Application Note

Alcatel 4400 Release 6.0, using E1 QSIG to Cisco Unified Communications Manager release 6.0

July 27, 2007 Initial Version

Table of Contents

Introduction 1
Network Topology 2
Limitations 2
System Components 2
  Hardware Requirements 2
  Software Requirements 3
Features 3
  Features Supported 3
  Features Not Supported 4
Configuration 4
  Configuring the Alcatel 4400 PBX 4
  Configuring the Cisco Unified Communication Manager 54
  Configuring the Cisco 3825-E1 Gateway 55
  Configuring the Cisco 3825 Router 106
  Configuring the PSTN Cisco 1700 Router 110
Acronyms 113

Introduction

This is an Application Note for connectivity between an Alcatel 4400 Release 6.0 PBX and Cisco Unified Communication Manager Release 6.0 using a Cisco 3825 voice gateway with MGCP and ISO QSIG protocol.

The network topology diagrams (Figures 1 and 2) show the test setup for end-to-end interoperability with Cisco Unified Communication Manager Release 6.0 connected to the PBX via the Cisco 3825 E1 QSIG link as MGCP gateway. A NM-HDV and VWIC-2MFT-E1 were used for the E1 QSIG interfaces. Calls were made to test basic call, caller ID, conference, transfer, forward, call back, reroute, MWI, and path replacement features.

Connectivity is achieved by using the QSIG ISDN switch type on the MGCP gateway with the Cisco Unified Communication Manager services parameter “QSIG variant” set to ISO, and ISO switch type on the Alcatel 4400 PBX.

This Application Note uses the Cisco 3825 voice gateway. However, the use of other Cisco voice gateways is also an option since CUCM QSIG implementation does not depend on the physical interface.

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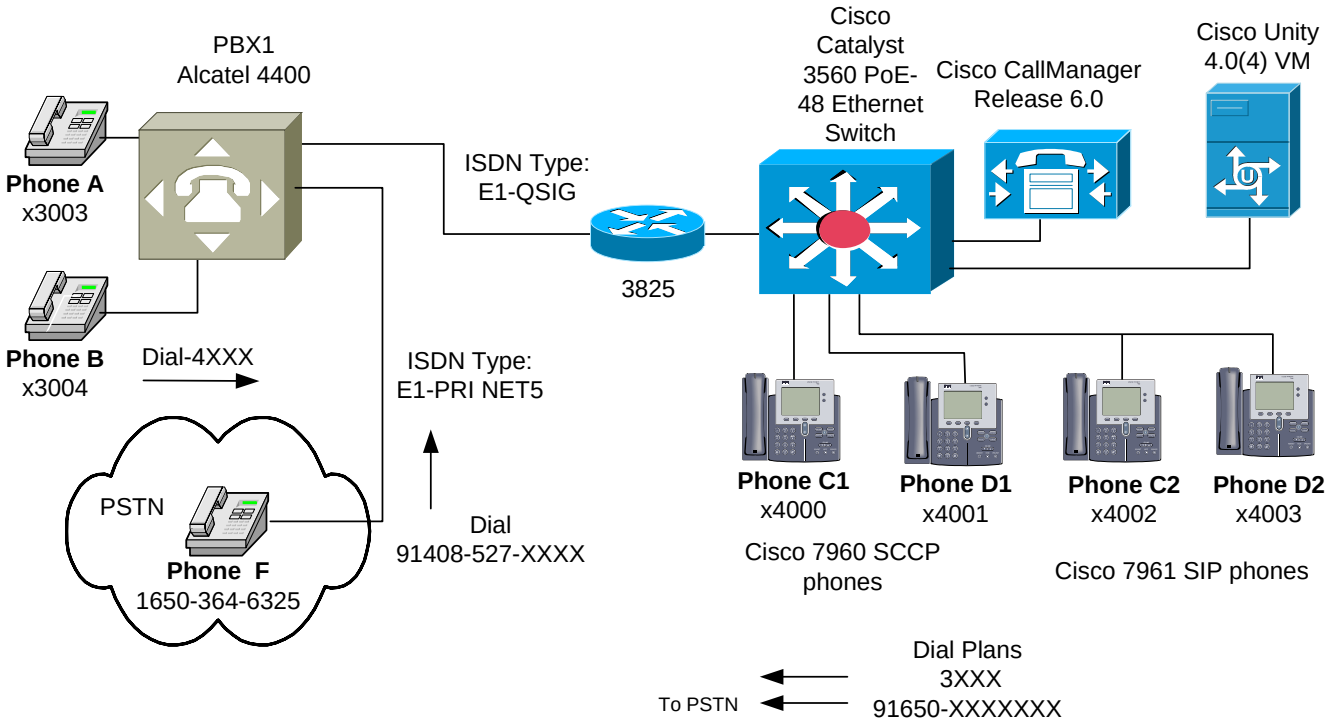
Network Topology

Figure 1. Basic Call Setup



Limitations

Basic Calls – Overlap

Connected number is sent from Cisco Unified Communication Manager, but not displayed on Alcatel phone when call is placed from PBX to IP phone.

Network/External Call Forward by Join

The Alcatel PBX does not support call forward by join. Instead, the Alcatel PBX performs a reroute.

MWI

Unfortunately, Cisco has not been able to validate MWI function in our labs because we do not have an internal voicemail system on our Alcatel PBX.

Cisco Unified Communication Manager can not be the message center PINX for stations on the Alcatel 4400 Release 6.0 PBX. This is because MWI across QSIG is not supported by the Alcatel 4400 Release 6.0 PBX.

System Components

Hardware Requirements

The following hardware is required:

Cisco MCS 7800 Unified Communication Manager Appliance

Cisco 3825 voice gateway

Cisco 1700 voice gateway

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NM-HDV

VWIC-2MFT-E1

VIC-2FXS

Analogue Phone Panasonic KX-TSC7

Cisco Unified IP phone 7940

Cisco Unified IP phone 7960

(2) Cisco Unified IP phone 7961G-GE

(2) Alcatel 4400 PBXs

(4) PRA2 trunk cards

(4) 4035 *Advanced Reflexes* digital phones

Software Requirements

The following software is required:

Cisco Unified Communication Manager Release 6.0

Alcatel 4400 software release 6.0

Cisco IOS Release 12.4(3a)

Features

This section lists new and changed features and features that are not supported.

Features Supported

Basic Call, ENBLOC

Basic Call, Overlap (see Limitations section for additional information)

Sending Alerting Name

Sending Busy Name

CLIP-Calling Line (Number) Identification Presentation

CLIR-Calling Line (Number) Identification Restriction

CNIP-Calling Name Identification Presentation

CNIR-Calling Name Identification Restriction

COLP-Connected Line (Number) Identification Presentation

COLR- Connected Line (Number) Identification Restriction

CONP-Connected Name Identification Presentation

CONR- Connected Name Identification Restriction

Tandem PSTN call

Consultation Transfer – Local

Consultation Transfer – Network/External

Blind Transfer – Local

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Blind Transfer – Network/External

Call Forward Unconditional by Join – Local

Call Forward Unconditional by Join – Network/External (See Limitations section for details.)

Call Forward Busy by Join – Local

Call Forward Busy by Join – Network/External (See Limitations section for details.)

Call Forward No Reply by Join – Local

Call Forward No Reply by Join – Network/External (See Limitations section for details.)

Call Forward Unconditional by Reroute – Network/External

Call Forward Busy by Reroute – Network/External

Call Forward No Reply by Reroute – Network/External

Call Completion to Busy Subscriber (Call Back when Free)

Call Completion on No Reply (Call Back Next Used)

Path Replacement for Call Transfer by Join

Path Replacement for Trombone Connection (accomplished by consultation transfer)

Features Not Supported

Any Call Forward (CFU, CFB, CFNR) by join from PBX. PBX always performs a reroute.

Path Replacement for Call Diversion by Forward Switch

MWI (see Limitations section for details.)

Configuration

This section contains configuration menus and commands and describes configuration sequences and tasks.

Configuring the Alcatel 4400 PBX

1. System Software Release
2. Configure “ISO Function” System Parameter.
3. Configure Board.
4. Configure Digital Access
5. Configure PRI-ABC_F Trunk Group
6. Configure PSTN Trunk Group
7. Configure Remote Network
8. Configure Network Routing
9. Configure Network routing for “Overlap”
10. Configure Network Routing “Own Node”.
11. Configure Digital Station
12. Configure Digital Station Phone Facilities

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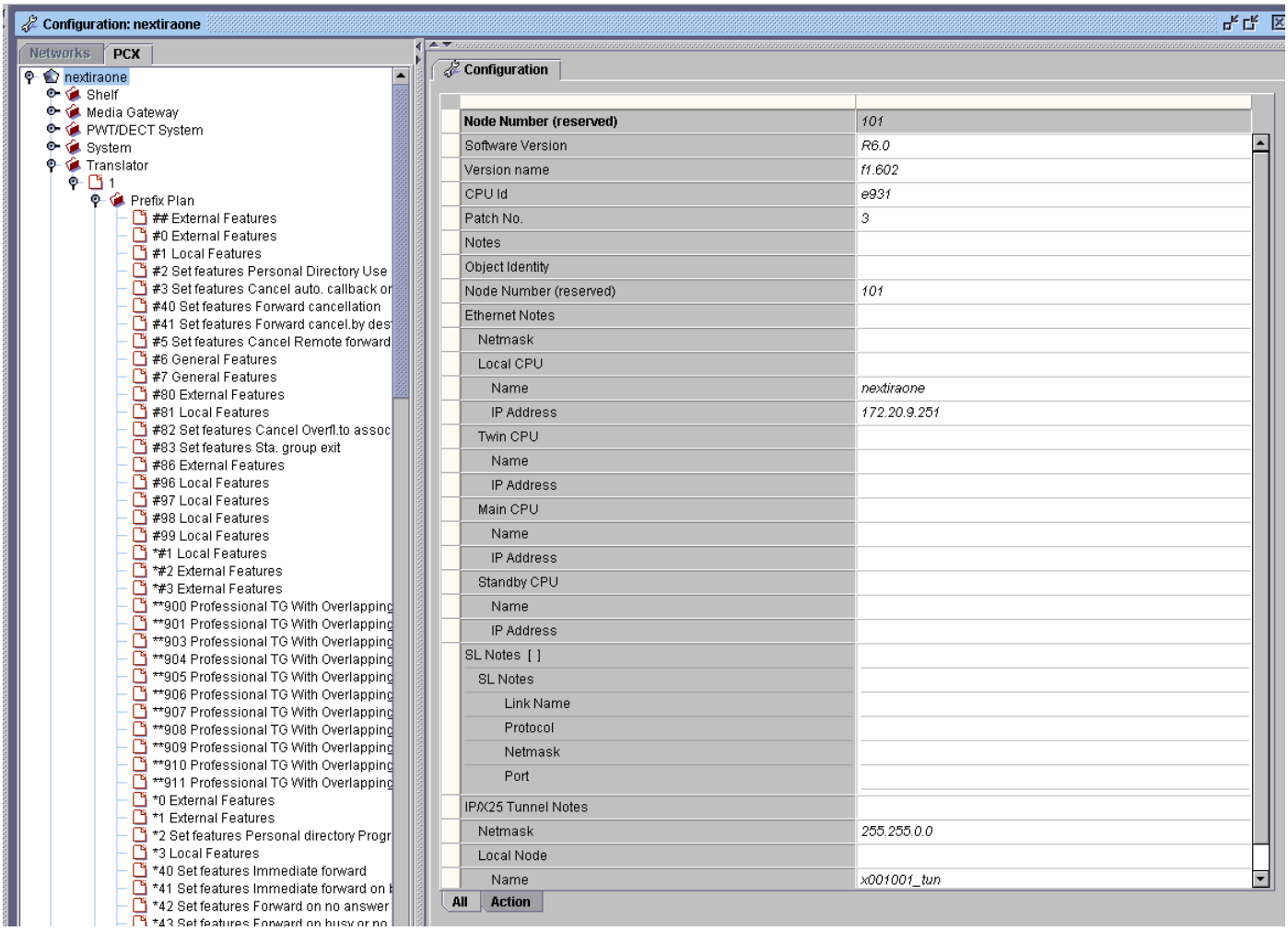
Configuration Menus for Alcatel 4400 PBX

System Software Version



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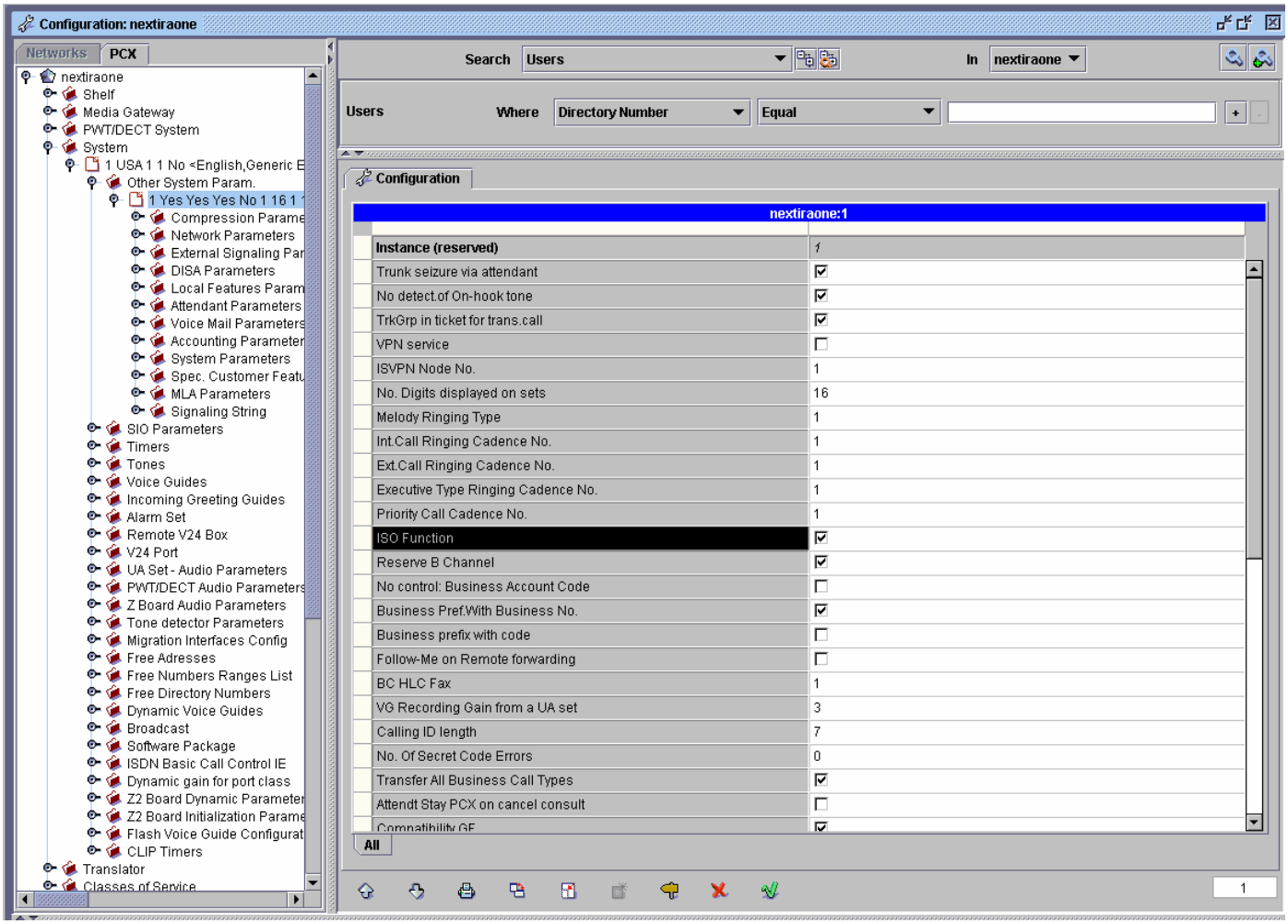
Configure “ISO Function” System Parameter



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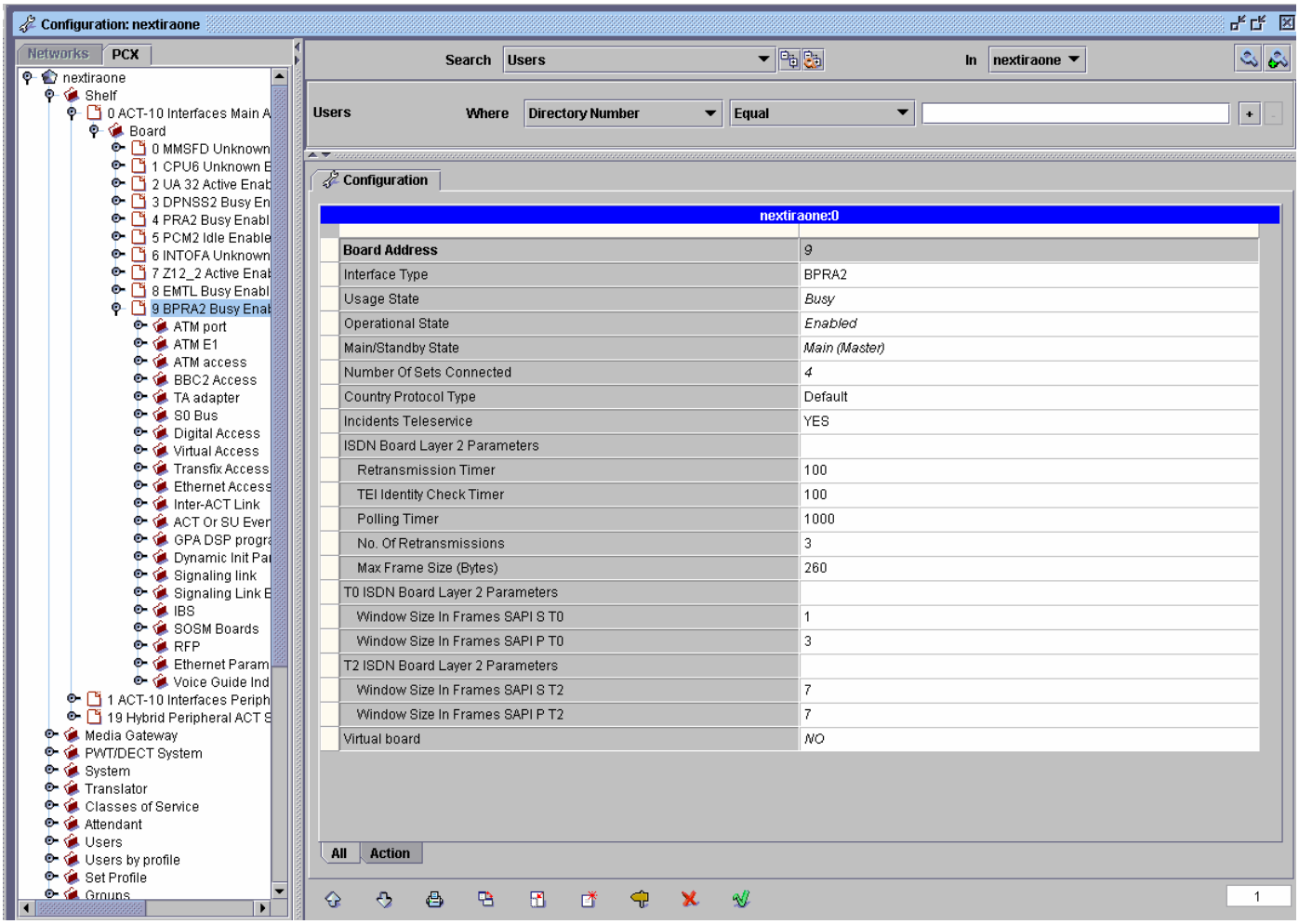
Configure Board (Board 9)



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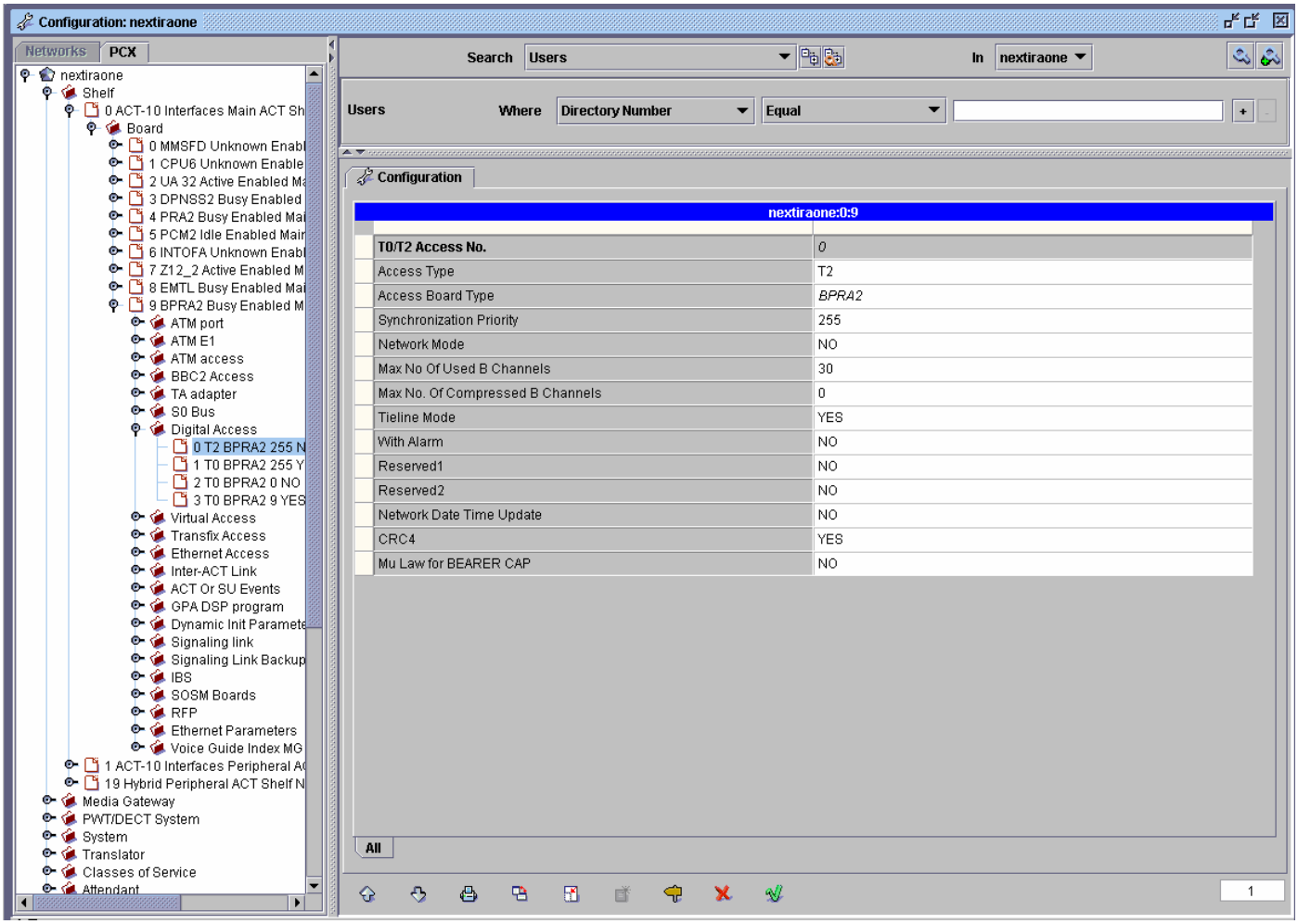
Configure Board (Board 9) Digital Access



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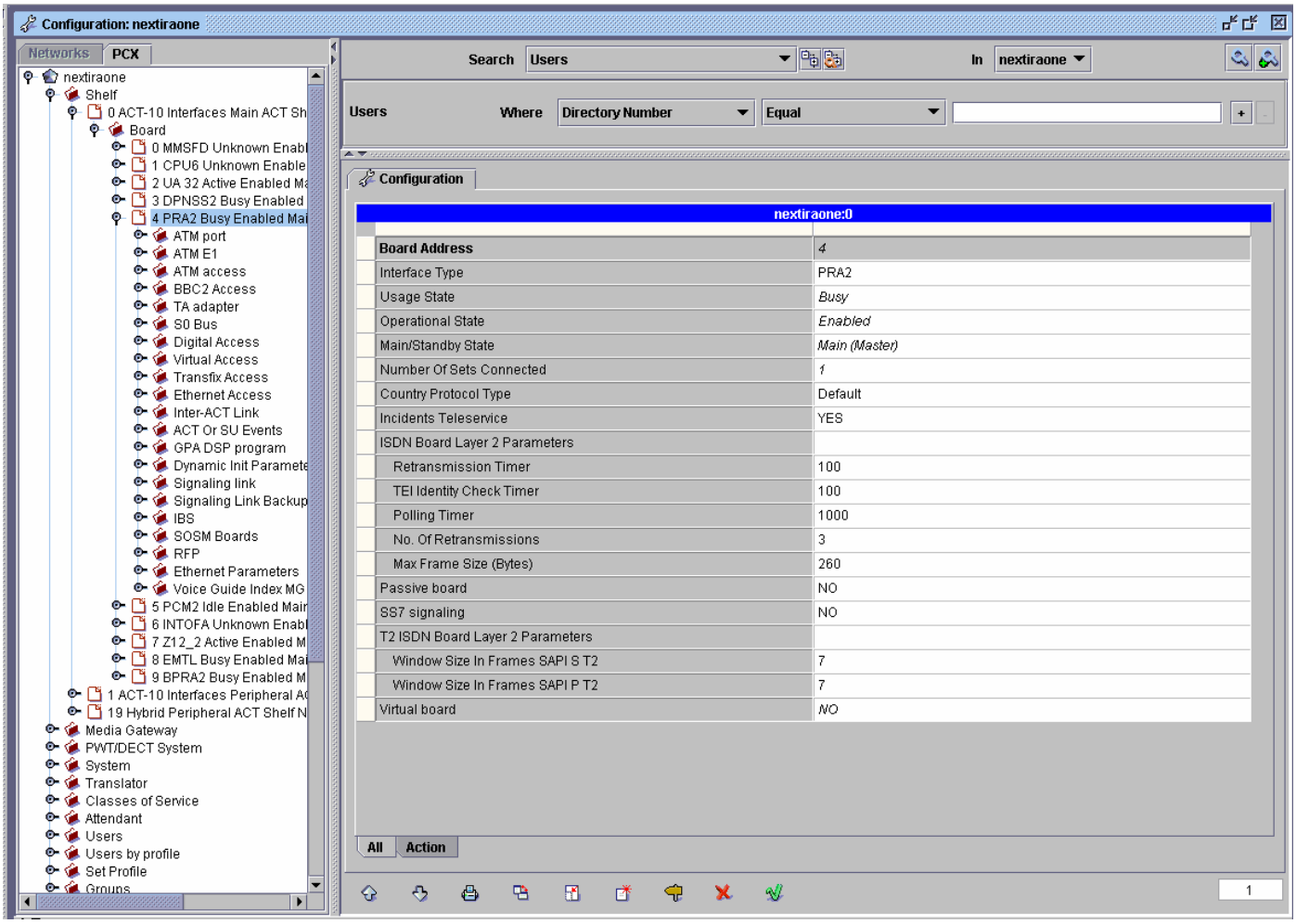
Configure Board (Board 4)



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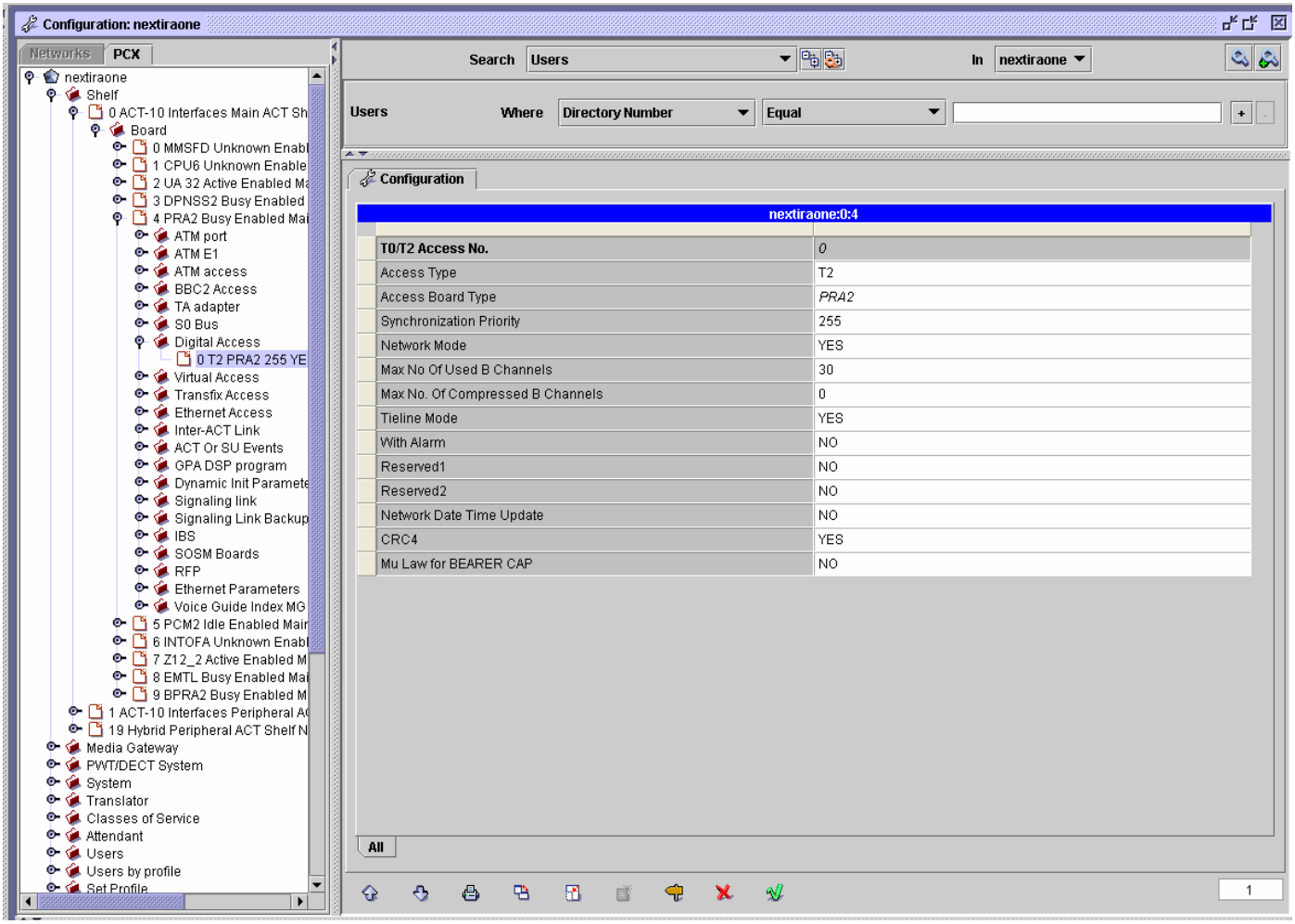
Configure Board (Board 4) Digital Access



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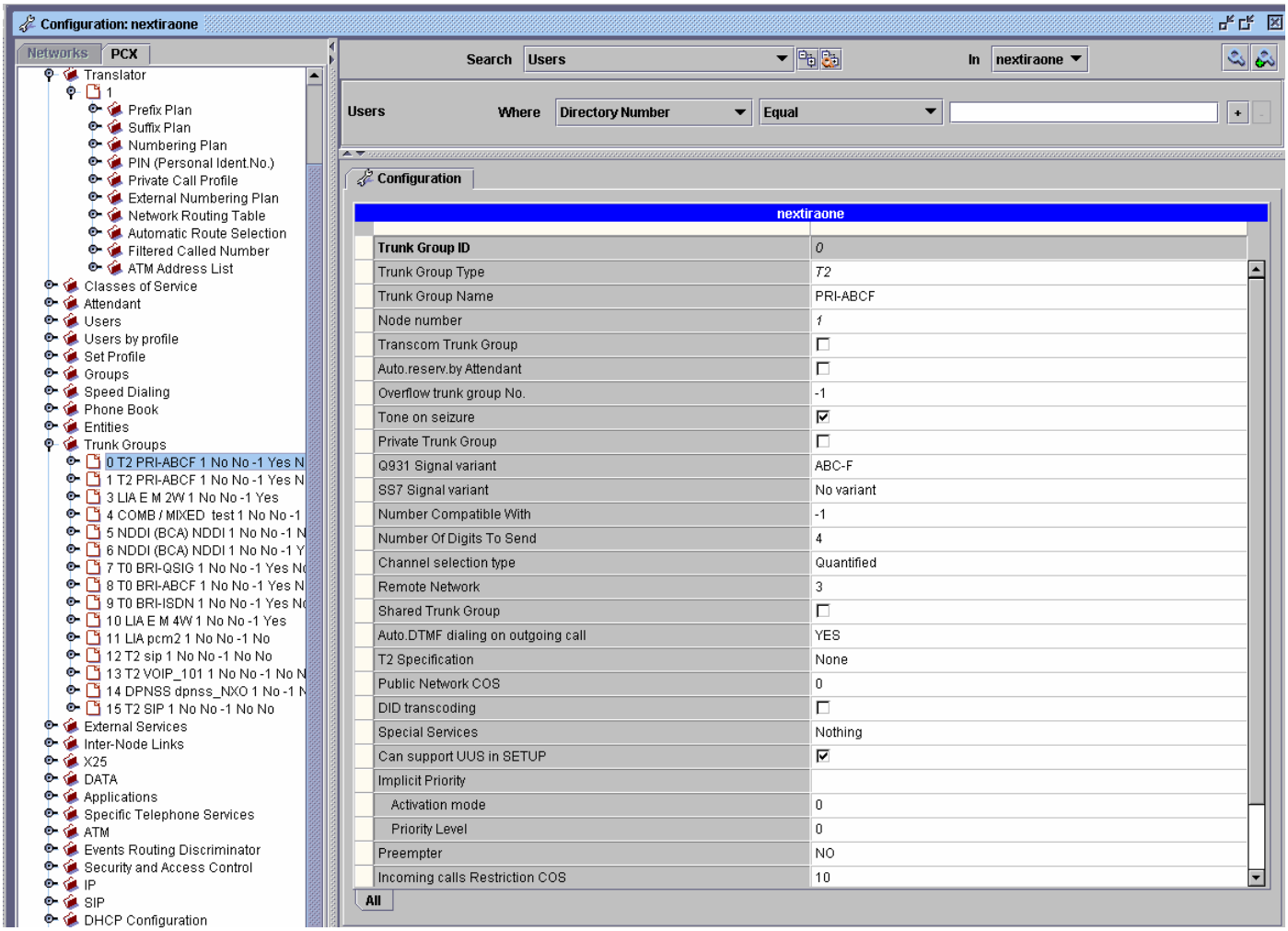
Configure PRI-ABC_F Trunk Group (Trunk Group 0 for Board 9) 1 of 5



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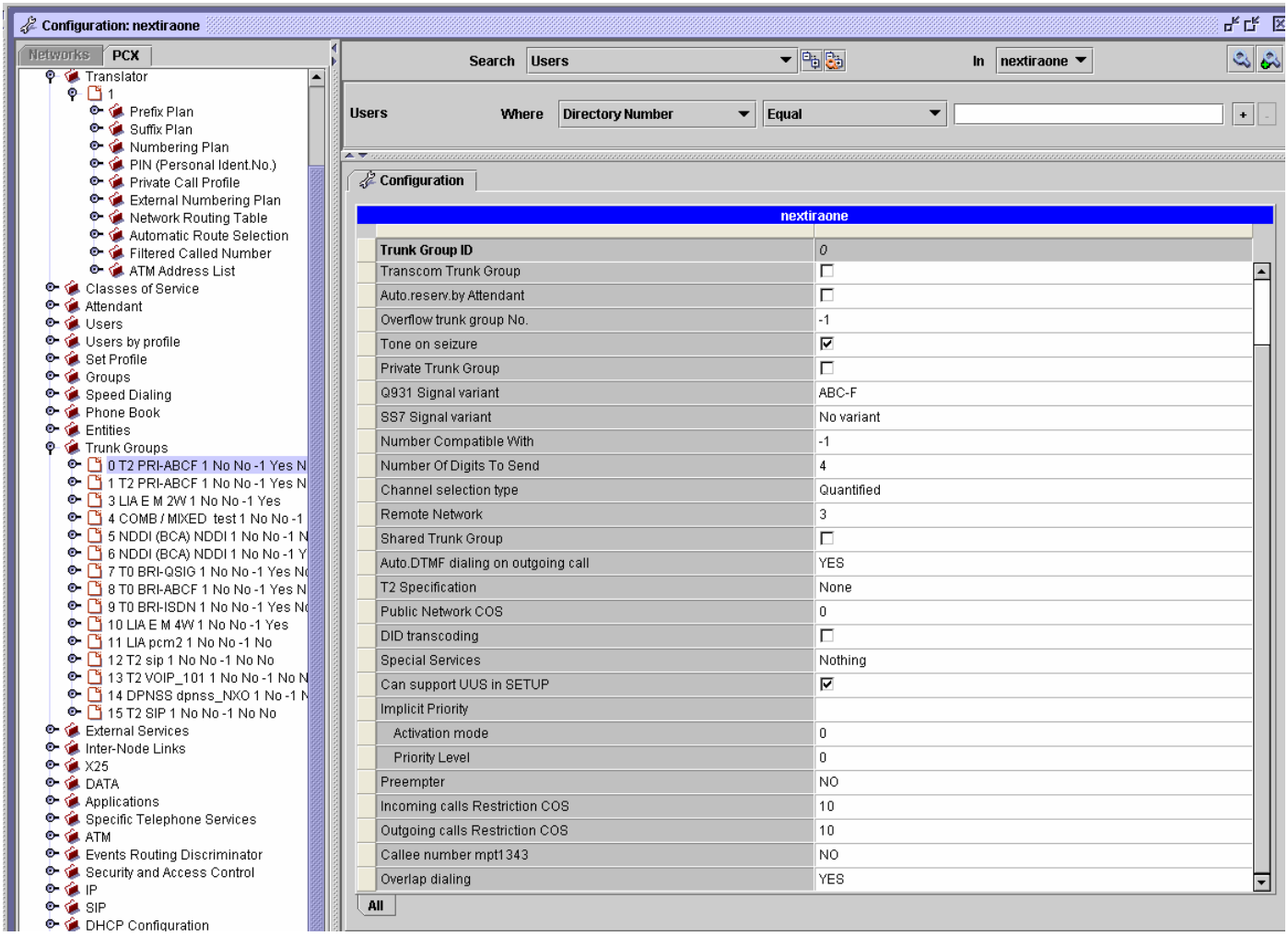
Configure PRI-ABC_F Trunk Group (Trunk Group 0 for Board 9) 2 of 5



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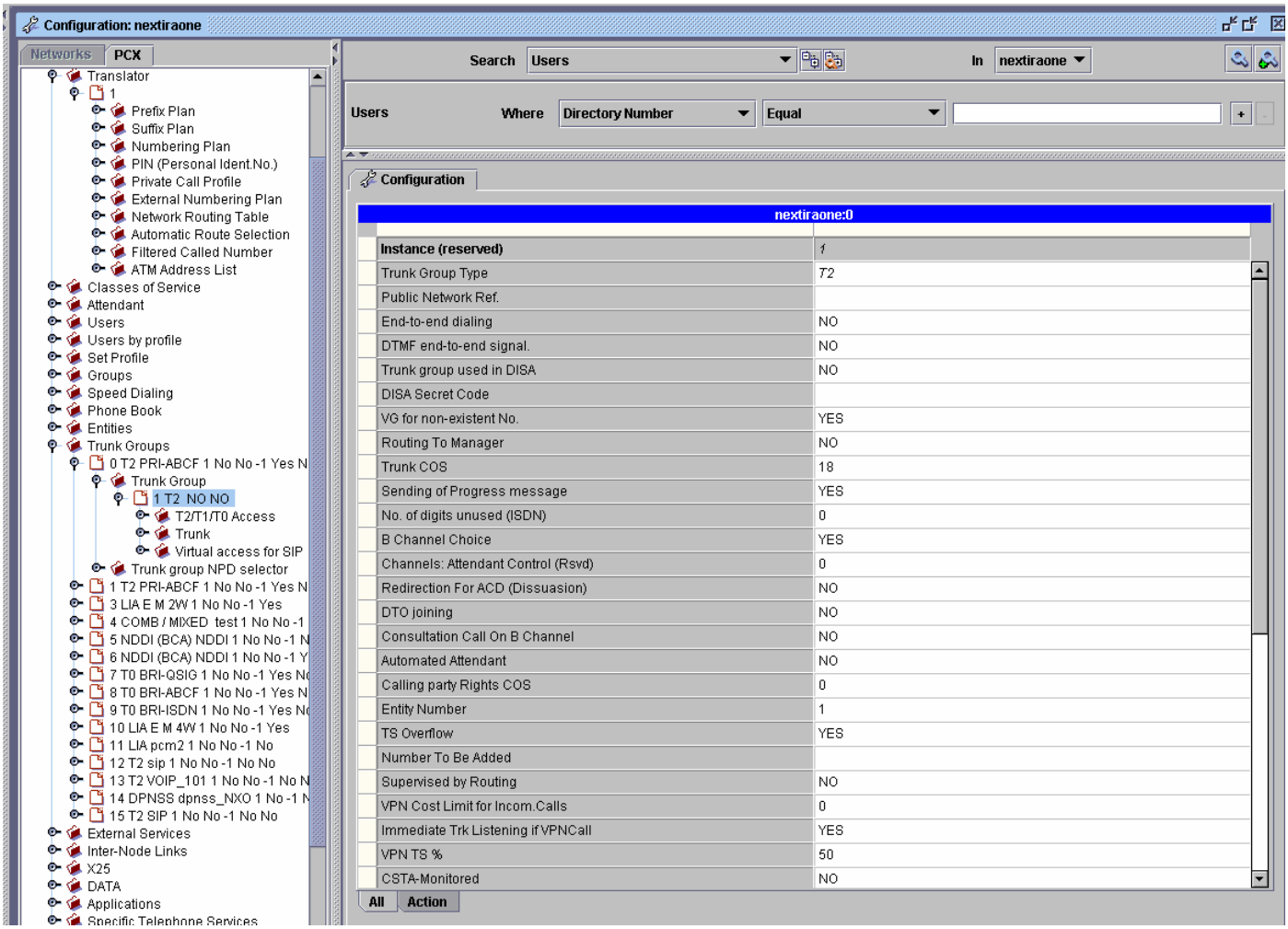
Configure PRI-ABC_F Trunk Group (Trunk Group 0 for Board 9) 3 of 5



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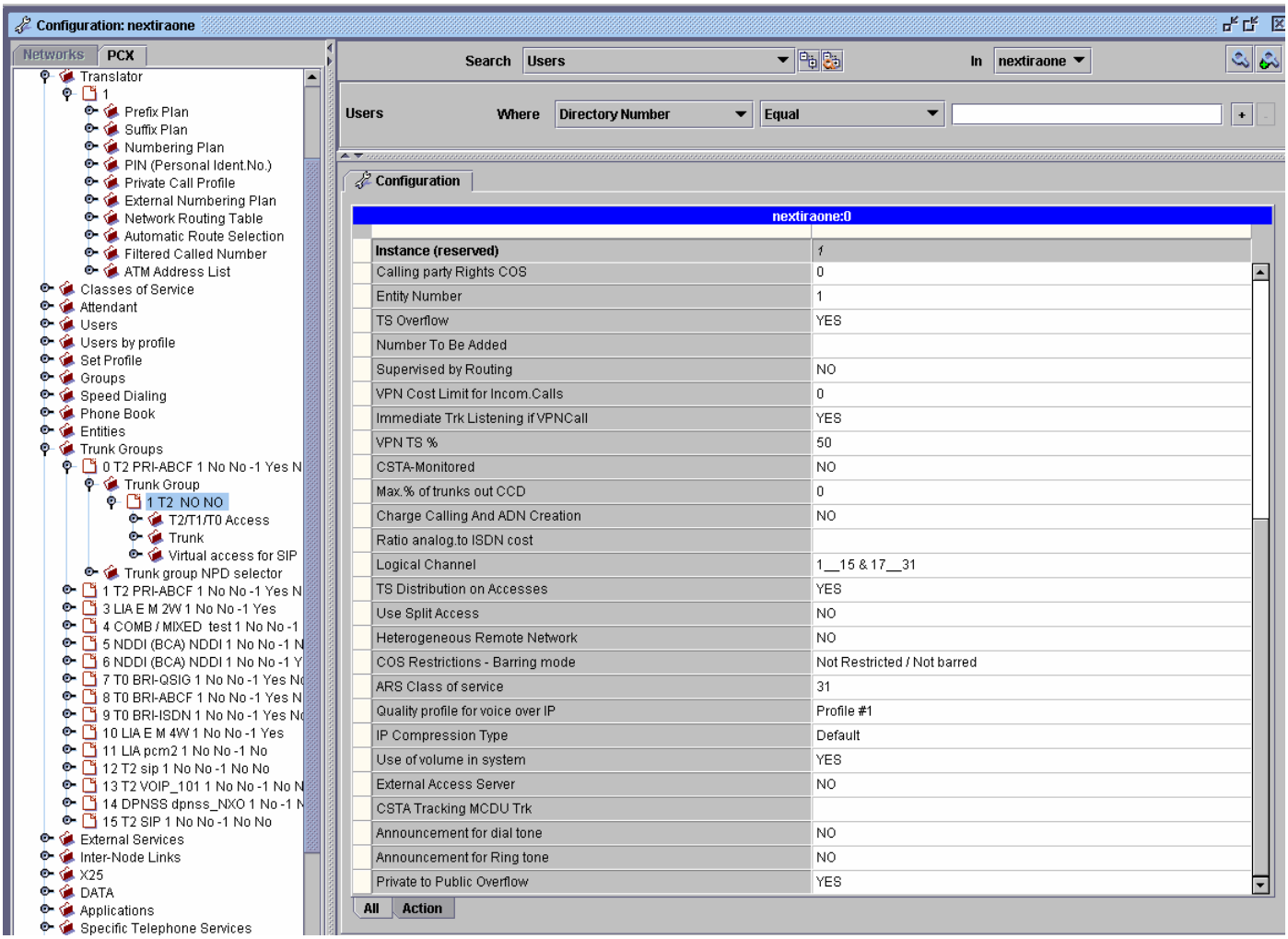
Configure PRI-ABC_F Trunk Group (Trunk Group 0 for Board 9) 4 of 5



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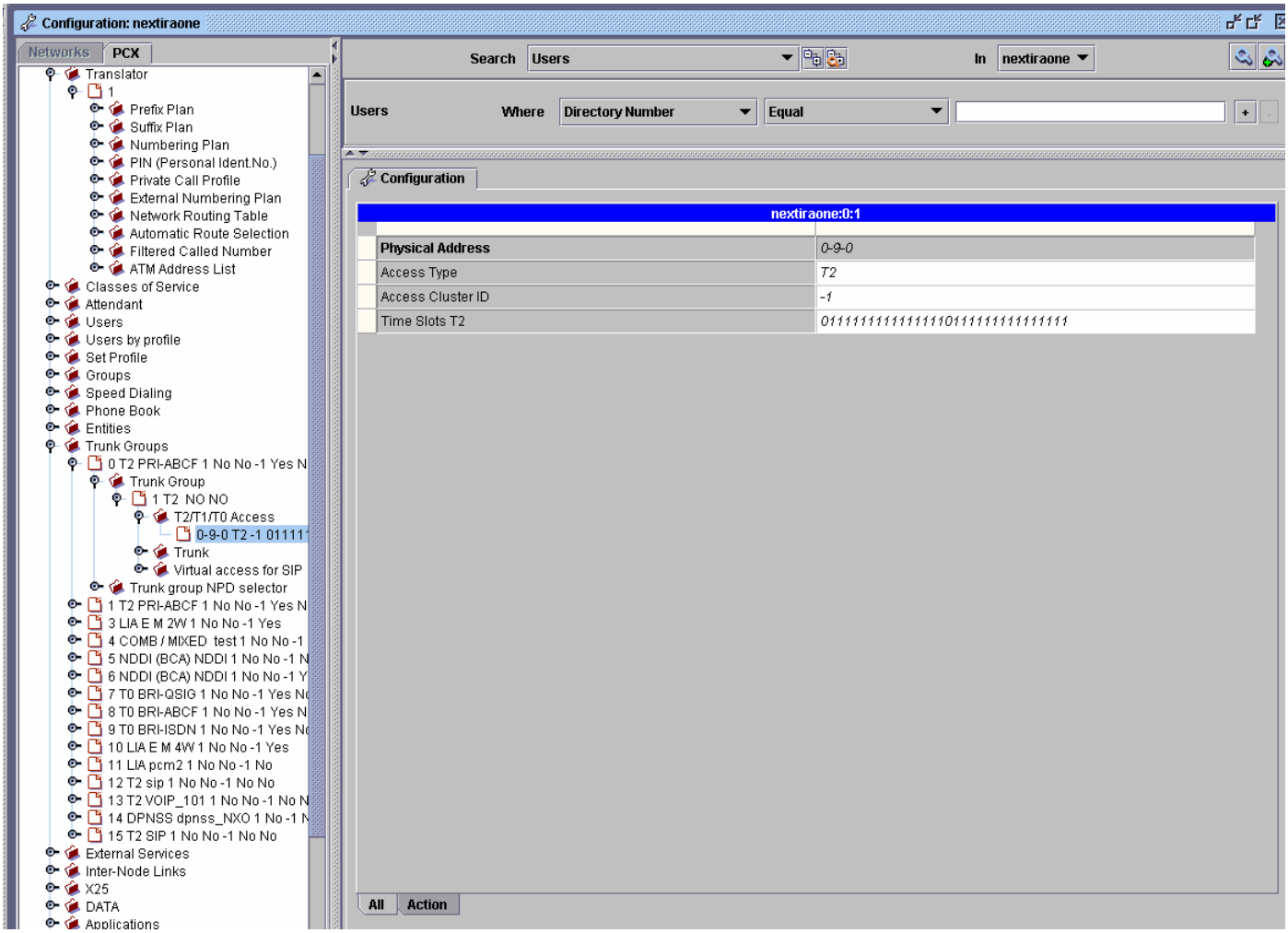
Configure PRI-ABC_F Trunk Group (Trunk Group 0 for Board 9) 5 of 5



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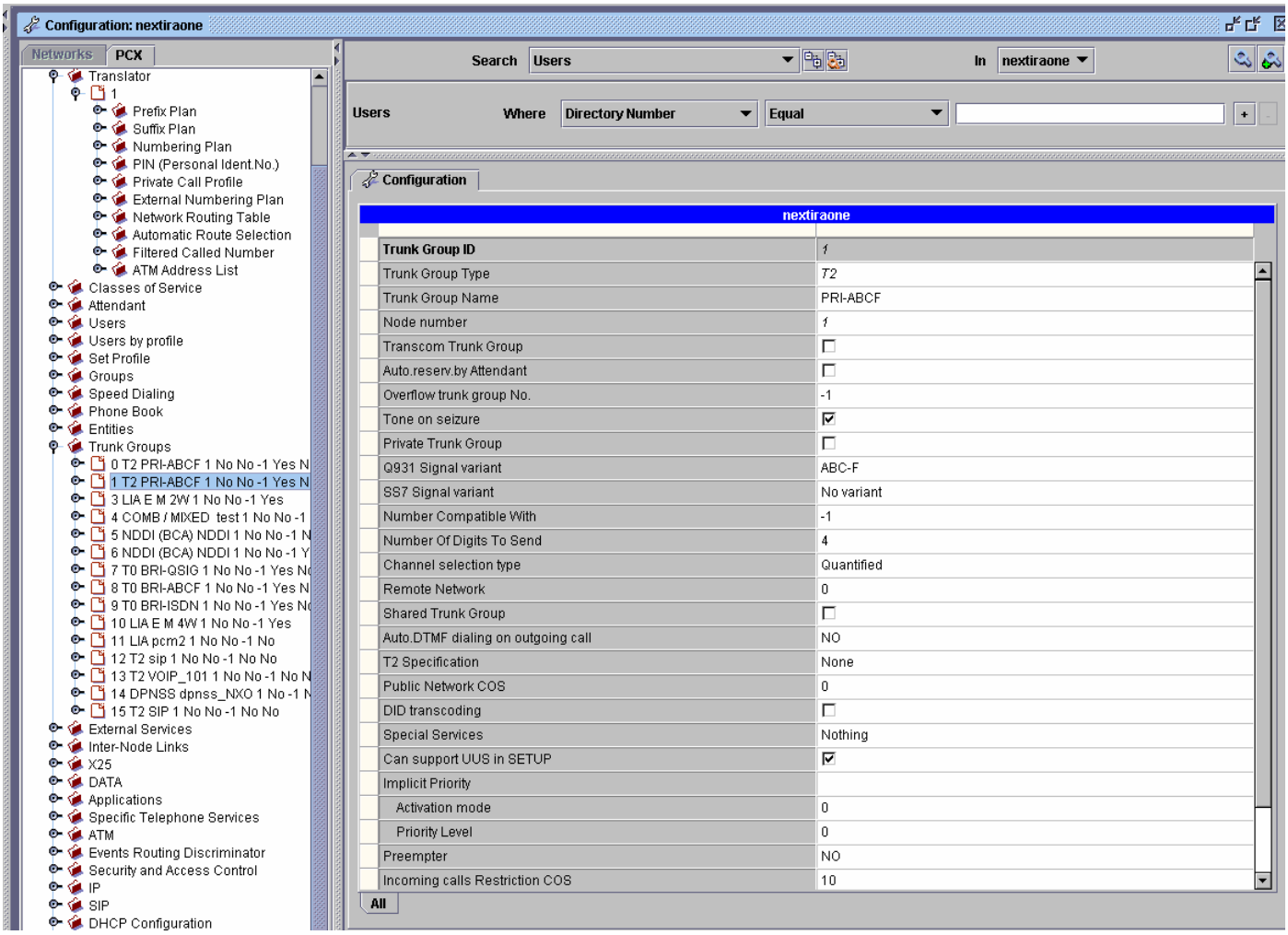
Configure PRI-ABC_F Trunk Group (Trunk Group 1 for Board 4) 1 of 5



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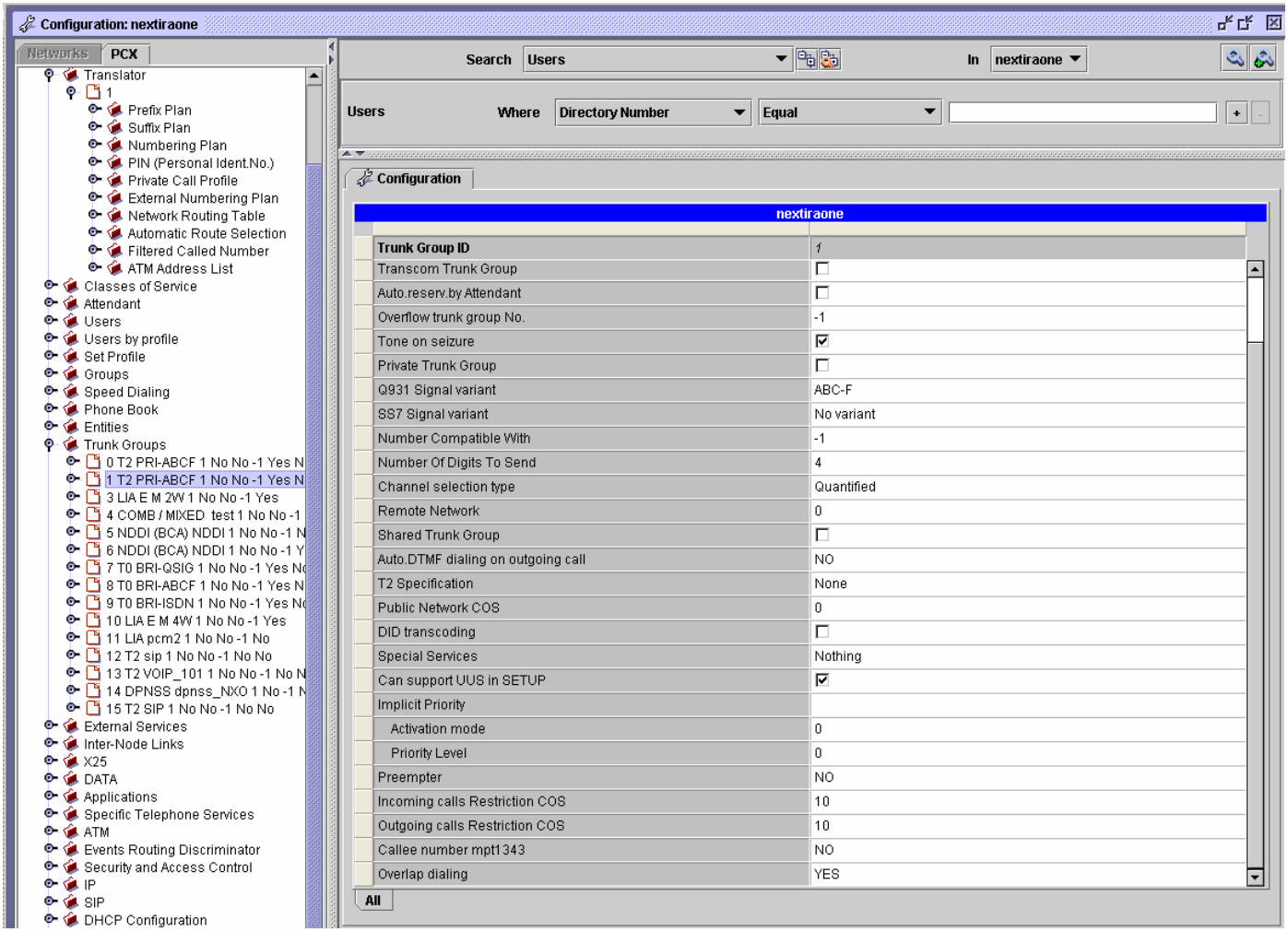
Configure PRI-ABC_F Trunk Group (Trunk Group 1 for Board 4) 2 of 5



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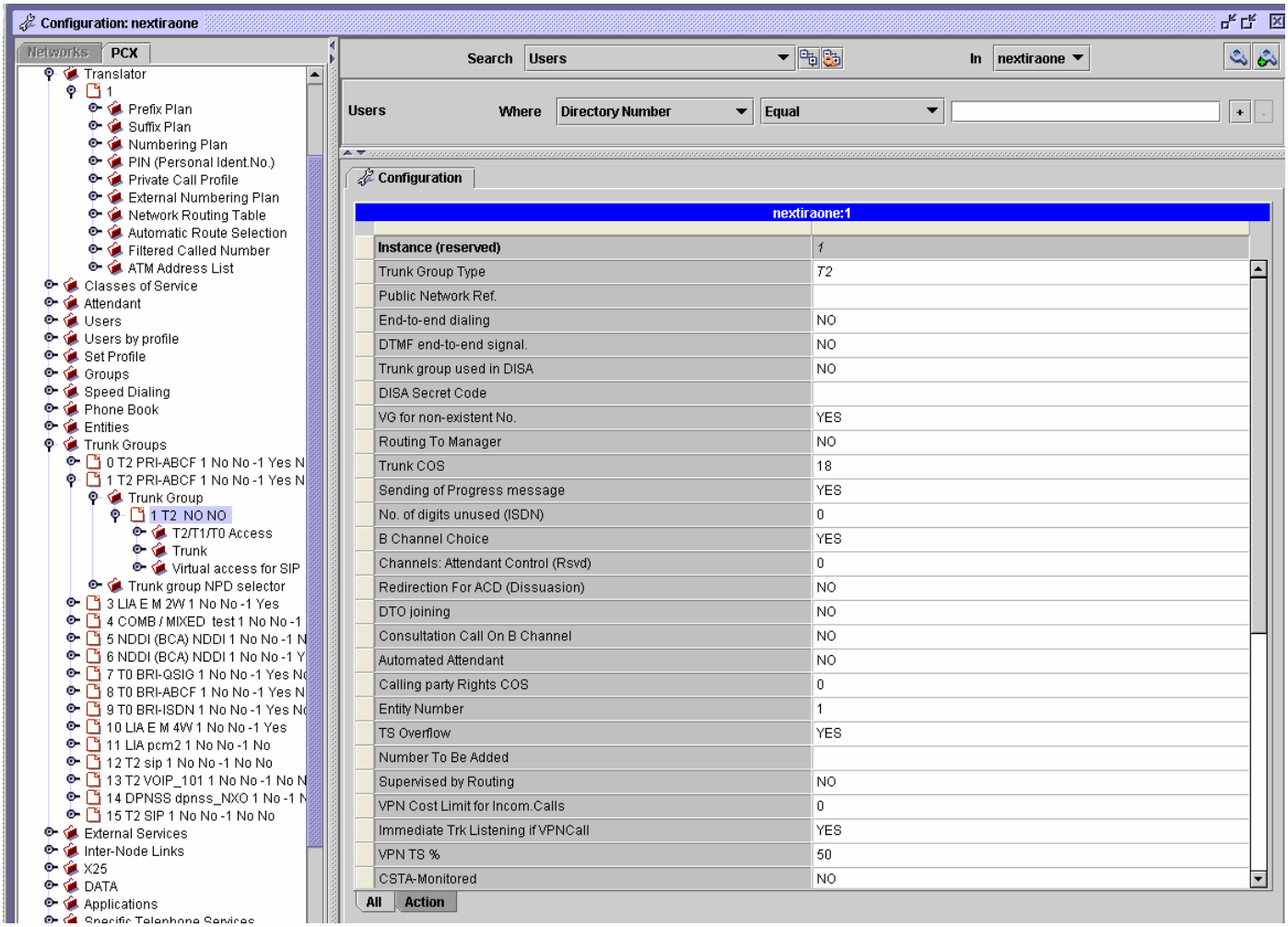
Configure PRI-ABC_F Trunk Group (Trunk Group 1 for Board 4) 3 of 5



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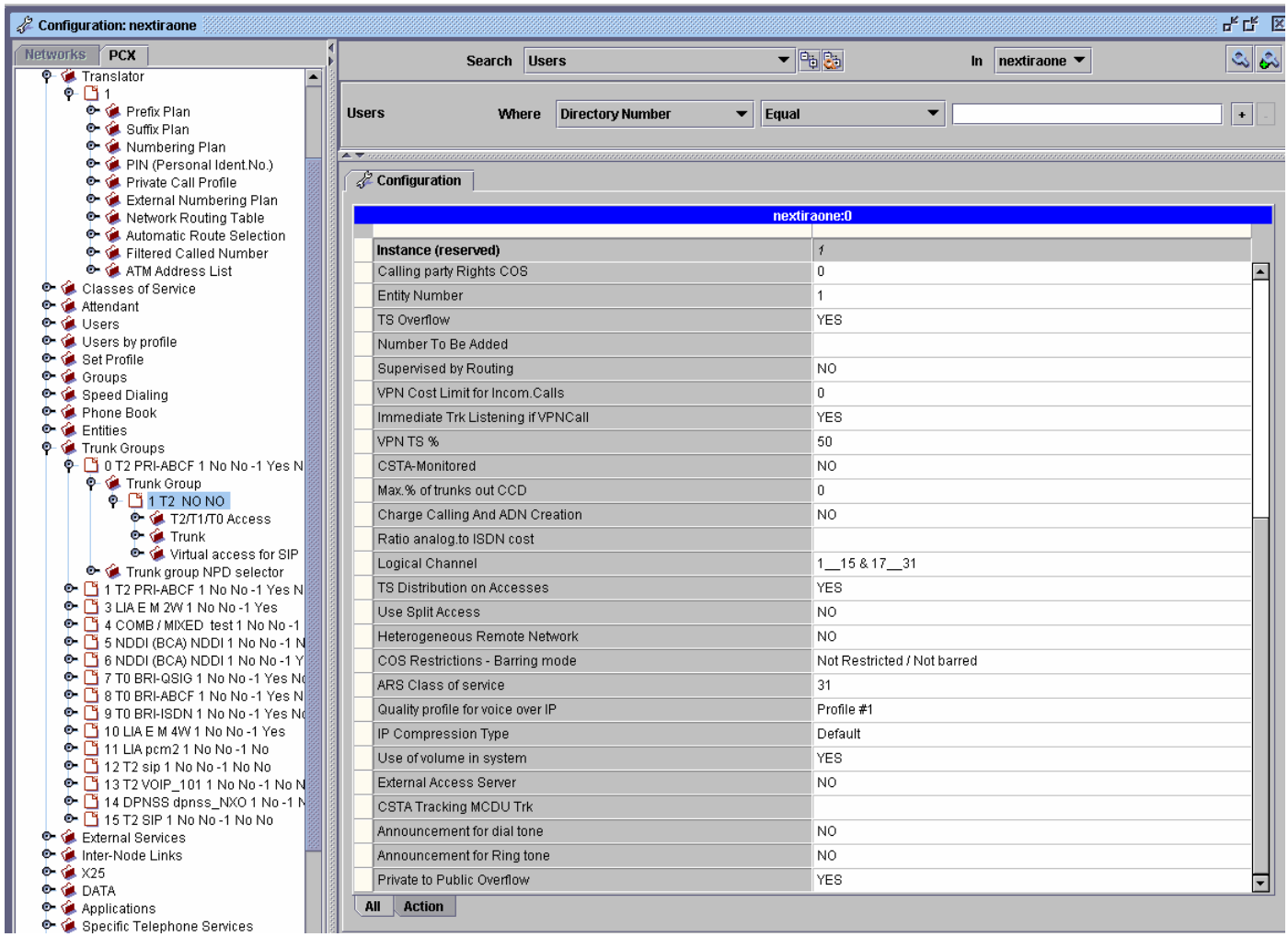
Configure PRI-ABC_F Trunk Group (Trunk Group 1 for Board 4) 4 of 5



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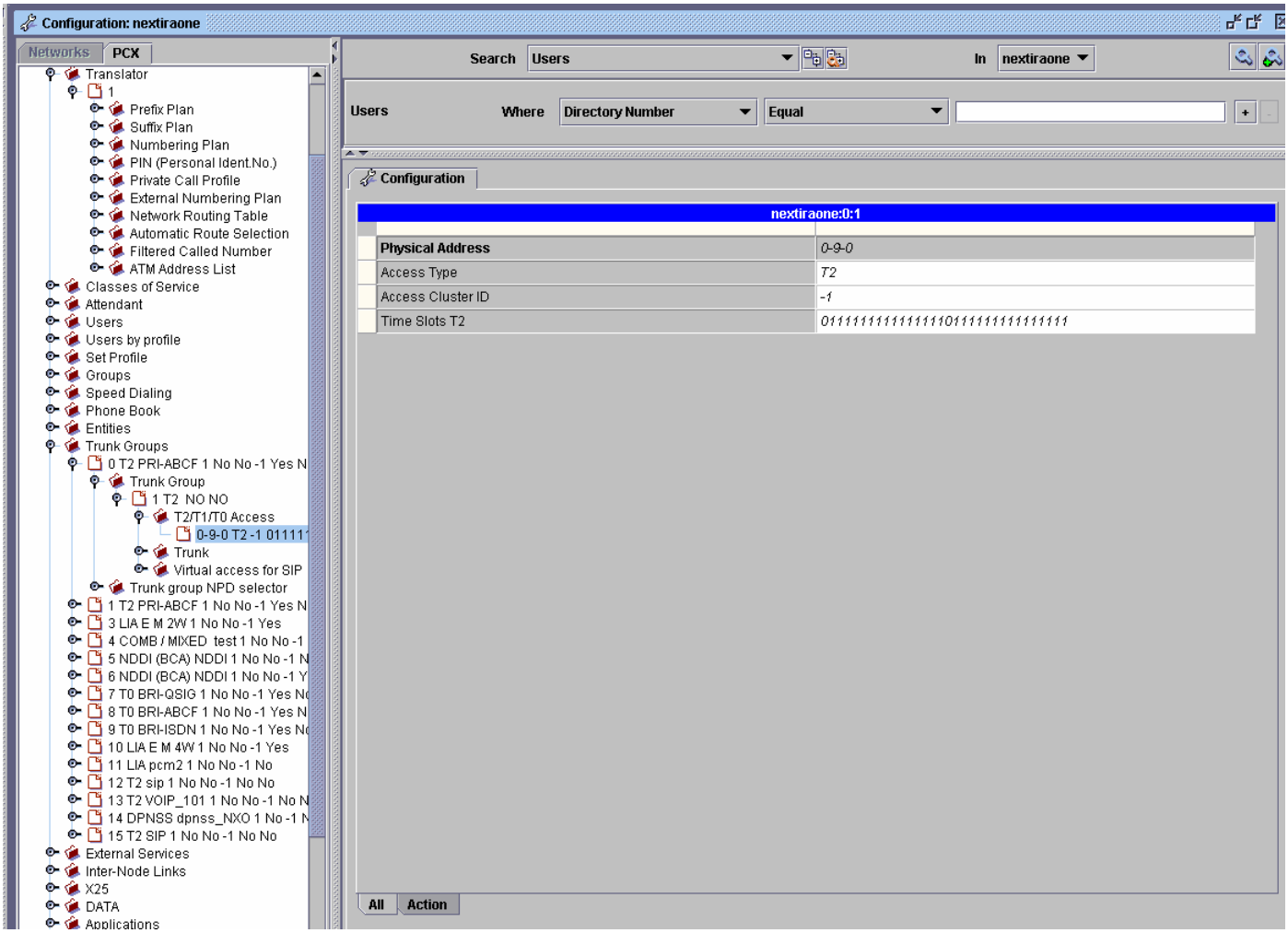
Configure PRI-ABC_F Trunk Group (Trunk Group 1 for Board 4) 5 of 5



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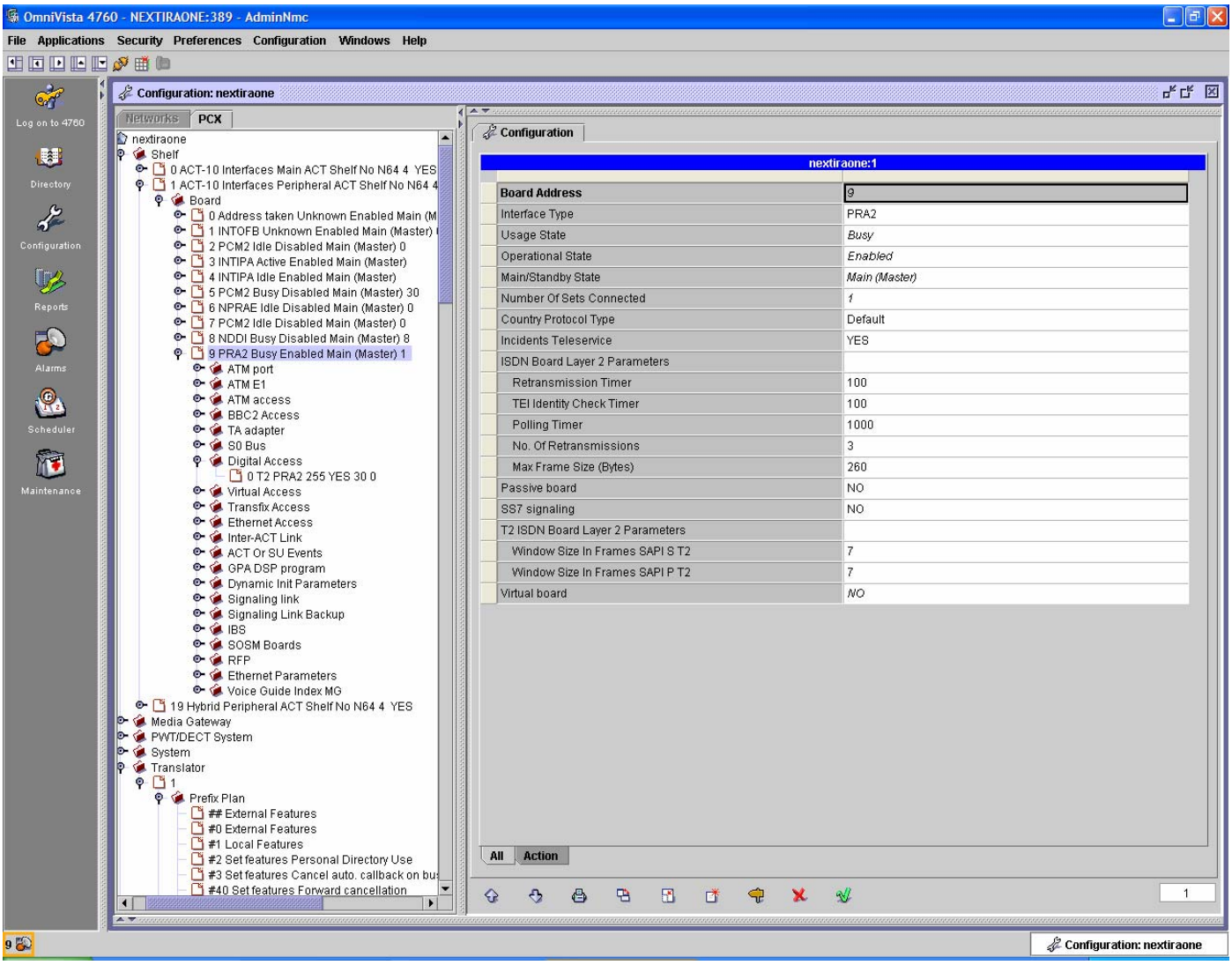
Configure PSTN Board 9 (1 of 1)



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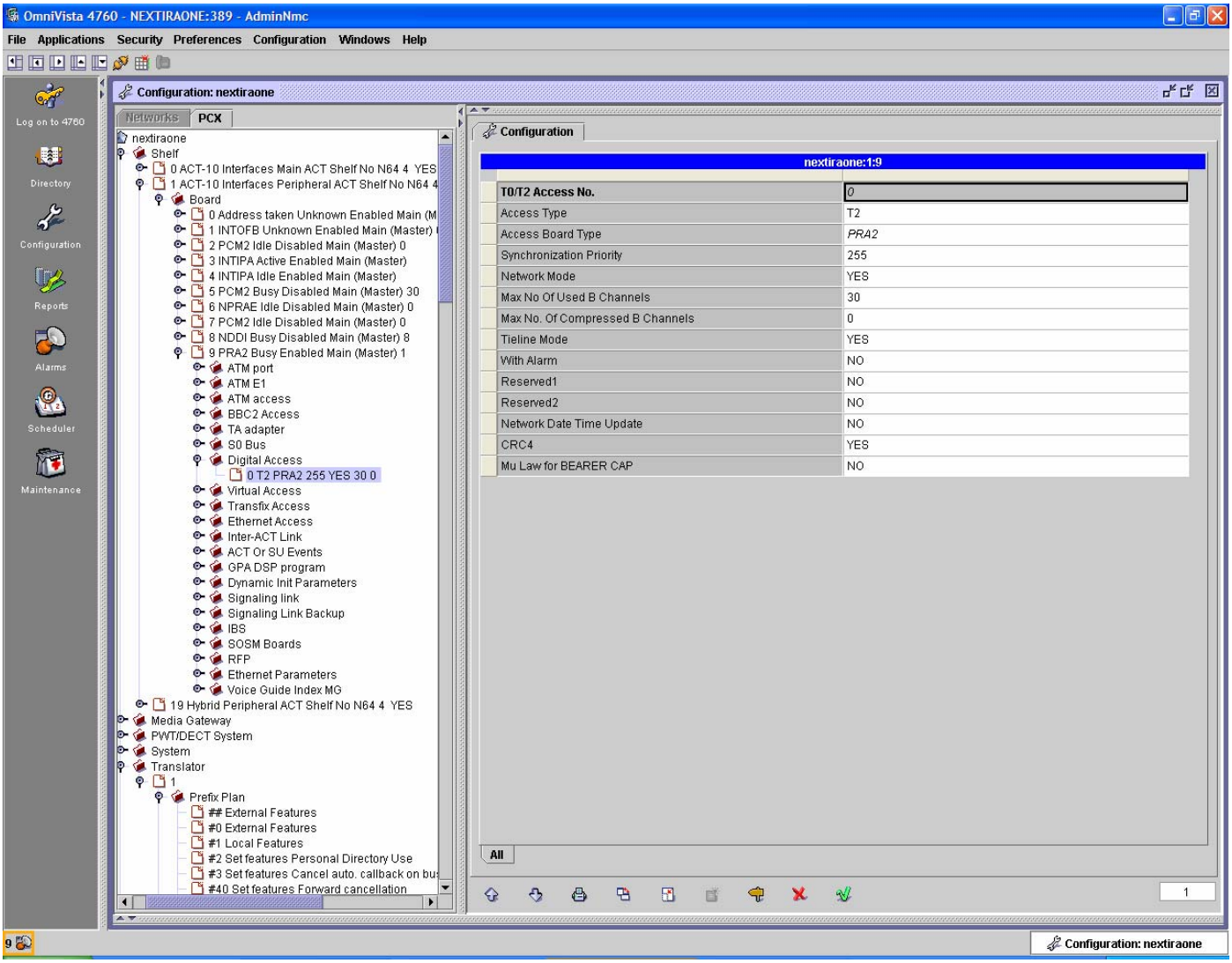
Configure PSTN Board 9 Digital Access (1 of 1)



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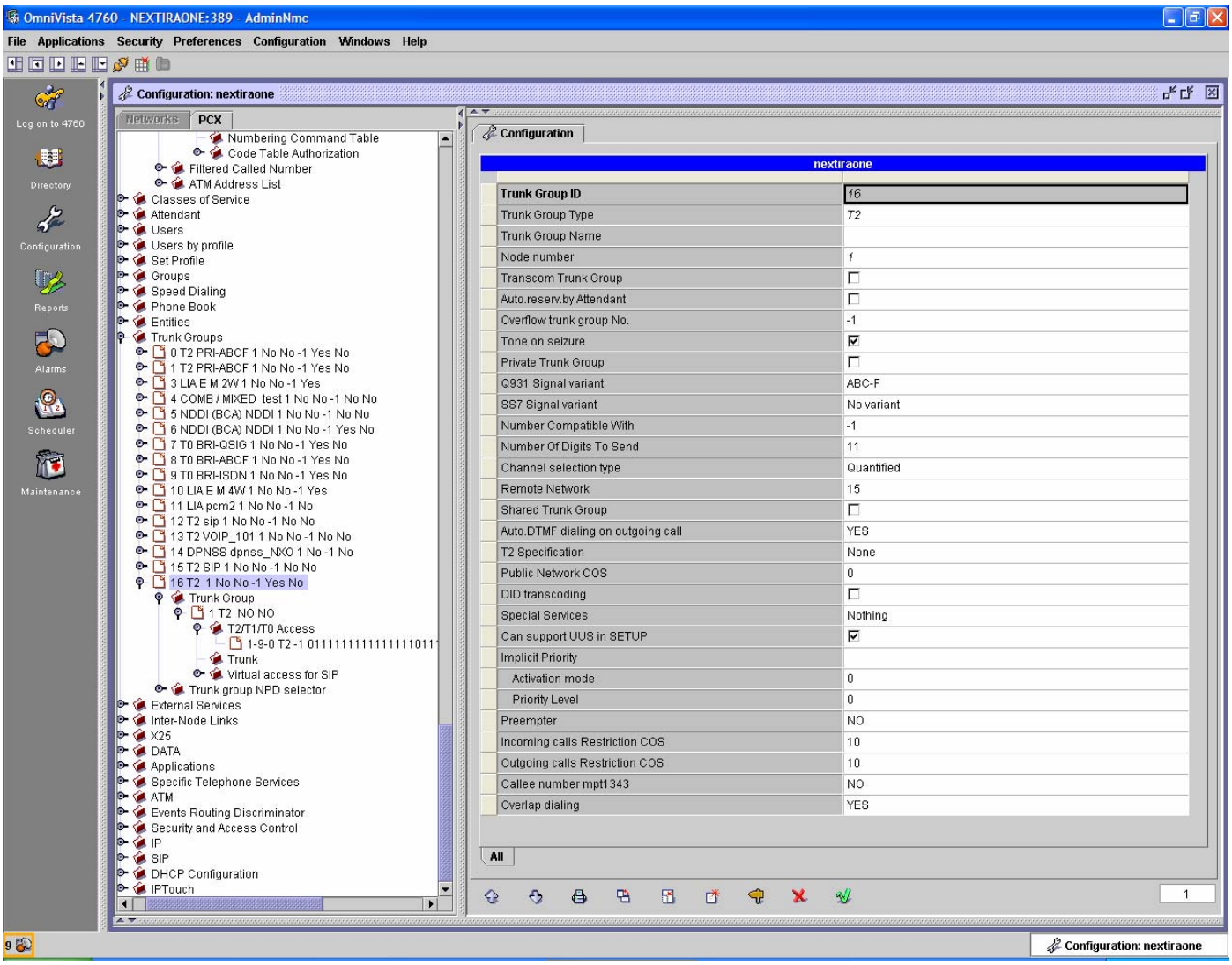
Configure PSTN Trunk Group (Trunk Group 16 for Board 9) 1 of 4



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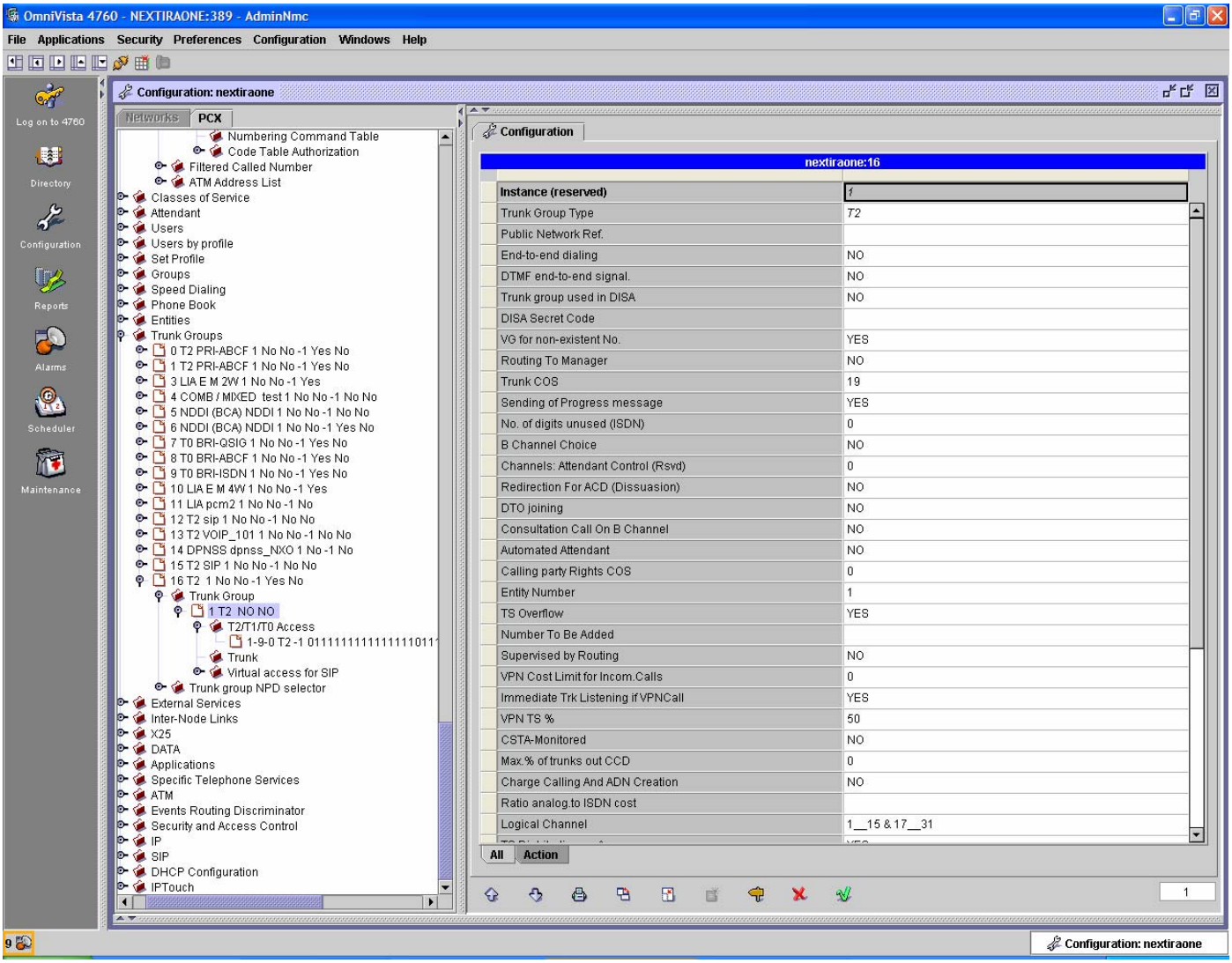
Configure PSTN Trunk Group (Trunk Group 16 for Board 9) 2 of 4



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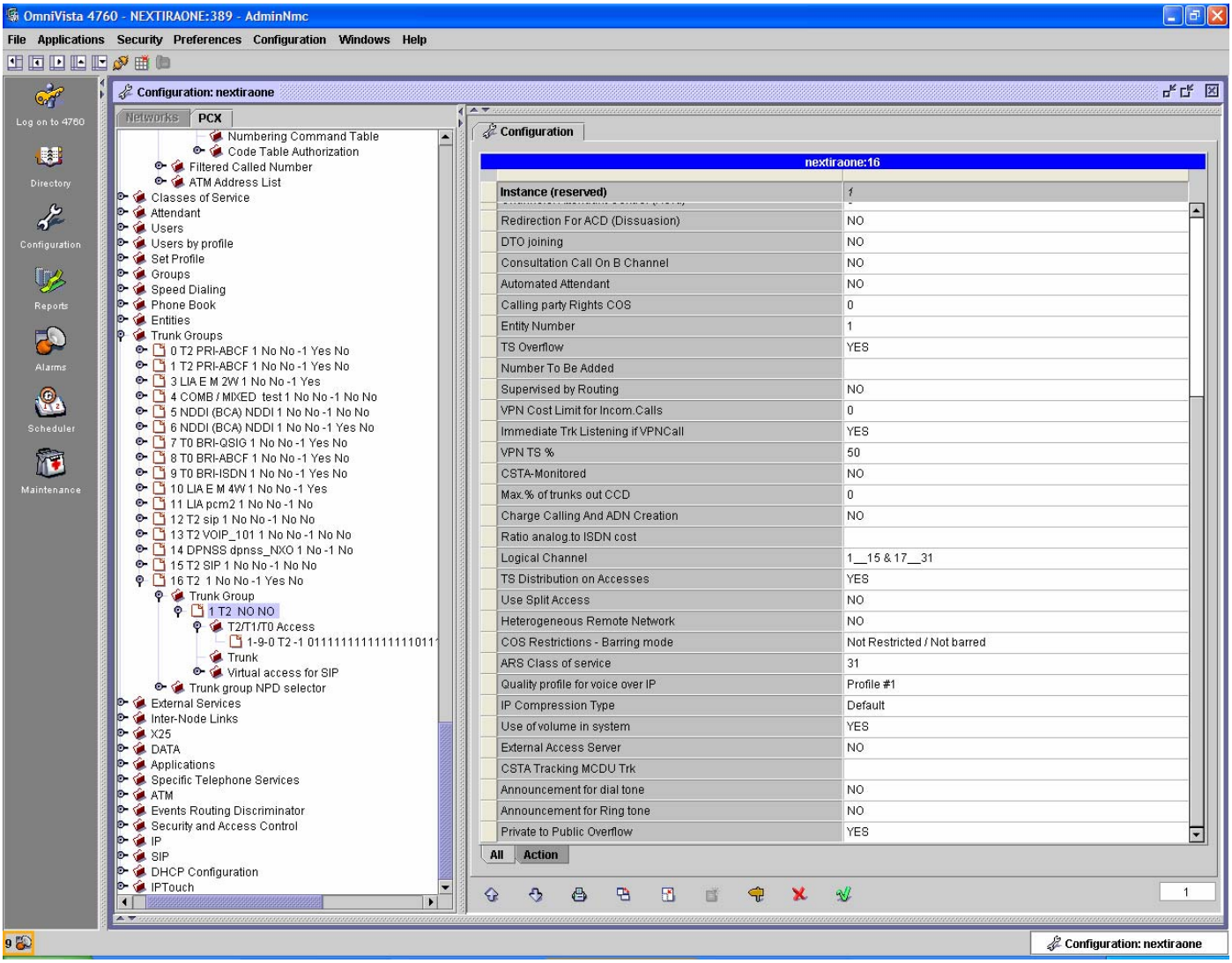
Configure PSTN Trunk Group (Trunk Group 16 for Board 9) 3 of 4



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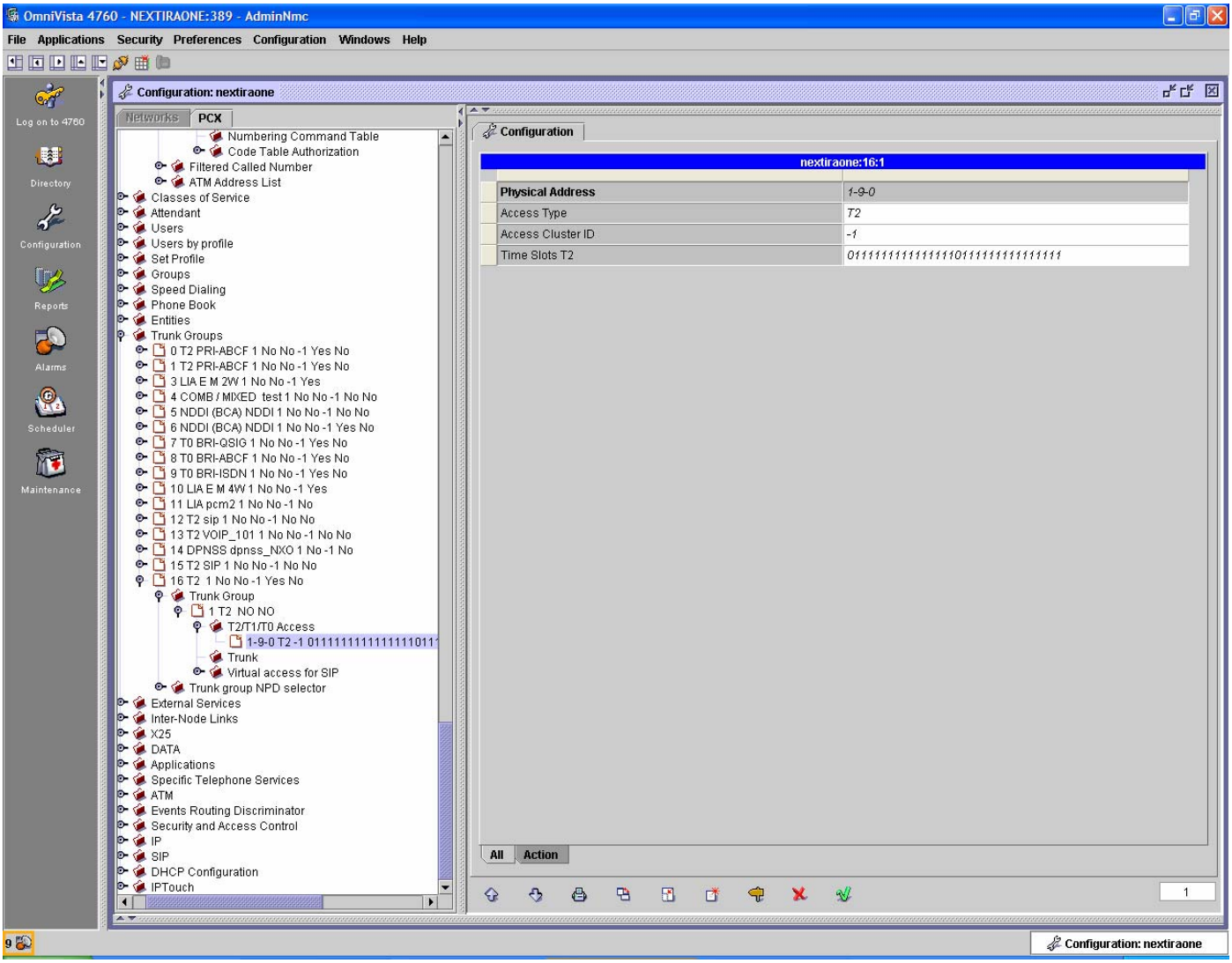
Configure PSTN Trunk Group (Trunk Group 16 for Board 9) 4 of 4



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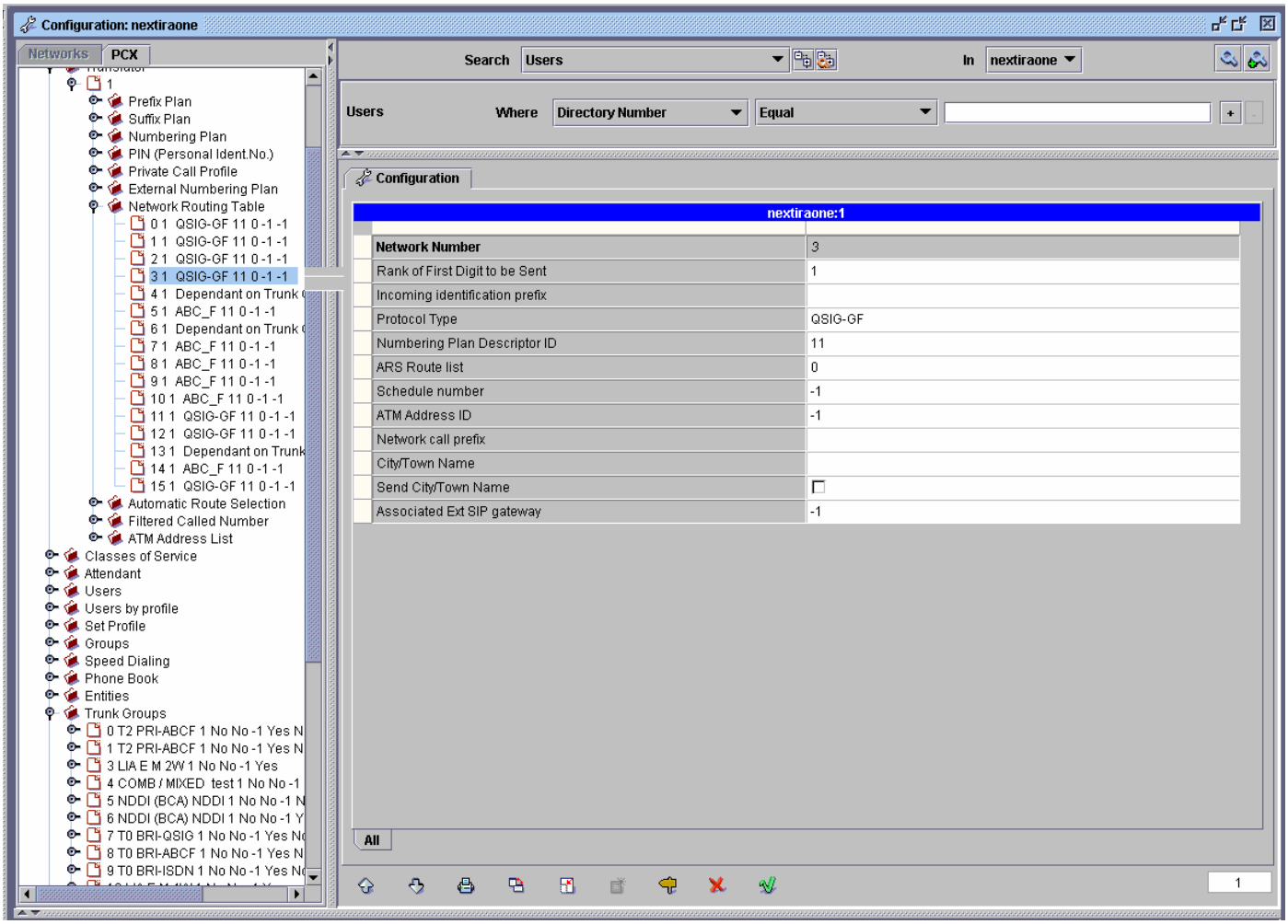
Configure Remote Network (Remote Network #3 for Trunk Group 0)



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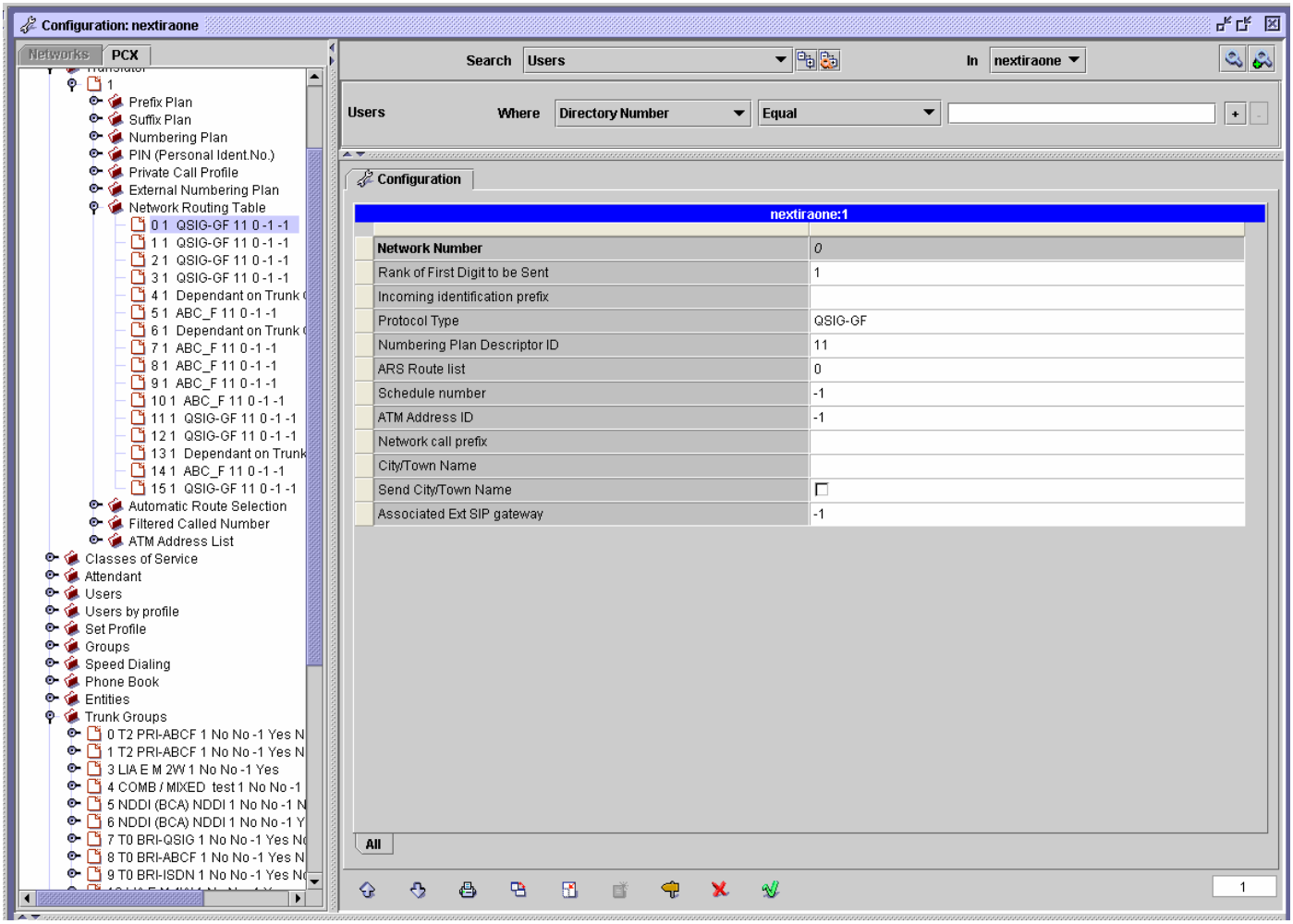
Configure Remote Network (Remote Network #0 for Trunk Group 1)



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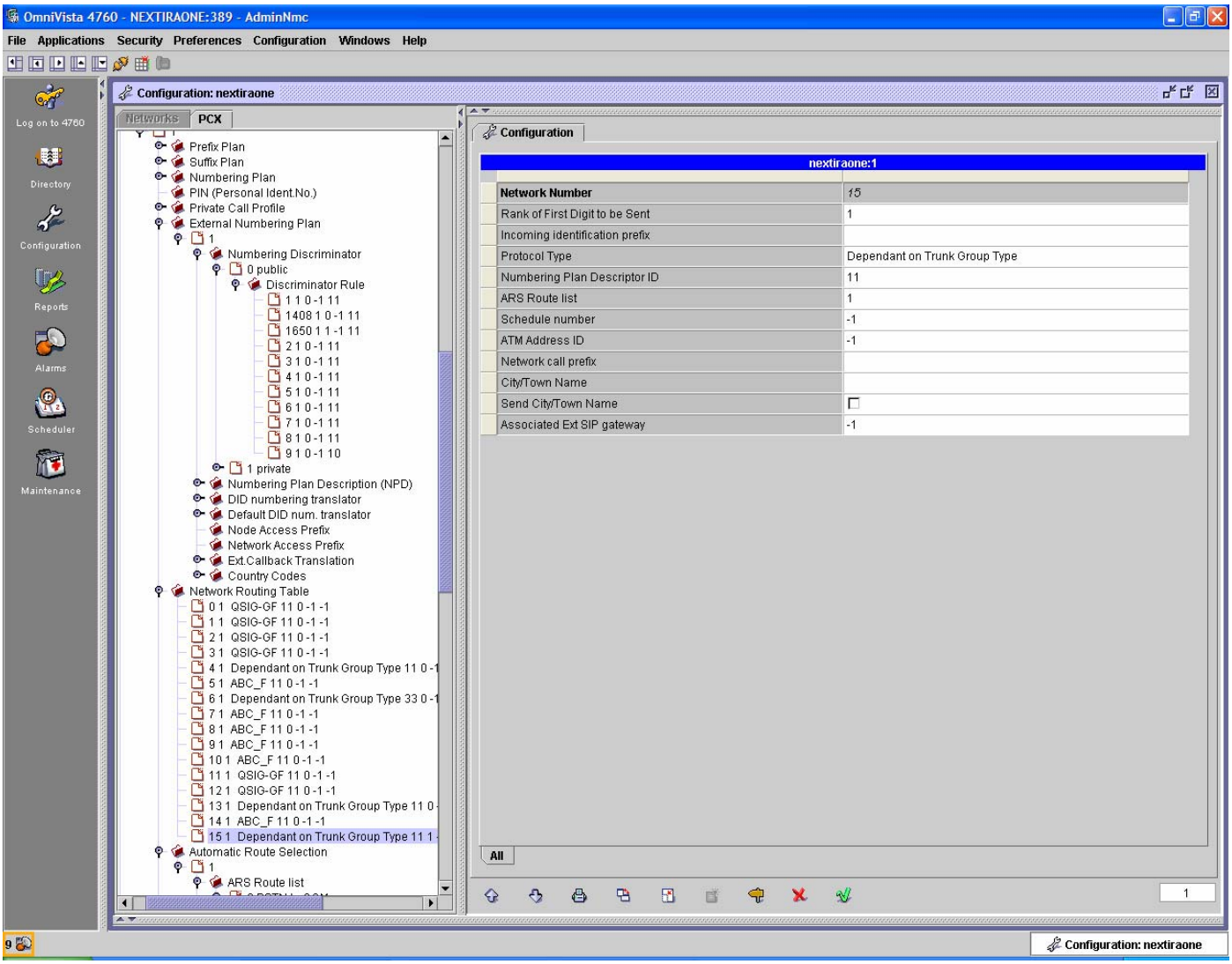
Configure Remote Network (Remote Network #15 for Trunk Group 16)



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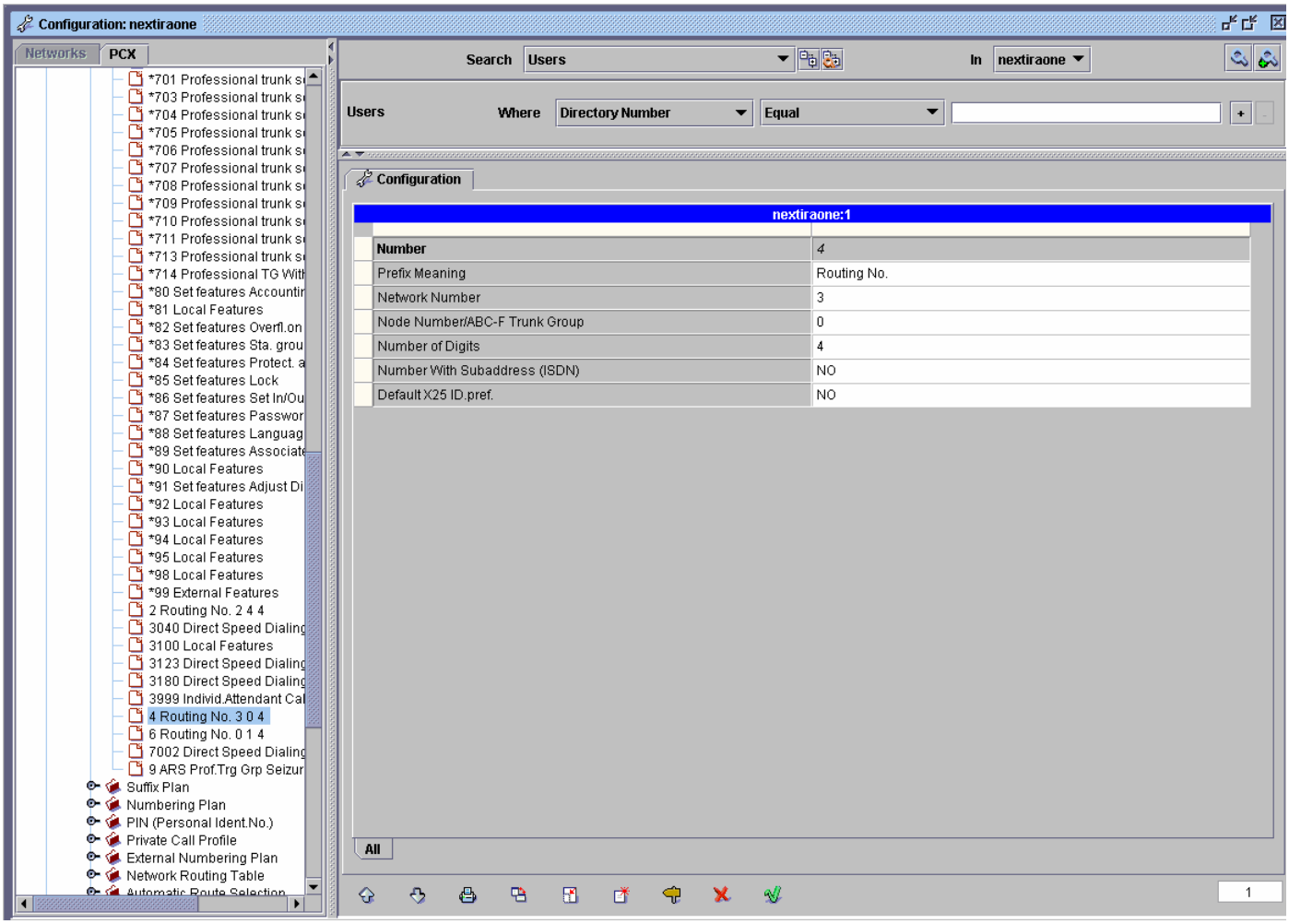
Configure Network Routing 4XXX (Trunk Group 0)



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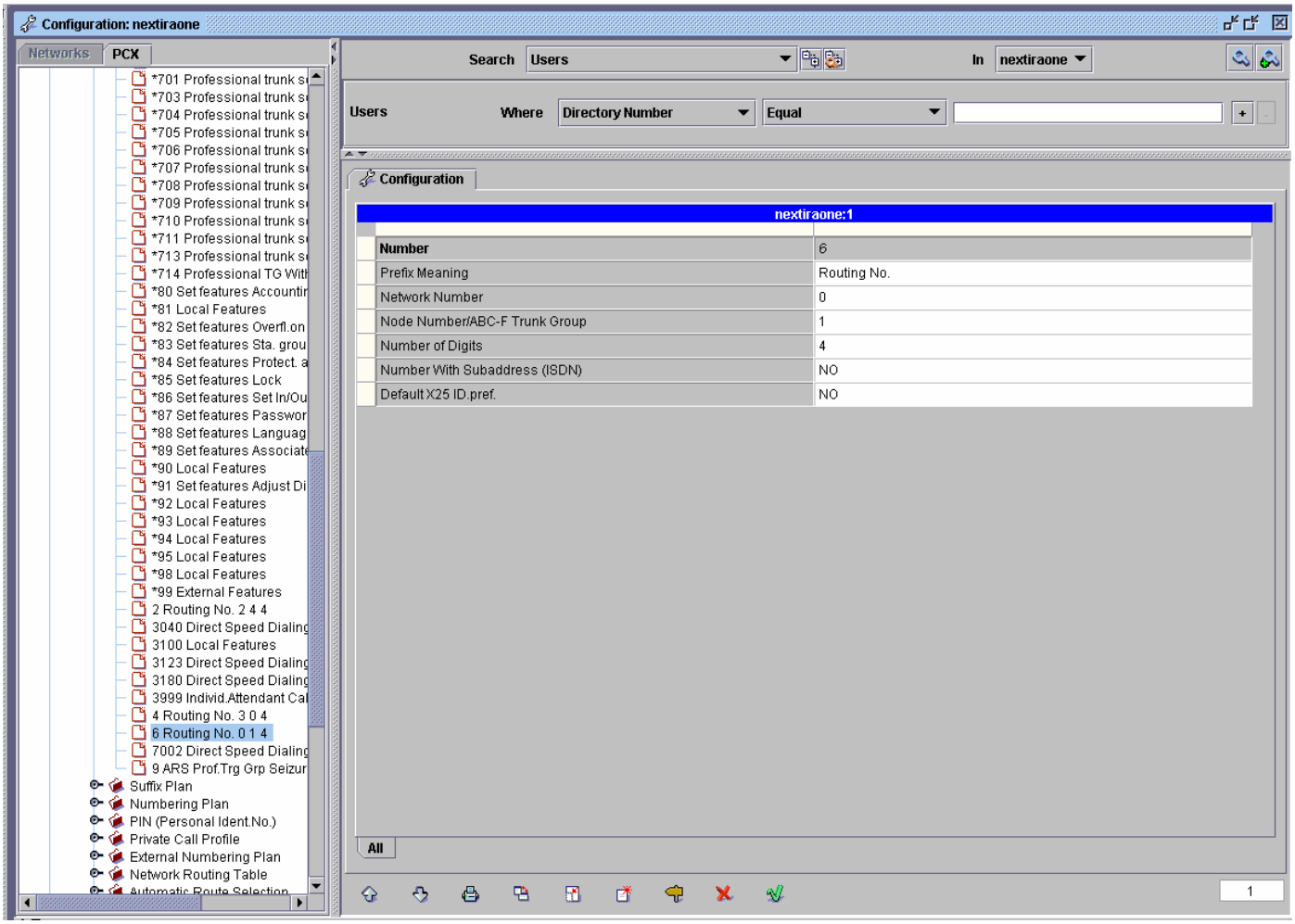
Configure Network Routing 6XXX (Trunk Group 1)



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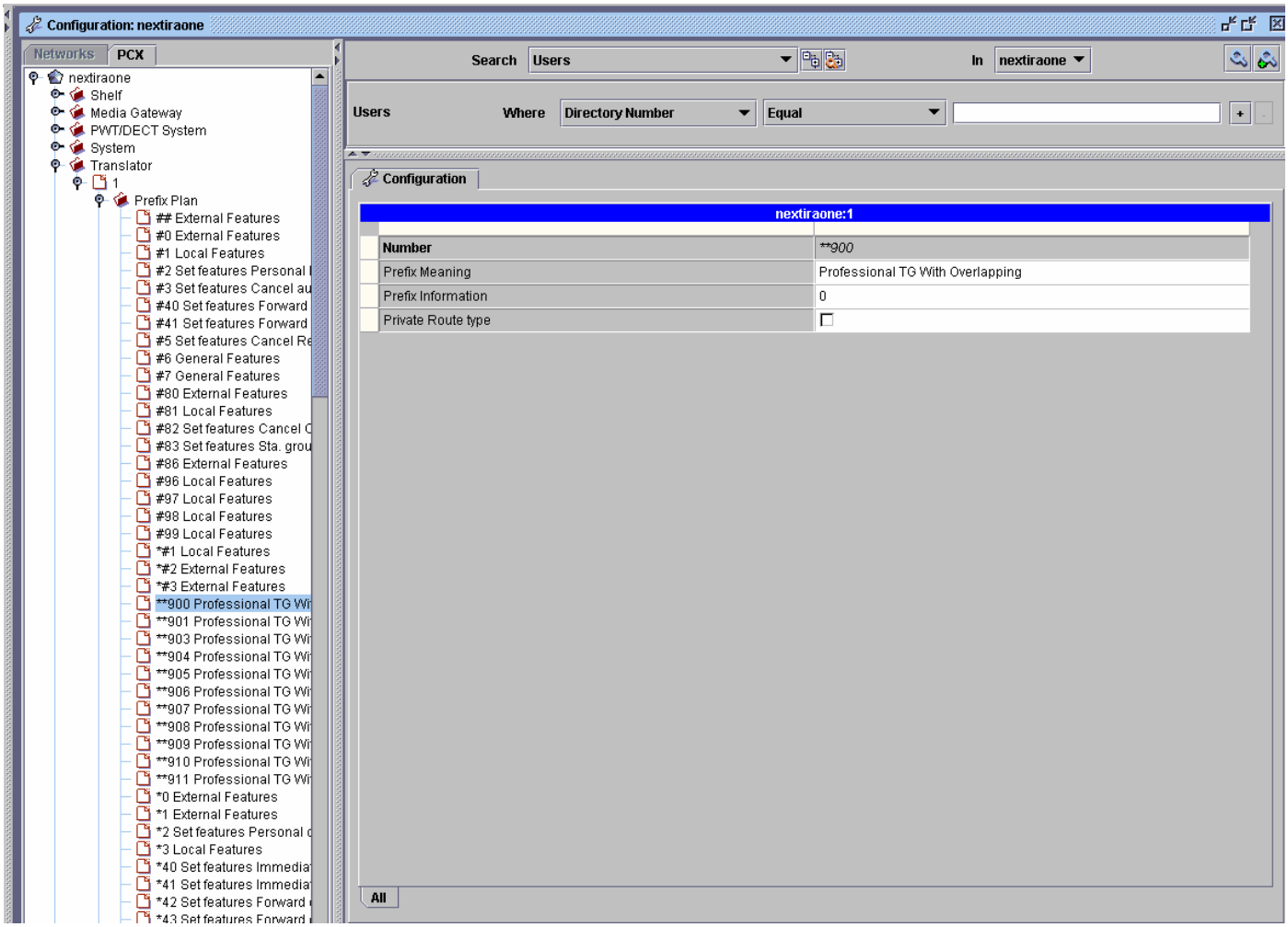
Configure Network routing for “Overlap” (Trunk Group 0)



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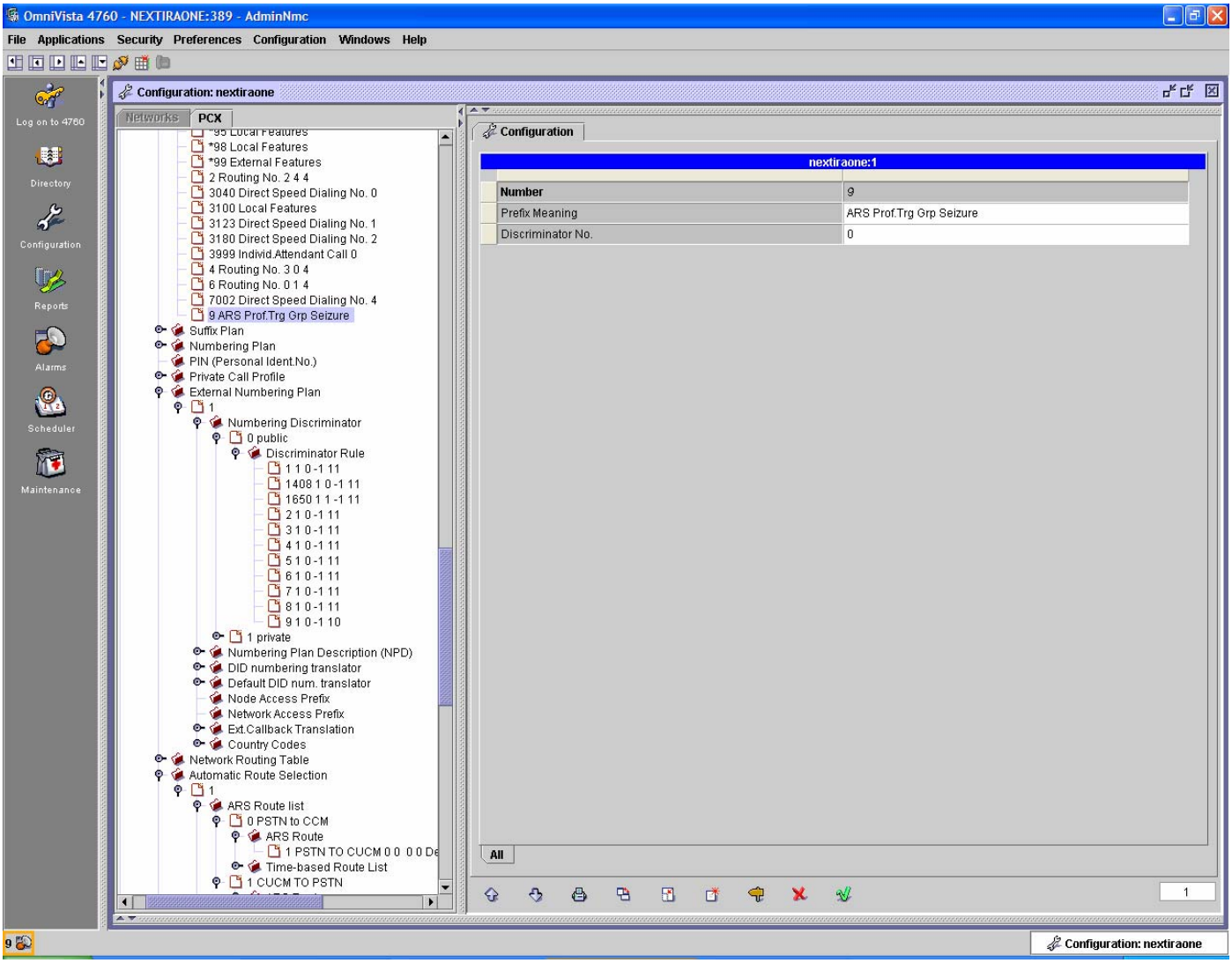
Configure Network Routing Automatic Route Selection (ARS) for PSTN (1 of 7)



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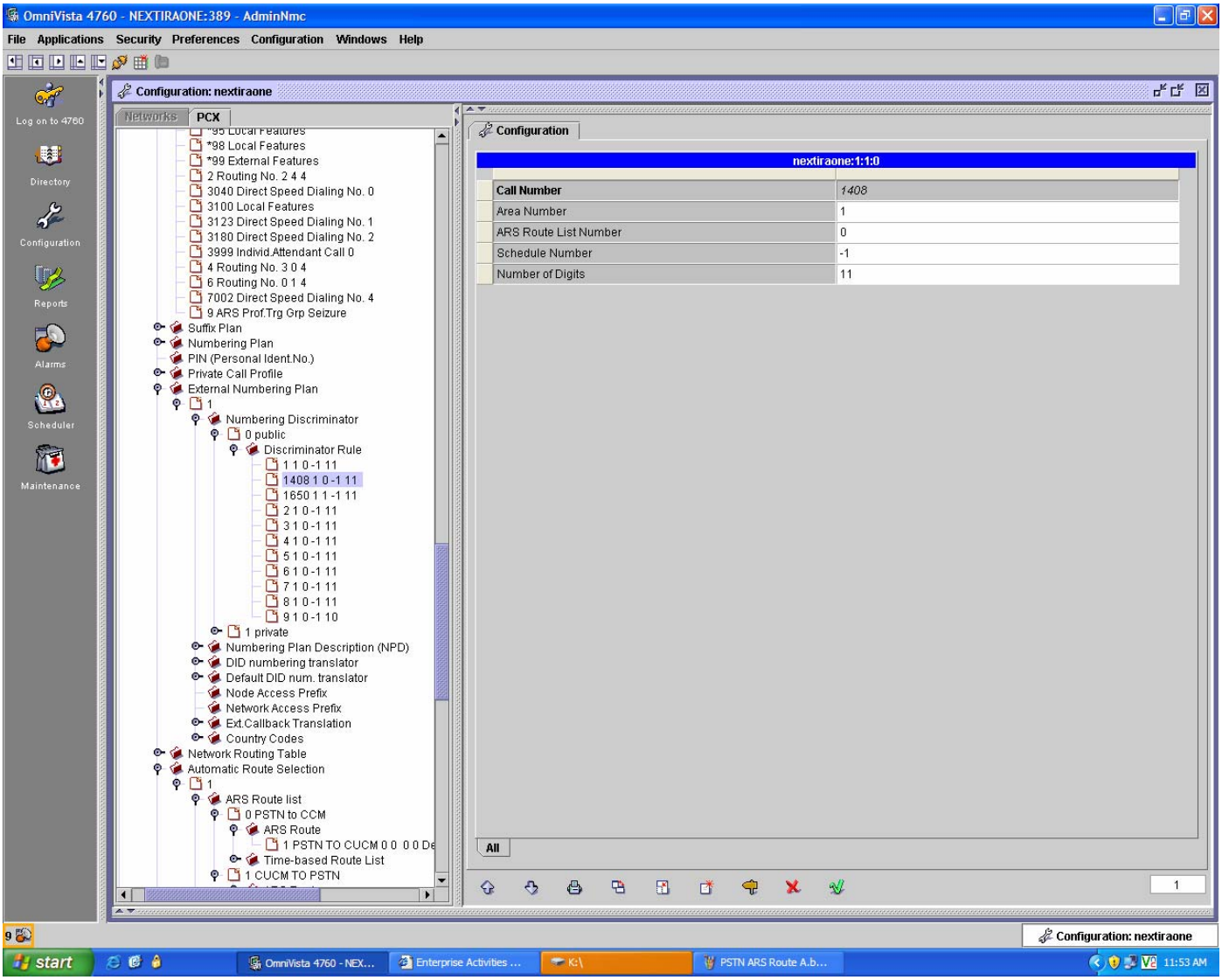
Configure Network Routing Automatic Route Selection (ARS) for PSTN (2 of 7)



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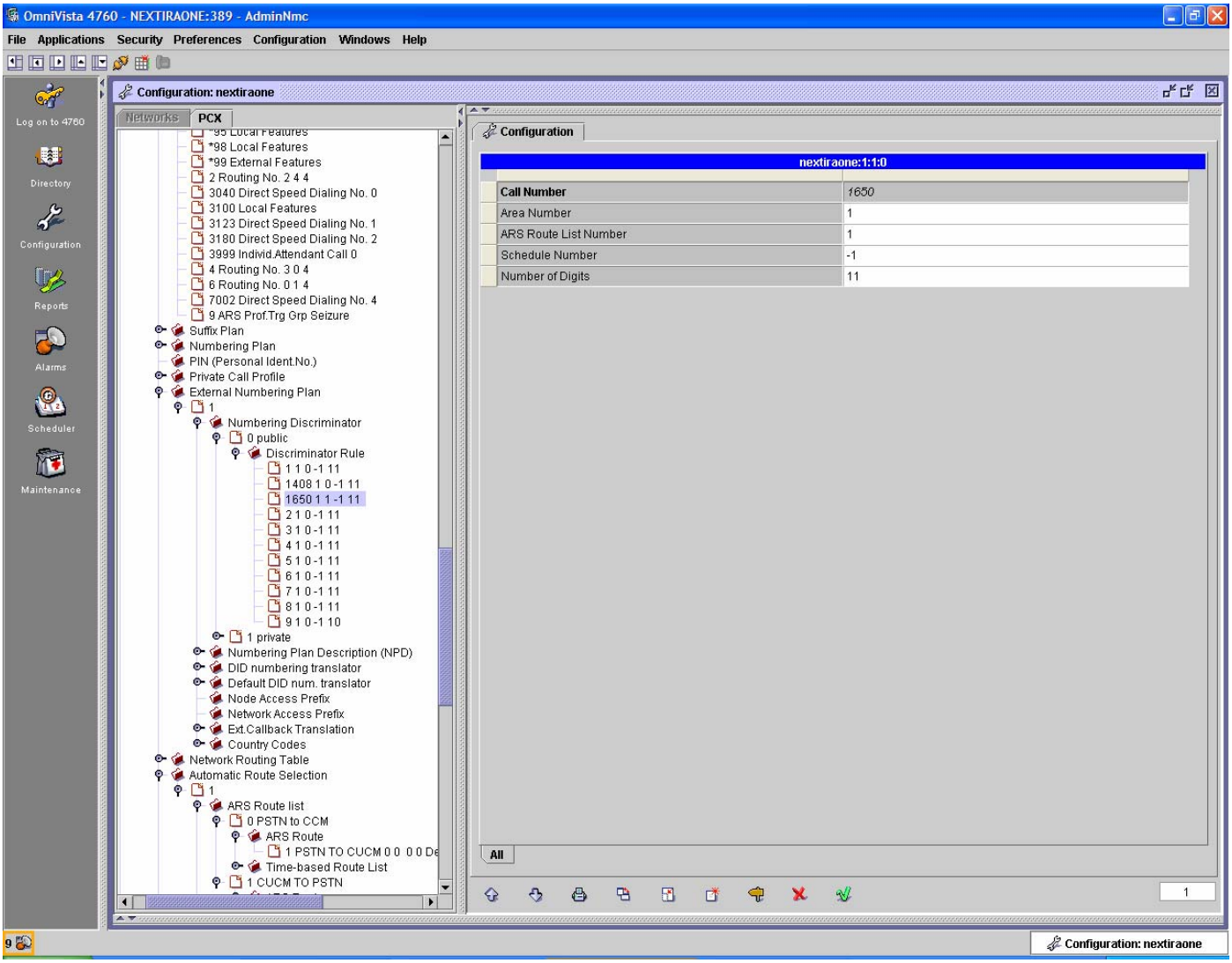
Configure Network Routing Automatic Route Selection (ARS) for PSTN (3 of 7)



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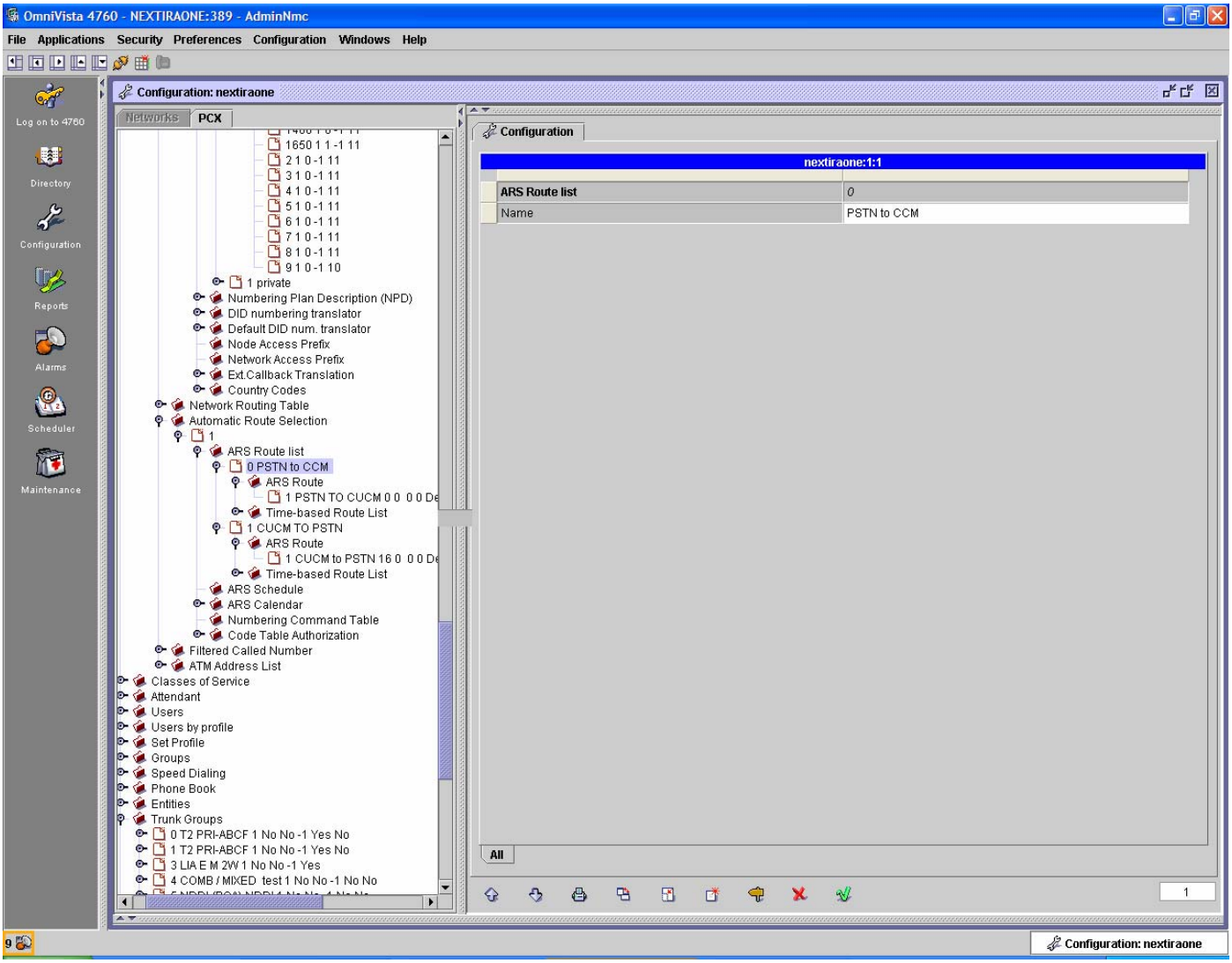
Configure Network Routing Automatic Route Selection (ARS) for PSTN (4 of 7)



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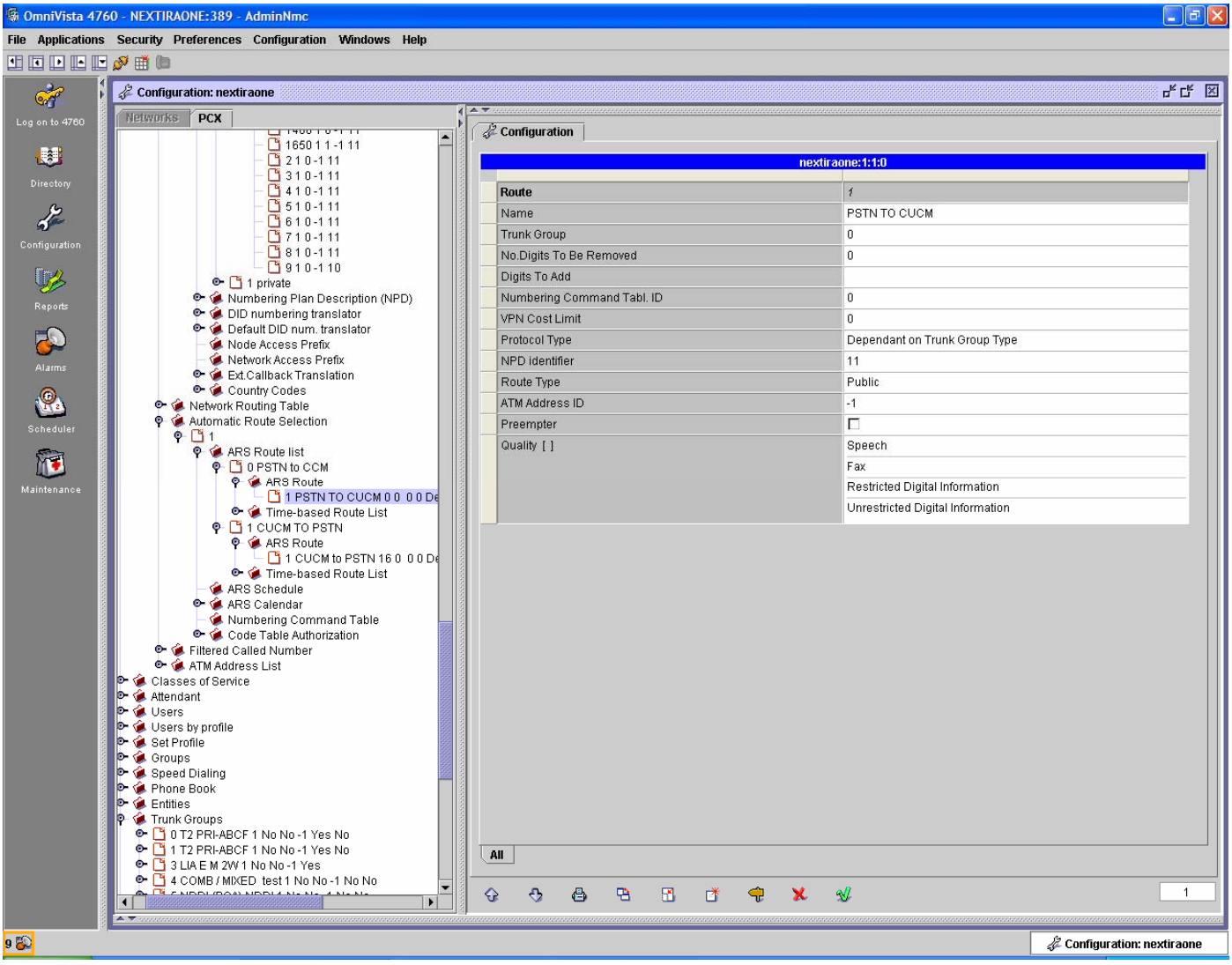
Configure Network Routing Automatic Route Selection (ARS) for PSTN (5 of 7)



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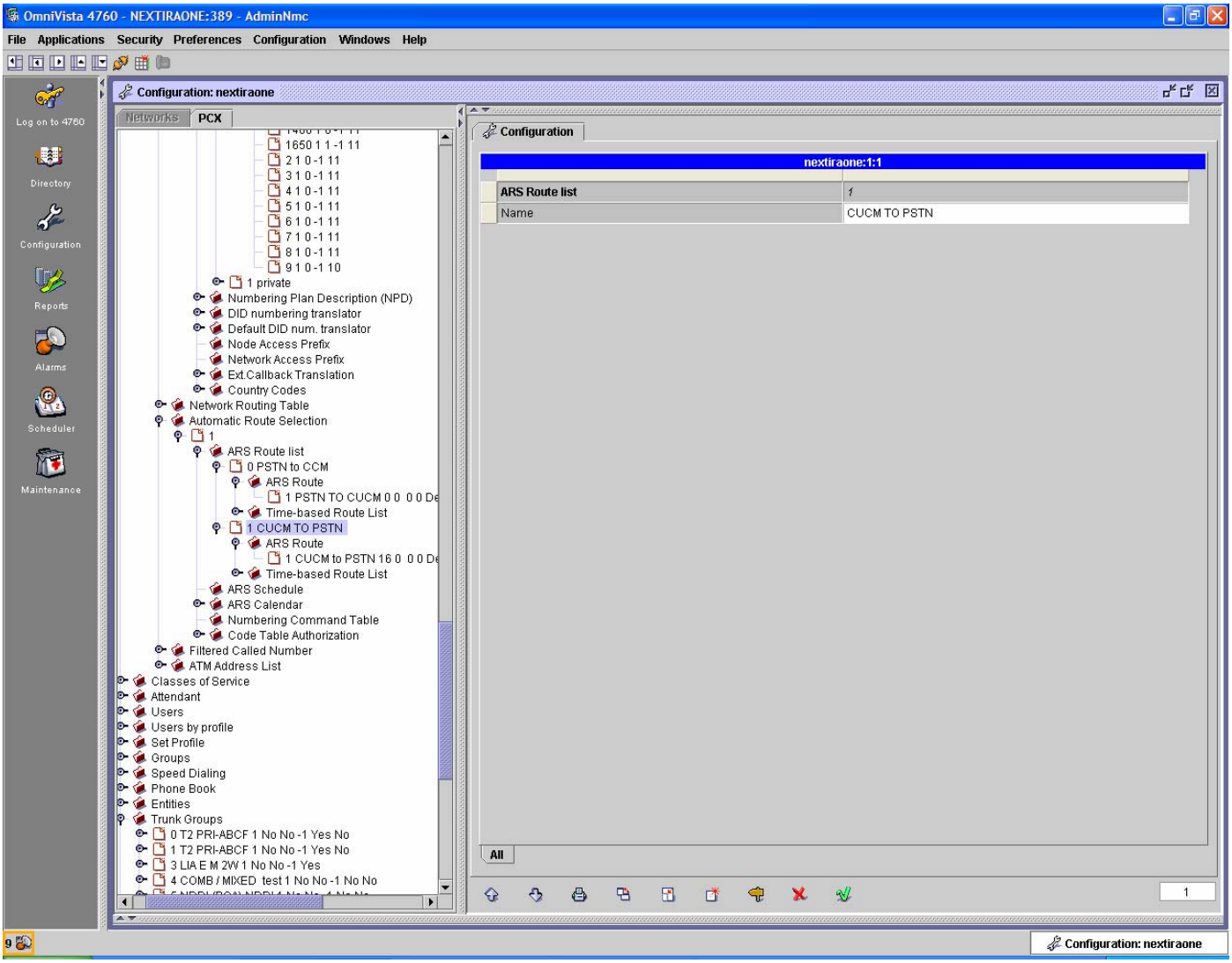
Configure Network Routing Automatic Route Selection (ARS) for PSTN (6 of 7)



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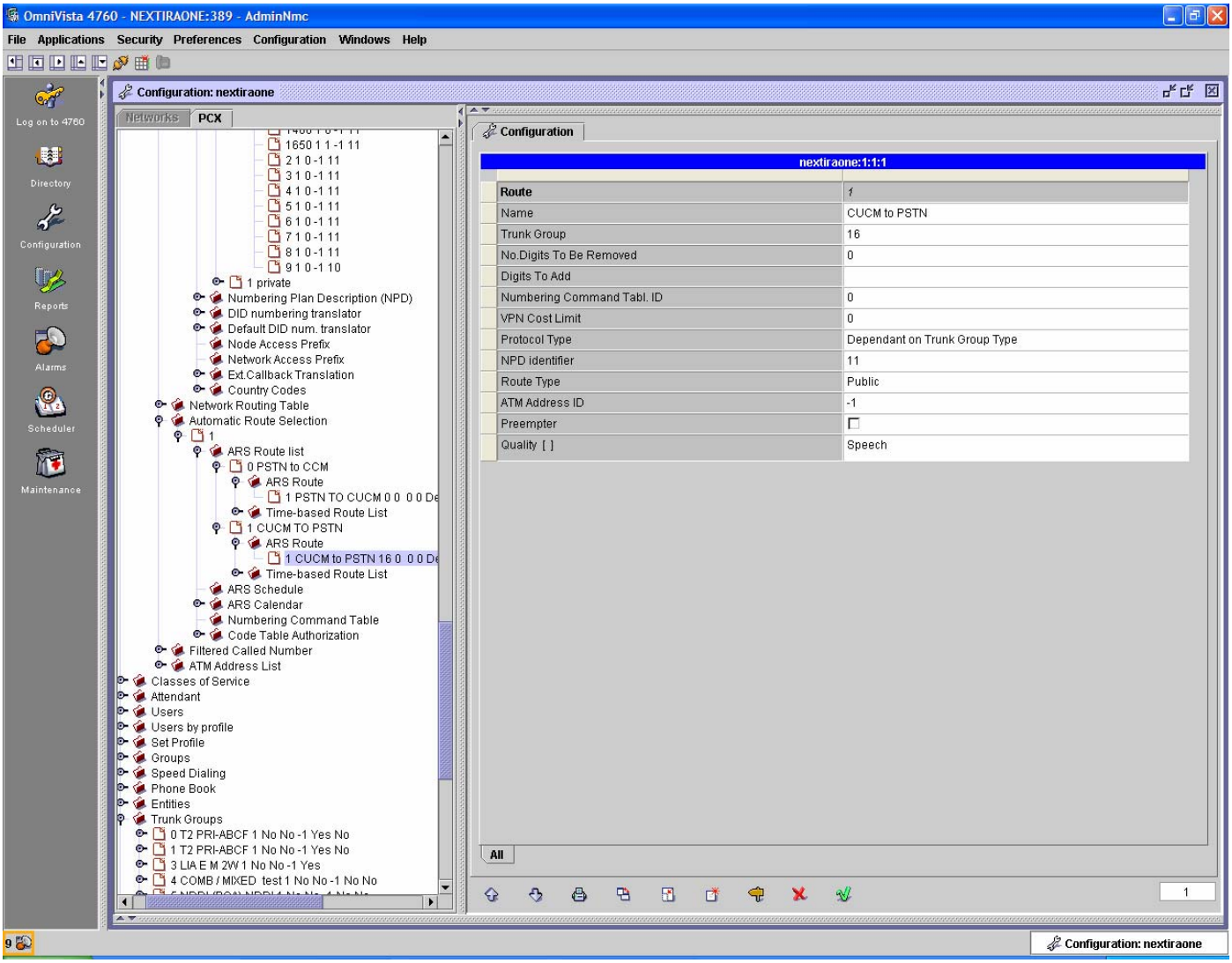
Configure Network Routing Automatic Route Selection (ARS) for PSTN (7 of 7)



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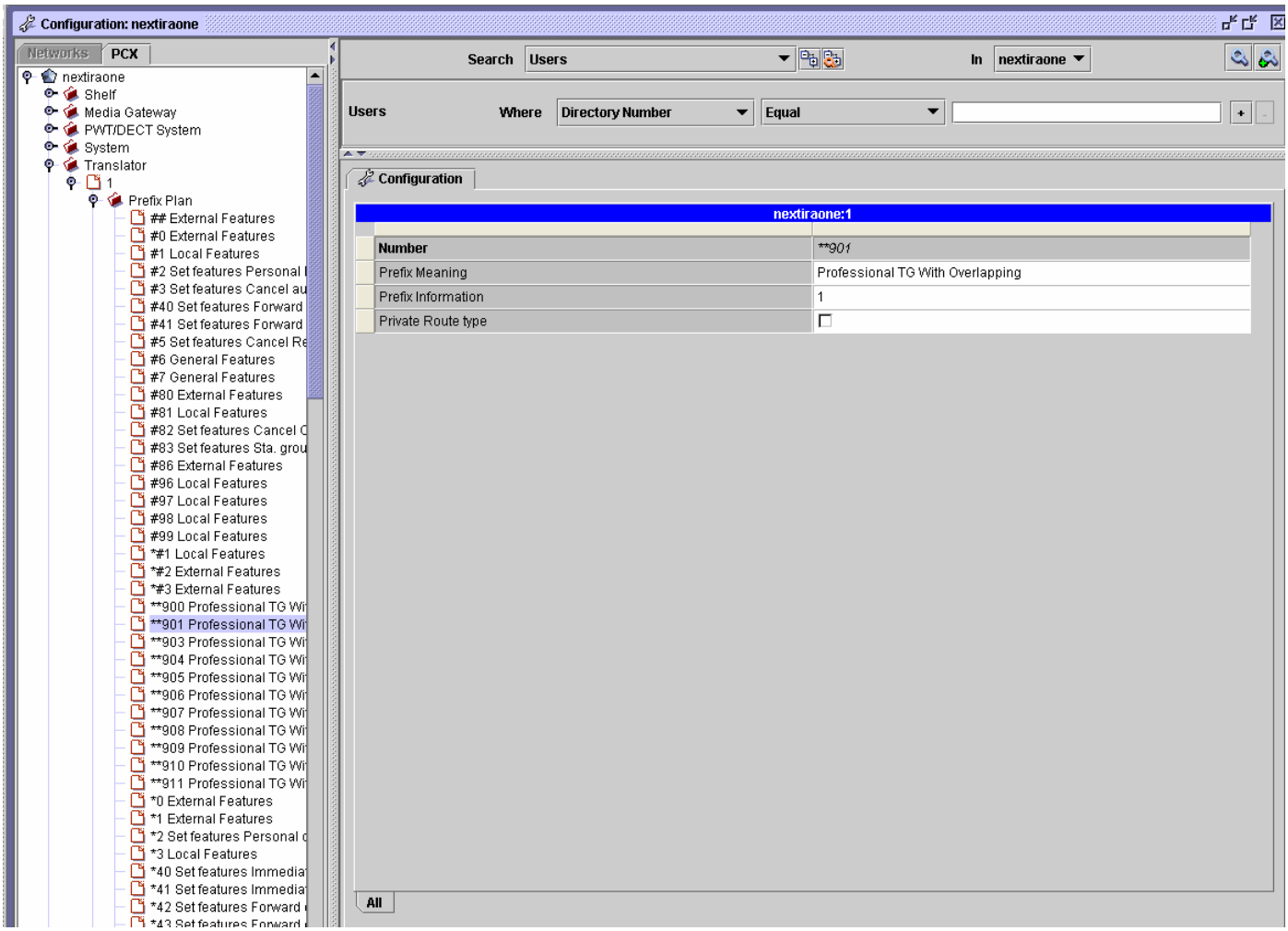
Configure Network routing for “Overlap” (Trunk Group 1)



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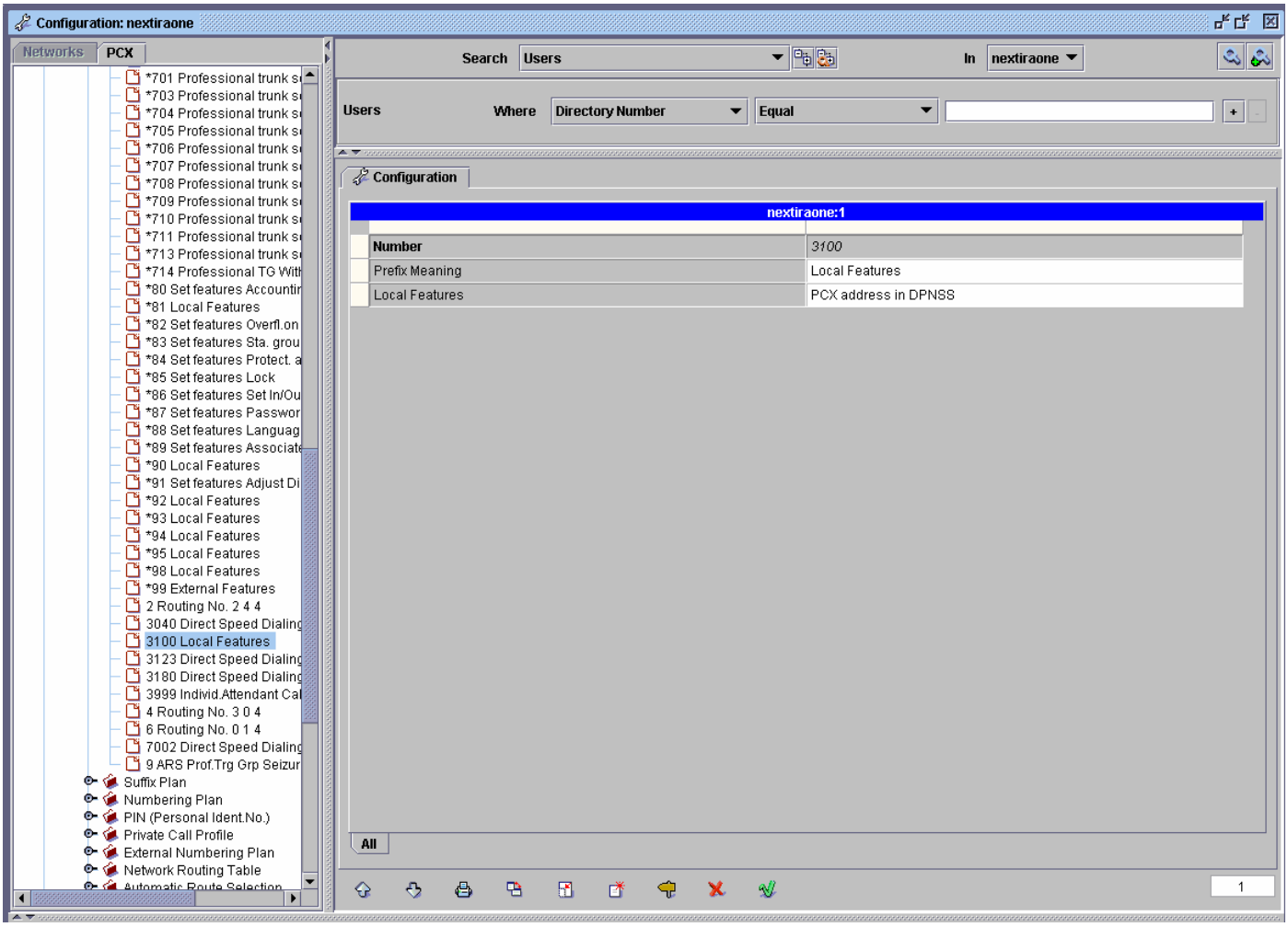
Configure Network Routing “Own Node”. (Required to enable ‘Path Replacement’)



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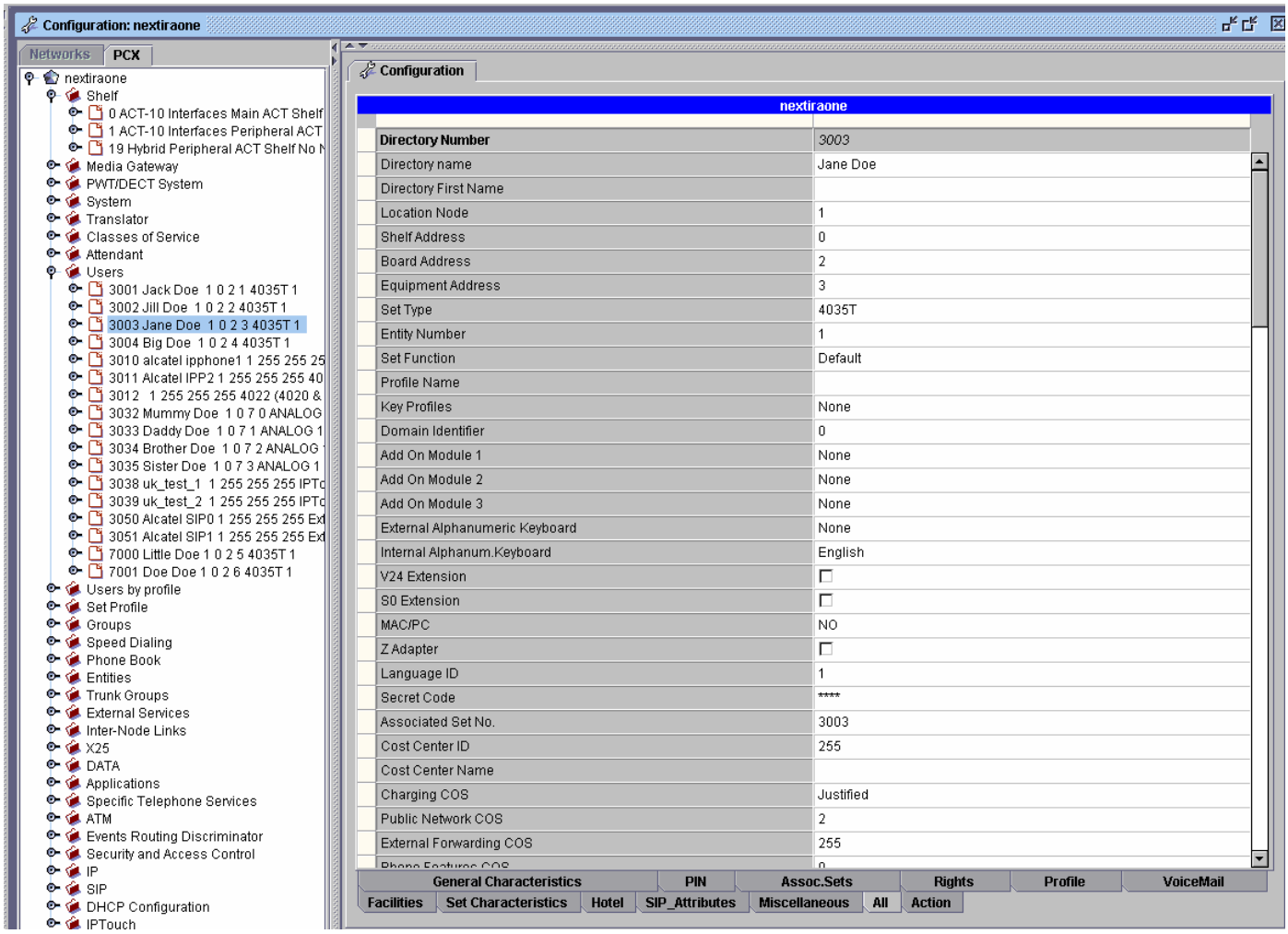
Configure Digital Station 1 of 5



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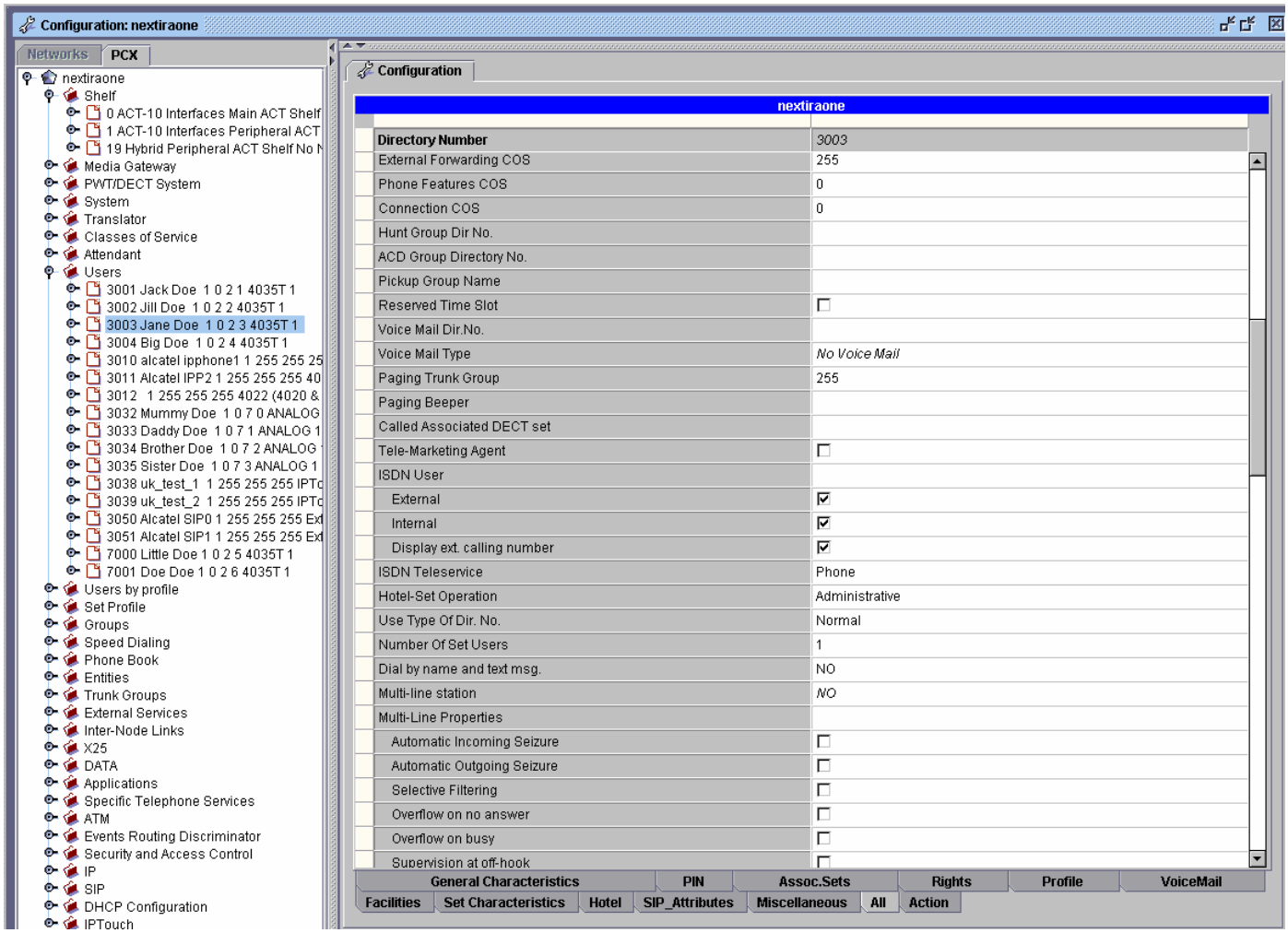
Configure Digital Station 2 of 5



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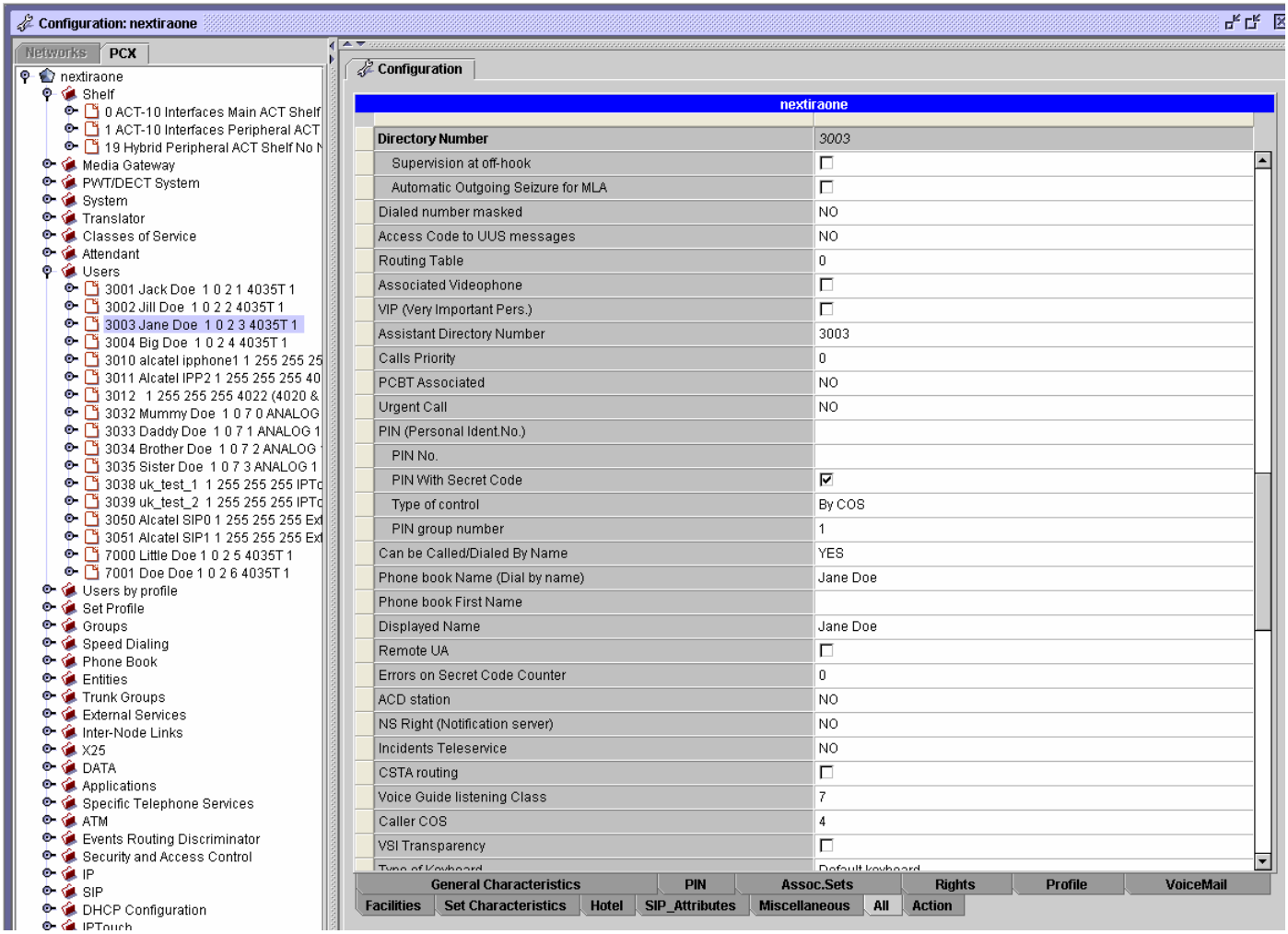
Configure Digital Station 3 of 5



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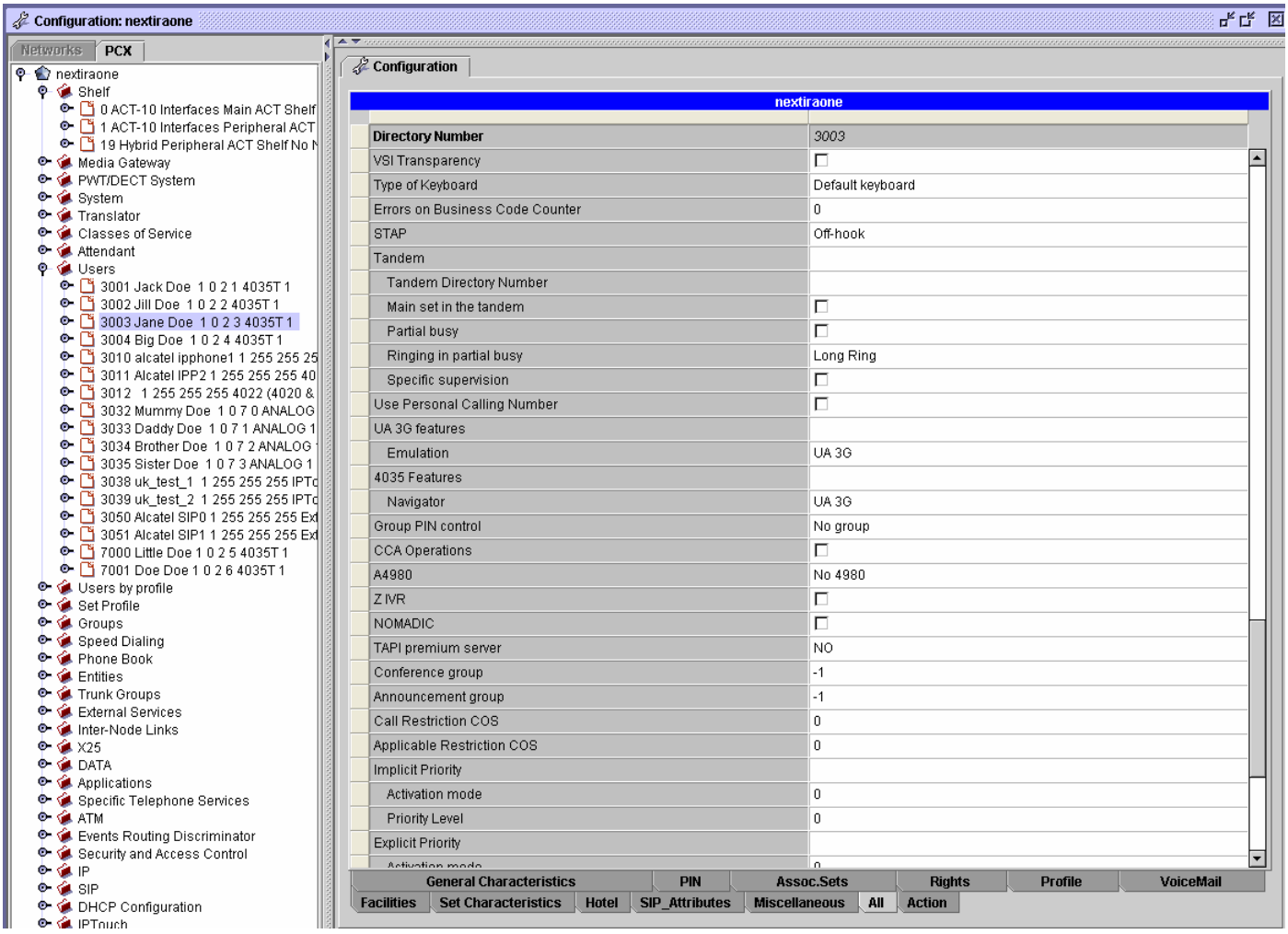
Configure Digital Station 4 of 5



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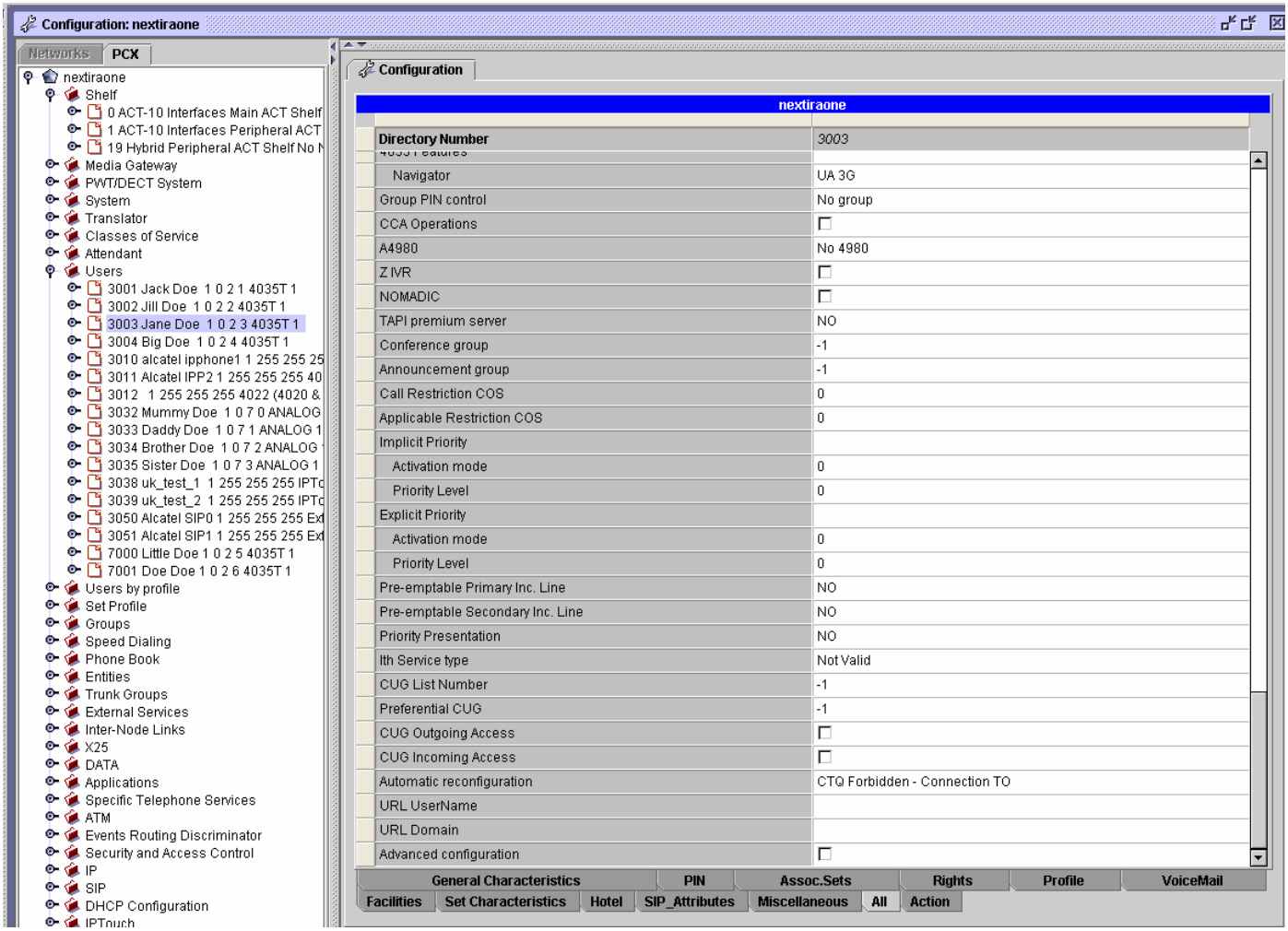
Configure Digital Station 5 of 5



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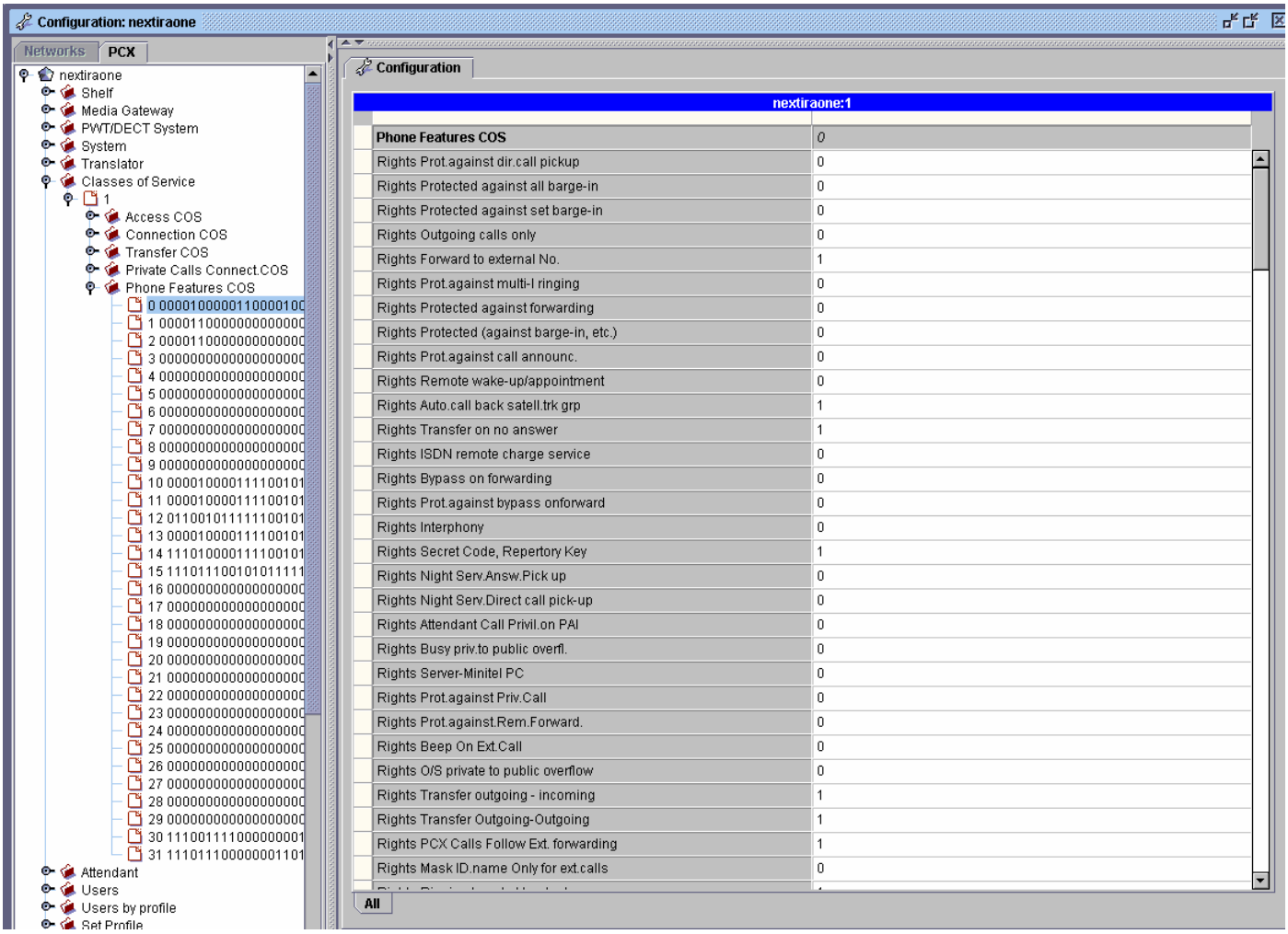
Configure Digital Station Phone Facilities 1 of 7



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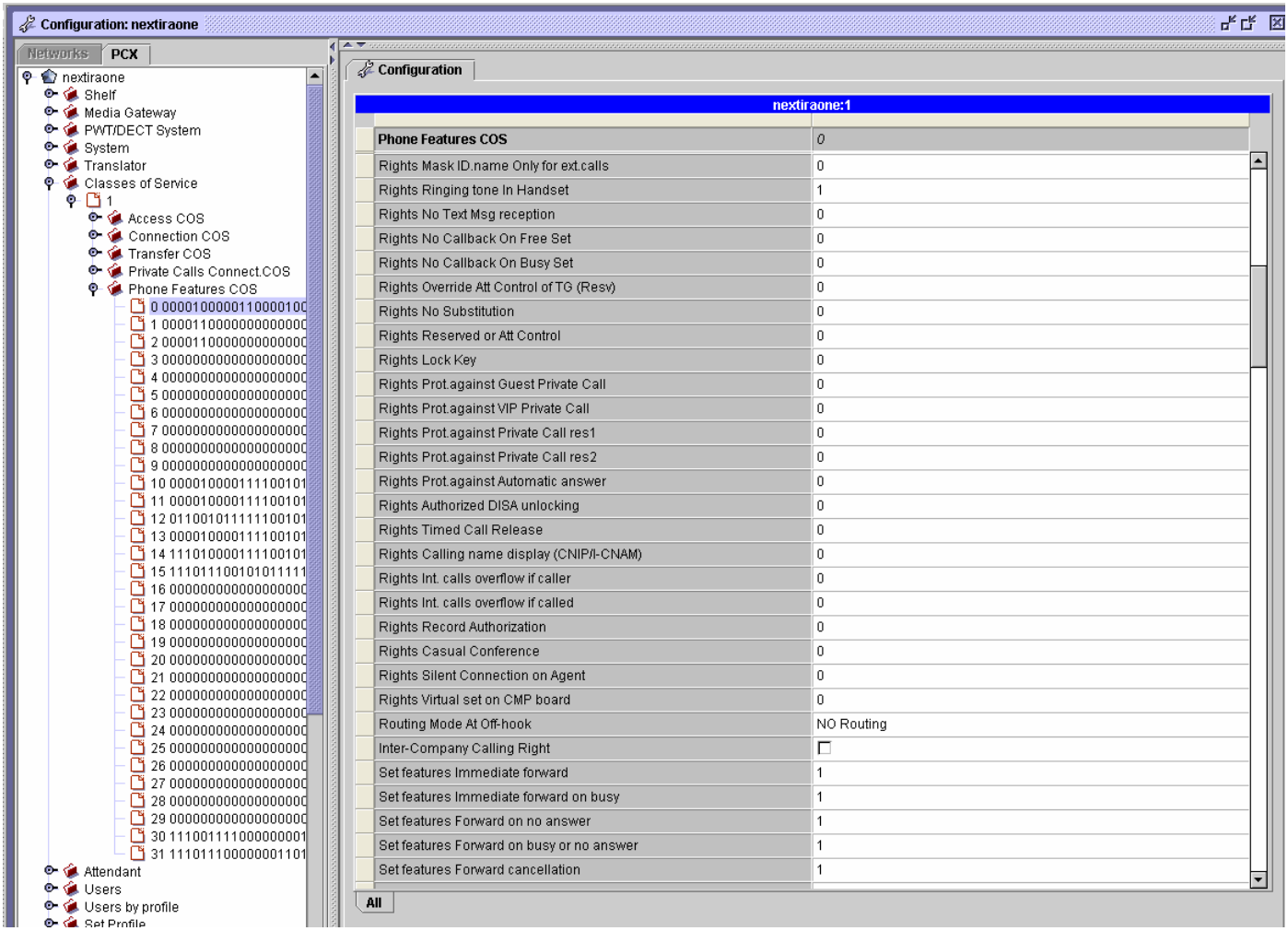
Configure Digital Station Phone Facilities 2 of 7



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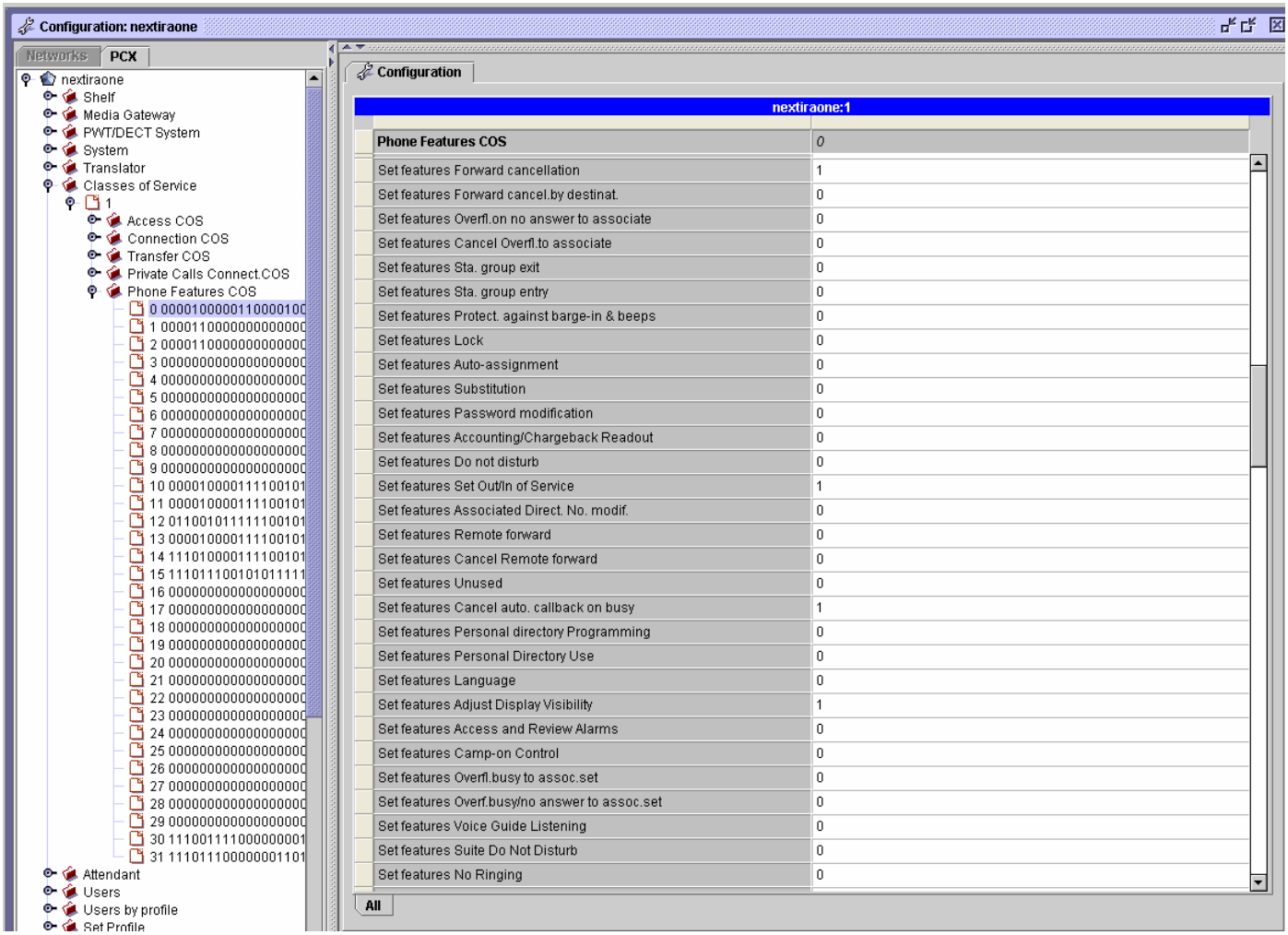
Configure Digital Station Phone Facilities 3 of 7



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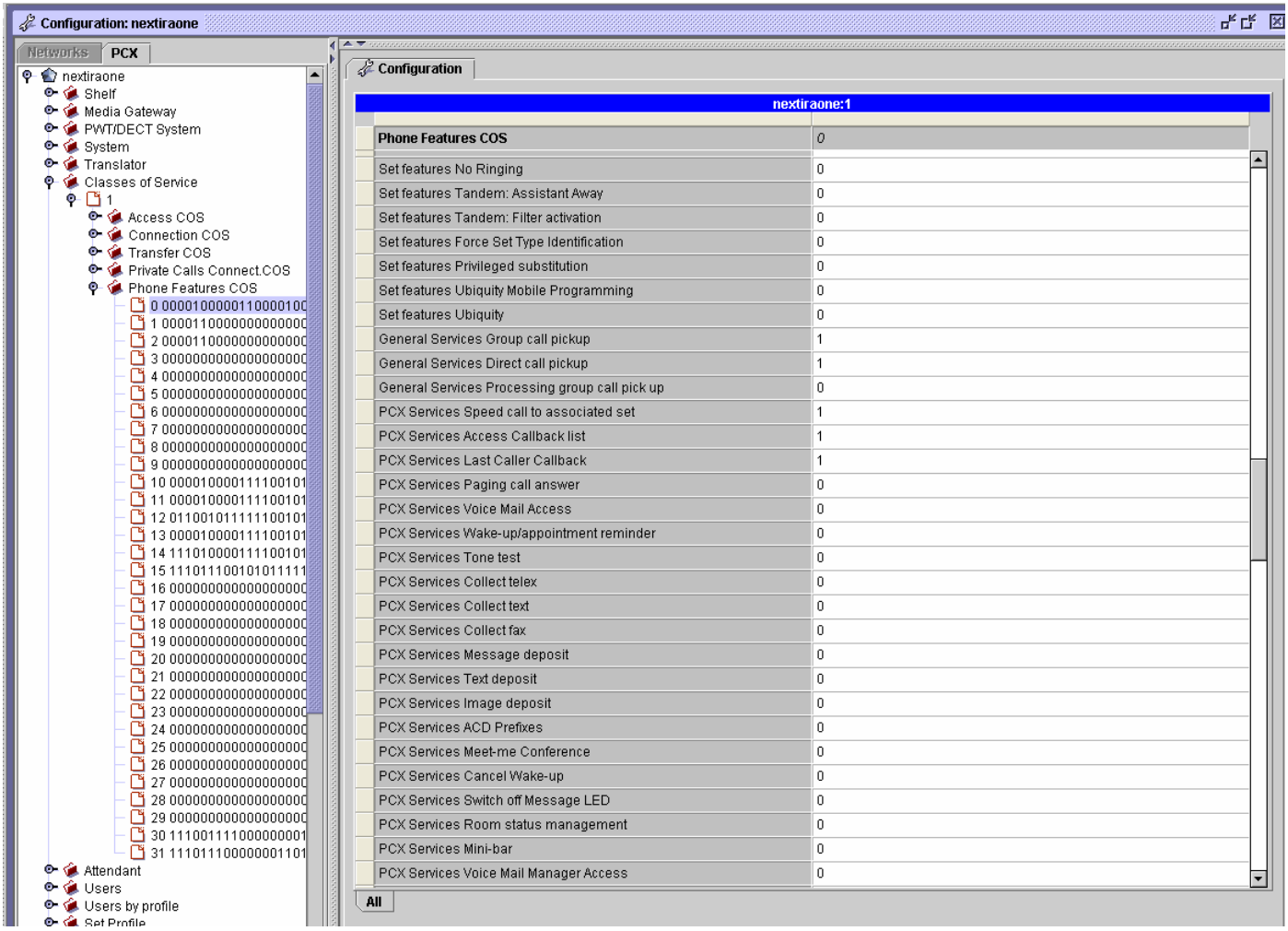
Configure Digital Station Phone Facilities 4 of 7



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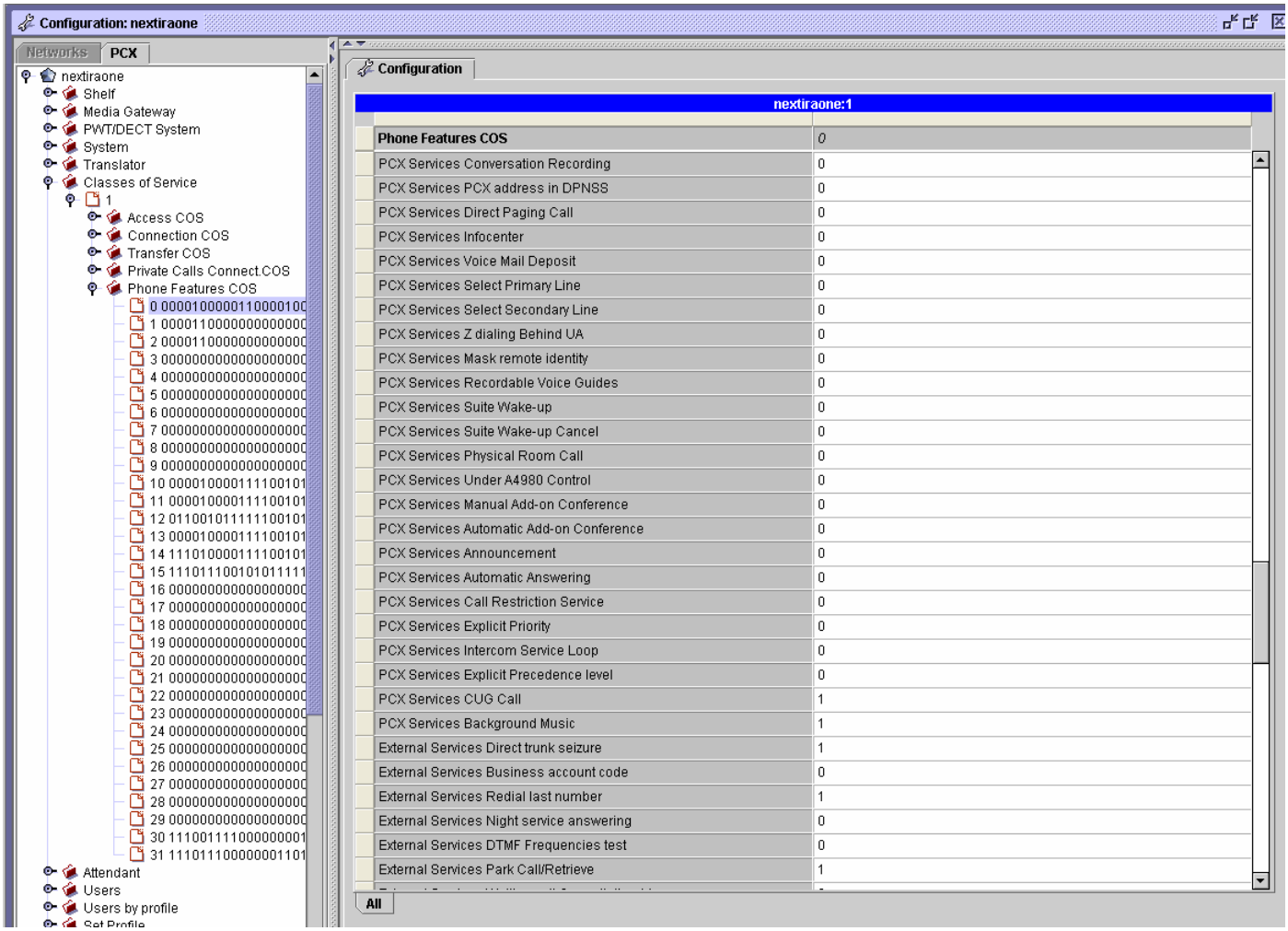
Configure Digital Station Phone Facilities 5 of 7



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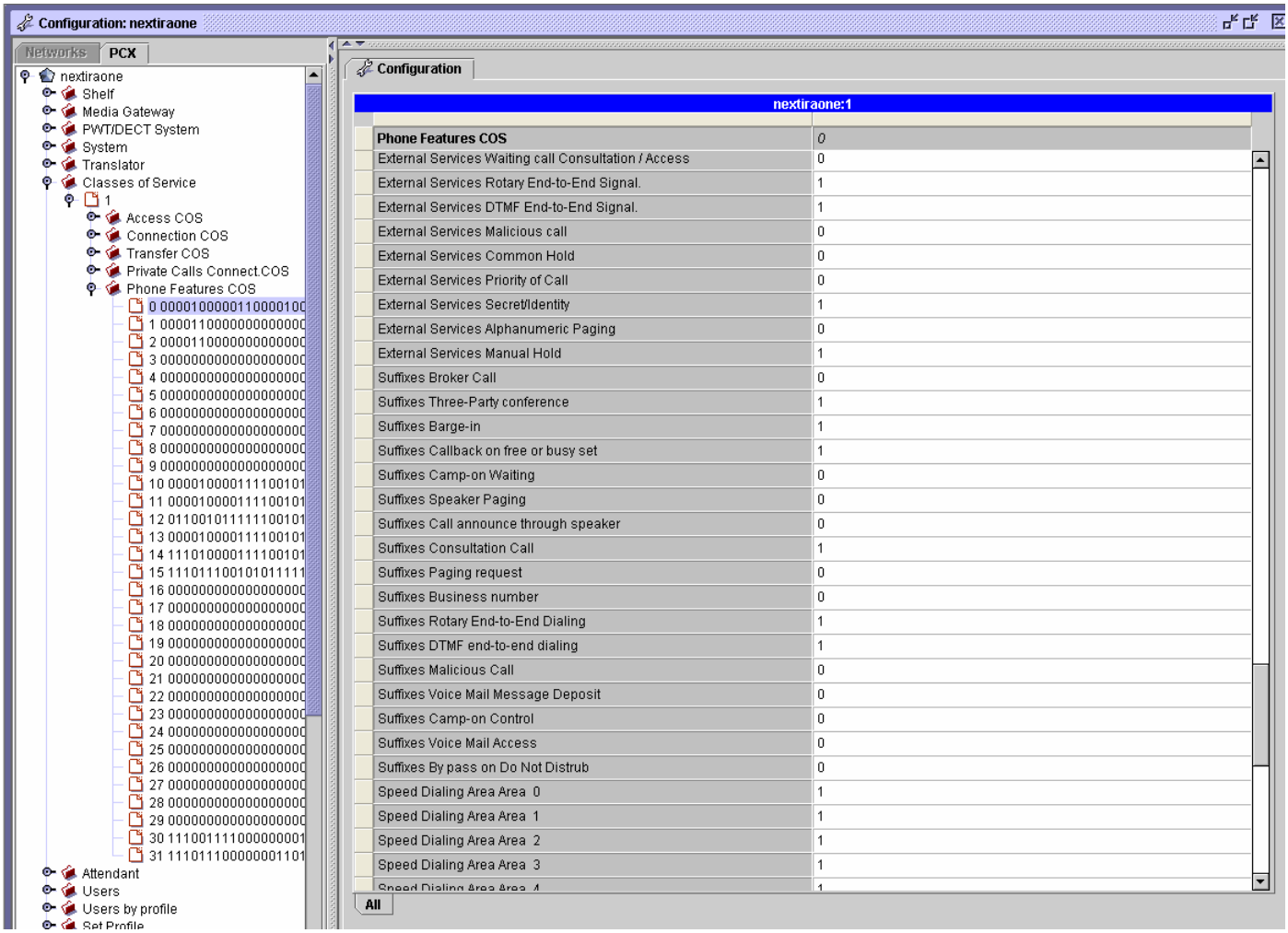
Configure Digital Station Phone Facilities 6 of 7



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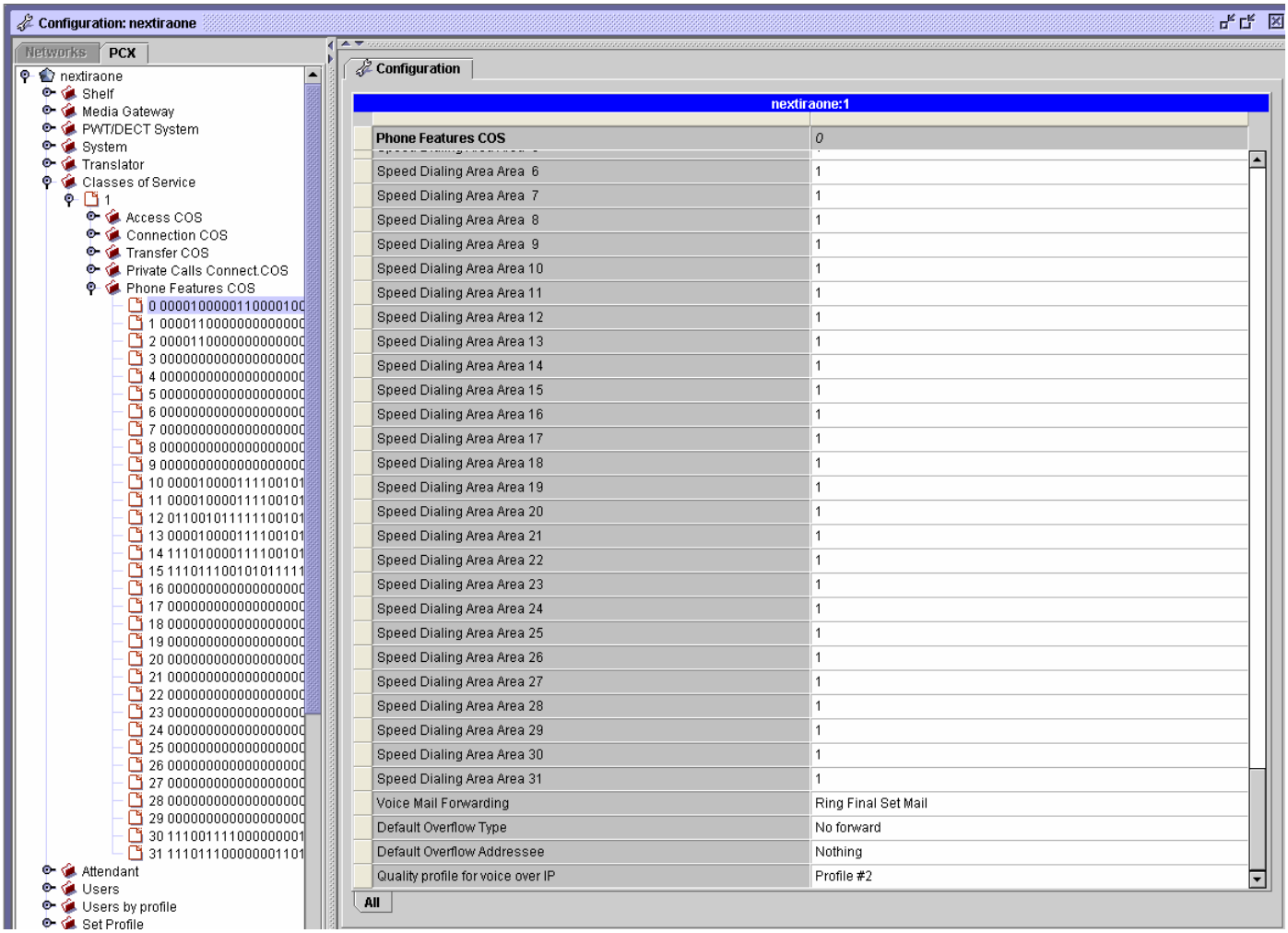
Configure Digital Station Phone Facilities 7 of 7



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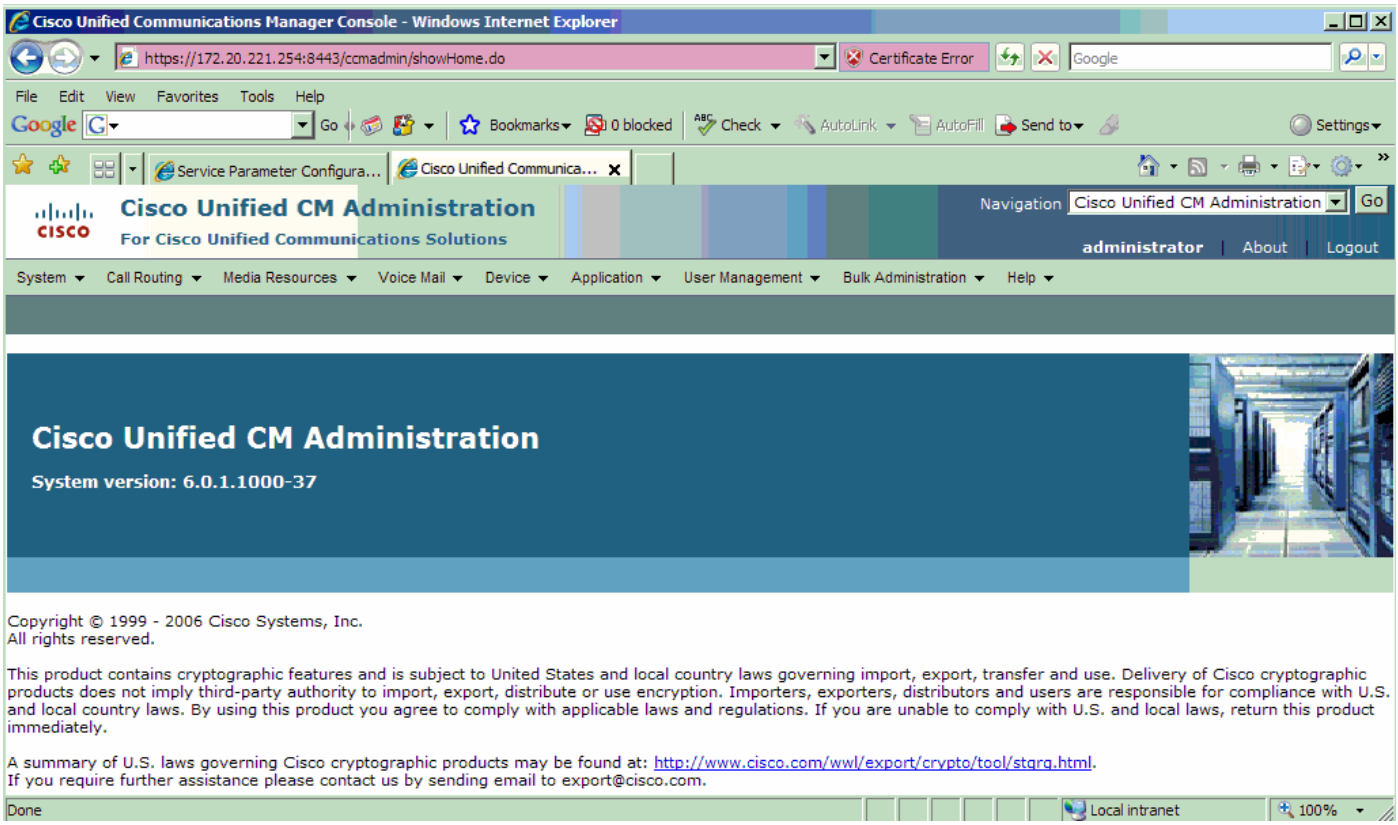
Configuring the Cisco Unified Communication Manager

CUCM Version



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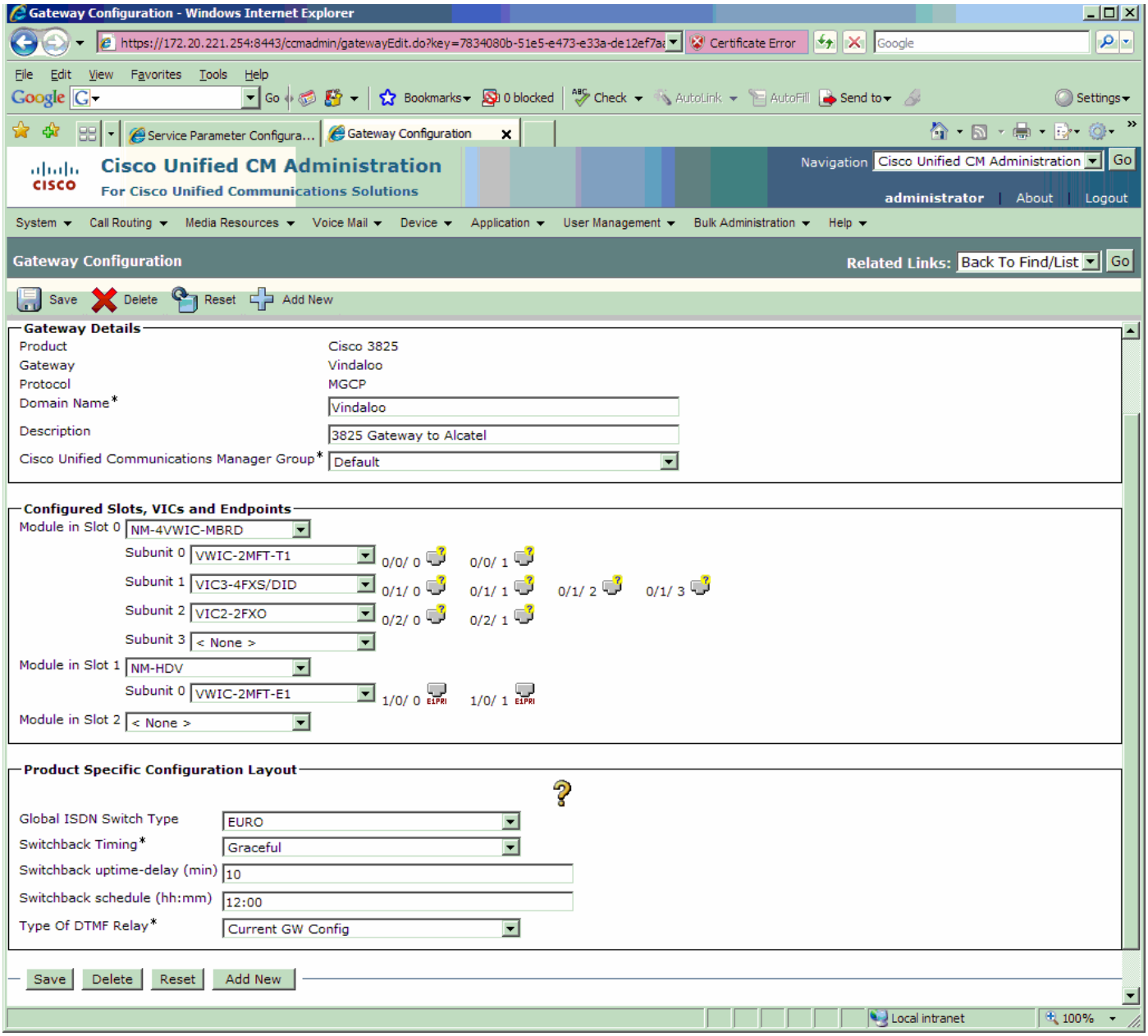
Configuring the Cisco 3825-E1 Gateway



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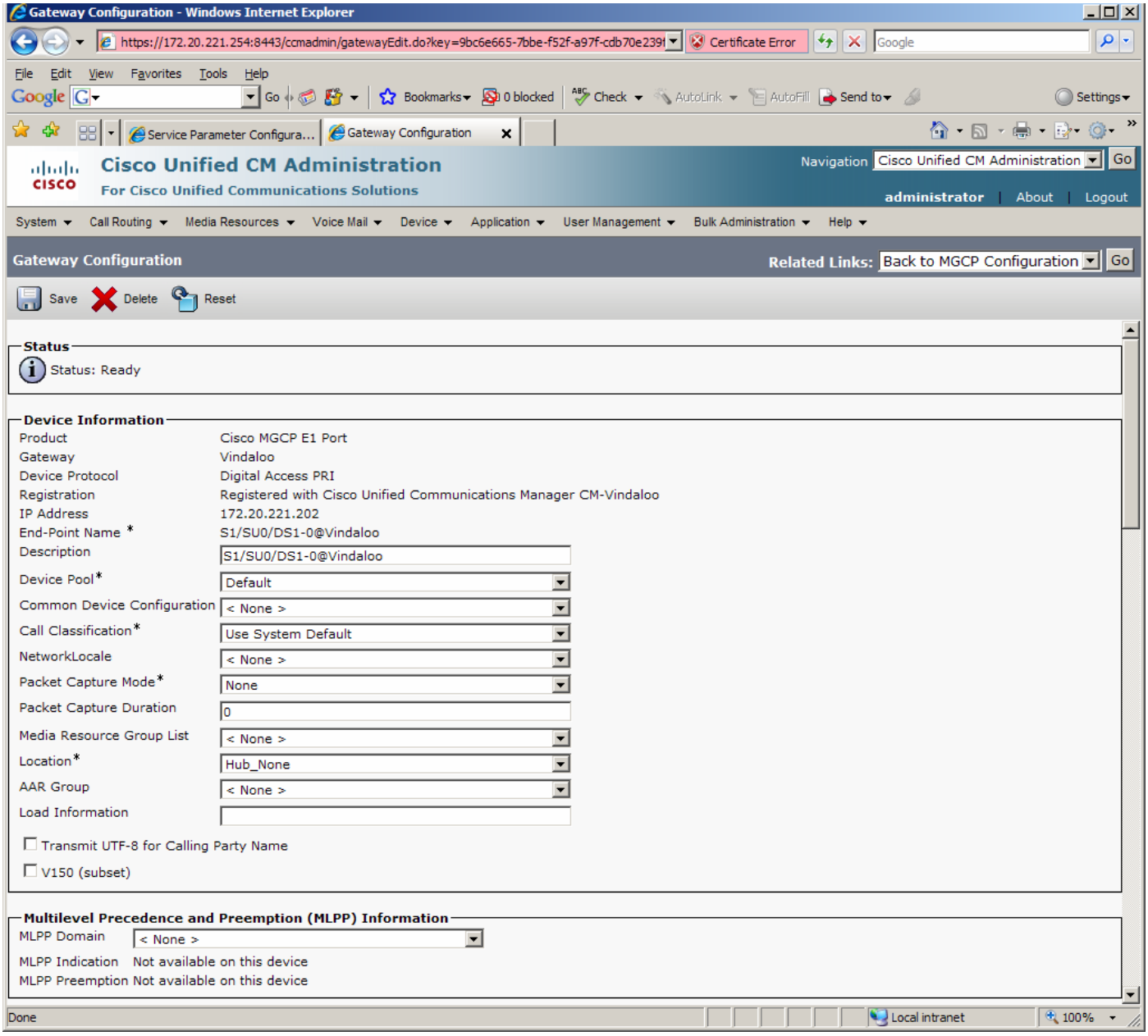
Cisco 3825-E1 Gateway Configuration port 1/0/0 (1 of 3)



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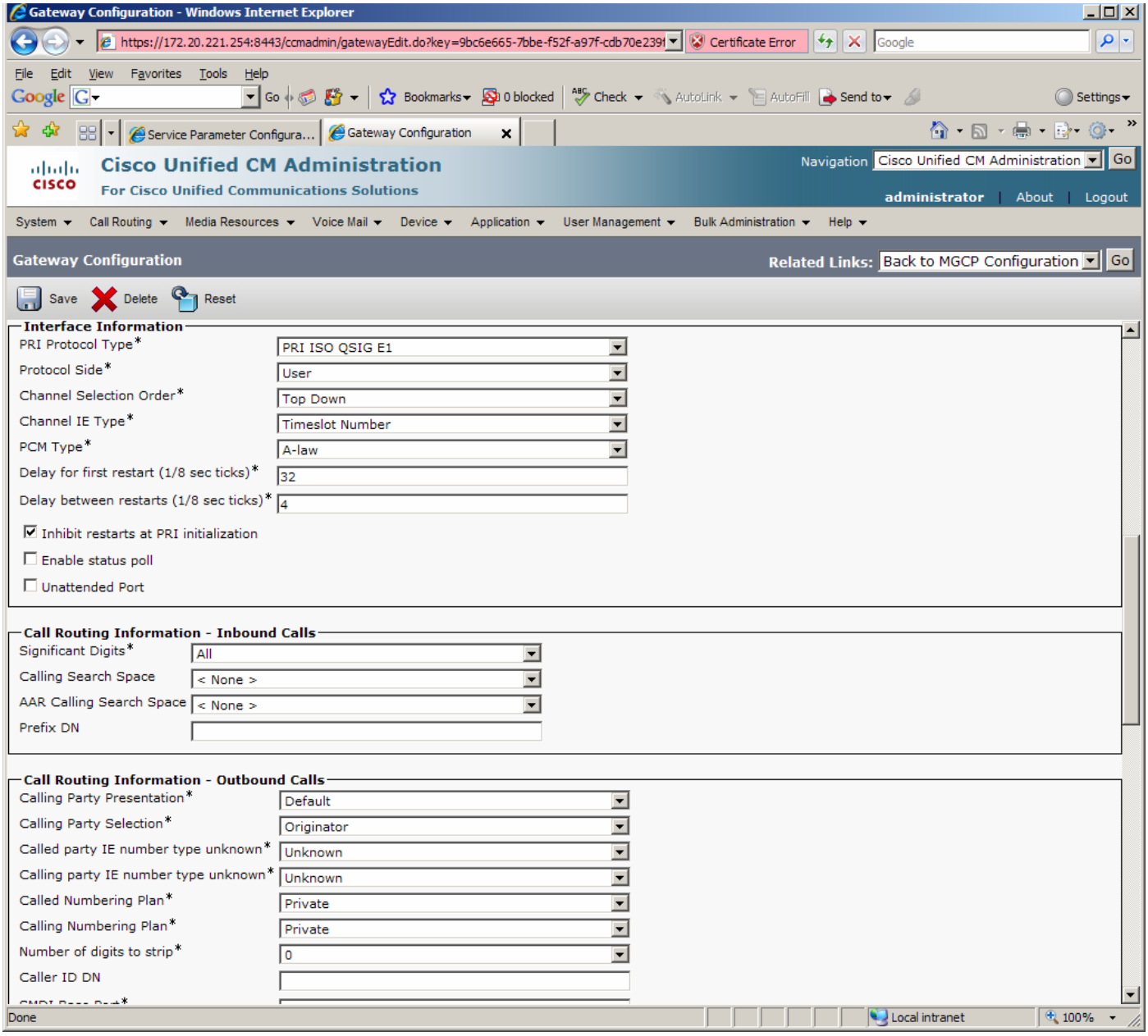
Cisco 3825-E1 Gateway Configuration port 1/0/0 (2 of 3)



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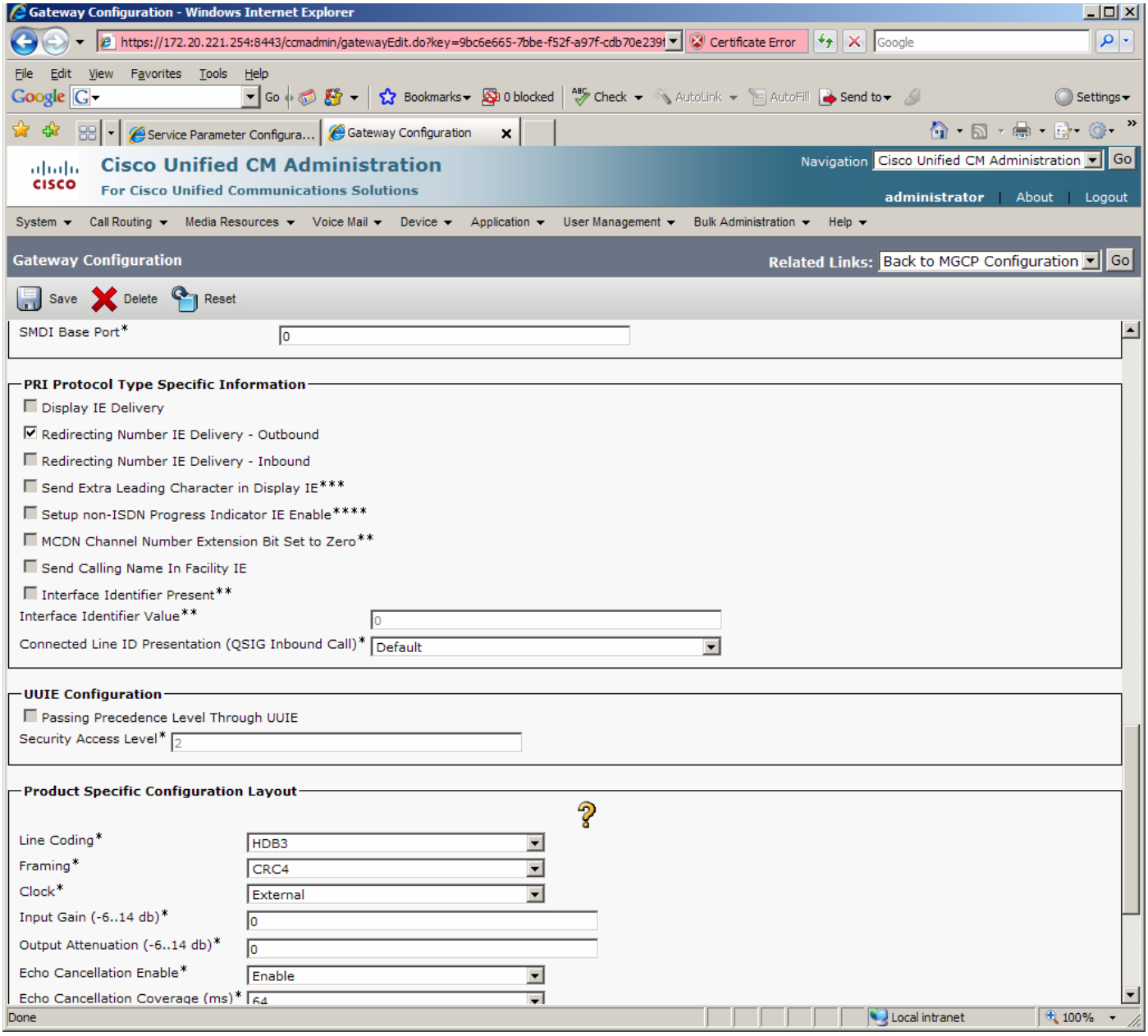
Cisco 3825-E1 Gateway Configuration port 1/0/0 (3 of 3)



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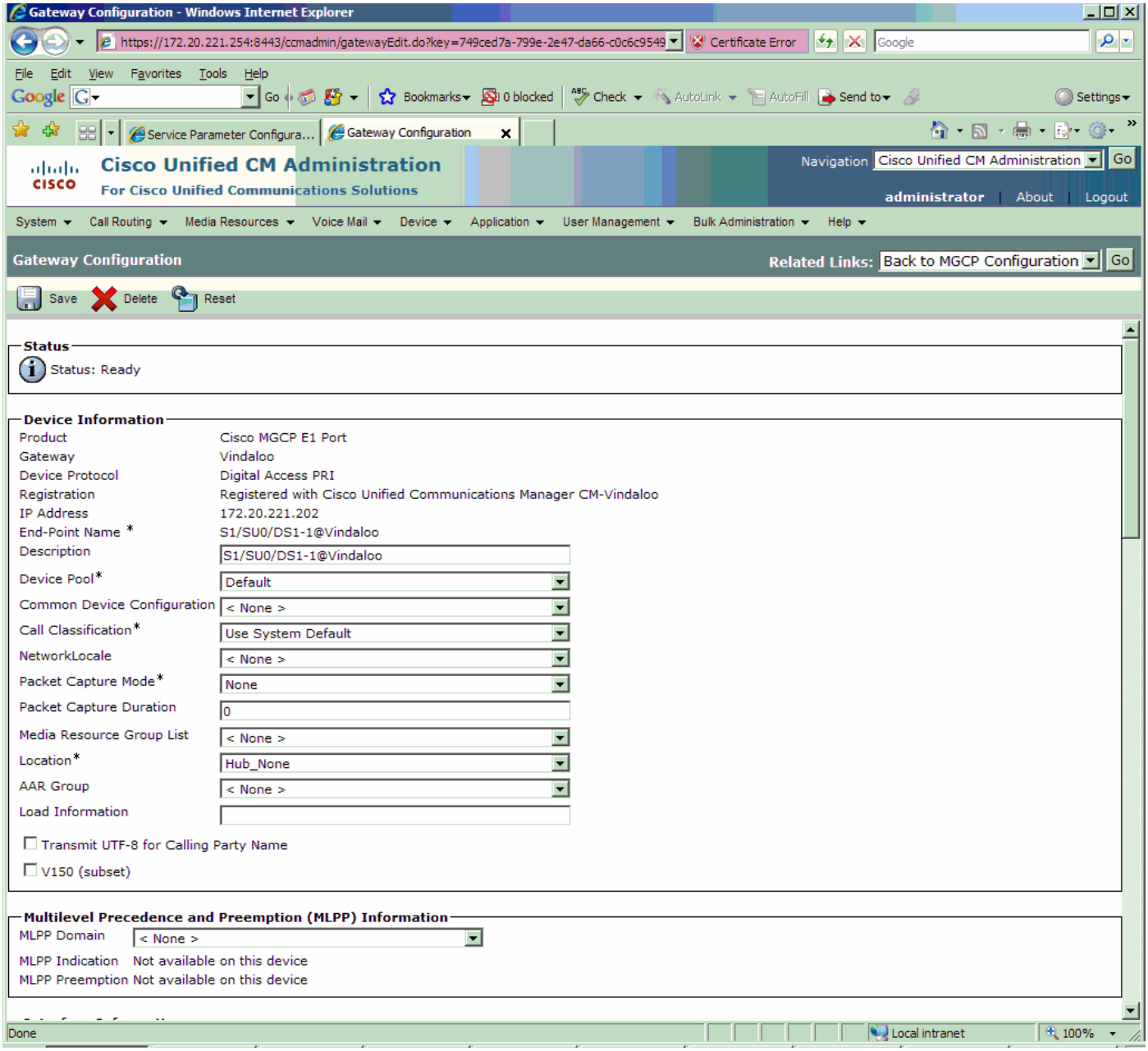
Cisco 3825-E1 Gateway Configuration port 1/0/1 (1 of 3)



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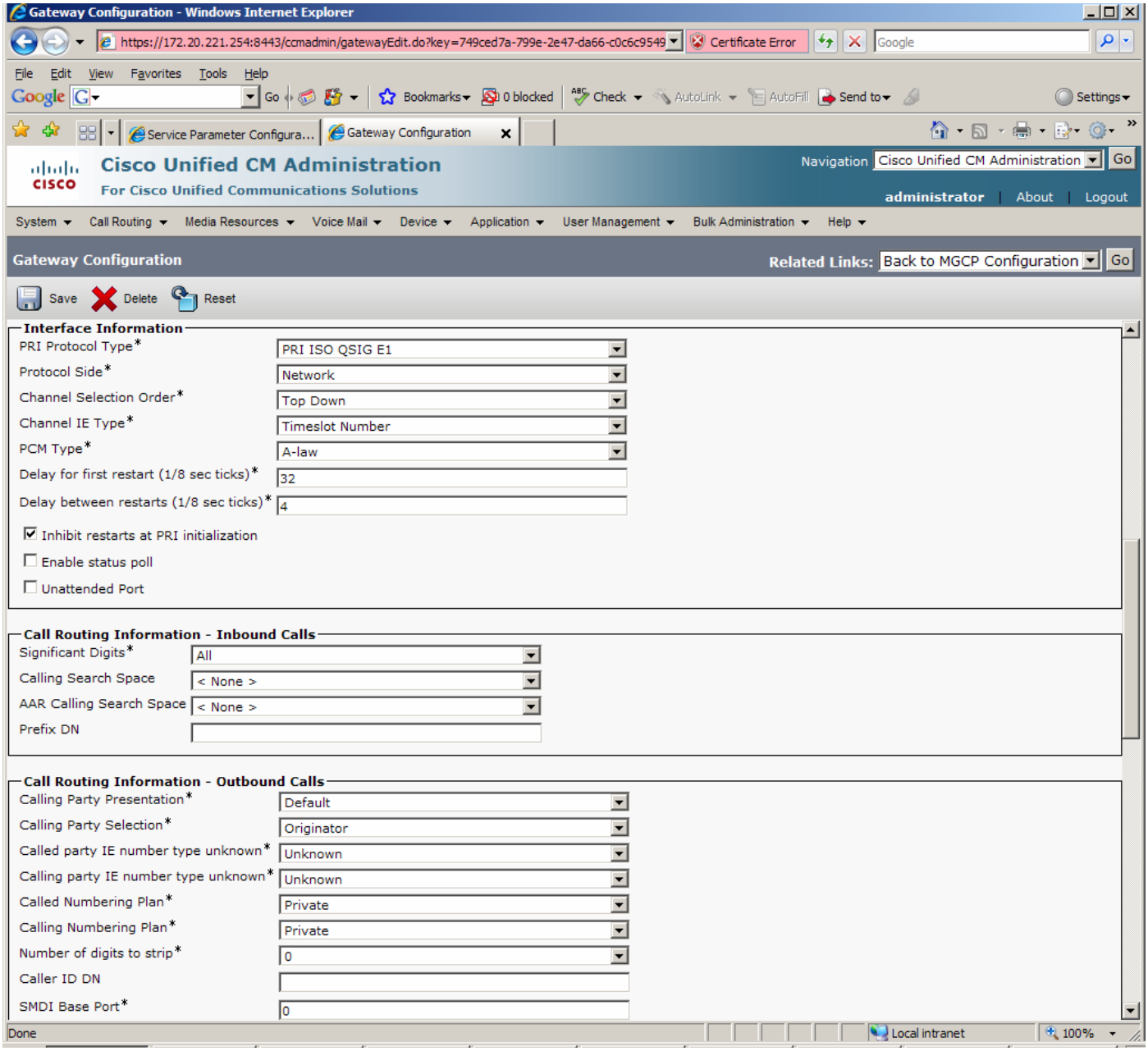
Cisco 3825-E1 Gateway Configuration port 1/0/1 (2 of 3)



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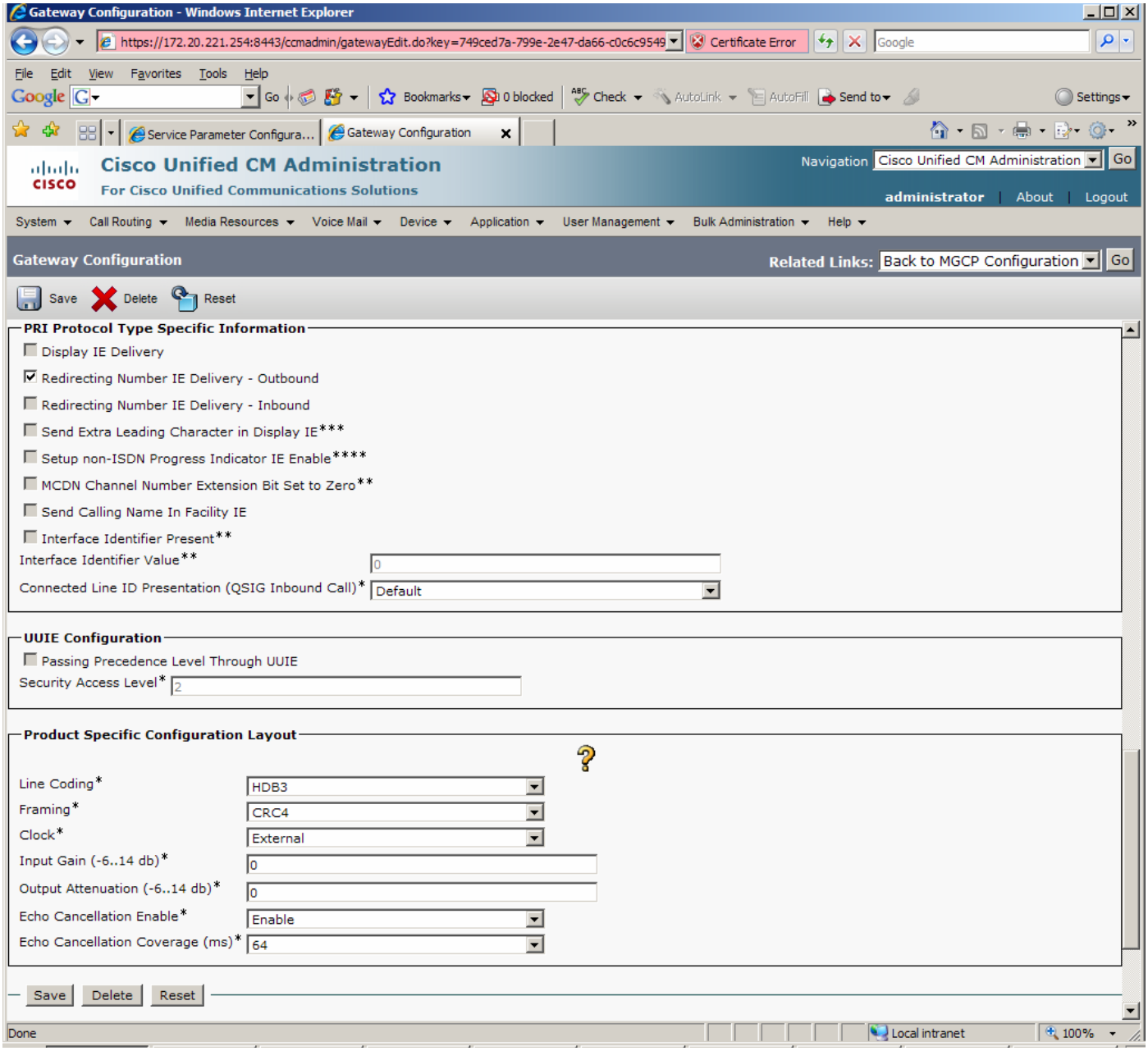
Cisco 3825-E1 Gateway Configuration port 1/0/1 (3 of 3)



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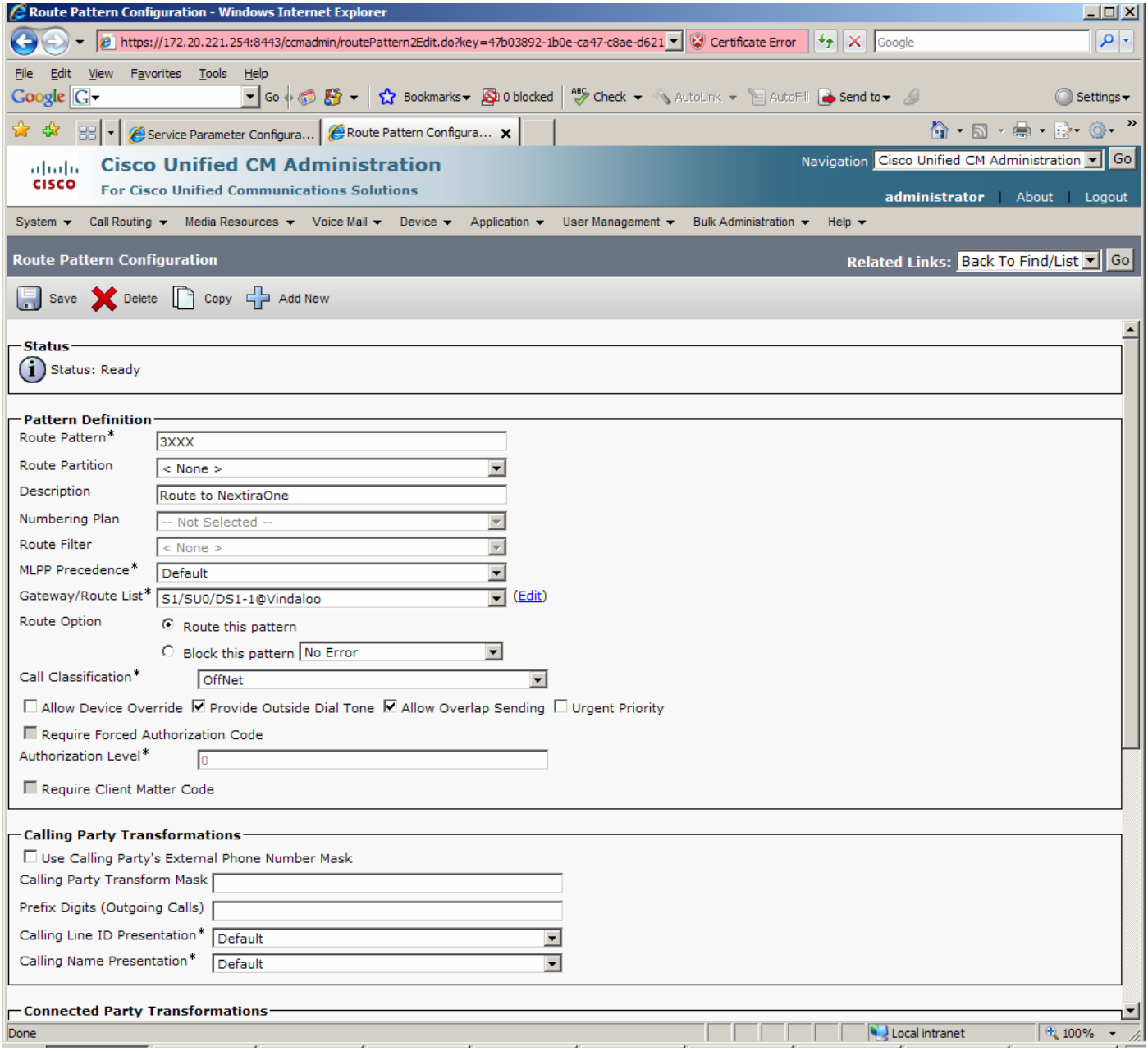
Enbloc Route Configuration 3XXX (1 of 2)



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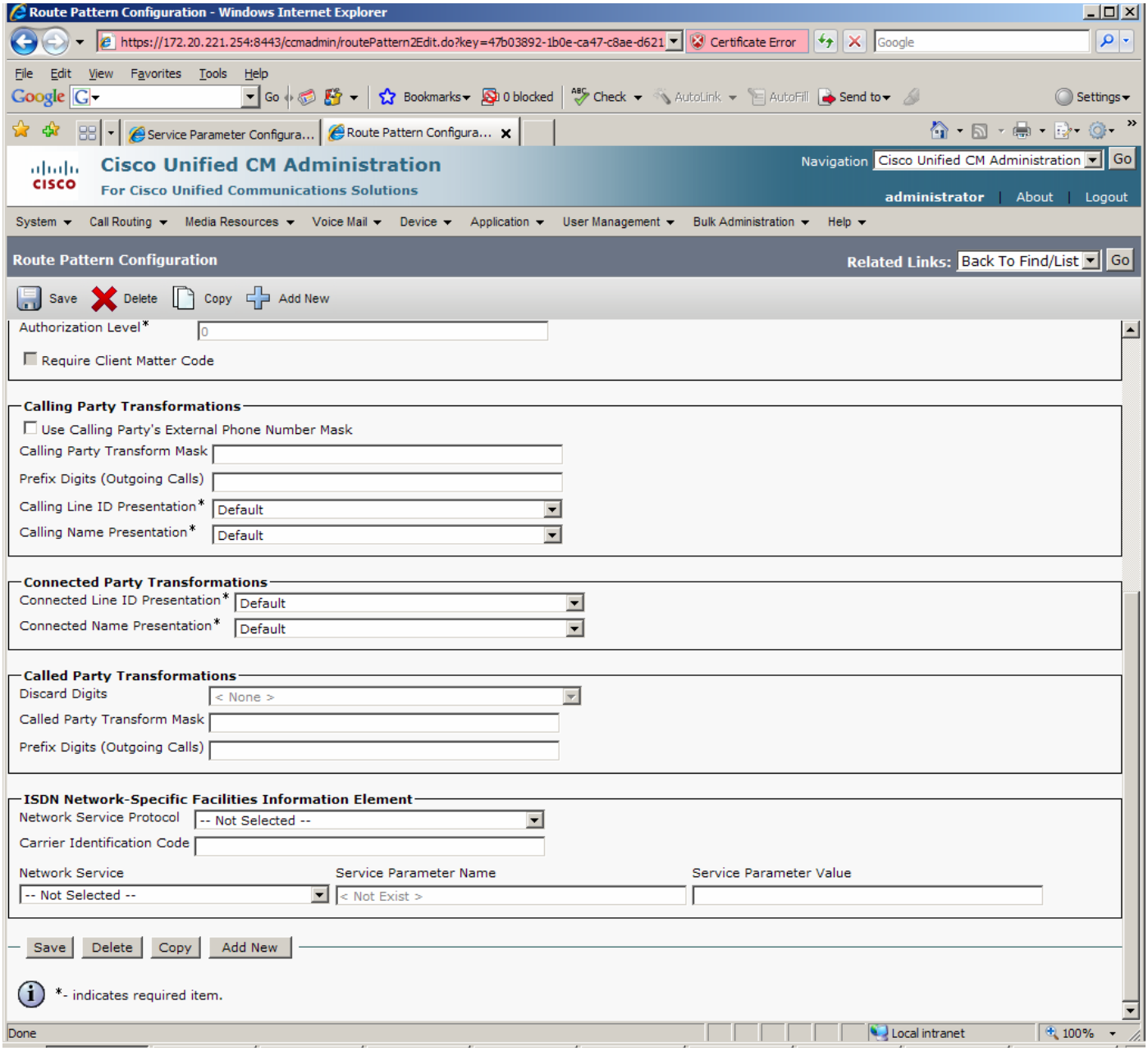
Enbloc Route Configuration 3XXX (2 of 2)



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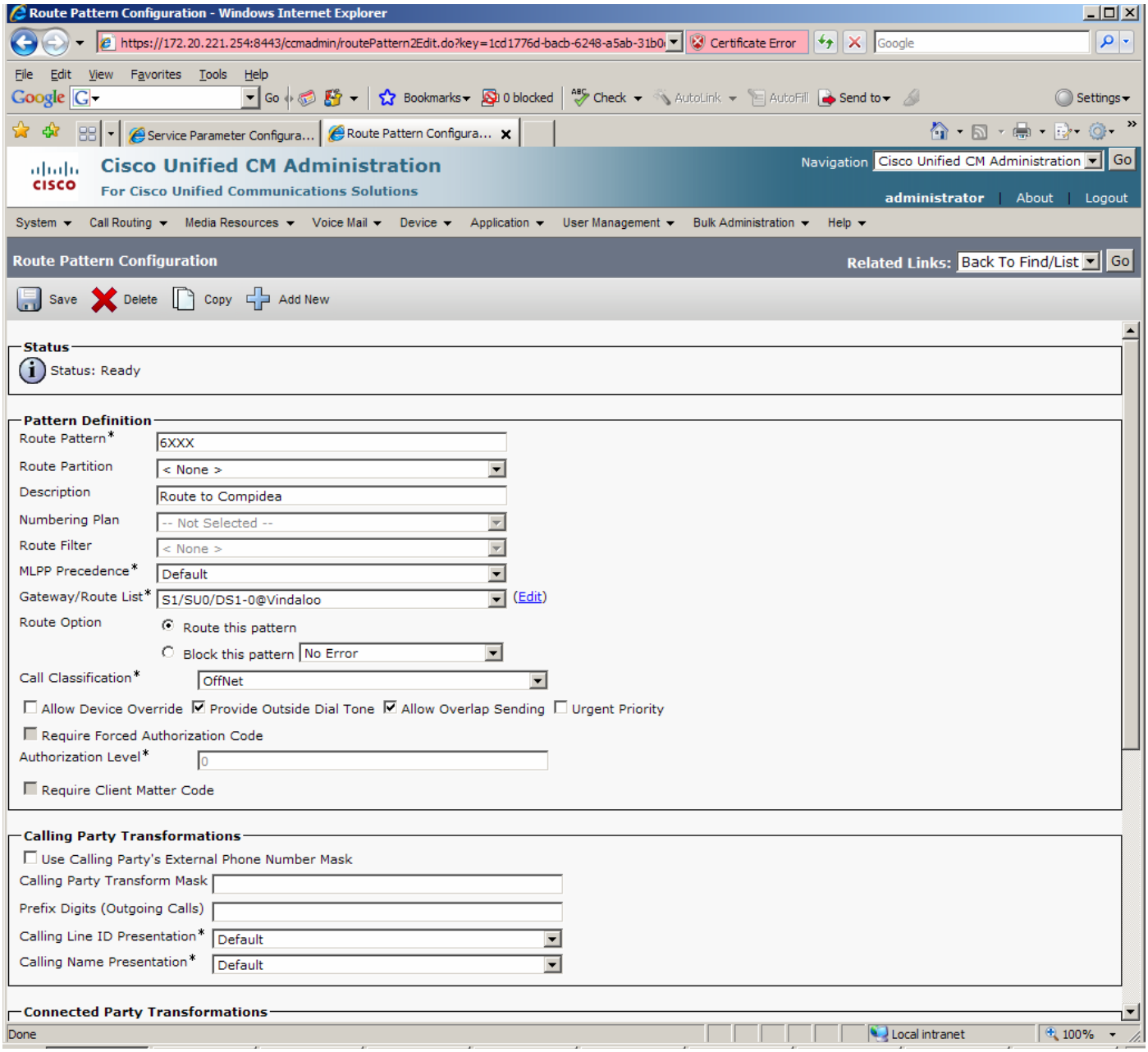
Enbloc Route Configuration 6XXX (1 of 2)



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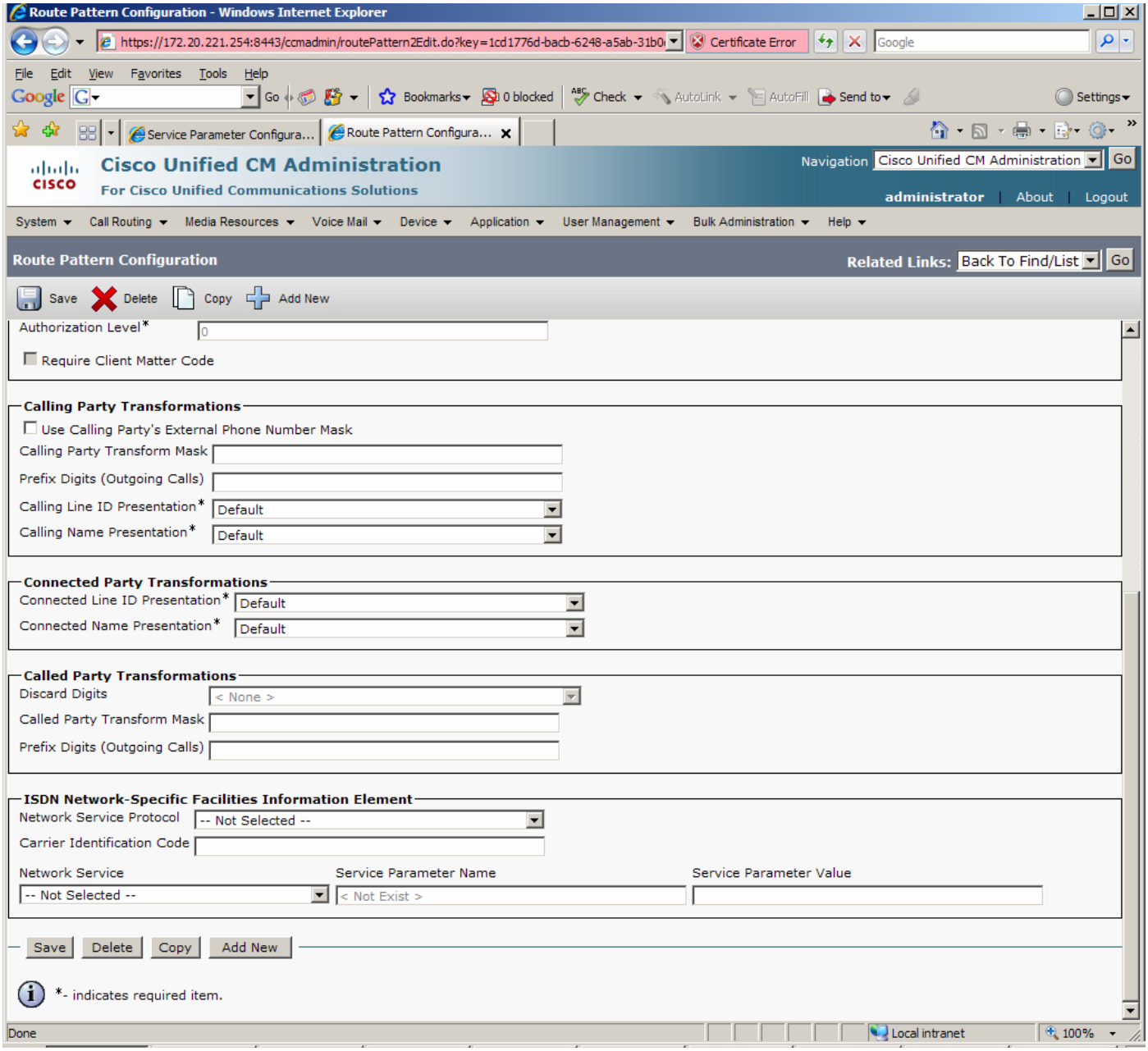
Enbloc Route Configuration 6XXX (2 of 2)



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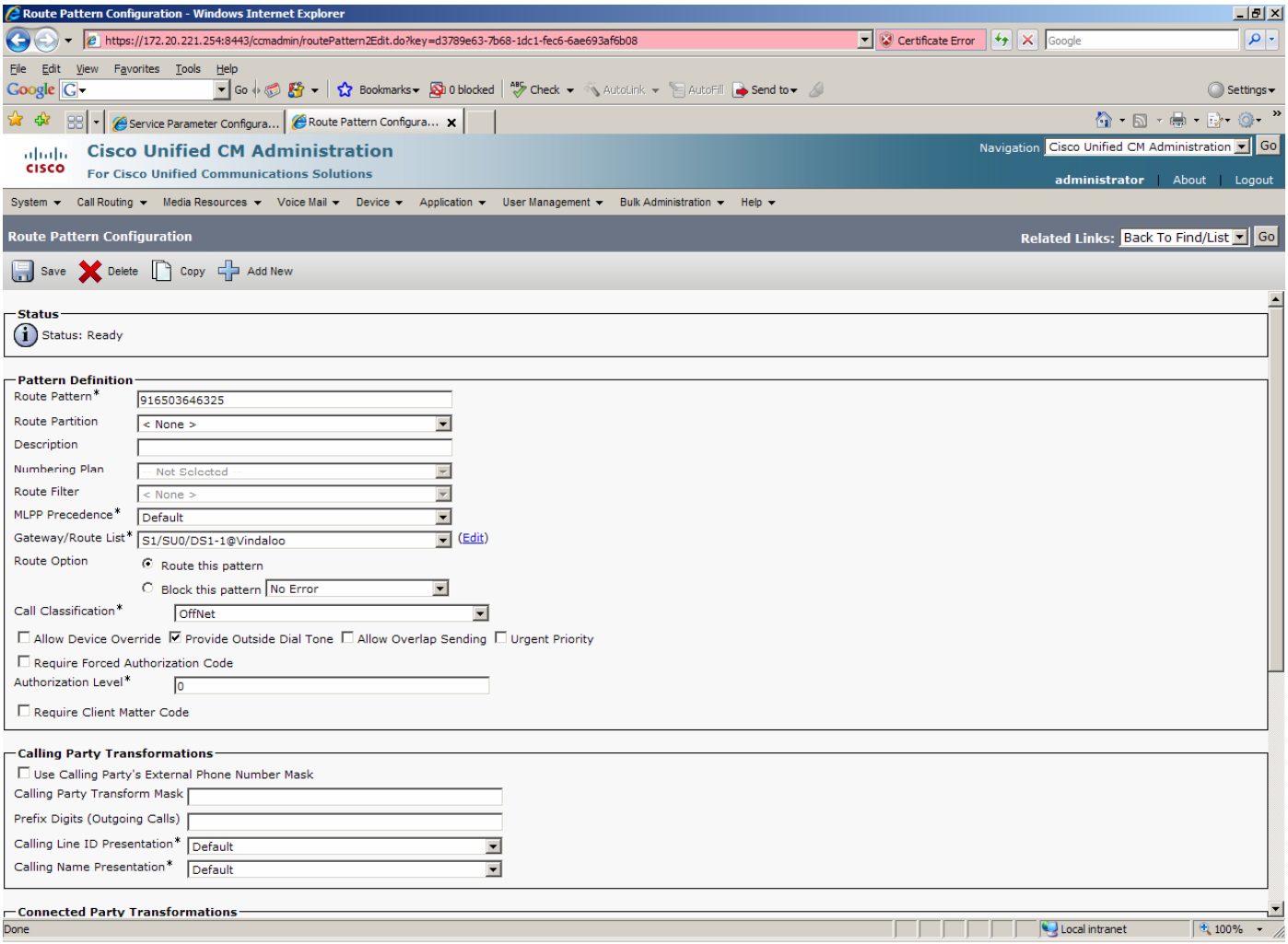
PSTN Route Configuration (1 of 2)



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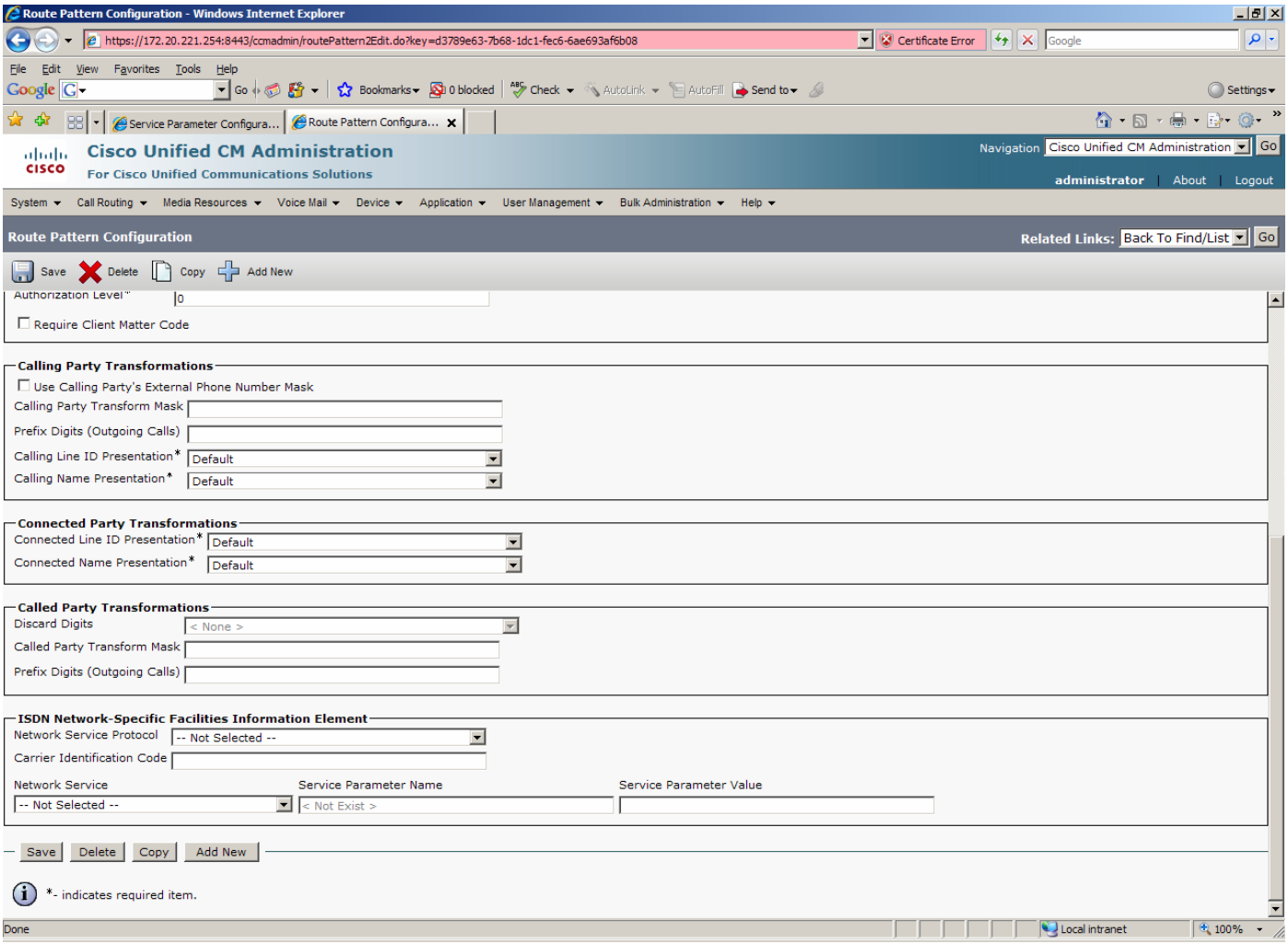
PSTN Route Configuration (1 of 2)



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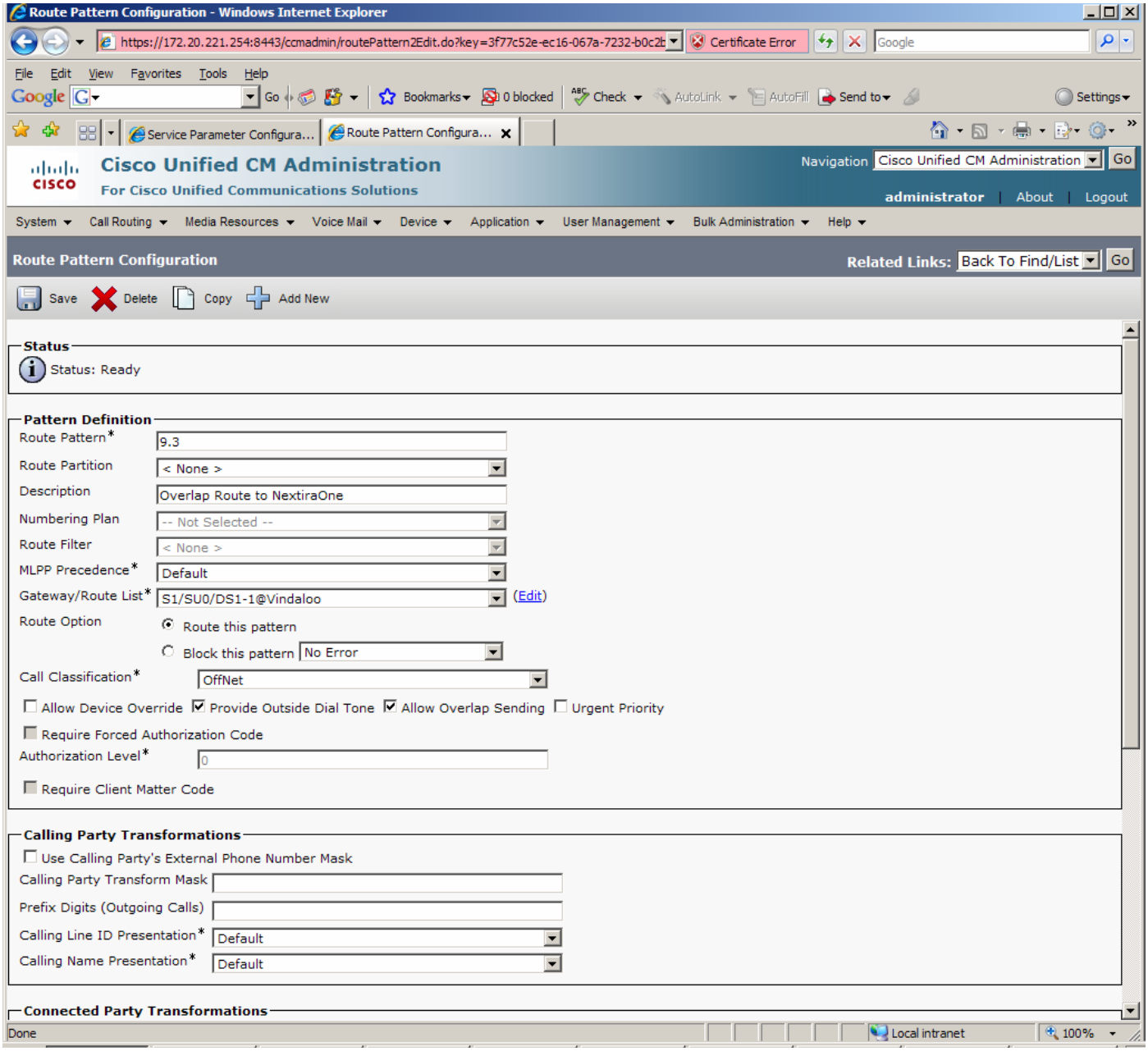
Overlap Route Sending Configuration 3XXX (1 of 2)



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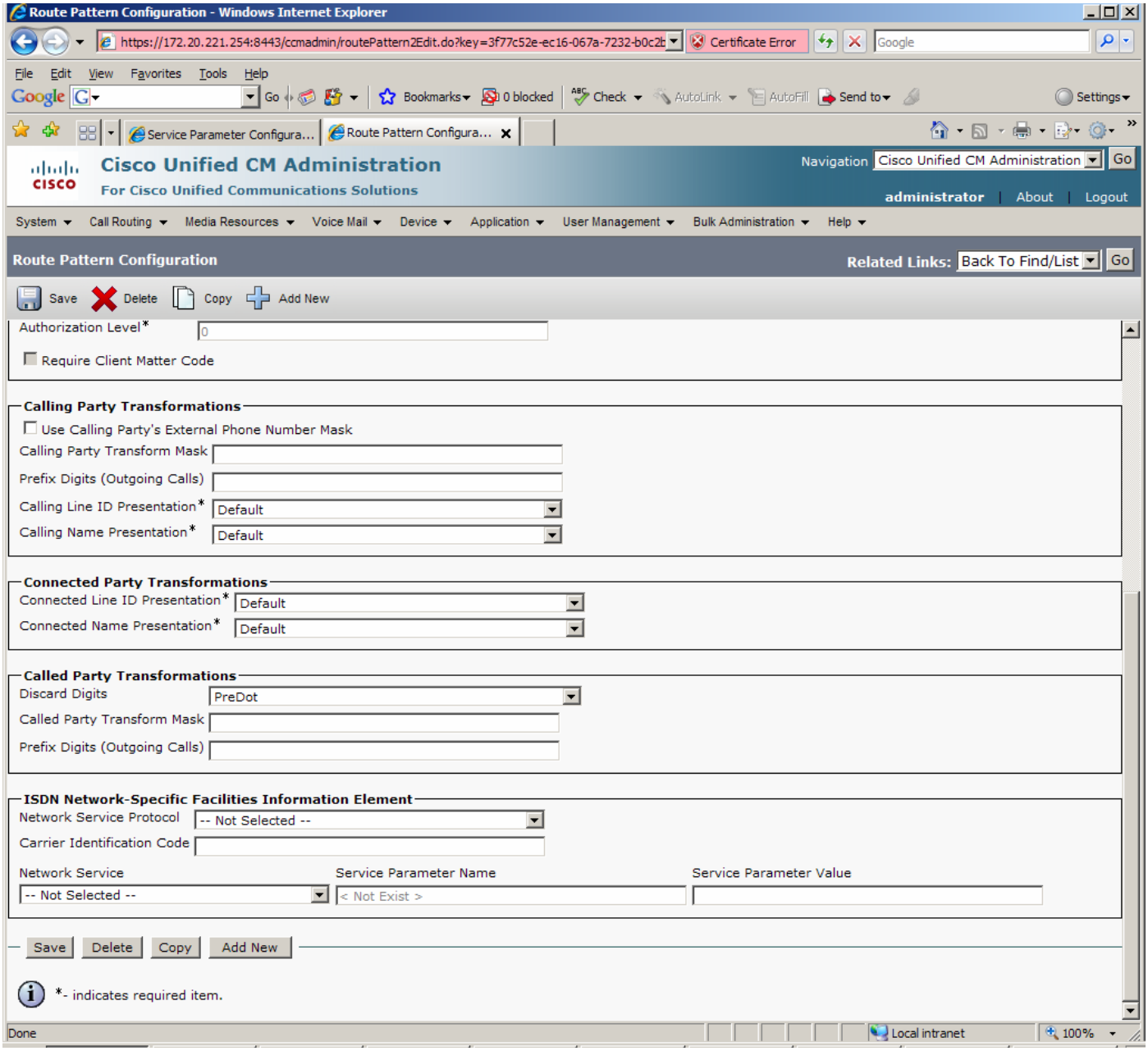
Overlap Sending Route Configuration 3XXX (2 of 2)



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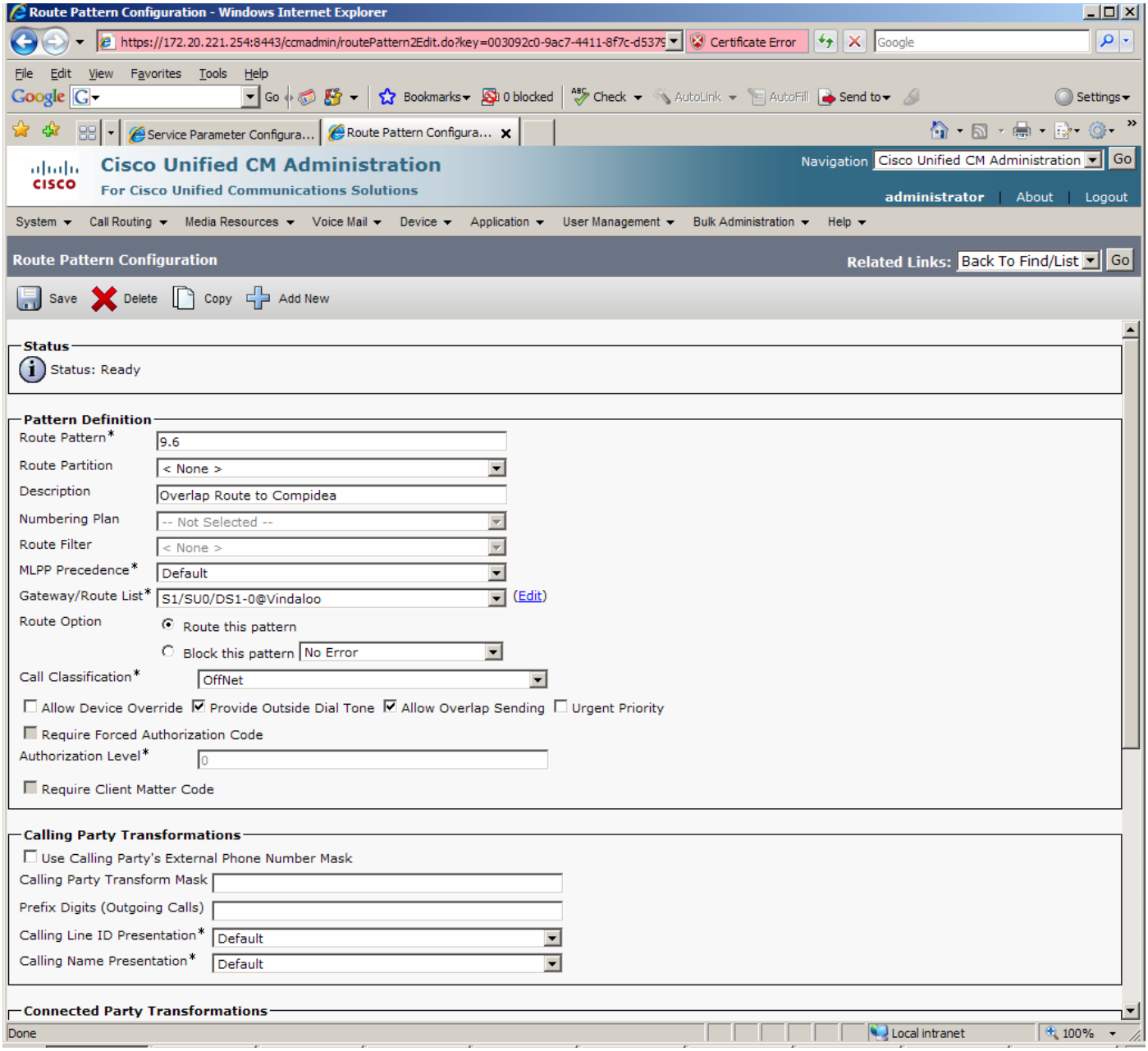
Overlap Sending Route Configuration 6XXX (1 of 2)



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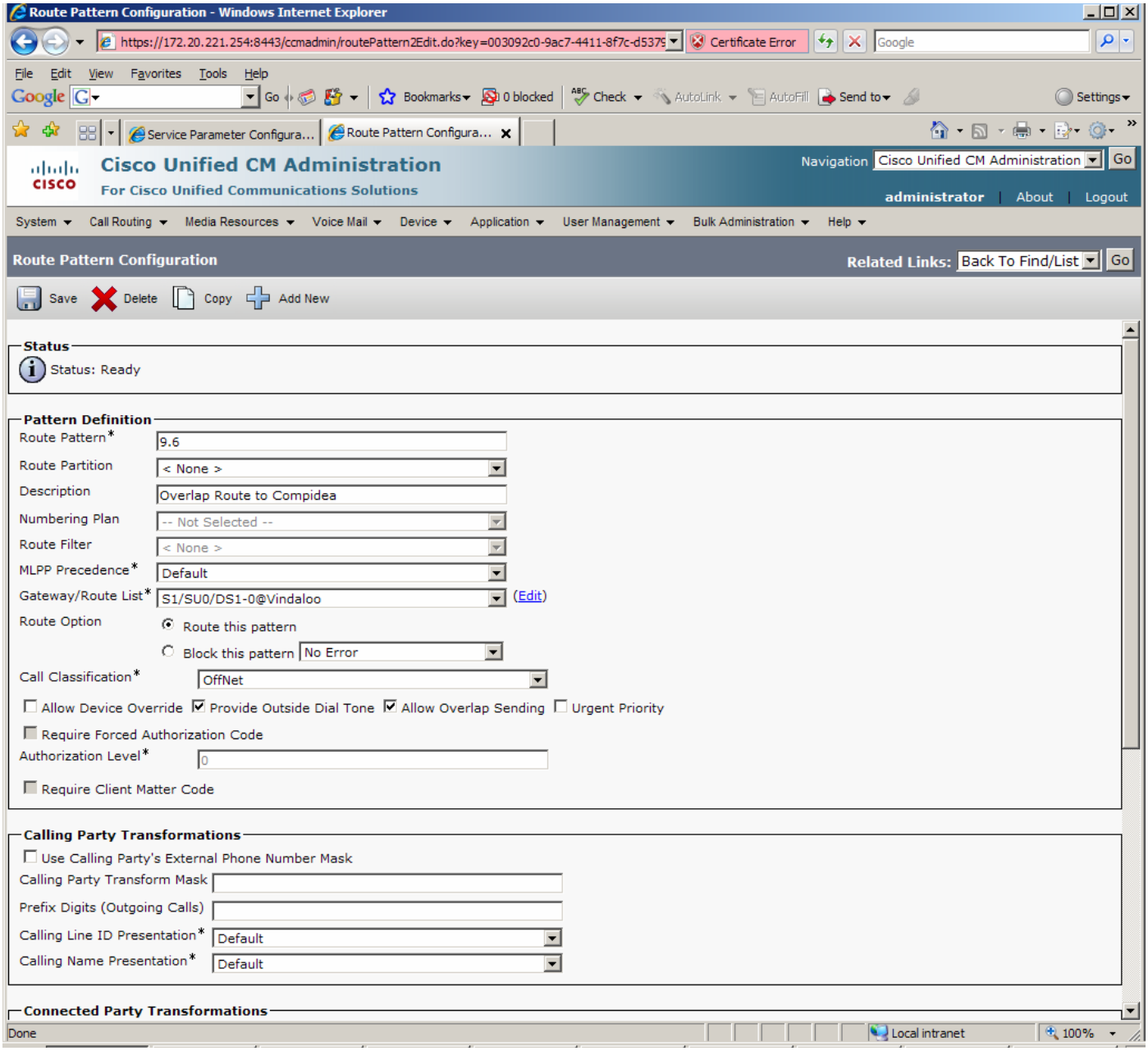
Overlap Sending Route Configuration 6XXX (2 of 2)



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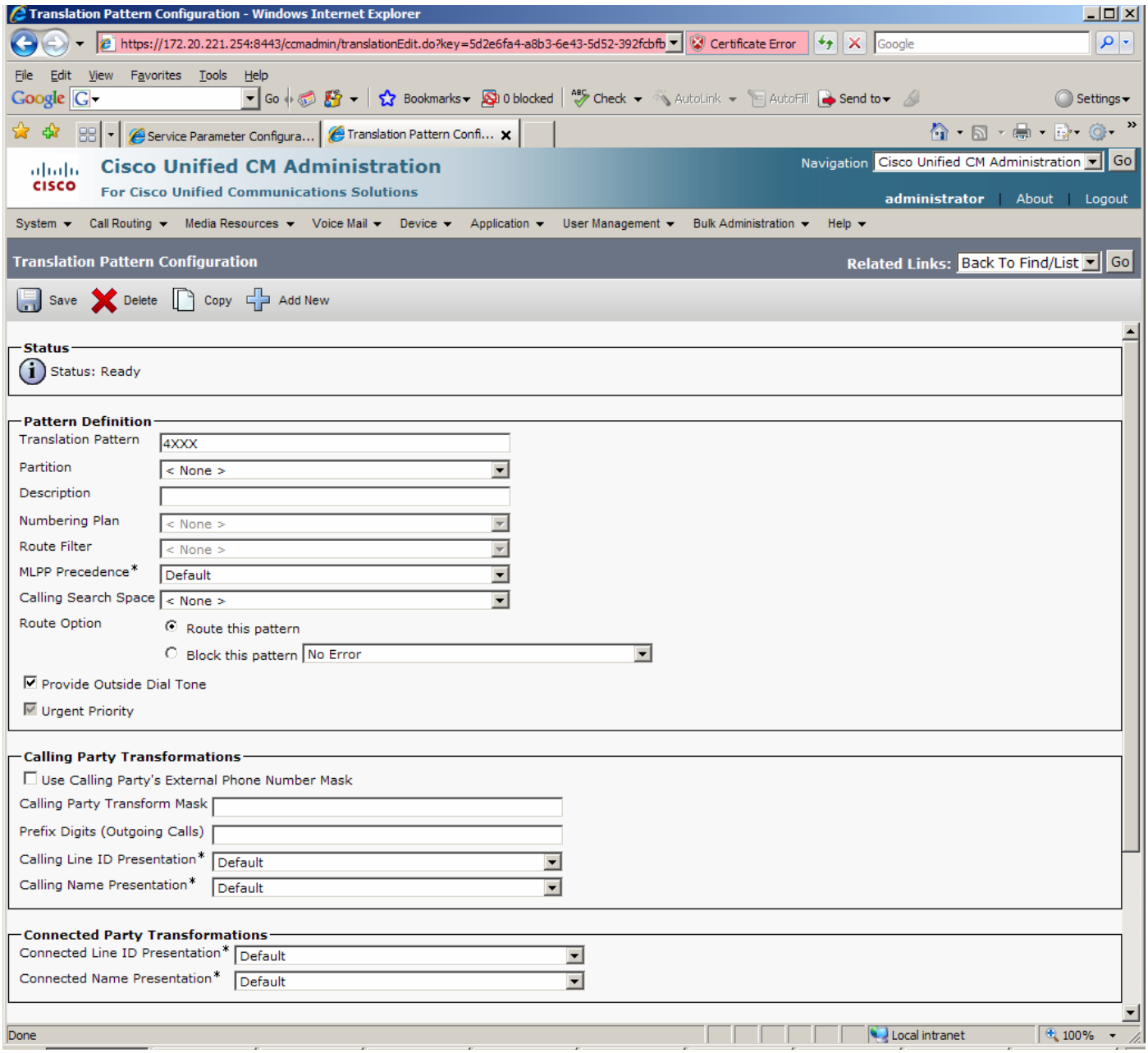
Translation Pattern for Incoming Calls (1 of 2)



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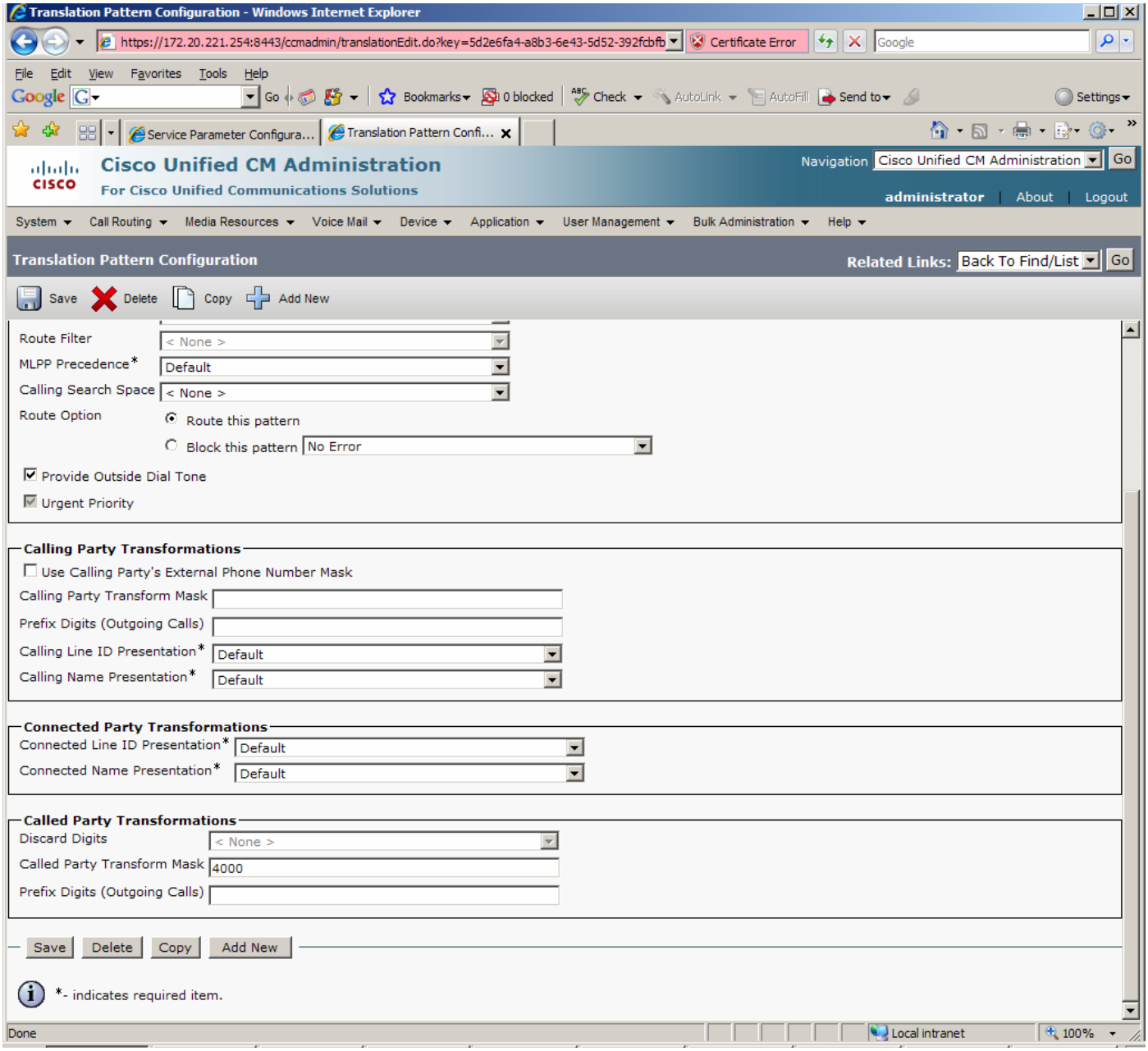
Translation Pattern for Incoming Calls (2 of 2)



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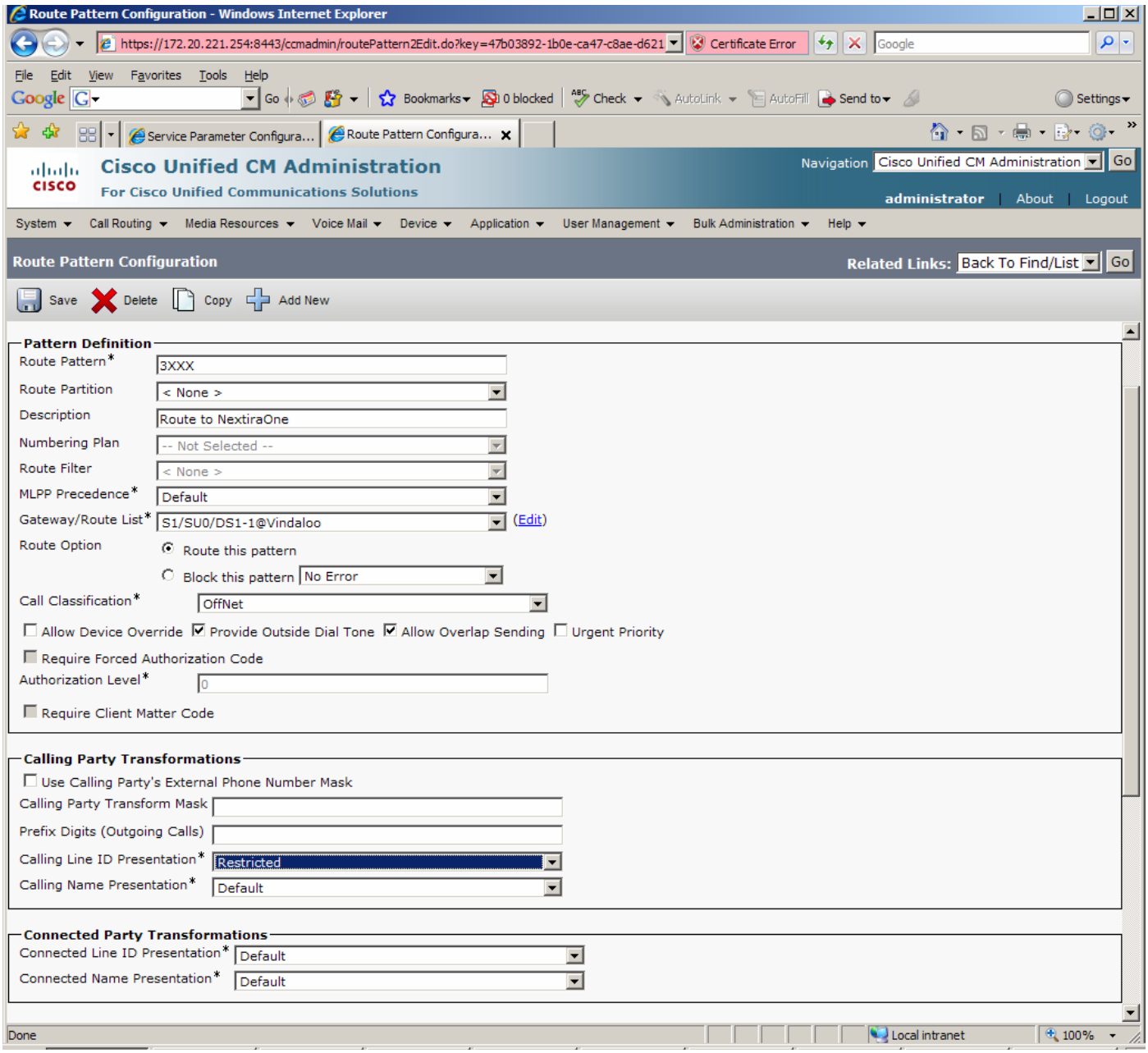
CLIR Route Pattern Configuration



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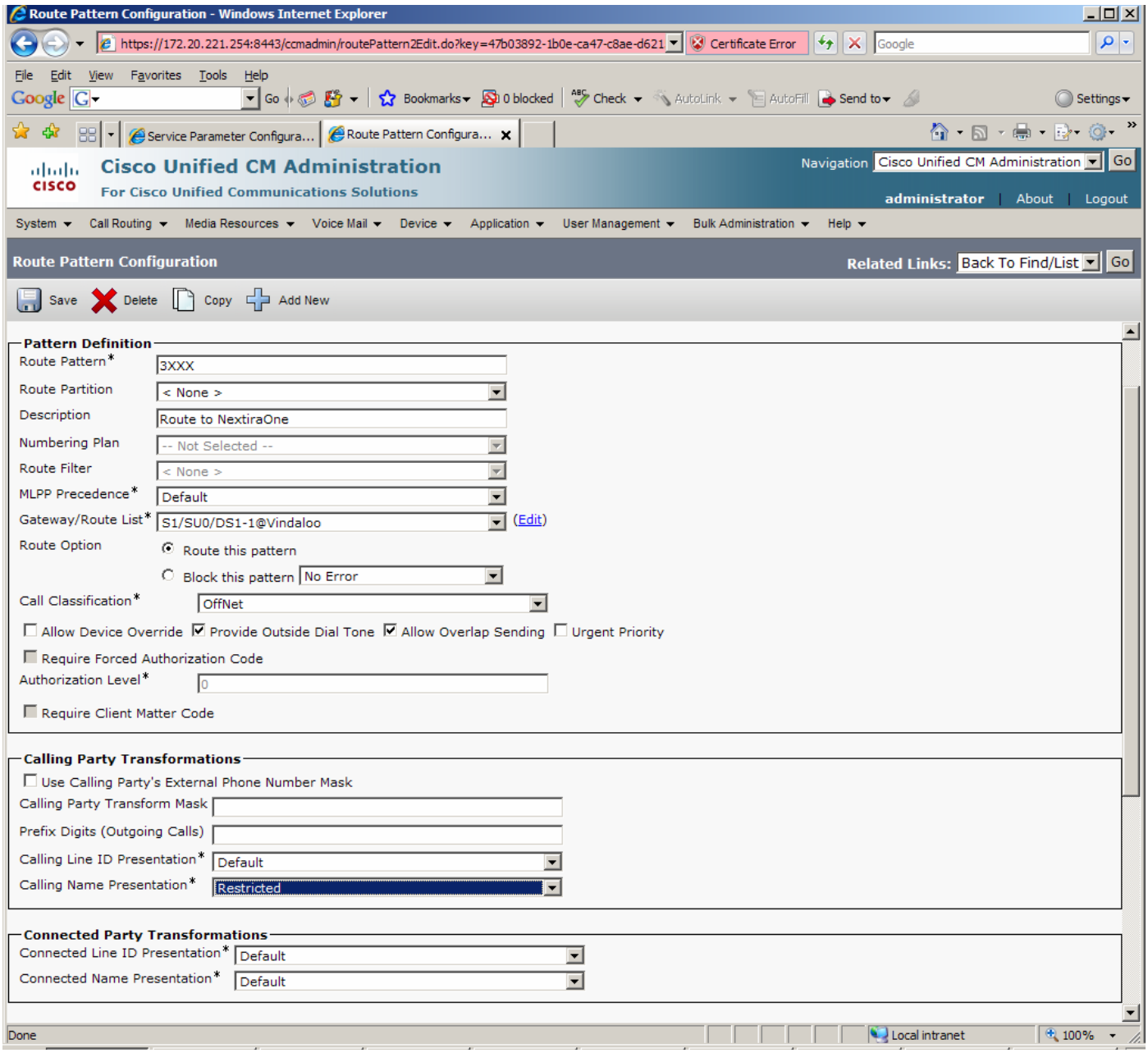
CNIR Route Pattern Configuration



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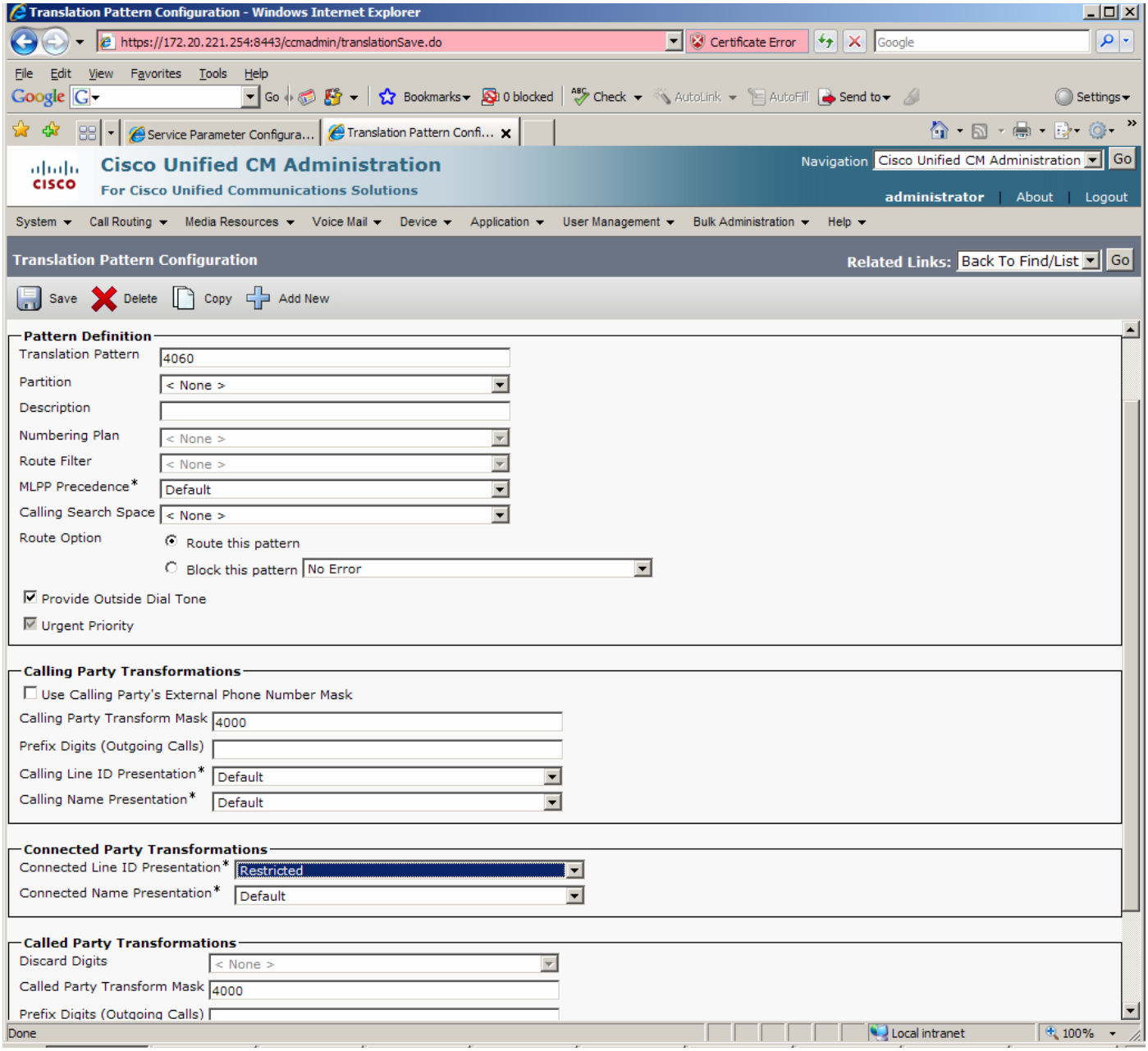
COLR Translation Pattern Configuration



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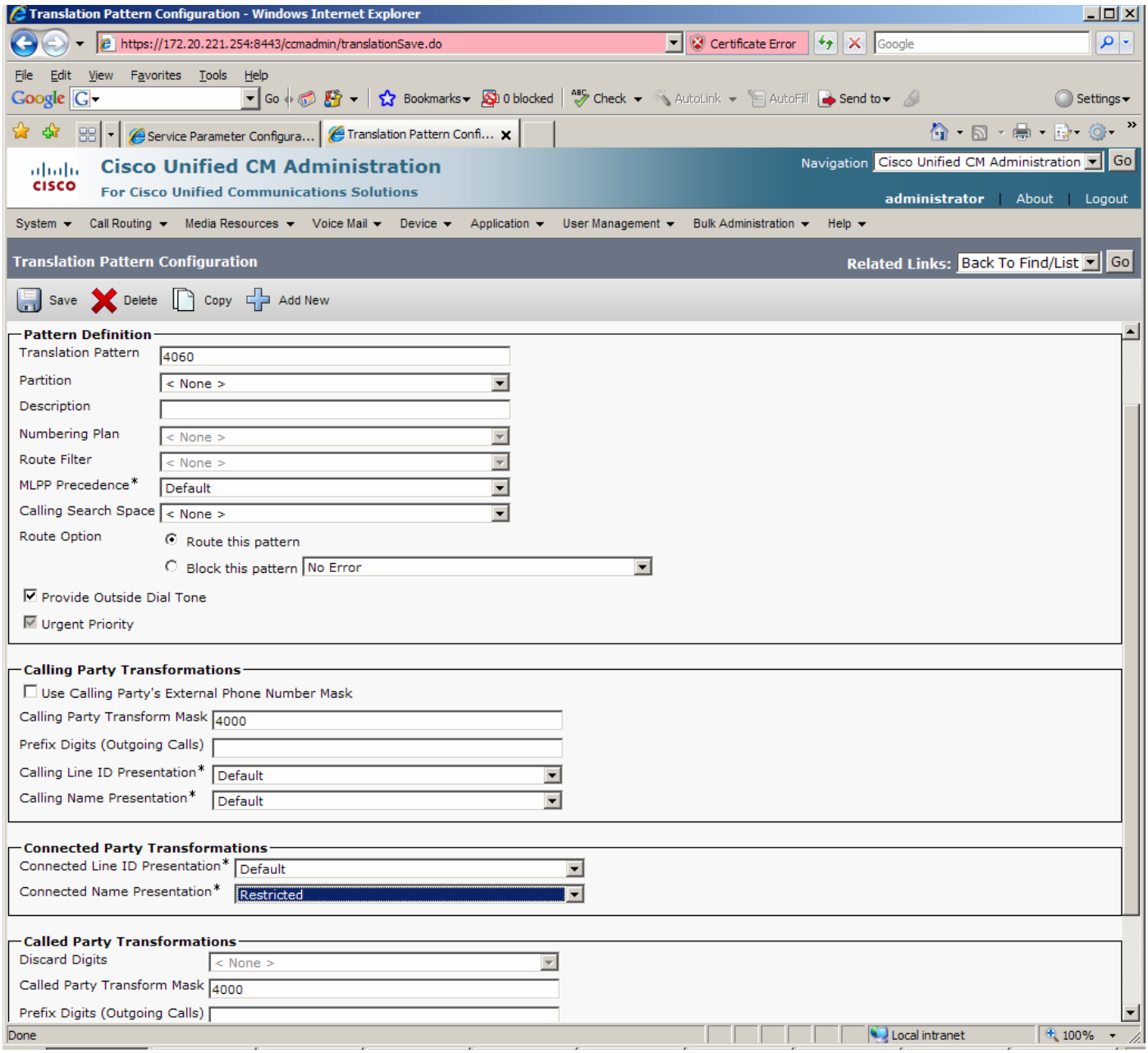
CONR Translation Pattern Configuration



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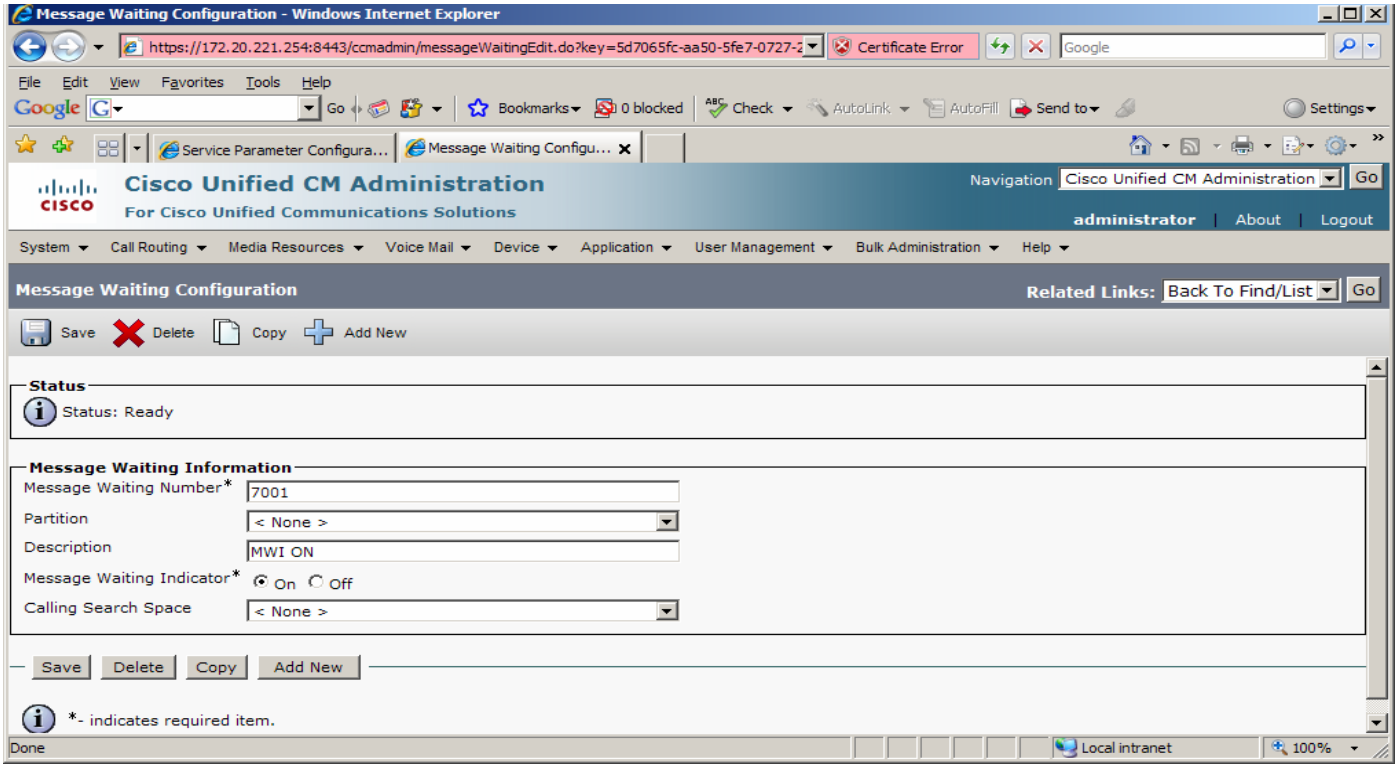
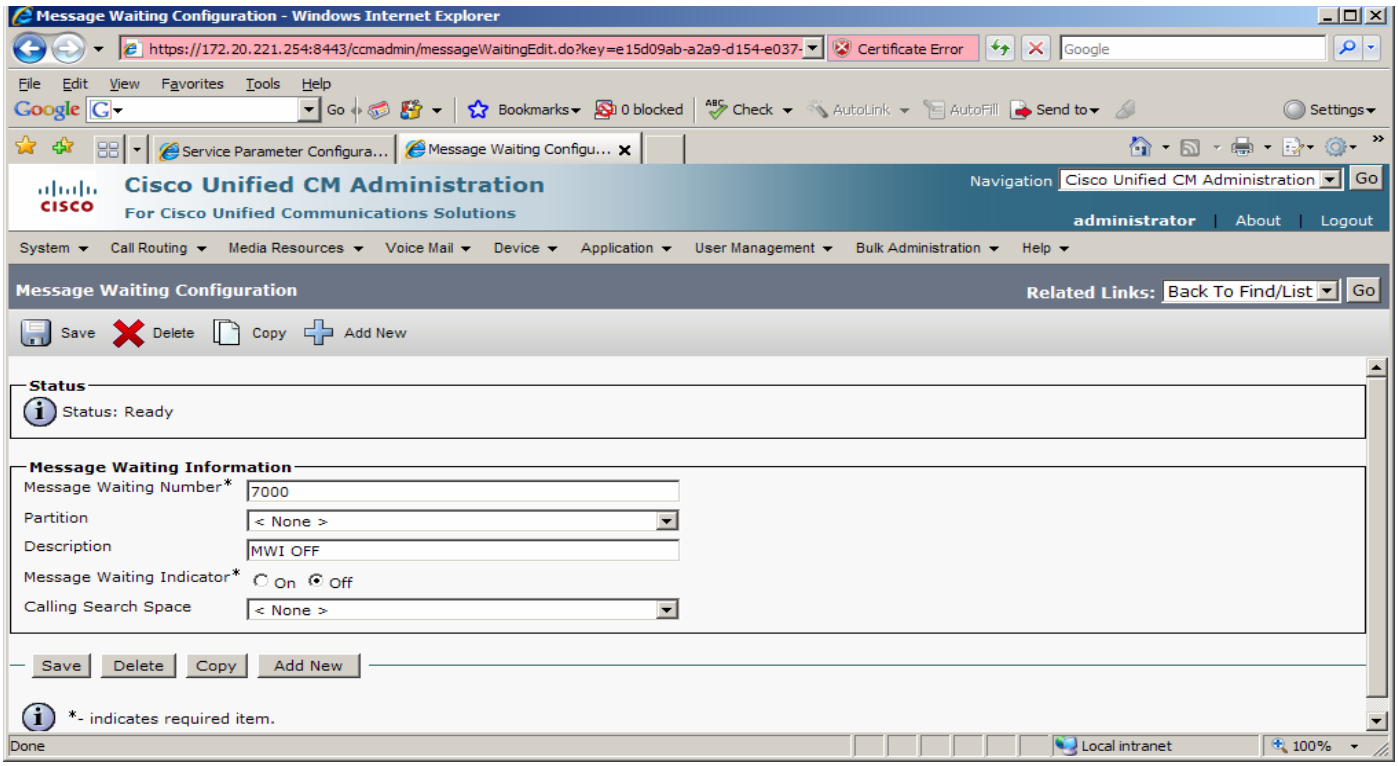
MWI lamp On/Off Configuration





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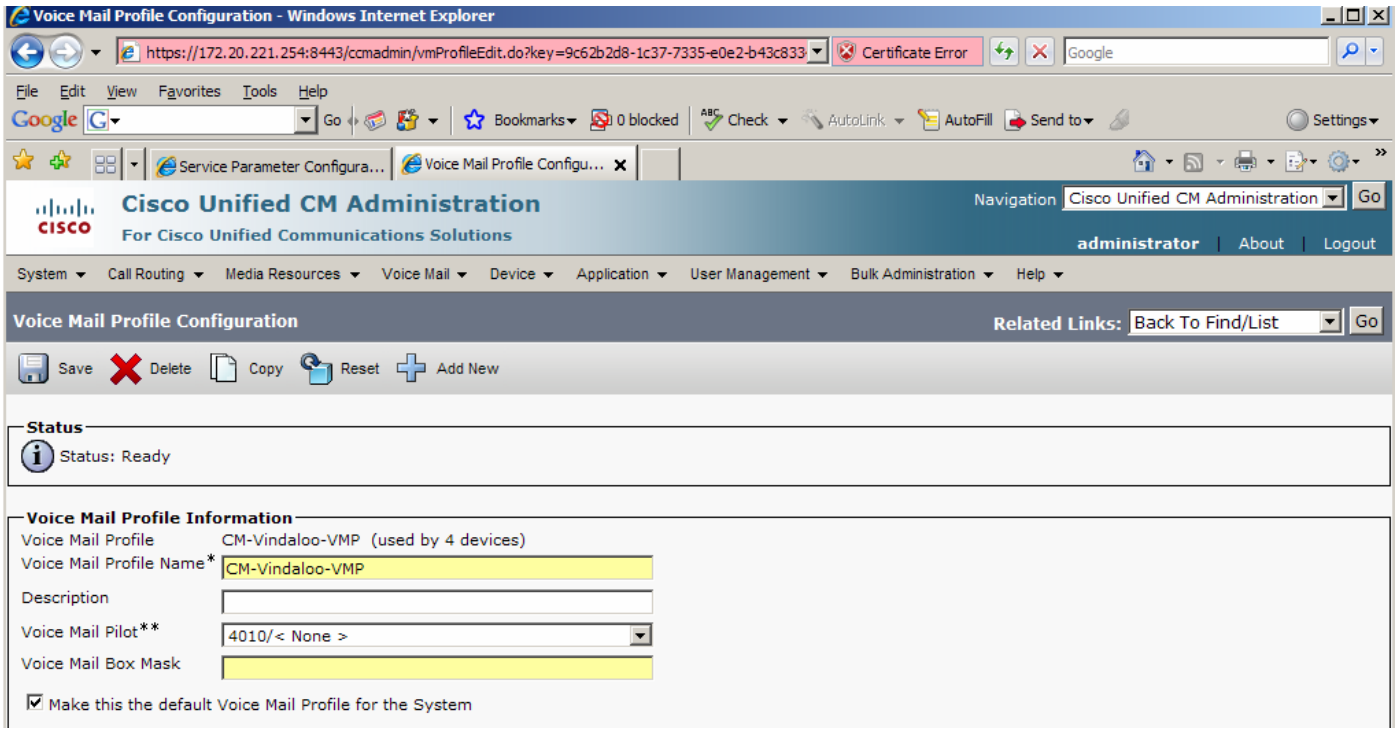
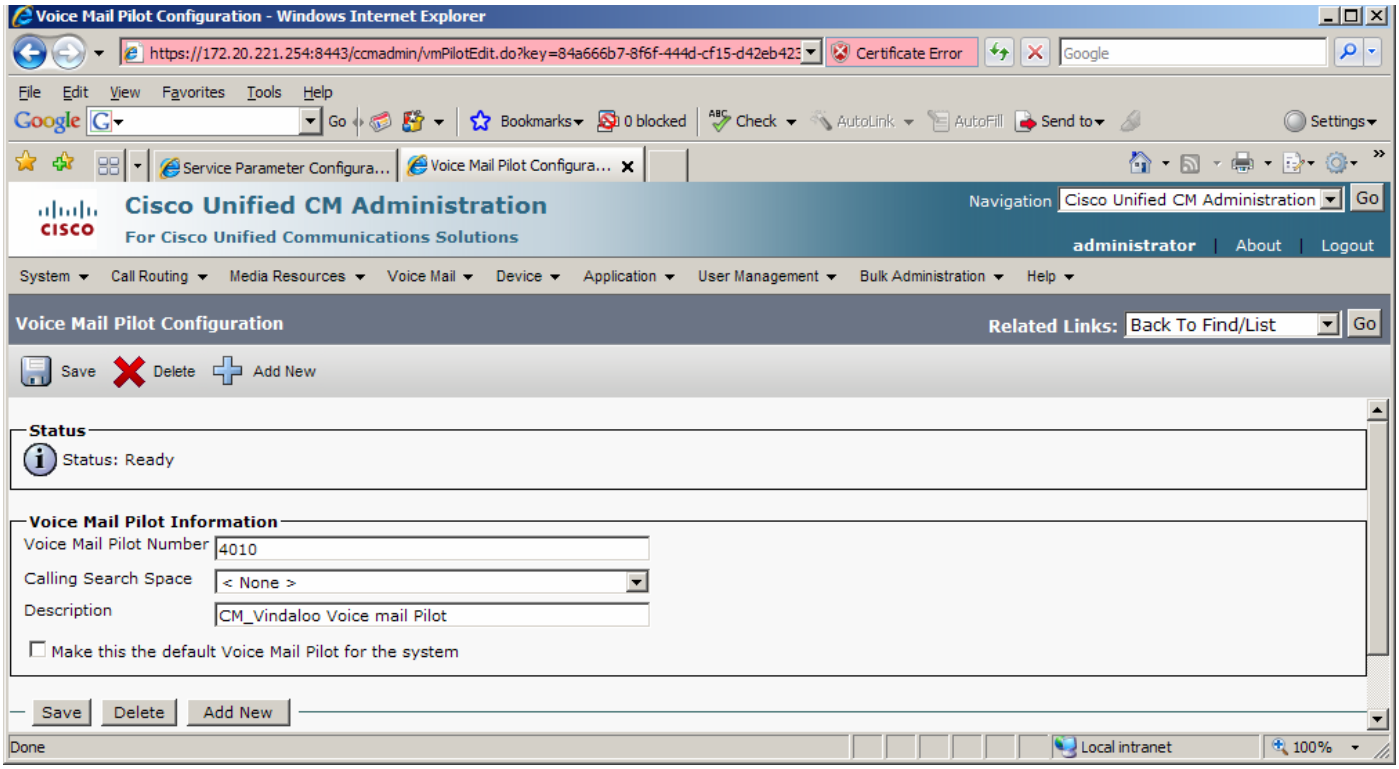
Voice Mail Profile Configuration



Voice Mail Pilot Configuration



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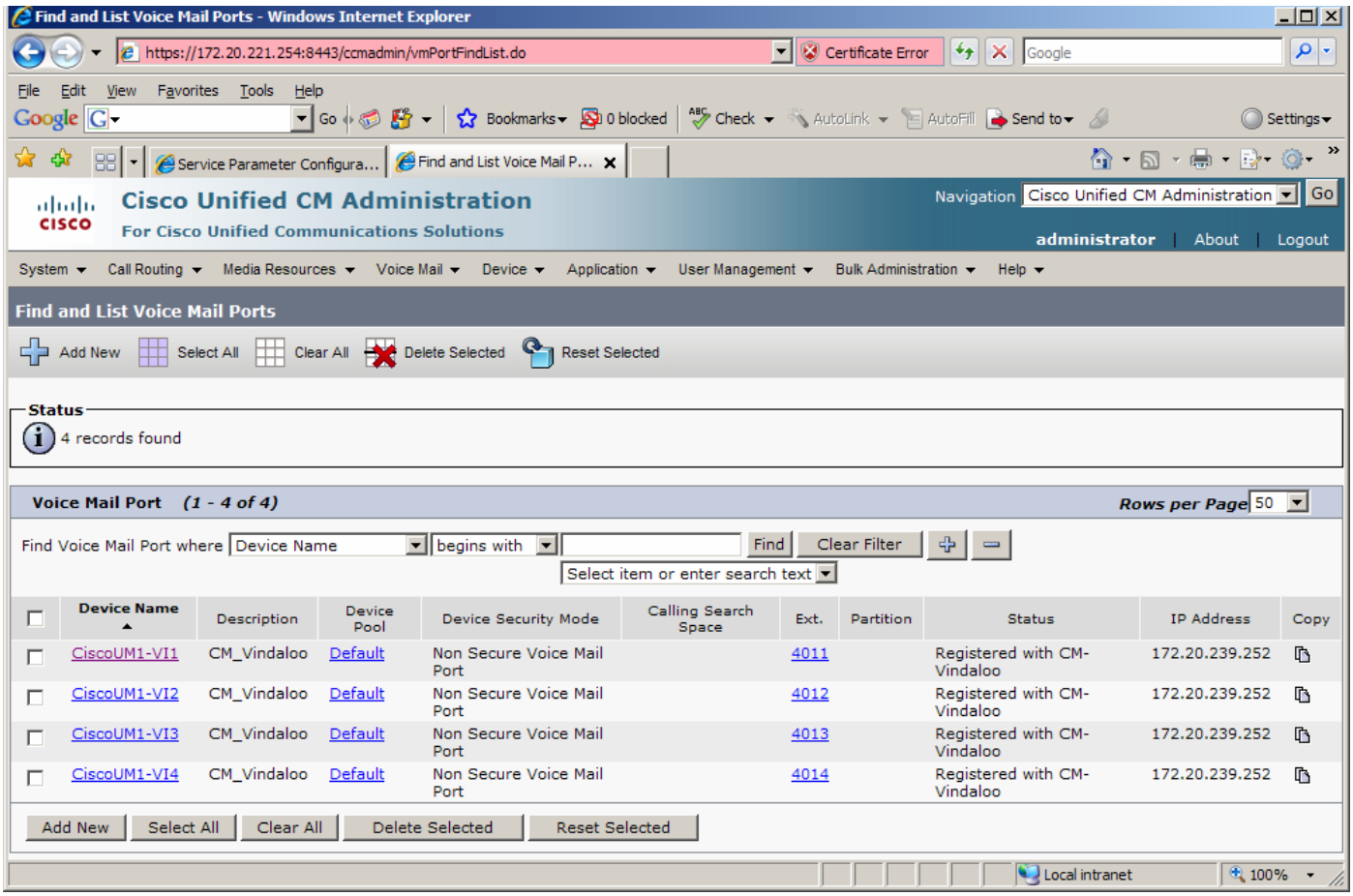
Voice Mail Ports List



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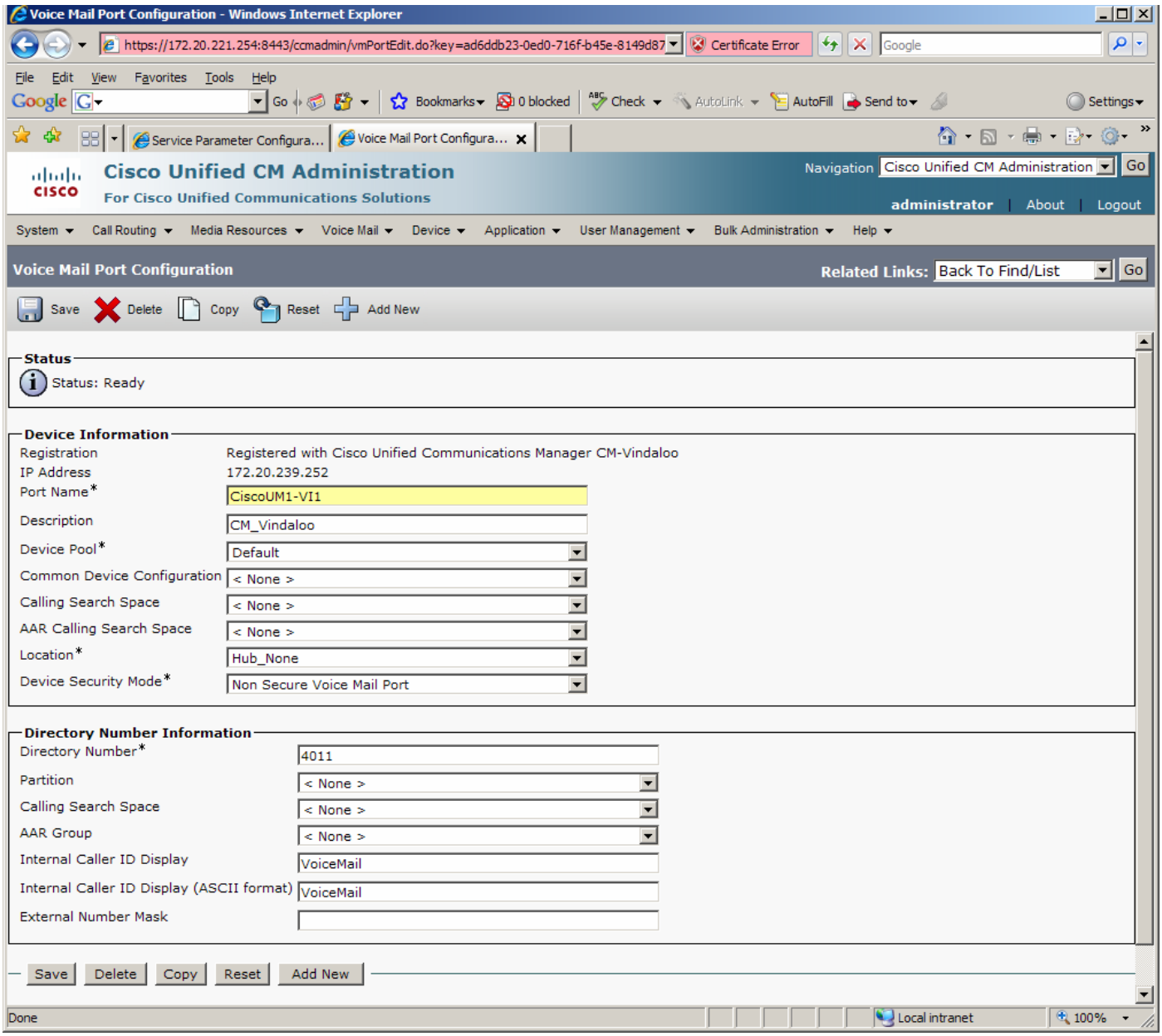
Voice Mail Port Configuration



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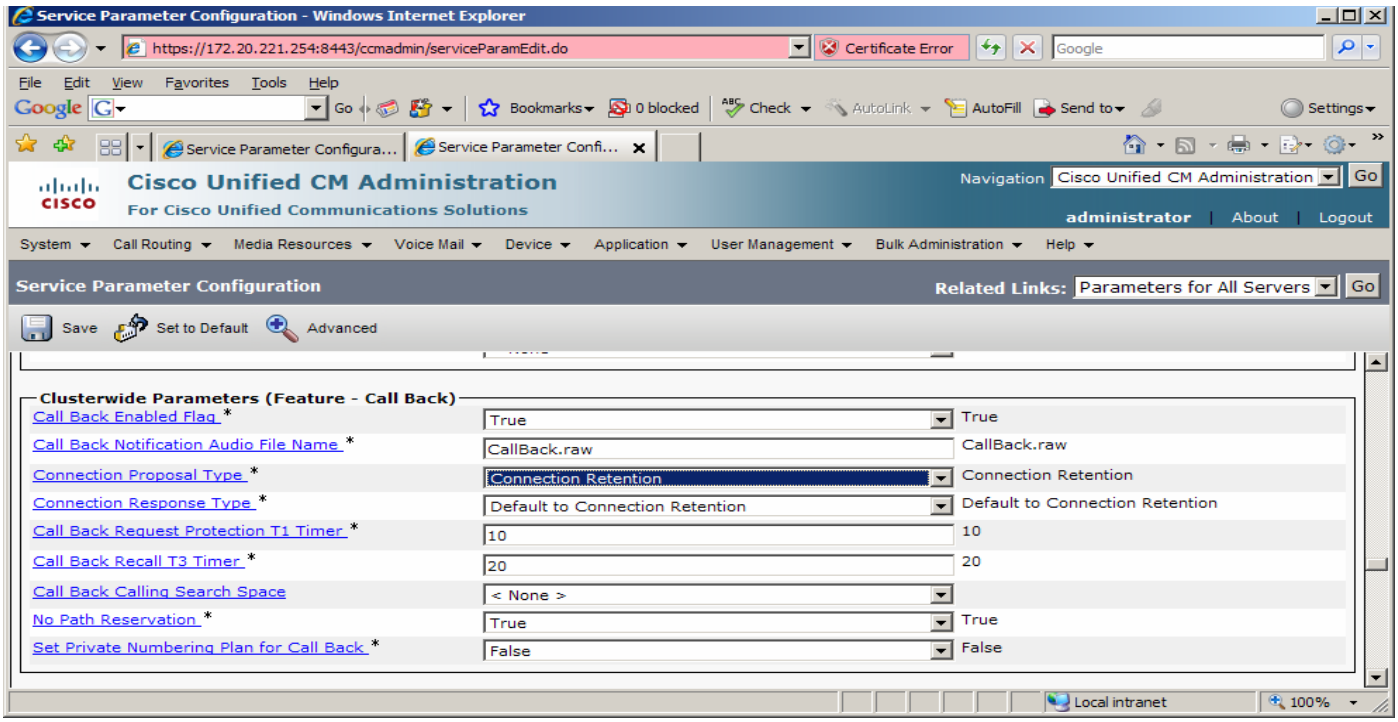
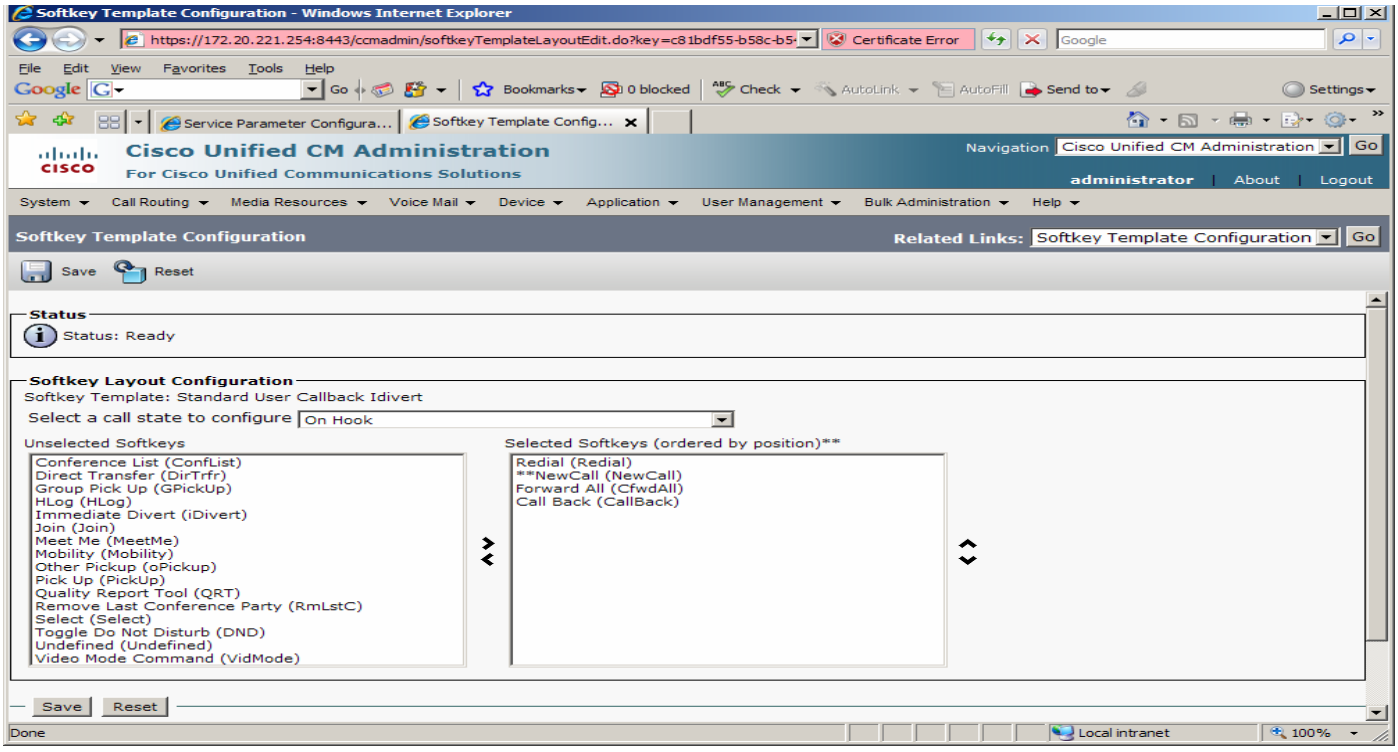
Callback Service Parameters



CallBack Softkey Configuration (1 of 2)



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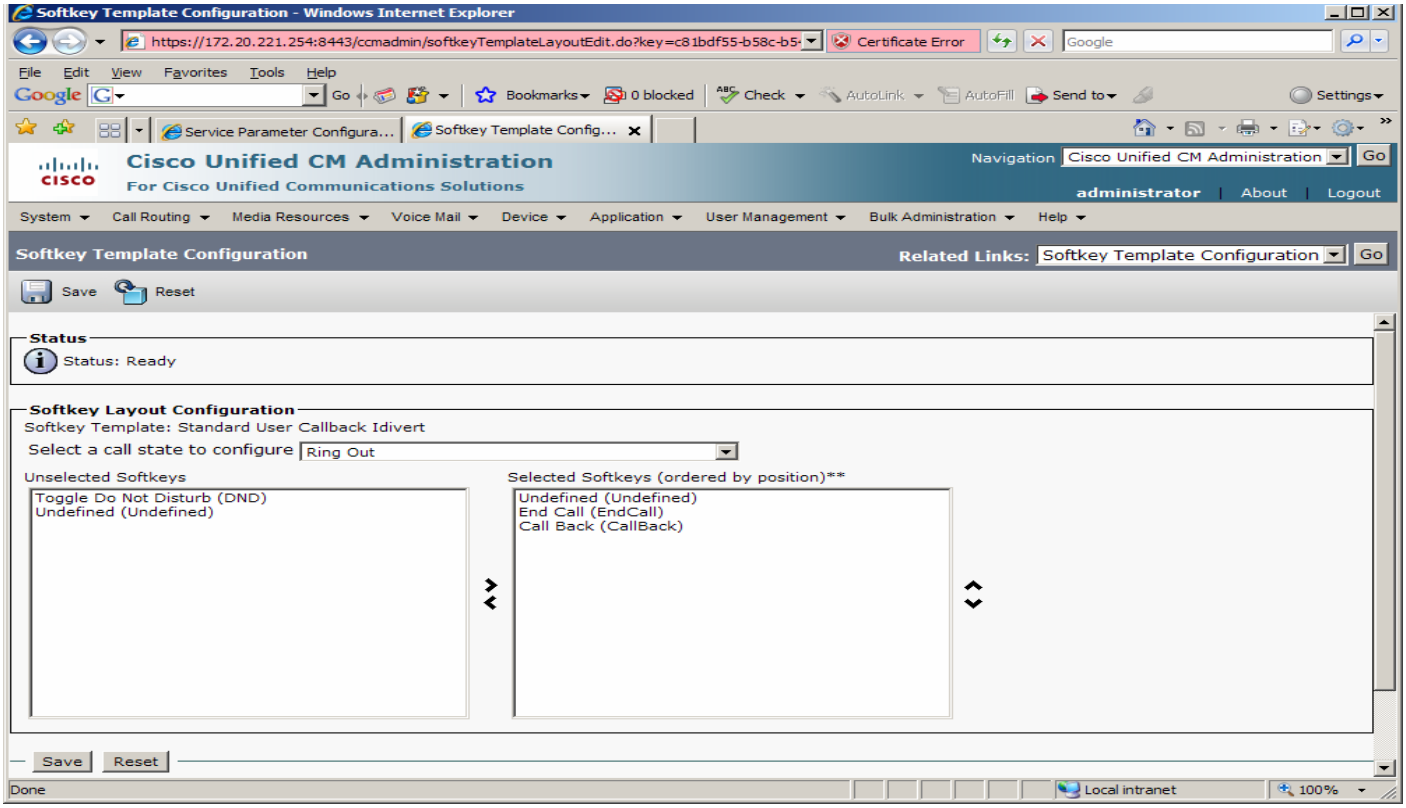
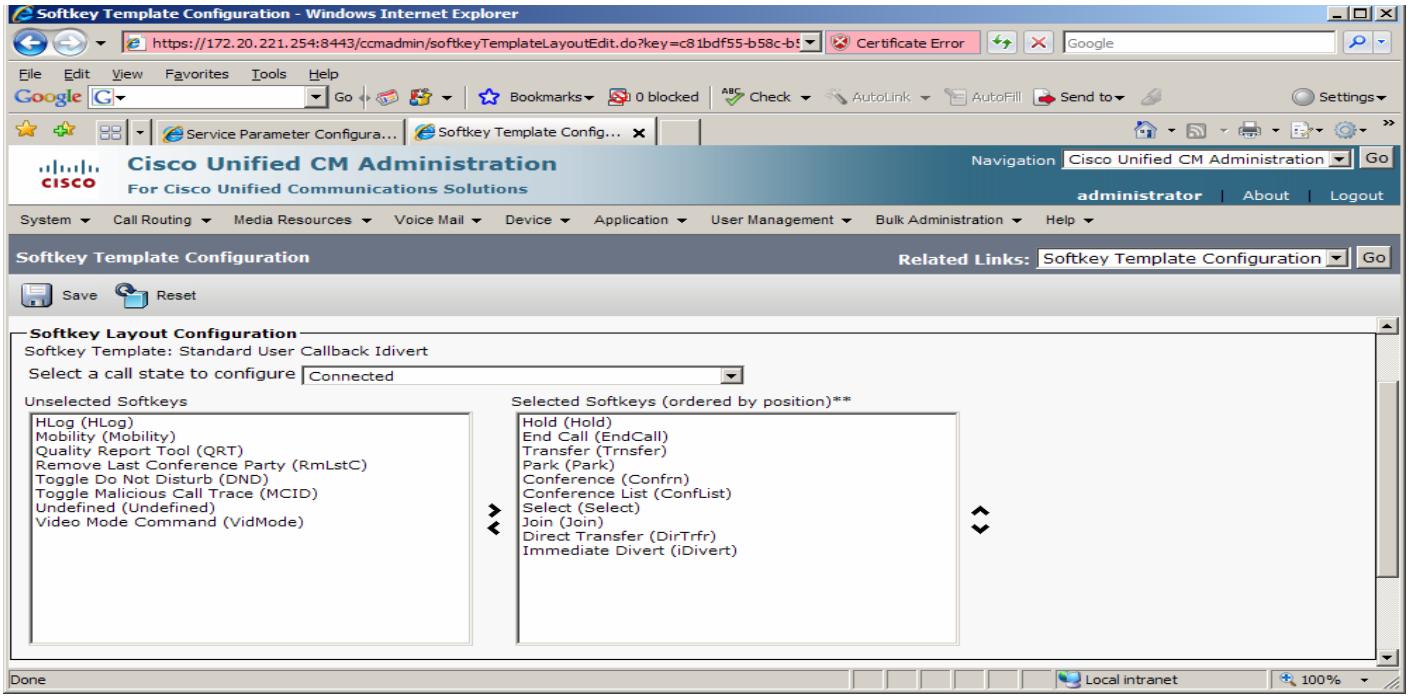
CallBack Softkey Configuration (2 of 2)



IDivert Softkey Configuration (1 of 3)



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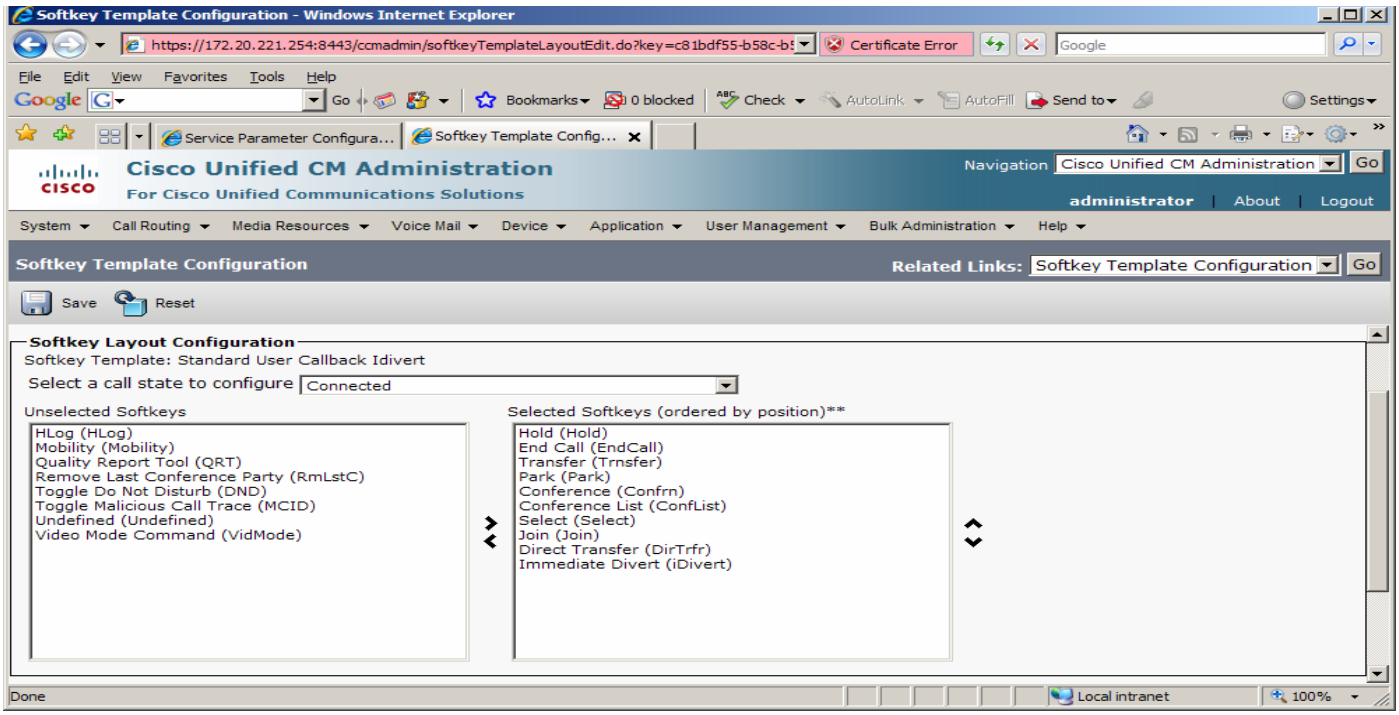
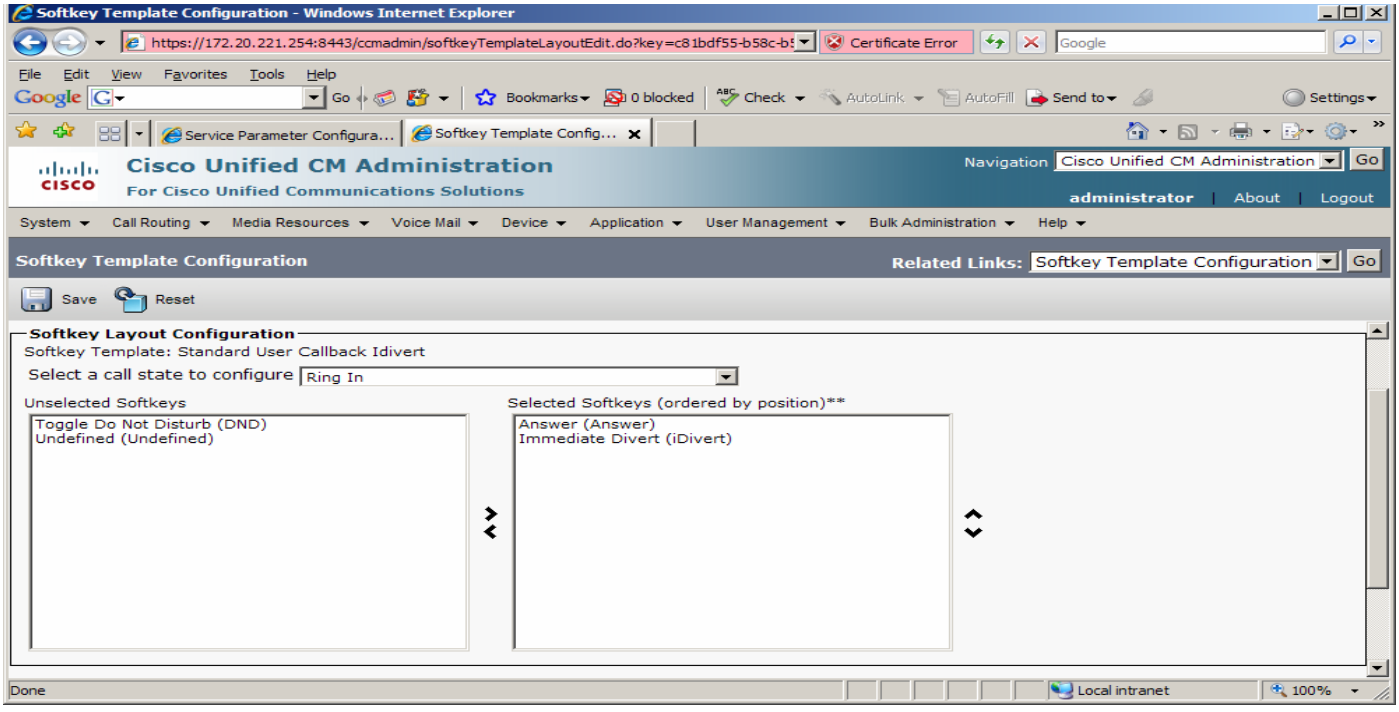
IDivert Softkey Configuration (2 of 3)



IDivert Softkey Configuration (3 of 3)



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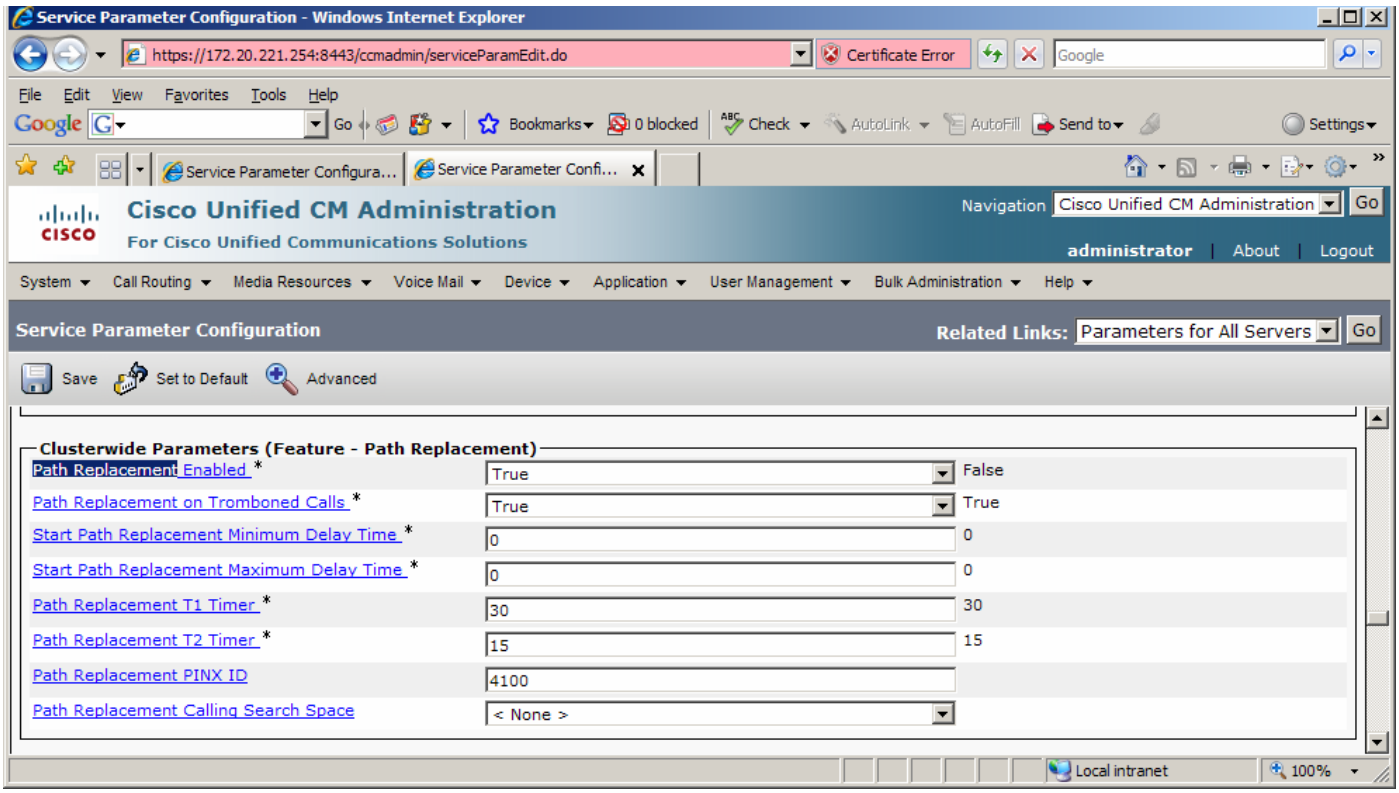
Path Replacement Service Parameters



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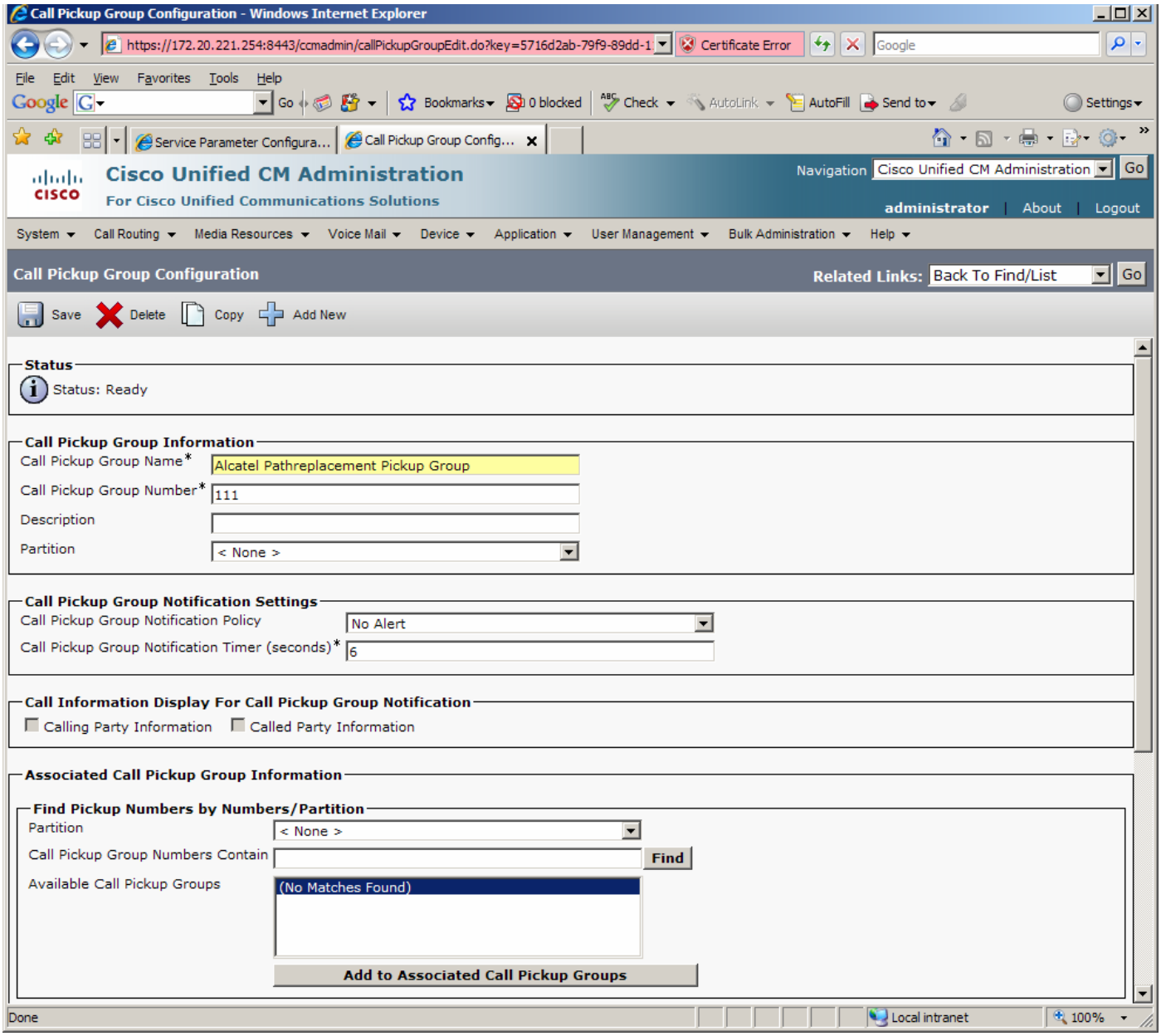
Path Replacement Call Pick Up Group (1 of 2)



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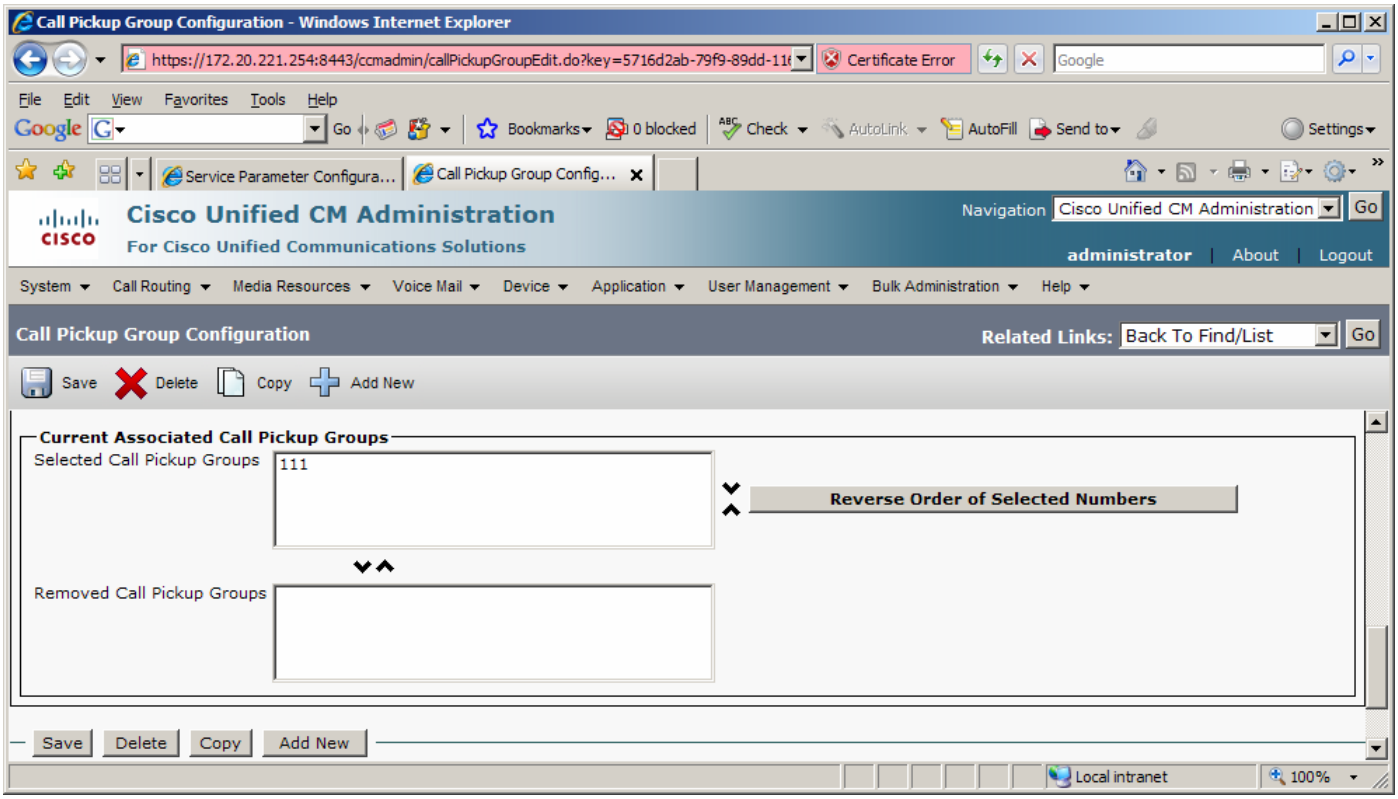
Path Replacement Call Pick Up Group (2 of 2)



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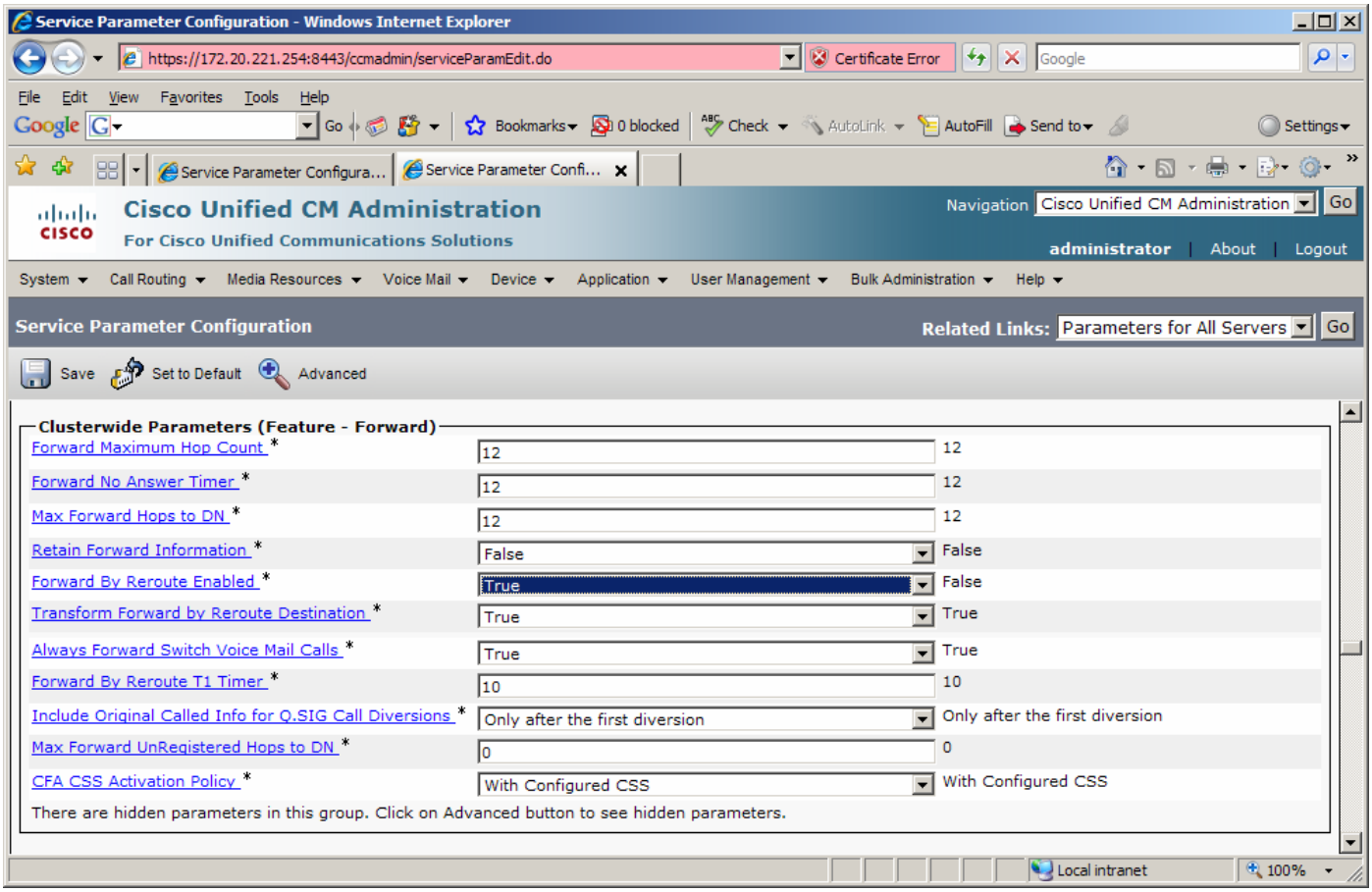
Forward by Reroute Service Parameter



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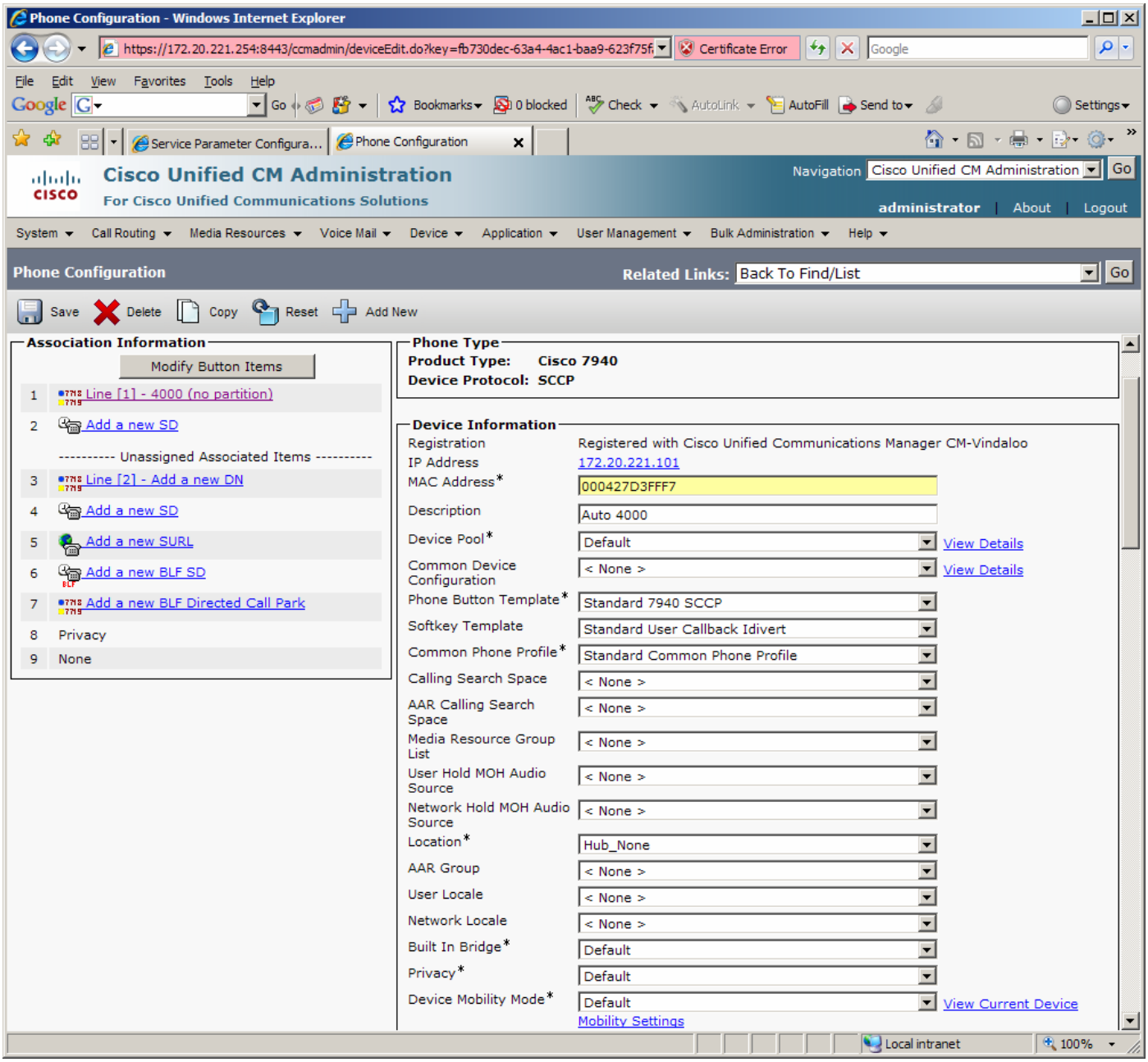
IP 7960 SCCP phone Configuration (1 of 8)



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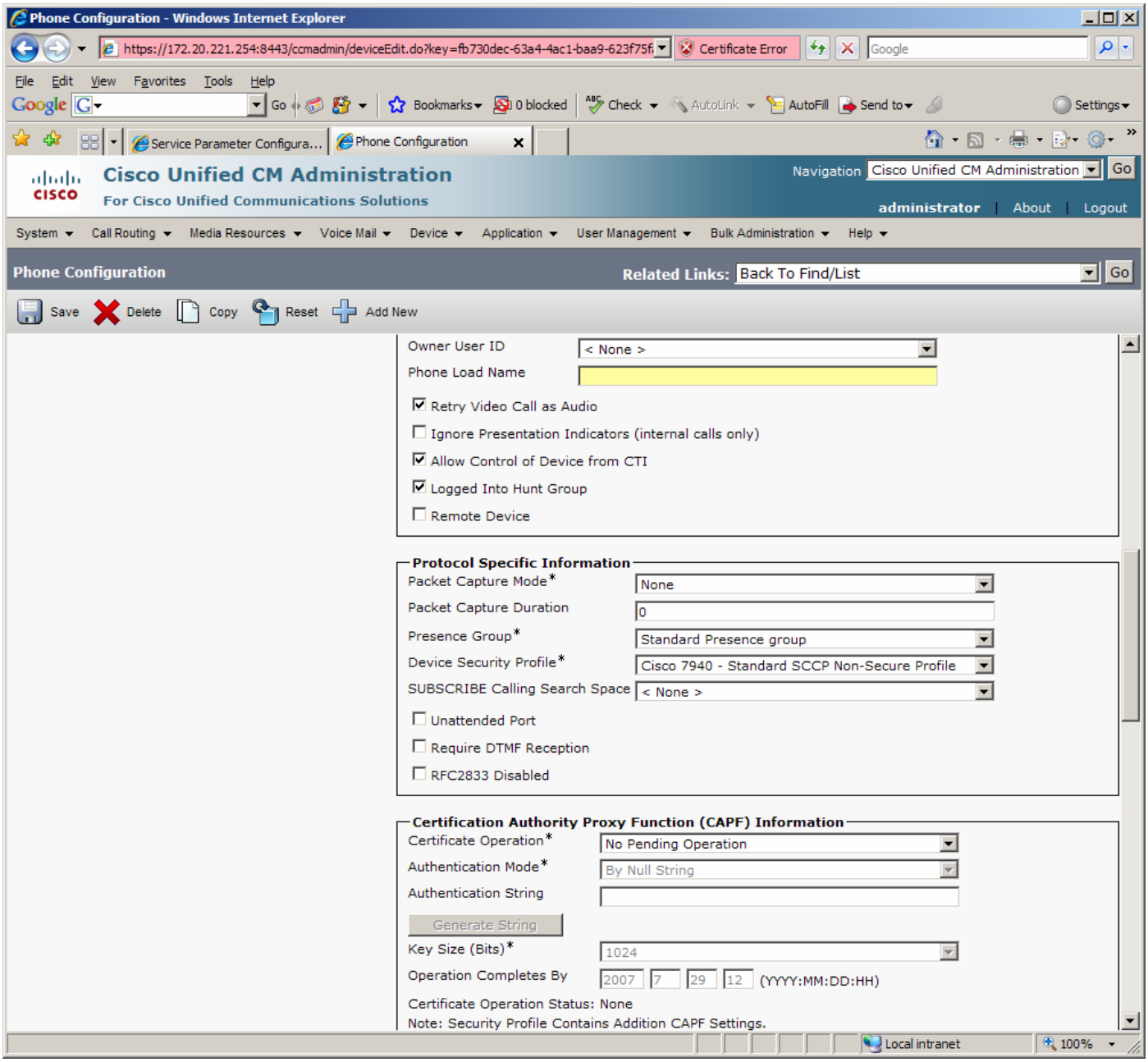
IP 7960 SCCP phone Configuration (2 of 8)



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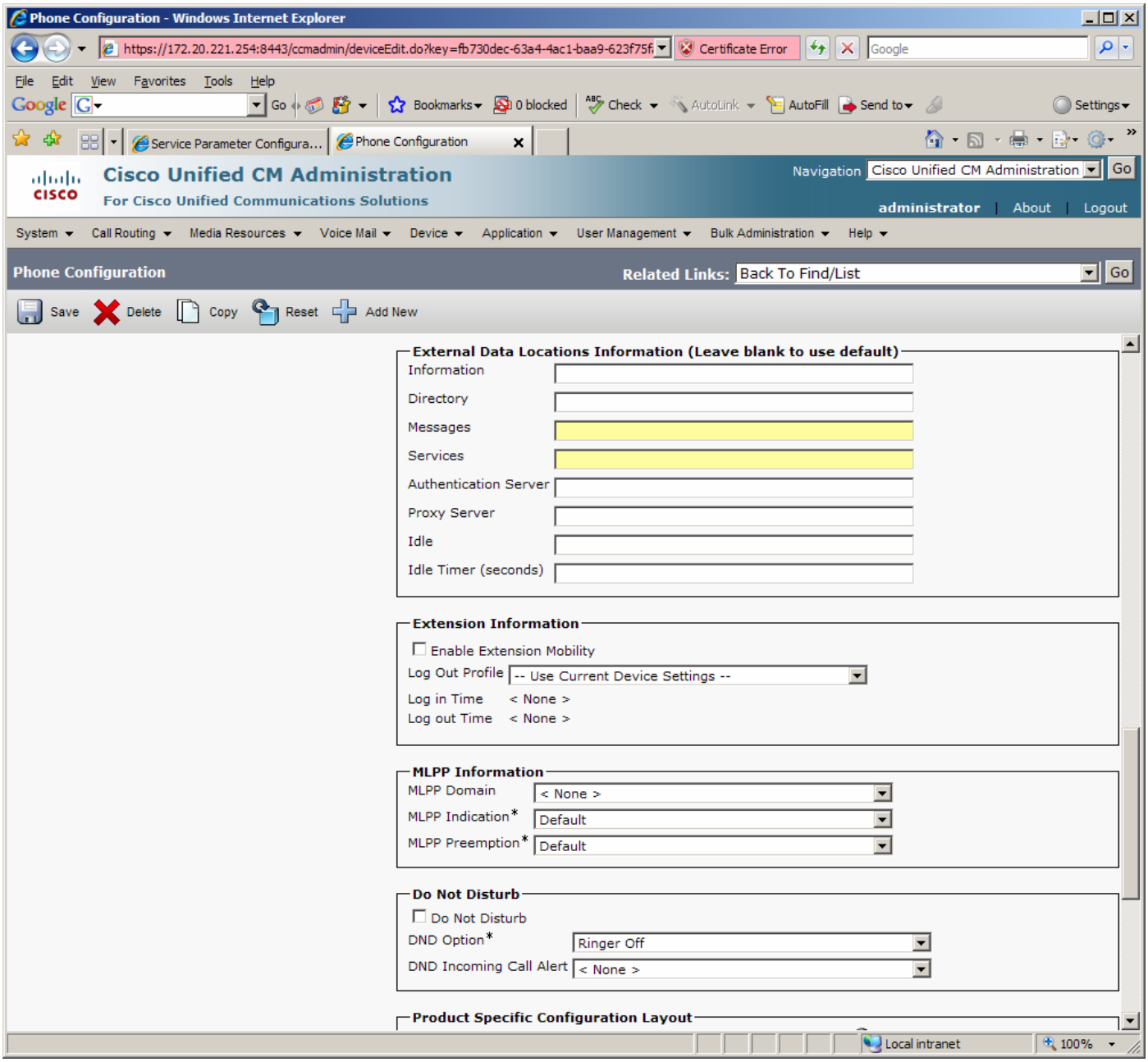
IP 7960 SCCP phone Configuration (3of 8)



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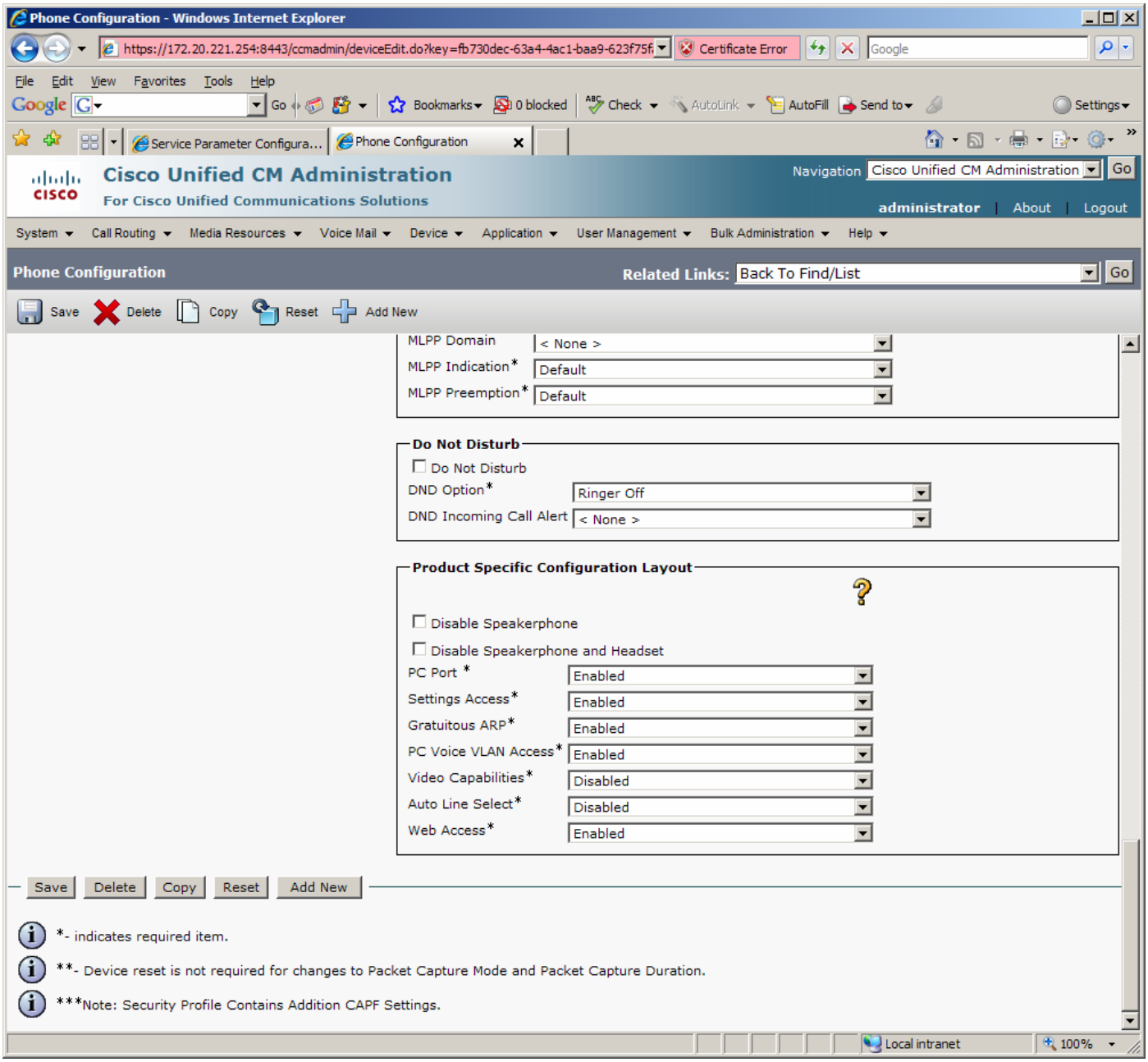
IP 7960 SCCP phone Configuration (4 of 8)



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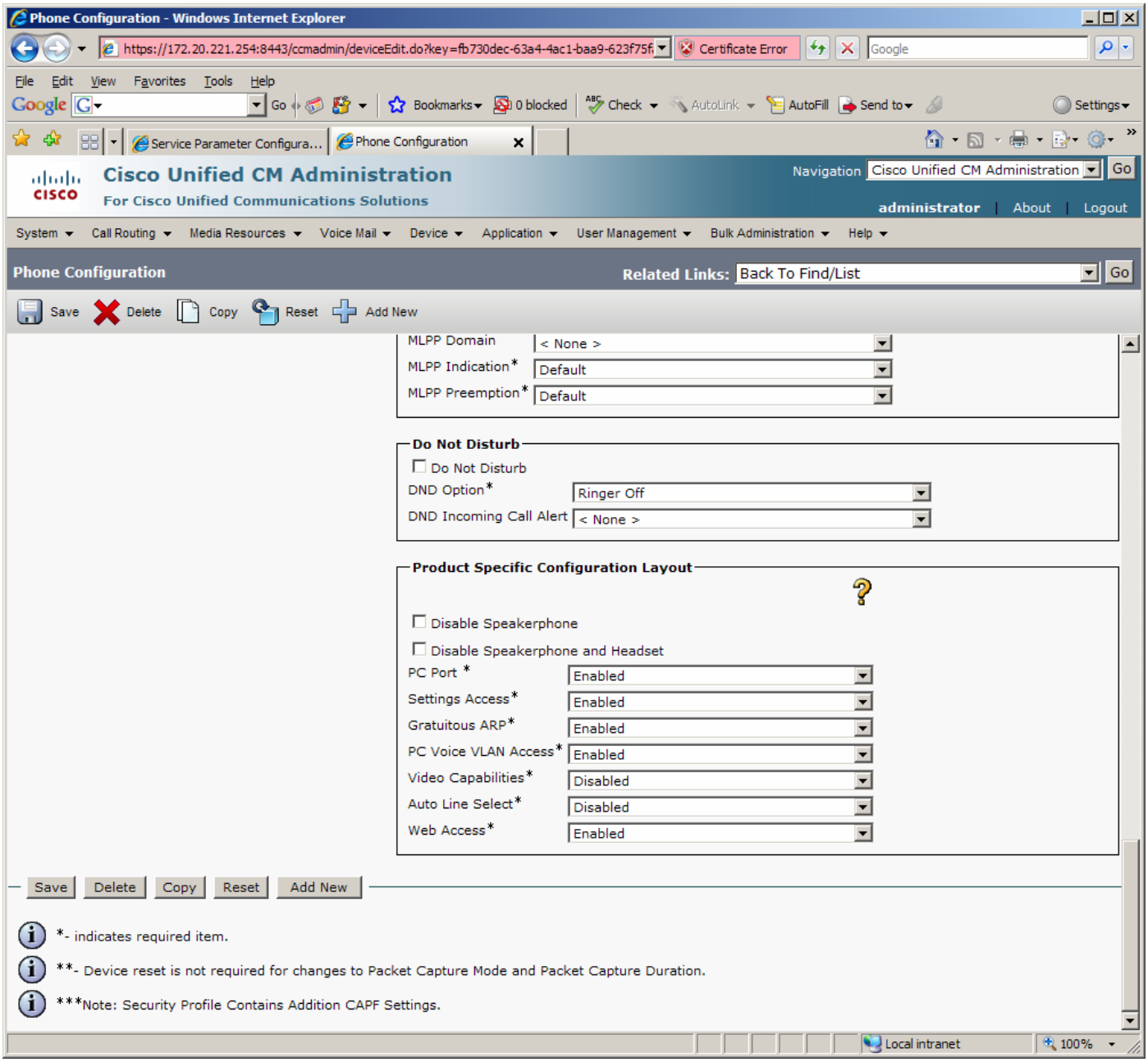
IP 7960 SCCP phone Configuration (5 of 8)



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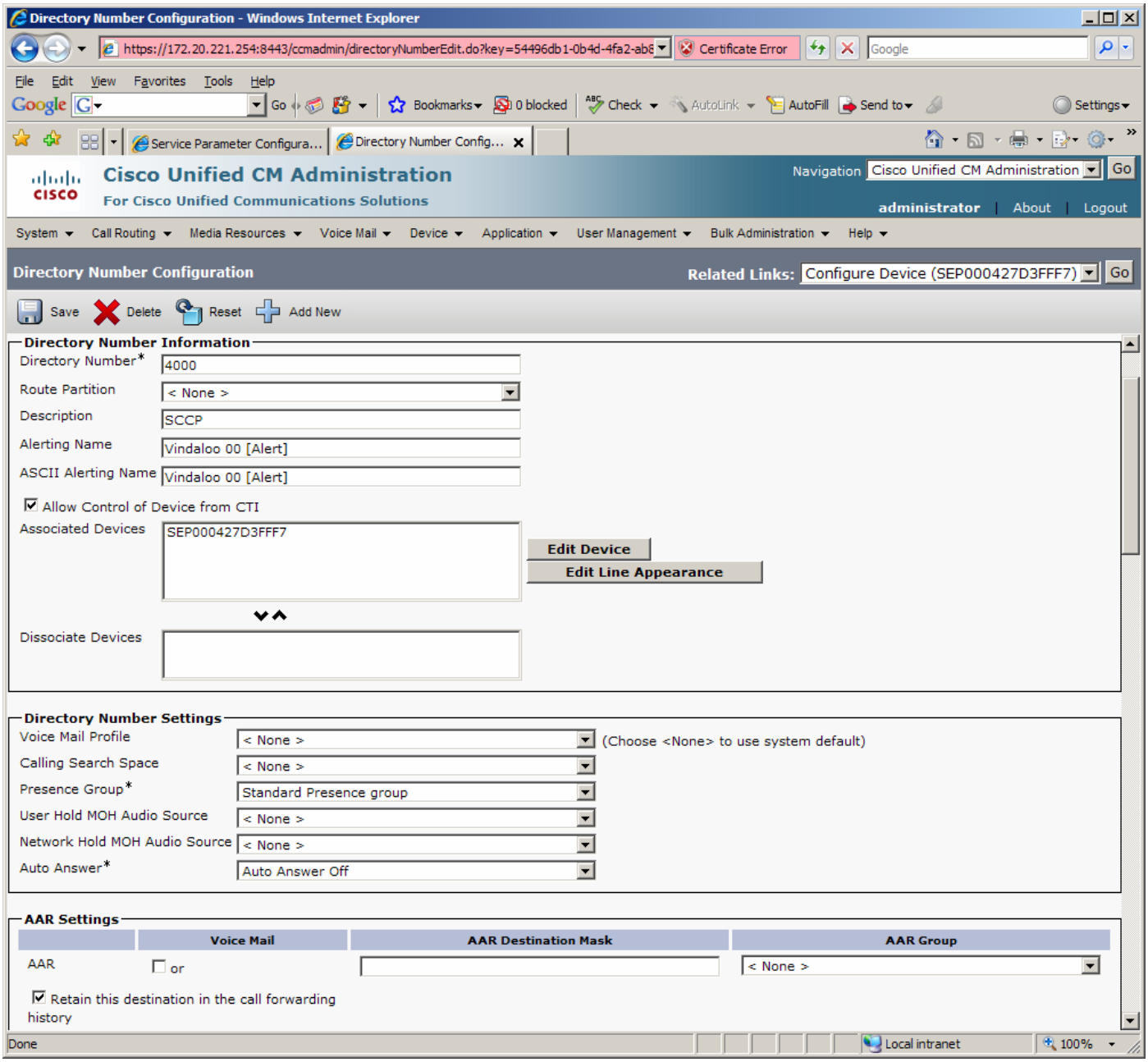
IP 7960 SCCP phone Configuration (6 of 8)



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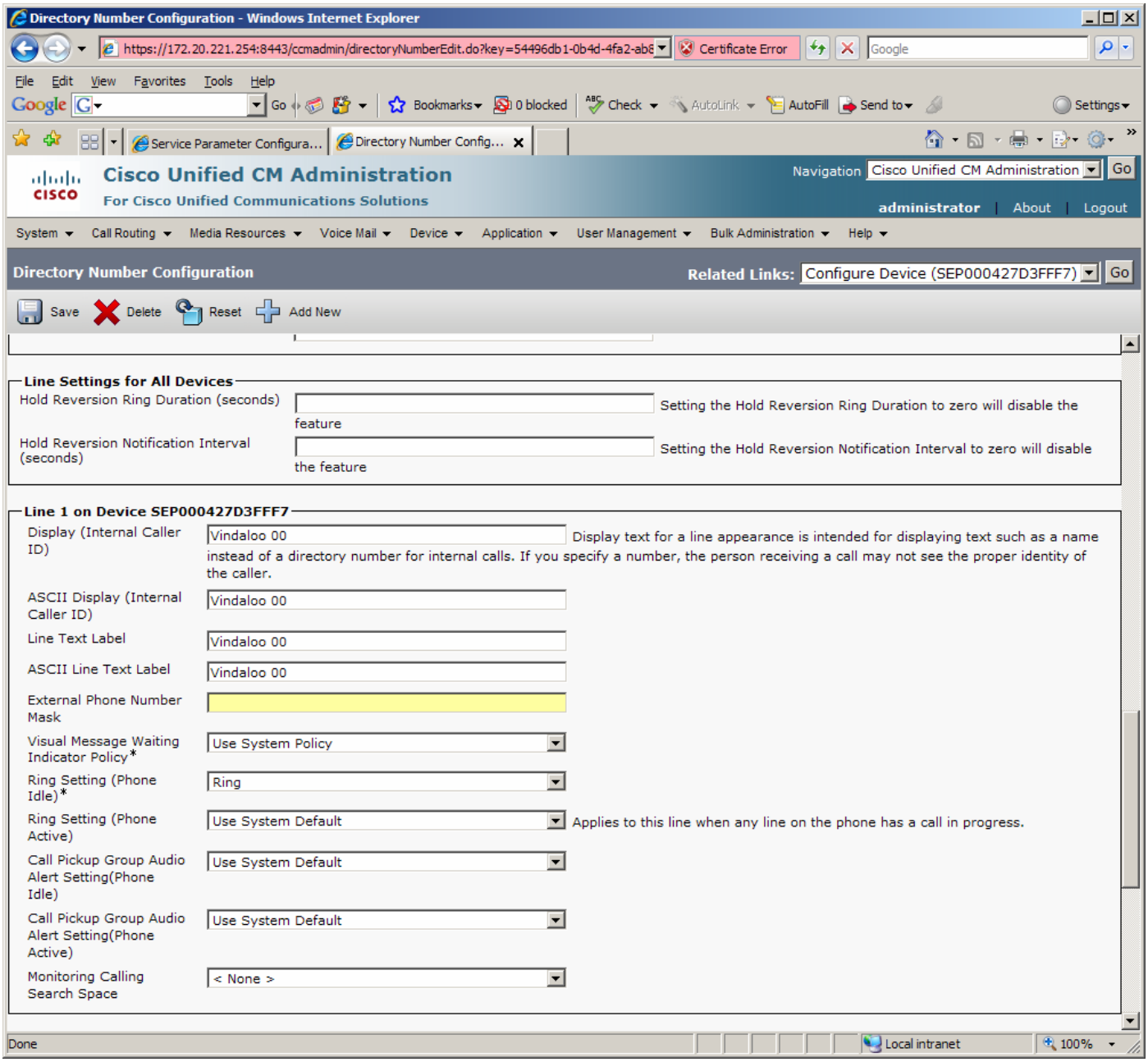
IP 7960 SCCP phone Configuration (7 of 8)



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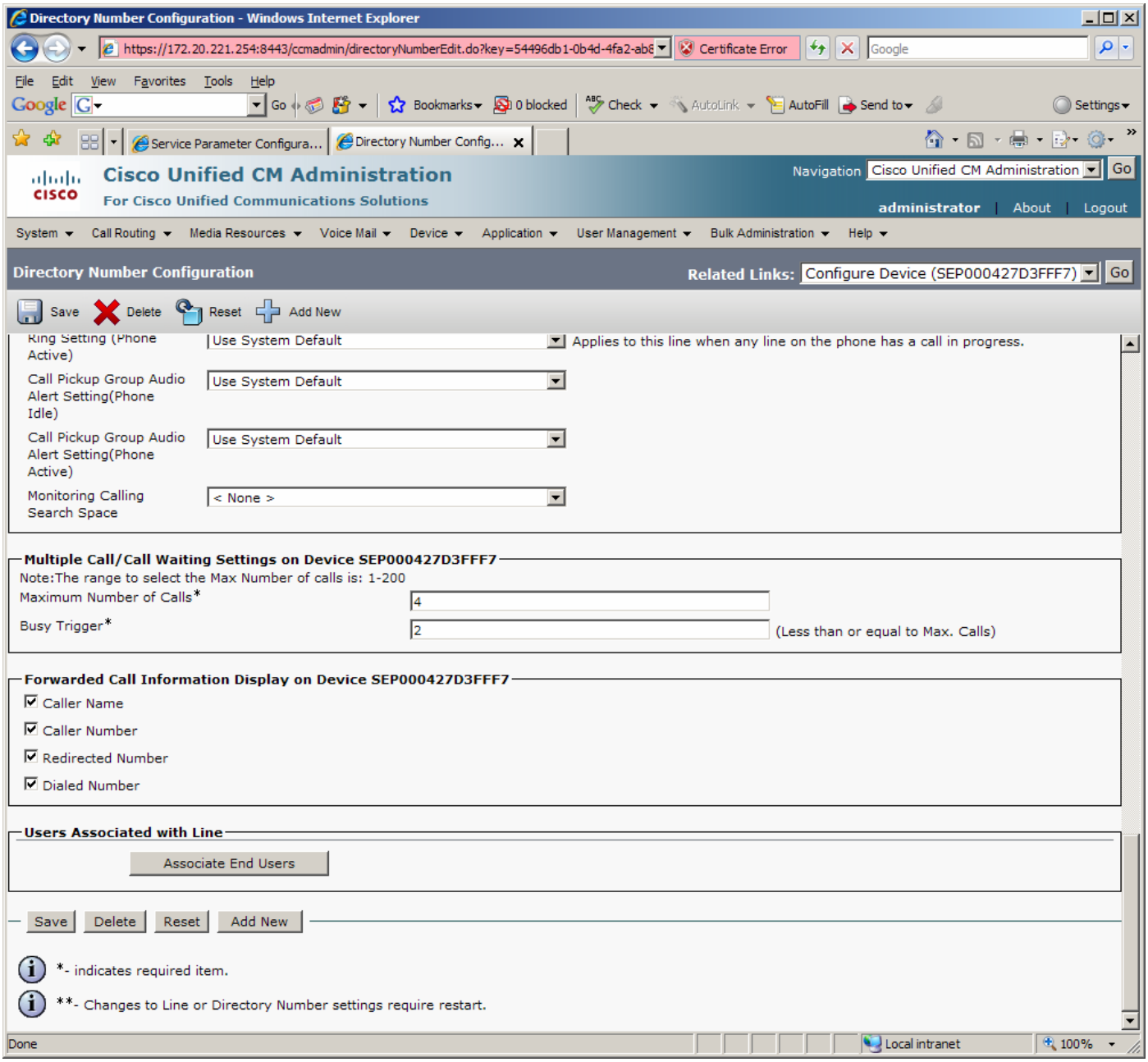
IP 7960 SCCP phone Configuration (8 of 8)



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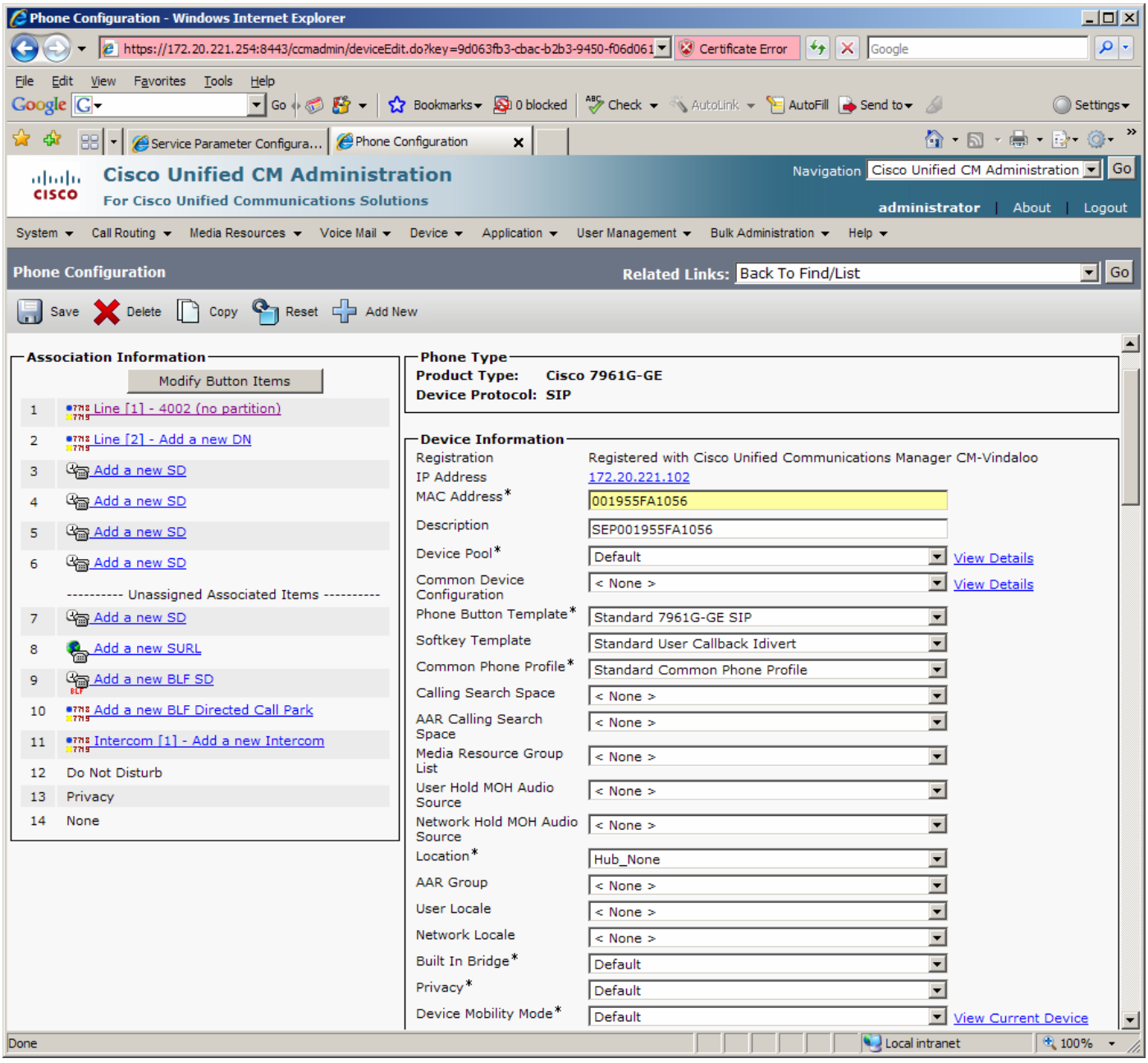
IP 7961 SIP phone Configuration (1 of 9)



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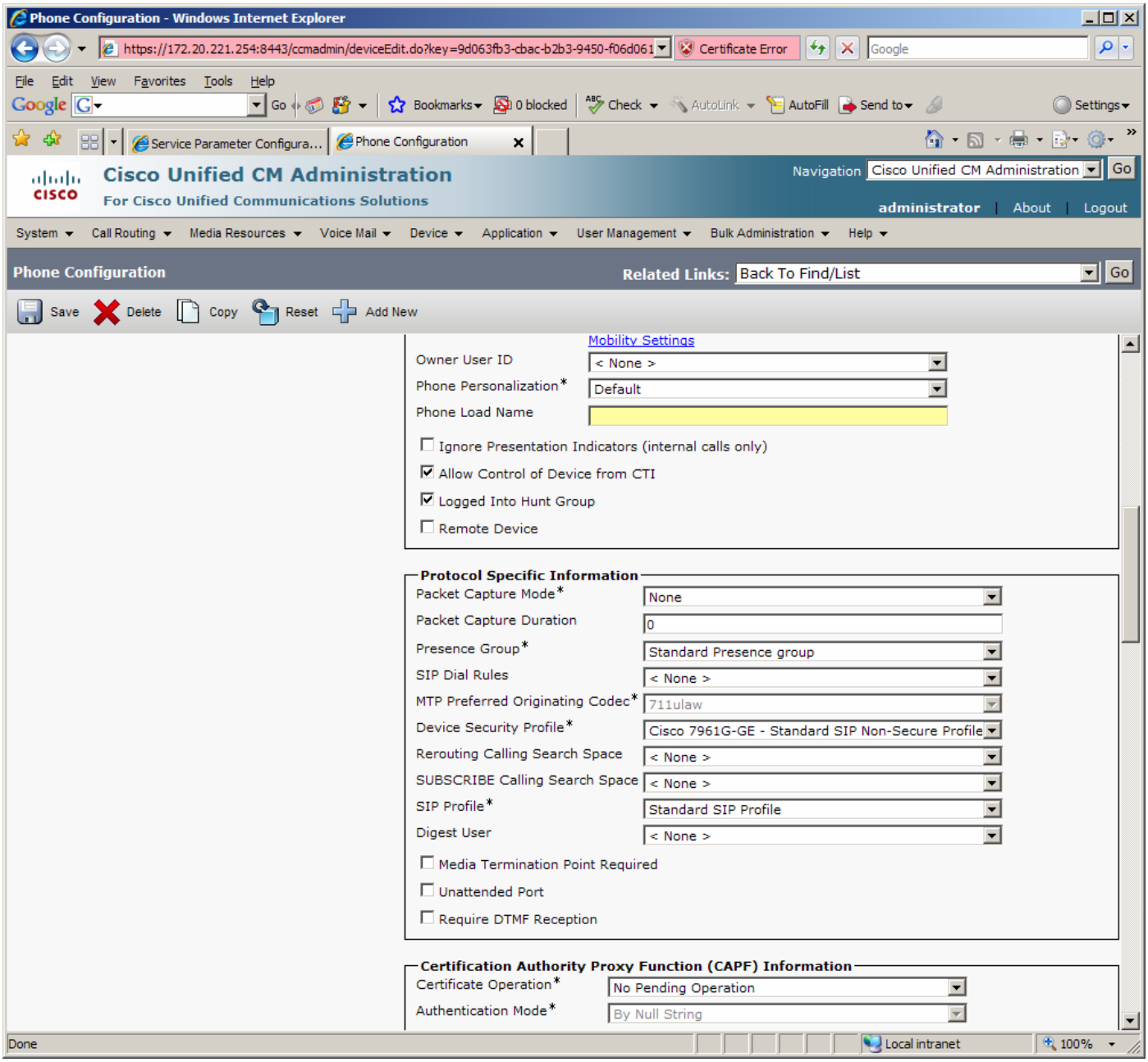
IP 7961 SIP phone Configuration (2 of 9)



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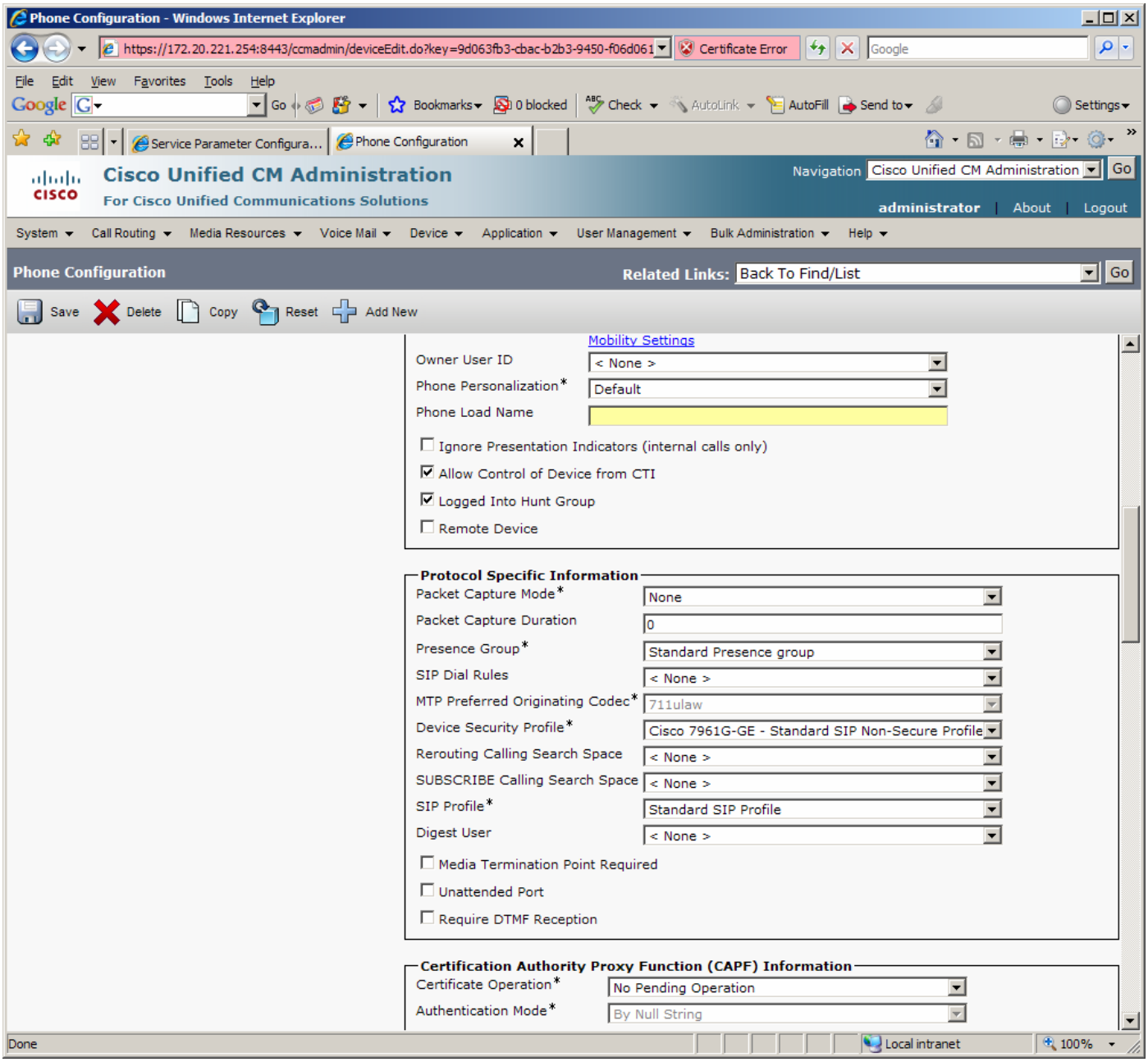
IP 7961 SIP phone Configuration (3 of 9)



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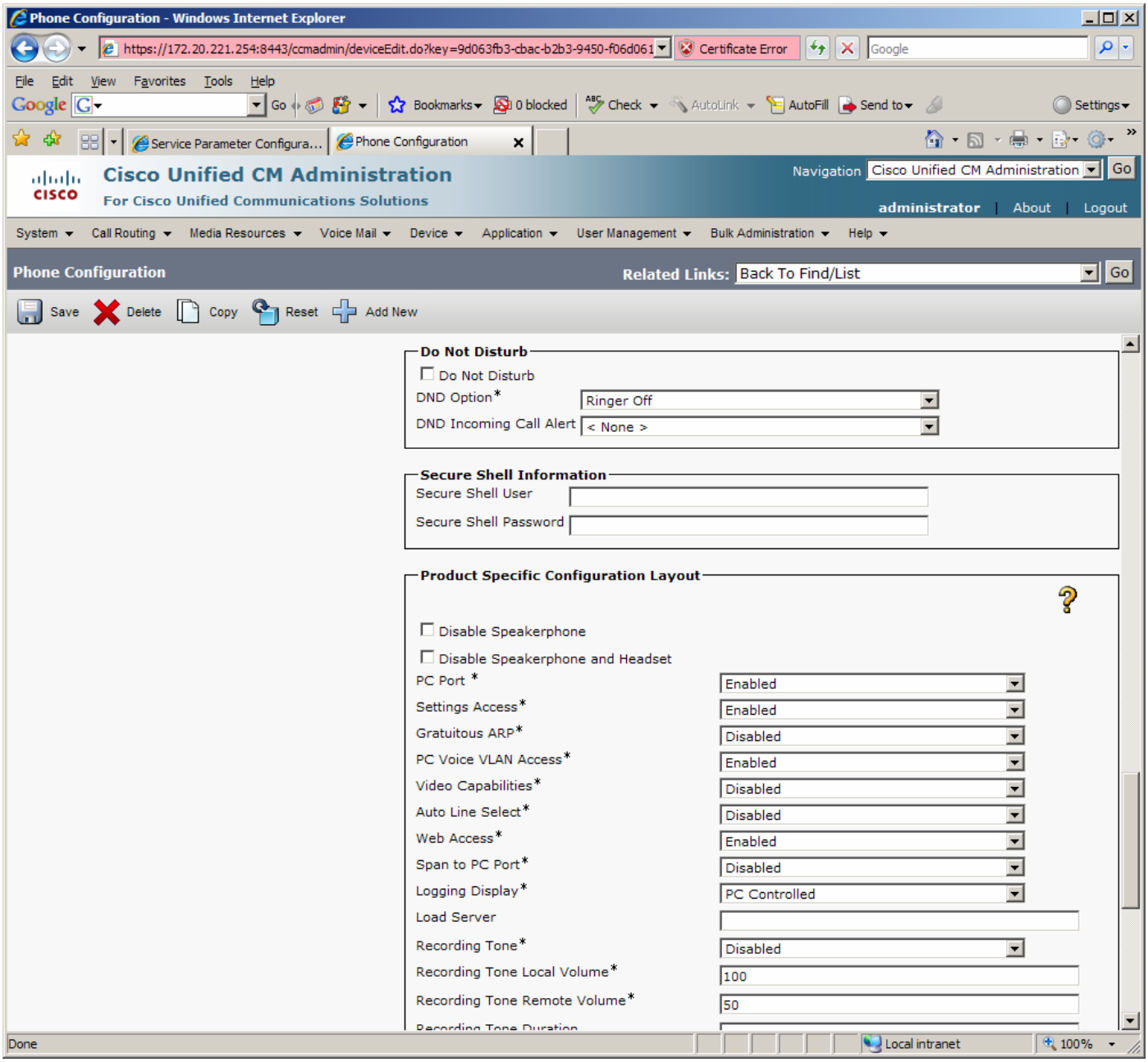
IP 7961 SIP phone Configuration (4 of 9)



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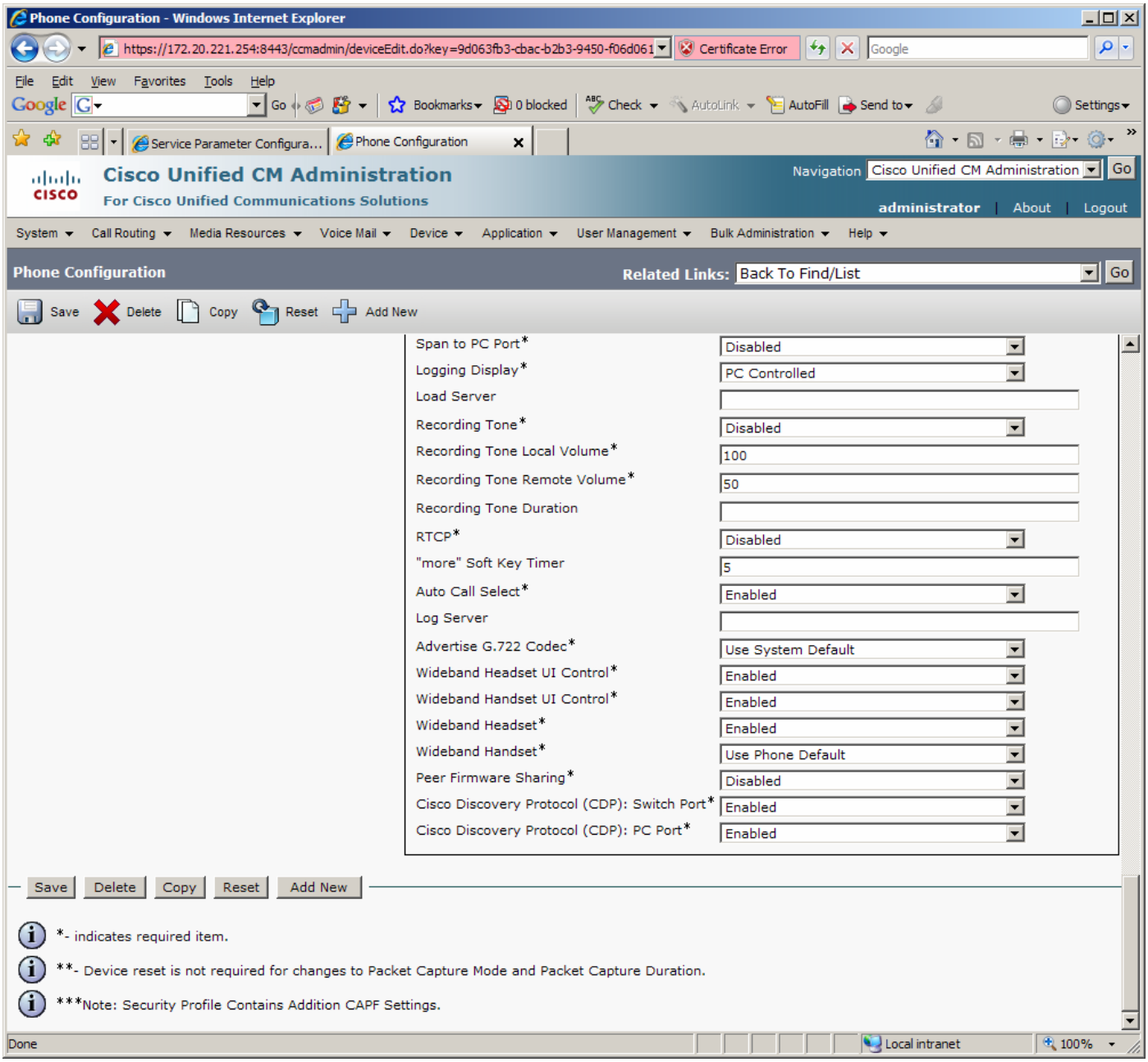
IP 7961 SIP phone Configuration (5 of 9)



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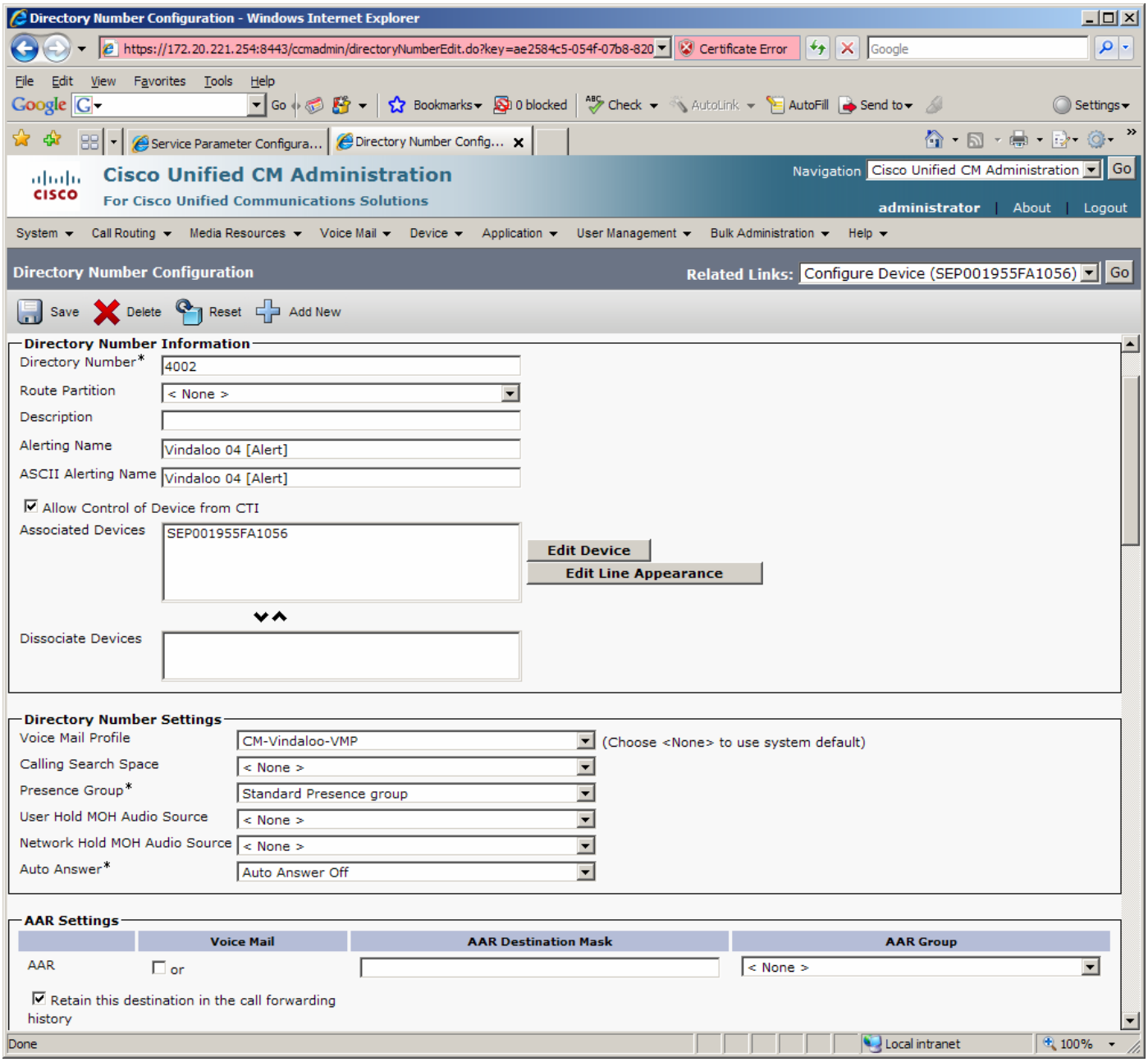
IP 7961 SIP phone Configuration (6 of 9)



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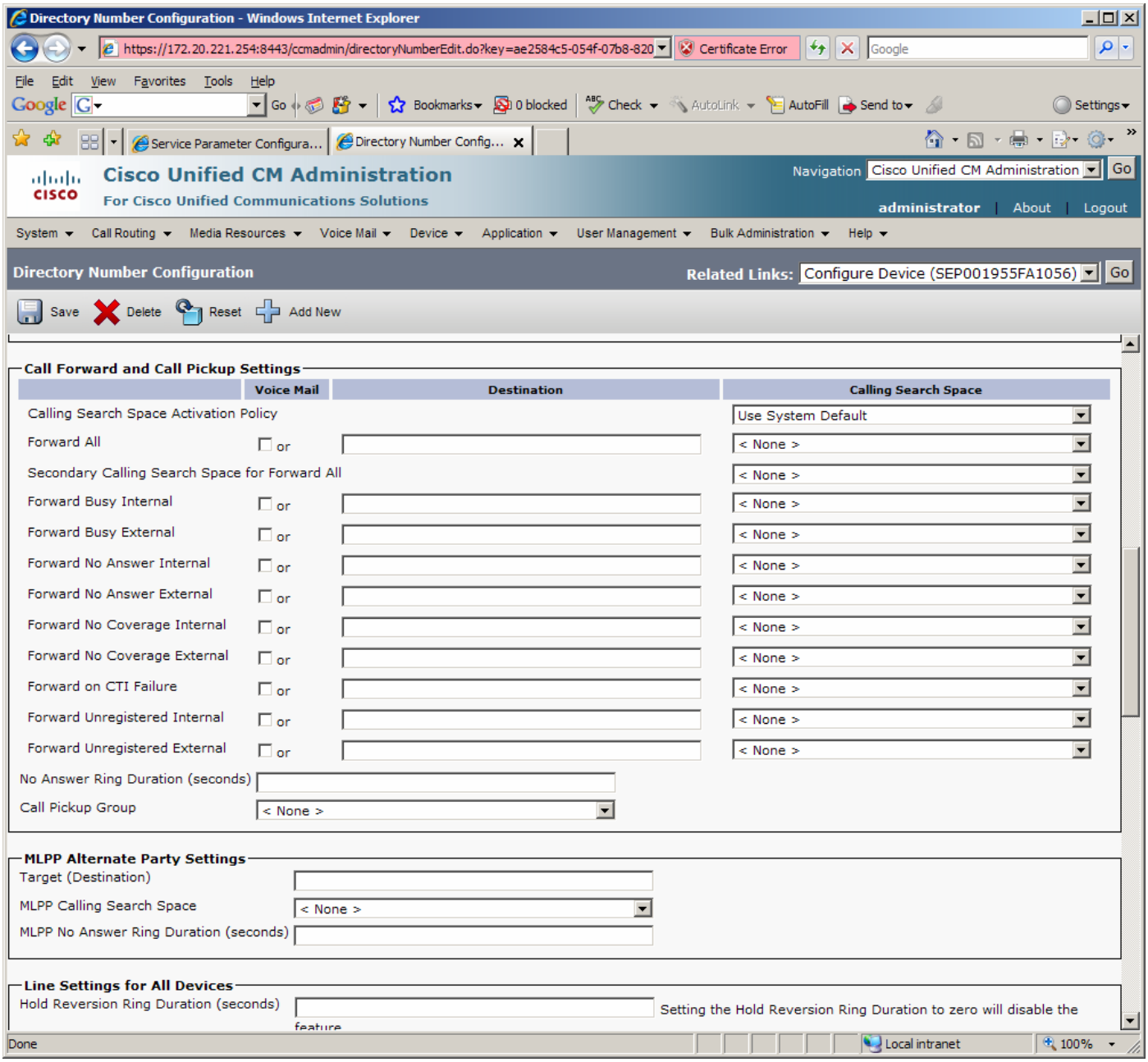
IP 7961 SIP phone Configuration (7 of 9)



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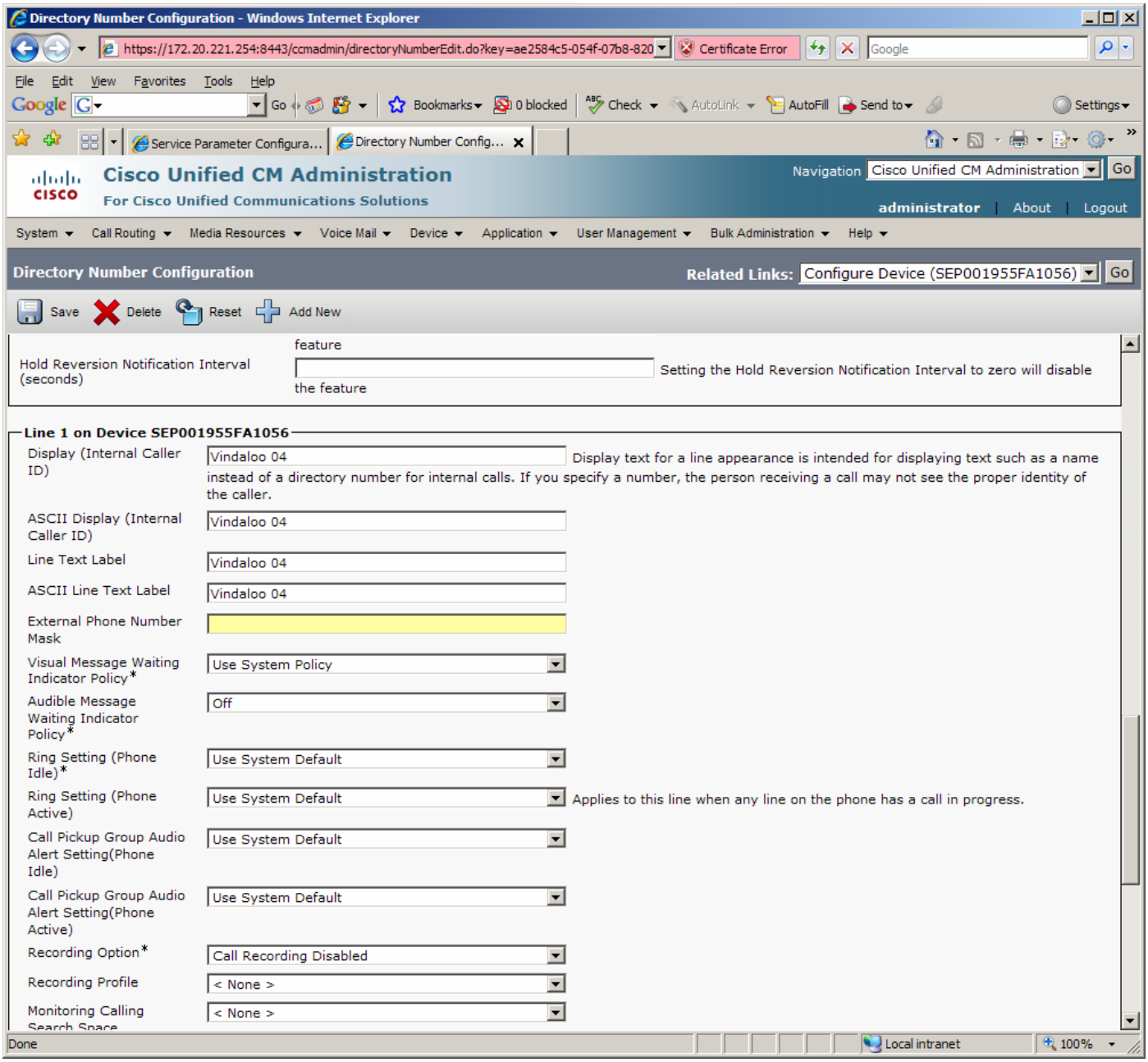
IP 7961 SIP phone Configuration (8 of 9)



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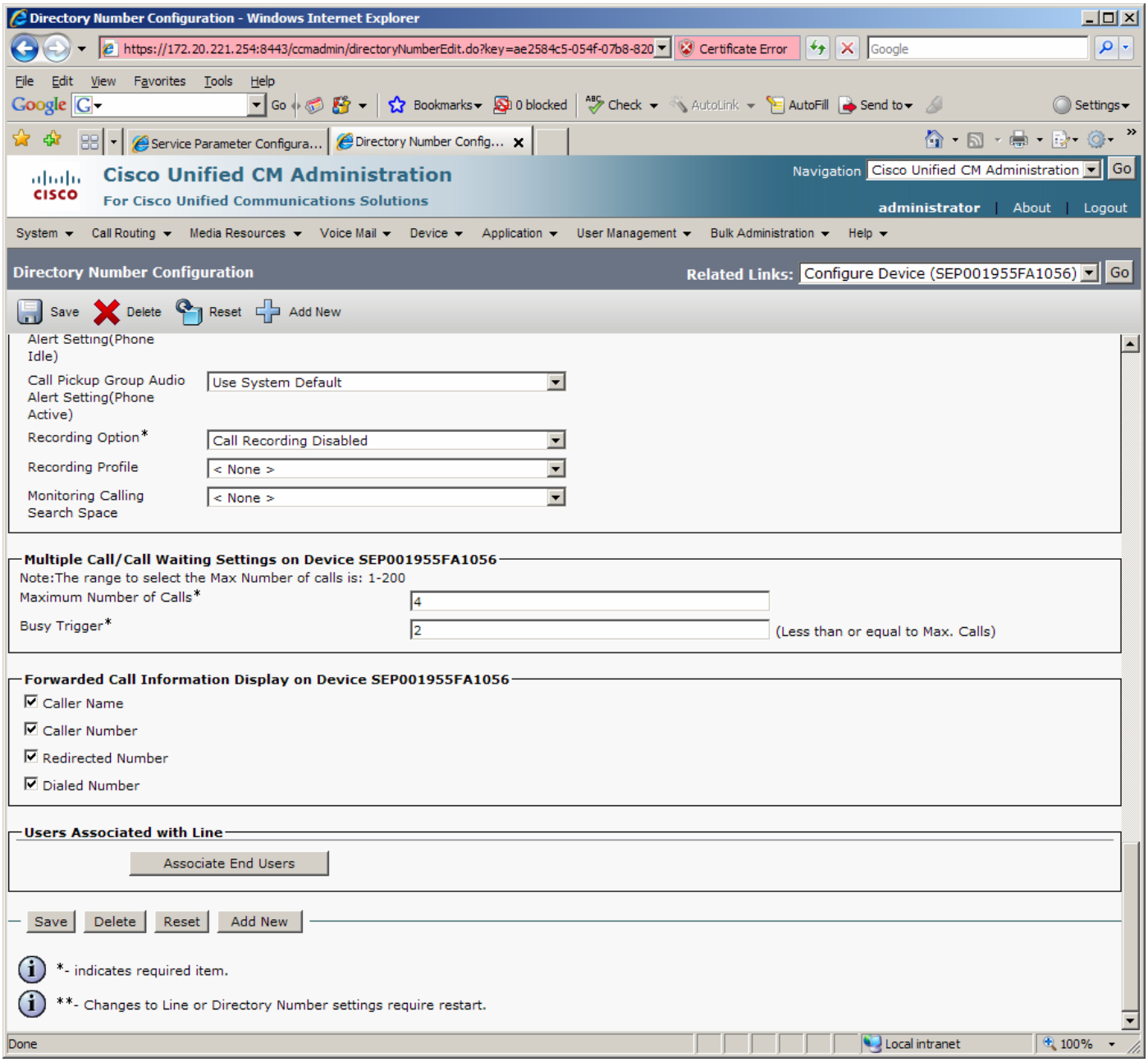
IP 7961 SIP phone Configuration (9 of 9)



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```
Vindaloo#sho ver
Cisco IOS Software, 3800 Software (CCisco 3825-IPVOICE-M), Version 12.4(3a), RELEASE
SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2005 by Cisco Systems, Inc.
Compiled Fri 30-Sep-05 01:45 by hqluong

ROM: System Bootstrap, Version 12.3(11r)T1, RELEASE SOFTWARE (fc1)

Vindaloo uptime is 25 weeks, 6 days, 20 hours, 25 minutes
System returned to ROM by power-on
System image file is "flash:cCisco 3825-ipvoice-mz.124-3a.bin"

Cisco 3825 (revision 1.0) with 226304K/35840K bytes of memory.
Processor board ID FHK0847F0QC
2 Gigabit Ethernet interfaces
62 Serial interfaces
2 Channelized E1/PRI ports
2 Channelized T1/PRI ports
2 Voice FXO interfaces
4 Voice FXS interfaces
DRAM configuration is 64 bits wide with parity enabled.
479K bytes of NVRAM.
62592K bytes of ATA System CompactFlash (Read/Write)

Configuration register is 0x2102

Vindaloo#
Vindaloo#sho run
Building configuration...

Current configuration : 2981 bytes
!
version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname Vindaloo
!
boot-start-marker
boot-end-marker
!
logging buffered 10000000 debugging
enable password cisco
!
no aaa new-model
!
resource policy
!
no network-clock-participate slot 1
no network-clock-participate wic 0
```

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```
voice-card 0
 no dspfarm
!
voice-card 1
 dspfarm
!
ip subnet-zero
ip cef
!
!
!
!
ip host CM-VINDALOO 172.20.221.254
ip host CM-MERCURY 172.20.215.254
ip host CM-PLUTO 172.20.238.254
ip host CM-MADRAS 172.20.237.254
ip host cm-venus 172.20.214.254
ip name-server 172.20.2.181
ip name-server 172.20.221.254
ip name-server 172.20.215.254
ip name-server 172.20.237.254
ip name-server 172.20.238.254
isdn switch-type primary-net5
!
!
!
!
!
!
!
!
!
!
!
fax interface-type fax-mail
!
!
controller T1 0/0/0
 framing esf
 linecode b8zs
!
controller T1 0/0/1
 framing esf
 linecode b8zs
!
controller E1 1/0/0
 pri-group timeslots 1-31 service mgcp
!
controller E1 1/0/1
 pri-group timeslots 1-31 service mgcp
!
!
!
```

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```
interface GigabitEthernet0/0
 ip address 172.20.221.202 255.255.255.0
 duplex auto
 speed auto
 media-type rj45
 negotiation auto
!
interface GigabitEthernet0/1
 no ip address
 shutdown
 duplex auto
 speed auto
 media-type rj45
 negotiation auto
!
interface Serial1/0/0:15
 no ip address
 isdn switch-type primary-qsig
 isdn incoming-voice voice
 isdn bind-l3 ccm-manager
 no cdp enable
!
interface Serial1/0/1:15
 no ip address
 isdn switch-type primary-qsig
 isdn protocol-emulate network
 isdn incoming-voice voice
 isdn T310 120000
 isdn bind-l3 ccm-manager
 no cdp enable
!
ip classless
ip route 0.0.0.0 0.0.0.0 GigabitEthernet0/0
ip route 0.0.0.0 0.0.0.0 172.20.221.1
!
no ip http server
!
!
!
tftp-server flash:cCisco 3825-ipvoice-mz.124-3a.bin
!
control-plane
!
!
!
voice-port 0/1/0
!
voice-port 0/1/1
!
voice-port 0/1/2
!
voice-port 0/1/3
!
voice-port 0/2/0
```

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```
!
voice-port 0/2/1
!
voice-port 1/0/0:15
!
voice-port 1/0/1:15
!
ccm-manager mgcp
ccm-manager music-on-hold
ccm-manager config server 172.20.221.254
ccm-manager config
!
mgcp
mgcp call-agent CM-Vindaloo 2427 service-type mgcp version 0.1
mgcp dtmf-relay voip codec all mode out-of-band
mgcp rtp unreachable timeout 1000 action notify
mgcp modem passthrough voip mode nse
mgcp package-capability rtp-package
no mgcp package-capability res-package
mgcp package-capability sst-package
no mgcp package-capability fxr-package
mgcp package-capability pre-package
no mgcp timer receive-rtcp
mgcp sdp simple
mgcp fax t38 inhibit
mgcp rtp payload-type g726r16 static
!
mgcp profile default
!
!
!
dial-peer voice 4151 pots
 port 0/1/0
!
dial-peer voice 999010 pots
 service mgcpapp
 port 0/1/0
!
dial-peer voice 1 pots
 service mgcpapp
!
dial-peer voice 2 pots
 service mgcpapp
 port 1/0/1:15
!
!
line con 0
 stopbits 1
line aux 0
 stopbits 1
line vty 0 4
 password cisco
 login
!
```

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```
scheduler allocate 20000 1000
ntp clock-period 17178609
ntp server 192.168.240.254
!
end

Vindaloo#
```

Configuring the PSTN Cisco 1700 Router

```
router_B#sho ver
Cisco Internetwork Operating System Software
IOS (tm) C1700 Software (C1700-IPVOICE-M), Version 12.3(13a), RELEASE SOFTWARE (fc2)
Technical Support: http://www.cisco.com/techsupport
Copyright (c) 1986-2005 by cisco Systems, Inc.
Compiled Tue 26-Apr-05 07:06 by ssearch
Image text-base: 0x8000816C, data-base: 0x81428AE4

ROM: System Bootstrap, Version 12.2(4r)XL, RELEASE SOFTWARE (fc1)
ROM: C1700 Software (C1700-IPVOICE-M), Version 12.3(13a), RELEASE SOFTWARE (fc2)

router_B uptime is 2 days, 3 hours, 2 minutes
System returned to ROM by power-on
System image file is "flash:c1700-ipvoice-mz.123-13a.bin"

cisco 1760 (MPC860P) processor (revision 0x200) with 49152K/16384K bytes of memory.
Processor board ID FOC06490MS4 (245310706), with hardware revision BB67
MPC860P processor: part number 5, mask 2
Channelized E1, Version 1.0.
Bridging software.
X.25 software, Version 3.0.0.
Primary Rate ISDN software, Version 1.1.
1 FastEthernet/IEEE 802.3 interface(s)
31 Serial network interface(s)
2 Channelized E1/PRI port(s)
2 Voice FXS interface(s)
32K bytes of non-volatile configuration memory.
16384K bytes of processor board System flash (Read/Write)

Configuration register is 0x2102

router_B#
router_B#
router_B#sho run
Building configuration...

Current configuration : 1513 bytes
!
version 12.3
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
```

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```
hostname router_B
!
boot-start-marker
boot-end-marker
!
!
memory-size iomem 25
tdm clock E1 0/0 both export line
tdm clock E1 0/1 both import E1 0/0 internal
mmi polling-interval 60
no mmi auto-configure
no mmi pvc
mmi snmp-timeout 180
voice-card 0
!
voice-card 3
!
no aaa new-model
ip subnet-zero
ip cef
!
!
!
no ftp-server write-enable
isdn switch-type primary-net5
!
!
!
!
!
!
!
!
!
!
!
!
!
controller E1 0/0
 pri-group timeslots 1-31
!
controller E1 0/1
!
!
!
interface FastEthernet0/0
 ip address 100.100.100.2 255.255.255.0
 speed auto
!
interface Serial0/0:15
 no ip address
 no logging event link-status
 isdn switch-type primary-net5
 isdn incoming-voice voice
```

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```
 isdn bchan-number-order ascending
 no cdp enable
!
ip classless
no ip http server
!
!
voice-port 0/0:15
!
voice-port 3/0
 station-id name bal
 station-id number 16503646325
 caller-id enable
!
voice-port 3/1
 station-id name BAL2
 station-id number 16503646326
 caller-id enable
!
!
dial-peer cor custom
!
!
!
dial-peer voice 1 pots
 destination-pattern 91408.......
 direct-inward-dial
 port 0/0:15
 prefix 91408
!
dial-peer voice 2 pots
 destination-pattern 3...
 direct-inward-dial
 port 0/0:15
 prefix 3
!
dial-peer voice 3 pots
 destination-pattern 16503646326
 port 3/1
 prefix 1
!
dial-peer voice 4 pots
 destination-pattern 16503646325
 port 3/0
 prefix 1
!
!
line con 0
line aux 0
line vty 0 4
 login
!
end
```

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Acronyms

Acronym	Definitions
ANF-PR	Additional Network Feature Path Replacement
AOC	Advice-of-charge. Information element is sent with the connection setup information for incoming Euro-ISDN connections. The AOC IE is used for call charge calculation.
CUCM	Cisco Unified Communication Manager
CCBS	Call Completion to Busy Subscriber
CCNR	Call Completion on No Reply
CFB	Call Forwarding on Busy
CFNR	Call Forwarding No Reply
CFU	Call Forwarding Unconditional
CLIP	Calling Line (Number) Identification Presentation
CLIR	Calling Line (Number) Identification Restriction
CNIP	Calling Name Identification Presentation
CNIR	Calling Name Identification Restriction
COLP	Connected Line (Number) Identification Presentation
COLR	Connected Line (Number) Identification Restriction
CONP	Connected Name Identification Presentation
CONR	Connected Name Identification Restriction
CT	Call Transfer
MWI	Message Waiting Indicator
PSTN	Public Switched Telephone Network

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