



Avaya Solution & Interoperability Test Lab

Configuring Avaya Aura™ Communication Manager 5.2.1 for H.323 Signaling and IP Trunks with Nortel Communication Server 1000E 6.0 – Issue 1.0

Abstract

These Application Notes present a sample configuration for a network comprised of an Avaya S8730 Server, Avaya G650 Media Gateway, and a Nortel Communication Server 1000E 6.0. The focus is on the Avaya Aura™ Communication Manager 5.2.1 configuration for the H.323 signaling groups, IP trunk groups, and IP codec sets, and the corresponding Nortel CS1000 configuration of IP Peer Networking and Virtual Trunks. Using this configuration, Nortel digital telephones, Nortel (UNISTIM) IP Telephones can be called by Avaya digital telephones, and Avaya IP Telephones. Screens that describe the detailed status and communication paths of active calls are presented to reinforce the understanding of the configuration. These results will be applicable to other Avaya servers and gateways.

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1 Introduction

These Application Notes present a sample configuration for a network comprised of an Avaya S8730 Server running Avaya Aura™ Communication Manager, Avaya G650 Media Gateway, a Nortel Communication Server 1000E and Nortel's messaging solution – Call Pilot. The focus is on the Avaya Aura™ Communication Manager configuration for the H.323 signaling groups, IP trunk groups, and IP codec sets, and the corresponding Nortel CS1000E configuration of IP Peer Networking and Virtual Trunks. Using this configuration, Nortel digital telephones, and Nortel IP Telephones can call (and be called by) Avaya digital telephones and Avaya IP Telephones. Screens that describe the detailed status and communication paths of active calls are presented to reinforce the understanding of the configuration. These results will be applicable to other Avaya servers and gateways.

It should be noted that this document will not detail the necessary administration to install the Avaya or Nortel systems from the ground up. Please see Section 8 at the end of this document that describes this in more detail.

Figure 1 (below) depicts the network used to verify these Application Notes.

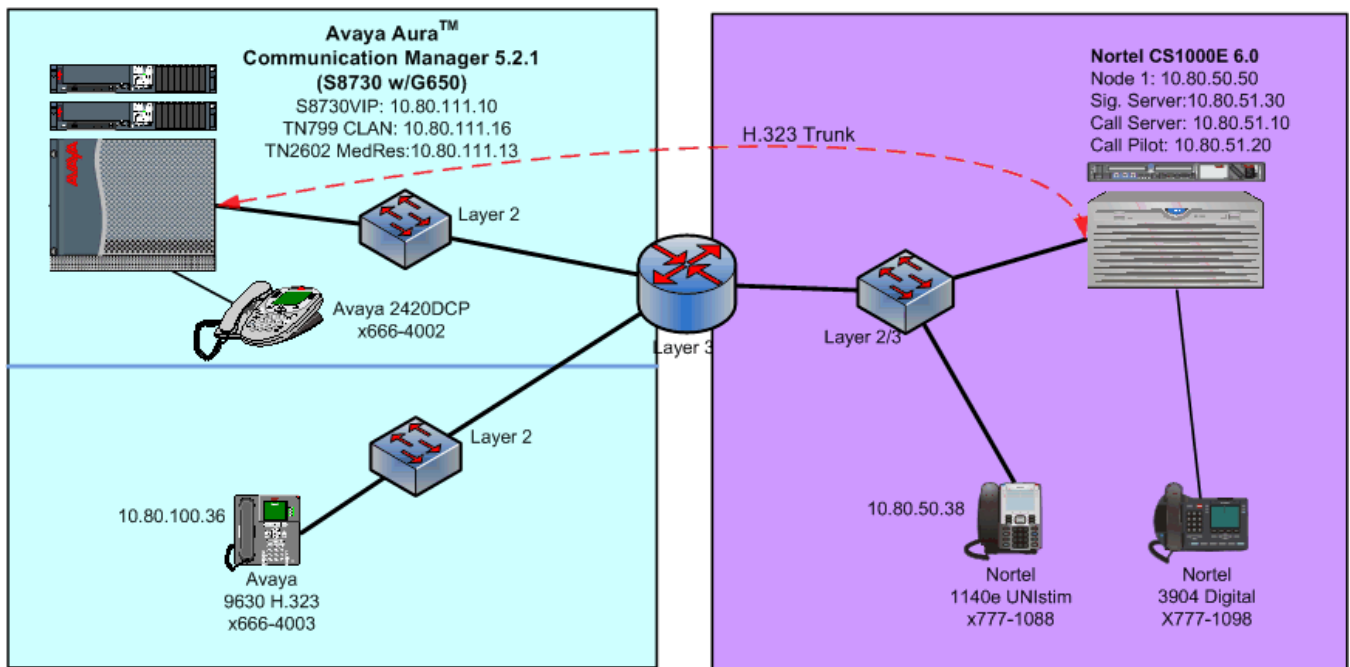


Figure 1: Network Overview

A seven-digit Uniform Dial Plan (UDP) is used to facilitate inter-system dialing. Unique ranges of extensions are associated with the Nortel CS1000 (777xxxx) and the Avaya S8730 Server (666xxxx). The Avaya S8730 Server will route 777xxxx extensions to the Nortel CS1000 over an H.323 signaling group and IP trunk group, whose configuration is fully described. The Nortel

CS1000E will in turn route 666xxxx numbers to the Avaya S8730 Server. The Nortel CS1000E 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 CS1000 in the network. All servers are configured to pass 7-digit extensions over the IP Trunks (i.e., 7-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.

Network Component	Version Information
S8730 Server running Avaya Aura™ Communication Manager	5.2.1, Load 16.4 with SA8507
Avaya G650 Media Gateway	n/a
Avaya TN799DP C-LAN	H1 FW34
Avaya TN2602AP Media Resource	HW2 FW51
Avaya 9630 H.323 Desk phone	3.0020
Avaya 2420 DCP Desk phone	n/a
Nortel CS1000 Signaling Server (Co-res)	6.0
Nortel CS1000E Call Server (Co-res)	6.0.18
Nortel Call Pilot messaging	5.0.41
Nortel 1140E UNIstim (IP) phone	0625C0
Nortel 3904 Digital phone	n/a

Table 1 – Equipment Version Information

3 Conventions

In these Application Notes, 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 CS1000 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 Aura™ Communication Manager on the Avaya S8730 Server

This section presents configuration steps for the Avaya S8730 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. If SA8507 is not enabled, contact an authorized Avaya sales representative.

```

(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

(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
(SA8608) - Increase Crisis Alert Buttons (S8700 only)? n
(SA8621) - SCH Feature Enhancements? n

```

4.1 Common Avaya Aura™ Communication Manager VoIP Concepts

Section 4.1 shows aspects of the configuration that are not unique to configurations involving Nortel CS1000. The standard configuration of the G650 Media Gateway and S8730 Server are omitted; product documentation and other available Application Notes cover these procedures. There are no special G650 Media Gateway considerations due to the presence of the Nortel CS1000 in this configuration. A reader experienced with the Avaya S8730 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 CS1000E.

The **list ip-interface all** command illustrates some of the IP address configuration of CM. The IP address and gateway address of the “C-LAN 01A03” interface are configured using CM’s SAT tool. This interface, named CLAN-1 will be used as the near-end of the H.323 signaling group to the Nortel CS1000. Avaya IP Telephones also registered for service with this interface.

```
list ip-interface all
```

IP INTERFACES								
ON	Type	Slot	Code/Sfx	Node Name/ IP-Address	Mask	Gateway Node	Net Rgn	VLAN
--	-----	-----	-----	-----	----	-----	---	----
y	MEDPRO	01A02	TN2602	XFire 10.80.111.13	/24	gateway1	1	n
y	C-LAN	01A03	TN799 D	CLAN-1 10.80.111.16	/24	gateway1	1	n

The **change/display ip-interface 01A03** screen shown below illustrates aspects of the C-LAN configuration. The following image shows similar information for the TN2602 in slot 01A02. Note the use of Network Region 1 for the Avaya devices.

```
display ip-interface 01a03                                     Page 1 of 3

                                IP INTERFACES

                                Type: C-LAN
                                Slot: 01A03      Target socket load and Warning level: 400
                                Code/Suffix: TN799 D      Receive Buffer TCP Window Size: 8320
                                Enable Interface? y      Allow H.323 Endpoints? y
                                VLAN: n      Allow H.248 Gateways? y
                                Network Region: 1      Gatekeeper Priority: 5


                                IPV4 PARAMETERS

                                Node Name: CLAN-1
                                Subnet Mask: /24
                                Gateway Node Name: gateway1

                                Ethernet Link: 1
                                Network uses 1's for Broadcast Addresses? y
```

```
display ip-interface 01a02                                     Page 1 of 4

                                IP INTERFACES

                                Critical Reliable Bearer? n

                                Type: MEDPRO
                                Slot: 01A02
                                Code/Suffix: TN2602
                                Enable Interface? y
                                VLAN: n
                                Network Region: 1
                                VOIP Channels: 320


                                IPV4 PARAMETERS

                                Node Name: XFire
                                Subnet Mask: /24
                                Gateway Node Name: gateway1
```

4.2 Configuration Related to Nortel CS1000E 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 CS1000.

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.

It's important to note that the IP address used for the Nortel CS1000E is that of the **NodeIP** and not the Call Server or Signaling servers addresses referenced in other parts of this document.

change node-names ip		Page 1 of 2
IP NODE NAMES		
Name	IP Address	
8730-1	10.80.111.11	
8730-2	10.80.111.12	
ASM1	10.80.100.24	
ASM2	10.80.100.26	
CLAN-1	10.80.111.16	
CLAN-2	10.80.111.17	
IPO	33.1.1.51	
NortelNodeIP	10.80.50.50	
VAL	10.80.111.18	
XFire	10.80.111.13	
default	0.0.0.0	
gateway1	10.80.111.1	

Signaling Group 30 will be created using the command “**add signaling-group 30**” to establish an H.323 signaling link between the Avaya S8730 Server and the Nortel CS1000. The signaling group number is not relevant; use any available number.

add signaling-group 30		Page 1 of 5
SIGNALING GROUP		
Group Number: 30	Group Type: h.323	
	Remote Office? n	Max number of NCA TSC: 1
	SBS? n	Max number of CA TSC: 2
IP Video? n		Trunk Group for NCA TSC: 30
Trunk Group for Channel Selection: 30		
TSC Supplementary Service Protocol: a		Network Call Transfer? y
T303 Timer(sec): 10		
H.245 DTMF Signal Tone Duration(msec):		
Near-end Node Name: CLAN-1	Far-end Node Name: NortelNodeIP	
Near-end Listen Port: 1720	Far-end Listen Port: 1720	
	Far-end Network Region: 1	
LRQ Required? n	Calls Share IP Signaling Connection? n	
RRQ Required? n	H245 Control Addr On FACility? n	
Media Encryption? n	Bypass If IP Threshold Exceeded? n	
	H.235 Annex H Required? n	
DTMF over IP: out-of-band	Direct IP-IP Audio Connections? y	
Link Loss Delay Timer(sec): 90	IP Audio Hairpinning? n	
Enable Layer 3 Test? n	Interworking Message: PROGRESS	
H.323 Station Outgoing Direct Media? n	DCP/Analog Bearer Capability: 3.1kHz	

The node-name CLAN-1 is used as the near-end of the signaling group. The far-end must be set to the Node IP address of the Nortel CS1000E, and not the IP address configured for the CS1000 Signaling Server. Retain the default near-end listen port (1720) and enter 1720 as the far-end listen port. **Calls Share IP Signaling Connection** should remain set to the default **n** setting, or interoperability problems will be experienced.

It should be noted that in earlier versions of the Nortel CS1000 (and noted in Reference 1), that ‘Direct IP-IP Audio Connections’ had to be set to ‘N’ and DTMF over IP set to ‘inband. It would appear that with version 6.0 of the Nortel CS1000E, these fields can now be set to ‘Y’ and ‘**rtp-payload**’ respectively. Additionally, in order for DTMF tones to be properly passed in both directions, set the **DTMF over IP** field to **out-of-band**.

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 set to '1' though it can be populated with another region value 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 CS1000. The approach used in this document allows connections among Avaya IP devices in Network Region 1 to use G.729A or G.711Mu-Law. For Signaling Group 30, the **Far-end Network Region** field has been set to 1. Communication Manager will treat calls using this signaling group as calls within Network Region 1.

The signaling group created with the preceding screen will be associated with Trunk Group 30 in a subsequent step.

The **ip-network-region** and **ip-codec-set** screens are shown below to complete the example of using different codec's for intra-region 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.

display ip-network-region 1		Page 1 of 19
IP NETWORK REGION		
Region: 1		
Location: 1 Authoritative Domain:		
Name:		
MEDIA PARAMETERS		Intra-region IP-IP Direct Audio: yes
Codec Set: 1		Inter-region IP-IP Direct Audio: yes
UDP Port Min: 2048		IP Audio Hairpinning? n
UDP Port Max: 16585		
DIFFSERV/TOS PARAMETERS		RTCP Reporting Enabled? y
Call Control PHB Value: 46		RTCP MONITOR SERVER PARAMETERS
Audio PHB Value: 46		Use Default Server Parameters? y
Video PHB Value: 26		
802.1P/Q PARAMETERS		
Call Control 802.1p Priority: 6		
Audio 802.1p Priority: 6		
Video 802.1p Priority: 5		AUDIO RESOURCE RESERVATION PARAMETERS
H.323 IP ENDPOINTS		RSVP Enabled? n
H.323 Link Bounce Recovery? y		
Idle Traffic Interval (sec): 20		
Keep-Alive Interval (sec): 5		
Keep-Alive Count: 5		


```
display 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: G.729        n           2          20
3:
4:
5:
6:
7:

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

For interoperability of calls requiring between Avaya and Nortel CS1000, there must be at least one matching audio codec between the two PBX's.

Next, a trunk group is configured using the command “**add trunk-group**” for calls to and from the Nortel CS1000. Most fields can be left at their defaults. Data has been entered in the fields shown in bold. The **Number of Members** field will determine the number of simultaneous calls allowed on the IP trunk group linking the Avaya S8730 Server with the Nortel CS1000. After this form is submitted, Communication Manager will assign a trunk number as a port identifier (e.g., T00032 and T00033 in this case, as seen in the verification screens in Section 8.)

```
change trunk-group 30                                     Page 1 of 21

TRUNK GROUP

Group Number: 30      Group Type: isdn      CDR Reports: y
Group Name: Nortel H323      COR: 1      TN: 1      TAC: #30
Direction: two-way      Outgoing Display? n      Carrier Medium: H.323
Dial Access? n      Busy Threshold: 255      Night Service:
Queue Length: 0
Service Type: tie      Auth Code? n
                        Member Assignment Method: auto
                        Signaling Group: 30
                        Number of Members: 10
```

Navigate to Page 2. Set the **Disconnect Supervision – In? Out?** field to “y” and “y” to allow an Avaya phone to transfer an incoming call from the Nortel PBX to an endpoint on the Nortel PBX.

change trunk-group 30 Group Type: isdn	Page 2 of 21
TRUNK PARAMETERS	
Codeset to Send Display: 6	Codeset to Send National IEs: 6
Supplementary Service Protocol: a	Charge Advice: none
	Digit Handling (in/out): enbloc/enbloc
Incoming Calling Number - Delete:	Digital Loss Group: 18
Insert:	Format:
Disconnect Supervision - In? y Out? y	
Answer Supervision Timeout: 0	
CONNECT Reliable When Call Leaves ISDN? n	

Navigate to Page 3. The **Send Calling Number** and **Send Name** field can be set to “y” to allow the calling party number & name 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). **Send Connected Number** field is shown set to “y”.

change trunk-group 30	Page 3 of 21
TRUNK FEATURES	
ACA Assignment? n	Measured: none
	Internal Alert? n
	Maintenance Tests? y
	Data Restriction? n
	NCA-TSC Trunk Member:
	Send Name: y
	Send Calling Number: y
Used for DCS? n	Send EMU Visitor CPN? n
Suppress # Outpulsing? n	Format: public
	UI IE Treatment: service-provider
	Replace Restricted Numbers? n
	Replace Unavailable Numbers? n
	Send Connected Number: y
Network Call Redirection: none	Hold/Unhold Notifications? n
Send UI IE? n	Modify Tandem Calling Number? n
Send UCID? n	
Send Codeset 6/7 LAI IE? y	

Next, the signaling group is associated with the IP trunk group. Using the command “**change signaling-group 30**”, enter the number **30** in the **Trunk Group for Channel Selection** field.

change signaling-group 30		Page 1 of 5	
SIGNALING GROUP			
Group Number: 30		Group Type: h.323	
Remote Office? n		Max number of NCA TSC: 1	
SBS? n		Max number of CA TSC: 2	
IP Video? n		Trunk Group for NCA TSC: 30	
Trunk Group for Channel Selection: 30			
TSC Supplementary Service Protocol: a		Network Call Transfer? y	
T303 Timer(sec): 10			
H.245 DTMF Signal Tone Duration(msec):			
Near-end Node Name: CLAN-1		Far-end Node Name: NortelNodeIP	
Near-end Listen Port: 1720		Far-end Listen Port: 1720	
		Far-end Network Region: 1	
LRQ Required? n		Calls Share IP Signaling Connection? n	
RRQ Required? n		H245 Control Addr On FACility? n	
Media Encryption? n		Bypass If IP Threshold Exceeded? n	
		H.235 Annex H Required? n	
DTMF over IP: rtp-payload		Direct IP-IP Audio Connections? y	
Link Loss Delay Timer(sec): 90		IP Audio Hairpinning? n	
Enable Layer 3 Test? n		Interworking Message: PROgress	
H.323 Station Outgoing Direct Media? n		DCP/Analog Bearer Capability: 3.1kHz	

Traditional Avaya UDP call routing is established such that dialed number 777xxxx is routed to a route pattern containing Trunk Group 30, passing the dialed 777xxxx digits to the Nortel CS1000.

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

5 Nortel CS1000E 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 listed in Section 8 “*IP Peer Networking: Installation and Commissioning*” [1] and “*NRS Fundamentals*” [2] are especially relevant to these Application Notes.

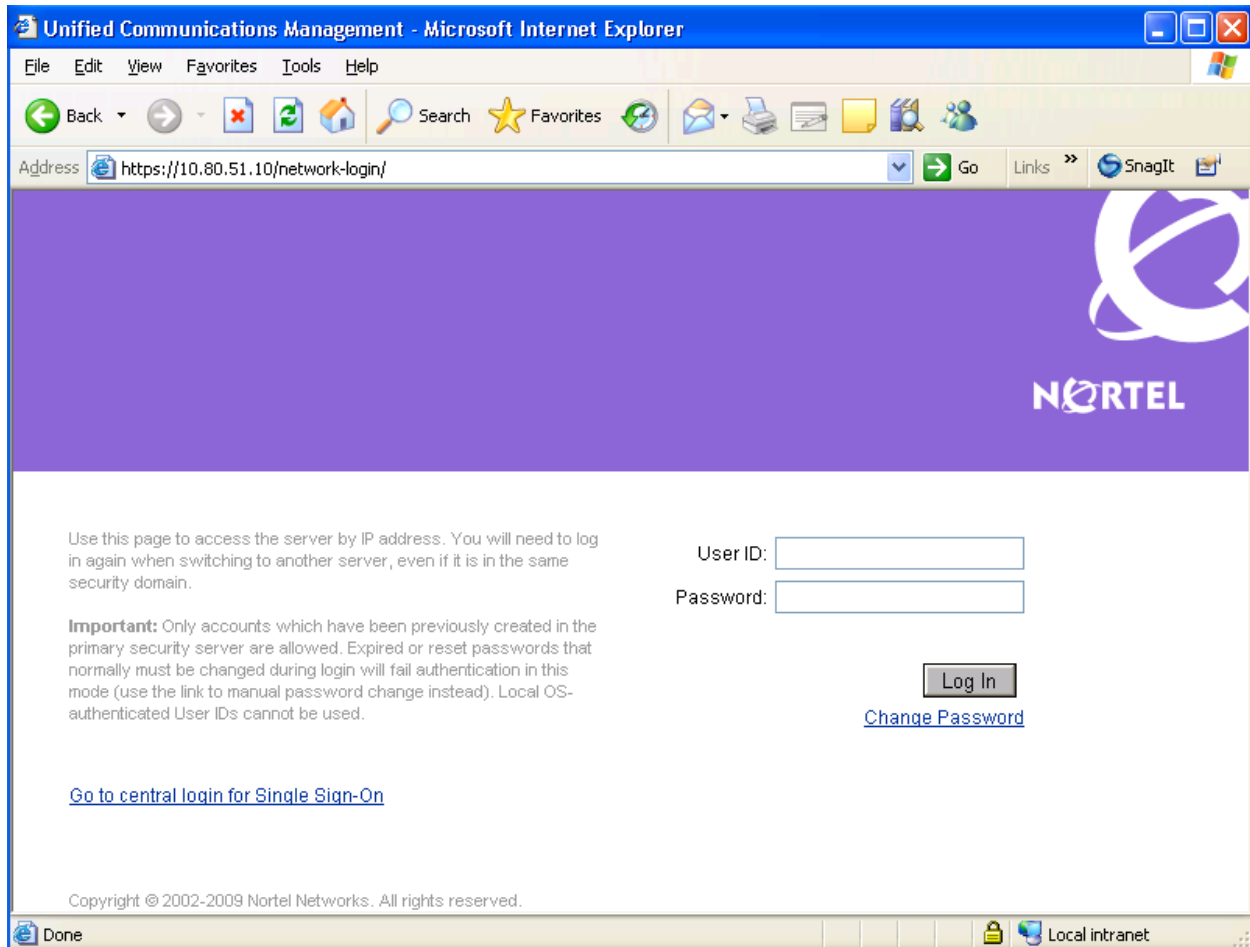
IP Peer Networking can use an H.323 Gatekeeper to manage a numbering plan for the network. For the simple network depicted in **Figure 1**, the numbering plan associated with the Avaya devices has the form 666xxxx. Routing calls over a H.323 link requires configuration steps on the CS1000E Call Server and the CS1000 Signaling Server. The CS1000 Call Server needs to be configured to steer calls of the form 666xxx to a Virtual Trunk using the Coordinated Dial Plan (CDP) feature. In addition, the CS1000 Signaling Server, co-resident on the CS1000 Call Server as part of the Network Routing Service (NRS), needs to be configured to direct dialed digits of the form 666xxxx to the Avaya S8730 Server. In these Application Notes, the interface to the Avaya S8730 Server is configured as a “non-RAS endpoint” in the NRS.

The CS1000 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 CS1000 Signaling Server also provides the “Terminal Proxy Server” (TPS) function for the Nortel IP Telephones associated with the CS1000. Finally, the Signaling Server includes two web interfaces called “Element Manager” and “Network Routing Service Manager” for managing the configuration of the Signaling Server and Call Server.

Lastly, it should be noted that the Nortel CS1000E has both a Command Line Interface (CLI) as well a web-based interface called Unified Communications Manager (UCM). More experienced Nortel administrators will likely prefer to use the CLI though this document was written based on UCM admin.

5.1 Launch Element Manager and Log in

For the configuration depicted in **Figure 1**, the Signaling Server address is 10.80.51.30, the Nortel Node IP address is 10.80.50.50 and the call server is at 10.80.51.10. A web browser can connect to <https://10.80.51.10> to access the Element Manager as shown below and complete the configuration. Click the **Login** button.



The **UCM** page is displayed as shown below. The left side of this screen will be referred to as the Navigation Tree. Click on **EM on Interop-cs1000e** link to display attributes related to the Node IP.

Unified Communications Management - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address <https://10.80.51.10/frames.faces?body=/secureObjectManagement.faces> Go Links SnagIt

NORTEL UNIFIED COMMUNICATIONS MANAGEMENT [Help](#) | [Logout](#)

Host Name: interop-cs1000e.interop.avaya.com Software Version: 02.00.0055.00(3266) User Name

Elements

New elements are registered into the security framework, or may be added as simple hyperlinks. Click an element name to launch its management service.

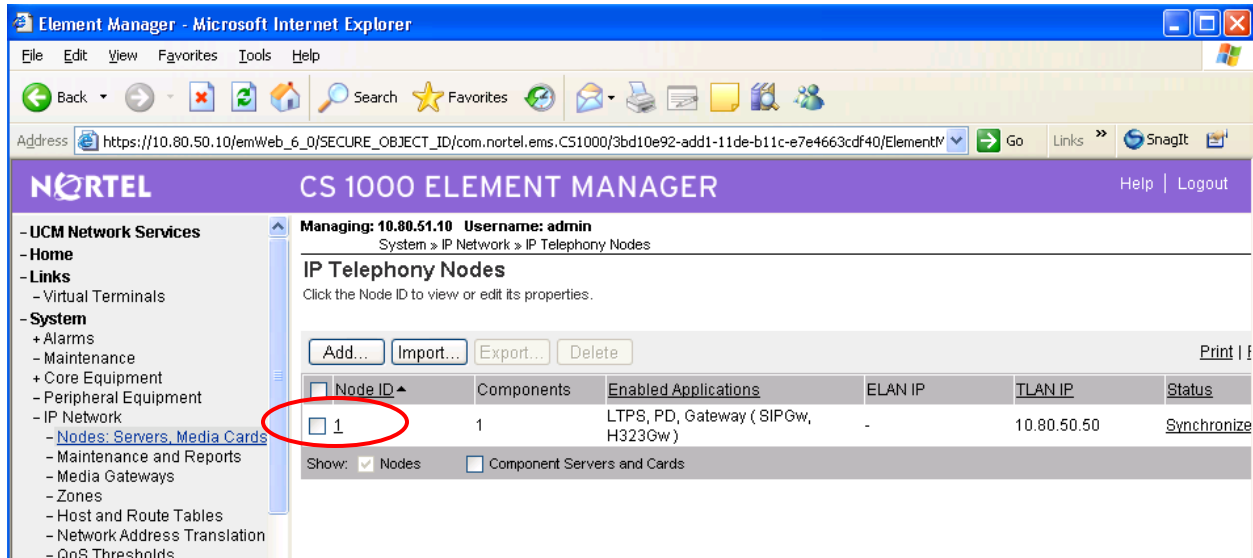
[Add...](#) [Edit...](#) [Delete](#)

<input type="checkbox"/>	Element Name	Element Type	Release	Address	Description
<input checked="" type="checkbox"/>	EM on interop-cs1000e	CS1000	6.0	10.80.51.10	New element.
<input type="checkbox"/>	interop-cs1000e.interop.avaya.com (primary)	Linux Base	6.0	10.80.50.10	Base OS element.
<input type="checkbox"/>	10.80.51.13	Media Gateway Controller	6.0	10.80.51.13	New element.
<input type="checkbox"/>	10.80.51.12	Media Gateway Controller	6.0	10.80.51.12	New element.
<input type="checkbox"/>	NRSM on interop-cs1000e	Network Routing	6.0	10.80.51.10	New element.

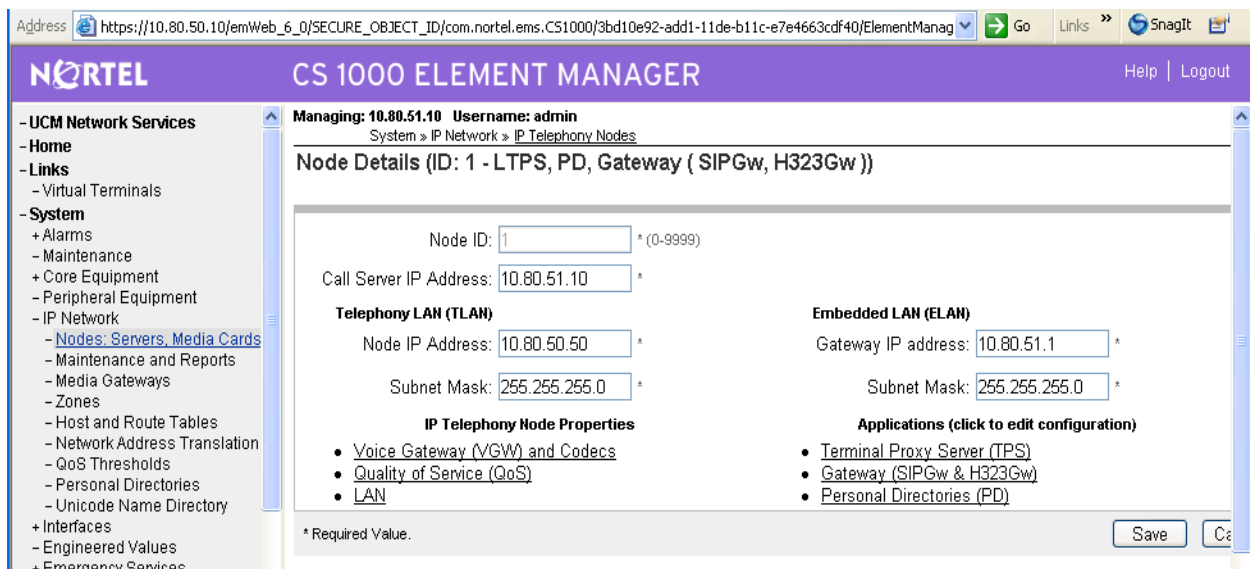
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Local intranet

Under **System** expand **IP Network** and select **Nodes: Servers, Media Cards**. The list of Node ID's is displayed. Select **Node 1**. Note that the node number and IP address may vary.



The **Node Configuration** screen is updated with additional details as shown below. Make a note of the **Node ID** “1”, the Call Server IP address of 10.80.51.10 (ELAN) and the Node IP address of “10.80.50.50”. Recall that we used the Node IP address as the far-end value on Communication Manager’s signaling-group 30. These values are also used to configure other sections.



5.2 Configure the Customer Data Block

Select **Customers** from the Navigation Tree.

The screenshot shows the Nortel CS 1000 Element Manager web interface in a Microsoft Internet Explorer browser. The address bar shows the URL: `https://10.80.50.10/emWeb_6_0/SECURE_OBJECT_ID/com.nortel.ems.CS1000/3bd10e92-add1-11de-b11c-e7e4663cdf40/ElementManag`. The page title is "Nortel CS 1000 ELEMENT MANAGER". The navigation tree on the left includes the following items:

- Network Address Translation
- QoS Thresholds
- Personal Directories
- Unicode Name Directory
- + Interfaces
- Engineered Values
- + Emergency Services
- + Geographic Redundancy
- + Software
- **Customers**
- Routes and Trunks
 - Routes and Trunks
 - D-Channels
 - Digital Trunk Interface
- Dialing and Numbering Plans
 - Electronic Switched Network
 - Flexible Code Restriction
 - Incoming Digit Translation

The main content area shows the "Customers" configuration page. It includes a status bar at the top indicating "Managing: 10.80.51.10 Username: admin" and "Customers". Below this, there is a table with the following columns: "Customer Number", "Total Routes", and "Total Trunks". The table contains one row with the following data:

Customer Number	Total Routes	Total Trunks
1 00	4	54

There are "Add..." and "Delete" buttons above the table, and a "Ref" link at the bottom right of the table.

Click the **Customer Number** link (00) associated with the customer. The screen below is displayed.

The screenshot shows a web browser window with the address bar displaying a URL starting with `https://10.80.50.10/emWeb_6_0/SECURE_OBJECT_ID/com.nortel.ems.CS1000/3bd10e92-add1-11de-b11c-e7e4663c`. The page title is "NORTEL CS 1000 ELEMENT MANAGER". The left sidebar contains a navigation menu with categories like "Host and Route Tables", "Network Address Translation", "QoS Thresholds", "Personal Directories", "Unicode Name Directory", "Interfaces", "Engineered Values", "Emergency Services", "Geographic Redundancy", "Software", "Customers", "Routes and Trunks", "Dialing and Numbering Plans", "Phones", "Tools", and "Security". The "Customers" link is highlighted. The main content area is titled "Edit" and lists various configuration options: Basic Configuration, Application Module Link, Call Detail Recording, Call Party Name Display, Call Redirection, Centralized Attendant Service, Controlled Class of Service, Feature Options, Feature Packages, Flexible Feature Codes, Intercept Treatments, ISDN and ESN Networking, Listed Directory Numbers, Mobile Service Directory Numbers, Multi-Party Operations, Night Service, Options, and Recorded Overflow Announcement. The footer of the page states "Copyright © 2002-2009 Nortel Networks. All rights reserved."

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.

The screenshot shows the 'Element Manager - Microsoft Internet Explorer' window. The address bar displays a URL starting with 'https://10.80.50.10/emWeb_6_0/SECURE_OBJECT_ID/com.nortel.ems.CS1000/3bd10e92-add1-11de-b11c-e7e4663c'. The page title is 'NORTEL CS 1000 ELEMENT MANAGER'. The left sidebar contains a navigation tree with categories like 'Zones', 'Interfaces', 'Customers', 'Routes and Trunks', 'Dialing and Numbering Plans', 'Phones', 'Tools', and 'Security'. The main content area is titled '- Integrated Services Digital Network Package: 145'. It includes a section '+ Dial Access Prefix on CLID table entry option'. The 'Integrated Services Digital Network' checkbox is checked and circled in red. Below it are various input fields and dropdown menus for configuration, including 'Virtual Private Network Identifier', 'Private Network Identifier', 'Node DN', 'Multi-location Business Group', 'Business Sub Group Consult-only', 'Prefix 1', 'Prefix 2', 'Home Number Plan Area code', 'Prefix for Central Office', 'Local steering code', 'Calling Number Type', 'Redirection Count for ISDN calls', 'CLID information for incoming/outgoing calls', and 'Public Service Telephone Networks'.

Scroll to the bottom of the page and click the **Submit** button (not shown).

5.3 Configure the D-Channel

The concept of a D-Channel on a Nortel system is a bit different than on Avaya. In this section Virtual D-Channel configuration steps are described which are used for signaling between the Nortel Call Server and Signaling Server.

Select **Routes and Trunks → D-Channels** from the Navigation Tree. The resulting screen will display any D-Channels that have been previously configured. D-Channel 1 is associated with the IP signaling to the Nortel Signaling Server (and ultimately to the Avaya PBX). The text below is written as if the D-Channel had not been previously configured.

The screenshot shows the Nortel CS 1000 Element Manager web interface. The top header is purple with the Nortel logo, 'CS 1000 ELEMENT MANAGER', a 'Capture Now' button, and 'Help | Logout' links. A status bar below the header shows 'Managing: 10.80.51.10', 'Username: admin', and the breadcrumb 'Routes and Trunks » D-Channels'. The left navigation tree is expanded to 'D-Channels'. The main content area is titled 'D-Channels' and contains two sections: 'Maintenance' with links for 'D-Channel Diagnostics (LD 96)', 'Network and Peripheral Equipment (LD 32, Virtual D-Channels)', 'MSDL Diagnostics (LD 96)', and 'D-Channel Expansion Diagnostics (LD 48)'; and 'Configuration'. The 'Configuration' section has a form to 'Choose a D-Channel Number' (set to 0) and 'type' (set to DCH), with a 'to Add' button. Below this is a table of existing channels:

Channel	Type	Card Type	Description	Action
Channel: 1	DCH	DCIP	VirtDtoSS	Edit
Channel: 20	DCH	TMDI	QSIGtoM1K	Edit
Channel: 21	DCH	TMDI	QsigtoCM	Edit

In the **Choose a D-Channel Number** drop-down, select an unused D-Channel number and click the **to Add** button. From the **D-channel Card Type (CTYP)** drop-down field, select **D-Channel is over IP (DCIP)**. In the **Designator (DES)** field, enter a descriptive name for the D-Channel. 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)**.

The screenshot shows the Nortel CS 1000 Element Manager web interface in Microsoft Internet Explorer. The browser address bar shows the URL: https://10.80.50.10/emWeb_6_0/SECURE_OBJECT_ID/com.nortel.ems.CS1000/3bd10e92-add1-11de-b11c-e7e4663cdf40/Elerr. The page title is "CS 1000 ELEMENT MANAGER".

The left sidebar contains a navigation menu with the following items:

- UCM Network Services
 - Home
 - Links
 - Virtual Terminals
 - System
 - + Alarms
 - Maintenance
 - + Core Equipment
 - Peripheral Equipment
 - + IP Network
 - + Interfaces
 - Engineered Values
 - + Emergency Services
 - + Geographic Redundancy
 - + Software
 - Customers
 - Routes and Trunks
 - Routes and Trunks
 - D-Channels
 - Digital Trunk Interface
 - Dialing and Numbering Plans
 - Electronic Switched Network
 - Flexible Code Restriction
 - Incoming Digit Translation
 - Phones
 - Templates
 - Reports
 - Properties
 - Migration
 - Tools
 - + Backup and Restore
 - Date and Time
 - + Logs and reports
 - Security

The main content area is titled "Basic Configuration" and contains a table with two columns: "Input Description" and "Input Value".

Input Description	Input Value
Action Device And Number (ADAN) (TYPE)	DCH
D channel Card Type (CTYP)	DCIP
Designator (DES)	VirtDtoSS
Recovery to Primary (RCVP)	<input type="checkbox"/>
PRI loop number for Backup D-channel (BCHL)	
User (USR)	Integrated Services Signaling Link Dedicated (ISLD)
Interface type for D-channel (IFC)	Meridian Meridian1 (SL1)
D-Channel PRI loop number (DCHL)	
Primary Rate Interface (PRI)	<input type="text"/> more PRI
Secondary PRI2 loops (PRI2)	<input type="text"/>
Meridian 1 node type (SIDE)	Slave to the controller (USR)
Release ID of the switch at the far end (RLS)	25
Central Office switch type (CO_TYPE)	100% compatible with Bellcore standard (STD)
Integrated Services Signaling Link Maximum (ISLM)	4000 Range: 1 - 4000
Signaling Server Resource Capacity (SSRC)	1800 Range: 0 - 4000

Below the table, there are two expandable sections:

- + Basic options (BSCOPT)
- + Advanced options (ADVOPT)

Select the "Remote Capabilities (RCAP)". Click on **Basic options (BSCOPT)** followed by the **Edit** button next to **Remote Capabilities (RCAP)**.

NORTEL

CS 1000 ELEMENT MANAGER

- UCM Network Services
- Home
- Links
 - Virtual Terminals
- System
 - + Alarms
 - Maintenance
 - + Core Equipment
 - Peripheral Equipment
 - + IP Network
 - + Interfaces
 - Engineered Values
 - + Emergency Services
 - + Geographic Redundancy
 - + Software
- Customers
- Routes and Trunks
 - Routes and Trunks
 - D-Channels
 - Digital Trunk Interface
- Dialing and Numbering Plans
 - Electronic Switched Network
 - Flexible Code Restriction
 - Incoming Digit Translation
- Phones
 - Templates
 - Reports
 - Properties
 - Migration
- Tools
 - + Backup and Restore
 - Date and Time
 - + Logs and reports
- Security

release ID of the switch at the far end (RLS) 25

Central Office switch type (CO_TYPE) 100% compatible with Bellcore standard (STD)

Integrated Services Signaling Link Maximum (ISLM) 4000 Range: 1 - 4000

Signaling Server Resource Capacity (SSRC) 1800 Range: 0 - 4000

- Basic options (BSCOPT)

Primary D-channel for a backup DCH (PDCH)

- PINX customer number (PINX_CUST)

- Progress signal (PROG)

- Calling Line Identification (CLID)

- Output request Buffers (OTBF) 32

- D-channel transmission Rate (DRAT) 56 kb/s when LCMT is AMI (56K)

- Channel Negotiation option (CNEO) No alternative acceptable, exclusive. (1)

- Remote Capabilities (RCAP) Edit

+ - Change protocol timer value (TIMR)

- B channel Service messaging. (BSRV)

+ Advanced options (ADVOPT)

+ Feature Packages

Submit Refresh Delete Cancel

A screen with parameters such as Network name display method 1 (ND1) is displayed. Scroll down and check the box for **Network name Display method 3 (ND3)**. Click the Return – Remote Capabilities button at the bottom of the page, followed by the Submit button to save the changes.

NORTEL CS 1000 ELEMENT MANAGER Help | Logout

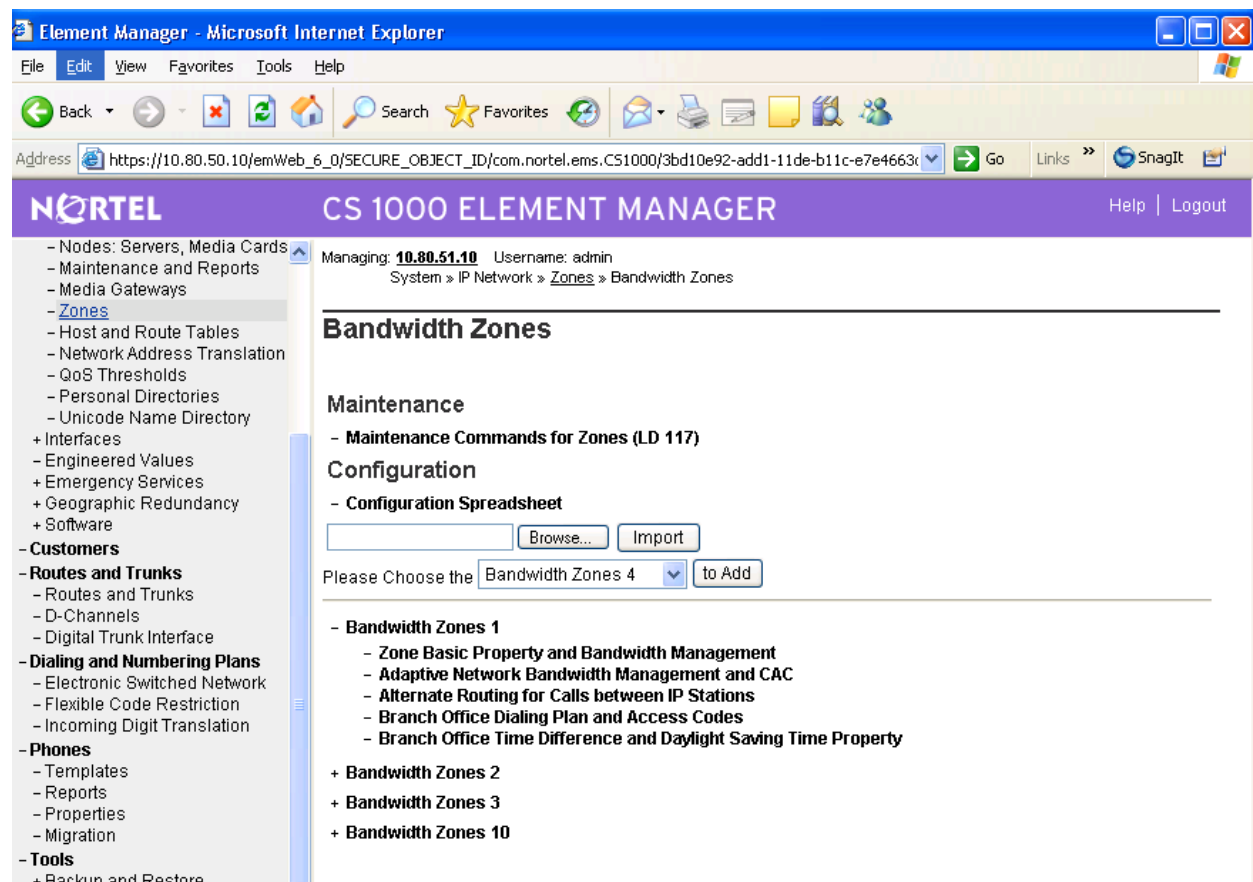
- UCM Network Services
 - Home
 - Links
 - Virtual Terminals
 - System
 - + Alarms
 - Maintenance
 - + Core Equipment
 - Peripheral Equipment
 - + IP Network
 - + Interfaces
 - Engineered Values
 - + Emergency Services
 - + Geographic Redundancy
 - + Software
 - Customers
 - Routes and Trunks
 - Routes and Trunks
 - **D-Channels**
 - Digital Trunk Interface
 - Dialing and Numbering Plans
 - Electronic Switched Network
 - Flexible Code Restriction
 - Incoming Digit Translation
 - Phones
 - Templates
 - Reports
 - Properties
 - Migration
 - Tools

Diversion info. is sent using object identifier (DV10) ☐
 Rerouting requests processed using integer value (DV2I) ☐
 Rerouting requests processed using object identifier (DV2O) ☐
 Diversion info. sent. rerouting requests processed (DV3I) ☐
 EuroISDN - div. info sent. rerouting req. processed (DV3O) ☐
 Call transfer notification and invocation to EuroISDN (ECTO) ☐
 Malicious call identification (MCID) ☐
 MCDN QSIG conversion (MQC) ☐
 Remote D-channel is on a MSDL card (MSL) ☐
 Message waiting interworking with DMS-100 (MMI) ☐
 Network access data (NAC) ☐
 Network call trace supported (NCT) ☐
 Network name display method 1 (ND1) ☐
 Network name display method 2 (ND2) ☐
 Network name display method 3 (ND3) ☒
 Name display - integer ID coding (NDI) ☐
 Name display - object ID coding (NDO) ☐
 Path replacement uses integer values (PRI) ☐
 Path replacement uses object identifier (PRO) ☐
 Release Link Trunks over IP (RLTI) ☐

5.4 Configure Bandwidth Zones

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

Select **IP Telephony → Zones** from the Navigation Tree. Then select **Bandwidth Zones**. The resulting screen will display a list of zones that have been previously configured. Zone 5 is associated with the IP route to the Avaya S8730 system. The text below is written as if the zone had not been previously configured.



Choose an unused zone number from the drop-down, and click **to Add**. A window with the text **To maintain consistent zone properties within the network, it is recommended to use the “Zone Basic Property and Bandwidth Management Spreadsheet”**. Do you wish to Proceed? will pop up. Click **OK**.

The **Zone Basic Property and Bandwidth Management** page will appear. The **Intrazone Strategy (INTRA_STGY)** should be left at the default value of **Best Quality (BQ)**. From the **Interzone Strategy (INTER_STGY)** drop-down, select the value **Best Quality (BB)**. This approach is similar to the Avaya configuration in Section 4.2. From the **Zone Intent (ZBRN)** drop-down, select the value **VTRK (VTRK)**. All other parameters are left with their default values. Enter text in the **Description (ZDES)** field if desired, and click the **Submit** button.

The screenshot shows the CS 1000 Element Manager web interface in a Microsoft Internet Explorer browser. The address bar shows the URL: https://10.80.50.10/emWeb_6_0/SECURE_OBJECT_ID/com.nortel.ems.CS1000/3bd10e92-add1-11de-b11c-e7e4663c. The page title is "CS 1000 ELEMENT MANAGER". The left sidebar contains a navigation tree with categories like Nodes, Maintenance and Reports, Media Gateways, Zones, Host and Route Tables, Network Address Translation, QoS Thresholds, Personal Directories, Unicode Name Directory, Interfaces, Engineered Values, Emergency Services, Geographic Redundancy, Software, Customers, Routes and Trunks, Dialing and Numbering Plans, and Phones. The main content area is titled "Zone Basic Property and Bandwidth Management". It displays a table with two columns: "Input Description" and "Input Value". The table contains the following rows:

Input Description	Input Value
Zone Number (ZONE):	2
Intrazone Bandwidth (INTRA_BW):	1000000
Intrazone Strategy (INTRA_STGY):	Best Quality (BQ)
Interzone Bandwidth (INTER_BW):	1000000
Interzone Strategy (INTER_STGY):	Best Quality (BQ)
Resource Type (RES_TYPE):	Shared (SHARED)
Zone Intent (ZBRN):	VTRK (VTRK)
Description (ZDES):	VIRT_TRUNKS

At the bottom of the form, there are four buttons: Submit, Refresh, Delete, and Cancel.

5.5 Configure Virtual Route

Select **Routes and Trunks** → **Routes and Trunks** from the Navigation Tree. Click the **Add route** button associated with the customer. In this case, **Route 10** was used to configure H323 properties.

Element Manager - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address https://10.80.50.10/emWeb_6_0/SECURE_OBJECT_ID/com.nortel.ems.CS1000/3bd10e92-add1-11de-b11c-e7e4663 Go Links SnagIt

NORTEL CS 1000 ELEMENT MANAGER Help | Logout

Managing: **10.80.51.10** Username: admin
Routes and Trunks » Routes and Trunks

Routes and Trunks

Customer	Total routes	Total trunks		
Customer: 0	4	54	Add route	
+Route: 1	Type: TIE	Description: SIPNRS	Edit	Add trunk
+Route: 3	Type: TIE	Description: QSIG TO CM	Edit	Add trunk
+Route: 4	Type: TIE	Description: QSIGTOM1K	Edit	Add trunk
+Route: 10	Type: TIE	Description: H323	Edit	Add trunk

A **Customer 0, New Route Configuration** screen appears. Under **Basic Configuration** section, select a Route Number from the **Route Number (ROUT)** drop-down. Route Number 10 is associated with the H323 IP virtual route to the Avaya S8730 Server. In the **Designator field for trunk (DES)** enter a descriptor. From the **Trunk Type (TKTP)** drop-down, select **TIE trunk data block (TIE)**. From the **Incoming and Outgoing trunk (ICOG)** drop-down, select **Incoming and Outgoing (IAO)**. Once **TIE** is selected for the **Trunk Type**, additional fields appear. Check the box **The route is for a virtual trunk route (VTRK)**. Enter the zone number configured in Section 5.4 in the **Zone for codec selection and bandwidth management (ZONE)** field (e.g. 3). Enter the node id (e.g., 1) 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 box for **Integrated Services Digital Network (ISDN)**. This will result in a few new fields to be displayed. In the **Mode of operation (MODE)** drop-down, select **Route uses ISDN Signaling Link (ISLD)**. Enter the D-channel number configured previously (e.g., 1). Check the boxes for **Network Calling Name Allowed (NCNA)**, and **Network Call Redirection (NCRD)**. Scroll to the top of the page and enter a value to the **Access code for the trunk route (ACOD)** field. When finished, click the **Submit** button (not shown).

Note: Slightly truncated screen shots are shown below.

Element Manager - Microsoft Internet Explorer

Address: https://10.80.50.10/emWeb_6_0/SECURE_OBJECT_ID/com.nortel.ems.CS1000/3bd10e92-add1-11de-b11c-e7e4663

NORTEL CS 1000 ELEMENT MANAGER

Help | Logout

- Nodes: Servers, Media Cards
- Maintenance and Reports
- Media Gateways
- Zones
- Host and Route Tables
- Network Address Translation
- QoS Thresholds
- Personal Directories
- Unicode Name Directory
- + Interfaces
- Engineered Values
- + Emergency Services
- + Geographic Redundancy
- + Software
- Customers
- Routes and Trunks
 - Routes and Trunks
 - D-Channels
 - Digital Trunk Interface
- Dialing and Numbering Plans
 - Electronic Switched Network
 - Flexible Code Restriction
 - Incoming Digit Translation
- Phones
 - Templates
 - Reports
 - Properties
 - Migration
- Tools
 - Backup and Restore
 - Date and Time

Customer 0, Route 10 Property Configuration

- Basic Configuration

Route data block (RDB) (TYPE)

Customer number (CUST)

Route number (ROUT)

Designator field for trunk (DES)

Trunk type (TKTP)

Incoming and outgoing trunk (ICOG)

Access code for the trunk route (ACOD)

Trunk type M911P (M911P) ☐

The route is for a virtual trunk route (VTRK) ☒

- Zone for codec selection and bandwidth management (ZONE) Range: 0 - 255

- Node ID of signaling server of this route (NODE) Range: 0 - 9999

- Protocol ID for the route (PCID)

Integrated services digital network option (ISDN) ☒

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Element Manager - Microsoft Internet Explorer

Address: https://10.80.50.10/emWeb_6_0/SECURE_OBJECT_ID/com.nortel.ems.CS1000/3bd10e92-add1-11de-b11c-e7e4663

NORTEL CS 1000 ELEMENT MANAGER

Help | Logout

- Nodes: Servers, Media Cards
- Maintenance and Reports
- Media Gateways
- Zones
- Host and Route Tables
- Network Address Translation
- QoS Thresholds
- Personal Directories
- Unicode Name Directory
- + Interfaces
- Engineered Values
- + Emergency Services
- + Geographic Redundancy
- + Software
- Customers
- Routes and Trunks
 - Routes and Trunks
 - D-Channels
 - Digital Trunk Interface
- Dialing and Numbering Plans
 - Electronic Switched Network
 - Flexible Code Restriction
 - Incoming Digit Translation
- Phones
 - Templates
 - Reports
 - Properties
 - Migration
- Tools
 - + Backup and Restore
 - Date and Time

The route is for a virtual trunk route (VTRK) ☒

- Zone for codec selection and bandwidth management (ZONE) Range: 0 - 255

- Node ID of signaling server of this route (NODE) Range: 0 - 9999

- Protocol ID for the route (PCID)

Integrated services digital network option (ISDN) ☒

- Mode of operation (MODE)

- D channel number (DCH) Range: 0 - 254

- Interface type for route (IFC)

- Private network identifier (PNI) Range: 0 - 32700

- Network calling name allowed (NCNA) ☒

- Network call redirection (NCRD) ☐

- Recognition of DTI2 ABCD FALT signal for ISL (FALT) ☐

- Channel type (CHTY)

- Call type for outgoing direct dialed TIE route (CTYP)

- Insert ESN access code (INAC) ☒

- Integrated service access route (ISAR) ☐

- Display of access prefix on CLID (DAPC) ☐

- Mobile extension route (MBXR) ☐

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5.6 Configure Virtual Trunks

Select **Routes and Trunks** → **Routes and Trunks** 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 10).

The screenshot shows the Nortel CS 1000 Element Manager web interface in a Microsoft Internet Explorer browser. The address bar shows the URL: https://10.80.50.10/emWeb_6_0/SECURE_OBJECT_ID/com.nortel.ems.CS1000/3bd10e92-add1-11de-b11c-e7e4663x. The page title is "CS 1000 ELEMENT MANAGER". The navigation tree on the left includes: UCM Network Services, Home, Links, System, Customers, Routes and Trunks (selected), and Phones. The main content area shows the "Routes and Trunks" configuration page for Customer 0. It displays a table of routes and trunks with buttons for editing and adding new entries.

Customer: 0	Total routes: 4	Total trunks: 54	Add route
+ Route: 1	Type: TIE	Description: SIPNRS	Edit Add trunk
+ Route: 3	Type: TIE	Description: QSIG TO CM	Edit Add trunk
+ Route: 4	Type: TIE	Description: QSIGTOM1K	Edit Add trunk
- Route: 10	Type: TIE	Description: H323	Edit Add trunk
Trunk: 1 - 4 Total trunks: 4			
- Trunk: 1	TN: 100 0 00 00	Description: H323	Edit Multi - Del
- Trunk: 2	TN: 100 0 00 01	Description: H323	Edit
- Trunk: 3	TN: 100 0 00 02	Description: H323	Edit
- Trunk: 4	TN: 100 0 00 03	Description: H323	Edit

In the **Trunk data block (TYPE)** drop-down, select **IP Trunk (IPT1)**. In the **Terminal Number (TN)** field, enter an unused TN (e.g., **100 0 00 00**). 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., **10 1**). In the **Start arrangement Incoming (STRI)** drop-down, select **Immediate (IMM)**. In the **Start arrangement Outgoing (STRO)** drop-down, select **Immediate (IMM)**. In the **Channel ID for this trunk** field, enter a Channel ID that has not been used in the system (e.g. 5). 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 (not shown).

Element Manager - Microsoft Internet Explorer

Address: https://10.80.50.10/emWeb_6_0/SECURE_OBJECT_ID/com.nortel.ems.CS1000/3bd10e92-add1-11de-b11

NORTEL CS 1000 ELEMENT MANAGER

Customer 0, Route 10, Trunk 1 Property Configuration

- Basic Configuration

Input Description	Input Value
Trunk data block (TYPE)	IPT1
Terminal Number (TN)	100 0 00 00
Designator field for trunk (DES)	H323
Extended Trunk (XTRK)	VTRK
Route number, Member number (RTMB)	10 1
Level 3 Signaling (SIGL)	
Card Density (CDEN)	8D
Start arrangement Incoming (STRI)	Immediate (IMM)
Start arrangement Outgoing (STRO)	Immediate (IMM)
Trunk Group Access Restriction (TGAR)	1
Channel ID for this trunk. (CHID)	10
Increase or decrease the member numbers (INC)	Increase channel and member number (YES)
Class of Service (CLS)	Edit

+ Advanced Trunk Configurations

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The following Routes and Trunks screen shows the results after 4 virtual trunk members have been added to Route 10. Configure the same number of virtual trunk members in CS1000 as have been configured as trunk members in the corresponding Communication Manager trunk group (i.e., Trunk Group 7 in Section 4.2).

Element Manager - Microsoft Internet Explorer

Address: https://10.80.50.10/emWeb_6_0/SECURE_OBJECT_ID/com.nortel.ems.CS1000/3bd10e92-add1-11de-b11

NORTEL CS 1000 ELEMENT MANAGER Help | Logout

Managing: **10.80.51.10** Username: admin
Routes and Trunks » Routes and Trunks

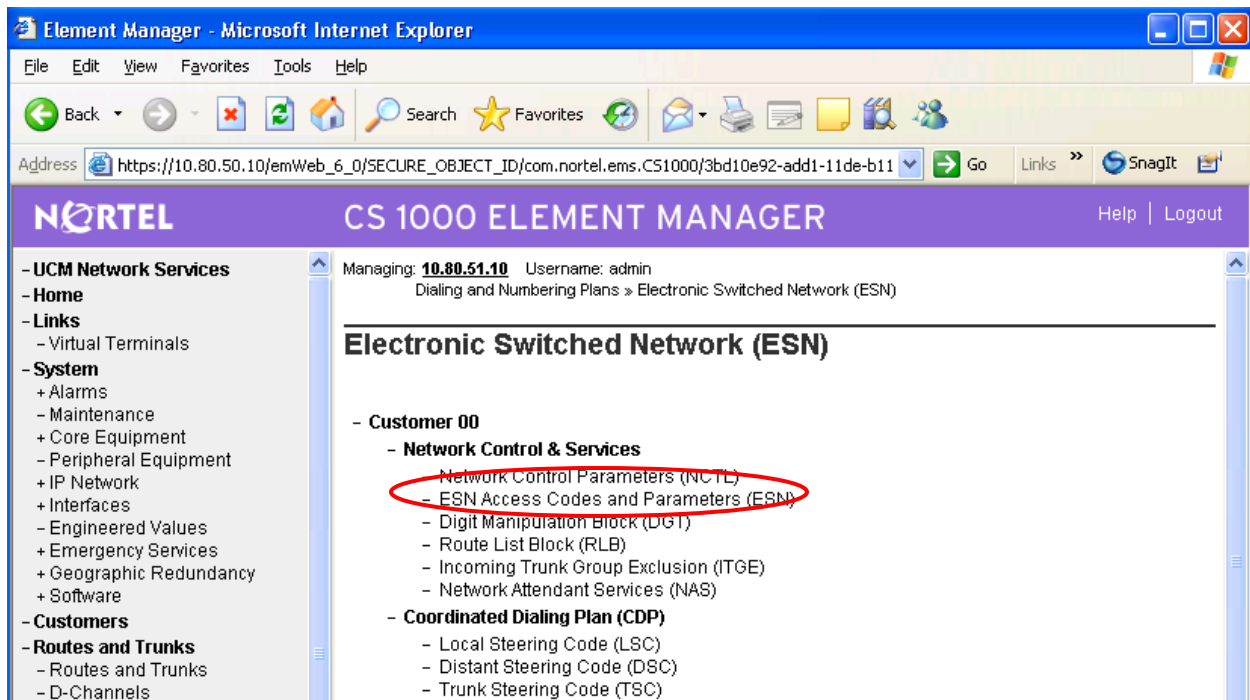
Routes and Trunks

Customer	Total routes	Total trunks		
- Customer: 0	4	54	Add route	
+ Route: 1	Type: TIE	Description: SIPNRS	Edit	Add trunk
+ Route: 3	Type: TIE	Description: QSIG TO CM	Edit	Add trunk
+ Route: 4	Type: TIE	Description: QSIGTOM1K	Edit	Add trunk
- Route: 10	Type: TIE	Description: H323	Edit	Add trunk
Trunk: 1 - 4 Total trunks: 4				
- Trunk: 1	TN: 100 0 00 00	Description: H323	Edit	Multi - Del
- Trunk: 2	TN: 100 0 00 01	Description: H323	Edit	
- Trunk: 3	TN: 100 0 00 02	Description: H323	Edit	
- Trunk: 4	TN: 100 0 00 03	Description: H323	Edit	

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 CS1000 to the IP Trunk to Communication Manager. The Nortel CDP feature together with the 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 **Dialing and Numbering Plans → Electronic Switched Network** 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** (not shown)

The screenshot shows the 'Element Manager - Microsoft Internet Explorer' window. The address bar displays the URL: https://10.80.50.10/emWeb_6_0/SECURE_OBJECT_ID/com.nortel.ems.CS1000/3bd10e92-add1-11de-b11. The page title is 'CS 1000 ELEMENT MANAGER'. The sidebar on the left contains the following navigation links:

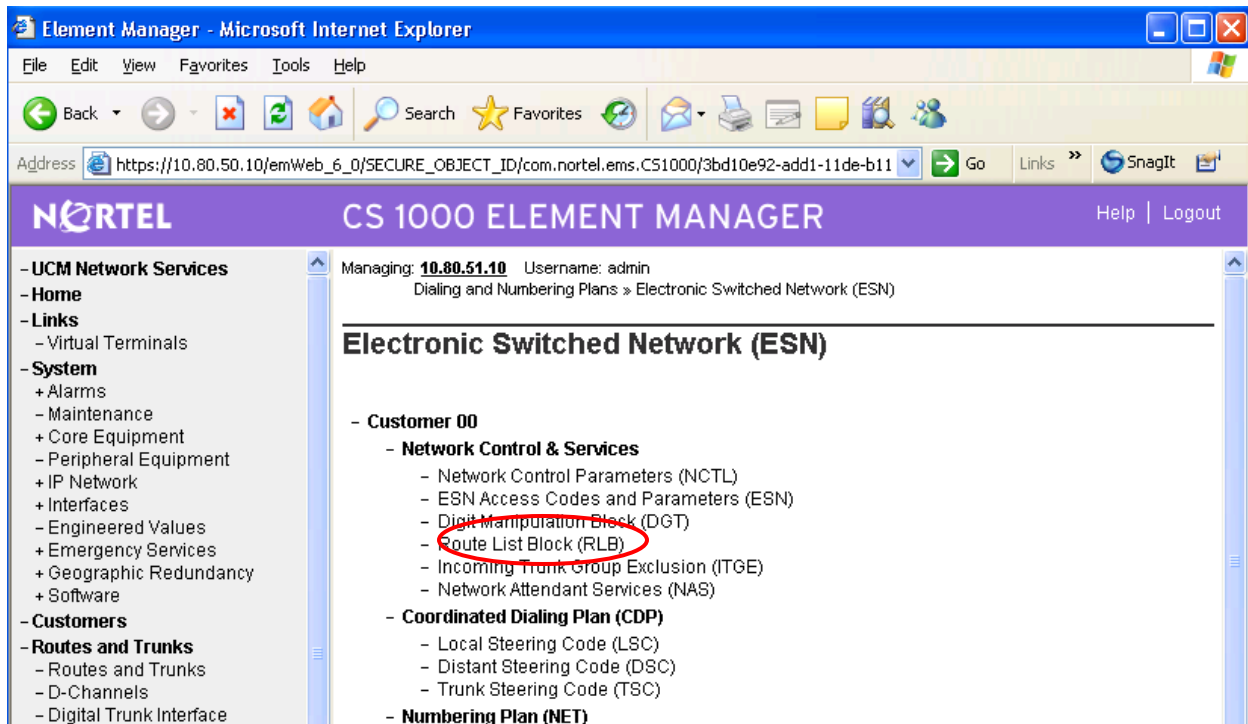
- UCM Network Services
 - Home
 - Links
 - Virtual Terminals
 - System
 - + Alarms
 - Maintenance
 - + Core Equipment
 - + Peripheral Equipment
 - + IP Network
 - + Interfaces
 - Engineered Values
 - + Emergency Services
 - + Geographic Redundancy
 - + Software
 - Customers
 - Routes and Trunks
 - Routes and Trunks
 - D-Channels
 - Digital Trunk Interface
 - Dialing and Numbering Plans
 - Electronic Switched Network
 - Flexible Code Restriction
 - Incoming Digit Translation
 - Phones
 - Templates
 - Reports
 - Properties
 - Migration
 - Tools
 - + Backup and Restore
 - Date and Time
 - + Logs and reports

The main content area displays the 'NCOS Map (NMAP):' table, which lists 62 items (28-0 to 62-0). Below the table, several configuration fields are visible:

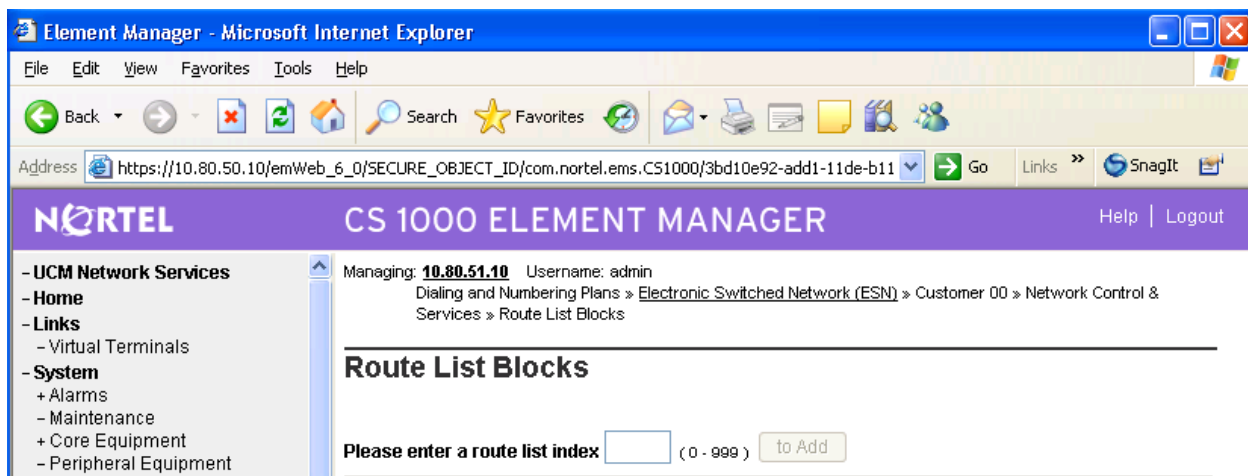
- Maximum number of Supplemental Digit restriction blocks (MXSD): 999 (0 - 1500)
- Maximum number of Incoming Trunk Group exclusion tables (MXIX): 200 (0 - 255)
- Maximum number of Free Calling area screening tables (MXFC): 200 (0 - 255)
- Maximum number of Free Special number screening tables (MXFS): 200 (0 - 255)
- NARS/BARS Access Code 1 (AC1): 9
- NARS/BARS Dial Tone after dialing AC1 or AC2 access codes (DLTN): ☒
- Expensive Route Warning Tone (ERWT): ☒
- Expensive Route Delay Time (ERDT): 6 (0 - 10)
- Extended Time of Day schedule (ETOD):
- Maximum number of LOC codes (NARS only) (MXLC): 999 (0 - 16000)
- Maximum number of Special Common Carrier entries (MSCC): (0 - 7)
- NARS Access Code 2 (AC2):
- Coordinated Dial Plan feature for this customer (CDP): ☒**

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 **Dialing and Numbering Plans** → **Electronic Switched Network**. Next, select **Route List Block**.



In the resulting **Route List Blocks** page, enter an unused route list index in the text box and click the **Add** button. Route List Block Index **10** will be associated with the IP trunk to Communication Manager Feature Server.



In the **Route Number (ROUT)** drop-down, select the appropriate route (e.g., **10**). Other parameters can be set according to customer preference or left at their default values. Scroll to the bottom and click the **Submit** button (not shown).

Element Manager - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address: https://10.80.50.10/emWeb_6_0/SECURE_OBJECT_ID/com.nortel.ems.CS1000/3bd10e92-add1-11de-b11

Nortel CS 1000 ELEMENT MANAGER Help | Logout

Managing: 10.80.51.10 Username: admin
Dialing and Numbering Plans » Electronic Switched Network (ESN) » Customer 00 » Network Control & Services » Route List Blocks » Route List Block

Route List Block

Input Description	Input Value
Route List Index (RLI):	10
Number of Alternate Routing Attempts (NALT):	5 (1 - 10)
Initial Set (ISET):	0 (0 - 64)
Set Minimum Facility Restriction Level (MFRL):	0
Overlap Length (OVLL):	0 (0 - 24)

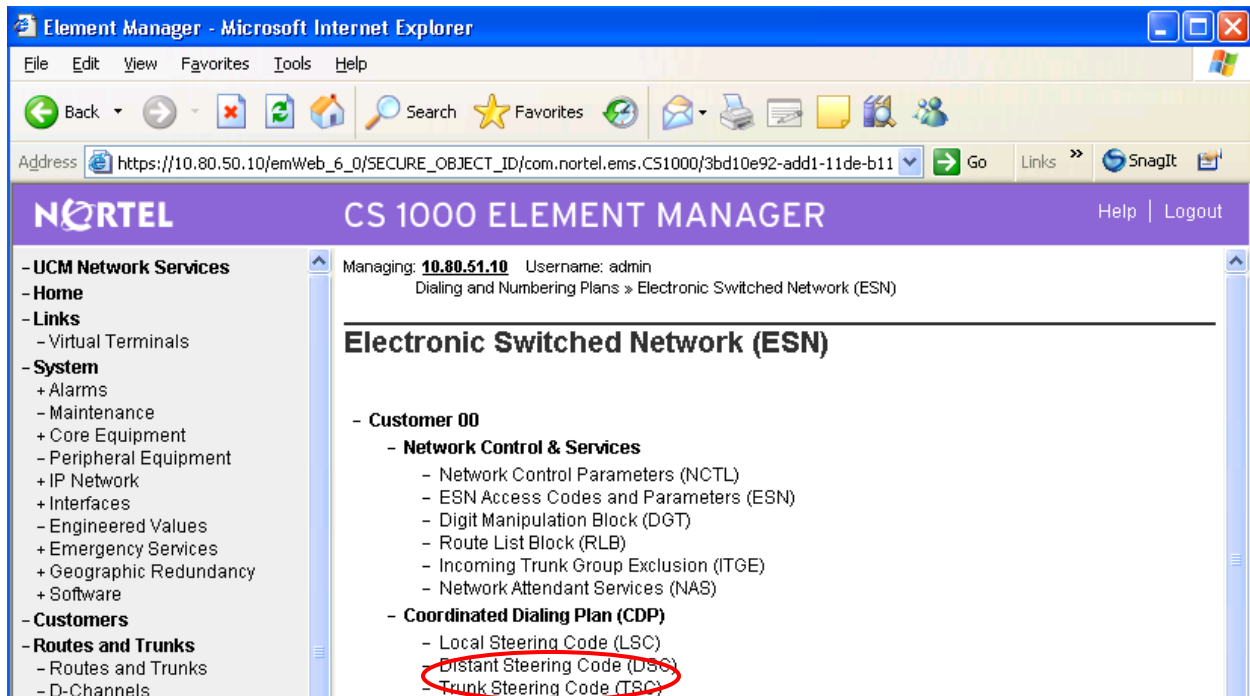
Please Choose the Data Entry Index 1 to Add

Data Entry Index -- 0 Edit

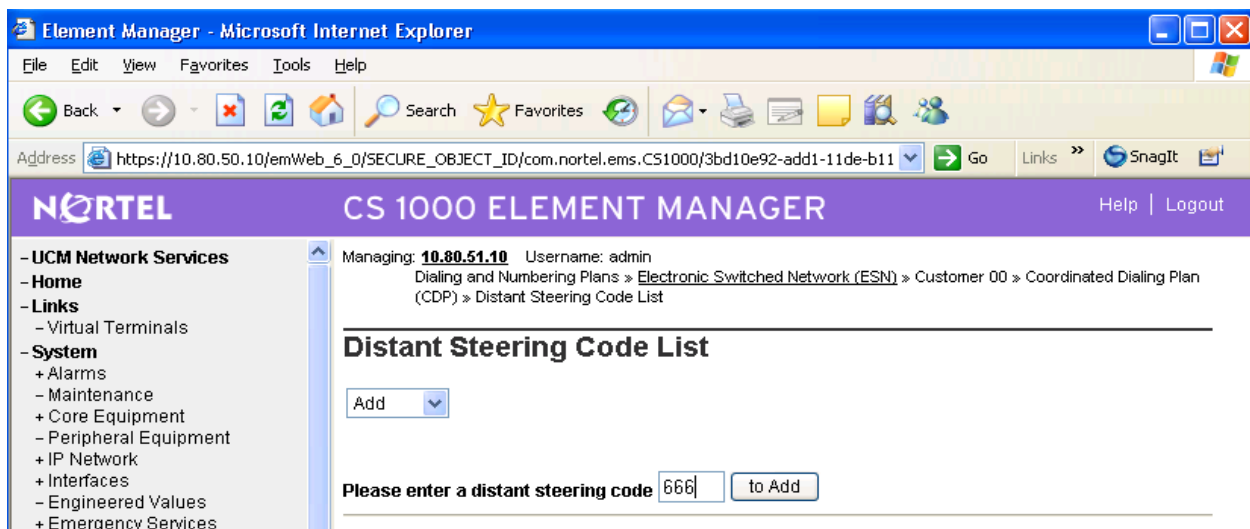
Route Number: 10
Expensive Route: N
Facility Restriction Level: 0
Digit Manipulation Index: 0
ISL D-Channel Down Digit Manipulation Index: 0
Free Calling Area Screening Index: 0
Free Special Number Screening Index: 0

5.9 Configure Steering Codes

From the Navigation Tree, select **Dialing and Numbering Plans** → **Electronic Switched Network**. Under the **Coordinated Dialing Plan (CDP)** heading, select **Distant Steering Code (DSC)**.



Select ADD from the drop-down and enter the leading digits of a CDP number (e.g., 666) in the **Please enter a distant steering code** text box, and click '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 list (e.g., 10). Click the **Submit** button.

Element Manager - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address https://10.80.50.10/emWeb_6_0/SECURE_OBJECT_ID/com.nortel.ems.CS1000/3bd10e92-add1-11de-b11 Go Links SnagIt

NORTEL CS 1000 ELEMENT MANAGER Help | Logout

Managing: **10.80.51.10** Username: admin
Dialing and Numbering Plans » Electronic Switched Network (ESN) » Customer 00 » Coordinated Dialing Plan (CDP) » Distant Steering Code List » Distant Steering Code

Distant Steering Code

Input Description	Input Value
Distant Steering Code (DSC):	666
Flexible Length number of digits (FLEN):	7 (0 - 10)
Display (DSP):	Local Steering Code (LSC)
Remote Radio Paging Access (RRPA):	<input type="checkbox"/>
Route List to be accessed for trunk steering code (RLI):	10
Collect Call Blocking (CCBA):	<input type="checkbox"/>
maximum 7 digit NPA code allowed (NPA):	
maximum 7 digit NXX code allowed (NXX):	

Submit Refresh Delete Cancel

5.10 Configure Codecs

From the Navigation Tree, select **IP Network → Nodes: Servers, Media Cards**. The following screen is displayed. Select the Node ID, which in this case is '1'.

Managing: 10.80.51.10 Username: admin
System » IP Network » IP Telephony Nodes

IP Telephony Nodes

Click the Node ID to view or edit its properties.

[Add...](#) [Import...](#) [Export...](#) [Delete](#) [Print](#) [Refresh](#)

<input type="checkbox"/> Node ID	Components	Enabled Applications	ELAN IP	TLAN IP	Status
<input type="checkbox"/> 1	1	LTPS, PD, Gateway (SIPGw, H323Gw)	-	10.80.50.50	Synchronized

Show: ☒ Nodes ☐ Component Servers and Cards

By clicking on the Node ID, the following page displays, illustrating the basic configuration of the node as well as providing a link to edit **‘Voice Gateway and Codecs’** settings. Select this link.

NORTEL CS 1000 ELEMENT MANAGER

Managing: 10.80.51.10 Username: admin
System » IP Network » IP Telephony Nodes

Node Details (ID: 1 - LTPS, PD, Gateway (SIPGw, H323Gw))

Node ID: * (0-9999)

Call Server IP Address: *

Telephony LAN (TLAN)

Node IP Address: *

Subnet Mask: *

Embedded LAN (ELAN)

Gateway IP address: *

Subnet Mask: *

IP Telephony Node Properties

- [Voice Gateway \(VGW\) and Codecs](#)
- [Quality of Service \(QoS\)](#)
- [LAN](#)

Applications (click to edit configuration)

- [Terminal Proxy Server \(TPS\)](#)
- [Gateway \(SIPGw & H323Gw\)](#)
- [Personal Directories \(PD\)](#)

* Required Value.

Associated Signaling Servers & Cards

Select to add

<input type="checkbox"/> Hostname	Type	Deployed Applications	ELAN IP	TLAN IP	Role
<input type="checkbox"/> interop-cs1000e	Signaling Server	LTPS, Gateway, PD	10.80.51.10	10.80.50.10	Leader

In the **VGW and IP phone Codec** screen select the check boxes for the desired codecs. Slightly truncated screen shots are show directly below. For G.711U and G.729A the Voice Payload size should match what was set on Avaya Communication Manager **ip-codec-set** screen in Section 4.2.

Element Manager - Microsoft Internet Explorer

Address: https://10.80.50.10/emWeb_6_0/SECURE_OBJECT_ID/com.nortel.ems.CS1000/3bd10e92-add1-11de-b11c-e7e4663cdf40/ElementManagerLaunch

NORTEL CS 1000 ELEMENT MANAGER Help | Logout

Managing: 10.80.51.10 Username: admin
System » IP Network » IP Telephony Nodes

Node ID: 1 - Voice Gateway (VGW) and Codescs

General | Voice Codescs | Fax

General

Echo Cancellation: ☒ Use canceller, with tail delay: 128

☒ Dynamic attenuation

Voice Activity Detection Threshold: -17 (-20 - +10 DBM)

Idle Noise Level: -65 (-327 - +327 DBM)

Signaling Options: ☒ DTMF Tone Detection

☐ Low latency mode

☒ Remove DTMF delay (squellch DTMF from TDM to IP)

☒ Modem/Fax pass-through

☒ V.21 Fax Tone Detection

Voice Codescs

Codec G711: ☒ Enabled (required)

Voice payload size: 20 (milliseconds per frame)

Voice Playout (jitter buffer) delay: 40 80 (milliseconds)

Nominal Maximum

Node ID: 1 - Voice Gateway (VGW) and Codescs

General | Voice Codescs | Fax

Voice Codescs

Codec G711: ☒ Enabled (required)

Voice payload size: 20 (milliseconds per frame)

Voice Playout (jitter buffer) delay: 40 80 (milliseconds)

Nominal Maximum

Maximum delay may be automatically adjusted based on Nominal settings.

☐ Voice activity detection (VAD)

Codec G729: ☒ Enabled

Voice payload size: 20 (milliseconds per frame)

Voice Playout (jitter buffer) delay: 40 80 (milliseconds)

Nominal Maximum

* Required Value.

Note: Changes made on this page will NOT be transmitted until the Node is also saved.

Save Cancel

5.11 Configure H.323 Gateway and Signaling Server

From the main screen in the previous section click on **GW (SIPGw & H323Gw)** to view the various options. For the H.323 settings, select the H.323 Gateway Settings link at the top of the screen or use the scroll bar at the right of the screen to get to the appropriate section of this form. Make a note of the Gateway endpoint name (*CS1KGateway*).

The screenshot shows the Nortel CS 1000 Element Manager interface. The left sidebar contains a navigation tree with categories like UCM Network Services, Links, System, Customers, Routes and Trunks, and Dialing and Numbering Plans. The main content area is titled "Node ID: 1 - Virtual Trunk Gateway Configuration Details". It features a tabbed interface with "General", "SIP Gateway Settings", "SIP Gateway Services", and "H.323 Gateway Settings". The "General" tab is active, showing fields for "Vtrk Gateway Application" (set to "SIPGw and H.323Gw"), "SIP Domain name" (set to "avaya.com"), "Local SIP Port" (set to "5060"), "Gateway endpoint name" (set to "CS1KGateway"), "Gateway password", "H.323 ID" (set to "CS1KGateway"), and "Enable failsafe NRS". There is also a "Virtual Trunk Network Health Monitor" section with a checkbox for "Monitor IP Addresses" and a list of "Monitor addresses". The "SIP Gateway Settings" section shows "TLS Security" set to "Security Disabled". At the bottom, there are "Save" and "Cancel" buttons and a note: "Note: Changes made on this page will NOT be transmitted until the Node is also saved."

Set the **Primary gatekeeper IP address** to 10.80.50.10, which is the TLAN IP address of the CS1000E Call Server running the Gatekeeper application. Note that the IP address entered into this field is not the Node IP address.

The screenshot shows the Nortel CS 1000 Element Manager interface, similar to the previous one, but with the "H.323 Gateway Settings" tab active. This tab contains fields for "Primary gatekeeper (TLAN) IP Address" (set to "10.80.50.10"), "Alternate gatekeeper (TLAN) IP Address" (set to "0.0.0.0"), "Primary Network Connect Server (TLAN) IP Address" (set to "0.0.0.0"), "Primary Network Connect Server Port number" (set to "16500"), "Alternate Network Connect Server (TLAN) IP Address" (set to "0.0.0.0"), "Alternate Network Connect Server Port number" (set to "16500"), and "Primary Network Connect Server timeout" (set to "10"). At the bottom, there are "Save" and "Cancel" buttons and a note: "Note: Changes made on this page will NOT be transmitted until the Node is also saved."

Click on **General** link. Check the **Enable gateway service on this Node** checkbox. Set the **Virtual Trunk TPS Gateway Application** drop-down to **H.323gw or SIPGw** and **H.323Gw** as appropriate. Fill in the H.323 ID as desired and record for later use. Click the **Save** button at the bottom of the screen.

The screenshot shows the Nortel CS 1000 Element Manager interface. The left sidebar contains a navigation tree with categories like UCM Network Services, Home, Links, System, and Customers. The main content area displays the configuration for 'Node ID: 1 - Virtual Trunk Gateway Configuration Details'. The 'General' tab is active, showing fields for 'Vtrk Gateway Application' (set to 'SIPGw and H.323Gw'), 'SIP Domain name' (set to 'SIP Gateway (SIPGw)'), 'Local SIP Port' (set to '5060'), 'Gateway endpoint name' (set to 'CS1KGateway'), 'Gateway password' (empty), 'H.323 ID' (set to 'CS1KGateway'), and 'Enable failsafe NRS' (unchecked). A 'Virtual Trunk Network Health Monitor' section is also visible, with a checkbox for 'Monitor IP Addresses (listed below)' and a list of 'Monitor IP' addresses.

Once all the configuration is completed for NRS admin click **SAVE** on the main screen. The following screen will be displayed:

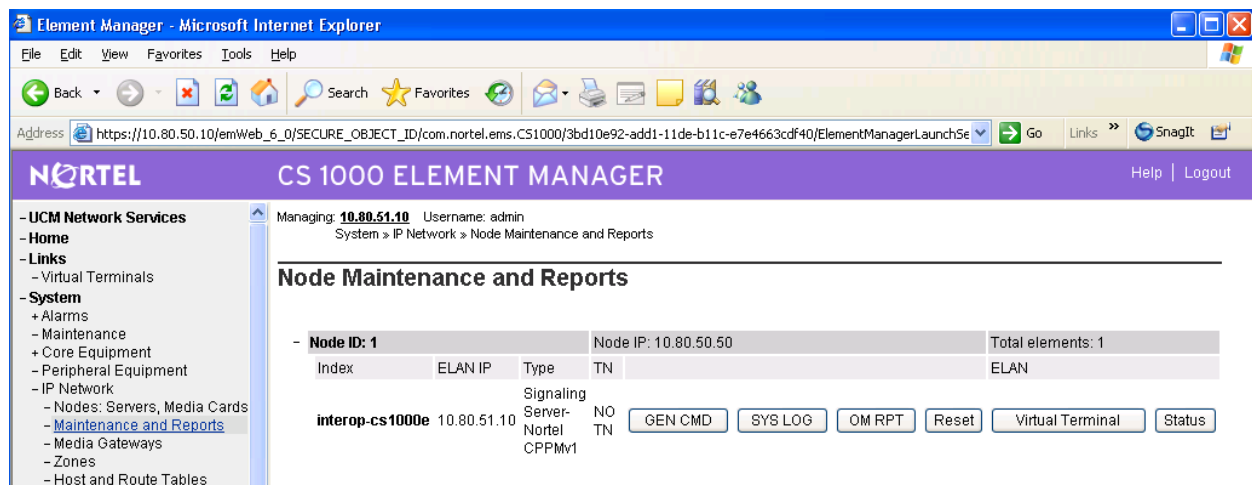
The screenshot shows the 'Node Saved' confirmation screen in the Nortel CS 1000 Element Manager. The message states: 'Node ID: 1 has been saved on the call server. The new configuration must also be transferred to associated servers and media cards.' Below the message, there are two buttons: 'Transfer Now...' and 'Show Nodes'. The 'Transfer Now...' button has a tooltip that says: 'You will be given an option to select individual servers, or transfer to all.' The 'Show Nodes' button has a tooltip that says: 'You may initiate a transfer manually at a later time.'

Select either '**Transfer Now**' to update individual or all nodes or select **Show Nodes** to transfer at a later time.

5.12 Reboot Signaling Server and Media Card

Some of the parameter changes require a reboot of the Signaling Server and the Media Card (e.g. **Primary gatekeeper IP address**, **Enable Gateway Servers**, and **Enable IP Peer Gateway or add a new node**).

To reboot the Signaling Server and Media Card, select **IP Telephony → Nodes: Servers, Media Cards → Maintenance and Reports** from the Navigation Tree. Click **Node ID: 1**. The following screen will appear:



Click **Reset** in the second line to reboot the Media Card. Click **Reset** in the first line to reboot the Signaling Server.

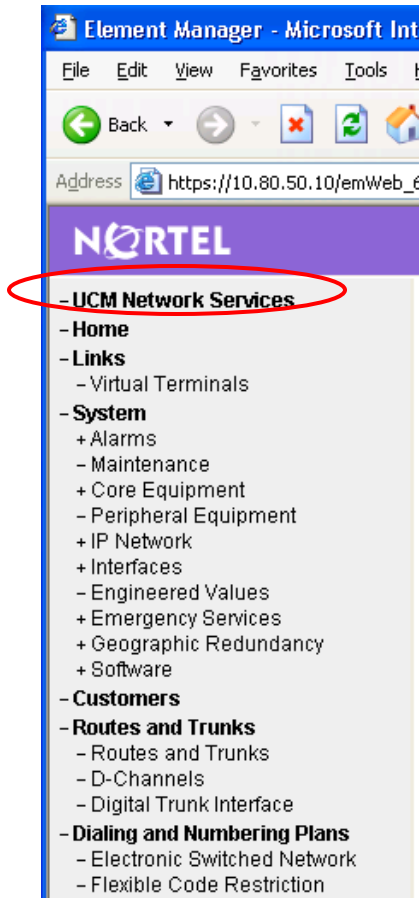
5.13 Gatekeeper Database Configuration

In the configuration depicted in **Figure 1**, the H.323 Gatekeeper function is provided by the Network Routing Service, which resides on the Signaling Server. A simple Gatekeeper database is configured to cause dialed digits of the form 666xxxx to be routed to the Avaya Communication Manager PBX. The approach can be generalized for any numbering plan. A “non-RAS” H.323 Gateway interface will be defined for the Nortel CS1000 to communicate with the Avaya S8730 Server.

The non-RAS H.323 Gateway interface will not send H.323 “Location Request” (LRQ) before initiating call setup. An alternative approach would be to define the Avaya system as a Collaborative Server. For further details on this, please refer to References in Section 8.

5.14 Log in to the Network Routing Service using Element Manager

The Gatekeeper configuration is configured through the Network Routing Service Manager. The Network Routing Service Manager can be accessed via the Element Manager. From the previous section's administration, select **UCM Network Services** to get back to the UCM screen.



Then select the appropriate NRS element in the main UCM screen:

Host Name: interop-cs1000e.interop.avaya.com Software Version: 02.00.0055.00(3266) User Name admin

Elements

New elements are registered into the security framework, or may be added as simple hyperlinks. Click an element name to launch its management service.

	Element Name	Element Type	Release	Address	Description
1	EM on interop-cs1000e	CS1000	6.0	10.80.51.10	New element
2	interop-cs1000e.interop.avaya.com (primary)	Linux Base	6.0	10.80.50.10	Base OS element
3	10.80.51.13	Media Gateway Controller	6.0	10.80.51.13	New element
4	10.80.51.12	Media Gateway Controller	6.0	10.80.51.12	New element
5	NRS on interop-cs1000e	Network Routing Service	6.0	10.80.51.10	New element

The browser will open a window with the name **NETWORK ROUTING SERVICE MANAGER**.

Select the **EDIT** button to configure the NRS Settings.

Managing: 10.80.51.10
System > NRS Server

NRS Server

Service Status

	Service Name	Service Status
1	SIP Proxy Server (SPS)	In service
2	Gatekeeper (GK)	In service
3	Network Connection Server (NCS)	In service

Server Configuration

NRS Setting

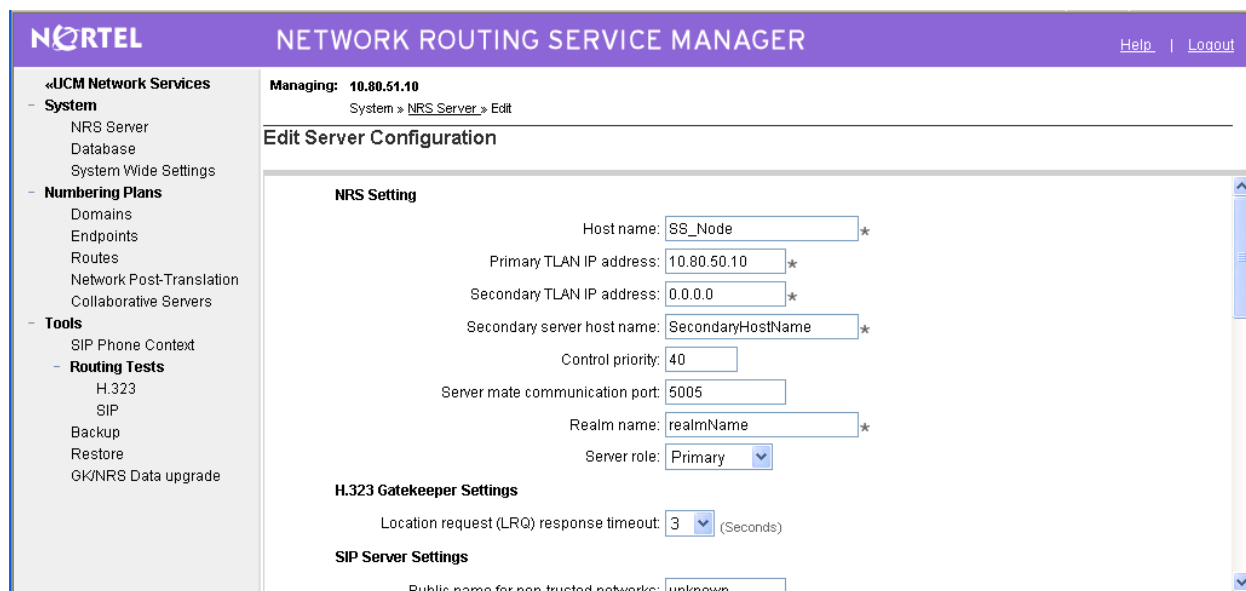
Host name SS_Node
 Primary TLAN IP address 10.80.50.10
 Secondary TLAN IP address 0.0.0.0
 Secondary server host name SecondaryHostName
 Control priority 40
 Server mate communication port 5005
 Realm name realmName
 Server role Primary

H.323 Gatekeeper Settings
 Location request (LRQ) response timeout 3

SIP Server Settings

The **NETWORK ROUTING SERVICE (NRS) Settings** screen is shown below. In the section titled **Server Configuration**, the properties for H.323 and SIP have been configured; however, for the purposes of this document, only the fields relevant to H.323 signaling will be discussed.

In the **Host name** field, enter the Host name of Signaling Server from the **Home – System Overview** page of the Element Manager in Section 5.1. In the **Primary IP (TLAN)** field, enter the Signaling Server TLAN IP address from Section 5.1. Retain the default values for the remaining fields. Scroll down to the bottom of the screen, click **Save**.



NORTEL NETWORK ROUTING SERVICE MANAGER [Help](#) | [Logout](#)

Managing: 10.80.51.10
System » NRS Server » Edit

Edit Server Configuration

NRS Setting

Host name: *

Primary TLAN IP address: *

Secondary TLAN IP address: *

Secondary server host name: *

Control priority:

Server mate communication port:

Realm name: *

Server role:

H.323 Gatekeeper Settings

Location request (LRQ) response timeout: (Seconds)

SIP Server Settings


Public name for non-trusted networks:

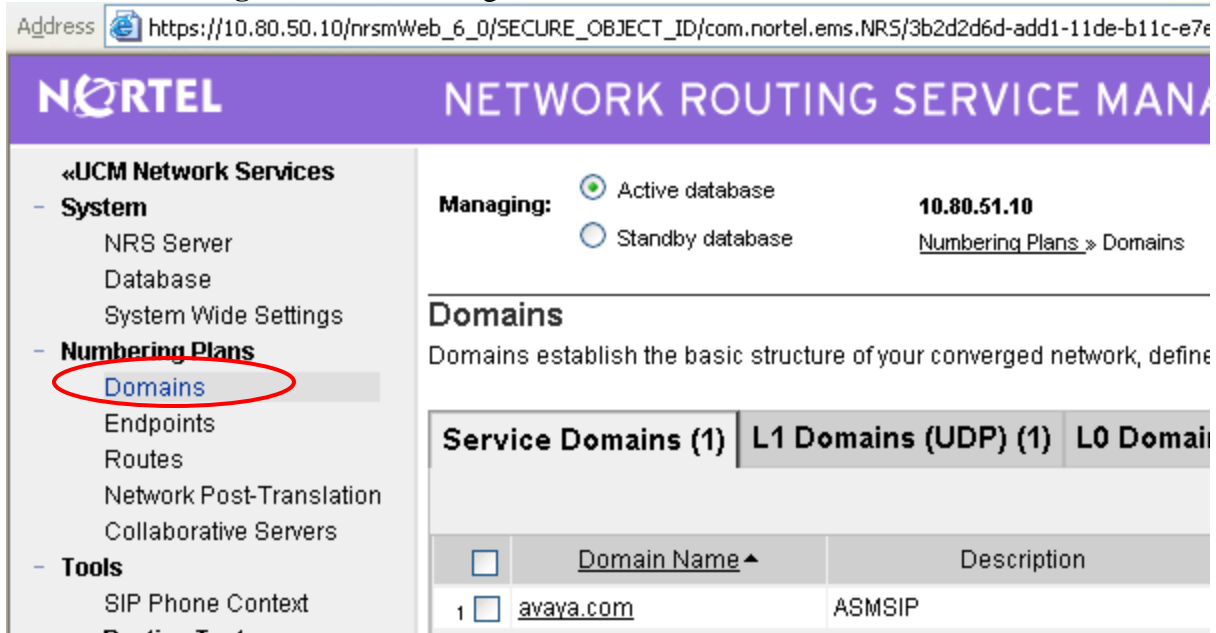
5.15 Configure NRS Database

The NRS hosts an active and a standby database. The active database is used for runtime queries, and the standby database is used for administrative modifications. To effect any changes on the NRS, the administrator must first switch to the Standby Database view. When configuration is completed on the standby database, the standby database can be 'cutover' to become the active database.

5.16 Administer Service Domain

Under **Numbering Plans** in the Navigation Pane, select **Domains**.

Address  https://10.80.50.10/nrsmWeb_6_0/SECURE_OBJECT_ID/com.nortel.ems.NRS/3b2d2d6d-add1-11de-b11c-e7e



NORTEL NETWORK ROUTING SERVICE MANAGER

«UCM Network Services

- System
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 - Database
 - System Wide Settings
- **Numbering Plans**
 - Domains**
 - Endpoints
 - Routes
 - Network Post-Translation
 - Collaborative Servers
- Tools
 - SIP Phone Context
 - Routing Tests

Managing: ☒ Active database **10.80.51.10**
☐ Standby database [Numbering Plans » Domains](#)

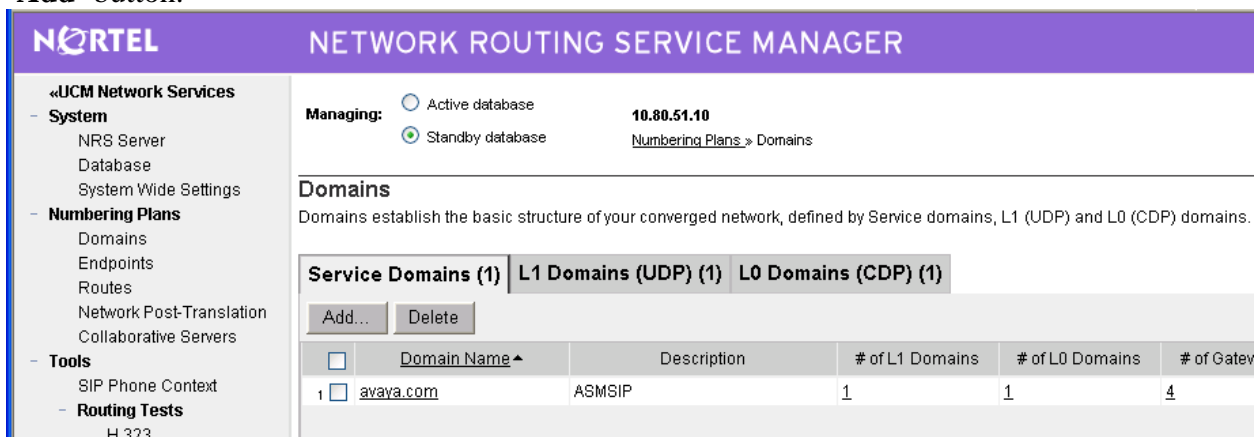
Domains

Domains establish the basic structure of your converged network, define

Service Domains (1) | L1 Domains (UDP) (1) | L0 Domains

	Domain Name ^	Description
1	avaya.com	ASMSIP

Next change over to the **Standby database** by selecting the appropriate radio button. Select 'Add' button.



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Managing: ☐ Active database **10.80.51.10**
☒ Standby database [Numbering Plans » Domains](#)

Domains

Domains establish the basic structure of your converged network, defined by Service domains, L1 (UDP) and L0 (CDP) domains.

Service Domains (1) | L1 Domains (UDP) (1) | L0 Domains (CDP) (1)

Add... Delete

	Domain Name ^	Description	# of L1 Domains	# of L0 Domains	# of Gateways
1	avaya.com	ASMSIP	1	1	4

The **Add/Edit Service Domain** screen is displayed. Enter the domain name into the **Domain name** field, and a descriptive text for the **Domain description** field. Click **Save**.

NORTTEL NETWORK ROUTING SERVICE MANAGER

Managing: ☐ Active database **10.80.51.10**
☒ Standby database
[Numbering Plans > Domains > Service Domains](#)

Edit Service Domain

Domain name: *

Domain description:

* Required value. Save Cancel

Select the **L1 Domains (UDP)** tab to display the **L1 Domains (UDP)** screen. Click **Add** to add a new L1 domain. The L1 and L0 domains are building blocks of the phone context for private addresses. For more information on L1 and L0 domains, refer to the Nortel documentation in Section 8.

NORTTEL NETWORK ROUTING SERVICE MANAGER

Managing: ☐ Active database **10.80.51.10**
☒ Standby database
[Numbering Plans > Domains](#)

Domains
 Domains establish the basic structure of your converged network, defined by Service domains, L1 (UDP) and L0 (CDP) domains.

Service Domains (1) L1 Domains (UDP) (1) L0 Domains (CDP) (1)

Filter by Domain:

Add... Delete Refresh

	ID	Description	# of L0 Domains	# of Gateway Endpoints	# of Routing Entries	Context
<input type="checkbox"/>	1	avaya UDP Domain	1	4	5	avaya.com

The **Add/Edit L1 Domain (avaya.com)** screen is displayed next, as shown below. Enter a descriptive **Domain name** and **Domain description**, and applicable **E.164 country code** and **E.164 area code** for the network configuration. Retain the default value in the remaining fields, and scroll down to the bottom of the screen to click **Save** (not shown).

The screenshot displays the NRS Manager web interface in a Microsoft Internet Explorer browser. The address bar shows the URL: https://10.80.50.10/nrsmWeb_6_0/SECURE_OBJECT_ID/com.nortel.ems.NRS/3bd2d6d-add1-11de-b11c-e7e4663cdf40/frames.faces. The page title is "NRS Manager - Microsoft Internet Explorer".

The main content area is titled "Edit L1 Domain (avaya.com)". It features a sidebar on the left with a tree view containing the following categories:

- «UCM Network Services
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 - NRS Server
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 - Endpoints
 - Routes
 - Network Post-Translation
 - Collaborative Servers
 - Tools
 - SIP Phone Context
 - Routing Tests
 - H.323
 - SIP
 - Backup
 - Restore
 - GK/NRS Data upgrade

The main configuration area includes the following fields and options:

- Managing:** Radio buttons for "Active database" and "Standby database". The IP address "10.80.51.10" is displayed.
- Domain name:** Text input field containing "udp".
- Domain description:** Text input field containing "avaya UDP Domain".
- Endpoint authentication enabled:** Dropdown menu set to "Authentication off".
- Authentication password:** Text input field.
- E.164 country code:** Text input field containing "1".
- E.164 area code:** Text input field containing "303".
- E.164 international dialing access code:** Text input field.
- E.164 international dialing code length:** Text input field with a range of "(0-99)".
- E.164 national dialing access code:** Text input field.
- E.164 national dialing code length:** Text input field with a range of "(0-99)".
- E.164 local (subscriber) dialing access code:** Text input field.
- E.164 local (subscriber) dialing code length:** Text input field with a range of "(0-99)".
- Private L1 domain (UDP location) dialing access code:** Text input field.

Select **L0 Domains (CDP)** tab to display the **L0 Domains (CDP)** screen. Select the appropriate Service Domain (in this case avaya.com) then click **Add** to add a new L0 domain.

NRS Manager - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Reload Home Search Favorites Print Mail Address Book Recent

Address https://10.80.50.10/nrsmWeb_6_0/SECURE_OBJECT_ID/com.nortel.ems.NRS/3b2d2d6d-add1-11de-b11c-e7e4663cdf40/frames.faces Go Links SnagIt

NORTEL NETWORK ROUTING SERVICE MANAGER [Help](#) [Logout](#)

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- **Tools**
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- **Routing Tests**
 - H.323
 - SIP

Managing:

☐ Active database
☒ Standby database

10.80.51.10

[Numbering Plans » Domains](#)

Domains

Domains establish the basic structure of your converged network, defined by Service domains, L1 (UDP) and L0 (CDP) domains.

Service Domains (1)
L1 Domains (UDP) (1)
L0 Domains (CDP) (1)

Filter by Domain : All service domains / All L1 domains

Add Delete Refresh

	ID	Description	# of Gateway Endpoints	# of Routing Entries	Context
1	cdp	Nortel L0 Domain	4	5	avaya.com / udp

The **Add L0 Domain (avaya.com /udp)** screen is displayed next, as shown below. Enter a descriptive **Domain name** and **Domain description**. Retain the default values in the remaining fields, and scroll down to the bottom of the screen to click **Save** (not shown).

NORTEL NETWORK ROUTING SERVICE MANAGER [Help](#) | [Logout](#)

Managing: ☐ Active database **10.80.51.10**
☒ Standby database [Numbering Plans > Domains > L0 Domain](#)

Edit L0 Domain (avaya.com / udp)

Domain name: *

Domain description:

Endpoint authentication enabled:

Authentication password:

E.164 country code:

E.164 area code:

Private unqualified number label:

E.164 international dialing access code:

E.164 international dialing code length: (0-99)

E.164 national dialing access code:

E.164 national dialing code length: (0-99)

E.164 local (subscriber) dialing access code:

E.164 local (subscriber) dialing code length: (0-99)

★ Required value.

5.17 Administer Gateway Endpoints

One of the functions that the Nortel CS1000 Signaling Server supports is an H.323 Gateway (it can also act a SIP signaling server). The H.323 Gateway translates TDM signaling to H.323 and vice versa. It is used by the Nortel Call Server to establish an H.323 signaling channel with the Gatekeeper and other systems (in these Application Notes, the C-LAN in the Avaya S8730 Server/G650).

The interfaces to the NRS and the Avaya S8730 Server are defined as Gateway Endpoints. In order to configure the Gateway Endpoint for the interface to the Avaya you must first be in the appropriate routing context for the endpoint you wish to add.

First select **Endpoints** in the navigation pane to display the **Gateway Endpoints** screen. Then select the appropriate **Service Domain (avaya.com)**, **CDP L1 Domain (CDP)** and **UDP L0 Domain 9UDP**.

Click **Add** to add a new gateway endpoint for the C-LAN in the Avaya S8730 Server/G650.

Address https://10.80.50.10/nrsmWeb_6_0/SECURE_OBJECT_ID/com.nortel.ems.NRS/3b2d2d6d-add1-11de-b11c-e7e4663cdf40/frames.faces Go Links SnagIt

NORTEL NETWORK ROUTING SERVICE MANAGER

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«UCM Network Services

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 - GK/NRS Data upgrade

Managing: ☐ Active database **10.80.51.10**
☒ Standby database [Numbering Plans > Endpoints](#)

Search for Endpoints [Hide](#)

Enter an endpoint ID (use * for all) and click Search. You may narrow the search by specifying a particular domain.

Endpoint ID:

Limit results to Domain: / /

Results per page:

Gateway Endpoints (4) | **User Endpoints (0)**

<input type="checkbox"/>	ID ^	Supported Protocols	SIP Mode	Call Signaling IP	Description	# of Routing Entries	Context
<input type="checkbox"/>							

After selecting ADD the following screen appears. Enter a descriptive **Endpoint name** and **Endpoint description**, as shown below.

«UCM Network Services

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- Numbering Plans
 - Domains
 - Endpoints
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 - SIP
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 - Restore
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Managing: ☐ Active database **10.80.51.10**
☒ Standby database [Numbering Plans > Endpoints > Gateway Endpoint](#)

Edit Gateway Endpoint (avaya.com / udp / cdp)

End point name: *

Description:

Trust Node: ☒

Tandem gateway endpoint name:

Endpoint authentication enabled:

Authentication password:

E.164 country code:

E.164 area code:

E.164 international dialing access code:

E.164 international dialing code length: (0-99)

E.164 national dialing access code:

E.164 national dialing code length: (0-99)

E.164 local (subscriber) dialing access code:

Scroll down the screen. Enter the IP address of the C-LAN from Section 4.1 in the **Static endpoint address** field. Select **Not RAS H.323 endpoint** from the **H.323 Support** drop-down. If your NRS is doing both SIP and H323 routing select **SIP Not supported** under the **SIP Support** drop-down. Retain the default values for the remaining fields. Click **Save**.

«UCM Network Services

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Managing: ☐ Active database **10.80.51.10**
☒ Standby database [Numbering Plans > Endpoints > Gateway Endpoint](#)

Edit Gateway Endpoint (avaya.com / udp / cdp)

Private Special number 1:

Private Special number 1 dialing code length: (0-31)

Private Special number 2:

Private Special number 2 dialing code length: (0-31)

Static endpoint address type:

Static endpoint address:

H.323 support:

SIP support:

SIP Mode ☒ Proxy Mode ☐ Redirect Mode

SIP TCP transport enabled: ☐

Repeat the procedures to add a gateway endpoint for the interface from the Nortel H.323 Gateway to the NRS as shown below. In the **Endpoint name** and **Endpoint description** field, enter the **H323 ID** configured in Section 5.1.1 (i.e. *CS1KGateway*) and a descriptive text. Select **Authentication on** from the drop-down list for the **Endpoint authentication enabled** field.

The screenshot displays the Nortel Network Routing Service Manager (NRS) web interface. The header bar is purple with the Nortel logo and the title "NETWORK ROUTING SERVICE MANAGER". On the right of the header are links for "Help" and "Logout".

On the left is a navigation menu under "«UCM Network Services":

- System
 - NRS Server
 - Database
 - System Wide Settings
- Numbering Plans
 - Domains
 - Endpoints
 - Routes
 - Network Post-Translation
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The main content area shows the "Managing:" section with two radio buttons: "Active database" (selected) and "Standby database". To the right, the IP address "10.80.51.10" is displayed, along with a breadcrumb trail: "Numbering Plans » Endpoints » Gateway Endpoint".

Below this is the title "Edit Gateway Endpoint (avaya.com / udp / cdp)".

The configuration form includes the following fields:

- End point name:** A text box containing "CS1KGateway" with an asterisk (*) indicating it is required.
- Description:** A text box containing "NortelRedirectServer".
- Trust Node:** A checkbox that is checked.
- Tandem gateway endpoint name:** A dropdown menu set to "Not Applicable".
- Endpoint authentication enabled:** A dropdown menu set to "Authentication on".
- Authentication password:** An empty text box.

Scroll down the screen. For the **H.323 Support** field, select **RAS H.323 endpoint** from the drop-down list. Leave the **Static endpoint address** field blank. Maintain the default values in the remaining fields, and click **Save**.

The screenshot displays the Nortel Network Routing Service Manager interface. The left sidebar contains a navigation menu with categories like «UCM Network Services», System, Numbering Plans, Tools, and Routing Tests. The main content area is titled 'Edit Gateway Endpoint (avaya.com / udp / cdp)'. It features a 'Managing:' section with radio buttons for 'Active database' and 'Standby database', and a status '10.80.51.10'. Below this, there are links for 'Numbering Plans', 'Endpoints', and 'Gateway Endpoint'. The configuration fields include: 'Private Special number 2' (text box), 'Private Special number 2 dialing code length' (text box with '(0-31)' hint), 'Static endpoint address type' (dropdown menu set to 'IP version 4'), 'Static endpoint address' (text box), 'H.323 support' (dropdown menu set to 'RAS H.323 endpoint'), 'SIP support' (dropdown menu set to 'Dynamic SIP endpoint'), 'SIP Mode' (radio buttons for 'Proxy Mode' and 'Redirect Mode', with 'Redirect Mode' selected), 'SIP TCP transport enabled' (checkbox checked), 'SIP TCP port' (text box with '5060'), 'SIP UDP transport enabled' (checkbox unchecked), and 'SIP UDP port' (text box with '5060').

5.18 Administer Routing Entry for Communication Manager

Configure a routing entry for endpoints at the Avaya S8730 Server. Select **Routing Entries** in the left pane to display the **Routing Entries** screen. As mentioned earlier when adding an endpoint, to add a route you must first select the appropriate Domain context before you can enter the route. In this case add route for the 666xxxx numbers on the Avaya PBX.

Select the Service Domain (**avaya.com**), L1 domain (**udp**) and L0 Domain (**cdp**) entered previously, as well as the gateway Endpoint Name for the Avaya S8730 Server (**CM-AE-DR**), and the screen will update automatically to show any existing routes. Click **Add** to add a routing entry, which in this case will be **666**. (and remember, user must be in the 'Standby Database' to make changes).

The screenshot displays the 'NETWORK ROUTING SERVICE MANAGER' interface. The left sidebar shows a navigation tree with 'UCM Network Services' expanded, including 'System', 'Numbering Plans', and 'Tools'. The 'Routing Tests' sub-item is selected. The main area shows the 'Managing' status as 'Standby database' and the IP '10.80.51.10'. Below this is a 'Search for Routing Entries' section with filters for 'DN Prefix' (set to '*'), 'DN Type' (set to 'All DN Types'), 'Limit results to Domain' (set to 'avaya.com / udp / cdp'), and 'Endpoint Name' (set to 'CM-AE-DR'). The 'Results per page' is set to 50. The 'Routing Entries (2)' tab is active, showing a table with two entries. The table has columns for 'DN Prefix', 'DN Type', 'Route Cost', 'SIP URI Phone Context', and 'Context'. The first entry has a prefix of '666' and the second has '668'. Both are 'Private level 0 regional (CDP steering code)' with a cost of 1 and context 'avaya.com / udp / cdp / CM-AE-DR'. The interface also includes buttons for 'Add...', 'Copy...', 'Move...', 'Import...', 'Export...', 'Routing test...', and 'Delete', along with a 'Refresh' button.

	DN Prefix	DN Type	Route Cost	SIP URI Phone Context	Context
1	666	Private level 0 regional (CDP steering code)	1	cdp.udp	avaya.com / udp / cdp / CM-AE-DR
2	668	Private level 0 regional (CDP steering code)	1	cdp.udp	avaya.com / udp / cdp / CM-AE-DR

The **Add Routing Entry** screen is displayed next. Select **Private level 0 regional (CDP steering code)** for the **DN Type** field from the drop-down list. In the **DN prefix** field, enter the leading digits of the dialed number to be directed to the C-LAN on the Avaya CM system. In these Application Notes, all numbers of the form 666xxxx are directed to the non-RAS gateway endpoint named “CM-AE-DR”. In the **Route cost (1-255)** field, enter an appropriate cost value. Click **Save**.

5.19 Administer Routing Entry for the Nortel CS1000E

In addition to adding a route to get to Communication Manager, it is also necessary to add a route to get to the Nortel CS1000E PBX. Follow the same steps as above only for the **Endpoint Name** be sure to select **CS1KGateway**. In this case we want to be sure any calls to the NRS for the extension 777xxxxx are routed back to the CS1000E.

DN Prefix	DN Type	Route Cost	SIP URI Phone Context	Context
777	Private level 0 regional (CDP steering code)	1	cdp.udp	avaya.com / udp / cdp / CS1KGateway

5.20 Test the Standby Database

Before committing any changes in the NRS, it may be desirable to test the numbering plan.

From the Navigation Pane, select **Tools → Routing Test → H.323**. Make sure to select the **‘Standby Database’** radio button at the top of screen. In the **Origination gateway endpoint name** textbox, select the gateway endpoint representing the interface to the Avaya C-LAN (e.g., CM-AE-DR). In the **DN to query** text box, enter the extension of an Avaya telephone, such as 6661234. In the DN Type drop-down, select **Private level 0 regional (CDP steering code)**. Click the **Submit** button.

The screenshot displays the Nortel Network Routing Service Manager (NRS) web interface. The top header bar is purple with the Nortel logo and the text "NETWORK ROUTING SERVICE MANAGER". On the right of the header are links for "Help" and "Logout".

The left sidebar, titled "«UCM Network Services", contains a navigation tree with the following items:

- System
 - NRS Server
 - Database
 - System Wide Settings
- Numbering Plans
 - Domains
 - Endpoints
 - Routes
 - Network Post-Translation
 - Collaborative Servers
- Tools
 - SIP Phone Context
 - Routing Tests
 - H.323
 - SIP
 - Backup
 - Restore
 - GINRS Data upgrade

The main content area is titled "H.323 Routing Test". At the top, it shows "Managing:" with two radio buttons: "Active database" (unselected) and "Standby database" (selected). To the right, it displays the IP address "10.80.51.10" and the breadcrumb "Tools » Routing Tests » H.323".

The configuration fields for the test are as follows:

- Service domain name: avaya.com (dropdown)
- L1 domain name: udp (dropdown)
- L0 domain name: cdp (dropdown)
- Originating gateway endpoint name: CM-AE-DR (dropdown)
- DN to query: 6661212 (text input, marked with an asterisk as required)
- DN type: Private Level0 Regional(CDP Steering Code) (dropdown)

At the bottom left of the form area, there is a note: "★ Required value." At the bottom right is a "Test" button.

A screen similar to the following should display, indicating that the call will be directed to the Avaya S8730 Server. NOTE: If no route is found, a message indicating such will be displayed.

«UCM Network Services

- **System**
 - NRS Server
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Managing: ☐ Active database **10.80.51.10**
☒ Standby database
 Tools » Routing Tests » H.323

H.323 Routing Test

Service domain name:
 L1 domain name:
 L0 domain name:
 Originating gateway endpoint name:
 DN to query: *
 DN type:

★ Required value. Test

Possible Routes Found

#	Terminating endpoint name	Registration status	Route cost
0	CM-AE-DR	Registered	1

5.21 Cutover the changes to the Active Database

Once all your changes in the NRS are completed, the administrator will need to get the changes from the Standby Database to the Active Database. There is a two step process which makes it possible to test one's changes before making them permanent.

The following screen can be accessed from the Navigation pane under **System → Database**:

To test your changes, first select the **Cut over** button. After this step completes, test your changes by making several phone calls. If satisfied with the results, select the **Commit** button to make the changes permanent.

«UCM Network Services

- **System**
 - NRS Server
 - Database
 - System Wide Settings
- **Numbering Plans**
 - Domains
 - Endpoints
 - Routes
 - Network Post-Translation
 - Collaborative Servers

Managing: **10.80.51.10**
 System » Database

Database

NRS uses a redundant database with Active and Standby copies. Normally changes are made to the standby database, tested, then cut over into active status.

Database status: Changed Cut over Revert Commit Roll back

6 Verification

Verification of the configuration described in these Application Notes included calls using both G.729A and G.711-uLaw codecs.

- Calls between Nortel IP telephones and Avaya IP Telephones registered to the Avaya S8730 Server. Successful calls can be made in both directions across the IP Trunk.
- Calls between Nortel IP telephones and Avaya digital telephones connected to the Avaya G650 Media Gateway. Successful calls can be made in both directions. This result may be extrapolated to other non-IP devices connected to the G650 Media Gateway (e.g., analog telephones, PSTN trunks, etc.).
- Calls between Nortel digital telephones and Avaya IP telephones connected to the Avaya G650 Media Gateway. Successful calls can be made in both directions. This result may be extrapolated to other non-IP devices connected to the G650 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 S8730 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 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 and Avaya digital telephones interacting with the Nortel Call Pilot messaging solution integrated to the Nortel CS1000E. The Call Pilot uses a proprietary integration with the CS1000E and was used as a coverage point for Nortel phones only. Digits pressed on the Avaya telephone keypads are processed properly by Call Pilot. This verification is included to show that applications requiring DTMF can collect the digits using **out-of-band** signaling from the IP Trunk interface to the Avaya S8730 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 name & number of the Avaya caller, provided the Avaya server is provisioned to send this information.
 - For calls from a Nortel telephone to an Avaya telephone, the Avaya telephone can display the **calling party name only**, when sent by the Nortel CS1000.

- A call between Nortel phones controlled by the Nortel CS1000 and Avaya phones controlled by the Avaya S8730 Server can be successfully held and subsequently un-hold by either the originating party or the termination party of the call.
- A call between Nortel phones controlled by the Nortel CS1000 and Avaya phones controlled by the Avaya S8730 Server can be successfully transferred to another Nortel phone or Avaya phone by either the originating party or the termination party of the initial call.
- A call between Nortel phones controlled by the Nortel CS1000 and Avaya phones controlled by the Avaya S8730 Server can successfully conference in another Nortel phone or Avaya phone. The conference action can be initiated by either the originating party or the termination party of the initial call.
- Call forwarding works in all cases: In an earlier releases of Nortel CS1000 (see Section 8) it was observed that when an Avaya phone calls a Nortel phone which has Call Forward All Calls feature activated to forward calls to another Avaya phone, the forwarded party will ring however, when the forwarded party answers, the call drops immediately. This scenario now appears to work properly with Nortel CS1000 Release 6.0.

7 Observed Limitations

- **DTMF:** During the initial setup and testing it appeared that in-band DTMF (using RTP-EVENT packets to convey DTMF across systems) was functional. Further testing revealed that for calls from Communication Manager to the Nortel system that covered (CFNA) to Call Pilot messaging, in-band DTMF was non-functional. Setting the signaling-group on Communication Manager to **out-of-band** allowed DTMF to be passed in all test cases.
- **Call Displays:** Call display issues were observed in a variety of call scenarios:
 - *Calls from Avaya to Nortel.* While ringing, the Avaya set will display the entire dialed string (e.g. 87771099). The Nortel sets display both Calling Name and Calling Number of the Avaya set. Once the Nortel set answers the call, the Avaya set displays only the Connected Name of the Nortel phone but not Connected Number. This behavior is due to the fact that the Nortel CS1000E sends only Connected Name back over the H.323 signaling connection and the Avaya set will update its display with what is received in the Q.931 message.
 - *Transfers between sets and systems:* Again due to limitations described above transferring calls within in system or across systems generally resulted in set displays not being updated with the appropriate connected name or number information. For example:
Avaya-A calls Nortel-B. Nortel B transfers the call to Nortel-C. Once the call is completed to Nortel-C, it will its connected to Avaya-A but the Avaya set itself will not be updated with either the connected name or number of Nortel C.

- **Trunk usage on transfers:** Generally speaking transferring calls between the systems resulted in trunk ports being used on both sides of the conversion. For example:
Nortel calls Avaya and Avaya then transfers the call back to a phone on the Nortel system. The resulting trunk port usage is such that two ports on each system are utilized; one for the original call, and one for the transferred call.

8 References

The following documents from the Nortel Communication Server Electronic Reference Library CD contain information relevant to these Application Notes. They can also be obtained at www.nortel.com.

[1] Nortel Communication Server 1000: *IP Peer Networking Installation and Commissioning* Release 6.0, rev 03.02. Document Number NN43001-313

[2] Nortel Communication Server 1000: *NRS Fundamentals*, Release 6.0, rev 01.03. Document Number: NN43001-130

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

The following reference is among the many Application Notes available at <http://www.avaya.com>

[3] *Configuring Avaya Aura™ Communication Manager for H.323 Signaling and IP Trunks with Nortel Communication Server 1000 – Issue 1.0*, SIL Application notes at <http://support.avaya.com>

[4] “*Configuring Avaya Communication Manager Release 4.0 To Use Secure Real-Time Transport Protocol (SRTP) over H.323 IP Trunks, Issue 1.0*”.
<http://www.avaya.com/master-usa/en-us/resource/assets/applicationnotes/srtp-iptrunk.pdf>

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