Cisco Virtual PGW 2200 Soft switch Support of Tunneled QSIG over SIP (SIPQ)

For Cisco Hosted Collaboration Solution 9.0
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Cisco Virtual PGW 2200 Softswitch Enhanced Generic Number Handling Feature Module

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## Contents

Feature Description ........................................................................................................... 4  
Prerequisites .................................................................................................................... 5  
Call Flows ....................................................................................................................... 5  
  SIPQ -to- QSIG .............................................................................................................. 6  
  SIPQ –to- DPNSS ......................................................................................................... 7  
Provisioning tasks ........................................................................................................... 7  
  Provisioning example .................................................................................................... 8  
Software changes ............................................................................................................. 8  
Memory, performance and SIPQ considerations ............................................................... 9  
SIPQ Call Back Interworking with Cisco Unified CommunicationManager .................. 10  
References: ...................................................................................................................... 11  
Glossary ........................................................................................................................... 12  
Obtaining Documentation, Obtaining Support, and Security Guidelines ......................... 12
**Feature Description**

The tunneled QSIG over SIP (SIPQ) feature allows the Cisco-Virtual PSTN Gateway (VPGW) to send QSIG contents through SIP networks to support interworking scenarios of QSIG/DPNSS over SIP tunnelling to interconnect legacy and IP PBX’s (QSIG/DPNSS).

This feature will enable VPGW to support the encapsulation of QSIG MIME body within SIP messages using SIPQ for interworking. VPGW can decode QSIG packet received in SIP message and will encode the QSIG packet in outgoing SIP message over SIPQ trunks with CUCM. VPGW also supports transparent transport or relay of QSIG messages over SIP network which provides end-to-end QSIG feature transparency over SIPQ- to- SIPQ calls.

It is recommended to ‘ECMA’ (ETS 300_172) variant of tunnelled QSIG payload for this feature. In case the variant is not specified in tunnelled QSIG message, vPGW will assume it as ‘ECMA’ variant by default. Unified Communication Manager will approach vPGW over SIPQ link SIP trunk enabled with QSIG Tunnelling only for connectivity with legacy PBXs with DPNSS/QSIG. It is recommended to CUCM 9.x version or later for this feature.

The following protocols must interwork to support QSIG tunneling:

(a) SIPQ-to-MGCP (QSIG)

(b) SIPQ-to-MGCP (DPNSS)
Prerequisites

The Cisco VPGW Softswitch must be running Software Release 9.9(1) S1P1 or later.

For more information on prerequisites, please refer Release Notes for the Cisco Virtual PGW 2200 (VPGW) Softswitch Software Release 9.9(1).

Below is the list of the minimum versions required for different nodes used for this feature testing:

<table>
<thead>
<tr>
<th>Component Type</th>
<th>Hardware</th>
<th>Software Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisco VPGW Node</td>
<td>Cisco UCS C210 M1/M2</td>
<td>Cisco VPGW Softswitch Release 9.9(1)</td>
</tr>
<tr>
<td></td>
<td>Cisco UCS B200 M1/M2/M3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cisco UCS B230 M2</td>
<td></td>
</tr>
<tr>
<td>CUCM(^1)</td>
<td>CUCM</td>
<td>Version 8.6 or higher</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Version 9.1.x and higher</td>
</tr>
<tr>
<td></td>
<td></td>
<td>recommended for SIPQ feature</td>
</tr>
<tr>
<td>Media Gateways (MGCP-controlled for PBX access)</td>
<td>Cisco AS5400XM, Cisco 2911 (ISR G2)</td>
<td>Cisco IOS Version 12.4(19)SW or higher</td>
</tr>
<tr>
<td>PBX (QSIG &amp; DPNSS)</td>
<td>Siemens EPABX HIPATH 4000</td>
<td>---</td>
</tr>
</tbody>
</table>

Standards used for QSIG and DPNSS:

- DPNSS BTN 188
- ETS_300_172
Call Flows

SIPQ- to- QSIG

The following figure shows the basic call flow of CUCM(SIPQ)-PBX(QSIG)
DPNSS-to-SIPQ

The following figure shows the basic call flow of CUCM (SIPQ)-PBX(DPNSS)

Provisioning tasks

For provisioning Information see the following sections in *Cisco Virtual PGW 2200 (VPGW) Softswitch Release 9.9 Provisioning Guide* in the following sections:

- Provisioning Overview:
- MML Basics: Provisioning Examples
- Provisioning Examples for Cisco Virtual PGW 2200 (VPGW) Softswitch : section VPGW SIP, QSIG and DPNSS Provisioning Example for SIPQ Feature

This section provides a provisioning example for this feature. For additional provisioning examples for this feature, please refer *Cisco Virtual PGW 2200 (VPGW) Softswitch Software Release 9.9 Provisioning Guide.*
**Provisioning example**

The following sample MML command sequence provisions the tunneled QSIG over SIP (SIPQ) feature between Unified Communication Manager and VPGW. When provisioned, the Cisco VPGW Softswitch allows QSIG support over SIP on SIP trunk between Unified Communication Manager and VPGW.

```
Pgw-6 mml> prov-ed:profile:name="sip-profil",sipmimebodysupport="5"
```

Provisioning parameter ‘sipmimebodysupport’ is extended with value 5 for this interworking support. The value sipmimebodysupport = 5 will represent ‘Incoming SIP and SIPQ allowed, outgoing SIPQ allowed’

**Software changes**

Provision the property below to enable this feature on the Cisco VPGW Softswitch software. For information about other properties for the Cisco VPGW Softswitch software, please refer Cisco Virtual PGW 2200 (VPGW) Softswitch Release 9.9 MML Command Reference.

<table>
<thead>
<tr>
<th>Property</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>*.sipMimeBodySupport</td>
<td>This property indicates how SIP, SIP-T, SIP-GTD, SIP-I &amp; SIPQ are supported on a trunk group. Valid values:</td>
</tr>
<tr>
<td></td>
<td>• 0 = only SIP supported</td>
</tr>
<tr>
<td></td>
<td>• 1 = SIP-T supported</td>
</tr>
<tr>
<td></td>
<td>• 2 = SIP-GTD supported</td>
</tr>
<tr>
<td></td>
<td>• 3 = Only SIP-I is supported on the incoming trunk group. SIP and SIP-I are supported on the outgoing trunk group</td>
</tr>
<tr>
<td></td>
<td>• 4 = SIP and SIP-I are supported on both the incoming and outgoing trunk groups</td>
</tr>
<tr>
<td></td>
<td>• 5 (Incoming SIP and SIPQ allowed, outgoing SIPQ allowed)</td>
</tr>
</tbody>
</table>

New property value of 5 is introduced for SIPQ feature.
Memory, performance and SIPQ considerations

- SIPQ interface should not have significant impact on overall PGW performance in terms of CPU/memory usage, average call establish time, switchover time, or replication time.
- All SIPQ-DPNSS and SIPQ-QSIG active calls should be replicated to standby PGW node, and after failover/switchover, these calls should continue to exist at the newly active node.
- Transient SIPQ Calls (in establishing state) are not replicated to standby node and after manual or automatic switchover will not be present at the newly active node.
- Existing property ‘sipmimebodysupport’ is extended with a value of 5 to enable SIPQ interworking support on desired SIP trunk groups.
- VPGW needs to be integrated with Cisco Unified Communication Manager. The minimum requirement version of CUCM is 9.1.

SIPQ Call Back Interworking with Cisco Unified Communication Manager

This feature enables the PGW 2200 to support interworking between a PBX and Cisco Unified Communication Manager for SIPQ Call Back When Free (CBWF), Call Back When Next Used (CBWNU) supplementary service features.

Call Back When Next Used

The Call Back When Next Used (CBWNU) feature allows a user who receives no reply when trying to establish a call in the Private Network to request an automatic call back. The calling party can clear the call and invoke Call Back When Next Used. When the called extension becomes free after having been used, the user that invoked the feature is notified by an audible and visual alert. The user has an option at that time to accept the call back and a call will be set up from the user to the extension that becomes free.

Call Back When Free

The Call Back When Free (CBWF) feature allows a user who receives a busy signal (i.e. extension busy or network congestion) when trying to establish a call in the Private Network to request an automatic call back. The calling party can register the feature with the originating PBX which requests the terminating PBX to monitor the called extension. When the called extension and a transmission path across the network become free, the user who invoked the feature is notified by an audible and visual alert that the called extension is available. The user has the option at that time to accept the call back and a call will be set up from the user to the extension that becomes free.

Note Cisco VPGW supports this feature for CUCM-QSIG calls, QSIG-QSIG calls and CUCM-CUCM calls.

Example of CBWF

The following example shows the Call flow of SIPQ-QSIG call.
- User A- PBX (QSIG)
- User B- PBX (QSIG)
- User C: CUCM (SIPQ)

The following figure shows sample call flow when User A (PBX)-User B (PBX) is in call and User C (CUCM) calls User A, User C (CUCM) gets busy signal.

Figure 1 Sample Call Flow between CUCM-PBX[QSIG]

The following figure shows sample call flow when User C activates Call Back When Free supplementary service.

Figure 2 Sample Call Flow between CUCM-PBX[QSIG]

The following figure shows sample call flow when User B hangs up the phone and User C will get CPWF free notification.
The following figure shows sample call flow when User C initiated the call with User A.

**References:**
- QSIG ETSI 300-172
- QSIG ECMA 185/186
- QSIG ECMA 175/176
- DPNSS BTN 188
- RFC 3261 ‘SIP Session Initiation Protocol’
- RFC 3265 ‘Session Initiation Protocol (SIP)-Specific Event Notification’
- RFC 3204 ‘MIME media types for ISUP and QSIG Objects’
- RFC 4497 ‘Inter-working between the Session Initiation Protocol (SIP) and QSIG MIME media types for ISUP and QSIG Objects’
Glossary

Expansions

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Expansion</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISUP</td>
<td>ISDN User Part</td>
</tr>
<tr>
<td>VPGW</td>
<td>Virtual PSTN Gateway</td>
</tr>
<tr>
<td>QSIG</td>
<td>Q signaling</td>
</tr>
<tr>
<td>DPNSS</td>
<td>Digital Private Network Signaling System</td>
</tr>
<tr>
<td>CUCM</td>
<td>Cisco Unified Communication Manager</td>
</tr>
<tr>
<td>SIP</td>
<td>Session Initiation Protocol</td>
</tr>
</tbody>
</table>

Obtaining Documentation, Support, and Security Guidelines

For documentation, support, providing documentation feedback, security guidelines, recommended aliases and general Cisco documents, please refer monthly What’s New in Cisco Product Documentation, which also lists all new and revised Cisco technical documentation at: