Application Note

Avaya Definity CM2.0 using T1 QSIG to Cisco Unified Communications Manager 6.0 and Cisco Emergency Responder 2.0

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July 11, 2007 Initial version

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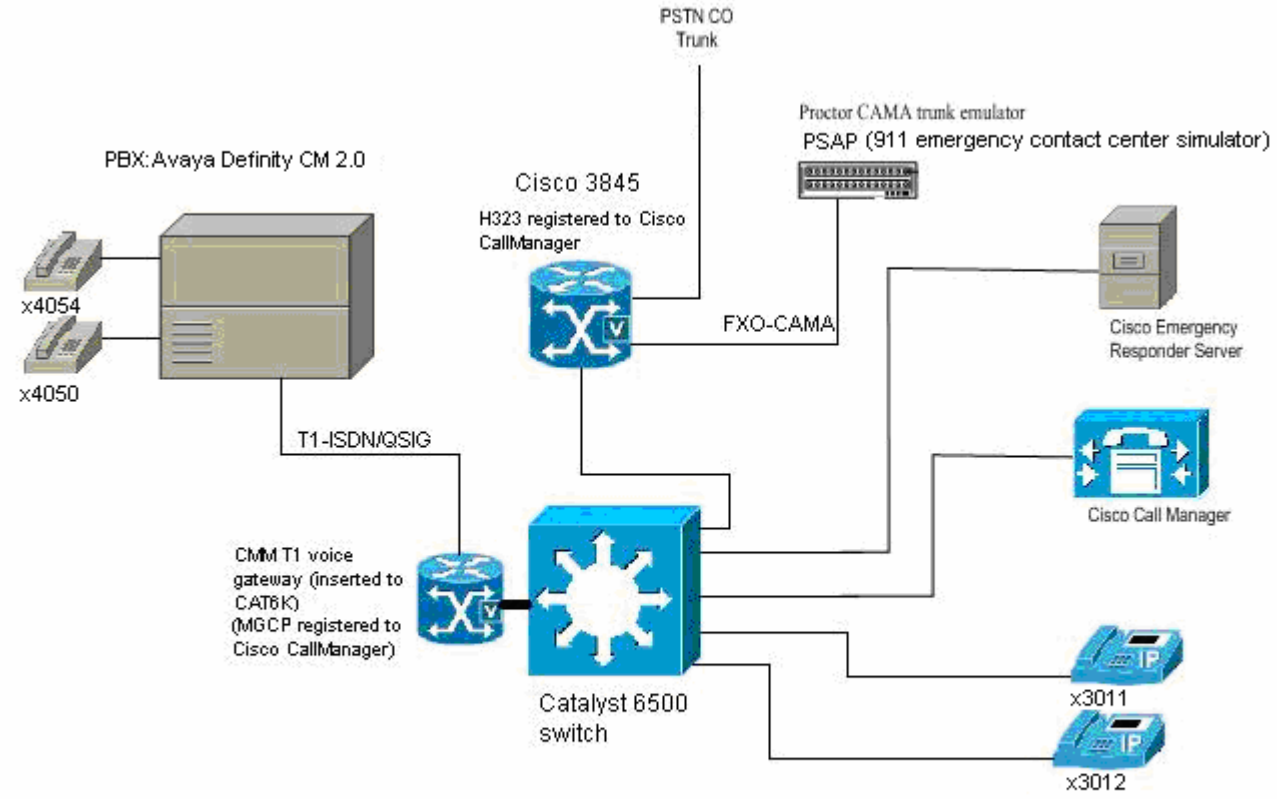
Introduction

The following is an Application Note for E911 Interoperability of a Cisco Unified Communications Manager (CUCM) 6.0 and Cisco Emergency Responder 2.0 to a Avaya Definity G3 CM 2.0 PBX via a Cisco Media Module CMM T1-QSIG trunk. The CUCM system is connected to a simulated E911 PSAP (Public Safety Answering Point) via a Cisco 3845 w/ CAMA trunk registered using H323. The Network Topology diagram shows the test set-up for interoperability between the Cisco Unified Communictaions Manager and Cisco Emergency Responder connected to the PBX via a T1 QSIG trunk using Cisco WS-SVC-CMM-6T1 MGCP gateway and connection to E911 PSAP using a Cisco 3825 H323 gateway via a CAMA trunk.

Network Topology

Figure 1. Network Topology or Test Setup



Limitations

Unique DID numbers must be used to associate with each Emergency Response Location to allow the return call if the 911 caller is disconnected.

Each available calling party that might dial 911 from the PBX side must have that calling party number configured in the Manually Configured Phones screen of the Cisco Emergency Responder.

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System Components

Hardware Requirements

Cisco Hardware

Cisco 3825 Gateway with VIC2-4FXO (CAMA trunk)
Cisco WS-SVC-CMM-6T1 Communications Media Module (inserted into cat6K)
Cisco Cat6K switch
Cisco Unified Communications Manager server
Cisco Emergency Responder server
AVAYA Definity PBX

Software Requirements

Cisco IOS Software release “c3825-ipvoice-mz.124-11.T”
Cisco IOS Software release “wscmm-ipvoicek9-mz.124-11.T
PBX Software: G3si MV1.1

Cisco Unified Communications Manager 6.0
Cisco Emergency Responder 2.0

Features

Supported Features

Calling Number

E911 ERL DID number passed to PSAP

Incoming DID calling to disconnected 911originating caller

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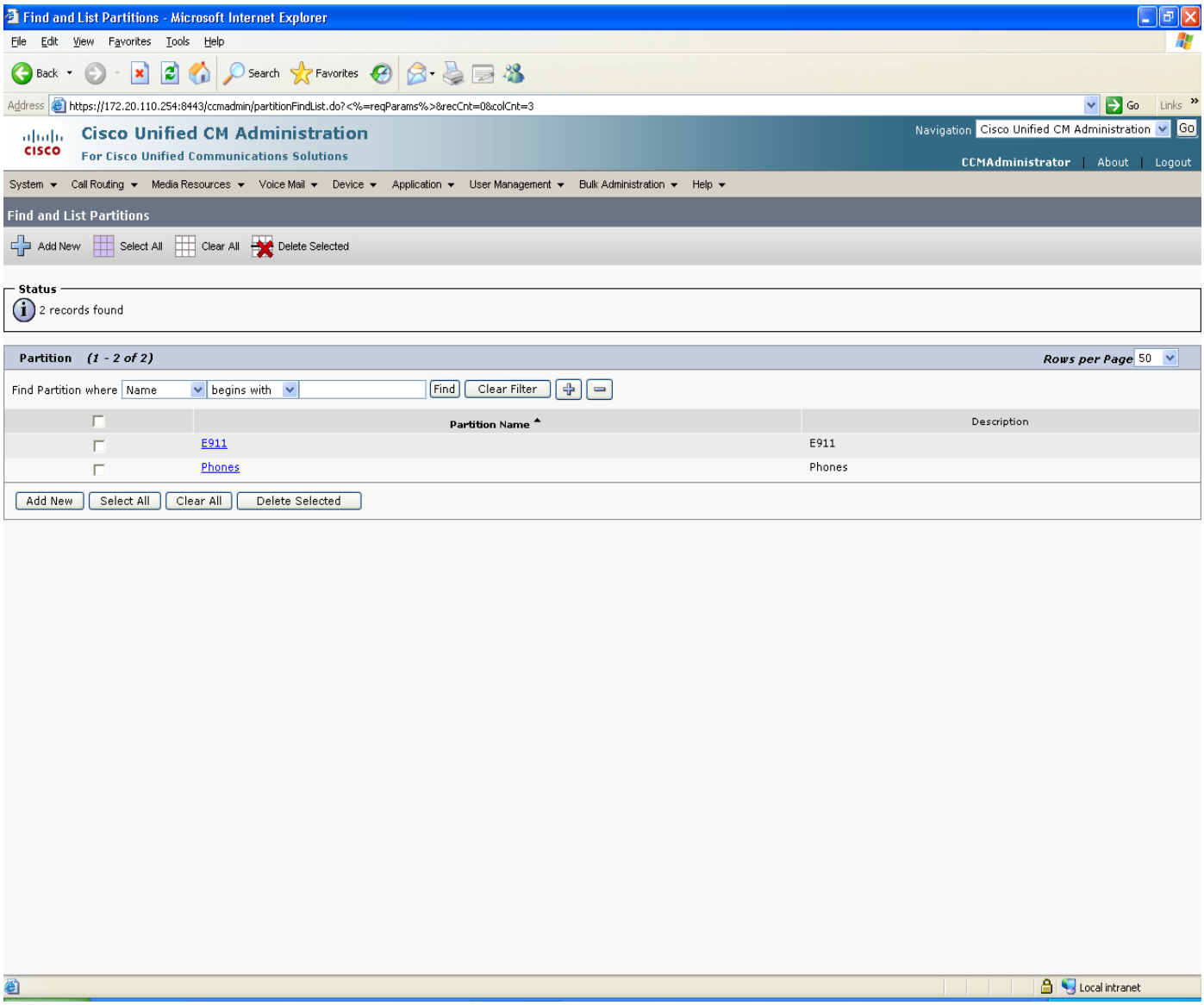
Configuration

Configuring Cisco Communications Manager

Partitions



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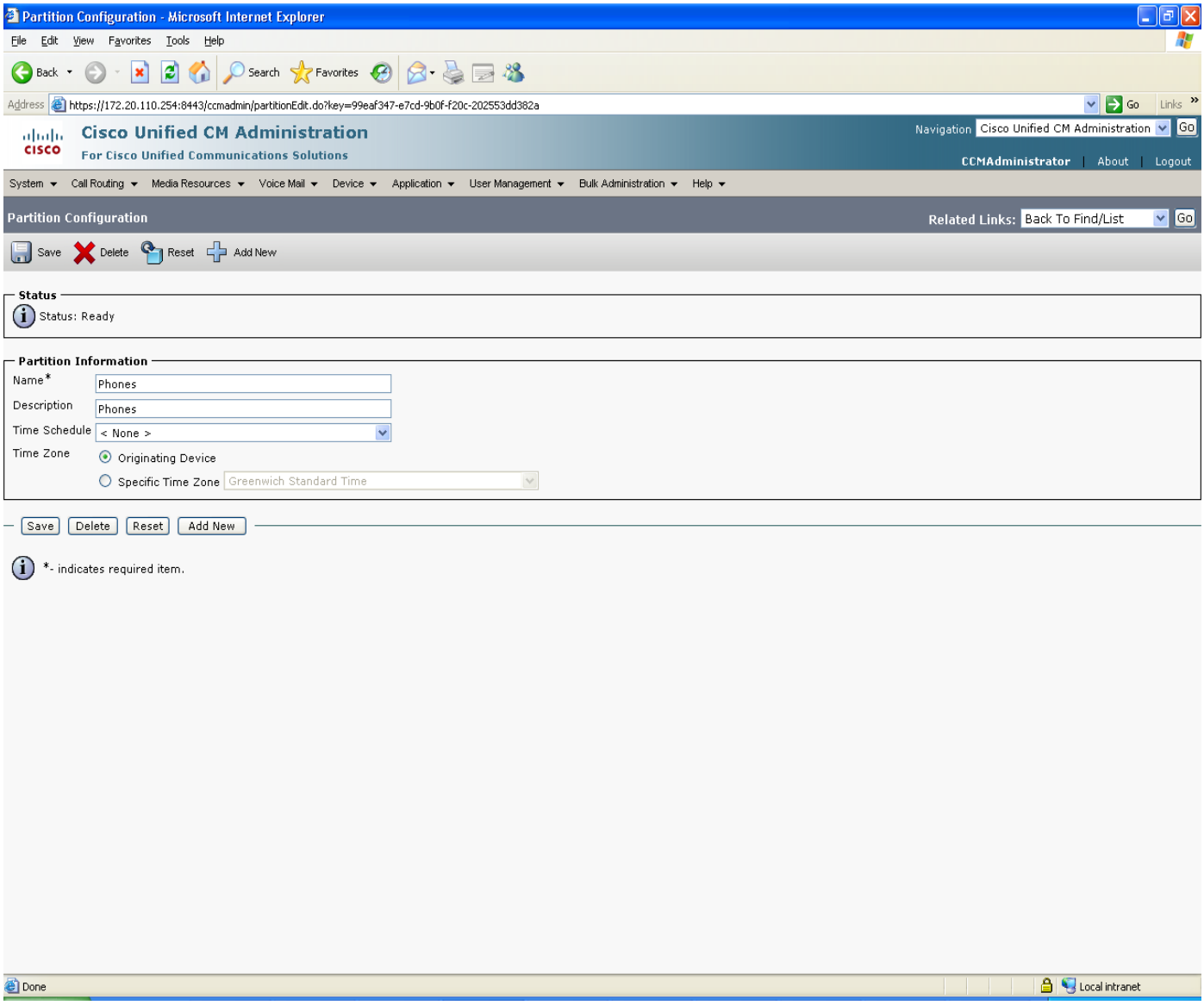
Phone Partition



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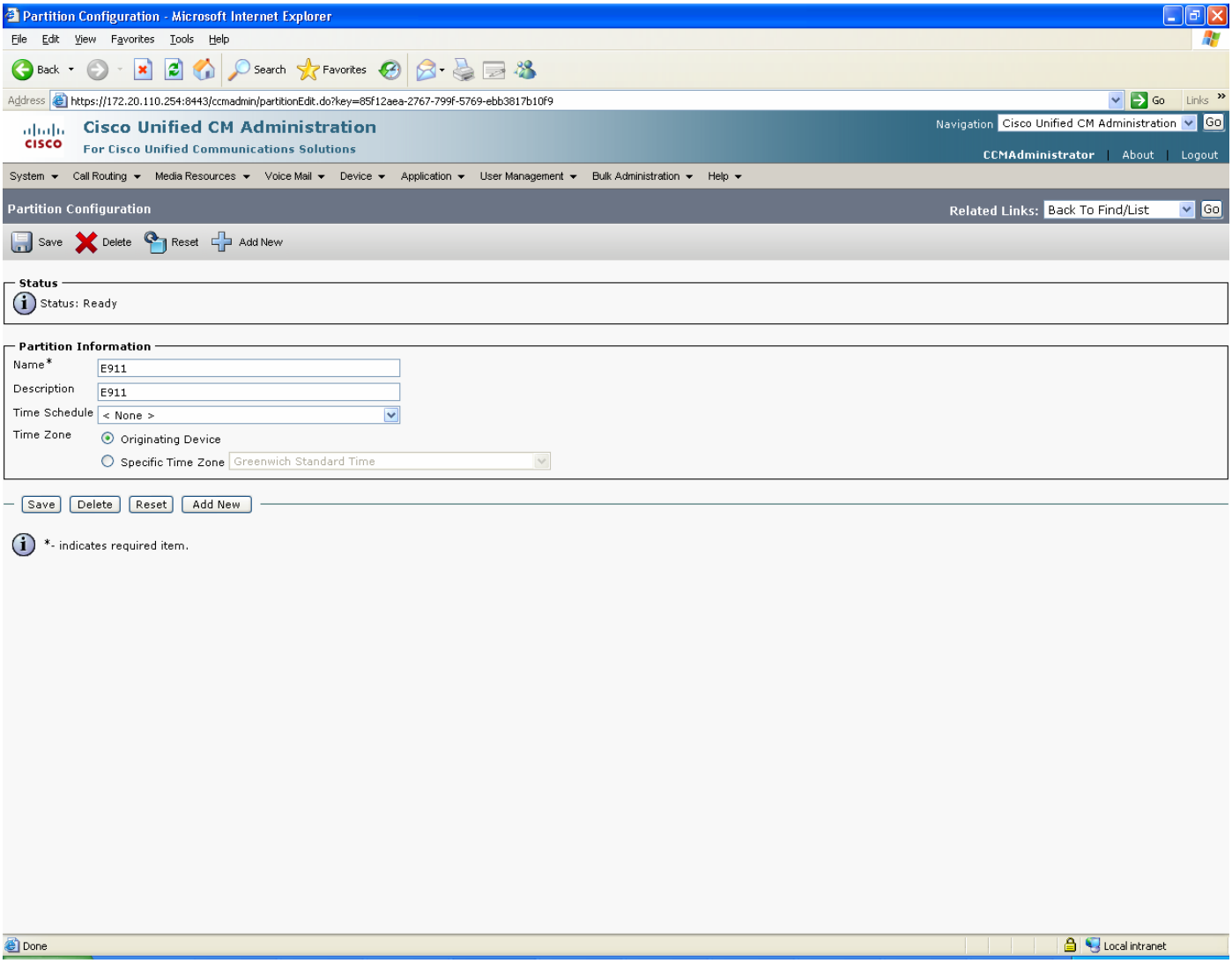
E911 Partition



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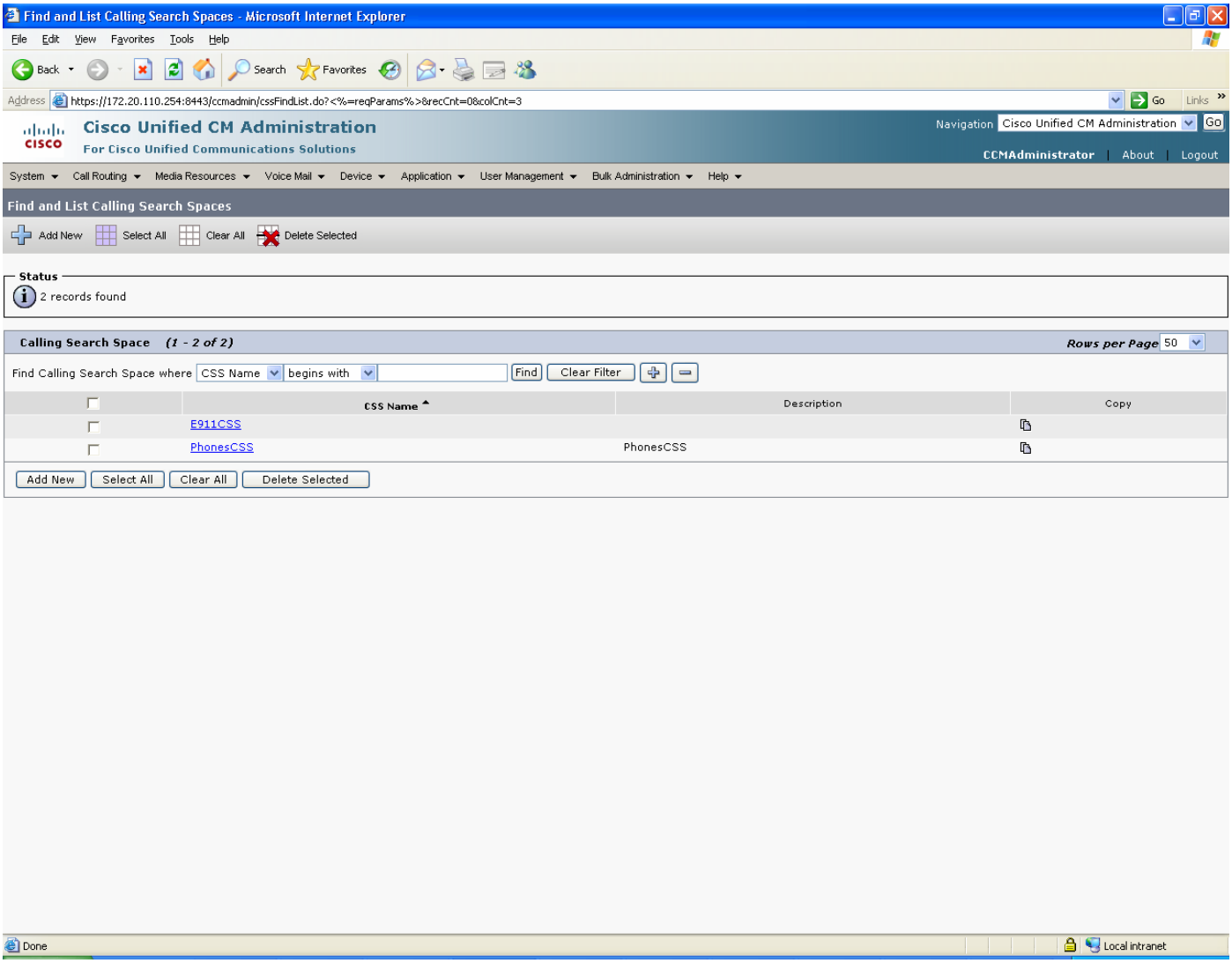
Calling Search Space



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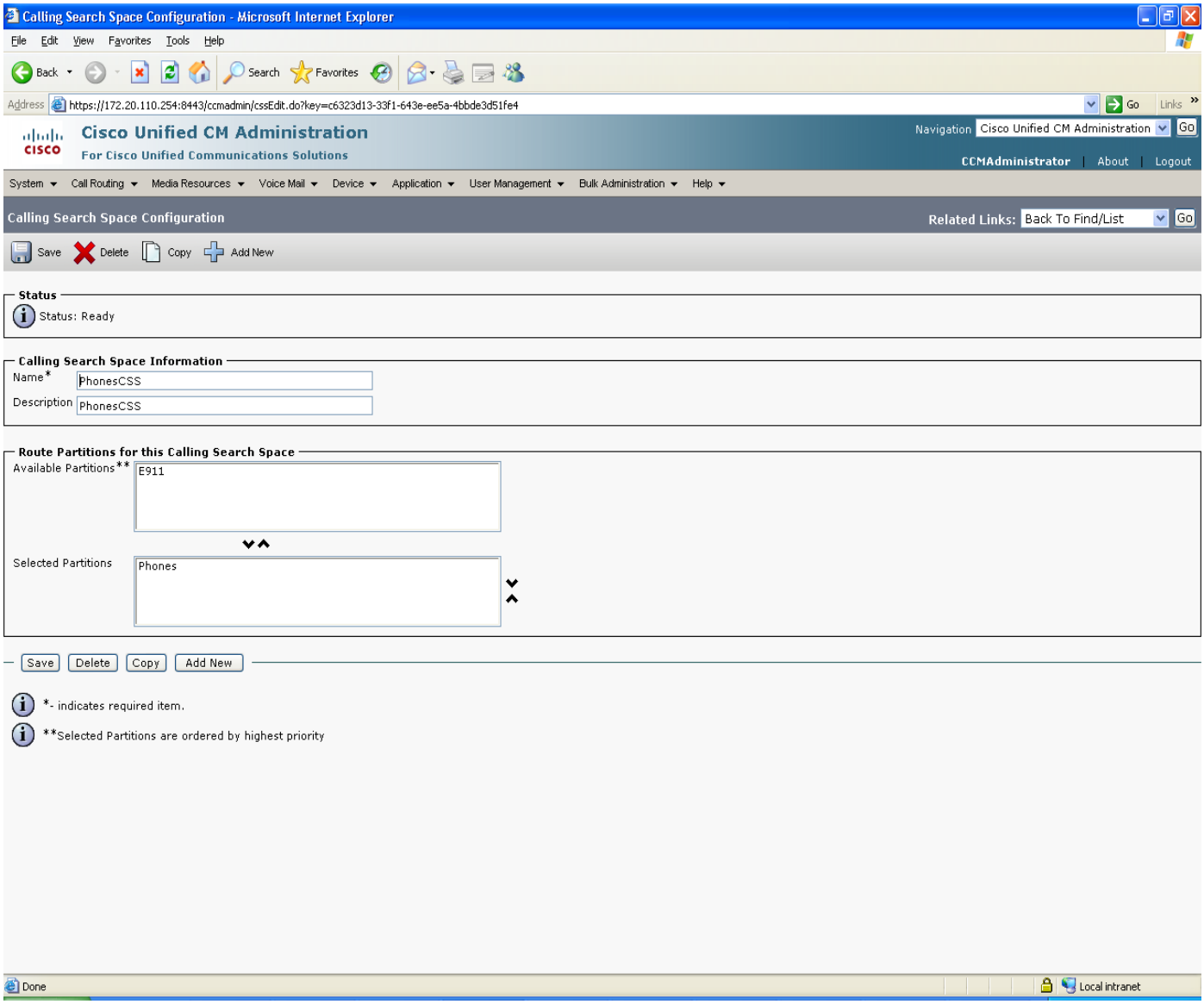
CSS Phones



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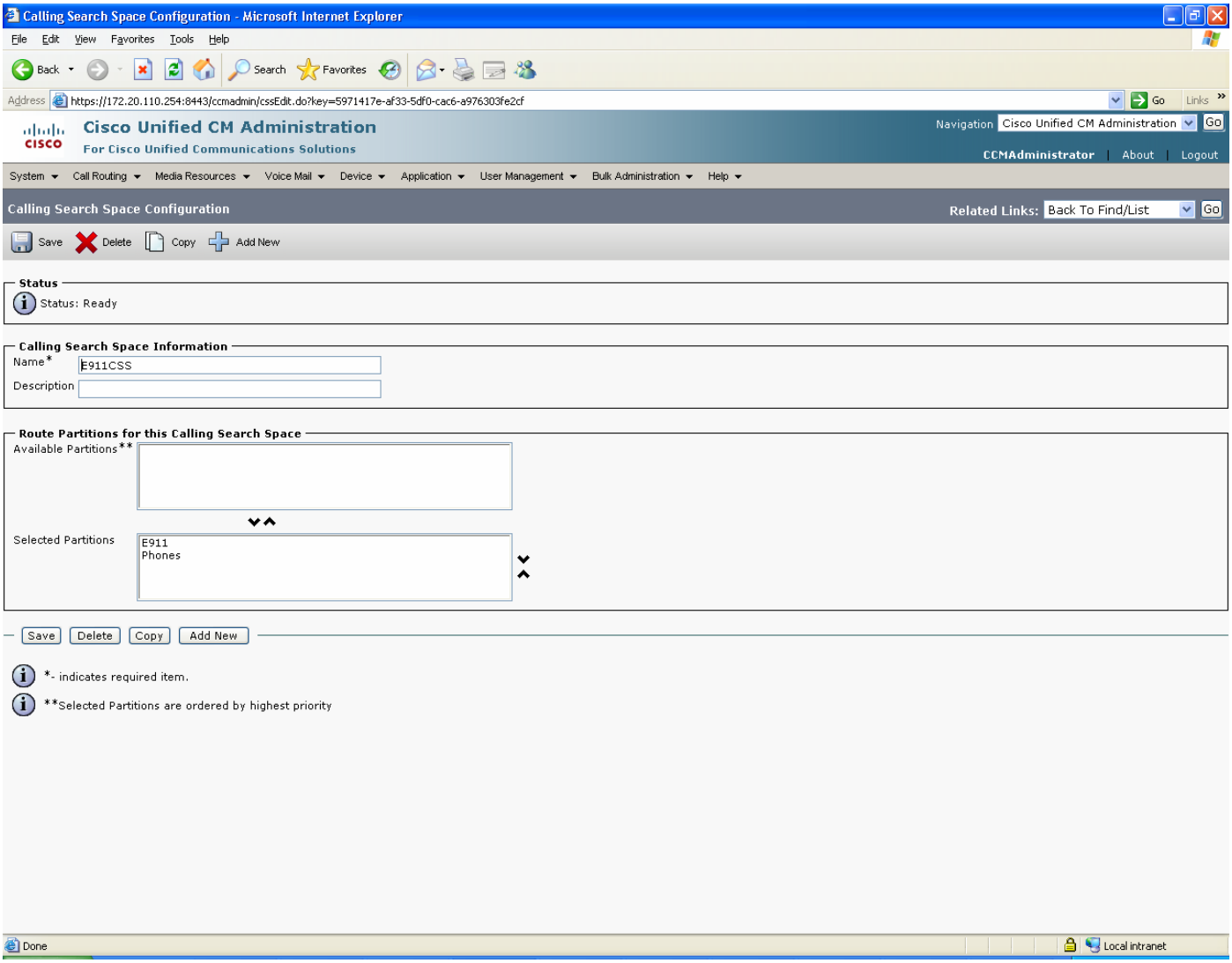
CSS E911



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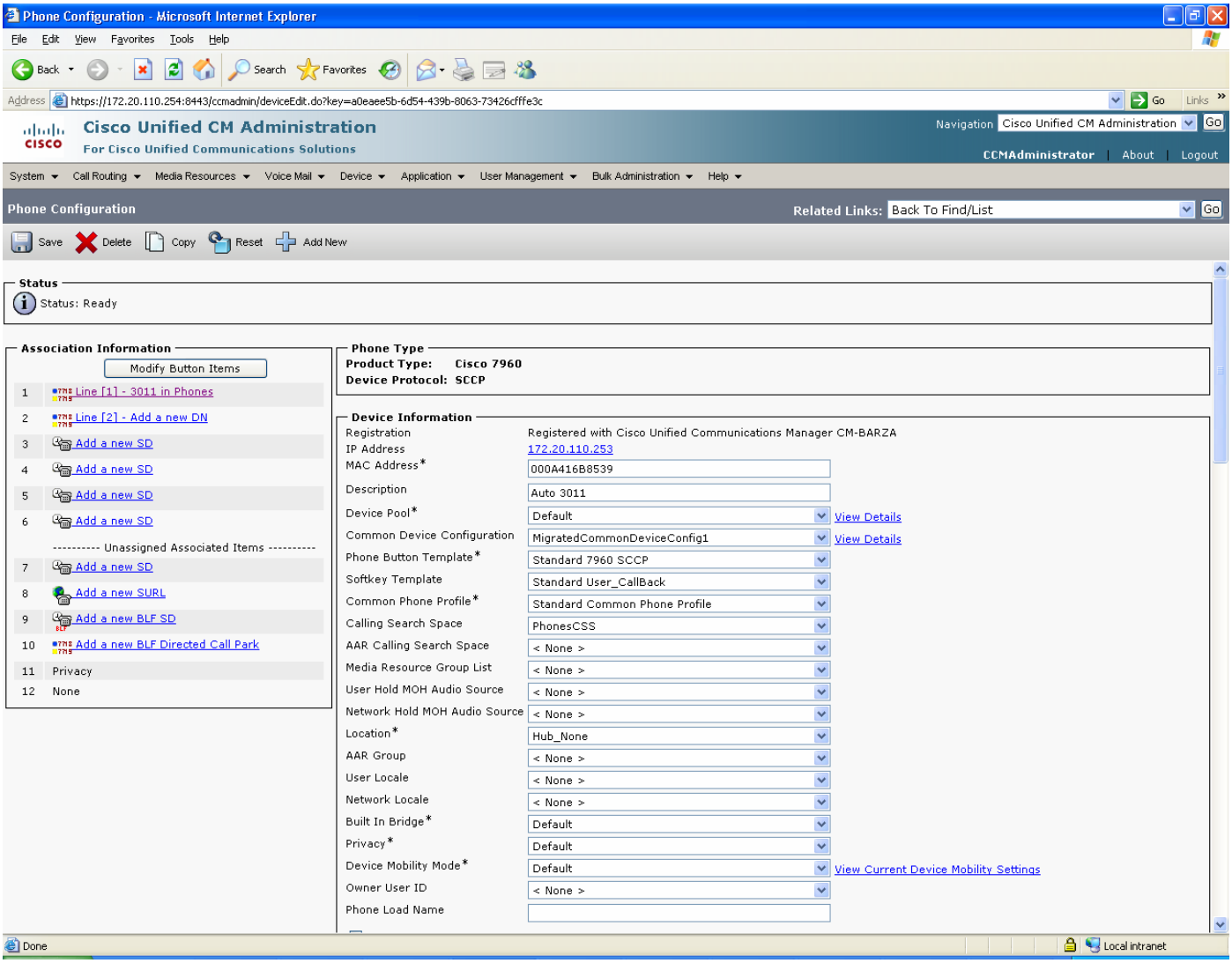
CCM IP phones



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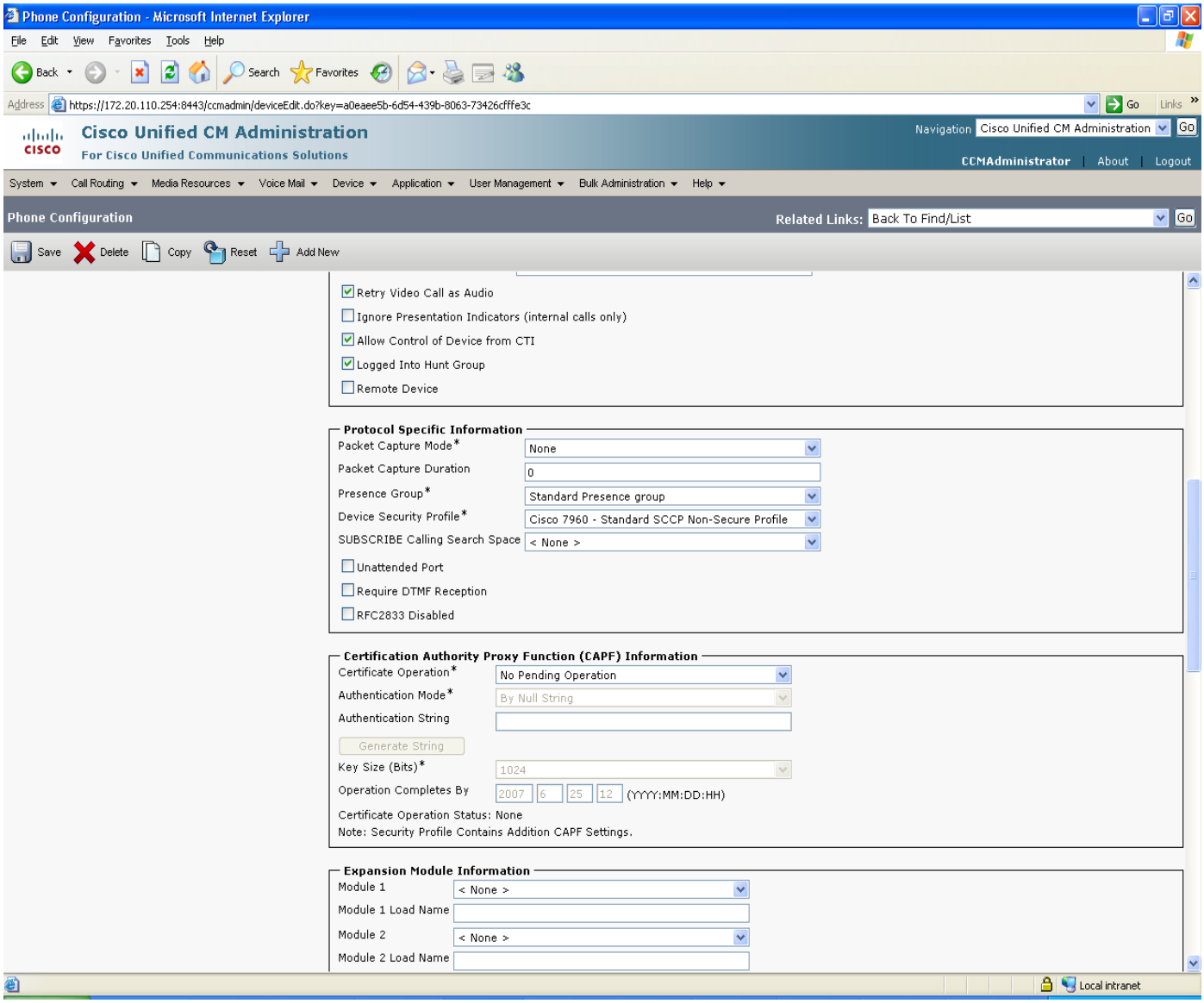

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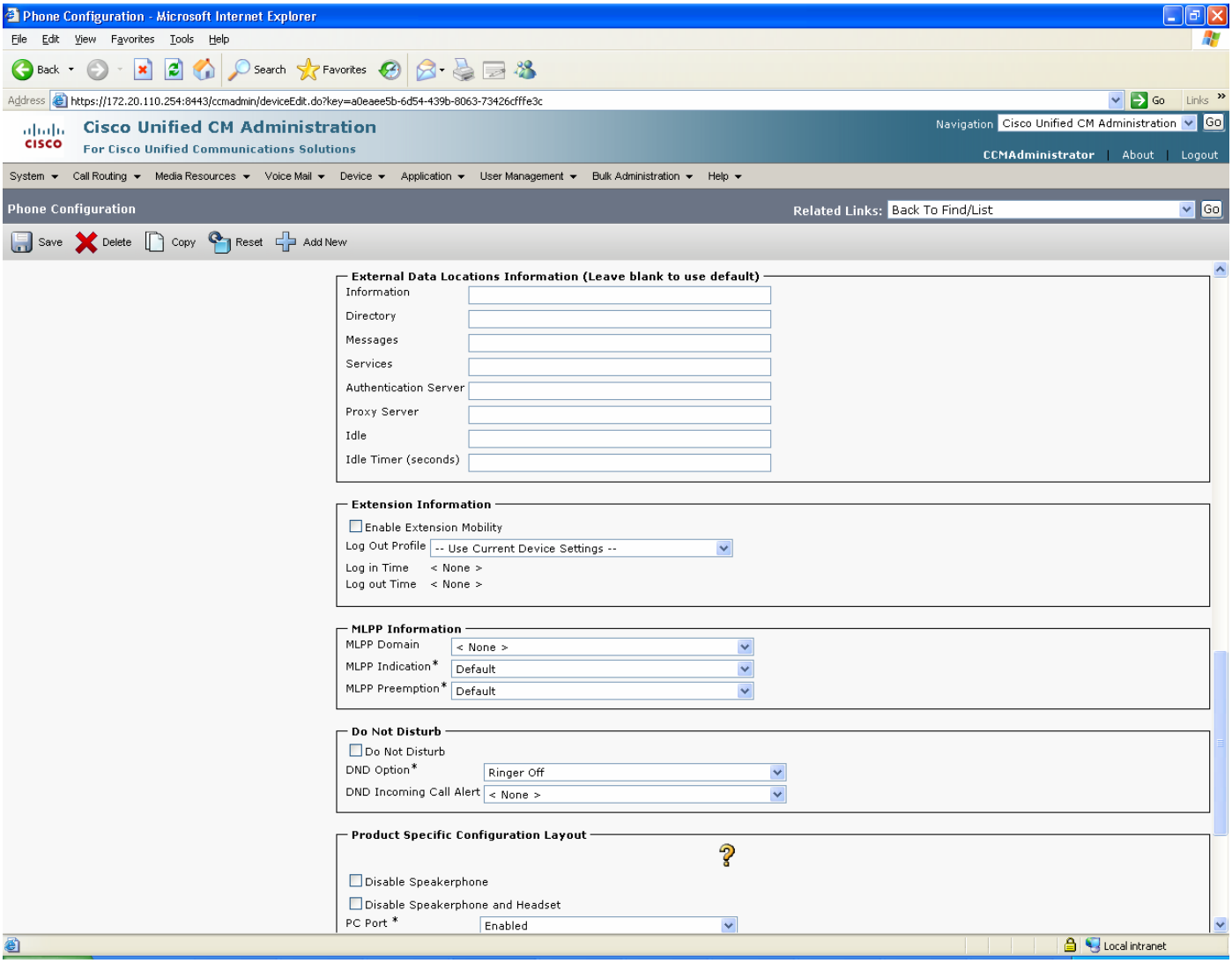

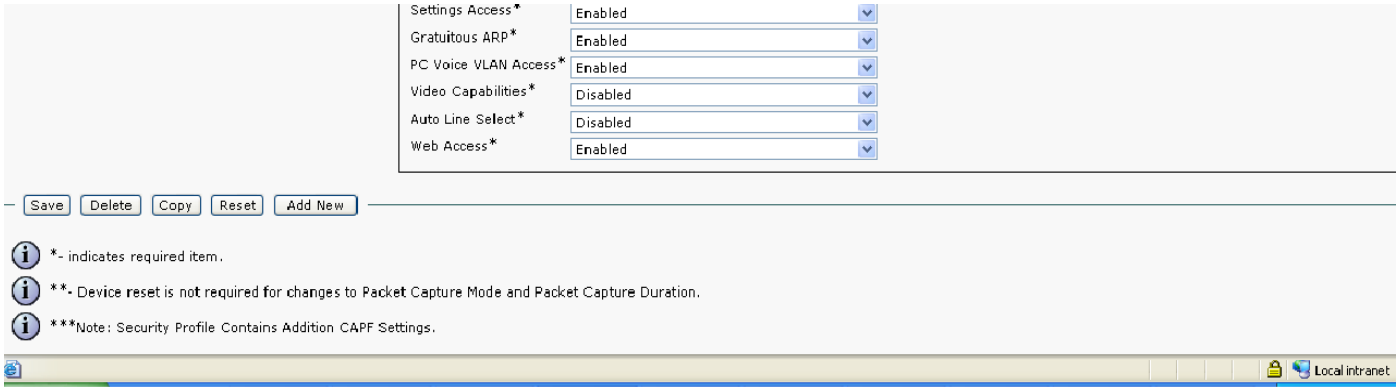

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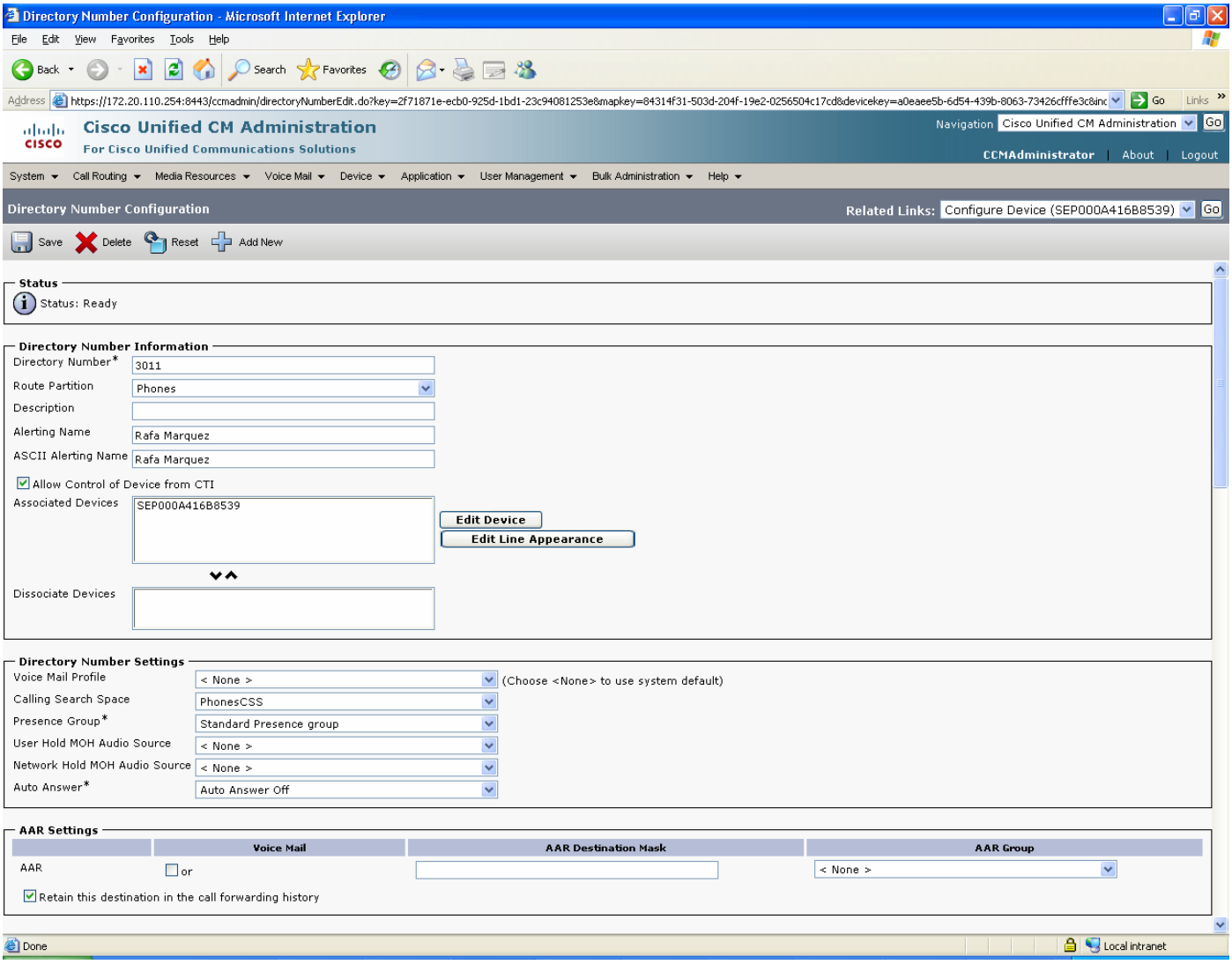

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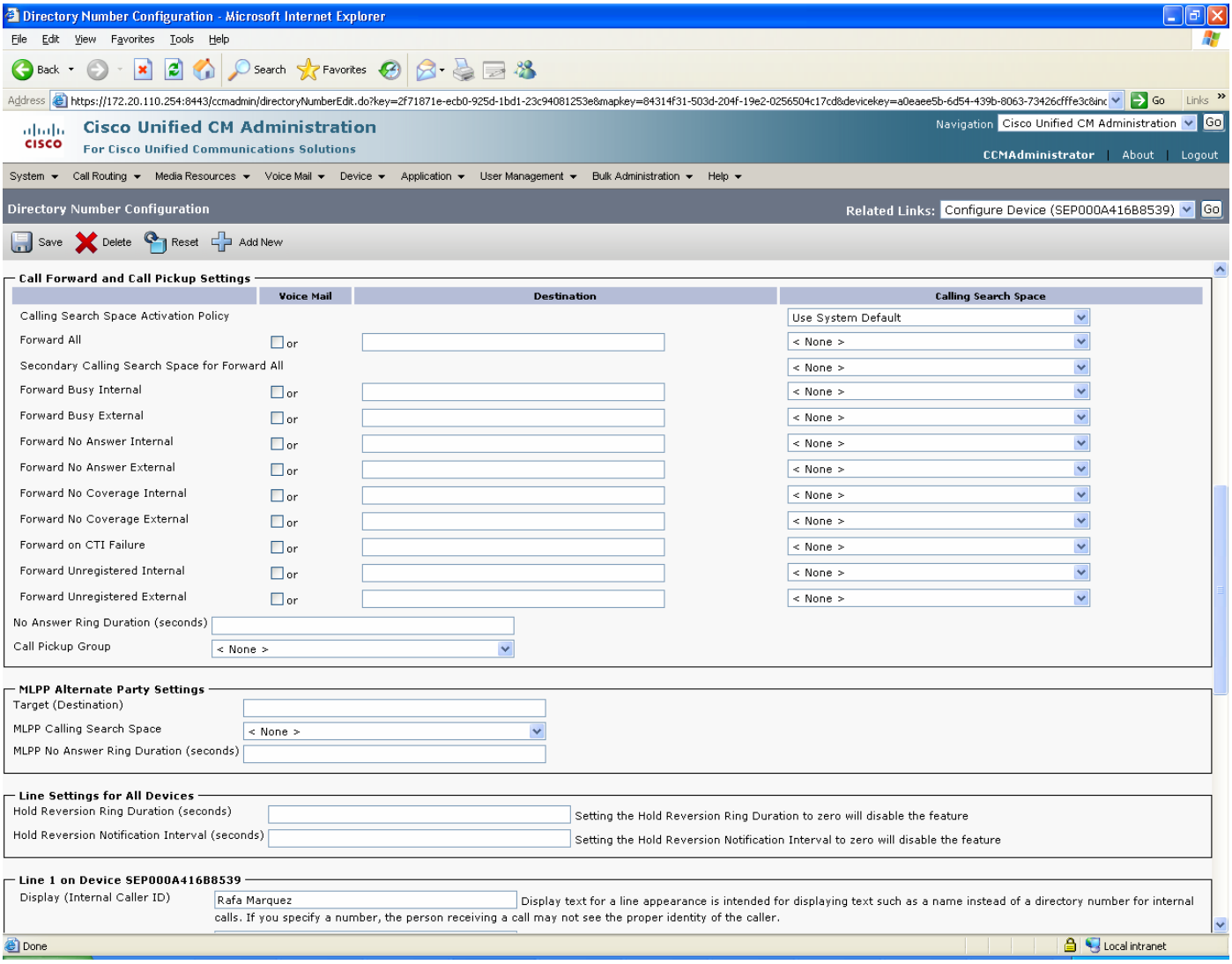

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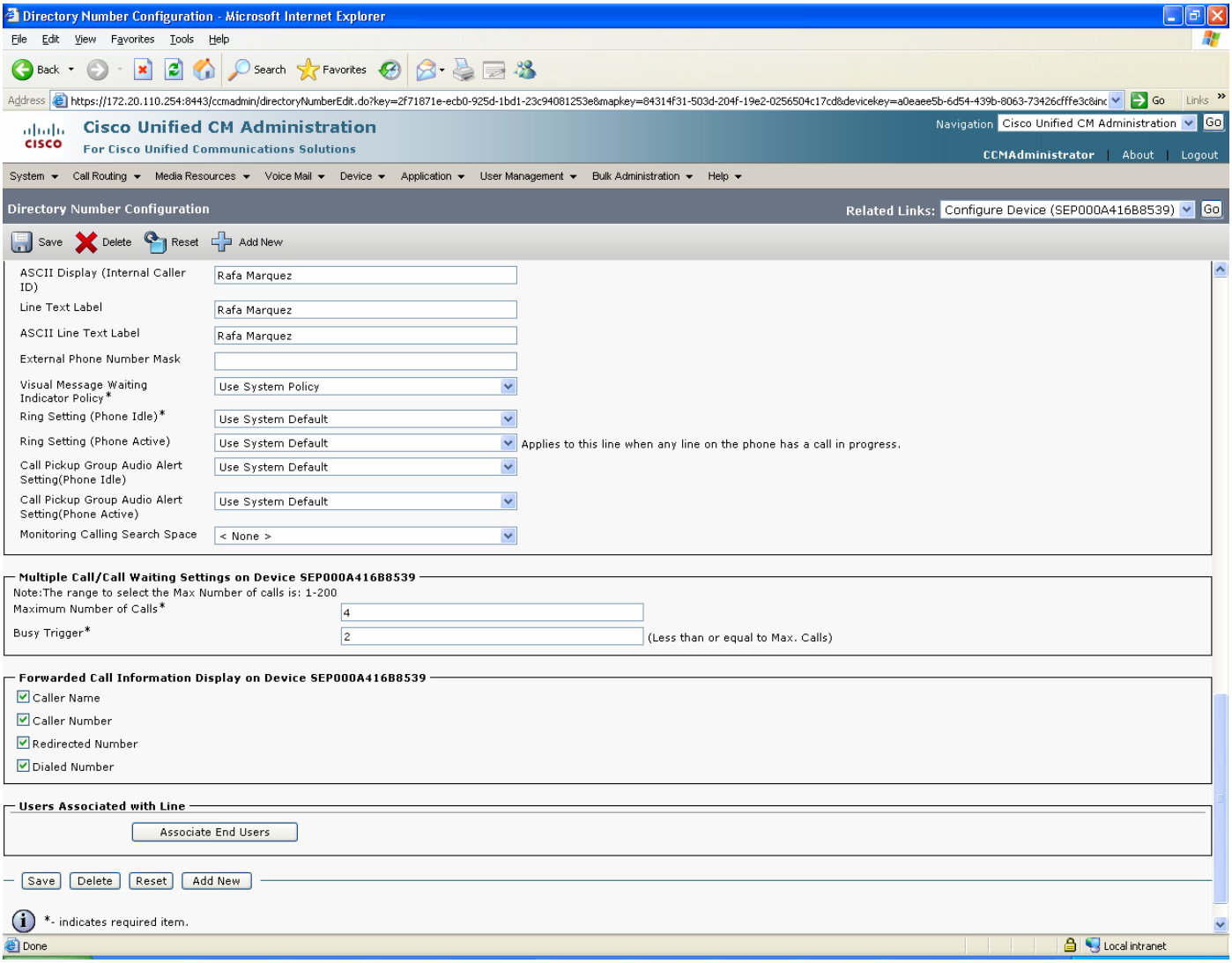

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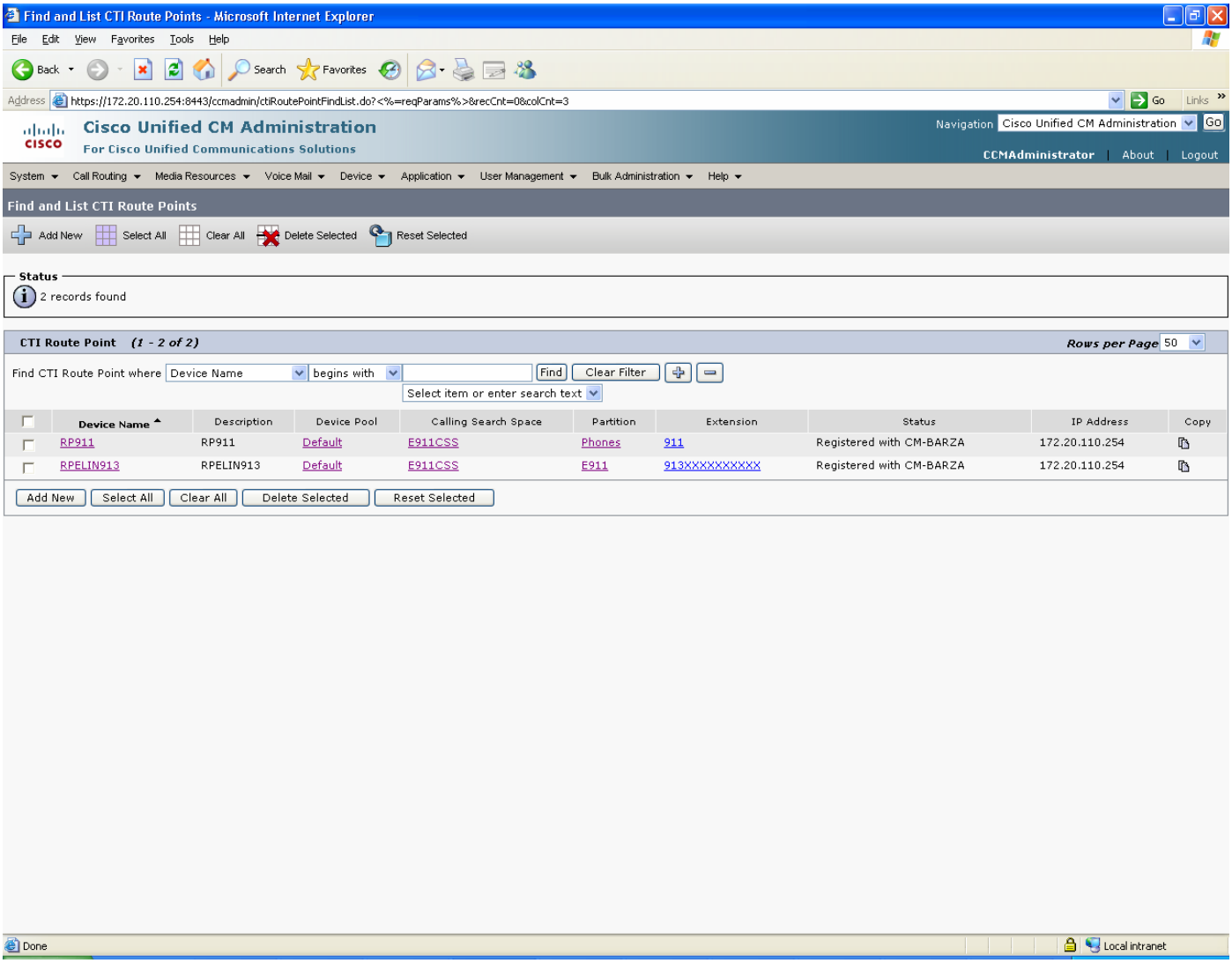
CTI Route Points



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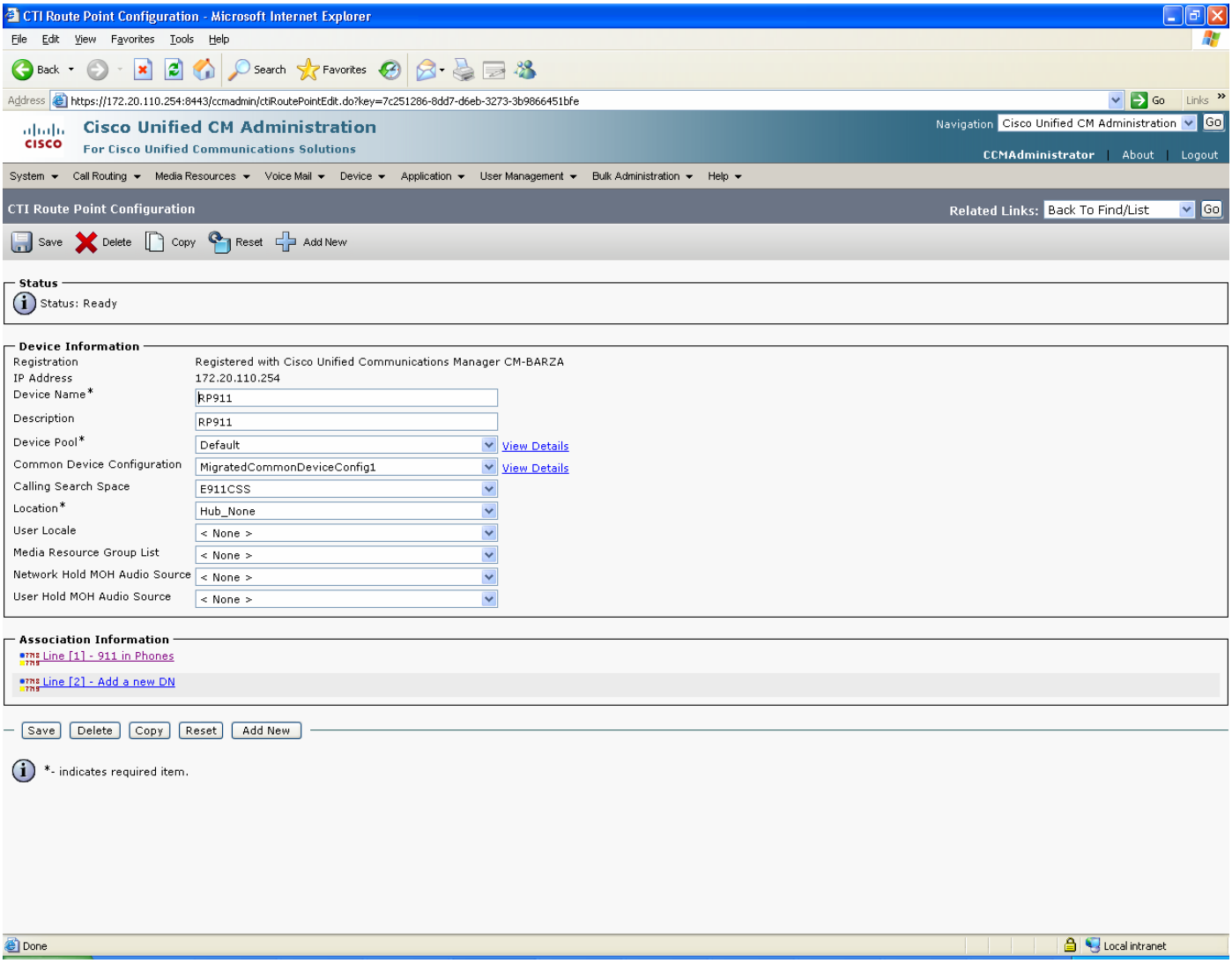
CTI Route Point 911



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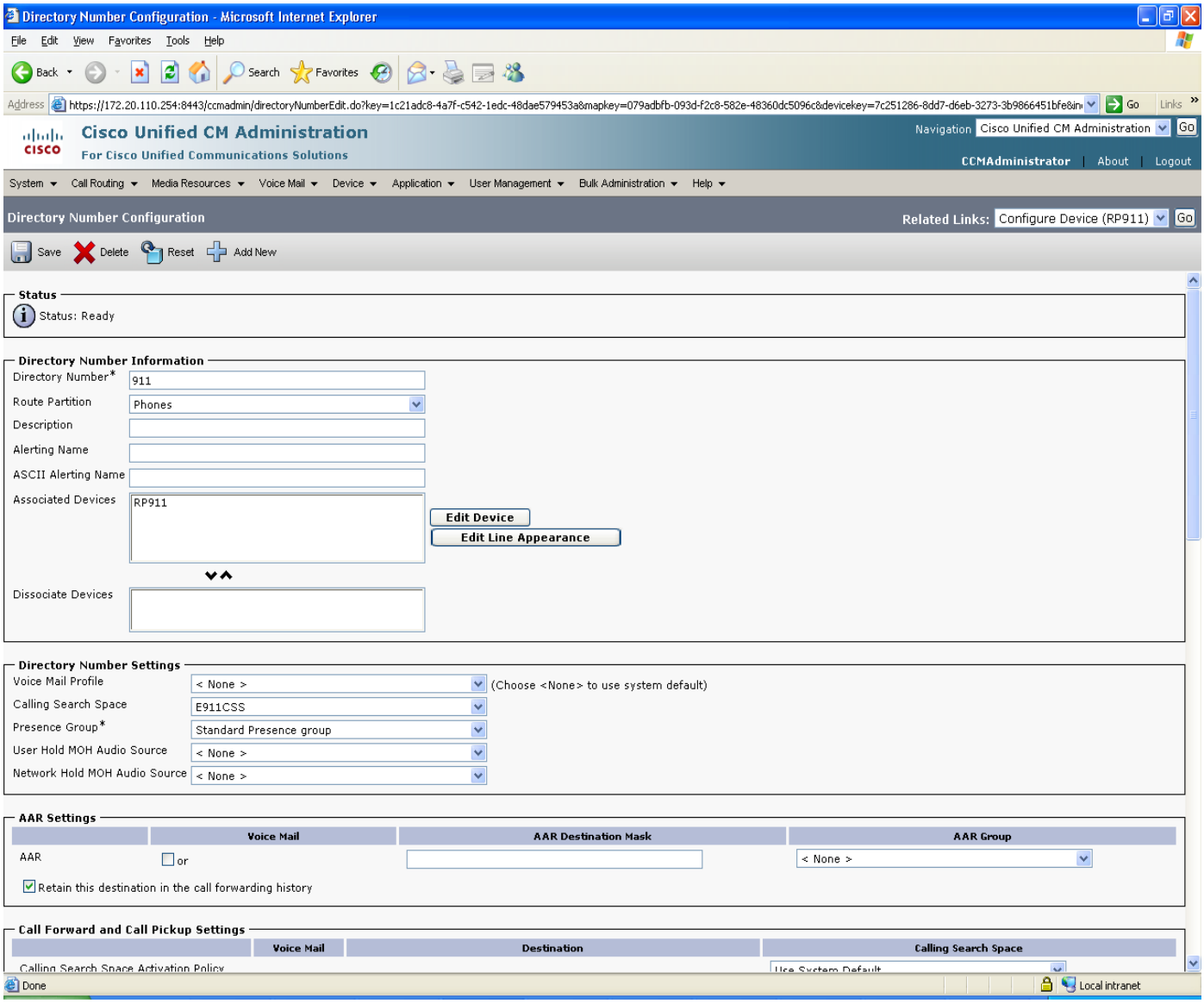

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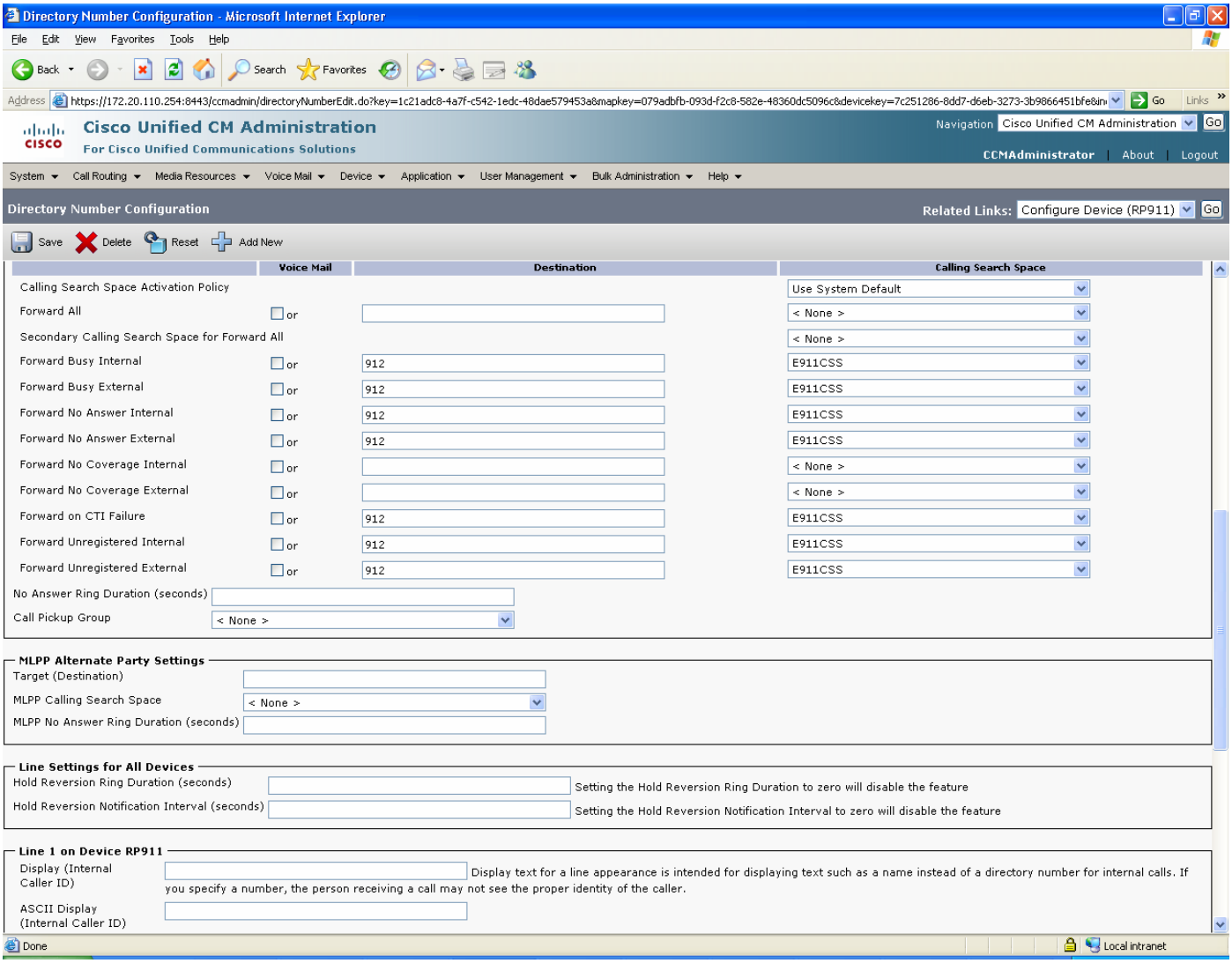

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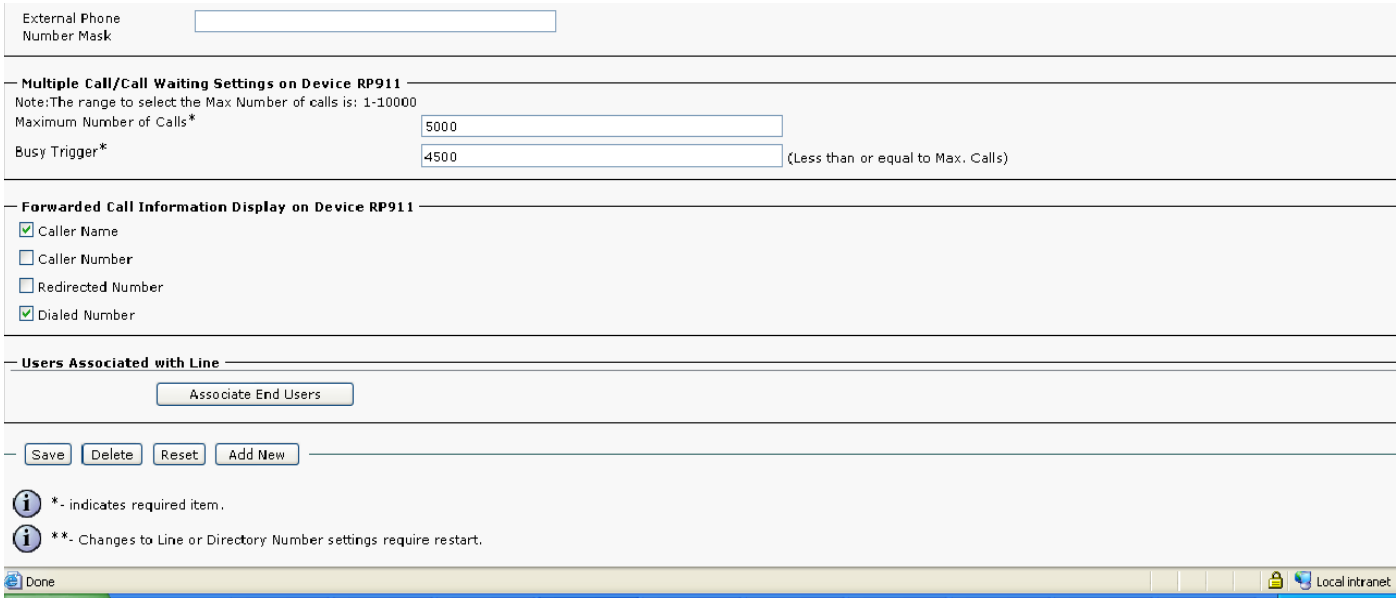

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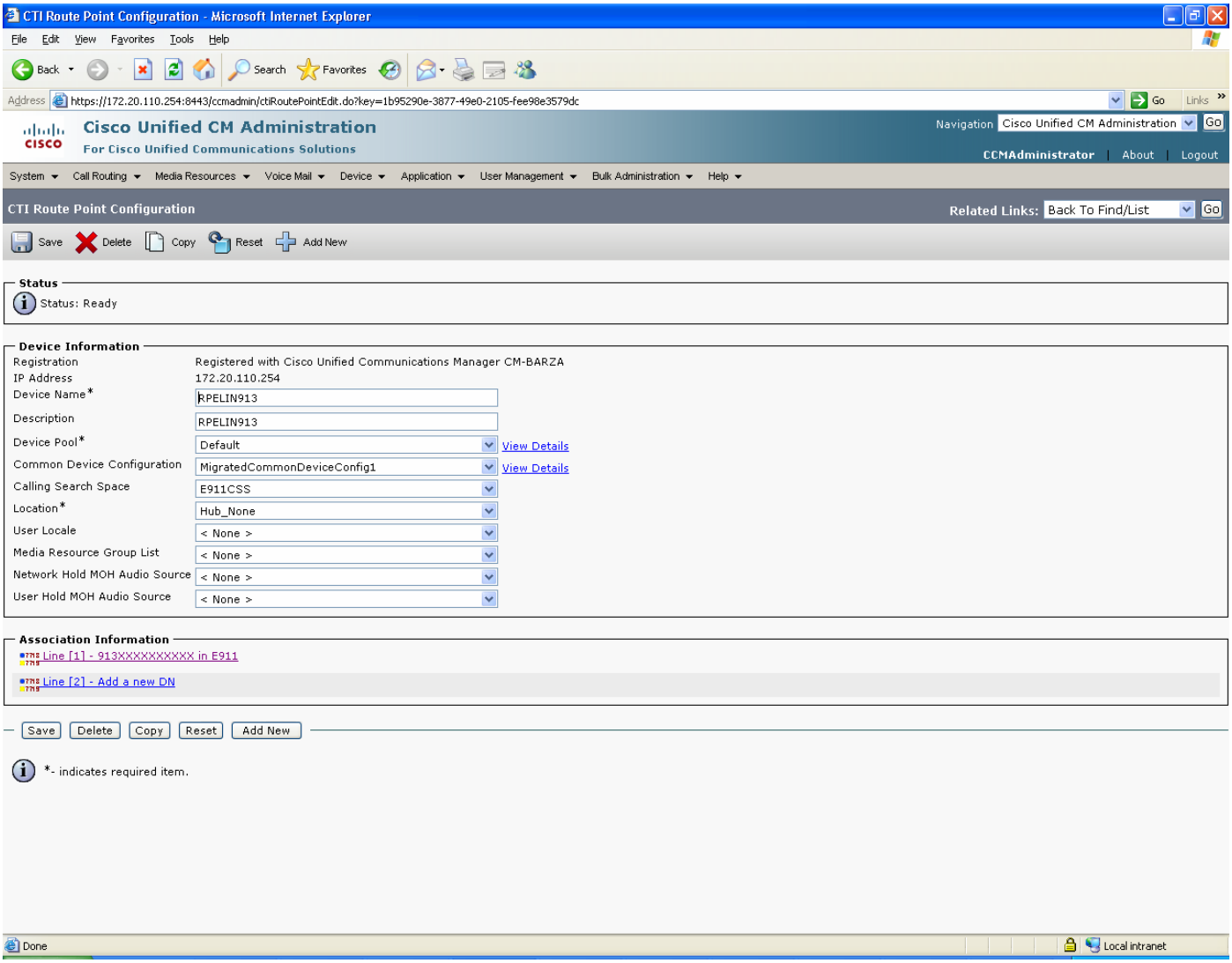
CTI Route Point 913



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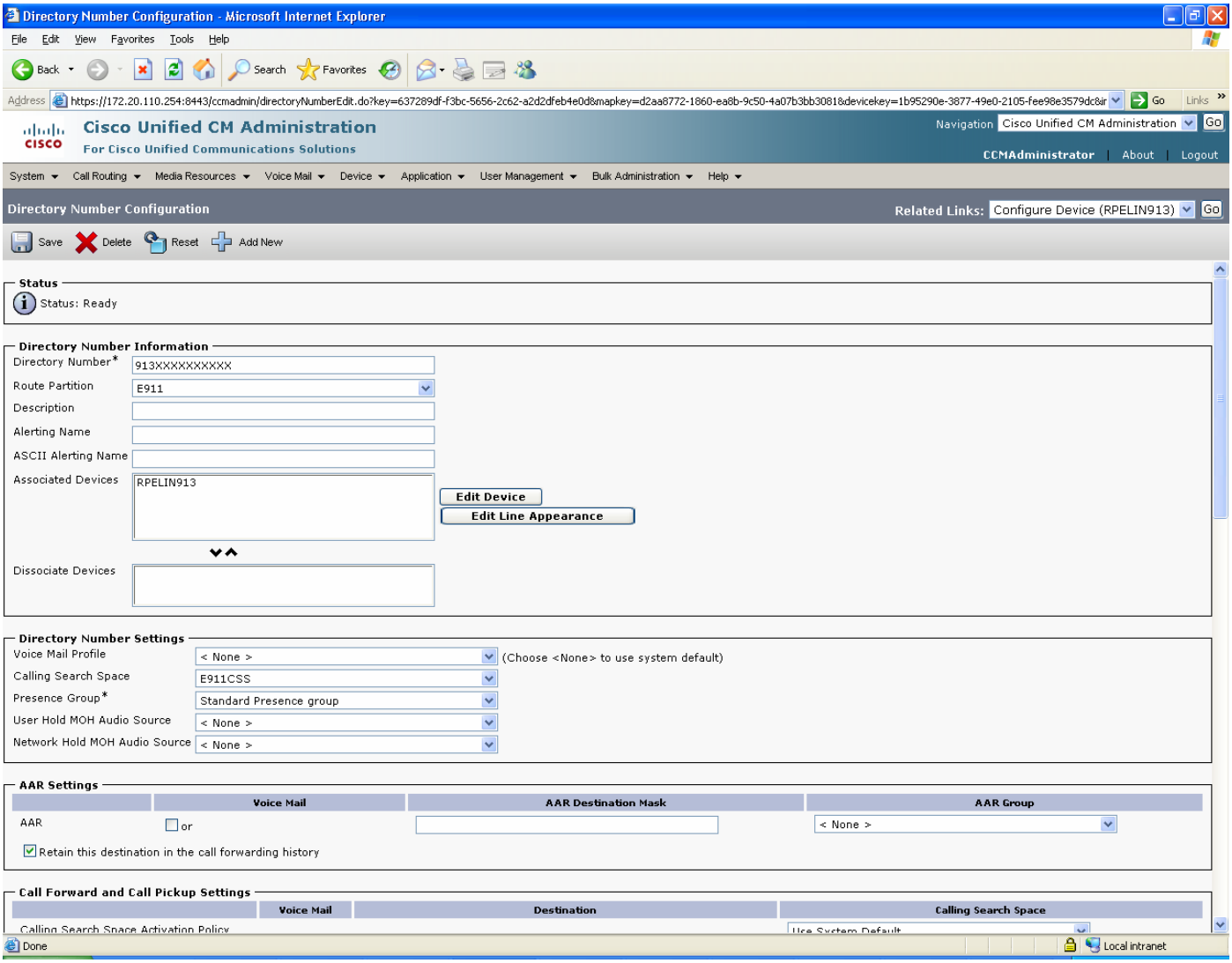

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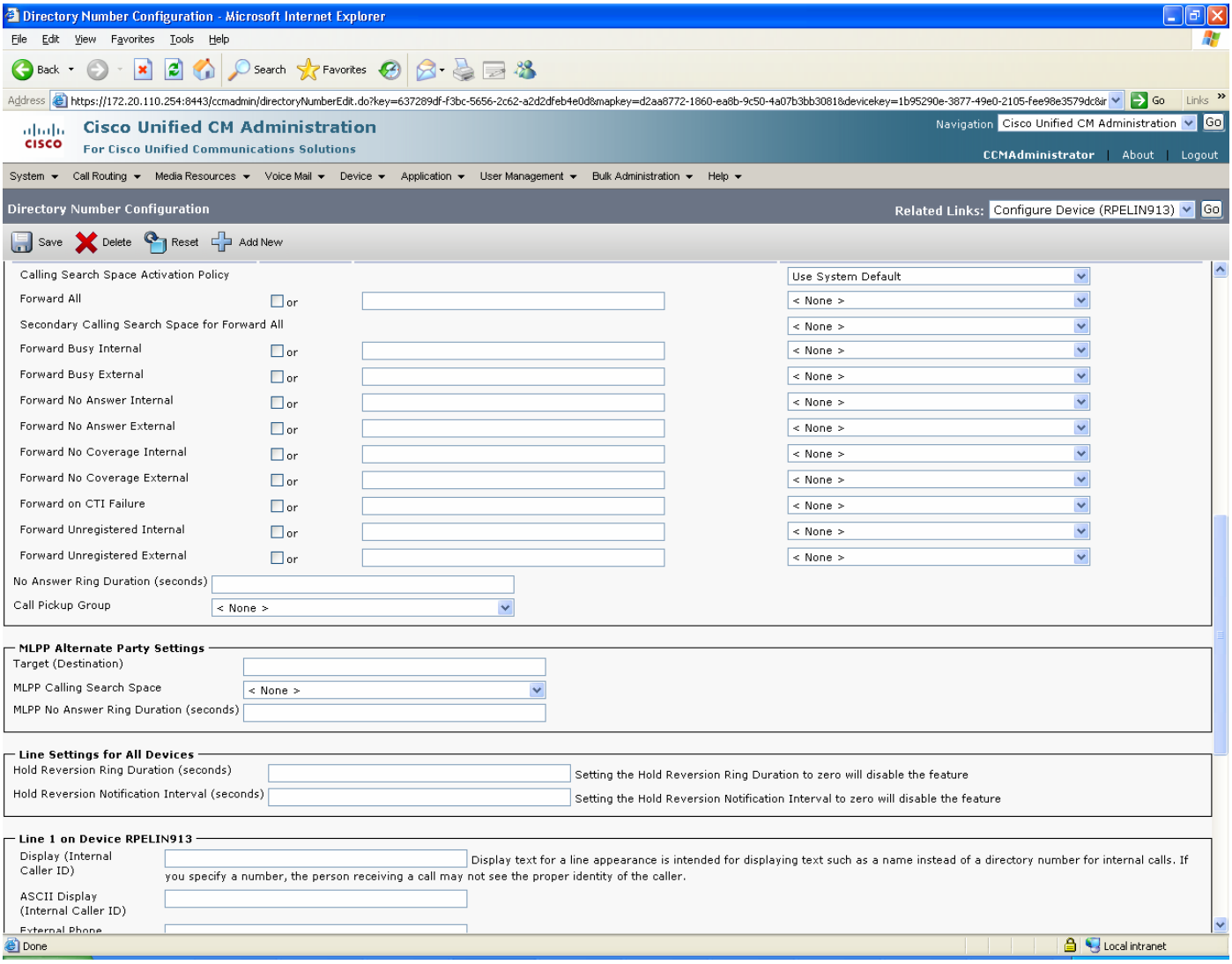

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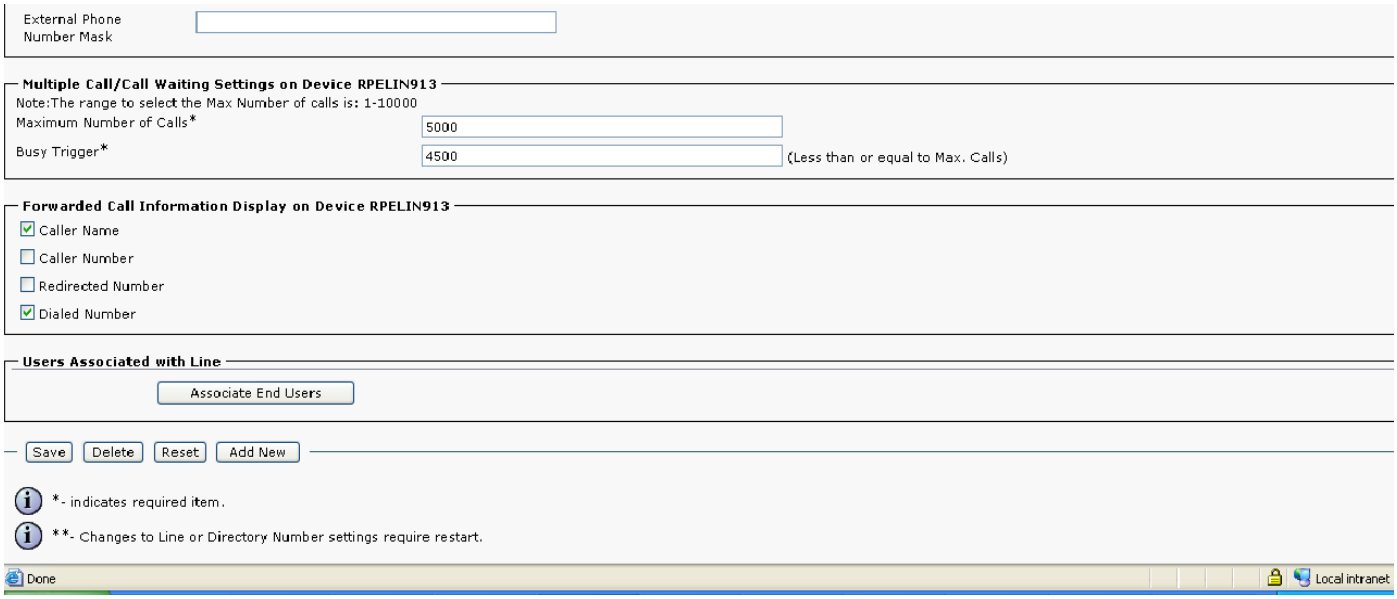

Note: A Backup CER server was not used during testing therefore CTI route point for 912 was not created.

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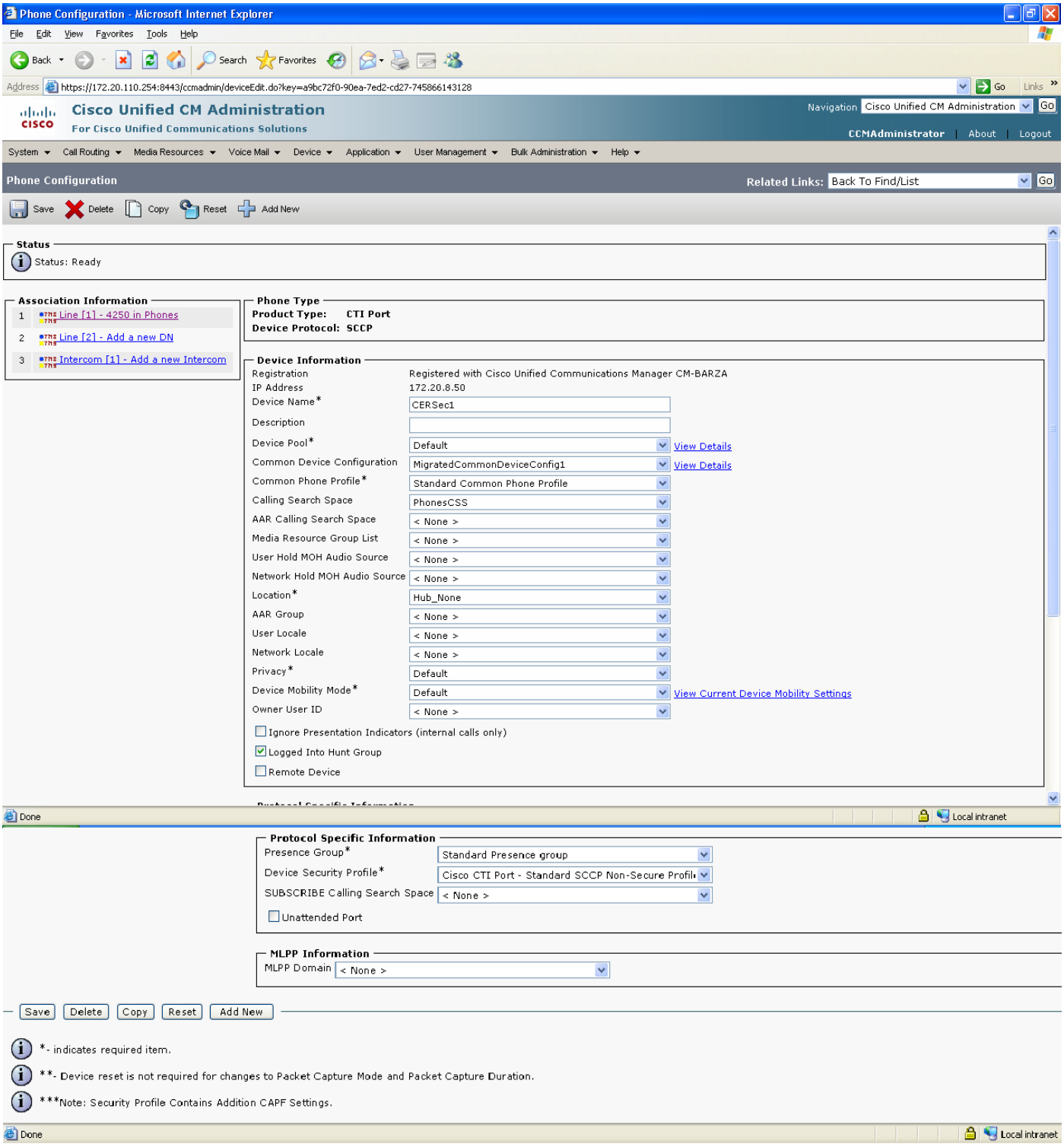
CTI Port



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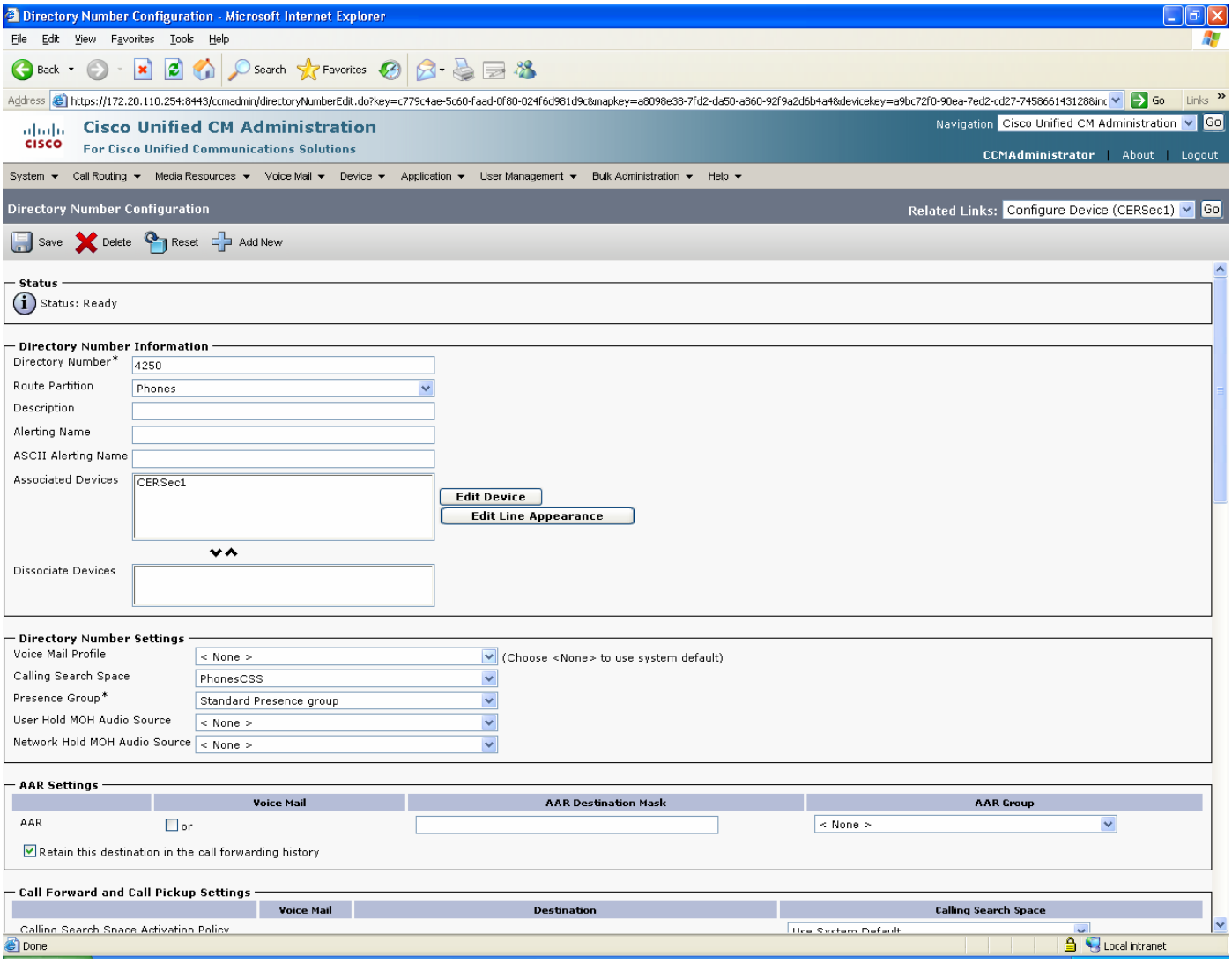

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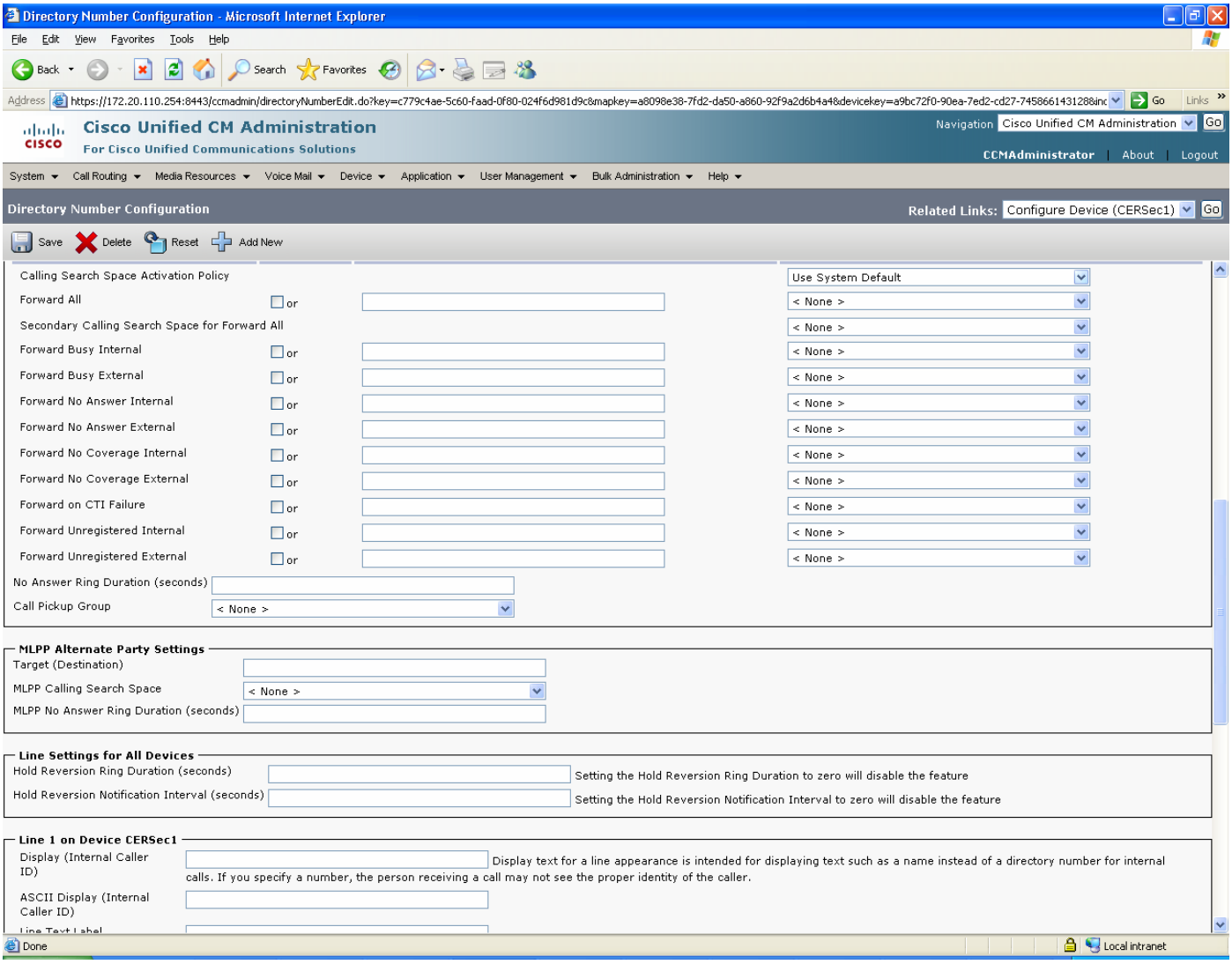

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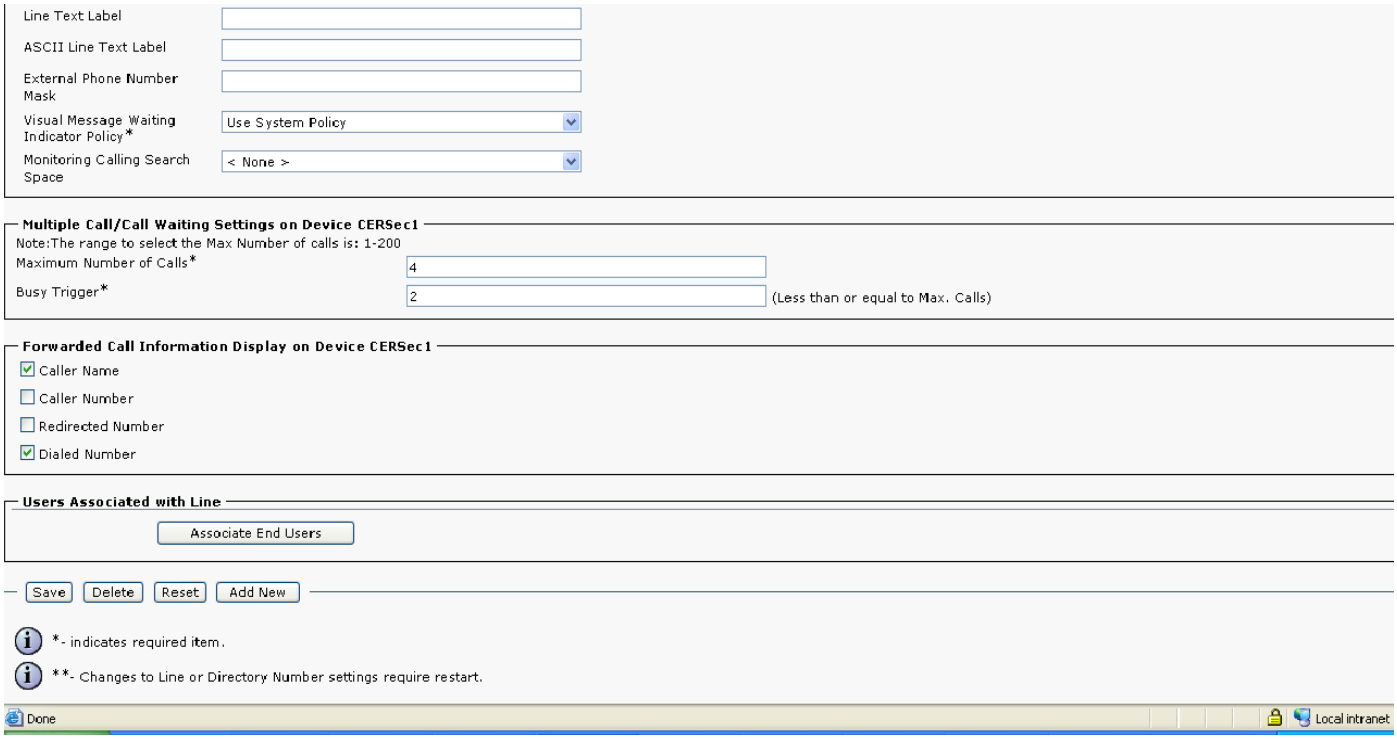

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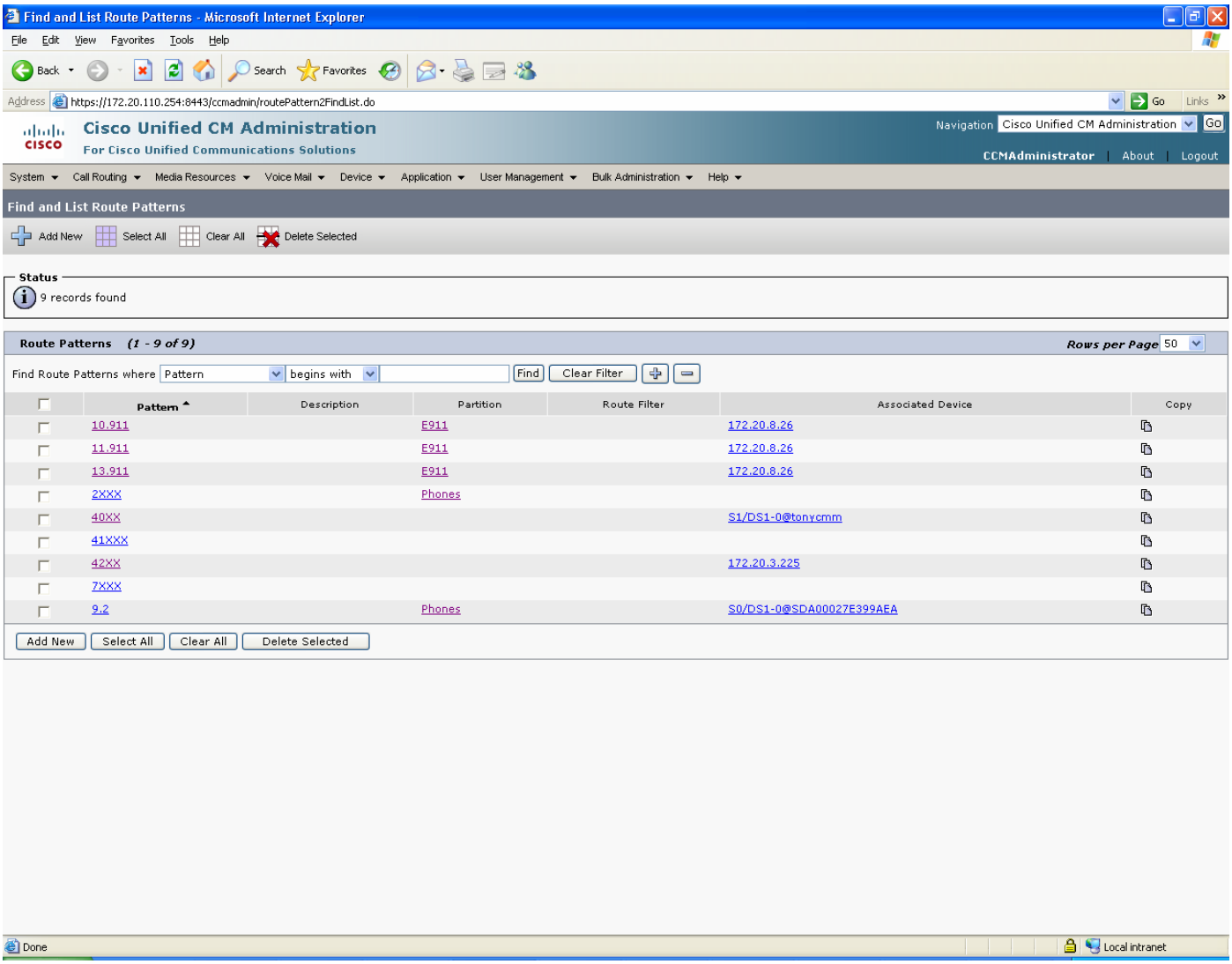
Route Patterns for ELINs



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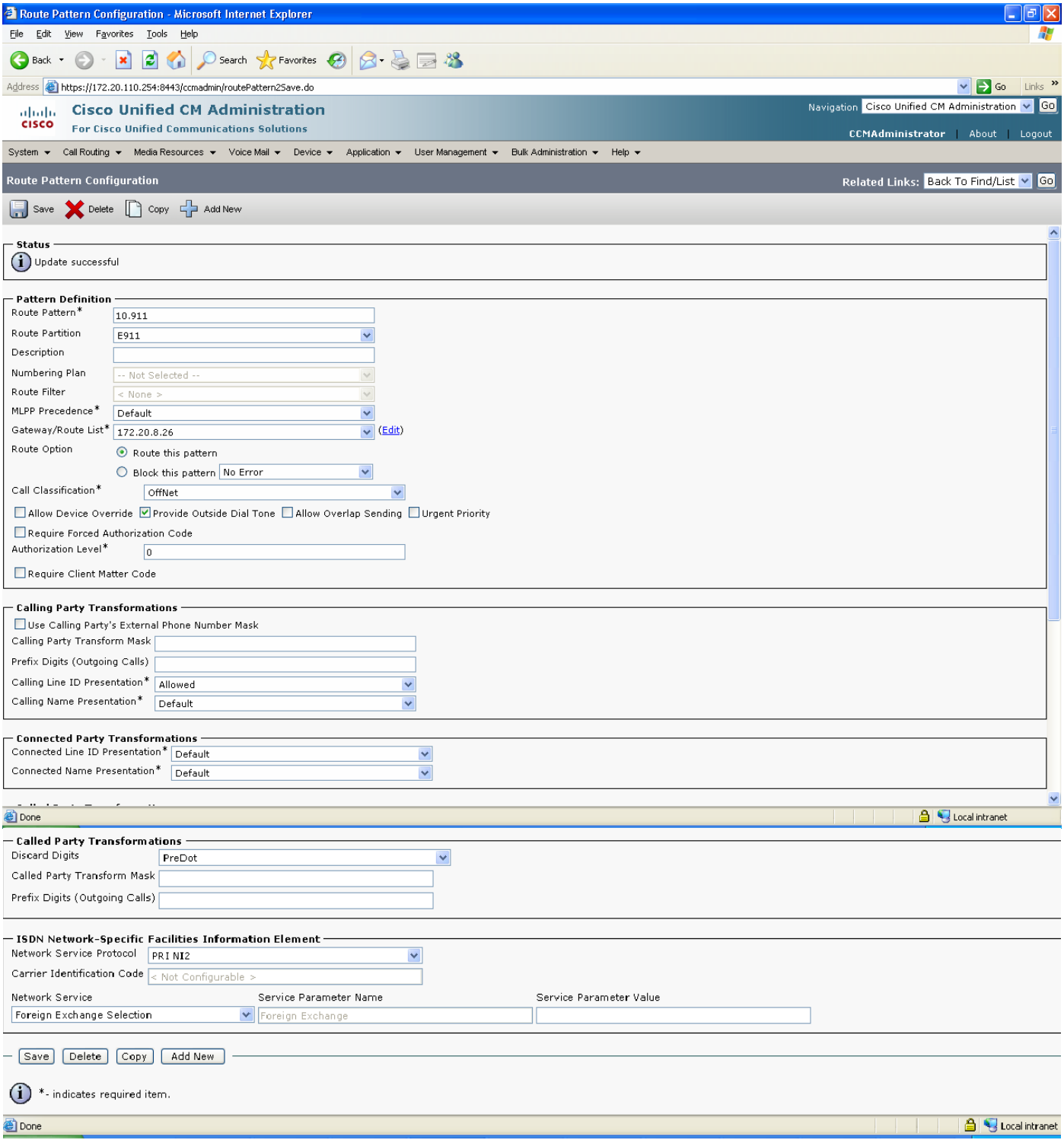
Route Pattern 10911



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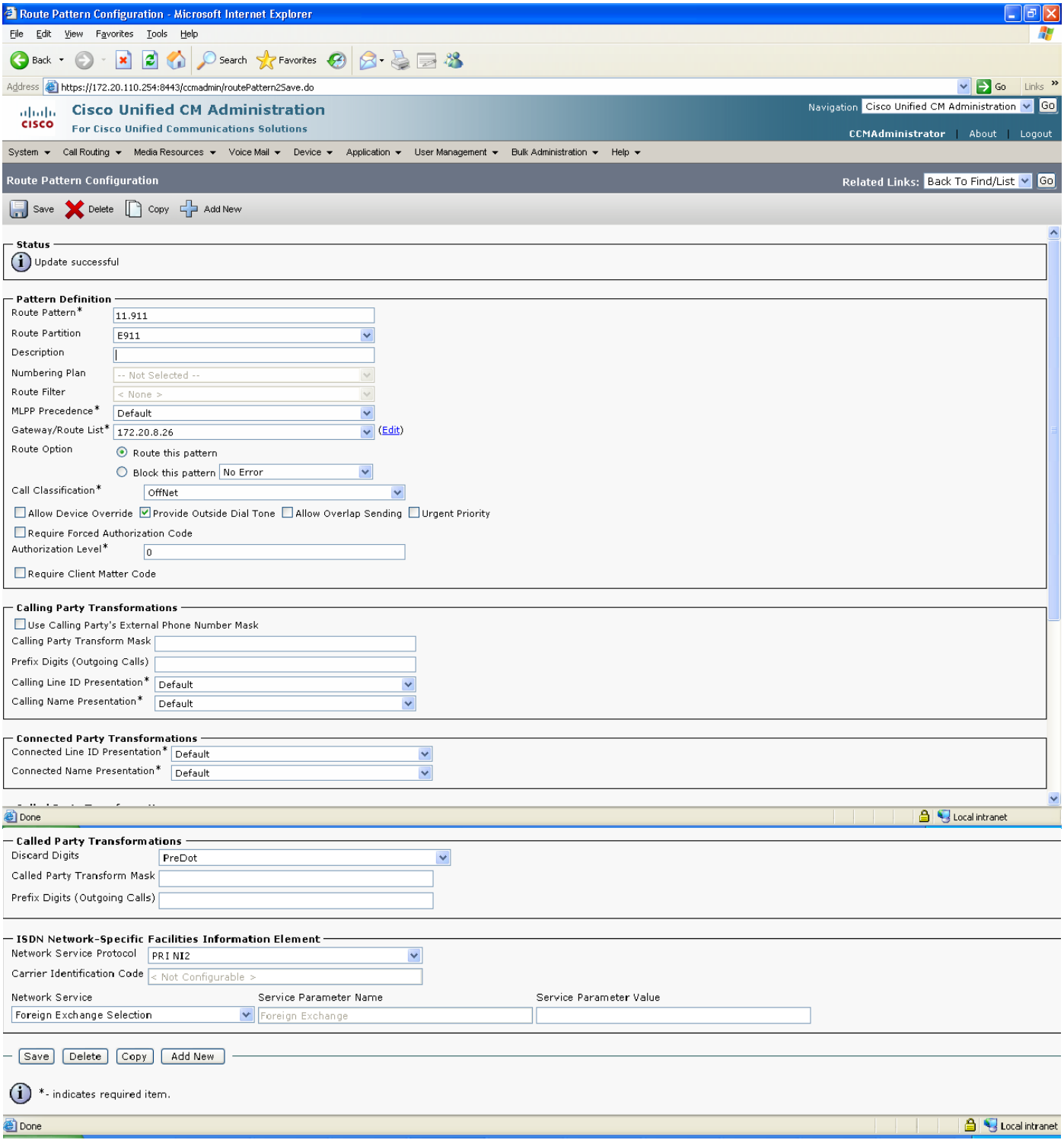
Route Pattern 11911



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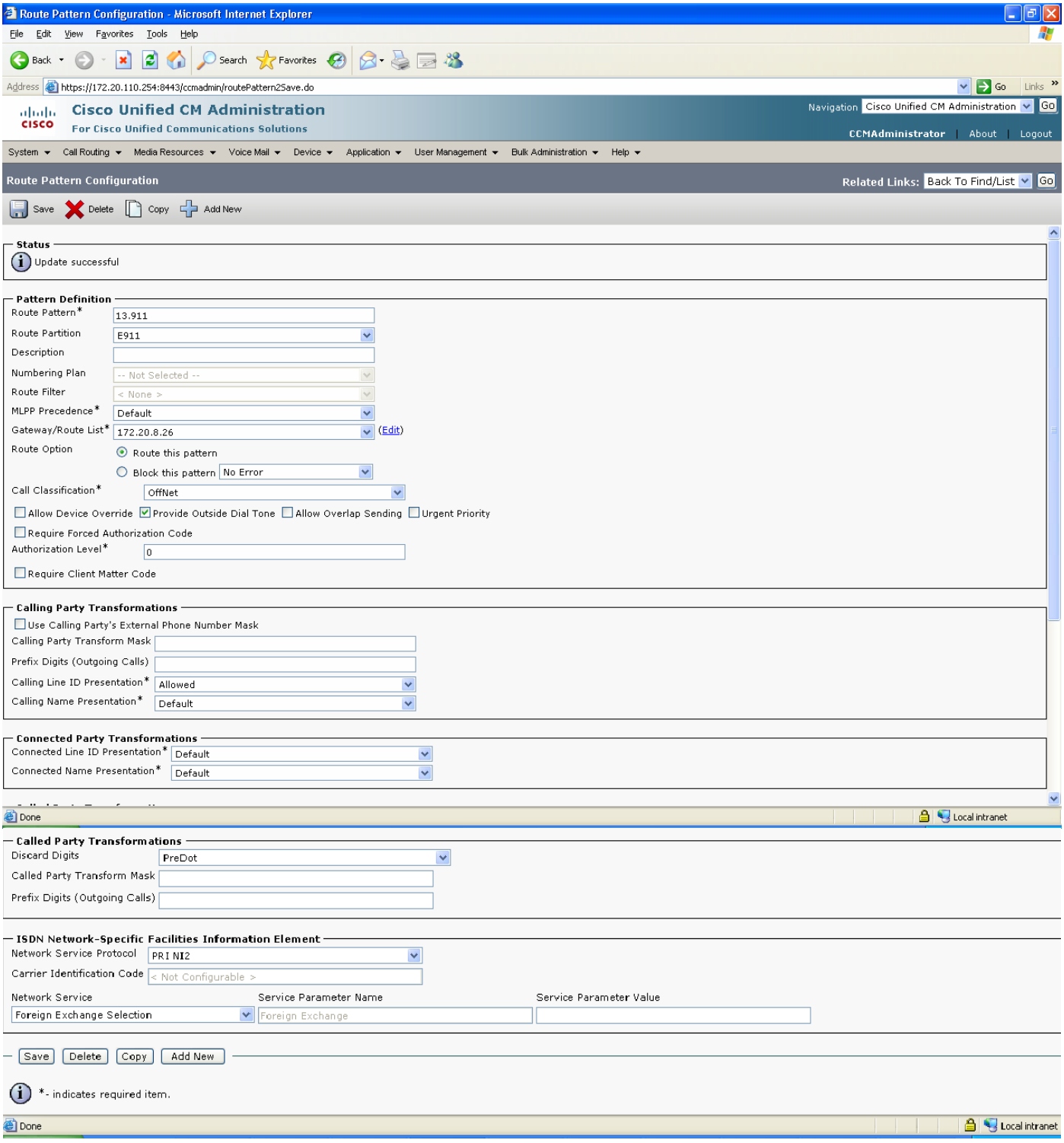
Route Pattern 13911



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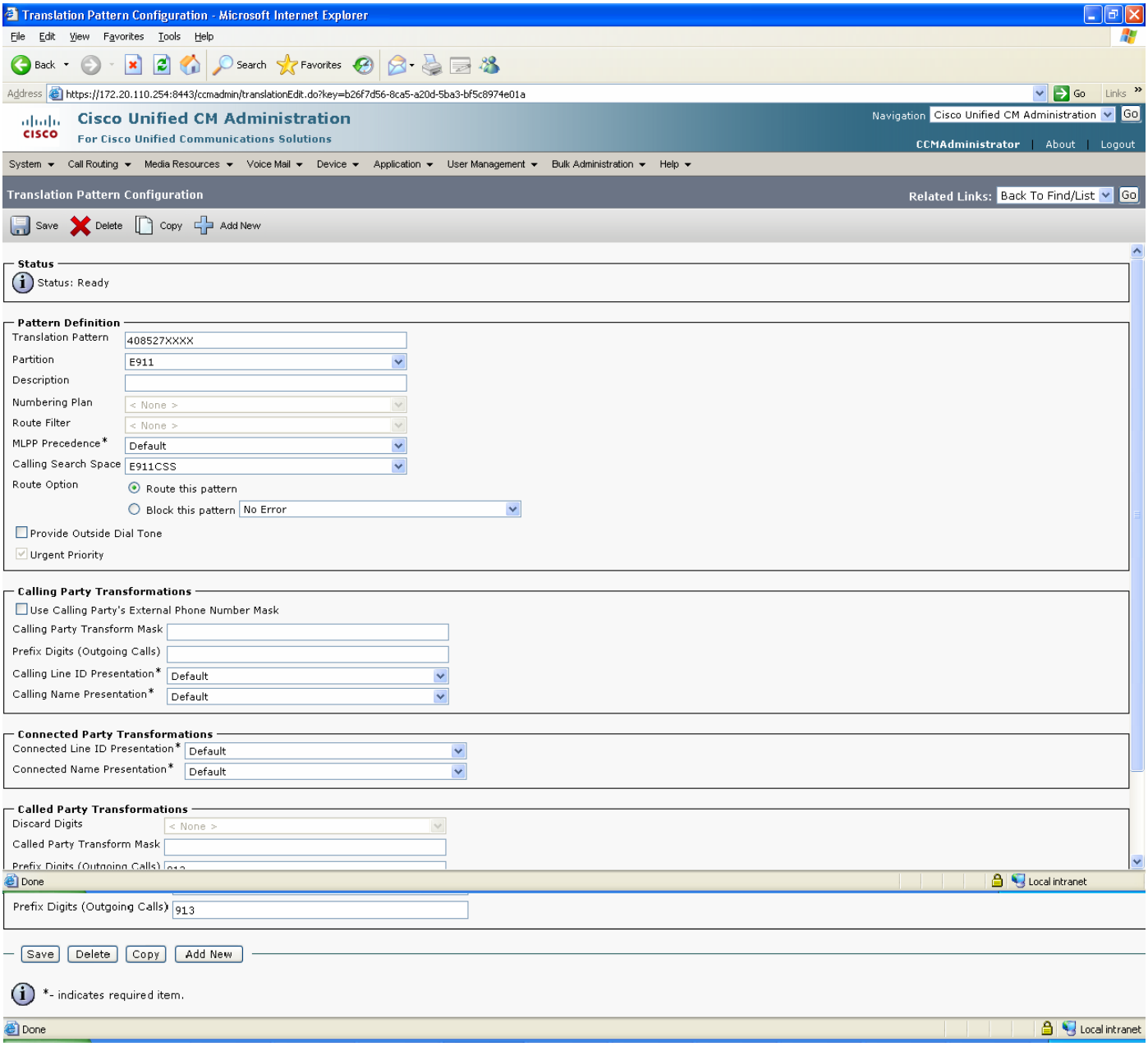
Translation Pattern for ELINs



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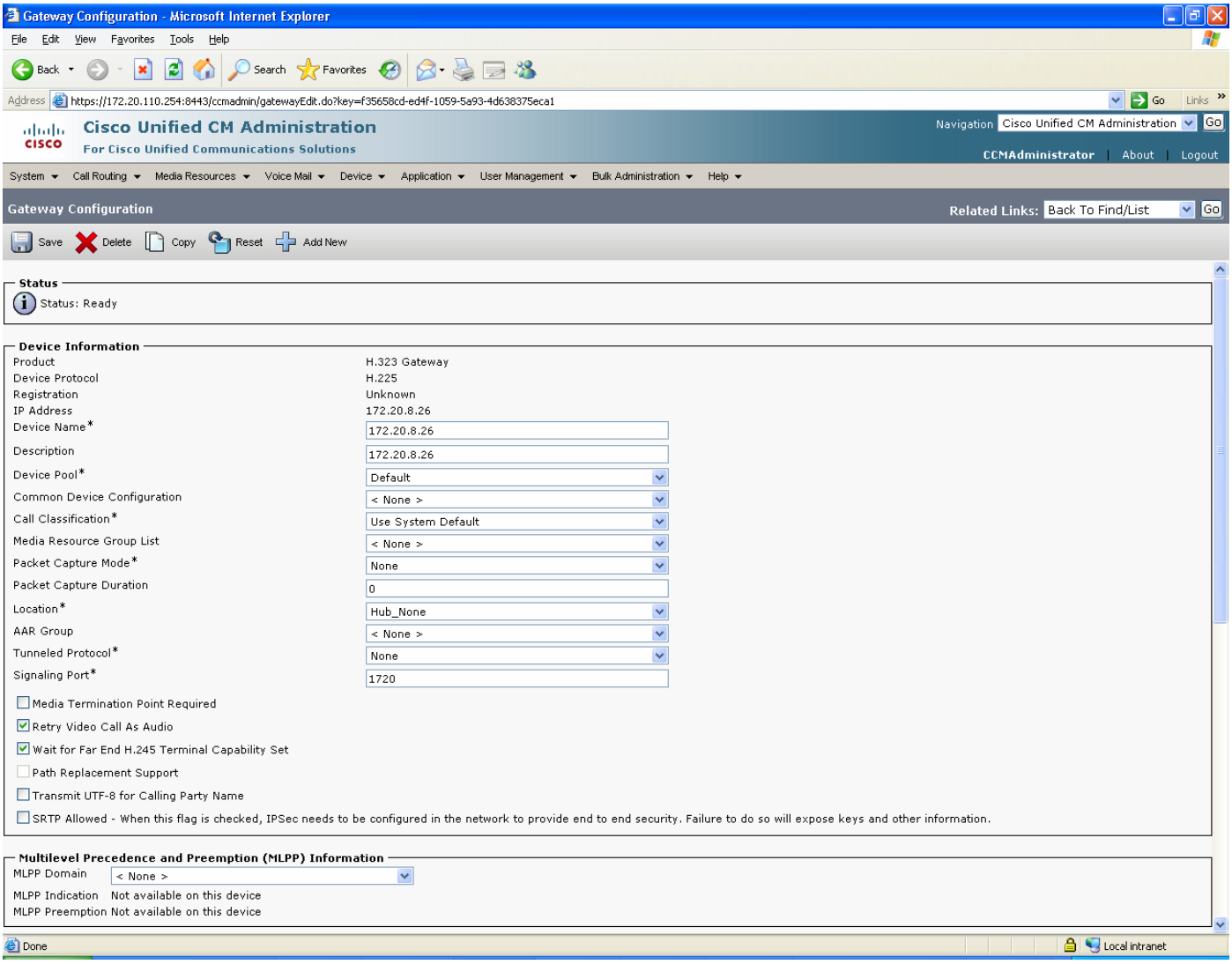
PSAP Gateway configuration (CAMA TRUNK)



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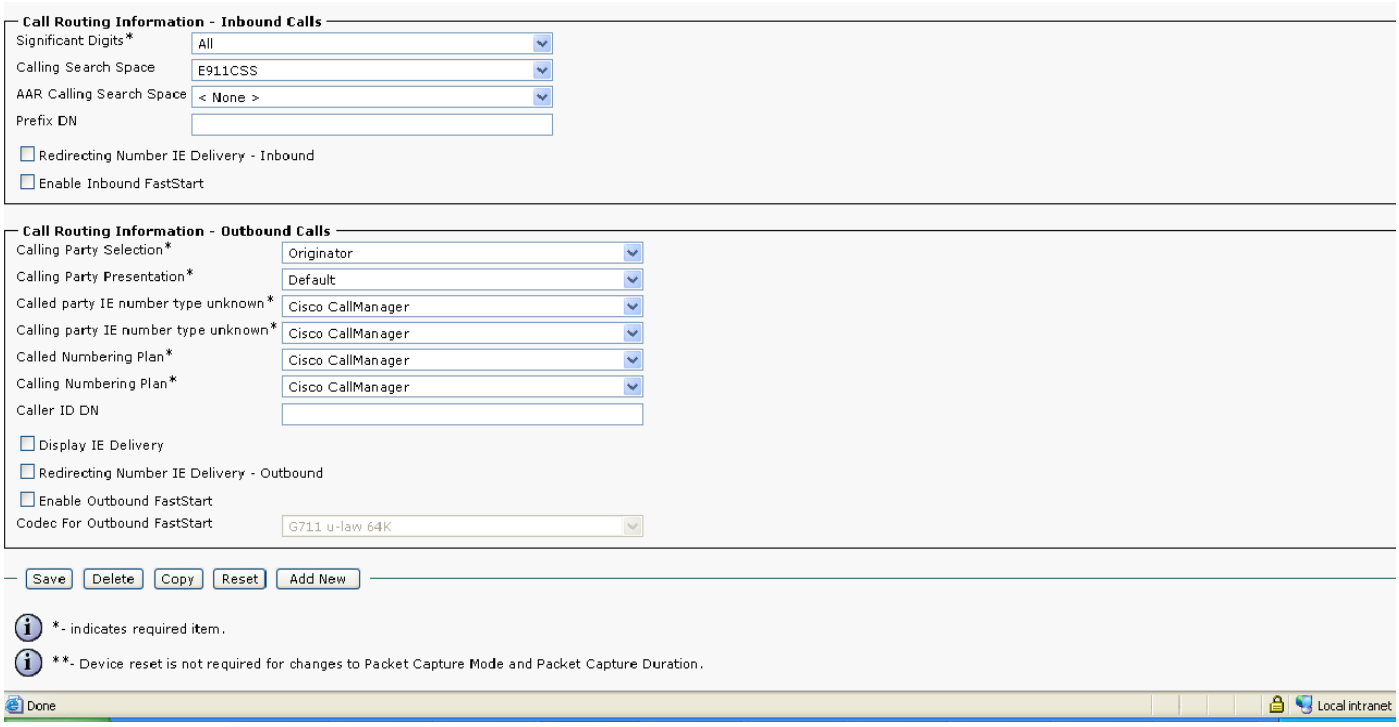

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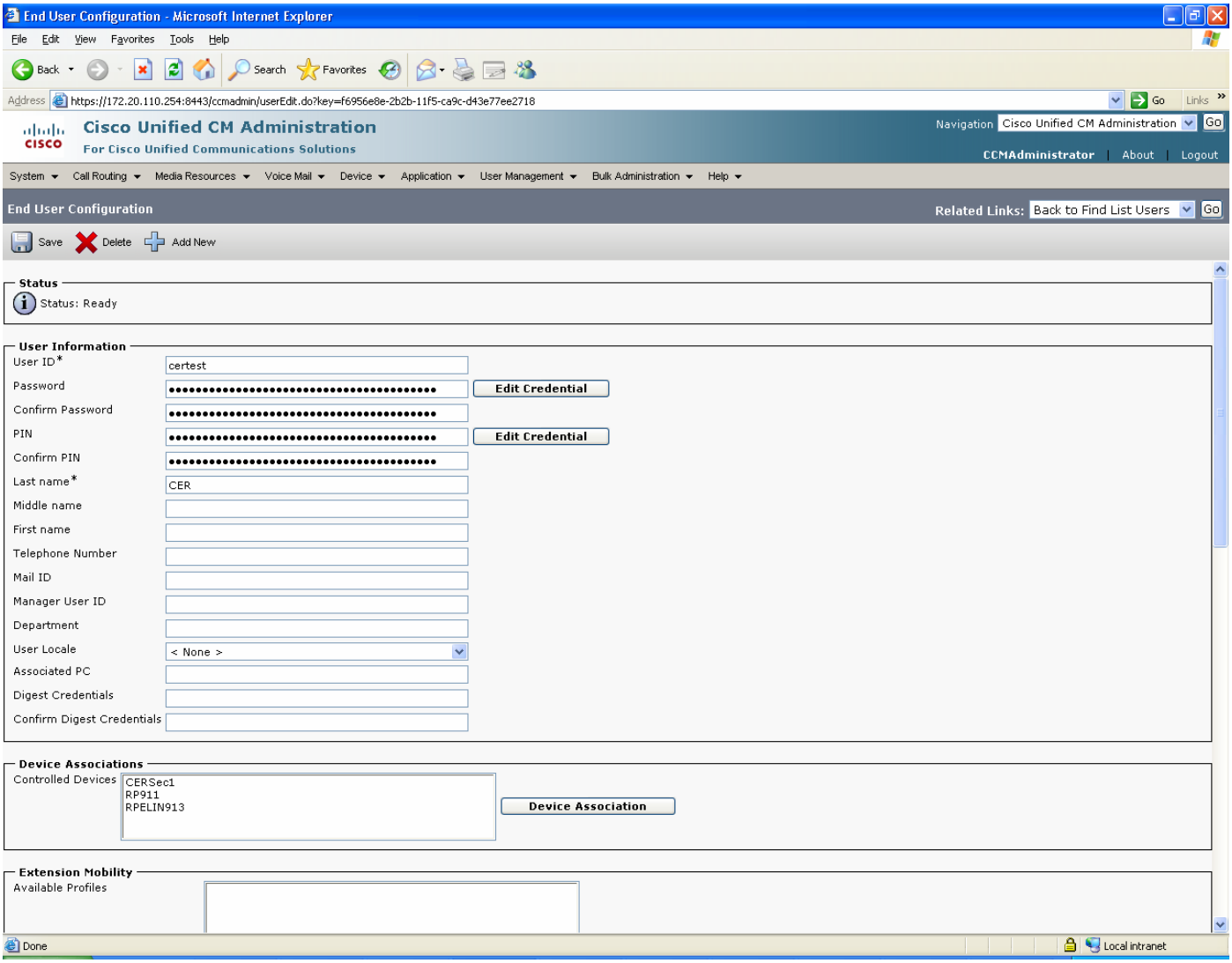
Cisco Communications Manager User



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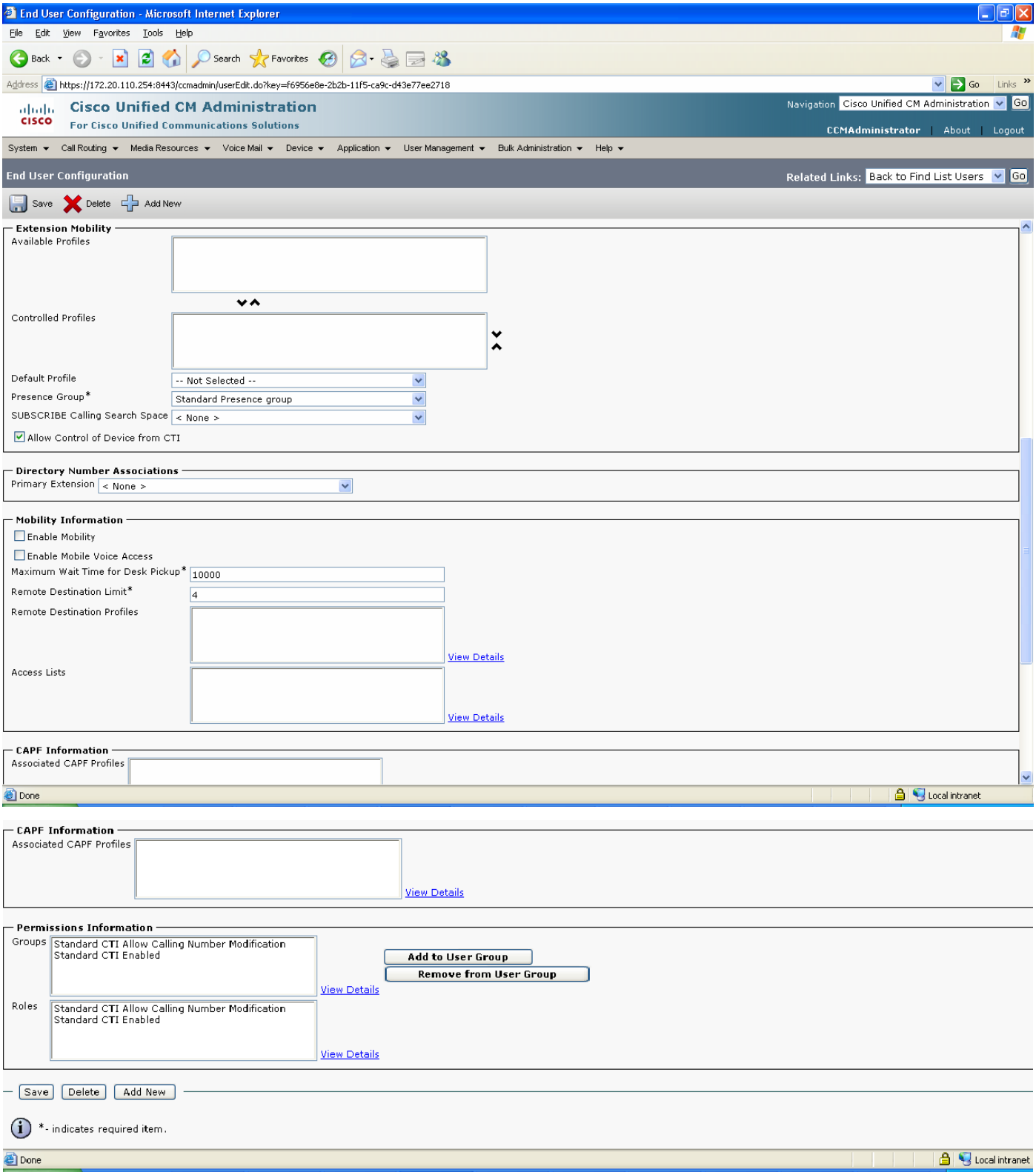

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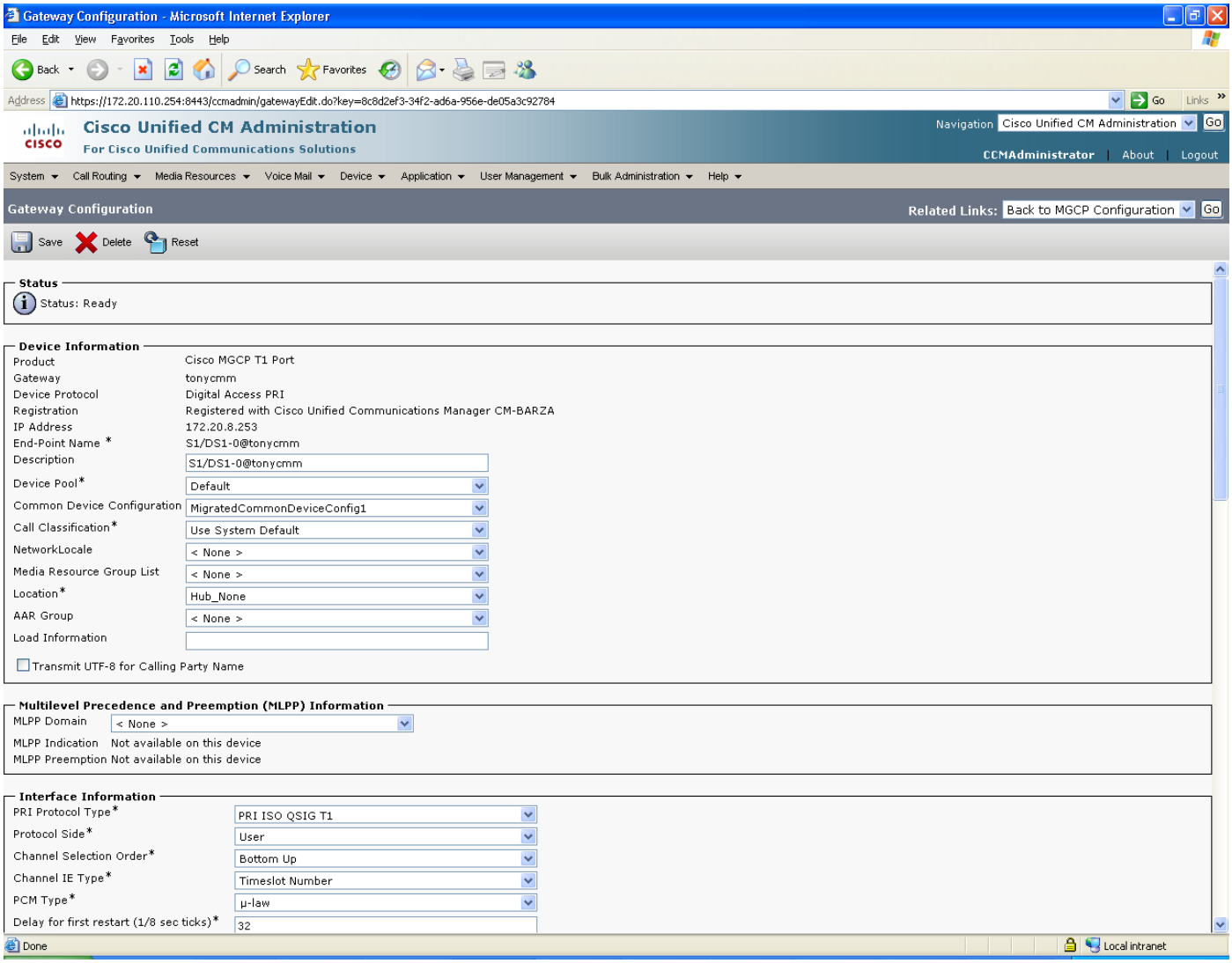
T1-QSIG Gateway



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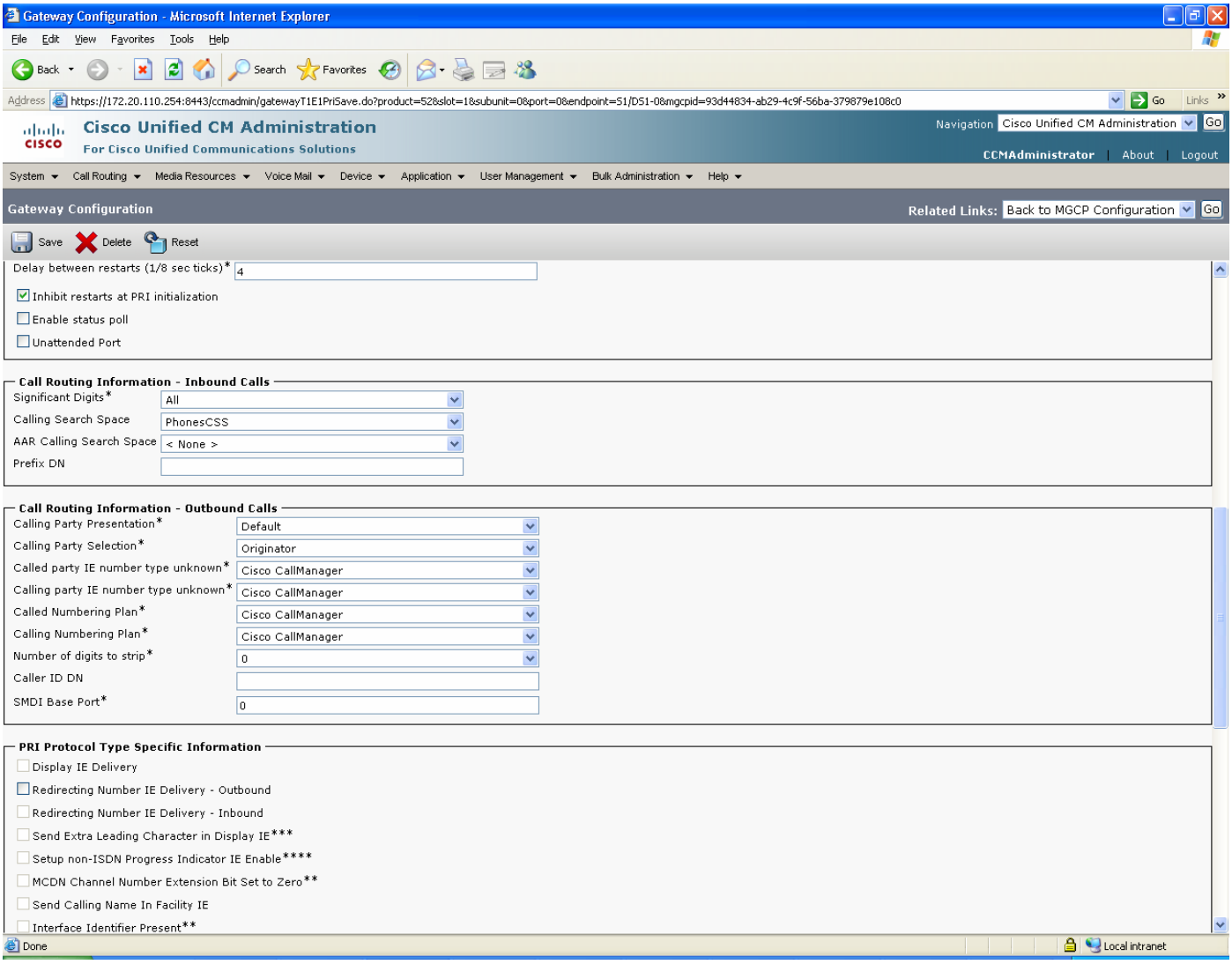

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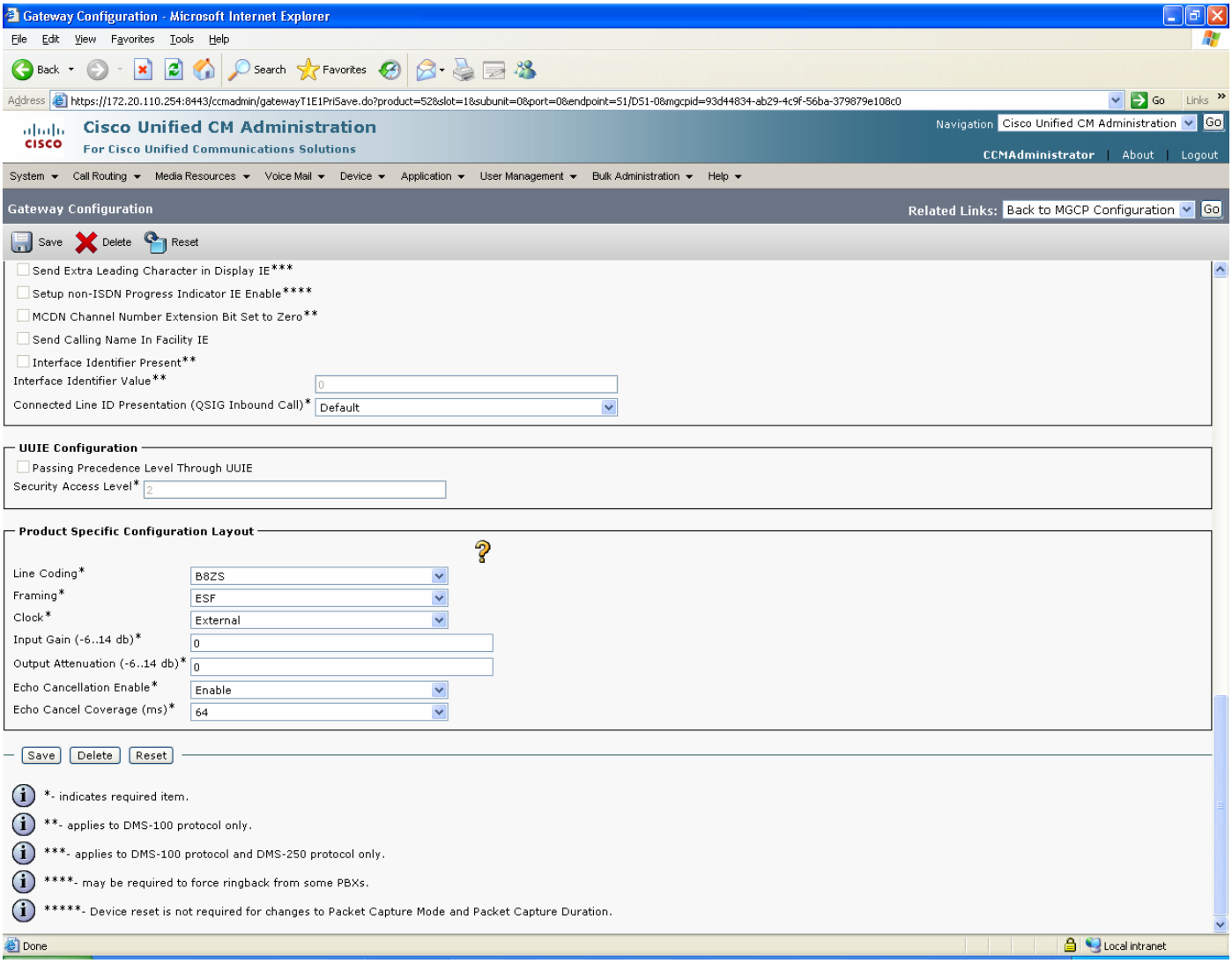

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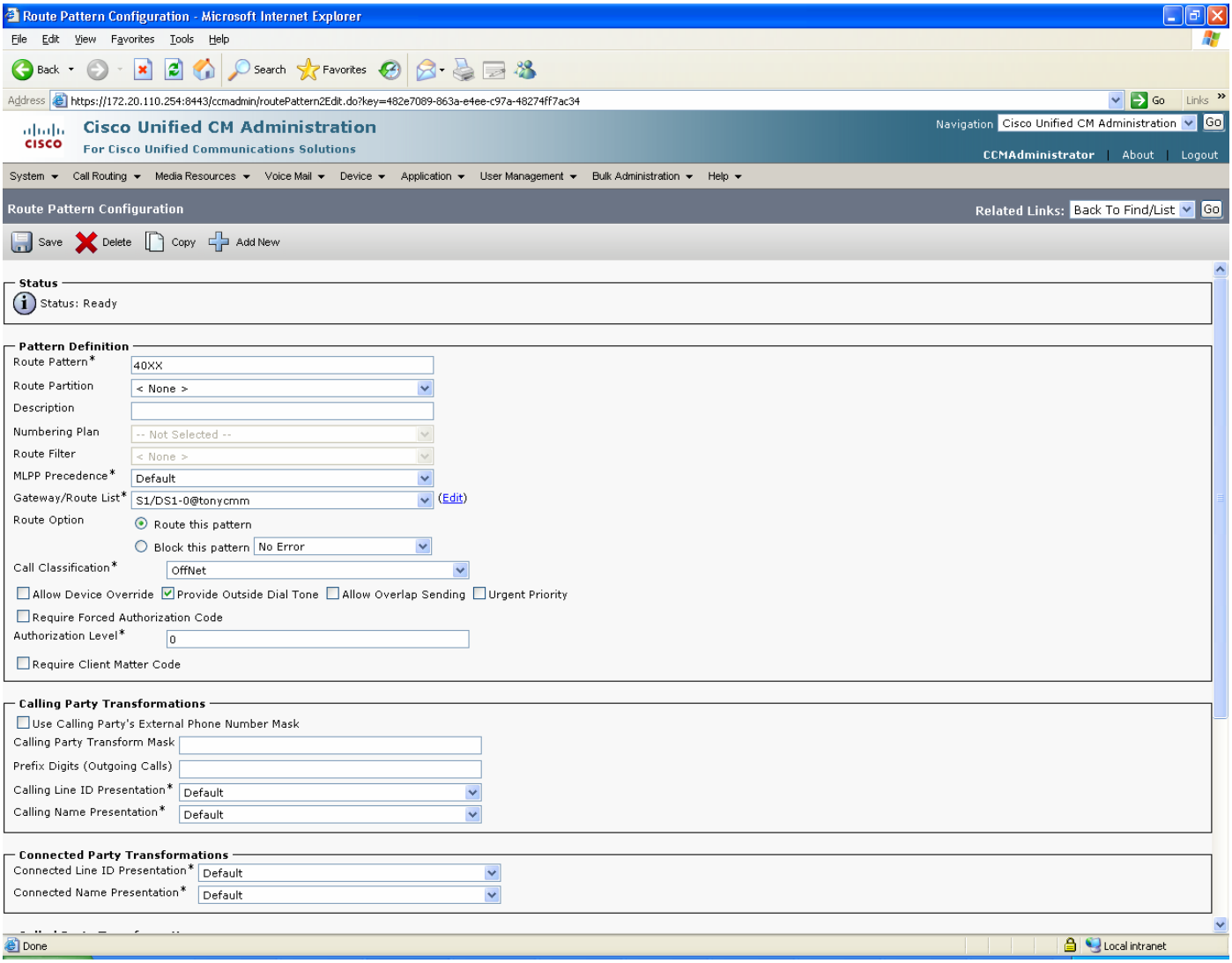
Route Pattern to QSIG Trunk



Note: For detailed information regarding QSIG interoperability between CCM and NEC PBX go to:
http://www.cisco.com/warp/public/779/largeent/avvid/inter_operability/flash/portal.html

SNMP service must be active

Performance and Monitoring Services

	Service Name	Activation Status
☑	Cisco Serviceability Reporter	Activated
☑	Cisco CallManager SNMP Service	Activated

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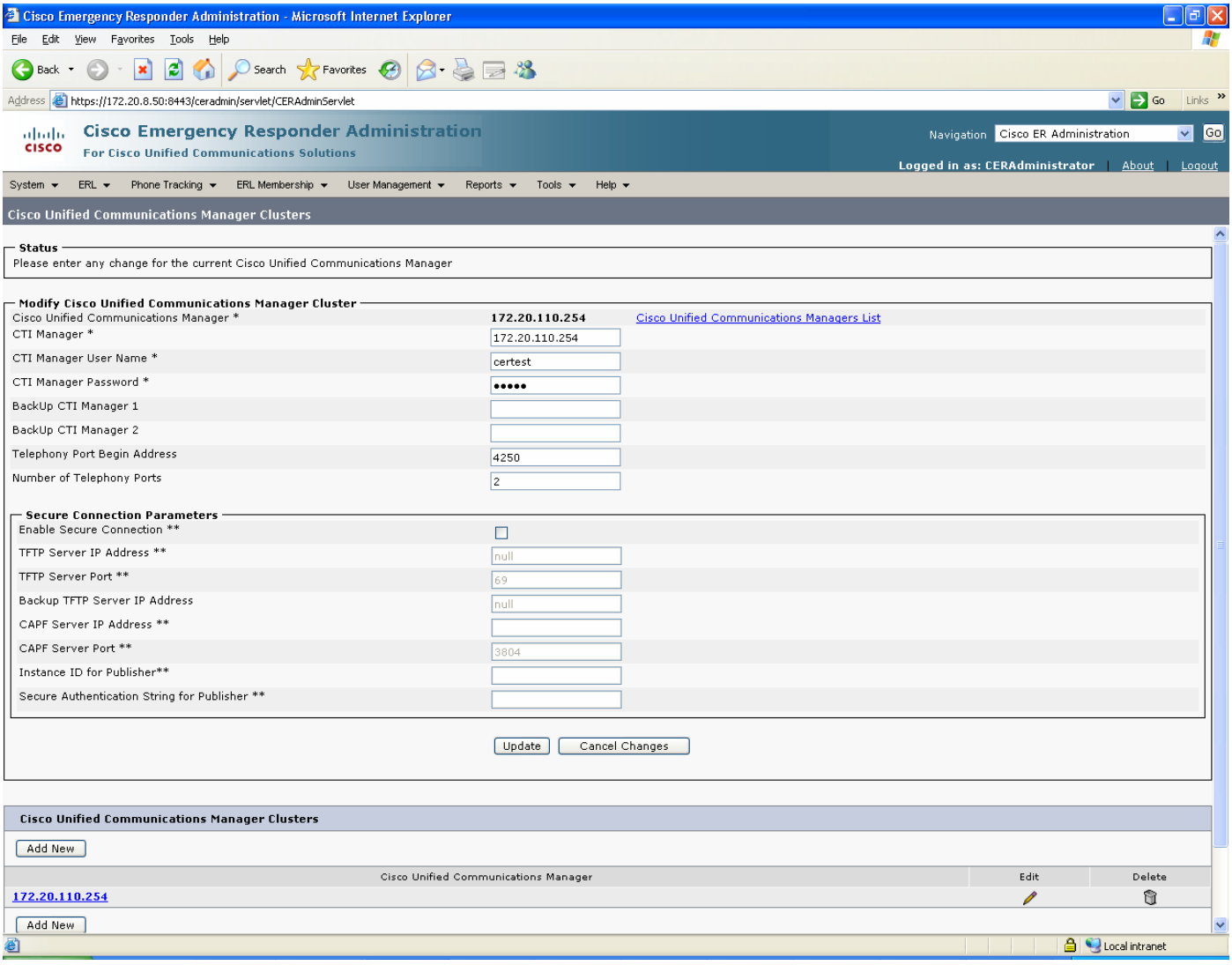
Configuring Cisco Emergency Responder

Cisco Communications Manager Details



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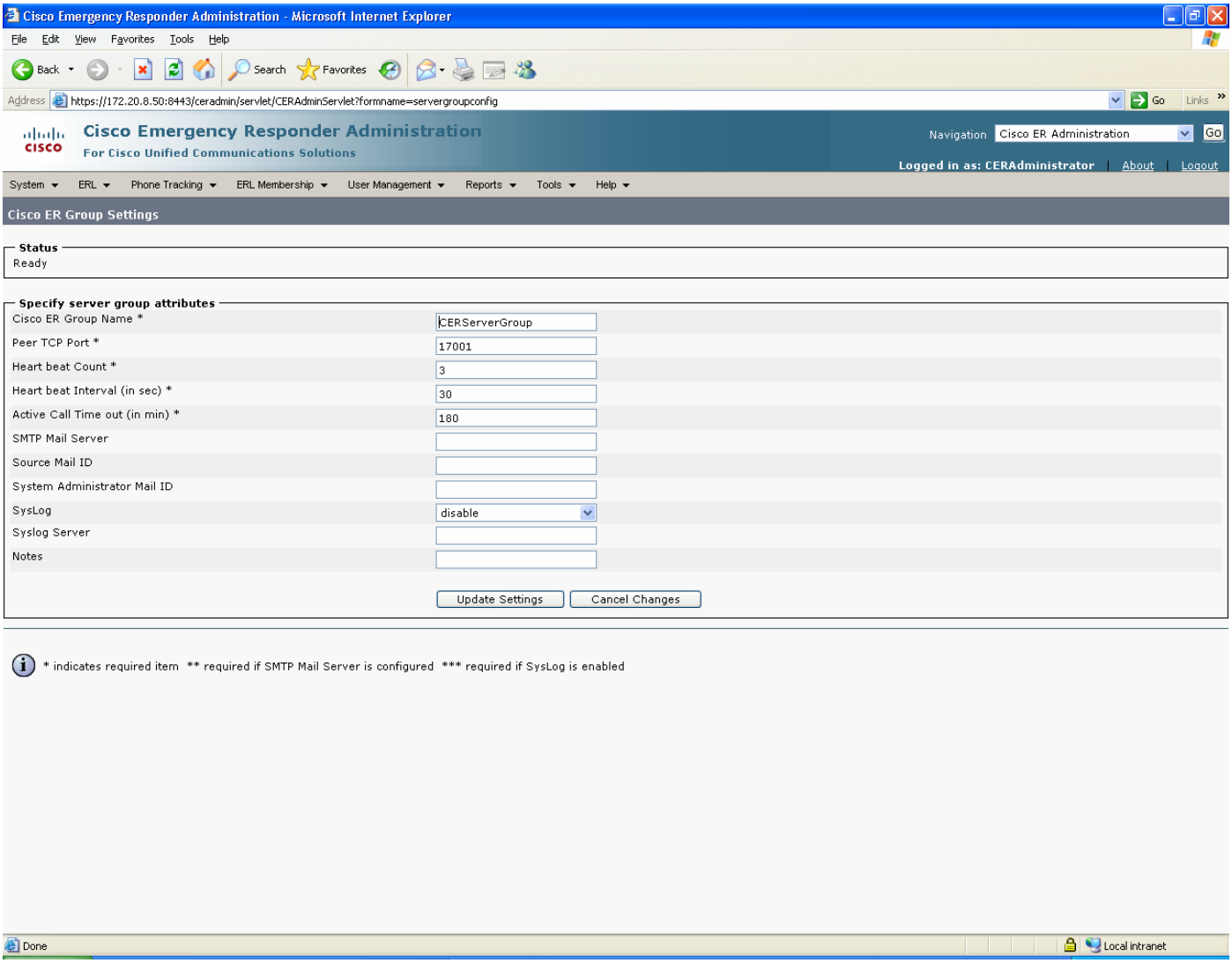
Cisco Emergency Responder Server group



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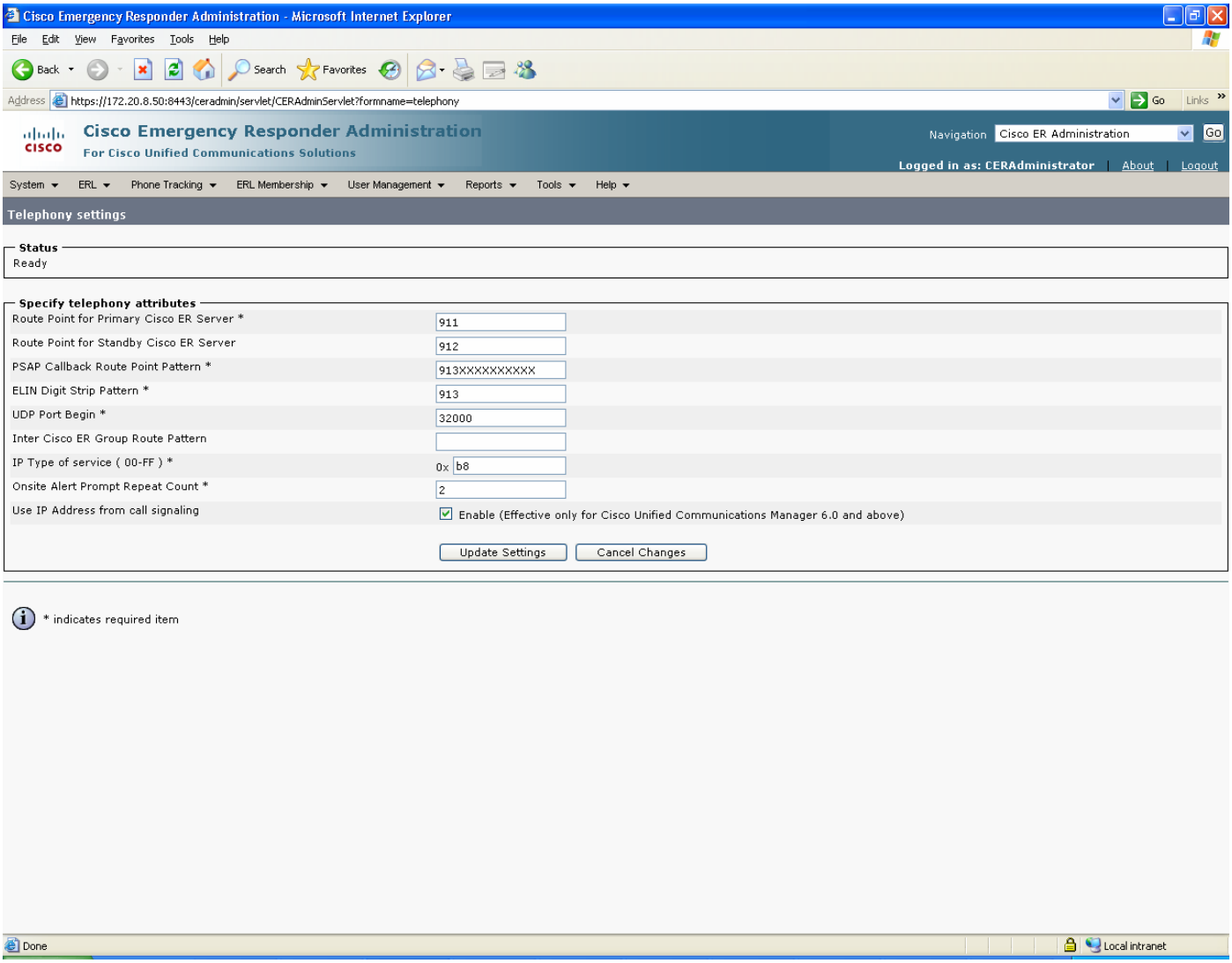
Telephony Settings



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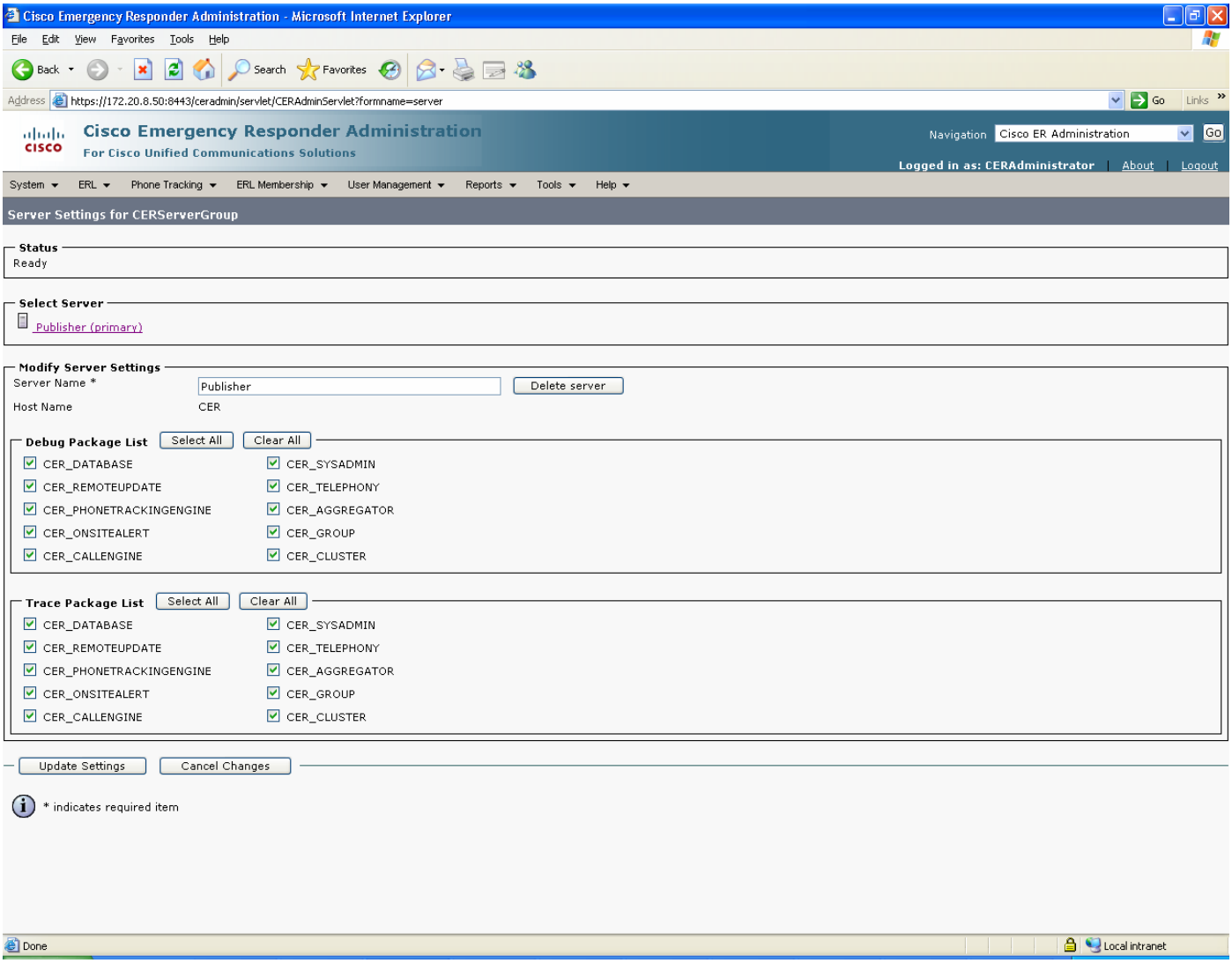
Server Settings



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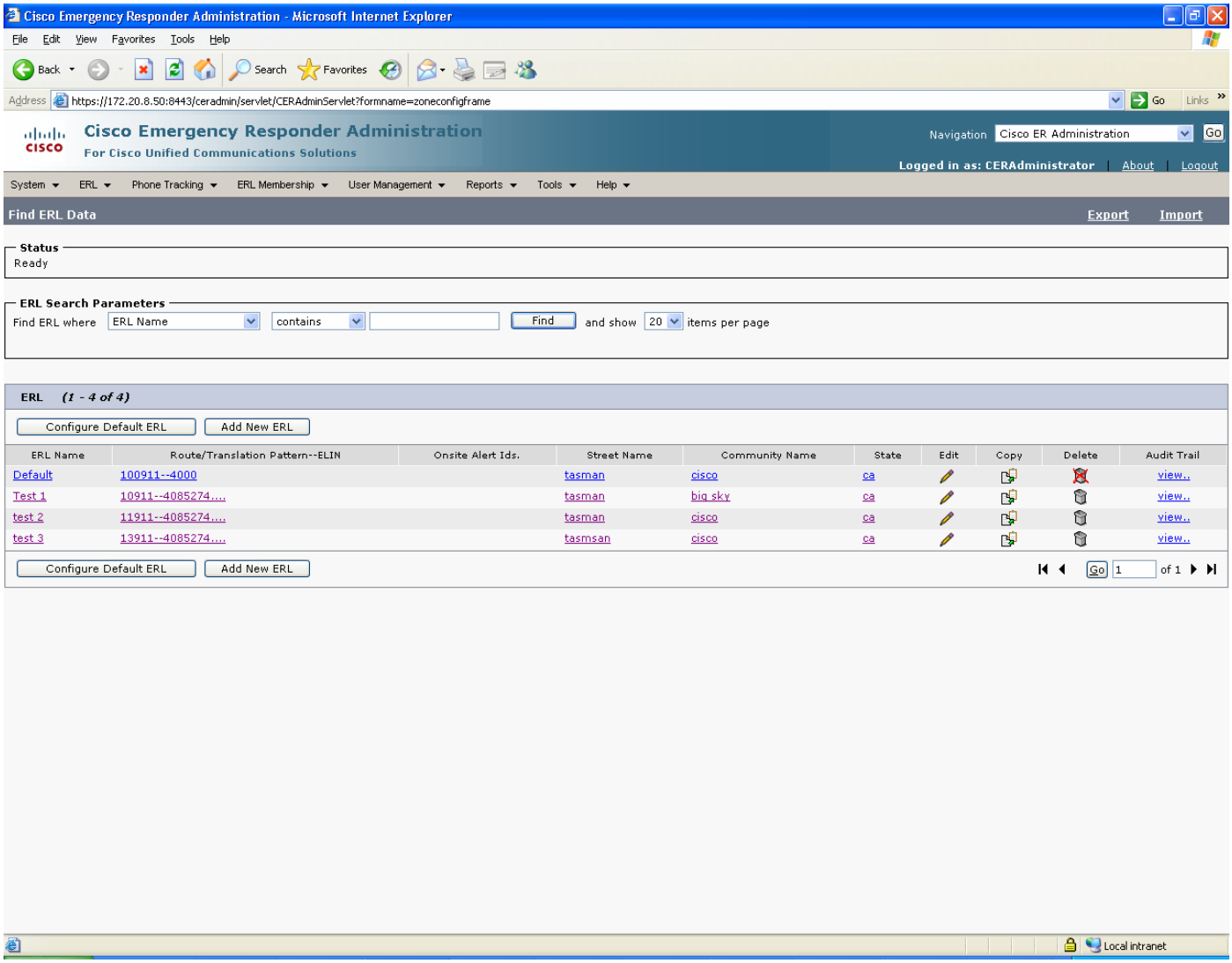
ERLs List



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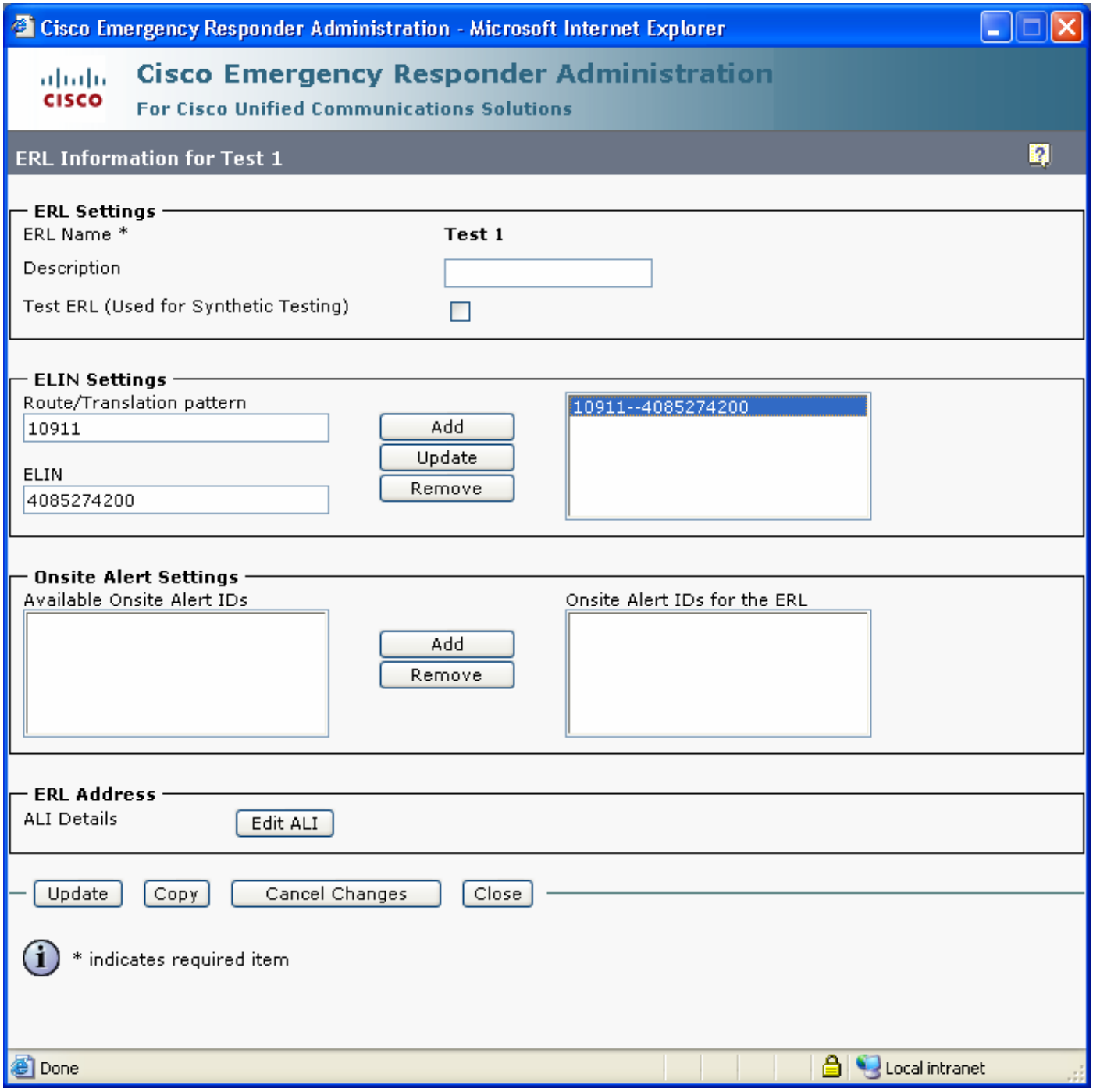
ERL 1



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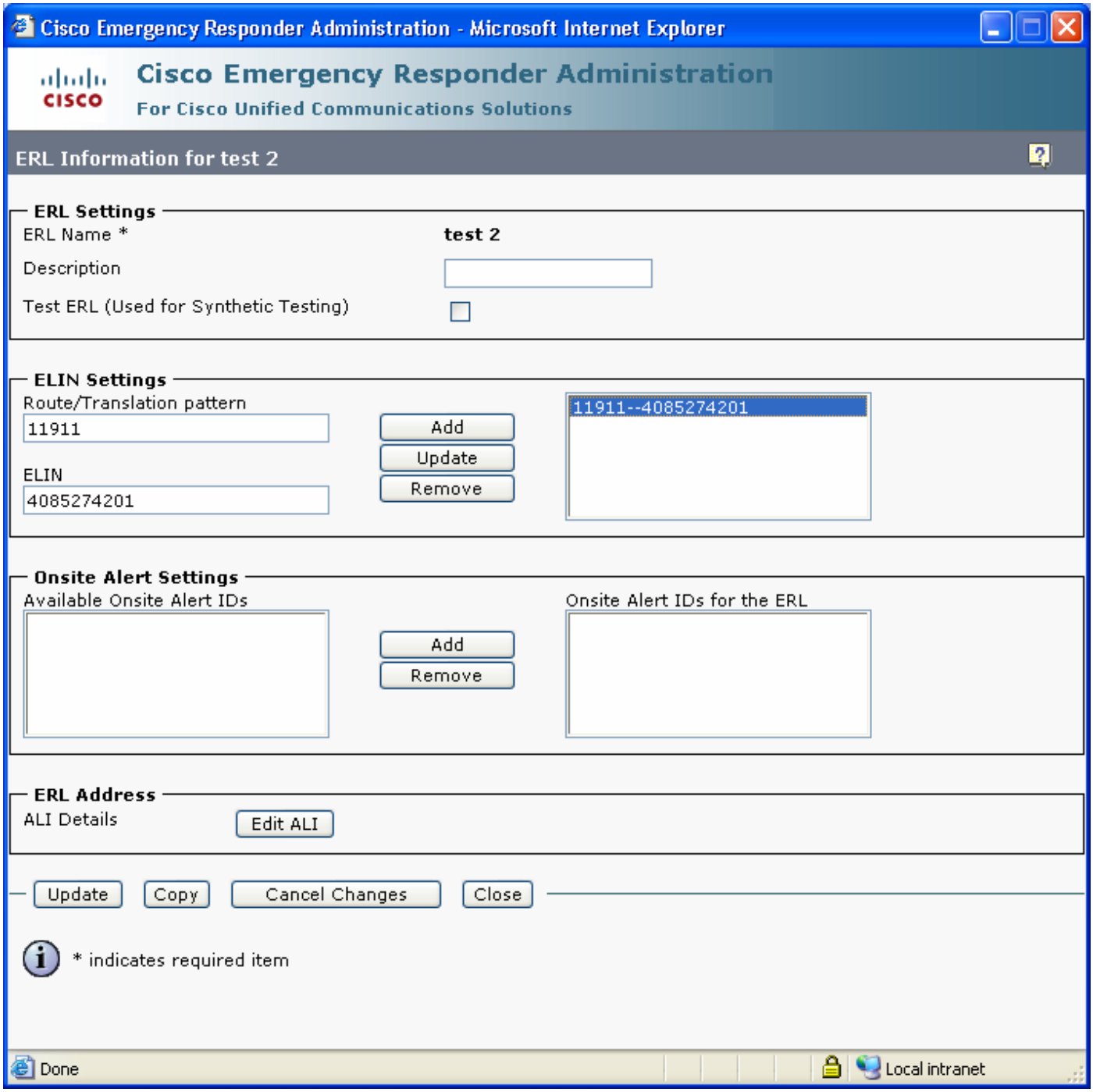
ERL 2



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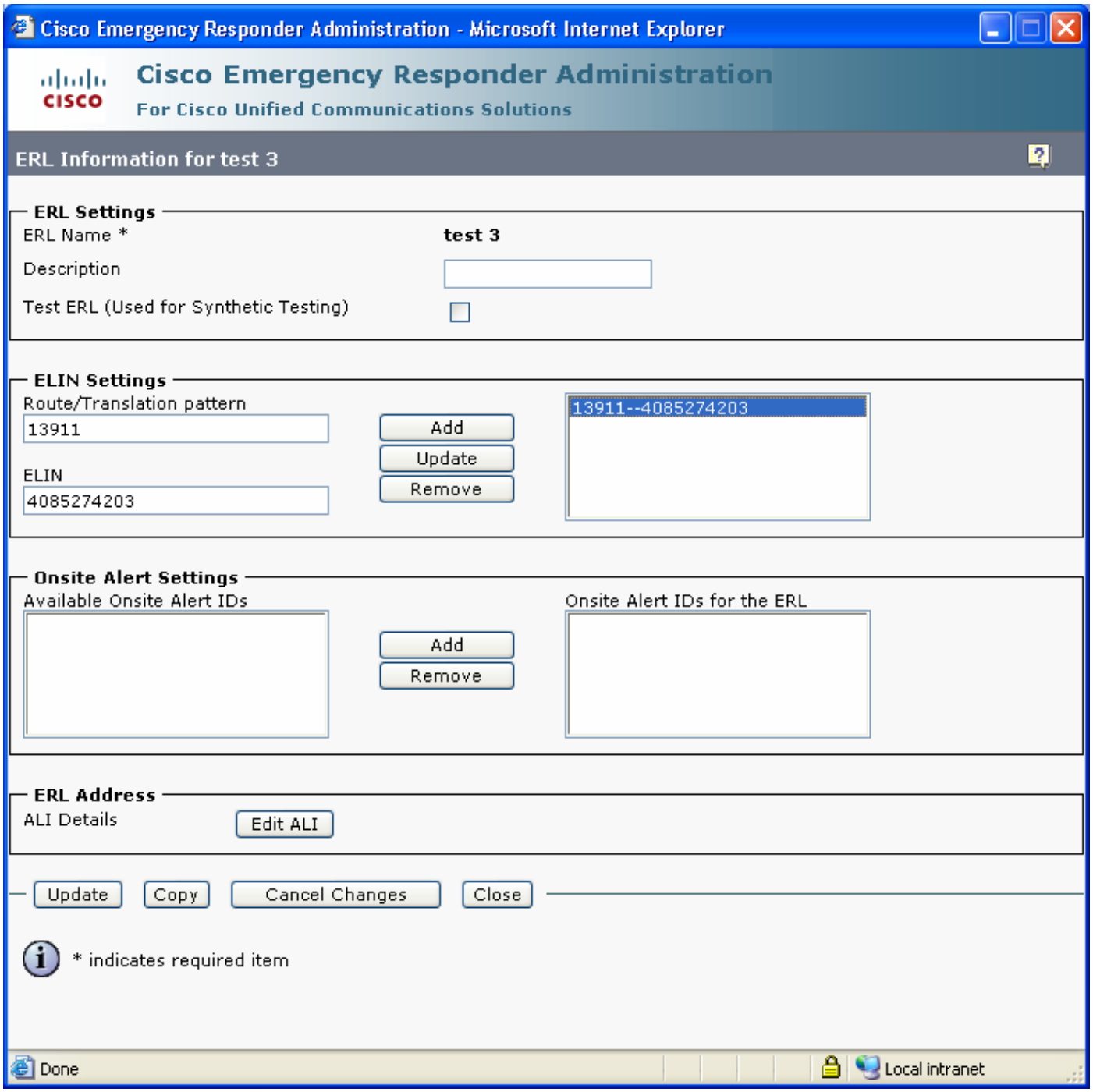
ERL 3



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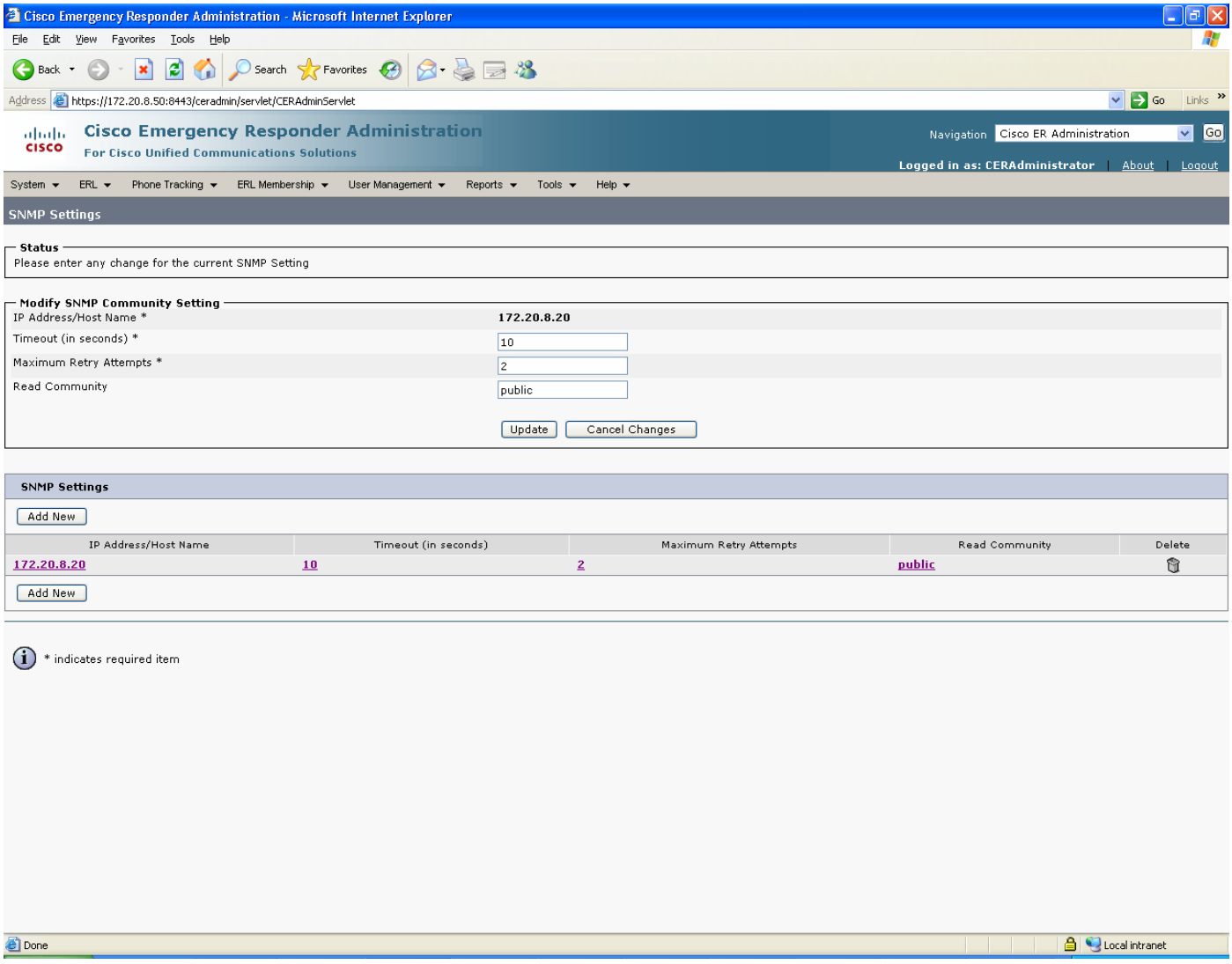
SNMP connection



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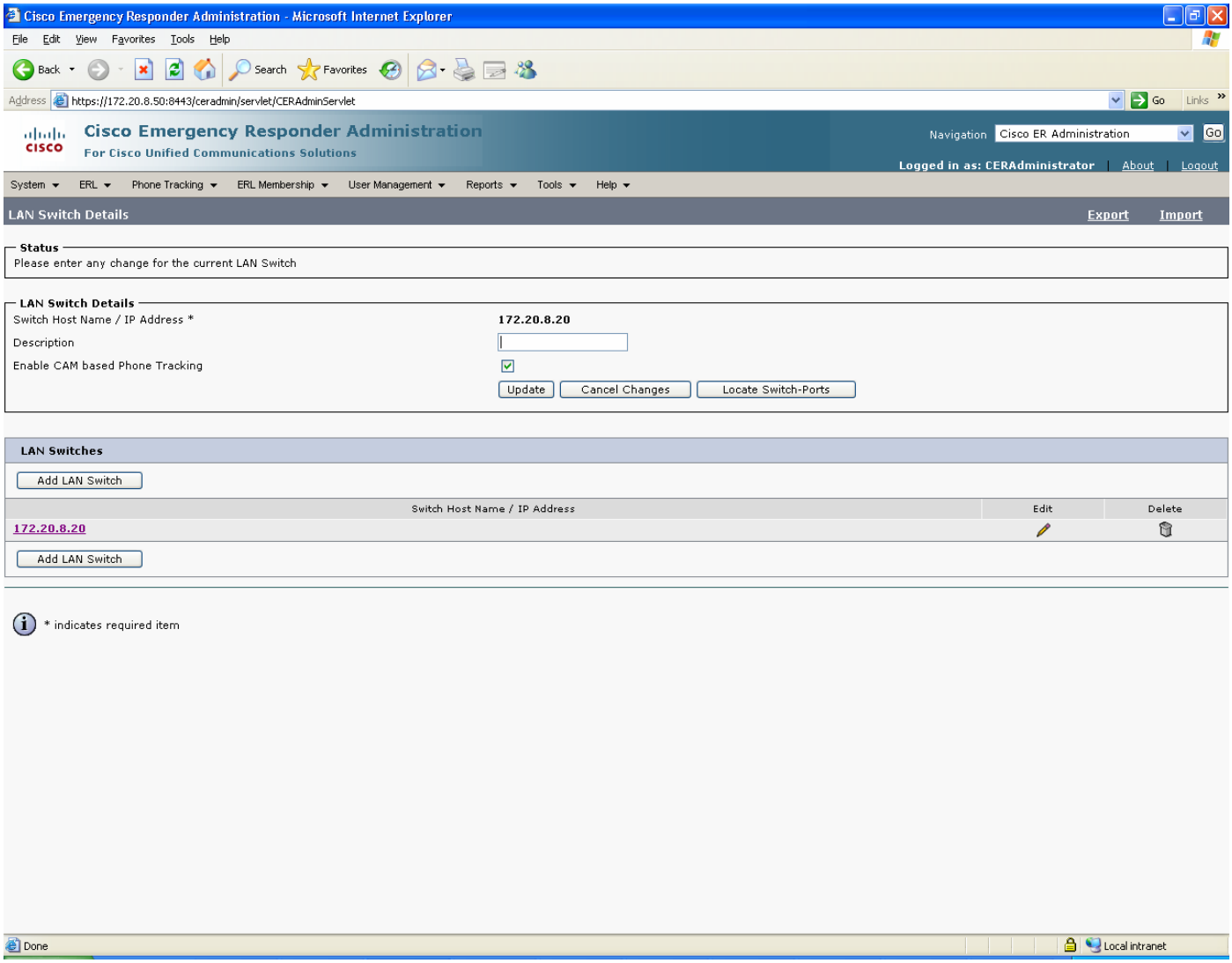
LAN Switch identifying



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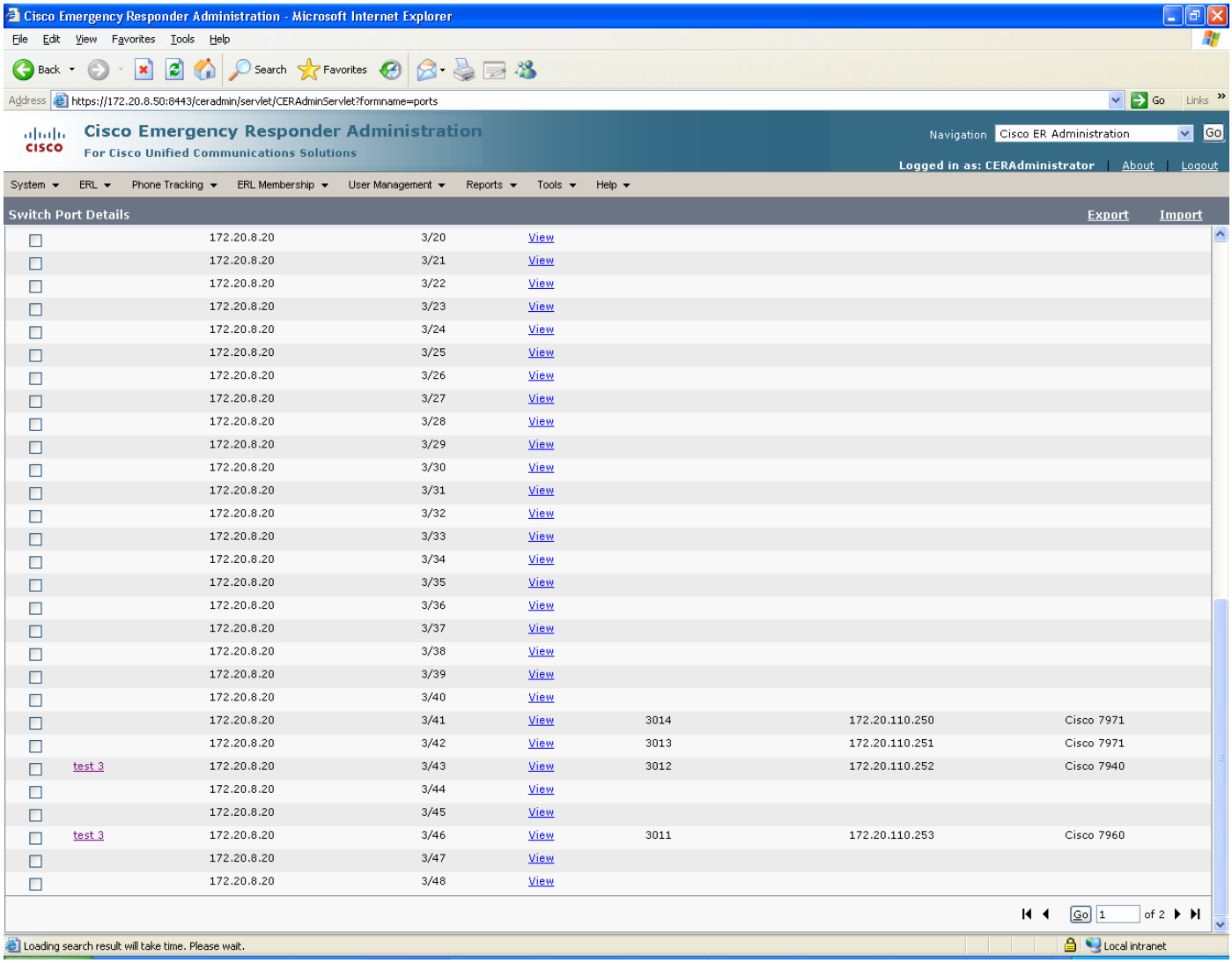
Switch Port Details



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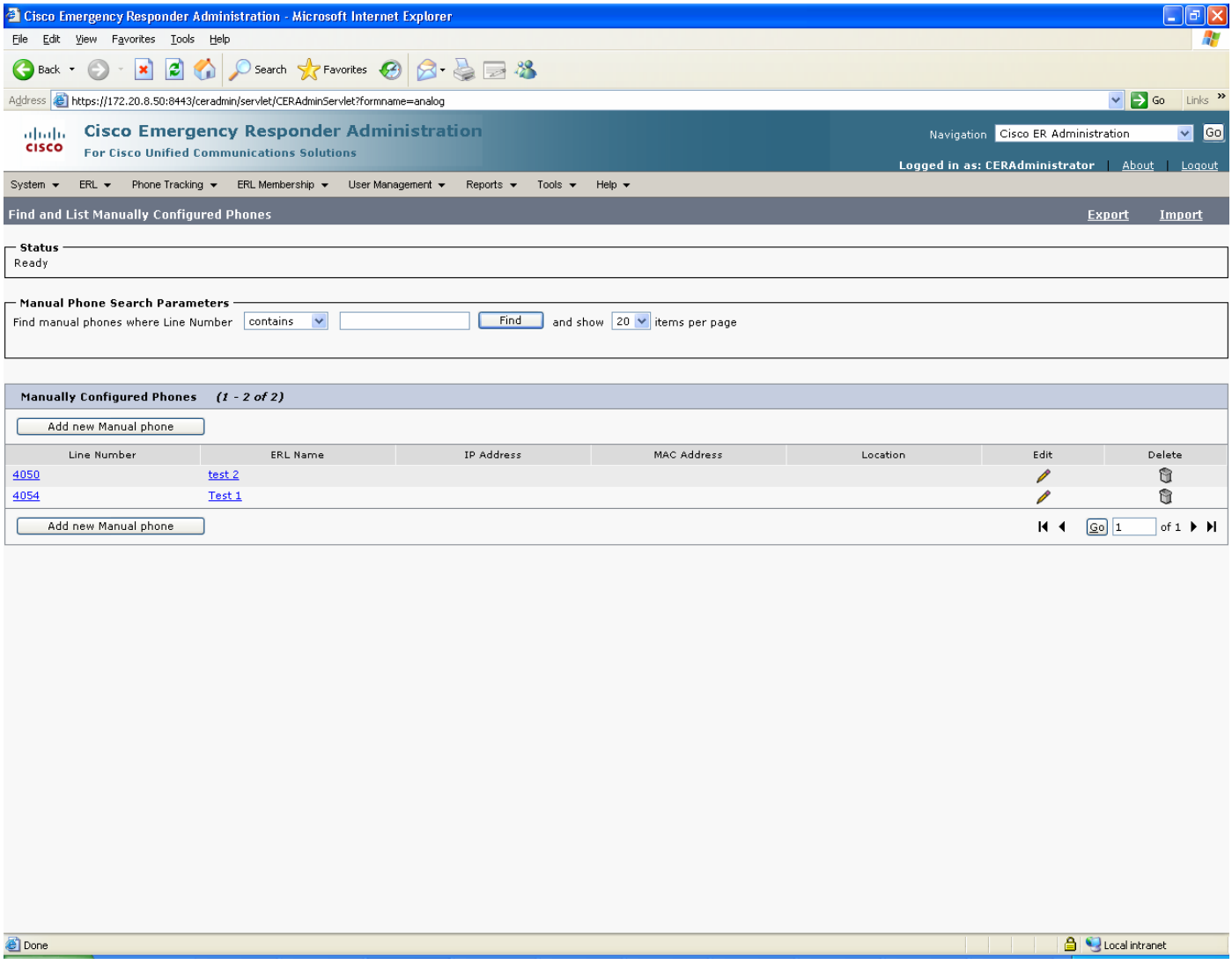
Defining Manual Phones (PBX Stations)



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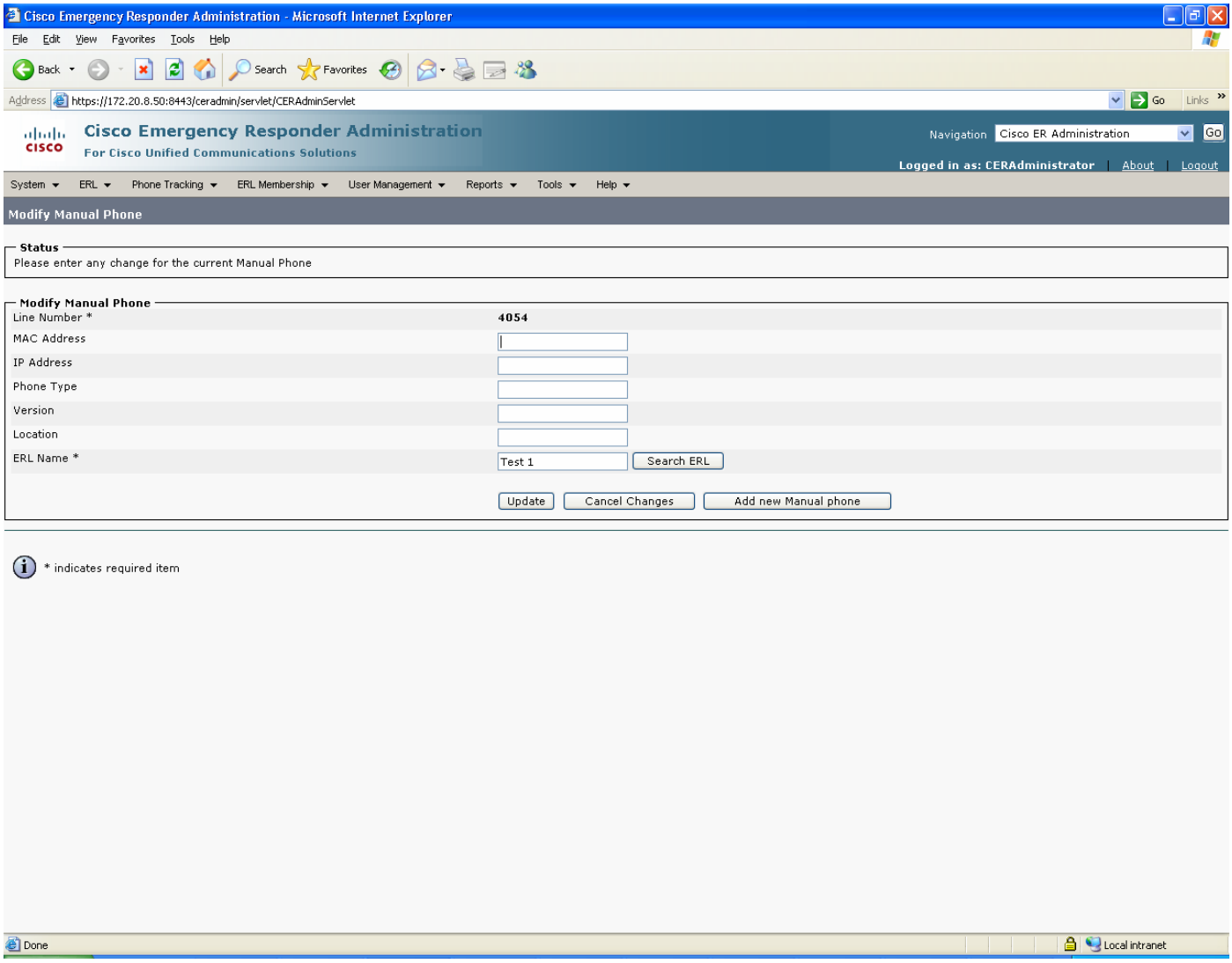

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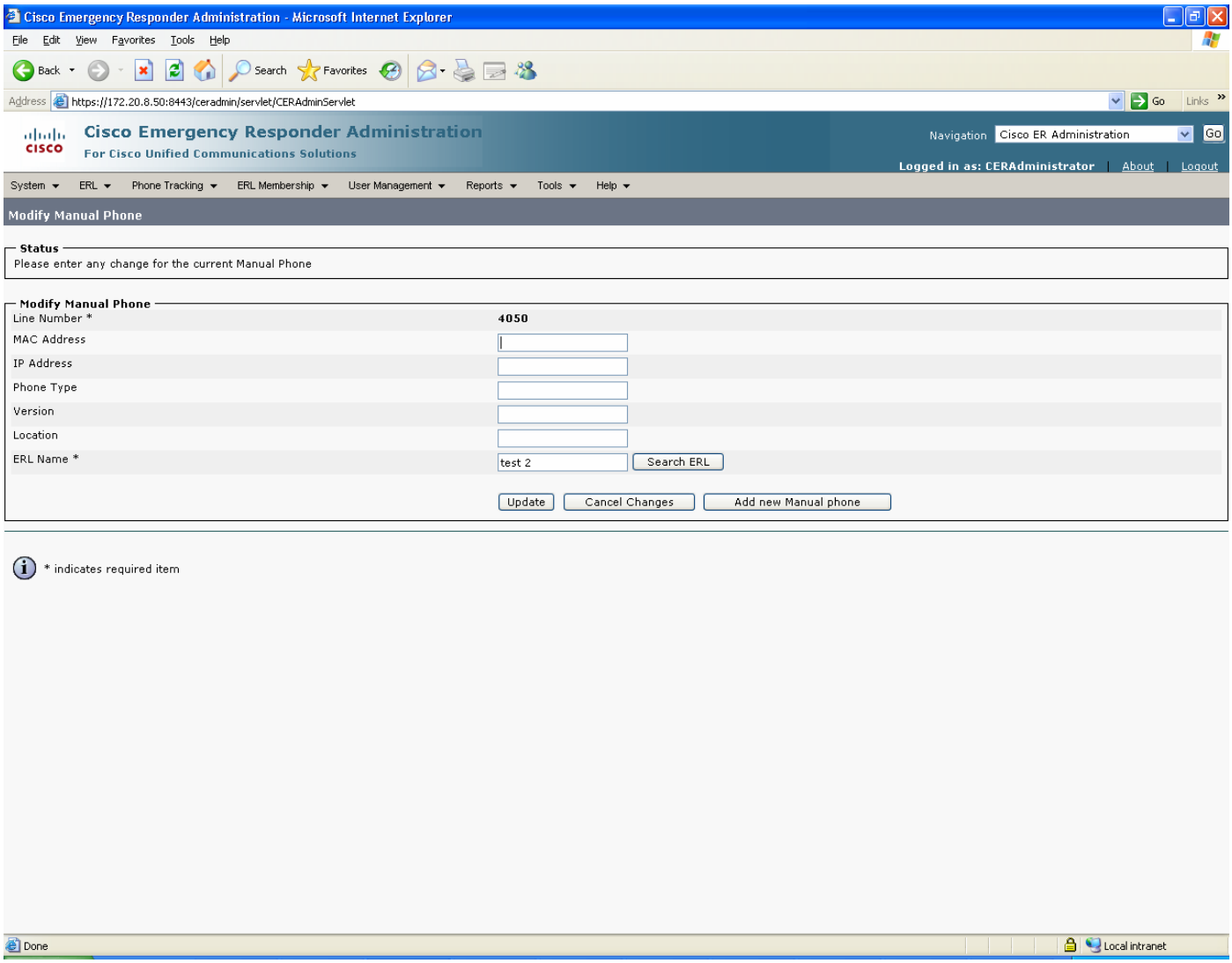

Cisco CUCM Cisco IOS Gateway MGCP Configuration for QSIG Connectivity

tonycmm#sh run

Building configuration...

Current configuration : 2077 bytes

!

version 12.4

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```
no service pad
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname tonycmm
!
boot-start-marker
boot system bootflash:wscmm-ipvoicek9-mz.124-11.T.bin
boot-end-marker
!
logging buffered 10000000
no logging console
enable password cisco
!
no aaa new-model
mmi polling-interval 60
no mmi auto-configure
no mmi pvc
mmi snmp-timeout 180
!
!
no ip domain lookup
ip host CM-BARZA 172.20.110.254
multilink bundle-name authenticated
!
isdn switch-type primary-qsig
!
!
!
!
!
!
!
!
!
```

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```
!
!
!
!
!
!
controller T1 1/0
 pri-group timeslots 1-24 service mgcp
!
controller T1 1/1
!
controller T1 1/2
!
controller T1 1/3
!
controller T1 1/4
!
controller T1 1/5
!
!
!
!
interface GigabitEthernet1/0
 ip address 172.20.8.253 255.255.255.0
 no ip proxy-arp
 no negotiation auto
 no keepalive
!
interface Serial1/0:23
 no ip address
 encapsulation hdlc
 no logging event link-status
 isdn switch-type primary-qsig
 isdn incoming-voice voice
 isdn bind-l3 ccm-manager
 no cdp enable
```

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```
!
ip default-gateway 172.20.8.1
ip route 0.0.0.0 0.0.0.0 172.20.8.1
!
no ip http server
no ip http secure-server
!
!
control-plane
!
!
voice-port 1/0:23
!
ccm-manager mgcp
ccm-manager music-on-hold
ccm-manager config server CM-BARZA
ccm-manager config
!
mgcp
mgcp call-agent CM-BARZA 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
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
!
!
!
```

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```
!
!
!
line con 0
 password cisco
 transport output all
line vty 0 4
 exec-timeout 0 0
 password cisco
 login
 transport input all
 transport output all
!
!
end

tonycmm#
```

Cisco 3825 IOS Gateway H323 configuration for CAMA trunk connectivity

```
CAMA_GW#sh run
Building configuration...

Current configuration : 1241 bytes
!
version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname CAMA_GW
!
boot-start-marker
boot-end-marker
!
enable password cisco
```

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```
!
no aaa new-model
ip cef
!
!
!
!
multilink bundle-name authenticated
!
voice-card 0
 no dspfarm
!
!
!
!
```

```
interface GigabitEthernet0/0
 ip address 172.20.8.26 255.255.255.0
 duplex auto
 speed auto
 media-type rj45
 no keepalive
!
interface GigabitEthernet0/1
 no ip address
 shutdown
 duplex auto
 speed auto
 media-type rj45
 no keepalive
!
ip route 0.0.0.0 0.0.0.0 172.20.8.1
!
!
ip http server
no ip http secure-server
!
!
!
!
control-plane
!
!
!
voice-port 0/2/0
 signal cama KP-0-NPA-NXX-XXXX-ST
 dial-type mf
 timing hookflash-out 500
 description CAMA
!
voice-port 0/2/1
!
```

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```
voice-port 0/3/0
!
voice-port 0/3/1
!
!
!
!
!
dial-peer voice 911 pots
 destination-pattern 911
 no digit-strip
 port 0/2/0
 forward-digits all
!
dial-peer voice 999 voip
 description Call-in PSTN simulation
 destination-pattern .T
 session target ipv4:172.20.110.254
!
!
!
line con 0
 password cisco
 login
 stopbits 1
line aux 0
 stopbits 1
line vty 0 4
 password cisco
 login
!
scheduler allocate 20000 1000
!
end

CAMA_GW#
```

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CAMA voice-port config

CAMA_GW#sh voice port 0/2/0

Foreign Exchange Office 0/2/0 Slot is 0, Sub-unit is 2, Port is 0

Type of VoicePort is FXO

Operation State is DORMANT

Administrative State is UP

The Last Interface Down Failure Cause is Administrative Shutdown

Description is CAMA

Noise Regeneration is enabled

Non Linear Processing is enabled

Non Linear Mute is disabled

Non Linear Threshold is -21 dB

Music On Hold Threshold is Set to -38 dBm

In Gain is Set to 0 dB

Out Attenuation is Set to 3 dB

Echo Cancellation is enabled

Echo Cancellation NLP mute is disabled

Echo Cancellation NLP threshold is -21 dB

Echo Cancel Coverage is set to 64 ms

Echo Cancel worst case ERL is set to 6 dB

Playout-delay Mode is set to adaptive

Playout-delay Nominal is set to 60 ms

Playout-delay Maximum is set to 250 ms

Playout-delay Minimum mode is set to default, value 40 ms

Playout-delay Fax is set to 300 ms

Connection Mode is normal

Connection Number is not set

Initial Time Out is set to 10 s

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Interdigit Time Out is set to 10 s

Call Disconnect Time Out is set to 60 s

Ringing Time Out is set to 180 s

Wait Release Time Out is set to 30 s

Companding Type is u-law

Region Tone is set for US

Analog Info Follows:

Currently processing none

Maintenance Mode Set to None (not in mtc mode)

Number of signaling protocol errors are 0

Impedance is set to 600r Ohm

Station name None, Station number None

Translation profile (Incoming):

Translation profile (Outgoing):

Voice card specific Info Follows:

Signal Type is cama

Cama Type is KP-0-NPA-NXX-XXXX-ST

Battery-Reversal is enabled

Number Of Rings is set to 1

Supervisory Disconnect is signal

Answer Supervision is inactive

Hook Status is On Hook

Ring Detect Status is inactive

Ring Ground Status is inactive

Tip Ground Status is inactive

Dial Out Type is mf

Digit Duration Timing is set to 75 ms

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InterDigit Duration Timing is set to 65 ms

Pulse Rate Timing is set to 10 pulses/second

InterDigit Pulse Duration Timing is set to 750 ms

Percent Break of Pulse is 60 percent

GuardOut timer is 2000 ms

Minimum ring duration timer is 125 ms

Hookflash-in Timing is set to 600 ms

Hookflash-out Timing is set to 500 ms

Supervisory Disconnnct Timing is set to 350 ms

OPX Ring Wait Timing is set to 6000 ms

CAMA_GW#

CAT6k configuration

```
Console> (enable) sh snmp
SNMP:                    Enabled
RMON:                    Disabled
Extended RMON Netflow Enabled : None.
Memory usage limit for new RMON entries: 85 percent
EngineId: 00:00:00:09:00:01:97:31:c8:00:00:00
Chassis Alias:
Traps Enabled: None
Port Traps Enabled: None

Community-Access     Community-String
----------------     --------------------
read-only            public
read-write           private
read-write-all       secret

Additional-                    Access-
Community-String     Access-Type    Number  View
-------------------- -------------- ------- ---------------------------------

Trap-Rec-Address Trap-Rec-Community Trap-Rec-Port Trap-Rec-Owner Trap-Rec-Index
---------------- ------------------ ------------- --------------- ---------------



Console> (enable) sh cdp
CDP              : enabled
```

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Message Interval : 60
Hold Time : 180
Version : V2
Device Id Format : Other
Console> (enable)

set interface sc0 109 172.20.8.20/255.255.255.0 172.20.8.255

Configuring the AVAYA Definity PBX

DS1 CIRCUIT PACK

```
display ds1 1a12                                          Page   1 of   2
                              DS1 CIRCUIT PACK

           Location: 01A12                          Name: T1 to CCM
           Bit Rate: 1.544                   Line Coding: b8zs
   Line Compensation: 1                     Framing Mode: esf
      Signaling Mode: isdn-pri
             Connect: pbx                       Interface: peer-master
   TN-C7 Long Timers? n                     Peer Protocol: Q-SIG
Interworking Message: PROGress                      Side: a
Interface Companding: mulaw                          CRC? n
           Idle Code: 11111111
                              DCP/Analog Bearer Capability: 3.1kHz




     Slip Detection? y                  Near-end CSU Type: other
```

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SIGNALING GROUP

```
display signaling-group 12
                               SIGNALING GROUP

 Group Number: 12              Group Type: isdn-pri
                     Associated Signaling? y          Max number of NCA TSC: 5
                        Primary D-Channel: 01A1224     Max number of CA TSC: 5
                                                    Trunk Group for NCA TSC: 12
       Trunk Group for Channel Selection: 12      X-Mobility/Wireless Type: NONE
          Supplementary Service Protocol: b
```

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TRUNK GROUP

```
display trunk-group 12                                          Page   1 of  10
                              TRUNK GROUP

Group Number: 12                  Group Type: isdn          CDR Reports: y
  Group Name: QSIG to CM-Neptune          COR: 1        TN: 1        TAC: 612
   Direction: two-way        Outgoing Display? y         Carrier Medium: PRI/BRI
 Dial Access? y                Busy Threshold: 99        Night Service:
Queue Length: 0
Service Type: tie                   Auth Code? n            TestCall ITC: rest
                        Far End Test Line No:
TestCall BCC: 4
TRUNK PARAMETERS
         Codeset to Send Display: 0     Codeset to Send National IEs: 6
        Max Message Size to Send: 260   Charge Advice: none
  Supplementary Service Protocol: b     Digit Handling (in/out): enbloc/enbloc

            Trunk Hunt: ascend                      QSIG Value-Added? y
                                                  Digital Loss Group: 13
Calling Number - Delete:     Insert:                Numbering Format: unk-unk
              Bit Rate: 1200         Synchronization: async    Duplex: full
 Disconnect Supervision - In? y  Out? y
 Answer Supervision Timeout: 0
```

```
display trunk-group 12                                          Page   3 of  10
                       INCOMING CALL HANDLING TREATMENT
 Service/       Called    Called        Del  Insert           Per Call  Night
 Feature         Len      Number                              CPN/BN    Serv
```

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Acronyms

Acronym	Definitions
CAMA	Analog “Centralized Automatic Message Accounting” E911 Trunk
PSAP	Public Service Answering Point

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