Abstract

These Application Notes describe the configuration steps required for Fonolo In-Call Rescue application to interoperate with Avaya Communication Server 1000 and Avaya Aura® Session Manager using SIP trunks.

Readers should pay attention to Section 2, in particular the scope of testing as outlined in Section 2.1 as well as the observations noted in Section 2.2, to ensure that their own use cases are adequately covered by this scope and results.

Information in these Application Notes has been obtained through DevConnect compliance testing and additional technical discussions. Testing was conducted via the DevConnect Program at the Avaya Solution and Interoperability Test Lab.
1. Introduction

These Application Notes describe the configuration steps required for Fonolo In-Call Rescue (ICR) to interoperate with Avaya Communication Server 1000 (Communication Server 1000) via Avaya Aura® Session Manager (Session Manager) using SIP trunks. ICR provides functionality to replace hold-time with a call-back and during this compliance testing was hosted on the cloud by Fonolo. The solution communicates via SIP/RTP. The ICR functionality was compliance tested utilizing SIP trunks to Session Manager. The configuration allowed Communication Server 1000 to use SIP trunking for calls to and from the ICR application. The ICR is a call center solution where instead of a caller staying in the queue when agents are all busy, can request to get a call back when an agent becomes available.

When a caller encounters a scenario where no agents are available in a call center environment and Communication Server 1000 is part of that environment, the caller is presented with options by the call center to either continue waiting in the queue or receive a call back from the call center. If the caller chose the latter, then the call center directs the caller to ICR via Session Manager SIP trunks where ICR then provides a message to the caller to leave a call back number, so that ICR can call back the caller when an agent becomes available. Once ICR receives the confirmed call back number from the caller, ICR uses SIP trunks with Session Manager to call back into the call center and wait in the queue until an agent becomes available. When an agent becomes available, ICR informs the agent that there is a call waiting and if the agent would like to get connected to the caller. If the agent accepts to connect to the caller, ICR then calls the caller via SIP trunks to Communication Server 1000 and connects the caller with the available agent. When ICR makes an outbound call to the caller and agent via Session Manager, it makes two SIP INVITE requests. One to the available agent and one to the caller and then mixes the audio within the ICR server.

For security purposes public and lab IP addresses have been altered in this document.

2. General Test Approach and Test Results

The interoperability compliance testing focused on verifying inbound and outbound calls flows between Communication Server 1000 and ICR. The feature test cases were performed manually. Calls were placed manually from users on the PSTN to a call center Control Directory Number (CDN). During compliance testing Avaya Aura® Contact Center (Contact Center) was used to emulate a call center. Assumption was made during compliance testing in the Contact Center script to direct callers to ICR when no agents are available. When caller connected with ICR, ICR read the call back number of the caller or asked caller to input a new call back number. ICR recognized the Dual Tone Multi Frequency (DTMF) input provided by the caller confirming the call back number. For compliance testing purposes, agents were made available after the above call between caller and ICR is completed. ICR then called into the call center CDN and connected with an available agent. ICR provided a recording informing the agent of a call in waiting and if the agent wants to get connected to the PSTN caller. Agent accepted the call by using DTMF input. ICR then made the second outbound call to the PSTN caller via Communication Server 1000 and if the PSTN caller answered the call they then get connected with the agent.
The serviceability test cases were performed manually by disconnecting and reconnecting the SIP trunk connection to ICR.

DevConnect Compliance Testing is conducted jointly by Avaya and DevConnect members. The jointly-defined test plan focuses on exercising APIs and/or standards-based interfaces pertinent to the interoperability of the tested products and their functionalities. DevConnect Compliance Testing is not intended to substitute full product performance or feature testing performed by DevConnect members, nor is it to be construed as an endorsement by Avaya of the suitability or completeness of a DevConnect member’s solution.

Avaya recommends our customers implement Avaya solutions using appropriate security and encryption capabilities enabled by our products. The testing referenced in these DevConnect Application Notes included the enablement of supported encryption capabilities in the Avaya products. Readers should consult the appropriate Avaya product documentation for further information regarding security and encryption capabilities supported by those Avaya products.

Support for these security and encryption capabilities in any non-Avaya solution component is the responsibility of each individual vendor. Readers should consult the appropriate vendor-supplied product documentation for more information regarding those products.

For the testing associated with these Application Notes, the interface between Avaya systems and Fonolo did not include use of any specific encryption features as requested by Fonolo.

This test was conducted in a lab environment simulating a basic customer enterprise network environment. The testing focused on the standards-based interface between the Avaya solution and the third-party solution. The results of testing are therefore considered to be applicable to either a premise-based deployment or to a hosted or cloud deployment where some elements of the third-party solution may reside beyond the boundaries of the enterprise network, or at a different physical location from the Avaya components.

Readers should be aware that network behaviors (e.g. jitter, packet loss, delay, speed, etc.) can vary significantly from one location to another and may affect the reliability or performance of the overall solution. Different network elements (e.g. session border controllers, soft switches, firewalls, NAT appliances, etc.) can also affect how the solution performs.

If a customer is considering implementation of this solution in a cloud environment, the customer should evaluate and discuss the network characteristics with their cloud service provider and network organizations and evaluate if the solution is viable to be deployed in the cloud.

The network characteristics required to support this solution are outside the scope of these Application Notes. Readers should consult the appropriate Avaya and third-party documentation for the product network requirements. Avaya makes no guarantee that this solution will work in all potential deployment configurations.
2.1. Interoperability Compliance Testing

The ICR application is hosted in a cloud environment by Fonolo. SIP trunks were used to connect the ICR application with Communication Server 1000 via Session Manager. The following features and functionality were covered during compliance testing:

- Establishment of SIP trunks connectivity between ICR and Session Manager including session refresh.
- Testing of G.711MU codec.
- Incoming calls to a CDN of Contact Center via Communication Server 1000 can be redirected to the ICR application via the SIP trunks based on Contact Center scripting. Outgoing calls from ICR to the CDN via Communication Server 1000 when callers decide on Call back. During this compliance testing Contact Center was used to simulate a call center environment and is not the scope of these Application Notes.
- The ICR application can make outbound call to the caller via Communication Server 1000 who had selected the call back option and merge the call between the caller and available agents. The outbound call is made from Communication Server 1000 via Session Manager and using SIP INVITE.
- DTMF transmission to ensure that options selected by the caller and agent is accepted correctly by ICR.

Serviceability testing focused on verifying the ability of ICR to recover from adverse conditions, such as the SIP trunks going down (disable command) and reboot of Session Manager.
2.2. Test Results
All test cases were executed and passed with the following exceptions/observations:

- ICR only supports G.711u codec.
- ICR only supports RFC2833 for DTMF transmission.

2.3. Support
Technical support on Fonolo ICR can be obtained through the following:

- **Phone:** 1-855-366-2500 (USA Toll-free)
- **Web:** [https://fonolo.com/contact/](https://fonolo.com/contact/)
- **Email:** support@fonolo.com
3. Reference Configuration

A simulated enterprise site consisting of Communication Server 1000, Session Manager and System Manager were used during compliance testing. As shown in Figure 1, SIP trunks were used to connect Fonolo ICR with Communication Server 1000 via Session Manager. Communication Server 1000 is connected to an emulated PSTN using SIP trunks. A skillset queue is configured on Communication Server 1000 with two agents belonging to this queue. The configuration allowed the enterprise site to use SIP trunking for calls to and from ICR via the Session Manager.

During compliance testing inbound calls to Fonolo were sent to two of Fonolo’s specific servers and outbound calls from Fonolo came from four of Fonolo’s other servers. This architecture was implemented by Fonolo due to some PBX vendors cannot support inbound and outbound calls on the same SIP trunk. Due to this design intent of Fonolo, inbound and outbound calls to and from Fonolo were handled by different servers. All these servers were hosted on the cloud by Fonolo.

The following values were configured during compliance testing:

- CDN: 54900
- Skillset: 1
- Agent Login ID: 1005, 1006
### 4. Equipment and Software Validated

The following equipment and software were used for the sample configuration provided:

<table>
<thead>
<tr>
<th>Equipment/Software</th>
<th>Release/Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avaya Communication Server 1000</td>
<td>7.65.16 SP9</td>
</tr>
<tr>
<td>Avaya Aura® System Manager running on virtual server</td>
<td>8.0.0.0.931077</td>
</tr>
<tr>
<td>Avaya Aura® Session Manager running on virtual server</td>
<td>8.0.0.0.800035</td>
</tr>
<tr>
<td>Avaya Aura® Contact Center</td>
<td>7.0.3.0 (FP3)</td>
</tr>
<tr>
<td>Avaya IP Deskphones: 1150E (UNIStim)</td>
<td>0627C94</td>
</tr>
<tr>
<td></td>
<td>0626C94</td>
</tr>
<tr>
<td>Fonolo In-Call Rescue hosted on a cloud</td>
<td>Version 3.2</td>
</tr>
</tbody>
</table>
5. Configure Avaya Communication Server 1000

The configuration operations illustrated in this section were performed using terminal access to the Communication Server 1000 over an “SSH” session using “PuTTY”. The information provided in this section describes the configuration of the Communication Server 1000 for this solution. For all other provisioning information such as initial installation and configuration, please refer to the product documentation in Section 11.

Note:
- During compliance test, route number (ROUT) and route list index (RLI) is 6 to Session Manager, this information is needed in Section 5.2 to configure route to ICR dialing plan of 30xxx. A full printout of the D-Channel, Route and Trunk information for the SIP Signalling Gateway used for the compliance testing is included in the Appendix B of these Application Notes.
- Not all prompts need a response. The prompts outlined below are mandatory for a basic configuration. Accept the default responses for all other prompts by pressing the return key.

5.1. Verify Licences

To ensure that Communication Server 1000 is licensed for SIP Trunks, use LD 22 and type SLT at the REQ prompt. Check for SIP ACCESS PORTS as shown below.

```
>ld 22
PT2000
REQ slt
System type is - Communication Server 1000E/CPPM Linux
CPPM - Pentium M 1.4 GHz
IPMGs Registered: 1
IPMGs Unregistered: 0
IPMGs Configured/unregistered: 0
TRADITIONAL TELEPHONES 32767 LEFT 32767 USED 0
DECT USERS 32767 LEFT 32767 USED 0
IP USERS 32767 LEFT 32682 USED 85
BASIC IP USERS 32767 LEFT 32764 USED 3
TEMPORARY IP USERS 32767 LEFT 32765 USED 2
DECT VISITOR USER 10000 LEFT 10000 USED 0
ACD AGENTS 32767 LEFT 32739 USED 28
MOBILE EXTENSIONS 32767 LEFT 32761 USED 6
TELEPHONY SERVICES 32767 LEFT 32767 USED 0
CONVERGED MOBILE USERS 32767 LEFT 32767 USED 0
AVAYA SIP LINES 32767 LEFT 32755 USED 12
THIRD PARTY SIP LINES 32767 LEFT 32740 USED 27
PCA 32767 LEFT 32764 USED 3
ITG ISDN TRUNKS 32767 LEFT 32767 USED 0
H.323 ACCESS PORTS 32767 LEFT 32767 USED 0
AST 32767 LEFT 32717 USED 50
SIP CONVERGED DESKTOPS 32767 LEFT 32767 USED 0
SIP CTI TR87 32767 LEFT 32733 USED 34
SIP ACCESS PORTS 32767 LEFT 32703 USED 64
```
5.2. Configure Coordinated Dialing Plan

This section shows steps on how to create Coordinated Dialing Plan (CDP) to route the call from Communication Server 1000 to ICR via Session Manager.

Use the **NEW** command in **LD 87** to create a **CDP** entry for ICR. In the example below, the **DSC** is “30”, **FLEN** is “5” and the **RLI** is “6”.

```plaintext
>ld 87
REQ   new
CUST  0
FEAT  cdp
TYPE  dsc
DSC   30   ➔ Distant Steering Code to dial ICR
FLEN  5   ➔ Length of the Distant Steering Code
DSP   LSC
RRPA  NO
RLI   6   ➔ Route List Index
CCBA  NO
NPA
NXX
```

5.3. Saving Avaya Communication Server 1000 Configuration

Type **LD 43** at the > prompt to save any newly configured parameters like CDP as mentioned in the above section, upon entering the overlay type **edd** at the “.” prompt as shown below.

```plaintext
ld 43
EDDO00
.edd
```
5.4. Configure Avaya Communication Server 1000 SIP Signaling Gateway

The SIP Signalling Gateway is an application installed on the Avaya Communication Server 1000 Signalling Server. In this example this Signalling Server is a co-resident installation with the Avaya Communication Server 1000 Call Server.

The SIP Signalling Gateway is configured at the Communication Server 1000 IP Telephony Node. Changes on the Communication Server 1000 Node are performed using Element Manager which is accessible through the System Manager. To make changes in Element Manager, access the System Manager web interface by using the URL “https://ip-address” in an Internet browser window, where “ip-address” is the IP address of System Manager. Log in using the appropriate credentials in the screen shown below.

From the main screen of System Manager shown below, navigate to Elements → Communication Server 1000.
Once \textbf{Communication Server 1000} is selected the following screen appears, click on the Element Manager link, in this case it is \textbf{EM on cppm3}.

Click on \textbf{IP Network $\rightarrow$ Nodes: Servers, Media Cards} in the left window. Click on the \textbf{Node ID} displayed in the right window, during compliance test Node 510 is configured to connect to Session Manager. Note the IP address of this node as it used while configuring Communication Server 1000 as SIP Entity endpoint on Session Manager in \textbf{Section 7.5.2}.
The **Node Details** page is launched when the **Node ID 510** is clicked as shown below. Click on the link **Gateway (SIPGw)** to launch the SIP Gateway Services page.

![Node Details](image1)

From the **SIP Gateway Services** page, scroll down to enter the IP address of the Session Manager in the **Primary TLAN IP address** field. Enter **Port** as “5060” and select the **Transport protocol** as “UDP”, this port and transport protocol will be used when configuring Communication Server 1000 SIP entity in Session Manager in **Section 7.5.2**. Click on **Save** once finished.

![Gateway Configuration Details](image2)

**Save** and **Transmit** (not shown) these Node properties to complete the SIPGw configuration. Once the components are synchronized the Signaling Gateway will require a restart.
6. Configure Avaya Aura® Contact Center

The administration of the routing and basic connectivity between Communication Server 1000 and Contact Center or the setting up of Skillset, CDN, Scripts, Agents for a contact center type environment are not the focus of these Application Notes; however, some details are provided only for informational purposes and completeness.

This section provides a sample script that was used during the compliance testing. When a call is directed to this script, caller is connected to ICR if there are no agents available in the Skillset.

From Contact Center Select Launchpad, navigate to **Scripting → Orchestration Designer → Launch Orchestration Designer** (not shown) to open the **Orchestration Designer** window as shown below. A basic script is configured in the example below. When a call reaches the CDN **54900** that was configured during compliance testing and if agents are not available, then the call is routed to **30000** which is the distant steering code that was configured in **Section 5.2** to reach ICR.

![Orchestration Designer Window](image)
7. Configure Avaya Aura® Session Manager

This section provides the procedures for configuring Session Manager. The procedures include the following areas:

- Launch System Manager
- Administer Domain
- Administer Locations
- Administer Adaptation
- Administer SIP Entities
- Administer Routing Policies
- Administer Dial Patterns

7.1. Launch System Manager

Access the System Manager web interface by using the URL “https://ip-address” in an Internet browser window, where “ip-address” is the IP address of System Manager. Log in using the appropriate credentials.

![Configuration Screen]

This system is restricted solely to authorized users for legitimate business purposes only. The actual or attempted unauthorized access, use, or modification of this system is strictly prohibited.

Unauthorized users are subject to company disciplinary procedures and or criminal and civil penalties under state, federal, or other applicable domestic and foreign laws.

The use of this system may be monitored and recorded for administrative and security reasons. Anyone accessing this system expressly consents to such monitoring and recording, and is advised that if it reveals possible evidence of criminal activity, the evidence of such activity may be provided to law enforcement officials.

All users must comply with all corporate instructions regarding the protection of information assets.

Supported Browsers: Internet Explorer 11.x or Firefox 38.0, 39.0 or 60.0.
7.2. Administer Domain

In the subsequent screen (not shown), select **Elements → Routing** to display the **Introduction to Network Routing Policy** screen below. Select **Routing → Domains** from the left pane and click **New** in the subsequent screen (not shown) to add a new domain.

The **Domain Management** screen is displayed. In the **Name** field enter the domain name, select “sip” from the **Type** drop down menu and provide any optional **Notes**.
7.3. Administer Locations

Select **Routing → Locations** from the left pane and click **New** in the subsequent screen (not shown) to add a new location for ICR.

The **Location Details** screen is displayed. In the **General** sub-section, enter a descriptive **Name** and optional **Notes**. Retain the default values in the remaining fields.

Scroll down to the **Location Pattern** sub-section, click **Add** and enter the IP address of all devices involved in the compliance testing in **IP Address Pattern**, as shown below. Retain the default values in the remaining fields.
7.4. Administer Adaptation

During compliance test, to make the call from and to Communication Server 1000 via Session Manager, an Adaptation to remove the phone-context in the SIP Message body from Communication Server 1000 was used.

Below are the steps that were used during compliance testing to create the needed Adaptation. Select Adaptations on the left panel menu and then click on the New button in the main window (not shown).

Enter the following for the Communication Server 1000 Adaptation.

- **Adaptation Name:** An informative name.
- **Module Name:** Select CS1000Adapter.
- **Module Parameter Type:** Select Name-Value Parameter.

Click Add to add a new row for the following values as shown below table:

<table>
<thead>
<tr>
<th>Name</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>fromto</td>
<td>true</td>
</tr>
</tbody>
</table>

In the Digit Conversion for Incoming Calls to SM, add the Matching Pattern, which corresponds to the dialing plan used during this compliance testing along with the Min and Max length of the numbers being dialed and the Phone Context. During compliance testing, “30xxx” was the dialing plan for ICR and “54xxx” was the dialing plan for Communication Server 1000 with the min and max length of “5” and “cdp.udp” being the phone context. See dialing plan details in Section 7.7.
Once the correct information is entered click the **Commit** button. Below is the screenshot showing the Adaptation created for Communication Server 1000.
7.5. Administer SIP Entities
Add seven new SIP entities, six for ICR and one for the new SIP trunks with Communication Server 1000.

7.5.1. SIP Entity for Fonolo ICR
Select Routing → SIP Entities from the left pane and click New in the subsequent screen (not shown) to add a new SIP entity for ICR.

The SIP Entity Details screen is displayed. Enter the following values for the specified fields and retain the default values for the remaining fields.

- **Name:** A descriptive name.
- **FQDN or IP Address:** The IP address of ICR SIP Server.
- **Type:** “Other”.
- **Notes:** Any desired notes.
- **Location:** Select the ICR location name from Section 7.3.
- **Time Zone:** Select the applicable time zone.
- **SIP Link Monitoring:** Select “Link Monitoring Enabled”.

![SIP Entity Details](image-url)
Scroll down to the **Entity Links** sub-section and click **Add** to add an entity link. Enter the following values for the specified fields and retain the default values for the remaining fields.

- **Name**: A descriptive name.
- **SIP Entity 1**: The Session Manager entity name, in this case “DevvmSM”.
- **Protocol**: “UDP”.
- **Port**: “5060”.
- **SIP Entity 2**: The ICR entity name from this section.
- **Port**: “5060”.
- **Connection Policy**: “trusted”.

Note that only UDP protocol was tested.

Repeat the above to configure a total of six SIP entities for ICR, since during the compliance testing two were used for outgoing calls from Communication Server 1000 to ICR and four were used for incoming calls from ICR to Communication Server 1000.
7.5.2. SIP Entity for Communication Server 1000

Select **Routing → SIP Entities** from the left pane and click **New** in the subsequent screen (not shown) to add a new SIP entity for Communication Server 1000. Note that this SIP entity is used for integration with ICR.

The **SIP Entity Details** screen is displayed. Enter the following values for the specified fields and retain the default values for the remaining fields.

- **Name:** A descriptive name.
- **FQDN or IP Address:** The IP address of an existing Communication Server 1000 node IP.
- **Type:** “Other”.
- **Notes:** Any desired notes.
- **Adaptation:** Select the adaptation configured in **Section 7.4**.
- **Location:** Select the applicable location for Communication Server 1000.
- **Time Zone:** Select the applicable time zone.
Scroll down to the **Entity Links** sub-section and click **Add** to add an entity link. Enter the following values for the specified fields and retain the default values for the remaining fields.

- **Name:** A descriptive name.
- **SIP Entity 1:** The Session Manager entity name, in this case “DevvmSM”.
- **Protocol:** The signaling group transport (UDP) method from **Section 5.4**.
- **Port:** The signaling group listen port (5060) number from **Section 5.4**.
- **SIP Entity 2:** The Communication Server 1000 entity name from this section.
- **Port:** The signaling group listen port (5060) number from **Section 5.4**.
- **Connection Policy:** “trusted”.

![Entity Links Table](image)
7.6. Administer Routing Policies
Add two new routing policies, one for ICR and one for the new SIP trunks with Communication Server 1000.

7.6.1. Routing Policy for Fonolo ICR
Select Routing → Routing Policies from the left pane and click New in the subsequent screen (not shown) to add a new routing policy for ICR.

The Routing Policy Details screen is displayed. In the General sub-section, enter a descriptive Name, and retain the default values in the remaining fields.

In the SIP Entity as Destination sub-section, click Select and select the ICR entity name from Section 7.5.1. In the Time of Day sub-section, enter “0” for Ranking. Ranking option is only configured for the two outgoing routing policies of ICR so that calls can be load balanced. The screen below shows the result of the selection.
7.6.2. Routing Policy for Communication Server 1000

Select Routing → Routing Policies from the left pane and click New in the subsequent screen (not shown) to add a new routing policy for Communication Server 1000.

The Routing Policy Details screen is displayed. In the General sub-section, enter a descriptive Name, and retain the default values in the remaining fields.

In the SIP Entity as Destination sub-section, click Select and select the Communication Server 1000 entity name from Section 7.5.2. The screen below shows the result of the selection.
7.7. Administer Dial Patterns
Add a new dial pattern for ICR and Communication Server 1000.

7.7.1. Dial Pattern for Fonolo ICR
Select Routing → Dial Patterns from the left pane and click New in the subsequent screen (not shown) to add a new dial pattern to reach ICR. The Dial Pattern Details screen is displayed. In the General sub-section, enter the following values for the specified fields, and retain the default values for the remaining fields.

- **Pattern:** A dial pattern to match, in this case “30”.
- **Min:** The minimum number of digits to match.
- **Max:** The maximum number of digits to match.
- **SIP Domain:** The signaling group domain name from Section 7.2.

In the Originating Locations and Routing Policies sub-section, click Add and create an entry for reaching ICR. In the compliance testing, the entry allowed for call originations from all Communication Server 1000 endpoints in locations “Belleville”. The ICR routing policy from Section 7.6.1 was selected as shown below. Note that two routing policies are selected since during this compliance testing, two outgoing routing policies were configured for calls made from Communication Server 1000 to ICR.
7.7.2. Dial Pattern for Communication Server 1000

Select **Routing → Dial Patterns** from the left pane and click **New** in the subsequent screen (not shown) to add a new dial pattern to reach Communication Server 1000. The **Dial Pattern Details** screen is displayed. In the **General** sub-section, enter the following values for the specified fields, and retain the default values for the remaining fields.

- **Pattern:** A dial pattern to match, in this case “54” and “62196754”.
- **Min:** The minimum number of digits to match.
- **Max:** The maximum number of digits to match.
- **SIP Domain:** The signaling group domain name from **Section 7.2**.
In the **Originating Locations and Routing Policies** sub-section, click **Add** and create an entry for reaching Communication Server 1000. In the compliance testing, the entry allowed for call originations from all ICR endpoints in locations “-ALL-” or “Belleville”. The Communication Server 1000 routing policy from **Section 7.6.2** was selected as shown below.
8. Configure Fonolo In-Call Rescue

This section provides a “snapshot” of ICR configuration used during compliance testing. ICR is typically configured for customers by Fonolo. The screen shots and partial configuration shown below, supplied by Fonolo, are provided only for reference. These represent only an example of the configuration GUI of ICR, available through the Fonolo Customer Portal at https://portal.fonolo.com/. Other configurations are possible. Contact Fonolo for details on how to configure ICR. The configuration operations described in this section can be summarized as follows:

- Add a New SIP Trunk Group
- Adding the Agent Call-Back Endpoint
- Adding a New Call-Back Profile

8.1. Add a New SIP Trunk Group

Navigate to Telco ➔ SIP Trunks and click the Add New SIP Trunk Group button (not shown) at the top of the page. Define a new label to identify this SIP trunk group. During compliance testing Avaya SM-CS1000 was used as the label. Then select Add New SIP Trunk (not shown).

Under the Members tab in this new SIP trunk group, click the Add New Member button (not shown), and the Add New SIP Trunk dialog will appear as shown below.

Under Add New SIP Trunk:

- **SIP URL**: The IP address of Session Manager formatted as a fully qualified URL, defining the protocol and SIP port.
- **DTMF Mode**: The mode to use for sending DTMF tones. Default is RFC 2833.
- **Identity Header**: Whether to include an identity header (either Remote-Party-ID or P-Asserted-Identity). Default is none.
- **Codec Support**: The list of audio codecs to use. Default is μ-law.
- **Priority**: A numeric value that can be used to determine failover or load balance groups when more than one SIP trunk group member is defined. Members with lower priority values are used first; members with an equal priority values are load balanced.
- **Keepalive**: This instructs the Fonolo platform to perform regular keep-alive using SIP OPTIONS requests, based on the number of seconds defined. Default is disabled.
- **Session Timers**: If Fonolo should enable SIP Session Timers (RFC 4028). Default is disabled.
- **NAT Support**: If the SIP trunk group member specified is located behind a NAT (Network Address Translation) device. Fonolo can compensate for the un-reachable RTP data specified in the SDP body of the INVITE request, using symmetric RTP.
Add the IP address of Session Manager, formatted as a fully qualified URL, defining the protocol and SIP port, then click the **Save Trunk** button. During compliance testing, the protocol **UDP** and port **5060** is used for the SIP service with Session Manager, and the default values for the remaining SIP trunk group member settings.
8.2. Adding the Agent Call-Back Endpoint

Navigate to Manage → Targets and click the Add New Target button (not shown). Define a new label to identify this new Target. During compliance testing Customer Service Agents was used as the Target Label. Select the Dial as SIP Extension option (shown below) for Dial Method and enter the CDN to reach the pertinent skillset via Session Manager in the Extension field.

During compliance testing, CDN 54900 was pre-configured on Communication Server 1000 which was accessible via Session Manager. Then click on the Add New Target button to save this Target.

![Target Configuration](image-url)

- **Target Label:** Customer Service Agents
- **Dial Method:** Dial as SIP Extension
- **Extension:** 54900
- **Retry Extension:**
- **Return Extension:**

When connecting via Direct SIP or using Fonolo appliances, failed calls will be redirected back to the sending host. By default, failed calls will be redirected back to the Direct Extension value. You may also specify an alternate extension to redirect the call back to.
From the **Telco Settings** section of the newly added Target, select the SIP trunk to use for this Target, from the **Direct SIP** drop down menu shown below. Select the **Avaya SM – CS1000** SIP trunk, added in **Section 8.1**, and then click the **Save Changes** button.
8.3. Adding a New Call-Back Profile

Navigate to Manage → Call-Back Profiles and click on the Add New Profile button (not shown), and configure the new profile:

- **Profile Label:** A label to identify this new profile.
- **Geo Whitelist:** A geographic whitelist to use for this new profile.
- **Channel:** Select “In-Call Rescue”.
- **Language:** Select the appropriate language for this skill set queue.
- **Client CID Number:** The Caller-ID number the customer will see.
- **Client CID Name:** The Caller-ID name the customer will see.
- **Agent CID Number:** The Caller-ID number the agent will see.
- **Agent CID Name:** The Caller-ID name the agent will see.

Click the **Add New Call-Back Profile** button to add this new profile.
From the **Call Options** section of the new **Call-Back Profile**, select the Target added in **Section 8.2** (from the drop-down menu highlighted below), and click the **Add Option** link to add the CDN value to the section on the left, as shown below, then click the **Save Changes** (not shown) button.

This associates the Target CDN with this new **Call-Back Profile**. Multiple call options can be associated with a single **Call-Back Profile**, one for each skill call-backs are being offered on.
From the Telco Settings section of the new Call-Back Profile, select the Avaya SM – CS1000 SIP trunk group created in Section 8.1 as the Direct SIP value under both the Client Call-Back Method and the In-Call Rescue Call Transfers section, as shown below, then click the Save Changes button.

Navigate to Manage → Call-Back Profiles and click on the Call Options link on the newly created Call-Back Profile (not shown). The ICR Settings dialog will appear (shown below) and include the inbound extensions to use for CDN. These are the extensions to transfer calls to, on the ICR system, when a call opts-in for a call-back. During compliance testing, the extension 30000 is configured on the Fonolo system.
9. Verification Steps

This section provides the tests that can be performed to verify proper configuration of Communication Server 1000, Session Manager and Fonolo ICR.

9.1. Verify Avaya Communication Server 1000

On Communication Server, verify the status of the SIP route by using \texttt{LD 32} and typing “\texttt{stat vtrm [cust no] [route no]}”, in this case which is \texttt{stat vtrm 0 6}, where “0” is the customer number and “6” is the SIP route configured (refer to \textbf{Appendix B}).

```bash
> ld 32
.stat vtrm 0 6

*******************************
STATUS OF VRTL IP TRK ROUTE AND MBRS
*******************************

================================
CUST ROUTE PROTOCOL CALL_DIRCTN
0  6  SIP   IN AND OUT
DCH 5  SSRC TOTAL 4096  SSRC USED 128  SSRC AVAILABLE 3968

MBR STATUS
IDLE UNREGISTERED 0
IDLE REGISTERED 64
BUSY 0
MBSY 0
DSBL UNREGISTERED 0
DSBL REGISTERED 0
LCKO 0
```

Verify the status of the local SIP trunk group by using the “\texttt{trac [customer no] [ACOD of route]}” command in \texttt{LD 80}. In this case \texttt{trac 0 8006}, where “0” is the customer number and “8006” is the ACOD for route 6 configured (refer to \textbf{Appendix B}). Verify that the trunks are in \texttt{IDLE} state as shown below.

```bash
> ld 80
.trac 0 8006

ROUT 6  IPTI NTRK 64
5  100  0  03  04  V PHYSICAL TN 000 0 00 00  IDLE
4  100  0  03  03  V PHYSICAL TN 000 0 00 00  IDLE
3  100  0  03  02  V PHYSICAL TN 000 0 00 00  IDLE
2  100  0  03  01  V PHYSICAL TN 000 0 00 00  IDLE
1  100  0  03  00  V PHYSICAL TN 000 0 00 00  IDLE
```
The following tests were also performed to verify proper configuration of ICR with Communication Server 1000.

- PSTN caller can select the call back option and get redirected to ICR via Communication Server 1000/Session Manager.
- PSTN caller can hear the ICR menu and make the required choices.
- ICR can recognize the choices made by the PSTN user.
- ICR can call the CDN and wait for an available agent.
- ICR can call out to the PSTN caller and connect them to an available agent.
9.2. Verify Avaya Aura® Session Manager

Navigate to Elements → Session Manager → System Status → SIP Entity Monitoring and select the Communication Server 1000 SIP Entity. Verify the Link Status is Up. Repeat the same procedure selecting the ICR SIP Entity and verify the Link Status is Up.
9.3. Verify Fonolo In-Call Rescue
In the Fonolo web portal, verify the link status of the SIP trunk group to the Session Manager, by navigating to **Telco → SIP Trunks** (not shown). Each SIP trunk group member will have a response time value, indicating the network latency (in milliseconds) between the Fonolo network, and the Session Manager. A positive **Response Time** value indicates a positive link status.

![Fonolo In-Call Rescue](image)

Additional information is available through the **Stats → Graphs** section of the Fonolo web portal (not shown).

10. Conclusion
These Application Notes describe the configuration steps required for Fonolo In Call Rescue to successfully interoperate with Avaya Communication Server 1000 and Avaya Aura® Session Manager. All feature and serviceability test cases were completed and passed with the exceptions/observations noted in **Section 2.2**.
11. Additional References
This section references the product documentation relevant to these Application Notes.

Product documentation for Avaya products may be found at http://support.avaya.com.


Fonolo provides their documentation upon delivery of their products/services.
## Appendix A

### Avaya Communication Server 1000 R7.6 - Linux Patches

**Product Release:** 7.65.16.00  
In system patches: 9

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Appendix B  
Solution & Interoperability Test Lab Application Notes  
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## Avaya Communication Server 1000 R7.6 - Call Server Patches

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- RELEASE 7
- VERSION 4121

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<td>21/09/2018</td>
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</table>

MDP>LAST SUCCESSFUL MDP REFRESH :2017-07-04 15:18:22 (Local Time)
MDP>USING DEPLIST ZIP FILE DownloadED :2017-06-30 15:52:25 (est)
Appendix B
Avaya Communication Server 1000 Route for SIP Signalling Gateway

id 21
PT1000

REQ: prt
TYPE: rdb
CUST 0
ROUT 6

TYPE RDB
CUST 00
ROUT 6
DES SIP_N510
TRTP 71E
M91I P NO
ESN NO
RPA NO
CNVT NO
SAT NO
RCLS EXT
VTRK YES
ZONE 00002
PCID SIP
CRID NO
SBWM NO
NODE 510
DTRK NO
ISDN YES
MODE ISLD
DCH 5
IFC SL1
PNI 00001
NCNA YES
NCRD YES
TRO YES
FALT NO
CTYP UKWN
INAC YES
ISAR NO
DAPC NO
MBXR NO
MBXOT NFA
MBXT 0
PTYP ATT
CNDP UKWN
AUTO NO
DNIS NO
DCDR NO
ICOG IAO
SRCH LIN
TRMB YES
STEP
ACOD 8006
TCPF NO
PII NO
AUXP NO
TARG 01
CLEN 1
BILN NO
OABS
INST
IDC YES
DCNO 0
NDNO 0 *
DEXT NO
DNAM NO
ANTX
SIGO STD
STYP SDAT
MFC NO
ICIS YES
OGIS YES

PAGE 002

PTUT 0
TIMR ICF 512
OGF 512
EOG 13952
DSI 34944
NRD 10112
DDL 70
ODT 4096
RGV 640
GTO 896
GTI 896
SFB 3
NBS 2048
NBL 4096

IENB 5
TFB 0
VSS 0
VGD 6
EESD 1024

SST 5 0
DTD NO
SCUT NO
2 DT NO
NEDC ORG
FEDC ORG
CPDC NO
DITN NO
HOLD 02 02 40
SEIZ 02 02
SVFL 02 02
DRNG NO
CDR NO
NATL YES
SSL
CPWR NO
IDOP NO
VRAT NO
MUS NO
PANS YES
RACD NO
MANO NO
FRL 0 0
FRL 1 0
FRL 2 0
FRL 3 0
FRL 4 0
FRL 5 0
FRL 6 0
FRL 7 0
OHQ NO
OHQT 00
CBQ NO
AUTH NO
TDET NO
TTLT 0
ATAN NO
OHTD NO
PLEV 2
Avaya Communication Server 1000 D-Channel for SIP Signalling Gateway

```bsh
>ld 22
PT2000

REQ prt
TYPE adan dch 5

ADAN DCH 5
CTYP DCIP
DES Vtrak_SIP_SIPL
USR ISLD
ISLM 4000
SSRC 3700
OTBF 32
NASA YES
IFC SL1
CNEX 1
RLS ID 7
RCAP ND2 TAT
MBGA NO
H323
OVLR NO
OVLS NO
```
Avaya Communication Server 1000 Trunk Channel for SIP Signalling Gateway

>ld 20
PT0000
REQ: prt
TYPE TNB
TN  100 0 3 0
DES SIP_N510
TN  100' 03 00 VIRTUAL
TYPE IPTI
CDEN 8D
CUST 0
XTRK VTRK
ZONE 00002
LDOP BOP
TIMP 600
BIMP 600
AUTO_BIMP NO
NMUS NO
TRK ANLG
NCOS 0
RTMB 6 1
CHID 65
TGR1 1
STRI/STRO IMM IMM
SUPN YES
AST NO
IAPG 0
CLS UNR DTN CND ECD WTA LPR THFD XREP SPCD MSBT
  P10 NTC MID
TKID
AACR NO
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