Avaya Solution & Interoperability Test Lab

Application Notes for Noble Systems using an H.323 Trunk to Avaya Aura™ Communication Manager – 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 H.323 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 H.323 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 H.323 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 H.323 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 inbounds 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) 966-2539
- 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 H.323 trunk to the simulated PSTN. When the calls are answered, the calls are delivered over an H.323 trunk to the agent endpoints on Communication Manager. Additionally, inbound H.323 trunks calls are placed from the PSTN to the Noble® Solution server, and then the calls are delivered over an H.323 trunk to the agent endpoints on Communication Manager.

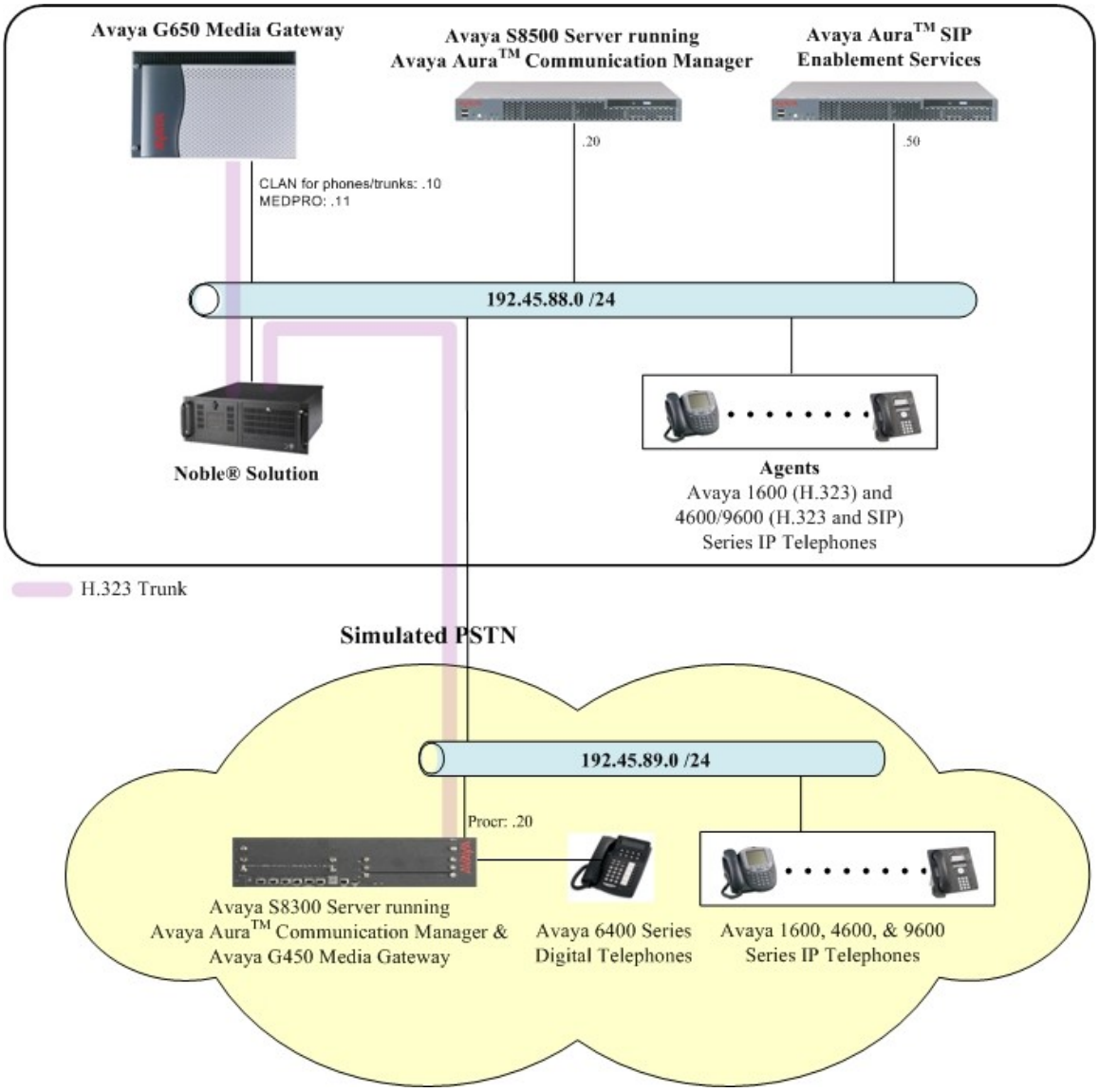


Figure 1: Noble® Solution with Communication Manager

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)	 HW01, FW026 HW02, FW007 HW15, FW030
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)	 3.002 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. Verify Communication Manager License

This section provides the steps required to verify that Communication Manager has the proper licenses for the features illustrated in these Application Notes.

1. Enter the **display system-parameters customer-options** command and navigate to **Page 2**. Verify that there is sufficient remaining capacity for H.323 trunks by comparing the **Maximum Administered H.323 Trunks** field value with the corresponding value in the **USED** column. The difference between the two values needs to be greater than or equal to the desired number of simultaneous H.323 trunk connections.

```
display system-parameters customer-options                    Page   2 of  11
                                OPTIONAL FEATURES

IP PORT CAPACITIES                                            USED
                     Maximum Administered H.323 Trunks: 450   44
           Maximum Concurrently Registered IP Stations: 18000 5
             Maximum Administered Remote Office Trunks: 0     0
Maximum Concurrently Registered Remote Office Stations: 0     0
              Maximum Concurrently Registered IP eCons: 0     0
  Max Concur Registered Unauthenticated H.323 Stations: 50    0
                       Maximum Video Capable Stations: 50    0
                   Maximum Video Capable IP Softphones: 50    0
                       Maximum Administered SIP Trunks: 450   48
  Maximum Administered Ad-hoc Video Conferencing Ports: 0     0
   Maximum Number of DS1 Boards with Echo Cancellation: 0     0
                            Maximum TN2501 VAL Boards: 10    0
                     Maximum Media Gateway VAL Sources: 0     0
           Maximum TN2602 Boards with 80 VoIP Channels: 128   0
          Maximum TN2602 Boards with 320 VoIP Channels: 128   1
   Maximum Number of Expanded Meet-me Conference Ports: 0     0

         (NOTE: You must logoff & login to effect the permission changes.)
```

The license file installed on the system controls the maximum permitted. If there is insufficient capacity or a required feature is not enabled, contact an authorized Avaya sales representative to make the appropriate changes.

4.2. Configure IP Codec Sets & IP-Network Regions

This section provides the steps required for configuring an ip-codec-set and ip-network regions.

1. Enter the **change ip-codec-set <codec set number>** command, where **<codec set number>** is the codec set number to be used with the Noble® Solution.

   - In the **Audio Codec** field(s), type the codec(s) to be used with the Noble® Solution (e.g. **G.711MU**).*****

   *** NOTE:** If any G.729 codec is used with the Noble® Solution, it is required to administer all of the G.729 codecs (G.729, G.729A, G.729B, and G.729AB) on this form.

```
change ip-codec-set 1                                          Page   1 of   2

                         IP Codec Set

   Codec Set: 1

   Audio         Silence      Frames   Packet
   Codec         Suppression  Per Pkt  Size(ms)
 1: G.711MU           n          2        20
 2:
 3:
 4:
 5:
 6:
 7:


    Media Encryption
 1: none
 2:
 3:
```

2. Enter the **change ip-network-region <region number>**, where **<region number>** is the ip network region number to be used with the Noble® Solution.

   - In the **Code Set** field, Enter the number of the codec set administered in **Step 1**. The **Codec Set** field reflects the codec set that must be used for connections between phones within this region or between phones and media processor boards within this region.
   - Direct media shuffling must be disabled with the Noble® Solution. Set the **Intra-region IP-IP Direct Audio** and **Inter-region IP-IP Direct Audio** fields to **no**.

```
change ip-network-region 1                                    Page   1 of  19
                            IP NETWORK REGION
  Region: 1
Location: 1       Authoritative Domain: dev8.com
    Name: interop
MEDIA PARAMETERS                Intra-region IP-IP Direct Audio: no
      Codec Set: 1              Inter-region IP-IP Direct Audio: no
   UDP Port Min: 2048                     IP Audio Hairpinning? y
   UDP Port Max: 65535
DIFFSERV/TOS PARAMETERS                 RTCP Reporting Enabled? y
 Call Control PHB Value: 48      RTCP MONITOR SERVER PARAMETERS
        Audio PHB Value: 48       Use Default Server Parameters? y
        Video PHB Value: 26
802.1P/Q PARAMETERS
 Call Control 802.1p Priority: 6
        Audio 802.1p Priority: 6
        Video 802.1p Priority: 5      AUDIO RESOURCE RESERVATION PARAMETERS
H.323 IP ENDPOINTS                                     RSVP Enabled? n
  H.323 Link Bounce Recovery? y
 Idle Traffic Interval (sec): 20
   Keep-Alive Interval (sec): 5
            Keep-Alive Count: 5
```

4.3. Configure Node-Names and IP Interfaces

This section provides the steps required for configuring node-names and ip-interfaces.

1. Enter the **change node-names ip** command and create node entries for the Communication Manager CLAN (or procr) to be used with for the H.323 trunk and the Noble® Solution server.

   - In the **Name** field, type a descriptive name to assign to each node.
   - In the **IP Address** field, type the IP address that will be assigned to each node.

```
change node-names ip                                          Page   1 of   2
                                  IP NODE NAMES
    Name                  IP Address
8300                  192.45.89.20
CLAN                  192.45.88.10
CLAN2                 192.45.88.13
CLAN3                 192.45.88.14
CLAN4                 192.45.88.15
Gateway001            192.45.88.1
LSP-8300              192.45.88.30
Member-CDR            192.168.199.69
NobleSystems          192.45.88.85
RDTT-CDR              192.45.88.45
SES                   192.45.88.50
cf-medpro             192.45.88.11
default               0.0.0.0
ipoffice              192.45.88.40
procr                 192.45.88.20
```

2. Enter the **add ip-interface <board location>** command, where **<board location>** is the board location of the CLAN, for example: 01A02.

   - In the **Enable Interface** field, type **y**.
   - In the **Network Region** field, type the network region number administered in **Section 4.2**.
   - In the **Node Name** field, type **<CLAN name>**, where **<CLAN name>** is the **Name** from **Step 1** above.
   - In the **Ethernet Link** field, type an available Ethernet link number.

```
add ip-interface 01a08                                          Page   1 of   3
                                IP INTERFACES


                 Type: C-LAN
                 Slot: 01A02        Target socket load and Warning level: 400
          Code/Suffix: TN799  D           Receive Buffer TCP Window Size: 8320
      Enable Interface? y                        Allow H.323 Endpoints? y
                 VLAN: n                          Allow H.248 Gateways? y
        Network Region: 1                           Gatekeeper Priority: 5



                               IPV4 PARAMETERS
             Node Name: CLAN
           Subnet Mask: /24
     Gateway Node Name:

          Ethernet Link: 1
```

4.4. 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.

   - **Group Type: h.323**
   - **TSC Supplementary Service Protocol: b**
   - **Near-end Node Name:** Enter the CLAN node name from **Section 4.3**.
   - **Far-end Node Name:** Enter the Noble® Solution server node name from **Section 4.3**.
   - **Near-end Listen Port: 1720**
   - **Far-end Listen Port: 1720**
   - **Far-end Network Region:** Enter the network region number from **Section 4.2**.
   - **Direct IP-IP Audio Connections? n**

```
add signaling-group 8                                          Page   1 of   1
                               SIGNALING GROUP

 Group Number: 8                Group Type: h.323
                           Remote Office? n          Max number of NCA TSC: 0
                                     SBS? n           Max number of CA TSC: 0
     IP Video? n                                   Trunk Group for NCA TSC:
       Trunk Group for Channel Selection:
      TSC Supplementary Service Protocol: b
                          T303 Timer(sec): 10
   H.245 DTMF Signal Tone Duration(msec):
   Near-end Node Name: CLAN                   Far-end Node Name: NobleSystems
 Near-end Listen Port: 1720                 Far-end Listen Port: 1720
                                         Far-end Network Region: 1
         LRQ Required? n                 Calls Share IP Signaling Connection? n
         RRQ Required? n
     Media Encryption? n                     Bypass If IP Threshold Exceeded? n
                                                     H.235 Annex H Required? n
         DTMF over IP: out-of-band            Direct IP-IP Audio Connections? n
  Link Loss Delay Timer(sec): 90                       IP Audio Hairpinning? n
         Enable Layer 3 Test? n                   Interworking Message: PROGress
H.323 Station Outgoing Direct Media? n   DCP/Analog Bearer Capability: 3.1kHz
```

4.5. Configure Trunk Group

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

1. Administer an H.323 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. **To Noble – H.323**).
   - **TAC:** Enter a Trunk Access Code that is valid under the provisioned dial plan (e.g. ***008**).
   - **Carrier Medium: H.323**
   - **Service Type: tie**
   - **Signal Group:** Enter the signaling group number from **Section 4.4**.
   - **Number of Members:** Enter the desired number of members.

```
add trunk-group 8                                          Page   1 of  21
                              TRUNK GROUP

Group Number: 8                    Group Type: isdn          CDR Reports: y
  Group Name: To Noble - H.323           COR: 1        TN: 1        TAC: *008
   Direction: two-way        Outgoing Display? n         Carrier Medium: H.323
 Dial Access? y              Busy Threshold: 255  Night Service:
Queue Length: 0
Service Type: tie                   Auth Code? n
                                          Member Assignment Method: auto
                                                   Signaling Group: 8
                                                 Number of Members: 20
```

2. On Page 2 of the form, enter the following value for the specified field and submit the form:

   - **Supplementary Service Protocol: b**

```
add trunk-group 8                                          Page   2 of  21
      Group Type: isdn

TRUNK PARAMETERS
         Codeset to Send Display: 6     Codeset to Send National IEs: 6
                                        Charge Advice: none
  Supplementary Service Protocol: b     Digit Handling (in/out): enbloc/enbloc


                                                  Digital Loss Group: 18
Incoming Calling Number - Delete:     Insert:                 Format:

 Disconnect Supervision - In? y  Out? n
 Answer Supervision Timeout: 0
                                    CONNECT Reliable When Call Leaves ISDN? n
```

4.6. 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 4.4**. Enter the following values for the specified fields and submit the form.

    - **Trunk Group for Channel Selection:** Enter the trunk group configured in **Section 4.5**.

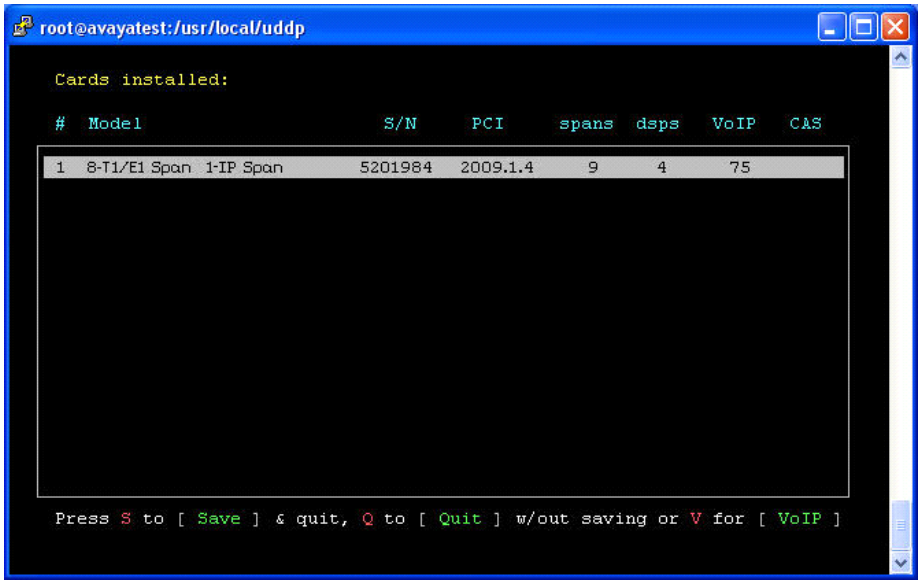
```
change signaling-group 8                                        Page   1 of   1
                                SIGNALING GROUP

 Group Number: 8              Group Type: h.323
                            Remote Office? n          Max number of NCA TSC: 0
                                      SBS? n           Max number of CA TSC: 0
     IP Video? n                                   Trunk Group for NCA TSC:
       Trunk Group for Channel Selection: 8
      TSC Supplementary Service Protocol: b
                           T303 Timer(sec): 10
   H.245 DTMF Signal Tone Duration(msec):
   Near-end Node Name: CLAN                  Far-end Node Name: NobleSystems
 Near-end Listen Port: 1720                Far-end Listen Port: 1720
                                         Far-end Network Region: 1
         LRQ Required? n                  Calls Share IP Signaling Connection? n
         RRQ Required? n
     Media Encryption? n                      Bypass If IP Threshold Exceeded? n
                                                    H.235 Annex H Required? n
         DTMF over IP: out-of-band             Direct IP-IP Audio Connections? n
  Link Loss Delay Timer(sec): 90                         IP Audio Hairpinning? n
         Enable Layer 3 Test? n                   Interworking Message: PROGress
H.323 Station Outgoing Direct Media? n   DCP/Analog Bearer Capability: 3.1kHz
```

5. Configure the Noble® Solution Server

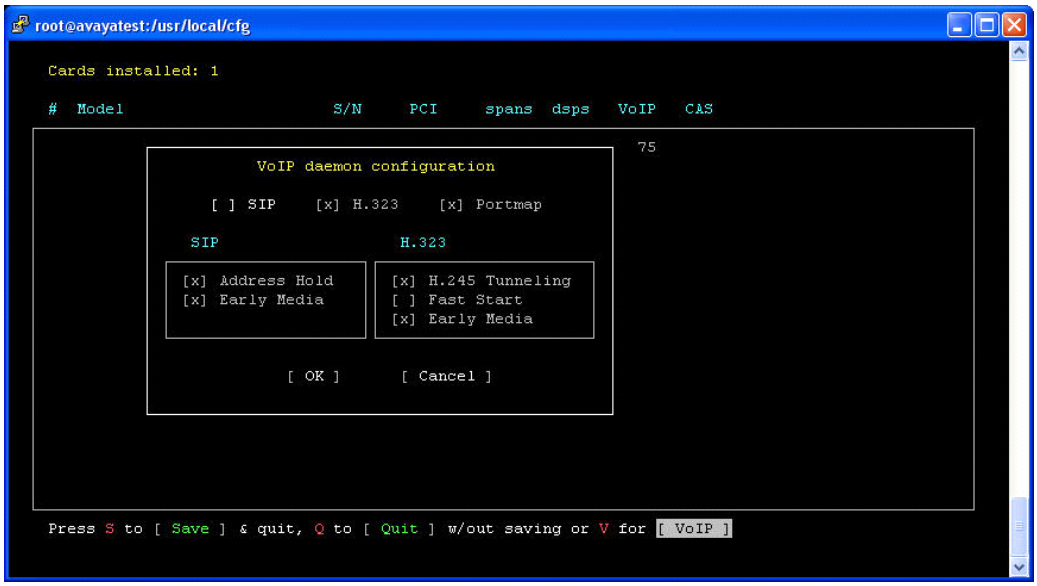
This section describes the configuration required on the Noble® Solution server to establish an H.323 trunk with Avaya Aura™ Communication Manager. This configuration change can only be performed by authorized Noble personnel.

1. Log in to the Noble® Solution server with the proper credentials.

2. Select the card to be configured and press **V** for **VOIP**.



3. Select **H.323** and disable **Fast Start**.
   Save all changes.



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 outbound and inbound calls while connected to Avaya Aura™ Communication Manager via an H.323 interface. Outbound calls were placed from the Noble® Solution server over a H.323 trunk to a simulated PSTN. When the calls were answered, they were delivered over an H.323 trunk to agent endpoints on Communication Manager. Additionally, inbound H.323 trunks calls were placed from the PSTN to the Noble® Solution server, and then the calls were delivered over an H.323 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 4.4**, and verify that the **Group Stat**e is "**in-service**".

```
status signaling-group 8
                         STATUS SIGNALING GROUP

       Group ID: 8                               Active NCA-TSC Count: 0
     Group Type: h.323                            Active CA-TSC Count: 0
  Signaling Type: facility associated signaling
     Group State: in-service
```

From the SAT, enter the command **status trunk t**, where **t** is the number of the trunk group configured in **Section 4.5** and verify that the **Service State** for each trunk group members is either "**in-service/idle**" or "**in-service/active**".

```
status trunk 8                                                    Page   1

                            TRUNK GROUP STATUS

Member    Port      Service State       Mtce Connected Ports
                                        Busy

0008/001 T00106   in-service/idle     no
0008/002 T00107   in-service/idle     no
0008/003 T00108   in-service/idle     no
0008/004 T00109   in-service/idle     no
0008/005 T00110   in-service/idle     no
0008/006 T00111   in-service/idle     no
0008/007 T00112   in-service/idle     no
0008/008 T00113   in-service/idle     no
0008/009 T00114   in-service/idle     no
0008/010 T00115   in-service/idle     no
0008/011 T00116   in-service/idle     no
0008/012 T00117   in-service/idle     no
0008/013 T00118   in-service/idle     no
0008/014 T00119   in-service/idle     no
```

2. Place an outbound call from the Noble® Solution server over an H.323 trunk. Verify the call is originated successfully and when the call is answered, verify the Noble® Solution server successfully delivers the call over an H.323 trunk to an available agent on Communication Manager.

8. Conclusion

These Application Notes describe the steps required for configuring an H.323 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 H.323 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*

Please e-mail any questions or comments pertaining to these Application Notes along with the full title name and filename, located in the lower right corner, directly to the Avaya DevConnect Program at devconnect@avaya.com.