RG 8700 V1.3
Key Component of a Stronger OpenScape Voice Family

As you move to more challenging next-generation networking, you need to more effectively interface circuit-switched traffic with your IP network.
Siemens’ RG 8700 Survivable Media Gateways (RG 8716 with 16 E1/T1, RG 8708 and RG 8702 with 8 and 2 E1/T1 respectively) offer the versatility, flexibility, redundancy and carrier-grade reliability to help you easily overcome the difficult networking challenges and profitably reach your revenue goals.

As a key component of the OpenScape Voice family of next generation networking solutions and applications for the enterprise environment, the RG 8700’s use the same administration tools such as the OpenScape Voice Assistant as the OpenScape Voice, thus making administration easier and more cost effective.

Because the RG 8700 family group supports a variety of industry standards protocols, you’ll have greater flexibility to deploy the precise service mix your customers want - faster than your competition.

The RG 8700’s provide the versatility to quickly convert voice, fax, modem and data traffic originating from the TDM network into packets that can be transmitted over the QoS IP network. With the survivability feature and the RG 8700’s support of dual-registration/proxy with all vendors supported SIP phones, you reduce the impact of WAN downtime.

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Also, you ensure continuous business flow to/from the PSTN via ISDN PRI/S2M CAMA (US only), and QSIG/ConNet.

With 3rd party outbound proxy support, more reliability is provided. Add the redundancy option and you can insure further back-up. The RG 8700 scalability gives you the flexibility to purchase only what you need, which keeps initial investment low while allowing for growth. All of this is accomplished with carrier-grade reliability that also enables profitable and rapid deployment of innovative, differentiated services.

**Highlights at a Glance**

The RG 8700 Survivable Media Gateway provides a scalable and standards-based platform that mediates TDM traffic to the packet world with carrier-grade reliability.

Offers seamless normal and survivability modes with continuous 911 access (US only); automatically invokes survivability mode when host connection is lost and continues to maintain active calls and 911 services while handling the switching of new calls.

When coupled with the OpenScape Voice, the RG 8700 provides a comprehensive array of features and facilities to SIP endpoints, which provide the user with an easy-to-use, reliable and "feature-rich" communications environment. Also, the RG 8700 supports connections in branches with OpenScape Branch.

Georedundancy offers additional flexibility to OpenScape Voice geographically separated nodes. It provides continuous RG 8700 normal mode service if one of the OpenScape Voice geographically separated nodes fail.

Many customers have been requesting a method of marking layer 3 IP packets using Differentiated Services Code Point (DSCP). The RG 8700 has the support to Layer 3 Packet Marking-DiffServ Code Point.

This allows them to support coarsely-grained, class-based mechanism for traffic management.

The RG 8700 also provides enhanced Bearer Security with RTP encryption and TLS Rapid Recovery of TLS connections to ensure that the encryption keys that are exchanged are kept secret.

The RG 8700 also supports payload encryption (i.e. Secure Real-Time Transport Protocol) over SIP-Q and SIP-Q V2 connections. This includes the ability to send the MIKEY I-message at the session level.
Once in survivability mode, the connection with HiPath Xpressions still remains – so it is still possible to listen to your voice messages that were delivered while the gateway was in normal mode (configuration needed).

With the Rapidstat tool, the system’s status and health can be quickly checked in a useful format. The field usable Real Time Trace (RTT) provides a mechanism in which tracing of signaling messages, status commands and development logs in RG 8700 can be retrieved from a remote machine using RTT Client Tool. The client is included in the OpenScape Voice trace manager.

Connectivity to PSTN

The main purpose of the RG8700 gateway is to provide connectivity to the PSTN over ISDN Primary Rate Interface (PRI) E1/T1 trunks. The following protocols are supported in V1.3:

**ISDN PRI Protocol Variants**
- ETSI
  - CLIP - Calling Line ID Presentation
  - CLIR - Calling Line ID Restriction
- ANSI
  - NI-2
  - Sprint DMS-250 PRI
  - DEX600 PRI
  - MCI DMS-250 PRI
  - AT&T 4ESS PRI
  - AT&T 5ESS PRI

**Additional PRI Services**
- E911 CPN support
- ETSI Calling number and name services
- NI2, AT&T, Sprint and MCI Call-By-Call Services
- QSIG/CorNet Tunneling for interfacing to HiPath 4000/OpenScape 4000

The RG 8700 provides enhanced and faster retrieval of subscriber data from OpenScape Voice via the SOAP server.

The RG 8700 includes the Audit Feature which is used to clean-up call blocks retained due to callback activation that might occur. The timers that are involved in that feature can be configured via CLI command or via Common Management Portal.

Secure Shell (SSH) provides a useful and flexible tool, so that Telnet and FTP-like capabilities can be carried on securely while preventing vulnerable access to the actual Telnet and FTP ports.

Survivability

In a typical business environment with geographically distributed branch offices or hotel locations, media gateways will be located at the outlying locations to ensure that, in the event of a WAN failure or where the OpenScape Voice can no longer be reached, communications with the customers or HQ personnel is still possible over the PSTN and to ensure that the impact of the outage is minimal. The goal of the Survivable Media Gateway is to provide cost effective, temporary, basic communications with the outside world.

RG 8700 survivability is accomplished with the use of SIP phones that are registered via proxy (under of RG8700) or via dual registration with the OpenScape Voice during normal operation and also with the RG 8700 (this is supported by optiPoint 410/420 and OpenStage 15/20/40/60/80). When the RG 8700 senses that it can no longer communicate with the OpenScape Voice, it transitions to its survivability mode thus allowing those SIP phones that are dual-registered to maintain access to the PSTN trunks. In this mode, there is also limited support of keyset and Direct Station Selection (DDS) phones as well as DN range-specific call forwarding.

The RG 8700 uses a single 1U, 19" Field Replaceable Unit (FRU) that accommodates up to 16 E1/T1 for maximum flexibility.

It supports a wide range of voice codec types (PCMU, PCMA, G.729A, G.723d, G.726_16, G.726_24, G.726_32, G.726_40) from any port and offers support for all bearer traffic modes, including voice, analog fax, T.38, modem and ISDN PRI/S2M over IP.

**Supported Devices**

The following Siemens SIP phones are currently supported:
- optiPoint 410/420
- OpenStage 15/20/40/60/80
- optiClient 130
- OpenScape Desktop PE and Web Client
- optiPocket
- 3rd party phones

**Operation**

Switching from normal to survivability mode is fully automatic and virtually transparent to the user. However, a special display message is presented on the optiPoint and OpenStage phones to advise the users that the RG 8700 is temporarily in survivability mode. Connected two-party calls in progress with other dual-registered phones will be maintained; calls that were on hold or in the process of dialing or otherwise not in a stable connected state, will be dropped and must re-initiate the call. Also, calls that were established between a PSTN user and a dual-registered RG 8700 user will be maintained.
Enabling
Survivability is a standard feature of the RG 8700 Gateway, and there is no command to disable this function. Also see Administration and Provisioning.

Call Processing
Because of the nature of the SIP function split between end devices and the call processing engine, some features that depend on OpenScape Voice call processing and the media server will no longer be available while the RG 8700 is operating in survivability mode. For example, recorded announcements will not be available.

Basic call set up, incoming, outgoing, internal and external only is possible:
- SIP-to-SIP calls; SIP-to-GW calls; GW-to-SIP calls
- PRI to PRI
- Basic CorNet-NQ calls
- QSIG-SIP Interworking
- E911 calls
- Local Subscriber Number Translation
- Headset operation; open-listening; speakerphone; mute; Ringer on/off function; Key Click on/off; Tone Generation; Local Display of Time of Day Clock (non-synchronized); Call Duration time Display; Local ID shown in idle menu.
- Phone Features; Call Forwarding; Call Hold; Call Transfer; Call Waiting; 3-Way Calling (phone based); Do Not Disturb.

Hunt Groups
In survivability mode, incoming PSTN DID calls will be routed to the Directory Number (DN) associated with the phones registered on the RG 8700. Calls directed to phones which are no longer reachable can be directed to a single answering position. In the case of MLHGs when a line is busy, calls can be offered to next line or an overflow number. For outgoing calls, trunk groups will continue to direct calls in an orderly manner. However, since the OpenScape Voice routing mechanism is no longer available, some PSTN services may no longer be accessible for the brief time until communication with the OpenScape Voice is restored.

SIP-to-SIP Calls
While in survivability mode, SIP phone to SIP phone calls within the same Business Group (BG) are possible by dialing the extension number. SIP-to-SIP calls to another different BG are accomplished by dialing the Directory Number of the destination phone.

It is possible to have multiple RG 8700 in one location. While in survivability mode, it is possible for phones registered on one RG 8700 to call a phone registered on another RG 8700, however, the call must be routed via the PSTN.

SIP endpoints are configured manually in the OpenScape Voice Location Database. The Location Database is duplicated in the RG 8700 by “copying” to the local memory.

The RG 8700 sends messages to the OpenScape Voice at regular intervals. The RG 8700 relies on the response from the OpenScape Voice to determine that the link with the OpenScape Voice is good.

In case the RG 8700 does not get a response to its register requests at predetermined intervals, it assumes the WAN is down and switches to survivability mode.

The SIP gateway now handles calls locally and reroutes calls to the local gateway or local endpoint.

The gateway adds or strips off leading access code digits, 9, 0, and so on.

**QSIG-SIP Interworking**

The RG 8700 can be connected to network elements via QSIG/CorNet-NQ ISDN signaling protocol.

The RG 8700 will perform basic protocol and service interworking between SIP and QSIG/CorNet-NQ in stand-alone mode. CorNet-NQ is Siemens extension of QSIG protocol to allow extended call features. Basic call and Calling/Connected ID supplementary service is same in CorNet-NQ and QSIG. QSIG also supports overlapping digits.

**E911 access (US only)**

To provide E911 access, 8-channels from the RG 8700 are connected to an external channel bank which in turn is connected to analog CAMA trunks.

In survivability mode, the RG 8700 will forward the Calling Party Number (CPN) to the PSAP operator.

The Location Identifier Number (LIN) is locally provisioned.

**Clocking**

The RG 8700 should be clocked externally from an extracted receive clock from any T1 or E1 line. In this case this clocking is interrupted, the RG 8700 has an internal 24 hour holdover clock.

**Call Restriction Descriptor**

The call restriction profile object (CRD) contains a digit string and rate area parameter to be used for filtering calls. This object is referenced for SIP-to-SIP and SIP-to-PRI calls during survivability mode only.

**Rate Area**

The Rate Area assigned via the Common Management Portal is used on the RG 8700 in survivability mode to primarily screen outgoing calls associated with a particular subscriber group (Rate Area).

**Digit Manipulation**

The RG 8700 provides an enhanced Digit Manipulation which can be very useful to manipulate digit substitutions, multi-line hunt groups, access codes, etc.

**Call Detail Recording**

In normal mode, call records are controlled and kept by the OpenScape Voice.

In survivability mode, a subset of the CDR records is stored in the RG 8700. When normal operation is restored, the craft person or Call Accounting device must manually retrieve/poll the call records from the RG 8700 for collating them with the OpenScape Voice call records.

In survivability mode, call records are stored in non-volatile memory in the RG 8700. However, the storage is generally done in a circular fashion meaning that it is important to have a procedure for pulling off stored data else it will eventually be overwritten.

The following call details are stored in the RG 8700 during survivability mode:
- Record Type
- Start Time
- Duration of Call
- Carrier ID Parameter
- Terminating Number/Called Party
- Originating Number/Calling Party
- Attempt Indicator
- Release Cause/Completion Indicator
- Incoming PRI Group ID
- DSO ID
- Signaling Type
- Codec Used
- Packets Sent (Not for SIP <-> SIP calls)
- Packets Received (Not for SIP <-> SIP calls)
- Packets Lost (Not for SIP <-> SIP calls)
- Inter-arrival Jitter (Not for SIP <-> SIP calls)
- RTP Security Information
- And others

**Serviceability**

The RG 8700 supports FODN only (Fully Qualified Domain Name) and DNS-SRV. The customer network must have and use a DNS server or the OpenScape Voice Host file.
Administration and Provisioning

A major advantage of the RG 8700 is that it utilizes the same suite of tools via Common Management Portal as the OpenScape Voice.

Upon initial installation and commissioning, there are some entries that can only be made locally via the Craft port on the RG 8700, for example: entry of IP address. However, most provisioning can be made from the OpenScape Voice Assistant terminal and information, such as registered devices, is pushed to the RG 8700 using FTP.

Monitoring Alarms

The RG 8700 identifies the occurrence of certain conditions by sending SNMP event notifications, or traps, to the OpenScape Voice Assistant. These conditions communicate the health of the devices and include thresholds that have exceeded predetermined values, among others.

While some traps simply provide information, a number of traps indicate abnormal conditions within a device or in the network that require the attention of a network operator. These conditions are reported as alarms by the OpenScape Voice Assistant.

Customer Database

Local configuration data is stored on flash memory in the RG 8700. It is downloaded from the OpenScape Voice Assistant via SOAP.

Some of the subscriber information which is stored in the RG 8700:
- Directory number (DN) of all subscribers
- User Name & Password
- Subscriber Realm
- Rate Area
- Business Group
- Number of digits for extensions
- Default/Attendant answering position DN

Upgrades

The goal is to have software upgrades only for introducing new features.

During the upgrade, service to/from the PSTN will be interrupted, however internal SIP to SIP calls will be maintained via OpenScape Voice.

Hardware

The complete unit is a single Field Replaceable Unit (FRU), mountable in a standard 19-inch rack. Brackets are shipped with the unit. The RG 8700 can be mounted anywhere in the rack.
- Motorola 440, 8250 processors
- Compact single board, rack-mountable, stackable FRUs
- Dimensions (WxHxL)
  - 17.138" (435.30 mm)
  - 1.748" (44.40 mm - 1U)
  - 16.70" (424.18 mm)
- Universal Power Supply (110 V/220 V)
- Operating System
  - VxWorks

LAN Interfaces and PSTN Connections

- 1x10/100 Base T, for RTP Bearer traffic
- 1x10/100 Base T for SIP signaling
- 1x10/100 Base T for Administration & Maintenance
- 2, 8, or 16 RJ45 interfaces for connection to the PSTN E1/T1 PRI circuits.

Supported Codecs

The RG 8700 supports the following codecs:
- Voice CODECs: PCMU, PCMA, G.729A, G.723d1, G.726_16, G.726_24, G.726_32, G.726_40
Models

RG 8700 V1.3 offers the following hardware models and configurations:

- **8716 Non-redundant**
  - 16 T1/E1
  - 368 or 480 trunks
- **8716 Redundant**
  - 16 T1/E1
  - 368 or 480 trunks
- **8708 Non-redundant**
  - 8 T1/E1
  - 184 or 240 trunks
- **8708 Redundant**
  - 8 T1/E1
  - 184 or 240 trunks
- **8702 Non-redundant**
  - 2 T1/E1
  - 46 or 60 trunks
- **8702 Redundant**
  - 2 T1/E1
  - 46 or 60 trunks

Voice, Fax & Modem Support

- Transparent Fax over IP with G.711 or T.38
- Modern support using G.711
- DTMF recognition and generation with relay capabilities whenever low-bit-rate codecs are used.
- Silence detection and suppression
- Comfort noise generation
- Echo cancelation up to 128 ms per channel per G.168
- ISDN transparent access 56 and 64 kbit/s
- Adaptive jitter buffer up to 150 ms
- Packet loss concealment
- VoIP protocol: SIP Version 2

Telephony Interface

- PRI (User side, TE)
- 2, 8, 16 x T1/E1

Capacities

- **Number of users E1/T1**
  - 8702: up to 500
  - 8708: up to 1000
  - 8716: up to 2000
- **Number of E1/T1 circuits**
  - 8702: 2
  - 8708: 8
  - 8716: 16
- **Number of B channels E1/T1**
  - 8702: 60/46
  - 8708: 240/184
  - 8716: 480/368
- **Number of simultaneous connections E1/T1**
  - 8702: 60/46
  - 8708: 240/184
  - 8716: 480/368

Alarm Indicators

The front panel has 6 LED alarm indicators:

- Power on/off indicator.
- Status LED: normal operation or initialization/self test.
- Fan error LED.
- Critical alarm LED: A Critical alarm service-impacting failure was detected.
- Major alarm LED: A Major alarm condition was detected, indicating a service-affecting condition or fault.
- Minor alarm LED: A Minor alarm condition was detected, indicating a potential service-affecting condition or fault.

Certifications

**EMI/EMC**

- EN 300 386-2 V1.1.3 ElectroMagnetic Compatibility (EMC) requirements; For non-Telecommunication Center applications and FCC Part 15 Subpart B Class A (including Canada).

**Safety**

- UL/CSA UL60950-1; EN60950-1 and IEC 60950-1; Safety of Information Technology Equipment CE certified.

**Telecoms (ISDN)**

- ANSI/TIA-968-A:2002 Telephone Terminal Equipment. Technical Requirements for Connection of Terminal Equipment to the Telephone Network (formerly FCC part 68) and Industry Canada CS-03 Attachment Requirements; T1
- ETSI TBR12 Business Telecommunications (BTC); Open Network Provision (ONP) technical requirements; 2048 kbit/s digital unstructured leased lines (D2048U); Attachment requirements for terminal equipment interface; E1
- ETSI TBR13 Business Telecommunications (BTC); 2048 kbit/s digital structured leased lines (D2048S);
- Attachment requirements for terminal equipment interface; E1, ITU-T G.703 Physical/electrical characteristics of hierarchical digital interfaces; E1/T1

**Operating Environment**

**Ambient Operating Temperature**

- +5 °C (+41 °F) to +40 °C (104 °F) long term
- +5 °C (+41 °F) to +50 °C (122 °F) short term

**Ambient Operating Humidity**

- 5 % to 85 % RH (operating), 5 % to 90 % RH (short term), non-condensing

**Ambient Storage Temperature**

- -40 °C (-40 °F) to +70 °C (158 °F)

**Ambient Storage Humidity**

- 5 % to 95 % RH, non-condensing