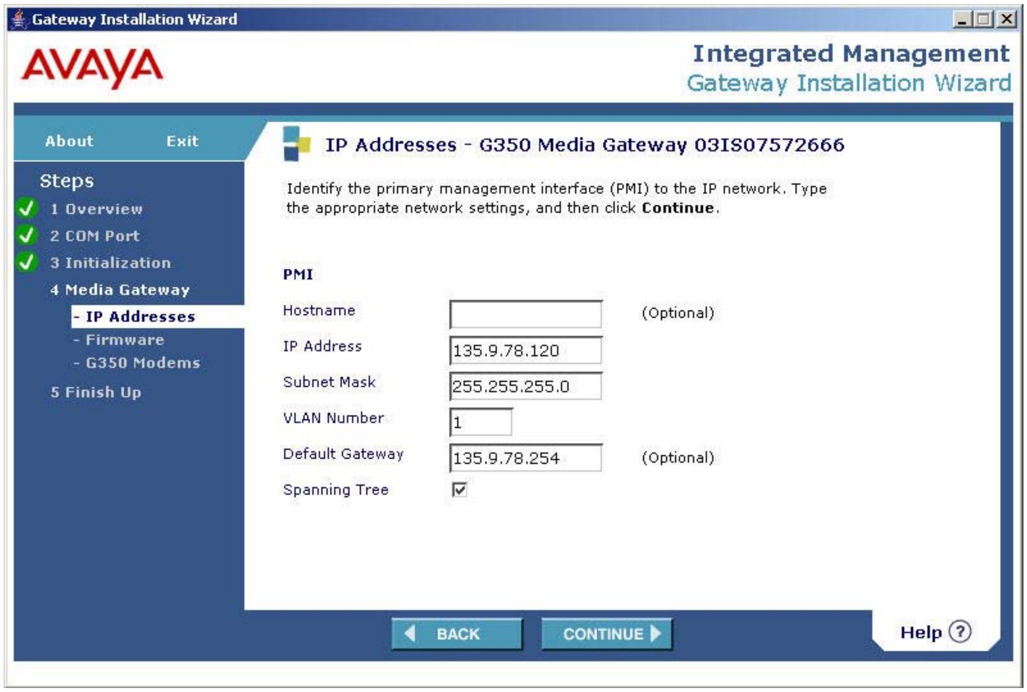
IP Addresses

This wizard automatically detected the following information about this media gateway. To configure the media gateway, click the icon in the **Action** column. To refresh this page with the latest configuration values, click **Refresh**. After configuring the gateway, click **Continue**.

Configured	Media Gateway Identifier	V1	V2	V3	V4	V5	V6	V7	Action
	03IS07572666	ICC	N/A	MM717	MM711	MM714	MM312	ANAL...	🔧

Refresh

11 Click 🔧 in the Action column. The PMI screen appears. In the PMI screen, specify the details of the Primary Management Interface (PMI) for the G350. See Configuring the Primary Management Interface (PMI) on page 40.



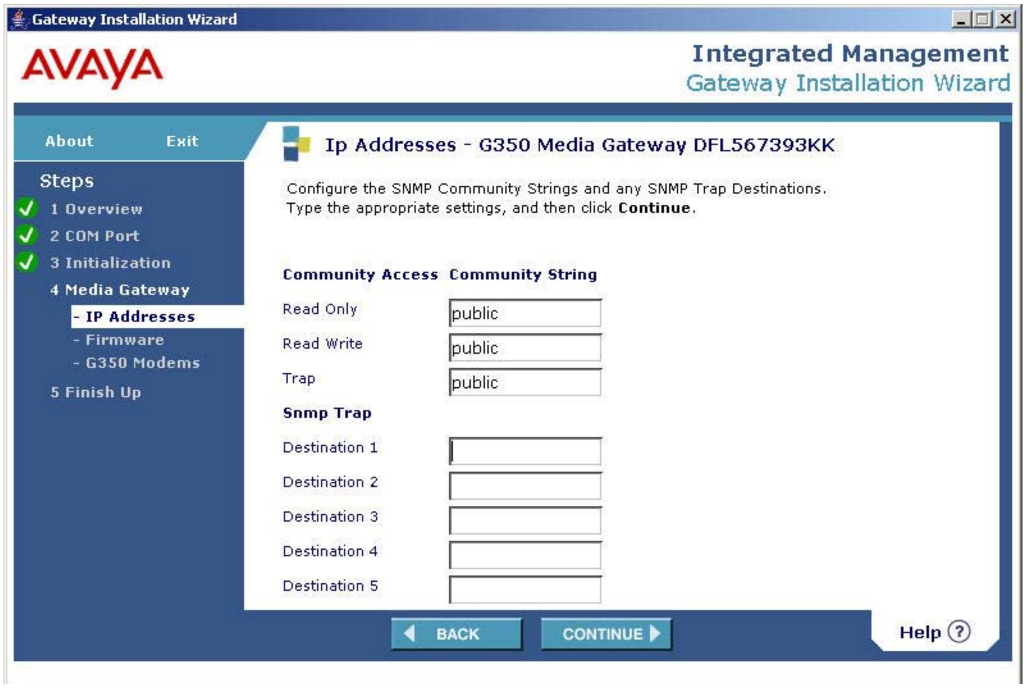
IP Addresses - G350 Media Gateway 03IS07572666

Identify the primary management interface (PMI) to the IP network. Type the appropriate network settings, and then click **Continue**.

PMI

Hostname		(Optional)
IP Address	135.9.78.120	
Subnet Mask	255.255.255.0	
VLAN Number	1	
Default Gateway	135.9.78.254	(Optional)
Spanning Tree	☑	

12 Click **Continue**. The SNMP screen appears. In the SNMP screen, specify SNMP community strings and trap destinations. SNMP traps will be sent to all IP addresses entered in the destination fields. For instructions on configuring SNMP, see Configuring SNMP on page 97.



Ip Addresses - G350 Media Gateway DFL567393KK

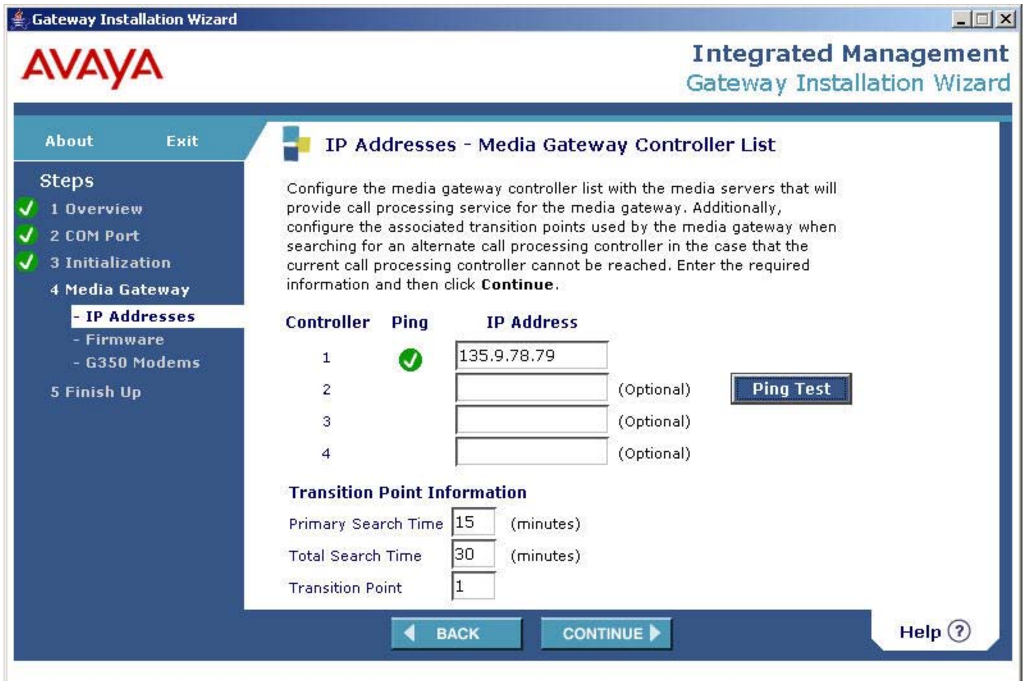
Configure the SNMP Community Strings and any SNMP Trap Destinations. Type the appropriate settings, and then click **Continue**.

Community Access	Community String
Read Only	public
Read Write	public
Trap	public

Snmp Trap

Destination 1	
Destination 2	
Destination 3	
Destination 4	
Destination 5	

13 Click **Continue**. The Media Gateway Controller List screen appears. In the Media Gateway Controller List screen, specify the IP address of the primary Media Gateway Controller (MGC). You can also specify the IP addresses of up to three additional MGCs (optional). For instructions on MGC configuration, see Configuring the Media Gateway Controller (MGC) on page 41.



IP Addresses - Media Gateway Controller List

Configure the media gateway controller list with the media servers that will provide call processing service for the media gateway. Additionally, configure the associated transition points used by the media gateway when searching for an alternate call processing controller in the case that the current call processing controller cannot be reached. Enter the required information and then click **Continue**.

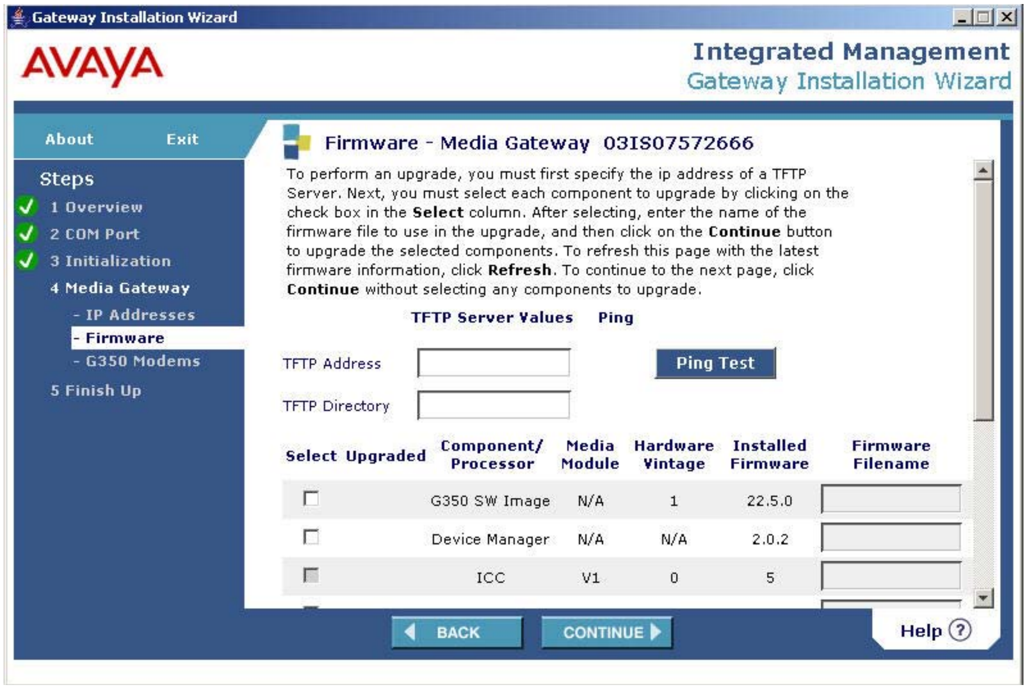
Controller	Ping	IP Address	
1	✓	135.9.78.79	
2			(Optional)
3			(Optional)
4			(Optional)

Transition Point Information

Primary Search Time	15	(minutes)
Total Search Time	30	(minutes)
Transition Point	1	

14 Click **Ping Test** to test the accessibility of each MGC.

15 Click **Continue**. The Firmware screen appears:



Firmware - Media Gateway 03IS07572666

To perform an upgrade, you must first specify the ip address of a TFTP Server. Next, you must select each component to upgrade by clicking on the check box in the **Select** column. After selecting, enter the name of the firmware file to use in the upgrade, and then click on the **Continue** button to upgrade the selected components. To refresh this page with the latest firmware information, click **Refresh**. To continue to the next page, click **Continue** without selecting any components to upgrade.

TFTP Server Values Ping

TFTP Address [ ] Ping Test

TFTP Directory [ ]

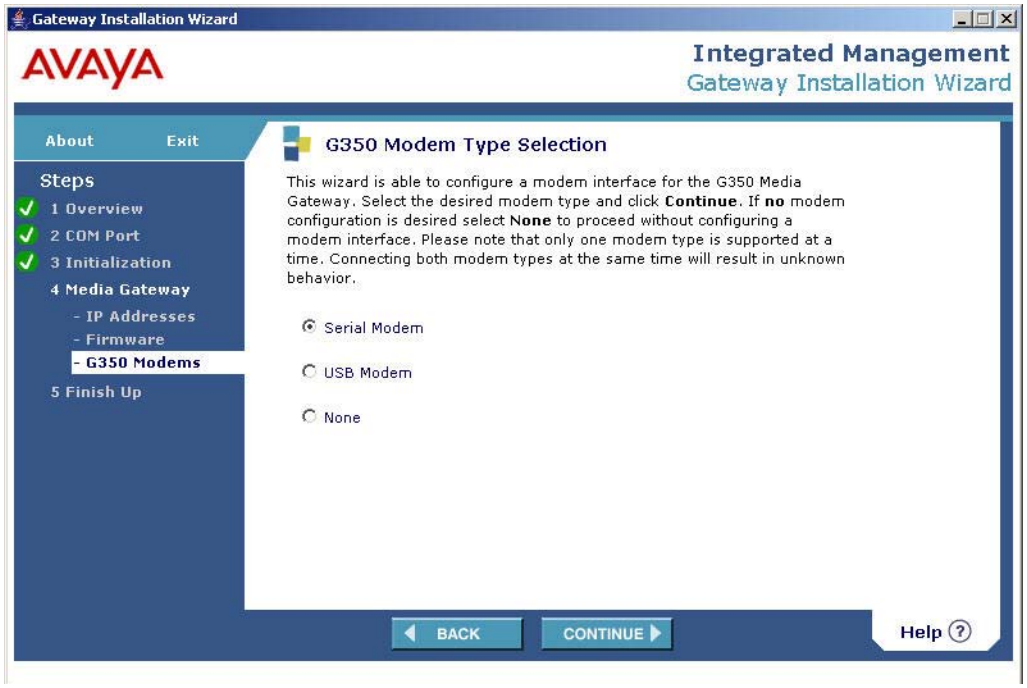
Select	Upgraded	Component/ Processor	Media Module	Hardware Vintage	Installed Firmware	Firmware Filename
□		G350 SW Image	N/A	1	22.5.0	
□		Device Manager	N/A	N/A	2.0.2	
□		ICC	V1	0	5	

16 In the **TFTP Directory** field, enter the name of the directory on the TFTP server in which the upgrade files are located.

17 In the table, select the **Select** box for all firmware components you want to upgrade. The current version of each component is listed to help you confirm the need for upgrade.

18 Enter the filename of each firmware upgrade file you want to install in each line of the table where you selected the **Select** box.

19 Click **Continue**. The firmware is upgraded and the G350 Modem Type Selection screen appears. Select the modem type you want to use. For more information on using a modem with the G350, see Configuring the G350 for modem use on page 67.



G350 Modem Type Selection

This wizard is able to configure a modem interface for the G350 Media Gateway. Select the desired modem type and click **Continue**. If **no** modem configuration is desired select **None** to proceed without configuring a modem interface. Please note that only one modem type is supported at a time. Connecting both modem types at the same time will result in unknown behavior.

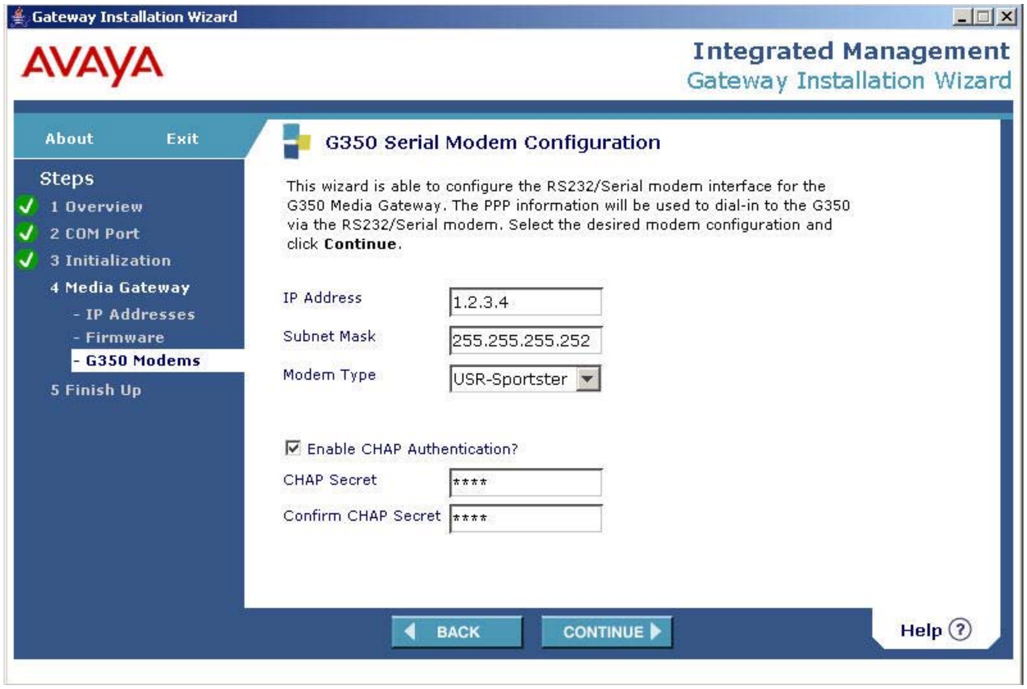
● Serial Modem

○ USB Modem

○ None

20 Click **Continue**. If you selected **Serial Modem**, the G350 Serial Modem Configuration screen appears. If you selected **USB Modem**, the G350 USB Modem Configuration screen appears. If you selected **None**, the Change Root Password screen appears.

21 If you selected **Serial Modem**, enter the required information in the G350 Serial Modem Configuration screen, then click **Continue**.



G350 Serial Modem Configuration

This wizard is able to configure the RS232/Serial modem interface for the G350 Media Gateway. The PPP information will be used to dial-in to the G350 via the RS232/Serial modem. Select the desired modem configuration and click **Continue**.

IP Address: 1.2.3.4

Subnet Mask: 255.255.255.252

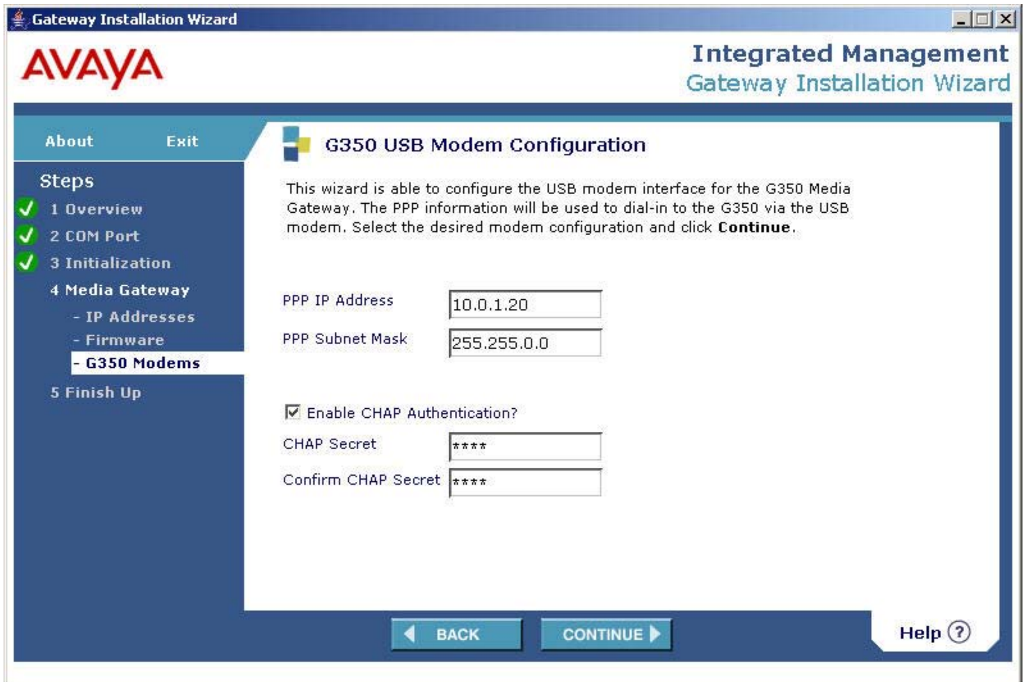
Modem Type: USR-Sportster

☑ Enable CHAP Authentication?

CHAP Secret: ****

Confirm CHAP Secret: ****

22 If you selected **USB Modem**, enter the required information in the G350 USB Modem Configuration screen, then click **Continue**.



G350 USB Modem Configuration

This wizard is able to configure the USB modem interface for the G350 Media Gateway. The PPP information will be used to dial-in to the G350 via the USB modem. Select the desired modem configuration and click **Continue**.

PPP IP Address 10.0.1.20

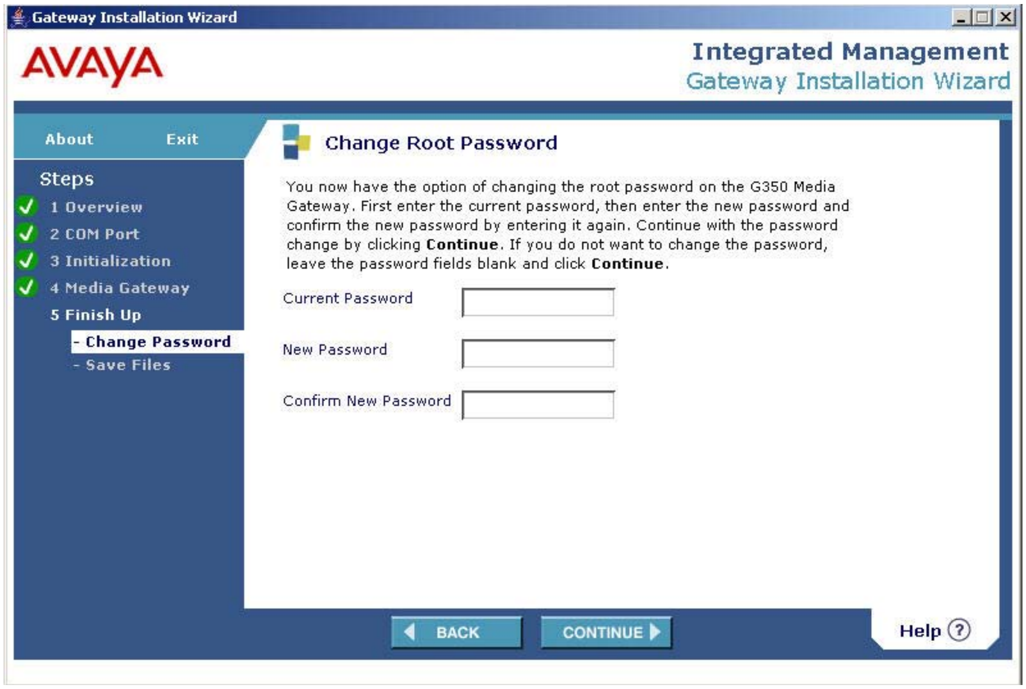
PPP Subnet Mask 255.255.0.0

☑ Enable CHAP Authentication?

CHAP Secret ****

Confirm CHAP Secret ****

23 Click **Continue**. The Change Root Password screen appears. This screen allows you to change the root password on the G350.



Change Root Password

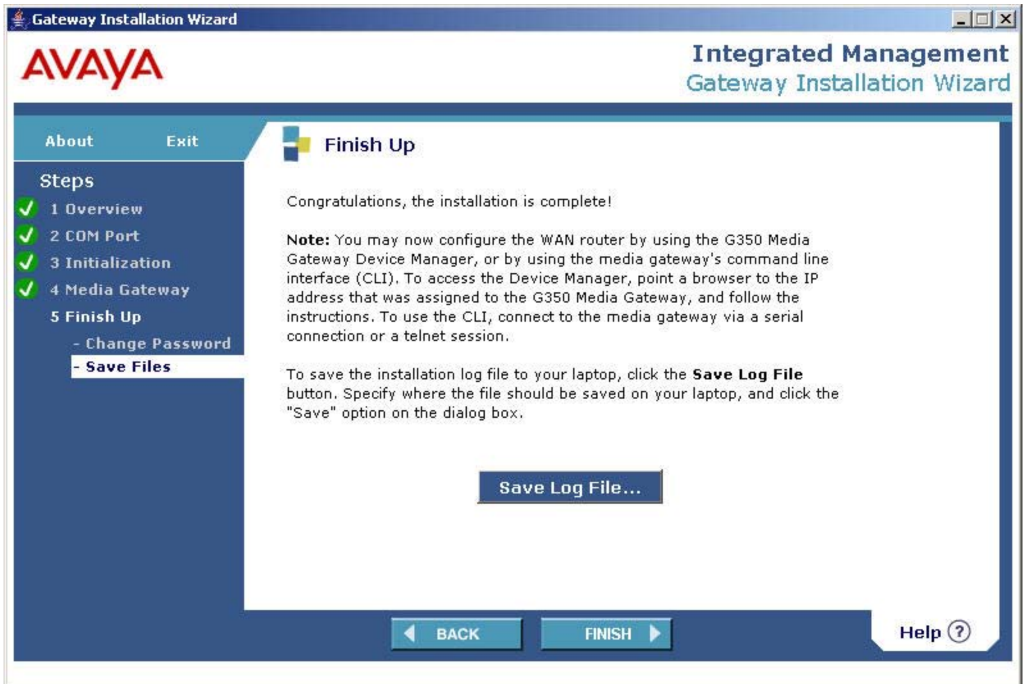
You now have the option of changing the root password on the G350 Media Gateway. First enter the current password, then enter the new password and confirm the new password by entering it again. Continue with the password change by clicking **Continue**. If you do not want to change the password, leave the password fields blank and click **Continue**.

Current Password

New Password

Confirm New Password

24 Click **Continue**. The Finish Up screen appears:



Finish Up

Congratulations, the installation is complete!

Note: You may now configure the WAN router by using the G350 Media Gateway Device Manager, or by using the media gateway's command line interface (CLI). To access the Device Manager, point a browser to the IP address that was assigned to the G350 Media Gateway, and follow the instructions. To use the CLI, connect to the media gateway via a serial connection or a telnet session.

To save the installation log file to your laptop, click the **Save Log File** button. Specify where the file should be saved on your laptop, and click the "Save" option on the dialog box.

25 Click **Continue**. The Finish Up screen appears. This screen allows you to save the installation log file to your laptop. To save the installation log file:

- **a** Click **Save Log File**. A dialog box appears.
- **b** Specify the location on your laptop in which in want to save the log file.
- **c** Click **Save**.

26 You have completed the GIW configuration process. Further configuration tasks, as described in this screen, can now be performed either remotely, via a modem that you enabled with GIW, or locally.

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