Configure MiVoice Business 7.2 with MBG for use with Twilio SIP Trunking

APRIL 2016
SIP COE 16-4940-00441
TECHNICAL CONFIGURATION NOTES
NOTICE

The information contained in this document is believed to be accurate in all respects but is not warranted by Mitel Networks ™ Corporation (MITEL®). The information is subject to change without notice and should not be construed in any way as a commitment by Mitel or any of its affiliates or subsidiaries. Mitel and its affiliates and subsidiaries assume no responsibility for any errors or omissions in this document. Revisions of this document or new editions of it may be issued to incorporate such changes.

No part of this document can be reproduced or transmitted in any form or by any means - electronic or mechanical - for any purpose without written permission from Mitel Networks Corporation.

TRADEMARKS

Mitel is a trademark of Mitel Networks Corporation.

Windows and Microsoft are trademarks of Microsoft Corporation.

Other product names mentioned in this document may be trademarks of their respective companies and are hereby acknowledged.

Mitel Technical Configuration Notes:

Configure MiVoice Business 7.2 for use with Twilio SIP Trunking
April 2016 – 16-4940-00441

®, ™ Trademark of Mitel Networks Corporation
© Copyright 2016, Mitel Networks Corporation
All rights reserved
# Table of Contents

## OVERVIEW

- Interop History ................................................................. 1
- Interop Status ................................................................. 1
- Software & Hardware Setup ................................................... 1
- Tested Features ................................................................. 2
- Device Limitations and Known Issues ..................................... 2
- Network Topology ............................................................. 3

## CONFIGURATION NOTES

- MiVoice Business Configuration Notes .................................... 4
  - Network Requirements ....................................................... 4
  - Assumptions for MiVoice Business Programming ........................ 4
  - Licensing and Option Selection – SIP Licensing .......................... 5
  - Class of Service Options ................................................... 6
  - Network Elements ............................................................ 7
  - Trunk Attributes .............................................................. 8
  - SIP Peer Profile .............................................................. 9
  - SIP Peer Profile Assignment by Incoming DID ........................... 12
  - ARS Digital Modification Plans ........................................... 13
  - ARS Routes ................................................................ 13
  - ARS Digits Dialed ............................................................. 14

- MiVoice Border Gateway Configuration Notes .......................... 15
  - MBG SIP Options ............................................................. 15
  - Adding MiVoice Business to MBG ......................................... 16
  - SIP Trunk Configuration ..................................................... 17
Overview

This document provides a reference to Mitel Authorized Solutions providers for configuring the MiVoice Business (MiVB) 7.2 to connect to Twilio SIP trunking. Different components can be configured in various configurations depending on your VoIP solution. This document covers a basic setup with required option setup.

Interop History

<table>
<thead>
<tr>
<th>Version</th>
<th>Date</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>April 2016</td>
<td>Initial Interop with Twilio SIP trunking and MiVoice Business</td>
</tr>
</tbody>
</table>

Interop Status

This Interop of Twilio with MiVoice Business 7.2 has been given a Compatible Certification status. This SIP trunk will be included in the SIP CoE Reference Guide.

Software & Hardware Setup

The table below provides the hardware and software specifications used to generate SIP audio calls, both point to point and conference calls, using Twilio SIP trunking connected to MiVoice Business 7.2.

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Variant</th>
<th>Software Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mitel</td>
<td>MiVoice Business</td>
<td>Release 7.2 (13.2.0.17)</td>
</tr>
<tr>
<td>Mitel</td>
<td>MiVoice Border Gateway (Trunking)</td>
<td>v9.1.1.41</td>
</tr>
<tr>
<td>Mitel</td>
<td>MiVoice Border Gateway (Teleworker)</td>
<td>v9.0.27.0</td>
</tr>
<tr>
<td>Mitel</td>
<td>NuPoint Unified Messaging</td>
<td>v17.0.0.24.01</td>
</tr>
<tr>
<td>Mitel</td>
<td>MiCollab Audio, Web and Video Conferencing</td>
<td>v5.0.3.33</td>
</tr>
<tr>
<td>Mitel</td>
<td>53xx Series IP Sets</td>
<td>v06.03.01.05</td>
</tr>
<tr>
<td>Mitel</td>
<td>68xx Series SIP Sets</td>
<td>v4.2.0.181</td>
</tr>
<tr>
<td>Twilio</td>
<td>SIP Trunking Service</td>
<td>As of April 2016</td>
</tr>
</tbody>
</table>
Tested Features

The table below provides an overview of the features tested during the Interoperability test cycle and not a detailed view of the test cases. Please see the SIP Trunk Side Interoperability Test Plan APTest 608 for detailed test cases and results.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Feature Description</th>
<th>Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Call</td>
<td>Making and receiving a call through SIP service provider and their PSTN gateway,</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>call holding, transferring, conferencing, busy calls, long calls durations, variable</td>
<td></td>
</tr>
<tr>
<td></td>
<td>codec</td>
<td></td>
</tr>
<tr>
<td>Automatic Call Distribution</td>
<td>Making calls to an ACD environment with RAD treatments, Interflow and Overflow call</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>scenarios and DTMF detection.</td>
<td></td>
</tr>
<tr>
<td>NuPoint Voicemail</td>
<td>Terminating calls to a NuPoint voicemail boxes and DTMF</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>detection.</td>
<td></td>
</tr>
<tr>
<td>Packetization</td>
<td>Forcing the Mitel MIVB to stream RTP packets through its E2T card at different</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>intervals, from 10ms to 60ms</td>
<td></td>
</tr>
<tr>
<td>Personal Ring Groups (PRG)</td>
<td>Receiving calls through MiVoice Business and their PSTN gateway to a personal</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>ring group. Also moving calls to/from the prime member and group members.</td>
<td></td>
</tr>
<tr>
<td>Teleworker</td>
<td>Making and receiving a call through MiVoice Business and their PSTN gateway to and</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>from Teleworker extensions.</td>
<td></td>
</tr>
<tr>
<td>Video</td>
<td>Making and receiving a call through MiVoice Business with video capable devices.</td>
<td>N/A</td>
</tr>
<tr>
<td>Fax</td>
<td>Use of G.711 for fax calls.</td>
<td>✓</td>
</tr>
</tbody>
</table>

✓ - No issues found  ❌ - Issues found, cannot recommend to use  ⚠️ - Issues found

Device Limitations and Known Issues

This is a list of problems or not supported features when using MiVB with Twilio SIP trunking.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Problem Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Call</td>
<td>Twilio only supports G.711.</td>
</tr>
<tr>
<td>Packetization</td>
<td>Twilio only supports 20ms packetization rate.</td>
</tr>
<tr>
<td>Fax</td>
<td>Twilio does not support T.38</td>
</tr>
</tbody>
</table>
Network Topology

This diagram shows how the testing network is configured for reference.

Figure 1 – Network Topology
Configuration Notes

This section is a description of how the SIP Interop was configured. These notes should give a guideline how a device can be configured in a customer environment and how the MiVB programming was configured in our test environment.

Disclaimer: Although Mitel has attempted to setup the interop testing facility as closely as possible to a customer premise environment, implementation setup could be different onsite. YOU MUST EXERCISE YOUR OWN DUE DILIGENCE IN REVIEWING, planning, implementing, and testing a customer configuration.

MiVoice Business Configuration Notes

The following information shows how to configure a MiVoice Business 7.2 to interconnect with Twilio SIP trunking.

Network Requirements

- There must be adequate bandwidth to support the VoIP network. As a guide, the Ethernet bandwidth is approx 85 Kb/s per G.711 voice session and 29 Kb/s per G.729 voice session (assumes 20ms packetization). As an example, for 20 simultaneous SIP sessions, the Ethernet bandwidth consumption will be approx 1.7 Mb/s for G.711 and 0.6Mb/s. Almost all Enterprise LAN networks can support this level of traffic without any special engineering. Please refer to the MiVoice Business Engineering guidelines on the Mitel eDocs Website (http://edocs.mitel.com) for further information.
- For high quality voice, the network connectivity must support a voice-quality grade of service (packet loss <1%, jitter < 30ms, one-way delay < 80ms).

Assumptions for MiVoice Business Programming

- The SIP signaling connection uses UDP on Port 5060.
Licensing and Option Selection – SIP Licensing

Ensure that the MiVB is equipped with enough SIP trunking licenses for the connection to Twilio. This can be verified within the License and Option Selection form.

Enter the total number of licenses in the SIP Trunk Licences field. This is the maximum number of SIP trunk sessions that can be configured in the MiVB to be used with all service providers, applications and SIP trunking devices.

Figure 2 – License and Option Selection
Class of Service Options

The Class of Service Options form is used to create or edit a Class of Service and specify the associated options. Classes of Service, identified by Class of Service numbers, are referenced in the Trunk Attributes form for SIP trunks.

Many different options may be required for your site deployment, but ensure that Public Network Access via DPNSS Class of Service Option is configured for all devices that make outgoing calls through the SIP trunks in the MiVB.

- Public Network Access via DPNSS set to Yes
- If use FAX equipment ensure that the following options are enabled,
  - Campbell Tone Security/FAX Machine set to Yes
  - Busy Override Security set to Yes

![Figure 3 – Class of Service Options](image-url)
Network Elements

Create a network element for the SIP peer Twilio as shown in Figure 4. The IP address or FQDN will be provided by Twilio.

![Figure 4 – Network Element for SIP Peer](image)

Create a network element for the Mitel MBG as shown in Figure 5. The IP address entered here is that of the MBG.

![Figure 5 – Network Element for MBG](image)
Trunk Attributes

Use **Trunk Attributes** form to configure Trunk Service Number. In this example, the Trunk Service Number 12 will be used to direct incoming calls to an answer point in MiVoice Business.

Program the **Non-dial In** or **Dial In Trunks** (DID) according to the site requirements and what type of service was ordered from your service provider.

**Figure 6** below shows configuration for incoming DID calls. The MiVoice Business will absorb the first 4 digits of the DID number received from Twilio’s SIP trunk leaving 7 digits for MiVoice Business to translate and ring the 4-digit extension.

For example, the Twilio SIP trunk delivers numbers 1-613-519-2701 through the SIP trunk to MiVoice Business, which will absorb the first 4 digits (1-613) leaving the remaining 7 digits (519-2701) to route the call. Number 519-2701 must be programmed as a valid dialable number in the MiVoice Business, ie. System Speed Call number to associate 519-2701 with an extension in MiVB. Please refer to MiVoice Business 7.2 System Administration documentation for further programming information.

![Trunk Attributes](image)

**Figure 6 – Trunk Service Assignment**
SIP Peer Profile

The recommended connectivity via SIP Trunking does not require additional physical interfaces. IP/Ethernet connectivity is part of the base MiVoice Business Platform. The SIP Peer Profile should be configured as shown in Figures 7 - 12.

Basic tab:

Network Element: The selected SIP Peer Profile needs to be associated with the previously created Twilio Network Element.

Registration User Name: Twilio does not support SIP trunk registration at this time so this field was left blank.

Address Type: Use ‘IP Address’.

Outbound Proxy Server: Select the Network Element previously configured for the outbound proxy server (MBG).

Trunk Service: Enter the trunk service previously configured.

SMDR: If Call Detail Records (CDR) are required for SIP Trunking, the SMDR Tag should be configured (by default there is no SMDR and this field is left blank).

Maximum Simultaneous Calls: Configure this entry to be the maximum number of SIP trunks provided by Twilio.

Username and Password: Twilio supports digest based authentication for outgoing calls only, inbound is not supported at this time. If you chose to use outbound call authentication fill in these two fields with the username and password you create with Twilio.

NOTE: Ensure the remaining SIP Peer profile configuration options are similar to the screenshots below.
Calling Line ID tab:

The ‘Default CPN’ (Calling Party Number) is applied to all outgoing calls; unless there is a match in the ‘Outgoing DID Ranges’ of the SIP Peer profile. This number must be one of the numbers supplied by Twilio.
Figure 9 – SIP Peer Profile - SDP Options

Figure 10 – SIP Peer Profile - Signaling and Header Manipulation
SIP Peer Profile Assignment by Incoming DID

This form is used to assign incoming digits from Twilio. DID range numbers assigned by Twilio are associated to a particular SIP peer.

Enter one or more telephone numbers. The maximum number of digits per telephone number is 26. You can enter a mix of ranges and single numbers (for example, "6135554000-6135554400, 6135554500"). The entire field width is limited to 60 characters.

Use a comma to separate telephone numbers and ranges. Use a dash (-) to indicate a range of telephone numbers. The first and last characters cannot be a comma or a dash. If the numbers do not fit within the 60 character maximum, you can create a new entry for the same profile.

Use a '*' to reduce the number of entries that need to be programmed. This is a type of "prefix identifier", and cannot be used as a range with '-'. For example, the string "11*" would be used to associate a peer with any number in the range from 110 up to the maximum digits per telephone number (In this case, 1199999999999999999999999999). Note that the string "11" by itself would not count as a match, as the '*' represents 1 or more digits.
ARS Digital Modification Plans

Ensure that ARS Digit Modification for outgoing calls on the SIP trunk to Twilio absorbs or inject additional digits according to your dialing plan. In this example, we will be absorbing 3 digits, for example 910 prefix to dial out.

![Figure 14 – ARS Digit Modification Plans](image)

ARS Routes

Create a route for SIP Trunks connecting to Twilio. In this example, the SIP trunk is assigned to Route Number 16. Choose SIP Trunk as a routing medium and choose the SIP Peer Profile and Digit Modification entry created earlier.

![Figure 15 – ARS Routes](image)
ARS Digits Dialed

ARS initiates the routing of trunk calls when certain digits are dialed from a station. In this example, when a user dials 9101613 followed by 7 digits, the call will be routed to Twilio via Route 16.

Figure 16 – ARS Digit Dialed
MiVoice Border Gateway Configuration Notes

**MBG SIP Options**

To enable SIP on the MiVoice Border Gateway (MBG),

- Login to Server Manager of MBG
- Select Mitel Border Gateway under Applications
- Select System Configuration tab
- Click on Settings
- Scroll down to the SIP Options section, see Figure 17
- Ensure the necessary transport protocols are selected, Twilio uses UDP

![SIP Options](image)

*Figure 17 – MBG - SIP Settings*
Adding MiVoice Business to MBG

To configure MiVoice Business into Mitel Border Gateway (MBG),

- Login to Server Manager of MBG
- Select Mitel Border Gateway under Applications
- Select Service Configuration tab
- Click on ICPs
- Add ICP by clicking the ‘+’ symbol under ‘ICP Information’
- Enter a name for MiVoice Business, example: SIPINT1
- Enter the IP address of MiVoice Business
- Select the type as MiVoice Business

![Figure 18 – Configuration - ICP Setup]
SIP Trunk Configuration

To configure Twilio SIP trunking into the Mitel Border Gateway (MBG),

- Under the **Service Configuration** tab of MBG, click on **SIP Trunking**
- Add a SIP Trunk by clicking on the ‘+’ under ‘SIP Trunk Information’ and Enter the SIP trunk’s details as shown.

  **Name:** Enter the trunk name, example: Twilio

  **Remote trunk endpoint address:** Enter the public IP address or FQDN of the provider’s switch or gateway. This address will be provided to you by Twilio.

  **Local/Remote RTP framesize (ms):** Leave as the default ‘Auto’.

  **PRACK:** Twilio does not currently support PRACK so set this to ‘Disabled’.

  **Routing rule one:** Allows routing of any digits to the selected MiVB

  The rest of the settings are optional and could be configured if required

- Click **Save**

![Manage SIP trunk](image)

**Figure 19 – Services - SIP Trunking setup**