SIP Overlap Signaling Feature Module

Document Release History

<table>
<thead>
<tr>
<th>Publication Date</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>August 5, 2008</td>
<td>Initial version of the document.</td>
</tr>
</tbody>
</table>

Feature History

<table>
<thead>
<tr>
<th>Release</th>
<th>Modification</th>
</tr>
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<tbody>
<tr>
<td>9.7(3)</td>
<td>This feature was introduced on the Cisco PGW 2200 Softswitch.</td>
</tr>
</tbody>
</table>

This document describes the SIP Overlap Signaling Feature Module feature in the following sections.

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Feature Description

This feature supports SIP overlap signaling between the Cisco PSTN Gateway Softswitch (Cisco PGW 2200) and the Cisco BTS 10200 Softswitch products using a derivative of draft-zhang-sipping-overlap-01, a method for overlap signaling in SIP.

Both the Cisco PGW 2200 and the Cisco BTS 10200 support the sending and receiving of overlap dialed digits over SIP. The Cisco PGW 2200 also supports the sending/receiving of overlap digits over the SS7 network.


**Operating Modes**

This feature is designed to work with only the interworking and B2BUA operation modes. The mode of operation is not determined until seizure of the terminating side.

If you select proxy mode before sending is complete on the originating call side, the call is forced into B2BUA mode to ensure that the call continues to signal correctly.

Interworking and B2BUA modes support overlap signaling, with the behavior of the terminating call side based on the setting of the TOverlap property.

For B2BUA mode it is possible for the originating side to work in overlap mode while the terminating side works in en-block mode, thus allowing conversion of overlap to en-block signaling.

**Call Flows**

This feature uses a 184 “Ready For More Digits” response instead of a 183 ‘Session Progress’ to avoid any ambiguity about when to send ACM.

Because the sending of a 183 might cause ACM to be returned, you can send a 184 to prevent any confusion about when to send ACM. Do not map the 184 to ACM. 184 is considered purely an enabler for subsequent INFO messages to be forwarded containing the remaining address digits if overlap is supported.

To improve the call flow, an additional specialized parameter “overlap” is attached to the username in the request line to explicitly indicate that subsequent address digits can be received. This parameter can then be used as a trigger for sending a 184.

The ‘overlap’ username parameter is used instead of a SIP: URI parameter, so that a tel: URI can also use the same mechanism. The absence of this parameter in the request line indicates that the number should be assumed to be a complete and normal en-block working.

**Example 1:**

```
INVITE sip:1234;overlap@host SIP/2.0
```

**Example 2:**

```
INVITE tel:1234;overlap SIP/2.0
```

The absence of this parameter in the request line indicates that the number should be assumed to be complete and normal en-block working.

**Figure 1** shows the call flow difference.
**Final Draft—Cisco Confidential**

**Feature Description**

**Figure 1** Call Flow Difference

<table>
<thead>
<tr>
<th>PSTN</th>
<th>Originating Server</th>
<th>Terminating Server</th>
<th>PSTN</th>
</tr>
</thead>
<tbody>
<tr>
<td>IAM</td>
<td>INVITE</td>
<td>IAM</td>
<td></td>
</tr>
<tr>
<td>SAM1</td>
<td>184</td>
<td>SAM1</td>
<td></td>
</tr>
<tr>
<td>SAM2</td>
<td>PRACK</td>
<td>SAM2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>200(PRACK)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>INFO</td>
<td>SAM1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>200(INFO)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>INFO</td>
<td>SAM2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>200(INFO)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>INFO</td>
<td>SAM3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>200(INFO)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Example 3:**

*Figure 2* shows the call flow for both sides enabled for overlap, SIP to SS7.

OOverlap=1
TOverlap=1
OMinDigits=0
OMaxDigits=20
TMinDigits=
TMaxDigits= 20
Prerequisites

The Cisco PGW 2200 must be running Cisco Media Gateway Controller (MGC) software Release 9.7(3) or later. Prerequisites for this release can be found in the Release Notes for the Cisco Media Gateway Controller Software Release 9.7(3) at


Restrictions or Limitations

- The Cisco PGW 2200 and the Cisco BTS 10200 must comply with the BTS 10200 support for Overlap Dialing when the Cisco BTS 10200 and Cisco PGW 2200 are connected over SIP.
- Ensure that INVITE requests that require a Cisco PGW 2200-specific 184 Response do not fork.

Related Features and Technology

- The Cisco BTS 10200 Overlap Dialing feature is related to this feature.
- The SIP Early-Dialog Offer/Answer Using PRACK/180/183 feature is related to this feature.
Related Documents

This document contains information that is strictly related to this feature. The documents that contain additional information related to the Cisco PGW 2200 are at http://www.cisco.com/en/US/products/hw/vcallcon/ps2027/tsd_products_support_series_home.html

Provisioning

To enable the SIP Overlap Signaling feature, follow the instructions provided in the following sections.

OOverlap/ TOverlap

Example 1
Use these commands to enable the OOverlap or TOverlap properties.

```
mml> prov-add:trnkgrpprop:name=''478'',ooverlap=''1''
MGC-01 - Media Gateway Controller 2008-06-22 21:06:30.672 CDT
M COMPLD
''trnkgrpprop:
WARNING: Restart is needed to activate property(s): OOVERLAP ''
;

sh-mustang mml> prov-ed:trnkgrpprop:name=''479'',ooverlap=''1'',toverlap=''1''
MGC-01 - Media Gateway Controller 2008-06-22 21:11:33.377 CDT
M COMPLD
''trnkgrpprop:
WARNING: Restart is needed to activate property(s): OOVERLAP ''
;
```

Example 2
For the Cisco PGW 2200, if the OCC side trunkgroup is 666 and TCC side is 444, configure on both sides to control the Overlap.

```
mml>prov-sta::srcver=''active'',dstver=''P_5_3'',confirm
M COMPLD

mml>prov-ed:trnkgrpprop:name=''444'',toverlap=''1'',tmindigits=''0'',tmaxdigits=''20'',sup port183=''3'',supportreliable100=''SUPPORTED''
M COMPLD
''trnkgrpprop''
;

mml>prov-cpy::
M COMPLD
''PROV-CPY''

mml>prov-ed:trnkgrpprop:name=''666'',ooverlap=''1'',omindigits=''0'',omaxdigits=''20'',sup port183=''3'',supportreliable100=''SUPPORTED''
M COMPLD
''trnkgrpprop''
;
```
OMaxDigits/OMinDigits/TMaxDigits/TMinDigits

Use these commands to change the OMaxDigits/OMinDigits/TMaxDigits/TMinDigits properties.

```mml> prov-add:trnkgrp:prop:name='''478''',omaxdigits='''10'''

M COMPLD
  ''trnkgrp:prop:
  WARNING: Restart is needed to activate property(s): OMAXDIGITS ''
;

mml>
prov-ed:trnkgrp:prop:name='''479''',omaxdigits='''10''',omindigits='''5''',tmaxdigits='''20''',tmin
digits='''10'''

MGC-01 - Media Gateway Controller 2008-06-22 21:14:27.038 CDT
M COMPLD
  ''trnkgrp:prop:
  WARNING: Restart is needed to activate property(s): OMAXDIGITS OMINDIGITS ''
;
```

OverlapDigitTime

Use these commands to change the OverlapDigitTime property.

```mml> prov-ed:trnkgrp:prop:name='''1701''',overlapdigitime='''30'''

MGC-01 - Media Gateway Controller 2008-06-22 21:15:52.725 CDT
M COMPLD
  ''trnkgrp:prop''
;
```

Disable the SIP Overlap

Use the following commands to disable the SIP overlap.

```mml> prov-ed:trnkgrp:prop:name='''478''',ooverlap='''0'''

MGC-01 - Media Gateway Controller 2008-06-22 21:17:20.809 CDT
M COMPLD
  ''trnkgrp:prop:
  WARNING: Restart is needed to activate property(s): OOVERLAP ''
;

mml> prov-dlt:trnkgrp:prop:name='''478''',''ooverlap'',''tooverlap''

MGC-01 - Media Gateway Controller 2008-06-22 21:18:04.673 CDT
M COMPLD
  ''trnkgrp:prop''
;
```
Software Changes for this Feature

Properties

There are no new properties associated with this feature, however, a number of existing properties are used to control overlap behavior. Some existing trunk group properties must be configured against SIP trunk groups.

OMaxDigits/OMinDigits/TMaxDigits/TMinDigits

The existing properties, OMinDigits, OMaxDigits, TMinDigits, and TMaxDigits are used to control overlapping behavior. Both call sides may allow overlap behavior but the conditions for overlap may be different on both call sides.

The following summarizes the behavior of these properties. These settings affect call behaviors of the SIP overlap in the same way as all other existing interworking scenarios.

OMinDigits
If a stop digit '#' is received on the originating call side but the number of digits in total received on the originating side is less than OMinDigits, the call is released with Address Incomplete.

OMaxDigits
If the call is in overlap and a subsequent digit is received not containing a stop digit and if the number of digits received is greater than OMaxDigits, the Cisco PGW 2200 sends out the number of OMaxDigits digits to the TCC side.

TMinDigits
If the number of digits to be sent to the terminating side is less than TMinDigits, the call is terminated with Address Incomplete.

TMaxDigits
If the number of digits to be sent to the terminating side exceeds the value of TMaxDigits, the digit string is truncated to the length of TMaxDigits.

OOverlap/TOverlap

The existing properties TOverlap and OOverlap are changed to allow configuration against SIP trunks.

- If an INVITE is received with a username parameter ';overlap', and OOverlap is not set to 1 (overlap supported), the call is terminated with 484 'Address Incomplete'.
- On the terminating call side, a check is made on receipt of LCallPart to see if the TOverlap is set to 1 (overlap supported). If this is true, and based on the settings of TMinDigits, an INVITE is created that includes the ';overlap' parameter in the INVITE. Subsequent INFO messages are created on receipt of LCallNext, LCallLast.
If $T_{Overlap}$ is set to 0 (en-block), LCM waits until Cisco PGW 2200 analysis determines that the number is complete before creating the terminating call side and sending $LCall$ to the terminating call side.

**OverlapDigitTime**

The existing property OverlapDigitTime is used to set the value of OverlapDigitsTimer used for timing inter-digit pause.

If the originating call-side is in overlap, LCM will start the existing timer OverlapDigitsTimer based on the property setting of the existing property OverlapDigitTime. This times the inter-digit pause waiting for more digits. Failure to receive more digits within this time results in a release of the call. On the originating call-side 484 ‘Address Incomplete’ is returned, and, if applicable on the terminating side, a CANCEL is generated.

When digit lengths are undetermined, this timer sets the amount of time it will wait before assuming no further digits will be dialed. Use of an explicit stop digit in the overlap signaling allows the call to reset the timer and continue call processing without waiting before timer expiry, thus speeding up connection times.

**Glossary**

**Table 1**

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Expansion</th>
</tr>
</thead>
<tbody>
<tr>
<td>B2BUA</td>
<td>Back to Back User Agent</td>
</tr>
<tr>
<td>BCF</td>
<td>Border Control Function (IMS function)</td>
</tr>
<tr>
<td>BGCF</td>
<td>Border Gateway Control Function (IMS function)</td>
</tr>
<tr>
<td>CBGF</td>
<td>Core Border Gateway Control Function (IMS function)</td>
</tr>
<tr>
<td>CDR</td>
<td>Call Detail Record</td>
</tr>
<tr>
<td>CLI</td>
<td>Calling Line Identity</td>
</tr>
<tr>
<td>CPC</td>
<td>Calling Party Category</td>
</tr>
<tr>
<td>DBR</td>
<td>Domain Based Routing</td>
</tr>
<tr>
<td>DNS</td>
<td>Domain Name System</td>
</tr>
<tr>
<td>DTMF</td>
<td>Dual Tone Multi-Frequency</td>
</tr>
<tr>
<td>DRP</td>
<td>Domain Routing Policy</td>
</tr>
<tr>
<td>GA</td>
<td>Generic Analysis (PGW analysis and routing module)</td>
</tr>
<tr>
<td>I-CSCF</td>
<td>Interrogating Call Session Control Function</td>
</tr>
<tr>
<td>IMS</td>
<td>IP Multimedia System</td>
</tr>
<tr>
<td>LI</td>
<td>Lawful Intercept</td>
</tr>
<tr>
<td>LCM</td>
<td>LightSpeed Call Model (PGW call control module aka UCM)</td>
</tr>
<tr>
<td>LNP</td>
<td>Local Number Portability</td>
</tr>
<tr>
<td>MGCF</td>
<td>Media Gateway Control Function</td>
</tr>
<tr>
<td>MGCP</td>
<td>Media Gateway Control Protocol</td>
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</tbody>
</table>
Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly What’s New in Cisco Product Documentation, which also lists all new and revised Cisco technical documentation, at http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html

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