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# Squire Technologies

## SVI\_MG

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SS7 to VoIP Media Gateway

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# SVI\_MG Media Gateway

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## SVI\_MG Overview

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- ▶ **The SVI\_MG SS7 Media Gateway enables Next Generation VoIP and VoLTE / IMS networks to seamlessly interconnect to legacy PSTN and mobile 2G + 3G networks.**
- ▶ **With full support for VoLTE and IMS based standards the SVI-MG provides a full Breakout Gateway Control Function ( BGCF ).**
- ▶ **A mature, proven, carrier grade technology packed with feature rich capabilities derived from a decade of global deployments.**

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# SVI\_MG Media Gateway

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## SVI\_MG Overview

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- ▶ The SVI MG is offered in 2 models the SVI\_MG **1000** and the SVI\_MG **8000** to satisfy clients deployment requirements and budget.
- ▶ The differences between the 1000 and 8000 models lie in the supported interfaces, scaling, form factors and redundancy options
- ▶ **SVI-MG 1000**
  - ▶ Entry Level product supporting from 1 to 72 E1/T1
  - ▶ Delivered in 1U, 2U or 4U PCI 19'
  - ▶ PCI Form Factor
  - ▶ Optional 1+1 Redundancy
- ▶ **SVI-MG 8000**
  - ▶ Full carrier grade product supporting from 1 to 1000 E1
  - ▶ Support for OC-3 / STM-1/ DS3 interfaces
  - ▶ Full Dual Plane Redundancy provided as standard
  - ▶ cPCI form factor

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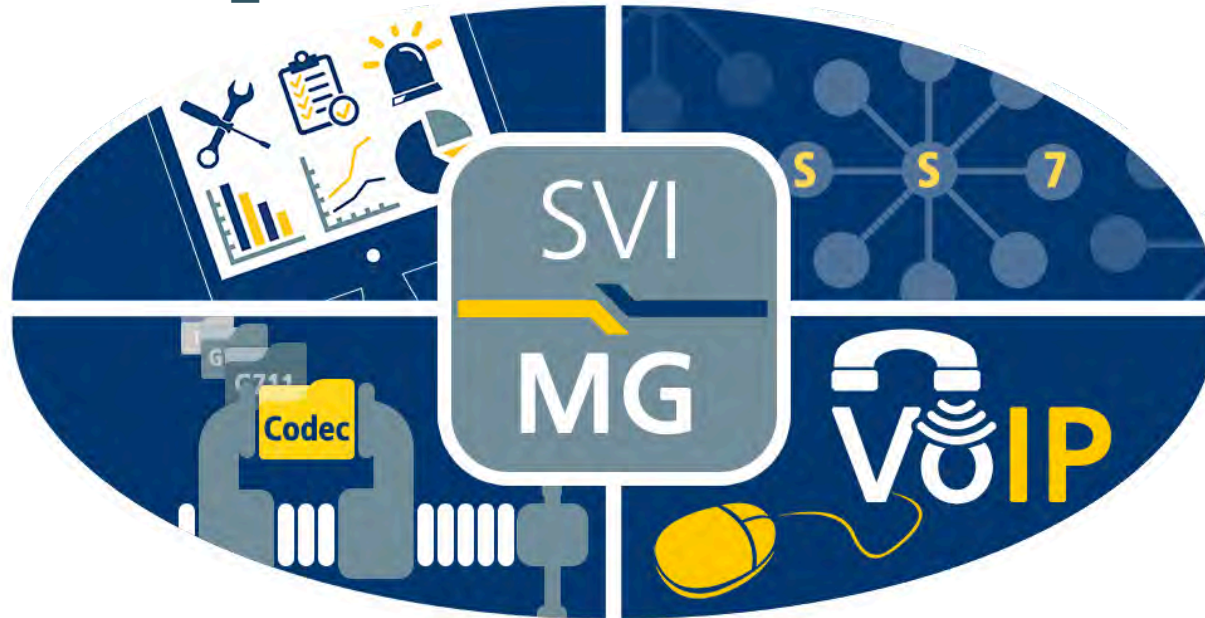
# SVI-MG Media Gateway

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## SVI\_MG Overview

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The signalling, supported media codecs, routing capabilities and OA&M interface is **common** across both SVI\_MG models



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### Common Signalling Functionality

SS7, ISDN, SIP, H.323, SIP-I, SIP-T, SIGTRAN

### Common Codec Functionality

G.711, G.726, G.727, G.723.1, G.729 A/B, GSM FR, MS, GSM, NetCoder, AMR, ilbc, G.722, T.38, Echo Cancellation, DTMF detection/generation, Call Progress tones, modem detection

### Common Operation, Admin and Maintenance Interface

User Interface, log files, traces

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# SVI\_MG Media Gateway

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## Product Overview

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### ▶ **Product Range**

- ▶ MG 1000
- ▶ MG 8000

### ▶ **Interfaces & Protocols**

- ▶ VoIP Protocols
- ▶ VoIP Media
- ▶ VoLTE Deployment Model
- ▶ PSTN Physical Interconnect
- ▶ SS7 MTP Configuration
- ▶ PSTN Layer 4 protocols

### ▶ **Performance Benchmarks**

- ▶ SS7 <-> SIP

### ▶ **Operational Functionality**

- ▶ Intelligent Call Routing
- ▶ External Routing APIs
- ▶ Billing Interface
- ▶ OA&M
- ▶ Security

### ▶ **Redundancy**

- ▶ 1000 Redundancy Model
- ▶ 8000 Redundancy Model

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# SVI\_MG 1000

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## Overview

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- ▶ Single box solution
- ▶ Scales from 1E1 to 72E1, upgrade path 1E, 2E1, 4E1, 8E1, E1/T1 interfaces
- ▶ Supports 1+1 Redundancy
- ▶ PCI Form Factor
- ▶ Delivered in 1U, 2U or 4U PCI 19' Telco Grade Chassis

# SVI\_MG 8000

## Overview



- ▶ Large scale deployments
- ▶ Scales from 16E1 to 1000 E1, upgrade path 8E1,16E1, E1/T1 interface support
- ▶ Support for OC-3 / STM-1/ DS3 interfaces
- ▶ Supports up to 9 x OC-3 / STM-1 interfaces
- ▶ Supports up to 27 x DS3/T3 interfaces,
- ▶ upgrade path 1xT3, 2xT3, 3xT3
- ▶ Full Dual Plane Redundancy provided as standard via Gateway Controller <-> Blade Server architecture.
- ▶ cPCI Form Factor – providing industry standard hot-swap capabilities
- ▶ Delivered in 1U, 2U, 5U or 8U cPCI 19' Telco Chassis

# SVI\_MG Media Gateway

## VoIP Protocols Supported

### SIP

- ▶ RFC 2246 The TLS Protocol
- ▶ RFC 2327 Session Description Protocol
- ▶ RFC 2976 SIP INFO Method
- ▶ RFC 3204 MIME media types for ISUP and QSIG Objects
- ▶ RFC 3261 Session Initiate Protocol
- ▶ RFC 3262 Reliability of Provisional Responses
- ▶ RFC 3263 SIP: Locating SIP Servers
- ▶ RFC 3264 An Offer/Answer Model with SDP
- ▶ RFC 3311 Update Method
- ▶ RFC 3325 SIP Asserted Identity
- ▶ RFC 3326 The Reason Header Field
- ▶ RFC 3372 SIP For Telephones SIP-T
- ▶ RFC 3398 ISUP-SIP Mapping

▶ RFC 3515 Refer Method

▶ RFC 3578 Overlap

▶ RFC 3581 An Extension to the Session Initiation Protocol (SIP) for Symmetric

### Response Routing

▶ RFC 3665 Session Initiation Protocol (SIP)

### Basic Call Flow Examples

▶ RFC 3666 Public Switched Telephone Network (PSTN) Call Flows

▶ RFC 3711 SRTP

▶ RFC 3891 "Replaces" Header

▶ RFC 3892 Referred-By Mechanism

▶ RFC 4028 Session timers in SIP

▶ RFC 4612 Real-Time Facsimile (T.38)

▶ RFC 4566 Session Description Protocol

▶ RFC 5806 Diversion Indication in SIP

▶ draft-levy-sip-diversion

▶ draft-ietf-sip-privacy

▶ draft-mahy-iptel-cpc

### H.323

▶ Fast and Slow Start

▶ ITU Version 2 and 4

▶ Gateway/ Gate Keeper interconnect

### SIP-I

▶ ITU Q.1912 for ISUP/ C7 to SIP interworking

### SIP-T

▶ ITU Q.1912 for ISUP/ C7 to SIP interworking

### SIGTRAN

▶ SCTP RFC 2960 Stream Control Transmission Protocol

▶ M2UA RFC 3331 Signaling System 7 (SS7) Message Transfer Part 2 (MTP2) - User Adaptation Layer (M2UA)

▶ M3UA RFC 3332 Signaling System 7 (SS7) Message Transfer Part 3 (MTP3) - User Adaptation Layer (M3UA)

▶ SUA RFC 3868 Signalling Connection Control Part User Adaptation Layer (SUA)

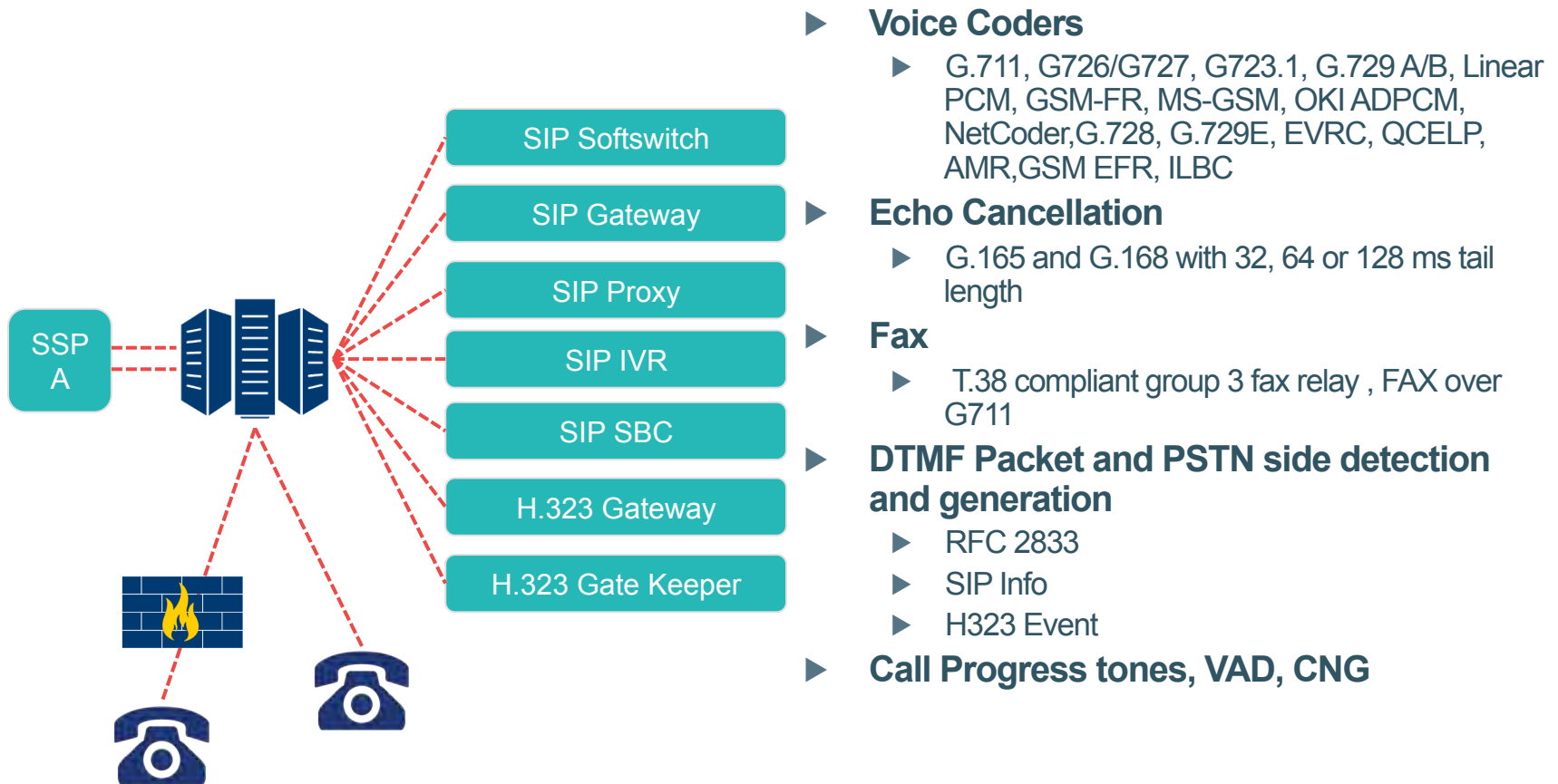
▶ M2PA RFC 4165 Signalling System 7 (SS7) Message Transfer Part 2 (MTP2) User Peer-to-Peer Adaptation Layer (M2PA)

▶ IUA RFC 3057 ISDN Q.921-User Adaptation Layer (IUA)



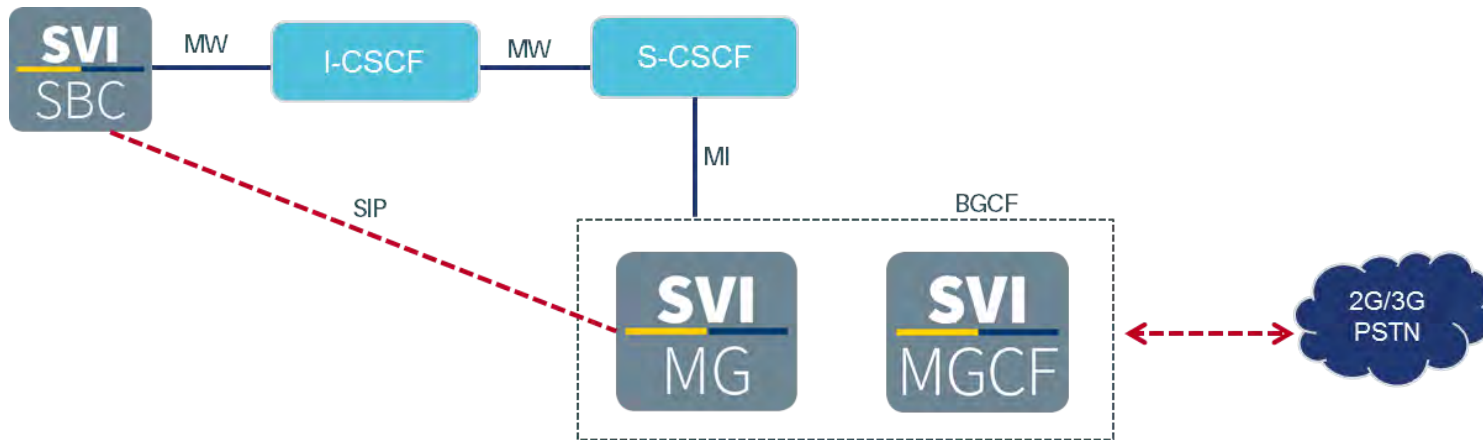
# SVI\_MG Media Gateway

## VoIP Media



# SVI\_MG Media Gateway

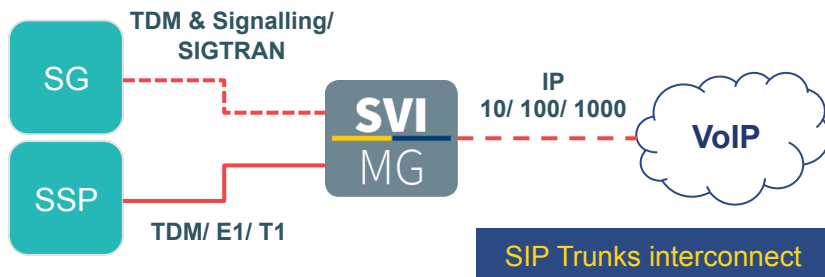
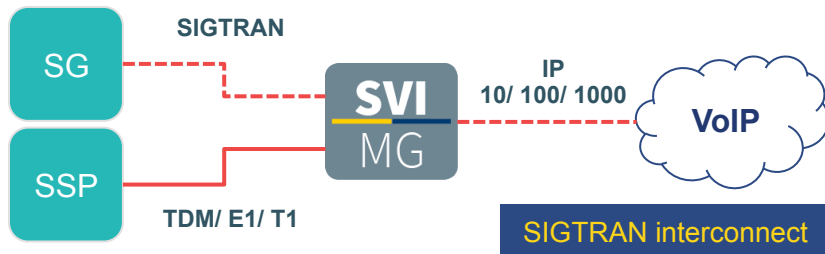
## VoLTE Deployment Model



- ▶ **Seamless breakout to legacy PSTN and mobile 2G + 3G networks**
- ▶ **Full support for IMS Breakout Gateway Control Function ( BGCF )**
- ▶ **Deployed as standalone unit or integrated with MGCF ( Media Gateway Control Function ) or MGC (Media Gateway Controller)**

# SVI\_MG Media Gateway

## PSTN Physical Interconnect



Supporting multiple interface types the SVI-MG delivers simultaneous termination of TDM and IP PSTN interconnect as well as simultaneous conversion between all variants.

### TDM interconnect

- E1/ T1
- T3, DS3
- OC-3/ STM-1

### SIGTRAN

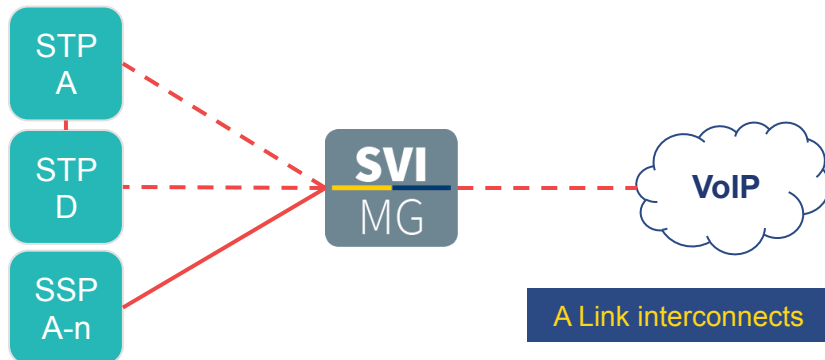
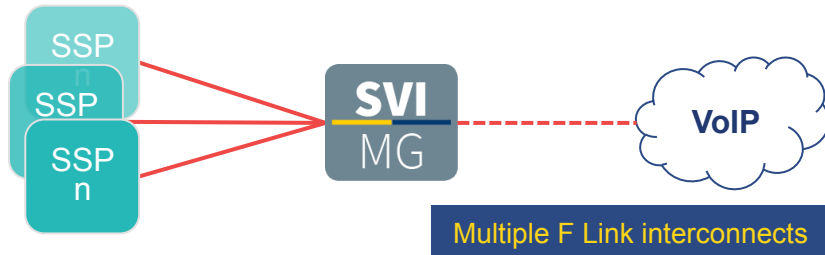
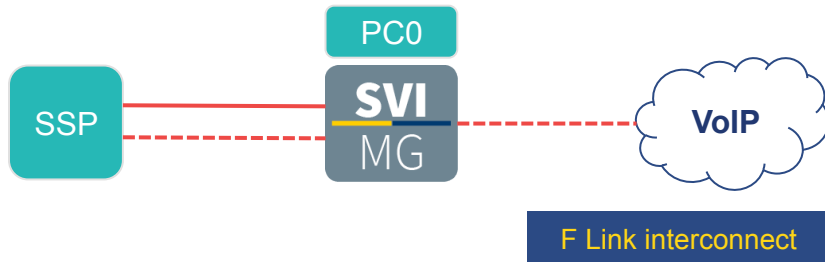
- M2PA
- M2UA
- M3UA
- SUA

### SIP Trunks

- SIP-I/ SIP-T
- Q1912.5

# SVI\_MG Media Gateway

## SS7 MTP Configurations



Delivering A–F link support, the SVI\_MG supports conversion between 'any-to-any' simultaneous multiple variants.

### MTP L1-L3

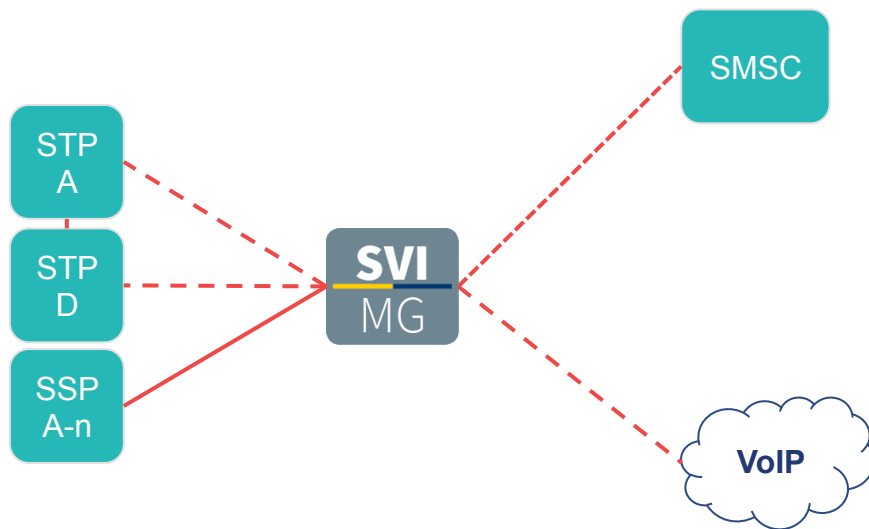
- ITU-T Q.701-707
- ANSI T1-111.1-111.8
- Chinese GF 001-9001
- PNO-ISC/ SPEC/005

### Dimensioning

- 32 Signalling Links
- 32 Originating Point Codes
- 128 Linksets
- 1024 Destination Point Codes

# SVI\_MG Media Gateway

## SS7 SIGTRAN SCCP/TCAP Backhaul



Allows backhaul of SCCP/TCAP traffic from SS7 interconnect to third party device over M3UA/SUA. SVI\_MG still terminates voice traffic

### Backhaul SIGTRAN

- M3UA
- SUA

# SVI\_MG Media Gateway

## PSTN Layer 4 Protocols

### ▶ ISUP

- ▶ ANSI ISUP - T1.113.1 to T1.113.4
- ▶ GR-246, Telcordia ISUP (T1.113.1 to T1.113.4)
- ▶ ITU ISUP - Q.761-Q.764 Blue & White Book
- ▶ TTC - JT- Q761-Q764
- ▶ ETSI ISUP- EN 300 356-1
- ▶ China YDN 038 China
- ▶ French SSURF (SPIROU)
- ▶ Australia ACIF AG500
- ▶ Belgium C2122 Ed.2
- ▶ Finland SFS 5779
- ▶ Germany ZZN7 3.0.0
- ▶ Hong Kong HKTA 2202
- ▶ Italy Specifica Tecnica N.763
- ▶ Mexico NOM-112SCTI
- ▶ Sweden 8211-A335, 8221 A325
- ▶ UK PNO-ISC/SPEC/007
- ▶ Russia ISUP-R
- ▶ Kazakhstan ISUP-K
- ▶ New Zealand PTC

- ▶ Lithuanian
- ▶ Brazilian 210-110-724
- ▶ Swiss
- ▶ Pakistan
- ▶ Spanish
- ▶ Polish
- ▶ Portuguese

### ▶ TUP

- ▶ ITU TUP Q721-Q725
- ▶ SSUTR2 V11-T 1998
- ▶ Chinese GF 001- 9001
- ▶ Brazil

### ▶ IUP

- ▶ UK PNO-ISC/SPEC/006

### ▶ SCCP

- ▶ ITUT Q711-Q714
- ▶ JT-Q711-G714
- ▶ ETSI ETS 300 589
- ▶ ANSI T1.112

### ▶ TCAP

- ▶ ITUT Q771-Q774
- ▶ JT-Q771-G774
- ▶ ANSI T1.114

### ▶ Operations

- ▶ CNAM ANSI T1.641-1995 (R2004) Calling Name Identification Presentation
- ▶ LNP GR-1936-CORE

### ▶ CAMEL

- ▶ 3GPP TS 23.078

### ▶ ISDN

- ▶ AT&T 41459/49 (AT&T ISDN PRI) (Bellcore GR-1268)
- ▶ ETSI PRI (ETS 300 102)
- ▶ ETSI QSIG (ETS 300 172)
- ▶ ITUT PRI (Q931,DSS1)
- ▶ NIS A211-1
- ▶ NI1, NI2
- ▶ TS014, 1TR6, VN3

### ▶ R2/ CAS

- ▶ CCITT Blue Book
- ▶ Country Variants

Contact us if support is required  
for a specific country variant

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# SVI\_MG Media Gateway

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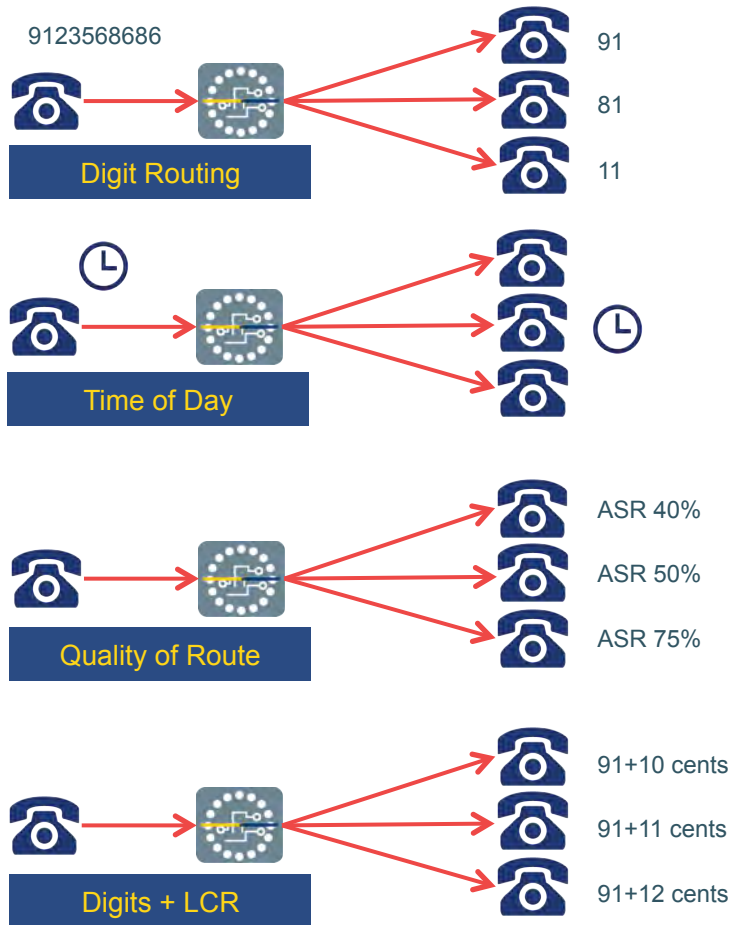
## Performance Benchmarks

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Test Scenarios	
Message Flow	SIP >> SS7 ISUP      SIP-I >> SS7 ISUP
	SS7 ISUP >> SIP      SS7 ISUP >> SIP-I
Results	
BHCA	3,600,000 (10 signalling links)
Call attempts/ sec	400 (10 signalling links)
% CPU Usage	Avg. 40%
Call Completion Rate	99.999%
Simultaneous Calls Supported	40 calls p/s per signalling link

# SVI\_MG Media Gateway

## Intelligent Call Routing



### ▶ Incoming Calls Routed based on

- ▶ Called and Calling Party Information
- ▶ Protocol Information
- ▶ Originating Network
  - ▶ Trunk Group, Hunt Group, VoIP
  - ▶ Destination, Protocol
- ▶ Time Of Day
- ▶ Cost Of Route

### ▶ Enhanced Call Completion Algorithms

- ▶ Reattempt call
  - ▶ Same Destination and/or different destinations
  - ▶ Reattempt based on call failure reason

### ▶ Outgoing Call Manipulation

- ▶ Called and Calling Party Information
- ▶ Protocol Information

### ▶ Load share across different destinations

- ▶ Hunt high, low, odd, even, incremental, decremental, percentage, ASR.

### ▶ Other

- ▶ Reject Call with Protocol Reason
- ▶ Reject Call with announcement



# SVI\_MG Media Gateway

## External Routing APIs

External Routing APIs allow for customers to fully control routing through their own applications, enabling integration of SVI into existing client infrastructure.

### ▶ SQL

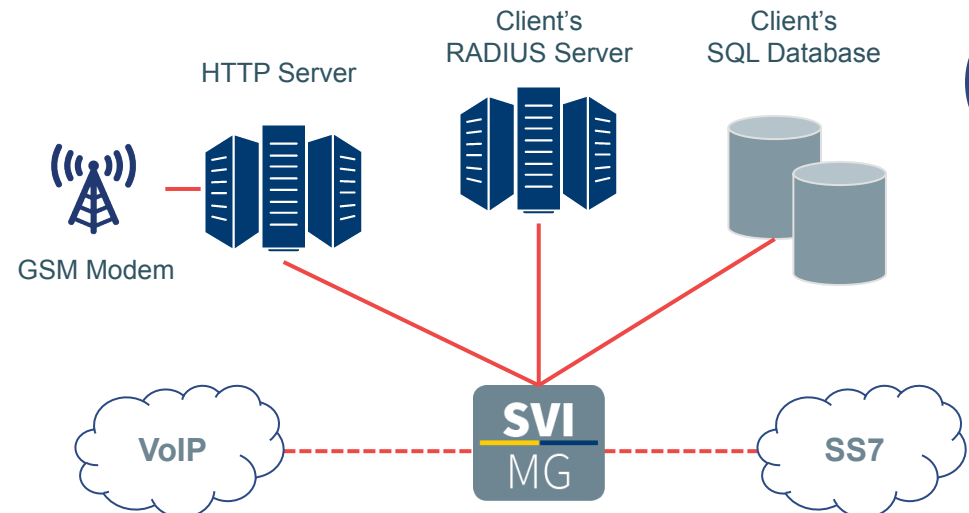
- ▶ SVI calls SQL stored procedures into customers SQL database which returns routing information
- ▶ PostgreSQL and MYSQL support

### ▶ Radius

- ▶ Radius Authorisation response contains routing information

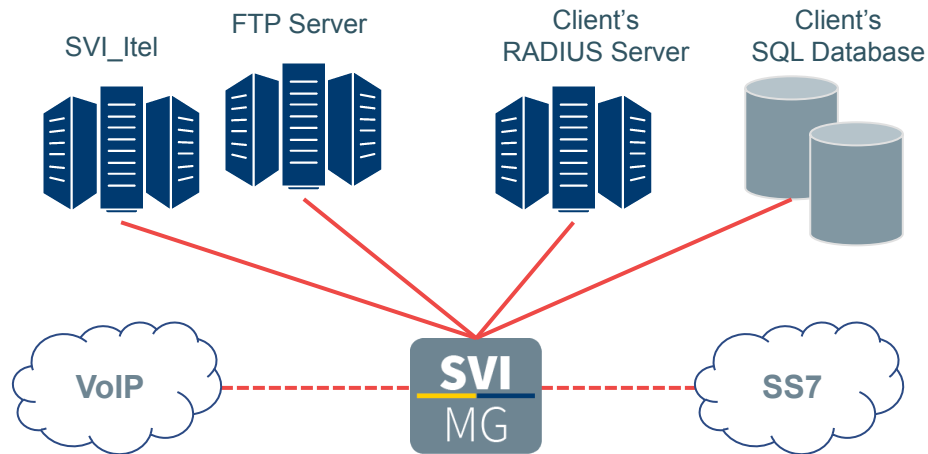
### ▶ HTTP

- ▶ Call back Service



# SVI\_MG Media Gateway

## Billing

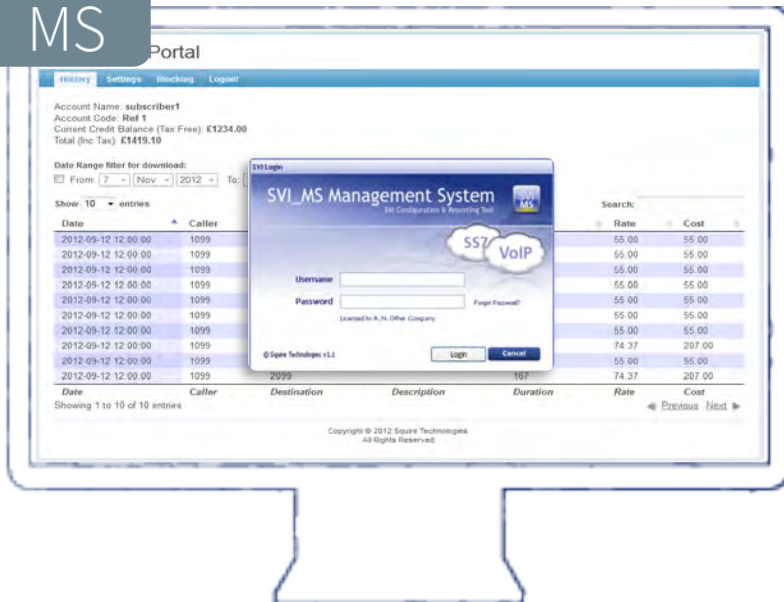


- ▶ **Call Data Records (CDRs)**
  - ▶ On board CSV files contains all call attempts
  - ▶ Stored in systems SQL Database
  - ▶ Over 60 fields of call information
- ▶ **FTP Server**
  - ▶ Client or Server controlled CDR retrieval
- ▶ **Radius/Diameter Server**
  - ▶ Full AAA support (Authentication, Authorisation and Accounting) support
- ▶ **SQL**
  - ▶ Direct writing of CDRS to SQL clients SQL database

# SVI\_MG Media Gateway

OA&M – Operation, Administration and Maintenance

SVI  
MS



## ▶ Web based GUI

### ▶ SVI\_MS Management System

- ▶ Secure Remote Access
- ▶ Full Configuration
- ▶ Monitoring
- ▶ Debugging
- ▶ Command Line Interface

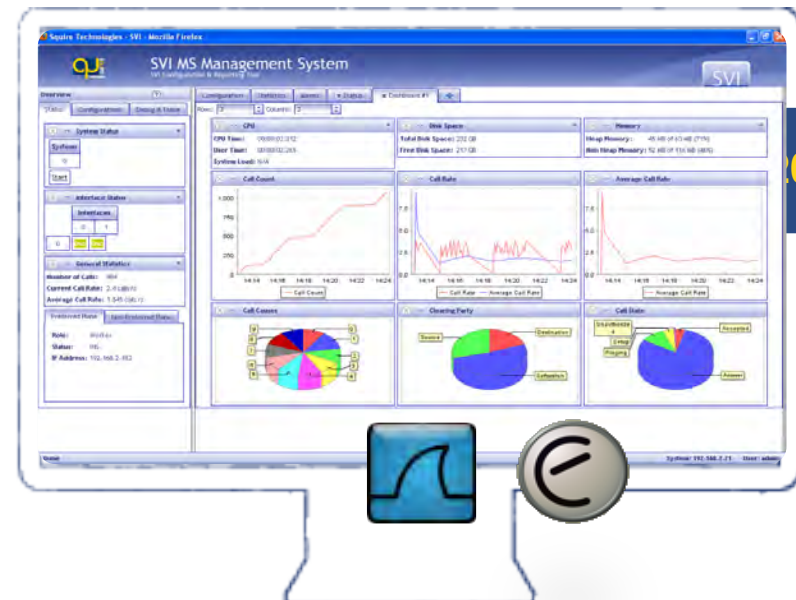
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# SVI\_MG Media Gateway

OA&M – Operation, Administration and Maintenance

## SVI MS

- ▶ The globally deployed SVI platform empowers its users with an advanced level of expertise and functionality.
- ▶ The SVI-MS management system features a comprehensive toolkit combining ease of use and the ability to run, analyse multiple systems both safely and securely, providing efficient:-
  - ▶ Configuration - Real time system setup, onboard resource and call routing management
  - ▶ Monitoring - Comprehensive statistical service monitoring and system status tool
  - ▶ Debugging - Rapid tracing, diagnosing and CDR analysis compatible with Wireshark and Ethereal



# SVI\_MG Media Gateway

## OA&M – Operation, Administration and Maintenance

- ▶ The web based GUI brings the user powerful tools to manage system resources, delivering a real-time OA&M, offering:-
  - ▶ Dashboard interface
  - ▶ Wizard library
  - ▶ Customisation – via XML
  - ▶ Secure multi-user features
  - ▶ Extensive help resources
  - ▶ Compatibility with the entire SVI range



# SVI\_MG Media Gateway

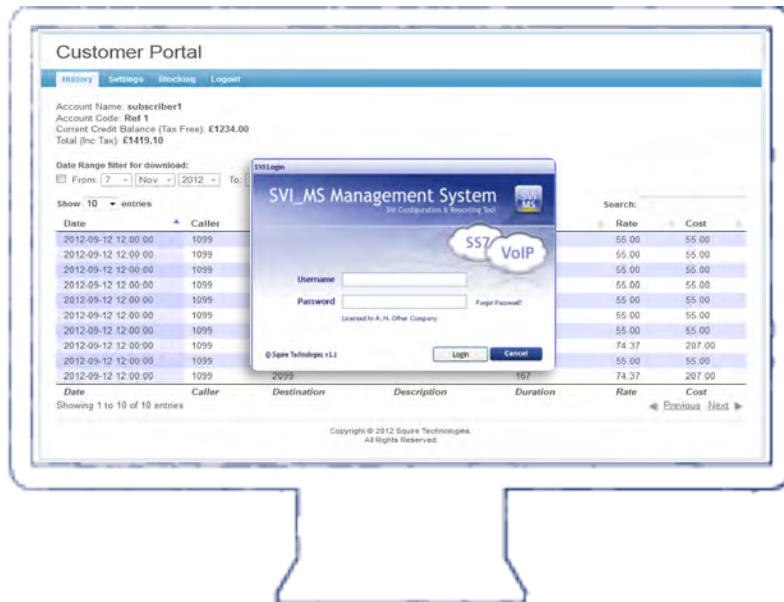
## OA&M – Command Line Interface

- ▶ **Configuration**
  - ▶ High speed real time configuration for expert users
  - ▶ Full 'secure' remote access
- ▶ **Administration**
  - ▶ Low Level MMI Interface
  - ▶ Full onboard database inspection and control
  - ▶ Real time resource status display
  - ▶ Controlling system resources
- ▶ **Maintenance**
  - ▶ Configurable logfiles, capturing all aspects of system performance
- ▶ **Performance**
  - ▶ Compatible with Wireshark and Ethereal for full graphical protocol traces
  - ▶ Extensive onboard CDRs and statistics generation
  - ▶ Call minutes, ASR, PDD, ACD, etc
  - ▶ Resource Statistics
  - ▶ Trap Reports
- ▶ **Network Monitoring**
  - ▶ Trap capture
  - ▶ Statistic monitoring, Graphing and Alarming



# SVI\_MG Media Gateway

## Security



The sophisticated SVI platform, brings secure reliability and a proven global pedigree for network operators, incorporating:-

### ▶ System

- ▶ Integrated Firewall
- ▶ Username, password protected
- ▶ Secure external protocols used for access (SSH, SCP)
- ▶ Only process calls for configured VoIP Destinations
- ▶ Reports on unauthorised access
- ▶ Client Challenge procedures

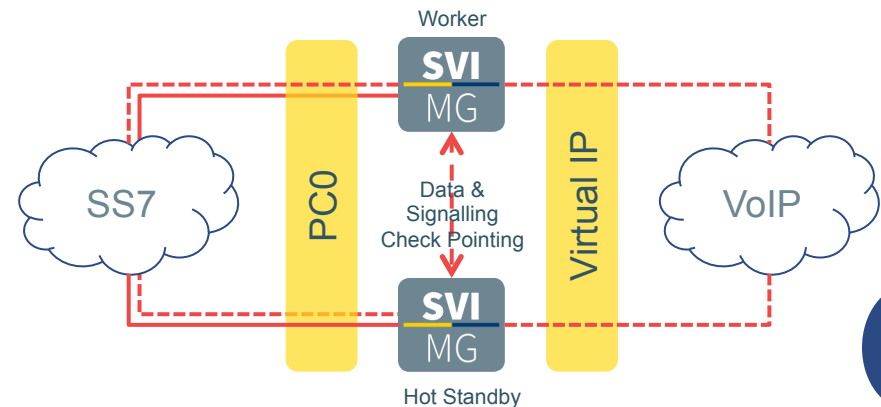
### ▶ Radius

- ▶ Authorisation and Authentication

# SVI\_MG Media Gateway

## SVI\_MG 1000 Redundancy Model

- ▶ 1+1 Dual Plan Worker/ Hot Standby
  - ▶ Database and signalling information checkpointed between planes
  - ▶ Replicated hardware and software
- ▶ Maintain SIP calls in answer on failover
- ▶ Eliminates single points of failure
- ▶ Five Nines uptime (99.999%)
- ▶ Sub 1 second switchover time
- ▶ Calls in session maintained
- ▶ Single IP service address using VIP technology
- ▶ Real time Maintenance upgrades

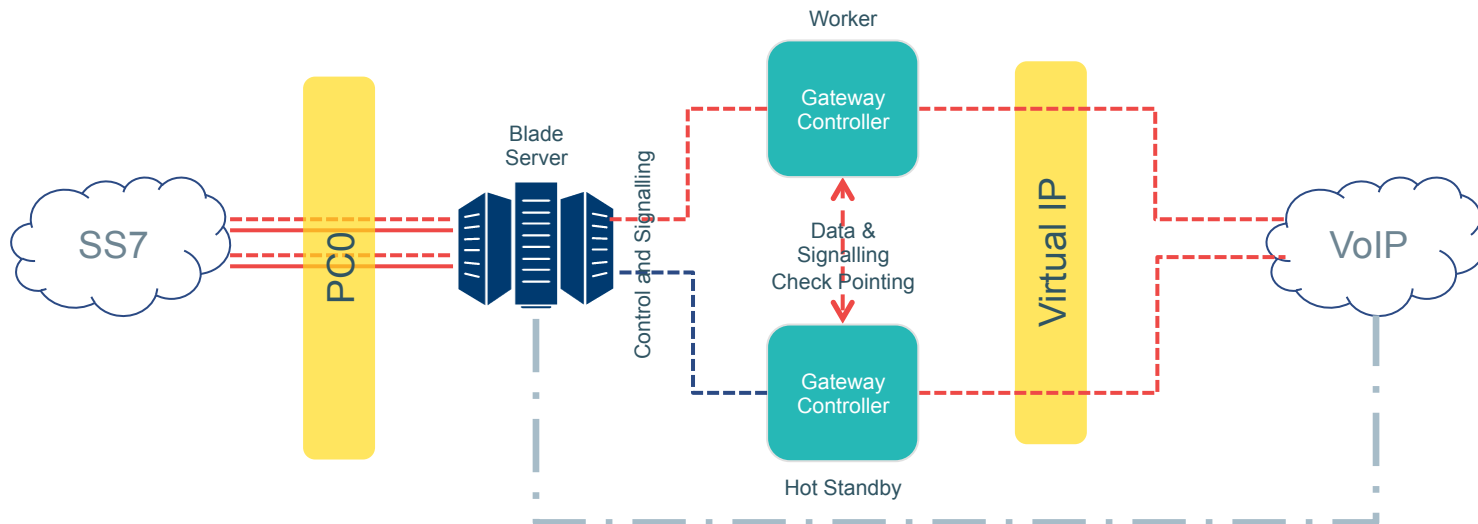


- ▶ SVI\_MG 1000
  - ▶ 1+1 Dual Plane Redundancy
  - ▶ How swap PSU, Fans



# SVI\_MG Media Gateway

## SVI\_MG 8000 Redundancy Model



- ▶ Separate Processing Units and Interface cards
  - ▶ No loss of bandwidth during processing unit outage
- ▶ Support of multiple Blade Servers
- ▶ Dual Controller Planes
  - ▶ 1+1 Dual Plane Redundancy
- ▶ Blade Server
  - ▶ Up to 8 Hot Swap PSUs
  - ▶ Each Interface Blade has redundant Ethernet
  - ▶ Passive Back Plane
  - ▶ Hot Swap Fans
  - ▶ Hot Swap Blades

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# SVI\_MG Media Gateway

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## Additional information: Services

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- ▶ **Installation services**
  - ▶ Pre-configuration services
  - ▶ On-site installation and commissioning
  - ▶ Remote installation and commissioning via internet/VPN
  - ▶ Training – onsite or at Squire Technologies



- ▶ **Support Services**
  - ▶ Range of support packages from office hours to 24-7



- ▶ **Product enhancement services**
  - ▶ Cost-effective, client focused adaptation of existing products
  - ▶ Feature request development

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# SVI\_MG Media Gateway

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Further information

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- ▶ Visit [www.squire-technologies.com](http://www.squire-technologies.com)
  - ▶ For further product information on SS7 VoIP products for carriers, operators and service providers, plus case studies and customer testimonials.
- ▶ Email [sales@squire-technologies.com](mailto:sales@squire-technologies.com)
  - ▶ To contact and member of our sales team
- ▶ Call [+44 \(0\)1305 757314](tel:+44(0)1305757314)
  - ▶ To speak with us today

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