



Avaya Solution & Interoperability Test Lab

Application Notes for Computer Instruments eONE with Avaya IP Office Server Edition - Issue 1.0

Abstract

These Application Notes describe the configuration steps required for Computer Instruments eONE to interoperate with Avaya IP Office Server Edition using SIP trunks. Computer Instruments eONE is an IVR development platform that includes a number of self-service IVR and Web applications. In this compliance test, Computer Instruments eONE was installed on a cloud.

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 Computer Instruments eONE to interoperate with Avaya IP Office Server Edition using SIP trunks. Computer Instruments eONE is an IVR development platform that includes a number of self-service IVR and Web applications.

In the compliance testing, Computer Instruments eONE used SIP trunks to Avaya IP Office to support inbound and outbound IVR applications.

The Computer Instruments eONE (heron refers to as eONE) server used in the testing was installed on a cloud.

2. General Test Approach and Test Results

The feature test cases were performed manually. The eONE inbound application was tested by manually placing calls from users on Avaya IP Office to the eONE inbound application. The associated eONE inbound application played greeting announcements and collected DTMF input from the caller to decide on the feature to provide, such as transfer to internal or external destinations. eONE outbound application to PSTN and Communication Manager were also tested.

The serviceability test cases were performed manually by disconnecting and reconnecting the Ethernet connection to eONE.

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.

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 interoperability compliance test included feature and serviceability testing.

The feature testing included inbound/outbound calls, G.711MU, inbound DTMF, invalid number, and busy destination.

The serviceability testing focused on verifying the ability of eONE to recover from adverse conditions, such as disconnecting/reconnecting network connection to eONE.

2.2. Test Results

All test cases passed. Inbound and outbound calls to/from eONE, inbound DTMF, call Supervised Transfer from eONE, and call termination were all successful.

2.3. Support

For technical support on eONE, contact Computer Instruments Technical Support via phone, email, or website.

- **Phone:** (888) 451-0851
- **Email:** support@instruments.com
- **Web:** http://instruments.com/support/email_form.html (monitored 24x7)

3. Reference Configuration

Figure 1 illustrates a sample configuration with Avaya IP Office and Computer Instruments eONE. eONE connects to Avaya IP Office via a SIP trunk. Avaya IP Office received incoming calls and then routed them to eONE ports. eONE then terminated the call to the appropriate IVR application. Avaya IP Office was also connected to a simulated PSTN, which was used to simulate customer calls.

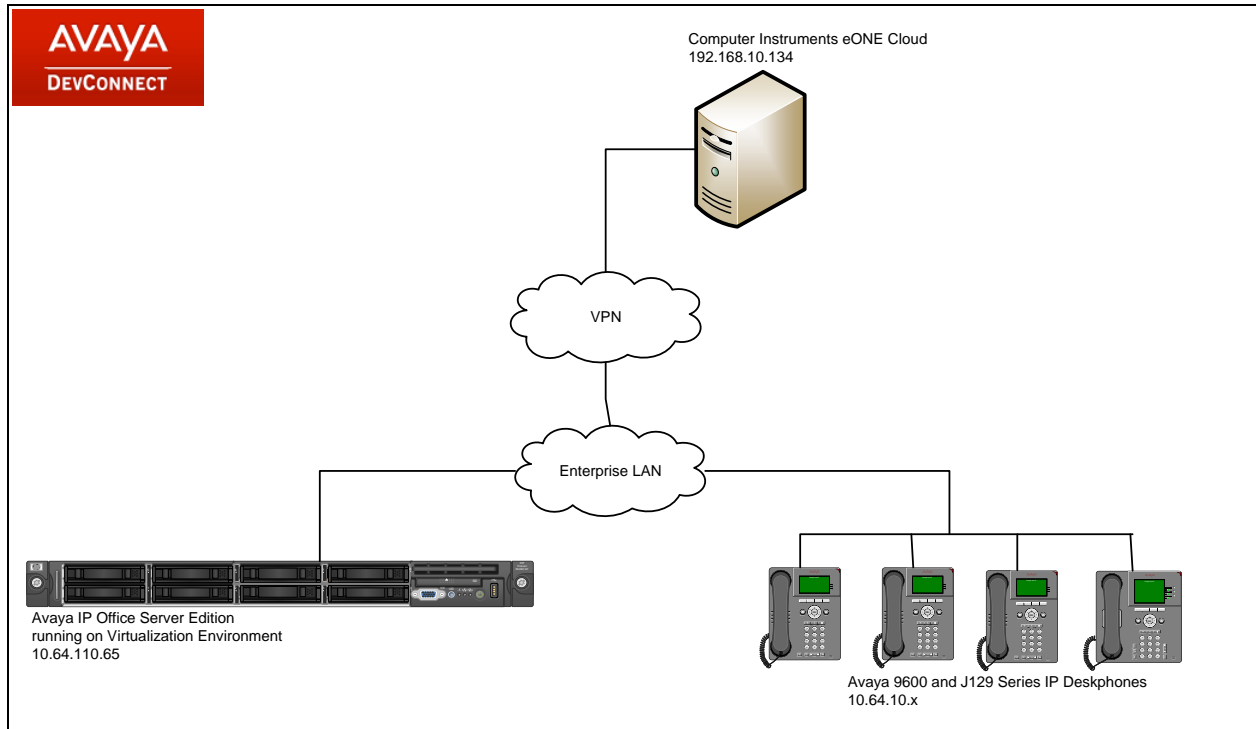


Figure 1: Computer Instruments eONE with Avaya IP Office

4. Equipment and Software Validated

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

Equipment/Software	Release/Version
Avaya IP Office Server Addition	10.1.0.0 (237)
Avaya IP Office Manager	10.1.0.0 (237)
Avaya 96x1 Series IP Deskphone	6.6 (H.323)
Avaya J129 IP Deskphone	1.1.0.0.15
Computer Instruments eONE	6.1.5

Note: Testing was performed with Avaya IP Office Server Edition, but it also applies to Avaya IP Office 500V2.

5. Configure Avaya IP Office

This section provides the procedures for configuring Avaya IP Office. The procedures include the following areas:

- Verify IP Office license
- Configuration System
- Configure SIP Line
- Configure Short Code

5.1. Verify IP Office License

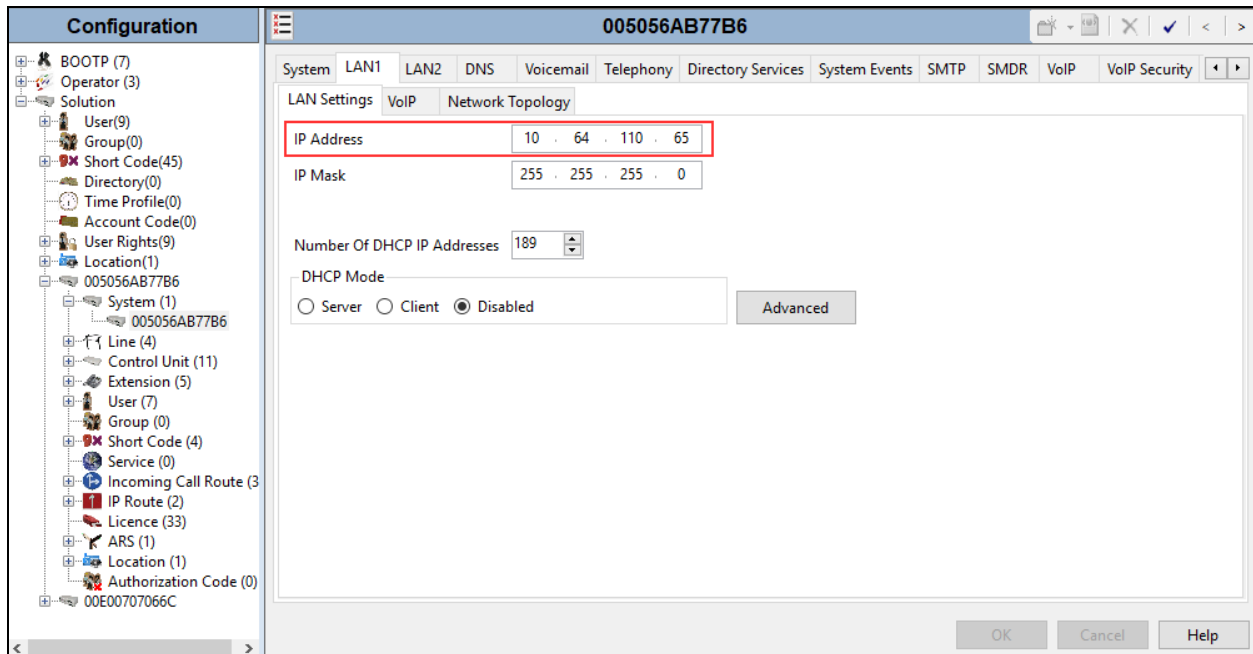
From a PC running the Avaya IP Office Manager application, select **Start → Programs → IP Office → Manager** to launch the Manager application. Select the proper Avaya IP Office system and log in with the appropriate credentials.

The **Avaya IP Office Manager for Server Edition** screen is displayed. From the configuration tree in the left pane, select **Licence** to display the license screen in the right pane. Verify that the **Licence Status** for **SIP Trunk Channels** is “Valid” and has enough instances.

Feature	Instances	Status	Expiry Date	Source
Receptionist	4	Valid	Never	PLDS Nodal
Additional Voicemail Pro Ports	152	Valid	Never	PLDS Nodal
VMPro Recordings Administrators	1	Valid	Never	PLDS Nodal
Essential Edition Additional Voice...	4	Obsolete	Never	PLDS Nodal
VMPro TTS (Generic)	40	Obsolete	Never	PLDS Nodal
Teleworker	384	Obsolete	Never	PLDS Nodal
Mobile Worker	384	Obsolete	Never	PLDS Nodal
Office Worker	384	Valid	Never	PLDS Nodal
Avaya Softphone Licence	100	Valid	Never	PLDS Nodal
VMPro TTS (Scansoft)	40	Obsolete	Never	PLDS Nodal
VMPro TTS Professional	40	Valid	Never	PLDS Nodal
IPSec Tunnelling	1	Obsolete	Never	PLDS Nodal
Power User	384	Valid	Never	PLDS Nodal
Avaya IP endpoints	384	Valid	Never	PLDS Nodal
IP500 Voice Networking Channels	32	Obsolete	Never	PLDS Nodal
SIP Trunk Channels	128	Valid	Never	PLDS Nodal
IP500 Universal PRI (Additional cha...	100	Obsolete	Never	PLDS Nodal
CTI Link Pro	1	Valid	Never	PLDS Nodal
Wave User	16	Obsolete	Never	PLDS Nodal

5.2. System Configuration

From the configuration tree in the left pane, select **System** to display the **System** screen for the Avaya IP Office Server Edition in the right pane. Select the **LAN1** tab, followed by the **LAN Settings** sub-tab in the right pane. Make a note of the **IP Address**, which will be used later to configure the Computer Instruments eONE SIP interface.



Select the **VoIP** sub-tab. Ensure that **SIP Trunks Enable** is checked. Also, ensure that **UDP** is enabled as shown below.

The screenshot displays the Avaya Configuration Manager interface for system 005056AB77B6. The left sidebar shows a tree view of configuration objects, including BOOTP, Operator, Solution, User, Group, Short Code, Directory, Time Profile, Account Code, User Rights, Location, and various system-level objects. The main pane is titled '005056AB77B6' and contains several tabs: System, LAN1, LAN2, DNS, Voicemail, Telephony, Directory Services, System Events, SMTP, SMDR, VoIP, and VoIP Security. The 'VoIP' tab is selected, and the 'LAN Settings' sub-tab is active. Within the 'LAN Settings' sub-tab, the 'SIP Trunks Enable' checkbox is checked and highlighted with a red box. Below this, the 'SIP Registrar Enable' checkbox is also checked. The 'SIP Domain Name' is set to 'avaya.com'. The 'SIP Registrar FQDN' is empty. Under the 'Layer 4 Protocol' section, the 'UDP' checkbox is checked and highlighted with a red box. The 'UDP Port' is set to 5060, and the 'Remote UDP Port' is also 5060. The 'TCP Port' is set to 5060, and the 'Remote TCP Port' is also 5060. The 'TLS Port' is set to 5061, and the 'Remote TLS Port' is also 5061. The 'Challenge Expiration Time (sec)' is set to 10. The 'H.323 Gatekeeper Enable' checkbox is checked, and the 'H.323 Remote Extension Enable' checkbox is unchecked. The 'Auto-create Extension' and 'Auto-create User' checkboxes are unchecked. The 'H.323 Signaling over TLS' dropdown is set to 'Disabled', and the 'Remote Call Signaling Port' is set to 1720.

5.3. Configure SIP Line

A SIP line is needed to establish the SIP connectivity between Avaya IP Office and eONE. From the configuration tree in the left pane, right-click on **Line** and select **New** → **SIP Line** from the pop-up list to add a new SIP line (not shown). The **SIP Line** tab is displayed.

5.3.1 SIP Line – SIP Line Tab

For **ITSP Domain Name**, enter the IP Address of eONE SIP interface. Set both **Incoming Supervised REFER** and **Outgoing Supervised REFER** to “Always”. The **Outgoing Blind REFER** field was checked.

Retain the default values in the remaining fields.

The screenshot displays the Avaya IP Office configuration interface for a SIP Line. The left pane shows the configuration tree with the following structure:

- BOOTP (7)
- Operator (3)
- Solution
- User (9)
- Group (0)
- Short Code (45)
- Directory (0)
- Time Profile (0)
- Account Code (0)
- User Rights (9)
- Location (1)
- 005056AB77B6
- System (1)
- 005056AB77B6
- Line (4)
- 1
- 2
- 4
- 6
- Control Unit (11)
- Extension (5)
- User (7)
- Group (0)
- Short Code (4)
- Service (0)
- Incoming Call Route (3)
- IP Route (2)
- Licence (33)
- ARS (1)
- Location (1)
- Authorization Code (0)
- 00E00707066C

The main configuration area is titled "SIP Line - Line 2" and includes the following fields and settings:

- Line Number: 2
- ITSP Domain Name: 192.168.10.134
- Local Domain Name:
- URI Type: SIP
- Location: Cloud
- Prefix:
- National Prefix: 0
- International Prefix: 00
- Country Code:
- Name Priority: System Default
- Description:
- In Service: ☒
- Check OOS: ☒
- Session Timers
 - Refresh Method: Reinvite
 - Timer (seconds): 90
- Redirect and Transfer
 - Incoming Supervised REFER: Always
 - Outgoing Supervised REFER: Always
 - Send 302 Moved Temporarily: ☐
 - Outgoing Blind REFER: ☒

Buttons at the bottom: OK, Cancel, Help.

5.3.2 SIP Line – Transport Tab

Select the **Transport** tab in the right pane. For **ITSP Proxy Address**, enter the IP address of eONE SIP interface. For **Layer 4 Protocol**, select “UDP”, and **Send Port** to “5060”.

The screenshot shows the 'SIP Line - Line 2' configuration window with the 'Transport' tab selected. The 'ITSP Proxy Address' field contains '192.168.10.134'. The 'Network Configuration' section shows 'Layer 4 Protocol' set to 'UDP' and 'Send Port' set to '5060'. 'Use Network Topology Info' is set to 'None' and 'Listen Port' is '5060'. 'Explicit DNS Server(s)' are '0.0.0.0' and '0.0.0.0'. 'Calls Route via Registrar' is checked.

5.3.1 SIP Line – SIP-URI Tab

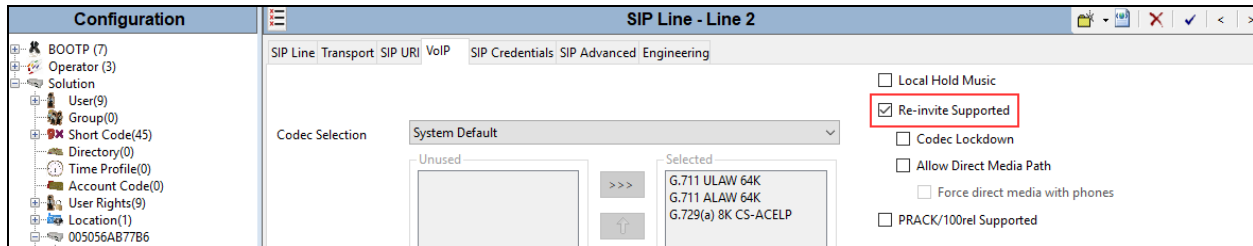
Select the **SIP URI** tab, and click **Add** to display the **New URI** section. Enter the following values for the specified fields, and retain the default values for the remaining fields.

- **Local URI:** “Auto”.
- **Contact:** “Auto”.
- **Display Name:** “Auto”.
- **Identity:** “Auto”.
- **Header:** “P Asserted ID”.
- **Incoming Group:** Enter the line number of current trunk group.
- **Outgoing Group:** Enter the line number of current trunk group.
- **Max Sessions:** The desired maximum number of simultaneous calls.
- Click **OK**.

The screenshot shows the 'SIP Line - Line 2' configuration window with the 'SIP URI' tab selected. The 'Local URI', 'Contact', 'Display Name', 'Identity', and 'Header' fields are all set to 'Auto'. The 'Header' dropdown is set to 'P Asserted ID'. The 'Forwarding And Twinning' section shows 'Originator Number' and 'Send Caller Id' (set to 'None'). 'Diversion Header' is 'None'. 'Registration' is '0: <None>'. The 'Incoming Group' is '2', 'Outgoing Group' is '2', and 'Max Sessions' is '10'.

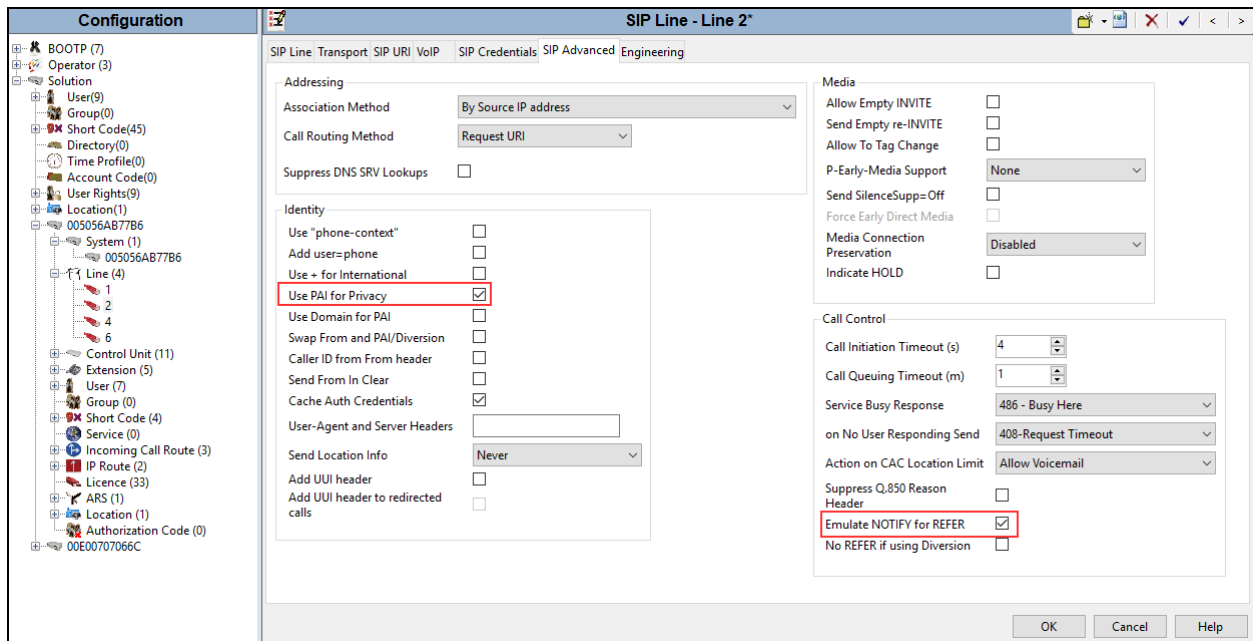
5.3.2 SIP Line – VoIP Tab

Select the **VoIP** tab, and check **Re-invite Supported**. Retain the default values for the remaining fields.



5.3.3 SIP Line – SIP Advance

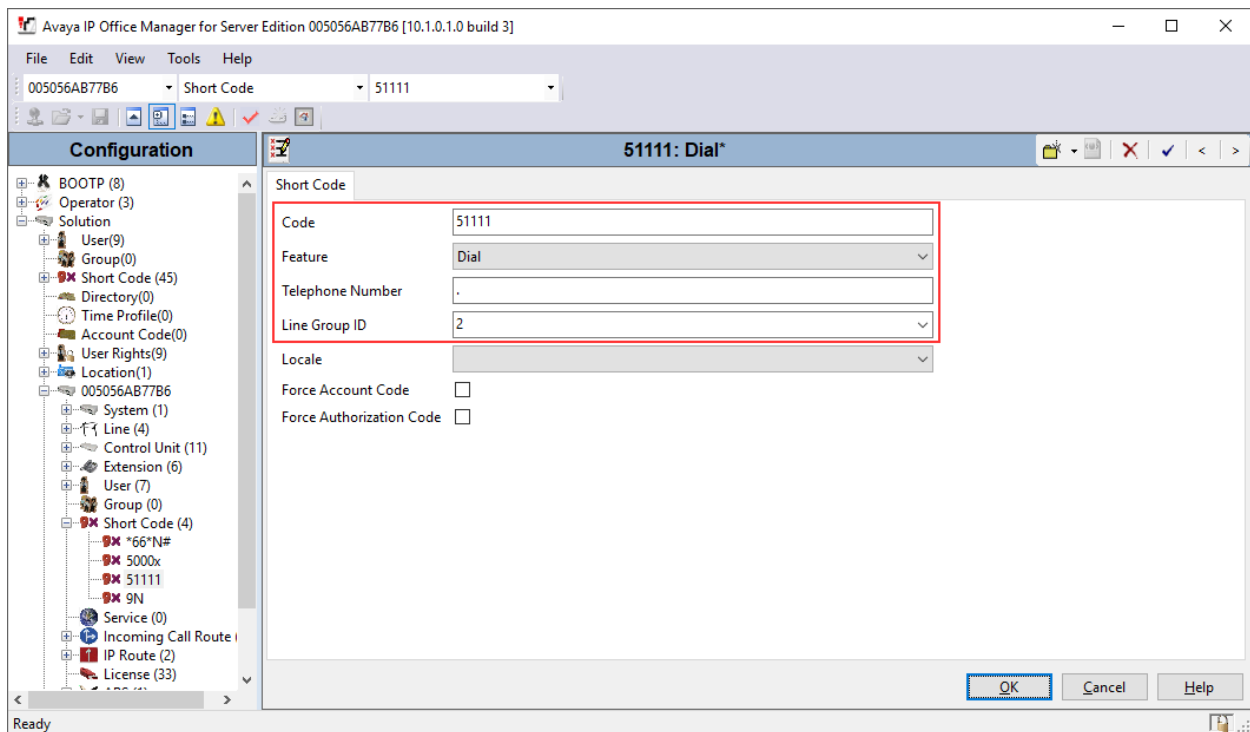
Check box for **Use PAI for Privacy** and **Emulate Notify for REFER** fields. Retain the default values for the remaining fields.



5.4. Configure Short Code

A short code needs to be configured such that when it is dialed, the call is routed to eONE. From the configuration tree in the left pane, right-click on **Short Code** and select **New** from the pop-up list to add a new short code (not shown). A **Short Code** tab is displayed.

- **Code:** Enter an extension number used for reaching eONE.
- **Feature:** “Dial”
- **Telephone Number:** “.”
- **Line Group ID:** Enter the value of SIP Line created in previous section.



Once done click **Save** to save the configuration on Avaya IP Office.



6. Configure Computer Instruments eONE

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

- Administer system config
- Administer EIVR.ini
- Restart service

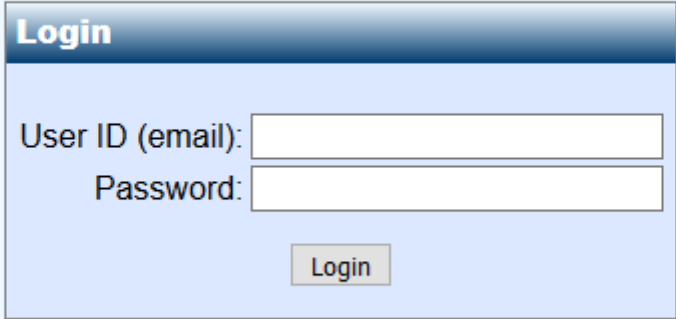
6.1. Administer System Config

Computer Instruments engineers installed/licensed/configured eONE cloud IVR. This section shows what was configured by the Computer Instruments engineers. For more information, please contact the Computer Instruments support, mentioned in **Section 2.3**.

To access the **System Config** page, navigate to:

<http://<ip-address>/eCI/VoiceAdmin/Default.aspx>, where <ip-address> is the ip address of eONE server.

Provide appropriate credentials on the **Login** page.



In the **CII-Voice Administrator** page, select **Voice Administrator → System Config** in the left pane to display the **Base System Configuration** screen.

Select the **Defaults** tab from the top of the **Base System Configuration** screen. Select “Avaya IP Office” for **PBX Integration**. For **Dial Plan Digits**, enter the maximum length of internal extensions on Avaya IP Office. For **Outside Line Access Prefix**, enter the applicable prefix for calls to the PSTN via Avaya IP Office.

OUTCALL GROUP	START	END
Message Lamp	1	1
Notification Outcall	1	1
Call Me Back Now!	1	4

Select the **Channel** tab from the top of the **Base System Configuration** pop-up screen.

In the **Channel Setting** sub-section, select the first channel entry. For **Extension**, enter the applicable extension used for the inbound application, in this case “51111”. By default, all third party channel resources are used for inbound applications unless otherwise specified. Select **Update** to update the extension value.

In the compliance testing, only one inbound application was used, and therefore only the first channel resource needed the extension mapping.

The screenshot shows the 'Base System Configuration' window with the 'Channel' tab selected. The 'Channel Settings' section is active, displaying a table of channel entries. The first entry, with extension 51111, is highlighted. Below the table, the 'Extension' field is set to 51111, and the 'Update' button is visible. The 'DNIS/MODE Settings' section is also visible on the right.

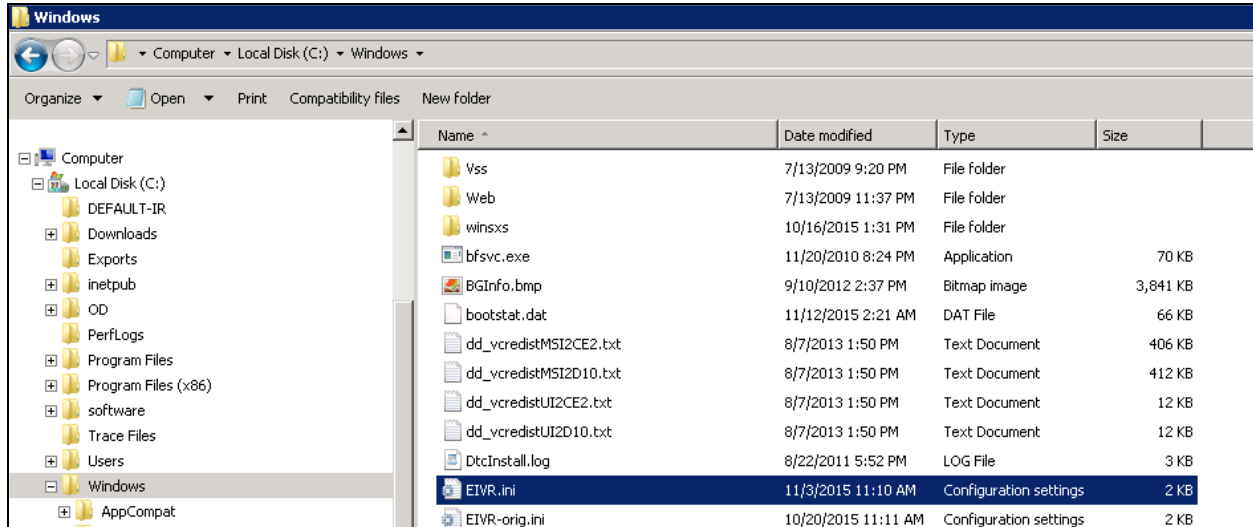
EXTENSION	APPLICATION	REG ?	Ch. #
51111	Default Application	False	1
51112	Default Application	False	2
51113	Default Application	False	3

Application: 1000 - Default Application
Extension: 51111
REG ? ☐ Update

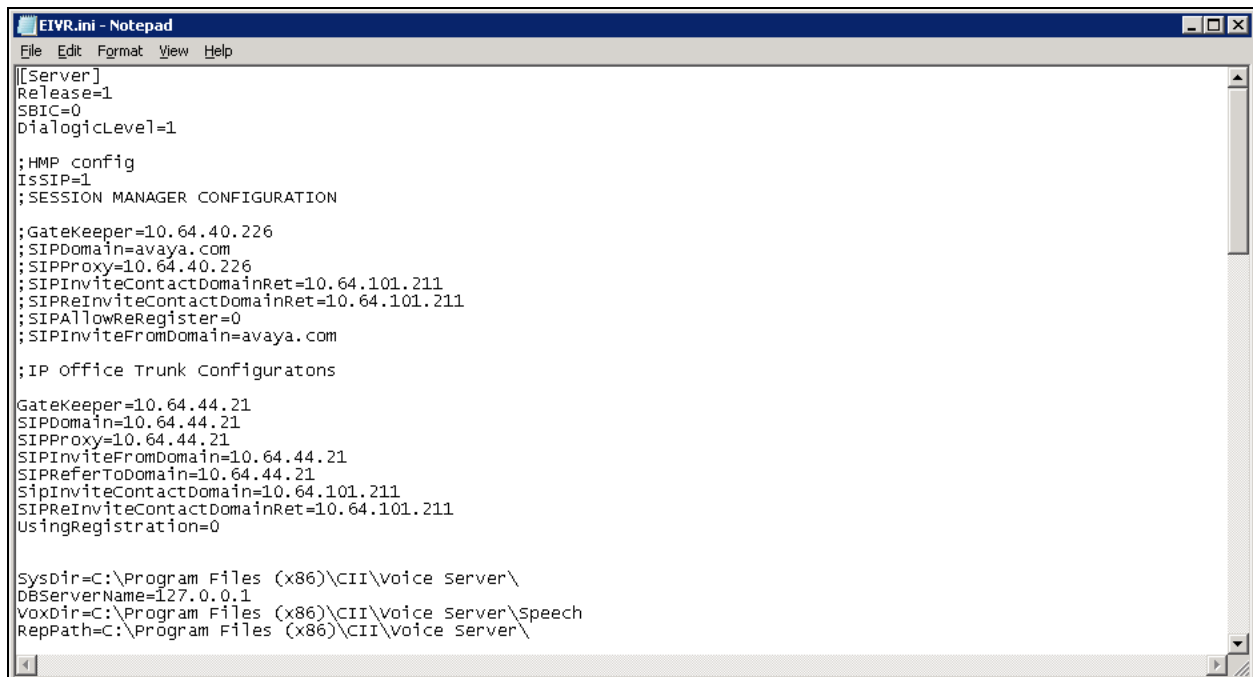
DNIS:
Application:
Save Delete

6.2. Administer EIVR.ini

From the eONE server, navigate to the **C:\Windows** directory to locate the **EIVR.ini** file shown below.




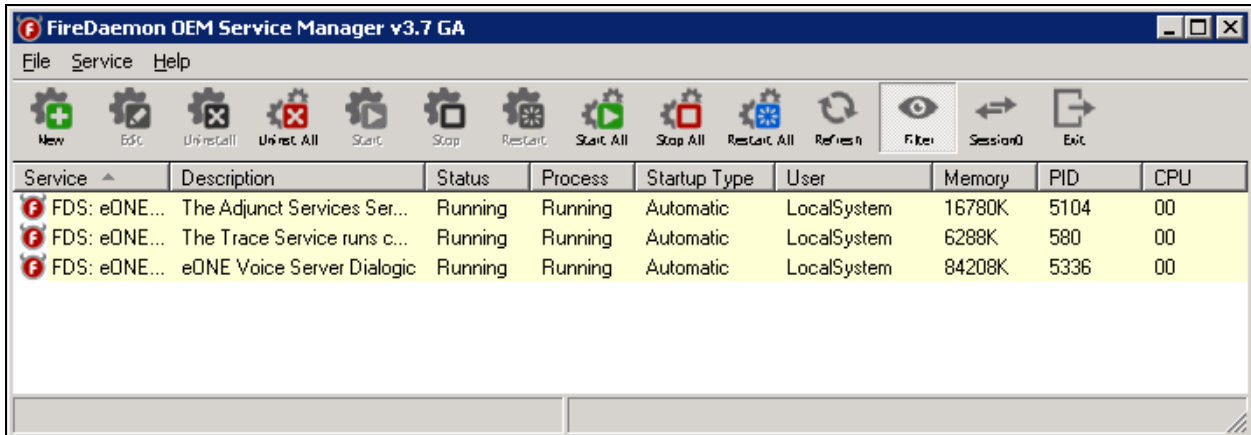
Open the **EIVR.ini** file with the Notepad application. Configure the parameters as shown below, where “10.64.110.65” is the IP address of Avaya IP Office, “192.168.10.134” is the IP address of the eONE server, and “avaya.com” is the domain name. During the compliance test, the domain name is converted to IP address in the hosts file.



6.3. Restart Service

Run the C:\Program Files (x86)\FireDaemon OEM\FireDaemonUI.exe or select the **Service**

Manager icon, , from Desktop to display the screen below. Restart the **eONE Voice Server Dialogic** service and verify that the **Status** is *Running* as shown below.



The screenshot shows the FireDaemon OEM Service Manager v3.7 GA application window. The interface includes a menu bar (File, Service, Help), a toolbar with icons for New, Edit, Uninstall, Uninstall All, Start, Stop, Restart, Start All, Stop All, Restart All, Refresh, Filter, Session, and Exit. Below the toolbar is a table listing services. The 'eONE Voice Server Dialogic' service is highlighted in yellow.

Service	Description	Status	Process	Startup Type	User	Memory	PID	CPU
FDS: eONE...	The Adjunct Services Ser...	Running	Running	Automatic	LocalSystem	16780K	5104	00
FDS: eONE...	The Trace Service runs c...	Running	Running	Automatic	LocalSystem	6288K	580	00
FDS: eONE...	eONE Voice Server Dialogic	Running	Running	Automatic	LocalSystem	84208K	5336	00

7. Verification Steps

This section provides tests that can be performed to verify proper configuration of Avaya IP Office and eONE.

7.1. Verify from Avaya IP Office

This section provides the tests that can be performed to verify proper configuration of Avaya IP Office. Establish a call between Avaya IP Office and eONE.

Navigate to **All Programs → IP Office → System Status** (not shown) to launch the System Status application, and log in using the appropriate credentials. The **IP Office System Status** screen is displayed. Expand **Trunks** in the left pane and select the SIP line in use, in this case “2”.

Verify that the **SIP Trunk Summary** screen shows an active channel with **Current State** of “Connected”. Also verify that the **Remote Media Address** contains the IP address of eONE, and that the **Other Party on Call** contains the local Avaya IP Office user.

The screenshot displays the Avaya IP Office System Status application. The left-hand navigation pane shows a tree structure with 'Trunks (4)' expanded, and 'Line: 2' selected. The main content area is titled 'SIP Trunk Summary' and contains the following details:

- Line Service State: In Service
- Peer Domain Name: 192.168.10.134
- Resolved Address: 192.168.10.134
- Line Number: 2
- Number of Administered Channels: 10
- Number of Channels in Use: 1
- Administered Compression: G711 Mu, G711 A, G729 A
- Enable Faststart: Off
- Silence Suppression: Off
- Media Stream: RTP
- Layer 4 Protocol: UDP
- SIP Trunk Channel Licenses: 128
- SIP Trunk Channel Licenses in Use: 1
- SIP Device Features: REFER (Incoming and Outgoing)

A green circular progress indicator shows 0.78% utilization. Below this is a table with 15 columns: Channel Number, URI G..., Ref, Current State, Time in State, Remote Media Address, Codec, Connection Type, Caller ID or Dialed Di..., Other Party on Call, Direction of Call, Round Trip Delay, Receive Jitter, Receive Packet L..., Transmit Jitter, and Transmit Packet L... The first row of the table shows a 'Connected' state for Channel 1, with a Remote Media Address of 192.168.10.134 and an Other Party on Call of Extn 18501, Tno8501.

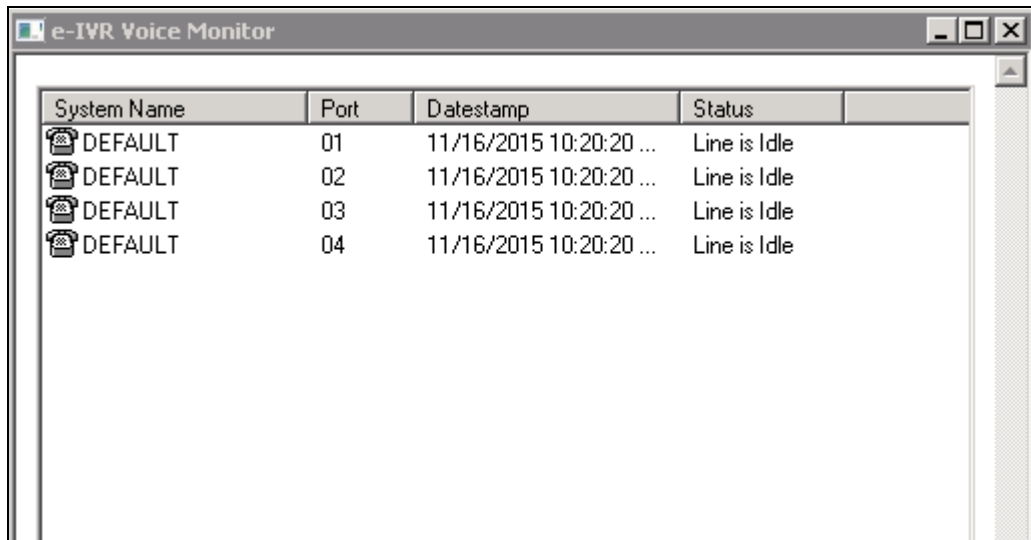
Channel Number	URI G...	Ref	Current State	Time in State	Remote Media Address	Codec	Connection Type	Caller ID or Dialed Di...	Other Party on Call	Direction of Call	Round Trip Delay	Receive Jitter	Receive Packet L...	Transmit Jitter	Transmit Packet L...
1		0	Connected	00:00:18	192.168.10.134	G711...	VCM		Extn 18501, Tno8501	Outgoing	0ms	3.9ms	0%	0ms	0%
2			Idle	15:24:12											
3			Idle	15:24:12											
4			Idle	15:24:12											
5			Idle	15:24:12											
6			Idle	15:24:12											
7			Idle	15:24:12											
8			Idle	15:24:12											
9			Idle	15:24:12											
10			Idle	15:24:12											

At the bottom of the application, there is a status bar showing the time as 9:30:11 AM and the system as Online. A row of buttons includes Trace, Trace All, Pause, Ping, Call Details, Graceful Shutdown, Force Out of Service, Print..., and Save As...

7.2. Verify from Computer Instruments eONE



On the eONE server, select the **Voice Monitor** icon, from Desktop, to display the **eONE Voice Monitor** screen. Verify that the **Status** for all ports is “Line is Idle”, as shown below.

A screenshot of a software window titled "e-IVR Voice Monitor". It contains a table with four columns: System Name, Port, Datestamp, and Status. The table lists four ports, all with a status of "Line is Idle".

System Name	Port	Datestamp	Status
DEFAULT	01	11/16/2015 10:20:20 ...	Line is Idle
DEFAULT	02	11/16/2015 10:20:20 ...	Line is Idle
DEFAULT	03	11/16/2015 10:20:20 ...	Line is Idle
DEFAULT	04	11/16/2015 10:20:20 ...	Line is Idle

8. Conclusion

These Application Notes describe the configuration steps required for Computer Instruments eONE to successfully interoperate with Avaya IP Office Server Edition using SIP trunks. All feature and serviceability test cases were completed.

9. Additional References

This section references the product documentation relevant to these Application Notes.

1. *Deploying Avaya IP Office Platform Server Edition*, Document Number 15-601042, October, 2017.
2. *Administering Avaya IP Office Platform with Manager*, Release 10.1, October 2017.
3. *Installing eONE*, available from <http://www.instruments.com>.
4. *eONE Application Server*, available from <http://www.instruments.com>.

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