



Avaya Solution & Interoperability Test Lab

Application Notes for Noble Systems with Avaya Aura[™] Communication Manager using an E1 Interface – Issue 1.0

Abstract

These Application Notes describe the configuration steps required for Noble Systems Noble® Solution to interoperate with Avaya Aura[™] Communication Manager using E1 trunks.

The Noble® Solution is an outbound/predictive dialing and inbound call management solution that interfaces with Avaya Aura[™] Communication Manager. The Noble® Solution supports various trunk interfaces to Communication Manager. This document covers only the E1 interface.

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

The Noble® Solution is an automated contact handling system that combines outbound predictive dialing and inbound ACD (automatic call distributor) switch functionality with blended call management, an integrated relational database, real-time reporting, advanced solutions, and advanced network environments.

The Noble® Solution manages telephony resources to automate and organize outbound campaigns and resources. The predictive dialing solution controls the dialing process, voice detection, call switching and screen pops. The inbound ACD capabilities perform ANI/DNIS detection and use extensive logical call control management to direct the call to the appropriate agent. Noble Systems maintains all campaigns, programs, groups, and agents, whether inbound or outbound, and records extensive data logs to track overall system performance.

The Noble® Solution supports various trunk interfaces to Communication Manager. This document covers only the E1 interface.

1.1. Interoperability Compliance Testing

The interoperability compliance testing focused on feature functionality and serviceability. The feature functionality testing evaluated the ability of the Noble® Solution to successfully establish E1 trunks to Communication Manager and to use those trunks to perform the following functions:

- Outbound Calls/Predictive Dialing: the ability to place outbound calls and then deliver the answered calls to available agents.
- Inbound Call Management: the ability to automatically distribute inbound calls to available agents.

The serviceability testing introduced several failure conditions to see if the Noble® Solution could properly resume operation after each failure recovery.

1.2. Support

Technical support for the Noble® Solution can be obtained by contacting Noble Systems at:

- Phone: 1 (888) 866-2538
- Web: <http://www.noblesys.com/contact.aspx>
- Email: info@noblesys.com

2. Reference Configuration

The figure below shows the configuration used during compliance testing. The configuration is comprised of an Avaya S8500 Media Server running Communication Manager (with an Avaya G650 Media Gateway), SIP Enablement Services, the Noble® Solution server, and Agents (both H.323 and SIP endpoints). Outbound calls are placed from the Noble® Solution server over an E1 trunk to the simulated PSTN. When the calls are answered, the calls are delivered over an E1 trunk to the agent endpoints on Communication Manager. Additionally, inbound E1 trunk calls are placed from the PSTN to the Noble® Solution server, and then the calls are delivered over an E1 trunk to the agent endpoints on Communication Manager.

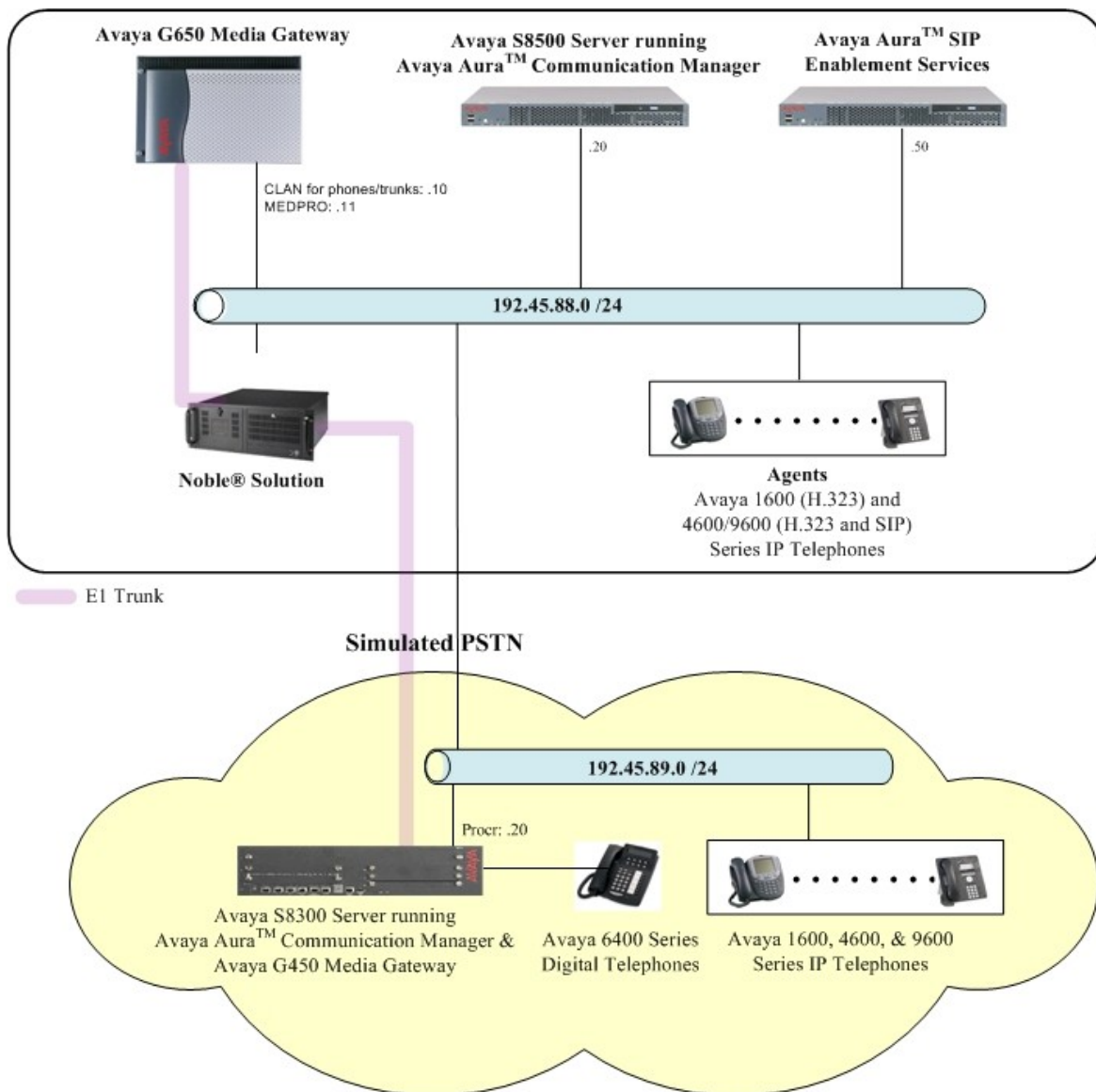


Figure 1: Noble® Solution with Communication Manager

3. Equipment and Software Validated

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

Equipment	Software
Avaya S8500 Server (w/ G650)	Avaya Aura™ Communication Manager 5.2 (R015x.02.0.947.3)
Avaya S8300 Server (w/ G450)	Avaya Aura™ Communication Manager 5.2 (R015x.02.0.947.3)
Avaya G650 Media Gateway: TN799DP (C-LAN) TN2602AP (MEDPRO) TN2312BP (IPSI) TN464F (DS1)	HW01, FW026 HW02, FW007 HW15, FW030 000020
Avaya G450 Media Gateway : MM710BP (DS1) MM712AP (DCP)	HW11, FW044 HW07, FW009
Avaya Aura™ SIP Enablement Services (SES) Server	5.2 (SES05.2-02.0.947.3a)
Avaya 1600 Series IP Phones : 1608SW (H.323) 1616SW (H.323)	1.0.3 1.0.3
Avaya 4600 Series IP Phones: 4610SW (H.323) 4620SW (H.323) 4621SW (H.323)	2.9 2.9 2.9
Avaya 9600 Series IP Phones: 9620 (H.323) 9630 (SIP)	2.0.0 2.4.1
Avaya 6400 Series Digital Phones	-
Noble® Solution Server	4000.12

4. Configure Communication Manager

All the configuration changes in this section for Communication Manager are performed through the System Access Terminal (SAT) interface. For more information on configuring Communication Manager, refer to the Avaya product documentation, **Reference [1]**.

The information shown on the screens throughout this section indicate the values that were used during compliance testing.

4.1. Configure DS1

This section provides the steps required for configuring a DS1 circuit pack.

1. Administer a DS1 circuit pack by using the “**add ds1 xxxxx**” command, where **xxxxx** is the location of the DS1 circuit pack in the media gateway. Enter the following values for the specified fields, and retain the default values for the remaining fields. Submit the form.

- **Name:** Enter a descriptive name (e.g. **noble**).
- **Bit Rate:** **2.048**
- **Line Coding:** **hdb3**
- **Signaling Mode:** **isdn-pri**
- **Connect:** **pbx**
- **Interface:** **network** the other end of the ISDN-PRI should be set to “user”.
- **Country Protocol:** **etsi**
- **Interface Companding:** **alaw**
- **CRC?** **y**

add ds1 01a10		Page 1 of 1	
DS1 CIRCUIT PACK			
Location: 01A10		Name: noble	
Bit Rate: 2.048		Line Coding: hdb3	
Signaling Mode: isdn-pri		Interface: network	
Connect: pbx		Country Protocol: etsi	
TN-C7 Long Timers? n		CRC? y	
Interworking Message: PROGRESS		DCP/Analog Bearer Capability: 3.1kHz	
Interface Companding: alaw		T303 Timer(sec): 4	
Idle Code: 11111111		Disable Restarts? n	
Slip Detection? n		Near-end CSU Type: other	

4.2. Configure Signaling Group

This section provides the steps required for configuring a signaling group.

1. Administer a signaling group by using the “**add signaling-group s**” command, where **s** is an available signaling-group number. Enter the following values for the specified fields, and retain the default values for the remaining fields. Submit the form.
 - **Group Type:** **isdn-pri**
 - **Primary D-Channel:** Enter **xxxxxyy**, where **xxxxx** is the board location of the DS1 circuit pack, and **yy** is the 16th channel of the DS1 circuit pack (e.g. **01A1016**).

add signaling-group 9		Page 1 of 5
SIGNALING GROUP		
Group Number: 9	Group Type: isdn-pri	
	Associated Signaling? y	Max number of NCA TSC: 0
	Primary D-Channel: 01A1016	Max number of CA TSC: 0
		Trunk Group for NCA TSC:
Trunk Group for Channel Selection:		
TSC Supplementary Service Protocol: a		

4.3. Configure Trunk Group

This section provides the steps required for configuring a trunk group.

1. Administer an E1 trunk group by using the “**add trunk-group t**” command, where **t** is an available trunk group number. Enter the following values for the specified fields, and retain the default values for the remaining fields.
 - **Group Type:** **isdn**
 - **Group Name:** Enter a descriptive name (e.g. **E1 trunk to Noble**).
 - **TAC:** Enter a Trunk Access Code that is valid under the provisioned dial plan (e.g. ***009**).
 - **Carrier Medium:** **PRI/BRI**
 - **Service Type:** **tie**

add trunk-group 9		Page 1 of 21
TRUNK GROUP		
Group Number: 9	Group Type: isdn	CDR Reports: y
Group Name: E1 trunk to Noble	COR: 1	TN: 1 TAC: *009
Direction: two-way	Outgoing Display? n	Carrier Medium: PRI/BRI
Dial Access? y	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		

2. On **Page 5** of the form, enter the following values for the specified fields, and retain the default values for the remaining fields. Submit the form.
 - **Port:** Add one or more trunk group members by entering **xxxxxxzz**, where **xxxxxx** is the location of the DS1 circuit pack configured in **Section 4.1**, and **zz** is a channel in the E1 ISDN-PRI.
 - **Sig Grp:** Enter the signaling group number configured in **Section 4.2**.

add trunk-group 9						Page 5 of 21	
TRUNK GROUP							
						Administered Members (min/max): 1/6	
						Total Administered Members: 6	
GROUP MEMBER ASSIGNMENTS							
	Port	Code	Sfx	Name	Night	Sig	Grp
1:	01A1001	TN464	F			9	
2:	01A1002	TN464	F			9	
3:	01A1003	TN464	F			9	
4:	01A1004	TN464	F			9	
5:	01A1005	TN464	F			9	
6:	01A1006	TN464	F			9	

4.4. Configure Trunk Group Channel Selection in Signaling Group

This section provides the steps required for configuring the trunk group channel selection in the signaling group.

1. Modify the signaling group by using the “**change signaling-group s**” command, where **s** is the signaling group configured in **Section 4.2**. Enter the following values for the specified fields and submit the form.
 - **Trunk Group for Channel Selection:** Enter the trunk group configured in **Section 4.3**

change signaling-group 9				Page 1 of 5	
SIGNALING GROUP					
Group Number: 9		Group Type: isdn-pri			
		Associated Signaling? y		Max number of NCA TSC: 0	
		Primary D-Channel: 01A1016		Max number of CA TSC: 0	
		Trunk Group for NCA TSC:			
Trunk Group for Channel Selection: 9					
TSC Supplementary Service Protocol: a					

5. Configure the Noble® Solution Server

This section describes the configuration required on the Noble® Solution server to establish an E1 trunk with Avaya Aura™ Communication Manager. This configuration change can only be performed by authorized Noble personnel.

1. Log in to the Noble® Solution server with the proper credentials, and enter the “**acucfg**” command from the command line interface to access the configuration screens.



2. Select the card to be configured and press **Enter**.

```
root@avayatest:/usr/local/uddp

Cards installed:

#  Model                      S/N      PCI      spans  dsps  VoIP  CAS
1  8-T1/E1 Span 1-IP Span      5201984  2009.1.4  9      4      75

Press S to [ Save ] & quit, Q to [ Quit ] w/out saving or V for [ VoIP ]
```

3. Tab to the **Spans** section in the middle of the screen and select an entry to configure. Press **Enter**.

```
root@avayatest:/usr/local/cfg

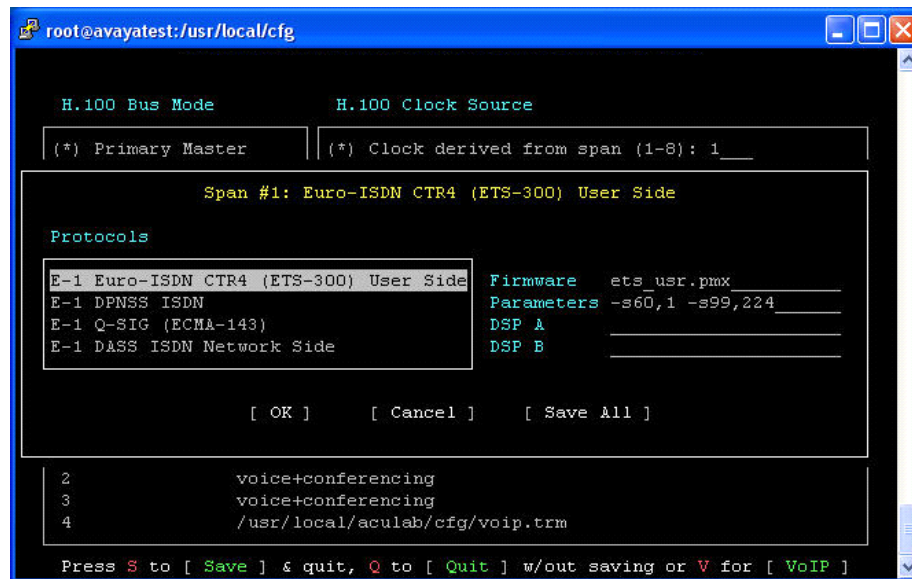
H.100 Bus Mode          H.100 Clock Source
(*) Primary Master      (*) Clock derived from span (1-8): 1__
( ) Secondary Master    ( ) Internal Oscillator
( ) Slave               ( ) Clock from H.100  (*) Primary ( ) Secondary
[x] Bus Termination     [ ] Fallback [ ] Auto Return

Spans: 8                Protocol
1      Euro-ISDN CTR4 (ETS-300) User Side
2      Euro-ISDN CTR4 (ETS-300) User Side
3      Euro-ISDN CTR4 (ETS-300) User Side
4      Euro-ISDN CTR4 (ETS-300) User Side

DSPs: 4                 Profile
1      voice+conferencing
2      voice+conferencing
3      voice+conferencing
4      /usr/local/arulab/cfg/voip.trm

Press S to [ Save ] & quit, Q to [ Quit ] w/out saving or V for [ VoIP ]
```

4. In the **Protocols** section, select **E-1 Euro-ISDN CTR4 (ETS-300) User Side** to match the DS1 configuration (i.e. Line Coding, Signal Mode, and Country Protocol) in **Section 4.1**. Select **Save All** and exit.



6. General Test Approach and Test Results

The general test approach was to place calls to and from the Noble® Solution server to verify it could properly managed inbound and outbound calls while connected to Avaya Aura™ Communication Manager via an E1 interface. Outbound calls were placed from the Noble® Solution server over an E1 trunk to a simulated PSTN. When the calls were answered, they were delivered over an E1 trunk to agent endpoints on Communication Manager. Additionally, inbound E1 trunks calls were placed from the PSTN to the Noble® Solution server, and then the calls were delivered over an E1 trunk to agent endpoints on Communication Manager.

For serviceability testing, failure conditions were introduced into the test configuration to verify that the Noble® Solution server could properly resume operation after failure recovery. These failure conditions included network cable pulls, signaling-group and trunk-group busyouts, and server resets.

All test cases were executed and passed.

7. Verification Steps

This section provides the steps that can be performed to verify proper configuration of Communication Manager and the Noble® Solution server.

1. From the SAT, enter the command **status signaling-group s**, where **s** is the number of the signaling group configured in **Section 4.2**, and verify that the **Group State** is “**in-service**”.

```
status signaling-group 9
                        STATUS SIGNALING GROUP

      Group ID: 9                      Active NCA-TSC Count: 0
      Group Type: isdn-pri              Active CA-TSC Count: 0
      Signaling Type: facility associated signaling
      Group State: in-service

                        Primary D-Channel

      Port: 01A1016                    Level 3 State: in-service

                        Secondary D-Channel

      Port:                            Level 3 State: no-link
```

2. From the SAT, enter the command **status trunk t**, where **t** is the number of the trunk group configured in **Section 4.3**, and verify that the **Service State** for each trunk group member is either “**in-service/idle**” or “**in-service/active**”.

status trunk 9			
TRUNK GROUP STATUS			
Member	Port	Service State	Mtce Connected Ports Busy
0009/001	01A1001	in-service/idle	no
0009/002	01A1002	in-service/idle	no
0009/003	01A1003	in-service/idle	no
0009/004	01A1004	in-service/idle	no
0009/005	01A1005	in-service/idle	no
0009/006	01A1006	in-service/idle	no

3. Place an outbound call from the Noble® Solution server over an E1 trunk. Verify the call is originated successfully and when the call is answered, verify the Noble® Solution server successfully delivers the call over an E1 trunk to an available agent on Communication Manager.

8. Conclusion

These Application Notes describe the steps required for configuring an E1 trunk between Avaya Aura™ Communication Manager 5.2 and the Noble® Solution server 4000.12. During compliance testing, the Noble® Solution server successfully managed inbound and outbound calls while configured with E1 interfaces. All feature and serviceability test cases were completed and passed.

9. Additional References

This section references the Avaya and Noble Systems product documentation that are relevant to these Application Notes.

The following Avaya product documentation can be found at <http://support.avaya.com>:

- [1] *Administering Avaya Aura™ Communication Manager*, Doc ID: 03-300509, Issue 5.0, Release 5.2, May 2009
- [2] *Administering Avaya Aura™ SIP Enablement Services on the Avaya S8300 Server*, Doc ID: 03-602508, Issue 2.0, May 2009

The following Noble Systems documentation was used during installation and configuration, and can be obtained by contacting Noble Systems support by phone, 888.9NOBLE9 (888.966.2539) or email, info@noblesys.com.

- [3] *Noble Installation and Configuration of UDDP*
- [4] *Maestro 2008.3.2 Express User Reference Manual*
- [5] *Maestro 2008.3.2 Enterprise User Reference Manual*
- [6] *Composer 8 v2008.4.2 Agent Manual*
- [7] *Composer 8 v2008.4.2 Product Reference Manual*

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