VoIP Operating System (VOS) for EdgeMarc

User Manual

Version 3.0
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Release Date:
9/2/10
## Contents

About this Guide ................................................................. xi
Typographic Conventions ................................................. xii

1 **Introduction**
   The VoIP Operating System for EdgeMarc .......................... 1
   Features ........................................................................ 1
   User Interface Components ............................................. 2
   Accessing the User Interface ........................................... 2

2 **Network Connectivity**
   Configuration Overview ................................................. 3
   Configuration for IP Centrex Applications .......................... 4
   Configuration for Station Side IP PBX Applications .............. 6
   System Configuration .................................................... 8
   Configuring WAN Settings ............................................. 8
   Configuring LAN Settings .............................................. 8
   Configuring VLANs ..................................................... 9
   Configuring Ethernet Interface Link Settings ...................... 10
   Configuring Subinterfaces ........................................... 11
   Configuring T1 Settings .............................................. 12

3 **DHCP Services**
   DHCP Relay ............................................................... 17
   DHCP Server ............................................................ 18
   DHCP Leases ........................................................... 19
   Configuring DHCP Server .......................................... 19

4 **Firewall**
   Overview ....................................................................... 21
   Configuring the Standard Firewall ................................... 22
   Configuring Advanced Firewall Settings .......................... 22
     Custom Rules .......................................................... 23
     Remote Management ................................................. 24
   Configuring Static Forwarding ...................................... 24

5 **NAT**
   Overview ....................................................................... 27
   Dynamic and Static NAT ............................................... 27
NAT and Firewall Options ........................................ 28
Configuring NAT for the Standard Firewall...................... 28
Configuring NAT for the Advanced Firewall...................... 29
Configuring Static NAT ........................................ 29

6 Advanced Data Capabilities
Configuring Certificates ........................................ 31
Configuring Dynamic DNS ....................................... 31
Configuring a DMZ Using Proxy ARP and Routed Subnets .... 32
Proxy ARP .................................................... 32
Configuring RADIUS ........................................ 33
Configuring TACACS .......................................... 34
EdgeMarc Support for TACACS+ Authentication ............... 34
TACACS+ Authentication Modes ................................ 34
EdgeMarc Support for TACACS+ Accounting ................... 35
TACACS+ and RADIUS ....................................... 36
Configuring TACACS+ Settings ................................ 36
Static Routes .................................................. 37

7 Management
Trusted Management Addresses ................................ 39
System Time ...................................................... 40
Network Information ............................................ 40
Remote Management .......................................... 41
SNMP ............................................................. 41
System message logging (syslog) ................................ 44
System Information ............................................. 45
Read-only Users ................................................ 45
User Commands ................................................ 46
Message of the Day ............................................. 46

8 VPNs
Overview and Examples .......................................... 49
Non-VLAN switches, one WAN subnet ......................... 49
Single LAN Ethernet and Separate PC and Phone Subnets ... 50
Single LAN Ethernet and Same PC and Phone Subnet ....... 50
Non-VLAN Edgewater Appliance, Non-VLAN Switches, One WAN Subnet ........................................... 51
VLAN or Non-VLAN Edgewater Appliance, Non-VLAN Switches, Two WAN Switches ......................... 51
Non-VLAN EdgeMarc Appliance ................................ 52
<table>
<thead>
<tr>
<th>Contents</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>VLAN-capable Ethernet switch, VLAN or Non-VLAN Edgewater Appliance</td>
<td>52</td>
</tr>
<tr>
<td>Non-VLAN EdgeMarc Appliance</td>
<td>52</td>
</tr>
<tr>
<td>Third Party Firewall in front of Edgewater Appliance</td>
<td>53</td>
</tr>
<tr>
<td>Dynamic WAN IP Address Assignment</td>
<td>53</td>
</tr>
<tr>
<td>Configuring VPN Settings</td>
<td>54</td>
</tr>
<tr>
<td><strong>9 Voice Over IP</strong></td>
<td></td>
</tr>
<tr>
<td>Traffic Management</td>
<td>57</td>
</tr>
<tr>
<td>Traffic Shaping</td>
<td>58</td>
</tr>
<tr>
<td>Advanced Traffic Shaping</td>
<td>58</td>
</tr>
<tr>
<td>ToS Byte Setting</td>
<td>59</td>
</tr>
<tr>
<td>Traffic Marking</td>
<td>59</td>
</tr>
<tr>
<td>Call Admission Control</td>
<td>60</td>
</tr>
<tr>
<td>Traffic Management in the EdgeMarc Device</td>
<td>61</td>
</tr>
<tr>
<td>Priority IP Addresses</td>
<td>63</td>
</tr>
<tr>
<td>VoIP ALG</td>
<td>63</td>
</tr>
<tr>
<td>SIP Settings</td>
<td>64</td>
</tr>
<tr>
<td>SIP Trunking</td>
<td>64</td>
</tr>
<tr>
<td>H.323 Configuration</td>
<td>67</td>
</tr>
<tr>
<td>H.323 Activity</td>
<td>67</td>
</tr>
<tr>
<td>H.323 Alias Manipulation</td>
<td>68</td>
</tr>
<tr>
<td>H.323 Neighboring</td>
<td>68</td>
</tr>
<tr>
<td>Regular Expressions</td>
<td>69</td>
</tr>
<tr>
<td>MGCP Settings</td>
<td>70</td>
</tr>
<tr>
<td>VoIP Subnet Routing</td>
<td>70</td>
</tr>
<tr>
<td><strong>10 Configuring FXS and FXO Ports</strong></td>
<td></td>
</tr>
<tr>
<td>Overview</td>
<td>73</td>
</tr>
<tr>
<td>Survivability</td>
<td>74</td>
</tr>
<tr>
<td>Session Initiation Protocol (SIP) Trunking</td>
<td>74</td>
</tr>
<tr>
<td>Two-Stage Dialing for Inbound IP and PSTN Calls</td>
<td>74</td>
</tr>
<tr>
<td>Transmit/Receive Gain</td>
<td>75</td>
</tr>
<tr>
<td>Priority Calling Support</td>
<td>75</td>
</tr>
<tr>
<td>FXS Hunt Group</td>
<td>76</td>
</tr>
<tr>
<td>Ad-Hoc Conferencing</td>
<td>76</td>
</tr>
<tr>
<td>Example Configurations</td>
<td>77</td>
</tr>
<tr>
<td>IP Centrex Configuration</td>
<td>77</td>
</tr>
<tr>
<td>SIP Trunking of Analog Ports Configuration</td>
<td>79</td>
</tr>
<tr>
<td>SIP Trunking of IP PBX Configuration</td>
<td>79</td>
</tr>
<tr>
<td>Configuring FXO Ports</td>
<td>80</td>
</tr>
<tr>
<td>Configuring T38 and G.711 Fax</td>
<td>82</td>
</tr>
</tbody>
</table>
11 Wireless
Overview ................................................................. 93
Security ................................................................. 93
Service Set Identifiers .............................................. 94
Channels and Power Levels ....................................... 94
Wireless Status ...................................................... 95
Configuring Wireless Settings ................................... 95
Configuring VLAN Settings to Support Wireless Traffic 96

12 Survivability
Overview ................................................................. 97
Configure Survivability ............................................. 99
SIP Server Redundancy ............................................. 99
SIP Server Availability ............................................. 100
MGCP Survivability Configuration ............................... 101
Survivability in Transparent Mode ............................... 102
Survivability ............................................................ 106
Assigning SIP Modes ............................................... 107
Survivability Voice Mail ............................................ 108
Voice Mail Process .................................................. 109
Configuring Survivability Voice Mail Settings ............... 110
Using the IVR System ............................................... 112

13 Stateful Failover
Overview ................................................................. 117
Configuring Stateful Failover .................................... 117
Configure the LAN and WAN IP addresses ................... 118
Configure Virtual IP addresses for the redundant pair ...... 118
Configure the Management Interface ......................... 119
Configure the Stateful Failover page ......................... 119
# Contents

## 14 WAN Link Redundancy
- Overview ................................................. 121
  - Data and Voice Interface Switchover .................. 122
  - Manual Switchover .................................... 122
  - Supported Interfaces .................................. 123
- Configuring WAN Link Redundancy ....................... 123

## 15 System Diagnostics
- Viewing Version, Hardware Platform and LAN MAC Address .................. 125
- Viewing the ALG Registration Code .......................... 125
  - Entering the Registration Code ......................... 125
- Viewing Networking Information .......................... 126
  - Routing Information .................................... 126
  - Link Status ........................................... 127
  - Interface Information ................................. 127
- Viewing Advanced System Information .................... 127
  - Passive Voice Call Monitoring ........................ 127
- Using Troubleshooting Tools .............................. 128
  - Verifying Registered Voice Devices .................. 128
  - Ping and Traceroute Tests ............................. 129
  - Networking Restart ................................. 130
- Rebooting the System .................................. 130
- Using T1 Diagnostics ................................... 131
- Verifying Connectivity with the Test UA. ............... 132

## 16 Device Configuration Management
- Overview .................................................. 135
- ewn Command ............................................ 135
- Logging off listed users ................................ 137
- Downloading Files ....................................... 138
- Using the Internal TFTP Server .......................... 138

## 17 Edgemarc BGP and Routing Configuration and Troubleshooting
- BGP enablement and configuration ....................... 141
- Troubleshooting using BGP and routing daemons .......... 143

## 18 System Upgrades
- Release Information ...................................... 145
- Upgrade Procedure for Software Revision 1.3.11 or Later ............. 146
Upgrade Procedure for Software Version 1.3.9 or Earlier .......... 146

19 Primary Rate Interface (PRI)
Overview ................................................................. 149
Configuring T1 for PRI ................................................. 149
Configuring Client Side ISDN PRI (PRI/GW) ......................... 150
Configuring Network Side ISDN PRI (PRI/UA) ....................... 152
Configuring SIP Trunking for PRI .................................... 153

A Syslog Messages

B Configuration Parameters
Network Page ............................................................... 169
Subinterfaces Page ....................................................... 171
DHCP Relay Page ........................................................ 172
DHCP Server Page ....................................................... 173
DHCP Leases Page ....................................................... 176
Standard Firewall Page ................................................ 176
Advanced Firewall Page ............................................... 179
Custom Rules Page ...................................................... 183
Current Advanced Firewall Rules (Show Rules) ...................... 185
Forwarding Rules Page ................................................ 186
Message of the Day Page .............................................. 188
NAT Pages ................................................................. 189
Traffic Shaper Page ...................................................... 193
Advanced Traffic Shaper Page ........................................ 196
VoIP ALG Page .......................................................... 200
H.323 Settings Page ..................................................... 204
H.323 Activity Page ...................................................... 208
H.323 Alias Manipulation Page ...................................... 209
H.323 Neighboring Page ................................................. 211
MGCP Settings Page .................................................... 213
SIP Settings Page ......................................................... 216
SIP Trunking Page ....................................................... 218
Survivability Page ...................................................... 221
FXS/Phone Port Settings - Basic (SIP UA) Page .................... 228
FXS/Phone Port Settings - Advanced Page ........................ 229
FXS/Phone Port FAX Settings Page .................................. 234
Distinctive Ring Page ................................................. 237
<table>
<thead>
<tr>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIP FXO/Line Port Configuration (SIP GW) Page</td>
</tr>
<tr>
<td>VPN Page</td>
</tr>
<tr>
<td>VPN Subnet Page</td>
</tr>
<tr>
<td>VPN Tunnel Settings Page</td>
</tr>
<tr>
<td>System Page</td>
</tr>
<tr>
<td>Certificate Page</td>
</tr>
<tr>
<td>Clients List Page</td>
</tr>
<tr>
<td>Dynamic DNS Page</td>
</tr>
<tr>
<td>File Download Page</td>
</tr>
<tr>
<td>File Server Page</td>
</tr>
<tr>
<td>Network Information</td>
</tr>
<tr>
<td>Network Restart Page</td>
</tr>
<tr>
<td>Network Test Tools Page</td>
</tr>
<tr>
<td>Proxy ARP Page</td>
</tr>
<tr>
<td>RADIUS Settings Page</td>
</tr>
<tr>
<td>Reboot System Page</td>
</tr>
<tr>
<td>Remote Management</td>
</tr>
<tr>
<td>Route Page</td>
</tr>
<tr>
<td>Services Configuration</td>
</tr>
<tr>
<td>Set Link Page</td>
</tr>
<tr>
<td>Stateful Failover</td>
</tr>
<tr>
<td>System Information</td>
</tr>
<tr>
<td>System Time Page</td>
</tr>
<tr>
<td>Test UA Settings page</td>
</tr>
<tr>
<td>T1 Configuration Page</td>
</tr>
<tr>
<td>T1 Configuration Page - MLPPPoFR</td>
</tr>
<tr>
<td>T1 Diagnostics Page</td>
</tr>
<tr>
<td>TACACS Settings Page</td>
</tr>
<tr>
<td>Upgrade Firmware Page</td>
</tr>
<tr>
<td>User Commands Page</td>
</tr>
<tr>
<td>VoIP Subnet Routing Page</td>
</tr>
<tr>
<td>VLAN Configuration Page</td>
</tr>
<tr>
<td>Wireless Configuration Page</td>
</tr>
<tr>
<td>Client Side ISDN PRI (PRI/GW) Configuration Page</td>
</tr>
<tr>
<td>Client Side ISDN CAS (CAS/GW) Configuration Page</td>
</tr>
<tr>
<td>Network Side ISDN PRI (PRI/UA) Configuration Page</td>
</tr>
<tr>
<td>Network Side ISDN CAS (CAS/UA) Configuration Page</td>
</tr>
<tr>
<td>WAN Link Redundancy Configuration Page</td>
</tr>
<tr>
<td>Secondary Interface Settings Configuration Page</td>
</tr>
</tbody>
</table>
C  License Information

EdgeMarc Software License Agreement ........................................... 315
Asterisk Copyright ................................................................. 318
Data Encryption Standard Copyright ........................................... 318
XML 1.0 Parser Library License ............................................... 319
Open LDAP Copyright ............................................................. 319
Open LDAP License ................................................................. 320
Open H.323 Copying Permission ................................................. 321
Henry Spencer Regex License .................................................. 322
Berkeley Source Distribution License ......................................... 322
Sleepycat Software License ...................................................... 323
Perl Compatible Regular Expressions License .......................... 324
Vovida Software License ........................................................ 325
Blowfish License ................................................................. 326
Open SSL License ................................................................. 327
Open SSL Toolkit License ......................................................... 329
Net SNMP License ................................................................. 330
Point-to-Point Protocol Daemon License .................................. 334
SSH License ................................................................. 336
Shadow Utilities License ......................................................... 341
GNU General Public License Version 2 .................................... 342
GNU General Public License Version 2.1 .............................. 349

D  Product Warranties

Hardware Warranty ............................................................... 359
Software Warranty ............................................................... 359
Preface

Thank you for your purchase of the EdgeMarc Converged Network Appliance. This guide describes the EdgeMarc VoIP Operation System (VOS), and is intended for network installers, network operators, and security officers.

This guide assumes that you have already installed and cabled your device according to the instructions in the Hardware Guide that came with your EdgeMarc device.

Before you use the information in this guide, make sure that you are connected to the device through a web browser.

Additional information about the features provided by VOS can be found in our extensive knowledge base located at:

http://www.edgewaternetworks.com/kb

About this Guide

The following table briefly describes each chapter and appendix in this guide.

<table>
<thead>
<tr>
<th>Chapter or Appendix</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chapter 1, Introduction</td>
<td>Lists the features of VOS for EdgeMarc and briefly describes the VOS user interface.</td>
</tr>
<tr>
<td>Chapter 2, Network Connectivity</td>
<td>Describes how to configure The EdgeMarc appliance to support network services</td>
</tr>
<tr>
<td>Chapter 3, DHCP Services</td>
<td>Describes how to configure DHCP services with and without VLANs.</td>
</tr>
<tr>
<td>Chapter 4, Firewall</td>
<td>Describes how to configure firewall features on the EdgeMarc appliance.</td>
</tr>
<tr>
<td>Chapter 5, NAT</td>
<td>Describes how to configure Network Address Translation (NAT) on the EdgeMarc appliance.</td>
</tr>
<tr>
<td>Chapter 6, Advanced Data Capabilities</td>
<td>Describes how to configure advanced data capabilities on the EdgeMarc appliance.</td>
</tr>
<tr>
<td>Chapter 7, Management</td>
<td>Describes how to configure management capabilities on the EdgeMarc appliance.</td>
</tr>
<tr>
<td>Chapter 8, VPNs</td>
<td>Describes how to configure virtual private networks (VPNs) on the EdgeMarc appliance.</td>
</tr>
<tr>
<td>Chapter 9, Voice Over IP</td>
<td>Describes how to configure Voice over IP (VoIP) features on the EdgeMarc appliance.</td>
</tr>
<tr>
<td>Chapter 10, Configuring FXS and FXO Ports</td>
<td>Describes how to use the FXS and FXO ports available on the EdgeMarc appliance.</td>
</tr>
<tr>
<td>Chapter 11, Wireless</td>
<td>Describes how to configure the EdgeMarc appliance as a wireless access point.</td>
</tr>
</tbody>
</table>
### Chapter or Appendix Description

<table>
<thead>
<tr>
<th>Chapter or Appendix</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chapter 12, Survivability</td>
<td>Describes how to manage survivability on the EdgeMarc appliance.</td>
</tr>
<tr>
<td>Chapter 13, Stateful Failover</td>
<td>Describes how to configure two EdgeMarc devices to act as a redundant pair.</td>
</tr>
<tr>
<td>Chapter 14, WAN Link Redundancy</td>
<td>Describes how to configure the EdgeMarc appliance to support the WAN Link Redundancy (WLR) feature.</td>
</tr>
<tr>
<td>Chapter 15, System Diagnostics</td>
<td>Describes how to use the diagnostic information, troubleshooting tools, and system maintenance utilities on the EdgeMarc appliance.</td>
</tr>
<tr>
<td>Chapter 16, Device Configuration Management</td>
<td>Describes the tools available to manage the EdgeMarc appliance configuration.</td>
</tr>
<tr>
<td>Chapter 17, System Upgrades</td>
<td>Describes how to upgrade the EdgeMarc device to the latest software release available from Edgewater Networks.</td>
</tr>
<tr>
<td>Chapter 18, Primary Rate Interface (PRI)</td>
<td>Describes how to configure the ISDN Primary Rate Interface (PRI) on the EdgeMarc appliance.</td>
</tr>
<tr>
<td>Appendix A, Syslog Messages</td>
<td>Lists syslog messages for the EdgeMarc appliance.</td>
</tr>
<tr>
<td>Appendix B, Configuration Parameters</td>
<td>Describes all the parameters available on the EdgeMarc device configuration pages.</td>
</tr>
</tbody>
</table>

### Typographic Conventions

User input is displayed in **boldface** type and can represent either keyboard input or mouse selections in a browser window depending on the context.

Names of web GUI menus and input areas are in *italics*.

#### Note

This format highlights information that is important or that has special interest.

#### Warning

This format highlights information that will help you prevent system damage or loss of data.
Contact and Support Information

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Phone: 408.351.7200 ext. 2
Support@edgewaternetworks.com
Introduction

This chapter introduces the features and user interface of the EdgeMarc appliance. It contains the following sections:

- The VoIP Operating System for EdgeMarc
- Features
- User Interface Components

The VoIP Operating System for EdgeMarc

The VoIP Operating System (VOS) for EdgeMarc is a new generation of operating system providing the demarcation point for real-time, interactive IP services. It is the ideal solution for connecting enterprise PCs and IP Phones to a private or public IP network. It replaces multiple standalone systems by integrating voice-over-IP (VoIP), network security, traffic management and voice call quality monitoring into a low-cost, easily managed device.

Use VOS to ensure high quality voice calls, maximize WAN link utilization for data traffic and protect the enterprise LAN from network based attacks.

VOS supports all EdgeMarc converged network appliance models from Edgewater Networks. For a current list of available models, go to the Edgewater Networks website at www.edgewaternetworks.com.

Features

The VOS for EdgeMarc provides the following features:

- Resolves NAT/firewall traversal problems for VoIP by providing a VoIP Application Layer Gateway (ALG) that supports SIP, MGCP and H.323
- Supports 2 to 30 concurrent VoIP calls
- Protects the enterprise LAN using a stateful packet inspection (SPI) firewall for both voice and data traffic
- Provides NAT and PAT for voice and data
- Performs static IP routing
- Performs traffic management including prioritization, classification, queuing, TOS bit setting and call admission control for voice
VoIP Operating System (VOS) for EdgeMarc User Manual

- Provides voice call quality monitoring and testing
- Provides integrated test tools to facilitate problem isolation
- Provides a DHCP server for enterprise PCs and IP phones
- Performs TFTP relay for IP phone images
- Uses a simple web-based GUI for configuration and management
- Supports logging to external syslog servers and interfaces to network management systems using SNMP

User Interface Components

The VOS interface consists of a navigation pane at the left of the window and a larger content pane at the right. The navigation pane contains the Configuration Menu, which lists the available configuration screens arranged in a hierarchical list or tree. When you make a selection in the Configuration Menu, the corresponding configuration page is displayed in the content pane. If a configuration function has more than one associated page, clicking on that function in the configuration menu expands the list to show the list of screens associated with that function.

Configuration pages contain the following types of information:
- Configurable fields
- Selection buttons
- Check boxes
- Read-only information

Accessing the User Interface

Reset administrator password

1. Choose System from the Configuration Menu.
2. Click Changed in the Change Administrator Password area.
3. Enter and confirm the new password.
4. Click Submit.
You can configure the EdgeMarc appliance to support a wide range of network services and enable or disable specific services based on the requirements of your network.

This chapter describes how to configure The EdgeMarc appliance to support network services. It contains the following sections:

- Configuration Overview
- System Configuration
  - Configuring WAN Settings
  - Configuring LAN Settings
  - Configuring VLANs
  - Configuring Ethernet Interface Link Settings
  - Configuring Subinterfaces
  - Configuring T1 Settings

### Configuration Overview

The EdgeMarc device is a flexible, easy-to-use converged network appliance that provides many critical networking functions for IP-based voice and data. It can be installed in several different VoIP topologies:

- At the customer premises for IP Centrex applications
- At the station side of enterprise IP PBXs

Most users will follow the steps in “System Configuration” on page 8 to initially connect the EdgeMarc device into the IP network. The remainder of the configuration can be different based on the application, VoIP topology, and presence of other networking equipment such as firewalls or DHCP servers. In general, however, the steps used to configure the EdgeMarc device are:

<table>
<thead>
<tr>
<th>Step</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>System configuration</td>
</tr>
<tr>
<td>2</td>
<td>VoIP configuration</td>
</tr>
<tr>
<td>3</td>
<td>Data networking configuration</td>
</tr>
<tr>
<td>4</td>
<td>Firewall configuration</td>
</tr>
</tbody>
</table>
Some of the steps are optional depending on your particular application. We have provided configuration guidelines below for each of the application types supported by the EdgeMarc device.

**Configuration for IP Centrex Applications**

A typical EdgeMarc device installation for an IP Centrex application uses an external router, xDSL, or cable modem to terminate the WAN link from the service provider. The EdgeMarc device is then connected directly to the WAN termination device and the LAN port of the EdgeMarc device is connected to the enterprise Ethernet local area network (typically a layer 2 switch). VoIP signaling is performed in the service provider network via a softswitch and the EdgeMarc device acts as a proxy for the voice devices installed in the enterprise LAN. In this configuration a single public IP address is used to proxy for all of the IP phones and to route to multiple PCs installed on the LAN. This particular example also uses static NAT entries to route to the publicly addressable servers. The EdgeMarc device performs the following functions in this application:

- **WAN/LAN IP routing.**
- Traffic shaping and priority queuing to guarantee high quality voice traffic. These mechanisms protect voice and data traffic from contending for the same network resources to guarantee low latency and the highest call quality possible for VoIP traffic. At the same time they ensure the best utilization of WAN bandwidth by enabling data traffic to burst up to full line rate in the absence of voice calls. Precedence is given to traffic for the range of addresses reserved for the IP phones.

- **NAT/PAT translation for IP phones and PCs.** This allows a single public IP address to be used on the WAN link to represent all of the private IP addresses assigned to the LAN IP phones and PCs.
- **Static NAT entries.** This enables the customer to use a WAN public IP address for data servers (for example web, mail, or FTP) connected behind the EdgeMarc device. These servers can then be configured with private IP addresses for additional security.
- **A VoIP-aware firewall.** A full layer 7 gateway for voice traffic and a stateful packet inspection firewall for data traffic.
- **Call Admission Control (CAC).** CAC uses a deterministic algorithm to decide when there are insufficient network resources available to adequately support new calls and then return the equivalent of a “fast busy” to new call requests.
- **DHCP server and TFTP relay.** These features are used to simplify and expedite the IP configuration of phones and PCs. This also includes VoIP signaling gateway information (MGCP, SIP and H.323).
- Call quality monitoring and test tools.

### Table 1  Configuration Outline

<table>
<thead>
<tr>
<th>Task</th>
<th>Subtask</th>
<th>Configure For IP Centrex Application?</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Configuration</td>
<td>Configure LAN/WAN interface.</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Set Ethernet link rate.</td>
<td>Optional</td>
</tr>
<tr>
<td></td>
<td>Enable the DHCP server.</td>
<td>Optional but recommended</td>
</tr>
<tr>
<td></td>
<td>Configure SNMP.</td>
<td>Optional</td>
</tr>
<tr>
<td>VoIP Configuration</td>
<td>Enable the VoIP ALG.</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Configure a VoIP subnet route.</td>
<td>Optional</td>
</tr>
<tr>
<td>Data Networking Configuration</td>
<td>Configure dynamic NAT.</td>
<td>Optional but recommended</td>
</tr>
<tr>
<td></td>
<td>Configure static NAT.</td>
<td>Optional</td>
</tr>
<tr>
<td></td>
<td>Configure static IP routing.</td>
<td>Optional</td>
</tr>
<tr>
<td>Firewall Configuration</td>
<td>Enable the data firewall.</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Configure basic settings.</td>
<td>Optional</td>
</tr>
<tr>
<td></td>
<td>Configure advanced settings.</td>
<td>Optional</td>
</tr>
</tbody>
</table>
Most private enterprise VoIP networks use an IP PBX at the corporate headquarters location to provide voice switching among headquarters, branch offices, and the PSTN. The EdgeMarc device is used in these environments to securely connect branch office employees to the IP PBX installed in the corporate headquarters location.

The installation of an EdgeMarc device on the station side of an enterprise IP PBX is very similar to the IP Centrex application previously described. The branch office is connected to the corporate network using VPNs or private T1 links terminated by a WAN router. The EdgeMarc device is then connected directly to the WAN router and the LAN port of the EdgeMarc device is connected to the enterprise Ethernet local area network (typically a layer 2 switch). The IP PBX in the corporate headquarters location performs VoIP signaling, and the EdgeMarc device acts as a proxy for the

<table>
<thead>
<tr>
<th>Traffic Management Configuration</th>
<th>Enable traffic shaping.</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Enable Call Admission Control.</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Table 1  Configuration Outline
voice devices installed at the branch office. The EdgeMarc device can perform the following functions in this application:

- **WAN/LAN IP routing.**
- **Traffic shaping and priority queuing to guarantee high quality voice traffic.** These mechanisms protect voice and data traffic from contending for the same network resources to guarantee low latency and the highest call quality possible for VoIP traffic. At the same time they ensure the best utilization of WAN bandwidth by enabling data traffic to burst up to full line rate in the absence of voice calls. Precedence is given to traffic for the range of addresses reserved for the IP phones.
- **NAT/PAT translation for IP phones and PCs.** This allows a single IP address to be used on the WAN link to represent all of the private IP addresses assigned to the LAN IP phones and PCs.
- **A VoIP-aware firewall.** A full layer 7 gateway for voice traffic and a stateful packet inspection firewall for data traffic.
- **Call Admission Control (CAC).** CAC uses a deterministic algorithm to decide when there are insufficient network resources available to adequately support new calls and then return the equivalent of a “fast busy” to new call requests.
- **DHCP server and TFTP relay.** These features are used to simplify and expedite the IP configuration of phones and PCs. This also includes VoIP signaling gateway information (MGCP, SIP, H.323).
- **Call quality monitoring and test tools.**

### Table 2 Configuration Outline

<table>
<thead>
<tr>
<th>Task</th>
<th>Subtask</th>
<th>Configure For Station Side IP PBX Application?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>System Configuration</strong></td>
<td>Configure LAN/WAN interface.</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Set Ethernet link rate.</td>
<td>Optional</td>
</tr>
<tr>
<td></td>
<td>Enable the DHCP server.</td>
<td>Optional but recommended</td>
</tr>
<tr>
<td></td>
<td>Configure SNMP.</td>
<td>Optional</td>
</tr>
<tr>
<td><strong>VoIP Configuration</strong></td>
<td>Enable the VoIP ALG.</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Configure a VoIP subnet route.</td>
<td>Optional</td>
</tr>
<tr>
<td><strong>Data Networking Configuration</strong></td>
<td>Configure dynamic NAT.</td>
<td>Optional but recommended</td>
</tr>
<tr>
<td></td>
<td>Configure static NAT.</td>
<td>Optional</td>
</tr>
<tr>
<td></td>
<td>Configure static IP routing.</td>
<td>Optional</td>
</tr>
<tr>
<td><strong>Firewall Configuration</strong></td>
<td>Enable the data firewall.</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Configure basic settings.</td>
<td>Optional</td>
</tr>
<tr>
<td></td>
<td>Configure advanced settings.</td>
<td>Optional</td>
</tr>
<tr>
<td><strong>Traffic Management</strong></td>
<td>Enable traffic shaping.</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Configuration</strong></td>
<td>Enable Call Admission Control.</td>
<td>Optional</td>
</tr>
</tbody>
</table>
System Configuration

This section explains how to configure the EdgeMarc device to function in your IP network. You will configure the Ethernet interfaces, network addresses, DNS settings, default gateway, and SNMP settings, and change the administrative password.

Configuring WAN Settings

This section describes how to set up WAN network parameters.

Note
Ask your ISP to assign an IP address for the EdgeMarc appliance, an IP address for the gateway, and a preferred and secondary IP address for the DNS server.

Configure WAN settings

1. Choose Network from the Configuration Menu.
2. Select the method to use to obtain an Internet connection.
   When you select a connection method, the page displays the appropriate settings in the WAN Interface Settings area.
   - ADSL-PPPoE—Enter the user name and password assigned by the network provider, and indicate whether to monitor the connection using keepalive ping messages.
   - DHCP—No additional configuration required.
   - Static IP Address—Enter the IP address and subnet mask.
   - EVDO—Enter the user name and password assigned by the EVDO service provider if required.

Note
For a list of specific EVDO cards that are supported by the EdgeMarc, visit http://portal.knowledgebase.net/article.asp?article=291396&p=4739.
   - T1—Enter the IP address and subnet mask. Click the underlined T1 link to open the T1 Configuration page and set additional T1 parameters. See “Configuring T1 Settings” on page 12.
3. Click Submit.
   A message indicates that service will be temporarily interrupted.
4. Click OK to confirm.

Configuring LAN Settings

This section describes how to set up LAN parameters with and without VLANs. The VLAN configuration feature allows you to connect the appliance to an Ethernet switch that has been configured to use VLANs.
Note
The EdgeMarc appliance is shipped with LAN IP address 192.168.1.1 and subnet mask 255.255.255.0.

Configure LAN network settings without VLANs

1. Choose Network from the Configuration Menu.
   The LAN Interface Settings area of the Network page shows the LAN IP address (192.168.1.1) and subnet mask (255.255.255.0).
2. Clear the Enable VLANs checkbox.
3. Click Submit.
   A message indicates that service will be interrupted while the new interface is added.
4. Click OK to confirm.

Configure LAN network settings with VLANs

1. Choose Network from the Configuration Menu.
2. Select Enable VLANs.
3. Click Submit.
   A message indicates that service will be interrupted while the new interface is added.
4. Click OK to confirm.
5. Click VLAN Settings to open the VLAN page.
6. Configure settings as appropriate for your EdgeMarc model. See “Set up VLANs on the 4200 and 4300T” on page 10 and “Set up VLANs on the 5300 and 6400” on page 10.

Configuring VLANs

The EdgeMarc appliance supports tagged and untagged VLANs. As specified in the IEEE 802.1q standard, tagged VLANs incorporate the VLAN ID and priority in the packet header. Untagged VLAN packets do not include the VLAN ID or priority.

All EdgeMarc appliances (4200, 4300T, 5300, and 6400) provide support for multiple tagged VLANs. The 5300 and 6400 each support a single untagged VLAN; while the 4200 and 4300 each support up to four untagged VLANs.

All EdgeMarc appliances support up to 16 VLANS.

Note
All voice devices should be placed in the same VLAN.
Set up VLANs on the 4200 and 4300T

1. Choose System > VLAN Configuration from the Configuration Menu.

2. Choose 802.1 or 802.1q from the LAN Port Membership pull-down list. Click Modify. If 802.1 is selected, radio buttons are presented to permit selection of a single VLAN. If 802.1q is selected, checkboxes are presented to permit selection of multiple tagged VLANs.

3. To add and configure a new VLAN, enter the new VLAN ID, IP address, and network mask. Press Add. A new VLAN entry is added to the VLAN configuration. The mode of the physical port determines the rules for VLAN assignment:
   - 802.1 mode: Assign the port to a single VLAN.
   - 802.1q mode: Assign the port to multiple VLANs

4. Repeat steps 3 and 4 for each VLAN you wish to create.

Note
For detailed field descriptions, see “VLAN Configuration Page” on page 291.

Set up VLANs on the 5300 and 6400

1. Choose System > VLAN Configuration.
   The screen displays the IP address and subnet mask of the default untagged VLAN. Each Ethernet port on the 5300 and 6400 can have both an untagged and multiple tagged VLANs. Each new VLAN that you add must be tagged.

2. To add a tagged VLAN, enter the VLAN ID, IP address, and network mask, and click Submit.
   A message indicates that service will be interrupted while the new interface is added.

3. Click OK to confirm.

4. Repeat steps 2 and 3 for each VLAN you want to create.

Delete a VLAN

1. Choose System > VLAN Configuration from the Configuration Menu.

2. Click the trash can icon to the right of the VLAN entry. It is not necessary to press Submit after deleting a VLAN.

Configuring Ethernet Interface Link Settings

You can modify the Ethernet interface link settings for the appliance, if needed to establish a reliable connection, and adjust the MTU size of the WAN interface to reduce the effects of large data packet on media data.
**Note**  
Take care when adjusting the Ethernet link rate. The device may become unreachable if an incompatible rate is set.

**Configure Ethernet interface link settings**

1. Choose System > Set Link.
2. Select a rate for each Ethernet link, or choose Autonegotiate. For details, see “Set Link Page” on page 271.
3. Click Add.
   A message indicates that service will be interrupted while the new interface is added.
4. Click OK to confirm.

**Configuring Subinterfaces**

The Subinterfaces page allows you to assign additional IP addresses to a system interface. After creating a LAN subinterface, it is often necessary to configure a firewall forwarding rule to permit IP packets through the system. To configure forwarding, see “Configuring Static Forwarding” on page 24.

**Configure network subinterfaces**

1. Choose Network > Subinterfaces from the Configuration Menu.
2. Enter IP address and interface information. For details, see “Subinterfaces Page” on page 171.
3. Click Add.
   A message indicates that service will be interrupted while the new interface is added.
4. Click OK to confirm.
5. Enter additional subinterfaces as needed.

**Delete a subinterface**

1. Choose Network > Subinterfaces from the Configuration Menu.
2. Select checkboxes for the entries that you want to delete. Click Select: All to choose all the entries or Select: None to clear your selections.
3. Click Delete.
4. Click OK to confirm.
## Configuring T1 Settings

Use the T1 Configuration page to configure and test the T1 interface on the appliance. This section describes the features that apply to the T1 interface:

- MLPPP
- Framing Mode and Line Encoding
- T1 Interface Configuration
- Multiple DLCIs and Fractional T1 Links

### MLPPP

Multilink Point-to-Point Protocol (MLPPP) is a line aggregation protocol that enables multiple physical connections between two network devices to appear as one virtual connection.

By aggregating or bundling multiple links (such as multiple T1 lines) into a single virtual connection, MLPPP expands the bandwidth available between devices while remaining transparent to users. For example, MLPPP can be used to combine two channels into a single virtual channel, thereby doubling the available bandwidth from 1.5Mbps to 3Mbps.

MLPPP also provides redundancy. If more than one physical line is in a bundle (single virtual line), then losing a physical line may not bring down the entire virtual line.

To operate, MLPPP must be implemented at both ends of the network connection. At the transmitting end, MLPPP controls the process of disassembling datagrams, recombining them according to the protocol design, and sending them in logical sequence across the multiple connections. At the receiving end, an MLPPP-equipped device disassembles the datagrams and reconstitutes them as needed for delivery to the appropriate destinations.

MLPPP is an extension of Point-to-Point Protocol (PPP), which is a standard method of preparing data packets for transmission over a single channel WAN connection.

The EdgeMarc appliance can be configured to use MLPPP for communication with an aggregating router. MLPPP creates a virtual interface to handle all voice and data traffic, and then the traffic is distributed over individual T1 lines. With MLPPP running on both the EdgeMarc appliance and aggregating router, the two devices automatically identify and activate the transport parameters that control which T1 lines are responsible for transporting each packet of information. The EdgeMarc appliance supports these protocols: HDLC, ANSI, and CCITT.

---

**Note**

MLPPP is licensed according to the number of available T1 lines. Before configuring MLPPP, verify that the feature is included with your license.
Configure MLPPP

1. Choose System > T1 Configuration.
2. To use MLPPP, select the Enable MLPPP checkbox and click Submit.

Note
When you enable or disable MLPPP, you must submit the changes before completing the rest of the configuration.

When MLPPP is enabled, any combination of the licensed T1 lines can join the virtual link. When MLPPP is disabled, only the first T1 port is available for use.

3. Choose the T1 ports to include in the MLPPP group.
4. Choose the T1 protocol to use. The following protocol options are supported.

<table>
<thead>
<tr>
<th>Protocol</th>
<th>Single T1</th>
<th>MLPPP</th>
</tr>
</thead>
<tbody>
<tr>
<td>HDLC</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>cHDLC</td>
<td>Y</td>
<td>-</td>
</tr>
<tr>
<td>PPP</td>
<td>Y</td>
<td>-</td>
</tr>
<tr>
<td>ANSI</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>CCITT</td>
<td>Y</td>
<td>Y</td>
</tr>
</tbody>
</table>

5. Select a checkbox for each physical T1 line that you want to enable.
6. Click Submit.
7. Choose System > T1 Network to open the Network page.
8. Select T1.
9. Enter the default gateway information.
10. Click Submit.

MLPPP is now configured.

Note
For detailed field descriptions, see “Network Page” on page 169 and “Test UA Settings page” on page 277.

Framing Mode and Line Encoding

Framing mode defines the T1/E1 framing mode. This typically defines the number of frames that are grouped together. Currently only ESF (F24) and D3/D4 (F12) are supported. ESF has 24 frames. D3/D4 has 12 frames.

Line Encoding defines the bit encoding method used while transmitting data over the line. B8ZS (Bipolar 8 bit zero substitution) and AMI (Alternative Mark Inversion) are currently supported.

Protocol: Display and set the T1 layer 2 protocol.
MLPPP Disabled: The protocols supported are HDLC, Cisco HDLC, PPP, Frame Relay ANSI and CCITT. The default setting is HDLC.

MLPPP Enabled: The protocols supported are HLDC, Frame Relay ANSI and CCITT.

The protocol must match the protocol sent by the network provider.

**Configure framing mode**

1. Choose System > T1 Configuration.
2. Select a framing mode from the pull-down list.
3. Click Submit.
   
   A message indicates that service will be interrupted while the new interface is added.
4. Click OK to confirm.

**T1 Interface Configuration**

You can assign a name to each T1 interface, choose the protocol for the interface, choose a timing option, and use the LBO parameter to assign power and attenuation characteristics of the transmit signal from the EdgeMarc T1 interfaces.

The LBO setting is used to configure the power and attenuation characteristics of the transmit signal from EdgMarc T1 interfaces.

DS1 level settings are used when connecting an EdgeMarc T1 to a smartjack or telephone company provided T1. The DS1 power levels can be changed depending on the length of the T1 cable from the EdgeMarc to the first T1 repeater. Typical values are 0db and -7.5db. 0db is used for the longest cable lengths while -22.5db is used for the shortest distances.

The DSX-1 level settings are used when connecting an EdgeMarc T1 to a private line or a co-resident PBX without a CSU/DSU. The DSX-1 settings can be changed based on the distance between the EdgeMarc and the terminating device.

**Configure LBO**

1. Choose System > T1 Configuration.
2. Select an LBO option from the pull-down list.
3. Click Submit.
   
   A message indicates that service will be interrupted while the new interface is added.
4. Click OK to confirm.
Multiple DLCIs and Fractional T1 Links

When the protocol is a frame relay value, additional configuration values are needed. The mode value sets the equipment type, either DTE or DCE. Generally, this value will be set to DTE for the customer premises. The Data Link Connection Identifier (DLCI) value is supplied by the T1 service provider and is used to identify the connection in the link data stream. Values 0-15 and 1023 are reserved and should not be used.

The multi-DLCI enhancement allows two virtual connections over the T1 line with separate IP addresses. This capability is supported in PPP over Frame Relay (either ANSI or CCITT) configuration.

To use this capability, you define a PVC for data and a secondary PVC for voice, each with a DLCI number. ALG is configured to use the voice PVC, and data is routed through the data PVC. Each has its own user name/password for authentication by the PPPoFR switch during PPP negotiation. Following authentication, each is assigned a its own IP address.

You can assign a contiguous subset of the 24 T1 timeslots to create a fractional T1 link. Specify the starting timeslot (1-24) and bandwidth in increments of 64kbps.

With auto DS0 fractional T1, you can automatically detect the currently-used timeslots based on the pre-configured IDLE value that the T1 service provider provides for unused timeslots.

The next procedure describes how to configure multiple DLCIs and fractional T1 links.

Configure DLCIs and fractional T1

1. Choose System > T1 Configuration to open the T1 Configuration page.
2. Assign frame relay settings for multiple DLCIs and fractional T1 as described in “Test UA Settings page” on page 277.
3. Click Submit.

Note
For detailed field descriptions, see “Test UA Settings page” on page 277.
Configuring IP Phones, IADs or Softphones

After configuring the EdgeMarc device VoIP ALG the voice devices must be configured to point to the LAN interface of the EdgeMarc device as their signaling gateway and optionally as their TFTP server (if they use the TFTP protocol to retrieve their software images). The steps required to set up these devices differ from vendor to vendor. Using the DHCP server included in the EdgeMarc device will significantly simplify the setup of these devices if they are able to obtain their IP configuration via DHCP. Consult the applicable user’s guide of each device for detailed instructions. For your convenience we have provided the configuration steps for a number of these devices in the support section of our website at: www.edgewaternetworks.com
This chapter describes how to configure DHCP services with and without VLANs. You can relay DHCP requests to an external DHCP server or use the DHCP server included in the EdgeMarc appliance.

It contains the following sections:

- DHCP Relay
- DHCP Server
- DHCP Leases
- Configuring DHCP Server
- Configuring DHCP With VLANs

This section describes using the DHCP Server capability on the EdgeMarc appliance with configured VLANs. The EdgeMarc appliances supports a maximum of 16 VLANs, all of which could be associated with the DHCP Server. The following are default VLAN IDs used on the EdgeMarc appliance:

### DHCP Relay

When you enable DHCP relay and point to a valid DHCP server, you determine that all DHCP requests will be forwarded to that server.

Local DHCP and DHCP Relay are mutually exclusive. That is, turning on DHCP Relay automatically turns off local DHCP, and turning on DHCP automatically turns off DHCP Relay.

**Note**

Use the DHCP relay page only if DHCP is disabled.

#### Configure DHCP relay

1. Choose **DHCP Relay** from the Configuration Menu.
2. Configure parameters as described in “DHCP Relay Page” on page 172.
3. Click **Submit**.
   - A message indicates that service will be temporarily interrupted.
4. Click **OK** to confirm.
DHCP Server

DHCP is a protocol that enables PCs and workstations to get temporary or permanent IP addresses (out of a pool) from centrally administered servers. The EdgeMarc appliance can act as a DHCP server, granting IP addresses to devices in the network. You can configure blocks of IP addresses, default gateway, DNS servers, and other parameters that can be served to requesting devices. Table 1 lists the DHCP options supported by the DHCP Server.

### Table 1 DHCP Server Options

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Subnet Mask - LAN Netmask of the EdgeMarc, Network page</td>
</tr>
<tr>
<td>2</td>
<td>Time Offset</td>
</tr>
<tr>
<td>3</td>
<td>Router - LAN IP of the EdgeMarc, Network page</td>
</tr>
<tr>
<td>6</td>
<td>DNS Server - DNS IP, Network page</td>
</tr>
<tr>
<td>42</td>
<td>NTP Servers</td>
</tr>
<tr>
<td>51</td>
<td>IP address lease time - Lease duration in seconds, DHCP page</td>
</tr>
<tr>
<td>53</td>
<td>DHCP Message Type - Set by DHCP server</td>
</tr>
<tr>
<td>54</td>
<td>Server Identifier - LAN IP of the EdgeMarc</td>
</tr>
<tr>
<td>66</td>
<td>Server-Name [ Polycom uses this for ftp server name]</td>
</tr>
<tr>
<td>67</td>
<td>Boot file name</td>
</tr>
<tr>
<td>129</td>
<td>Call Server IP Address - VLAN ID Discovery</td>
</tr>
<tr>
<td>150</td>
<td>Phone Image TFTP Server IP - LAN IP of the EdgeMarc, Network Page</td>
</tr>
<tr>
<td>151</td>
<td>MGCP Control Server IP - LAN IP of the EdgeMarc, Network Page</td>
</tr>
<tr>
<td>159</td>
<td>Allows the user to enter a text string in the form of a FQDN for Polycom phones. It can be used to point the Polycom phones to the domain name of a TFTP server using HTTP.</td>
</tr>
<tr>
<td>160</td>
<td>Allows the user to enter a text string in the form of a FQDN for Polycom phones. It can be used to point the Polycom phones to the domain name of a TFTP server using HTTPS.</td>
</tr>
</tbody>
</table>

DHCP on your system does not have to be enabled if a DHCP server exists elsewhere in your company network. It can be disabled. At least one DHCP server must exist on an accessible network. When you have enabled the DHCP server, you can turn it on or off using the Enable DHCP Server box without having to change other settings.
The DHCP IP Address Ranges table shows the dynamic addresses to use for the LAN devices. Enter individual DHCP IP addresses or a range. Assign static IP addresses for any common-access devices, such as printers or fax machines.

**DHCP Leases**

The DHCP Leases page displays view-only information about hosts that are currently leasing a DHCP address.

**View DHCP lease information**

- Choose DHCP Server > DHCP Leases.

**Configuring DHCP Server**

Configuring DHCP Server on the EdgeMarc appliance includes enabling the server and configuring the DHCP IP Address range to be used by LAN devices. Use the following procedure to configure DHCP.

**Configure DHCP**

1. Choose DHCP Server to open the DHCP Server page.
2. Configure parameters as described in “DHCP Server Page” on page 173.
3. Click Submit.
   - A message indicates that service will be temporarily interrupted.
4. Click OK to confirm.

**Configuring DHCP With VLANs**

This section describes using the DHCP Server capability on the EdgeMarc appliance with configured VLANs. The EdgeMarc appliances supports a maximum of 16 VLANs, all of which could be associated with the DHCP Server. The following are default VLAN IDs used on the EdgeMarc appliance:

- VLAN ID 1 (formerly 2730) -- used for management interface
- VLAN ID 500 -- used for voice
- VLAN ID 600 -- used for data

**Note**

To use DHCP with VLANs, the VLAN capability must be enabled and VLANs configured. To enable VLAN capability, refer to “Configuring VLANs” on page 9 or “Network Page” on page 169.
Once VLAN capability is enabled and VLANs configured, use the following procedure.

1. Select the VLAN to be used from the drop down list.
2. Check Enable DHCP Server.
3. Add DHCP IP Address Ranges (Scope). In the DHCP IP Address Range table, input the starting and ending IP address, then click Add.

**Note**

Click **Save** if you delete a VLAN, the DHCP Server must be re-enabled for the remaining VLANs.
This chapter describes how to configure firewall features on the EdgeMarc appliance. It contains the following sections:

- Overview
- Configuring the Standard Firewall
- Configuring Advanced Firewall Settings
- Configuring Static Forwarding

Overview

The EdgeMarc appliance can act as a firewall for voice, video and data traffic. A firewall restricts and controls the traffic between networks, typically between a corporate network and the Internet. If an external firewall is used, the firewall configuration can be set to pass or block data traffic depending on whether the system is placed in series or in parallel with the external firewall.

Users can define policies to filter traffics that traverse the device or administration traffics destined to the device.

Voice and video firewalls are implemented by VoIP Proxy. For more information on VoIP Proxy functions and configuration, see “VoIP ALG” on page 63.

The EdgeMarc supports two firewall versions:

- Standard Firewall—the standard (default) version of the firewall.
- Advanced Firewall—the advanced version of the firewall, which includes options for pre-defined policies and logging.

You can switch between the standard and advanced firewall by following the link provided at the bottom of each firewall page.
Configuring the Standard Firewall

Use the Standard Firewall page to configure settings for the default firewall.

Configure the standard firewall

1. Open the Standard Firewall page:
   - If the standard firewall is currently enabled (default), choose **Standard Firewall** from the Configuration Menu.
   - If the advanced firewall has been enabled, choose **Advanced Firewall** from the Configuration Menu, and then click the link at the bottom of the page to open the Standard Firewall page.

2. Enable the firewall by selecting the Enable Firewall checkbox.

3. Click **Submit**.

4. Select protocol and port options for the WAN firewall. To restrict the configuration to a specified set of addresses, enter the addresses in the Trusted Management Addresses area. Enter the forwarding rules that will apply to packets being forwarded to systems that run behind the firewall. For detailed field descriptions, see “Standard Firewall Page” on page 176.

5. Click **Submit**.
   A message indicates that service will be interrupted while the new interface is added.

6. Click **OK** to confirm.

Configuring Advanced Firewall Settings

The Advanced Firewall page allows you to configure options for firewall policies, session control, and remote management. You can choose from a set of pre-defined policies and desired logging options.

Configure the advanced firewall

1. Open the Advanced Firewall page:
   - If the advanced firewall has already been enabled, choose **Advanced Firewall** from the Configuration Menu.
   - If the advanced firewall has not yet been enabled, choose **Standard Firewall** from the Configuration Menu, and then click the link at the bottom of the page to open the Advanced Firewall page.

2. Select **Enable** from the pull-down list to activate the firewall functionality.

3. Select logging options to apply when the firewall is enabled:
   - Log Denied Packet enables logging of packets that are blocked by the firewall.
- Log Allowed Packet enables logging of packets that are blocked by the firewall.

4. Select one of the Log Interface options:
   - WAN Only generates system log messages for traffic handling to and from the network/WAN interface.
   - LAN Only generates system log messages for traffic handling to and from the LAN interface (more resource-intensive).

**Warning**
Logging LAN traffic creates a large number of system log messages and affects the system's performance.

- WAN and LAN generates system log messages for traffic handling to and from the LAN and WAN interfaces. This option generates the maximum number of firewall rules, is very CPU-intensive, and should be avoided.

5. For Inbound Connection Rate Limit, select a rate in connections per second for inbound connections. This rate is used for automatic detection of denial of service (DoS) attacks from the public network. Packet requests to establish new sessions from the WAN to LAN that exceed this rate are temporarily denied. If this parameter is not defined, the default limit of 20 new sessions is used.

6. For Outbound Connection Rate Limit, select a rate in connections per second for new outbound connections. This rate is used for automatic detection of denial of service (DoS) attacks from behind the firewall to the public network. Packet requests to establish new sessions from the LAN to WAN that exceed this rate are temporarily denied. If this parameter is not defined, the default limit of 20 new sessions is used.

7. Select allowed outbound protocols.
   - For each checked protocol under Outbound protocols to be allowed, the firewall will allow sessions of that type to be created by LAN clients and will pass the inbound and associated outbound traffic through the firewall.
   - To enable any protocol not specifically mentioned, select ALL OTHERS.

8. Click **Submit**.
   - A message indicates that service will be temporarily interrupted.

9. Click **OK** to confirm.

**Custom Rules**

The Custom Rules page allows you to define additional rules for the advanced firewall that are not included in the NAT or port forwarding configuration. When configured, the custom rules are automatically loaded by the advanced firewall.
Configure custom firewall rules

1. Enable the advanced firewall, if it is not already enabled, and choose **Advanced Firewall > Custom Rules** from the Configuration Menu. See “Configuring Advanced Firewall Settings” on page 22.
2. Enter the custom rules, with each rule specified on a new line.
3. Click **Submit**.
   A message indicates that service will be temporarily interrupted.
4. Click **OK** to confirm.

For sample rules, see “Custom Rules Page” on page 183.

Display custom firewall rules

1. Enable the advanced firewall, if it is not already enabled, and choose **Advanced Firewall > Show Rules** from the Configuration Menu. See “Configuring Advanced Firewall Settings” on page 22.
2. View the current rules.

Remote Management

The Remote Management Page allows you to specify the protocols that are permitted for management traffic and to restrict management access to defined subnets. You can access the Remote Management page from the System menu or by clicking the link in the Remote Management area of the Advanced Firewall page.

Configure remote management

1. Choose **System > Remote Management** from the Configuration Menu.
2. Configure parameters as described in “Remote Management” on page 266.
3. Click **Submit**.
   A message indicates that service will be temporarily interrupted.
4. Click **OK** to confirm.

Configuring Static Forwarding

Forwarding rules define how the firewall forwards data traffic for a subnet from one interface to another. When forwarding a subnet, an IP address must be assigned to the system to serve as the default router for the subnet.

When forwarding, one address from the forwarded range of addresses must be assigned to the rule's output interface. The EdgeMarc appliance uses this address to
Firewall

act as a gateway router for the subnet. The address may be assigned using the Subinterfaces page.

Note
The subnet and forwarded addresses are not protected by the firewall.

A similar method for forwarding traffic is provided by Proxy ARP. Proxy ARP is used to “bridge” addresses within a single subnet range from one interface to another. Often this is used to bridge and forward a public address to the protected side of the system without having to subnet the public address range. Proxy ARP does not require an additional gateway address on the system for the subnet, but does not allow port and protocol filtering for forwarded data.

The following example shows how the feature is used.

- The ISP has supplied two separate subnets to the customer:
  - A small one (2 hosts) for the WAN link
  - A large one (254 hosts) for a bank of servers
- 67.40.41.2 is the WAN IP address for the EdgeMarc appliance.
- NAT is a private IP range of 192.168.1.xxx using the WAN address for PCs and Phones
- On the LAN side of the EdgeMarc appliance are the following:
  - Private IP subnet (192.168.1.xxx)
  - Public IP subnet (67.40.40.xxx)

This is shown in Figure 1.

Figure 1  Static Forwarding

Note
The subnet and forwarded addresses are not protected by the firewall
Configure static forwarding

1. Choose Standard Firewall > Forwarding Rules or Advanced Firewall > Forwarding Rules from the Configuration Menu.

2. The Forwarding Rules page contains a Forwarding Rules table, which shows the list of defined forwarding rules. To select a single table entry, click the entry. To select all entries, click Select: All. To deselect all selected entries, click Select: None.

3. To delete one or more entries from the table, select the entry or entries and click the Delete button.

To add an entry to the table, configure parameters as described in Forwarding Rules Page on page 186 and click Add.
This chapter describes how to configure Network Address Translation (NAT) on the EdgeMarc appliance. It contains the following sections:

- Overview
- Configuring NAT for the Standard Firewall
- Configuring Static NAT

Overview

Network Address Translation (NAT) is a method of allowing two connected networks to use different and incompatible IP addressing schemes. Address translation allows hosts on a private internal network to transparently communicate with devices on an external network and vice versa.

After traffic shaping, the packets undergo the NAT process, which maps the single public IP address of the system and the IP port number associated with a particular session to the private address and port number of the appropriate IP phone device.

NAT allows many private IP addresses to be mapped to a single public address. However, devices behind NAT are hidden and not directly addressable from a public network. This is a problem for IP phone devices that need to accept calls from the public network. To handle this issue, the system implements a call-agent proxy to map the common public address to unique private addresses.

For VoIP, the system restricts the UDP port range on the public side to the minimum required for the number of simultaneous calls desired. This is typically four times the number of sessions: an RTP port and RTCP port in both directions. This is done to minimize the UDP port range that must be opened when using an external firewall.

Additional security is provided by dynamically creating port mappings when a communication session is initiated and destroying them when a session is terminated. In addition to VoIP devices, the NAT function can be used for standard data applications and devices.

Dynamic and Static NAT

The EdgeMarc device supports dynamic NAT and static NAT. Dynamic NAT rewrites outbound packets' source addresses and ports to the device's WAN IP address and
dynamically allocated ports. Static NAT rewrites inbound packets' destination addresses and ports to addresses and ports of hosts behind the device.

Because NAT reuses public IP addresses and maps public address to private address and vice versa, users can access hosts with private address from the public network, or access public networks from hosts with private addresses. NAT also hides the internal network and protects the internal network from being exposed to the public networks.

**Note**
NAT can be used to translate the LAN IP addresses to the public routable IP address that is assigned to the WAN port.

**NAT and Firewall Options**

The available NAT options depend upon whether the standard firewall or advanced firewall is used.

- Standard firewall—Enable NAT on the LAN and configure static NAT client entries.
- Advanced firewall—Enable dynamic NAT and add any static NAT entries.

**Configuring NAT for the Standard Firewall**

The next procedure describes how to configure NAT for the standard firewall.

**Configure NAT**

1. Choose **Standard Firewall > NAT** from the Configuration Menu. For information on configuring the standard firewall, see “Configuring the Standard Firewall” on page 22.
2. Select the checkbox to enable NAT.
3. Enter the information in the format described in “NAT Pages” on page 189.
   A message indicates that service will be temporarily interrupted.
4. Click **OK** to confirm.

**Delete a NAT entry**

1. Choose **Standard Firewall > NAT** from the Configuration Menu.
2. Delete the text for the NAT rule.
3. Click **Submit**.
   A message indicates that service will be temporarily interrupted.
4. Click **OK** to confirm.
Configuring NAT for the Advanced Firewall

The next procedure describes how to configure settings to support dynamic NAT.

**Configure dynamic NAT**

1. Enable the advanced firewall, if it is not already enabled, and choose Advanced Firewall > NAT from the Configuration Menu. See “Configuring Advanced Firewall Settings” on page 22.
2. Select the Dynamic NAT checkbox, and click Submit.
   A message indicates that service will be temporarily interrupted.
3. Click OK to confirm.

Configuring Static NAT

The next procedure describes how to configure settings to support static NAT.

**Configure static NAT**

1. If the standard firewall is used, choose Firewall > NAT from the Configuration Menu. If the advance firewall is used, choose Advanced Firewall > NAT from the Configuration Menu.
2. Enter address and port information, as described in “NAT Pages” on page 189.
3. Click Submit.
   A message indicates that service will be temporarily interrupted.
4. Click OK to confirm.

Delete a static NAT entry

1. Choose Firewall > NAT from the Configuration Menu.
2. Highlight the entry, and click Delete.
   A message indicates that service will be temporarily interrupted.
3. Click OK to confirm.
Advanced Data Capabilities

This chapter describes how to configure advanced data capabilities on the EdgeMarc appliance. It contains the following sections:

- Configuring Certificates
- Configuring Dynamic DNS
- Configuring a DMZ Using Proxy ARP and Routed Subnets
- Configuring RADIUS
- Configuring TACACS
- Static Routes

Configuring Certificates

The Certificate page allows you to configure the device certificate used by HTTPS for secure remote management. To access the device via the WAN, HTTPS access must be granted through the firewall.

**Configure certificate**

To access the Certificate page, select **System > Certificate** from the Configuration Menu. This page includes the following fields:

1. Choose **System > Certificate**.
2. Configure parameters as described in **Certificate Page on page 249**.
3. Click **Add**.

   A message indicates that service will be interrupted while the new interface is added.
4. Click **OK** to confirm.

Configuring Dynamic DNS

Dynamic DNS allows a system administrator to associate a name with the public address of the system. When a change occurs to the public interface of the system, the Dynamic DNS service is notified of the change. Common uses for Dynamic DNS are...
systems with a frequently changing public address (DHCP or PPPoE). Even systems with static addresses can use dynamic DNS to assign a name to a system.

**Configure dynamic DNS**

1. Choose System > Dynamic DNS.
2. Configure parameters as described in Dynamic DNS Page on page 253.
3. Click Add.
   A message indicates that service will be interrupted while the new interface is added.
4. Click OK to confirm.

**Configuring a DMZ Using Proxy ARP and Routed Subnets**

This section describes how to set up a DMZ using proxy ARP and routed subnets.

**Proxy ARP**

Proxy ARP is used to create a bridge between two interfaces on the system. Addresses and networks that are bridged bypass the firewall and NAT, allowing complete unprotected access to the systems using the addresses. Proxy ARP allows the system to respond to ARP requests for the IP address on the specified interface. Without an ARP response, external devices would be unable to communicate with the requested IP address.

Even though the system responds to ARP requests, it is transparent to the external device and the system using the proxied address. Because the system is transparent, the firewall and NAT features do not affect traffic to and from the proxied address.

**Warning**

If an address is proxied, the system using the address should have a firewall or it should not be on the public network. In addition to proxying individual addresses, a range of addresses can be proxied by specifying a network netmask rather than a host netmask.

**Configure proxy ARP**

1. Choose System > Proxy ARP.
2. Configure parameters as described in “Proxy ARP Page” on page 262.
3. Click Submit.
   A message indicates that service will be temporarily interrupted.
4. Click OK to confirm.

Delete a proxy ARP entry

1. Select checkboxes for the entries that you want to delete. Click Select: All to choose all the entries or Select: None to clear your selections.
2. Click Delete.
   A message indicates that service will be temporarily interrupted.
3. Click OK to confirm.

Configuring RADIUS

Remote Authentication Dial In User Service (RADIUS) is an authentication, authorization and accounting protocol that is used for management sessions with the EdgeMarc series appliances. If RADIUS authentication is configured, the EdgeMarc appliance communicates with a network deployed RADIUS server to authenticate serial console, SSH, TELNET, http, and https management sessions.

If the EdgeMarc cannot contact the network based RADIUS server in the specified number of retries, or the configured shared secret does not match the secret on the RADIUS server, the EdgeMarc uses the credentials supplied by the user to perform local authentication.

The RADIUS Settings page contains parameters for RADIUS server authentication for HTTP, HTTPS, SSH, Telnet, and console login.

The following screen shows RADIUS server configuration for the RADIUS server with IP address 192.168.12.2, using three server retries and the CHAP authorization mode.

For all protocols except SSH, feedback is given to the operator indicating whether the login is being sent to the RADIUS server or verified locally. Sessions involving the RADIUS server are identified with the string “Radius” in the login prompt, as in the following example:

Sessions authenticated locally on the EdgeMarc appliance are identified with the string “System” in the login prompt. A sample http login using local authentication is shown in the following example:

Configure RADIUS

1. Choose System > RADIUS Settings.
2. Configure parameters as described in “RADIUS Settings Page” on page 264.
3. Click Submit.
   A message indicates that service will be temporarily interrupted.
4. Click OK to confirm.
Configuring TACACS

Terminal Access Controller Access Control System (TACACS) is an authentication and accounting protocol designed for use with UNIX platforms. In TACACS authentication, a remote server supplies user login and password information to an authentication server. In TACACS accounting, detailed accounting information is sent to a remote server.

TACACS+ is a newer generation replacement for TACACS, which divides authentication, authorization, and accounting into separate functions. A remote TACACS+ server stores the user and password information. This information is supplied during the authentication process. TCP is used as the communications protocol for TACACS+ messages.

EdgeMarc Support for TACACS+ Authentication

TACACS+ authentication support is provided for the following management interfaces on the EdgeMarc appliance:
- HTTP/HTTPS
- Console Login
- SSH
- Telnet

If TACACS+ is enabled, then the system prompts for user name and password whenever a user attempts to login using the above-mentioned protocols. Upon receiving the user name and password, the EdgeMarc appliance attempts to establish a connection with the TACACS+ server. When the connection is established, the user authentication request is transmitted to the TACACS+ server. The details of the request depend upon the authentication mode configured in the EdgeMarc appliance.

TACACS+ authentication may result in any of the following outcomes:
- The TACACS server authenticates the user, and login is successful.
- Connection to the TACACS+ server fails (times out). Administrator password authentication is used for the next login attempt.
- Connection is established with the TACACS+ server, but the authentication parameters (user name and password) are not validated and authentication fails. TACACS+ authentication mechanism is used again for the next login attempt.

TACACS+ Authentication Modes

The EdgeMarc appliance supports the following TACACS+ authentication modes:
- ASCII—The user name is sent as part of the TACACS client request and the password is sent as part of the continue message.
- Password Authentication Protocol (PAP)—Both username and password are sent as part of the request message.
- Challenge Handshake Authentication Protocol (CHAP)—The password is used to calculate the response to a random challenge. Both the challenge and response are sent as part of the TACACS+ request message.
For successful authentication, the user name and password entered for TACACS+ authentication at run-time must match the values that are configured on the TACACS+ server. The user name and password settings depend on the authentication mode (PAP/CHAP/ASCII).

**EdgeMarc Support for TACACS+ Accounting**

TACACS+ accounting support is provided for the EdgeMarc appliance. TACACS+ accounting can be used to track user interactions with the system and provide a user audit trail that can be used for resource allocation or billing.

**Logging of GUI Interactions**

When TACACS+ logging is enabled, all the configured parameters that have changed from their original stored values are sent as a sequence of attribute-value pairs (AV pairs). The format is

```
attributename=attributevalue
```

where `attributename` is the name of the configurable parameter (similar to the GUI field name) and `attributevalue` is the new value of that parameter.

All TACACS+ parameters except for TACACS+ Authentication Mode are applicable for both logging and authentication features.

For the GUI interface, the TACACS+ logging message also contains the following protocol-specific fields:

- `service=http`
- `page_name=symbolic name of the web page e.g. pg_vpn`
- `operation=self explanatory action name such as submit, add, delete`

For Telnet, SSH and console the logging messages consists of the following:

- `Command=issued command`

If the parameter value or command name exceeds the maximum AV Pair length of 255 characters, then the message is broken into multiple AV pairs, as follows (This is a TACACS+ limitation):

```
attrname=attrvalue
attrname_continued=attrvalue_cont.
```

and so on.

In addition to the field information, the TACACS+ logging message also contains some protocol-specific fields.
TACACS+ and RADIUS

The EdgeMarc appliance supports use of TACACS+ or Remote Authentication Dial In User Service (RADIUS), but not both. If you attempt to enable TACACS+ while RADIUS is enabled, or vice versa, an error message is displayed, and the configuration is not applied.

If either TACACS+ or RADIUS are enabled but the system is not able to communicate with the server (TACACS+ or RADIUS respectively), then the system reverts to administrator password authentication.

Configuring TACACS+ Settings

This section describes how to configure TACACS+ on the TACACS+ Configuration Page. The page contains these checkboxes:

- a. Enable TACACS+ Authentication—Enables the TACACS+ authentication feature.
- b. Enable TACACS+ Logging—Enables the TACACS+ accounting feature.

Select the checkboxes for the TACACS+ features that you want to use:
- a and b—Enable both authentication and logging
- a only—Enable authentication only
- b only—Enable logging only
- No selection—Disable both logging and authentication

Note

All of the other fields on the TACACS+ Configuration page apply to authentication and accounting, except TACACS+ Authentication Mode, which applies only to authentication.

Configure TACACS+

1. Choose System > TACACS Settings.
2. If want to use the authentication features, select Enable TACACS+ Authentication.

Note

An error message is presented if you attempt to enable TACACS+ while RADIUS is enabled. To disable RADIUS, choose System > RADIUS Settings from the Configuration Menu, clear the Enable checkbox, and click Submit.

3. Configure parameters as described in “TACACS Settings Page” on page 286.
4. Click Submit.
   A message indicates that service will be temporarily interrupted.
5. Click OK to confirm.
Disable TACACS+ authentication

1. Choose System > TACACS Settings.
2. Clear the Enable TACACS+ Authentication checkbox.
3. Click Submit.
   A message indicates that service will be temporarily interrupted.
4. Click OK to confirm.

Disable TACACS+ accounting

1. Choose System > TACACS Settings.
2. Clear the Enable TACACS+ Logging checkbox.
3. Click Submit.
   A message indicates that service will be temporarily interrupted.
4. Click OK to confirm.

Static Routes

Use the Route page to create static routes on the system. Static routes may be needed to support network applications (such as a web server) that are allowed through the firewall and directed to a specific IP address or subnet.

Caution
Use care when configuring static routes! Static routes may prevent the other networking features in the system from functioning properly.

Note
To configure routing to support the transfer of VoIP data for more than one subnet, see “VoIP Subnet Routing” on page 70.

Configure static routes

1. Choose System > Route to open the Static Routes page.
2. Select the Apply Route checkbox.
3. Enter address information, as described in “Route Page” on page 267.
4. Click Submit.
   A message indicates that service will be temporarily interrupted.
5. Click OK to confirm.
This chapter describes how to configure management capabilities on the EdgeMarc appliance. It contains the following sections:

- Trusted Management Addresses
- System Time
- Network Information
- Remote Management
- SNMP
- System message logging (syslog)
- System Information
- User Commands
- Message of the Day

**Trusted Management Addresses**

This section describes Trusted Management Addresses and discusses how to configure the capability in the firewall. Trusted Management Addresses define a list of trusted management host addresses or network/masks. All other addresses are blocked from accessing the device.

To configure Trusted Management Addresses use the following procedure.

**Configuring Trusted Management Addresses**

1. On the Configuration Menu, select **Firewall**.
2. Within the Trusted Management Addresses, enter a list of trusted management host addresses or network/masks.
   
   The basic firewall rules will be applied only to the listed addresses. All other addresses will be blocked from accessing the device. If you do not include your management station, or a station to which you have access, you lose access to the appliance. You can only reinstate access by connecting to the serial console interface.
3. Press Submit.
System Time

Use the System Time page to set the system's time or configure it to synchronize with a network time source via Simple Network Time Protocol (SNTP).

Set the system time

2. Choose one of the following methods to set the time:
   - To use SNTP, select the Enable SNTP checkbox, and enter the domain name or IP address of the SNTP server.
   - Enter the time manually.
3. Click Submit.
   A message indicates that service will be interrupted while the new interface is added.
4. Click OK to confirm.

Network Information

The read-only page Network Information page displays the low-level network configuration of the system. The display areas include Routing Information, Link Status, and Interface Information.

The system routing table contains the static routes for hosts and networks that are configured on the system. When the LAN and WAN settings have been fully configured, four routing lines are displayed. The order of the lines may vary depending on the subnet masks, but they include:

- The private subnet associated with the LAN interface
- A similar line for the WAN interface
- A line for the loopback interface
- The network default gateway forwarding to the WAN interface

Additional lines may be present, depending on the contents of the Route and VoIP Subnet Routing pages. Each entry on one of these pages causes an additional entry in the routing table.
View network information

1. Choose System > Network Information from the Configuration Menu.
2. View the settings as described in “Network Information” on page 258.

Remote Management

Remote Management allows you to specify the protocols that are permitted for management traffic and to restrict management access to defined subnets.

Note
At any time, you can logoff a listed remote or local user who has management access to the device. For more information, see Enter the number of the assigned user that you wish logoff. A message is displayed confirming that the assigned user has been logged off. on page 138.

Configure remote management

1. Choose System > Remote Management from the Configuration Menu.
2. Configure the settings as described in “Remote Management” on page 266.
3. Click Submit.
   A message indicates that service will be temporarily interrupted.
4. Click OK to confirm.

SNMP

EdgeMarc appliances can be managed remotely by an SNMP network management system such as HP Openview. The EdgeMarc appliances support SNMPv1, v2, and v3 and the following MIBS:

- MIB-II (RFC 1213)
- IF-MIB (RFC 2863)
- SNMPv2-MIB (RFC 3418)
- TCP-MIB (RFC 4022)
- IP-MIB (RFC 2011)
- UDP-MIB (RFC 4113)
- SNMP-VIEW-BASED-ACM-MIB (RFC 3415)
- SNMP-MPD-MIB (RFC 3412)
- SNMP-USER-BASED-SM-MIB (RFC 3414)
- SNMP-FRAMEWORK-MIB (RFC 3411)
All MIB variables are read only. The SNMPv2-MIB variables sysContact, sysLocation and sysName can be set through the web GUI.

VOS 6.1 supports the configuration of multiple SNMP v1 and SNMP v2 trap destinations. The traps are sent to each of the configured destination using the appropriate protocol version and community string. SNMPv3 supports only one trap destination.

The EdgeMarc appliances send the following traps:
- coldStart
- authenticationFailure
- linkup
- linkDown

**Configure SNMP**

1. Choose **System > Services Configuration**.
2. To use SNMPv1, select the Enable SNMPv3 checkbox. By default, the agent-address field in SNMPv1 traps is set to the address of the interface that is used to send the trap. You can assign a custom IP address by entering a value in the SNMPv1 Trap Agent IP Address field.
3. To use SNMPv3, check the Enable SNMPv3 checkbox. Enter the user name, passphrase, security method, trap context, and destination trap IP address. The following security methods are supported:
   - None: No authentication and no Privacy
   - Auth(MD5): Authentication using MD5
   - AuthPriv(MD5/DES): Authentication using MD5 and Privacy using DES protocol
4. Configure other parameter on the page as described in “Services Configuration” on page 267.
5. Click **Submit**.
   - A message indicates that service will be temporarily interrupted.
6. Click **OK** to confirm.

The figure below displays the EdgeMarc configuration for the SNMP Network setup shown in the figure y:
Figure 2  SNMP Configuration Example

**Disable SNMP**

1. Choose **System > Services Configuration**.
2. Clear the Enable SNMPv1 or Enable SNMPv3 checkbox. A message indicates that service will be temporarily interrupted.
3. Click **OK** to confirm.
Delete an SNMP trap

1. Choose System > Services Configuration.
2. Click the wastebasket icon for the trap.
3. Click Delete.

System message logging (syslog)

You can configure remote systems to receive syslog messages from the EdgeMarc appliance.

Configure systems to receive syslog messages

1. Choose System > Services Configuration.
2. Check Enable Remote System Logging.
3. Enter the hostnames or IP addresses of the remote hosts (space-separated) and select the filter level, as described in “Services Configuration” on page 267.
4. Click Submit.
   A message indicates that service will be temporarily interrupted.
5. Click OK to confirm.

The next figure shows how to assign the system with IP address 10.10.20.159 and the system with host name “remhost” as remote syslog hosts.
System Information

The most commonly accessed system information is presented on the System page. The software version, hardware platform, and LAN MAC address are common pieces of information requested by system administrators and technical support.

The registration status for the ALG feature is displayed to ensure that the feature is enable. If the feature is not registered, no calls will be allowed to pass. The registration code is available on a sticker on the bottom of the system or from your service provider.

The password for administrator web access is set on the Reset Password page. The system administrator should reset the password when the system is first installed. Changing the default password will increase the security of the system.

Configure network subinterfaces

1. Choose System from the Configuration Menu.
2. View the settings as described in “Stateful Failover” on page 272.

Read-only Users

You can configure a user with the user name rouser to have read-only access to the system. All information is displayed in a non-changeable form. Information changed in entry boxes cannot be submitted. In fact, most Submit and OK buttons are not visible when the read-only user logs in.

Note
You must have administrator privileges and log in as an administrator to change read-only user.

Enable a read-only user

1. Choose System from the Configuration Menu.
2. In the Read-Only Password area, click changed.

Note
All open web browsers must be closed when you change between administrative user “root” and read-only rouser.

3. Enter and confirm the password, which must be a minimum of six characters long.
4. Click Submit.
   A message indicates that service will be temporarily interrupted.
5. Click OK to confirm.
When the system using the user name rouser and the configured password, all fields are read-only.

**User Commands**

The User Commands page allows you to enter specialized commands or enable features that are not available through other GUI pages. User commands are stored in the file `/etc/config/user_defs.conf`, as described in a number of Edgewater Knowledgebase articles. They are automatically executed whenever the box starts or a Network Restart is performed. User commands are commonly used to create user specific firewall and routing rules.

User Commands should only be entered when following instructions in an Edgewater Knowledgebase article or by request of the Edgewater TAC.

User commands:

```
ifconfig eth0:20 192.168.20.10 netmask 255.255.255.0
iptables -I POSTROUTING -t nat -s 192.168.20.10 -j ACCEPT
```

**Caution**

Take care when adding user commands. If an incorrect command is entered, the system may become unreachable.

**Access the user commands page**

1. Choose **System > User commands**.
2. Enter commands in the User Commands area. Enter each command on a new line.
3. Click **Submit**.

   A message indicates that service will be temporarily interrupted.
4. Click **OK** to confirm.

It is recommended that you perform a network restart if you change other GUI pages after issuing performing user commands.

**Message of the Day**

The EdgeMarc appliance supports configuration of custom messages of the day (MOTD) for administrators who log in to the system console.

The following message types are supported:

- **System Authorization Message of the Day**—This message is presented to users before they log into the system. A typical message would warn users that access
Management

is private and requires permission. Unauthorized users can be prompted to terminate the login session before attempting to log in.

- System Greeting Message of the Day—This message is displayed following successful login. A typical message would include a system greeting along with notification about important events or changes to the system.

Several method are supported for system login to the EdgeMarc appliance. The choice of login method determines which of the configured messages are displayed:

- Command line access through serial console connection—The System Authorization and System Greeting messages are displayed.
- Telnet or SSH access—The System Greeting message is displayed, but not the System Authorization message.
- HTTP/HTTPS—Neither the System Authorization nor System Greeting message is displayed.

Configure message of the day

1. Choose System > MOTD from the Configuration Menu.
2. Enter text messages as described in Message of the Day Page on page 188
3. Click Submit.
   A message indicates that service will be temporarily interrupted.
4. Click OK to confirm.

Note
For detailed field descriptions, see Message of the Day Page on page 188.
This chapter describes how to configure virtual private networks (VPNs) on the EdgeMarc appliance. It contains the following sections:

- Overview and Examples
- Configuring VPN Settings

Overview and Examples

Multiple options are available to configure VPN and firewall for use with the EdgeMarc appliance. The available options described in this section depend upon the EdgeMarc device, VLAN configuration, and IP configuration.

- Non-VLAN switches, one WAN subnet
- Single LAN Ethernet and Separate PC and Phone Subnets
- Single LAN Ethernet and Same PC and Phone Subnet
- Non-VLAN Edgewater Appliance, Non-VLAN Switches, One WAN Subnet
- VLAN or Non-VLAN Edgewater Appliance, Non-VLAN Switches, Two WAN Switches
- Non-VLAN EdgeMarc Appliance
- VLAN-capable Ethernet switch, VLAN or Non-VLAN Edgewater Appliance
- Non-VLAN EdgeMarc Appliance
- Third Party Firewall in front of Edgewater Appliance

Non-VLAN switches, one WAN subnet

Use these configurations with non-VLAN switches and one WAN subnet are supported on the Edgewater appliances that VLAN. The following characteristics apply to these configurations.

- The EdgeMarc device provides NAT, Firewall and DHCP Plug ‘n Dial to phones.
- A third-party firewall provides NAT, Firewall and DHCP to PCs.
- The WAN interface has one free IP address. The EdgeMarc is assigned an IP address from the WAN subnet, while Other addresses, including the one already being used by the third-party Firewall/VPN device, are bridged through the EdgeMarc to its LAN interface.
- EdgeMarc LAN interface uses two VLANs:
VLAN #2730 is used for the private subnet for phones (associated with EM LAN port 4). This LAN uses standard 802.1 frames.

VLAN #2 with a public subnet for the 3rd-party VPN / Firewall device (associated with EdgeMarc LAN port 3). This LAN uses standard 802.1 frames.

These configuration options have the following limitations:

- Two two drops per cube or office are required.
- Because DHCP is used separately for PCs and phones, two broadcast domains (and two LANs) are required.

Single LAN Ethernet and Separate PC and Phone Subnets

These configurations are possible only on Edgewater appliances that provide VLAN support, such as the 4300 series appliances. The following characteristics apply to these configurations.

- The EdgeMarc device provides NAT and firewall capabilities to phones.
- A third party firewall provides NAT, Firewall and DHCP to PCs.
- The WAN interface has one free IP address. The EdgeMarc is assigned an IP address from the WAN subnet, while Other addresses, including the one already being used by the third-party Firewall/VPN device, are bridged through the EdgeMarc to its LAN interface.
- EdgeMarc LAN interface uses two VLANs:
  - VLAN #2730 is used for the private subnet for phones (associated with EdgeMarc LAN port 4). This LAN uses standard 802.1 frames.
  - VLAN #2 with a public subnet for the 3rd-party VPN / Firewall device (associated with EdgeMarc LAN port 3). This LAN uses standard 802.1 frames.

These configuration options have the following limitations:

- DHCP and Plug ‘n Dial not available for phones
- Phones must be manually configured with IP addresses in the 10.10.10.0 subnet and a SIP Proxy or MGCP Control Server address of the EdgeMarc.
- This configuration is only possible on Edgewater appliances that provide VLAN support, such as the 4300 Series appliance.

Single LAN Ethernet and Same PC and Phone Subnet

These configurations are possible only on Edgewater appliances that provide VLAN support, such as the 4300 series appliances. The following characteristics apply to these configurations.

- EdgeMarc provides ALG functionality to phones.
- A third party firewall provides NAT, Firewall and DHCP to PCs and phones.
- Phones receive IP addresses from the same pool as PCs.
- The default router for PC and phones is the third party firewall.
- The EdgeMarc device is the SIP Proxy or MGCP control server to phones.
- The WAN interface has one free IP address:
The EdgeMarc is assigned one IP address from the WAN subnet.
Other address(es), including the one already being used by the 3rd-party Firewall/VPN device, are bridged through the EdgeMarc to its LAN interface.

The EdgeMarc LAN interface uses two VLANs:
- VLAN #2730 with private subnet for phones, and shared by PCs (associated with EM LAN port 4). This LAN uses standard 802.1 frames.
- VLAN #2 with a public subnet for the 3rd-party VPN / Firewall device (associated with EM LAN port 3). This LAN uses standard 802.1 frames.

These configuration options have the following limitation:
- This configuration is only possible on Edgewater appliances that provide VLAN support, such as the 4300 Series appliance.

**Non-VLAN Edgewater Appliance, Non-VLAN Switches, One WAN Subnet**

The following characteristics apply to these configurations:
- EdgeMarc provides NAT, Firewall and DHCP Plug ‘n Dial to phones
- A third-party firewall provides NAT, Firewall and DHCP to PCs
- The WAN interface has one free IP address:
  - The EdgeMarc is assigned one IP address from the WAN subnet
  - Other address(es), including the one already being used by the 3rd-party Firewall/VPN device, are bridged through the EdgeMarc to its LAN interface.

These configuration options have the following limitation:
- This configuration requires two drops per cube or office. DHCP is used separately for PCs and Phones, requiring two broadcast domains. Two broadcast domains means two LANs.

**VLAN or Non-VLAN Edgewater Appliance, Non-VLAN Switches, Two WAN Switches**

The following characteristics apply to these configurations:
- You must create two LAN-side VLANs:
  - One VLAN with a public subnet for the 3rd-party VPN / Firewall device (associated with EM LAN port 3).
  - One VLAN with private subnet for phones (associated with EM LAN port 1).
- VPN / Firewall device provides DHCP, Firewall and NAT to PCs and servers.
- The VPN creates a third subnet (192.168.3.0, above), but it is ignored by the EdgeMarc and only used by the VPN and associated PCs.
- EdgeMarc provides Firewall and NAT to phones.

These configuration options have the following limitations:
Plug ‘n Dial is not available for phones. Phones must be manually configured with SIP Proxy or MGCP Control Server address.

This configuration is only possible on Edgewater appliances that provide VLAN support, such as the 4300 Series appliance.

Non-VLAN EdgeMarc Appliance

The following characteristics apply to these configurations:

- EdgeMarc provides DHCP, Firewall and NAT to phones.
- A third party firewall provides DHCP, Firewall and NAT to PCs and servers.

These configuration options have the following limitations:

- This configuration requires two Ethernet drops to each desk.

VLAN-capable Ethernet switch, VLAN or Non-VLAN Edgewater Appliance

The following characteristics apply to these configurations:

- EdgeMarc provides NAT, Firewall and DHCP Plug ‘n Dial to phones.
- A third party firewall provides NAT, Firewall and DHCP to PCs.
- The WAN interface has at least one free IP address:
  - The EdgeMarc is assigned one IP address from the WAN subnet.
  - Other address(es), including the one already being used by the 3rd-party Firewall/VPN device, are bridged through the EdgeMarc to its LAN interface.
- EdgeMarc LAN interface uses two VLANs:
  - VLAN #200 with private subnet for phones (associated with EM LAN port 2). This LAN uses 802.1q frames.
  - VLAN #2 with a public subnet for the 3rd-party VPN / Firewall device (associated with EM LAN port 3). This LAN uses standard 802.1 frames.

These configuration options have the following limitation:

- Requires VLAN-capable and CDP-capable Ethernet switch and phones.

Non-VLAN EdgeMarc Appliance

The following characteristics apply to these configurations:

- EdgeMarc provides NAT, Firewall and DHCP Plug ‘n Dial to phones.
- A third-party firewall provides NAT, Firewall and DHCP to PCs.
- The WAN interface has at least one free IP address:
  - The EdgeMarc is assigned one IP address from the WAN subnet.
  - Other address(es), including the one already being used by the 3rd-party Firewall/VPN device, are bridged through the EdgeMarc to its LAN interface.
- EdgeMarc LAN interface uses two Subnets (over one LAN segment).
Subnet 10.10.10.0/24 for phones (VLAN #200 within switch)
Proxy ARP subnet 67.40.40.2/32 for the 3rd-party VPN / Firewall device (VLAN #2 within switch).

These configuration options have the following limitation:
- Requires VLAN-capable and CDP-capable Ethernet switch and phones.
- VLANs #2 and #200 share Ethernet segment at EdgeMarc

Third Party Firewall in front of Edgewater Appliance

The following characteristics apply to these configurations:
- External device provides port firewalling
- EdgeMarc provides Traffic Shaping (by having the servers, PCs and phones behind the EdgeMarc)
- EdgeMarc provides DHCP and NAT to PCs and phones
- EdgeMarc provides IP address passthrough from firewall to servers

These configuration options have the following limitation:
- This scenario is more complex than the above in that it requires the firewall to open ports necessary for VoIP protocol.

Dynamic WAN IP Address Assignment

In some network environments, it is necessary for the EdgeMarc device to use a dynamically assigned WAN IP address rather than a static address assigned by way of the EdgeMarc GUI.

Examples:
- WAN DHCP—The EdgeMarc device is connected via Ethernet behind a router that includes a DHCP server. This is common in small office/home office (SOHO) environments. The DHCP server assigns the IP address.
- PPPoE—The EdgeMarc device is connected via Ethernet behind a DSL router, and a Point to Point Protocol (PPP) session is terminated in the carrier network using a digital subscriber line access multiplexer (DSLAM). The DSLAM assigns the IP address to the EdgeMarc device.
- T1 PPPoFR, MLPoFR — The EdgeMarc device is connected using single or Multiple T1 interfaces running over frame relay. The dynamic WAN IP address is negotiated using the PPP protocol.

To support these environments, IPSec VPNs on the EdgeMarc device are now compatible with dynamic WAN IPs. Support includes the case in which the IP address changes on both ends of an IPSec tunnel.

The EdgeMarc device also supports dynamic WAN IPs if IPSec is not configured.

Example:
- An installation has a key system on the LAN side of a central EdgeMarc device, and IP phones or soft clients connect over the Internet through a remote EdgeMarc device without using VPN. When the WAN IP address on the remote
EdgeMarc device changes, the device can continue to send traffic using the new address. The ALG is not used and the voice traffic is treated as data. The IP phone re-registers using the new IP address so that the central-site key system can learn the new address of the remote device.

Support for dynamic IP addresses extends to NAT operations. Static NAT statements permit mapping between public IP:ports and private IP:ports. In the dynamic WAN IP environment, any change of WAN IP address now results in the updating of NAT table entries.

Example:
- A public IP:port 8080 is mapped to a private IP:port 80 webserver. If the WAN IP of the Edgemarc changes, the static NAT rules are automatically updated with the new WAN IP address.

When Dynamic DNS (DDNS) is used, the public IP of the EdgeMarc device is resolved using DNS. When the public IP changes, the DDNS client in the EdgeMarc device reports to the dynamic DNS server.

**Note**
If EdgeView is deployed, the EdgeMarc device updates EdgeView device by forwarding its MAC address, hostname and new IP address.

The following options are supported for configuration to support assignment of dynamic WAN IP addresses.
- WAN_IP only
- DNS only
- WAN_IP and DNS

where WAN_IP represents the WAN IP address of the EdgeMarc device, and DNS refers to the IP address of the remote VPN server.

### Configuring VPN Settings

The VPN Configuration page allows you to create, configure, edit, and delete VPN tunnels.

**Note**
Only some EdgeMarc devices support VPN.

**Add a VPN tunnel**

1. Choose VPN from the Configuration Menu.
2. Click on the Add Tunnel button. The VPN Tunnel Settings page opens to display the configuration of the selected tunnel.
3. Configure settings as described in “VPN Tunnel Settings Page” on page 245.
4. Click Apply.
**Modify a VPN tunnel**

1. Choose VPN from the Configuration Menu.
2. Click on the tunnel name of the VPN tunnel that you want to modify. The VPN Tunnel Settings page opens to display the configuration of the selected tunnel.
3. Configure settings as described in “VPN Tunnel Settings Page” on page 245.
4. Click Apply.

**Delete a VPN tunnel**

1. Choose VPN from the Configuration Menu.
2. Select the tunnel and click the Delete button.
This chapter describes how to configure Voice over IP (VoIP) features on the EdgeMarc appliance. It contains the following sections:

- Traffic Management
- VoIP ALG
- VoIP Subnet Routing

Traffic Management

Traffic management is required to ensure high quality voice calls when both voice and data traffic share the same WAN link. Voice traffic must be prioritized for transmission over data traffic to meet the stringent jitter, latency, and packet loss requirements for toll-quality voice. By default, the EdgeMarc device:

- Automatically prioritizes voice traffic over data traffic to ensure toll-quality voice calls.
- Manages bandwidth using different upstream and downstream link speeds (for example ADSL).
- Maximizes WAN link utilization by allowing data traffic to burst up to full line rate in the absence of voice calls.
- Controls the data transfer rate of upstream TCP devices to limit WAN link congestion.
- Optimizes throughput for low-bandwidth WAN links (for example ADSL) by automatically adjusting the maximum transmission unit (MTU) and maximum segment size of IP datagrams during periods of WAN congestion.
- Supports network-based QoS applications by setting the TOS bits for all VoIP packets sent to the WAN and the LAN. TOS bits are used so that VoIP packets can be prioritized in the network by DiffServ enabled routers. The TOS bit value used by the EdgeMarc device is to “minimize delay and maximize throughput” or 8p hexadecimal. This value is set for all VoIP packets processed by the EdgeMarc device and overwrites any specific TOS bit configuration set by VoIP endpoints.
- Ensures that bandwidth allocated to new voice calls does not adversely affect the quality of existing active calls (call admission control or CAC).
- When deployed in an MPLS-based virtual private network, the EdgeMarc provides up to 8 priority queues that can accommodate multiple applications with different needs for bandwidth and priority.
To use traffic shaping, you must configure the incoming and outgoing physical link data rates for the bottleneck link in the network. The bottleneck most often occurs on the WAN link in the form of a T-1 or DSL line.

If Call Admission Control (CAC) will be enabled, you must first determine the number of calls that can be supported. If the codec is G.711, the required data rate per call is 85.6 Kbytes/sec. If the codec is G.729, the required data rate per call is 29.6 Kbytes/sec. The data rates apply in both the upstream and downstream directions. The smaller of the upstream and downstream rates should be used to determine how many calls can be supported.

One example configuration would be a DSL line with physical data rates of 768/128 Kbytes. You would enter 768 in the WAN Downstream Bandwidth field and 128 in the WAN Upstream Bandwidth field. If CAC were enabled and the codec used was G.711, then the maximum number of calls supported would be one call. In this case, the upstream bandwidth is the limiting value.

Another example configuration would be a T1 line with physical data rates of 1544/1544 Kbytes. You would enter 1544 in the WAN Downstream Bandwidth field and 1544 in the WAN Upstream Bandwidth field. If CAC were enabled and the codec used was G.711, then the maximum number of calls supported would be 15 calls.

**Traffic Shaping**

Traffic shaping in the system is designed to ensure that high priority real-time data is processed before lower priority non-real-time data. High priority endpoint devices such as VoIP phones are identified by the VoIP ALG function and are automatically marked as high priority. No user configuration is required.

Traffic shaping uses a combination of queues to both prioritize and smooth the media data. As packets pass through the system, they are marked as either high or low priority based. All packets are placed in a class-based queue. The two classes of data support by the queue are high and low. When data is available in the high priority queue, it is sent out at up to the configured upstream bandwidth. To smooth bursts from high speed data links (typically the LAN Ethernet), priority data is sent using a periodic queue that smooths the data and sends it at a rate that the slowest link can support. Non-priority data is sent when there is available bandwidth.

To ensure that some bandwidth is available to non-priority traffic, the system enforces an upper limit on the priority data rate of 90-95% of the slowest link rate. Priority data is bounded so that low priority data is not starved. If low priority clients are starved, they generate retries that may exacerbate congestion during periods of peak usage.

**Advanced Traffic Shaping**

Advanced traffic shaping is available for use with MPLS-based virtual private networks. Advanced traffic shaping allows you to distinguish between up to eight different traffic classes. You can configure these classes so that they further prioritize traffic using bandwidth specifications and rules which are applied to traffic flows.

Advanced traffic shaping uses the Differentiated Services Coding Point (DSCP) to distinguish between the priority classes. All priority classes can exceed their specified...
bandwidth if bandwidth is available, otherwise they will be restricted to the bandwidth values assigned to them. In the case where multiple classes are exceeding the bandwidth values assigned to them but the WAN link is not yet saturated each class will be allocated the remaining unused bandwidth equally. This will continue until the WAN link becomes congested or saturated at which point the throughput for any class will fall back to its configured bandwidth.

If a class is not created for a DSCP value in use, all packets with that value will be sent to the class that has a DSCP value of Best Effort. Furthermore, CAC values for Primary and Secondary links specified on the Traffic Shaper page must not exceed the specified bandwidth of the class that is associated with the voice and video traffic.

**ToS Byte Setting**

Since the Internet itself has no direct knowledge of how to optimize the path for a particular application or user, the IP protocol provides a limited facility for upper layer protocols to convey hints to the Internet Layer about how the trade-offs should be made for the particular packet. This facility is the “Type of Service” or ToS facility.

ToS settings allow the service provider to prioritize time sensitive traffic, such as voice plus video to ensure minimized packet loss and delay through their network. When providing end-to-end QOS, it is important that the voice plus video traffic be placed in the correct queues to deliver a higher QOS than regular traffic. Regular traffic, that is not time sensitive, can be delayed with little or no indication to the user, while the slightest delay in voice plus video can cause auditable differences. The ToS byte setting helps prioritize traffic going to the WAN so a provider can prioritize the traffic correctly in its network.

Although the ToS facility has been a part of the IP specification since the beginning, it has been little used in the past. However, the Internet host specification now mandates that hosts use the ToS facility. Additionally, routing protocols (including OSPF and Integrated IS-IS) have been developed which can compute routes separately for each type of service. These new routing protocols make it practical for routers to consider the requested type of service when making routing decisions.

For all RTP traffic (voice and video), the EdgeMarc 4300T marks the ToS byte in the IP header as “High Priority,” and strips (set to 0) the ToS byte for all other traffic. Unchecking the “Enable ToS Byte Stripping” option means that the ToS byte will not be stripped from non-RTP traffic, but will remain unchanged.

For most situations, you should leave this setting as it is. Only change it if your provider indicates that you should do so.

**Traffic Marking**

While the Internet maintains no direct knowledge of how to optimize the path for a particular application or user, the IP protocol does provide a limited facility for upper layer protocols to convey hints to the Internet layer about how the trade-offs should be made for the particular packet. This facility is called Type of Service (ToS).

ToS settings allow the service provider to prioritize time sensitive traffic, such as voice plus video, to ensure minimized packet loss and delay through the network.
When providing end-to-end quality of service (QoS), it is important that the voice plus video traffic be placed in the correct queues to deliver a higher QoS than regular traffic. Normal traffic that is not time sensitive can be delayed with little or no impact on the user, whereas the slightest delay in voice plus video can cause noticeable differences.

Although ToS has been a part of the IP specification since its inception, it has not been used extensively. However, the Internet host specification now mandates that hosts use ToS. Additionally, routing protocols (including OSPF and Integrated IS-IS) can now compute routes separately for each type of service. These new routing protocols make it practical for routers to consider the requested type of service when making routing decisions.

The Differentiated Services Code Point (DSCP) is the priority value that is encoded in the IP packet header. The DSCP value determines the level of preferred treatment that the packet receives as it travels through the network.

For all real-time transport protocol (RTP) traffic (voice and video), the EdgeMarc 4300T marks the ToS byte in the IP header as High Priority, and strips (set to 0) the ToS byte for all other traffic. Unchecking the Enable ToS Byte Stripping option means that the ToS byte will not be stripped from non-RTP traffic, but instead will remain unchanged.

**Call Admission Control**

The EdgeMarc device uses CAC to limit the number of active voice calls over the WAN link. This is necessary because a typical installation uses a ratio of 1:2 or 1:4 active voice calls to voice devices on the assumption that 50% or 25% of all users are on the phone at the same time. These ratios are guidelines only, and at times the number of concurrent calls may exceed the amount of WAN bandwidth available to process the calls. In this instance existing phone calls will experience poor quality or be dropped altogether. To prevent this from occurring, a typical voice installation will set a threshold for the maximum number of concurrent voice calls supported by the WAN access link. New call requests in excess of this threshold will receive the equivalent of a “fast busy” and the WAN link will not become oversubscribed.

For IP Centrex installations the maximum number of concurrent voice calls is usually configured in the EdgeMarc device by enabling CAC. When the EdgeMarc device is deployed in IP PBX applications, the maximum number of concurrent calls could be configured in the IP PBX. If the PBX is responsible for this setting, you do not need to configure CAC in the EdgeMarc device. Check with your IT administrator to determine if this is the case.

**Note**
CAC is available in the EdgeMarc device for the MGCP and SIP VoIP protocols only.

**Determining the Maximum Number of Concurrent Calls**

The maximum number of concurrent calls that can be supported by the WAN access link is calculated using the following formula:

Max calls = (Maximum WAN upstream bandwidth * .85)/VoIP codec rate
where

Maximum WAN upstream bandwidth = value entered in the **WAN Upstream Bandwidth** field (in Kbps)

VoIP codec rate = 85.6 Kbps for G.711 voice devices or 29.6Kbps for G.729 voice devices.

The maximum WAN upstream bandwidth is multiplied by .85 in this formula to reduce the total bandwidth available for voice calls by 15%. This reduction is necessary because the EdgeMarc device automatically reserves 15% of the total WAN bandwidth for low priority data traffic so that data traffic is not starved completely. Starving data traffic completely would increase the number of retry attempts and exacerbate congestion on the link during periods of peak usage.

**Examples**

The maximum number of G.711 voice calls supported by a T1 (1.544 Kbps) WAN is calculated as follows:

\[(1544\times0.85)/85.6 = 15.3\text{ or }15\text{ total voice calls.}\]

The maximum number of G.711 voice calls supported by a 768Kbps SDSL WAN is calculated as follows:

\[(768\times0.85)/85.6 = 7.6\text{ or }7\text{ total voice calls}\]

The maximum number of G.711 voice calls supported by an ADSL WAN with 768Kbps downstream WAN bandwidth and 256Kbps upstream WAN bandwidth is calculated as follows:

\[(256\times0.85)/85.6 = 2.5\text{ or }2\text{ total voice calls}\]

The maximum number of G.729 voice calls supported by an ADSL WAN with 768Kbps downstream WAN bandwidth and 256Kbps upstream WAN bandwidth is calculated as follows:

\[(256\times0.85)/29.6 = 7.4\text{ or }7\text{ total voice calls}\]

After determining the maximum number of voice calls, enable CAC as follows:

1. Click the **Enable Call Admission Control** checkbox.
2. Enter **Maximum number of calls allowed** as calculated above.
3. Click **Submit**.

**Traffic Management in the EdgeMarc Device**

The traffic management mechanisms provided by the EdgeMarc device are designed to ensure that high-priority, real-time voice traffic is processed before lower priority data traffic. At the same time, bandwidth not in use by voice traffic is made available so that data traffic can burst up to full line rate, making efficient use of WAN bandwidth. Traffic management mechanisms are applied to traffic in both the upstream (LAN to WAN) and downstream (WAN to LAN) direction. Each direction is independent of the other and can support different size priority queues. This is
particularly useful in the case of ADSL, where the downstream bandwidth is greater than the upstream bandwidth and it would be undesirable to limit downstream data traffic to the rate of the slower upstream link.

Classifying

High-priority voice traffic generated by endpoint devices such as IP phones and client adaptors is identified by their IP address. The user configures these addresses into a priority list using the traffic shaping features of the EdgeMarc device VOS. As the EdgeMarc device processes packets they are marked as either high or low priority based on this configuration.

Upstream Traffic Management

The EdgeMarc device uses a combination of class-based queuing and simple classless queuing to send data in the upstream direction. The class-based queue (CBQ) consists of two priority classes (high and low), a scheduler to decide when packets need to be sent earlier than others, and a traffic shaper to rate limit by delaying packets before they are sent. Voice traffic is placed in the high-priority class and data traffic is placed in the low-priority class. High-priority data is sent at up to the configured priority data rate. This class is polled before lower priority data to reduce overall latency for voice traffic. Although preferential treatment is given to priority data, it is bounded so that low priority data is not starved. To smooth bursts from high speed data links (typically from the LAN Ethernet segment to the WAN) the EdgeMarc device uses a buffer that clocks data out at a rate not exceeding the maximum amount for the slowest link. Any lasting burst condition will cause packets to be delayed and then dropped.

Downstream Traffic Management

In the upstream direction (LAN to WAN) it is easy to see how QoS mechanisms can be applied to traffic being sent by the EdgeMarc device to guarantee sufficient bandwidth for voice traffic. The EdgeMarc device has control over how packets are handed to the WAN interface. In the downstream direction (WAN to LAN) The EdgeMarc device is installed at the CPE end of a service provider link and has no control over the amount of voice or data traffic being sent to the WAN interface. How then can we still guarantee the quality of voice traffic when it is entirely possible for an FTP session, for example, to consume the vast majority of downstream bandwidth?

Voice traffic quality can be guaranteed by shaping on both the egress LAN and egress WAN ports of the EdgeMarc device and leveraging the congestion avoidance mechanisms built into TCP to reduce the amount of data traffic on the link. Essentially, data packets received at a rate that exceeds the configured maximum are delayed (then dropped if necessary) when sent to the LAN interface by the EdgeMarc device. Similarly, data traffic sent back to the EdgeMarc device for transmission to the WAN is also delayed. This results in the end stations slowing down their transmit rate. This technique is effective because end stations usually reduce their transmit rate before VoIP signaling has completed for new call setup.

For example, consider situation where no voice calls are being sent over an SDSL WAN link, and multiple FTP sessions are consuming all available bandwidth. In this situation:
A new call request is received by the EdgeMarc device from the WAN.

- All signaling messages for the call are classified as voice traffic and prioritized for transmission over the LAN before servicing FTP data.
- RTP traffic is similarly classified as voice traffic and treated with priority.
- FTP data is buffered (or dropped) on the egress LAN port and ACKs are also delayed on the egress WAN port. This throttles the transmit rate of the FTP hosts to reduce overall WAN bandwidth consumption.

Excessive UDP traffic must be shaped in the service provider network, because UDP does not provide congestion avoidance mechanisms. The exception to this is in the case of RTP messages for voice traffic. Although RTP is based on UDP, the EdgeMarc device provides its own congestion avoidance mechanism for voice traffic using CAC.

Priority IP Addresses

VoIP traffic from devices that use the VoIP ALG function (for example, telephones, video stations, or softphones on PCs) are already marked as high priority and do not need to be manually configured in this list. This list is used to prioritize voice traffic from trunk interfaces of IP PBXs or other high-priority devices that do not use the VoIP ALG function of the EdgeMarc device.

Configure traffic shaping

1. Choose Traffic Shaper from the Configuration Menu.
2. Configure settings as described in “Traffic Shaper Page” on page 193.
3. Click Submit.
   A message indicates that service will be temporarily interrupted.
4. Click OK to confirm.

VoIP ALG

An application-layer gateway (ALG) provides basic proxy features. Serving as an ALG proxy, the system maps many network appliances into one or more public IP addresses and provides the connectivity and management for IP phones. The ALG must first recognize and register a network appliance before it presents the IP telephone or data device through its public WAN port. The system contains an MGCP, SIP and H.323 call-control proxy ALG. VoIP phones and client adapters must be configured to point to the system, which serves as a call-control server, proxy, gatekeeper, or gateway.

For corporate customers with high-end routers and firewalls, the system can be configured as a VoIP Application Layer Gateway only. This allows all the normal data traffic to continue to be handled by the existing network devices, and voice/video traffic to be handled by the system. For this configuration, the system WAN Ethernet port is connected to the Internet. The system LAN Ethernet port is connected to a port
on the desired LAN Ethernet switch. The system can reside on one subnet and be accessed by VoIP devices on other subnets through the router.

**Configure ALG**

1. Choose **VoIP ALG**.
2. Configure settings as described in *Advanced Traffic Shaper Page on page 196*.
3. Click **Submit**.
   
   A message indicates that service will be temporarily interrupted.
4. Click **OK** to confirm.

To configure a protocol for the VoIP ALG, select one of the following items under VoIP ALG on the Configuration Menu:

- H.323 Configuration
- MGCP Settings
- SIP Settings

**SIP Settings**

Use the SIP Settings page to configure SIP for the VoIP ALG.

**Configure SIP settings**

1. Choose **VoIP ALG > SIP** from the Configuration Menu.
2. Configure settings as described in *Advanced Traffic Shaper Page on page 196*.
3. Click **Submit**.
   
   A message indicates that service will be temporarily interrupted.
4. Click **OK** to confirm.

**SIP Trunking**

You can configure the following SIP trunking functions for the EdgeMarc appliance:

- Dial String Manipulation
- Priority Redirection

**Dial String Manipulation**

Outbound SIP trunking rules are now available to support dial string manipulation for outbound calls sent out to a network softswitch. Outbound rules allow a gateway to direct calls through the EdgeMarc appliance to a Softswitch using appropriate dialing conventions, even if the gateway itself does not support the required conventions.
For example, if a Softswitch requires use of a + sign that is not normally supported by a particular gateway, you can define an outbound SIP trunking rule that appends a + sign to outbound calls that come from the gateway.

Figure 3 shows how the SIP trunking rule works. A call comes in from the PSTN through a gateway to the EdgeMarc appliance. The gateway does not support + dialing, so the EdgeMarc appliance applies an outbound SIP trunking rule to prepend a + sign before forwarding the call to the Softswitch.

**Figure 3   Outbound Dial String Manipulation**

If you assign a particular gateway to multiple outbound SIP trunking rules. The EdgeMarc device applies the first matching rule that applies to that gateway.

**Priority Redirection**

You can apply SIP trunking rules to redirect local calls through any of the FXO ports on the Edgemarc device to a matching trunking device without having to direct the call to a network Softswitch. Any call that matches a specified pattern is automatically routed to a specified gateway, thereby bypassing the network Softswitch.

You can also tag redirection rules as having a priority designation. If a priority-tagged call comes in while all FXO ports are in use with non-priority calls, one of the in-progress calls is dropped and the priority call is connected. Priority calls do not interrupt other priority calls, however.

Priority redirection can be used to improve handling of 911 calls, as shown in Figure 4. If a SIP trunking rule is defined for 911 pattern match and tagged as priority, then a local 911 call is sent directly from the local phone through an FXO port on the EdgeMarc appliance to the designated gateway. If all FXO ports are in use and at least one of the ports is not tagged for priority, then a non-priority call is dropped and the 911 call is connected.

Priority redirection can help emergency responders speed identification of a caller’s location.
To configure priority redirection, use the SIP Trunking page, as described in “SIP Trunking Page” on page 218, and also enable Priority Calling services on the FXO/Line Configuration page, as described in “SIP FXO/Line Port Configuration (SIP GW) Page” on page 238.

Priority calls do not support dial string manipulation. They must be sent through as-is.

Add a SIP trunking device

1. Choose VoIP ALG> SIP > Trunking.
2. In the Add a Trunking Device area, select Add a new trunking device.
3. Configure address and port information as described in “SIP Trunking Page” on page 218.
4. Click Commit.
   The trunking device is added to the SIP Trunking Devices table on the page.

Delete a SIP trunking device

1. Choose VoIP ALG> SIP > Trunking.
2. Click the waste basket icon for the device you want to delete.

Add a SIP trunking rule

1. Choose VoIP ALG> SIP > Trunking.
2. In the Add a Rule area, select Add a new rule.
3. Configure parameters as described in “SIP Trunking Page” on page 218.
4. Click Commit.
Delete a SIP trunking rule

1. Choose VoIP ALG > SIP > Trunking.
2. Click the waste basket icon for the rule you want to delete.

H.323 Configuration

Use the H.323 Settings page to configure the H.323 protocol for the VoIP ALG. The H.323 Settings page includes the following areas:
- Gatekeeper Mode
- WAN/Provider-side gatekeeper mode settings
- LAN/Subscriber-side gatekeeper mode settings
- Embedded gatekeeper mode settings
- LRQ Size
- Default Alias
- Stale Time
- Multicast Messages
- H.460.18 Support
- Alias Restrictions

Configure H.323 settings

1. Choose VoIP ALG > H.323.
2. Configure settings as described in H.323 Settings Page on page 204.
3. Click Submit.
   A message indicates that service will be temporarily interrupted.
4. Click OK to confirm.

H.323 Activity

The H.323 Activity page is a read-only page that shows the following information:
- Current time
- WAN Gatekeeper status
- Current payload bandwidth
- Estimated total bandwidth
- Activity log of recent H.323 events

View H.323 activity

- Choose VoIP ALG > H.323 > Activity.
H.323 Alias Manipulation

Alias manipulation is performed immediately when a message (such as an ARQ, LRQ or a Setup) is received. Any matching pattern is replaced with the specified string, allowing you to replace characters or strings that are hard or impossible to dial on certain endpoints. Normal call look-up is performed following alias manipulation.

Configure H.323 alias manipulation

1. Choose VoIP ALG > H.323 > Alias Manipulation.
2. Configure settings as described in H.323 Settings Page on page 204.

Note

Rules are executed in the order in which they are listed. Use the arrows to move entries up and down, or use the Index field to specify where a new or edited rule falls in the list.

3. Click Submit.
   A message indicates that service will be temporarily interrupted.
4. Click OK to confirm.

H.323 Neighboring

Neighboring and prefix routing can be used to route calls based on a matching prefix in the destination alias of the call. The call decision is made following alias manipulation and acts on the modified string, similar to other call lookup processes such as registered client look-up. Each prefix is associated with a domain name or IP address that is used in the event that the prefix matches.

To access the H.323 Neighboring page (formerly the Prefix Routing page), select VoIP ALG > H.323 > Neighboring in the Configuration Menu.

Configure H.323 alias neighboring

1. Choose VoIP ALG > H.323 > Neighboring.
2. Select Add a new prefix.
3. Configure settings as described in H.323 Neighboring Page on page 211.
4. Click Commit.
   A message indicates that service will be temporarily interrupted.
5. Click OK to confirm.
6. The new entry is added to the table.
Delete an H.323 neighboring entry

1. Choose VoIP ALG > H.323 > Neighboring.
2. Click the waste basket icon for the entry you want to delete.

Regular Expressions

Alias manipulation patterns and prefixes use regular expressions to match a string in the destination alias. A regular expression can be a string of literal characters to match or a set of special expressions.

Alias manipulation patterns can match a sub-string at any location and number of times within the alias. Prefixes are always searched from the left of the alias and cannot match a middle part or the end of the alias.

Regular expressions are listed in Table 3 and Table 4 lists some example expressions.

Table 3  Regular Expressions

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>.</td>
<td>Matches any single character.</td>
</tr>
<tr>
<td>[]</td>
<td>Matches any single character listed between the []. For example, [abc], [123]. If the characters are separated by a -, all characters between the two are matching, e.g. [a-z], [0-9]</td>
</tr>
<tr>
<td>()</td>
<td>Matches the literal string given, e.g. (abc)</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>?</td>
<td>Matches 0 or 1 of the preceding block.</td>
</tr>
<tr>
<td>*</td>
<td>Matches 0 or more of the preceding block.</td>
</tr>
<tr>
<td>+</td>
<td>Matches 1 or more of the preceding block.</td>
</tr>
<tr>
<td>\</td>
<td>Escapes the special meaning of the next character.</td>
</tr>
<tr>
<td>{a}</td>
<td>Matches exactly 'a' numbers of the preceding block.</td>
</tr>
<tr>
<td>{a,}</td>
<td>Matches 'a' or more of the preceding block.</td>
</tr>
<tr>
<td>{a,b}</td>
<td>Matches between 'a' and 'b' (inclusive) of the preceding block.</td>
</tr>
</tbody>
</table>

Table 4  Example Regular Expressions

<table>
<thead>
<tr>
<th>Expression</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>Matches the string 100.</td>
</tr>
<tr>
<td>(555)?123</td>
<td>Matches 555123 or 123.</td>
</tr>
<tr>
<td>(408)555</td>
<td>Matches 408 or 555.</td>
</tr>
<tr>
<td>555[0-9]{3}</td>
<td>Matches 555 followed by exactly 3 digits.</td>
</tr>
</tbody>
</table>
Use the MGCP Settings page to configure the MGCP protocol for the VoIP ALG.

**Configure MGCP settings**

1. Choose **VoIP ALG > MGCP**
2. Configure settings in the following areas, as described in MGCP Settings Page on page 213.
   - In the MCGP protocol area, configure settings for the softswitch where all client traffic will be forwarded.
   - In the Re-Registration area, configure automatic re-registration on behalf of the clients.
   - In the Audit Endpoint area, configure an audit endpoint, to allow the system to detect whether a client is still responsive.
3. Click **Submit**.
   A message indicates that service will be temporarily interrupted.
4. Click **OK** to confirm.

VoIP Subnet Routing

The EdgeMarc device acts as a proxy for network devices on its own subnet. Because network devices reside on the same subnet as the system, packets proxied by the ALG function and sent to the LAN do not require additional routing information.

Use the VoIP Subnet Routing page, to configure the server to proxy remote networking devices that are not on the same subnet. To system is limited to a total of 20 VoIP subnets.

These subnets reach the system via intermediate routers. The intermediate routers are configured to direct data from network devices to the system. In order for the system to send data to the intermediate router, a return path must be configured on the system.
Configure VoIP Subnet Routing

2. Configure settings as described in VoIP Subnet Routing Page on page 290.
3. Click Submit.
   - A message indicates that service will be temporarily interrupted.
4. Click OK to confirm.
Configuring FXS and FXO Ports

This chapter describes how to use the FXS and FXO ports available on the EdgeMarc device. It contains the following sections:

- Overview
- Example Configurations
- Configuring FXO Ports
- Configuring T38 and G.711 Fax
- Configuring FXS Ports
- Gain Settings
- Configuring SIP Trunking
- Configuring FXS Hunt Group
- Calling Features for Analog Phones on the FXS port

Overview

Foreign eXchange Subscriber (FXS) and Foreign eXchange Office (FXO) are standard analog telephony interfaces used in Public Switched Telephone Network (PSTN) networks. The FXS interface is the modular wall plug that connects the telephone to the central office (CO) of the PSTN. The CO delivers power, dial tone, and ringing capabilities by way of the FXS interface.

The FXO interface is the companion interface that receives analog phone service from the CO. Phones and other analog phone system devices each have an FXO port that receives on-hook and off-hook signals from the CO.

The EdgeMarc appliance supports PSTN connections through its FXO ports and connections to analog phones through its FXS ports. It provides a low-cost long distance connectivity solution for enterprises that have PBXs in geographically separated locations. It also provides survivability capabilities. A Softswitch can also use the EdgeMarc FXO ports as an enterprise gateway to route calls.

A Private Branch eXchange (PBX) can be connected to the EdgeMarc appliance for Session Initiation Protocol (SIP) trunking applications. A PBX is a private telephone switch that provides local phone service for an office or building. A PBX typically contains both FXS and FXO ports.
Survivability

The EdgeMarc survivability feature provides call control for local phones and a failover connection to the PSTN. If the connection to the Softswitch is lost, local calls can still be connected, and calls can be routed to the PSTN if the FXO ports are connected or a LAN-side gateway is used.

How Survivability Works

The EdgeMarc appliance creates a dial plan for survivability by monitoring the calls between VoIP endpoints and the network based Feature Server or Softswitch. When a local user dials a phone number, the EdgeMarc appliance collects all the keyed numerals and then sends a message to the Softswitch in the network. The Softswitch verifies that the call is a PSTN call, computes the destination, and arranges for the connection to be made. As part of this process, the local phones register with the Softswitch, and the EdgeMarc stores the registration information before sending it to the Softswitch. If the Softswitch or WAN link goes down, EdgeMarc has sufficient stored information to make connections between the local phones. This makes it possible for all the local phones to continue operating as if the Softswitch were still available.

In addition, if the WAN link is down, EdgeMarc appliance can also route calls destined for any non-local phone to the PSTN through its FXO ports. Up to two outbound calls can be made one time through the two FXO ports on the EdgeMarc appliance.

Session Initiation Protocol (SIP) Trunking

If an enterprise has multiple offices with associated PBXs in geographically separated locations, the EdgeMarc appliance can help provide lower cost service between the offices.

For multiple office connection support, an EdgeMarc appliance is installed with each PBX. As in the single office case, the PBXs provide local call processing. However, calls between the different offices are handled through the service provider, rather than through the PSTN. The process employs SIP trunking to make connections through the service provider's IP network. SIP handles the call set-up, control, and disconnect between PBXs.

Note

With SIP trunking, it may still be desirable to keep a single FXO port connected to the PSTN to support survivability.

Two-Stage Dialing for Inbound IP and PSTN Calls

You can enable two-stage dialing for inbound calls from the IP network and the PSTN:
Inbound IP network calls—For calls that come into FXO/line ports on the EdgeMarc device from the IP network, dial tone is provided to the caller to enable the caller to dial a number and connect through the PSTN.

Inbound PSTN calls—For calls that come in from the PSTN, the SIP/FXO line port provides dial tone when the PSTN call is answered. This enables the caller to dial an extension to complete the call or hang up.

Transmit/Receive Gain

You can configure the transmit and receive gain setting for each FXS port on the EdgeMarc device. Most devices will operate with the default 0dB Rx gain setting; however, if necessary, you can adjust the setting to interoperate with user endpoints such as phones, fax, or key systems.

It may be necessary to adjust the receive gain settings if, when a user endpoint device is hooked to the FXS port, the port is unable to detect the digits sent from the device. If this occurs, adjust the gain in steps of -4dB until the digits are detected.

Tx gain adjustments could be helpful to support devices that require a specific gain to decipher tones such as CNG or DIS, to support key systems that are connected to the FXS port, or for DTMF detection.

For FXS ports, the TX/RX gain settings will be adjusted at the user endpoint. TX will adjust the gain in the direction from IP WAN to the FXS port. RX will adjust the gain in the direction from the FXS port to IP WAN.

For FXO ports, the TX/RX gain settings will be adjusted at the WAN interface. TX will adjust the gain in the direction from the FXO port to the IP WAN. RX will adjust the gain in the direction from the IP WAN to the FXO port.

Priority Calling Support

Priority calling services provide for the routing of priority calls, as defined in the VoIP ALG SIP trunking plan. Calls made to a priority calling number from any FXS port are routed and connected on a priority basis.

The following rules determine the treatment of an incoming priority call:

- If a free FXO port is available, the priority call is routed and connected.
- If all FXO ports are busy, a non-priority call on one of the ports is dropped to allow the priority call to be routed and connected. **Note:** The PSTN live connection to the FXO port must support 3-way calling.
- If all FXO ports are busy with priority calls, the incoming priority call is not accepted.

To configure priority calling, enable the feature on the SIP FXO/Line Port Configuration Page and then define priority rules on the SIP Trunking Rules page.

**Note**

Priority calling services cannot be configured when WAN Link Redundancy is enabled.
FXS Hunt Group

The FXS Hunt Group feature enables the EdgeMarc appliance to group all FXS ports into a pool for answering incoming calls from the IP network. If a port is busy, the next port is picked until the call is answered by an idle port. If no FXS port is free to receive a call, a busy is returned to the calling party. The following characteristics apply to the Hunt Group feature:

- EdgeMarc can have only one hunt group consisting of all FXS ports.
- Hunt group is identified by a unique DID.
- The DID and authentication credentials are replicated for all ports.
- Supports sequential hunting only

Associated with the FXS Hunt Group feature is Dial-in-Prefix. In deployments where FXS is hooked up to a PBX, Dialed-in prefix provides a way to manipulate the incoming dial-pattern. If dial-in prefix matches the beginning of the incoming dial-string, then the prefix will be stripped from incoming dial-string before forwarding that dial-pattern to the PBX. This may be used to provide abbreviated dialing (i.e. 4 digit dialing). For example:

- If the dial-in prefix is 408555 and dial-in string is 4085551234, then after stripping, the dial-pattern given to the PBX will be 1234 (4-digit dialing).
- If the incoming dial-string is 4085551234 and no stripping occurs, the dial-pattern given to PBX is 4085551234 (10 digit dialing). This will also be the case when dial-in prefix is empty.

Note
For FXS Hunt Group configuration refer to “Configuring FXS Hunt Group” on page 88

Ad-Hoc Conferencing

The EdgeMarc appliance supports creating a conference by using ad-hoc SIP means, known as the Conference Factory URI (Conference URI on EM). The conference URI identifies a resource in the SIP/IP network that can handle conferencing and media mixing. Identifying the resource for ad-hoc conferencing is the ISP’s responsibility.

When EM is configured for ad-hoc conferencing, the FXS port uses this network based conferencing capability for 3-Party conferencing. If EM is not configured for ad-hoc conferencing, the FXS port does the local media mixing.

The following example depicts the operation of ad-hoc conferencing using Conference URI:

- Party on FXS port A has a need to 3-way conference with B and C
- Party A calls party B
- Party A puts party B on hold
- Party A calls party C
- Party A initiates a flash-hook and all three parties are put in conference
Configuring FXS and FXO Ports

Example Configurations

The EdgeMarc 4500 series appliance supports these configurations using the FXS and FXO ports:

- IP Centrex Configuration
- SIP Trunking of Analog Ports Configuration
- SIP Trunking of IP PBX Configuration

IP Centrex Configuration

Figure 5 shows a typical configuration IP Centrex configuration.
- In this configuration, the EdgeMarc offers the following capabilities:
  - Inbound and outbound dialing are supported.
  - For inbound FXO calls, two-stage dialing and call forwarding are supported.
  - The Real-time Transport Protocol (RTP) for local calls follows the shortest path directly from one phone to another.
  - Calls can be routed out to the WAN side of the EdgeMarc appliance.
  - With survivability enabled, it is still possible to route local calls if the WAN link goes down or the Softswitch is unreachable.

Note
In all the FXO configurations, the Softswitch must be configured to know that the EdgeMarc appliance is a PSTN gateway and PSTN calls can be routed back to the EdgeMarc appliance.
Figure 5  IP Centrex Configuration on the EdgeMarc Appliance

Figure 6 shows how the arrangement in Figure 5 can be expanded in a cascading model with multiple EdgeMarc devices. An EdgeMarc 4500 series appliance is connected to the WAN and also to the PSTN through its FXO ports. Additional EdgeMarc devices provide added FXS ports to service local phones.

Figure 6  Cascaded Model
SIP Trunking of Analog Ports Configuration

Figure 7 shows a typical configuration in which the EdgeMarc appliance is used to connect analog or IP based key-systems and PBXs to SIP trunking services. The PBX or existing key system uses the FXS port on the EdgeMarc appliance.

In this configuration, the EdgeMarc offers the following capabilities:

- Inbound and outbound dialing are supported.
- For inbound FXO calls, two-stage dialing and call forwarding are supported.
- The RTP for local calls uses a shortest path rule directly between the two phones involved in a call.
- Calls can be routed out to the WAN side of the EdgeMarc appliance.
- With survivability enabled, it is still possible to route local calls if the WAN link goes down or the softswitch is unreachable.

SIP Trunking of IP PBX Configuration

Figure 8 shows a typical configuration in which the EdgeMarc appliance supports SIP trunking dial plans to route PSTN calls out the FXO ports and multiple LAN side gateways. In the figure, an EdgeMarc 4500 series appliance is configured with two LAN side PSTN gateway and two FXO lines. Using the dial plans in the SIP trunking feature, you can now route calls through different gateways based on the rules specified in the dial plan.

In this configuration, the EdgeMarc offers the following capabilities:

- The IP PBX is Ethernet-connected.
- IP PBX does not need to register.
- Call are routed to the IP PBX using the Dial Plan.
Configuring FXO Ports

Note
Before configuring the FXO ports, verify that survivability is included with your license. To check the license information, click on the system on the left in the configuration menu and then click on the hyperlink in the "Registration Status" section of the web page.

This section describes how to configure the FXO ports on the EdgeMarc appliance to allow voice calls from IP networks to the PSTN.

Note
If the EdgeMarc 250W loses power, only the phone connected to Port 4 is enabled to send voice calls to the PSTN. FXS port 4 must have a phone connected for this feature to be used.

Configure FXO Ports

1. Choose VoIP ALG > SIP from the Configuration Menu to open the SIP Configuration page.
2. Enter the IP address and port of the SIP proxy, and click Submit.
3. Choose **SIP GW** from the Configuration Menu to open the SIP FXO/Line Port Configuration page. Refer to “**SIP FXO/Line Port Configuration (SIP GW) Page**” on page 240.

4. Select **Enable SIP FXO/Line Port Services**.

5. In the RTP silence delay field, enter a delay, or accept the default setting of 60 seconds. RTP silence delay is the interval used to monitor RTP silence during a call and determines if the PSTN party has been disconnected. If there is a continuous RTP silence for the configured number of seconds, then the FXO/Line port terminates the call.

6. By default, FXO/Line binds to the address of LAN with the last octet of address replaced with 253. For example, if the LAN IP address is configured as 192.168.1.1, the FXO/Line takes the address 192.168.1.253. If the assigned address conflicts with any device on the LAN, then override the FXO/Line the address by entering an address in the SIP GW IP field.

7. Select **Enable Priority Calling Services** to allow special treatment for calls designated as high priority.

8. Enter Callback Extension number.

   **Note**

   Enabling ‘Priority Calling Services’ sends all calls to the Callback extension, thus overriding the following settings for individual ports: ‘Enable InBound(from PSTN) two stage dialing’ and ‘Forwarded To’. In addition to enabling priority calling, you must define rules that determine which calls are given priority. See “**Configuring SIP Trunking**” on page 84.

9. Configure the following for each port that will be used:
   - Select **Enable FXO port**.
   - Enter a name and password in the SIP Authentication Name and Password fields only if the SIP FXO/Line port needs to be authenticated.
   - Select **Enable InBound (from IP network) two stage dialing** to allow two-stage dialing for incoming calls from the IP network.
   - Select **Enable InBound (from PSTN) two stage dialing** to allow two-stage dialing for incoming calls from the PSTN and enter the forwarding number in the Forwarded to field.

10. Click **Submit**.

11. Choose **VoIP ALG > SIP Trunking** from the Configuration Menu to open the SIP Trunking page.

    The SIP Trunking page includes an entry for the FXO ports in the SIP Trunking Devices table. A default rule should also be included to route all calls to this gateway. If you do not see a default rule, you must create one.

12. Add a Target:
   - Select **Add new target**.
   - Enter a logical name to identify the gateway
   - Enter the IP address of the gateway
   - Keep the default

13. Define a default rule, if one is not already defined:
- Select **Add new rule**.
- Select **Default Rule**.
- Add the pattern match for routing calls through the target gateway.
- Enter the number of digits to be stripped, if any, from the front of the called number if the pattern matches.
- Select the target gateway from the Target pull-down list.

14. Click **Commit**.

The FXO ports are now configured. If survivability is enabled on the EdgeMarc and the Softswitch is unreachable, then the FXO ports can act as a LAN side gateway.

### Configuring T38 and G.711 Fax

You can send and receive T38 Fax on FXS port 1 or port 2 on the EdgeMarc appliance. On all the other FXS ports, only G.711 Fax can be send or received.

**Configure T38 Fax Settings**

1. Choose **SIP UA > Fax** from the Configuration Menu to open the FXS/Phone Port Fax Settings page.
2. Configure the settings as described in **FXS/Phone Port FAX Settings Page on page 236**.
3. Click **Submit**.

### Configuring FXS Ports

This section describes how to configure the FXS ports on the EdgeMarc appliance.

**Note**

For the EdgeMarc 200 Series, FXS port 1 is connected to the FXO port 1 when the power is off.

**Configure FXS Ports**

1. Choose **VoIP ALG > SIP** to open the SIP Settings page.
2. Enter the IP address of the VoIP provider, and click **Submit**.
3. Choose **SIP UA** from the Configuration Menu to open the FXS/Phone Port Settings page.
4. Configure up to six ports, as described in **FXS/Phone Port FAX Settings Page on page 236**.
5. Click **Submit**.
It may be necessary to choose SIP UA link again from the Configuration Menu to refresh the page and see the Port Configuration state change from Unregistered to Registered.

A message indicates that service will be temporarily interrupted.

6. Click OK to confirm.

Note
If the state is still unregistered, check with your VoIP provider to confirm that the Authentication Name and Password is valid.

You can now make and receive calls on the phones that are connected to the configured FXS ports.

Configure advanced FXS/phone capabilities

1. Choose SIP UA > Advanced from the Configuration Menu.
2. Configure parameters as described in “FXS/Phone Port Settings - Advanced Page” on page 231.
3. Click Add.
   A message indicates that service will be interrupted while the new interface is added.
4. Click OK to confirm.

Gain Settings

Use the next procedure to configure transmit and receive gain settings.

Configure gain settings

1. Choose SIP UA > Advanced from the Configuration Menu to open the SIP FXO/Line Port Configuration page.
2. Scroll down to the section for the port that you want to configure.
3. Select gain settings from the Analog Receive Gain and the Analog Transmit Gain pull-down lists, as described in “FXS/Phone Port Settings - Advanced Page” on page 231.
4. Click Submit.
   A message indicates that service will be temporarily interrupted.
5. Click OK to confirm.
Configuring SIP Trunking

SIP trunking can be used to configure dial plans or rules to route calls from the softswitch/IP-PBX to client devices that do not register. Each rule points to a device that should receive matching calls, based on the called SIP URI. When an incoming softswitch/IP-PBX SIP message is received, it is always matched against the list of currently registered clients first. If no registered client matches the destination of the call, these rules are tried.

If a rule matches, the device that the rule points to will receive the call. If no rule matches, a configured default rule (if any) will be used to match the call.

Note
Messages from SIP clients (including trunking devices) are always forwarded to the SIP ALG configured soft-switch/IP-PBX.

SIP Trunking Devices

The available SIP trunking devices must be added to this list. Each device must be configured with its IP address and port number. It can be optionally named to make it easier for the user to associate the entry with the device.

If internal FXO ports are available on appropriate platforms and enabled, they will act as a default device unless configured otherwise.

Rules

Rules match incoming calls to a specific device. A rule is written with a number of explicit digits or pattern that match a range of digits.

Note
A default rule can not have a dial string for matching. There can be only one default rule.

Each rule can have a number of digits to strip, and a string of digits to add, associated with it. If a rule has a number of digits to strip, this number of digits will be removed from the called number in the case of a match. Likewise, a string of digits to add will be added to the dialed number in case the rule matches.

Table 5  Matching Patterns for SIP Trunking

<table>
<thead>
<tr>
<th>Pattern</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>.</td>
<td>Matches one or more digits.</td>
</tr>
<tr>
<td>[x-y]</td>
<td>Matches any single digit between x and y (inclusive). For example, [1-3], matches 1, 2 or 3.</td>
</tr>
<tr>
<td>X</td>
<td>Matches any digit between 0 and 9, equivalent to [0-9]</td>
</tr>
<tr>
<td>Z</td>
<td>Matches any digit between 1 and 9, equivalent to [1-9]</td>
</tr>
<tr>
<td>N</td>
<td>Matches any digit between 2 and 9, equivalent to [2-9]</td>
</tr>
</tbody>
</table>
Examples:

<table>
<thead>
<tr>
<th>Pattern</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1XXX</td>
<td>Matches any four-digit number starting with 1, e.g., 1000, 1200, 1234</td>
</tr>
<tr>
<td>9NXXXXXXXXXX</td>
<td>Local calls preceded by a 9, e.g., 95551234</td>
</tr>
<tr>
<td>91NXXNXXXXXXXX</td>
<td>Long distance calls preceded by a 9, e.g., 914085551234</td>
</tr>
</tbody>
</table>

**Priority Redirection**

In priority redirection, priority calls are directed to a designated gateway (which can be an FXO port on the EdgeMarc device). If all FXO ports are busy and if any of them is being used for a non-priority call, that call is dropped and one of the FXO ports is freed to make room for the priority call.

You can also tag redirection rules as having a priority designation. If a priority-tagged call comes in while all FXO ports are in use with non-priority calls, one of the in-progress calls is dropped and the priority call is connected. Priority calls do not interrupt other priority calls, however.

Priority redirection can be used to improve handling of 911 calls, as shown in Figure 9. If a SIP trunking rule is defined for 911 pattern match and tagged as priority, then a local 911 call is sent directly from the local phone through an FXS port on the EdgeMarc appliance to the designated gateway. If all FXO ports are in use and at least one of the ports is not tagged for priority, then a non-priority call is dropped and the 911 call is connected.

Priority redirection can help emergency responders speed identification of a caller’s location.

**RESTRICTION:** Priority calls do not support dial string manipulation. They must be sent through as-is.

**FURTHER RESTRICTION:** Redirect operations are only performed for SIP INVITE messages. As a result, mid-call features such as transfer, hold or conference may not function as expected.

**Note**
To configure priority redirection, use the SIP Trunking page, as described in the section, and also enable Priority Calling services on the FXO/Line Configuration page, as described in *Configuring FXO Ports on page 80*. 
Configuring SIP Trunking Enhancements

This section describes how to configure the SIP trunking enhancements.

**Configure SIP trunking enhancements**

1. Choose **VoIP ALG > SIP > Trunking** to open the SIP Trunking Configuration page.
2. In the Add a Rule area, select **Redirect** from the Type pull-down list.
3. Configure the rule as described in **SIP Trunking Page on page 220**.

**Note**
You cannot specify digits to be stripped or strings to be added in priority rules.

4. Select a gateway from the Trunking Device pull-down list.
5. Click **Commit**.

**Distinctive Rings**

The EdgeMarc converged network appliance is shipped with five distinctive ring patterns (Ring0 - Ring4) that are available for use when ringing an analog phone on the FXS/phone port. The appliance can automatically select a ring pattern based on the number that is being called or the number that originated the call.

By default, the appliance is configured to use Ring0 for all calls. You can assign different ring patterns based on the following types of rules:

- **Caller-Pattern-match**—Uses the ring pattern if the caller’s phone number matches the pattern.
- **Called-Pattern-match**—Uses the ring pattern if the called phone number matches the pattern.
Caller-Pattern-match and Called-Pattern-match—Uses the ring pattern if the caller’s phone number matches the pattern AND the called phone number also matches the pattern.

Add a distinctive ring pattern rule

1. Choose SIP UA > Distinctive ring to open the FXS/Phone Port Distinctive Ring configuration page.
2. Select Add new rule from the pull-down list.
3. Enter a pattern in the Caller-Pattern-match field, the Called-Pattern-match field, or both. See “Pattern Matching Rules” on page 87 for a description of the matching symbols.
4. Select the ring pattern.
5. Click Commit.

Note
For detailed field descriptions, see “Distinctive Ring Page” on page 239.

Modify a distinctive ring pattern rule

1. Choose SIP UA > Distinctive ring to open the FXS/Phone Port Distinctive Ring configuration page.
2. Choose the rule to modify from the Action: pull-down list.
3. Modify the pattern in the Caller-Pattern-match field, the Called-Pattern-match field, or both. See “Pattern Matching Rules” on page 87 for a description of the matching symbols.
4. Select the ring pattern.
5. Click Commit.

Delete a distinctive ring pattern rule

1. Choose SIP UA > Distinctive ring to open the FXS/Phone Port Distinctive Ring configuration page.
2. Choose the rules to delete from the checkboxes to the left of the rules. Select: All selects all the rules; Select: None deselects all the rules.
3. Click Delete.

Pattern Matching Rules

Distinctive ring rules are applied in the order in which they are defined. If a rule matches, the ring pattern defined for the rule is used to ring analog phones on the FXS/phone port.
Note
You cannot change the order in which rules are applied. If the order is not as desired, you must delete or redefine the existing rules.

Rules can include a mix of the digits and patterns listed in Table 6.

**Table 6  Number Patterns**

<table>
<thead>
<tr>
<th>Pattern</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>.</td>
<td>Matches one or more digits.</td>
</tr>
<tr>
<td>[x-y]</td>
<td>Matches any single digit between x and y (inclusive). For example, [1-3], matches 1, 2 or 3.</td>
</tr>
<tr>
<td>X</td>
<td>Matches any digit between 0 and 9, equivalent to [0-9]</td>
</tr>
<tr>
<td>Z</td>
<td>Matches any digit between 1 and 9, equivalent to [1-9]</td>
</tr>
<tr>
<td>N</td>
<td>Matches any digit between 2 and 9, equivalent to [2-9]</td>
</tr>
</tbody>
</table>

Table 7 lists some example rules.

**Table 7  Example Rules**

<table>
<thead>
<tr>
<th>Caller Pattern match</th>
<th>Called Pattern match</th>
<th>Ring ID</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>.</td>
<td>408.</td>
<td>1</td>
<td>If any call goes to an FXS/Port extension that starts with 408, ring the phone with Ring 1.</td>
</tr>
<tr>
<td>408.</td>
<td>.</td>
<td>3</td>
<td>If the call is from a caller with a number that begins with 408 and is destined for any FXS/Port extension, ring the phone with Ring 3.</td>
</tr>
<tr>
<td>.</td>
<td>91NXXNXXXXXX</td>
<td>4</td>
<td>If a call is a long distance call (called phone number begins with 91), and terminates on the analog FXS/Phone port, ring the phone with Ring 4.</td>
</tr>
</tbody>
</table>

Configuring FXS Hunt Group

The EdgeMarc appliance could be implemented with the FXS ports connected to analog phones or a PBX. In either implementation, if EM is configured for Hunt Group, softswitch would route calls to EM using the Hunt Group’s unique DID. When EM receives the call from the IP network, it will use the Dial Rules to match the DID and forward the calls to the hunt group.

Use the following guidelines to configure FXS Hunt Group on the EdgeMarc appliance:

- Designate a unique DID for the hunt group (i.e., 408-555-1234)
- Configure FXS/Phone Basic Settings
Configure SIP Trunking
Enable Hunt Mode
Configure Dial-in-Prefix (optional)
Define an FXS Port to a Hotline Number

Configure FXS/Phone basic settings

1. Choose **SIP UA** from the Configuration Menu to open the FXS/Phone Port Settings - Basic page.
2. Configure the ports, as described in **FXS/Phone Port Settings - Basic (SIP UA) Page on page 230**.
   a. Enter display name (unique DID)
   b. Enter username (unique DID)
   c. Enter authentication name (unique DID)
   d. Password (if applicable)
3. Click **Submit**.  
   It may be necessary to choose SIP UA link again from the Configuration Menu to refresh the page and see the Port Configuration state change from Unregistered to Registered.  
   A message indicates that service will be temporarily interrupted.
4. Click **OK** to confirm

**Note**
All ports should have the same information

Configure SIP - Trunking

1. Add a device (i.e., Hunt Group). Choose **VoIP ALG> SIP > Trunking**.
2. In the Add a Trunking Device area, select **Add a new trunking device**.
3. Configure address and port information as described in **“SIP Trunking Page”** on page 220.
4. Click **Commit**.  
   The trunking device is added to the SIP Trunking Devices table on the page.
5. Add a rule that will route any inbound traffic matching the unique DID for Hunt Group to the FX ports. All other traffic should use the default.
   a. Choose **VoIP ALG> SIP > Trunking**.
   b. In the Add a Rule area, select **Add a new rule**.
   c. Configure parameters as described in **“SIP Trunking Page”** on page 220.
   d. Click **Commit**.
Enable Hunt Mode

1. Choose **SIP UA > Advanced** from the Configuration Menu.
2. Click **Enable Hunt** as described in “FXS/Phone Port Settings - Advanced Page” on page 231.
3. Click **Add**.
   A message indicates that service will be interrupted while the new interface is added.
4. Click **OK** to confirm.

Configure Dial-in-Prefix

1. To configure Dial-in-Prefix see “FXS/Phone Port Settings - Advanced Page” on page 231

*Note*
If EM is deployed with FXS ports connected to a PBX, Dial-in-Prefix is an optional configuration.

Define an FXS Port to a Hotline Number

1. Choose **SIP UA > Advanced** from the Configuration Menu.
2. Enter the hotline number in the Hotline Number field. This field is located in the port level configuration section of the FXS port to be defined as a hotline number.
3. Click **Submit** to activate the hotline number.

Calling Features for Analog Phones on the FXS port

All EdgeMarc platforms running VOS 7.x or later support the following mid-calling features for analog phones connected to the FXS port on the EdgeMarc:
- Call hold
- Call Transfer – Unattended
- Call Transfer – Attended
- Call Waiting
- 3-Way Calling

**Call hold**

1. When in a call perform a flash-hook to hold the call.
2. Press the flash-hook again to resume the call.
3. A on-hook action will end the call.

**Call Transfer – Unattended**

1. Phone A and Phone B are in call.
2. Phone A presses flash-hook to place Phone B on hold.
3. Phone A receives dialtone, enters the Phone C number and hangs up to transfer the call to Phone C. This also results in Phone A call hang-up.

**Call Transfer – Attended**

1. Phone A and Phone B are in call.
2. Phone A presses flash-hook to place Phone B on hold.
3. Phone A receives dialtone, enters Phone C number, talks to Phone C and hangs up to transfer the call to Phone C.
4. This also results in Phone A call hang-up.

Please note the following:

- If Phone A hangs up within 3 seconds of completing the dial, the call will be treated as an unattended transfer, and generate a REFER to Phone C.
- If Phone A remains on the line, the call is treated as a consultative transfer, and generate an INVITE to the new number. Phone A should hear a ring-back to indicate that the Phone C is being rung.
- If Phone A hangs up after this point, the call is cancelled and the Phone C gets hung up. Phone B should get hung up too.

**Call Waiting**

1. Phone A and Phone B are in call.
2. Phone C calls Phone B. Phone B presses cradle hook/flash hook to connect to Phone C.
3. Then presses cradle hook/flash hook to switch back on call with Phone A.

**3-Way Calling**

There are two ways to perform 3-way calling:

Method 1

1. Phone A and Phone B are in call.
2. Phone A presses the "flash-hook", Phone B is put on hold, Phone A gets dial tone.
3. Phone A dials Phone C number, in call with Phone C, and then Phone A presses flash-hook OR enters “#3” to initiate 3-way conference between Phone A, Phone B & Phone C.

4. If Phone A performs a flash-hook before Phone C answers but after the call rings Phone A will return to the original call with Phone B.

Method 2

1. Phone A and Phone B are in call.

2. Phone C calls Phone B. Phone B presses cradle hook/flash hook to connect to Phone C.

3. Phone B can switch between Phone A and Phone C by pressing cradle hook/flash.

4. Phone B can conference all parties together by pressing “#3”.

**Note**

When Phone A hangs up, Phone B & Phone C will terminate and get busy tone. But if Phone B or Phone C hangs up, then Phone A will still be in call with active caller.

**CODER Behavior**

Following behavior applies to the local mode 3-way calling:

1. If an analog phone on one of the FXS ports is engaged in a call and wants to add another party (including an analog phone on one of the FXS ports) to perform a 3-way call and all the other phones on the remaining FXS ports are off-hook, the system terminates the 3-way call and the first party is connected back to the initiator of the 3-way call as an indication that the 3-way call did not go through.

2. For models containing FXS ports, FXS ports 1 and 2 can not simultaneously participate in the same 3-way call, except for model 4508E where multiple FXS ports from ports 1 through 4 can participate in the same 3-way call. Similarly multiple FXS ports from ports 5 through 8 can participate in a 3-way call, but FXS ports from both of these groups can not simultaneously participate in the same 3-way call.

If a free FXO port is selected, that port is marked as busy and will not engage in any PSTN trunking.
This chapter describes how to configure the EdgeMarc appliance as a wireless access point. It contains the following sections:

- Overview
- Configuring Wireless Settings
- Configuring VLAN Settings to Support Wireless Traffic

**Overview**

The EdgeMarc appliance can be configured as an access point to provide wireless communications for network clients. The EdgeMarc appliance supports the following wireless modes:

- 802.11a
- 802.11b
- 802.11g
- 802.11b/g

When the wireless option is enabled and VLANs are also enabled, a bridge is automatically set up between the wireless connection and a selected VLAN, and the VLAN traffic travels over the wireless link. If VLANs are not enabled, the wireless connection is automatically bridged to eth0.

**Security**

The EdgeMarc appliance supports Wi-Fi Protected Access security with the pre-shared key (WPA-PSK) security option.

WPA is the family of current-generation wireless security solutions. WPA incorporates improved algorithms and options that are more secure against compromise than earlier generation security solutions. The EdgeMarc appliance supports WPA with pre-shared keys (WPA-PSK), which offers the advantages of the WPA algorithms without the need for an external authentication server.

For encryption, the EdgeMarc appliance supports Temporal Key Integrity Protocol (TKIP).

In WPA-PSK security, a common security key is entered into each network device. When a client requests association to the EdgeMarc appliance using WPA-PSK,
initial authentication is based on the common shared key. During the time that the connection is in place, the devices are synchronized frequently, with the keys automatically changing at each synchronization. The synchronization time is configurable; the default is 3600 seconds.

**Service Set Identifiers**

Each wireless network is identified by the service set identifier (SSID), a unique name for the network. Client devices select the wireless network established by the EdgeMarc appliance by choosing the SSID that is configured in the EdgeMarc appliance. The EdgeMarc appliance is shipped with the default SSID EWNxxxxxx, where xxxxxx represents the last 6 digits of the appliance’s MAC address. The SSID must be no more than 32 characters, and is case-sensitive.

By default, the EdgeMarc device broadcasts the SSID in its wireless beacon, and clients can see the SSID as they scout for available wireless networks. You can opt to disable the SSID broadcast, in which case the clients do not see the SSID as they scan for networks, and they must know the SSID to be able to associate to the EdgeMarc appliance.

**Channels and Power Levels**

The available multiple radio frequency (RF) channels depend upon the 802.11 wireless mode.

- 802.11a: 36, 40, 44, 48, 52, 56, 60, 64.
- 802.11b/g: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11.

The default is 802.11b/g, channel 6.

The power levels for the EdgeMarc appliance radio are configurable. It is best to choose a power level that is high enough to reach the target clients, but not higher than necessary. Table 8 shows the power settings on the EdgeMarc appliance and the associated power levels. The default is 4 (13dBm).

<table>
<thead>
<tr>
<th>Table 8</th>
<th>Radio Power Settings and Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power Setting</strong></td>
<td><strong>Power Level</strong></td>
</tr>
<tr>
<td>1</td>
<td>10dBm</td>
</tr>
<tr>
<td>2</td>
<td>11dBm</td>
</tr>
<tr>
<td>3</td>
<td>12dBm</td>
</tr>
<tr>
<td>4</td>
<td>13dBm (default)</td>
</tr>
<tr>
<td>5</td>
<td>14dBm</td>
</tr>
<tr>
<td>6</td>
<td>15dBm</td>
</tr>
<tr>
<td>7</td>
<td>16dBm</td>
</tr>
<tr>
<td>8</td>
<td>17dBm</td>
</tr>
</tbody>
</table>
Wireless Status

A link on the Network configuration page indicates whether wireless support is currently enabled. Clicking the underlined Configure Wireless link opens the Wireless screen and displays the configuration settings.

Configuring Wireless Settings

This section describes how to configure wireless settings.

Configure wireless settings

2. Select the checkbox at the top of the screen to enable wireless capabilities on the EdgeMarc appliance.
3. In the Network SSID field, enter a unique name for the network established by the EdgeMarc appliance. The wireless client must enter the SSID to connect to the EdgeMarc appliance.
4. Select Enable SSID Broadcast if you want the EdgeMarc appliance to advertise the SSID in its 802.11 beacon.
5. Choose the wireless mode that is compatible with the clients to be served.
6. In the Channel field, select the 802.11 operating RF channel.
7. In the Power Level field, choose a level for the strength of the wireless signal transmitted by the EdgeMarc appliance.
8. Enter a key in the Pre-Shared Key field.
9. In the Key Renewal Interval, enter the number of seconds between attempts to automatically synchronize the pre-shared keys.
10. Click Submit.

A message indicates that service will be temporarily interrupted.
11. Click OK to confirm.

Note

If you clear the Enable Security check box, the page is updated to hide the security fields.
Note
For detailed field descriptions, see “Wireless Configuration Page” on page 293.

Configuring VLAN Settings to Support Wireless Traffic

If VLANs are configured, use the VLAN Configuration page to configure a bridging option for wireless traffic.

Note
If VLANs are not configured, wireless traffic is automatically bridged over the eth0 interface on the EdgeMarc appliance.

Select a VLAN for bridging wireless traffic

1. Choose VLAN from the Configuration Menu to open the VLAN Configuration page.
2. In the Wireless column on the right side of the page, select the VLAN to use for the wireless traffic.
3. Click Modify to save the modified VLAN settings.
This chapter describes how to manage survivability on the EdgeMarc appliance. It contains the following sections:

- Overview
- SIP Server Redundancy
- SIP Server Availability
- MGCP Survivability Configuration
- Survivability in Transparent Mode
- Survivability Voice Mail

**Overview**

Survivability is a collection of features that enables the system to extend the availability of VoIP services. These features include support for redundant SIP soft switches and local call control in the event of WAN link failure, softswitch failure or during periods of network congestion that result in loss of connectivity to a remote softswitch.

Dynamic WAN links (for example, DHCP and PPPoE) can renegotiate their public IP address at any time, interrupting VoIP services. All system services must be restarted when the WAN connection is restarted, because the WAN IP address may have changed. Because survivability must communicate with the Softswitch/IP PBX, survivability will be restarted when a WAN link renegotiation occurs, interrupting any local calls that are in progress. For this reason, survivability is not recommended for systems that use dynamic WAN links.

Survivability allows users connected to an EdgeMarc appliance to make and receive calls when the softswitch or the link to the softswitch is down. Survivability encompasses the following capabilities:

- Detection of when the softswitch is unreachable (Availability)
- Switching to a redundant softswitch (Redundancy)
- Making and receiving station to station calls while the softswitch is unreachable (Survivability)
- Making and receiving PSTN calls while the softswitch is unreachable.
To switch to survivability mode, the EdgeMarc appliance must be able to detect when the softswitch is unreachable. The softswitch may be unreachable for reasons such as the following:

- The softswitch is down.
- A router on the path to the softswitch is malfunctioning.
- The network is physically disconnected.

The most reliable way to ensure that the softswitch is reachable and available is to make a request at the application layer. If the request receives a response, the softswitch is reachable at the IP layer and also up and servicing requests.

The survivability process works as follows:

1. SIP requests sent to the softswitch, and their responses, are monitored to check for softswitch availability. If requests are sent to the softswitch but no responses are received in a configured time interval, the softswitch is considered unreachable and a backup server (if available) is selected as the current server. The default time interval is configured so that failover occurs before the phone has finished resending its request. This enables the call to be connected with only a slight delay.

2. A configuration option also allows the active softswitch to be monitored with keepalive messages. The messages are sent at a configurable intervals with time allowed for a response to be received. If too many messages are unanswered, the softswitch is considered unreachable.

3. When a softswitch is marked as unreachable, the EdgeMarc appliance uses a different keepalive mechanism to determine when it becomes available again. The EdgeMarc appliance sends keepalive messages to failed servers using a backoff algorithm that progressively increases the interval, until a maximum is reached. By default, the maximum interval is longer than the one used when no other backup server is available.

4. An upstream EdgeMarc appliance or EdgeProtect device can send a specially marked keepalive response to inform the downstream EdgeMarc appliance about loss of connectivity to the softswitch. This causes an immediate fallback to the backup server or survivability mode in the downstream EdgeMarc appliance without a time delay.

5. The EdgeMarc appliance can choose the active softswitch from a list of multiple redundant softswitches based on priority and availability. It can obtain the list of redundant softswitches dynamically by doing a DNS SRV lookup on the SIP Server domain name or from a list entered in the appliance user interface. When multiple IP addresses are configured, the highest priority one is used. If this server becomes unreachable, the next reachable server in the order of priority is used. If a previously unreachable server becomes available and it has a higher priority than the currently used server, the higher priority server is used again.

6. If no softswitch is available, the EdgeMarc appliance enters survivability mode and handles call signaling itself. Because the EdgeMarc appliance forwards all messages between the phones and the softswitch, it knows the address of all phones and can direct calls to the phones itself.

7. A SIP PSTN gateway can be installed on the LAN side of the EdgeMarc appliance and used for inbound and outbound calling during survivability. (Normally, the gateway functionality is provided by the softswitch.) The gateway
can be configured to send any incoming calls to the EdgeMarc appliance, and the EdgeMarc appliance can be configured to use the gateway as the default destination for calls not directed to another local phone.

8. When connectivity to the softswitch is restored, the EdgeMarc appliance automatically returns control of all subsequent call requests to the softswitch. Calls in progress that were established while the EdgeMarc appliance was in fallback mode are not disrupted.

Configure Survivability

Follow these steps to configure survivability.

Configure survivability

1. Choose Survivability from the Configuration Menu.
2. Scroll down to the Survivability area and select an option.
   - Disabled—Survivability feature is not available.
   - Enabled—Local call switching is enabled between VoIP endpoints and premises based-PSTN gateways during WAN link failures or other failures that prevent connectivity to the softswitch.
   - Always Local—Only local call switching is supported. Calls are not forwarded to network call processing servers.
3. Click Submit.
   A message indicates that service will be temporarily interrupted.
4. Click OK to confirm.

SIP Server Redundancy

To configure SIP server redundancy, you must specify the SIP Server address or domain name using one of the following methods:

- DNS Name in the SIP Server Domain Name field—Automatic discovery of primary and backup SIP Servers using DNS SRV lookup.
- IP addresses in the ordered SIP Server list—Manually-entered list of softswitch IP addresses and ports in priority order.

If the first method is used, the EdgeMarc appliance queries the DNS SRV records and collects a list of all SIP proxies for the configured domain.

Note
For detailed field descriptions, see Survivability Page on page 223.
Configure redundancy

1. Choose VoIP ALG > SIP from the Configuration Menu to open the SIP Settings page.

2. Choose one of the following methods to specify the SIP Sever address:
   Method 1:
   a. Enter the SIP Server domain name and default port.
   b. Click Submit.
   Method 2:
   a. Click Create to display the fields for manual entry.
   b. If the domain name is the same for all SIP Servers, enter the domain name in the SIP Server Domain Name field. Otherwise, leave this field blank.
   c. Click Add row as many times as needed to create a row for each SIP server to be added.
   d. In priority order, enter the IP address and port number of each server or Session Border Controller (SBC). URLs are not permitted when you use manual entry.
   e. Click the garbage can icon to delete any unneeded rows.
   f. Click Submit.

Note
If all the rows are deleted, the page returns to the single SIP server address and port fields.

3. Choose Survivability from the Configuration Menu.

4. (Method 1 only) In the Softswitch/IP PBX Reachability Configuration area, enter the amount of time, in seconds, between DNS lookups.

5. In the SIP Server Redundancy Settings area, choose the options shown below, as described in “Survivability Page” on page 223.

6. Click Submit.

SIP Server Availability

Availability is the mechanism that enables survivability and redundancy. EdgeMarc determines the availability of softswitches in the following ways:

- Monitoring outgoing SIP requests and making sure that a reply is received from the server.

By default, the EdgeMarc appliance monitors all outgoing SIP messages to the active softswitch. If no replies are received from the server within the specified time interval, the switch is marked unreachable and the backup server is selected as the current server. The default time for declaring a SIP message lost is configured so that fallback occurs within the SIP retransmission interval and the clients transaction does not time out.
Sending periodic SIP OPTIONS messages to the server and monitoring the replies from the server.

Keepalive messages are sent to failed servers using a backoff algorithm that progressively increases the interval until a maximum is reached. By default the maximum interval, when at least one server is reachable is longer than the one when no other backup server is available.

Listening for specially marked SIP OPTIONS messages that signal loss of connectivity to soft switch from an upstream EdgeMarc appliance or EdgeProtect.

An upstream EdgeMarc appliance or EdgeProtect device can send a specially marked keep-alive response to inform the downstream EdgeMarc appliance about loss of connectivity to the soft-switch. This causes an immediate fallback to the backup server or survivable mode in the downstream EdgeMarc appliance without loss of time. It is not necessary to configure any options to support this capability.

**Configure availability**

1. Choose **Survivability** from the Configuration Menu.
2. Choose values for the following parameters, as described in “Survivability Page” on page 223.
   - Time(s) between Keepalive messages
   - Time(s) to declare Keepalive message lost
   - Number of missed messages to declare alarm
   - Number of received messages to clear alarm
   - Interpret error code as success
3. Click **Submit**.
   A message indicates that service will be temporarily interrupted.
4. Click **OK** to confirm.

**MGCP Survivability Configuration**

You can configure survivability for the MGCP protocol.

**Configure MGCP survivability**

1. Choose **VoIP ALG > Survivability** from the Configuration Menu.
2. In the MGCP Survivability area, configure values as described in “Survivability Page” on page 223.
3. Click **Submit**.
   A message indicates that service will be temporarily interrupted.
4. Click **OK** to confirm.
Survivability in Transparent Mode

The EdgeMarc appliance now supports survivability when the transparent option is selected for the Session Initiation Protocol (SIP) mode.

An EdgeMarc appliance is typically deployed with two separate IP addresses:

- Public IP address used for interactions with the WAN
- Private IP address used for communications with locally-installed phones and other devices
The devices attached to the EdgeMarc appliance communicate with the appliance using the private IP address, and the EdgeMarc device communicates with the WAN using the public IP address. The network Softswitch that provides feature services knows the public IP address but has no knowledge of the private address. Figure 10 shows an example configuration with labeled public and private IP addresses.

**Figure 10  EdgeMarc Configuration with Example IP Addresses**

![Figure 10](image)

The treatment of traffic sent between phones and the network depends on the choice of SIP mode.
In normal (default) mode (Figure 11), a phone connected to the EdgeMarc appliance is configured with a private IP address and views the appliance as if the appliance is a Softswitch. The Layer 3 signalling between the phone and the EdgeMarc appliance is terminated at the appliance, and a separate Layer 3 signalling link is established between the EdgeMarc appliance and the Softswitch on the network. The phone device cannot see all the way to the network Softswitch, and the Softswitch cannot see all the way to the phone.

**Figure 11  Normal Mode**
In *multi-homed outbound proxy* mode (Figure 12), the EdgeMarc appliance functions as a proxy server. Each phone connected to the appliance is configured with the IP address of the network Softswitch. An outbound proxy address is also configured, which the EdgeMarc appliance is able to translate. Because the phone includes the Softswitch address in its SIP message, the EdgeMarc appliance is able to forward the SIP message to the Softswitch. The proxy mode is multi-homed, because it is possible for phones connected to a single EdgeMarc appliance to be served by different Softswitches. In addition to performing translation, the EdgeMarc appliance is able to forward the signalling to the correct Softswitch for each phone.

Figure 12  Multi-Homed Proxy Mode
In **transparent** mode (Figure 11), the phone is configured with the IP address of the Softswitch, and Layer 3 packets are sent all the way from the phone to the Softswitch without being terminated. The EdgeMarc appliance picks up the signals as they are forwarded through the appliance and translates, but does not terminate them. Because the EdgeMarc appliance hides the local topology from the WAN, the Softswitch does not know the private IP addresses of the phones attached to the appliance; however, the phones know the identity of the Softswitch. For this reason, it is also possible for different phones connected to the EdgeMarc appliance to be served by different Softswitches.

**Figure 13  Transparent Mode**

Survivability capabilities are triggered if the EdgeMarc device loses its connection to the WAN or if the network Softswitch is not accessible. When this occurs, the EdgeMarc appliance uses the information that was obtained from the terminated or forwarded phone signals to direct local calls between phones attached to the appliance.

For example, assume that phones A and B are connected to the EdgeMarc appliance and that A attempts to call B. The survivability process works as follows:

1. Phone A sends a request to the EdgeMarc appliance.
2. The EdgeMarc appliance attempts to forward the call to the Softswitch IP address that is configured in the appliance. The number of attempts is dictated by the survivability settings.
3. If the attempt to contact the Softswitch fails, the EdgeMarc appliance takes over and performs the Softswitch function, connecting phone A to phone B (Figure 14).

**Figure 14  Survivability**

![Diagram showing survivability setup]

**Note**
The EdgeMarc appliance always attempts to connect to the Softswitch that is configured in the appliance. In transparent mode, this could be a different Softswitch from that which is configured in some of the phones. If the Softswitches are different, then the EdgeMarc appliance is unable to perform the survivability function.

**Assigning SIP Modes**

This section shows how to assign the SIP mode settings. When the SIP mode is assigned, survivability is enabled.

**Note**
For information on configuring survivability settings, see the *VOS for EdgeMarc Manual*. 
Assign the SIP mode

1. Choose VoIP ALG > Survivability from the Configuration Menu to open the SIP Settings page.
2. Choose and configure a SIP mode:
   - Normal—Clear the Enable Multi-Homed Outbound Proxy Mode checkbox and the Enable Transparent Proxy Mode checkbox.
   - Multi-Homed Outboard Proxy—Select the Enable Multi-Homed Outbound Proxy Mode checkbox.
   - Transparent mode—Select the Enable Transparent Proxy Mode checkbox, and click Submit to enter Softswitch addresses. Enter an IP address in the Allowed SIP Proxies IP Address field, and click Add. Add additional addresses as needed.
3. Click Submit.

Survivability Voice Mail

The EdgeMarc 5300 survivability voice mail service enables enterprises to provide continued voice mail services even if WAN access is unavailable. The service is intended for enterprises that use voice mail services offered by the Internet Service Provider (ISP) or other WAN-accessible supplier.

Note
Survivability voice mail is available only on Edgemarc 5300 and 5300LF platforms.

If survivability voice mail is enabled, the EdgeMarc 5300 appliance detects when the WAN link is down and activates survivability voice mail as a service on the EdgeMarc 5300. When the WAN link comes back up, the survivability voice mail service is automatically inactivated.

Voice mail messages received while the WAN link is down are stored in the EdgeMarc appliance RAM. Each voice message generates an automated email message to the designated recipient, and the voice message is attached to the message as a .wav file. Windows Media Player or any other player capable of playing .wav files can play the message.

The survivability voice mail service also includes an integrated voice response (IVR) system. If a voice mail message comes in while the survivability voice mail service is active, the message light on the user’s telephone lights up. The user can call into the IVR system resident on the EdgeMarc appliance and use the IVR menu prompts to play back the message.

Note
This feature is available as an add-on to the EdgeMarc 5300, and requires a new license key.
Voice Mail Process

The survivability voice mail service operates as follows:

1. On the License page, the EdgeMarc 5300 administrator enables the survivability voice mail feature by entering the correct license key. A SIP and SIP Survivability license is required.

2. On the SIP Client page, the administrator enters the IP phone address, phone extension, and email address for each phone user. This creates a mapping between phone numbers and email addresses. A voice mailbox is automatically created for each SIP client.

3. On the Survivability page, the administrator enters the email address that will be used as the originating address for automated email messages. The administrator can also modify the number of seconds that the phone rings before going to voice mail, the phone extension number for the IVR system, and the maximum number of messages per mailbox.

4. During normal operations, the WAN link is up, and the enterprise obtains voice mail services from the ISP or other external provider. The survivability voice mail service is inactive.

5. When the WAN link goes down, the survivability voice mail service is automatically activated.

6. When the WAN link is down and a voice mail message is received, the EdgeMarc appliance stores the message in local RAM.

7. The system generates an automated email message from the email address that was entered in the Survivability page to the email address that was mapped to the extension receiving the voice mail. The message indicates that a voice mail has been received and directs the user to open the attached .wav file:

   Hello Mailbox 2222:

   You have a new voice message (0:03sec) in mailbox 2222.

   The message was left by phone number 2222 on Wednesday, September 20, 2006 at 09:40:31 AM.

   The user can read the message using any standard email client and can perform any functions supported by the media player, such as fast forward, rewind, or pause. The message waiting light on the phone is automatically lit.

   **Note**

   Voice mail is received and stored whether or not a phone extension-to-email address mapping has been configured on the SIP Client page; however, the email notification is sent only if the mapping is defined.

8. The user can access the IVR to listen to the .wav file. The user dials the IVR extension that was configured on the Survivability page. The IVR system prompts for the user mailbox number and password. See Using the IVR System on page 112 for information on the user mailbox number and password.
9. When the WAN link comes back up, the survivability voice mail service is automatically inactivated, and the enterprise goes back to using the standard voice mail system.

The EdgeMarc 5300 survivability voice mail service is intended for use only when the WAN is down, and the following restrictions apply:

- Storage space for voice messages is limited. Approximately 120 message minutes can be stored. When this limit is exceeded no additional messages are accepted. The caller hears the message: “I’m sorry, that extension is not accepting messages.”
- Because messages are stored in RAM, messages are deleted when the EdgeMarc appliance is rebooted. If this occurs, users can still access messages by opening the automated email message with the attached .wav file.
- If the EdgeMarc appliance is rebooted or the WAN link comes back up, the IVR system becomes inactive. When this occurs, users must open the automated email message to listen to the voice mail.

**Configuring Survivability Voice Mail Settings**

This section explains how to configure the survivability voice mail settings:

- Configuring License Key on page 110
- Configuring SIP Client Settings on page 110
- Configuring Survivability Voice Mail Settings on page 112

**Configuring License Key**

Follow the steps in this section to assign a license key.

**Configure license key**

1. Choose **System** from the Configuration Menu to open the System page.
2. Click **License Key** in the Registration Status area of the screen.
3. Click **Edit License Key**.
4. Enter the license key.
5. Click **Submit**.

**Configuring SIP Client Settings**

The phone extension-to-email address mappings are defined on the SIP Client page. You can enter mappings manually on the SIP Clients page, or create an email definition file and upload it to the EdgeMarc appliance.

**Note**

Because email delivery outside the local domain cannot be guaranteed if the WAN link is down, the Email addresses mapped to phone extensions for the SIP clients should belong to the same local domain as the email address used for of the EdgeMarc device. For example, if the domain of the EdgeMarc device is
edgewaternetworks.com, then each email address using in a phone extension-to-email mapping should also belong to the edgewaternetworks.com domain.

Configure SIP client settings manually

1. Choose System > Clients List from the Configuration Menu to open the SIP Clients List page.
2. In the Name field near the bottom of the page, enter the phone extension for the SIP client.
3. In the Address field, enter the IP address of the client.
4. In the Port field, enter 5060 as the port number.
5. In the Email field, enter the email address that will receive notification for voice mail messages sent to the phone extension listed in the Name field.

Note
The email address field is optional. Each phone user is assigned a voice mailbox regardless of whether an email address is assigned. If the email address for a user is not specified, however, the user will not receive email notifications.

6. Click Add.
7. Repeat step 2 - step 6 for each phone extension for which you want to support survivability voice mail.

Configure SIP client settings using an mail definition file

1. Create a file with a row for each phone extension. Each row should include the following information, with a space separating each entry.
   
   `<space>ip_address<space>port_number<space>phone_number<space>email_address`

   For example:
   
   * 192.168.1.3 5060 222 user1@edgewaternetworks.com
   * 192.168.1.4 5060 3333 user2@edgewaternetworks.com
   ...

2. To upload the file, open a Telnet, ssh, or terminal window to the EdgeMarc appliance.
3. Log in, if necessary.
   
   Use echo:
   
   `"<space>ip_address<space>port_number<space>phone_number<space>email_address >> /etc/config/email_defs.conf"`
For example, to add an email address to the email definition file for phone users 2222 and 1234567890, issue the following “echo” commands while logged in to the EdgeMarc appliance 5300/5300LF through a Telnet or ssh window:

```
# echo '*  192.168.1.55  5060  2222  jack@edgewaternetworks.com'  >> /etc/config/email_defs.conf
# echo '*  192.168.1.31  5060  1234567890  jill@edgewaternetworks.com'  >> /etc/config/email_defs.conf
```

When you are finished adding all the email entries, issue the following command from the same window to save the changes:

```
#/etc/conf/bin/cfg_commit
```

### Configuring Survivability Voice Mail Settings

Follow these steps to set up phone extension to email mappings.

**Configure survivability voice mail settings**

1. Choose **Survivability** from the Configuration Menu.
2. Enter the number of seconds that an incoming call is allowed to ring before going to voice mail. The default is 20 seconds, and the maximum is 50 seconds.
3. Enter the maximum number of messages that will be stored for each mailbox. Because space to store messages is limited, it may be desirable to keep this number low. The default is 2 message, and the maximum is 20 message.
4. Enter the phone extension for the IVR system that phone users can call to retrieve messages. The default extension is 9999.
5. Enter the email address that will be listed as the originator for email notifications. The email address must include a valid domain name; for example: edgemarc@edgewaternetworks.com.
6. Click **Submit**.

**Note**
The mailbox password can be reset to default. See **Resetting the Mailbox Password** on page 114.

### Using the IVR System

Phone users can call into the IVR system to access their survivability voice mailbox. The following functions are available through the IVR system:

- Fast forwarding—Press # while the message is being played to fast-forwarded the message 5 seconds.
- Rewinding—Press * while the message is being played to rewind the message 5 seconds.
- Stop voice prompts, play back the message envelope (caller ID, message timestamp), and speed-up entering of mailbox number and password—Press #.
The following guidelines apply to IVR system messages and mailboxes.

- The maximum message length is 60 seconds.
- The mailbox number for the user is determined by the number of digits for local dialing defined on the Survivability page. For example, if the user name or extension number is 4081234567, and the number of digits for local dialing is set to 5, the mailbox number for the user is 34567. If the user name or extension number is shorter than the number of digits for local dialing, it will be used as-is for the mailbox number. For example, if the user has extension 123, and the number of digits for local dialing is 4, the mailbox number for the user is 123.
- The default password is of the form 0mbox9, where mbox is the mailbox number. For example, if the user mailbox is 4455, the default password is 044559.

The IVR system uses the prompts and messages described in this section.

**IVR System Prompts**

**User Accesses the Voice Mailbox**

When a SIP phone user dials the IVR system extension to log in to the IVR system and check messages, the system uses the following prompts:

- “Please enter your mailbox number”—Enter the phone extension
- “Please enter your password”—Enter the password. The default is of the form 0ext9 where ext is the phone extension. User presses # after entering the password.
- Press 1 to listen to messages (if there are messages in mailbox)
  - Message plays.
  - “Press 1 to listen to the next message”
  - “Press 2 to hear the current message again”
  - “Press 3 to delete the current message”
- Press 4 to change your password
  - “Please enter your new password”
  - <Enter new password>
  - “Please re-enter your new password”
  - <Re-enter new password>
  - “Password changed” <if new password was entered correctly>
  - “Password mismatched, no change” <if new password was NOT entered correctly>
- “Press # to exit voicemail
  - “Goodbye”

If a call has been picked up and answered by the voicemail system, the caller can press * to log in instead of leaving message.

- <call made to extension N was not answered and picked up by Voicemail>
- “The person at extension N did not answer”
- <* was pressed>
  - “Please enter your mailbox number”
  - “Please enter your password”
System continues the prompts listed in IVR System Prompts on page 113.

Caller Leaves Message

When a call is not answered, or the destination extension is busy, the voicemail system answers the call using the following prompts:

- <call was not answered and picked up by voicemail>
- “The person at extension N did not answer”
- “Record your message after the tone”
- <tone>
- <recording of message>
- “Press 1 to send your message”
  - “Message sent”
  - “Thank you”
  - “Goodbye”
- “Press 2 to review your recording”
  - <playing the recorded message>
- “Press 3 to erase and re-record”
  - Record your message after the tone
  - <tone>

Resetting the Mailbox Password

You can reset a user’s mailbox password to the default by entering the client information on the SIP Clients List page and clicking Add. If the email address is different (not an exact match), the EdgeMarc appliance treats the Add request as an update for the email address of the user and not as a password reset.

For example, to change the email address “account” of a user to “new-account,” that is, from:

Address: 192.168.1.55
Port: 5060
Name: 2222
Email Address: account@edgewaternetworks.com

enter the address, port, name, and new email address, and click Add.

Address: 192.168.1.55
Port: 5060
Name: 2222
Email Address: new-account@edgewaternetworks.com

To reset the password of the same client (address “account”) enter the exact client information:

Address: 192.168.1.55
Port: 5060
Name: 2222
Email Address: account@edgewaternetworks.com

And click **Add**.

**Note**
If the client doesn't have an email address, adding the client again with (still) no email address will also reset the client mailbox's password.
This chapter describes how to configure two EdgeMarc devices to act as a redundant pair. The pair works to eliminate single points of failure in a network configuration.

This chapter contains the following sections:

- Overview
- Configuring Stateful Failover

Overview

You can configure two EdgeMarcs to use automatic, stateful failover in the event of an EdgeMarc failure. One device is designated as the primary device, the other is designated as the backup device. Attached LAN devices, as well as the far-end WAN devices, are unaware that two EdgeMarcs are installed. The two appliances appear as a single device, using a single, constant IP address called a *Virtual IP Address (VIP)*.

Configure the two EdgeMarcs to send status updates to each other by specifying the IP addresses of both the primary and secondary EdgeMarc for the LAN, WAN, or management interfaces. You must enable state transfer for one or more of the IP interfaces. If you enable state transfer for multiple interfaces, you have a higher chance of successful state transfer during link failures. The drawback is that the state transfer causes extra network traffic on that link.

When the master EdgeMarc fails, or one of the links fails, the secondary EdgeMarc will detect the failure and take over in approximately 3 seconds.

When this occurs an event is written to the syslog.

Configuring Stateful Failover

To configure stateful failover with a redundant pair, complete the following tasks on both EdgeMarcs:

1. Configure the LAN and WAN IP addresses.
2. Configure Virtual IP addresses for the redundant pair.
3. Configure the Management Interface.
4. Configure the Stateful Failover page.
Configure the LAN and WAN IP addresses

Configure the LAN and WAN IP addresses. These are real, unique IP addresses.

On each device, complete the following steps:

1. Choose Network from the configuration menu to open the Network Configuration page.
2. Enter the IP address for the LAN interface in the IP Address field under the LAN Interface Settings section.
3. Enter the IP address for the WAN interface, complete the following fields:
   a. Select the Static IP Address radio button.
   b. Enter an IP address in the IP Address field under the WAN Interface Settings section.
4. Complete any remaining fields as described in Network Page on page 169.
5. Click Submit to save your results.

Configure Virtual IP addresses for the redundant pair

Configure the VoIP ALG page on both devices in the redundant pair, specifying the Virtual IP Addresses for the shared LAN and WAN interfaces under Use ALG Alias IP Addresses.

On each device, complete the following steps:

1. Choose VoIP ALG from the configuration menu.
2. Select the checkbox next to Use ALG Alias IP Addresses. If the checkbox is already selected, skip to step 5.
3. Click Submit.
4. Click Ok when prompted to confirm that it is ok to interrupt all voice and video services. The VoIP ALG page is reloaded.
5. In the ALG LAN Interface IP Address field, enter a common IP address that will correspond to a LAN IP address to be shared by both devices in the redundant pair.
6. In the ALG WAN Interface IP Address field, enter a common IP address that will correspond to a WAN IP address to be shared by both devices in the redundant pair.
8. Click Submit to save your results.
Configure the Management Interface

Optionally, enable the management interface on each device to enable state transfer between both device’s management interfaces.

On each device, complete the following steps:

1. Choose System > Management Interface from the primary web configuration menu.
2. Select the Enable Management Interface box.
3. Enter a unique management IP address in the Management Interface IP Address field.
4. Enter the following subnet mask in the Subnet Mask field: 255.255.255.0
5. Click Submit to save your results.

Configure the Stateful Failover page

Configure all parameters on the stateful failover page for each device.

On each device, complete the following steps:

1. Choose System > Management Interface from the primary web configuration menu.
2. Select the Enable Stateful Failover check box.
3. Specify the Designation field as Primary or Secondary.

Note
One device must be designated as the primary device and the other device must be designated as secondary device.

4. Enter the password in the Password field.

Note
The password must be the same on both systems.

5. Enter the LAN Virtual IP address (the ALG LAN Interface IP Address) into the LAN Virtual IP address or Subscriber Virtual IP address field.
6. Enter the WAN Virtual IP address (the ALG WAN Interface IP Address) into the WAN Virtual IP address or Provider Virtual IP address field.
7. Enter the real LAN interface address of the other device in the LAN Remote Address field.
8. Enter the real WAN interface address of the other device in the WAN Remote Address field.
9. Enter the real Management Interface address of the other device in the Management Remote Address field.

10. For each link that will transfer state information, select its corresponding Enable State Transfer checkbox.

Note
For redundant pairs that process high volumes of SIP signaling and RTP media, enable state transfer of at least two, if not all three, IP interfaces, one of which should be the Management Interface. In the case that one interface should fail, this increases the probability that the state will be successfully transferred between devices.
WAN Link Redundancy

This chapter describes how to configure the EdgeMarc appliance to support the WAN Link Redundancy (WLR) feature. It contains the following sections:

- Overview
- Configuring WAN Link Redundancy

**Overview**

WLR is a critical part of increasing the reliability of VoIP and data communications. It allows enterprise and service provider customers to take advantage of diverse routing and dual access link connections to private or public IP networks.

WLR relies on two separate physical routes, primary and secondary routes to the WAN network. EdgeMarc switches to the secondary route, if a communication failure is detected on the primary route, thus reducing the risk of the WAN link being the single point of failure. As shown in Figure 15, WLR together with “Survivability”, enables the EdgeMarc to provide robust and reliable voice services that meet the needs of both Enterprise and Service Provider deployments.
Data and Voice Interface Switchover

- **Revertive Mode**
  If the Primary interface has been defined as main interface (See Table 77) and the Secondary interface is the currently active interface, then the system will automatically switch to the Primary interface as soon as it is detected to be available.

- **Non-revertive Mode**
  The system shall continue to use the currently active interface until it goes down in which case it will switchover to the other interface.

**Manual Switchover**

*Note*
Manual Switchover mode is only applicable when the EdgeMarc is configured in non-revertive mode (See Manual Switchover on page 308).
If the user selects Manual Switchover at any instance then WLR module invokes a network restart setting up the default routes on the system to start using the currently Inactive interface. This switchover takes place irrespective of the status (Up/Down) of the inactive interface.

**Supported Interfaces**

Wan Link Redundancy can be implemented using two different physical interfaces on the same Edgemarc (e.g. T1 interface and ethernet) or one physical interface with two gateways to the WAN reachable through an intermediate local area network. All tested combinations of a primary and a secondary interface or gateway are provided in Table 9 and Table 10. Any interface or gateway can either be primary or secondary.

**Table 9  Primary and secondary gateways on separate WAN interfaces**

<table>
<thead>
<tr>
<th>Gateway Selection</th>
<th>Ethernet</th>
<th>T1</th>
<th>EVDO</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP IP</td>
<td>ANSI T1</td>
<td>Static IP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PPP T1</td>
<td>PPPoE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PPP T1</td>
<td>DHCP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PPPoFR T1</td>
<td>PPPoE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PPPoFR T1</td>
<td>DHCP</td>
<td></td>
</tr>
<tr>
<td></td>
<td>IP IP</td>
<td>PPPoE</td>
<td>EVDO</td>
</tr>
<tr>
<td></td>
<td>IP IP</td>
<td>Static IP</td>
<td>EVDO</td>
</tr>
</tbody>
</table>

WAN Link Redundancy can be implemented using two different physical interfaces or one physical interface with two gateways to the WAN.

**Table 10  Primary and secondary gateways on one WAN interface**

<table>
<thead>
<tr>
<th>Gateway IP Selection</th>
<th>Ethernet WAN Interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethernet Static IP</td>
<td>Static IP Static IP</td>
</tr>
<tr>
<td>Ethernet Static IP</td>
<td>Dynamic IP DHCP</td>
</tr>
<tr>
<td>Ethernet Static IP</td>
<td>PPPoE</td>
</tr>
</tbody>
</table>

**Configuring WAN Link Redundancy**

This section describes how to configure WAN link redundancy settings.
Configure WLR settings

Note
Priority calling services cannot be configured when WAN Link Redundancy is enabled.

1. Choose Network submenu of “Configuration Menu” and configure the primary interface and gateway. Also, configure the parameters in the “Primary WAN Redundancy Settings” section (See Network Page) and click Submit.

2. Choose “Configuration Menu → Wan-Link Redundancy” and choose “Secondary WAN Config” submenu. Configure the secondary interface and gateway (See Secondary Interface Settings Configuration Page) and click Submit.

3. Choose “Configuration Menu → Wan-Link Redundancy” and choose “WLR Parameters Config” submenu. Change the default values of the parameters if necessary and click Submit.

4. Choose “Configuration Menu → Wan-Link Redundancy” and choose the main interface for data and voice by choosing primary or secondary (See WAN Link Redundancy Configuration Page).

5. Enable WAN Link Redundancy and if needed enable revertive mode.

6. Click Submit.
   A message indicates that service will be temporarily interrupted.

7. Click OK to confirm.
This chapter describes how to use the diagnostic information, troubleshooting tools, and system maintenance utilities on the EdgeMarc appliance. It contains the following sections:

- Viewing Version, Hardware Platform and LAN MAC Address
- Viewing the ALG Registration Code
- Viewing Networking Information
- Viewing Advanced System Information
- Using Troubleshooting Tools
- Rebooting the System
- Using T1 Diagnostics
- Verifying Connectivity with the Test UA

**Viewing Version, Hardware Platform and LAN MAC Address**

The software version, hardware platform, and LAN MAC address are common pieces of information requested by technical support. You can obtain this information from the System page of VOS for EdgeMarc.

To ensure that you are running the latest software version, visit our website for a complete listing of software releases at:


**Viewing the ALG Registration Code**

You will also find a link to the ALG registration code on the System page. The registration code enables the ALG and is pre-installed at the factory.

**Entering the Registration Code**

If the registration code is inadvertently deleted you can re-enter the code.
Enter license key

1. Choose System from the Configuration Menu.
2. Click License Key.
3. Click Edit License Key.
4. Enter the License Key (registration code).
   The registration code is printed on the sticker located on the bottom of the EdgeMarc device.
5. Click Submit.
   A message indicates that service will be temporarily interrupted.
6. Click OK to confirm.

Viewing Networking Information

To view the networking configuration and status of the EdgeMarc device, open the Network Information page.

View networking information

- Choose System > Network Information from the Configuration Menu.

The Network Information page includes the following information:
- Routing Information
- Link Status
- Interface Information

Routing Information

The system routing table contains the static routes for hosts and networks that are configured on the EdgeMarc device. If only the LAN and WAN IP addresses have been configured multiple lines are displayed:
- The private subnet associated with the LAN interface
- A public subnet present for the WAN interface
- An entry for the EdgeMarc device loopback interface
- An entry for each IPSec tunnel
- The EdgeMarc device's default gateway forwarding to the WAN interface

Additional lines may be displayed depending on the contents of the Route and VoIP Subnet Routing pages. Each entry on one of these pages causes an additional entry in the routing table.
**Link Status**

Link Status shows the status of the Ethernet interfaces. Ethernet autonegotiation is often unreliable, especially between different vendors or old and new networking equipment. Failure of autonegotiation is generally not a cause for concern. However, if the negotiated rates change intermittently or the link is reported as down or no link, the link rate may need to be set manually on the Set Link page. Intermittent data and voice outages may be caused by link “flapping” when the two endpoints of the Ethernet cable cannot reach agreement using autonegotiation. If the link rate is set manually, make sure that the device at the far end of the connection can communicate at the desired rate. Incompatible rates can cause a loss of communication with the EdgeMarc device.

**Interface Information**

The specific status and configuration information for the system interfaces is displayed in the Interface Information section.

The interface statistics can point to areas of congestion in the network. If the errors statistic is a few percent or more of the total packets sent, it may be an indication of excessive congestion on the network interface. If this congestion is not corrected the quality of voice calls will be affected. The topology of the network attached to the network interface with the errors should be examined and modified to better segment and isolate network traffic.

**Viewing Advanced System Information**

To view advanced system information for the EdgeMarc device, open the System Information page.

**View networking information**

- Choose System > System Information from the Configuration Menu.

For detailed field descriptions, see “Subinterfaces Page” on page 171.

**Passive Voice Call Monitoring**

The EdgeMarc device monitors live voice calls and performs objective speech quality assessment. This information enables the network operator to assess voice quality for the purposes of SLA tracking or problem isolation. Mean Opinion Score (MOS) results for RTP streams in both directions of a VoIP call are calculated at call completion. This information, along with the IP addresses of the VoIP endpoints supporting the call, is logged locally and optionally sent to an external syslog server. In addition, the EdgeMarc device generates a real-time message for any MOS values calculated less than 2.5 (considered poor quality) during an active call.
Voice call quality information is available in the System Logging Messages section of the System Information page. A sample of this information is provided below.

**Recent Call Log:**

Mar 16 22:15:38 69.169.190.223 E_5300LF mand: Advanced MOS (v1.5);STR=1237241693;STP=1237241738;Call ID=165479;SRC=66.7.123.134;SDD=18013589822;DST=10.221.61.255;DDD=801 3751757;MOS=4.36;BTC=0;PJ=0.00;PPL=0.00;LP=4;RR=2190;SRE=2194;OOP=0 ;PD=0.41;MPJ=2.34;CLP=3;PLB=2.00;

Mar 16 22:15:38 69.169.190.223 E_5300LF mand: Advanced 2MOS (v1.5);STR=1237241693;Call ID=165479;SRCP=20520;DSTP=16448;SIP-CALL-ID=995a8b51-8f639c90@10.22 1.61.255;IFACE=eth1;


Mar 16 22:15:40 69.169.190.223 E_5300LF mand: Creating call ID 165492 between 10.221.106.241 and 66.7.123.134. Active calls=63

Mar 16 22:15:43 69.169.190.223 E_5300LF mand: Creating call ID 165493 between 10.221.60.224 and 66.7.123.134. Active calls=63


Mar 16 22:15:43 69.169.190.223 E_5300LF mand: Advanced MOS (v1.5);STR=1237241716;STP=1237241743;Call ID=165486;SRC=10.221.174.240;SDD=8013741283;DST=66.7.123.134;DDD=319 6125;MOS=4.35;BTC=0;PJ=0.00;PPL=0.00;LP=3;RR=1362;SRE=1365;OOP=0;PD =0.60;MPJ=18.91;MNJ=24.34;CLP=2;PLB=1.50;

Using Troubleshooting Tools

The EdgeMarc device provides convenient test tools to facilitate problem isolation and resolution. A network operator can use these tools to verify connectivity to and from the EdgeMarc device and to trace datapaths to endpoints throughout the network.

Verifying Registered Voice Devices

The EdgeMarc device maintains a list of all registered voice devices called a clients list, so that it can properly route voice calls. At startup, voice devices register their IP addresses with the EdgeMarc device. The EdgeMarc device then registers on behalf
of the voice devices by providing its own WAN IP address to the softswitch or IP PBX.

If a user or network operator reconfigures the IP address of the voice device, it re-registers the new address with the EdgeMarc device. In this instance, voice calls may be routed improperly because the EdgeMarc device clients list contains out-of-date information.

To update the clients list, highlight and delete any duplicate or stale entries.

**Note**
You can configure MGCP and H.323 to age out clients that do not respond to local audits and remove them from the clients list dynamically. To configure this feature, use the appropriate Voip ALG pages.

**Verify voice devices**

1. Choose **System > Clients List** from the Configuration Menu to open the SIP Clients List page.
   By default, the SIP clients are shown.

2. Select **MGCP** or **H.323** to view the registered clients for those protocols.

3. In the clients list table, select the checkboxes for any duplicate entries or other entries that required deletion and click **Delete Selected**.

4. Click **Submit**.

5. Restart the VoIP ALG according to the instructions in Networking Restart on page 130.

**Ping and Traceroute Tests**

The Network Test Tools page provides an easy way to perform a ping test or traceroute test. To access the Network Test Tools page, select **System > Network Test Tools** in the Configuration Menu.

**Performing a Ping Test**

A ping test is the most common test used to verify basic connectivity to a networking device. Successful ping test results indicate that both physical and virtual path connections exist between the EdgeMarc device and the test IP address. A successful ping test does not guarantee that all data traffic is allowed between the EdgeMarc device and the test IP address, but it is useful to verify basic reachability.

**Perform a ping test**

1. Choose **System > Network Test Tools** from the Configuration Menu.
2. Enter an address in the IP Address to Ping field.
3. Click **Ping**.
The Network Test Tools page reopens to display results of the ping test. (This may take several seconds.)

4. Click **Reset** to clear the data.

### Performing a Traceroute Test

A traceroute test is used to track the progress of a packet through the network. The test can be used to verify that data destined for a WAN device reaches the remote IP address via the desired path. Similarly, internal network paths can be traced over the LAN to verify the local network topology.

**Perform a traceroute test**

1. Choose **System > Network Test Tools** from the Configuration Menu.
2. Enter an address in the **IP address to Trace** field.
3. Select **WAN** or **LAN**.
4. Click **Traceroute**.
   - The Network Test Tools page reopens to display results of the test. (This may take several seconds.)
5. Click **Reset** to clear the data.

### Networking Restart

Technical support may request that networking services be restarted during a troubleshooting session. In this case, you can use the Network Restart page to stop and restart all the networking services that are running on the system.

**Restart networking services**

1. Choose **System > Restart** to open the Networking Restart page.
2. Click **Submit**.
   - A message indicates that service will be temporarily interrupted.
3. Click **OK** to confirm.

**Warning**

Restarting network services will interrupt the system for up to a minute. All voice, video and data sessions currently in progress will be interrupted! Proceed with caution!

### Rebooting the System

Rebooting the system stops all networking services and reboots the system. The operating system and networking services will be loaded from scratch. Reboot is
functionally equivalent to power cycling the system. Technical support may request that the system be rebooted during a troubleshooting session.

**Note**
As an alternative to rebooting, you can perform a reset locally by temporarily disconnecting the power cable from the EdgeMarc device.

### Reboot the system

1. Choose **System > Reboot System** from the Configuration Menu.
2. Click Reboot.
3. Click **Submit**.
   
   A message indicates warns that rebooting the system will interrupt services for a few minutes.
4. Click **OK** to confirm.

**Caution**

Rebooting the system will interrupt services for a few minutes. All voice, video and data sessions currently in progress will be interrupted! Proceed with caution!

### Using T1 Diagnostics

Open the T1 Diagnostics page to display T1 diagnostic information and statistics and run diagnostic commands.

### Perform T1 diagnostics

1. Choose **System > T1 Diagnostics** from the Configuration Menu.
2. Select the loopback test you want to run from a pull-down list, and click **Submit** for the desired interface. “T1 Diagnostics Page” on page 283 describes the available loopback tests.
3. Select the BERT test type from the BERT menu and click **Submit**.
   
   The BERT test sends a framed Quasi Random Bit Sequence (QRBS) on the T1 link and monitors the receive path for bit errors. A BERT test is usually run in conjunction with a network loopback at the remote end so that the test pattern sent by the EdgeMarc can be compared to the pattern received on the same interface. The EdgeMarc can send a QRBS $2^{15}-1$ and a QRBS $2^{20}-1$ pattern.

**Note**

The EdgeMarc appliance also responds to network generated, AT&T formatted loop up/down codes. Loopback codes sent from far end equipment will loop the T1 interfaces back towards the network.
The T1 Status shows the current alarm state and indicates if there is a loopback or BERT test in progress. For descriptions of alarm and loopback types, see “T1 Diagnostics Page” on page 283.

The T1 Diagnostics page displays the current 15-minute (CUR) and 24-hour total (SUM) statistics for the T1 interfaces. This information allows you to compare performance from different time intervals. “T1 Diagnostics Page” on page 283 describes and the interval data.

**View T1 Statistics**

1. Choose **System > T1 Diagnostics** from the Configuration Menu.
2. Click **Reset** to clear the statistics for the current interval.
   A message indicates that service will be temporarily interrupted.
3. Click **OK** to confirm.

**View advanced T1 diagnostics**

1. Choose **System > T1 Diagnostics** from the Configuration Menu.
2. Click **T1 advanced diagnostics page**
   The page displays data for each 15-minute interval over the last 24 hours.

**Note**

The oldest-15 minute interval is removed from the 24-hour total as each new 15-minute interval is added.

**Verifying Connectivity with the Test UA**

You can use the Test UAto verify VoIP connectivity. The Test UA allows you to place a call to the EdgeMarc itself. You can confirm that the call was successfully placed and received as well as monitor the quality of service (QOS) for the call in the System Logging Messages.

For information about placing calls to and from the EdgeMarc using an EdgeView appliance, see the *EdgeView VoIP Support System User Manual*. 
Placing a call to the EdgeMarc

**Prerequisite:** A telephone number must be assigned to the Test UA on the softswitch to which the EdgeMarc points.

1. Choose Test UA from the primary web configuration menu.
2. Complete the required fields as specified in “Test UA Settings page” on page 277. Use the telephone number assigned to the Test UA and the IP address for the softswitch on which the telephone number is registered.
3. Place a call to the telephone number. A successfully placed call to the EdgeMarc results in a series of beeps.
4. Choose System > System Information from the primary web configuration menu.
5. Scroll to the section titled System Logging Messages. This section provides a message for every logged call.

The successfully placed call will appear as follows in the syslog:

Call ID [ID] [IP Start Address]->[IP End Address]:
Call complete. Remaining active calls=0. Minimum MOS=[MOS Score] Average MOS=[MOS Score]
Device Configuration Management

This chapter describes the tools available to manage the EdgeMarc appliance configuration. It contains the following sections:

- Overview
- ewn Command
- Logging off listed users
- Downloading Files
- Using the Internal TFTP Server

Overview

The EdgeMarc device stores all configuration information for the system in a series of individual files that reside in local flash memory. These files are read at boot time to determine the configuration identity of the EdgeMarc device and then stored in RAM as “running” state. As you configure the EdgeMarc device the submit command writes the configuration changes to both RAM and flash so that the files stored in flash are always up to date with the running state of the system.

The EdgeMarc device provides a utility that enables you to copy the individual configuration files stored in flash to a single, consolidated backup file. This single file can then be used as a backup for the entire system and restored at a later date if necessary. Multiple backup files with different system configurations can also be created and stored locally in the EdgeMarc device or on remote TFTP servers.

Note
No more than two backup files can be stored in the EdgeMarc device flash because of size constraints. Also, it is recommended that you create a backup file after any configuration changes are made to the EdgeMarc device. This is to prevent the loss of any configuration changes made since your last backup in the event that you must restore the system configuration.

ewn Command

The ewn command is used to perform multiple tasks related to backup operations.

The syntax for the ewn command is as follows:
USAGE:

ewn help|list
ewn save|load|restore|delete [file name]
ewn upload|download [file name] [ip address]

where file name must use extension .conf1 or .conf2

The ewn command can be used with a local terminal connection or remotely using SSH.

- Use a straight-through cable to connect to the console port of the EdgeMarc device.
- Use a terminal emulator such as HyperTerminal set to a baud rate of 9600, 8 data bits, 1 stop bit, and no and parity.

Alternatively you can connect to the EdgeMarc device remotely using SSH. Log on as root and enter the password provided by Edgewater.

At the command prompt (bash#), you can create the backup file, store it to local flash, copy it to a remote TFTP server, copy it from a remote TFTP server, delete it, load it, restore it, or list all available backup files.

Creating a backup file and save to local flash

The following command creates a backup file of the current running configuration and saves it to local flash memory:

bash# ewn save <filename>

Filename format (must use extension .conf1 or .conf2):
<filename1>.conf1
<filename2>.conf2

<filenameX> can be a combination of both letters and characters. For example, EWNxx_041503.conf1 or location1_Exx00.conf2. Trying to use any other filename format will result in the error message: “EWN_ERROR_BAD_FILE_NAME”.

Caution

The .conf extensions have special significance. If you save a configuration with <filename-new>.conf1, any existing older <filename-old>.conf1 will be overwritten with the new one.

Copy a backup file to a remote TFTP server

The following commands copies a backup file from the EdgeMarc device to a TFTP server.

bash# ewn upload <filename> <tftp server IP Address>
Download a backup file from a remote TFTP server

The following command downloads a backup file from a TFTP server to the EdgeMarc device.

```
bash# ewn download <filename> <tftp server IP Address>
```

List available backup files

The following command lists all backup files stored in flash memory. If no file has been saved, the command will only return the bash# prompt.

```
bash# ewn list
```

Delete a backup file

The following command deletes the specified backup file:

```
bash# ewn delete <filename>
```

Loading a backup file to become the running configuration

The following command loads the specified backup file into RAM and makes it the active running configuration.

```
bash# ewn load <filename>
```

Caution

Issuing this command will automatically restart the EdgeMarc device and therefore interrupt any active voice calls and data sessions.

Restoring a backup file to become the running configuration

The following command deletes all preexisting configurations, restores the specified backup file into RAM, and makes it the active running configuration.

```
bash# ewn restore<filename>
```

Logging off listed users

The following command logs off any listed user logged into the web configuration GUI or the CLI. RADIUS and TACACS users are also tracked.

```
bash# ewn logoff
```
To log off a user, complete the following steps:

1. At the CLI prompt, enter the command `ewn logoff`. A menu appears displaying all listed users who are logged in. Also listed are the ports and ip addresses for those listed users.

2. Enter the number of the assigned user that you wish logoff. A message is displayed confirming that the assigned user has been logged off.

### Downloading Files

File Download allows the appliance to download files from a central FTP server and store them locally. These files can then be served out by the local TFTP or HTTP/1.0 servers.

The File Download feature works in conjunction with the File Server feature. The files requested for download cannot be stored locally until a RAMDISK is created by the File Server feature.

When using FTP, File Download will log into the FTP server as the “anonymous” user. File Download assumes the files reside in the `/pub` directory of the FTP server.

When serving files using HTTP/1.0, only the files that are listed on the File Download page can be served out by the HTTP server. Files that are pushed to the local system's RAMDISK by an external management system are not available for HTTP download.

**Note**

To use file download, the file server RAMDISK must be enabled. Downloaded files cannot be stored on the local system or served out until the file server is enabled.

#### Download files

1. Choose **System > File Download** from the Configuration Menu.
2. Select **Enable File Download**.
3. Enter the IP address of the FTP server and the desired frequency of download.
4. Enter the files to be downloaded. All files must be in the `/pub` directory on the FTP server.
5. Click **Submit**.
   - A message indicates that service will be temporarily interrupted.
6. Click **OK** to confirm.

### Using the Internal TFTP Server

In some instances, a public TFTP server is not available. Enabling the TFTP server allows configuration and image files to be downloaded from the system by using
TFTP. Configuration and image files can be pushed to the system by a management station using a secure protocol. These files are then served out when an endpoint requests them.

The File Server page is used to enable and configure an internal TFTP file server. The file server is used to store phone configuration information. Enabling the TFTP server will disable the TFTP ALG. Files that are stored on the server are stored in RAM. The files will be lost when the system is rebooted or a Submit is pressed on this page.

**Enable the TFTP server**

1. Choose System > File Server from the Configuration Menu.
2. Configure the server as described in “File Server Page” on page 256.
3. Click Submit.
   
   A message indicates files stored on the RAM disk will be lost and that voice and video services will be interrupted.
4. Click OK to confirm.
Edgemarc BGP and Routing Configuration and Troubleshooting

This chapter describes how you can use the EdgeMarc command line interface (CLI) for the EdgeMarc 4500 series to configure and troubleshoot Border Gateway Protocol (BGP). You can use the CLI to enable and configure BGP and routing daemons, as well as troubleshoot existing BGP and routing daemons.

The chapter contains the following sections:
- BGP enablement and configuration
- Troubleshooting using BGP and routing daemons

BGP enablement and configuration

Complete the following steps to enable, connect, and configure the BGP daemon:

1. At the command prompt (#), enter the following command:
   ```
   config_routing --bgp --enable
   ```
   The BGP daemon is now enabled.

2. At the command prompt (#), complete the following steps:
   a. Enter the following command:
      ```
      config_routing --bgp --connect
      ```
      You are prompted for the BGP password.
   b. Enter the default password: bgp
      The BGP console (BGP>) is displayed.

3. At the BGP console (BGP>), enter the following command:
   ```
   enable
   ```
   The BGP daemon is now in privileged mode. The BGP privileged mode console (BGP#) is displayed.
4. At the BGP privileged mode console (BGP#), enter the following command:

```
config terminal
```

The BGP daemon is now in BGP terminal configuration mode. The BGP terminal configuration mode console (BGP(config)#) is displayed.

5. At the BGP terminal configuration mode console (BGP(config)#), add an Autonomous System (AS):

```
router bgp <AS>
```

**Note**

<AS> can be any number between 1 and 65535.

The BGP daemon is now in router configuration mode. The router configuration console (BGP(config-router)#) is displayed.

6. At the router configuration console (BGP(config-router)#) enter the following command:

```
redistribute connected
```

The autonomous system is established as a default route for any PE router.

7. To set the BGP router ID and uniquely identify the Edgemarc 4500 device, enter the following command from the router configuration console (BGP(config-router)#):

```
BGP(config-router)# bgp router-id <WAN-IP>
```

8. To configure a BGP peer, enter the following command from the router configuration console (BGP(config-router)#):

```
neighbor <peer-IP> remote-as <peer-AS>
```

9. If you are making changes to an existing BGP configuration, you must ecomplete the following additional steps before exiting the BGP daemon:
   a. Exit until you reach the BGP privileged mode console (BGP#).
   b. Enter the following command:

```
clear ip bgp *
```

The BGP daemon is reset.

10. To save your configuration file, enter the following command from any BGP daemon console:

```
write file
```

The configuration file is saved in program memory and its destination is noted.

11. To save your configuration file permanently by storing it in EdgeMarc flash storage, complete the following steps:
   a. Exit from the BGP console by entering exit until you have reached the initial CLI command prompt (#).
   b. At the CLI command prompt (#), enter the following command: `cfg_commit`. The configuration file is stored in EdgeMarc flash storage.
Troubleshooting using BGP and routing daemons

You can troubleshoot existing routes and configurations using the BGP and routing daemons. Use the BGP daemon to display the current configuration, BGP summary, and BGP neighbors. Use the routing daemon to display all received routes that are mapped by both the provider edge (PE) router and customer edge (CE) router.

The following two topics provide more information:
- Troubleshooting using the BGP daemon
- Troubleshooting using the routing daemon

## Troubleshooting using the BGP daemon

To use the BGP daemon to review existing configurations using the CLI, complete the following steps:

1. At the command prompt (#), enter the following command:
   ```
   config_routing --bgp --enable
   ```
   The BGP daemon is now enabled.

2. At the command prompt (#), complete the following steps:
   a. Enter the following command:
      ```
      config_routing --bgp --connect
      ```
      You are prompted for the BGP password.
   b. Enter the default password: `bgp`
      The BGP console (`BGP>` is displayed.

3. At the BGP console (`BGP>`), enter the following command:
   ```
   enable
   ```
   The BGP daemon is now in privileged mode. The BGP privileged mode console (`BGP#`) is displayed.

4. To display BGP configuration from the PGP privileged mode console (`BGP#`), enter the following command:
   ```
   show running-config
   ```
   The BGP configuration is displayed.

5. To monitor and debug the BGP daemon, complete the following steps:
   a. From the BGP privileged mode console (`BGP#`), enter the following command:
      ```
      terminal monitor
      ```
      Monitoring the BGP daemon is enabled.
6. At the BGP privileged mode console (BGP#), enter the following command:
   ```
   config terminal
   ```
   The BGP daemon is now in BGP terminal configuration mode. The BGP terminal configuration mode console (BGP(config)#) is displayed.

b. At the BGP terminal configuration mode console (BGP(config)#), enter the following command:
   ```
   log monitor
   ```
   Debugging the BGP daemon is enabled.

7. Exit the BGP terminal configuration mode by entering the following command:
   ```
   exit
   ```
   The BGP privileged mode console (BGP#) is displayed.

8. To display the BGP summary from the BGP terminal configuration mode (BGP#), enter the following command:
   ```
   show ip bgp summary
   ```
   The BGP summary is displayed.

9. To display BGP neighbors from the BGP terminal configuration mode (BGP#), enter the following command:
   ```
   show ip bgp neighbors
   ```

**Troubleshooting using the routing daemon**

To use the routing daemon to display all received routes that are mapped by both the PE and CE routers, complete the following steps:

1. At the command prompt (#), enter the following command:
   ```
   config_routing --bgp --enable
   ```
   The BGP daemon is now enabled.

2. At the command prompt (#), complete the following steps:
   a. Enter the following command:
      ```
      config_routing --connect
      ```
      You are prompted for the Routing password.
   b. Enter the default password: `routing`
      The routing console (Routing>) is displayed.

3. At the routing console (Routing>), enter the following command:
   ```
   show ip route
   ```
   All received routes are displayed.
This chapter describes how to upgrade the EdgeMarc device to the latest software release available from Edgewater Networks. It contains the following sections:

- Release Information
- Upgrade Procedure for Software Revision 1.3.11 or Later
- Upgrade Procedure for Software Version 1.3.9 or Earlier

Release Information

To display version information for the system, choose **System** from the Configuration Menu. The software version information is presented at the top of the page.

Additional information can be found in the release notes section of our website at:


It is recommended that you reboot the EdgeMarc device before performing an upgrade. The reboot will ensure that enough dynamic memory is available to handle the upgrade process.

**Warning**

When you update your software, telephone services will be unavailable for several minutes. It is therefore advised that upgrades be performed during a maintenance window when telephone traffic can be interrupted.
Upgrade Procedure for Software Revision 1.3.11 or Later

Use this procedure if your EdgeMarc device is running software revision 1.3.11 or later. The software version is listed on the System page of the web GUI.

Upgrade - Revision 1.3.11 or later

1. Select System > Upgrade Firmware from the Configuration Menu.
2. Enter the Download Server IP address of 204.202.2.188 (the public IP address of the FTP site hosted by Edgewater Networks).
3. Enter the Filename: image.bin
4. Click Submit.
   You can follow the progress of the upgrade by selecting the refresh the upgrade status link.

Caution
Do not change the configuration or power off the device until the write is 100 percent complete. The EdgeMarc device may become unusable if the write is interrupted. The flash write can take up to 5 minutes depending on the speed of the download server.

The system will automatically restart after the new image has been loaded.

5. Verify that the upgrade was successful by checking the software revision number found on the System page.

Upgrade Procedure for Software Version 1.3.9 or Earlier

Use this procedure if your EdgeMarc device is running software revision 1.3.11 or later. The software version is listed on the System page of the web GUI.

We recommend running the upgrade command using the CLI rather than the web GUI. This is because running the command in the CLI provides more feedback to the operator.

Upgrade using local terminal connection

1. Use a straight-through cable to connect to the console port of the EdgeMarc device.
2. Use a terminal emulator such as HyperTerminal set to a baud rate of 9600, 8 data bits, 1 stop bit, and no parity.
Use SSH access

1. Log on as root.
2. Enter the password (contact Edgewater support for the password)
3. Ping the Edgewater Networks FTP server to determine if you can reach the upgrade server by issuing the following command:
   `ping 204.202.2.188`
4. If the ping was successful enter the upgrade command as follows:
   `netflash -fk 204.202.2.188 pub/e_<edgemarc device>/flash.bin`
   You will be prompted for a user ID and password. The user ID is anonymous and there is no password. The following is a log of the process:

```
netflash: login to remote host 204.202.2.188
Name (204.202.2.188:root): anonymous
Password: 
netflash: ftping file "pub/e_<edgemarc device>/flash.bin" from 204.202.2.188
...............................................................
.........................................................
netflash: got "pub/e_<edgemarc device>/flash.bin", netflash: image is compressed, decompressed length xxxxx
netflash: programing FLASH device /dev/mtd3
...............................................................
..............................................................
Restarting system.
```

The upgrade process takes between 5 and 10 minutes, depending on the speed of the FTP download.

**Caution**
Do not change the configuration or power off the device until the write operation is 100 percent complete. The EdgeMarc device may become unusable if the write operation is interrupted. The flash write can take up to 5 minutes depending on the speed of the download server.

You may see a “Restarting system” message or your SSH session will exit. This indicates that the system is rebooting. The system takes 1–2 minutes to reboot.

5. Verify that the upgrade was successful by checking the software revision number on the System page

6. If you opened an SSH session, you should log out of the EdgeMarc device and close the SSH session by entering **exit** in the command line.
Primary Rate Interface (PRI)

This chapter describes how to configure the ISDN Primary Rate Interface (PRI) on the EdgeMarc appliance. It contains the following sections:

- Overview
- Configuring T1 for PRI
- Configuring Network Side ISDN PRI (PRI/UA)
- Configuring Client Side ISDN PRI (PRI/GW)
- Configuring SIP Trunking for PRI

Overview

The EdgeMarc appliance can be configured to act as a gateway (client device) connecting the IP network to PSTN through a T1 PRI line. It can also work as a network device connecting a PBX to the IP network. The default configuration enables 23 B-channels (64 Kbps each) and 1 D-channel (64 Kbps).

The following applies to the implementation of PRI on the EdgeMarc appliance:

- The appliance can be a client device (gateway) or network device, but not both.
- Supports the following switch types:
  - NISDN-2 or NI2
  - 4ESS
  - 5ESS
  - DMS100
- The highest port number of licensed T1 ports should be used for PRI.

Configuring T1 for PRI

Before PRI can be enabled, following steps must be performed to configure T1:

1. Choose the “T1 configuration” link under “System” on the Configuration menu.
2. If MLPPP is enabled and all licensed T1 ports are used for data, then disable the highest T1 port for data and then select it for PRI/CAS.
3. If MLPPP is not enabled, then choose the highest licensed T1 port for PRI/CAS.
4. The only other parameter that need to be configured is “LBO” in the “Set Interface Configuration” section. Use the following guidelines when connecting EdgeMarc to a T1 line:
   - DS1 level settings are used when connecting an EdgeMarc to a smartjack or T1 line provided by the telephone company. The DS1 power levels can be changed depending on the length of the T1 cable from the EdgeMarc to the first T1 repeater. 0db is used for the longest cable length and -22.5db is used for the shortest cable length.
   - The DSX-1 level settings are used when connecting an EdgeMarc T1 to a private line or a co-resident PBX without a CSU/DSU. The DSX-1 settings can be changed based on the distance between the EdgeMarc and the terminating device.

**Configuring Client Side ISDN PRI (PRI/GW)**

The Client Side PRI enables the SIP GW to provide a standard PRI client-side interface to the PSTN. SIP GW receives calls from the IP side and connects them to the PSTN and vice versa. Figure 14 is an example of the Client Side PRI.

**Figure 14   Client Side ISDN PRI (PRI/GW)**

1. Enable PRI/GW services:
   a. Choose “SIP GW” link from the Configuration Menu
   b. Check “Enable SIP FXO/Line services” to enable the FXO services
c. Click Submit

2. Choose the “PRI/Client configuration” link under “SIP GW” from the “Configuration Menu”

3. Check “Enable PRI/GW services”

4. Click Submit.

Note
For complete description of each parameters for Client Side PRI, please refer to Client Side ISDN PRI (PRI/GW) Configuration Page

5. Define the switch type that Client-side PRI will be simulating. The default is NI2.

Note
Switch type entry must match the Network-side switch-type to which this interface is connected.

6. Select D-channel number that will be used for Q.931 signaling.

7. Enable/disable each PRI channel.

8. Check PRI connection. If the connection is up, all ports should display a status of “Idle”.

9. If clock signal is provided by the Service Provider then do not check the “Internal Clocking” parameter.

10. If the softswitch requires that endpoint has to be registered before a call can be made, then check the “Register with SIP server” parameter and enter all the pertinent information in the following parameters.
Configuring Network Side ISDN PRI (PRI/UA)

The Network Side PRI enables the SIP UA to provide a standard ISDN PRI network side interface to the PBXs and to imitate legacy phone switches. Figure 15 is an example of the Network Side PRI.

**Figure 15  Network Side ISDN PRI (PRI/UA)**

1. Enable SIP UA services by choosing the “SIP UA” link from the “Configuration Menu” and checking the “Enable SIPUA” parameter.

2. Enable PRI/UA services:
   a. Choose “SIP UA” link from the Configuration Menu
   b. Choose “PRI/NET configuration” submenu.
   c. Check “Enable PRI/UA services”
   d. Click Submit.
   e. Click OK in the warning dialog box.

**Note**

For complete description of each parameters for Network Side PRI, please refer to Network Side ISDN PRI (PRI/UA) Configuration Page

3. Select the switch type from the drop down list. The default is NI2.

**Note**

Switch type entry must match the Client-side switch-type to which this interface is connected.

4. Select D-channel number that will be used for Q.931 signaling.
5. Define the device name. This name will be used in the SIP Trunking to define an incoming rule so that all the incoming calls will be handed off to SIP UA which will in turn give it to.

Note
The device name must match the name that will be used in SIP trunking device and dial-rule page for PRI.

6. Enable/disable each PRI channel.

7. Check PRI connection. If the connection is up, all ports should display a status of “Idle”.

8. If clock signal is provided by the PBX then do not check the “Internal Clocking” parameter.

9. If the softswitch requires that endpoint has to be registered before a call can be made, then check the “Register with SIP server” parameter and enter all the pertinent information in the following parameters.

Configuring SIP Trunking for PRI

SIP trunking must be configured in order for PRI to work properly. To configure SIP trunking choose the “VoIP ALG” link from the “Configuration Menu” and then choose the “SIP>Trunking” submenu.

Note
For more information on SIP Trunking see “SIP Trunking” on page 64 or “SIP Trunking Page” on page 218

Use the following guidelines when configuring SIP trunking for PRI:

Configuration for Client Side PRI

- If SIP GW services have been enabled, then a default route should be set to Internal Gateway whose IP address should be the same address to which SIP GW is attached to.
- Upon enabling the Network Side PRI services, SIP GW will forward all the calls going to the “Internal Gateway” to the PRI interface.
- Make sure that the IP address and the port of the “Internal Gateway” are the same as <IP Address> and <Port Number> as displayed in the following message on the “PRI/Client Configuration” page: “SIP/GW is currently bound to address: <IP Address> and port: <Port Number>”

Configuration for Network Side PRI

1. Obtain the IP address and port number of the SIP UA from the “SIP UA>PRI/NET configuration” page under “Configuration Menu” from the following message: SIP/UA is currently bound to address: <IP Address> and port: <Port Number>
2. Create a SIP Trunking device for PRI with the same name as the one used on the submenu “PRI/NET configuration” of “SIP UA” configuration page.

![Add a trunking device](image)

3. Associate an inbound default rule with the newly created device.

![Add a rule](image)

**Note**
All the inbound traffic coming to SIP UA will be forwarded to the PRI device with the exception of the traffic destined for one of the registered FXS ports.
This appendix describes syslog messages for the EdgeMarc appliance.

**Note**
All firewall-related syslog messages include the string `<FW>`.

### Table 11 Syslog Messages

<table>
<thead>
<tr>
<th>Message</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>000:EnableRemoteLog</td>
<td>Allowed Remote Logging</td>
</tr>
<tr>
<td>010:Allow-Lan-In</td>
<td>Allowed input packet from the LAN interface</td>
</tr>
<tr>
<td>011:Allow-Lan-Tcp-In</td>
<td>Allowed input of TCP packet from the LAN interface</td>
</tr>
<tr>
<td>012:Allow-Lan-Udp-In</td>
<td>Allowed input of UDP packet from the LAN interface</td>
</tr>
<tr>
<td>013:Allow-Lan-Icmp-In</td>
<td>Allowed input of ICMP packet from the LAN interface</td>
</tr>
<tr>
<td>014:Allow-Lan-Out</td>
<td>Allowed output packet from LAN interface</td>
</tr>
<tr>
<td>015:Allow-Lan-Tcp-Out</td>
<td>Allowed output of TCP packet from LAN interface</td>
</tr>
<tr>
<td>016:Allow-Lan-Udp-Out</td>
<td>Allowed output of UDP packet from LAN interface</td>
</tr>
<tr>
<td>017:Allow-Lan-Icmp-Out</td>
<td>Allowed output of ICMP packet from LAN interface</td>
</tr>
<tr>
<td>018:Deny-Wan-In</td>
<td>Denied input packet from the WAN interface</td>
</tr>
<tr>
<td>019:Deny-Wan-Tcp-In</td>
<td>Denied input of TCP packet from the LAN interface</td>
</tr>
<tr>
<td>020:Deny-Wan-Udp-In</td>
<td>Denied input of UDP packet from the LAN interface</td>
</tr>
<tr>
<td>021:Deny-Wan-Icmp-In</td>
<td>Denied input of ICMP packet from the LAN interface</td>
</tr>
<tr>
<td>022:Deny-Wan-Out</td>
<td>Denied output packet to WAN</td>
</tr>
<tr>
<td>023:Deny-Wan-Tcp-Out</td>
<td>Denied output of TCP packet from LAN to WAN</td>
</tr>
<tr>
<td>024:Deny-Wan-Udp-Out</td>
<td>Denied output of UDP packet from LAN to WAN</td>
</tr>
<tr>
<td>025:Deny-Wan-Icmp-Out</td>
<td>Denied output of Ping/ICMP packet to WAN</td>
</tr>
<tr>
<td>026:Allow-Wan-Icmp-Out</td>
<td>Allowed output of Ping/ICMP packet to WAN</td>
</tr>
<tr>
<td>027:Allow-Wan-Tcp-Out</td>
<td>Allowed output of TCP packet to WAN</td>
</tr>
</tbody>
</table>
### Table 11  Syslog Messages (continued)

<table>
<thead>
<tr>
<th>Message</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>030:Deny-Mgcp-Fwd</td>
<td>Denied forwarding of UDP packet to MGCP Softswitch port 2727</td>
</tr>
<tr>
<td>034:NoTrack-Lan-Mgcp</td>
<td>No connection tracking of UDP packet from LAN IP to MGCP Softswitch port 2727</td>
</tr>
<tr>
<td>038:NoTrack-Wan-Mgcp</td>
<td>No connection tracking of UDP packet from WAN IP to MGCP Softswitch port 2727</td>
</tr>
<tr>
<td>042:Allow-Lan-Mgcp</td>
<td>Allowed UDP packet from LAN IP to MGCP Softswitch port 2727</td>
</tr>
<tr>
<td>046:Allow-Wan-Mgcp</td>
<td>Allowed UDP packet from WAN IP to MGCP Softswitch port 2727</td>
</tr>
<tr>
<td>050:Notrack-Lan-Sip</td>
<td>No connection tracking of UDP packet from LAN IP to SIP Softswitch port 5060</td>
</tr>
<tr>
<td>052:Notrack-Wan-Sip</td>
<td>No connection tracking of UDP packet from WAN IP to SIP Softswitch port 5060</td>
</tr>
<tr>
<td>054:Allow-Lan-Sip</td>
<td>Allowed UDP packet from LAN IP to SIP port 5050</td>
</tr>
<tr>
<td>056:Allow-Wan-Sip</td>
<td>Allowed UDP packet from WAN IP to SIP Softswitch port 5060</td>
</tr>
<tr>
<td>058:Deny-Sip-Fwd</td>
<td>Denied forwarding of UDP packet to SIP Softswitch port 5060</td>
</tr>
<tr>
<td>070:Allow-Lan-H323-In</td>
<td>Allowed incoming H323 packet from LAN</td>
</tr>
<tr>
<td>071:Allow-Lan-H323-Out</td>
<td>Allowed outgoing H323 to LAN</td>
</tr>
<tr>
<td>072:Allow-Wan-H323-In</td>
<td>Allowed incoming H323 packet to network port 1718-1719</td>
</tr>
<tr>
<td>073:Deny-H323-Fwd</td>
<td>Denied forwarding of UDP packet from LAN to WAN which was destined to H323 port 1718-1719</td>
</tr>
<tr>
<td>074:Deny-H323-Fwd</td>
<td>Denied forwarding of TCP packet from LAN to WAN which was destined to H323 port 1720</td>
</tr>
<tr>
<td>075:Deny-H323-Fwd</td>
<td>Denied forwarding of UDP packet to H323 port 1718-1719</td>
</tr>
<tr>
<td>076:Deny-H323-Fwd</td>
<td>Denied forwarding of TCP packet to H323 port 1720</td>
</tr>
<tr>
<td>077:Allow-Wan-H323-Out</td>
<td>Allowed outgoing H323 packet to network port 1718-1719</td>
</tr>
<tr>
<td>078:Allow-Wan-H245</td>
<td>Allowed incoming/outgoing H245 packet to/from WAN</td>
</tr>
<tr>
<td>079:Allow-Lan-H245</td>
<td>Allowed incoming/outgoing H245 packet to/from LAN</td>
</tr>
<tr>
<td>090:NoTrack-Lan-Rtp</td>
<td>No connection tracking for prerouting UDP packet from LAN IP to RTP port 16384-35000</td>
</tr>
</tbody>
</table>
### Table 11  Syslog Messages (continued)

<table>
<thead>
<tr>
<th>Message</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>091:NoTrack-Lan-Rtp</td>
<td>No connection tracking for output UDP packet from LAN IP to RTP port 16384-35000</td>
</tr>
<tr>
<td>092:NoTrack-Wan-Rtp</td>
<td>No connection tracking for prerouting UDP packet from WAN IP to RTP port 16384-35000</td>
</tr>
<tr>
<td>093:NoTrack-Wan-Rtp</td>
<td>No connection tracking for output UDP packet from WAN IP to RTP port 16384-35000</td>
</tr>
<tr>
<td>094:Deny-Lan-Udp-Fwd</td>
<td>Denied forwarding of UDP packet from LAN IP to RTP port 16384-35000</td>
</tr>
<tr>
<td>095:Deny-Wan-Udp-Fwd</td>
<td>Denied forwarding of UDP packet from WAN IP to RTP port 16384-35000</td>
</tr>
<tr>
<td>096:Deny-Rtp-Kernel</td>
<td>Denied TCP packet to RTP port 2000</td>
</tr>
<tr>
<td>098:Strip-Tos-Bit</td>
<td>Prerouting packet with source address 0000 was stripped off its TOS bit</td>
</tr>
<tr>
<td>099:Deny-Icmp-Unreach</td>
<td>Denied ICMP packet of type Port-unreachable</td>
</tr>
<tr>
<td>100:Mark-Voice-Pkt</td>
<td>Mark DSCP packet with 0x40</td>
</tr>
<tr>
<td>101:Allow-Lan-Udp</td>
<td>Allow UDP packet from/to LAN interface</td>
</tr>
<tr>
<td>110:Allow-Lan-Proxy</td>
<td>Allowed LAN packet destined for PROXY ARP IP</td>
</tr>
<tr>
<td>111:Allow-Wan-Proxy</td>
<td>Allowed WAN packet from PROXY ARP IP</td>
</tr>
<tr>
<td>112:Allow-Proxy-Fwd</td>
<td>Allowed forwarding of packet destined for PROXY ARP IP</td>
</tr>
<tr>
<td>113:Allow-Proxy-Fwd</td>
<td>Allowed forwarding of WAN packet from PROXY ARP IP</td>
</tr>
<tr>
<td>120:Allow-Nat-Establ</td>
<td>Allowed prerouting NAT packet of an established connection</td>
</tr>
<tr>
<td>121:Deny-Wan-Spoof</td>
<td>Denied prerouting WAN packet with spoofed source address</td>
</tr>
<tr>
<td>131:Allow-Est-Fwd</td>
<td>Allowed forwarding of packet belongs to an established connection</td>
</tr>
<tr>
<td>132:Allow-Lan-Lan-Fwd</td>
<td>Allowed forwarding of packet from LAN to LAN</td>
</tr>
<tr>
<td>134:Allow-Lan-Wan-Fwd</td>
<td>Allowed forwarding of packet from LAN to WAN</td>
</tr>
<tr>
<td>140:Allow-Nat-Fwd</td>
<td>Allowed postrouting packet from Forward Addresses</td>
</tr>
<tr>
<td>141:Allow-Tcpmss-Route</td>
<td>Allowed postrouting TCP packet with flags SYN,RST SYN with TCP Maximum Segment Size adjusted</td>
</tr>
<tr>
<td>142:Allow-Fwd</td>
<td>Allowed forwarding of packet destined for Forward Addresses</td>
</tr>
<tr>
<td>143:Allow-Fwd</td>
<td>Allowed forwarding of packet destined for Forward Addresses from Input Interface to Output Interface specified in Forward Address menu</td>
</tr>
</tbody>
</table>
### Table 11 Syslog Messages (continued)

<table>
<thead>
<tr>
<th>Message</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>151:Allow-Dhcp-In</td>
<td>Allowed incoming DHCP packet to LAN interface</td>
</tr>
<tr>
<td>152:Allow-Dhcp-Out</td>
<td>Allowed outgoing DHCP packet from LAN interface</td>
</tr>
<tr>
<td>153:Allow-BootP-In</td>
<td>Allowed incoming BOOTP packet to LAN interface</td>
</tr>
<tr>
<td>154:Allow-BootP-Out</td>
<td>Allowed outgoing BOOTP packet from LAN interface</td>
</tr>
<tr>
<td>160:Deny-Port-Scan</td>
<td>Denied Port-scan packet (TCP packet destined for port 0)</td>
</tr>
<tr>
<td>161:Deny-Port-Scan</td>
<td>Denied Port-scan packet (UDP packet destined for port 0)</td>
</tr>
<tr>
<td>170:Deny-Spoof</td>
<td>Denied Spoofed packet of Local address (127000) from non-local interface</td>
</tr>
<tr>
<td>171:Deny-Invalid-Src</td>
<td>Denied packet with Invalid source address (255255255255)</td>
</tr>
<tr>
<td>172:Deny-Invalid-Dst</td>
<td>Denied packet with Invalid destination port (0000)</td>
</tr>
<tr>
<td>173:Deny-Invalid-Src</td>
<td>Denied packet with Invalid source address (224000)</td>
</tr>
<tr>
<td>180:Deny-Invalid-State</td>
<td>Denied packet with state INVALID</td>
</tr>
<tr>
<td>182:Deny-Tcp-Invalid</td>
<td>Denied prerouting TCP packet with flags SYN,RST</td>
</tr>
<tr>
<td>183:Deny-Tcp-Invalid</td>
<td>Denied prerouting TCP packet with flags SYN,FIN</td>
</tr>
<tr>
<td>184:Deny-Tcp-Invalid</td>
<td>Denied prerouting TCP packet with flag FIN FIN</td>
</tr>
<tr>
<td>185:Deny-Tcp-Invalid</td>
<td>Denied prerouting TCP packet with all flags set</td>
</tr>
<tr>
<td>186:Deny-Tcp-Invalid</td>
<td>Denied prerouting TCP packet with all flags set</td>
</tr>
<tr>
<td>187:Deny-Tcp-Invalid</td>
<td>Denied prerouting TCP packet with flag NONE ALL</td>
</tr>
<tr>
<td>188:Deny-Tcp-Invalid</td>
<td>Denied prerouting TCP packet with flag ALL NONE</td>
</tr>
<tr>
<td>189:Deny-Tcp-Invalid</td>
<td>Denied prerouting TCP packet requesting new connection with flag RST RST</td>
</tr>
<tr>
<td>190:Deny-Tcp-Invalid</td>
<td>Denied prerouting TCP packet with flag FIN FIN that doesn’t belong to any connection</td>
</tr>
<tr>
<td>191:Deny-Tcp-Invalid</td>
<td>Denied prerouting TCP packet with flag RST RST that doesn’t belong to any connection</td>
</tr>
<tr>
<td>200:Deny-Http-Wan-In</td>
<td>Denied HTTP packet from WAN due to HTTP Inbound being disabled</td>
</tr>
<tr>
<td>202:Allow-Http-Wan-In</td>
<td>Allowed HTTP Inbound packet from WAN</td>
</tr>
<tr>
<td>203:Deny-Http-Lan-In</td>
<td>Denied LAN HTTP packet from non-management host</td>
</tr>
<tr>
<td>204:Deny-Http-Wan-Out</td>
<td>Denied HTTP packet to WAN due to HTTP Outbound being disabled</td>
</tr>
</tbody>
</table>
Table 11  Syslog Messages (continued)

<table>
<thead>
<tr>
<th>Message</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>206:Allow-Http-Wan-Out</td>
<td>Allowed HTTP Outbound packet to WAN</td>
</tr>
<tr>
<td>207:Allow-Http-Lan-In</td>
<td>Allowed HTTP Inbound packet from LAN</td>
</tr>
<tr>
<td>209:Allow-Http-Lan-Out</td>
<td>Allowed HTTP Outbound packet to LAN</td>
</tr>
<tr>
<td>210:Deny-Https-Wan-In</td>
<td>Denied HTTPS packet from WAN due to HTTPS Inbound being disabled</td>
</tr>
<tr>
<td>212:Allow-Https-Wan-In</td>
<td>Allowed HTTPS packet from WAN</td>
</tr>
<tr>
<td>213:Deny-Https-Lan-In</td>
<td>Denied LAN HTTPS packet from non-management host</td>
</tr>
<tr>
<td>214:Deny-Https-Wan-Out</td>
<td>Denied HTTPS Outbound packet to WAN due to HTTPS Outbound being disabled</td>
</tr>
<tr>
<td>216:Allow-Https-Wan-Out</td>
<td>Allowed HTTPS Outbound packet to WAN</td>
</tr>
<tr>
<td>217:Allow-Https-Lan-In</td>
<td>Allowed HTTPS packet from LAN</td>
</tr>
<tr>
<td>219:Allow-Https-Lan-Out</td>
<td>Allowed HTTPS Outbound packet to LAN</td>
</tr>
<tr>
<td>220:Deny-Telnet-Wan-In</td>
<td>Denied Telnet packet from WAN due to Telnet Inbound being disabled</td>
</tr>
<tr>
<td>222:Allow-Telnet-Wan-In</td>
<td>Allowed Telnet packet from WAN</td>
</tr>
<tr>
<td>223:Deny-Telnet-Lan-In</td>
<td>Denied LAN TCP packet from non-management host</td>
</tr>
<tr>
<td>224:Deny-Telnet-Wan-Out</td>
<td>Denied Telnet Outbound packet to WAN due to Telnet Outbound being disabled</td>
</tr>
<tr>
<td>226:Allow-Telnet-Wan-Out</td>
<td>Allowed Telnet packet from WAN</td>
</tr>
<tr>
<td>227:Allow-Telnet-Lan-In</td>
<td>Allowed Telnet packet from LAN</td>
</tr>
<tr>
<td>228:Allow-Telnet-Lan-Out</td>
<td>Allowed Telnet packet from LAN</td>
</tr>
<tr>
<td>230:Deny-Ssh-Wan-In</td>
<td>Denied SSH packet from WAN due to SSH Inbound being disabled</td>
</tr>
<tr>
<td>232:Allow-Ssh-Wan-In</td>
<td>Allowed TCP packet to SSH port</td>
</tr>
<tr>
<td>233:Deny-Ssh-Lan-In</td>
<td>Denied LAN SSH packet from non-management host</td>
</tr>
<tr>
<td>235:Deny-Ssh-Wan-Out</td>
<td>Denied SSH Outbound packet to WAN due to SSH Outbound being disabled</td>
</tr>
<tr>
<td>236:Allow-Ssh-Wan-Out</td>
<td>Allowed SSH Outbound packet to WAN</td>
</tr>
<tr>
<td>237:Allow-Ssh-Lan-In</td>
<td>Allowed SSH packet from LAN</td>
</tr>
<tr>
<td>239:Allow-Ssh-Lan-Out</td>
<td>Allowed SSH Outbound packet to LAN</td>
</tr>
<tr>
<td>240:Deny-Smtp-In</td>
<td>Denied SMTP packet from WAN to LAN</td>
</tr>
<tr>
<td>242:Allow-Smtp-In</td>
<td>Allowed SMTP packet from WAN to LAN</td>
</tr>
<tr>
<td>245:Deny-Smtp-Wan-Out</td>
<td>Denied SMTP packet to WAN due to SMTP Outbound being disabled</td>
</tr>
<tr>
<td>246:Allow-Smtp-Wan-Out</td>
<td>Allowed SMTP packet to WAN</td>
</tr>
</tbody>
</table>
### Table 11  Syslog Messages (continued)

<table>
<thead>
<tr>
<th>Message</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>247:Allow-Smtp-Lan-Out</td>
<td>Allowed SMTP packet to LAN</td>
</tr>
<tr>
<td>251:Allow-Http-In</td>
<td>Allowed HTTP packet to Trusted Management Address</td>
</tr>
<tr>
<td>252:Allow-Http-Out</td>
<td>Allowed HTTP packet from Trusted Management Address</td>
</tr>
<tr>
<td>261:Allow-Https-In</td>
<td>Allowed TCP packet from Trusted Management Address via HTTPS port</td>
</tr>
<tr>
<td>262:Allow-Https-Out</td>
<td>Allowed TCP packet to Trusted Management Address via HTTPS port</td>
</tr>
<tr>
<td>271:Allow-Telnet-In</td>
<td>Allowed TCP packet from Trusted Management Address via Telnet port</td>
</tr>
<tr>
<td>272:Allow-Telnet-Out</td>
<td>Allowed TCP packet to Trusted Management Address via Telnet port</td>
</tr>
<tr>
<td>281:Allow-Ssh-In</td>
<td>Allowed TCP packet from Trusted Management Address via SSH port</td>
</tr>
<tr>
<td>282:Allow-Ssh-Out</td>
<td>Allowed TCP packet to Trusted Management Address via SSH port</td>
</tr>
<tr>
<td>290:Deny-Snmp-Wan-In</td>
<td>Denied SNMP packet from WAN due to SNMP Inbound being disabled</td>
</tr>
<tr>
<td>291:Allow-Snmp-Wan-In</td>
<td>Allowed SNMP packet from WAN</td>
</tr>
<tr>
<td>292:Allow-Snmp-In</td>
<td>Allowed UDP packet from Trusted Management Address via SNMP port</td>
</tr>
<tr>
<td>293:Allow-Snmp-Out</td>
<td>Allowed UDP packet to Trusted Management Address via SNMP port</td>
</tr>
<tr>
<td>295:Deny-Snmp-Wan-Out</td>
<td>Denied SNMP packet to WAN due to SNMP Outbound being disabled</td>
</tr>
<tr>
<td>296:Allow-Snmp-Wan-Out</td>
<td>Allowed SNMP packet to WAN</td>
</tr>
<tr>
<td>297:Deny-Snmp-Lan-In</td>
<td>Denied LAN SNMP packet from non-management host</td>
</tr>
<tr>
<td>298:Allow-Snmp-Lan-In</td>
<td>Allowed SNMP packet from LAN</td>
</tr>
<tr>
<td>299:Allow-Snmp-Lan-Out</td>
<td>Allowed SNMP packet to LAN</td>
</tr>
<tr>
<td>301:Deny-Dns-In</td>
<td>Denied DNS packet from WAN to LAN</td>
</tr>
<tr>
<td>302:Allow-Dns-In</td>
<td>Allowed DNS packet from WAN to LAN</td>
</tr>
<tr>
<td>305:Deny-Dns-Wan-Out</td>
<td>Denied DNS packet to WAN due to DNS Outbound being disabled</td>
</tr>
<tr>
<td>306:Allow-Dns-Wan-Out</td>
<td>Allowed DNS packet to WAN</td>
</tr>
<tr>
<td>307:Allow-Dns-Lan-Out</td>
<td>Allowed DNS packet to LAN</td>
</tr>
<tr>
<td>310:Deny-Imap-In</td>
<td>Denied IMAP packet from WAN to LAN due to IMAP protocol being disabled</td>
</tr>
<tr>
<td>312:Allow-Imap-In</td>
<td>Allowed IMAP packet from WAN to LAN</td>
</tr>
</tbody>
</table>
## Syslog Messages (continued)

<table>
<thead>
<tr>
<th>Message</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>314:Allow-Imap-Lan-Out</td>
<td>Allowed IMAP packet to LAN</td>
</tr>
<tr>
<td>315:Deny-Imap-Wan-Out</td>
<td>Deny IMAP packet to WAN due to IMAP Outbound being disabled</td>
</tr>
<tr>
<td>317:Allow-Imap-Wan-Out</td>
<td>Allowed IMAP packet to WAN</td>
</tr>
<tr>
<td>320:Deny-Pop3-In</td>
<td>Denied POP3 packet from WAN to LAN</td>
</tr>
<tr>
<td>322:Allow-Pop3-In</td>
<td>Allowed POP3 packet from WAN to LAN</td>
</tr>
<tr>
<td>325:Deny-Pop3-Wan-Out</td>
<td>Denied POP3 packet to WAN due to POP3 Outbound being disabled</td>
</tr>
<tr>
<td>327:Allow-Pop3-Wan-Out</td>
<td>Allowed POP3 packet to WAN</td>
</tr>
<tr>
<td>329:Allow-Pop3-Lan-Out</td>
<td>Allowed POP3 packet to LAN</td>
</tr>
<tr>
<td>330:Deny-Ntp-In</td>
<td>Denied NTP packet from the network</td>
</tr>
<tr>
<td>331:Allow-Ntp-In</td>
<td>Allowed NTP packet from the network</td>
</tr>
<tr>
<td>332:Deny-Ntp-Wan-Out</td>
<td>Denied NTP packet to the network due to NTP Outbound being disabled</td>
</tr>
<tr>
<td>333:Allow-Ntp-Wan-Out</td>
<td>Allowed NTP packet to the network</td>
</tr>
<tr>
<td>334:Allow-Ntp-Lan-Out</td>
<td>Allowed NTP packet to LAN</td>
</tr>
<tr>
<td>338:Deny-Ping-In-Limit</td>
<td>Denied Inbound ICMP packet (from WAN) due to Ping limit being exceeded</td>
</tr>
<tr>
<td>339:Deny-Ping-Out-Limit</td>
<td>Denied Outbound ICMP packet (to WAN) due to Ping limit being exceeded</td>
</tr>
<tr>
<td>340:Deny-Wan-Ping</td>
<td>Denied Inbound ICMP packet (from WAN) due to Ping being disallowed from GUI</td>
</tr>
<tr>
<td>341:Allow-Ping-Route</td>
<td>Allowed ICMP type 3 code 3 packet from WAN</td>
</tr>
<tr>
<td>342:Deny-Ping-Vlan</td>
<td>Denied Inbound ICMP packet from WAN to VLAN</td>
</tr>
<tr>
<td>343:Allow-Ping-Reply</td>
<td>Allowed Inbound ICMP type 0 of an established connection</td>
</tr>
<tr>
<td>344:Allow-Ping-Err</td>
<td>Allowed Inbound ICMP type 3-4 (fragmentation, unreachable, source quench,)</td>
</tr>
<tr>
<td>345:Allow-Ping-Redir</td>
<td>Allowed Inbound ICMP type 5 (redirection) of an established connection</td>
</tr>
<tr>
<td>346:Deny-Ping-Other</td>
<td>Denied Inbound Ping/ICMP packet that are not allowed from WAN</td>
</tr>
<tr>
<td>347:Deny-Ping-Wan-Out</td>
<td>Denied Ping/ICMP packet to WAN due to Outbound Ping being disabled from GUI</td>
</tr>
<tr>
<td>348:Allow-Ping-Wan-Out</td>
<td>Allowed Ping/ICMP packet to WAN</td>
</tr>
<tr>
<td>349:Allow-Ping-Request</td>
<td>Allowed Inbound Ping/ICMP type 8</td>
</tr>
<tr>
<td>350:Allow-Vrrp</td>
<td>Allowed VRRP packet</td>
</tr>
<tr>
<td>351:Allow-Ping-Lan-Out</td>
<td>Allowed Ping/ICMP packet to LAN</td>
</tr>
<tr>
<td>Message</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>353:Deny-Wan-Pptp</td>
<td>Denied incoming PPTP packet due to PPTP not enabled</td>
</tr>
<tr>
<td>354:Deny-Pptp-In-Limit</td>
<td>Denied incoming PPTP packet due to limit on new connection rate being exceeded</td>
</tr>
<tr>
<td>360:Allow-Console</td>
<td>Allowed TCP packet from CONSOLE IP to port 10115</td>
</tr>
<tr>
<td>361:Allow-Peer</td>
<td>Allowed TCP packet from PEER IP to port 10115</td>
</tr>
<tr>
<td>362:Allow-Peer</td>
<td>Allowed UDP packet from PEER IP to Allowed UDP port</td>
</tr>
<tr>
<td>363:Allow-Peer</td>
<td>Allowed UDP packet from PEER IP to Allowed UDP port</td>
</tr>
<tr>
<td>364:Allow-Mgmt</td>
<td>Allowed postrouting packet from Trusted Management Address</td>
</tr>
<tr>
<td>365:Deny-Eth2</td>
<td>Denied packet from eth2 of EdgeProtect to WAN</td>
</tr>
<tr>
<td>366:Deny-Eth2</td>
<td>Denied packet from eth2 of EdgeProtect to LAN</td>
</tr>
<tr>
<td>367:Deny-Unknown-Mgmt</td>
<td>Denied packet from unknown Management IP</td>
</tr>
<tr>
<td>371:Allow-Wan-Pptp</td>
<td>Allowed WAN PPTP packet</td>
</tr>
<tr>
<td>372:Allow-Pptp-Fwd</td>
<td>Allowed forwarding of TCP packet from WAN to PPTP port</td>
</tr>
<tr>
<td>374:Allow-Ipsec</td>
<td>Allowed forwarding of UDP packet to port 500 of WAN IP</td>
</tr>
<tr>
<td>375:Allow-Ipsec</td>
<td>Allowed forwarding of IPSEC packet to WAN IP</td>
</tr>
<tr>
<td>376:Allowed-Ipsec</td>
<td>Allowed forwarding of packet from ipsec0 interface</td>
</tr>
<tr>
<td>377:Allow-Ipsec</td>
<td>Allowed forwarding of packet to ipsec0 interface</td>
</tr>
<tr>
<td>380:Allow-Port-Fwd</td>
<td>Allowed forwarding of packet from WAN to Destination IP</td>
</tr>
<tr>
<td>381:Allow-Port-Fwd</td>
<td>Allowed forwarding of packet from WAN to Destination IP &amp; Port</td>
</tr>
<tr>
<td>401:Allow-Ftp-In</td>
<td>Allowed FTP packet from WAN to LAN</td>
</tr>
<tr>
<td>402:Deny-Ftp-In</td>
<td>Denied FTP packet from WAN to LAN</td>
</tr>
<tr>
<td>405:Allow-Ftp-Wan-Out</td>
<td>Allowed FTP packet to WAN</td>
</tr>
<tr>
<td>406:Allow-Ftp-Lan-Out</td>
<td>Allowed FTP packet to LAN</td>
</tr>
<tr>
<td>407:Deny-Ftp-Wan-Out</td>
<td>Denied FTP packet to WAN due to FTP Outbound being disabled</td>
</tr>
<tr>
<td>410:Deny-Tftp-In</td>
<td>Denied incoming TFTP packet from WAN</td>
</tr>
<tr>
<td>411:Allow-Tftp-In</td>
<td>Allowed incoming TFTP packet from WAN</td>
</tr>
<tr>
<td>412:Deny-Tftp-Wan-Out</td>
<td>Denied outgoing TFTP packet to WAN</td>
</tr>
<tr>
<td>413:Allow-Tftp-Wan-Out</td>
<td>Allowed outgoing TFTP packet to WAN</td>
</tr>
</tbody>
</table>
### Syslog Messages (continued)

<table>
<thead>
<tr>
<th>Message</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>416:Allow-Tftp-Lan-Out</td>
<td>Allowed outgoing TFTP packet to LAN</td>
</tr>
<tr>
<td>440:Deny-Tcp-In-Ses</td>
<td>Denied new inbound TCP session as Inbound</td>
</tr>
<tr>
<td></td>
<td>Connection Rate Limit is exceeded</td>
</tr>
<tr>
<td>441:Deny-Udp-In-Ses</td>
<td>Denied new inbound UDP session as Inbound</td>
</tr>
<tr>
<td></td>
<td>Connection Rate Limit is exceeded</td>
</tr>
<tr>
<td>450:Deny-Tcp-Out-Ses</td>
<td>Denied new outbound TCP session as Outbound</td>
</tr>
<tr>
<td></td>
<td>Connection Rate Limit is exceeded</td>
</tr>
<tr>
<td>451:Deny-Udp-Out-Ses</td>
<td>Denied new outbound UDP session as Outbound</td>
</tr>
<tr>
<td></td>
<td>Connection Rate Limit is exceeded</td>
</tr>
<tr>
<td>460:Allow-RADIUS-Wan</td>
<td>Allowed Radius UDP packet from/to WAN</td>
</tr>
<tr>
<td>461:Allow-RADIUS-Lan</td>
<td>Allowed Radius UDP packet from/to LAN</td>
</tr>
<tr>
<td>560:Allow-TACACS-Wan</td>
<td>Allowed Tacacs TCP packet from/to WAN</td>
</tr>
<tr>
<td>561:Allow-TACACS-Lan</td>
<td>Allowed Tacacs TCP packet from/to LAN</td>
</tr>
<tr>
<td>600:Masquerade-Out</td>
<td>Masquerade outbound packet</td>
</tr>
<tr>
<td>601:Nat-In</td>
<td>Dynamic Nat performed on inbound packet</td>
</tr>
<tr>
<td>602:Nat-Out</td>
<td>Static Nat performed on outbound packet</td>
</tr>
<tr>
<td>700:Deny-HTTP-Wan-Fwd</td>
<td>Denied forwarding HTTP packet to WAN due to HTTP</td>
</tr>
<tr>
<td></td>
<td>being disabled</td>
</tr>
<tr>
<td>702:Allow-HTTP-Wan-Fwd</td>
<td>Allowed forwarding HTTP packet to WAN</td>
</tr>
<tr>
<td>705:Deny-POP3-Wan-Fwd</td>
<td>Denied forwarding POP3/POP3S packet to WAN</td>
</tr>
<tr>
<td></td>
<td>due to POP3 being disabled</td>
</tr>
<tr>
<td>706:Allow-POP3-Wan-Fwd</td>
<td>Allowed forwarding POP3/POP3S packet to WAN</td>
</tr>
<tr>
<td>710:Deny-HTTPS-Wan-Fwd</td>
<td>Denied forwarding HTTPS packet to WAN due to HTTPS</td>
</tr>
<tr>
<td></td>
<td>being disabled</td>
</tr>
<tr>
<td>712:Allow-HTTPS-Wan-Fwd</td>
<td>Allowed forwarding HTTPS packet to WAN</td>
</tr>
<tr>
<td>715:Deny-IMAP-Wan-Fwd</td>
<td>Denied forwarding IMAP/IMAPS packet to WAN</td>
</tr>
<tr>
<td></td>
<td>due to IMAP being disabled</td>
</tr>
<tr>
<td>716:Allow-IMAP-Wan-Fwd</td>
<td>Allowed forwarding IMAP/IMAPS packet to WAN</td>
</tr>
<tr>
<td>720:Deny-Telnet-Wan-Fwd</td>
<td>Denied forwarding Telnet packet to WAN due to Telnet</td>
</tr>
<tr>
<td></td>
<td>being disabled</td>
</tr>
<tr>
<td>722:Allow-Telnet-Wan-Fwd</td>
<td>Allowed forwarding Telnet packet to WAN</td>
</tr>
<tr>
<td>725:Deny-WAN-PING-Fwd</td>
<td>Denied forwarding PING packet to WAN due to PING</td>
</tr>
<tr>
<td></td>
<td>being disabled</td>
</tr>
<tr>
<td>730:Deny-SSH-WAN-Fwd</td>
<td>Denied forwarding SSH packet to WAN due to SSH</td>
</tr>
<tr>
<td></td>
<td>being disabled</td>
</tr>
<tr>
<td>731:Allow-PING-WAN-Fwd</td>
<td>Allowed forwarding ICMP packet to WAN</td>
</tr>
<tr>
<td>732:Allow-SSH-WAN-Fwd</td>
<td>Allowed forwarding SSH packet to WAN</td>
</tr>
<tr>
<td>740:Deny-SNMP-WAN-Fwd</td>
<td>Denied forwarding SNMP packet to WAN due to SNMP</td>
</tr>
<tr>
<td></td>
<td>being disabled</td>
</tr>
<tr>
<td>Message</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>742:Allow-Snmp-Wan-Fwd</td>
<td>Allowed forwarding SNMP packet to WAN</td>
</tr>
<tr>
<td>750:Deny-Ftp-Wan-Fwd</td>
<td>Denied forwarding FTP packet to WAN due to FTP being disabled</td>
</tr>
<tr>
<td>752:Allow-Ftp-Wan-Fwd</td>
<td>Allowed forwarding FTP packet to WAN</td>
</tr>
<tr>
<td>760:Deny-Smtp-Wan-Fwd</td>
<td>Denied forwarding SMTP packet to WAN due to SMTP being disabled</td>
</tr>
<tr>
<td>762:Allow-Smtp-Wan-Fwd</td>
<td>Allowed forwarding SMTP packet to WAN</td>
</tr>
<tr>
<td>770:Deny-Dns-Wan-Fwd</td>
<td>Denied forwarding DNS packet to WAN due to DNS being disabled</td>
</tr>
<tr>
<td>772:Allow-Dns-Wan-Fwd</td>
<td>Allowed forwarding DNS packet to WAN</td>
</tr>
<tr>
<td>780:Deny-Ntp-Wan-Fwd</td>
<td>Denied forwarding NTP packet to WAN due to NTP being disabled</td>
</tr>
<tr>
<td>782:Allow-Ntp-Wan-Fwd</td>
<td>Allowed forwarding NTP packet to WAN</td>
</tr>
<tr>
<td>790:Deny-Tftp-Wan-Fwd</td>
<td>Denied forwarding TFTP packet to WAN due to TFTP being disabled</td>
</tr>
<tr>
<td>792:Allow-Tftp-Wan-Fwd</td>
<td>Allowed forwarding TFTP packet to WAN</td>
</tr>
<tr>
<td>802:Allow-Wan-Http-Fwd</td>
<td>Allowed forwarding HTTP packet from WAN</td>
</tr>
<tr>
<td>805:Deny-Wan-Pop3-Fwd</td>
<td>Denied forwarding POP3/POP3S packet from WAN due to POP3 being disabled</td>
</tr>
<tr>
<td>806:Allow-Wan-Pop3-Fwd</td>
<td>Allowed forwarding POP3/POP3S packet from WAN</td>
</tr>
<tr>
<td>812:Allow-Wan-Https-Fwd</td>
<td>Allowed forwarding HTTPS packet from WAN</td>
</tr>
<tr>
<td>815:Deny-Wan-Imap-Fwd</td>
<td>Denied forwarding IMAP/IMAPS packet from WAN due to IMAP being disabled</td>
</tr>
<tr>
<td>816:Allow-Wan-Imap-Fwd</td>
<td>Allowed forwarding IMAP/IMAPS packet from WAN</td>
</tr>
<tr>
<td>822:Allow-Wan-Telnet-Fwd</td>
<td>Allowed forwarding Telnet packet from WAN</td>
</tr>
<tr>
<td>825:Deny-Wan-Ping-Fwd</td>
<td>Denied forwarding PING packet from WAN due to PING being disabled</td>
</tr>
<tr>
<td>826:Deny-Ping-Vlan-Fwd</td>
<td>Denied forwarding PING packet from WAN to VLAN</td>
</tr>
<tr>
<td>827:Allow-Ping-Rpl-Fwd</td>
<td>Allowed forwarding of Ping Reply packet from WAN</td>
</tr>
<tr>
<td>828:Allow-Ping-Err-Fwd</td>
<td>Allowed forwarding of ICMP Error packet from WAN</td>
</tr>
<tr>
<td>829:Allow-Ping-Rdr-Fwd</td>
<td>Allowed forwarding of ICMP Redirection packet from WAN</td>
</tr>
<tr>
<td>832:Allow-Wan-Ssh-Fwd</td>
<td>Allowed forwarding SSH packet from WAN</td>
</tr>
<tr>
<td>842:Allow-Wan-Snmp-Fwd</td>
<td>Allowed forwarding SNMP packet from WAN</td>
</tr>
<tr>
<td>850:Deny-Wan-Ftp-Fwd</td>
<td>Denied forwarding FTP packet from WAN due to FTP being disabled</td>
</tr>
<tr>
<td>Message</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------------</td>
<td>------------------------------------------------------------------</td>
</tr>
<tr>
<td>852:Allow-Wan-Ftp-Fwd</td>
<td>Allowed forwarding FTP packet from WAN</td>
</tr>
<tr>
<td>860:Deny-Wan-Smtp-Fwd</td>
<td>Denied forwarding SMTP packet from WAN due to SMTP being disabled</td>
</tr>
<tr>
<td>862:Allow-Wan-Smtp-Fwd</td>
<td>Allowed forwarding SMTP packet from WAN</td>
</tr>
<tr>
<td>870:Deny-Wan-Dns-Fwd</td>
<td>Denied forwarding DNS packet from WAN due to DNS being disabled</td>
</tr>
<tr>
<td>872:Allow-Wan-Dns-Fwd</td>
<td>Allowed forwarding DNS packet from WAN</td>
</tr>
<tr>
<td>880:Deny-Wan-Ntp-Fwd</td>
<td>Denied forwarding NTP packet from WAN due to NTP being disabled</td>
</tr>
<tr>
<td>882:Allow-Wan-Ntp-Fwd</td>
<td>Allowed forwarding NTP packet from WAN</td>
</tr>
<tr>
<td>890:Deny-Wan-Tftp-Fwd</td>
<td>Denied forwarding TFTP packet from WAN due to TFTP being disabled</td>
</tr>
<tr>
<td>892:Allow-Wan-Tftp-Fwd</td>
<td>Allowed forwarding TFTP packet from WAN</td>
</tr>
<tr>
<td>900:Deny-Wan-Syn-Dos</td>
<td>Denied SYN-flood packet from WAN</td>
</tr>
<tr>
<td>902:Deny-Wan-Icmp-Dos</td>
<td>Denied ICMP-flood packet from WAN</td>
</tr>
<tr>
<td>904:Deny-Wan-Udp-Dos</td>
<td>Denied UDP-flood packet from WAN</td>
</tr>
<tr>
<td>906:Deny-Wan-Rst-Dos</td>
<td>Denied RST-flood packet from WAN</td>
</tr>
<tr>
<td>950:Allow-Lan-Tcp-In</td>
<td>Allowed incoming LAN TCP packet</td>
</tr>
<tr>
<td>951:Allow-Lan-Udp-In</td>
<td>Allowed incoming LAN UDP packet</td>
</tr>
<tr>
<td>952:Allow-Lan-Icmp-In</td>
<td>Allowed incoming LAN ICMP packet</td>
</tr>
<tr>
<td>954:Allow-Lan-In</td>
<td>Allowed incoming LAN packet</td>
</tr>
<tr>
<td>960:Allow-Lan-Tcp-Out</td>
<td>Allowed outgoing LAN TCP packet</td>
</tr>
<tr>
<td>961:Allow-Lan-Udp-Out</td>
<td>Allowed outgoing LAN UDP packet</td>
</tr>
<tr>
<td>962:Allow-Lan-Icmp-Out</td>
<td>Allowed outgoing LAN ICMP packet</td>
</tr>
<tr>
<td>964:Allow-Lan-Out</td>
<td>Allowed outgoing LAN packet</td>
</tr>
<tr>
<td>970:Allow-Wan-Tcp-In</td>
<td>Allowed incoming WAN TCP packet</td>
</tr>
<tr>
<td>971:Allow-Wan-Udp-In</td>
<td>Allowed incoming WAN UDP packet</td>
</tr>
<tr>
<td>972:Allow-Wan-Icmp-In</td>
<td>Allowed incoming WAN ICMP packet</td>
</tr>
<tr>
<td>973:Allow-Wan-Pptp-In</td>
<td>Allowed incoming WAN PPTP packet</td>
</tr>
<tr>
<td>974:Allow-Wan-In</td>
<td>Allowed incoming WAN packet</td>
</tr>
<tr>
<td>980:Allow-Wan-Tcp-Out</td>
<td>Allowed outgoing WAN TCP packet</td>
</tr>
<tr>
<td>981:Allow-Wan-Udp-Out</td>
<td>Allowed outgoing WAN UDP packet</td>
</tr>
<tr>
<td>982:Allow-Wan-Icmp-Out</td>
<td>Allowed outgoing WAN ICMP packet</td>
</tr>
<tr>
<td>983:Allow-Wan-Pptp-Out</td>
<td>Allowed outgoing WAN PPTP packet</td>
</tr>
<tr>
<td>984:Allow-Wan-Out</td>
<td>Allowed outgoing WAN packet</td>
</tr>
<tr>
<td>991:Allow-Lan-Fwd</td>
<td>Allowed forwarding of packet from LAN interface</td>
</tr>
</tbody>
</table>
Table 11  Syslog Messages (continued)

<table>
<thead>
<tr>
<th>Message</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>995:Allow-Wan-Out-Any</td>
<td>Allowed output of packet from WAN interface</td>
</tr>
<tr>
<td>996:NoTrack-Local-Msg</td>
<td>No tracking of voice signaling packet from Local interface to LAN IP address</td>
</tr>
<tr>
<td>997:Deny-Wan-Fwd</td>
<td>Denied forwarding of packet from WAN to LAN</td>
</tr>
</tbody>
</table>
Configuration Parameters

This appendix describes all the parameters available on the following EdgeMarc device configuration pages:

- Network Page
- Subinterfaces Page
- DHCP Relay Page
- DHCP Server Page
- DHCP Leases Page
- Standard Firewall Page
- Advanced Firewall Page
- Custom Rules Page
- Current Advanced Firewall Rules (Show Rules)
- Forwarding Rules Page
- Message of the Day Page
- NAT Pages
- Traffic Shaper Page
- Advanced Traffic Shaper Page
- H.323 Settings Page
- H.323 Activity Page
- H.323 Alias Manipulation Page
- H.323 Neighboring Page
- MGCP Settings Page
- SIP Settings Page
- SIP Trunking Page
- Survivability Page
- FXS/Phone Port Settings - Basic (SIP UA) Page
- FXS/Phone Port Settings - Advanced Page
- FXS/Phone Port FAX Settings Page
- Distinctive Ring Page
- SIP FXO/Line Port Configuration (SIP GW) Page
- VPN Page
- VPN Subnet Page
- VPN Tunnel Settings Page
- Certificate Page
- Clients List Page
- Dynamic DNS Page
- File Download Page
- File Server Page
- Network Information
- Network Restart Page
- Network Test Tools Page
- Proxy ARP Page
- RADIUS Settings Page
- Reboot System Page
- Route Page
- Services Configuration
- Set Link Page
- Stateful Failover
- System Time Page
- Test UA Settings page
- T1 Configuration Page - MLPPPoFR
- TACACS Settings Page
- Upgrade Firmware Page
- User Commands Page
- VoIP Subnet Routing Page
- VLAN Configuration Page
- Wireless Configuration Page
- Client Side ISDN PRI (PRI/GW) Configuration Page
- Network Side ISDN PRI (PRI/UA) Configuration Page
- WAN Link Redundancy Configuration Page
Network Page

Use this page to configure networking configuration parameters for the public and private networks. Table 12 describes the parameters on the page.

To access this page, choose Network from the Configuration Menu.
Table 12  Network Parameters

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LAN Interface Settings</strong></td>
<td></td>
</tr>
<tr>
<td>IP Address</td>
<td>Enter the IP address needed to establish the connection to the LAN. In addition to needing an Internet connection, the system must also be attached to your LAN to serve your voice, video and data needs.</td>
</tr>
<tr>
<td>Subnet Mask</td>
<td>Enter the network mask associated with the IP address. The default value is 255.255.255.0.</td>
</tr>
<tr>
<td>VLAN Support</td>
<td>Select to enable VLAN support in the LAN.</td>
</tr>
<tr>
<td>Configure Wireless</td>
<td>Link to the wireless configuration page. The value shows the status of the wireless link.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> This link is only visible for the models with WAP.</td>
</tr>
<tr>
<td><strong>WAN Interface Settings</strong></td>
<td></td>
</tr>
<tr>
<td>Radio buttons</td>
<td>Select the method used to obtain a connection to the Internet:</td>
</tr>
<tr>
<td></td>
<td>• ADSL-PPPoE — When this option is selected, only areas B and C from the above figure are visible.</td>
</tr>
<tr>
<td></td>
<td>• ADSL-PPPoATM — When this option is selected, only areas A, B, and C are visible from the above figure.</td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> This option is available only on ADSL WAN based models.</td>
</tr>
<tr>
<td></td>
<td>• DHCP — Allows the device to obtain the WAN-side IP address using a DHCP server available from the WAN side of the network. <strong>NOTE:</strong> To see the WAN IP address for the system, go to the Network Information page. Only area C and F are visible for this option.</td>
</tr>
<tr>
<td></td>
<td>• Static IP Address — Allows you to configure the WAN interface with a static IP address (default). Areas C, D, and F are visible for this option.</td>
</tr>
<tr>
<td></td>
<td>• VLAN - Allows you to use the VLAN defined in</td>
</tr>
<tr>
<td></td>
<td>• EVDO — Allows the device to use select 3G cards. Only area C and F are visible for this option.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> For a list of specific EVDO cards that are supported by the EdgeMarc, visit <a href="http://portal.knowledgebase.net/article.asp?article=291396&amp;p=4739">http://portal.knowledgebase.net/article.asp?article=291396&amp;p=4739</a>.</td>
</tr>
<tr>
<td></td>
<td>• T1 — Allows you to configure the WAN interface with a static IP address and also configure and test the T1 interface on the system on the T1 Configuration page. You can click the underlined link to open the T1 Configuration page. For information on using the T1 Configuration page, see Test UA Settings page on page 279. Areas C, D, and F are visible for this option.</td>
</tr>
<tr>
<td>VPI</td>
<td>Enter the VPI value assigned by your network provider</td>
</tr>
<tr>
<td>VCI</td>
<td>Enter the VCI value assigned by your network provider</td>
</tr>
<tr>
<td>User Name</td>
<td>Enter the user name assigned by your network provider.</td>
</tr>
</tbody>
</table>
Table 12  Network Parameters (continued)

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Password</td>
<td>Enter the password assigned by your network provider.</td>
</tr>
<tr>
<td>Keepalive Ping</td>
<td>Select to send an ICMP echo request to its gateway every minute to ensure</td>
</tr>
<tr>
<td></td>
<td>that the ISP keeps the PPPoE connection open.</td>
</tr>
<tr>
<td>PPPoE Link Status (view only)</td>
<td>View the status of the PPPoE line.</td>
</tr>
<tr>
<td>IP Address</td>
<td>IP address to be assigned manually.</td>
</tr>
<tr>
<td>Subnet Mask</td>
<td>Subnet mask to be assigned manually.</td>
</tr>
</tbody>
</table>

Network Settings

Note: Enter these settings if you selected Static IP Address or T1 in the WAN interface Settings area.

Default Gateway Enter the default IP gateway for the system. This gateway will be on the same IP subnet as the IP address.
Primary DNS Enter the primary DNS server as supplied by the ISP.
Secondary DNS Enter the secondary DNS server as supplied by the ISP. Used if the primary server is unavailable.

Primary WAN Redundancy Settings

Enable Ping based status detection If WLR is enabled and this field is checked, then the system sends ICMP packets to the “Ping Hot” and if no response is received, then the link is declared as down.
Ping Host If “Enable Ping based status detection” is checked and WLR is enabled, then ICMP packets will be sent to the host whose IP address is specified in this field.

The Network page contains the following buttons:

Submit Applies the settings configured on this page.
Reset Clears all fields and selections and allows you to enter new information.

Subinterfaces Page

Use this page to assign additional IP addresses to a system interface. Table 13 describes the parameters on the page. To access this page, choose Network > Subinterfaces from the Configuration Menu.
The Subinterfaces page contains the following buttons:

- **Add**: Adds the specified entry
- **Delete**: Deletes the selected entries.
- **Clear**: Clears all fields and selections and allows you to enter new information.

Table 13  Network Subinterface Page Parameters

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP Address</td>
<td>Enter the IP address of the subinterface.</td>
</tr>
<tr>
<td>Netmask</td>
<td>Enter the network mask associated with the IP address. The default value is 255.255.255.0.</td>
</tr>
<tr>
<td>Interface</td>
<td>Select whether the interface is for the LAN or WAN.</td>
</tr>
</tbody>
</table>

The Subinterfaces page contains the following buttons:

WAN VLAN Configuration

Use this page to configure the VLANs that will be connected to the WAN. Table 15 describes the parameters on the page. To access this page, choose **Network > WAN VLAN Configuration** from the Configuration Menu.
**Note:** This option will only be visible if VLAN has been selected as the specified WAN connection to the Internet.
Table 14  WAN VLAN Configuration

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WAN VLAN List</strong></td>
<td>Enable and disable data or voice VLANs.</td>
</tr>
<tr>
<td><strong>Enable</strong> (checkbox)</td>
<td>Select the VLAN that will be enabled or disabled.</td>
</tr>
<tr>
<td><strong>Create additional WAN VLANs</strong></td>
<td>Add another WAN VLAN to the WAN VLAN list.</td>
</tr>
<tr>
<td><strong>VLAN ID</strong></td>
<td>Enter the ID of the VLAN interface.</td>
</tr>
<tr>
<td><strong>IP Address</strong></td>
<td>Enter the IP address of the VLAN interface.</td>
</tr>
<tr>
<td><strong>Netmask</strong></td>
<td>Enter the network mask associated with the IP address. The default value is 255.255.255.0.</td>
</tr>
</tbody>
</table>

The Subinterfaces page contains the following buttons:

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commit</td>
<td>Commits the specified entry</td>
</tr>
<tr>
<td>Delete</td>
<td>Deletes the selected entries.</td>
</tr>
<tr>
<td>Clear</td>
<td>Clears all fields and selections and allows you to enter new information.</td>
</tr>
</tbody>
</table>

**DHCP Relay Page**

Use this page to enable DHCP relay. Table 15 describes the parameters on the page. To access this page, choose **DHCP Relay** from the Configuration Menu.
The DHCP Relay page contains the following buttons:

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable DHCP Relay</td>
<td>Select this checkbox to enable DHCP Relay.</td>
</tr>
<tr>
<td>DHCP Relay IP Address</td>
<td>Enter the IP address of the DHCP server where the system will forward traffic.</td>
</tr>
</tbody>
</table>

The DHCP Relay page contains the following buttons:

- **Submit**: Applies the settings configured on this page.
- **Reset**: Clears all fields and selections and allows you to enter new information.

## DHCP Server Page

Use this page to configure the internal DHCP server. Table 16 describes the parameters on the page.

To access this page, choose **DHCP Server** from the Configuration Menu.
Table 16   DHCP Server Parameters

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DHCP IP Address Ranges Table</td>
<td>Shows the dynamic addresses to use for the LAN devices. Enter individual DHCP IP addresses or a range. Assign static IP addresses for any common-access devices, such as printers or fax machines. To configure an address range, select the appropriate values and click Add. To delete an address, highlight the address and press the Delete key on your keyboard.</td>
</tr>
<tr>
<td>VLAN</td>
<td>Select the VLAN served by the DHCP server.</td>
</tr>
<tr>
<td>Enable DHCP Server</td>
<td>Select this checkbox to enable the DHCP server.</td>
</tr>
<tr>
<td>Subnet Mask</td>
<td>Enter the Subnet Mask address for the DHCP pool. The default implied value is 255.255.255.0.</td>
</tr>
</tbody>
</table>
Table 16 DHCP Server Parameters (continued)

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lease Duration (Days)</td>
<td>Enter the number of days you want to lease the DHCP service. This is the amount of time a DHCP service will remain connected without lapse. Resource allocation and cost might influence the quantity assigned. The value can be 1 day minimum and 30 days maximum.</td>
</tr>
<tr>
<td>Time Offset, +/- hours (option 2)</td>
<td>Set the time offset in hours from UTC (Universal time Code) for your local location.</td>
</tr>
<tr>
<td>NTP Server Address (option 42)</td>
<td>Set the Network Time Protocol (NTP) address that is served out by DHCP.</td>
</tr>
<tr>
<td>WINS Address (option 44)</td>
<td>The Windows Internal Naming Service (WINS) is a service that keeps a database of computer name-to-IP address mappings so that computer names used in Windows environments can be mapped to IP addresses.</td>
</tr>
<tr>
<td>TFTP/FTP Server Name (option 66)</td>
<td>Set the TFTP/FTP server name that is served out by DHCP. By default, this option is the same as the TFTP server on the ALG page.</td>
</tr>
<tr>
<td>VLAN ID Discovery (option 129)</td>
<td>Set the VLAN ID that Polycom phones will acquire after rebooting. <strong>Note:</strong> The Polycom phone boots on the Data VLAN &quot;Native VLAN&quot; by default and acquires the 129 Option. Upon learning option 129, the phone re-boots with the correct VLAN ID</td>
</tr>
</tbody>
</table>

The DHCP Relay page contains the following buttons:

- **Add:** Adds the specified entry.
- **Submit:** Applies the settings configured on this page.
- **Reset:** Clears all fields and selections and allows you to enter new information.
DHCP Leases Page

Use this page to view address information about hosts that are currently leasing DHCP addresses. Table 17 describes the parameters on the page.

To access this page, choose DHCP Server > DHCP Leases from the Configuration Menu.

<table>
<thead>
<tr>
<th>Table 17  DHCP Leases Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Item</strong></td>
</tr>
<tr>
<td>Hostname</td>
</tr>
<tr>
<td>IP Address</td>
</tr>
<tr>
<td>MAC Address</td>
</tr>
<tr>
<td>Expires</td>
</tr>
</tbody>
</table>

There are no buttons on the DHCP Leases page.

Standard Firewall Page

Use this page to configure the basic Edgewater appliance firewall. Table 18 describes the parameters on the page.

To access this page:
- If the standard firewall is currently enabled (default), choose Standard Firewall from the Configuration Menu.
- If the advanced firewall has been enabled, choose Advanced Firewall from the Configuration Menu, and then click the link at the bottom of the page to open the Standard Firewall page.
Table 18  Standard Firewall Parameters

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable Firewall for WAN</td>
<td>Activates firewall features for the WAN interface.</td>
</tr>
</tbody>
</table>
### Table 18  Standard Firewall Parameters (continued)

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Basic WAN Firewall Settings</strong></td>
<td></td>
</tr>
<tr>
<td>Allow HTTPS Access Through Firewall</td>
<td>Select this to allow HTTPS management of the system from the WAN interface.</td>
</tr>
<tr>
<td>Allow TELNET Access Through Firewall</td>
<td>Select this to allow Telnet management of the system from the WAN interface.</td>
</tr>
<tr>
<td>Allow SSH Access Through Firewall</td>
<td>Select this to allow SSH version 2 ONLY management of the system from the WAN interface.</td>
</tr>
<tr>
<td>Allow SNMP Access Through Firewall</td>
<td>Select this to allow SNMP V1 and V3 management of the system from the WAN interface.</td>
</tr>
<tr>
<td>Allow TCP Port</td>
<td>Specify the TCP port numbers to which access will be granted. Use spaces to separate multiple port values (for example 8070 8080 8090).</td>
</tr>
<tr>
<td>Allow UDP Port</td>
<td>Specify the UDP port numbers to which access will be granted. Use spaces to separate multiple port values (for example 8070 8080 8090).</td>
</tr>
<tr>
<td><strong>Trusted Management Addresses</strong></td>
<td>Use this area to limit the addresses to which the configuration applies. You can specify an IP address (a.b.c.d) or address/mask (a.b.c.d/n). The basic firewall rules will be applied only to those addresses. All other WAN addresses are blocked from accessing the device.</td>
</tr>
<tr>
<td><strong>Forwarding WAN Firewall Settings</strong></td>
<td></td>
</tr>
<tr>
<td>Enable Firewall Logging</td>
<td>Select this to enable logging for packets dropped by the firewall. <strong>WARNING:</strong> Because port scanning and login attacks are common when connected to a public network, logging is disabled by default. When enabling logging, use caution! Firewall logging may affect call quality and system performance. It may also use network bandwidth if system logging is enabled over the WAN.</td>
</tr>
<tr>
<td>Enable PPTP Server Pass-Through</td>
<td>Select this to allow a Point to Point Tunneling Protocol (PPTP) server to be placed on the LAN side with a private IP address. This allows Windows PPTP to pass through to a Windows server, but firewalls the server from other traffic.</td>
</tr>
</tbody>
</table>
Table 18  Standard Firewall Parameters (continued)

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPTP Server IP Address</td>
<td>Enter the private IP address of the PPTP server. All outside users will use the system’s public IP address to access the PPTP server. The Windows server has a private IP address, which is handled by the system using NAT.</td>
</tr>
</tbody>
</table>

Firewall Selection
This area contains a link to the Advanced Firewall page. See "Advanced Firewall Page" on page 181.

The Standard Firewall page contains the following buttons:

- **Submit**: Applies the settings configured on this page.
- **Reset**: Clears all fields and selections and allows you to enter new information.

Advanced Firewall Page

Use this page to configure the advanced Edgewater appliance firewall. Table 19 describes the parameters on the page.

To access this page:

- If the standard firewall is currently enabled, choose **Standard Firewall** from the Configuration Menu, and then click the link at the bottom of the page to open the Advanced Firewall page.
- If the advanced firewall has been enabled, choose **Advanced Firewall** from the Configuration Menu.
Table 19 Advanced Firewall Parameters

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firewall Policy</td>
<td>Enable or disable the firewall by selecting from the pull-down list.</td>
</tr>
<tr>
<td>Log Denied Packet</td>
<td>Select to enable logging of packets that are blocked by the firewall.</td>
</tr>
<tr>
<td>Log Allowed Packet</td>
<td>Select to enable logging of packets that are allowed by the firewall.</td>
</tr>
</tbody>
</table>

Advanced Firewall

Submit is required to complete reloading the Advanced Firewall.

Firewall Policy

Firewall Logging (only when Firewall is enabled)

- Log Denied Packet
- Log Allowed Packet
- Log Interface

Inbound Session Control:

Inbound Connection Rate Limit: [ ] /second
Enable PPTP Server Pass-through: [ ]
PPTP Server IP Address: [ ]

Outbound Session Control:

Outbound Connection Rate Limit: [ ] /second
Outbound protocol(s) to be allowed:

- DNS: [ ]
- FTP: [ ]
- HTTP: [ ]
- HTTPS: [ ]
- IMAP: [ ]
- NTP: [ ]
- PING: [ ]
- POP3: [ ]
- SMTP: [ ]
- SNMP: [ ]
- SSH: [ ]
- TELNET: [ ]
- ALL OTHERS: [ ]

Remote Management:

To configure Remote Management address and options, click here

Firewall Selection:

To switch to Standard Firewall, click here

Submit  Reset
### Inbound Session Control

These settings determine the treatment of packets entering the device.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inbound</td>
<td>Select a rate in connections per second for inbound connections. This rate is used for automatic detection of denial of service (DoS) attacks from the public network. Packet requests to establish new sessions from the WAN to LAN that exceed this rate are temporarily denied. If this parameter is not defined, the default limit of 20 new sessions is used.</td>
</tr>
<tr>
<td>Rate Limit</td>
<td></td>
</tr>
<tr>
<td>Enable PPTP</td>
<td>Select this option to allow a Point to Point Tunneling Protocol (PPTP) server to be placed on the LAN side with a private IP address. This allows Windows PPTP to pass through to a Windows server, but firewalls the server from other traffic.</td>
</tr>
<tr>
<td>Sever Pass-Through</td>
<td></td>
</tr>
<tr>
<td>PPTP Server IP Address</td>
<td>Enter the private IP address of the PPTP server. All outside users will use the system's public IP address to access the PPTP server. The Windows server has a private IP address, which is handled by the system using NAT.</td>
</tr>
</tbody>
</table>

### Outbound Session Control

These settings determine the treatment of packets leaving the device.

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outbound Connection</td>
<td>Select a rate in connections per second for new outbound connections. This rate is used for automatic detection of denial of service (DoS) attacks from the public network. Packet requests to establish new sessions from the LAN to WAN that exceed this rate are temporarily denied. If this parameter is not defined, the default limit of 20 new sessions is used.</td>
</tr>
<tr>
<td>Rate Limit</td>
<td></td>
</tr>
<tr>
<td>Outbound protocols to be allowed</td>
<td>Select the protocols for which outbound traffic will be allowed by the firewall. To enable any protocol not specifically mentioned, check the ALL OTHERS box.</td>
</tr>
</tbody>
</table>
The Advanced Firewall page contains the following buttons:

- **Submit**: Applies the settings configured on this page.
- **Reset**: Clears all fields and selections and allows you to enter new information.

**The Remote Management**
This area contains a link to the Remote Management page, which is used to configure management protocols and trusted management addresses. See “Remote Management” on page 268.

**Firewall Selection**
This area contains a link to the Firewall page. See “Standard Firewall Page” on page 178.

---

**Table 19  Advanced Firewall Parameters (continued)**

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Remote Management</td>
<td>This area contains a link to the Remote Management page, which is used to configure management protocols and trusted management addresses. See “Remote Management” on page 268.</td>
</tr>
<tr>
<td>Firewall Selection</td>
<td>This area contains a link to the Firewall page. See “Standard Firewall Page” on page 178.</td>
</tr>
</tbody>
</table>
Custom Rules Page

Use this page to define custom rules for the advanced firewall. Table 19 describes the parameters on the page.

To access this page, choose Firewall from the Configuration Menu, click the advanced firewall link, and then choose Advanced Firewall > Custom Rules from the Configuration Menu.

![Custom Rules Page](image)
Table 20  Custom Rules

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Custom Rules</td>
<td>Enter the custom rules with each rule on a new line.</td>
</tr>
<tr>
<td>Sample rules:</td>
<td># Allow Inbound and Outbound UDP traffic from/to port 138:</td>
</tr>
<tr>
<td></td>
<td>-t filter -A FILTER_WAN_UDP_IN -p udp -m multiport --ports 138 -j ACCEPT</td>
</tr>
<tr>
<td></td>
<td>-t filter -A FILTER_WAN_UDP_OUT -p udp -m multiport --ports 138 -j ACCEPT</td>
</tr>
<tr>
<td></td>
<td># Allow Inbound and Outbound traffic on interface &quot;ppp0&quot;</td>
</tr>
<tr>
<td></td>
<td>-t filter -A INPUT -i ppp0 -j ACCEPT</td>
</tr>
<tr>
<td></td>
<td>-t filter -A OUTPUT -o ppp0 -j ACCEPT</td>
</tr>
<tr>
<td></td>
<td># Allow IP Protocol 1 (ICMP) Inbound and Outbound traffic from/to address 10.10.13.185:</td>
</tr>
<tr>
<td></td>
<td>-t filter -A FILTER_WAN_ICMP_IN -p 1 -i eth1 -d 10.10.13.185 -j ACCEPT</td>
</tr>
<tr>
<td></td>
<td>-t filter -A FILTER_WAN_ICMP_OUT -p 1 -o eth1 -s 10.10.13.185 -j ACCEPT</td>
</tr>
</tbody>
</table>

The Custom Rules page contains the following buttons:

| Submit | Applies the settings configured on this page.                        |
| Reset  | Clears all fields and selections and allows you to enter new information. |
**Current Advanced Firewall Rules (Show Rules)**

Use this page to view the custom rules that are currently in effect. There are no fields or buttons on this page.

To access this page, choose **Firewall** from the Configuration Menu, click the advanced firewall link, and then choose **Advanced Firewall > Show Rules** from the Configuration Menu.

### Current Advanced-Firewall Rules

<table>
<thead>
<tr>
<th>Rule Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>DROP all -- eth1 * 0.0.0.0/0 0.0.0.0/0 state INVALID</td>
<td>DROP all -- eth1 * 0.0.0.0/0 0.0.0.0/0 state INVALID</td>
</tr>
<tr>
<td>DROP tcp -- eth1 * 0.0.0.0/0 0.0.0.0/0 tcp flags:0x16/0x02 recent</td>
<td>DROP tcp -- eth1 * 0.0.0.0/0 0.0.0.0/0 tcp flags:0x16/0x02 recent</td>
</tr>
<tr>
<td>125 6079 FILTER_WAN_TCP_IN tc0 -- eth1 * 0.0.0.0/0 0.0.0.0/0 tcp flags:0x16/0x02 recent</td>
<td>125 6079 FILTER_WAN_TCP_IN tc0 -- eth1 * 0.0.0.0/0 0.0.0.0/0 tcp flags:0x16/0x02 recent</td>
</tr>
<tr>
<td>0 DROP all -- eth1 * 0.0.0.0/0 192.168.1.0/24 state INVALID:NEW:UNTRACKED</td>
<td>0 DROP all -- eth1 * 0.0.0.0/0 192.168.1.0/24 state INVALID:NEW:UNTRACKED</td>
</tr>
<tr>
<td>18 610 FILTER_WAN_UDP_IN udp -- eth1 * 0.0.0.0/0 0.0.0.0/0 multiprot sport:</td>
<td>18 610 FILTER_WAN_UDP_IN udp -- eth1 * 0.0.0.0/0 0.0.0.0/0 multiprot sport:</td>
</tr>
<tr>
<td>5050.0660.1716.1719</td>
<td>5050.0660.1716.1719</td>
</tr>
<tr>
<td>0 FILTER_WAN_UDP_IN udp -- eth1 * 0.0.0.0/0 0.0.0.0/0 multiprot sport:</td>
<td>0 FILTER_WAN_UDP_IN udp -- eth1 * 0.0.0.0/0 0.0.0.0/0 multiprot sport:</td>
</tr>
<tr>
<td>5050.0660.1716.1719</td>
<td>5050.0660.1716.1719</td>
</tr>
<tr>
<td>0 FILTER_WAN_TCP_IN tcp -- eth1 * 0.0.0.0/0 0.0.0.0/0 multiprot sport:</td>
<td>0 FILTER_WAN_TCP_IN tcp -- eth1 * 0.0.0.0/0 0.0.0.0/0 multiprot sport:</td>
</tr>
<tr>
<td>17200</td>
<td>17200</td>
</tr>
<tr>
<td>0 DROP tcp -- eth1 * 0.0.0.0/0 0.0.0.0/0 tcp flags:0x16/0x04 recent</td>
<td>0 DROP tcp -- eth1 * 0.0.0.0/0 0.0.0.0/0 tcp flags:0x16/0x04 recent</td>
</tr>
<tr>
<td>120 FILTER_WAN_TCP_IN tc0 -- eth1 * 0.0.0.0/0 0.0.0.0/0 tcp flags:0x16/0x04 recent</td>
<td>120 FILTER_WAN_TCP_IN tc0 -- eth1 * 0.0.0.0/0 0.0.0.0/0 tcp flags:0x16/0x04 recent</td>
</tr>
<tr>
<td>0 DROP icmp -- eth1 * 0.0.0.0/0 0.0.0.0/0 0.0.0.0/0 recent: CHECK seconds: 5</td>
<td>0 DROP icmp -- eth1 * 0.0.0.0/0 0.0.0.0/0 0.0.0.0/0 recent: CHECK seconds: 5</td>
</tr>
<tr>
<td>17 1102 FILTER_WAN_ICMP_IN icmp -- eth1 * 0.0.0.0/0 0.0.0.0/0 0.0.0.0/0 recent</td>
<td>17 1102 FILTER_WAN_ICMP_IN icmp -- eth1 * 0.0.0.0/0 0.0.0.0/0 0.0.0.0/0 recent</td>
</tr>
<tr>
<td>0 DROP udp -- eth1 * 0.0.0.0/0 0.0.0.0/0 0.0.0.0/0 state INVALID:NEW:UNTRACKED recent</td>
<td>0 DROP udp -- eth1 * 0.0.0.0/0 0.0.0.0/0 0.0.0.0/0 state INVALID:NEW:UNTRACKED recent</td>
</tr>
<tr>
<td>17 1103 1150K FILTER_WAN_UDP_IN udp -- eth1 * 0.0.0.0/0 0.0.0.0/0 state</td>
<td>17 1103 1150K FILTER_WAN_UDP_IN udp -- eth1 * 0.0.0.0/0 0.0.0.0/0 state</td>
</tr>
<tr>
<td>0 FILTER_LAN_UDP_IN udpc -- eth0.1 * 0.0.0.0/0 0.0.0.0/0</td>
<td>0 FILTER_LAN_UDP_IN udpc -- eth0.1 * 0.0.0.0/0 0.0.0.0/0</td>
</tr>
<tr>
<td>0 FILTER_LAN_TCP_IN tcp -- eth0.1 * 0.0.0.0/0 0.0.0.0/0</td>
<td>0 FILTER_LAN_TCP_IN tcp -- eth0.1 * 0.0.0.0/0 0.0.0.0/0</td>
</tr>
<tr>
<td>0 FILTER_LAN_UDP_IN udpc -- eth0 * 0.0.0.0/0 0.0.0.0/0</td>
<td>0 FILTER_LAN_UDP_IN udpc -- eth0 * 0.0.0.0/0 0.0.0.0/0</td>
</tr>
<tr>
<td>0 FILTER_LAN_TCP_IN tcp -- eth0 * 0.0.0.0/0 0.0.0.0/0</td>
<td>0 FILTER_LAN_TCP_IN tcp -- eth0 * 0.0.0.0/0 0.0.0.0/0</td>
</tr>
<tr>
<td>0 FILTER_LAN_TCP_IN tcp -- eth0 * 0.0.0.0/0 0.0.0.0/0</td>
<td>0 FILTER_LAN_TCP_IN tcp -- eth0 * 0.0.0.0/0 0.0.0.0/0</td>
</tr>
<tr>
<td>0 FILTER_LAN_TCP_IN tcp -- eth0 * 0.0.0.0/0 0.0.0.0/0</td>
<td>0 FILTER_LAN_TCP_IN tcp -- eth0 * 0.0.0.0/0 0.0.0.0/0</td>
</tr>
<tr>
<td>0 FILTER_LAN_TCP_IN tcp -- eth0.1 * 0.0.0.0/0 0.0.0.0/0</td>
<td>0 FILTER_LAN_TCP_IN tcp -- eth0.1 * 0.0.0.0/0 0.0.0.0/0</td>
</tr>
<tr>
<td>165 25480 FILTER_WAN_UDP_IN udp -- eth1 * 0.0.0.0/0 0.0.0.0/0</td>
<td>165 25480 FILTER_WAN_UDP_IN udp -- eth1 * 0.0.0.0/0 0.0.0.0/0</td>
</tr>
<tr>
<td>319 42072 FILTER_WAN_TCP_IN tcp -- eth1 * 0.0.0.0/0 0.0.0.0/0</td>
<td>319 42072 FILTER_WAN_TCP_IN tcp -- eth1 * 0.0.0.0/0 0.0.0.0/0</td>
</tr>
<tr>
<td>0 FILTER_WAN_ICMP_IN icmp -- eth1 * 0.0.0.0/0 0.0.0.0/0</td>
<td>0 FILTER_WAN_ICMP_IN icmp -- eth1 * 0.0.0.0/0 0.0.0.0/0</td>
</tr>
<tr>
<td>170 200410 FILTER_WAN_TCP_IN tcp -- eth1 * 0.0.0.0/0 0.0.0.0/0</td>
<td>170 200410 FILTER_WAN_TCP_IN tcp -- eth1 * 0.0.0.0/0 0.0.0.0/0</td>
</tr>
<tr>
<td>0 DROP all -- eth1 * 0.0.0.0/0 0.0.0.0/0</td>
<td>0 DROP all -- eth1 * 0.0.0.0/0 0.0.0.0/0</td>
</tr>
</tbody>
</table>
Forwarding Rules Page

Use this page to configure the rules that determine how the firewall forwards data traffic for a subnet from one interface to another. Table 21 describes the parameters on the page.

To access this page, choose Firewall > Forwarding Rules from the Configuration Menu.

![Forwarding Rules Page](image)

**Forwarding Rules**

Forwarding Rules permits the firewall to forward data traffic for a subnet from one interface to another. When forwarding a subnet, an IP address needs to be assigned to the system to serve as the default router for the subnet. To add an additional IP address to the system, visit the Subinterfaces page.

The list is currently empty

Add a Forwarding Rule:
IP Subnet:
Netmask:
Input Interface:
Output Interface:
Protocol:
Custom Port:

![Add Clear Buttons]
The Forwarding Rules page contains the following buttons:

- **Add**: Adds the specified entry
- **Delete**: Deletes the selected entries.
- **Clear**: Clears all fields and selections and allows you to enter new information.

### Table 21  Forwarding Rules Parameters

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forwarding Rules Table</td>
<td>Forwarding Rules permits the firewall to forward data traffic for a subnet from one interface to another. When forwarding a subnet, an IP address needs to be assigned to the system to serve as the default router for the subnet. To add an additional IP address to the system, visit the Subinterfaces page. Rules are executed in the order in which they are listed. Use the arrows to move entries up and down, or use the Index field to specify where a new or edited rule falls in the list.</td>
</tr>
<tr>
<td>Rules</td>
<td></td>
</tr>
<tr>
<td>IP Subnet</td>
<td>Subnet to be forwarded through the firewall from the Input Interface to the Output Interface.</td>
</tr>
<tr>
<td>Netmask</td>
<td>Network mask to apply to the IP Subnet to create the range of IP addresses that are forwarded through the firewall.</td>
</tr>
<tr>
<td>Input Interface</td>
<td>Interface where data is received that is destined for the forwarded subnet (one or more destination addresses).</td>
</tr>
<tr>
<td>Output Interface</td>
<td>Interface where data is received that is sent from the forwarded subnet (one or more source addresses).</td>
</tr>
<tr>
<td>Protocol</td>
<td>Can be one of the following:</td>
</tr>
<tr>
<td></td>
<td>• Custom-UDP—For the specified network, allows the specified UDP port to pass through the system</td>
</tr>
<tr>
<td></td>
<td>• Custom-TCP—For the specified network, allows the specified TCP port to pass through the system</td>
</tr>
<tr>
<td></td>
<td>• Any—For the specified network, allows all ports and protocols through the system. No ports are required because not all protocols support the concept of ports.</td>
</tr>
<tr>
<td>Custom Port</td>
<td>Port Number that is allowed through the system when either Custom-UDP or Custom-TCP protocol is selected. This parameter is not required when Any or a protocol other than Custom-UDP or Custom-TCP is selected.</td>
</tr>
</tbody>
</table>
Message of the Day Page

Use this page to customize the messages that are displayed upon user access and login. Table 22 describes the parameters on the page.

To access this page, choose Firewall > MOTD from the Configuration Menu.

Message of the Day (MOTD)

The messages of the day are displayed when the system is accessed using via HTTP/HTTPS, Telnet, SSH, and console.

System Authorization Message of the Day

The System Authorization MOTD is used to warn users before they log into the system that it is private and requires permission to use the system. This message is displayed when login in via the console, Telnet, and SSH.

HTTP/HTTPS Short System Authorization Message of the Day

The HTTP/HTTPS System Authorization MOTD is used to warn users before they log into the GUI on the system that it is private and requires permission to use the system. The message is limited to 511 characters.

System Greeting Message of the Day

The System Greeting MOTD is used to display a message upon successful login. It is used to display the system greeting and notify authorized users about important events or changes to the system.
The Message of the Day page contains the following buttons:

- **Submit**: Applies the settings configured on this page.
- **Reset**: Clears all fields and selections and allows you to enter new information.

### Table 22  Message of the Day Parameters

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Authorization Message of the Day</td>
<td>Message used to warn users before they log into the system that it is private and requires permission to use the system. This message is displayed when login in via the console, Telnet, and SSH.</td>
</tr>
<tr>
<td>HTTP/HTTPS Short System Authorization Message of the Day</td>
<td>Message used to warn users before they log into the GUI on the system that it is private and requires permission to use the system. The message is limited to 511 characters.</td>
</tr>
<tr>
<td>System Greeting Message of the Day</td>
<td>Message that is displayed upon successful login. Includes a greeting and notification to authorized users about important events or changes to the system.</td>
</tr>
</tbody>
</table>

The Message of the Day page contains the following buttons:

NAT Pages

Use the NAT pages to configure the address translations for dynamic and static Network Address Translation (NAT):

- **NAT for Standard Firewall**
- **NAT for Advanced Firewall**

**NAT for Standard Firewall**

Table 24 describes the parameters on this page.

To access this page, choose **Standard Firewall > NAT** from the Configuration Menu.
Table 23  NAT Parameters for Standard Firewall

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable LAN NAT</td>
<td>Select to allow the EdgeMarc appliance to provide WAN IP addresses for devices on the local LAN.</td>
</tr>
<tr>
<td>Add a Static NAT Rule</td>
<td></td>
</tr>
</tbody>
</table>
The NAT page for standard firewall contains the following buttons:

- **Submit**: Applies the settings configured on this page.
- **Reset**: Clears all fields and selections and allows you to enter new information.

### Table 23  NAT Parameters for Standard Firewall (continued)

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protocol</td>
<td>Select the protocol for traffic over the interface.</td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong>: When 'any' is selected as the protocol type, all data to the</td>
</tr>
<tr>
<td></td>
<td>source IP address will be forwarded to the destination IP address.</td>
</tr>
<tr>
<td></td>
<td><strong>Restriction</strong>: When 'any' is used as the Protocol, the specified</td>
</tr>
<tr>
<td></td>
<td>ports for the source IP address and the destination IP address must also be</td>
</tr>
<tr>
<td></td>
<td>able to process any protocol type.</td>
</tr>
<tr>
<td>Src IP</td>
<td>Enter the IP address of the source interface.</td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong>: When the system’s own IP address is a dynamic WAN IP address and</td>
</tr>
<tr>
<td></td>
<td>will be used as the source interface, use the token “WAN_IP”.</td>
</tr>
<tr>
<td>Src Netmask</td>
<td>Enter the network mask for the source interface.</td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong>: If the token “WAN_IP” is used to specify the source IP address,</td>
</tr>
<tr>
<td></td>
<td>use the token “WAN_SUBNET”. The token “WAN_SUBNET” specifies that the</td>
</tr>
<tr>
<td></td>
<td>system use its own WAN subnet as the source netmask.</td>
</tr>
<tr>
<td>Src Port</td>
<td>Enter the port on the source interface to which the Static NAT rule should</td>
</tr>
<tr>
<td>Dest IP</td>
<td>Enter the port on the destination interface to which the Static NAT rule</td>
</tr>
<tr>
<td>Dest Port</td>
<td>Enter a port to be used to route traffic to specific devices.</td>
</tr>
</tbody>
</table>

**Static NAT rules**
This table contains an entry for each static NAT rule.
NAT for Advanced Firewall

Table 24 describes the parameters on this page.

To access this page, choose Advanced Firewall > NAT from the Configuration Menu.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable Dynamic NAT</td>
<td>Select to map private IP addresses on the LAN side to public IP addresses on the WAN interface.</td>
</tr>
<tr>
<td>Static NAT</td>
<td>Enter values in the following fields for static NAT:</td>
</tr>
<tr>
<td>Client Entries</td>
<td>Enter the IP address of the WAN interface.</td>
</tr>
<tr>
<td>Netmask</td>
<td>Enter the network mask for the WAN interface.</td>
</tr>
<tr>
<td>LAN Port</td>
<td>Enter a port to be used to route traffic to specific devices.</td>
</tr>
<tr>
<td>LAN Address</td>
<td>Enter the IP address for the LAN side.</td>
</tr>
</tbody>
</table>
Traffic Shaper Page

Use this page to configure rules that govern the behavior and priority of network traffic. Table 25 describes the parameters on the page.

To access this page, choose Traffic Shaper from the Configuration Menu.
Traffic Shaper

Enable Traffic Shaping:  

WAN Downstream Bandwidth: 300 Kbps  
WAN Upstream Bandwidth: 300 Kbps  

Enable Priority IP Addresses:  
Note: Devices that use the VoIP ALG function (phones, video stations, etc.) are already marked as high priority and do not need to be in this list. All data from IP addresses in this list has the same priority as voice data. Poorly behaved data may cause voice quality problems. Use with caution!

Enter an individual IP address or a range or the token WAN_IP (to specify dynamic WAN_IP Address). Examples:

- 192.168.1.2  
- 192.168.1.3-9  
- WAN_IP  

To delete an entry, highlight and delete it.

Differentiated Services Code Point (DSCP)  
- Expedited Forwarding (default)  
- IP Precedence  
- Assured Forwarding  
- Custom Value (1-63)  

Enable TOS based routing:  
Enable TOS Byte Stripping:  

Note: Call admission control settings impacts H.323 video calls uniquely, see the Help page before enabling.

Enable Call Admission Control:  
Maximum number of calls allowed: 3  
Note: See the Help page for help determining how many calls your WAN link can support.

Enable SIP Inactivity Monitor:  
SIP Inactivity Timeout (min): 90

Submit  Reset
Table 25  Traffic Shaper Parameters

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic shaping</td>
<td>Select this checkbox to enable traffic shaping. <strong>NOTE:</strong> With traffic shaping disabled, the VoIP devices that are registered to the system’s ALG will still have their layer 3 packets marked as TOS 0xb8 or DIFFServ AF46. Data traffic by default will be re-written to 0x00 (See <strong>Enable TOS Byte Stripping</strong>.)</td>
</tr>
<tr>
<td>WAN Bandwidth</td>
<td>Enter the total actual downstream bandwidth that applies to your WAN connection. This value is entered in Kbps; for example, 1024 = 1 Mbps.</td>
</tr>
<tr>
<td>WAN Upstream Bandwidth</td>
<td>Enter the total actual upstream bandwidth the applies to your WAN connection. This value is entered in Kbps; for example 1024 = 1 Mbps.</td>
</tr>
<tr>
<td>Priority IP Addresses</td>
<td>To specify a device in the network as high priority, you can manually add its IP address to the list of high priority devices. Use care when entering IP addresses in this list. Devices that consume all the bandwidth may cause media quality problems. Enter an individual IP or range, for example 192.168.1.10-150. To delete an entry, highlight it and press the Delete key on your keyboard.</td>
</tr>
<tr>
<td>Enable Priority IP Address</td>
<td>By default, this option is not selected. When enabled, this causes all VoIP related packets to be forcefully routed through the main WAN interface. This is used in rare configurations where you want the default route to be other than the WAN interface (for example, VPN) and you want VoIP traffic to still be routed through the WAN. This option should NOT be enabled for most configurations.</td>
</tr>
<tr>
<td>Enable TOS based routing</td>
<td>By default, this option is selected. For all RTP traffic (voice and video) the system marks the TOS byte as High Priority, and strips (set to 0) the TOS byte for all other traffic. When this option is not selected, the TOS byte will not be stripped from non-RTP traffic, but will remain unchanged. <strong>Note:</strong> Devices that use the VoIP ALG function (phones, video stations, etc.) are already marked as high priority and do not need to be in this list. All data from IP addresses in this list has the same priority as voice data. Poorly behaved data may cause voice quality problems. Use with caution!</td>
</tr>
<tr>
<td>Differentiated Services Code Point (DSCP)</td>
<td>This setting uses expedited forwarding as the forwarding rule.</td>
</tr>
</tbody>
</table>
The Traffic Shaper page contains the following buttons:

<table>
<thead>
<tr>
<th>Button</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submit</td>
<td>Applies the settings configured on this page.</td>
</tr>
<tr>
<td>Reset</td>
<td>Clears all fields and selections and allows you to enter new information.</td>
</tr>
</tbody>
</table>

### Table 25 Traffic Shaper Parameters (continued)

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP Precedence</td>
<td>This setting uses classification of IP layer packets to determine priority.</td>
</tr>
<tr>
<td>Assured Forwarding</td>
<td>This setting assures that the packets will be forwarded.</td>
</tr>
<tr>
<td>Custom Value</td>
<td>For non-standard per-hop behavior, this field permits the use of a custom rule.</td>
</tr>
</tbody>
</table>

**Call Admission Control (CAC)**

- **Enable Call Admission Control**: Select this checkbox to enable the Call Admission Control.
- **Maximum Number of Calls Allowed**: Enter the total number of VoIP calls allowed to traverse the system, for example as RTP streams from VoIP devices. Use CAC to ensure that the system will NOT over subscribe the total amount of WAN bandwidth. If the codec is G.711, the required data rate per call is 85.6 Kbytes/sec. If the codec is G.729, the required data rate per call is 29.6 Kbytes/sec.

**SIP Inactivity**

- **Enable SIP Inactivity Monitor**: Select this checkbox to enable monitoring of RTP activity on all calls.
- **SIP Activity Timeout (min)**: Enter the time in minutes after which SIP activity is deemed to have timed out. The SIP call is torn down and deallocated by the system. **Note**: The default and recommended timeout value is 90 minutes.

The Traffic Shaper page contains the following buttons:

Use this page to configure rules that govern the behavior and priority of network traffic. Table 25 describes the parameters on the page.

To access this page, choose **Traffic Shaper > Advanced** from the Configuration Menu.
### Advanced Traffic Shaping

Hit submit to apply the new CoS configuration.

<table>
<thead>
<tr>
<th>Classes of Service</th>
<th>Classification Rules</th>
</tr>
</thead>
</table>

#### Classes of Service

<table>
<thead>
<tr>
<th>Name</th>
<th>Priority Class</th>
<th>Bandwidth %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voice_Video</td>
<td>EF / IP5</td>
<td>50</td>
</tr>
<tr>
<td>priority</td>
<td>AF4x / IP4</td>
<td>20</td>
</tr>
<tr>
<td>Real_Time_Data</td>
<td>AF3x / IP3</td>
<td>10</td>
</tr>
<tr>
<td>Best_Effort</td>
<td>Best Effort</td>
<td>20</td>
</tr>
</tbody>
</table>

### Create a new Class

Name: 

Priority Class: 

Bandwidth Percentage (%): 

[Submit]
Advanced Traffic Shaping

Hit submit to apply the new CoS configuration.

| Classes of Service | Classification Rules |

**Classification Rules**

<table>
<thead>
<tr>
<th>Select:</th>
<th>All</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direction</td>
<td>IP Address</td>
<td>Source Port</td>
</tr>
<tr>
<td>☐</td>
<td>N/A</td>
<td>0.0.0.0</td>
</tr>
<tr>
<td>☐</td>
<td>N/A</td>
<td>0.0.0.0</td>
</tr>
<tr>
<td>☐</td>
<td>N/A</td>
<td>0.0.0.0</td>
</tr>
<tr>
<td>☐</td>
<td>N/A</td>
<td>0.0.0.0</td>
</tr>
<tr>
<td>☐</td>
<td>N/A</td>
<td>0.0.0.0</td>
</tr>
<tr>
<td>☐</td>
<td>N/A</td>
<td>0.0.0.0</td>
</tr>
</tbody>
</table>

Create a new Classification Rule

Traffic can be classified by a single or a range of IP addresses and/or ports. For example: 192.168.1.100-105, 1000-1005.

- **IP Address:**
- **Direction:**
- **Protocol:**
- **Source Port:**
- **Destination Port:**
- **Differentiated Services Code Point:**
  - Expedited Forwarding
  - IP Precedence
  - Assured Forwarding
  - Custom Value (1-63)

**Submit**
Table 26 Advanced Traffic Shaper Parameters

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classes of Service Table</td>
<td>Note: This table is featured by default. The table can be refreshed by clicking on the “Class of Service” link, located at the top of the page. Each row is an entry for a priority class.</td>
</tr>
<tr>
<td>Create a new Class</td>
<td>Name Specifies the name of the class of service and its associated priority queue.</td>
</tr>
<tr>
<td></td>
<td>Priority Class Specifies the Per-Hop Behavior (PHB) for the associated class of service.</td>
</tr>
<tr>
<td></td>
<td>Bandwidth Percentage Specifies the guaranteed percentage of bandwidth for the associated class during times of congestion. Note: The sum of bandwidth percentages for all configured classes can not exceed 100 percent.</td>
</tr>
<tr>
<td>Classification Rules Table</td>
<td>Note: This table is featured on the page when you select the “Classification Rules” link, located at the top of the page. Each of the table’s rows contains an entry for a classification rule.</td>
</tr>
<tr>
<td>Create a new Classification Rule</td>
<td>IP Address Specifies the IP address.</td>
</tr>
<tr>
<td></td>
<td>Direction Specifies the direction of the traffic.</td>
</tr>
<tr>
<td></td>
<td>Protocol Specifies the transport protocol: TCP, UDP or any.</td>
</tr>
<tr>
<td></td>
<td>Source Port Specifies the source port.</td>
</tr>
<tr>
<td></td>
<td>Destination Port Specifies the destination port.</td>
</tr>
<tr>
<td></td>
<td>Differentiated Services Code Point Specifies the DSCP value used to mark the traffic flow.</td>
</tr>
</tbody>
</table>

The Advanced Traffic Shaper page contains the following buttons:

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delete</td>
<td>Deletes the entry for the selected row or rows in the table.</td>
</tr>
<tr>
<td>Commit</td>
<td>Commits the entry for the selected</td>
</tr>
<tr>
<td>Submit</td>
<td>Applies the settings configured on this page.</td>
</tr>
<tr>
<td>Reset</td>
<td>Clears all fields and selections and allows you to enter new information.</td>
</tr>
</tbody>
</table>
VoIP ALG Page

Use this page to configure parameters that allow the EdgeMarc device to recognize and register network devices. Table 27 describes the parameters on the page.

To access this page, choose VoIP ALG from the Configuration Menu.
### Table 27  VoIP ALG Parameters

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Application Layer Gateway (ALG) Support</strong></td>
<td></td>
</tr>
<tr>
<td>ALG is on VLAN ID</td>
<td>Select a VLAN for the ALG to support. The ALG can only support one VLAN.</td>
</tr>
<tr>
<td>TFTP server IP address</td>
<td>Select to allow the system to act as a TFTP server providing subsequent configuration information to other VoIP phones or devices.</td>
</tr>
<tr>
<td>Use ALG Alias IP Address</td>
<td>Select to enable the use of the IP address of the ALG alias. When this checkbox is selected, you can change the following parameters:</td>
</tr>
<tr>
<td></td>
<td>• ALG LAN Interface IP—Enter the IP address on the LAN that endpoints communicate with. Generally, this is the same as the LAN IP address.</td>
</tr>
<tr>
<td></td>
<td>In some cases, the ALG addresses will not correspond to the addresses of the LAN or the WAN ports (e.g. when VRRP is enabled). The addresses</td>
</tr>
<tr>
<td></td>
<td>will be alias addresses that have been configured on the ports. In general, you should leave this feature disabled.</td>
</tr>
<tr>
<td></td>
<td>• ALG WAN Interface IP—Enter the IP address on the WAN that communicates with the soft switch. Generally, this is the same as the WAN IP address.</td>
</tr>
<tr>
<td><strong>Note:</strong> ALG is enabled on your system, allowing the system to recognize and register a network appliance before it presents the IP telephone or data device through its public WAN port. When the ALG is not registered this text will read <strong>Invalid License Key. The device has to be registered.</strong></td>
<td></td>
</tr>
<tr>
<td>Do strict RTP source check</td>
<td>Select to help prevent a specific RTP-based denial-of-service attack as well as address network based gateways that periodically fail to stop sending an RTP stream when a call ends. If the source of an inbound RTP stream does not match the IP Address and Port for an existing outbound RTP stream, it is assumed that the inbound stream is &quot;rogue RTP.&quot; When rogue RTP is detected, a syslog message is generated and the inbound stream is dropped.</td>
</tr>
<tr>
<td>Enable Client List lockdown</td>
<td>Select to prevent new clients from registering. First a client list must be established, either by manually entering all clients that are allowed to use the system, or by running the system without the Client List lockdown feature until all desired clients have registered, and then enabling this feature. To use the Client List Lockdown feature with clients using dynamic IP address assignment (DHCP) you must disable Allow Shared Usernames so that Client List IP addresses can be updated if client addresses change over time.</td>
</tr>
</tbody>
</table>
Table 27  VoIP ALG Parameters (continued)

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allow Shared Usernames</td>
<td>Select to allow multiple clients to register using the same username. A new entry and a unique contact field will be generated for each client. If Client List Lockdown and Allow Shared Usernames are enabled at the same time, new phones using an existing username will not be added to the clients list and will fail to work.</td>
</tr>
<tr>
<td>Use unique ports for shared users</td>
<td>Allows the system to assign a unique port for clients using the same IP address and port. Note: This option is applicable to SIP clients only. If you enable this feature, you will have to clear the SIP clients list.</td>
</tr>
<tr>
<td>Strip G.729 from calls</td>
<td>Select to improve codec compatibility for legacy and newer networks by removing all references to the G.729 in codec lists for calls made using SIP and MGCP. The codecs in the signaling protocols are listed in the SDP (session description protocol). When you enable the G.729 feature, the codecs are removed from the SDP.</td>
</tr>
<tr>
<td>Allow clients on WAN</td>
<td>Select this checkbox to allow clients to register from the WAN side of the device. If you have no clients on the WAN side, you should leave this option disabled.</td>
</tr>
</tbody>
</table>
| RTP Range                     | If the application requires that traffic shaping and MOS scoring should be performed on the calls initiated by non-translated signaling protocols, then enter the RTP ranges that will be associated with these calls. It can be specified as RTP port, RTP range, or any combinations of these separated by commas as can be seen below.  
  2000,30000-32000,40000,45000-46000  
  Currently this functionality is only supported for VoIP VPN application. A license must be obtained for VoIP VPN before this functionality can be operational. |

Application Layer Gateway (ALG) Support

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum total bandwidth (kbps)</td>
<td>Enter the maximum available bandwidth. Bandwidth includes the RTF payload plus the IP header overhead.</td>
</tr>
<tr>
<td>Maximum per-call bandwidth (kbps)</td>
<td>Enter the maximum available per call bandwidth, which is the bandwidth available for the RTP payload (value that the client uses to specify call bandwidth).</td>
</tr>
<tr>
<td>Default audio stream bandwidth (kbps)</td>
<td>Enter the bandwidth available for streaming audio traffic.</td>
</tr>
<tr>
<td>Default video stream bandwidth (kbps)</td>
<td>Enter the bandwidth available for streaming video traffic.</td>
</tr>
</tbody>
</table>
The VoIP ALG page contains the following buttons:

- **Submit**: Applies the settings configured on this page.
- **Reset**: Clears all fields and selections and allows you to enter new information.

### Table 27  VoIP ALG Parameters (continued)

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current payload bandwidth</td>
<td>Indicates the current bandwidth used for traffic payloads (read only).</td>
</tr>
<tr>
<td>Estimated current total bandwidth</td>
<td>Indicates the current total bandwidth (RTF payload plus IP header) (read only).</td>
</tr>
</tbody>
</table>
H.323 Settings Page

Use this page to configure parameters for the H.323 protocol. Table 28 describes the parameters on the page.

To access this page, choose VoIP ALG > H.323 from the Configuration Menu.

<table>
<thead>
<tr>
<th>Gatekeeper mode</th>
<th>Help</th>
</tr>
</thead>
<tbody>
<tr>
<td>The gatekeeper mode configuration specifies whether the system should work in WAN/Provider-side gatekeeper mode, Peering-Proxy mode, or embedded gatekeeper mode.</td>
<td></td>
</tr>
<tr>
<td>None (H.323 is disabled)</td>
<td></td>
</tr>
<tr>
<td>WAN/Provider-side gatekeeper mode</td>
<td></td>
</tr>
<tr>
<td>LAN/Subscriber-side gatekeeper mode</td>
<td></td>
</tr>
<tr>
<td>Peering-Proxy mode (configure prefixes)</td>
<td></td>
</tr>
<tr>
<td>Embedded gatekeeper mode</td>
<td></td>
</tr>
</tbody>
</table>

| WAN/Provider-side gatekeeper mode settings |      |
| The H.323 gatekeeper that all client traffic shall be forwarded to. |
| WAN/Provider-side GK address: 0.0.0.0 |      |
| Modify Time-To-Live: |      |
| New Time-To-Live (s): 300 |      |
| Gatekeeper reachability: N/A (Not in WAN GK mode) |      |

| LAN/Subscriber-side gatekeeper mode settings |      |
| The H.323 gatekeeper that all incoming calls should be forwarded to. It is possible to have a LAN side gatekeeper configured for peering-proxy mode as well. |
| LAN/Subscriber-side GK address: |      |
| By allowing public IP addresses to be returned in an LCF, the gatekeeper may be able to do more complex policy decisions. This field should usually not be enabled. |
| Allow public IP in LCF: |      |

| Embedded gatekeeper mode settings |      |
| These settings control the embedded gatekeeper behavior. |
| Time-To-Live (s): 300 |      |
| Prevent calls from unregistered endpoints: |      |
### Table 28  H.323 Parameters

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gatekeeper Mode</strong></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>H.323 is disabled.</td>
</tr>
<tr>
<td>WAN/Provider-side gatekeeper mode</td>
<td>Specifies that the system will forward all client RAS messages to the gatekeeper. If this is selected, you must configure the settings in the WAN/Provider-side gatekeeper mode settings area.</td>
</tr>
<tr>
<td>LAN/Subscriber-side gatekeeper mode</td>
<td>Specifies that the system will act as a gatekeeper. If this option is selected, you must configure the settings in the LAN/Subscriber-side gatekeeper mode settings area.</td>
</tr>
</tbody>
</table>
Peering-Proxy mode Allows calls to be forwarded to other endpoints based on the information sent from the endpoints. All the information about routing the call must be sent as part of the request or prefixes must be configured.

H.323 prefixes can be used to route calls based on a matching prefix in the destination alias of the call. Each prefix is associated with a domain name or IP address to send the call to in case the prefix matches.

The prefixes are searched in order, that is, the first prefix is tried first, and then the next one on the list until the system finds a matching prefix. This means that if there are multiple matching prefixes, the first one is used.

Prefixes use regular expressions to match the destination alias. Prefixes are always searched from the left of the alias and cannot match a middle part or the end of the alias. A regular expression can be a string of literal characters to match or a number of special expressions.

Embedded gatekeeper mode Provides gatekeeper functions and accepts endpoint registrations. If this option is selected, you must configure the settings in the Embedded gatekeeper mode settings area.

WAN/Provider-Side Gatekeeper Mode
If WAN/Provider-side gatekeeper mode is selected, you must configure the following parameters:

WAN/Provider-side GK address Specifies the IP address of the gatekeeper

Modify Time-To-Live Allows you to override the value for time-to-live returned by the gatekeeper before forwarding the response to the endpoint.

New Time-To-Live Specifies how long an endpoint's registration should be valid.

LAN/Subscriber-Side Gatekeeper Mode
If LAN/Subscriber-side gatekeeper mode is selected, you must configure the following parameters:

LAN/Subscriber-side GK address Enter the IP address of the gatekeeper.

Allow public IP in LCF Select the checkbox if the gatekeeper has been deployed with multiple outbound proxies and must decide which proxy to use based on the IP address returned in the LCF.

This is an advanced configuration option and should usually not be selected.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peering-Proxy mode</td>
<td>Allows calls to be forwarded to other endpoints based on the information sent from the endpoints. All the information about routing the call must be sent as part of the request or prefixes must be configured. H.323 prefixes can be used to route calls based on a matching prefix in the destination alias of the call. Each prefix is associated with a domain name or IP address to send the call to in case the prefix matches. The prefixes are searched in order, that is, the first prefix is tried first, and then the next one on the list until the system finds a matching prefix. This means that if there are multiple matching prefixes, the first one is used. Prefixes use regular expressions to match the destination alias. Prefixes are always searched from the left of the alias and cannot match a middle part or the end of the alias. A regular expression can be a string of literal characters to match or a number of special expressions.</td>
</tr>
<tr>
<td>Embedded gatekeeper mode</td>
<td>Provides gatekeeper functions and accepts endpoint registrations. If this option is selected, you must configure the settings in the Embedded gatekeeper mode settings area.</td>
</tr>
<tr>
<td>WAN/Provider-side GK address</td>
<td>Specifies the IP address of the gatekeeper</td>
</tr>
<tr>
<td>Modify Time-To-Live</td>
<td>Allows you to override the value for time-to-live returned by the gatekeeper before forwarding the response to the endpoint.</td>
</tr>
<tr>
<td>New Time-To-Live</td>
<td>Specifies how long an endpoint's registration should be valid.</td>
</tr>
<tr>
<td>LAN/Subscriber-side GK address</td>
<td>Enter the IP address of the gatekeeper.</td>
</tr>
<tr>
<td>Allow public IP in LCF</td>
<td>Select the checkbox if the gatekeeper has been deployed with multiple outbound proxies and must decide which proxy to use based on the IP address returned in the LCF. This is an advanced configuration option and should usually not be selected.</td>
</tr>
</tbody>
</table>
If embedded gatekeeper mode is selected, you must configure the following parameters:

**Time-to-Live(s)**
Enter a time in seconds. This setting controls how long an endpoint’s registration should be valid. At the end of this period the endpoint sends another registration request.

**GK routed mode**
Specifies whether the system should allow signaling to go directly between endpoints when possible (disabled) or always route signaling between endpoints (enabled).

**Prevent calls from unregistered endpoints:**
Blocks unregistered LAN-side endpoints from making calls through the device.

**Location Request (LQR) Size**
You can limit the number of source aliases in a forwarded LRQ message to a maximum of two to allow interoperability with gatekeepers that cannot handle more than two source aliases.

**Limit LRQ Size**
Enter a number of source aliases (maximum 2).

**Default Alias**
Enter a default alias to be added to incoming calls without a destination message in the Q.931 Setup message. This alias allows the embedded gatekeeper or a LAN/Subscriber-side gatekeeper to route the call to a default endpoint. Enter a default alias and select one of the following types:

- E.164
- H.323

**Stale Time**
Select if you want to delete clients that have not sent any registration requests in the specified interval.

**Multicast Messages**
Enable the process of listening to multicast messages. Some RAS messages can be multicast in order to automatically detect gatekeepers.

**H.460/18 Support**
Disables H.460.18 support.
Table 28  H.323 Parameters (continued)

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enabled</td>
<td>Enables H.460.18 support. This allows the system to do NAT/Firewall traversal for clients behind NAT or firewall devices. This area includes the following configurable parameters:</td>
</tr>
<tr>
<td>Keep-alive time(s)</td>
<td>Specifies the keep-alive time if H.460.18 support is enabled.</td>
</tr>
</tbody>
</table>

**Alias Restrictions**

| Max Aliases | Enter the maximum number of allowed aliases. If the value is set to 0, the maximum is not enforced. |

The H.323 Settings page includes the following buttons:

| Submit | Applies the settings configured on this page. |
| Reset  | Clears all fields and selections and allows you to enter new information. |

## H.323 Activity Page

Use this page to view time, status, bandwidth, and log information for the H.323 protocol. Table 29 describes the information on the page.

To access this page, choose **VoIP > H.323 > H.323 Activity** from the Configuration Menu.
H.323 Alias Manipulation Page

Use this page to configure aliases that are used for H.323 IDs or E.164. Table 30 describes the parameters on the page.

To access this page, choose VoIP > H.323 > Alias Manipulation from the Configuration Menu.

---

**Table 30  H.323 Activity Parameters**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current time</td>
<td>Current local device time.</td>
</tr>
<tr>
<td>WAN Gatekeeper status</td>
<td>Indication of the WAN gatekeeper status, if WAN GK mode is used.</td>
</tr>
<tr>
<td>Current payload</td>
<td>Current bandwidth of H.323 data.</td>
</tr>
<tr>
<td>bandwidth</td>
<td></td>
</tr>
<tr>
<td>Estimated total</td>
<td>Estimation of total available bandwidth for H.323 data.</td>
</tr>
<tr>
<td>bandwidth</td>
<td></td>
</tr>
<tr>
<td>Activity log of</td>
<td>List of recent H.323 activity, including time, source, and destination</td>
</tr>
<tr>
<td>recent H.323 events</td>
<td>of the transmission.</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 30  H.323 Alias Manipulation Parameters

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Destination H323-ID or E.164 Alias Modification table</strong></td>
<td>Lists alias manipulation rules.</td>
</tr>
<tr>
<td></td>
<td>Rules are executed in the order in which they are listed. Use the arrows to move entries up and down, or use the Index field to specify where a new or edited rule falls in the list.</td>
</tr>
</tbody>
</table>

**Rules**

- **Allows you to add new prefixes to the Prefix Routing and Gatekeeping Neighboring table.**

- **Action**
  - Indicates whether the rule is to be added or edited.

- **Pattern**
  - Specifies the pattern to be matched. See “Regular Expressions” on page 69 for details on valid patterns.

- **Index**
  - Determines the order in which the rule is scanned in the Destination H323-ID or E.164 Alias Modification table. To add a rule between two rules with consecutive indexes (n and m), use the higher index (m).

- **Replace**
  - Specifies the string that will replace the matched pattern.
The H.323 Alias Manipulation page contains the following buttons:

**H.323 Neighboring Page**

Use this page to configure rules for neighboring and prefix routing. Table 31 describes the parameters on the page.

To access this page, choose **VoIP > H.323 > Neighboring** from the Configuration Menu.
Table 31  H.323 Neighboring Parameters

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prefix Routing and Gatekeeping Neighboring table</td>
<td>Lists rules for forwarding incoming calls based on their dialed alias. Rules are executed in the order in which they are listed. Use the arrows to move entries up and down, or use the Index field to specify where a new or edited rule falls in the list.</td>
</tr>
</tbody>
</table>

**Add a Prefix**

Allows you to add new prefixes to the Prefix Routing and Gatekeeper Neighboring table.

<table>
<thead>
<tr>
<th>Action</th>
<th>Indicates whether the rule is to be added or edited.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prefix</td>
<td>Specifies the prefix pattern to be matched against the dialing string. See “Regular Expressions” on page 69 for details on valid patterns.</td>
</tr>
<tr>
<td>Index</td>
<td>Determines the order in which the rule is scanned in the Prefix and Gatekeeper Neighboring table. To add a rule between two rules with consecutive indexes (n and m), use the higher index (m).</td>
</tr>
<tr>
<td>Strips</td>
<td>Indicates whether the matching prefix is stripped from the dialing string.</td>
</tr>
<tr>
<td>Add</td>
<td>Specifies a string to be prepended to the dialing string.</td>
</tr>
<tr>
<td>Neighbor</td>
<td>Determines whether a location request (LRQ) is sent when this prefix matches.</td>
</tr>
<tr>
<td></td>
<td>• If enabled, the prefix becomes a neighboring statement.</td>
</tr>
<tr>
<td></td>
<td>• If disabled, the incoming Q.931 Setup is forwarded to the given address without a preceding LRQ.</td>
</tr>
<tr>
<td></td>
<td>This field is used for interoperability with other gatekeepers that may not accept a Setup without a preceding LRQ.</td>
</tr>
<tr>
<td>Local Zone</td>
<td>Provides compatibility with remote gatekeepers that are configured to accept LRQs only from sources that match its configured remote zone. If a gatekeeper is configured to accept requests only from a known source, enter the zone in this field.</td>
</tr>
<tr>
<td>Address</td>
<td>Specifies the IP address or domain name of the device to which the call is to be forwarded.</td>
</tr>
</tbody>
</table>

The H.323 Neighboring page contains the following buttons:
MGCP Settings Page

Use the MGCP Settings page to configure parameters for the MGCP protocol. Table 32 describes the parameters on the page.

To access this page, choose VoIP > MGCP from the Configuration Menu.
<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MGCP Protocol Settings</strong></td>
<td></td>
</tr>
<tr>
<td>MGCP Server IP Address</td>
<td>If a MGCP ALG is needed, enter the IP address for the MGCP Server as provided. The MGCP server provides media gateway control protocol service to IP phones, client adapters and gateways.</td>
</tr>
<tr>
<td>MGCP Call Agent Port</td>
<td>Call Agent Port specifies the port number that the Call Agent (soft-switch) listens to for messages from the phones. (Default is 2727)</td>
</tr>
<tr>
<td>MGCP Media Gateway Port</td>
<td>The Media Gateway Port specifies the port number the Media Gateway (phones) listens to for messages from the soft-switch. (Default is 2427)</td>
</tr>
<tr>
<td>MGCP Notify Entity Port</td>
<td>The Notified Entity port specifies the port number that the soft-switch uses for notifications from the phones, e.g. hook up, hook down, digits. (Default is 2432)</td>
</tr>
<tr>
<td><strong>Reregistration</strong></td>
<td>This section allows you to configure automatic re-registration on behalf of clients.</td>
</tr>
<tr>
<td>Automatic MGCP Re-registration</td>
<td>Re-registers MGCP endpoints every time the network or system restarts. Enable this feature to automatically synchronize the softswitch and phones immediately after a restart. The default is Enabled (checkbox selected).</td>
</tr>
<tr>
<td>MGCP Re-Registration Rate (s)</td>
<td>Sets the number of MGCP RSIP messages to send per second to the Media Gateway Controller when re-registration is needed. Generally, this value does not need to be modified. If the MGCP Re-registration Rate needs to be changed, enter a value between 1 and 5. The default value is 5 messages per second.</td>
</tr>
<tr>
<td>MGCP Re-Registration Retry Delay (s)</td>
<td>The system re-registers clients when it starts up. If any re-registration request fails, the system will wait for the configured number of seconds and then retry the re-registration for the clients that failed. The system will make at most 10 re-registration requests for failed attempts. Generally, this value does not need to be modified. If the MGCP Re-registration Retry Delay needs to be changed, enter a value between 30 and 60 seconds. The default value is 30 seconds.</td>
</tr>
<tr>
<td><strong>Audit Endpoint</strong></td>
<td>This section allows you to set an audit endpoint to help the appliance detect whether a client is still responsive.</td>
</tr>
<tr>
<td>Automatic MGCP Audit</td>
<td>Select this to specify that MGCP clients will be automatically audited by sending a message to each client and waiting for a response.</td>
</tr>
</tbody>
</table>
### Configuration Parameters

The MGCP Settings page contains the following buttons:

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audit Cycle Interval (m)</td>
<td>Specifies in minutes how often these messages should be sent out to the clients. At each cycle, all endpoints will be audited so the rate of messages being sent is dependent on the number of clients currently registered. The default value is 15 minutes.</td>
</tr>
<tr>
<td>Stale Time (m)</td>
<td>This value in minutes is used to decide when a client is supposed to be deemed stale, or unavailable. The value is entered in minutes. The default value is 1440 minutes.</td>
</tr>
<tr>
<td>Prevent Stale Registration</td>
<td>Select this to disable the automatic MGCP re-registration feature for stale clients.</td>
</tr>
<tr>
<td>Automatic Client Deletion</td>
<td>Deletes clients that have been unavailable for the period of time specified by the Deletion Time parameter.</td>
</tr>
<tr>
<td>Deletion Time (m)</td>
<td>Specifies the time in minutes for the automatic client deletion feature.</td>
</tr>
</tbody>
</table>

**Table 32  MGCP Parameters**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submit</td>
<td>Applies the settings configured on this page.</td>
</tr>
<tr>
<td>Reset</td>
<td>Clears all fields and selections and allows you to enter new information.</td>
</tr>
</tbody>
</table>
SIP Settings Page

Use this page to configure parameters for the SIP protocol. Table 33 describes the parameters on the page.

To access this page, choose VoIP > SIP from the Configuration Menu.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIP Protocol Settings</td>
<td></td>
</tr>
<tr>
<td>SIP Server Domain Name</td>
<td>Specifies the domain name of the SIP server that accepts forwarded client traffic.</td>
</tr>
<tr>
<td>List of SIP Servers:</td>
<td></td>
</tr>
<tr>
<td>Priority</td>
<td>Sip Server Address</td>
</tr>
<tr>
<td>0</td>
<td>63.52.12.98</td>
</tr>
<tr>
<td>Enable Multi-homed Outbound Proxy Mode:</td>
<td>✓</td>
</tr>
<tr>
<td>Enable Transparent Proxy Mode:</td>
<td>✓</td>
</tr>
<tr>
<td>Limit Allowed Proxies:</td>
<td>✓</td>
</tr>
<tr>
<td>Allowed SIP Proxies</td>
<td>This is the list of outbound proxies or registrars that are allowed through Transparent Proxy Mode. The SIP Server Address above is always included and does not have to be in this list.</td>
</tr>
<tr>
<td>IP Address:</td>
<td>Add</td>
</tr>
<tr>
<td>66.52.177.135</td>
<td></td>
</tr>
<tr>
<td>Stale Timer</td>
<td>The stale timer, if set, is used to automatically delete SIP clients that have not registered within the given time period.</td>
</tr>
<tr>
<td>Stale client time (m):</td>
<td>1440</td>
</tr>
<tr>
<td>Registration Rate-Pacing parameters are available on the Survivability page.</td>
<td></td>
</tr>
</tbody>
</table>

Table 33  SIP Parameters

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIP Protocol Settings</td>
<td></td>
</tr>
<tr>
<td>SIP Server Domain Name</td>
<td>Specifies the domain name of the SIP server that accepts forwarded client traffic.</td>
</tr>
</tbody>
</table>
Table 33  SIP Parameters (continued)

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>List of SIP Servers</td>
<td>Specifies the address (either an IP or URL) for the SIP Server and port number as provided, if a SIP ALG is needed. The SIP server provides session-initialization protocol service to IP phones, client adapters and gateways.</td>
</tr>
<tr>
<td>Enable Multi-homed</td>
<td>Allows phones behind the same System to utilize the default softswitch or one of their own choosing.</td>
</tr>
<tr>
<td>Outbound Proxy Mode</td>
<td></td>
</tr>
<tr>
<td>Enable Transparent Proxy Mode</td>
<td>Allows the system to intercept SIP messages from a LAN-side phone regardless of the Outbound Proxy and SIP Proxy values configured in the phone.</td>
</tr>
<tr>
<td>Limit Allowed Proxies</td>
<td>Restricts the number of permitted proxies that are specified in the Allowed SIP Proxies area.</td>
</tr>
<tr>
<td>Stale Timer</td>
<td>Lists the IP addresses of outbound proxies or registrars that are allowed in transparent proxy mode.</td>
</tr>
</tbody>
</table>

Stale Timer

Sets the inactivity timer interval in minutes after which the system deletes SIP clients that have not registered within the specified time.

The SIP Settings page includes the following buttons:

Add Row  Adds a new row to the list of SIP servers.
Add      Adds a new IP address.
Submit   Applies the settings configured on this page.
Reset    Clears the indicated fields and selections and allows you to enter new information.
SIP Trunking Page

Use this page to configure parameters for SIP trunking devices. Table 34 describes the parameters on the page.

To access this page, choose VoIP > SIP > Trunking from the Configuration Menu. See the next two figures.

### SIP Trunking

Configuration of SIP trunking devices.

### SIP Trunking devices

A SIP trunking device can be a PSTN gateway, or similar device, that does not issue REGISTER messages. Calls will be forwarded to the device based on the dial-plan rules below.

If VLANs are enabled, the SIP trunking device needs to be in the same VLAN as defined in the VoIP ALG page.

<table>
<thead>
<tr>
<th>SIP Trunking Devices</th>
<th>Action: Delete</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select: All None</td>
<td></td>
</tr>
<tr>
<td>Address</td>
<td>Port</td>
</tr>
<tr>
<td>192.168.1.253</td>
<td>1026</td>
</tr>
</tbody>
</table>

### Add a trunking device

<table>
<thead>
<tr>
<th>Action: Add new trunking device</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name:</td>
</tr>
<tr>
<td>Address:</td>
</tr>
<tr>
<td>Port: 5060</td>
</tr>
</tbody>
</table>

### Header Transformation

These header transformation rules are applied to all SIP trunking devices. They define how specified SIP headers should be transformed when forwarding to the SIP Server.

### From Header

Select the domain to use in From header when sending requests to the SIP Server:

- SIP Server Address (default)
- System WAN IP

### Rules

Rules are used to forward and/or modify incoming and outgoing calls. There are 3 types of rules:
- Inbound: from server to trunking device
- Outbound: from trunking device to server
- Redirect: from local phone to trunking device (w/o routing to server)
Table 34  SIP Trunking Configuration Parameters

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIP Trunking Devices table</td>
<td>This area allows you to add new SIP trunking devices. A SIP trunking device can be a PSTN gateway, or similar device, that does not issue REGISTER messages. Calls will be forwarded to the device based on the dial-plan rules below.</td>
</tr>
<tr>
<td>Action</td>
<td>Indicates whether the device is to be added or modified.</td>
</tr>
<tr>
<td>Name</td>
<td>Specifies the name of the trunking device.</td>
</tr>
<tr>
<td>Address</td>
<td>Specifies the IP address of the device.</td>
</tr>
<tr>
<td>Port</td>
<td>Specifies the port for the SIP traffic.</td>
</tr>
<tr>
<td>Item</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Header Transformation</strong></td>
<td>This area allows you to transform the header of a SIP message sent by a SIP endpoint so that it is forwarded to either the SIP Server or the system IP’s address.</td>
</tr>
<tr>
<td>SIP Server Address</td>
<td>Specifies that the SIP message will be forwarded to the SIP Server. By default, registered SIP endpoints send messages to the SIP Server.</td>
</tr>
<tr>
<td>(default)</td>
<td></td>
</tr>
<tr>
<td>System WAN IP</td>
<td>Specifies that the SIP message will be forwarded to the system’s IP address. Unregistered SIP endpoints typically send messages to the WAN IP address.</td>
</tr>
<tr>
<td><strong>Rules table</strong></td>
<td>This area allows you to forward incoming and outgoing calls to and from a specific SIP trunking device based on a pattern-matching string for the called number. It is also possible to redirect calls from a local device to go directly to the trunking device without being routed to the soft-switch first by using the redirect rules.</td>
</tr>
<tr>
<td>Action</td>
<td>Indicates whether the rule is to be added or modified.</td>
</tr>
<tr>
<td>Type</td>
<td>Indicates the type of rule:</td>
</tr>
<tr>
<td></td>
<td>• Inbound — Determines the trunking device to use for an inbound call from the soft-switch through the voice system to the trunking device.</td>
</tr>
<tr>
<td></td>
<td>• Outbound — Determines a dial string modification rule to use for calls from a specified trunking device through the voice system to the soft-switch.</td>
</tr>
<tr>
<td></td>
<td>Specify the Call Party as “Called” or “Calling” to assign the rule to the corresponding outbound call.</td>
</tr>
<tr>
<td></td>
<td>• Redirect — Determines how to directly connect a local device to a trunking device without sending the signaling to the soft-switch first.</td>
</tr>
<tr>
<td><strong>NOTE:</strong> Redirect operations are only performed for SIP INVITE messages. As a result, mid-call features such as transfer, hold or conference may not function as expected.</td>
<td></td>
</tr>
<tr>
<td>Default rule</td>
<td>Indicates that this is the default trunking rule. Only one default rule can be specified.</td>
</tr>
<tr>
<td>Priority</td>
<td>Indicates that an inbound or redirect call will preempt any other call that is not priority. Non-priority calls in progress may be dropped.</td>
</tr>
<tr>
<td>(inbound &amp; redirect only)</td>
<td></td>
</tr>
<tr>
<td>Pattern-Match</td>
<td>Specifies the pattern that must be matched for the rule to apply. See “Regular Expressions” on page 69 for details on valid patterns.</td>
</tr>
<tr>
<td>Strip digits</td>
<td>Specifies the number of digits to be stripped from the front of the called number when the pattern matches.</td>
</tr>
<tr>
<td>Add string</td>
<td>Specifies a string to be added to the called number when the pattern matches.</td>
</tr>
</tbody>
</table>
Table 34  SIP Trunking Configuration Parameters (continued)

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use SIP proxy as secondary</td>
<td>Specifies that the Sip Server be used a secondary target.</td>
</tr>
<tr>
<td>target</td>
<td></td>
</tr>
<tr>
<td>Trunking device</td>
<td>Specifies a SIP trunking device from the SIP Trunking Devices table on this page.</td>
</tr>
</tbody>
</table>

The SIP Trunking page contains the following buttons:

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commit</td>
<td>Applies the settings configured on this page.</td>
</tr>
<tr>
<td>Delete</td>
<td>Deletes the selected entry.</td>
</tr>
<tr>
<td>Reset</td>
<td>Clears all fields and selections and allows you to enter new information.</td>
</tr>
</tbody>
</table>

**Survivability Page**

Use this page to configure parameters that extend the availability of VoIP services. Table 35 describes the parameters on the page.

To access this page, choose **Survivability** from the Configuration Menu. See the next two figures.
Survivability

Survivability is a collection of features that enable the system to extend the availability of VoIP services. These features include support for redundant Softswitch/IP PBX and local call control in the event of WAN link failure, Softswitch/IP PBX failure, or during periods of network congestion that result in loss of connectivity to a remote Softswitch/IP PBX.

Click here for online Survivability help.

Enable Common Survivability Defaults

Softswitch/IP PBX Reachability Configuration

The reachability settings control how often messages are sent to the Softswitch/IP PBX and how quickly a Softswitch/IP PBX will be declared unreachable or reachable. The configuration below is used to determine Softswitch/IP PBX reachability for both redundancy and local or remote call control functions.

- Time (s) between DNS lookups: 60
- Time (s) between Keepalive messages: 5
- Softswitch Recovery Timer (MGCP Only): 5
- Time (s) to declare Keepalive message lost: 5
- Number of missed messages to declare alarm: 5
- Number of received messages to clear alarm: 10
- Interpret error code as success: 0
- Enable Local-Mode Indicator: 
- Enable Shared Call: 

Current SIP Server reachability status:

<table>
<thead>
<tr>
<th>Name</th>
<th>Address</th>
<th>Port</th>
<th>P</th>
<th>W</th>
<th>Lost</th>
<th>Rcvd</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>63.152.12.68</td>
<td>5060</td>
<td>0</td>
<td>1</td>
<td>872</td>
<td>0</td>
<td>unreachable</td>
</tr>
</tbody>
</table>

Current MGCP Server reachability status:

No information available.

MGCP Survivability Settings:

- Fill in the Blanks (requires Submit): disconnected
- RM Message for RSIP: 
- Local Endpoint Name for RSIP: 0036561616
- Domain Name for RSIP: 0036561616
- Number of NTTFY resends to declare alarm: 5
- Immediate Switch Back to Softswitch: 

SIP Server Redundancy Configuration

Redundancy allows the DNS server to give multiple SIP Server names in the answers to SRV lookups. Each server will be monitored using periodic messages and the highest priority answer which is currently reachable will be used for signaling.

SIP Server Redundancy Settings:

- Enable SIP server redundancy: 
- Enable forward next REGISTER: 
- Enable sticky failover mode: 
- Enable keepalive messages for active server: 
- Time for declaring SIP messages lost (seconds): 6
### Configuration Parameters

#### Table 35  Survivability Parameters

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable Common Survivability Defaults</td>
<td>Enables the survivability features on the device.</td>
</tr>
</tbody>
</table>

#### Softswitch/IP PBX Reachability Configuration

These settings control how often messages are sent to the Softswitch/IP PBX and how quickly a Softswitch/IP PBX will be declared unreachable or reachable. This determines Softswitch/IP PBX reachability for redundancy and local or remote call control functions.

- **Time (s) Between DNS Lookups**: Specifies the number of seconds that lapse between DNS lookups.
- **Time (s) Between Keepalive Messages-lost**: Specifies the number of seconds between consecutive keepalive messages sent to the softswitch to determine connectivity.
- **Time (s) To Declare Keepalive message Lost**: Specifies the number of seconds after which a message is considered lost if no keepalive message is sent during that period.
Table 35  Survivability Parameters (continued)

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Missed Messages To Declare Alarm</td>
<td>Specifies the number of missed messages after which a loss of connectivity to the remote switch is declared.</td>
</tr>
<tr>
<td>Number of received messages to clear alarm</td>
<td>Specifies the number of consecutively received keepalive messages required for the system to declare successful connectivity to the remote softswitch.</td>
</tr>
<tr>
<td>Interpret error code as success</td>
<td>Specifies the error code to be treated as a successful response (range 300-699). A response with a successful return code (range 200-299) is always accepted.</td>
</tr>
<tr>
<td>Enable Local-Node Indicator</td>
<td>Specifies that the EdgeMarc device will ignore register messages from the phone to trigger the phone into displaying a different icon or line-appearance symbol while it is in Local mode.</td>
</tr>
<tr>
<td>Enable Shared Call</td>
<td>Allows the EdgeMarc device to route all calls to the first (primary) line appearance of the phone while in Local mode, if the phone is configured to have multiple shared/bridged call appearances. Without this option, calls made to any of the appearances, other than the first appearance, will be ignored by the EdgeMarc device while it is in Local mode.</td>
</tr>
</tbody>
</table>

Current SIP and MGCP Server Reachability Status (view only)

This section reports on the current ability of the device to reach the configured SIP and MGCP servers.

The following information is reported for each configured server:
- Name—Name of the server as returned by DNS server
- Address—IP address of the server
- Port—Port for the configured protocol (SIP or MGCP)
- P—Priority of the server
- W—Weight of the server
- Lost—Number of consecutive OPTION messages lost
- Rcvd—Number of consecutive OPTIONS messages received
- Status—This column can have one of the following values:

Fill in the Blanks (requires Submit)

Fills most fields with the default values. You must click Submit for this setting to take effect.

Heartbeat RM Message for RSIP

Specifies the exact character string to be sent as part of the "RM:" option in the RSIP message to the softswitch. The default RM message is survping. Alternatively, disconnected can be used depending on your specific environment.

For example, if survping is specified, the RSIP message to the softswitch is similar to the following:

RSIP 332 00c002e0f8f8@edgewaternetworks.com MGCP 1.0
RM: survping
Table 35  Survivability Parameters (continued)

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Endpoint Name for RSIP</td>
<td>Specifies the endpoint name to be embedded in the RSIP message that is used as the heartbeat. The endpoint name can be a real/physical endpoint in the system, or it can be a virtual endpoint whose name is user determined, as long as the name syntax is acceptable to the softswitch. The default value for this field is the MAC Address of the LAN Interface in the system.</td>
</tr>
<tr>
<td>Domain Name for RSIP</td>
<td>Specifies the domain name to be embedded in the RSIP message. This domain name can be a real domain name, or it can be any character string that is acceptable to the softswitch.</td>
</tr>
<tr>
<td>Number of NTFY resends to declare alarm-</td>
<td>Specifies the number of times a NTFY messages sent to the softswitch can go un-acknowledged before the system considers the communications with the Softswitch to be lost (causing a switch over to the system's local mode). The minimum number of resends is 1, and the recommended value is 4 (most MGCP devices retransmit at most 4 times).</td>
</tr>
<tr>
<td>Immediate Switch Back to Softswitch</td>
<td>Disconnects all local calls and immediately switches out of the local mode when communication is reestablished with the softswitch. If this checkbox is unchecked, the calls are left running, but the system still switches out of local mode without waiting for the calls to end. (Default is checked.)</td>
</tr>
</tbody>
</table>

**SIP Server Redundancy Configuration**

These settings allow the DNS server to give multiple SIP server names in the answers to SRV lookups. Each server is monitored using periodic messages. The highest priority server that is currently reachable is used for signaling.

*Enable SIP server redundancy*  
Indicates whether the SIP redundancy feature is enabled.

*Enable forward next REGISTER*  
Indicates whether the EdgeMarc appliance will forward the first REGISTER from the client to the server after the active server has been changed, even if the rate pacing interval is not over.

*Enable sticky failover mode*  
Indicates whether the EdgeMarc appliance will fail over to the next available softswitch and not monitor the failed ones. This does not affect the monitoring of failed switches in survivability mode.

*Enable Keep-Alive messages to active server*  
Indicates whether the active softswitch will be monitored with keepalive messages. If both survivability and redundancy are disabled, then no keepalive messages are sent, even if "Enable keepalive messages for active server" is checked.

*Time for declaring SIP messages lost*  
Specifies the number of seconds after which a SIP message will be considered lost.

**Call Control Configuration (view only)**
Table 35  Survivability Parameters (continued)

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Survivability Configuration</td>
<td>Shows the current status of call control. This can be one of the following:</td>
</tr>
<tr>
<td></td>
<td>• Remote--There is connectivity to a remote softswitch. Calls are being processed by the softswitch.</td>
</tr>
<tr>
<td></td>
<td>• Local--Connectivity to the remote softswitch is lost. Calls are being processed locally by the system.</td>
</tr>
<tr>
<td></td>
<td>Determines local call switching for survivability.</td>
</tr>
<tr>
<td></td>
<td>• Disabled--The system does not check for connectivity of the softswitch and will not provide local call switching in the event of a loss</td>
</tr>
<tr>
<td></td>
<td>of connectivity to the softswitch. By default, survivability configuration is disabled.</td>
</tr>
<tr>
<td></td>
<td>• Enabled--The system checks the connectivity of the softswitch and automatically performs local call switching when the softswitch becomes</td>
</tr>
<tr>
<td></td>
<td>unavailable.</td>
</tr>
<tr>
<td></td>
<td>• Always Local--The system always provides local call switching even when the softswitch is available to process calls. In this mode</td>
</tr>
<tr>
<td></td>
<td>subscribers will only be able to make local, station-to-station phone calls. This setting is typical when troubleshooting-- it allows you to</td>
</tr>
<tr>
<td>Number of digits for local dialing</td>
<td>Specify the number of digits the system uses for local call switching when in survivability mode.</td>
</tr>
<tr>
<td></td>
<td>PSTN-Gateway Prefix for Outdial--The number of digits that the system will use to process local calls when providing local call switching. For</td>
</tr>
<tr>
<td></td>
<td>example if 4 is entered then the last four digits are used as the phone extension. If 0 is entered, the whole phone number is used.</td>
</tr>
<tr>
<td>Request Subscriber Information</td>
<td>Allows the device to request subscriber information as part of the phone registration process, if the softswitch supports such a request.</td>
</tr>
<tr>
<td></td>
<td>The softswitch returns additional information about the phone that can be used in survivability mode, such as additional extensions.</td>
</tr>
</tbody>
</table>
Table 35  Survivability Parameters (continued)

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registration Rate-Pacing</td>
<td>Specifies the rate at which registration messages are forwarded to the Softswitch/IP PBX:</td>
</tr>
<tr>
<td></td>
<td>• Expires override (s)—Number of seconds a registration is valid.  The system uses this value to re-write the expires value returned from the SIP Server.</td>
</tr>
<tr>
<td></td>
<td>• Softswitch/IP PBX Expires override (s)—Number of seconds used when forwarding registration messages to the SIP Server.</td>
</tr>
<tr>
<td></td>
<td>This should be higher than the rate pacing value, otherwise, the SIP Server may consider the phones registration to have expired.</td>
</tr>
<tr>
<td></td>
<td>• Register rate pacing (s)—Number of seconds to wait before forwarding a register message from one phone to the SIP Server.</td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong>: It is possible for registration messages to overload the SIP Server. To prevent this, set the SIP Register pacing field to the number of seconds to wait before forwarding a register message from one phone to the SIP Server. Any register messages received before this time are answered locally by the system. For example, you can set the expires value to 60 and the pacing value to 1800 to have the phone register to the system every minute but only let a register message through to the SIP Server every 30 minutes.</td>
</tr>
<tr>
<td>Codec Choice</td>
<td>Specifies the codec should to be used for signaling in survivability mode. The codec choice is limited to G.711 ulaw for a system with MGCP Survivability enabled.</td>
</tr>
</tbody>
</table>

The Survivability page contains the following buttons:

- **Enable Common Survivability Defaults** Enables the survivability features on the appliance.
- **Submit** Applies the settings configured on this page.
- **Reset** Clears all fields and selections and allows you to enter new information.
FXS/Phone Port Settings - Basic (SIP UA) Page

Use this page to configure basic parameters that allow analog phones at each FXS port to make IP or PSTN calls. Table 36 describes the parameters on the page.

To access this page, choose SIP UA from the Configuration Menu.

Table 36 FXS/Phone Port Settings - Basic

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Global Configuration</strong></td>
<td>These settings apply to all ports.</td>
</tr>
<tr>
<td>Enable SIPUA</td>
<td>Enables the SIP UA features. If the checkbox is not checked, the configuration on this page can still be saved, but the SIP UA functions are not available.</td>
</tr>
<tr>
<td>Use SIP Username for SIP authentication</td>
<td>Specifies that the SIP username is used for SIP authentication.</td>
</tr>
<tr>
<td>Codec Preference</td>
<td>Specifies the codec that to be given preference when making or receiving a call. The codec must be part of the negotiated codec list: G.711 ulaw, G.711 alaw, G.729, G.726, 16 kbps, G.726, 24 kbps, G.726, 32 kbps, G.726, 40 kbps</td>
</tr>
<tr>
<td>Use Preferred codec only</td>
<td></td>
</tr>
<tr>
<td>Use REFER for transfer</td>
<td></td>
</tr>
<tr>
<td>Register with proxy</td>
<td></td>
</tr>
</tbody>
</table>
Table 36  FXS/Phone Port Settings - Basic (continued)

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use preferred codec only</td>
<td>Allows only the preferred codec to be used. No preference is given to the other codecs.</td>
</tr>
<tr>
<td>Use REFER for transfer</td>
<td>Indicates that the VoIP switch supports REFER requests for call transfer, as described in RFC3515.</td>
</tr>
<tr>
<td>Register with proxy</td>
<td>Instructs each configured FXS ports to register by sending a REGISTER request to the configured domain through a configured outbound proxy. <strong>Note:</strong> Some VoIP deployments use the static registration for the FXS ports and do not require port registration. If this checkbox is not checked, FXS ports will not register.</td>
</tr>
</tbody>
</table>

Port Configuration
This section includes a set of parameters for each port.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIP Display Name</td>
<td>Specifies the name used by the FXS port to authentication itself, if the “Use SIP Username for SIP authentication” field is checked in global configuration area on this page.</td>
</tr>
<tr>
<td>SIP Username</td>
<td>Identifies the analog phone connected to the FXS port. This value can be either a name or a number that people use to reach to the analog phone.</td>
</tr>
<tr>
<td>SIP Authentication name</td>
<td>Specifies the name used to authenticate the SIP UA against the softswitch or outbound proxy.</td>
</tr>
<tr>
<td>Password</td>
<td>Specifies the passwords to authenticate the SIP UA against the softswitch or outbound proxy.</td>
</tr>
</tbody>
</table>

The FXS/Phone Port Settings - Basic page contains the following buttons:

- **Submit** Applies the settings configured on this page.
- **Reset** Clears all fields and selections and allows you to enter new information.

**FXS/Phone Port Settings - Advanced Page**

Use this page to configure advanced parameters that allow analog phones at each FXS port to make and receive IP or PSTN calls. **Table 37** describes the parameters on the page.

To access this page, choose **SIP UA > Advanced** from the Configuration Menu.
FXS/Phone Port Settings - Advanced

This Page allows advance configuration of FXS/Phone ports..

Global configuration:
- Enable SIPUA:
- Bind to LAN:
- SIPUA IP Address:
- SIPUA bind Port:
- Conference URI:
- Domain:
- RTP Min Port: 20000
- RTP Max Port: 20010
- Outbound Proxy Server IP:
- Outbound Proxy Server Port:
- Termination Impedance: 600 ohms
- Dialed in prefix (Incoming from IP network):
- CPC (Call Party Control) timer (in milliseconds): 260
- Inter Digit Delay timer (in seconds): 4
- Enable Call Waiting:
- Internal Call Ring:
- External Call Ring:
- Hunt Group DID:
- VAD Enable:
- Caller ID Time offset:

Port 1 Configuration:
- Codec Preference:
- Use Preferred codec only:
- Domain:
- Outbound Proxy Server IP:
- Outbound Proxy Server Port:
- Analog Receive gain: 0dB
- Analog Transmit gain: 0dB
- Member of HUNT group:
- Enable Call Waiting:
- VAD Enable:
- Hotline number:

Port 2 Configuration:
- Codec Preference:
- Use Preferred codec only:
- Domain:
- Outbound Proxy Server IP:
- Outbound Proxy Server Port:
- Analog Receive gain:
- Analog Transmit gain:
- Member of HUNT group:
- Enable Call Waiting:
- VAD Enable:
- Hotline number:

Extended Hunt Group Members
- Name:
- Address:
- Add to list:
Table 37  FXS Phone Port Settings - Advanced

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Global Configuration</strong></td>
<td>These settings apply to all ports.</td>
</tr>
<tr>
<td>Note:</td>
<td>Values set for individual FXS/Phone ports on this page override the global settings.</td>
</tr>
<tr>
<td>Enable SIPUA</td>
<td>Enables the SIP UA features. If the checkbox is not checked, the configuration on this page can still be saved, but the SIP UA functions are not available.</td>
</tr>
<tr>
<td>SIPUA bind Port</td>
<td>Define a port number to which the SIP UA will bind and listen for SIP messages. If this field is empty, the SIP UA binds to internal port 5060.</td>
</tr>
<tr>
<td>Bind to LAN</td>
<td>Select to internally bind the UA to the LAN IP of the EdgeMarc, processing all signaling through the EdgeMarc's ALG. If not selected, the UA will internally bind to the WAN IP, bypassing the EdgeMarc's ALG. The later setting is used in special circumstances only. By default, this option is selected.</td>
</tr>
<tr>
<td>SIPUA IP Address</td>
<td>Specifies the LAN side IP address with which the SIP UA will bind. When this field is blank, the IP address will be set to the class C subnet of the VoIP ALG LAN plus 252.</td>
</tr>
<tr>
<td>Conference URI</td>
<td>SIP Conference Factory URI supplied by ISP. It should be identified in the same manner as a SIP end-point (user@host). Note: Conference URI is applicable only if your soft-switch supports creating a conference using Ad-Hoc SIP methods.</td>
</tr>
<tr>
<td>Domain</td>
<td>Specifies the domain of the softswitch where the SIP UA is provisioned. The domain is also the authentication domain for SIP UA.</td>
</tr>
<tr>
<td>RTP Min Port, RTP Max Port</td>
<td>Defines the range of RTP ports that SIP UA will use for media.</td>
</tr>
<tr>
<td>Outbound Proxy Server IP</td>
<td>Specifies the IP address of the outboard proxy server.</td>
</tr>
<tr>
<td>Outbound Proxy Server Port</td>
<td>Specifies the outbound proxy server port that SIP UA uses to register each FXS port and make outbound calls. If VoIP-ALG is enabled, the outbound proxy must point to the VOIP-ALG LAN interface.</td>
</tr>
<tr>
<td>Termination Impedance</td>
<td>Specifies the impedance on the outboard port.</td>
</tr>
<tr>
<td>Dialed in Prefix</td>
<td>Applicable only when HUNT mode is enabled. When a dial pattern is defined, that pattern is looked for in the dialed in number (TO field of SIP message). If the pattern is found as prefix, that prefix is stripped out and the remaining digits are given to the PBX as the dial pattern.</td>
</tr>
</tbody>
</table>
Configuration Parameters

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Call Party Control (CPC) timer (in milliseconds)</td>
<td>A timer value ranging from 250-800 milliseconds. The Call Party Control (CPC) indicates that the “calling party” has hung up. APBX/Key-system connected to the FXS port can make use of the CPC as a call disconnect signal.</td>
</tr>
<tr>
<td>Inter Digit Delay timer (in seconds)</td>
<td>Defines the maximum delay between two digits when dialed. When dialing, if a key is not pressed within the defined delay, dialing is auto-completed and the collected digits are dialed out. The default value for this field is set to 4 seconds.</td>
</tr>
<tr>
<td>Enable Call Waiting</td>
<td>Check this box to enable the call-waiting feature globally on all FXS ports. By default, this box is checked and call-waiting is enabled on all ports. To control feature at port level, disable the global setting and select the settings a port level.</td>
</tr>
<tr>
<td>Internal Call Ring</td>
<td>Associates a distinctive ring with all internal calls. The ring and the rules defining an internal call are specified on the FXS/Phone Port Distinctive Ring configuration page.</td>
</tr>
<tr>
<td>External Call Ring</td>
<td>Associates a distinctive ring with all external calls. The ring and the rules defining an external call are specified on the FXS/Phone Port Distinctive Ring configuration page.</td>
</tr>
<tr>
<td>VAD Enable</td>
<td>Globally enables voice activity detection. By default, VAD is enabled.</td>
</tr>
<tr>
<td>Caller ID Time offset</td>
<td>Defines the offset value in hours and minutes (positive or negative) that would be necessary to reflect the hours and minutes in the local time zone, as compared to the time zone where the EdgeMarc is located.</td>
</tr>
</tbody>
</table>

Port Configuration

This section includes a set of parameters for each port.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Codec Preference</td>
<td>Specifies the codec that to be given preference when making or receiving a call. The codec must be part of the negotiated codec list: G.711 ulaw, G.711 alaw, G.729, G.728, G.726, 16 kbps, G.726, 24 kbps, G.726, 32 kbps, G.726, 40 kbps</td>
</tr>
<tr>
<td>Use preferred codec only</td>
<td>Allows only the preferred codec to be used. No preference is given to the other codecs.</td>
</tr>
<tr>
<td>Domain</td>
<td>Specifies the domain of the softswitch where the SIP UA is provisioned. The domain is also the authentication domain for SIP UA.</td>
</tr>
<tr>
<td>Outbound Proxy Server IP</td>
<td>Specifies the IP address of the outboard proxy server.</td>
</tr>
<tr>
<td>Outbound Proxy Server Port</td>
<td>Specifies the outbound proxy server port that SIP UA uses to register each FXS port and make outbound calls. If VoIP-ALG is enabled, the outbound proxy must point to the VOIP-ALG LAN interface.</td>
</tr>
<tr>
<td>Analog Receive Gain</td>
<td>Specifies the receive gain for the FXS port. The default setting of 0dB is appropriate for most installations; however, you can adjust the setting to interoperate with user endpoints such as phones, fax, or key systems.</td>
</tr>
</tbody>
</table>
The FXS/Phone Port Settings - Advanced page contains the following buttons:

- **Submit**: Applies the settings configured on this page.
- **Reset to Defaults**: Changes all the settings on the page to their factory defaults.
- **Reset**: Clears all fields and selections and allows you to enter new information.

### Table 38: Parameters on the FXS/Phone Port Settings - Advanced Page

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analog Transmit Gain</td>
<td>Specifies the transmit gain for the FXS port. The default setting of 0dB is appropriate for most installations; however, you can adjust the setting to interoperate with user endpoints such as phones, fax, or key systems.</td>
</tr>
<tr>
<td>Member of Hunt Group</td>
<td>Check this box to enable the associated FXS port to answer incoming calls that are placed to the hunt group from an IP network. The port will still receive calls that are placed to it directly.</td>
</tr>
<tr>
<td>Enable Call Waiting</td>
<td>Check this box to enable call-waiting feature at the port level.</td>
</tr>
<tr>
<td>VAD Enable</td>
<td>Enables voice activity detection for the FXS port.</td>
</tr>
<tr>
<td>Hotline Number</td>
<td>Configures the FXS port such that when the phone goes off hook, the port will automatically dial the specified destination.</td>
</tr>
</tbody>
</table>

The FXS/Phone Port Settings - Advanced page contains the following buttons:

- **Submit**: Applies the settings configured on this page.
- **Reset to Defaults**: Changes all the settings on the page to their factory defaults.
- **Reset**: Clears all fields and selections and allows you to enter new information.

**FXS/Phone Port FAX Settings Page**

Use this page to configure FAX settings for the FXS/Phone ports. Table 38 describes the parameters on the page.

To access this page, choose **SIP UA > FAX** from the Configuration Menu.
### FXS/Phone Port FAX Settings

FAX configuration for FXS/Phone port 1 and 2. FAX hookup is currently only available on FXS/Phone port 1 and 2. If T38 is enabled, T38 version 0 over UDP is supported.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use T38 for FAX</td>
<td>Uses the T38 to send and received faxes, if this checkbox is selected.</td>
</tr>
<tr>
<td></td>
<td>If this checkbox is not selected, G711ulaw is used to send and receives faxes.</td>
</tr>
<tr>
<td>Fax Bit rate (bps)</td>
<td>Specifies the data rate that the fax machine support (bps). Maximum is 14400 bps.</td>
</tr>
<tr>
<td>Fax TCF</td>
<td>Defines the Data Rate Management Method for TCF (Training Check Function) signal:</td>
</tr>
<tr>
<td></td>
<td>• Local—Requires that the TCF training signal is generated locally by the receiving gateway (the entity that receives the T38 data and translates it into T30 data, Port 1 or 2). Data rate management is done by the emitting gateway (entity that takes the T30 data and encodes it into T38 packets, Port 1 or 2) based on training results from local and remote FAX terminals. This method is used for TCP connections and is optional for UDP.</td>
</tr>
<tr>
<td></td>
<td>• Transferred—Requires that the TCF signal is transferred from the emitting gateway to the receiving gateway. In this case, the speed selection is done by the G3FEs in the same way as for a PSTN connection. This method is mandatory for UDP.</td>
</tr>
</tbody>
</table>
The FXS/Phone Port FAX Settings page contains the following buttons:

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fax Options</td>
<td>Specifies special settings for the fax machine:</td>
</tr>
<tr>
<td></td>
<td>• Default—No option is set.</td>
</tr>
<tr>
<td></td>
<td>• BitRemoval—Fill bits can be inserted or removed in the</td>
</tr>
<tr>
<td></td>
<td>Message Transmission Phase C, non-ECM data to reduce</td>
</tr>
<tr>
<td></td>
<td>bandwidth in the packet network.</td>
</tr>
<tr>
<td></td>
<td>• TransMMR—Conversion between MMR and the line format to</td>
</tr>
<tr>
<td></td>
<td>increase data compression and reduce bandwidth in the packet</td>
</tr>
<tr>
<td></td>
<td>network.</td>
</tr>
<tr>
<td></td>
<td>• JBIG Transcoding—Use JBIG conversion to reduce bandwidth.</td>
</tr>
<tr>
<td>UDP Max buffer</td>
<td>Defines the maximum number of octets that can be stored on the</td>
</tr>
<tr>
<td></td>
<td>remote device before an overflow condition occurs. Maximum</td>
</tr>
<tr>
<td></td>
<td>value is 4096.</td>
</tr>
<tr>
<td>UDP Max Datagram size</td>
<td>Defines the maximum size of a UDPTL packet or the maximum size of the payload within an RTP packet that can be accepted by the remote side. Maximum is 512.</td>
</tr>
<tr>
<td>Fax Error Correction</td>
<td>Defines the error correction method used by the fax machine.</td>
</tr>
</tbody>
</table>

The FXS/Phone Port FAX Settings page contains the following buttons:

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submit</td>
<td>Applies the settings configured on this page.</td>
</tr>
<tr>
<td>Reset</td>
<td>Clears all fields and selections and allows you to enter new information.</td>
</tr>
</tbody>
</table>
Distinctive Ring Page

Use this page to configure distinctive ring tones for FXS/Phone ports. Table 39 describes the parameters on the page.

To access this page, choose SIP UA > Distinctive Ring from the Configuration Menu.

Table 39  FXS/Phone Port Distinctive Ring Parameters

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Action</td>
<td>Applicable task (Add a Rule, Edit a Rule)</td>
</tr>
<tr>
<td>Caller-Pattern-Match</td>
<td>Caller pattern that triggers the distinctive ring.</td>
</tr>
<tr>
<td>Called- Pattern -Match</td>
<td>Called pattern that triggers the distinctive ring.</td>
</tr>
<tr>
<td>Ring Type</td>
<td>Selection of the specific distinctive ring for this rule.</td>
</tr>
</tbody>
</table>
The Distinctive Ring page contains the following buttons:

<table>
<thead>
<tr>
<th>Button</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commit</td>
<td>Applies the settings configured on this page.</td>
</tr>
<tr>
<td>Delete</td>
<td>Deletes the selected entry.</td>
</tr>
<tr>
<td>Reset</td>
<td>Clears all fields and selections and allows you to enter new information.</td>
</tr>
</tbody>
</table>

**SIP FXO/Line Port Configuration (SIP GW) Page**

Use this page to configure the SIP FXO/Line port to allow SIP IP phones or analog phone at FXS ports to make or receive PSTN calls. Table 40 describes the parameters on the page.

To access this page, choose SIP GW from the Configuration Menu.
**Table 40  SIP FXO/Line port configuration**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable SIP FXO/Line port services</td>
<td>Select this checkbox to enable SIP FXO/Line port services.</td>
</tr>
<tr>
<td>RTP Silence delay</td>
<td>A value used to monitor RTP silence packets when in call and determine if a PSTN party has been disconnected. By default the value is 120 seconds. If there is a continuous RTP silence from the PSTN side for the duration of this interval, the FXO/Line port will terminate the call.</td>
</tr>
</tbody>
</table>
### Table 40 SIP FXO/Line port configuration (continued)

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SIPGW IP Address</td>
<td>Specifies the LAN side IP address to which the SIP gateway binds. By default, it is set to the class C subnet of the ALG LAN plus 253. For example, if the ALG LAN is 192.168.1.0/24, the default IP address of the SIP gateway is 192.168.1.253. If the default IP address conflicts with another host on the ALG LAN, you can modify the SIP gateway IP address in this field. Otherwise, the default configuration is sufficient.</td>
</tr>
<tr>
<td>Enable Priority Calling services</td>
<td>Enables priority calling services for FXO ports. When priority call services are enabled, any call placed to a priority calling number from any FXS port or LAN-side SIP phone, will be routed on priority basis to FXO port and connected. <strong>Note:</strong> Enabling ‘Priority Calling Services’ will override (or hide) the following settings for individual ports: Enable InBound(from PSTN) two stage dialing and ‘Forwarded To’. <strong>Additional Note:</strong> Priority calling services cannot be configured when WAN Link Redundancy is enabled.</td>
</tr>
<tr>
<td>Callback extension</td>
<td>Only visible when Priority Calling services are enabled. Define a callback number that will receive Callbacks from Priority calling services operators, if such services are available. This field is mandatory and make sure it is set to an extension (which MUST be an FXS port or an extension on LAN side that is always up. <strong>Note:</strong> When ‘Priority calling’ is enabled, ‘Callback extension’ overrides any ‘Forwarding number’ configured for FXO ports.</td>
</tr>
<tr>
<td>Priority Call Window</td>
<td>Only visible when Priority Calling services are enabled. Each port can feature a Priority call window. The priority call window field defines a time period during which an Inbound call from the PSTN will be forwarded to the last IP caller that made an Outbound priority call through the FXO port. The time period is measured in seconds. The time period starts when a caller makes an Outbound priority call through a FXO port and ends when the window has expired.</td>
</tr>
<tr>
<td>Register with SIP server</td>
<td>Enables the FXO/GW to register with SIP server, using the ‘Override SIP FROM’ as SIP user name.</td>
</tr>
<tr>
<td>Override FROM Username (To IP Network)</td>
<td>Overrides FROM field in SIP messages with the SIP username. <strong>Note:</strong> When the Override FROM field is specified with the SIP username, it replaces any Dial Out Prefix and CallerID.</td>
</tr>
<tr>
<td>Sip Authentication Name (optional)</td>
<td>Defines the SIP authentication name.</td>
</tr>
<tr>
<td>Password (optional)</td>
<td>Supplies optional credentials which may be required for successful SIP logon.</td>
</tr>
</tbody>
</table>
The SIP FXO/Line Port Configuration page contains the following buttons:

- **Submit**: Applies the settings configured on this page.
- **Reset**: Clears all fields and selections and allows you to enter new information.

**Note**

The following diagram is an example of the SIP FXO/Line port configuration page when Enable Priority Calling services is not enabled. Table 36 describes the parameters for this page.

---

### Table 40  SIP FXO/Line port configuration (continued)

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSTN CO Auto-Disconnect timer (sec)</td>
<td>The time in seconds it will take the PSTN CO line to terminate a call when the call originated from the PSTN through the FXO port and the SIP caller has hung up the call.</td>
</tr>
<tr>
<td>Override FROM Display Name (To IP network)</td>
<td>Overrides FROM field in SIP messages with the SIP Display Name.</td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong>: When Override FROM field is specified with the Display Name, CallerID is replaced with the display name “anonymous”.</td>
</tr>
</tbody>
</table>

**Port Configuration**

This section includes a set of parameters for each port.

- **Enable FXO Port**: Enables the FXO/Line port for incoming and outgoing calls. When this field is not checked, the FXO/Line port will be disabled.
- **Analog Receive gain**: Adjusts the gain to optimize echo cancellation in a call. The default value is 0db. **Note**: In cases where the default value does not optimize echo cancellation, adjust the gain with -6DB in steps to -10DB till echo is gone.
- **Analog Transmit gain**: Identifies the SIP FXO/Line port. The field is optional and only needed if the SIP FXO/Line port must be authenticated.
- **Enable InBound (from IP Network) two stage dialing**: Identifies the password to authenticate the SIP FXO/Line port against the SIP softswitch or outbound proxy. This field is optional and only needed if SIP FXO/Line port must be authenticated.
- **Enable InBound (from PSTN) two stage dialing**: Supports two-stage dialing for incoming PSTN calls:
  - Provides dial tone when a call is answered. Caller can then dial an extension to further complete the call or hang up.
  - Forwards an incoming call from PSTN to the configured number.
- **Forwarded to**: Specifies the forwarding number if two-stage dialing is disabled.

The SIP FXO/Line Port Configuration page contains the following buttons:

- **Submit**: Applies the settings configured on this page.
- **Reset**: Clears all fields and selections and allows you to enter new information.

---
SIP FXO/Line port configuration

SIP FXO/Line port allows voice call from
GW is currently bound to 192.168.1.

(If you enable or disable the SIP FXO/Lir
configure the SIP trunking rules.)
Enable SIP FXO/Line services:
RTP Silence delay:
SIPGW IP Address:
Add Dial Out Prefix (To IP network):
Enable Priority Calling services:
Callback extension(Mandatory):
Priority Call Window(sec):
(You must also configure Priority call
these services to work.)
VPN Page

Use this page to add, edit, or delete VPN tunnels. Table 41 describes the settings on this page.

To access this page, choose VPN from the Configuration Menu.

Table 41   VPN page settings

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable the VPN module</td>
<td>Enables the VPN module. If this box is not checked, no VPN tunnels will be available for use.</td>
</tr>
</tbody>
</table>

The VPN page contains the following buttons and links:

Submit  Applies the settings configured on this page.
Delete   Deletes the selected entry or entries.
Refresh Status  Refreshes the status information for all VPN tunnels.
Status    Displays the current status of the tunnel listed in each row of the VPN Tunnels table. If more information is available, such as the time the status event occurred, the IP address of the remote party, or a detailed help text, then an information icon will be displayed.
Add Tunnel Creates a new tunnel.
VPN Subnet Page

Use this page to allow traffic between a local and remote subnet to be sent through a given tunnel. Table 42 describes the parameters on the page.

**Note**
The remote side of the tunnel must have a similar configuration.

To access this page, choose **VPN > VPN Subnets** from the Configuration Menu.

### Table 42  VPN Subnet Management Parameters

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Action</td>
<td>Add or edit an existing subnet</td>
</tr>
<tr>
<td>Name</td>
<td>Enter or edit a unique name for the subnet</td>
</tr>
<tr>
<td>Local Subnet</td>
<td>Specify the local subnet. Must be in a network/mask or network/bits format.</td>
</tr>
<tr>
<td>Remote Subnet</td>
<td>Specify the remote subnet. Must be in a network/mask or network/bits format.</td>
</tr>
<tr>
<td>Remote VPN gateway</td>
<td>The remote VPN gateway to use when processing packets matching the specified local and remote subnets.</td>
</tr>
</tbody>
</table>

The VPN Subnet Management Parameters page contains the following buttons:

- **Commit**: Applies the settings configured on this page.
- **Delete**: Deletes the selected entry.
- **Reset**: Clears all fields and selections and allows you to enter new information.
VPN Tunnel Settings Page

Use this page to configure a new or existing VPN tunnel. Table 43 describes the parameters on the page.

To access this page, choose VPN from the Configuration Menu, and then click on the Add Tunnel button. If tunnels are listed in the VPN Tunnels table, you can also click on a tunnel name listed in the Tunnel Name column to access this page.
Table 43  Add New VPN Tunnel Page Settings

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status</td>
<td>Displays the current status of the tunnel. If more information is available, such as the time the status event occurred, the IP address of the remote party, or a detailed help text, an information icon is displayed.</td>
</tr>
<tr>
<td>Name</td>
<td>Enter the name of the VPN tunnel. The name must be unique per device, with maximum length of 32 characters.</td>
</tr>
<tr>
<td>Enabled</td>
<td>Select this checkbox to enable this tunnel.</td>
</tr>
<tr>
<td>Local VPN Gateway</td>
<td>To use a static IP address, enter the WAN IP address of this device.</td>
</tr>
<tr>
<td></td>
<td>To use dynamic WAN IP address assignment, enter the string “WAN_IP” to permit dynamic assignment of the WAN-side IP address.</td>
</tr>
<tr>
<td>Protected Local Network</td>
<td>Enter the address of the local subnet that is protected by this tunnel in network/mask or network/bits format. Example: 10.10.10.0/255.255.255.0 or 10.10.10.0/24.</td>
</tr>
<tr>
<td>Remote VPN Gateway</td>
<td>Enter the static IP address of the remote VPN gateway.</td>
</tr>
<tr>
<td>Protected Remote Network</td>
<td>Enter the IP address of the remote subnet protected by the tunnel, in network/mask or network/bits format. Example: 10.10.10.0/255.255.255.0 or 10.10.10.0/24.</td>
</tr>
<tr>
<td>PerfectForward Secrecy</td>
<td>Select this checkbox to enable Perfect Forward Secrecy for IKE negotiation.</td>
</tr>
<tr>
<td>DH Group</td>
<td>Enter the Diffie-Hellman Group to use for Phase 1 and Phase 2. Supported values are &quot;DH Group 2&quot; (1024-bit key) and &quot;DH Group 5&quot; (1536-bit key).</td>
</tr>
<tr>
<td>Phase 1</td>
<td>Enter the cipher and hash algorithms to use for Phase 1 (IKE) encryption. Supported settings are 3DES or AES for the cipher, and MD5 or SHA1 for the hash.</td>
</tr>
<tr>
<td>Phase 2</td>
<td>Enter the cipher and hash algorithms to use for Phase 2 (ESP) encryption. Supported settings are 3DES or AES for the cipher, and MD5 or SHA1 for the hash.</td>
</tr>
<tr>
<td>Phase 1 lifetime</td>
<td>Specify the time that the keying channel (ISAKMP SA) should last before being renegotiated. Valid range for the Phase 1 Lifetime is 600-28800 seconds.</td>
</tr>
<tr>
<td>Phase 2 lifetime</td>
<td>Specify the time that the connection (IPsec SA) should last before being renegotiated. Valid range for the Phase 2 Lifetime is 600-86400 seconds.</td>
</tr>
</tbody>
</table>
Early Start Select this checkbox to cause the VPN gateway to start key negotiation when you click Apply or when the gateway reboots. The Keepalive Ping settings are displayed if Early Start is selected. If Early Start is not selected, the local gateway defers the key negotiation until the remote VPN gateway starts key negotiation or a packet from the protected local network attempts to pass through the tunnel.

Keepalive Ping (Optional) Enter the source and destination IP addresses of a host that belongs to the remote protected VPN. The system sends pings messages to this address to detect VPN tunnels that are down and renew those tunnels automatically. Keepalive ping is active only when user enables Early Start. To disable this feature, leave the fields blank or disable Early Start.

**Source IP Address:** The source IP address to use when sending the pings. This must be a configured address of the local system.

**Destination IP Address:** The Destination IP address to use when sending the pings.

### System Page

Use this page to view information about the EdgeMarc appliance and configure passwords for the administrator and read-only user. Table 44 describes the parameters on the page.

To access this page, choose System from the Configuration Menu.
Table 44  System Information

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Software Version</td>
<td>Current running system firmware version.</td>
</tr>
<tr>
<td>Hostname</td>
<td>Currently assigned Hostname of the system.</td>
</tr>
<tr>
<td>Model Number (view only)</td>
<td>Model number of the system.</td>
</tr>
<tr>
<td>LAN Interface MAC Address (view only)</td>
<td>LAN interface MAC address of the system.</td>
</tr>
<tr>
<td>Registration Status</td>
<td>Registration status for the ALG feature; this information is displayed to ensure that the feature is enable. If the feature is not registered, no calls will be allowed to pass. The registration code is available on a sticker on the bottom of the system or from your service provider.</td>
</tr>
</tbody>
</table>

Change Administrative Password:
The password of the read-write administrative user can be changed.

Change Read-Only Password:
The password of the read-only user can be changed.
Certificate Page

Use this page to configure the device certificate used by HTTPS for secure remote management. Table 45 describes the parameters on the page.

To access this page, choose System > Certificate from the Configuration Menu.
The Certificate Parameters page contains the following buttons:

**Table 45  Certificate Parameters**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certificate</td>
<td>X.509 certificate for HTTPS-based device authentication. You should obtain a certificate from a trusted CA and enter the certificate in this field. The system only supports certificates in .pem format.</td>
</tr>
<tr>
<td>Private Key</td>
<td>Private key associated with the device certificate. The system only supports private keys in .pem format.</td>
</tr>
<tr>
<td>Password</td>
<td>The password that protects the private key file. The Certificate page includes the following button: Submit—Applies the settings configured on this page.</td>
</tr>
</tbody>
</table>

The Certificate Parameters page contains the following buttons:

**Submit**  Applies the settings configured on this page.
Clients List Page

Use this page to configure the entries for devices that have registered with the EdgeMarc devices. When you select a protocol on the page, the page refreshes to show information for the selected protocol. Table 46 describes the parameters on the page.

To access this page, choose System > Clients List from the Configuration Menu.
Table 46  SIP Clients List

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client List Filter</td>
<td>Applies a filter on the client list before displaying it, making it possible to search for a subset of clients. The Apply button applies the currently typed string, and the Clear button clears the filter.</td>
</tr>
</tbody>
</table>

Client Information table

- **Clients can be selected manually by clicking on the check-box of each client, or by pressing the Select: All link. Clients can be cleared by pressing the Select: None link. The select all and none links only apply to the currently displayed clients. A certain subset of clients can be selected by first applying a filter and then selecting all displayed clients.** Trashcan icon—Deletes the entry.
- Info icon—Display additional information about the client.
- MGCP specific icons—Allows you to modify the extension number of the client. The client's extension number is required only if the MGCP Survivability feature is enabled. Otherwise, it can be left blank.
- Warning icon—Client has not responded to audits for the given amount of time.
- H.323 lock icon—Lock or unlock the endpoint. A locked endpoint is not automatically deleted by the system (if that feature is enabled).

Add a SIP Client to the Clients List

- **Name** Specifies the name of the client.
- **Address** Specifies the IP address of the client.
- **Port** Specifies the port used by the client.

Add an MGCP Client to the Clients List

- **Name** Specifies the name of the client.
- **Address** Specifies the IP address of the client.
- **Extension** Specifies the client's phone extension.

Add an H.323 Client to the Clients List

- **Address** Specifies the static IP address of the H.323 client.
- **Q.931 Port** Specifies the Q.931 call signaling port on which the endpoint sends call setup. Port 1720 is generally used.
- **RAS Port** Specifies the Registration, Admission and Status (RAS) port. Port 1719 is generally used.
- **Alias** Specifies the H.323 or E.164 alias for the static client that you are adding.
- **Alias Type** Specifies the type of alias entered in the Alias field.
The Clients List page contains the following buttons:

<table>
<thead>
<tr>
<th>Button</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apply</td>
<td>Applies the settings configured on this page.</td>
</tr>
<tr>
<td>Clear</td>
<td>Clears the value entered but not saved in the Client List Filter field.</td>
</tr>
<tr>
<td>Delete</td>
<td>Deletes the selected entry.</td>
</tr>
<tr>
<td>Delete All</td>
<td>Deletes all the client list entries.</td>
</tr>
<tr>
<td>Add</td>
<td>Adds a SIP client to the client list.</td>
</tr>
<tr>
<td>Reset</td>
<td>Clears the information entered but not added for the SIP clients.</td>
</tr>
</tbody>
</table>

**Dynamic DNS Page**

Use this page to configure dynamic DNS parameters. Table 47 describes the parameters on the page.

To access this page, choose **System > Dynamic DNS** from the Configuration Menu.
Table 47 Dynamic DNS Parameters

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable Dynamic DNS</td>
<td>Select this checkbox to enable the system to notify the external DNS server that the system’s IP address has changed.</td>
</tr>
<tr>
<td>Service Name</td>
<td>Enter the service name that the system is using. Use one of the names from the following table.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Service Name</th>
<th>URL for Service Provider</th>
</tr>
</thead>
<tbody>
<tr>
<td>dns</td>
<td><a href="http://www.dhs.org">www.dhs.org</a></td>
</tr>
<tr>
<td>dyndns</td>
<td><a href="http://www.dyndns.org">www.dyndns.org</a></td>
</tr>
<tr>
<td>ods</td>
<td><a href="http://www.ods.org">www.ods.org</a></td>
</tr>
<tr>
<td>tzo</td>
<td><a href="http://www.tzo.com">www.tzo.com</a></td>
</tr>
<tr>
<td>easydns</td>
<td><a href="http://www.easydns.com">www.easydns.com</a></td>
</tr>
<tr>
<td>justlinux</td>
<td><a href="http://www.justlinux.com">www.justlinux.com</a></td>
</tr>
<tr>
<td>zoneedit</td>
<td><a href="http://www.zoneedit.com">www.zoneedit.com</a></td>
</tr>
</tbody>
</table>

User ID
Enter the user ID. User ID and Password are used together to authenticate the DNS name with the service provider. This is usually the information used when a user signs up for Dynamic DNS with one of the service providers shown.

Password
See User ID.

Host ID
Enter the domain name chosen by the user to identify the name of the system. This name is usually created in the user’s portal on the service provider’s site. The name is the fully qualified domain name that can be used to access the system from the public Internet (for example, mysitename.dyndns.org).

The Dynamic DNS page contains the following buttons:

- **Submit**: Applies the settings configured on this page.
- **Reset**: Clears all fields and selections and allows you to enter new information.
File Download Page

Use this page to download image and configuration files from a central FTP server and store them locally on the EdgeMarc appliance. Table 48 describes the parameters on the page.

To access this page, choose System > File Download from the Configuration Menu.

Table 48  File Download

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable File Download</td>
<td>Check this box to enable file download.</td>
</tr>
<tr>
<td>File Server Address</td>
<td>Enter the IP address of the remote FTP server.</td>
</tr>
<tr>
<td>File Refresh Frequency</td>
<td>Enter the value in hours that the system will contact the remote FTP server for these files.</td>
</tr>
</tbody>
</table>
| List the Files to Download from the Server | List the files in this text box to download from the remote server. (FTP files are assumed to be in /pub.) Enter the file names in one of the following formats:  
  • <filename> space <filename> or  
  • <filename>  
  • <filename> |

The File Download page contains the following buttons:
File Server Page

Use this page to enable and configure FTP and/or TFTP file servers on the EdgeMarc appliance. Table 49 describes the parameters on the page.

To access this page, choose System > File Server from the Configuration Menu.
Table 49  File Server Parameters

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable TFTP Server</td>
<td>Check this box to enable the TFTP Server.</td>
</tr>
<tr>
<td>Enable FTP Server</td>
<td>Check this box to enable the FTP Server. Either the TFTP ALG or TFTP server can be enabled. Enabling the TFTP server automatically disabled the TFTP ALG function. By default, the TFTP ALG is enabled and the TFTP server is disabled.</td>
</tr>
<tr>
<td>RAMDISK Size</td>
<td>Select the size of the systems RAMDISK, values are in Kbps.</td>
</tr>
<tr>
<td></td>
<td>• 512Kbps</td>
</tr>
<tr>
<td></td>
<td>• 1024Kbps</td>
</tr>
<tr>
<td></td>
<td>• 2048Kbps</td>
</tr>
<tr>
<td></td>
<td>• 4096Kbps</td>
</tr>
<tr>
<td></td>
<td>• 8192Kbps</td>
</tr>
<tr>
<td></td>
<td>• 16384Kbps</td>
</tr>
</tbody>
</table>

Server Maintenance

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable Read-Write Server</td>
<td>Check to allow the file server to allow files to be uploaded to it via FTP. Use caution when enabling this feature. If the server file system fills up, phone configuration and image files could be lost. The default is disabled (a read-only file system).</td>
</tr>
<tr>
<td>Enable Automatic Cleanup</td>
<td>Check to cause the files listed in Filenames to Cleanup to be automatically deleted from the server.</td>
</tr>
<tr>
<td>Automatic Cleanup Interval</td>
<td>Enter the interval between file cleanup operations. The default cleanup interval is 15 minutes.</td>
</tr>
<tr>
<td>Filenames to Cleanup</td>
<td>Add the list of files to clean up. The filename can include wild cards such as &quot;**&quot;. For example, to remove all log files, enter &quot;.log&quot;.</td>
</tr>
</tbody>
</table>

The File Server page contains the following buttons:

<table>
<thead>
<tr>
<th>Button</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submit</td>
<td>Applies the settings configured on this page.</td>
</tr>
<tr>
<td>Reset</td>
<td>Clears all fields and selections and allows you to enter new information.</td>
</tr>
</tbody>
</table>
Network Information

Use this read-only page to display the low-level network configuration for the EdgeMarc appliance. Table 50 lists the types of information presented.

To access this page, choose **System > Network Information** from the Configuration Menu.

### Network Information

Networking Information displays the low level network configuration for the system.

#### Routing Information:

<table>
<thead>
<tr>
<th>Destination</th>
<th>Gateway</th>
<th>netmask</th>
<th>Flags</th>
<th>Metric</th>
<th>Ref</th>
<th>Use</th>
<th>iface</th>
</tr>
</thead>
<tbody>
<tr>
<td>192.168.1.253</td>
<td></td>
<td>255.255.255.255</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>192.168.1.0</td>
<td></td>
<td>255.255.255.0</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>192.168.1.1</td>
<td></td>
<td>255.255.255.0</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>192.168.1.2</td>
<td></td>
<td>255.255.255.0</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>68.12.177.0</td>
<td></td>
<td>255.255.255.0</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1.1.0</td>
<td></td>
<td>255.255.255.0</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>127.0.0.0</td>
<td></td>
<td>255.0.0.0</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.0.0.0</td>
<td>68.12.177.1</td>
<td>0.0.0.0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td>eth0</td>
</tr>
</tbody>
</table>

#### Link Status:

- eth0(3): no link
- eth0(2): no link
- eth0(3): no link
- eth0(4): no link

eth0 negotiate: 100BaseTX-HD, link ok

#### Interface Information:

- **eth0**: Link encap:Ethernet HWaddr 00:03:60:DF:32:60
  - UP BROADCAST MULTICAST MTU:1500 Metric:1
  - RX packets:0 errors:0 dropped:0 overruns:0 frame:0
  - TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
  - collisions:0 txqueuelen:0

- **eth0.1**: Link encap:Ethernet HWaddr 00:03:60:DF:32:60
  - inet addr:192.168.1.1 Bcast:192.168.1.255 Mask:255.255.255.0
  - UP BROADCAST RUNNING MULTICAST MTU:1496 Metric:1
  - RX packets:0 errors:0 dropped:0 overruns:0 frame:0
  - TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
  - collisions:0 txqueuelen:0

- **eth0.2**: Link encap:Ethernet HWaddr 00:03:60:DF:32:60
  - UP BROADCAST RUNNING MULTICAST MTU:1496 Metric:1

- **eth0.3**: Link encap:Ethernet HWaddr 00:03:60:DF:32:60
  - UP BROADCAST RUNNING MULTICAST MTU:1496 Metric:1

- **eth0.100**: Link encap:Ethernet HWaddr 00:03:60:DF:32:60
  - inet addr:1.1.1.1 Bcast:255.255.255.0 Mask:255.255.255.0
  - UP BROADCAST MULTICAST MTU:1500 Metric:1

- **eth0.253**: Link encap:Ethernet HWaddr 00:03:60:DF:32:60
  - UP BROADCAST MULTICAST MTU:1500 Metric:1

- **eth1**: Link encap:Ethernet HWaddr 00:03:60:DF:32:61
  - inet addr:68.12.177.178 Bcast:68.255.255.255 Mask:255.255.255.0
  - UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
  - RX packets:415288 errors:0 dropped:0 overruns:0 frame:0
  - TX packets:23154 errors:0 dropped:0 overruns:0 carrier:0
  - collisions:0 txqueuelen:126

- **lo**: Link encap:Loopback
  - inet addr:127.0.0.1 Mask:255.0.0.0
  - UP LOOPBACK RUNNING MTU:16436 Metric:1
  - RX packets:65530 errors:0 dropped:0 overruns:0 frame:0
  - TX packets:65530 errors:0 dropped:0 overruns:0 carrier:0
  - collisions:0 txqueuelen:0
Network Restart Page

This page is used to restart the network. It contains the following buttons:

To access this page, choose System > Network Restart from the Configuration Menu.

<table>
<thead>
<tr>
<th>Networking Restart</th>
<th>Help</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restarting the network services will interrupt the system for up to a minute. Proceed with caution!</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Submit</th>
<th>Reset</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Restarts the network.</td>
</tr>
<tr>
<td>Reset</td>
<td></td>
</tr>
</tbody>
</table>
Network Test Tools Page

Use this page to verify connectivity of the EdgeMarc appliance and trace the path of data throughout the network. Table 51 describes the parameters on the page.

To access this page, choose System > Network Test Tools from the Configuration Menu.

![Network Test Tools](image)

Table 51  Network Test Tools

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ping Test</td>
<td></td>
</tr>
<tr>
<td>IP Address to Ping</td>
<td>Enter the destination IP address for the ping command. The ping test is the most common test used to verify basic connectivity to a networking device. Successful ping test results indicate that both physical and virtual path connections exist between the system and the test IP address. Successful ping tests do not guarantee that all data message are allowed between the system and the test IP address. Enter the IP address (IPv4 addresses only) of the device to send an ICMP ping to. Select Ping to execute the ping test. Select Reset to clear the IP address field so you can test a different path.</td>
</tr>
</tbody>
</table>
The Network Test Tools page contains the following buttons:

- **Ping**: Perform a ping test.
- **Traceroute**: Perform a traceroute test.
- **Reset**: Clears selections and allows you to enter new information.

### Table 51  Network Test Tools (continued)

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Traceroute Test</strong></td>
<td></td>
</tr>
<tr>
<td>IP Address to Trace</td>
<td>Enter the destination IP address for the traceroute command. The traceroute test is used to track the progress of a packet through the network. The test can be used to verify that data destined for a WAN device reaches the remote IP address via the desired path. Similarly, network paths internal to a company can be traced over the LAN to verify the local network topology. Enter the IP address (IPv4 addresses only) of the device to send a traceroute test to. Select Traceroute to execute the traceroute test. Select Reset to clear the IP address field so you can test a different path.</td>
</tr>
<tr>
<td>Interface</td>
<td>Choose the scope of the traceroute change.</td>
</tr>
</tbody>
</table>
Proxy ARP Page

Use this page to configure bridges between the WAN and the LAN for an IP address or network. Table 52 describes the parameters on the page.

To access this page, choose System > Proxy ARP from the Configuration Menu.

Table 52  Proxy ARP Parameters

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
</table>

Edit Proxy ARP List
In addition to proxying individual addresses, a range of addresses can be proxied by specifying a network netmask rather than a host netmask.

IP Address/Bitmask
The IP address and netmask of the subnet to be proxied e.g. 67.40.40.1/32 for this single address.

On Interface
The specific interface of the system where the proxy target is connected. When VLAN (4300 only) is not enabled, this is always the LAN interface. When VLAN (4300 only) is enabled, you should choose the VLAN interface that the target is connected to.
The Proxy ARP page contains the following buttons:

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gateway</td>
<td>The IP address of the gateway for the proxy target. The IP address should belong to the subnet of the target's interface that is connected to EdgeMarc device. EdgeMarc uses this IP address as the source IP for the ARP requests to the proxy target. This ensures that Proxy ARP works for devices that require that an ARP request’s source IP address belong to its receiving interface. Note the gateway does not necessarily exist physically. You only need to choose a logical IP address that belongs to the proxy target's subnet and also does not conflict with existing IP address.</td>
</tr>
<tr>
<td>Respond To ARP Requests From</td>
<td>The interface that the system will use to respond to ARP requests. The interface to use is the one that does not have access to the host system using the proxied address. Currently this interface must be the WAN interface of the system.</td>
</tr>
<tr>
<td>Add</td>
<td>Adds the entry to the configured ARP entries list.</td>
</tr>
<tr>
<td>Delete</td>
<td>Deletes the selected entry.</td>
</tr>
</tbody>
</table>

### Configured Proxy ARP List

Shows a list of configured Proxy ARP entries.
RADIUS Settings Page

Use this page to configure RADIUS authentication settings. Table 53 describes the parameters on the page.

To access this page, choose System > RADIUS Settings from the Configuration Menu.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable RADIUS</td>
<td>Select this checkbox to enable RADIUS authentication.</td>
</tr>
<tr>
<td>Primary RADIUS Server Address</td>
<td>IP address of the primary RADIUS server.</td>
</tr>
<tr>
<td>Server Retries</td>
<td>Number of times to try again to reach the RADIUS server if an attempt fails</td>
</tr>
<tr>
<td>Retransmit Interval (in seconds)</td>
<td>Delay in seconds between Server Retries. The default value is 2 seconds.</td>
</tr>
<tr>
<td>Shared Secret</td>
<td>A value used for authentication of the RADIUS request. The client and the server must have the same secret. There is no default for the shared secret.</td>
</tr>
<tr>
<td>Shared Secret (confirm)</td>
<td>Enter the shared secret a second time to confirm the value.</td>
</tr>
</tbody>
</table>

Table 53  RADIUS Settings
The RADIUS Settings page contains the following buttons:

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RADIUS Port</td>
<td>Port for local clients to use for communication with the RADIUS servers. The default is 1812.</td>
</tr>
<tr>
<td>RADIUS Authorization Mode</td>
<td>Mode for RADIUS authorization. Basic mode confirms the shared secret with the server. CHAP mode also shares the secret with the server but includes a built-in challenge as part of the CHAP protocol. The default is Basic.</td>
</tr>
</tbody>
</table>

The RADIUS Settings page contains the following buttons:

| Submit | Applies the settings configured on this page. |
| Reset  | Clears all fields and selections and allows you to enter new information. |

### Reboot System Page

This page is used to reboot the system.

To access this page, choose **System > Reboot System** from the Configuration Menu.

The Reboot System page contains the following buttons:

| Reboot | Reboots the EdgeMarc appliance. |
Remote Management

Use this page to specify the protocols that are permitted for management traffic and to restrict management access to defined subnets. Table 54 describes the parameters on the page.

To access this page, choose **System > Remote Management** from the Configuration Menu.

Table 54  Remote Management

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management Protocols</td>
<td>Specifies the protocols to be allowed for management traffic.</td>
</tr>
<tr>
<td>Remote Management</td>
<td>Restricts management access to the defined subnets. Enter each IP address</td>
</tr>
<tr>
<td></td>
<td>and bit mask.</td>
</tr>
</tbody>
</table>

The Route page contains the following buttons:

- **Add**: Adds the new entry
- **Delete**: Removes the selected entry
- **Submit**: Applies the settings configured on this page.
Route Page

Use this page to create static routes. Table 55 describes the parameters on the page.

To access this page, choose System > Route from the Configuration Menu.

Table 55  Static Routes

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apply Route</td>
<td>Select to activate this route.</td>
</tr>
<tr>
<td>IP Network</td>
<td>Enter the IP address of the remote network.</td>
</tr>
<tr>
<td>Netmask</td>
<td>Enter the subnet mask of the remote network.</td>
</tr>
<tr>
<td>Gateway</td>
<td>Enter the IP address of the gateway for the remote network.</td>
</tr>
</tbody>
</table>

The Route page contains the following buttons:

- **Submit**: Applies the settings configured on this page.
- **Reset**: Clears all fields and selections and allows you to enter new information.

Services Configuration

Use this page to configure SNMP and other services. Table 56 describes the parameters on the page.

To access this page, choose System > Services from the Configuration Menu.
# Services Configuration

Customize the configuration of the services accessible on the system.

| Enable SNMPv1: | ✔ |
| Enable SNMPv3: | ☐ |

## SNMPv1
- **Read-Only Community:** public
- **Trap Agent IP Address:**
- **Trap Destinations:**

<table>
<thead>
<tr>
<th>IP Address</th>
<th>Version</th>
<th>Community</th>
<th>Delete</th>
</tr>
</thead>
</table>

## SNMPv3
- **User Name:**
- **Passphrase:**
- **Security:** None
- **Trap Context:**
- **Trap Destination IP Address:**

## SNMP Common Configuration
- **System Location:** VON Servers
- **System Contact:** Larry Cromwell
- **Port:** 161

## Remote System Logging
- **Enable Remote System Logging:** ✔
- **Remote Syslog Hosts:** 66.52.177.135
- **Syslog filter:** Debug

## Current Hostname
- **Current Hostname:** E_4500@VON
- **Set Hostname:** E_4500@VON

## Admin Inactivity Timeout (seconds)
- **Admin Inactivity Timeout (seconds):** 0

## Enable MOS Scoring
- **Enable MOS Scoring:** ✔
- **Current MOS Threshold:** 2.5
- **Set MOS Threshold:** 2.5

**Submit** | **Reset**
### Table 56 Services Configuration

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SNMPv1</strong></td>
<td></td>
</tr>
<tr>
<td>Enable</td>
<td>Indication that SNMPv1 is enabled.</td>
</tr>
<tr>
<td>SNMPv1</td>
<td></td>
</tr>
<tr>
<td>Read-Only Community</td>
<td>The community string that the management station uses when accessing read-only objects from the system.</td>
</tr>
<tr>
<td>Trap Community</td>
<td>Trap community string place in trap PDUs.</td>
</tr>
<tr>
<td>Agent IP Address</td>
<td>When sending an SNMPv1 trap, set the trap agent field to this address. It is recommended that the IP address be one of the public addresses configured on the system. If this value has not been set, the agent will use the WAN/Provider address of the system.</td>
</tr>
<tr>
<td><strong>SNMPv3</strong></td>
<td></td>
</tr>
<tr>
<td>Enable</td>
<td>Indication that SNMPv3 is enabled.</td>
</tr>
<tr>
<td>User Name</td>
<td>If SNMPv3 is enabled, this field defines the SNMPv3 user name for SNMPv3 USM based authentication and VACm access control.</td>
</tr>
<tr>
<td>Passphrase</td>
<td>The SNMPv3 passphrase is optionally used to authenticate the user as well as encrypt the payload based on the SNMPv3 Security setting below. The minimum length of a valid passphrase is 8.</td>
</tr>
<tr>
<td>Security</td>
<td>The SNMPv3 security level for user authentication and encryption of both synchronous requests as well as asynchronous traps. &quot;None&quot; means neither SNMPv3 authentication or encryption are used. &quot;Auth(MD5)&quot; means authenticating user using MD5 hash algorithm. &quot;AuthPriv(MD5/DES)&quot; means authentication as well as encryption using the DES encryption algorithm. The default value is None.</td>
</tr>
<tr>
<td>Trap Context</td>
<td>The SNMPv3 trap context defaults to nothing but can be set to any string.</td>
</tr>
<tr>
<td><strong>Common Configuration</strong></td>
<td></td>
</tr>
<tr>
<td>System Location</td>
<td>A comment string that can be used to indicate the location of the system. By default, no value is set.</td>
</tr>
<tr>
<td>System Contact</td>
<td>The administrative contact information for the system. By default, no value is set.</td>
</tr>
<tr>
<td>SNMP Port</td>
<td>The port that the system monitors to read and send SNMP data. The default is 161.</td>
</tr>
<tr>
<td>Trap Destination IP</td>
<td>The IPv4 address to send traps to. Specifying this address enables cold start, authentication and linkUp/linkDown traps.</td>
</tr>
</tbody>
</table>
Table 56 Services Configuration (continued)

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable Remote System Logging</td>
<td>Indication that syslog messages can be sent to a remote system.</td>
</tr>
<tr>
<td>Remote Syslog Host</td>
<td>The address or addresses systems running a system log server. The system sends to the default syslog port 514. The port cannot be changed. You can enter multiple syslog hosts by separating the IP addresses with a space. Entering multiple host names or IP addresses causes syslog messages to be sent to each of the specified systems.</td>
</tr>
<tr>
<td>Syslog Filter</td>
<td>The current logging level for the syslog service on the system. The priorities are Debug, Informational, Notice, Warning, Error, Critical, Alert and Emergency. Choosing a higher priority excludes lower level syslog messages. Debug is the lowest logging level meaning it will log all the log levels. Emergency is the highest level and it will exclude all levels except Emergency. The default priority is Debug.</td>
</tr>
<tr>
<td>Local Hostname</td>
<td>Set the hostname for this system. By default, the hostname is the system type.</td>
</tr>
<tr>
<td>Admin Inactivity Timeout</td>
<td>This timer terminates login sessions that are inactive for the number of second specified. This timer applies to console, Telnet, and SSH logins. Changes to this value do not affect sessions that are already open. The timer starts counting when the session is available to receive a command. The timer is not reset until a complete command is entered. The empty command resets the timer (i.e. pressing enter). The timer is not active when a command is running (e.g. a continuous ping). A value of 0 disables the inactivity timer. The largest allowed timeout value is 86400 seconds. The default is 0.</td>
</tr>
<tr>
<td>Enable MOS Scoring</td>
<td>Enable MOS scoring for media that is passing through the system. Disabling MOS scoring will improve system performance. By default, MOS scoring is Enabled.</td>
</tr>
<tr>
<td>MOS Threshold</td>
<td>Set the minimum allowable MOS for the system. MOS values below this value will cause system messages to be sent to the system log. By default, the value is 2.5.</td>
</tr>
</tbody>
</table>

The Services Configuration page contains the following buttons:

- **Add New Destination**: Adds the specified SNMP information.
- **Submit**: Applies the settings configured on this page.
- **Reset**: Clears all fields and selections and allows you to enter new information.
Set Link Page

Use this Set Link page to display and choose the current Ethernet interface link settings. Table 57 describes the parameters on the page.

To access this page, choose System > Set Link from the Configuration Menu.

### Table 57 Set Link

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Link Rate Settings</td>
<td>Displays the current settings for the LAN and WAN interfaces. The default setting is autonegotiate.</td>
</tr>
<tr>
<td>Detailed Link Rate Information</td>
<td>Ethernet autonegotiation is often unreliable, especially between different vendors or old and new networking equipment. Failure of autonegotiation is generally not a cause for concern. However, if the negotiated rates change intermittently or the link is reported as no link or down, the link rate may need to be set manually. Both side of the link MUST be set to the same rate. Inconsistent rates may cause &quot;flutter&quot;, leading to intermittent voice, video and data outages.</td>
</tr>
</tbody>
</table>
There are no buttons on the Set Link page.

**Stateful Failover**

Use this page to enable or disable stateful failover configuration parameters. Table 58 describes the type of information on the page.

To access this page, choose System > **Stateful Failover** from the Configuration Menu.

### Table 57  Set Link (continued)

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set Ethernet Link Rate</td>
<td>The link rate of an interface can be assigned to a desired rate. A network administrator may want to set the rate manually if autonegotiation fails to select a rate consistently or it selects a rate that is slower than the maximum rate supported by both interfaces.</td>
</tr>
<tr>
<td>Set WAN MTU size</td>
<td>On the 5300 and 6400 platforms, the WAN MTU size may be set to reduce the latency that is introduced when large data packets are sent over a slow link. The default setting is 1500 bytes for static IP addresses. PPPoE links negotiate the value automatically although the value can be overridden using this field. If the WAN Upstream Bandwidth is less than 256 kbps, the MTU size is automatically reduced to 800 bytes. When the link rate is set manually, ensure that the device at the far end of the connection can communicate at the desired rate. Incompatible rates can cause a loss of communication with the system.</td>
</tr>
</tbody>
</table>
## Stateful Failover

**Administratively Disabled**

Select this checkbox on the primary or secondary system to bring it out of active mode and cause the other device in the redundant pair to take over.

*Note:* Administratively disable the system during an upgrade.

*Additional Note:* If a secondary system has not been enabled, voice services will be disrupted.

**Stateful Failover Configuration**

**Enable Stateful Failover**

Select this checkbox to enable stateful failover.

*Note:* This box should be checked on both the primary and the secondary system that will act as participants in a redundant pair.

### Table 58  Stateful Failover

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administratively Disabled</td>
<td>Select this checkbox on the primary or secondary system to bring it out of active mode and cause the other device in the redundant pair to take over.</td>
</tr>
<tr>
<td><strong>Stateful Failover Configuration</strong></td>
<td></td>
</tr>
<tr>
<td>Enable Stateful Failover</td>
<td>Select this checkbox to enable stateful failover.</td>
</tr>
</tbody>
</table>

**Note:** Administratively disable the system during an upgrade.

*Additional Note:* If a secondary system has not been enabled, voice services will be disrupted.
Table 58  Stateful Failover

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Designation</td>
<td>Specify the device as the primary or secondary system in a redundant pair.</td>
</tr>
<tr>
<td>Password</td>
<td>Enter the password used by both the primary and secondary system.</td>
</tr>
<tr>
<td>LAN Virtual IP Address</td>
<td>Specify the common virtual IP address for the LAN that is shared between both the primary and secondary system.</td>
</tr>
<tr>
<td>WAN Virtual IP Address</td>
<td>Specify the common virtual IP address for the WAN that is shared between both the primary and secondary system.</td>
</tr>
<tr>
<td>LAN Remote Address</td>
<td>Specify the actual LAN address of the other system in the redundant pair. Note: Stateful failover must be enabled on the remote device.</td>
</tr>
<tr>
<td>WAN Remote Address</td>
<td>Specify the actual WAN address of the other system in the redundant pair. Note: Stateful failover must be enabled on the remote device.</td>
</tr>
<tr>
<td>Management Remote Address</td>
<td>Specify the actual management IP address of the other system in the redundant pair. Note: Stateful failover must be enabled on the remote device.</td>
</tr>
<tr>
<td>Enable State Transfer</td>
<td>Select this box for each address that will transfer state information to the other address in the redundant pair. Note: To eliminate the possibility of incomplete state transfer, enable state transfer on more than one link. If the redundant pair processes high volumes of traffic, enable state transfer on the management address, as this address is reserved and not used for SIP signalling or RTP media.</td>
</tr>
</tbody>
</table>

The Stateful Failover page contains the following buttons:

| Commit | Saves the settings configured on this page to the EdgeMarc. |
| Reset  | Clears all fields and selections and allows you to enter new information. |

**System Information**

Use this page to view detailed operating system and device information. Table 59 describes the types of information on the page.

To access this page, choose System > System Information from the Configuration Menu.
System Information

System Information displays detailed operating system and device information.

System Uptime:
12:24:00 up 1 day, 12:19, load average: 0.00, 0.02, 0.00

Number of Active Streams:
0

Recent Call Log: [click here for online MOS help]

<table>
<thead>
<tr>
<th>Process Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>FID</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td>7</td>
</tr>
<tr>
<td>78</td>
</tr>
<tr>
<td>79</td>
</tr>
<tr>
<td>101</td>
</tr>
</tbody>
</table>

Table 59  System Information

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Uptime</td>
<td>Shows the current time, the amount of time elapsed since the last system reboot, and the system load averages for the past 1, 5, and 15 minutes. Uptime can help trace when a power outage may have interrupted service. Load averages that remain greater than 2 indicate excessive system loading. Partitioning voice traffic using a second system may be required.</td>
</tr>
<tr>
<td>Number of Active Streams</td>
<td>Indicates how many calls are using the WAN link. Calls that are in progress and between two devices on the system LAN are not counted in this number.</td>
</tr>
<tr>
<td>Recent Call Log</td>
<td>Displays quality information for calls that are in progress or have recently completed. If a call falls below the configured MOS Threshold, a system log message will be created. The MOS score for a call is always displayed when the call is completed. Detailed statistics for the call are reported in the Advanced MOS syslog message. For a description of the fields in the Advanced MOS syslog message, click the link [click here for online MOS help].</td>
</tr>
<tr>
<td>Process Information</td>
<td>Active processes in the EdgeMarc device.</td>
</tr>
<tr>
<td>Memory Usage</td>
<td>Detailed memory allocation information that may be of use to technical support.</td>
</tr>
<tr>
<td>System Logging Messages</td>
<td>Information logged during system boot and normal operation. Logging messages may include information about unauthorized attempts to access the EdgeMarc device; process restart messages; and excessive resource utilization messages.</td>
</tr>
</tbody>
</table>
There are no buttons on the System Information page.

**System Time Page**

Use this page to set the stem time. Table 60 describes the parameters on the page.

To access this page, choose **System > System Time** from the Configuration Menu.

![System Time](image)

**Table 60  System Time**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable SNTP</td>
<td>Select the checkbox to use SNTP</td>
</tr>
<tr>
<td>SNTP Server</td>
<td>Enter the IP address of the SNTP server. The server address can be either</td>
</tr>
<tr>
<td></td>
<td>an IP address or the DNS name of the SNTP server.</td>
</tr>
<tr>
<td>Set Date</td>
<td>The date on the device can be set manual using this option. The values are</td>
</tr>
<tr>
<td></td>
<td>entered in numeric form. Month range: 1-12</td>
</tr>
<tr>
<td></td>
<td>Day range: 1-31</td>
</tr>
<tr>
<td></td>
<td>Year range: 1970-2034</td>
</tr>
<tr>
<td></td>
<td>Hour range: 0-23</td>
</tr>
<tr>
<td></td>
<td>Minute range: 0-59</td>
</tr>
<tr>
<td></td>
<td>Second range: 0-59</td>
</tr>
</tbody>
</table>

The System Time page contains the following buttons:
Test UA Settings page

Use this page to make a call to or from the EdgeMarc itself. Table 60 describes the parameters on the page.

**Note**
You must first have enabled the Test UA to access this page.

To access this page, choose Test UA from the Configuration Menu.
### Table 61  Test UA Settings

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable Test UA</td>
<td>Enables the Test UA function.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> Unchecking this box will not delete any pre-existing Test UA configuration.</td>
</tr>
<tr>
<td>Use SIP Username for SIP authentication</td>
<td>Enables the use of the SIP username for SIP authentication.</td>
</tr>
<tr>
<td>Register with proxy</td>
<td>Enables the Test UA to register with a configured domain using a configured outbound proxy.</td>
</tr>
<tr>
<td>SIP Display name</td>
<td>Defines the identity of the Test UA.</td>
</tr>
<tr>
<td>SIP Username</td>
<td>Defines the name that is used by the Test UA for SIP authentication.</td>
</tr>
<tr>
<td>SIP Authentication Name</td>
<td>Specifies the SIP Authentication Name. May be the same as the SIP username.</td>
</tr>
<tr>
<td>Password</td>
<td>Provides authentication credentials to the soft-switch.</td>
</tr>
<tr>
<td>Domain</td>
<td>Specifies the IP address assigned to the user agent.</td>
</tr>
</tbody>
</table>

### T1 Configuration Page

Use this page to view and configure T1 parameters. Table 62 describes the parameters on the page.

To access this page, choose **System > T1 Configuration** from the Configuration Menu.
### Table 62  T1 Configuration

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MLPPP Settings</strong></td>
<td></td>
</tr>
<tr>
<td>Enable MLPPP</td>
<td>Indicates whether MLPPP is enabled.</td>
</tr>
<tr>
<td>MLPPP</td>
<td></td>
</tr>
<tr>
<td><strong>Framing and Line Encoding:</strong></td>
<td></td>
</tr>
<tr>
<td>Framing Mode</td>
<td>Defines the number of frames that are grouped together. ESF (F24) and D3/D4 (F12) are supported. ESF has 24 frames and D3/D4 has 12 frames.</td>
</tr>
<tr>
<td>Line Encoding</td>
<td>B8ZS</td>
</tr>
<tr>
<td><strong>Set Interface Configuration:</strong></td>
<td></td>
</tr>
<tr>
<td>Type: T1</td>
<td></td>
</tr>
<tr>
<td>T1-1 Name:</td>
<td></td>
</tr>
<tr>
<td>T1-2 Name:</td>
<td></td>
</tr>
<tr>
<td>T1-3 Name:</td>
<td></td>
</tr>
<tr>
<td>T1-4 Name:</td>
<td></td>
</tr>
<tr>
<td>Protocol: HDLC</td>
<td></td>
</tr>
<tr>
<td>Clock: External</td>
<td></td>
</tr>
<tr>
<td>LBO: 0.0db (DS1 signal)</td>
<td></td>
</tr>
<tr>
<td><strong>Fractional Settings:</strong></td>
<td></td>
</tr>
<tr>
<td>Enable Fractional Support:</td>
<td></td>
</tr>
</tbody>
</table>
### Table 62  T1 Configuration (continued)

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Set Interface Configuration</strong></td>
<td></td>
</tr>
<tr>
<td>T1 Name</td>
<td>Specifies the interface name.</td>
</tr>
<tr>
<td>Protocol</td>
<td>Specifies the protocol for the T1 interfaces.</td>
</tr>
<tr>
<td>Clock</td>
<td>Specifies an internal or external clock.</td>
</tr>
<tr>
<td>LBO</td>
<td>Determines the power and attenuation level (dB) for the transmit signal from the EdgeMarc T1 interfaces.</td>
</tr>
<tr>
<td><strong>Fractional Settings</strong></td>
<td><em>These settings are visible if MLPPP is disabled.</em></td>
</tr>
<tr>
<td>Enable Fractional Support</td>
<td>Allows configuration of a fractional T1 links.</td>
</tr>
<tr>
<td><strong>Frame Relay Settings</strong></td>
<td><em>These settings are visible if MLPPP is enabled and one of the PPPoFR protocol options is selected.</em></td>
</tr>
<tr>
<td>Frame Relay Mode</td>
<td>Specifies the DCE or DTE mode for frame relay.</td>
</tr>
<tr>
<td>Frame Relay DLCI</td>
<td>Specifies the DLCI value (channel number).</td>
</tr>
<tr>
<td>PPPoFR User Name</td>
<td>Specifies the user name for authentication by the PPPoFR switch.</td>
</tr>
<tr>
<td>PPPoFR Password</td>
<td>Specifies the password for authentication by the PPPoFR switch.</td>
</tr>
<tr>
<td><strong>Frame Relay Secondary Settings</strong></td>
<td><em>These settings are visible if MLPPP is disabled and fractional support is enabled.</em></td>
</tr>
<tr>
<td>Enable Secondary DLCI</td>
<td>Specifies the DCE or DTE mode for frame relay.</td>
</tr>
<tr>
<td>Secondary DLCI</td>
<td>Specifies the DLCI value (channel number).</td>
</tr>
<tr>
<td>PPPoFR User Name</td>
<td>Specifies the user name for authentication by the PPPoFR switch.</td>
</tr>
<tr>
<td>PPPoFR Password</td>
<td>Specifies the password for authentication by the PPPoFR switch.</td>
</tr>
<tr>
<td>Enable Auto DS0 Detection</td>
<td>Allows automatic detection of currently-used timeslots based on the pre-configured IDLE value that the T1 service provider provides for unused timeslots.</td>
</tr>
</tbody>
</table>
The T1 Configuration page contains the following buttons:

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submit</td>
<td>Applies the settings configured on this page.</td>
</tr>
<tr>
<td>Reset</td>
<td>Clears all fields and selections and allows you to enter new information.</td>
</tr>
</tbody>
</table>

Table 62  T1 Configuration (continued)

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bandwidth</td>
<td>Specifies the bandwidth for the fractional link as a multiple of 64kbps.</td>
</tr>
<tr>
<td>Starting DS0</td>
<td>Specifies the beginning timeslot for the DS0 link (1-23).</td>
</tr>
</tbody>
</table>
T1 Configuration Page - MLPPPoFR

The following page is an example of the T1 configuration for MLPPPoFR.

**Note**
If PPP Authentication is enabled, you can enter the PPPoFr Username and password and also have an option to enable secondary DLCI.
T1 Diagnostics Page

Use this page to perform T1 diagnostic testing. Table 63 lists the loopback tests, Table 64 lists the alarm types, Table 65 lists the loopback types, Table 66 lists diagnostics counters, and Table 67 lists the interval data.

To access this page, choose System > T1 Diagnostics from the Configuration Menu.
Table 63 Loopback Tests

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local</td>
<td>Tests the inward loopback such that the interface on the EdgeMarc can synchronize on the signal it is sending. Used to verify the proper operation of the T1 interface on the EdgeMarc appliance.</td>
</tr>
<tr>
<td>Network line</td>
<td>Loops the data back towards the network before the framer chip in the EdgeMarc appliance.</td>
</tr>
<tr>
<td>Network payload</td>
<td>Loops the data back towards the network at the T1 framer chip in the EdgeMarc appliance.</td>
</tr>
<tr>
<td>Remote line (AT&amp;T or ANSI)</td>
<td>Causes the EdgeMarc sends an AT&amp;T TR 62411 or ANSI T1.403 formatted in-band line loop code to the network. Generating this code causes the remote equipment to loop data back to the EdgeMarc.</td>
</tr>
<tr>
<td>Remote payload (AT&amp;T or ANSI)</td>
<td>The EdgeMarc sends an AT&amp;T TR 62411 or ANSI T1.403 formatted in-band payload loop code to the network. Generating this code causes the remote equipment to loop data back to the EdgeMarc.</td>
</tr>
</tbody>
</table>

Table 64 Alarm Types

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Alarm</td>
<td>The EdgeMarc is not receiving a valid framing pattern from the network. Something is usually broken with the receive (of the EdgeMarc) path of the T1 line or with the sending equipment.</td>
</tr>
<tr>
<td>Yellow Alarm</td>
<td>The remote end (network side T1 interface) is not able to synchronize to the signal sent by the EdgeMarc. Something is usually broken with the transmit (from the EdgeMarc) path of the T1 line or with the receiving equipment.</td>
</tr>
<tr>
<td>Blue Alarm</td>
<td>The EdgeMarc is receiving an unframed all ones signal. This usually indicates a problem with the network side equipment.</td>
</tr>
</tbody>
</table>

Table 65 Loopback Types

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network line</td>
<td>Loops the data back towards the network before the framer chip in the EdgeMarc.</td>
</tr>
<tr>
<td>Network payload</td>
<td>Loops the data back towards the network at the T1 framer chip in the EdgeMarc.</td>
</tr>
<tr>
<td>Remote line (AT&amp;T or ANSI)</td>
<td>Causes the EdgeMarc appliance to send an AT&amp;T TR 62411 or ANSI T1.403 formatted in-band line loop code to the network. Generating this code causes the remote equipment to loop data back to the EdgeMarc.</td>
</tr>
<tr>
<td>Remote payload (AT&amp;T or ANSI)</td>
<td>Causes the EdgeMarc appliance to send an AT&amp;T TR 62411 or ANSI T1.403 formatted in-band payload loop code to the network. Generating this code causes the remote equipment to loop data back to the EdgeMarc.</td>
</tr>
</tbody>
</table>
The T1 Diagnostics page contains the following buttons:

- **Submit**: Applies the settings configured on this page.
- **Reset**: Clears all fields and selections and allows you to enter new information.

### Table 66  T1 Diagnostic Counters

<table>
<thead>
<tr>
<th>Counter Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Framing Errors</td>
<td>Incorrect or unexpected framing bit has been received.</td>
</tr>
<tr>
<td>Code Violation Errors</td>
<td>Bipolar Violation (BPV) or excessive zero event.</td>
</tr>
<tr>
<td>CRC Errors</td>
<td>Received cyclical redundancy check (CRC) code does not match the code that was calculated locally.</td>
</tr>
<tr>
<td>Bit Errors</td>
<td>Number of bit errors during BERT/QRBS test.</td>
</tr>
<tr>
<td>Seconds Since Last</td>
<td>Number of seconds since the last performance data event.</td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong>: T1.403 and TR54016 standards allow for performance data via FDL. This is the number of seconds since the last receive of FDL performance data.</td>
</tr>
<tr>
<td>ESF Error Events</td>
<td>CRC or out of frame event.</td>
</tr>
<tr>
<td>Current Status</td>
<td>Current status code.</td>
</tr>
<tr>
<td>Valid Intervals</td>
<td>Number of valid 15 minute intervals.</td>
</tr>
</tbody>
</table>

### Table 67  Interval Data

<table>
<thead>
<tr>
<th>Interval Data</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Errored (s)</td>
<td>Number of seconds with one or more Extended Superframe (ESF) Error events.</td>
</tr>
<tr>
<td>Unavailable (s)</td>
<td>Number of seconds during which the T1 interface is unavailable.</td>
</tr>
<tr>
<td>Severely Errored (s)</td>
<td>Number of seconds with 320 or more ESF error events.</td>
</tr>
<tr>
<td>Bursty Errored (s)</td>
<td>Number of seconds with more than one and fewer than 320 ESF error events.</td>
</tr>
<tr>
<td>Loss of Frame (s)</td>
<td>Number of seconds during which an out of frame error is detected.</td>
</tr>
<tr>
<td>Controlled Slip (s)</td>
<td>Number of seconds during which there have been one or more controlled slips. A controlled slip occurs when there is a difference between the timing of the EdgeMarc appliance and the received T1 signal.</td>
</tr>
<tr>
<td>Valid Intervals (s) w/ Actual Data</td>
<td>Number of elapsed seconds in the current interval.</td>
</tr>
</tbody>
</table>

Number of seconds for which there is data.
TACACS Settings Page

Use this page to configure parameters for TACACS+ server authentication and logging for HTTP, HTTPS, SSH, Telnet, and console login. Table 68 describes the parameters on the page.

To access this page, choose System > TACACS Settings from the Configuration Menu.

Table 68  TACACS Settings

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable TACACS+ Authentication</td>
<td>Select the checkbox to activate TACACS+ authentication.</td>
</tr>
<tr>
<td>TACACS+ Server Address</td>
<td>Enter the IP address of the TACACS server to contact for authentication.</td>
</tr>
<tr>
<td>Shared Secret</td>
<td>is a value used for authentication of the TACACS+ request. The client and the server must have the same secret. There is no default for the shared secret.</td>
</tr>
<tr>
<td>Shared Secret (confirm)</td>
<td>Reenter the shared secret to confirm.</td>
</tr>
<tr>
<td>Server Timeout (in seconds)</td>
<td>If the TACACS+ server does not respond to a request within this period of time, it is deemed to be unavailable. The range is 1-100 seconds, and the default is 5 seconds.</td>
</tr>
</tbody>
</table>
The TACACS page contains the following buttons:

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
</table>
| TACACS+ Authentication Mode | Select one of the following TACACS+ authentication modes:  
  - ASCII: The user name is sent as part of the TACACS client request and the password is sent as part of the continue message.  
  - Password Authentication Protocol (PAP): Both username and password are sent as part of the request message.  
  - Challenge Handshake Authentication Protocol (CHAP): The password is used to calculate the response to a random challenge. Both the challenge and response are sent as part of the TACACS+ request message. |
| Enable TACACS+ Logging | If enabled, all configuration changes done by user over HTTP, HTTPS, SSH, Telnet, and system console are logged. |

Submit  Applies the settings configured on this page.
Reset   Clears all fields and selections and allows you to enter new information.
Upgrade Firmware Page

Use this page to upgrade the firmware on the EdgeMarc appliance. Table 69 describes the parameters on the page.

To access this page, choose System > Upgrade Firmware from the Configuration Menu.

Table 69  Upgrade Firmware

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Download Server</td>
<td>Enter the IP address of the server from which the new firmware will be downloaded.</td>
</tr>
<tr>
<td>Filename</td>
<td>Enter the name of the firmware file.</td>
</tr>
</tbody>
</table>

The Upgrade Firmware page contains the following buttons:

Submit  Applies the settings configured on this page.
Reset   Clears all fields and selections and allows you to enter new information.
User Commands Page

Use this page to enter specialized commands or enable features that are not available through other GUI pages. Table 70 describes the parameters on the page.

To access this page, choose **System > User Commands** from the Configuration Menu.

The User Command page contains the following buttons:

![User Commands Page]

**Table 70  User Commands**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>User Commands</td>
<td>Area to enter specialized commands or enable features that are not available through the GUI.</td>
</tr>
</tbody>
</table>

The User Command page contains the following buttons:
VoIP Subnet Routing Page

Use this page to configure the EdgeMarc appliance to proxy remote networking devices that are not on the same subnet. Table 71 describes the parameters on the page.

To access this page, choose System > VoIP Subnet Routing from the Configuration Menu.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP Network</td>
<td>Enter the IP address of the remote network.</td>
</tr>
<tr>
<td>Netmask</td>
<td>Enter the subnet mask for the remote network.</td>
</tr>
<tr>
<td>Gateway</td>
<td>Enter the IP address of the gateway for the remote network.</td>
</tr>
<tr>
<td>Delete Subnet</td>
<td>Select the checkbox to delete the subnet.</td>
</tr>
</tbody>
</table>

Table 71  VoIP Subnet Routing
The VoIP Subnet Routing page contains the following buttons:

<table>
<thead>
<tr>
<th>Button</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submit</td>
<td>Applies the settings configured on this page.</td>
</tr>
<tr>
<td>Reset</td>
<td>Clears all fields and selections and allows you to enter new information.</td>
</tr>
</tbody>
</table>

## VLAN Configuration Page

Use this page to configure VLAN support. Table 72 describes the parameters on the page.

To access this page, choose **System > VLAN Configuration** from the Configuration Menu.

### Table 72   VLAN Configuration

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>View and modify existing VLAN Configuration</td>
<td>VLAN ID.</td>
</tr>
<tr>
<td>IP Address</td>
<td>IP address of the VLAN.</td>
</tr>
<tr>
<td>Network Mask</td>
<td>Network make of the VLAN.</td>
</tr>
</tbody>
</table>
The VLAN Configuration page contains the following buttons:

**Add**  Adds a new VLAN.
**Modify**  Modifies an existing VLAN.
**Reset**  Clears all fields and selections in this area of the page and allows you to enter new information.

---

### Table 72  VLAN Configuration (continued)

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAN Port Membership</td>
<td>Selection of protocols for each LAN port: 802.1 or 802.1q. The mode of the physical port determines the rules for VLAN assignment:</td>
</tr>
<tr>
<td></td>
<td>• 802.1 mode: Assign the port to a single VLAN.</td>
</tr>
<tr>
<td></td>
<td>• 802.1q mode: Assign the port to multiple VLANs</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> Port 4 is resolved for 802.1.</td>
</tr>
</tbody>
</table>

Add and configure a new VLAN

<table>
<thead>
<tr>
<th>ID</th>
<th>VLAN ID.</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP Address</td>
<td>IP address of the VLAN.</td>
</tr>
<tr>
<td>Network Mask</td>
<td>Network make of the VLAN.</td>
</tr>
</tbody>
</table>

The VLAN Configuration page contains the following buttons:
Wireless Configuration Page

Use this page to configure the EdgeMarc appliance as a wireless access point. Table 73 describes the parameters on the page.

To access this page, choose System > Wireless from the Configuration Menu.

Table 73  Wireless Configuration

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable Wireless</td>
<td>Indication that the appliance can be used as a wireless access point.</td>
</tr>
<tr>
<td>IP Address</td>
<td>IP address of the VLAN.</td>
</tr>
</tbody>
</table>

**Settings**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network SSID</td>
<td>Unique name for the wireless network. Wireless client must enter the SSID to connect to the network.</td>
</tr>
<tr>
<td>Enable SSID Broadcast</td>
<td>Indication that the SSID is advertised in the 802.11 beacon.</td>
</tr>
<tr>
<td>Wireless Mode</td>
<td>Wireless mode that is compatible with the served clients.</td>
</tr>
<tr>
<td>Power Level</td>
<td>Level of power provided for the 802.11 signals (dBm)</td>
</tr>
<tr>
<td>Channel</td>
<td>801.11 operating RF channel.</td>
</tr>
</tbody>
</table>
The Wireless Configuration page contains the following buttons:

- **Add**: Adds a new VLAN.
- **Modify**: Modifies an existing VLAN.
- **Reset**: Clears all fields and selections in this area of the page and allows you to enter new information.

### Table 73  Wireless Configuration (continued)

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Security Settings</strong></td>
<td></td>
</tr>
<tr>
<td>Enable Security</td>
<td>Indication that security is checked when a client accesses the wireless network.</td>
</tr>
<tr>
<td>Pre-Shared Key</td>
<td>Key for initial access to the wireless network.</td>
</tr>
<tr>
<td>Key Renewal Interval</td>
<td>Number of seconds between attempts to automatically synchronize the pre-shared keys.</td>
</tr>
</tbody>
</table>

---

The Wireless Configuration page contains the following buttons:

- **Add**: Adds a new VLAN.
- **Modify**: Modifies an existing VLAN.
- **Reset**: Clears all fields and selections in this area of the page and allows you to enter new information.
Client Side ISDN PRI (PRI/GW) Configuration Page

Use this page to configure the Client Side ISDN PRI (PRI/GW) on the EdgeMarc appliance. Table 66 describes the parameters on this page.

To access this page, choose “SIP-GW → PRI Client configuration” from the Configuration Menu.

To be continued on the next page...
### Table 74 ISDN PRI (PRI/GW) Configuration Parameters

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable PRI/GW services</td>
<td>Enables Client side ISDN PRI interface and SIP trunking on IP side.</td>
</tr>
<tr>
<td>Trunk Switch Type</td>
<td>Switch type that Client-side ISDN PRI will be simulating. Default is NI2.</td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong>: Switch type must match Network-side switch-type to which this interface is connected.</td>
</tr>
<tr>
<td>D Channel</td>
<td>D-channel number that will be used for Q.931 signaling.</td>
</tr>
</tbody>
</table>
## Table 74  ISDN PRI (PRI/GW) Configuration Parameters

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>B Channel order descending (optional)</td>
<td>For an outgoing call, it enables the system to select the highest free B-Channel from 24 to 1, bypassing the channel configured as D-Channel by &quot;D Channel&quot; parameter above.</td>
</tr>
<tr>
<td>Internal Clocking</td>
<td>The PRI line requires a synching time source which can be &quot;internal&quot; or &quot;external&quot;. The &quot;internal&quot; time source can be a local system clock and the &quot;external&quot; clocking signal is provided by the service provider or the PBX connected on the other side of the PRI line. This option enables the use of internal clock for synching time signal.</td>
</tr>
<tr>
<td>Register with SIP server</td>
<td>This optional parameter enables the device to register with the SIP server. If specified, the value of &quot;Override SIP FROM&quot; parameter below is used, otherwise its default value is used for SIP user name. If authentication is required, &quot;SIP Authentication name&quot; and &quot;SIP Password&quot; parameters below must also be provided.</td>
</tr>
<tr>
<td>Override SIP FROM Username</td>
<td>When an incoming call from PSTN to the Client side PRI gateway is terminated on the IP network, the FROM field in the SIP message towards the IP network contains the value of this parameter. If no value is specified for this parameter, then gateway's LAN MAC address is used by default.</td>
</tr>
<tr>
<td>SIP Authentication name</td>
<td>This parameter is required if &quot;Register with SIP Server&quot; is enabled and authentication is required. It defines the name to be used in the authentication process of the Client side PRI gateway registration with the SIP server.</td>
</tr>
<tr>
<td>SIP Password</td>
<td>This parameter is required if &quot;Register with SIP Server&quot; is enabled and authentication is required. It defines the password to be used in the authentication process of the Client side PRI gateway registration with the SIP server.</td>
</tr>
</tbody>
</table>

### Define configuration for each PRI channel.

<table>
<thead>
<tr>
<th>Channel No.</th>
<th>B-channel number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable</td>
<td>Enables the B-channel as part of the call. By default all the 23 channels are enabled.</td>
</tr>
<tr>
<td>Status</td>
<td>Provides the read-only status for a given PRI channel. Status can be Unknown, Idle, Busy, Not-connected.</td>
</tr>
</tbody>
</table>

**Note:** Fraction of B-channels on the PRI interface can be selected.
Client Side ISDN CAS (CAS/GW) Configuration Page

Use this page to configure the Client Side ISDN CAS (CAS/GW) on the EdgeMarc appliance. Table 66 describes the parameters on this page.

To access this page, choose SIP/GW > CAS Client configuration from the Configuration Menu.
### Table 75  Client Side ISDN CAS Configuration Parameters

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS signaling model</td>
<td>Specifies the type of CAS signaling to be used in the call setup and tear down.</td>
</tr>
<tr>
<td>Internal Clocking</td>
<td>The CAS line requires a synching time source which can be &quot;internal&quot; or &quot;external&quot;. The &quot;internal&quot; time source can be a local system clock and the &quot;external&quot; clocking signal is provided by the service provider or the PBX connected on the other side of the CAS line. This option enables the use of internal clock for synching time signal.</td>
</tr>
</tbody>
</table>
Register with SIP server
This optional parameter enables the device to register with the SIP server. If specified, the value of "Override SIP FROM" parameter below is used, otherwise its default value is used for SIP user name. If authentication is required, "SIP Authentication name" and "SIP Password" parameters below must also be provided.

Override SIP FROM Username
When an incoming call from PSTN to the Client side CAS gateway is terminated on the IP network, the FROM field in the SIP message towards the IP network contains the value of this parameter. If no value is specified for this parameter, then gateway's LAN MAC address is used by default.

SIP Authentication name
This parameter is required if "Register with SIP Server" is enabled and authentication is required. It defines the name to be used in the authentication process of the Client side CAS gateway registration with the SIP server.

SIP Password
This parameter is required if "Register with SIP Server" is enabled and authentication is required. It defines the password to be used in the authentication process of the Client side CAS gateway registration with the SIP server.

**Define configuration for each PRI channel.**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Channel No.</td>
<td>CAs channel number</td>
</tr>
<tr>
<td>Enable</td>
<td>Enables the CAS channel as part of the call. By default all the 24 channels are enabled.</td>
</tr>
<tr>
<td></td>
<td><strong>Note</strong>: Fraction of CAS channels can be selected.</td>
</tr>
<tr>
<td>Status</td>
<td>Provides the read-only status for a given CAS channel. Status can be Unknown, Idle, Busy, Not-connected.</td>
</tr>
</tbody>
</table>

**Table 75  Client Side ISDN CAS Configuration Parameters**
Network Side ISDN PRI (PRI/UA) Configuration Page

Use this page to configure the Network Side ISDN PRI (PRI/UA) on the EdgeMarc appliance. Table 67 describes the parameters on this page.

To access this page, choose SIP/UA > PRI/NET configuration from the Configuration Menu.

To be continued on the next page...
### Table 76 Network Side ISDN PRI Configuration Parameters

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable PRI/GW services</td>
<td>Enables Network side ISDN PRI interface and SIP trunking on IP side.</td>
</tr>
<tr>
<td>PRI line</td>
<td>T1 line (port 1) for ISDN PRI.</td>
</tr>
<tr>
<td>Trunk Switch Type</td>
<td>Switch type that Network-side ISDN PRI will be simulating. Default is Ni2.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> Switch type must match Client-side switch-type to which this</td>
</tr>
<tr>
<td></td>
<td>interface is connected.</td>
</tr>
<tr>
<td>D Channel</td>
<td>D-channel number that will be used for Q.931 signaling.</td>
</tr>
<tr>
<td>Device Name</td>
<td>Device name as it is configured in <strong>VoIP ALG-&gt;SIP-&gt;Trunking page</strong>.</td>
</tr>
<tr>
<td></td>
<td><strong>Note:</strong> It is advisable to change this field, if device name in trunking</td>
</tr>
<tr>
<td></td>
<td>page is changed.</td>
</tr>
</tbody>
</table>
Table 76  Network Side ISDN PRI Configuration Parameters

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>B Channel order descending</td>
<td>For an outgoing call, it enables the system to select the highest free B-Channel from 24 to 1, bypassing the channel configured as D-Channel by &quot;D Channel&quot; parameter above.</td>
</tr>
<tr>
<td>Internal Clocking</td>
<td>The PRI line requires a synching time source which can be &quot;internal&quot; or &quot;external&quot;. The &quot;internal&quot; time source can be a local system clock and the &quot;external&quot; clocking signal is provided by the service provider or the PBX connected on the other side of the PRI line.</td>
</tr>
<tr>
<td>This option enables the use of internal clock for synching time signal.</td>
<td></td>
</tr>
<tr>
<td>Register with SIP server</td>
<td>This optional parameter enables the device to register with the SIP server. If specified, the value of &quot;Override SIP FROM&quot; parameter below is used, otherwise its default value is used for SIP user name. If authentication is required, &quot;SIP Authentication name&quot; and &quot;SIP Password&quot; parameters below must also be provided.</td>
</tr>
<tr>
<td>Override SIP FROM Username</td>
<td>When an incoming call from PSTN to the Network side PRI UA is terminated on the IP network, the FROM field in the SIP message towards the IP network contains the value of this parameter. If no value is specified for this parameter, then gateway's LAN MAC address is used by default.</td>
</tr>
<tr>
<td>SIP Authentication name</td>
<td>This parameter is required if &quot;Register with SIP Server&quot; is enabled and authentication is required. It defines the name to be used in the authentication process of the Network side PRI UA registration with the SIP server.</td>
</tr>
<tr>
<td>SIP Password</td>
<td>This parameter is required if &quot;Register with SIP Server&quot; is enabled and authentication is required. It defines the password to be used in the authentication process of the Network side PRI UA registration with the SIP server.</td>
</tr>
</tbody>
</table>

Define configuration for each PRI channel.

<table>
<thead>
<tr>
<th>Channel No.</th>
<th>B-channel number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable</td>
<td>Enables the B-channel as part of the call. By default all the 23 channels are enabled.</td>
</tr>
<tr>
<td>Status</td>
<td>Provides the read-only status for a given PRI channel. Status can be Unknown, Idle, Busy, Not-connected.</td>
</tr>
</tbody>
</table>

Note: Fraction of B-channels on the PRI interface can be selected.
Network Side ISDN CAS (CAS/UA) Configuration Page

Use this page to configure the Network Side ISDN CAS (CAS/UA) on the EdgeMarc appliance. Table 67 describes the parameters on this page.

To access this page, choose “SIP UA → CAS/NET configuration” from the Configuration Menu.

To be continued on the next page...
Table 77  Network Side ISDN CAS Configuration Parameters

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAS signaling model</td>
<td>Specifies the type of CAS signaling to be used in the call setup and tear down.</td>
</tr>
<tr>
<td>Device name</td>
<td>Specifies the device name as it is configured in 'VoIP ALG-&gt;SIP-&gt;Trunking’ page. It is advisable to change this field, if device name in trunking page is changed.</td>
</tr>
</tbody>
</table>
Internal Clocking

The CAS line requires a synching time source which can be "internal" or "external". The "internal" time source can be a local system clock and the "external" clocking signal is provided by the service provider or the PBX connected on the other side of the CAS line.

This option enables the use of internal clock for synching time signal.

International Prefix

This parameter specifies the digits to be added at the beginning of an international number before it is sent to the SIP server.

Register with SIP server

This optional parameter enables the device to register with the SIP server. If specified, the value of "Override SIP FROM" parameter below is used, otherwise its default value is used for SIP user name. If authentication is required, "SIP Authentication name" and "SIP Password" parameters below must also be provided.

Override SIP FROM Username

When an incoming call from a PBX to the Network side CAS UA is terminated on the IP network, the FROM field in the SIP message towards the IP network contains the value of this parameter. If no value is specified for this parameter, then gateway's LAN MAC address is used by default.

SIP Authentication name

This parameter is required if "Register with SIP Server" is enabled and authentication is required. It defines the name to be used in the authentication process of the Network side CAS UA registration with the SIP server.

SIP Password

This parameter is required if "Register with SIP Server" is enabled and authentication is required. It defines the password to be used in the authentication process of the Network side CAS UA registration with the SIP server.

Define configuration for each PRI channel.

Channel No. | CAs channel number
Enable | Enables the CAS channel as part of the call. By default all the 24 channels are enabled.

**Note:** Fraction of CAS channels can be selected.

Status | Provides the read-only status for a given CAS channel. Status can be Unknown, Idle, Busy, Not-connected.

Table 77  Network Side ISDN CAS Configuration Parameters

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal Clocking</td>
<td>The CAS line requires a synching time source which can be &quot;internal&quot; or &quot;external&quot;. The &quot;internal&quot; time source can be a local system clock and the &quot;external&quot; clocking signal is provided by the service provider or the PBX connected on the other side of the CAS line. This option enables the use of internal clock for synching time signal.</td>
</tr>
<tr>
<td>International Prefix</td>
<td>This parameter specifies the digits to be added at the beginning of an international number before it is sent to the SIP server.</td>
</tr>
<tr>
<td>Register with SIP server</td>
<td>This optional parameter enables the device to register with the SIP server. If specified, the value of &quot;Override SIP FROM&quot; parameter below is used, otherwise its default value is used for SIP user name. If authentication is required, &quot;SIP Authentication name&quot; and &quot;SIP Password&quot; parameters below must also be provided.</td>
</tr>
<tr>
<td>Override SIP FROM Username</td>
<td>When an incoming call from a PBX to the Network side CAS UA is terminated on the IP network, the FROM field in the SIP message towards the IP network contains the value of this parameter. If no value is specified for this parameter, then gateway's LAN MAC address is used by default.</td>
</tr>
<tr>
<td>SIP Authentication name</td>
<td>This parameter is required if &quot;Register with SIP Server&quot; is enabled and authentication is required. It defines the name to be used in the authentication process of the Network side CAS UA registration with the SIP server.</td>
</tr>
<tr>
<td>SIP Password</td>
<td>This parameter is required if &quot;Register with SIP Server&quot; is enabled and authentication is required. It defines the password to be used in the authentication process of the Network side CAS UA registration with the SIP server.</td>
</tr>
</tbody>
</table>
WAN Link Redundancy Configuration Page

Use this page to configure the WAN Link Redundancy on the EdgeMarc appliance. Table 78 describes the configurable parameters on this page.

To access this page, choose “Wan-Link Redundancy” submenu from “Configuration Menu”

Table 78   WAN Link Redundancy

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Interface</td>
<td>Allows the user to choose Primary or Secondary interface as the active interface for data. If Revertive Mode is enabled, then the chosen interface will also be treated as the main interface for data services. The only time this interface will not be used is when it is down.</td>
</tr>
<tr>
<td>Voice Interface</td>
<td>Allows the user to choose Primary or Secondary interface as the active interface for voice. If Revertive Mode is enabled, then the chosen interface will also be treated as the main interface for voice services. The only time this interface will not be used is when it is down.</td>
</tr>
</tbody>
</table>
The WAN Link Redundancy page contains the following buttons:

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable WAN Link Redundancy</td>
<td>Enable WAN Link Redundancy by selecting the check box. WAN Link Redundancy is disabled if the check box is cleared.</td>
</tr>
<tr>
<td>Enable Revertive Mode</td>
<td>Select the checkbox to delete the subnet.</td>
</tr>
<tr>
<td>Note:</td>
<td>Priority calling services cannot be configured when WAN Link Redundancy is enabled.</td>
</tr>
<tr>
<td>Manual Switchover</td>
<td>Switches voice and data services from their currently active interfaces over to their inactive interfaces. This action will result in a network restart.</td>
</tr>
<tr>
<td>Note:</td>
<td>Only works when Revertive Mode is disabled.</td>
</tr>
</tbody>
</table>

### Table 78 WAN Link Redundancy

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable WAN Link Redundancy</td>
<td>Enable WAN Link Redundancy by selecting the check box. WAN Link Redundancy is disabled if the check box is cleared.</td>
</tr>
<tr>
<td>Enable Revertive Mode</td>
<td>Select the checkbox to delete the subnet.</td>
</tr>
<tr>
<td>Note:</td>
<td>Priority calling services cannot be configured when WAN Link Redundancy is enabled.</td>
</tr>
<tr>
<td>Manual Switchover</td>
<td>Switches voice and data services from their currently active interfaces over to their inactive interfaces. This action will result in a network restart.</td>
</tr>
<tr>
<td>Note:</td>
<td>Only works when Revertive Mode is disabled.</td>
</tr>
</tbody>
</table>
Secondary Interface Settings Configuration Page

Use this page to configure the Secondary interface for the WAN Link Redundancy feature on EdgeMarc. Table 79 describes the configurable parameters on this page.

To access this page, choose “Wan-Link Redundancy→Secondary WAN Config” submenu from “Configuration Menu”
Table 79  Secondary Interface Settings

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
</table>
| Radio buttons         | Select the method used to obtain a connection to the Internet:  
  • ADSL-PPPoE — When this option is selected, only areas B and C from the above figure are visible.  
  • DHCP — Allows the device to obtain the WAN-side IP address using a DHCP server available from the WAN side of the network. **NOTE:** To see the WAN IP address for the system, go to the Network Information page. Only area C is visible for this option.  
  • Static IP Address — Allows you to configure the WAN interface with a static IP address (default). Areas C and D are visible for this option.  
  • EVDO — Allows the device to use a 3G card from Verizon Wireless. Only area C is visible for this option.  
  • T1 — Allows you to configure the WAN interface with a static IP address and also configure and test the T1 interface on the system on the T1 Configuration page. You can click the underlined link to open the T1 Configuration page. For information on using the T1 Configuration page, see Test UA Settings page on page 279. Areas C and D are visible for this option. |
| User Name             | Enter the user name assigned by your network provider.                                                                                     |
| Password              | Enter the password assigned by your network provider.                                                                                       |
| Keepalive Ping        | Select to send an ICMP echo request to its gateway every minute to ensure that the ISP keeps the PPPoE connection open.                      |
| PPPoE Link Status     | View the status of the PPPoE line.                                                                                                          |
| IP Address            | IP address to be assigned manually.                                                                                                         |
| Subnet Mask           | Subnet mask to be assigned manually.                                                                                                        |

**Secondary WAN Network Settings**

**Note:** Enter these settings if you selected Static IP Address or T1 in the WAN interface Settings area.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default Gateway</td>
<td>Enter the default IP gateway for the system. This gateway will be on the same IP subnet as the IP address.</td>
</tr>
<tr>
<td>Primary DNS</td>
<td>Enter the primary DNS server as supplied by the ISP.</td>
</tr>
<tr>
<td>Secondary DNS</td>
<td>Enter the secondary DNS server as supplied by the ISP. Used if the primary server is unavailable.</td>
</tr>
</tbody>
</table>

**Secondary WAN Redundancy Settings**
The Secondary Interface Settings page contains the following buttons:

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable Ping based status detection</td>
<td>If WLR is enabled and this field is checked, then the system sends ICMP packets to the “Ping Hot” and if no response is received, then the link is declared as down.</td>
</tr>
<tr>
<td>Ping Host</td>
<td>If “Enable Ping based status detection” is checked and WLR is enabled, then ICMP packets will be sent to the host whose IP address is specified in this field.</td>
</tr>
</tbody>
</table>

Submit  Applies the settings configured on this page.
Reset   Clears all fields and selections and allows you to enter new information.

Table 79  Secondary Interface Settings
WAN Link Parameters Configuration Page

Use this page to configure the various parameters effecting the behavior of WAN Link Redundancy feature on the EdgeMarc. Table 80 describes the configurable parameters on this page.

To access this page, choose “Wan-Link Redundancy → WLR Parameters Config” submenu from “Configuration Menu”

Table 80  WLR Parameters Configuration

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Link Detection Module</strong></td>
<td></td>
</tr>
<tr>
<td>Up Link Timer</td>
<td>Specifies the time interval in seconds before the module polls a physically up interface for its status.</td>
</tr>
<tr>
<td>Up Link Attempts</td>
<td>Specifies the number of UP responses from a previously down interface before it can be declared as up.</td>
</tr>
<tr>
<td>Down Link Timer</td>
<td>Specifies the time interval in seconds before the the module polls a physically down interface for its status.</td>
</tr>
<tr>
<td>Down Link Attempts</td>
<td>Specifies the number of DOWN responses from a previously physically up interface before it can be declared as down.</td>
</tr>
<tr>
<td><strong>Ping Detection Module</strong></td>
<td></td>
</tr>
<tr>
<td>Up Ping Timer</td>
<td>Specifies the time interval in seconds before the module sends an ICMP packet on a physically up link to the “Ping Host”.</td>
</tr>
<tr>
<td>Up Ping Attempts</td>
<td>Specifies the number consecutive responses for ICMP requests from the “Ping Host” on a previously down link before the link can be declared as up.</td>
</tr>
</tbody>
</table>
### Item Description

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Down Ping Timer</td>
<td>Specifies the time interval in seconds before the module sends an ICMP request on a down link with physically up interface.</td>
</tr>
<tr>
<td>Down Ping Attempts</td>
<td>Specifies the number of consecutive ICMP requests with no responses from the &quot;Ping Host&quot; on a physically up interface with a previously up link status.</td>
</tr>
</tbody>
</table>
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      <vincent.rijmen@esat.kuleuven.ac.be>  * @author Antoon Bosselaers
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