



Avaya Solution & Interoperability Test Lab

Application Notes for Configuring Avaya Aura® Communication Manager 8.0 with Nu Technologies™ ORBi- TEL⁷ - Issue 1.0

Abstract

These Application Notes describe the configuration steps required for Avaya Aura® Communication Manager 8.0 with Nu Technologies ORBi-TEL⁷ 19.3.0.

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

Nu Technologies ORBi-TEL⁷ is a set of integrated tools to measure quality of service, usage trends, and performance to optimize the network. Nu Technologies ORBi-TEL⁷ consists of four modules. Cost management, also referred to as call logging and reporting module, was the only module that was tested. Call logging and Reporting module collects, stores and processes Call Detail Records to provide usage analysis, call costing and billing capabilities. The other modules that were not tested include Performance management, Traffic management, Operations management, Mobile Data Analysis (MDA) and Alarm management.

Nu Technologies ORBi-TEL⁷ retrieves Call Detail Records from Avaya Aura[®] Communication Manager. Avaya Aura[®] Communication Manager can generate Call Detail Records for intra-switch calls, inbound trunk calls and outbound trunk calls. In addition, split records can be generated for transferred calls and conference calls. Nu Technologies ORBi-TEL⁷ can support any Call Detail Record format provided by Avaya Aura[®] Communication Manager. Nu Technologies ORBi-TEL⁷ creates a custom PBX configuration file to accurately parse the CDR data. For the compliance testing, a customized format was used. Nu Technologies ORBi-TEL⁷ server is capable of receiving Call Details Records from multiple sites.

2. General Test Approach and Test Results

Interoperability testing contained functional tests mentioned in **Section 2.1**.

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.

2.1. Interoperability Compliance Testing

The testing included:

- Verification of connectivity between ORBi-TEL⁷ and Communication Manager using a TCP connection.
- Verification that CDR data was collected as output by the Communication Manager.
- Link Failure/Recovery was also tested to ensure successful reconnection after link failure.
- CDR data collected included:
 - Local internal call handling
 - Handling of Incoming Network calls over PRI and SIP trunks
 - Handling of External Calls
 - Call Forwarding on busy or No Answer
 - Transfers – Blind and Supervised
 - Conference Calls
 - Call Park and Call Pick Up
 - Account Codes
- Handling of calls to and from Avaya H323, SIP, and Softphones
- Handling of calls over SIP and QSIG trunks
- Defence Tests to ensure recovery following LAN interruptions

2.2. Test Results

The testing was successful. All the test cases are passed.

2.3. Support

Technical support from Nu Technologies can be obtained through the following:

Phone: +44 1582 814700
E-mail: support@nut.eu.com
Web: <http://www.nut.eu.com>

3. Reference Configuration

Figure 1 illustrates the network topology used during compliance testing. The Avaya solution consists of a Communication Manager, System Manager, Session Manager and a G450 Gateway. The Communication Manager is configured to output Call Detail Records data over a TCP/IP port. The Call Detail Records are sent in customized format, retrieved by the ORBi-TEL⁷ application at defined periods. A variety of Avaya 96x1 IP Telephone H323, SIP and 1408 Digital phones were used to generate intra-switch calls (calls between phones on the same system), and outbound/inbound calls to/from the PSTN. QSIG and SIP trunks were configured to connect to the PSTN.

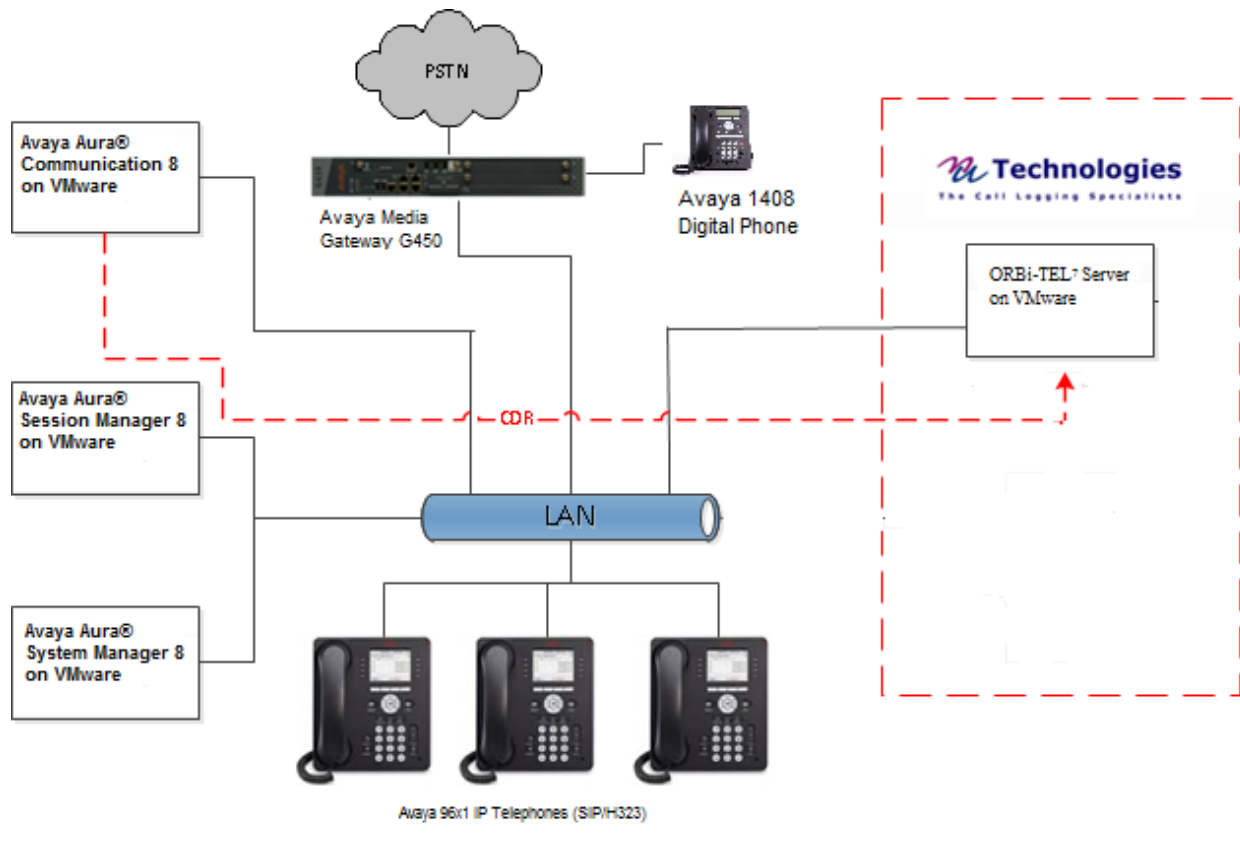


Figure 1: Avaya Aura[®] Communication Manager and Nu Technologies ORBi-TEL⁷ Reference Configuration

4. Equipment and Software Validated

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

Avaya Equipment	Software / Firmware Version
Avaya Aura® Communication Manager running on VMware	8.0.0.1.2-SP1 CP2
Avaya Aura® Session Manager running on VMware	8.0
Avaya Aura® System Manager running on VMware	8.0
Avaya G450 Media Gateway	40.10.1
Avaya 96x1 Series IP Deskphones H.323	6.7
Avaya 96x1 Series IP Deskphones SIP	7.1.2
Avaya Digital 1408	4.0.10
Nu Technologies Equipment	Software / Firmware Version
ORBi-TEL ⁷	Version 19.3.0

5. Configure Avaya Aura® Communication Manager

Configuration and verification operations on the Communication Manager illustrated in this section were all performed using Avaya Site Administrator Emulation Mode. The information provided describes the configuration of the Communication Manager for this solution. It is implied that a working system is already in place. For all other provisioning information such as initial installation and configuration, please refer to the product documentation in **Section 9**. The configuration operations described in this section can be summarized as follows:

- Create Node Name for ORBi-TEL⁷
- Define the CDR Link
- Enable Special Application 8201 (SA8201)
- Change CDR system-parameters
- Set Intra-Switch Extensions
- Configure Trunks for CDR Reporting

5.1. Create Node Name for ORBi-TEL7

A Node Name needs to be created to associate ORBi-TEL7 with the Communication Manager. Use the **change node-names ip** command to configure the following:

- **Name** Enter an informative name i.e. **ORBi-TEL7**
- **IP address** Enter the IP address of the **ORBi-TEL7**

Press **f3** button to save the new settings.

change node-names ip		Page	1 of 2
		IP NODE NAMES	
Name	IP Address		
ORBi-TEL7	10.128.224.164		

5.2. Define the CDR Link

A CDR link needs to be defined between the Communication Manager and the ORBi-TEL7 server. Use the **change ip-services** command to configure the following:

- **Service Type** Enter **CDR1**
- **Local Node** Enter **procr**
- **Remote Node** Enter **ORBi-TEL7**
- **Remote Port** Enter **9001**

change ip-services			Page	1 of 3	
			IP SERVICES		
Service Type	Enabled	Local Node	Local Port	Remote Node	Remote Port
CDR1		procr	0	ORBi-TEL7	9001

Navigate to **Page 3** and set the **Reliable Protocol** field to **y**. This will enable Reliable Session Protocol (RSP) for CDR transmission. In this case, the CDR link will use TCP with RSP.

- **Reliable Protocol** Enter **y**

Press **F3** button to save the new settings.

change ip-services			Page	3 of 3	
			SESSION LAYER TIMERS		
Service Type	Reliable Protocol	Packet Resp Timer	Session Connect Message Cntr	SPDU Cntr	Connectivity Timer
CDR1	y	30	3	3	60

5.3. Enable Special Application 8201 (SA8201)

This feature provides the user with the capability to customize the CDR (Call Description Record) using five new keywords. These five new keywords allow the user to add start date and end date in one of two formats either DDMMYY or DDMMYYYY format and to add start time and end time in HHMMSS format.

Use the **change system-parameters special-applications** command to enable SA8201. Navigate to **Page 3**

- **(SA8201) - Start Time and 4-Digit Year CDR Custom Fields?:** Set this to **y**

Press **F3** button to save the new settings.

5.4. Change CDR System Parameters

Certain parameter changes are required for Communication Manager to interoperate with ORBi-TEL⁷. The screen shots below show the settings used during compliance testing. Use the **change system-parameters cdr** command to configure the following:

- **CDR Date Format:** Set it to **month/day**. The date format will be used for the date stamp that begins each new day of call records.
- **Primary Out Format:** Set this to **customized** format.
- **Primary Output Endpoint:** Set to **CDR1** to correspond with CDR link set in **Section 5.2**.
- **Intra-switch CDR:** Set this to **y** to allow call records for internal calls involving specific stations. Those stations must be specified in the **intra-switch-cdr** form as set in **Section 5.5**.
- **Record Outgoing Calls Only:** Set this to **n** to allow incoming trunk calls to appear in the CDR records along with the outgoing trunk calls.
- **Suppress CDR for Ineffective Call Attempts?** Set this to **n** so that calls that are blocked do not generate CDR.
- **Outg Trk Call Splitting:** Set this to **y** to allow a separate call record for any portion of an outgoing call that is transferred or conferenced.
- **Inc Trk Call Splitting:** Set this to **y** to allow a separate call record for any portion of an incoming call that is transferred or conferenced.

```

change system-parameters cdr                               Page 1 of 2
                  CDR SYSTEM PARAMETERS

Node Number (Local PBX ID):                               CDR Date Format: month/day
  Primary Output Format: customized      Primary Output Endpoint: CDR1
Secondary Output Format:
  Use ISDN Layouts? n                      Enable CDR Storage on Disk? y
  Use Enhanced Formats? n          Condition Code 'T' For Redirected Calls? n
  Use Legacy CDR Formats? y          Remove # From Called Number? n
Modified Circuit ID Display? n          Intra-switch CDR? y
  Record Outgoing Calls Only? n        Outg Trk Call Splitting? y
  Suppress CDR for Ineffective Call Attempts? n  Outg Attd Call Record? y
  Disconnect Information in Place of FRL? n    Interworking Feat-flag? n
Force Entry of Acct Code for Calls Marked on Toll Analysis Form? n
  Calls to Hunt Group - Record: member-ext
Record Called Vector Directory Number Instead of Group or Member? n
Record Agent ID on Incoming? n          Record Agent ID on Outgoing? y
  Inc Trk Call Splitting? y              Inc Attd Call Record? n
  Record Non-Call-Assoc TSC? n          Call Record Handling Option: warning
  Record Call-Assoc TSC? n          Digits to Record for Outgoing Calls: dialed
  Privacy - Digits to Hide: 0          CDR Account Code Length: 15
Remove '+' from SIP Numbers? y

```

Navigate to **Page 2** and enter the following information.

- Enter **Data Item** and **Length** as shown in the screen below

Press **F3** button to save the new settings.

```

change system-parameters cdr                               Page 2 of 2
                CDR SYSTEM PARAMETERS

      Data Item - Length      Data Item - Length      Data Item - Length
1: end-date(4d)      - 8    17: auth-code      - 13   33: line-feed      - 1
2: space            - 1    18: space          - 1    34:                -
3: start-time       - 6    19: in-crt-id     - 4    35:                -
4: space            - 1    20: space          - 1    36:                -
5: sec-dur          - 5    21: out-crt-id    - 4    37:                -
6: space            - 1    22: space          - 1    38:                -
7: cond-code        - 1    23: isdn-cc       - 11   39:                -
8: space            - 1    24: space          - 1    40:                -
9: code-dial        - 4    25: ppm           - 5    41:                -
10: space           - 1    26: space          - 1    42:                -
11: code-used       - 4    27: acct-code     - 15   43:                -
12: space           - 1    28: space          - 1    44:                -
13: dialed-num      - 23   29: in-trk-code   - 4    45:                -
14: space           - 1    30: space          - 1    46:                -
15: clg-num/in-tac - 15   31: attd-console  - 2    47:                -
16: space           - 1    32: return        - 1    48:                -

                Record length = 141
  
```

5.5. Set Intra-Switch Extensions

If the Intra-switch CDR field is set to **y** in the CDR SYSTEM PARAMETERS form in **Section 5.4**, use the **change intra-switch-cdr** command to define the extensions that will be subject to CDR. On **Page 1** of the **INTRA-SWITCH CDR** form, enter a specific extension whose usage will be tracked with a CDR. Add an entry for each additional **Extension**.

```

change intra-switch-cdr                               Page 1 of 3
                INTRA-SWITCH CDR

      Assigned Members: 0 of 1000 administered
      Extension      Extension      Extension      Extension
70001
70002
70003
70004
70005
79791
  
```


5.6. Configure Trunks for CDR Reporting

For each trunk group for which CDRs are desired, verify that CDR reporting is configured to generate CDRs. Use the **change trunk-group n** command, where **n** is the trunk group number, to verify that the **CDR Reports** field is set to **y**. This applies to all types of trunk groups.

```
change trunk-group 9                                     Page 1 of 21
                                     TRUNK GROUP
Group Number: 9                                         Group Type: isdn           CDR Reports: y
  Group Name: 2_PSTN                                     COR: 1                    TN: 1          TAC: #09
  Direction: two-way                                     Outgoing Display? n      Carrier Medium: PRI/BRI
  Dial Access? n                                         Busy Threshold: 255      Night Service:
Queue Length: 0
Service Type: tie                                       Auth Code? n             TestCall ITC: rest
                                     Far End Test Line No:
TestCall BCC: 4
```

6. Configure ORBi-TEL⁷

This section provides the procedures to configure ORBi-TEL⁷ server to receive CDR data from the Communication Manager.

6.1. Configure the ORBi-TEL⁷ Server

The ORBi-TEL⁷ server needs to be configured for site details and setting up the Collection and Translation script for receiving CDR data. This procedure is normally carried out by a Nu Technologies engineer during installation and subsequent re-configuration.

6.2. Add Extensions to the ORBi-TEL⁷ Server Database

The database on the ORBi-TEL⁷ Server must be populated with Communication Manager extensions and trunks prior to running reports. Enter the following url <http://<IPaddr of ORBi-TEL> orbitel>. Select **Database** and then select **Directory Administration**.

On Tab Extension (not shown), click Add and complete the following fields:

- **Site** Choose a pre-configured site name.
- **Extension** Enter a valid extension as configured on Communication Manager
- **Status** Choose **Ext Owner**

Click the **Add** button. Repeat these steps to add all necessary extensions

Reports > Database > Profile > Administration > NetWatch > About >

Directory Administration

Required Details		Location	
Name	<input type="text" value="70005"/> <input checked="" type="checkbox"/>	Site	<input type="text" value="AVAYA1"/> <input type="checkbox"/>
Extension	<input type="text" value="70005"/>	Node	<input type="text" value="AVAYA1 EXTENSIONS"/> <input type="checkbox"/>
Status	<input type="text" value="Ext Owner"/> <input type="checkbox"/>	Code	<input type="text"/> <input type="checkbox"/>
Personnel Details		Personnel Notes	
Email	<input type="text"/> <input type="checkbox"/>	<input type="text"/>	
Alternative	<input type="text"/> <input type="checkbox"/>		
Staff Number	<input type="text"/> <input type="checkbox"/>		
Colleagues			
Manager	<input type="text"/>	<input type="text"/>	<input type="checkbox"/>
Secretary	<input type="text"/>	<input type="text"/>	<input type="checkbox"/>
Equipment Allocation for Owners only			

7. Verification Steps

This section provides tests that can be performed to verify correct configuration of the Avaya and ORBi-TEL⁷ solution.

7.1. Verify the Avaya Aura® Communication Manager CDR Link

Use the **status cdr-link** command to verify that the link between the Communication Manager and the ORBi-TEL⁷ server is in service. **Link State: up** and **Reason Code: OK** confirms successful connection.

```
status cdr-link
```

		CDR LINK STATUS	
	Primary		Secondary
Link State:	up		CDR administered
Date & Time:	2018/11/27 16:15:46		0000/00/00 00:00:00
Forward Seq. No:	27		0
Backward Seq. No:	0		0
CDR Buffer % Full:	0.03		0.00
Reason Code:	OK		

7.2. Verify the connection between ORBi-TEL⁷ and Avaya Aura[®] Communication Manager

Make some test calls, including internal, inbound trunk and outbound trunk calls, have been made then run the ORBi-TEL⁷ report to ensure correct collection of results. Compare to Communication Manager raw file output. The following screens shows a sample report after some calls were made.

Summary	Name	Period	Org Structure	Call Types	Specific Calls	Sites	Times	Flags	Layout	Output	Schedule
Report Name: avaya Title: avaya Format: Call List Start Period: 18/10/2018 End Period: 18/11/2018 Structure Type: Bothway Node Structure: AVAYA1 EXTENSIONS, AVAYA2 EXTENSIONS Run On: 28/11/2018 07:37:00											
Date	Start Time	End Time	Source Extn	Source Trunk	Dest Extn	Dest Trunk	Dialled Digits				
18/10/2018	04:36:03	04:36:08	70005				0270005				
18/10/2018	04:33:47	04:36:28	79791		70005		70005				
18/10/2018	04:33:47	04:36:28	70005			020024	0270005				
18/10/2018	04:36:34	04:39:16	79791		70005		70005				
18/10/2018	04:36:34	04:39:16	70005			020025	0270005				
29/10/2018	04:39:27	04:39:28	70005			020037	0270005				
30/10/2018	05:37:45	05:37:47	70005			020134	0270005				
30/10/2018	05:44:05	05:44:06	70005			020135	0270005				
Totals											
Calls			205								
Outgoing			172								
Internal			21								
Incoming			12								
Tandem			0								
Total Cost			0.00								
Total Duration (hh:mm:ss)			11:04:49								
Average Ring Time			00:00								

Powered by ORBi-TEL⁷

8. Conclusion

A full and comprehensive set of feature functional test cases were performed during Compliance testing. ORBi-TEL⁷ 19.3.0 is considered compliant with Avaya Aura[®] Communication Manager 8.0. All test cases have passed and met the objectives outlined in **Section 2.2**.

9. Additional References

These documents form part of the Avaya official technical reference documentation suite. Further information may be obtained from <http://support.avaya.com> or from Avaya representative.

- i. *Administering Avaya Aura® Communication Manager, Release 8, Issue 2.0, Nov 2018*
- ii. *Administering Avaya Aura® Session Manager, Release 8, Issue 2, August 2018*
- iii. *Administering Avaya Aura® System Manager, Release 8, Issue 4, September 2018*

Product Documentation for ORBi-TEL⁷ can be obtained from Nu Technologies Ltd. or may be requested at <http://www.nut.eu.com/contact>

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