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Avaya Solution & Interoperability Test Lab

Application Notes for Intego Systems ProNet.net Nurse Call System with Avaya Communication Manager using Avaya SIP Enablement Services – Issue 1.0

Abstract

These Application Notes describe the configuration steps required for the Intego Systems ProNet.net Nurse Call System to successfully interoperate with Avaya Communication Manager using Avaya SIP Enablement Services. The compliance testing focused on connecting the hospital staff on Avaya Communication Manager and Avaya SIP Enablement Services via SIP trunks to patients on the Intego Systems ProNet.net Nurse Call System.

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.

TLT; Reviewed:
SPOC 12/17/2008

Solution & Interoperability Test Lab Application Notes
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Intego-SES

1. Introduction

These Application Notes describe the configuration steps required for the Intego Systems ProNet.net Nurse Call System to successfully interoperate with Avaya Communication Manager using Avaya SIP Enablement Services (SES).

The Intego Systems ProNet.net Nurse Call System solution consists of a server, nurse station clients, and patient nurse call devices. The Intego Systems ProNet.net Nurse Call System server also uses a third party Brekeke SIP Server for SIP proxy functions.

The compliance testing focused on the uni-directional calls from the hospital staff on Avaya Communication Manager, via the SIP trunks to patient nurse call devices on the Intego Systems ProNet.net Nurse Call System. The hospital staff on Avaya Communication Manager is equipped with Avaya 4600 Series H.323 and SIP Telephones.
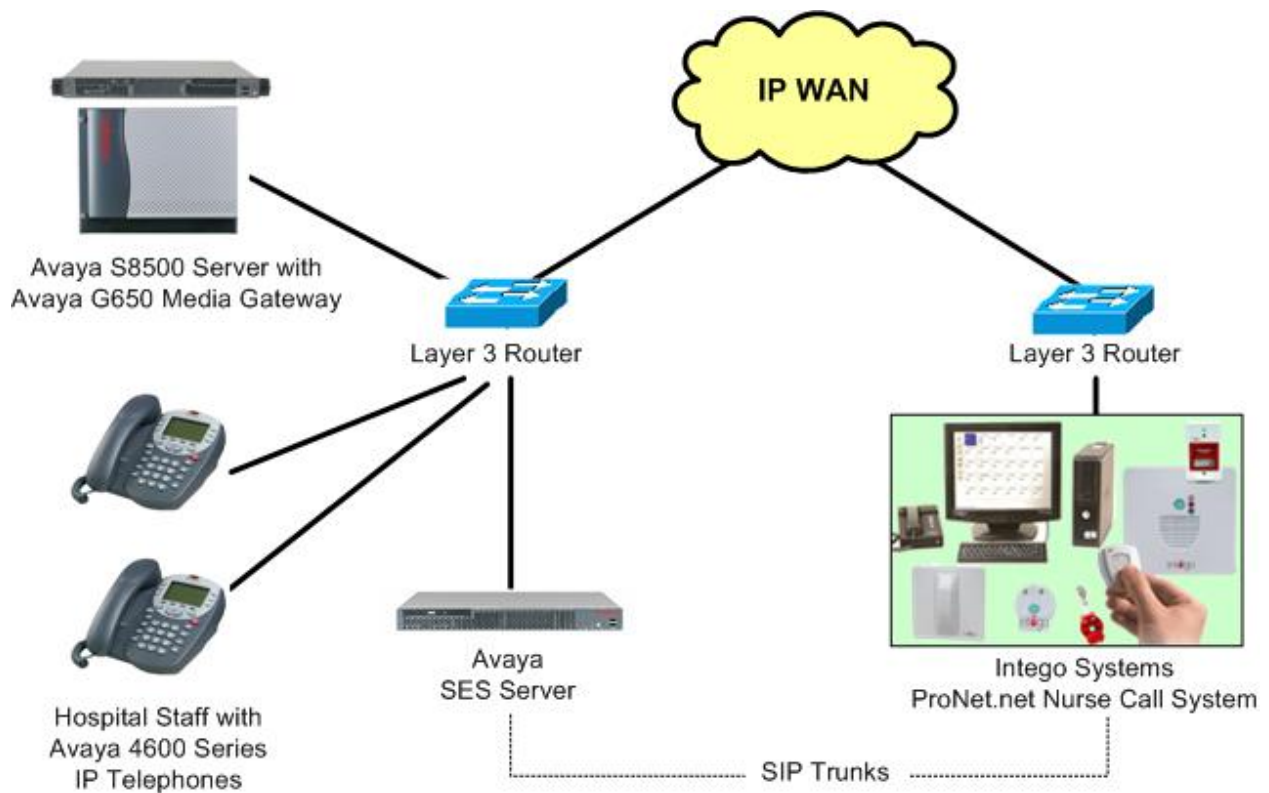
2.

Equipment and Software Validated

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

Equipment	Software
Avaya S8500 Server	Avaya Communication Manager 5.0, R015x.00.0.825.4
Avaya MCC1 Media Gateway • TN799DP C-LAN Circuit Pack	HW01 FW017
Avaya SIP Enablement Services	5.0, SES-5.0.0.0-825.31
Avaya 4610SW IP Telephone (H.323)	2.9
Avaya 4621SW IP Telephone (SIP)	2.2.2
Intego Systems ProNet.net Nurse Call System with Brekeke SIP Server	1.0.16.12 2.2.6.2

3. Configure Avaya Communication Manager

The detailed administration of basic connectivity between Avaya Communication Manager and Avaya SES is not the focus of these Application Notes and will not be described. For administration of basic connectivity to Avaya SES, refer to the appropriate documentation listed in **Section 10**. This section provides the procedures for the following:

- Verify Avaya Communication Manager license
- Administer IP codec set
- Administer IP network region
- Administer SIP trunk group
- Administer SIP signaling group
- Administer SIP trunk group members
- Administer route pattern
- Administer public unknown numbering
- Administer uniform dial plan
- Administer AAR analysis

3.1. Verify Avaya Communication Manager License

Log into the System Access Terminal (SAT) to verify that the Avaya Communication Manager license has proper permissions for features illustrated in these Application Notes. Use the "display system-parameters customer-options" command. Navigate to **Page 2**, and verify that there is sufficient remaining capacity for SIP trunks by comparing the **Maximum Administered SIP Trunks** field value with the corresponding value in the **USED** column.

The license file installed on the system controls the maximum permitted. If there is insufficient capacity, contact an authorized Avaya sales representative to make the appropriate changes.

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

IP PORT CAPACITIES                                           USED
                   Maximum Administered H.323 Trunks: 100   6
          Maximum Concurrently Registered IP Stations: 2400  0
             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: 0     0
                Maximum Video Capable H.323 Stations: 0     0
                Maximum Video Capable IP Softphones: 0     0
                   Maximum Administered SIP Trunks: 600   80
  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
```

3.2. Administer IP Codec Set

Use the "change ip-codec-set n" command, where "n" is an existing codec set number that will be used for integration with the Intego Systems ProNet.net Nurse Call System. Enter the audio codec type in the **Audio Codec** fields. Note that the Intego Systems ProNet.net Nurse Call System only supports the G.711 codec type.

```
change ip-codec-set 7                                            Page   1 of   2

                         IP Codec Set

    Codec Set: 7


    Audio          Silence      Frames   Packet
    Codec          Suppression  Per Pkt  Size(ms)
 1: G.711MU            n           2        20
 2:
```

3.3. Administer IP Network Region

Use the "change ip-network-region n" command, where "n" is an existing network region that will be used for integration with Intego. For the **Authoritative Domain** field, enter the SIP domain name of the Avaya SES server, in this case "avremote.com". For the **Codec Set** field, enter the codec set number from **Section 3.2**.

In the compliance testing, the same network region is used for the Avaya endpoints. If the network configuration uses a different network region for the Avaya endpoints, then **Page 3** can be used to specify which codec set to use for calls between regions.

```
change ip-network-region 7                                       Page   1 of  19
                            IP NETWORK REGION
  Region: 7
Location:              Authoritative Domain: avremote.com
    Name:
MEDIA PARAMETERS                   Intra-region IP-IP Direct Audio: yes
      Codec Set: 7                 Inter-region IP-IP Direct Audio: yes
  UDP Port Min: 2048                      IP Audio Hairpinning? n
  UDP Port Max: 65531
DIFFSERV/TOS PARAMETERS                   RTCP Reporting Enabled? y
 Call Control PHB Value: 34      RTCP MONITOR SERVER PARAMETERS
        Audio PHB Value: 46       Use Default Server Parameters? y
        Video PHB Value: 26
```

3.4. Administer SIP Trunk Group

Administer a SIP trunk group to interface with the Intego Systems ProNet.net Nurse Call
System. Use the "add trunk-group n" command, where "n" is an available trunk group number.
Set the **Group Type** to "sip", and **Service Type** to "tie". Enter a descriptive **Group Name**, and
an available trunk access code for the **TAC** field.

```
add trunk-group 7                                           Page   1 of  21
                          TRUNK GROUP

Group Number: 140                    Group Type: sip         CDR Reports: y
  Group Name: SIP trunk to SES/Intego      COR: 1      TN: 1      TAC: 107
   Direction: two-way       Outgoing Display? n
 Dial Access? n                                         Night Service:
Queue Length: 0
Service Type: tie                    Auth Code? n

                                              Signaling Group:
                                         Number of Members: 0
```

Navigate to **Page 3**, and enter "public" for the **Numbering Format** field as shown below.

```
add trunk-group 7                                           Page   3 of  21
TRUNK FEATURES
         ACA Assignment? n            Measured: none
                                                  Maintenance Tests? y

                   Numbering Format: public
                                          UUI Treatment: service-provider

                                          Replace Restricted Numbers? n
                                          Replace Unavailable Numbers? n

 Show ANSWERED BY on Display? y
```

3.5. Administer SIP Signaling Group

Administer a SIP signaling group for the new trunk group to use for signaling. Use the "add signaling-group n" command, where "n" is an available signaling group number. Set the **Group Type** to "sip". For the **Near-end Node Name** field, enter an existing C-LAN node name, in this case "clan1". For the **Far-end Node Name** field, enter the Avaya SES node name, in this case "ses". For the **Far-end Network Region** field, enter the IP network region number from **Section 3.3**. Retain the default values in the remaining fields.

```
add signaling-group 7
                              SIGNALING GROUP

 Group Number: 7                    Group Type: sip
                      Transport Method: tls


  Near-end Node Name: clan1                  Far-end Node Name: ses
 Near-end Listen Port: 5061               Far-end Listen Port: 5061
                                        Far-end Network Region: 7
      Far-end Domain:

                                            Bypass If IP Threshold Exceeded? n

       DTMF over IP: rtp-payload            Direct IP-IP Audio Connections? y
                                                   IP Audio Hairpinning? n
       Enable Layer 3 Test? n
 Session Establishment Timer(min): 3
```

3.6. Administer SIP Trunk Group Members

Administer SIP trunk group members for the newly added SIP trunk group. Use the "change trunk-group n" command, where "n" is the trunk group number added in **Section 3.4**. Enter the corresponding signaling group number from **Section 3.5** into the **Signaling Group** field. Enter the desired number of trunk group members into the **Number of Members** field.

```
change trunk-group 7                                         Page   1 of  21
                             TRUNK GROUP

Group Number: 7                    Group Type: sip          CDR Reports: y
  Group Name: SIP trunk to SES/Intego    COR: 1       TN: 1       TAC: 107
   Direction: two-way        Outgoing Display? n
 Dial Access? n                                    Night Service:
Queue Length: 0
Service Type: tie                   Auth Code? n

                                           Signaling Group: 7
                                         Number of Members: 10
```

3.7. Administer Route Pattern

Create a route pattern to use for the newly created SIP trunk group. Use the "change route-pattern n" command, where "n" is an available route pattern. Enter a descriptive **Pattern Name**. In the **Grp No** field, enter the trunk group number from **Section 3.4**. In the **FRL** field, enter a level that allows access to this trunk with "0" being least restrictive.

```
change route-pattern 7                                        Page   1 of   3
                 Pattern Number: 7   Pattern Name: To SES/Intego
                             SCCAN? n     Secure SIP? n
    Grp FRL NPA Pfx Hop Toll No.  Inserted                        DCS/ IXC
    No          Mrk Lmt List Del  Digits                          QSIG
                             Dgts                                 Intw
 1: 7    0                                                         n   user
 2:                                                                n   user
 3:                                                                n   user
 4:                                                                n   user
 5:                                                                n   user
 6:                                                                n   user

     BCC VALUE  TSC CA-TSC    ITC BCIE Service/Feature PARM  No. Numbering LAR
    0 1 2 M 4 W    Request                                   Dgts Format
                                                          Subaddress
 1: y y y y y n  n            rest                                        none
```

3.8. Administer Public Unknown Numbering

Use the "change public-unknown-numbering 0" command, to define the calling party number to send to the Intego Systems ProNet.net Nurse Call System. Add an entry for the trunk group defined in **Section 3.4**. In the example shown below, all calls originating from a 5-digit extension beginning with 6 and routed to trunk group 7 will result in a 5-digit calling number. The calling party number will be in the SIP "From" header.

```
change public-unknown-numbering 0                             Page   1 of   2
                     NUMBERING - PUBLIC/UNKNOWN FORMAT
                                          Total
Ext Ext           Trk      CPN           CPN
Len Code          Grp(s)   Prefix        Len
                                               Total Administered: 2
 5  6             7                     5      Maximum Entries: 9999
```

3.9. Administer Uniform Dial Plan

This section provides a sample AAR routing used for routing calls with dialed digits 5xxx to the Intego Systems ProNet.net Nurse Call System. Note that other methods of routing may be used. Use the "change uniform-dialplan 0" command, and add an entry to specify the use of AAR for routing digits 5xxx, as shown below.

```
change uniform-dialplan 0                                    Page   1 of   2
                        UNIFORM DIAL PLAN TABLE
                                                           Percent Full: 0

  Matching                  Insert                Node
  Pattern      Len Del      Digits      Net Conv Num
 5              4   0                    aar  n
```

3.10. Administer AAR Analysis

Use the "change aar analysis 0" command, and add an entry to specify how to route calls to 5xxx. In the example shown below, calls with digits 5xxx will be routed as an AAR call using route pattern "7" from **Section 3.7**.

```
change aar analysis 0                                        Page   1 of   2
                        AAR DIGIT ANALYSIS TABLE
                                                           Percent Full:   2

        Dialed          Total      Route    Call   Node  ANI
        String          Min  Max   Pattern  Type   Num   Reqd
   5                     4    4     7        aar          n
```

4. Configure Avaya SIP Enablement Services

This section provides the procedures for configuring Avaya SIP Enablement Services (SES). The procedures include the following areas:

- Launch SES administration interface
- Administer host address map
- Administer host contact
- Administer trusted host

4.1. Launch SES Administration Interface

Access the SES web interface by using the URL "http://ip-address/admin" in an Internet browser window, where "ip-address" is the IP address of the SES server. Log in with the appropriate credentials.
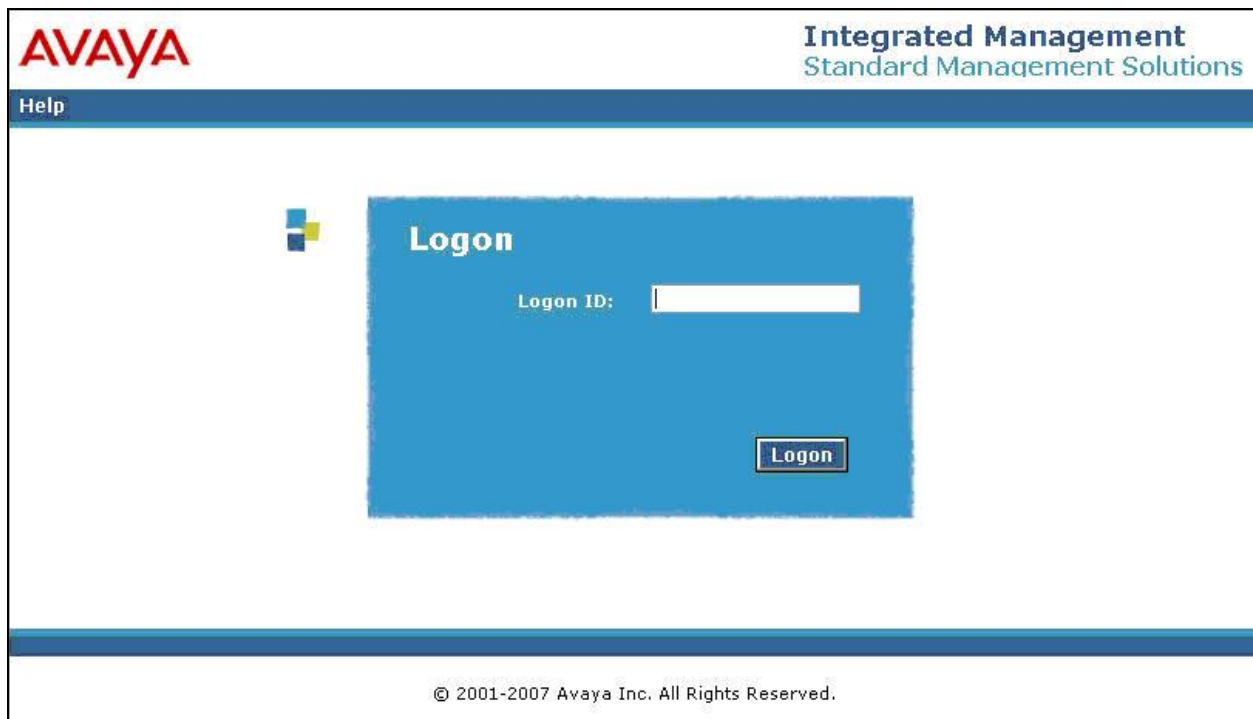
In the subsequent screen, select **Launch SES Administration Interface**.
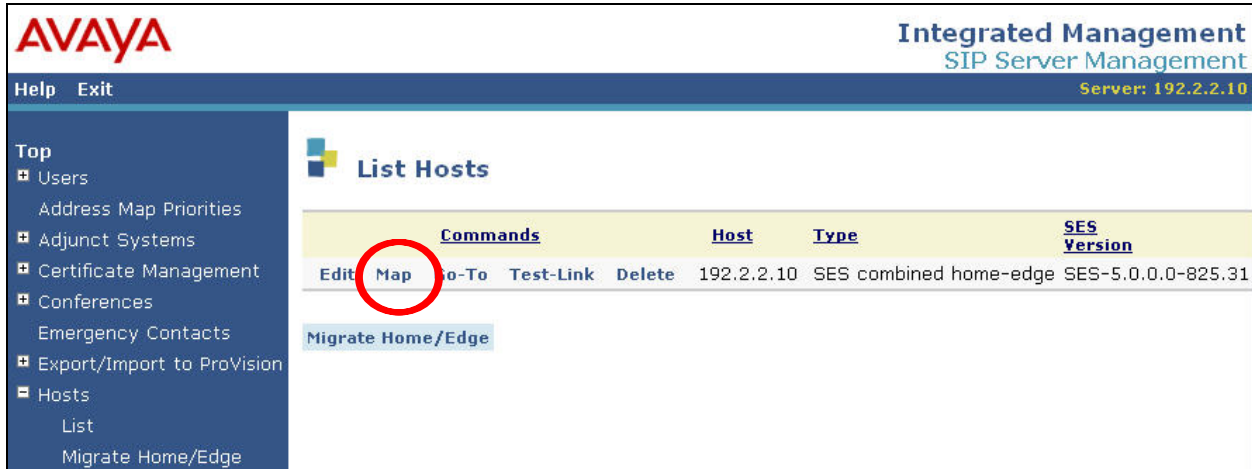
The **Top** screen is displayed next.

4.2. Administer Host Address Map

Select **Hosts > List** from the left pane. The **List Hosts** screen is displayed. Click on the **Map** link.

In the **List Host Address Map** screen below, click on the **Add Map In New Group** link in the right pane.

The **Add Host Address Map** screen is displayed next. This screen is used to specify which calls are to be routed to the Intego Systems ProNet.net Nurse Call System. For the **Name** field, enter a descriptive name to denote the routing. For the **Pattern** field, enter an appropriate syntax for address mapping. For the compliance testing, a pattern of "^sip:5[0-9]{3}" is used to match to any patient extensions of 5xxx at the Intego Systems ProNet.net Nurse Call System. Maintain the check in **Replace URI**.

4.3. Administer Host Contact

The **List Host Address Map** screen is displayed again, and updated with the newly created address map. Click **Add Another Contact** in the right pane.

In the **Add Host Contact** screen, enter the contact "sip:$(user)@<destination-IP-address>
:5060;transport=udp", where the <destination-IP-address> is the IP address of the Intego
Systems ProNet.net Nurse Call System. Avaya SES will substitute "$(user)" with the user
portion of the request URI before sending the message. Note that in the compliance testing, a
NAT device was used to front end the ProNet.net Nurse Call System server, therefore the public
IP address of the NAT device was used and masked in the screen shots for privacy.

4.4. Administer Trusted Host

Select **Trusted Hosts > Add** from the left pane. The **Add Trusted Host** screen is displayed.
For the **IP Address** field, enter the IP address of the Intego Systems ProNet.net Nurse Call
System from **Section 4.3**. Enter a desired description for the **Comment** field.

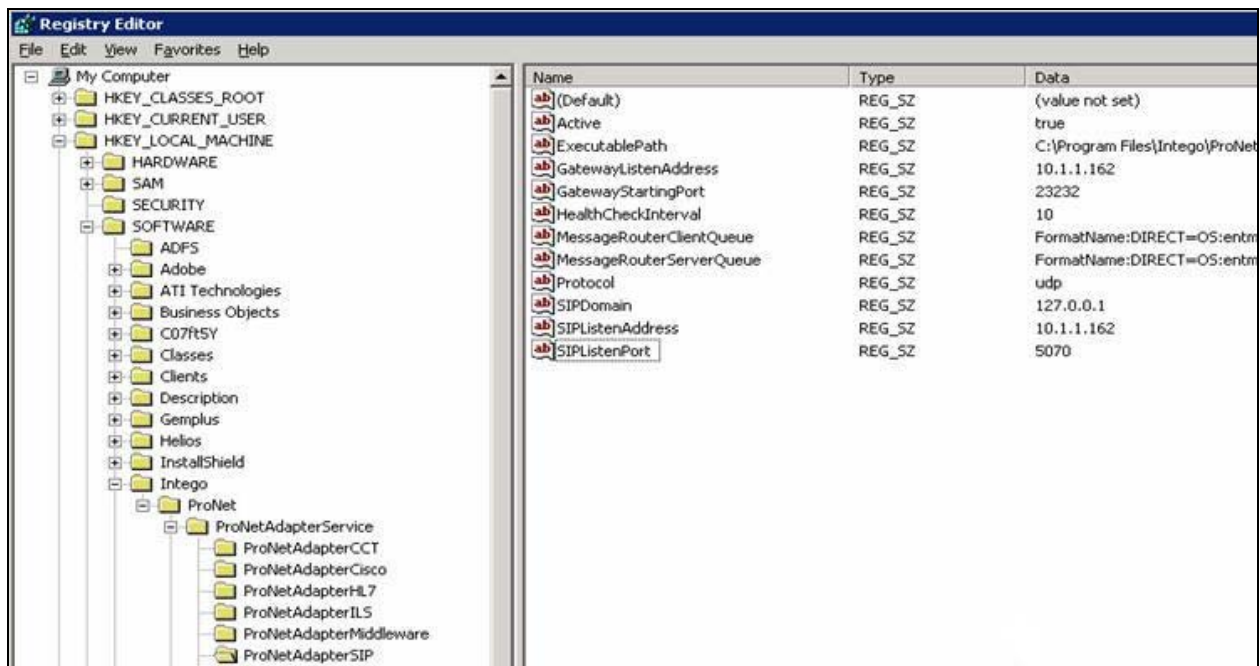# 5. Configure Intego Systems ProNet.net Nurse Call System

The detailed administration of the Intego Systems ProNet.net Nurse Call System is not the focus of these Application Notes and will not be described. This section provides the procedures for configuring the Intego Systems ProNet.net Nurse Call System server for SIP trunks integration with Avaya SES. The procedures include the following areas:

- Administer ProNet Adapter
- Administer dial plan

Configuration of the ProNet.net Nurse Call System is typically performed by Intego Systems service technicians. The procedural steps are presented in these Application Notes for informational purposes.

5.1. Administer ProNet Adapter

From the ProNet.net Nurse Call System server, launch the **Registry Editor** window. Select **My Computer > HKEY_LOCAL_MACHINE > SOFTWARE > Intego > ProNet > ProNetAdapterService > ProNetAdapterSIP**. For the **Protocol** field, enter the value "udp". For the **SIPListenAddress** field, enter the IP address of the ProNet.net Nurse Call System server. For the **SIP Listen Port**, enter "5070".

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5.2. Administer Dial Plan

From the ProNet.net Nurse Call System server, access the Brekeke SIP Server web interface by using the URL "http://ip-address:8080/proxy" in an Internet browser window, where "ip-address" is the IP address of the ProNet.net Nurse Call System server. Log in with the appropriate credentials.

In the subsequent screen, select **Dial Plan** followed by the **New Rule** tab to create a new dial plan rule as shown below. Note that the "500." in the **Matching Patterns** field will match to patient extensions digits of 500x. In the compliance testing, the **Deploy Patterns** field contains the IP address and port number of the private side of the NAT device, and the IP address and port number of the ProNet.net Nurse Call System server.

6. Interoperability Compliance Testing

The interoperability compliance test included feature and serviceability testing.

The feature testing included basic call, hold/reconnect, media shuffling, audio codec, and simultaneous call scenarios.

The serviceability testing focused on verifying the ability of the Intego Systems ProNet.net Nurse Call System to recover from adverse conditions, such as disconnecting and reconnecting the Ethernet cable to the Intego Systems ProNet.net Nurse Call System server.

6.1. General Test Approach

The feature test cases were performed manually. Calls were made from the Avaya H.323 and Avaya SIP endpoints to the patient nurse call devices on the Intego Systems ProNet.net Nurse Call System.

The serviceability test cases were performed manually by disconnecting and reconnecting the LAN cables to the Intego Systems ProNet.net Nurse Call System server.

6.2. Test Results

All feature test cases were executed and passed.

7. Verification Steps

This section provides the tests that can be performed to verify proper configuration of Avaya Communication Manager, Avaya SES, and the Intego Systems ProNet.net Nurse Call System.

Make a call from an Avaya endpoint to a patient nurse call device on the Intego Systems ProNet.net Nurse Call System. Verify that the patient nurse call device opens, with connected two-way talk paths.

8. Support

Technical support on the Intego Systems ProNet.net Nurse Call System can be obtained through the following:

- **Phone:** (888) 846-8346

9. Conclusion

These Application Notes describe the configuration steps required for the Intego Systems ProNet.net Nurse Call System to successfully interoperate with Avaya Communication Manager using Avaya SES.

10. Additional References

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

- *Administrator Guide for Avaya Communication Manager*, Document 03-300509, Issue 4.0, Release 5.0, January 2008, available at http://support.avaya.com.

- *Installing, Administering, Maintaining, & Troubleshooting SIP Enablement Services*, Document 03-600768, Issue 5.0, January 2008, available at http://support.avaya.com

- *SIP Support in Avaya Communication Manager Running on Avaya S8xxx Servers*, Document 555-245-206, Issue 8, January 2008, available at http://support.avaya.com

- *ProNet.Net Nursecall Installation,* May 2007, documentation available via technical support.

- *ProNet.Net Nursecall Configuration*, May 2007, documentation available via technical support.