Avaya Solution & Interoperability Test Lab

Configuring Avaya Communication Manager for H.323 Signaling and IP Trunks with Nortel Succession 1000 – Issue 1.0

Abstract

These Application Notes present a sample configuration for a network comprised of an Avaya S8300 Media Server, Avaya G700 Media Gateway, and a Nortel Succession 1000. The focus is on the Avaya Communication Manager configuration for the H.323 signaling groups, IP trunk groups, and IP codec sets, and the corresponding Nortel Succession configuration of IP Peer Networking and Virtual Trunks. Using this configuration, Nortel digital telephones, Nortel IP Telephones, and Nortel IP Software Phones can call (and be called by) Avaya digital telephones, Avaya IP Telephones, and Avaya IP Softphones. Screens that describe the detailed status and communication paths of active calls are presented to reinforce the understanding of the configuration. These results should be applicable to other Avaya media servers and gateways.

1. Introduction

These Application Notes present a sample configuration for a network comprised of an Avaya S8300 Media Server, Avaya G700 Media Gateway, and a Nortel Succession 1000. The focus is on the Avaya Communication Manager configuration for the H.323 signaling groups, IP trunk groups, and IP codec sets, and the corresponding Nortel Succession configuration of IP Peer Networking and Virtual Trunks. Using this configuration, Nortel digital telephones, Nortel IP Telephones, and Nortel IP Software Phones can call (and be called by) Avaya digital telephones, Avaya IP Telephones, and Avaya IP Softphones. Screens that describe the detailed status and communication paths of active calls are presented to reinforce the understanding of the configuration. These results should be applicable to other Avaya media servers and gateways.

Figure 1 depicts the network used to verify these Application Notes. The data network is kept simple to focus on the relevant server and H.323 IP Trunk configuration. Although the Nortel BCM is not the subject of these Application Notes, it is included in the configuration below the line in **Figure 1**. The network below the line is identical to the configuration presented in the previously published Application Notes [3] describing H.323 IP Trunks between Avaya Communication Manager and Nortel BCM.

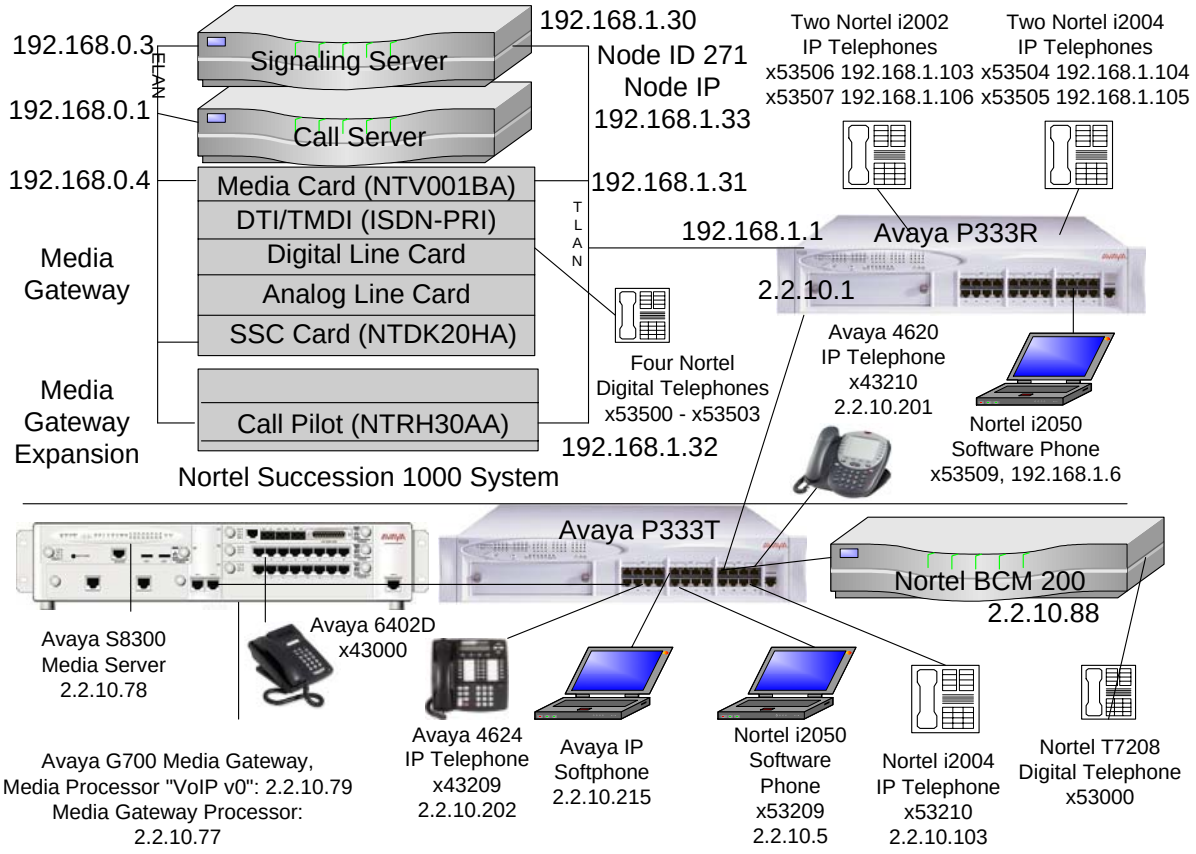


Figure 1: Network Overview

A five digit Uniform Dial Plan (UDP) is used to facilitate inter-system dialing. Unique ranges of extensions are associated with the Nortel Succession (535xx) and the Avaya S8300 Media Server (43xxx). The Avaya S8300 Media Server will route 535xx extensions to the Nortel Succession over an H.323 signaling group and IP trunk group, whose configuration is fully described. The Nortel Succession will in turn route 43xxx numbers to the Avaya S8300 Media Server. The Nortel Succession configuration is presented, inclusive of the Coordinated Dial Plan (CDP) feature that is similar to the Avaya UDP feature. The Avaya UDP configuration steps are not described, since there is no new routing consideration introduced by the presence of the Nortel Succession in the network. All servers are configured to pass 5 digit extensions over the IP Trunks (i.e., five digits are included in the Called Party Number Information Element in the Q.931 SETUP message).

2. Equipment and Software Validated

The following equipment and software were used for this sample configuration. For Avaya Communication Manager 2.1.1 (load 414.1), patch 7689 is required for the interoperability described in these Application Notes. Special Application SA8507 must also be enabled in the Avaya Communication Manager license file.

Network Component	Version Information
Avaya S8300 Media Server running Avaya Communication Manager	2.1.1, Load 414.1 + Patch 7689, with SA8507 turned on
Avaya G700 Media Gateway Processor	22.16.0
Avaya G700 VoIP	Firmware V42
Avaya 4620 IP Telephone	2.0
Avaya IP Softphone	5.1.4.6
Nortel Succession Signaling Server	SSE 2.11.3
Nortel Succession Call Server (NTDK20HA)	Version 2121 Release 3
Nortel Succession Voice Gateway Media Card (Single Slot 24 port NTV001BA card)	Firmware Release 6.7
Nortel i2002 IP Telephone (Registered to Succession)	0603B59
Nortel i2004 IP Telephone (Registered to Succession)	0603B59
Nortel i2050 Software Phone (Registered to Succession)	1.4.0 Build 346
Nortel M3904 and M3904 Digital Telephones	N/A
Nortel Business Communications Manager (BCM 200)	BCM Release 3.0, specifically UM-111302-BCM30-RC2.2, UNISTIM Terminal Proxy Server version 30.120.20.21
Nortel BCM Media Services Card (MSC)	Type MSC 1A \ HW Revision 3
Nortel i2004 IP Telephone (Registered to BCM)	C502B41

Table 1 – Equipment Version Information

3. Conventions

Native Avaya Communication Manager interfaces have been used to describe the configuration. Graphical and wizard interfaces are also available as an alternative. For example, additional information on the Avaya Installation Wizard and other wizards can be found at http://support.avaya.com/avayaiw/.

In these Application Notes, Avaya Communication Manager administration screens are shown with a gray shaded background. These administration screens are also referred to as "SAT" (System Access Terminal) screens in this document. In many instances, the original screens have been edited for brevity in presentation. Commands and fields requiring user input or special attention are highlighted in bold. Nortel Succession command line interface (CLI) screen captures are presented without background shading.

It is assumed that the appropriate license files have been installed on all products, and that login and password credentials for all products are available to the reader.

4. Configuring Avaya Communication Manager on the Avaya S8300 Media Server

This section presents configuration steps for the Avaya S8300 Media Server. Before proceeding, use the command "**display system-parameters special-applications"** and page forward to Page 4 to verify that Special Application SA8507 is enabled. SA8507 must be enabled to achieve the interoperability documented in these Application Notes. If SA8507 is not enabled, contact an authorized Avaya sales representative.

```
display system-parameters special-applications                  Page   4 of   5
                            SPECIAL APPLICATIONS
     (SA8481) - Replace Calling Party Number with ASAI ANI? n
               (SA8500) - Expanded UUI Display Information? n
                 (SA8506) - Altura Interoperability (FIPN)? n
                (SA8507) - H245 Support With Other Vendors? y
                (SA8508) - Multiple Emergency Access Codes? n
 (SA8510) - NTT Mapping of ISDN Called-Party Subaddress IE? n
                     (SA8517) - Authorization Code By COR? n
   (SA8518) - Automatic Callback with Called Party Queuing? n
          (SA8520) - Hoteling Application for IP Terminals? n
  (SA8558) - Increase Automatic MWI & VuStats (S8700 only)? n
                (SA8567) - PHS X-Station Mobility over IP? n
      (SA8569) - No Service Observing Tone Heard by Agent? n
                (SA8573) - Call xfer via ASAI on CAS Main? n
           (SA8582) - PSA Location and Display Enhancements? n
                (SA8587) - Networked PSA via QSIG Diversion? n
                          (SA8589) - Background BSR Polling? n
                     (SA8601) - Two-Digit AUX Reason Codes? n
                       (SA8621) - SCH Feature Enhancements? n
                  (SA8622) - Enhanced Call Pickup Alerting? n
```

Section 4.1 shows aspects of the configuration that are not unique to configurations involving Nortel Succession. The standard configuration of the G700 Media Gateway and S8300 Media Server are omitted; product documentation and other available Application Notes cover these

procedures. There are no special G700 Media Gateway considerations due to the presence of the Nortel Succession in this configuration. A reader experienced with the Avaya S8300 Media Server may wish to skip forward to Section 4.2, which illustrates the parameters used in the administration of the H.323 signaling group, IP trunk group, and IP codec sets used to connect with Nortel Succession.

4.1. Common Avaya Communication Manager VoIP Concepts

The "list ip-interface" command illustrates the IP configuration of the S8300 Media Server. The IP address and gateway address of the "PROCR" interface are configured using the S8300 Media Server Web utilities. The "PROCR" interface will be used as the near-end of the H.323 signaling group to the Nortel Succession. Avaya IP Telephones also register for service with this interface.

```
list ip-interface
                                IP INTERFACES
                                                                        Net
ON Type  Slot  Code Sfx Node Name       Subnet Mask     Gateway Address Rgn VLAN
-- ----  ----  ---- --- --------------- --------------- --------------- --- ----
y PROCR                2.2.10.78       255.255.255.0   2.2.10.1        1
```

The "display media-gateway 1" screen shown below illustrates aspects of the G700 Media Gateway configuration in **Figure 1**. The "IP Address" field is a display only field that is not assigned via the SAT. The "IP Address" field will contain the address of the G700 Media Gateway processor, after it has registered with the Avaya S8300 Media Server as its controller. As noted in **Figure 1**, the IP address associated with the VoIP Media Processor "VoIP v0" on the G700 Media Gateway is 2.2.10.79. Note the use of Network Region 1 for the Avaya devices.

```
display media-gateway 1
                            MEDIA GATEWAY
         Number: 1                              IP Address: 2  .2  .10 .77
           Type: g700               FW Version/HW Vintage: 22 .16 .0  /3
           Name: Nortel-Interop-Test          MAC Address: 00:04:0d:51:8b:0d
     Serial No: 04J239801972                Encrypt Link? y
 Network Region: 1                             Location: 1
    Registered? y                   Controller IP Address: 2  .2  .10 .78
                                                Site Data:
      Slot   Module Type               Name
       V1:   S8300                     ICC MM
       V2:
       V3:   MM712                     DCP MM
       V4:

       V8:
       V9:   gateway-announcements     ANN VMM
```

4.2. Configuration Related to Nortel Succession Interoperability

This section focuses on the parameter settings for the H.323 signaling group, IP trunk group, and IP codec sets used to connect with Nortel Succession.

The following illustrates a subset of the "change node-names ip" screen that maps logical names to IP addresses. These node names are presented because they will appear in other screens, such as the screen defining the H.323 signaling group.

```
change node-names ip                                          Page   1 of   1
                                  IP NODE NAMES
    Name                  IP Address          Name              IP Address
G700-VoIP-V0           2  .2  .10 .79                            .   .   .
Nortel-BCM             2  .2  .10 .88                            .   .   .
Succ-media-card        192.168.1  .31                            .   .   .
Succ-sig-svr           192.168.1  .30                            .   .   .
default                0  .0  .0  .0                             .   .   .
procr                  2  .2  .10 .78                            .   .   .
succ-node-ip           192.168.1  .33                            .   .   .
```

Signaling Group 7 will be created using the command "**add signaling-group 7**" to establish an H.323 signaling link between the Avaya S8300 Media Server and the Nortel Succession. The signaling group number is not relevant; use any available number.

```
add signaling-group 7                                         Page   1 of   5
                                SIGNALING GROUP
 Group Number: 7                Group Type: h.323
                              Remote Office? n          Max number of NCA TSC: 0
                                        SBS? n           Max number of CA TSC: 0
                                                      Trunk Group for NCA TSC:
       Trunk Group for Channel Selection:
          Supplementary Service Protocol: a
                         T303 Timer(sec): 10

        Near-end Node Name: procr             Far-end Node Name: succ-node-ip
     Near-end Listen Port: 1720             Far-end Listen Port: 1720
                                         Far-end Network Region: 4
              LRQ Required? n             Calls Share IP Signaling Connection? n
              RRQ Required? n                   H245 Control Addr On FACility? n
          Media Encryption? n                 Bypass If IP Threshold Exceeded? n

              DTMF over IP: out-of-band       Direct IP-IP Audio Connections? n
                                                        IP Audio Hairpinning? n
                                               Interworking Message: PROGress
```

The S8300 "procr" is the near-end of the signaling group. The far-end must be set to the Succession Node IP address (192.168.1.33), and not the IP address configured for the Succession Signaling Server (192.168.1.30). Retain the default near-end listen port (1720) and enter 1720 as the far-end listen port. The "Calls Share IP Signaling Connection" and the "Direct IP-IP Audio Connections?" fields must remain set to the default "n" setting, or interoperability problems will be experienced. The "IP Audio Hairpinning" field is also intentionally left at the default of "n".

In general, the "Far-end Network Region" field can be left blank, or it can be populated with a network region number. In these Application Notes, the "Far-end Network Region" field is populated to illustrate how different audio codecs can be used for intra-region calls among the Avaya devices, and inter-region calls over the IP Trunk to the Nortel Succession. Since "Direct IP-IP Audio Connections", also referred to as "shuffling", must remain disabled for the signaling group, calls between Avaya IP Telephones and Nortel devices will require the resources of the G700 media processors. The approach described below allows connections among Avaya IP devices in Network Region 1 to use G.711MU while media connections across the IP Trunk to Nortel IP devices will use G729AB. This may be an appropriate configuration in environments where the two servers are separated by a WAN, and it is desirable to conserve bandwidth over the WAN. (An alternative showing G.711MU over the IP Trunk is shown in Section 7). For Signaling Group 7, the "Far-end Network Region" field has been set to 4. Avaya Communication Manager will treat calls using this signaling group as calls between Network Region 1 and Network Region 4.

The signaling group created with the preceding screen will be associated with Trunk Group 7 in a subsequent step.

The "ip-network-region" and "ip codec set" screens are shown below to complete the example of using different codecs for intra-region (Avaya-Avaya) and inter-region (Avaya-Nortel) calls. For connections within region 1, the "Codec Set" field shown in bold on the first page of the form determines the codec set used.

```
change ip-network-region 1                                    Page   1 of  19
                              IP NETWORK REGION
  Region: 1
Location: 1               Home Domain:
    Name: G700/S8300
                               Intra-region IP-IP Direct Audio: yes
AUDIO PARAMETERS               Inter-region IP-IP Direct Audio: yes
   Codec Set: 1                          IP Audio Hairpinning? y
UDP Port Min: 2048
UDP Port Max: 3028                      RTCP Reporting Enabled? y
                             RTCP MONITOR SERVER PARAMETERS
DIFFSERV/TOS PARAMETERS       Use Default Server Parameters? y
 Call Control PHB Value: 34
        Audio PHB Value: 46
802.1P/Q PARAMETERS
 Call Control 802.1p Priority: 7
        Audio 802.1p Priority: 6      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
```

Navigate to Page 3. The codec set configured for calls between Region 1 and Region 4 will be Codec Set 4, as shown by the bolded row in the following screen. In this example, no Call Admission Control bandwidth limits are configured for inter-region connections.

```
change ip-network-region 1                                    Page   3 of  19
                   Inter Network Region Connection Management
 src dst  codec  direct                                  Dynamic CAC
 rgn rgn   set    WAN    WAN-BW-limits  Intervening-regions    Gateway
 1   1     1
 1   2     2       y           :NoLimit
 1   3     3       y           :NoLimit
 1   4     4       y           :NoLimit
```

Calls among the Avaya IP devices within Region 1 will use G.711MU with 2 Frames Per Packet. This represents the default configuration.

```
 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
```

Calls to and from the Nortel Succession use Codec Set 4 because Signaling Group 7 to the Nortel Succession specifies the "Far-end Network Region" field to be Region 4, and calls between Region 1 and Region 4 are configured to use Codec Set 4. For interoperability for calls requiring the Nortel Succession Media Card, such as calls over the IP Trunk to Nortel digital telephones, the audio codec must be set to G.729B or G.729AB (i.e., not G.729, nor G.729A).

```
change ip-codec-set 4                                          Page   1 of   2
                          IP Codec Set
    Codec Set: 4

    Audio      Silence      Frames   Packet
    Codec      Suppression  Per Pkt  Size(ms)
 1: G.729AB         n         2        20
 2:
 3:
 4:
 5:
 6:
 7:
     Media Encryption
 1: none
```

Although the configuration presented here shows how to achieve G.729AB across the IP Trunk, note that G.711MU was also verified successfully, as shown in Section 7.

Next, a trunk group is established using the command "add trunk-group" for calls to and from the Nortel Succession. Most fields can be left at their defaults. Data has been entered in the fields shown in bold.

```
add trunk-group 7                                          Page   1 of  22
                              TRUNK GROUP
Group Number: 7                  Group Type: isdn          CDR Reports: y
  Group Name: To Succession              COR: 1        TN: 1        TAC: 107
   Direction: two-way        Outgoing Display? n         Carrier Medium: IP
 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
TRUNK PARAMETERS
         Codeset to Send Display: 6     Codeset to Send National IEs: 6
        Max Message Size to Send: 260   Charge Advice: none
  Supplementary Service Protocol: a     Digit Handling (in/out): enbloc/enbloc
            Trunk Hunt: cyclical
                                                  Digital Loss Group: 18
Incoming Calling Number - Delete:     Insert:                 Format: unk-unk
              Bit Rate: 1200         Synchronization: async    Duplex: full
 Disconnect Supervision - In? y  Out? n
 Answer Supervision Timeout: 0
```

Navigate to Page 2. The "Send Calling Number" field can be set to "y" to allow the calling party number to be included in calls from Avaya to Nortel, subject to the usual rules governing the inclusion and content of this information (i.e., not unique to Nortel, and not presented here). Although the "Send Connected Number" field is shown set to "y", the Nortel Succession software tested does not display the connected number on a display-equipped telephone.

```
add trunk-group 7                                            Page   2 of  22
TRUNK FEATURES
          ACA Assignment? n            Measured: none      Wideband Support? n
                                 Internal Alert? n        Maintenance Tests? y
                               Data Restriction? n     NCA-TSC Trunk Member:
                                      Send Name: y      Send Calling Number: y
            Used for DCS? n
   Suppress # Outpulsing? n    Format: private
 Outgoing Channel ID Encoding: preferred     UUI IE Treatment: service-provider

                                                 Replace Restricted Numbers? n
                                                Replace Unavailable Numbers? n
                                                      Send Connected Number: y
                                               Modify Tandem Calling Number? n
             Send UUI IE? y
               Send UCID? n
 Send Codeset 6/7 LAI IE? y
                      SBS? n  Network (Japan) Needs Connect Before Disconnect? n
```

Navigate to Page 6, and add the trunk members, as shown below. The keyword "ip" is entered in the "Port" field, and the signaling group number is entered in the "Sig Grp" field. The number of rows or trunk members added here will determine the number of simultaneous calls allowed on the IP trunk group linking the Avaya S8300 Media Server with the Nortel Succession. After this

form is submitted, Avaya Communication Manager will assign a trunk number as a port identifier (e.g., T00007 and T00008 in this case, as seen in the verification screens in Section 7.)

```
add trunk-group 1                                          Page   6 of  22
TRUNK GROUP
                                    Administered Members (min/max):   0/0
GROUP MEMBER ASSIGNMENTS                Total Administered Members:   0

       Port    Code Sfx Name        Night           Sig Grp
  1: ip                                              7
  2: ip                                              7
    ……….
```

Next, the signaling group is associated with the IP trunk group. Using the command "change signaling-group 7", enter the number 7 in the "Trunk Group for Channel Selection" field.

```
change signaling-group 7                                     Page   1 of   5
                                SIGNALING GROUP
 Group Number: 7              Group Type: h.323
                            Remote Office? n          Max number of NCA TSC: 0
                                      SBS? n           Max number of CA TSC: 0
                                                    Trunk Group for NCA TSC:
       Trunk Group for Channel Selection: 7
          Supplementary Service Protocol: a
                         T303 Timer(sec): 10

        Near-end Node Name: procr            Far-end Node Name: succ-node-ip
      Near-end Listen Port: 1720           Far-end Listen Port: 1720
                                      Far-end Network Region: 4
              LRQ Required? n            Calls Share IP Signaling Connection? n
              RRQ Required? n                  H245 Control Addr On FACility? n
          Media Encryption? n                Bypass If IP Threshold Exceeded? n

              DTMF over IP: out-of-band       Direct IP-IP Audio Connections? n
                                                        IP Audio Hairpinning? n
                                               Interworking Message: PROGress
```

Traditional Avaya UDP call routing is established such that dialed number 535xx is routed to a route pattern containing Trunk Group 7, passing the dialed 535xx digits to the Nortel Succession.

The command "**save translation**" must be entered to save the configuration.

5. Nortel Succession Configuration

This section illustrates the relevant Nortel configuration used to verify these Application Notes. Please consult the Nortel Networks product documentation referenced in Section 9 for additional information. The documents "IP Peer Networking" [1] and "Signaling Server: Installation and Configuration" [2] are especially relevant to these Application Notes.

IP Peer Networking can use an H.323 Gatekeeper to manage a numbering plan for the network. For the simple network depicted in **Figure 1**, the numbering plan associated with the Avaya devices has the form 43xxx. The Succession Call Server can be configured to steer calls of the form 43xxx to an IP Virtual Trunk using the Coordinated Dial Plan (CDP) feature. The

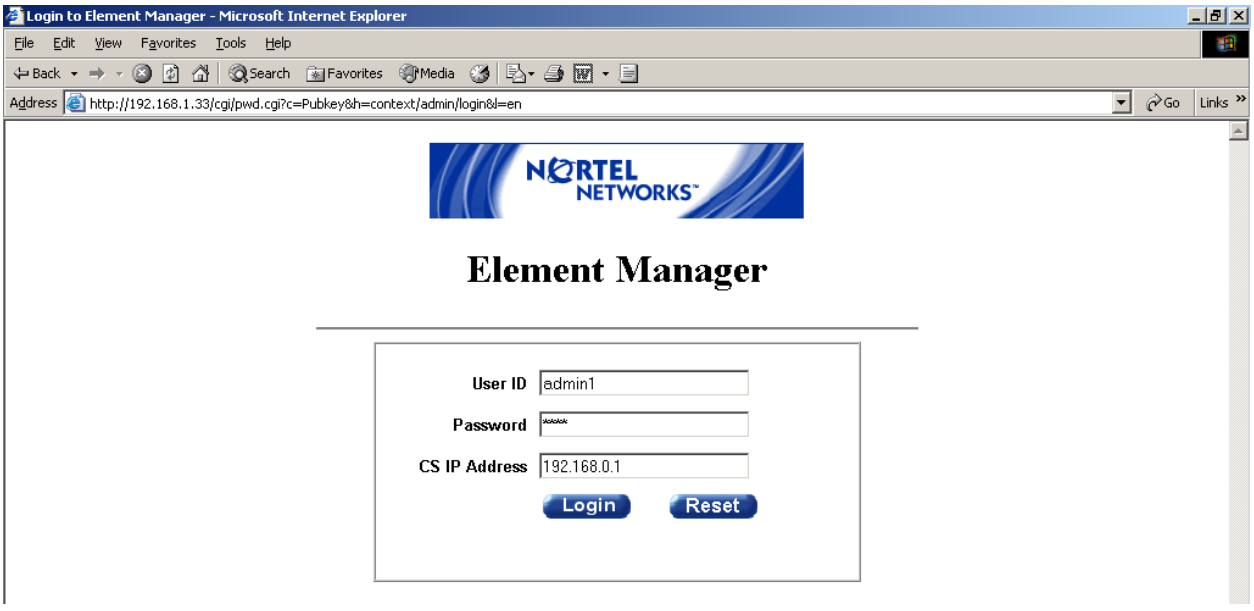
Succession Gatekeeper, co-resident on the Succession Signaling Server in this configuration, can similarly be configured to direct dialed digits of the form 43xxx to the Avaya S8300 Media Server. In these Application Notes, the Avaya S8300 Media Server is configured as a "non-RAS endpoint" in the Nortel Succession Gatekeeper. An alternative would be to configure Avaya Communication Manager as a zone gatekeeper, and the configuration differences for this alternative are briefly summarized in Section 5.12.

The Succession Signaling Server provides the H.323 Gateway function for "Virtual Trunks" that correspond logically to the Avaya H.323 IP trunk configuration described in Section 4.2. The Succession Signaling Server also provides the "Terminal Proxy Server" (TPS) function for the Nortel IP Telephones associated with the Succession. Finally, the Signaling Server includes a web interface called "Element Manager" for managing the configuration of the Signaling Server and Gatekeeper.

The configuration steps below follow the order specified by the procedures in Reference [1]. Configuration will be performed using the "Element Manager", accessed via a web browser.

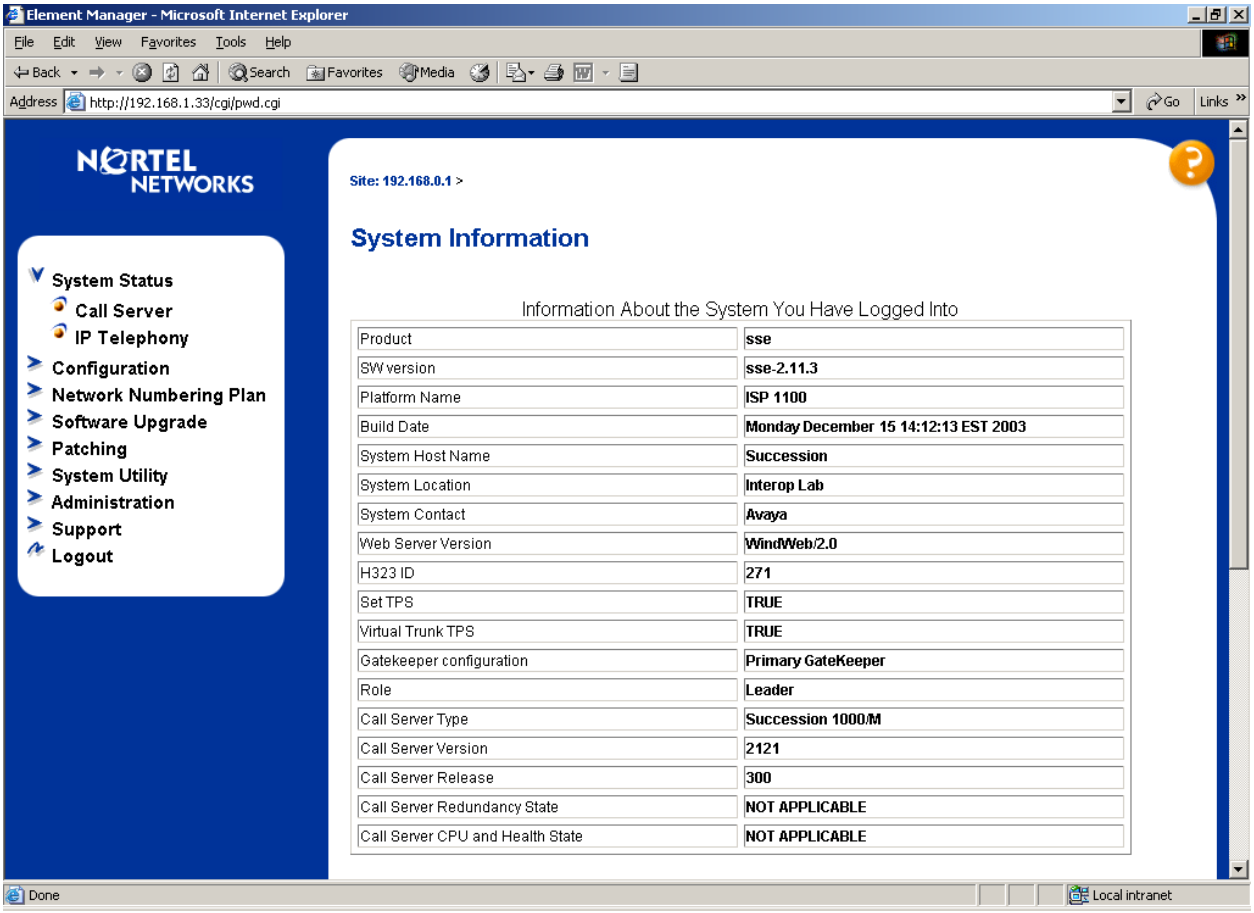
5.1. Launch Element Manager and Log in

In the configuration depicted in **Figure 1**, the Nortel Node IP address is 192.168.1.33. A web browser can connect to http://192.168.1.33 as shown below. The "CS IP Address" (in this case, 192.168.0.1) is the private ELAN IP Address of the Succession Call Server, and should be automatically populated from prior basic system configuration. Click the **Login** button.



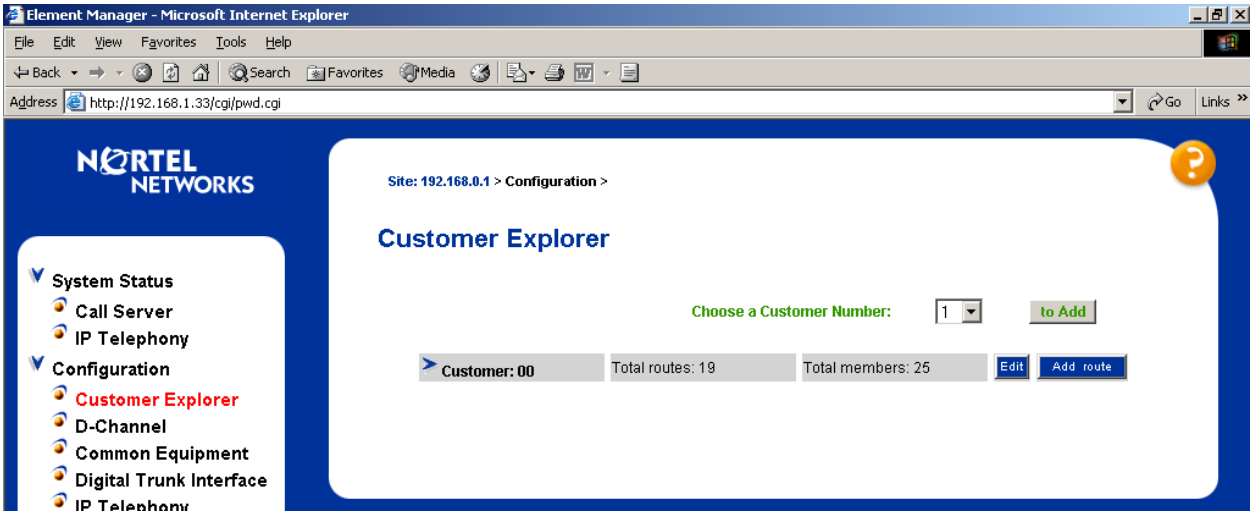
.

The System Information page is displayed as shown below. Note that this Succession Signaling Server is the “Primary Gatekeeper” and has the role of “Leader”. The left side of this screen will be referred to as the Navigation Tree.

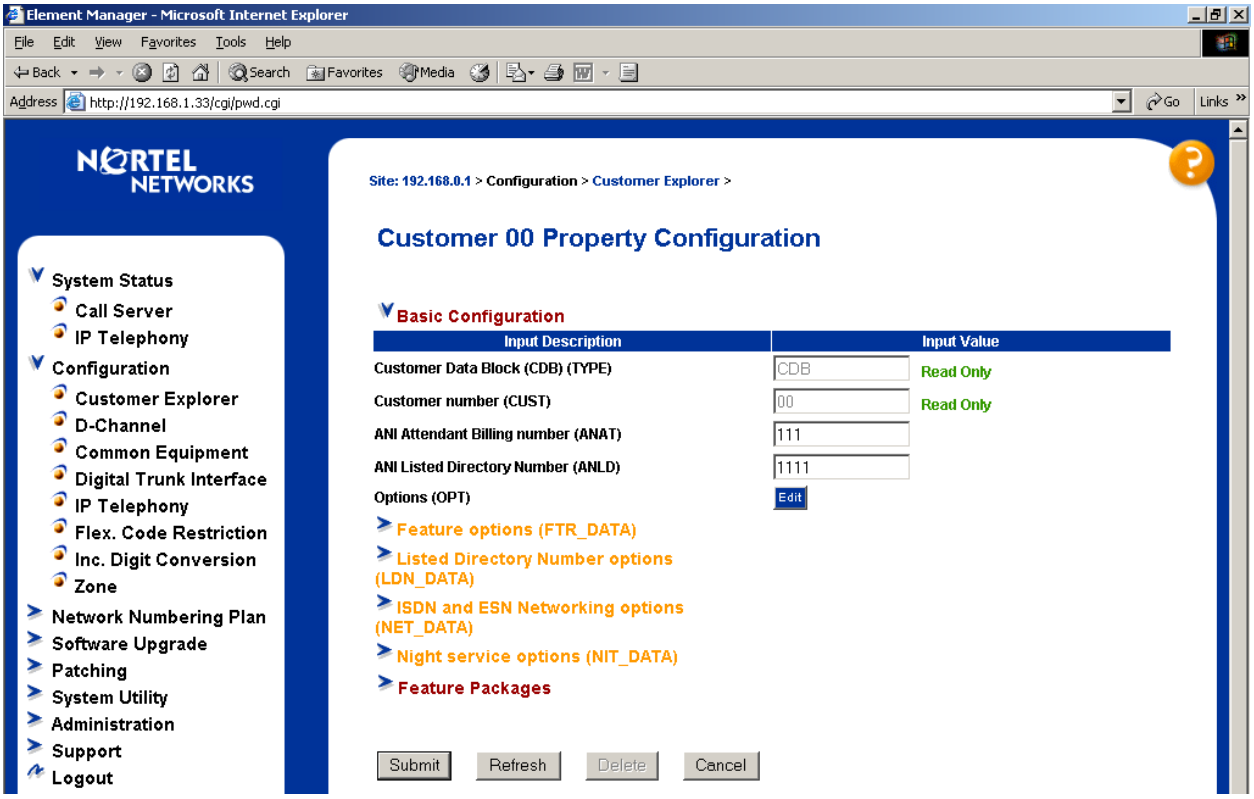


5.2. Configure the Customer Data Block

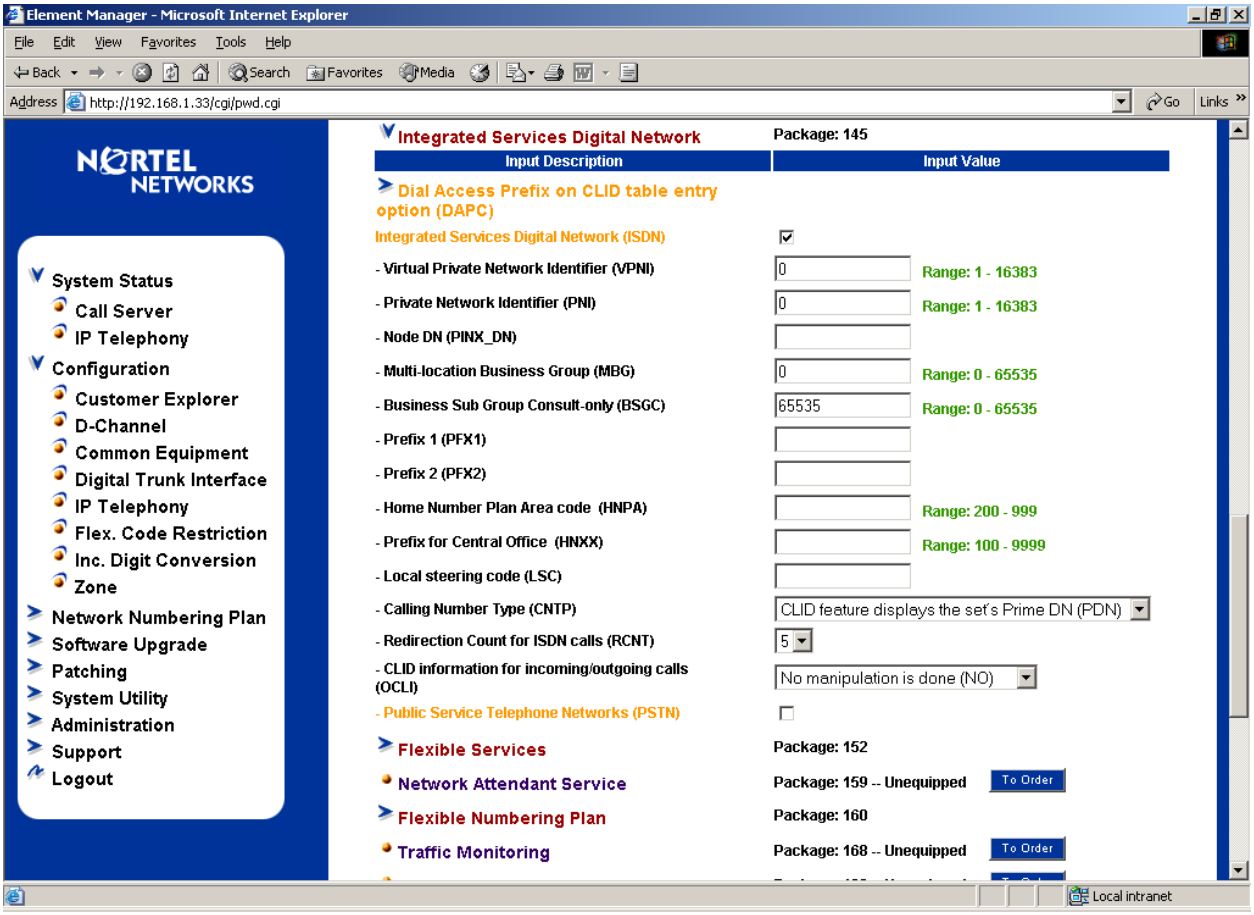
Select **Configuration → Customer Explorer** from the Navigation Tree.



Click the **Edit** button associated with the customer.



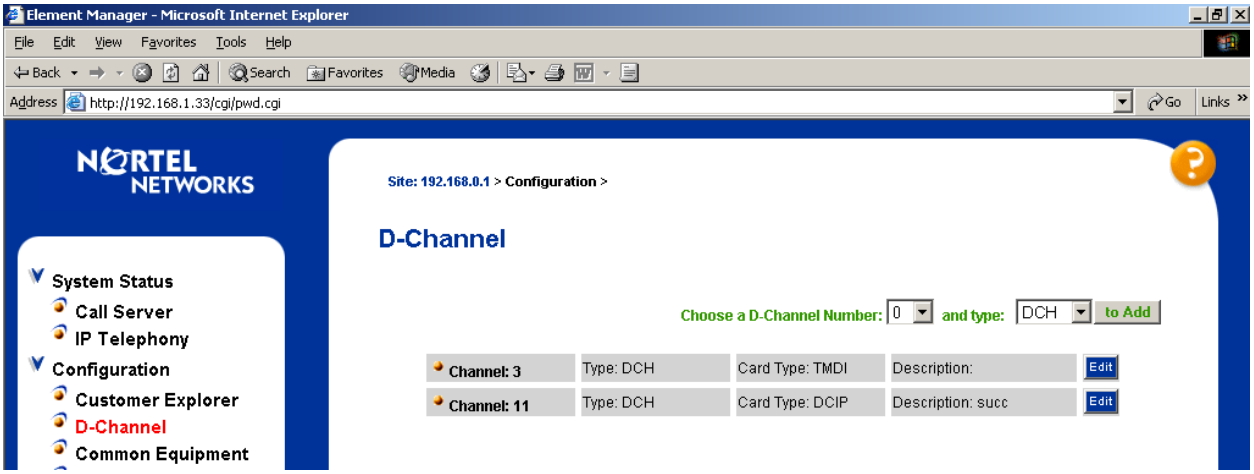
Click **Feature Packages**. Scroll down the resulting screen and select **Integrated Services Digital Network Package: 145**. Check the **Integrated Services Digital Network (ISDN)** checkbox, as shown below.



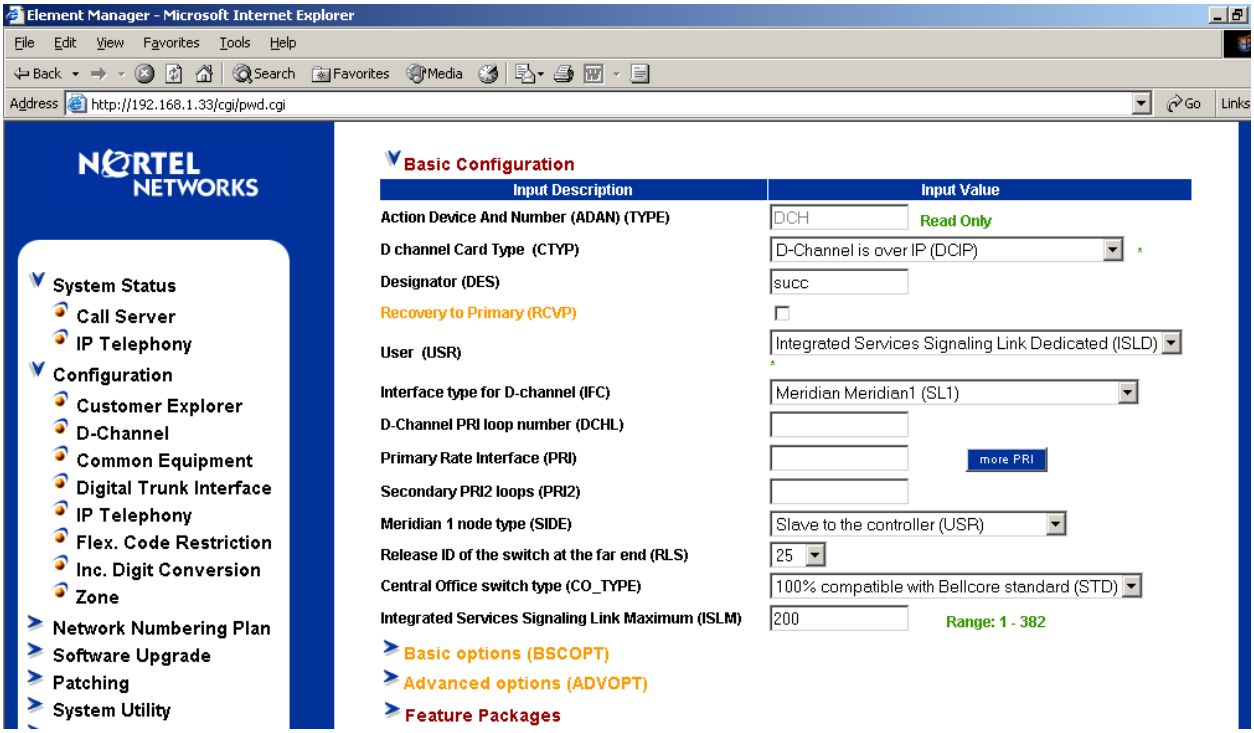
Scroll to the bottom of the page and click the Submit button.

5.3. Configure the D-Channel

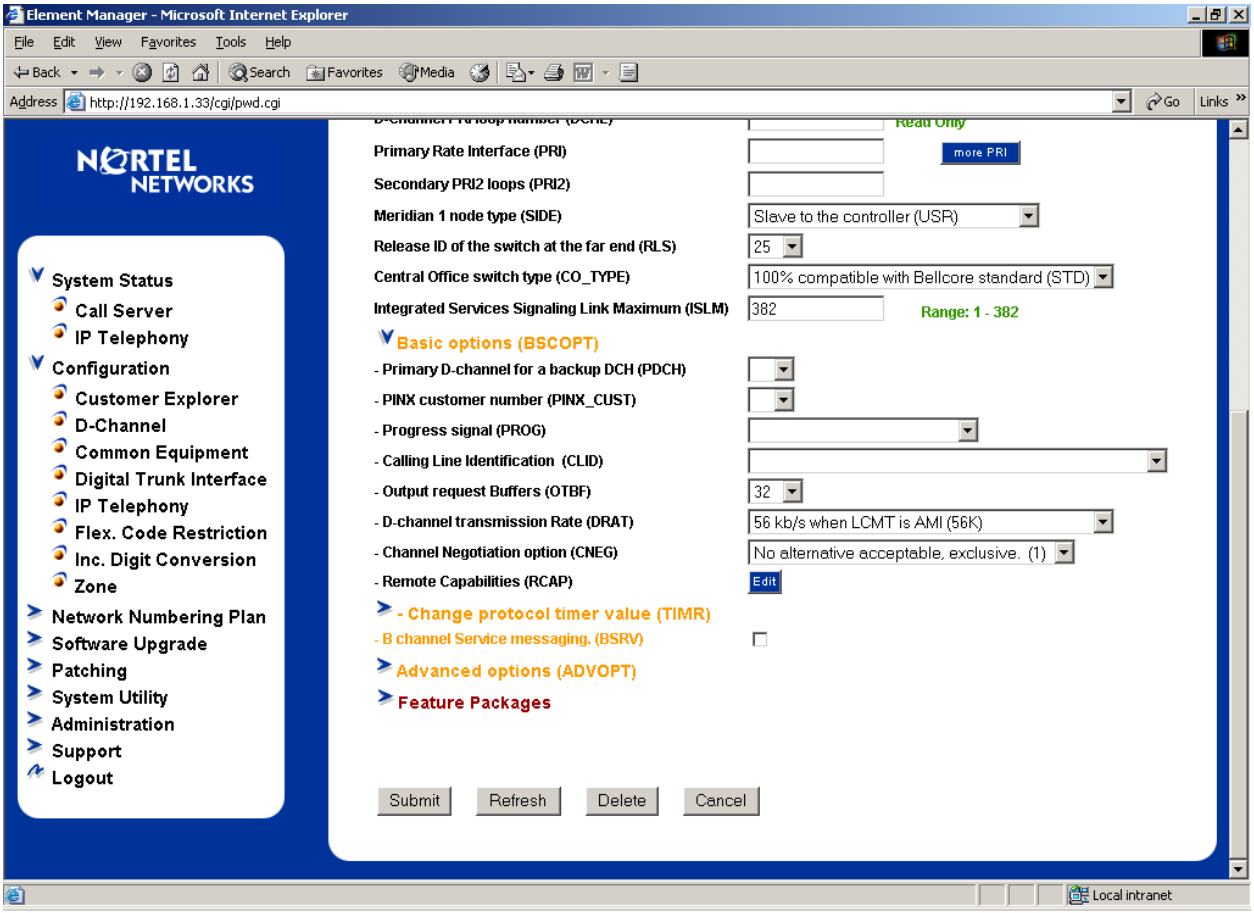
Select **Configuration → D-Channel** from the Navigation Tree. The resulting screen will depend on whether any D-Channels have been previously configured. In the screen capture below, D-Channels 3 and 11 have been previously configured. D-Channel 11 is associated with the IP trunk to the Avaya system. The text below is written as if the D-Channel had not been previously configured.



In the **Choose a D-Channel Number** drop-down, select an unused D-Channel number and click the **to Add** button.



With reference to the prior screen, from the **D-channel Card Type (CTYP)** drop-down field, select **D-Channel is over IP (DCIP).** From the **User (USR)** drop-down, select **Integrated Services Signaling Link Dedicated (ISLD).** From the **Interface type for D-channel (IFC)** drop-down, select **Meridian Meridian1 (SL1).** Optionally, to set the "Remote Capabilities", click on **Basic options (BSCOPT)** followed by the **Edit** button next to **Remote Capabilities (RCAP).**

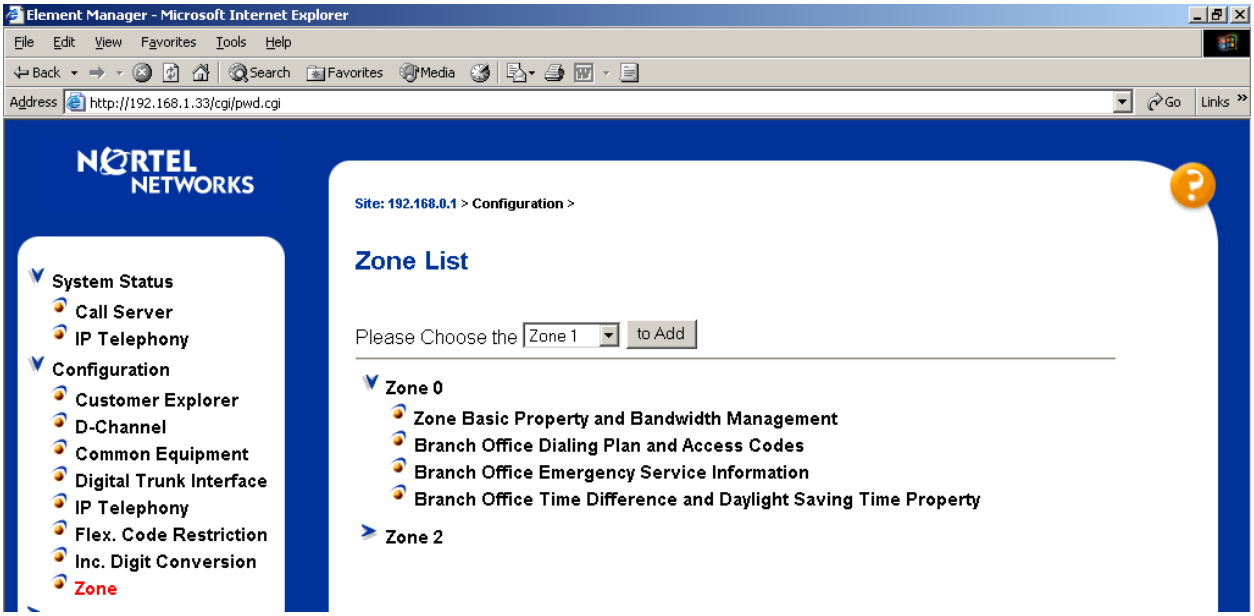


A screen allowing parameters such as Network Name Display method is displayed**.** Scroll down and check the box for **Network name Display method 2 (ND2)** (not pictured). Click the **Return – Remote Capabilities** button at the bottom of the page, followed by the **Submit** button to save the changes.

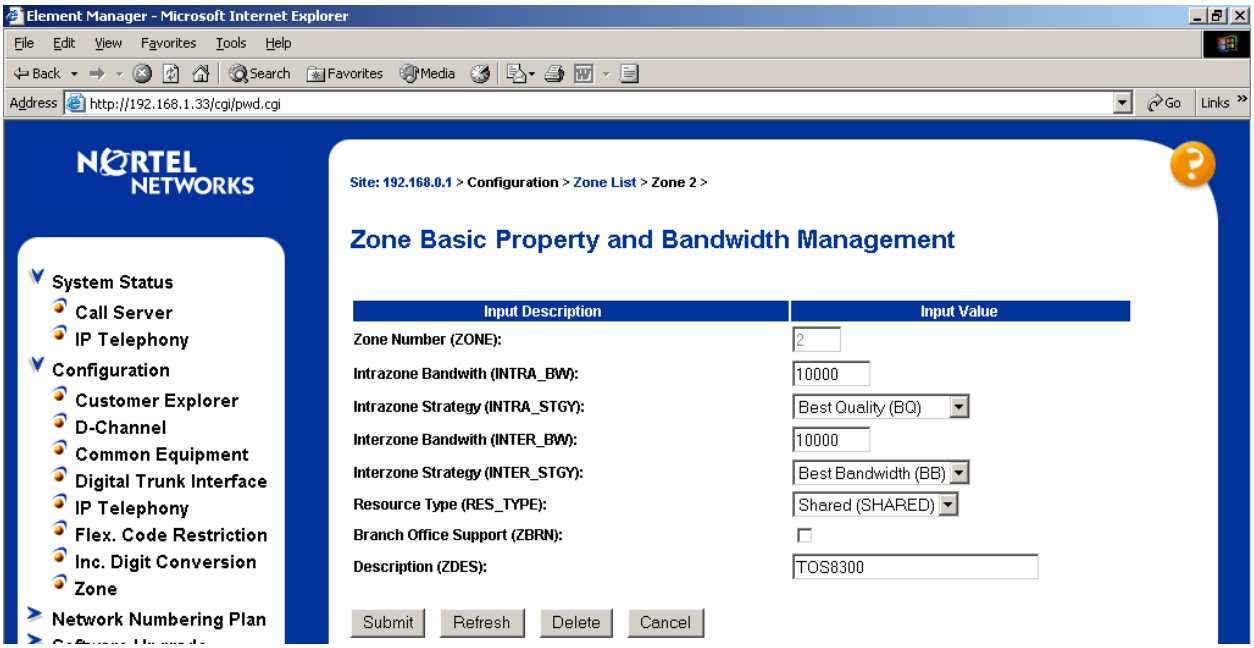
5.4. Configure Zones

Zones can be used for bandwidth management. In this respect, the zone concept is similar to the Avaya Communication Manager "network region" (see Section 4.2). A zone must be configured prior to the virtual route.

Select **Configuration → Zone** from the Navigation Tree.



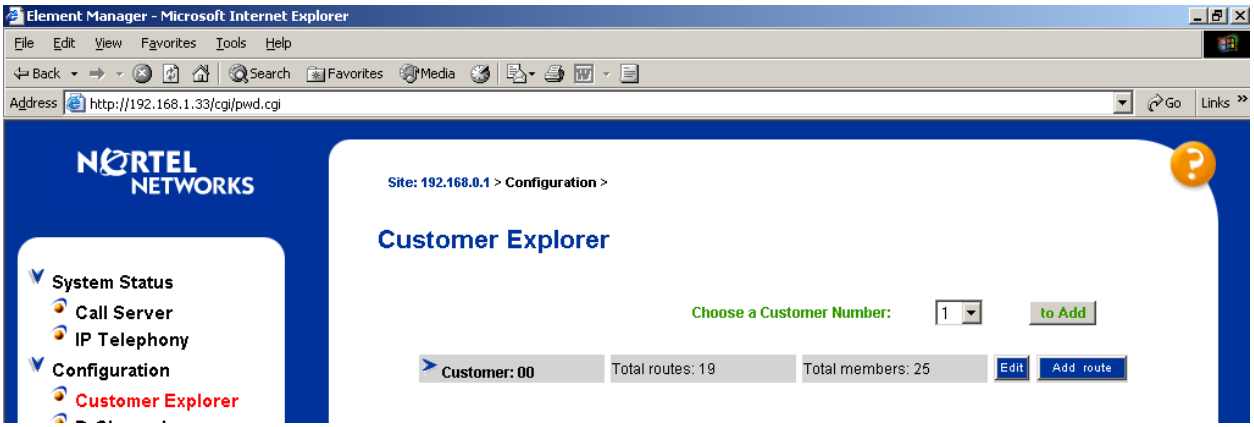
Choose an unused zone number from the drop-down, and click **to Add,** or select one of the previously defined zones to expand the menu, as shown above for Zone 0. Zone 2 will be associated with the IP route to the Avaya S8300 Media Server.



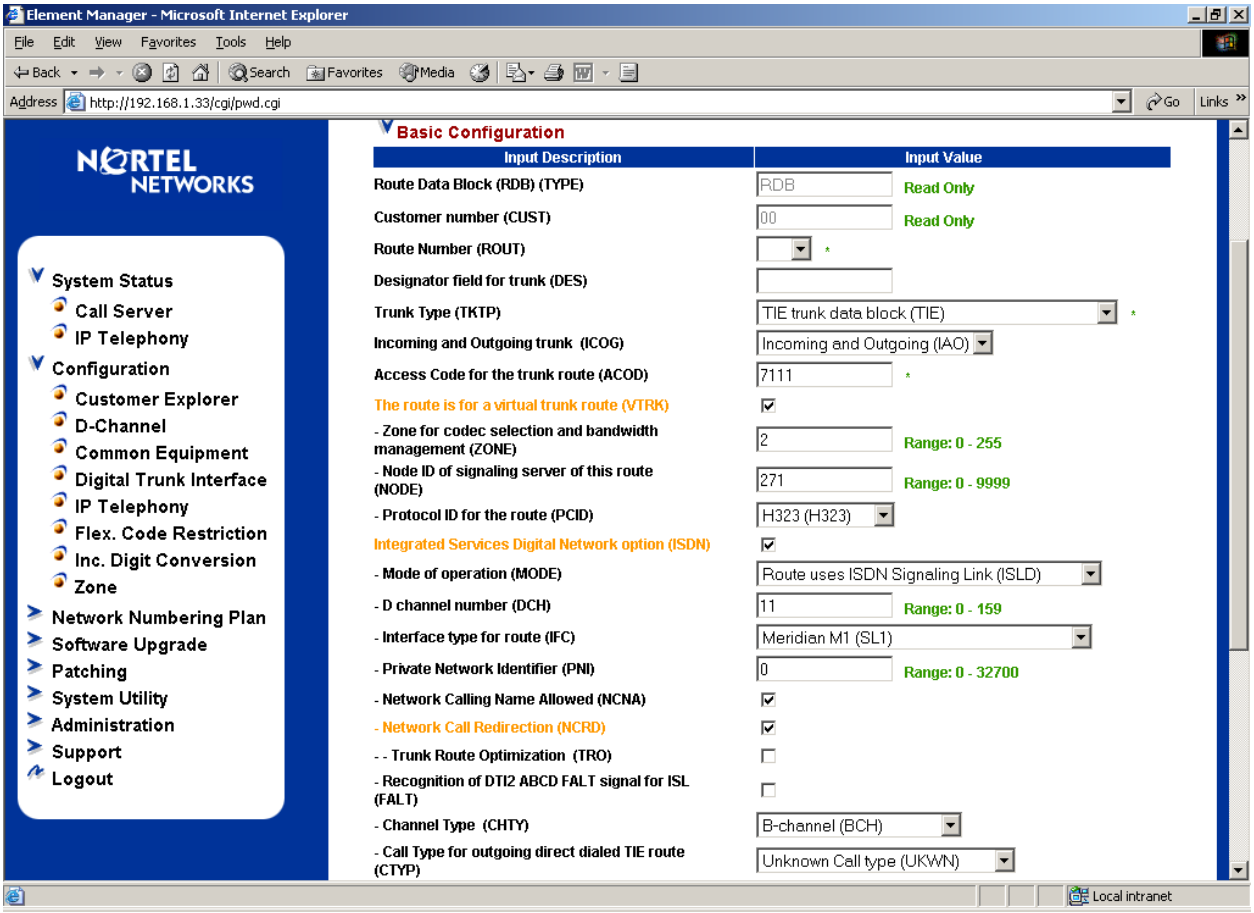
From the **Zone Basic Property and Bandwidth Management** page, observe the options. The **Intrazone Strategy** has been left at the default value of **Best Quality (BQ).** From the **Interzone Strategy** drop-down, the value **Best Bandwidth (BB)** has been selected. This approach is similar to the Avaya configuration in Section 4.2. All other parameters are shown with their default values. Enter text in the **Description** field if desired, and click the **Submit** button.

5.5. Configure Virtual Route

Select **Configuration → Customer Explorer** from the Navigation Tree.



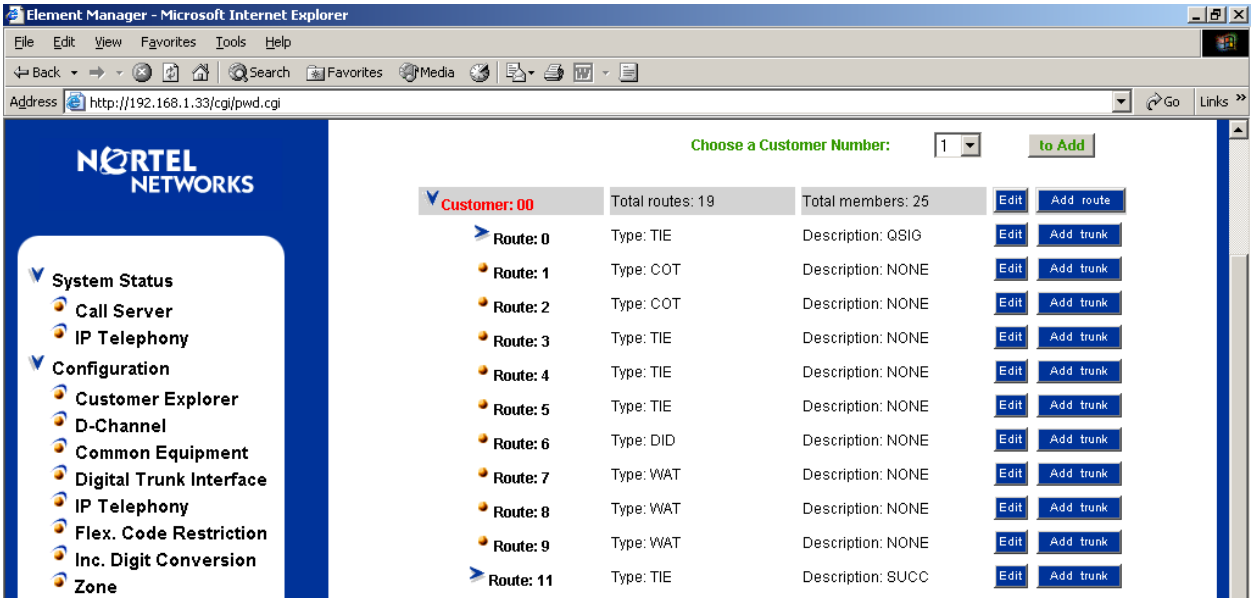
Click the **Add route** button associated with the customer.



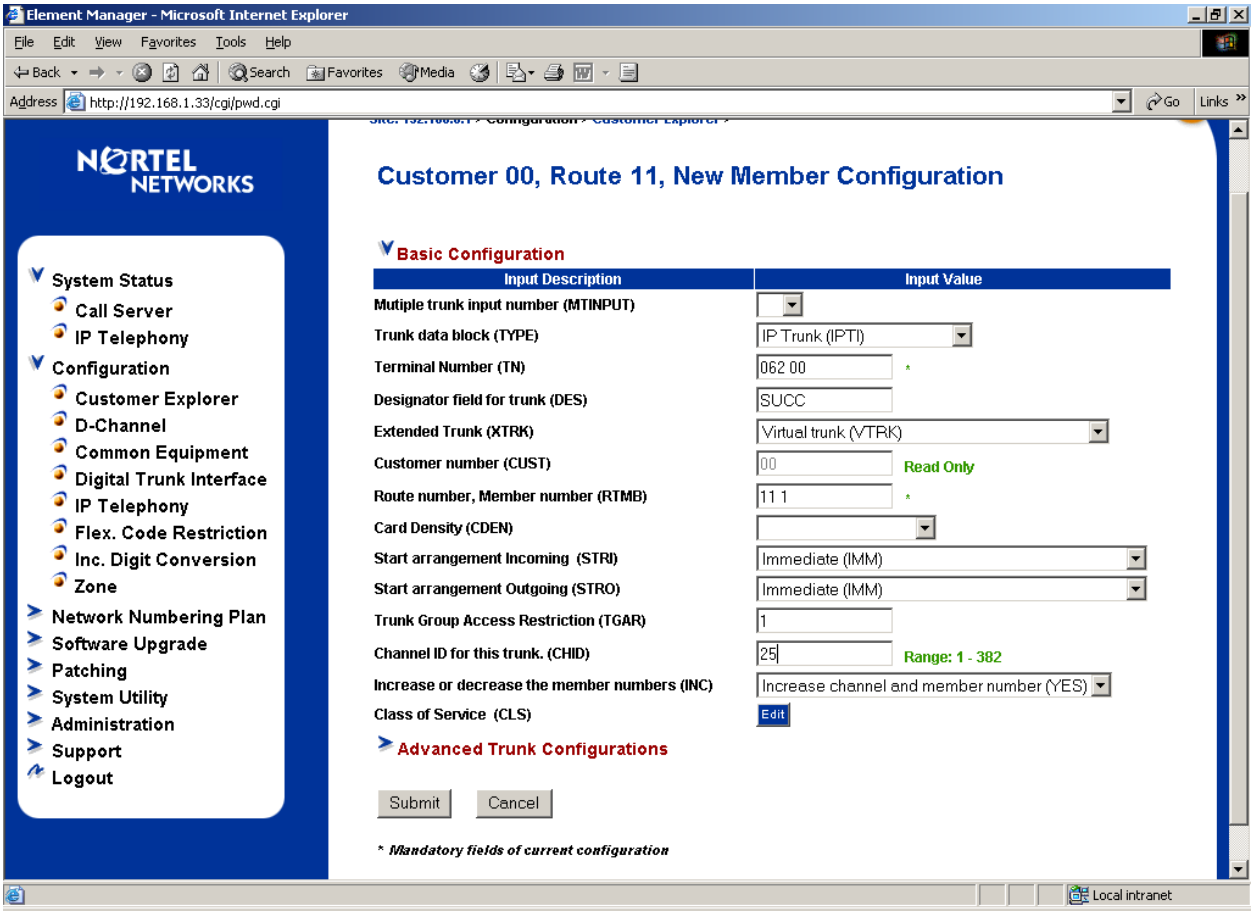
Under **Basic Configuration** in the prior screen, select a **Route Number** from the drop-down. In these Application Notes, Route Number 11 is associated with the IP virtual route to the Avaya S8300 Media Server. From the **Trunk Type** drop-down, select **TIE Trunk Data Block (TIE)**. Once "TIE" is selected, additional options appear. Check the box **The route is for a virtual trunk route (VTRK).** Enter a zone number (e.g., 2) in the **Zone for codec selection and bandwidth management (ZONE)** field. Enter the node id (e.g., 271) in the **Node ID of signaling server for this route (NODE)** field. Confirm the auto-filled **Protocol ID for the route (PCID)** is set to **H323 (H323)**. Check the boxes for **Integrated Services Digital Network (ISDN), Network Calling Name Allowed (NCNA), and Network Call Redirection (NCRD)**. In the **Mode of operation (MODE)** drop-down, select **Route uses ISDN Signaling Link (ISLD)**. Enter the D-channel number configured previously (e.g., 11). Scroll to the top of the page and enter an **Access code for the trunk route (ACOD).** Other options can be set according to customer considerations, or left at their default settings. When finished, click the **Submit** button.

5.6. Configure Virtual Trunks

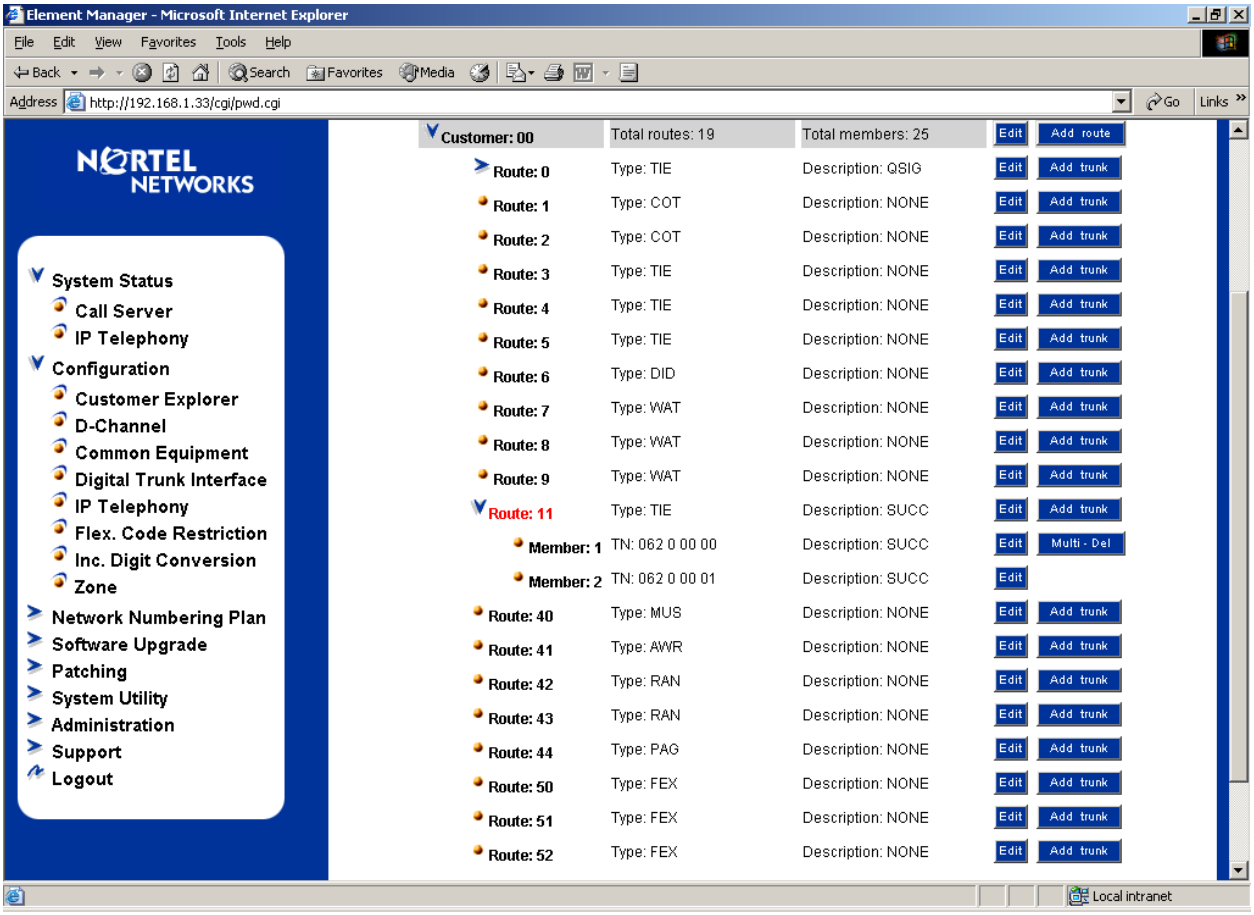
Select **Configuration → Customer Explorer** from the Navigation Tree. Select the customer to expand the list of routes. Click the **Add Trunk** button beside the desired route (e.g., Route 11).



In the **Trunk data block (TYPE)** drop-down, select **IP Trunk (IPT1).** In the **Terminal Number (TN)** field, enter an unused TN (e.g., **062 00**). Consult [1] for a discussion of TN numbers and virtual loops for IP terminals and trunks. In the **Extended Trunk (XTRK)** drop-down, select **Virtual trunk (VTRK).** In the **Route Number, Member number (RTMB)** field, enter the configured route from Section 5.5 followed by a space and the configured trunk member (e.g., **11 1**). Fill the remaining fields according to customer preference. Repeat this procedure for each trunk member. Alternatively, to add multiple trunk members in a single operation, use the **Multiple trunk input number (MTINPUT)** drop-down. When finished, click the **Submit** button.



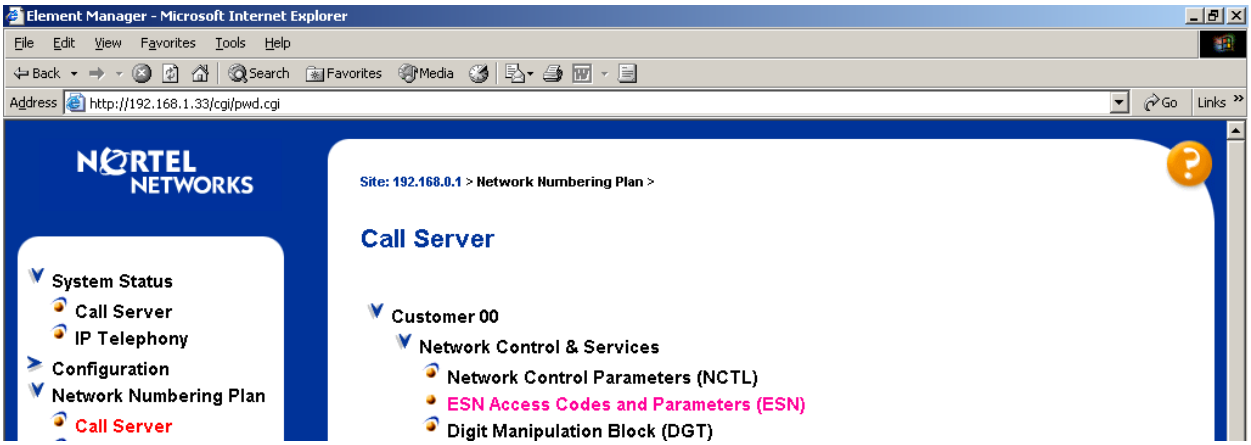
The following Customer Explorer screen shows the results after two virtual trunk members have been added to Route 11. Configure the same number of virtual trunk members in Succession as have been configured as trunk members in the corresponding Avaya Communication Manager trunk group (i.e., Trunk Group 7 in Section 4.2).



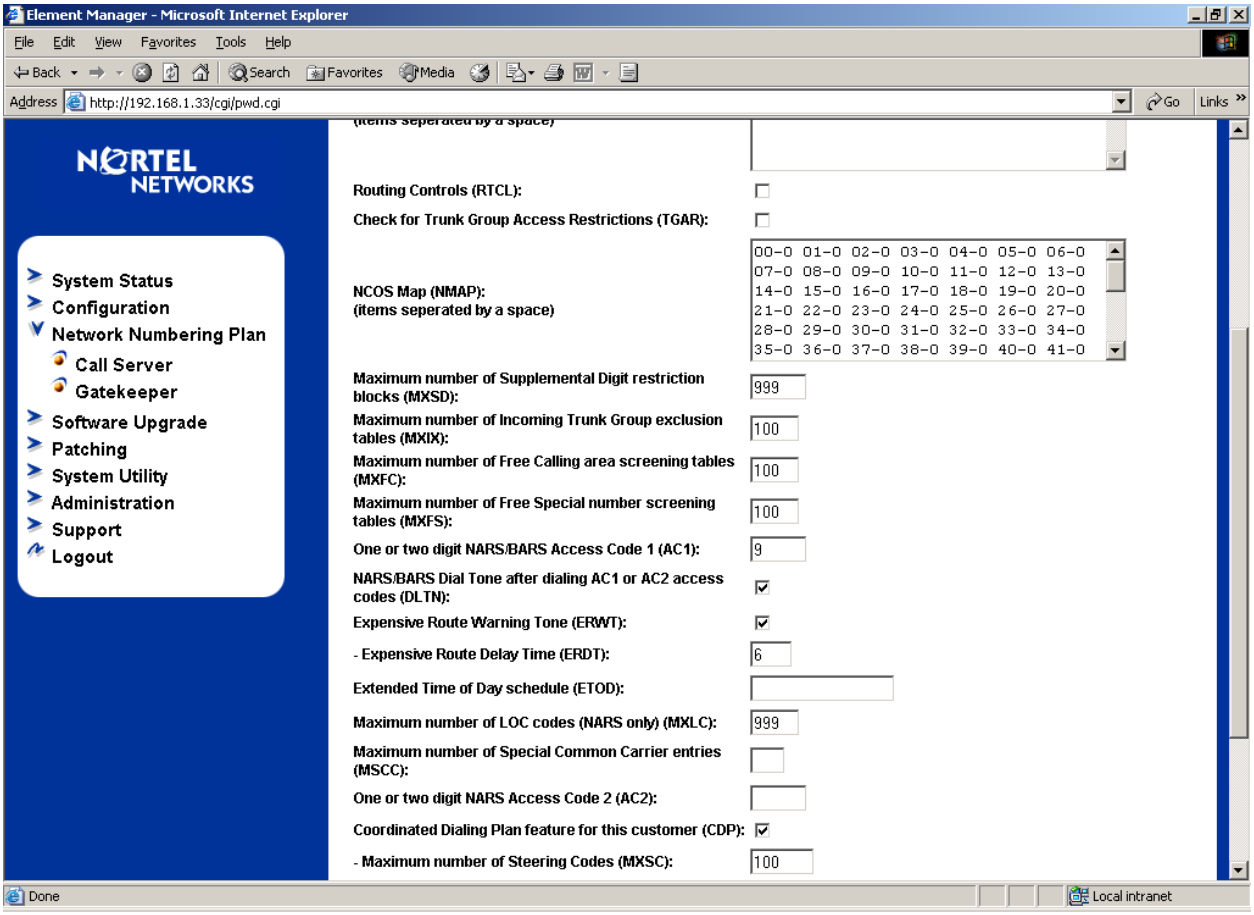
5.7. Enable Desired Networking Options for the Call Server

These Application Notes use the Coordinated Dial Plan (CDP) feature to steer calls from the Nortel Succession to the IP Trunk to Avaya Communication Manager. The Nortel CDP feature together with the Avaya Communication Manager Uniform Dial Plan (UDP) feature enable Nortel and Avaya telephone users to dial 5-digit extensions to reach one another. Of course, other numbering plan options are also possible.

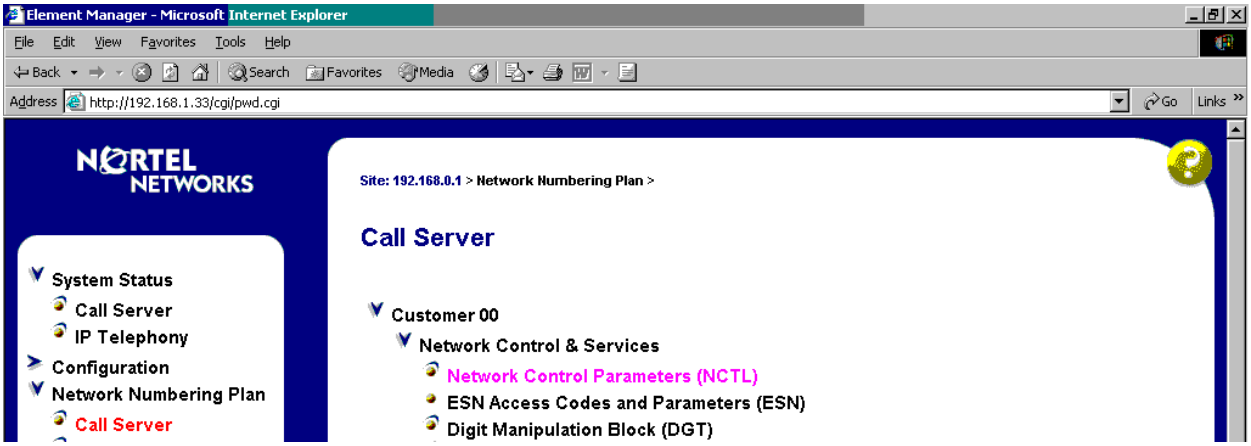
To ensure that CDP is enabled, select **Network Numbering Plan → Call Server** from the Navigation Tree. Select **ESN Access Codes and Parameters (ESN).**



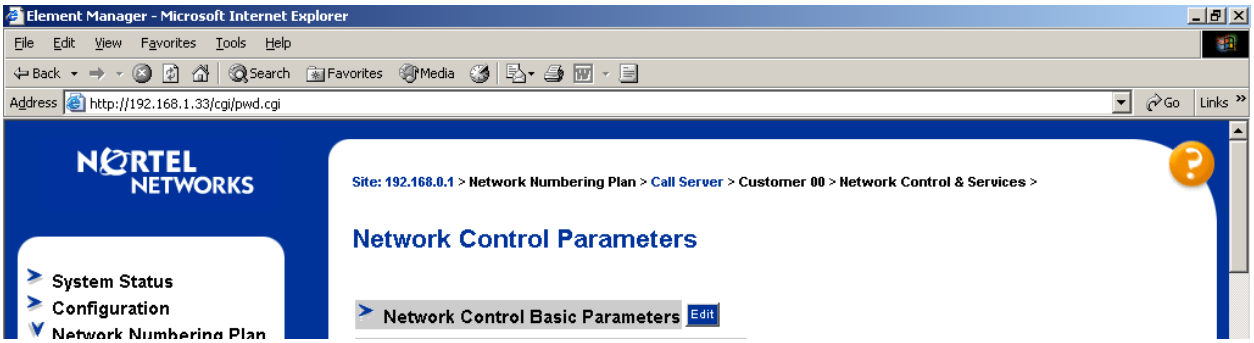
Scroll down to the bottom of the resulting screen and check **Coordinated Dial Plan Feature for this customer (CDP)**. Scroll to the bottom of the page and click **Submit**.



The default parameters for Network Control must be turned on. From the Navigation Tree, select **Network Numbering Plan → Call Server**. Select **Network Control Parameters (NCTL).**



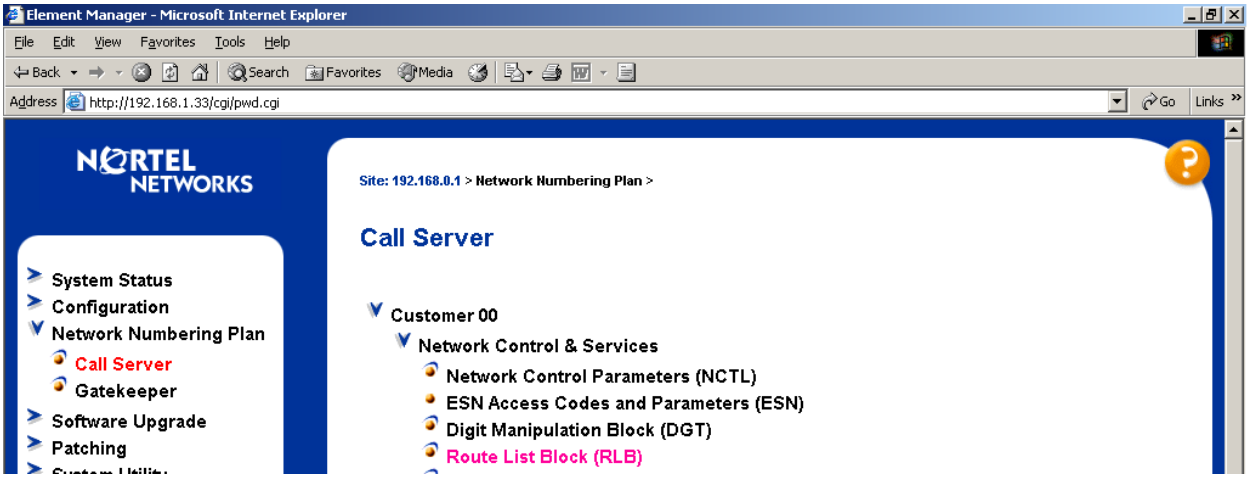
Select the **Edit** button next to **Network Control Basic Parameters**.



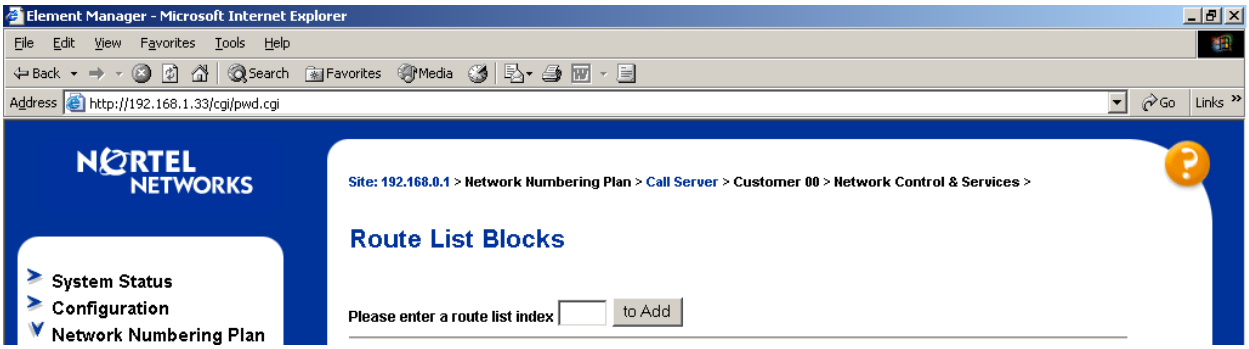
On the resulting page, click the **Submit** button to accept the default parameters.

5.8. Configure Route List Block

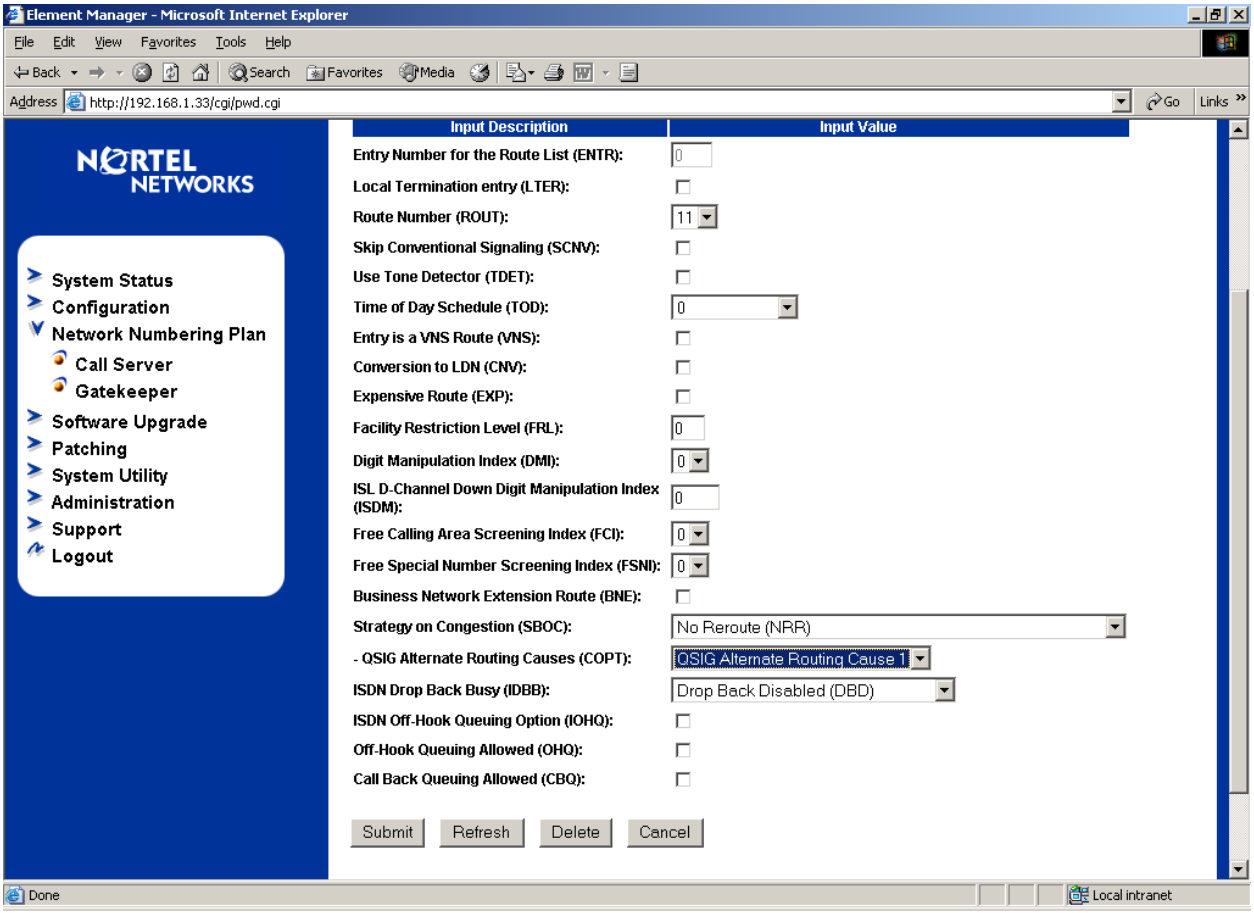
Configure the Route List Block that will be used to route calls over the virtual trunk route. From the Navigation Tree, select **Network Numbering Plan → Call Server**. Next, select **Route List Block.**



In the resulting **Route List Blocks** page, enter an unused route list block index in the text box and click the **to Add** button. Route List Block Index 11 will be associated with the IP trunk to the Avaya S8300 Media Server.

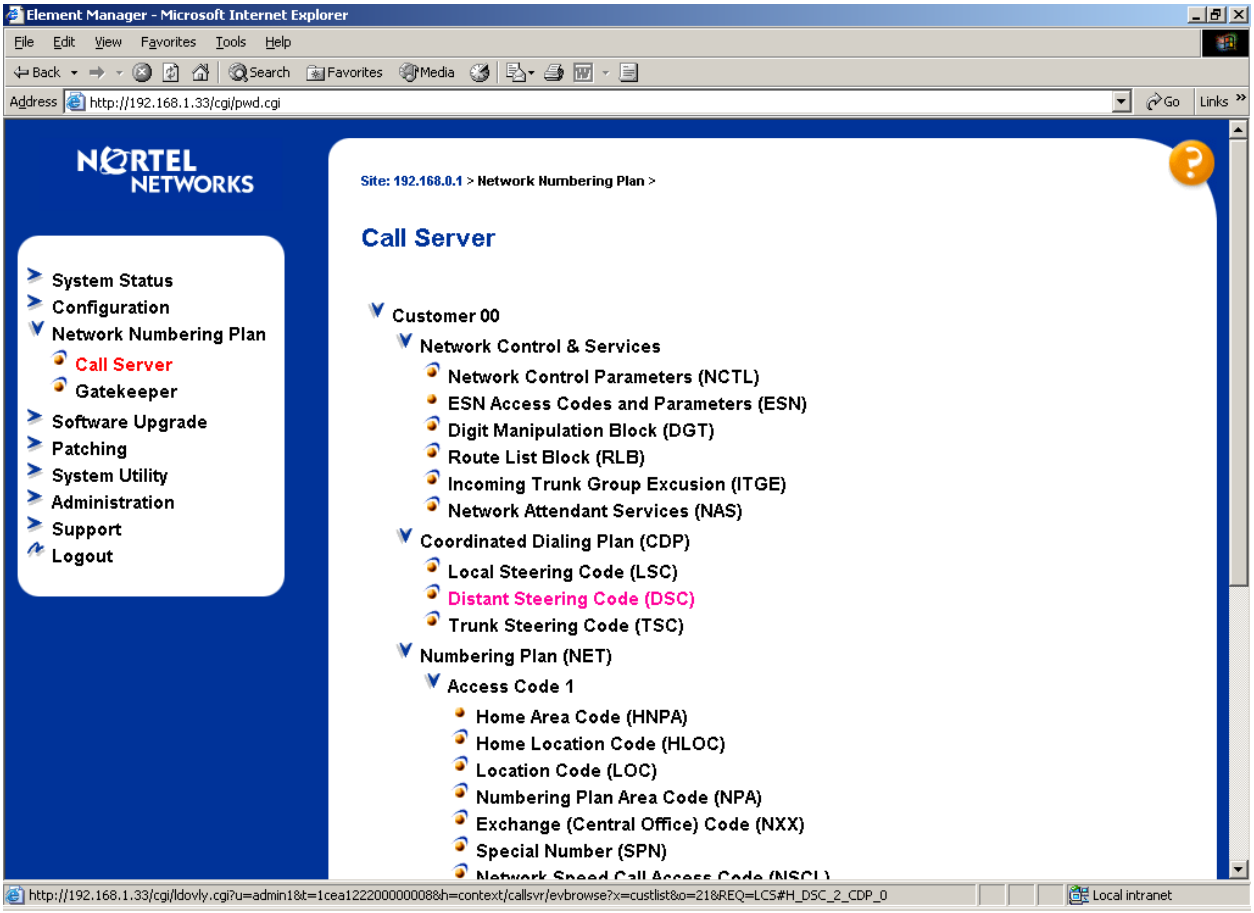


In the **Route Number (ROUT)** drop-down, select the appropriate route (e.g., **11**). Other parameters can be set according to customer preference or left at their default values. Click the **Submit** button.

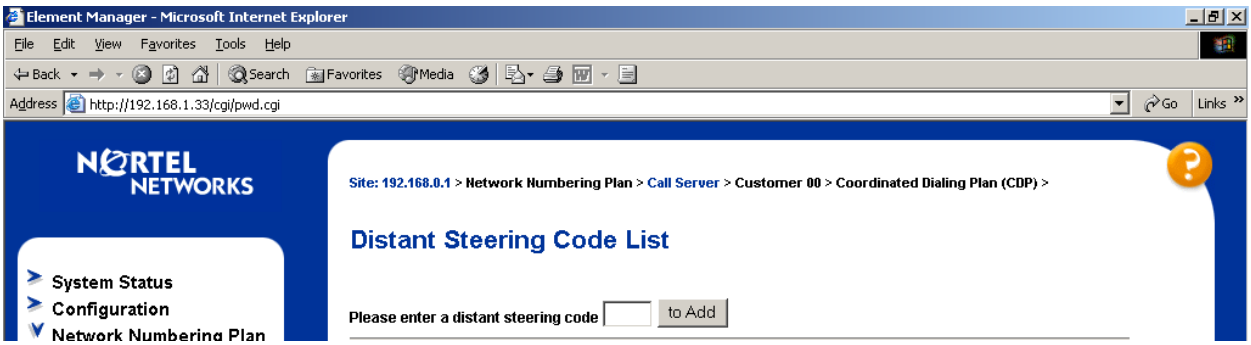


5.9. Configure Steering Codes

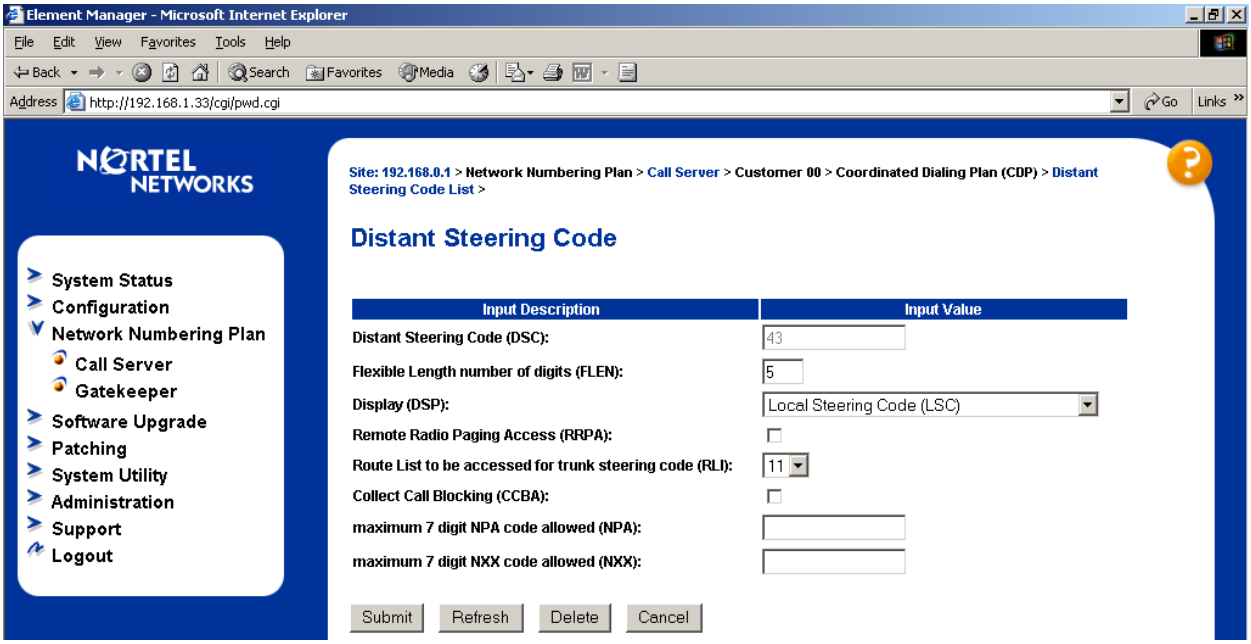
From the Navigation Tree, select **Network Numbering Plan → Call Server**. Under the Coordinated Dialing Plan heading, select **Distant Steering Code (DSC).**



Enter the leading digits of a CDP number (e.g., 43) in the **Please enter a distant steering code** text box, and click the **to Add** button.

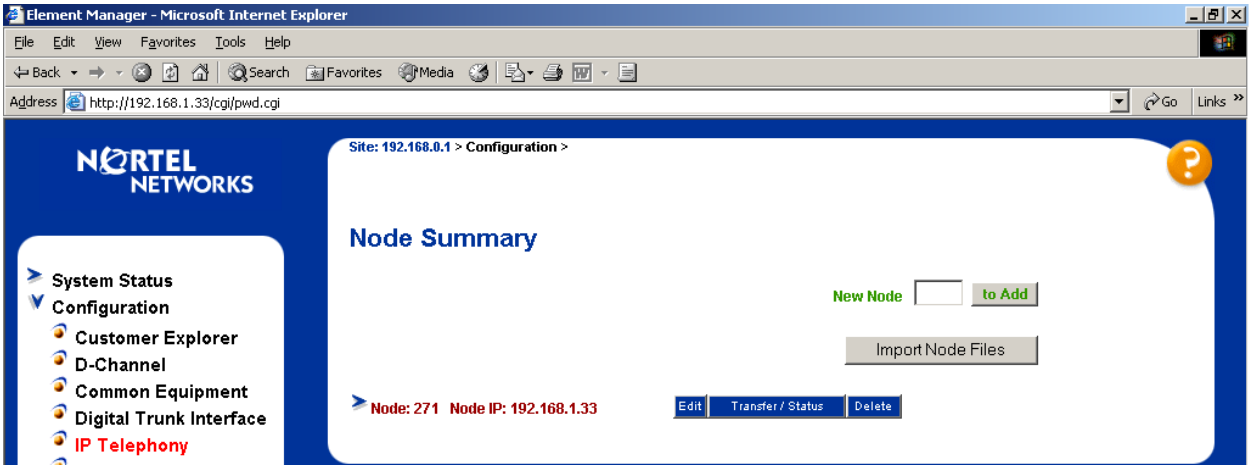


In the **Flexible Length number of digits (FLEN)** text box, enter the number of digits used in the CDP. In these Application Notes, a 5-digit dialing plan is illustrated. In the **Route List to be accessed for trunk steering code (RLI)** drop-down, select the appropriate route (e.g., **11**). Click the **Submit** button.

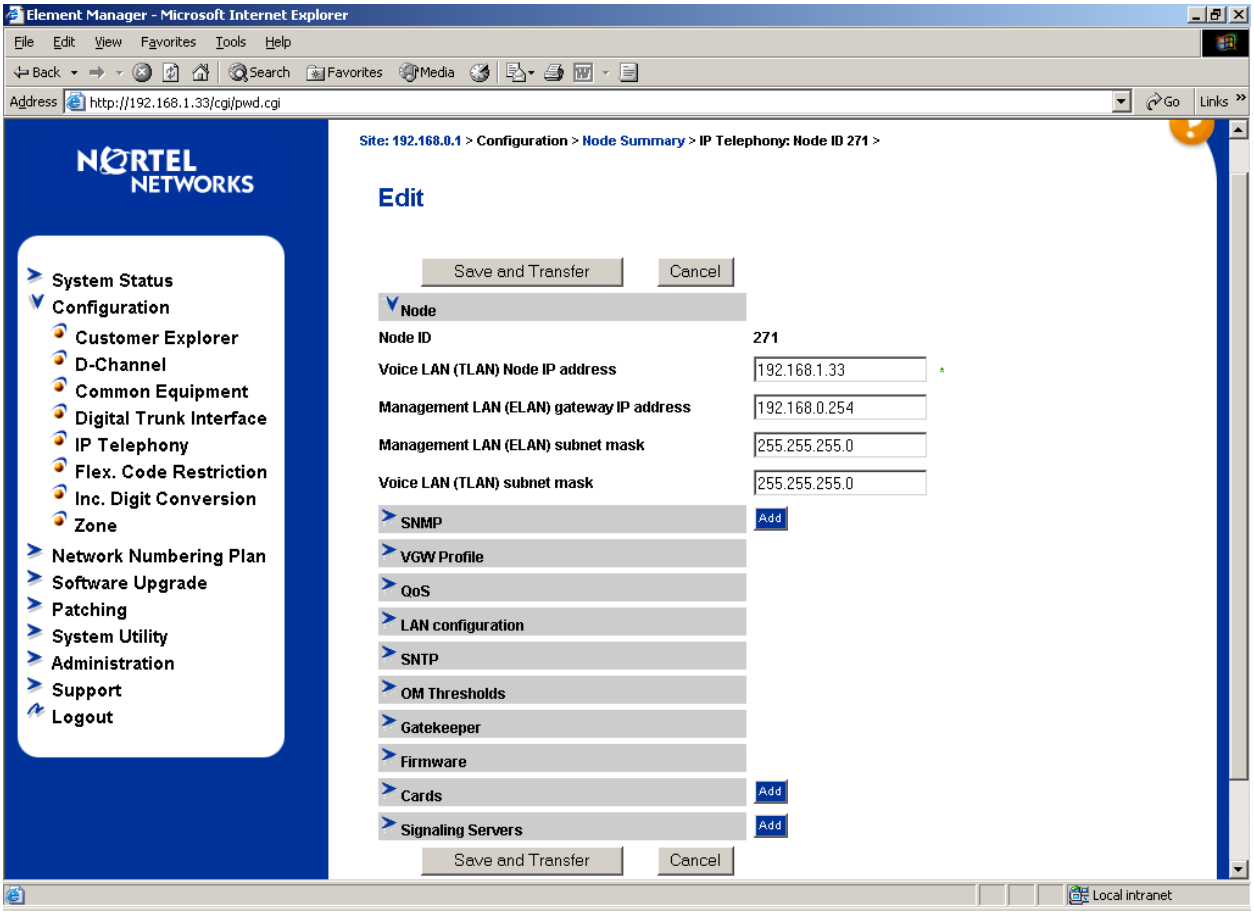


5.10. Configure Codecs

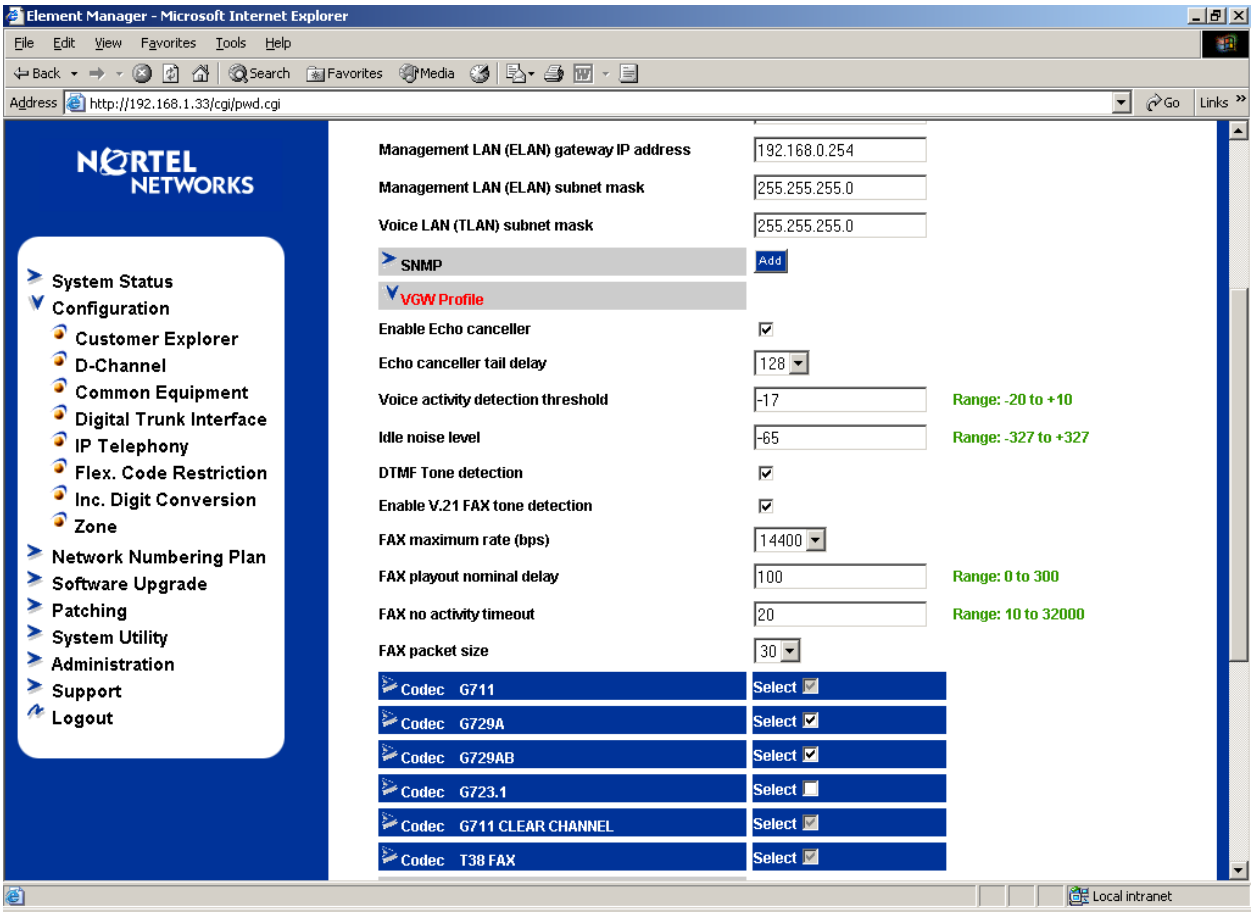
From the Navigation Tree, select **Configuration → IP Telephony**.



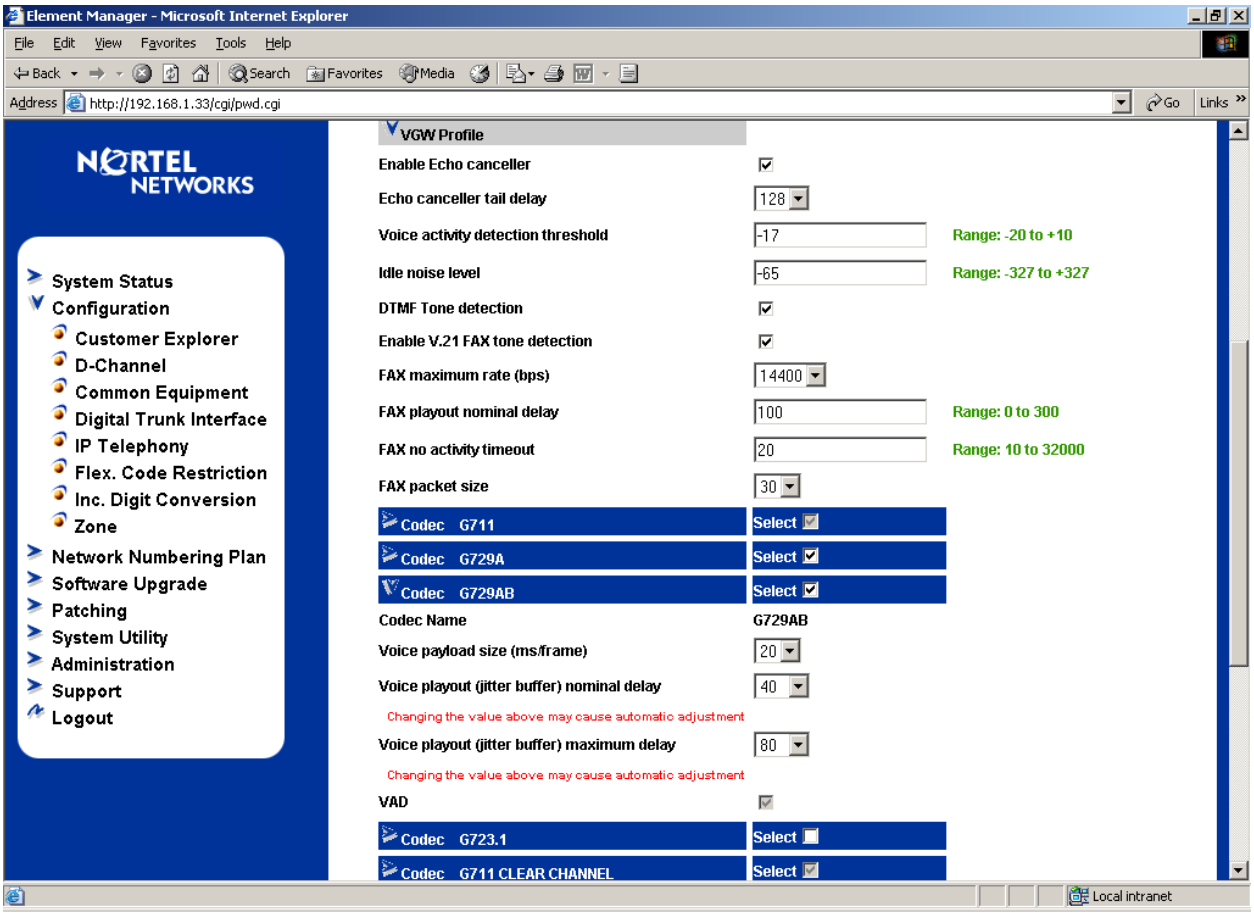
Click the **Edit** button. The Edit page displays, illustrating the basic configuration of the node.



Click **VGW Profile**. Select the check boxes for the desired codecs. In these Application Notes, G729AB is illustrated for calls between Avaya and Nortel users.



Click on each codec if additional special configuration of the codec is desired. The following screen shows the expanded view for G729AB, although all values are left at their defaults.



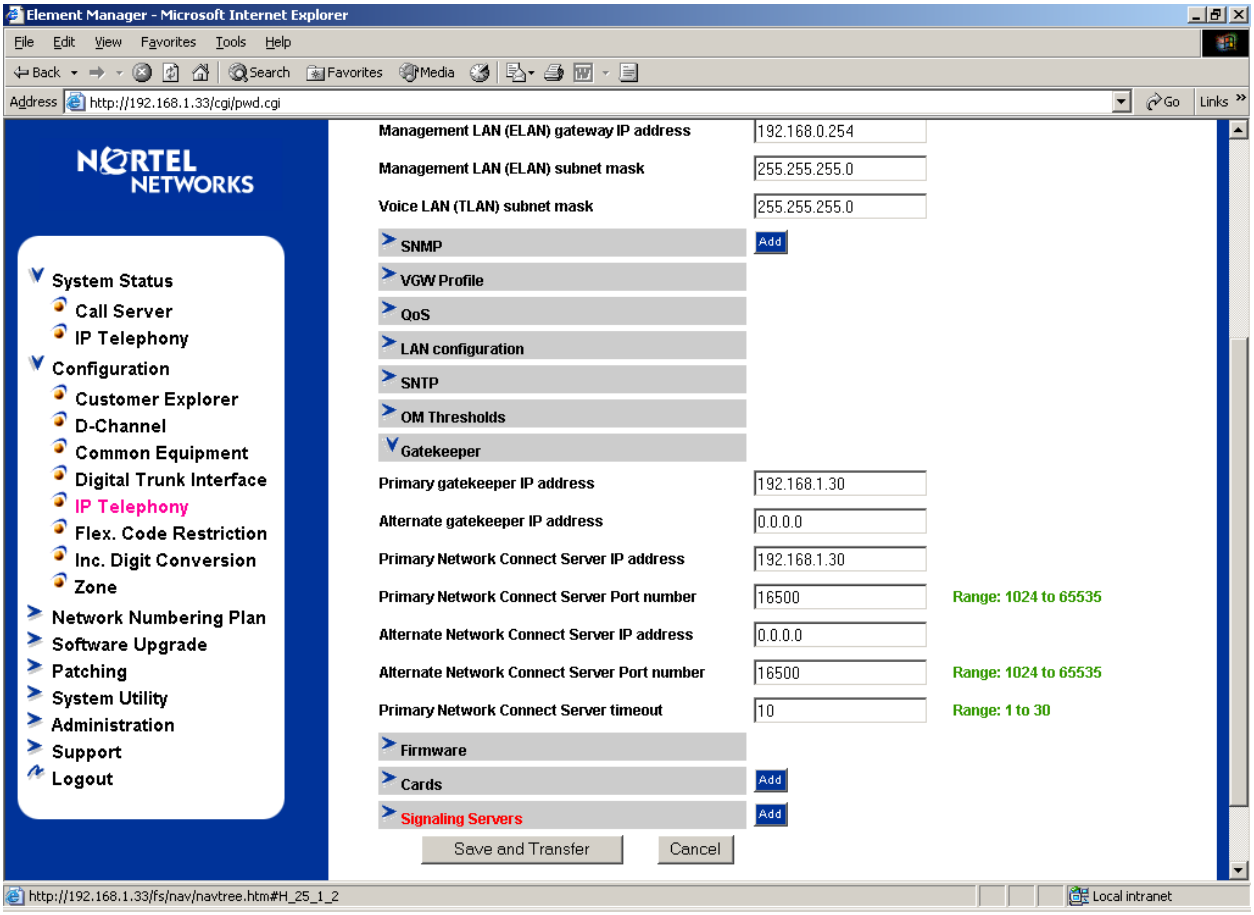
When finished, scroll to the bottom of the screen, and click the **Save and Transfer** button. A series of pages may display, indicating the progress and result of the operation.

5.11. Verify the Gatekeeper and Signaling Server Configuration

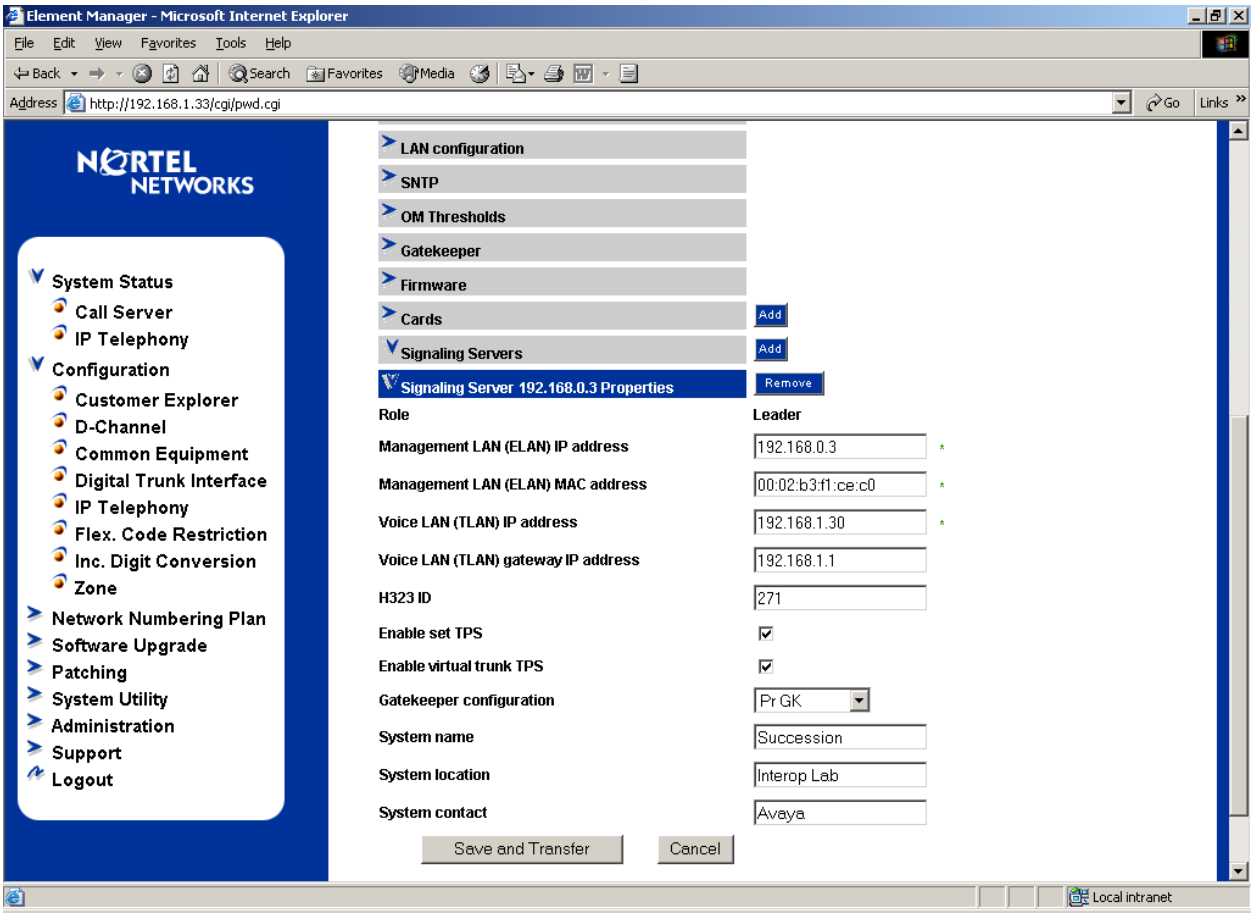
Although a thorough treatment of installation and configuration of the Gatekeeper software is beyond the scope of these Application Notes, this section presents the essential Gatekeeper configuration used in the network of **Figure 1**.

From the Navigation Tree, select **Configuration → IP Telephony**. From the resultant **Node Summary** web page, click **Edit.**

Click on **Gatekeeper** to expand the options. As can be seen from the screen below, the **Primary gatekeeper IP address** is set to 192.168.1.30, which is the TLAN IP address of the Succession Signaling Server running the Gatekeeper application. Note that the IP address entered into this field is not the Node IP address.



Click on **Signaling Servers**, and then click on the appropriate signaling server properties. The screen below illustrates the configuration for the network in **Figure 1**. Observe that the Terminal Proxy Server (TPS) and virtual trunk TPS are enabled, and the H323 ID is the text string "271". This is the primary gatekeeper. If configuration is being performed rather than simply observed, click the **Save and Transfer** button at the bottom of the screen, and reboot the Signaling Server.



5.12. Gatekeeper Database Configuration

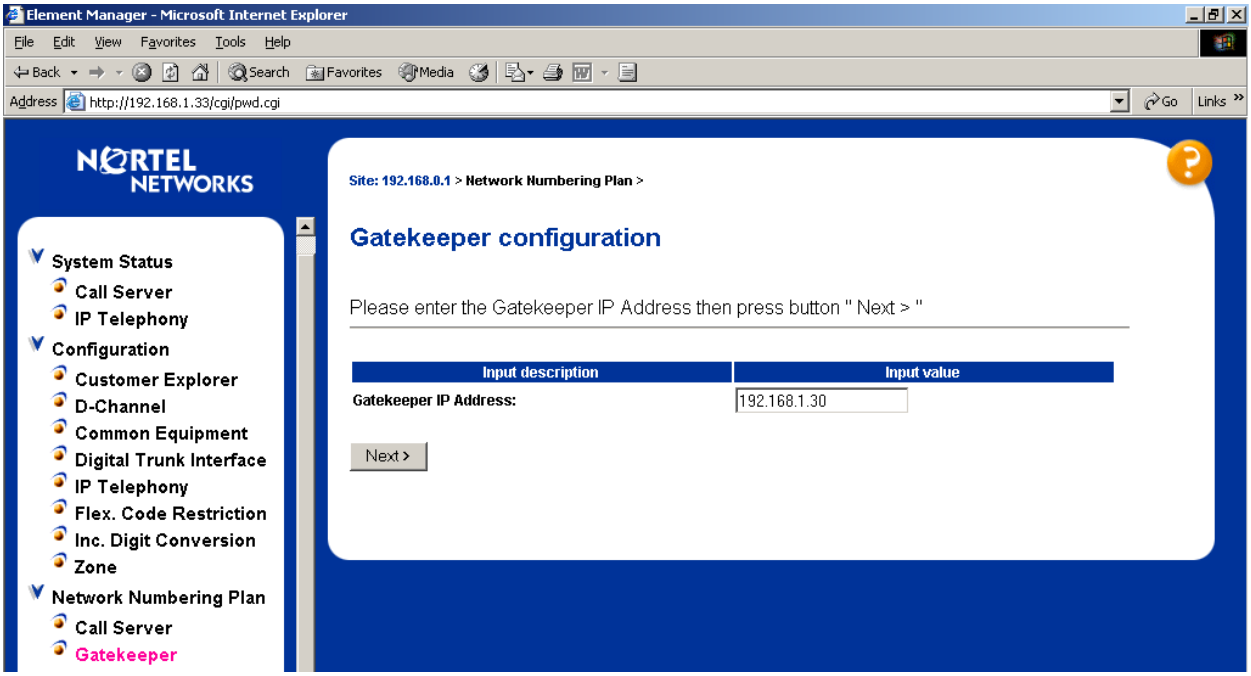
In these Application Notes, a simple Gatekeeper database is configured to cause dialed digits of the form 43xxx to be routed to the Avaya S8300 Media Server. The approach can be generalized for any numbering plan. The Avaya S8300 Media Server will be defined as a "non-RAS endpoint". This section will describe only those aspects of the Gatekeeper configuration that are relevant to the communication with the Avaya S8300 Media Server.

When the Avaya system is added as a non-RAS endpoint, no H.323 "Location Request" (LRQ) will be sent before initiating call setup. An alternative approach would be to define the Avaya system as a zone gatekeeper. Although not specifically illustrated in these Application Notes, this summary paragraph is provided to summarize the alternative approach, which has also been verified. If the IP address of the S8300 Media Server were defined in the Nortel Gatekeeper as a zone gatekeeper, the Avaya system would not need to be added as a non-RAS endpoint nor

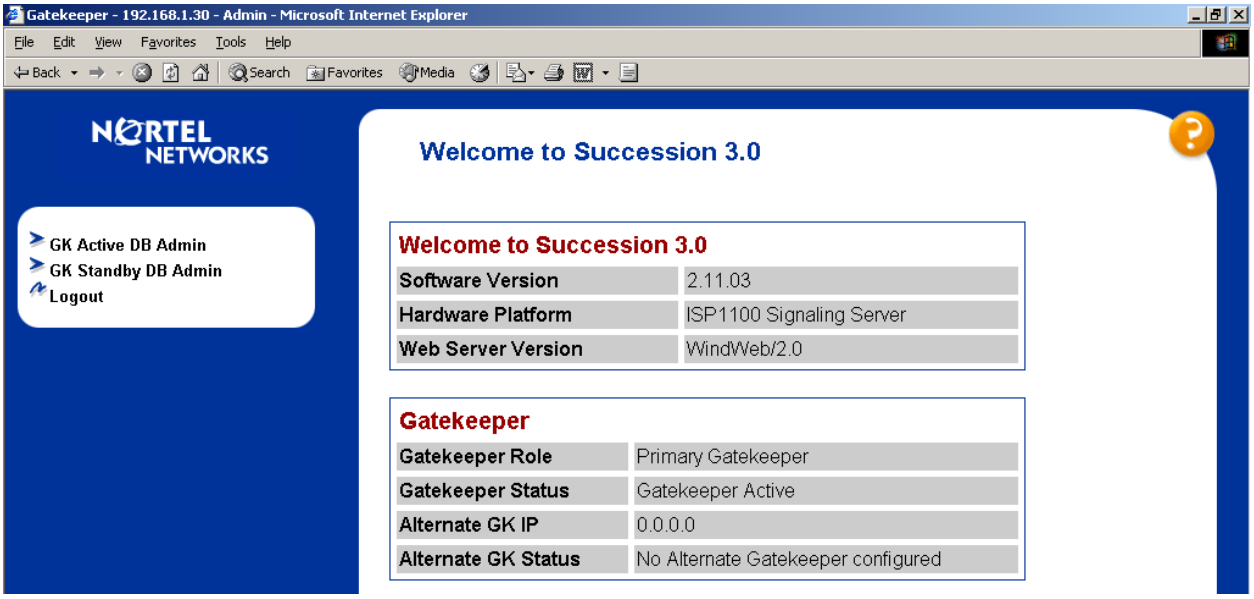
would it be necessary to define the numbering plan (e.g., 43xxx) that the Avaya system can terminate. However, an additional signaling group would be required in Avaya Communication Manager. This additional signaling group would have its far-end set to the TLAN IP of the Nortel Succession Signaling Server that would appear as the source IP of the LRQ. The near-end and far-end listen ports for this additional signaling group would be set to 1719 (for RAS). The additional signaling group could be associated with the same trunk group (e.g., trunk group 7) used for the outbound calls from Avaya to Nortel. That is, inbound and outbound calls could effectively use the same Avaya IP trunk group, even though outbound calls (to Nortel) would use Signaling Group 7 as defined in Section 4.2, while inbound calls (from Nortel) would use the additional RAS LRQ signaling group summarized in this paragraph.

5.12.1. Log in to the Gatekeeper using Element Manager

One means to log in to the Gatekeeper configuration web pages is via Element Manager. From the Navigation Tree, select **Network Numbering Plan → Gatekeeper**.



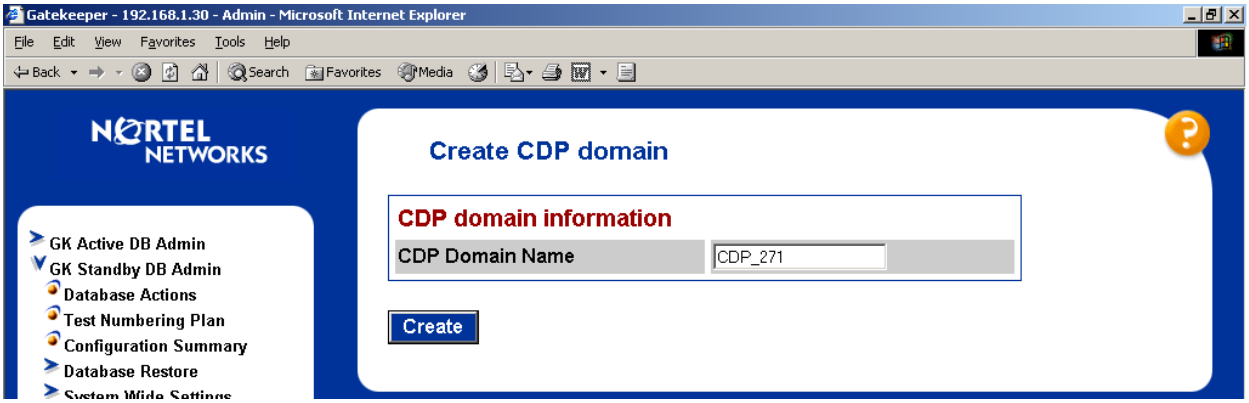
Click the **Next** button. When the Login window displays, enter an appropriate **User Name** and **Password** and click **OK**. A welcome page similar to the following will display.



5.12.2. Configure the Standby Database

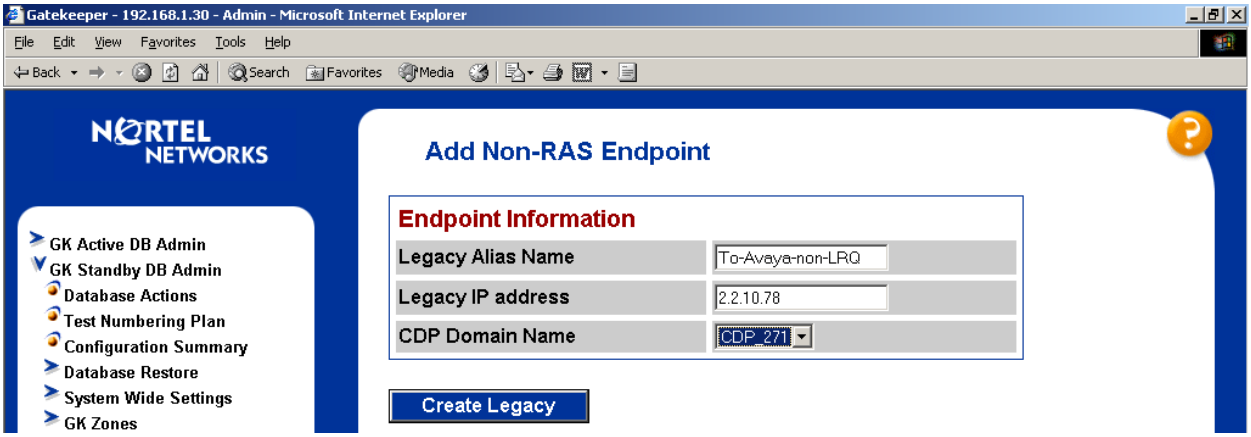
The Gatekeeper maintains two databases. Configuration changes are made to the standby database. When configuration is completed on the standby database, the standby database can be cutover to become the active database.

To configure a CDP domain, select **GK Standby DB Admin → CDP Domains → Create** from the Navigation Tree. Enter a CDP Domain Name (e.g., CDP_271) and click the **Create** button.

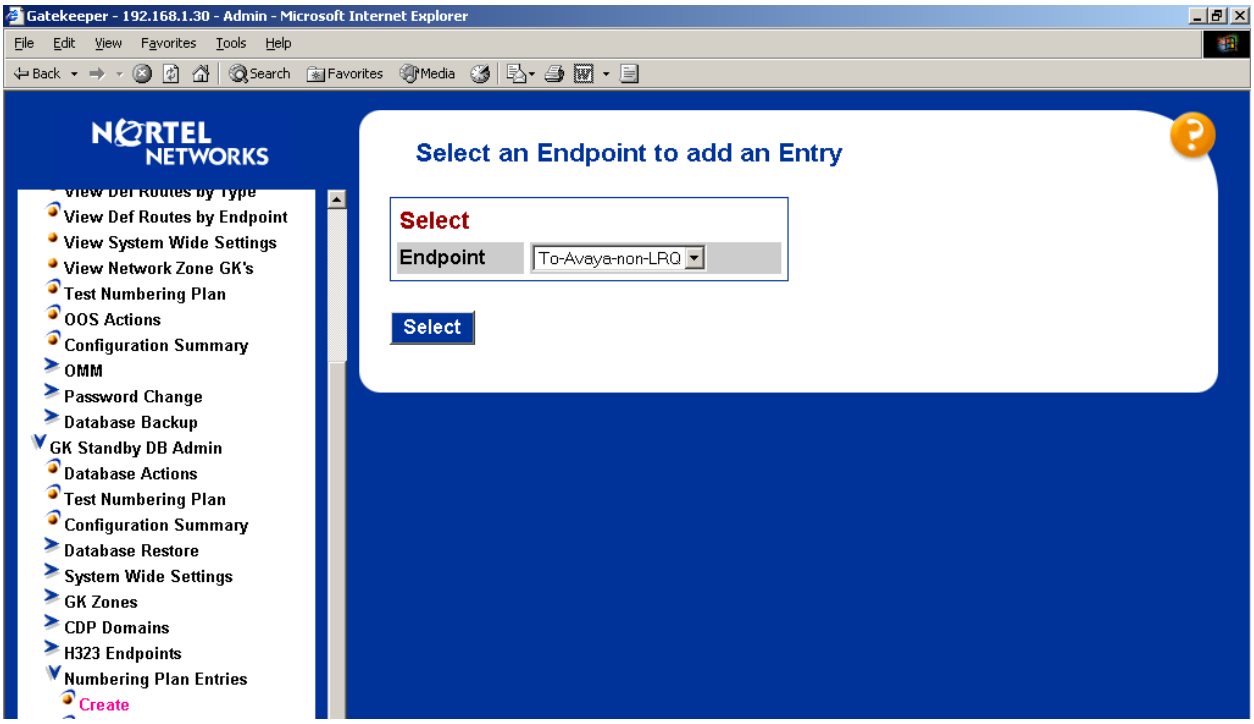


To add the S8300 Media Server as a "non-RAS endpoint", select **GK Standby DB Admin → H323 Endpoints → Add non-RAS Endpoint** from the Navigation Tree.

Enter a descriptive name in the **Legacy Alias Name** field, and enter the IP Address of the Avaya S8300 Media Server in the **Legacy IP address** field. In this case, the name "To-Avaya-non-LRQ" is used, and the IP address of the S8300 Media Server is 2.2.10.78, as shown in **Figure 1**. Click the **Create Legacy** button.

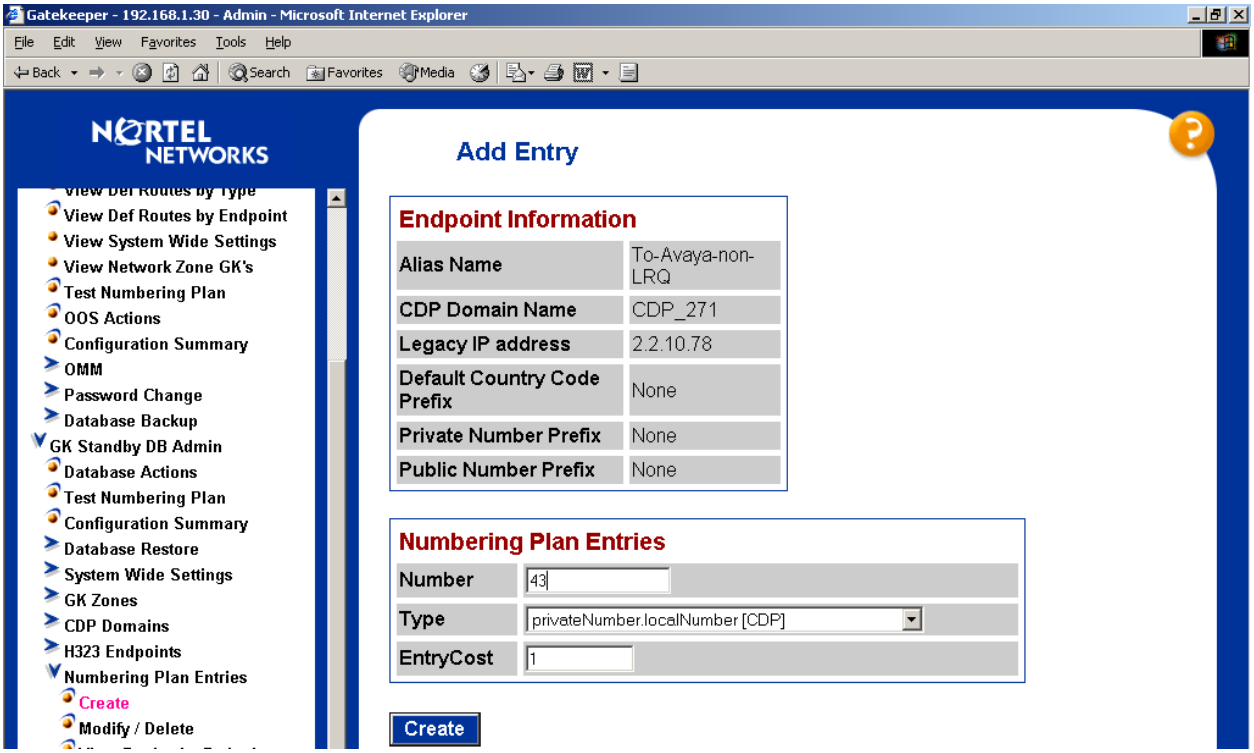


Next, configure the numbering plan entries that will be associated with this endpoint. From the Navigation Tree, select **GK Standby DB Admin → Numbering Plan Entries → Create**. From the **Endpoint** drop-down, select the appropriate name (e.g., To-Avaya-non-LRQ).



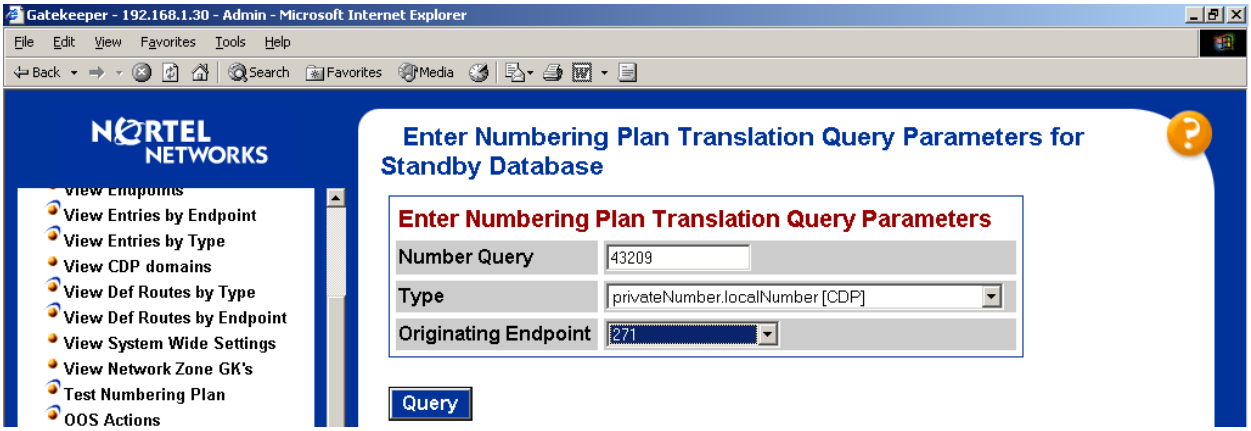
Click the **Select** button.

In the Number text box, enter the leading digits of the dialed number to be directed to the Avaya S8300 Media Server. In these Application Notes, all numbers of the form 43XXX are directed to the non-RAS endpoint named "To-Avaya-non-LRQ". The default for the **Type** field can be retained. Click the **Create** button.

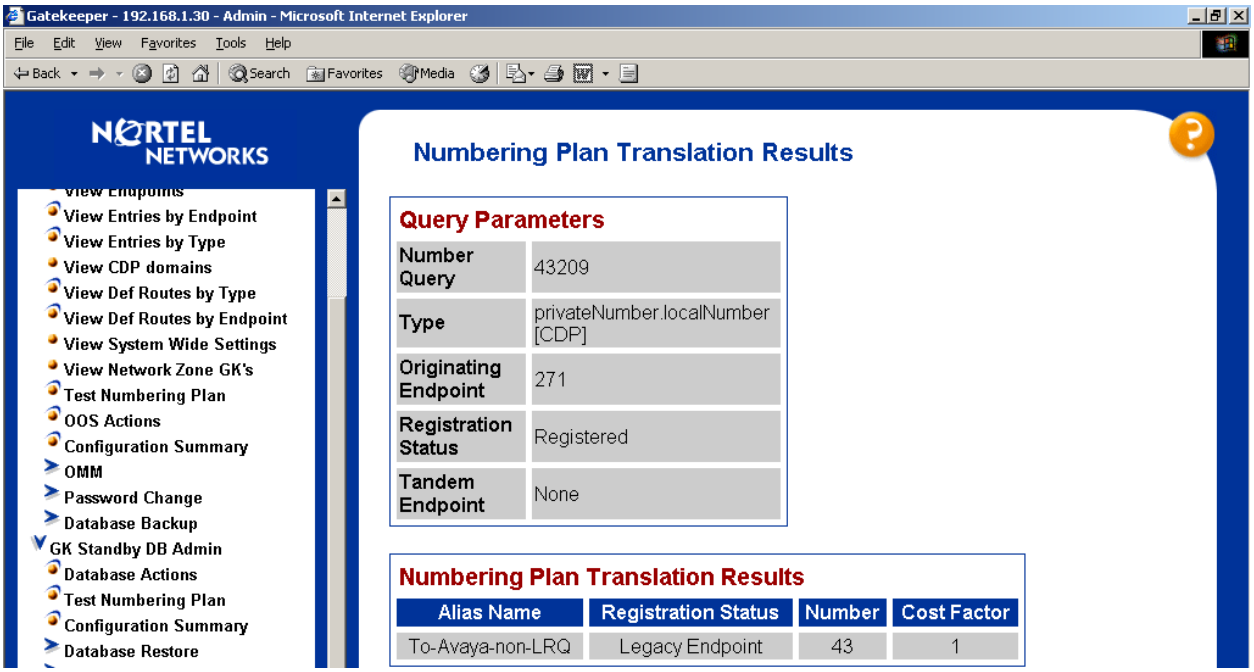


5.12.3. Test the Standby Database

Before making the standby database the active database, it may be desirable to test the numbering plan. From the Navigation Tree, select **GK Standby DB Admin → Test Numbering Plan**. In the **Number Query** text box, enter the extension of an Avaya telephone, such as 43209. In the **Origination Endpoint** drop-down, select the endpoint corresponding to the Nortel Succession devices (e.g., 271). Click the **Query** button.

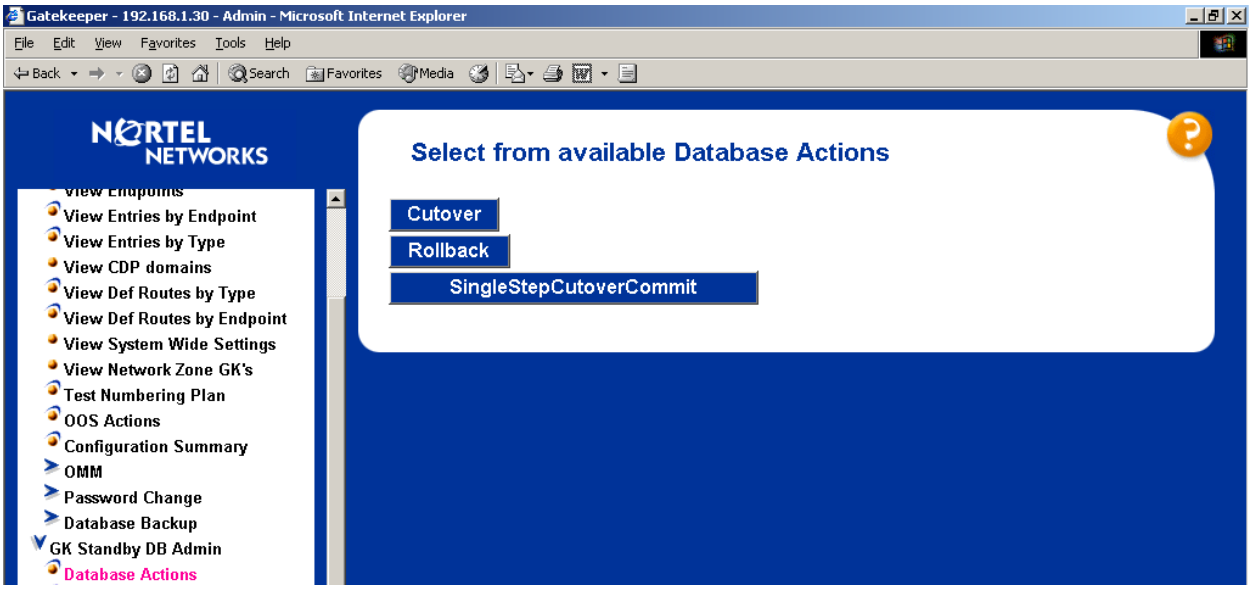


A screen similar to the following should display, indicating that the call will be directed to the Avaya S8300 Media Server.



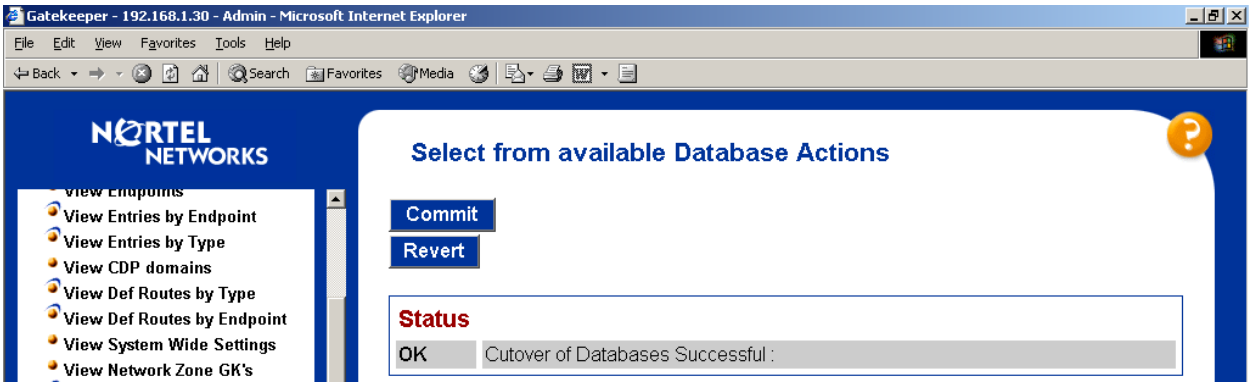
5.12.4. Cutover the Standby Database

When satisfied that the standby database is proper, the standby database can be made the active database. From the Navigation Tree, select **GK Standby DB Admin → Database Actions.**



To swap the active and standby databases, retaining the uniqueness of each, click the **Cutover** button. To make the standby database active and also synchronize the databases so that the

primary and standby databases are identical, click the **SingleStepCutoverCommit** button. In the example below, the **Cutover** button was used.



5.12.5. Test the Active Database

Before making calls, it may be desirable to check the active database. Similar procedures to those described in Section 5.12.3 may be used to test the active database after cutover. From the Navigation Tree, select **GK Active DB Admin → Test Numbering Plan,** and follow the procedures shown in Section 5.12.3.

6. Verification

Verification of the configuration described in these Application Notes included:

- Calls between Nortel IP telephones and Software Phones controlled by the Nortel Succession and Avaya IP Telephones and Softphones registered to the Avaya S8300 Media Server. Successful calls can be made in both directions across the IP Trunk using either G.729AB or G.711MU. As mentioned previously, "shuffling" of the media to "ip-direct" must be disabled.
- Calls between Nortel IP telephones and Software Phones controlled by the Nortel Succession and Avaya digital telephones connected to the Avaya G700 Media Gateway. Successful calls can be made in both directions using G.711MU or G.729AB. This result may be extrapolated to other non-IP devices connected to the G700 Media Gateway (e.g., analog telephones, PSTN trunks, etc.).
- Calls from Nortel IP telephones and Nortel digital telephones into an Avaya Meet-Me conference configured on the Avaya S8300 Media Server. After the welcome announcement prompts the caller for the conference password, digits pressed on any of the Nortel telephone keypads (to enter the conference password) are processed properly, and the Nortel telephones can participate in the conference. This verification is included to show that Avaya applications requiring DTMF collection can collect the digits using out-of-band signaling from the IP Trunk interface to the Nortel server. The IP Trunk interface serving the Nortel telephones can be muted using the Avaya Communication Manager "fe-mute" feature button, and the Nortel telephone can use the "#" key to un-mute the trunk. Far-end mute is a feature that can be used to allow unwanted music on

hold or noisy audio sources to be muted at the Avaya trunk interface by a display-equipped telephone or softphone.

- Calls from Avaya IP Telephones, Avaya IP Softphones, and Avaya digital telephones interacting with the Call Pilot voice messaging system of the Nortel Succession. Digits pressed on the Avaya telephone keypads are processed properly by the Nortel voice messaging application. This verification is included to show that Nortel applications requiring DTMF can collect the digits using out-of-band signaling from the IP Trunk interface to the Avaya server.
- Ringback tone to the originator of calls is heard when appropriate in all cases.
- Calling party number can be displayed for calls in either direction:
    - For calls from an Avaya telephone to a Nortel telephone, the Nortel telephone can display the number of the Avaya caller, provided the Avaya server is provisioned to send this information. The screen capture from the Nortel i2050 Software Phone in Section 7.5 illustrates the calling number of the Avaya caller.
    - For calls from a Nortel telephone to an Avaya telephone, the Avaya telephone can display the calling party number, when sent by the Nortel Succession. The screen capture from the Avaya IP Softphone in Section 7.5 illustrates the calling number of the Nortel caller.

7. Detailed Information for Active Calls

To reinforce the understanding of the configuration, the following subsections show detailed status for representative calls.

7.1. Avaya IP Telephone Calls Nortel IP Telephone

This section presents details for a call involving the Avaya 4620SW IP Telephone with IP address 2.2.10.201 (x43210) and the Nortel IP Telephone with IP address 192.168.1.106 (x53507). Avaya IP telephones are registered with the S8300 Media Server, whose address is 2.2.10.78. Nortel IP telephones are registered with the Nortel Succession Node IP, whose address is 192.168.1.33.

Observe the final audio path for the call, shown in the Avaya "status station" screen below. The first media path shown, between the Avaya IP Telephone and the Avaya G700 Media Gateway VoIP at 2.2.10.79, is within Network Region 1. Recall that Codec Set 1 has been configured for intra-region calls, and Codec Set 1 contains G.711MU at 2 Frames Per Packet (20 msec audio). The second media path shown is from the G700 VoIP at 2.2.10.79 to the Nortel IP Telephone. This connection was configured as an inter-region call between Network Region 1 and Network Region 4, due to the "Far-end Network Region" field being set to 4 for the signaling group to the Nortel Succession Node IP. Codec Set 4, which contained G.729AB , is configured for calls between Regions 1 and 4. Recall that the G700 Media Gateway VoIP remains in the communication path because "Direct IP-IP Audio Connections" or "shuffling" has been turned off on the signaling group to the Nortel Succession. With the software loads shown in **Table 1**, it is necessary to turn off shuffling.

```
status station 43210                                          Page   5 of   6
                            CONNECTED PORTS
          src port: S00001
                                                              MP      HP
ip-start:   2.  2. 10.201:2816
  ip-end:   2.  2. 10. 79:2112                              001V103
   audio: G.711MU        encryption:none  ss:off  pkt:20ms

ip-start:   2.  2. 10. 79:2114                              001V102
  ip-end: 192.168.  1.106:5200
   audio: G.729A+B       encryption:none  ss:off  pkt:20ms

          dst port: T00007
```

The following screen shows the results of the Nortel **npmShow** command issued from a telnet session into the Nortel Succession Node IP.

```
oam> npmShow
Npm status:                     Active
Active GateKeeper:              192.168.1.30 (primary)
GateKeeper registration status:  registered, TTL: 25 secs, re-register: 15 secs
Channels Busy / Idle / Total:    1 / 381 / 382
Stack version:                  RadVision 4.1.0.19
Channel tracing:                -1
Signaling Server H323 ID :      271

Chan Direction CallState RxState   TxState   Codec                  AirTime FS
MS Fax DestNum RemoteIP
---- --------- --------- --------- --------- ---------------------- ------- ---
-- --- ------- ---------------
  25 Terminate Connected Connected Connected G_729AB_20MS              257 yes
s  no  53507   2.2.10.78
```

The following illustrates the first page of the Avaya "status trunk" screen for this same call. This is included to illustrate the H.245 and Q.931 signaling from the S8300 Media Server (2.2.10.78) to the Nortel Succession Node IP Address (192.168.1.33).

```
status trunk 7/1                                              Page   1 of   2
                           TRUNK STATUS
 Trunk Group/Member: 0007/001             Service State: in-service/active
               Port: T00007             Maintenance Busy? no
 Signaling Group ID:                        CA-TSC state: not allowed
    Connected Ports: S00001

                   Port     Near-end IP Addr : Port    Far-end IP Addr : Port
        Signaling: 01A0017    2.  2. 10. 78  : 10879   192.168.  1. 33 : 1720
           H.245: 01A0017    2.  2. 10. 78  : 10880   192.168.  1. 33 : 1369
G.729A+B    Audio: 1          2.  2. 10. 79  : 2114    192.168.  1.106 : 5200
  H.245 Tunneled in Q.931? no
    Audio Connection Type: ip-tdm
```

7.2. Nortel IP Telephone Calls Avaya IP Telephone

The following Avaya screens show status for a call from a Nortel IP telephone to an Avaya IP Telephone.

```
status trunk 7/1                                              Page   1 of   2
                           TRUNK STATUS
 Trunk Group/Member: 0007/001              Service State: in-service/active
               Port: T00007             Maintenance Busy? no
 Signaling Group ID:                        CA-TSC state: none
    Connected Ports: S00001
                  Port     Near-end IP Addr : Port    Far-end IP Addr : Port
        Signaling: 01A0017    2.  2. 10. 78  : 1720    192.168.  1. 33 : 1370
            H.245: 01A0017    2.  2. 10. 78  : 10885   192.168.  1. 33 : 1371
G.729A+B    Audio: 1          2.  2. 10. 79  : 2116    192.168.  1.106 : 5200

  H.245 Tunneled in Q.931? no
    Audio Connection Type: ip-tdm
```

The next screen shows Page 2. Observe that the packet size negotiates to 10ms for calls from Nortel to Avaya.

```
status trunk 7/1                                                Page   2 of   2
                           CONNECTED PORTS
          src port: T00007
                                                                  MP      HP
ip-start: 192.168.  1.106:5200
  ip-end:   2.  2. 10. 79:2116                                 001V102
   audio: G.729A+B       encryption:none  ss:off  pkt:10ms

ip-start:   2.  2. 10. 79:2118                                 001V103
  ip-end:   2.  2. 10.201:2816
   audio: G.711MU        encryption:none  ss:off  pkt:20ms

          dst port: S00001
```

The next screen shows the information for this call available from the "npmShow" command from the Nortel Succession Signaling Server CLI.

```
oam> npmShow
Npm status:                     Active
Active GateKeeper:              192.168.1.30 (primary)
GateKeeper registration status:  registered, TTL: 25 secs, re-register: 8 secs
Channels Busy / Idle / Total:    1 / 381 / 382
Stack version:                  RadVision 4.1.0.19
Channel tracing:                -1
Signaling Server H323 ID :      271

Chan Direction CallState RxState   TxState   Codec                  AirTime FS
MS Fax DestNum RemoteIP
---- --------- --------- --------- --------- ---------------------- ------- ---
-- --- ------- --------------
  26 Originate Connected Connected Connected G_729AB_10MS               300 yes
s  no  43210   2.2.10.78
```

7.3. Nortel Digital Telephone calls Avaya Digital Telephone

This section illustrates details for a call between an Avaya digital telephone (i.e., example of a non-IP Telephone) connected to port 1v301 on the G700 Media Gateway and the Nortel M3904 Digital Phone with extension 53501. The Nortel digital telephone dialed the Avaya digital telephone (x43000). Observe the Q.931 and H.245 signaling path is between the Avaya S8300, whose IP address is 2.2.10.78 (near-end of Signaling Group 7), and the Nortel Succession Node IP, whose IP address is 192.168.1.33 (far-end of Signaling Group 7). The audio path is from the G700 VoIP media processor, whose IP address is 2.2.10.79, to the Nortel Succession Media Card with IP Address 192.168.1.31.

```
status trunk 7/1                                                Page   1 of   2
                              TRUNK STATUS
 Trunk Group/Member: 0007/001              Service State: in-service/active
               Port: T00007              Maintenance Busy? no
 Signaling Group ID:                          CA-TSC state: none
    Connected Ports: 001V301
                   Port     Near-end IP Addr : Port    Far-end IP Addr : Port
        Signaling: 01A0017    2.  2. 10. 78  : 1720    192.168.  1. 33 : 1372
            H.245: 01A0017    2.  2. 10. 78  : 10890   192.168.  1. 33 : 1373
G.729A+B    Audio: 1          2.  2. 10. 79  : 2120    192.168.  1. 31 : 5206
  H.245 Tunneled in Q.931? no
    Audio Connection Type: ip-tdm
```

The following screen shows Page 2.

```
status trunk 7/1                                                Page   2 of   2
                              CONNECTED PORTS
          src port: T00007
                                                                  MP      HP
ip-start: 192.168.  1. 31:5206
  ip-end:   2.  2. 10. 79:2120                                 001V102
   audio: G.729A+B       encryption:none  ss:off  pkt:10ms

          dst port: 001V301
```

The next screen shows the information available from the "npmShow" command from Nortel Succession for this call. The screen has been edited to remove common information.

```
oam> npmShow
Chan Direction CallState RxState   TxState   Codec                  AirTime FS
MS Fax DestNum RemoteIP
---- --------- --------- --------- --------- ---------------------- ------- ---
-- --- ------- ---------------
  26 Originate Connected Connected Connected G_729AB_10MS              315 yes
s  no  43000   2.2.10.78
```

7.4. Avaya Digital Telephone calls Nortel Digital Telephone

The following screen shows a status screen for a call from Avaya digital telephone extension 43000 to Nortel digital telephone 53501.

```
 status trunk 7/2                                                Page   1 of   2
                              TRUNK STATUS
 Trunk Group/Member: 0007/002              Service State: in-service/active
               Port: T00008             Maintenance Busy? no
 Signaling Group ID:                          CA-TSC state: not allowed
    Connected Ports: 001V301
                   Port     Near-end IP Addr : Port    Far-end IP Addr : Port
        Signaling: 01A0017    2.  2. 10. 78  : 10895   192.168.  1. 33 : 1720
            H.245: 01A0017    2.  2. 10. 78  : 10896   192.168.  1. 33 : 1374
G.729A+B    Audio: 1          2.  2. 10. 79  : 2122    192.168.  1. 31 : 5210
  H.245 Tunneled in Q.931? no
    Audio Connection Type: ip-tdm
```

The following screen shows Page 2.

```
status trunk 7/2                                                 Page   2 of   2
                              CONNECTED PORTS
          src port: T00008
                                                                  MP      HP
ip-start: 192.168.  1. 31:5210
  ip-end:   2.  2. 10. 79:2122                                 001V102
   audio: G.729A+B       encryption:none  ss:off  pkt:20ms

          dst port: 001V301
```

The next screen shows the information available from the "npmShow" command from Nortel Succession for this call. Again, the screen has been edited to remove common information.

```
oam> npmShow
Chan Direction CallState RxState   TxState   Codec                  AirTime FS
MS Fax DestNum RemoteIP
---- --------- --------- --------- --------- ---------------------- ------- ---
-- --- ------- ---------------
  25 Terminate Connected Connected Connected G_729AB_20MS               166 yes
s  no  53501   2.2.10.78
```

7.5. Calls Involving Nortel IP Software Phone or Avaya IP Softphone

7.5.1. Example of Call Using Nortel i2050 Software Phone

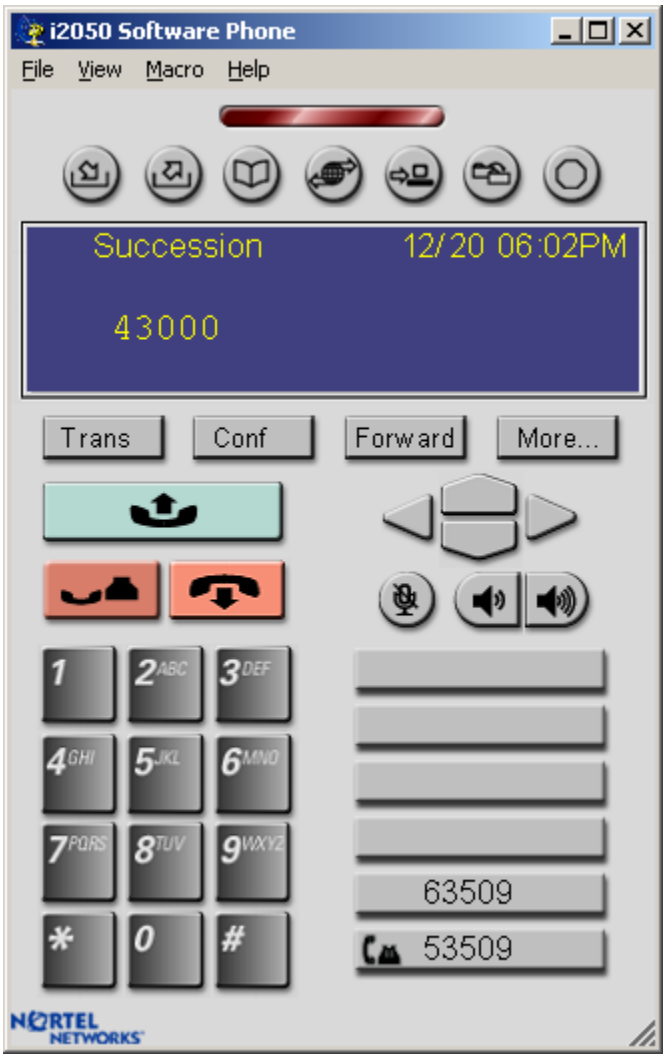
The following screens illustrate details for a call between an Avaya digital telephone connected to port 1v301 in the G700 Media Gateway and the Nortel i2050 Software Phone, loaded on a computer whose IP address is 192.168.1.6. The Avaya digital telephone is extension 43000, and the Nortel i2050 Software Phone is extension 53509. In this example, the Avaya digital set dialed 53509. This call does not illustrate any new concept; it is presented to include status of a call involving the Nortel i2050 Software Phone.

```
status trunk 7/1                                                Page   1 of   2
                              TRUNK STATUS
 Trunk Group/Member: 0007/001             Service State: in-service/active
               Port: T00007             Maintenance Busy? no
 Signaling Group ID:                        CA-TSC state: not allowed
    Connected Ports: 001V301

                   Port     Near-end IP Addr : Port    Far-end IP Addr : Port
        Signaling: 01A0017    2.  2. 10. 78  : 11023   192.168.  1. 33 : 1720
            H.245: 01A0017    2.  2. 10. 78  : 11024   192.168.  1. 33 : 1421
G.729A+B    Audio: 1          2.  2. 10. 79  : 2248    192.168.  1.  6 : 5200
  H.245 Tunneled in Q.931? no
    Audio Connection Type: ip-tdm
```

Page 2 shows further details of the IP audio path, using G.729AB between the Nortel IP Software Phone (192.168.1.6) and the G700 Media Gateway VoIP (2.2.10.79).

```
status trunk 7/1                                                Page   2 of   2
                            CONNECTED PORTS
          src port: T00007
                                                                  MP      HP
ip-start: 192.168.  1.  6:5200
  ip-end:   2.  2. 10. 79:2248                                 001V103
   audio: G.729A+B       encryption:none  ss:off  pkt:20ms

          dst port: 001V301
```

The following is a screen capture of the Nortel i2050 Software Phone while this call was in progress. Note that the caller identification (43000) of the Avaya originator is displayed.



The next (edited) screen shows the information available from the "npmShow" command from the Nortel Succession Signaling Server CLI, while this call was in progress.

```
oam> npmShow
Chan Direction CallState RxState   TxState   Codec                  AirTime FS
MS Fax DestNum RemoteIP
---- --------- --------- --------- --------- ---------------------- ------- ---
-- --- ------- --------------
  25 Terminate Connected Connected Connected G_729AB_20MS              410 yes
s  no  53509   2.2.10.78
```

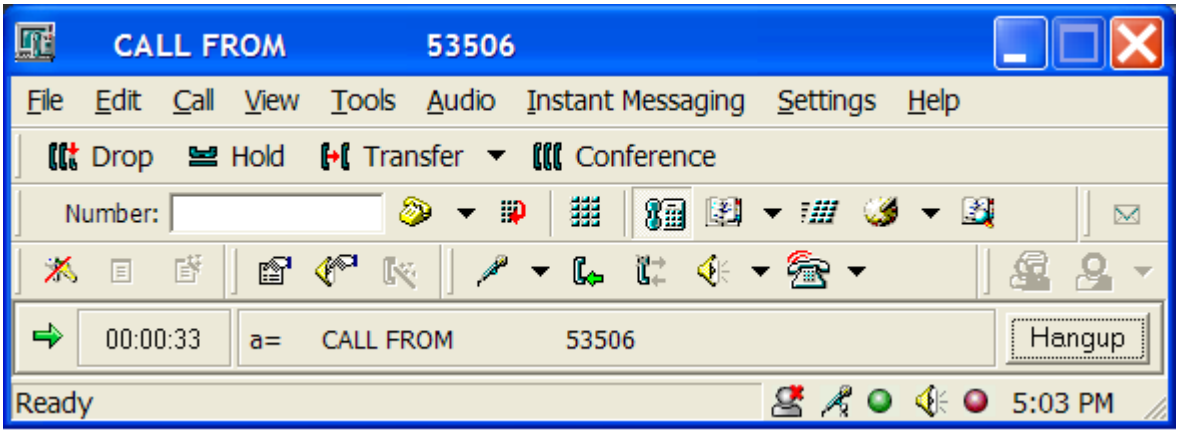
7.5.2. Example of Call Using Avaya IP Softphone

The following screen illustrates details for a call from a Nortel IP Telephone to an Avaya IP Softphone, loaded on a computer whose IP address is 2.2.10.215. The Avaya IP Softphone is

logged in as extension 43210, and the Nortel IP Telephone is extension 53506. In this example, the Nortel IP Telephone called extension 43210. This call does not illustrate any new concept; it is presented to include status of a call involving the Avaya IP Softphone.

```
status station 43210                                          Page   5 of   6
                          CONNECTED PORTS
          src port: S00001
                                                                 MP      HP
ip-start:   2.  2. 10.215:2048
  ip-end:   2.  2. 10. 79:2276                                 001V103
   audio: G.711MU        encryption:none  ss:off  pkt:20ms

ip-start:   2.  2. 10. 79:2274                                 001V102
  ip-end: 192.168.  1.103:5200
   audio: G.729A+B       encryption:none  ss:off  pkt:10ms

          dst port: T00007
```

The following is a screen capture of the Avaya IP Softphone while this call was in progress. Note that the caller identification (53506) of the Nortel originator is displayed.



7.6. Status for Nortel IP Devices

The following commands can be executed from the CLI of the Succession Signaling Server. The following screen shows the registration of the Nortel IP Telephones shown in **Figure 1**, using the "isetShow" command from the CLI. Observe the registered status of the i2002, i2004, and i2050 Software Phone depicted in **Figure 1**.

```
oam> isetShow

Set Information
---------------
    IP Address      Type      RegType  State         Up  Time       Set-TN
 Regd-TN           HWID         FWVsn  UNIStimVsn SrcPort DstPort
----------------- ---------- ------- ----------- -------------- ------------ -
---------- ----------------- ------- ---------- ------- -------
192.168.1.103      i2002      Regular online           6 03:40:34    061-01
  061-01    18000ae40860fc6600 0603B59    2.8       5100    5000
192.168.1.104      i2004      Regular online           6 01:26:39    061-04
  061-04    18000ae40829b16600 0602B59    2.8       5100    5000
192.168.1.105      i2004      Regular online           6 01:25:31    061-00
  061-00    18000ae40829a26600 0602B59    2.8       5100    5000
192.168.1.106      i2002      Regular online           5 05:18:19    061-05
  061-05    18000ae40860f86600 0603B59    2.8       5100    5000
192.168.1.6        i2050      Regular online           0 00:10:28    061-02
  061-02    18000bdb03ee7e6600 1400346    2.6       5100    5000

Total sets = 5
```

The following screen shows the status of the Terminal Proxy Server, using the "tpsShow" command available from the CLI.

```
oam> tpsShow
Node ID       : 271
Is master     : 1
Up time       : 7 days, 22 hours, 8 mins, 12 secs  (684492 secs)
Platform      : ISP 1100
TPS Service   : Yes
IP TLAN       : 192.168.1.30
IP ELAN       : 192.168.0.3
ELAN Link     : Up
Sets Connected: 5
Sets Reserved : 0
oam>
```

The following screen shows the status of the virtual trunks, using the "vtrkShow" command. In this case, the command was executed with a call actively using one of the virtual trunks.

```
oam> vtrkShow
------------------------------------------------------------------------------
------------
IND    TN    DCH  PROTOCOL  CHID  CUST  ROUTE  MEMB  ICOG  VoIP  ESN5 PRFX  SAT
NCOS STATUS
------------------------------------------------------------------------------
------------
  0  062-00  011  MCDN->EST  025   00    011    001   IO   H323   NO  ----  NO
 00  CS BUSY
  1  062-01  011  MCDN->EST  026   00    011    002   IO   H323   NO  ----  NO
 00  CS IDLE
------------------------------------------------------------------------------
-----------------
VTRK State = Active
---------------------------

VTRK Status = Enabled
---------------------------
```

The following screen shows summary information on the status of the Succession Media Card, using the "itgCardShow" command available from the CLI of the Media Card (i.e., telnet to 192.168.1.31). In this case, the command was executed with a call actively using one of the virtual trunks.

```
IPL> itgCardShow

      Index        : 2
      Type         : EXUT
      Role         : Follower
      Node         : 271
      Leader IP    : 192.168.1.33
      Card IP      : 192.168.1.31
      Card TN      : Slot 14
      Card State   : ENBL
      Uptime       : 7 days, 3 hours, 56 mins, 40 secs  (619000 secs)
      Codecs       : G711Ulaw(default), G711Alaw, G729A, G729AB, G711CC, T38FAX
ELAN (ixpMac1) stat: 10 Mbps, Half duplex  (Carrier OK)
TLAN (ixpMac0) stat: 100 Mbps, Full duplex  (Carrier OK)

value = 1 = 0x1
```

The following screen shows summary information on the voice gateway status of the Succession Media Card, using the "vgwShow" command available from the CLI of the Media Card (i.e., telnet to 192.168.1.31). In this case, the command was executed with a call actively using one of the virtual trunks to the Avaya system.

```
IPL> vgwShow
VGW Service is: Enabled
Chan ChanState  DspMode   Codec      Tn     Reg AirTime        rxTsap
    txTsap
---- ---------- --------- ---------- ------ --- ------- -------------------- ---
-----------------
   5 Busy       Voice     G.729AB-20 0x0c49 yes    1458    192.168.1.31:5210
   2.2.10.79:2122
value = 98 = 0x62 = 'b'
```

As previously mentioned, calls among the Avaya endpoints in "ip-network-region 1" will use G.711MU while calls across the IP Trunk will use G.729AB. The following screens illustrate the similar concept for calls among the Nortel endpoints.

The following screen shows summary information on the voice gateway status of the Succession Media Card, using the "vgwShow" command available from the CLI of the Media Card (i.e., telnet to 192.168.1.31). In this case, the command was executed with two calls active. The G.729AB resource is being used for a virtual trunk call with the Avaya system. The G.711 resource is being used for a call involving a Nortel IP Telephone (192.168.1.103) and a Nortel digital telephone.

```
IPL> vgwShow
VGW Service is: Enabled
Chan ChanState  DspMode   Codec      Tn     Reg AirTime        rxTsap
    txTsap
---- ---------- --------- ---------- ------ --- ------- -------------------- ---
-----------------
   8 Busy       Voice     G.711-20   0x0c88 yes     371    192.168.1.31:5216   1
92.168.1.103:5200
  12 Busy       Voice     G.729AB-20 0x0cc8 yes     243    192.168.1.31:5224
   2.2.10.79:2126
value = 98 = 0x62 = 'b'
```

7.7. Multiple Calls Active over the Avaya-Nortel IP Trunk

The following screens were captured while two calls were active over the Avaya – Nortel IP Trunk. In this example, two Nortel IP Telephones and one Avaya IP Telephone were dialed into an Avaya Meet-Me Conference. (If one call at a time can be placed over the IP Trunk, but problems arise when a second concurrent call is attempted, verify the "Calls Share Signaling Connection" parameter is set to "no" on the Avaya signaling group.) The following screen shows that both members of Trunk Group 7 are active.

```
status trunk 7
                            TRUNK GROUP STATUS
Member   Port     Service State      Mtce Connected Ports
                                     Busy
0007/001 T00007   in-service/active  no   T00008   S00001
0007/002 T00008   in-service/active  no   T00007   S00001
```

All participants in the conference were required to enter a passcode, and therefore success of this call requires that Avaya Communication Manager can properly interpret the out-of-band DTMF signals from the Nortel Succession.

```
status meet-me-vdn 43801
                              GENERAL STATUS
                                          Service State: active
            Extension: 43801
   Connected Ports: T00007      T00008      S00001
```

The following "status station" screens illustrate the media paths. Observe the two separate G.729A+B sessions over the two IP Trunks, and the use of G.711MU from the Avaya IP Telephone to the Avaya G700 VoIP resource.

```
status station 43210                                          Page   5 of   7
                            CONNECTED PORTS
          src port: S00001
                                                              MP      HP
ip-start:   2.  2. 10.201:2816
  ip-end:   2.  2. 10. 79:2138                              001V104
   audio: G.711MU        encryption:none  ss:off  pkt:20ms

ip-start:   2.  2. 10. 79:2134                              001V102
  ip-end: 192.168.  1.103:5200
   audio: G.729A+B       encryption:none  ss:off  pkt:10ms

          dst port: T00007
```

The following screen is another page for this same call. Note the second trunk port (T00008).

```
status station 43210                                          Page   6 of   7
                            CONNECTED PORTS
          src port: S00001
                                                              MP      HP
ip-start:   2.  2. 10.201:2816
  ip-end:   2.  2. 10. 79:2138                              001V104
   audio: G.711MU        encryption:none  ss:off  pkt:20ms

ip-start:   2.  2. 10. 79:2136                              001V103
  ip-end: 192.168.  1.106:5200
   audio: G.729A+B       encryption:none  ss:off  pkt:10ms

          dst port: T00008
```

The next (edited) screen shows the information available from the "npmShow" command from Nortel Succession for this same call.

```
oam> npmShow
Npm status:                     Active
Active GateKeeper:              192.168.1.30 (primary)
GateKeeper registration status:  registered, TTL: 25 secs, re-register: 18 secs
Channels Busy / Idle / Total:    2 / 380 / 382

Chan Direction CallState RxState   TxState   Codec                 AirTime FS
MS Fax DestNum RemoteIP
---- --------- --------- --------- --------- --------------------- ------- ---
-- --- ------- ---------------
  26 Originate Connected Connected Connected G_729AB_10MS             1027 yes
s  no  43801   2.2.10.78
  25 Originate Connected Connected Connected G_729AB_10MS             1009 yes
s  no  43801   2.2.10.78
```

7.8. Example of Call Using G.711MU over the IP Trunk

As stated previously, the configuration screens presented in these Application Notes show how to achieve G.729AB over the IP Trunk. A compressed codec like G.729AB might be chosen to conserve bandwidth for VoIP calls over the IP Trunk. Other codecs are also supported. For example, the following screen shows a call from an Avaya IP Telephone to a Nortel IP Telephone across the IP Trunk using G.711MU. G.711MU might be configured to optimize voice quality when ample bandwidth is available. To vary codec selection, the configured Avaya

Communication Manager "ip-codec-set" can be changed (see Section 4.2), along with Nortel Succession parameters associated with inter-zone behavior (see Section 5.4).

```
status station 43210                                          Page   5 of   6
                            CONNECTED PORTS
          src port: S00001
                                                              MP      HP
ip-start:   2.  2. 10.201:2816
  ip-end:   2.  2. 10. 79:2150                              001V102
   audio: G.711MU        encryption:none  ss:off  pkt:20ms

ip-start:   2.  2. 10. 79:2152                              001V103
  ip-end: 192.168.  1.106:5200
   audio: G.711MU        encryption:none  ss:off  pkt:20ms

          dst port: T00007
```

The next (edited) screen shows the information available from the "npmShow" command from the Nortel Succession Signaling Server CLI for this same call.

```
oam> npmShow
Chan Direction CallState RxState   TxState   Codec                  AirTime FS
MS Fax DestNum RemoteIP
---- --------- --------- --------- --------- ---------------------- ------- ---
-- --- ------- ---------------
  25 Terminate Connected Connected Connected G_711_u_law_20MS_NOVAD     297 yes
s  no  53507   2.2.10.78
```

7.9. Example of Call Using Encryption Among the Avaya IP Devices

If it is desired to use media encryption among the Avaya IP devices, encryption can be enabled for the codec set used for the intra-region connections (e.g., codec set 1 in Section 4.2). For example, the following status screen illustrates a call from an Avaya 4620 IP Telephone to a Nortel IP Telephone where the bolded Avaya intra-region connections use G.711MU and AES encryption, while the connection over the IP Trunk to Nortel continues to use G.729AB and no encryption.

```
status station 43210                                          Page   5 of   6
                            CONNECTED PORTS
          src port: S00001
                                                              MP      HP
ip-start:   2.  2. 10.201:2816
  ip-end:   2.  2. 10. 79:2050                              001V103
   audio: G.711MU        encryption:aes   ss:off  pkt:20ms

ip-start:   2.  2. 10. 79:2052                              001V102
  ip-end: 192.168.  1.106:5200
   audio: G.729A+B       encryption:none  ss:off  pkt:20ms

          dst port: T00008
```

For detailed configuration procedures for media encryption, the interested reader may wish to consult the Application Notes listed as reference [4] in Section 9.

8. Conclusion

As illustrated in these Application Notes, Avaya Communication Manager can interoperate with Nortel Succession using H.323 Trunks, inclusive of basic calling and out-of-band DTMF collection. Compared with other interoperable H.323 Trunk configurations, the main Avaya Communication Manager configuration differences for interoperability with the Nortel Succession are as follows. First, Special Application SA8507 must be enabled. Second, Direct IP-IP audio connections, often referred to as "shuffling", must be disabled on the Avaya H.323 signaling group. Finally, if compression using a G.729 variant is desired for calls involving the Nortel Succession Media Card, the Avaya "ip-codec-set" must be configured for "G.729B" or "G.729AB" rather than the generic "G.729" or "G.729A".

9. References

The following documents from the Succession Meridian Electronic Reference Library CD (Disk 1 of 2, NTLH91AA A0518482) contain information relevant to these Application Notes:

[1] *IP Peer Networking*, Document Number 553-3001-213.

[2] *Signaling Server: Installation and Configuration*, Document Number 553-3001-212

Avaya product documentation can be found at http://support.avaya.com

The following references are among the many Application Notes available at http://www.avaya.com/gcm/master-usa/en-us/resource

[3] "Configuring Avaya Communication Manager on an Avaya S8300 Media Server with Nortel Business Communications Manager (BCM 200), using H.323 Signaling and IP Trunks – Issue 1.0".

[4] "Configuring Avaya Communication Manager for Media Encryption, Issue 1.0".

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 Solution & Interoperability Test Lab at interoplabnotes@list.avaya.com