

Avaya Solution & Interoperability Test Lab

Configuring a Voice T1 PRI Trunk between Avaya Communication Manager and a Cisco Catalyst 6509 Switch as a VoIP Gateway Controlled by Cisco CallManager - Issue 1.0

Abstract

These Application Notes describe the configuration steps to set up a T1 ISDN PRI trunk between an Avaya S8700 Media Server/G650 Media Gateway and a Cisco Catalyst 6509 switch as a VoIP gateway controlled by Cisco CallManager. The configuration described should be applicable to other Avaya Media Servers and Media Gateways.

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1. Introduction

With an 8-port T1 module installed, the Catalyst 6509 switch can be configured as a VoIP gateway controlled by Cisco CallManager. Each T1 port can provide 23 voice channels with ISDN PRI signaling. These Application Notes focus on the configuration of T1 PRI on the Avaya G650 Media Gateway controlled by Avaya S8700 Media Server and the Cisco Catalyst 6509 switch controlled by Cisco CallManager. Although the 8-port T1 module is installed on the Catalyst switch, the entire VoIP gateway related configuration is done on the CallManager. **Figure 1** shows the network setup used for these configurations.

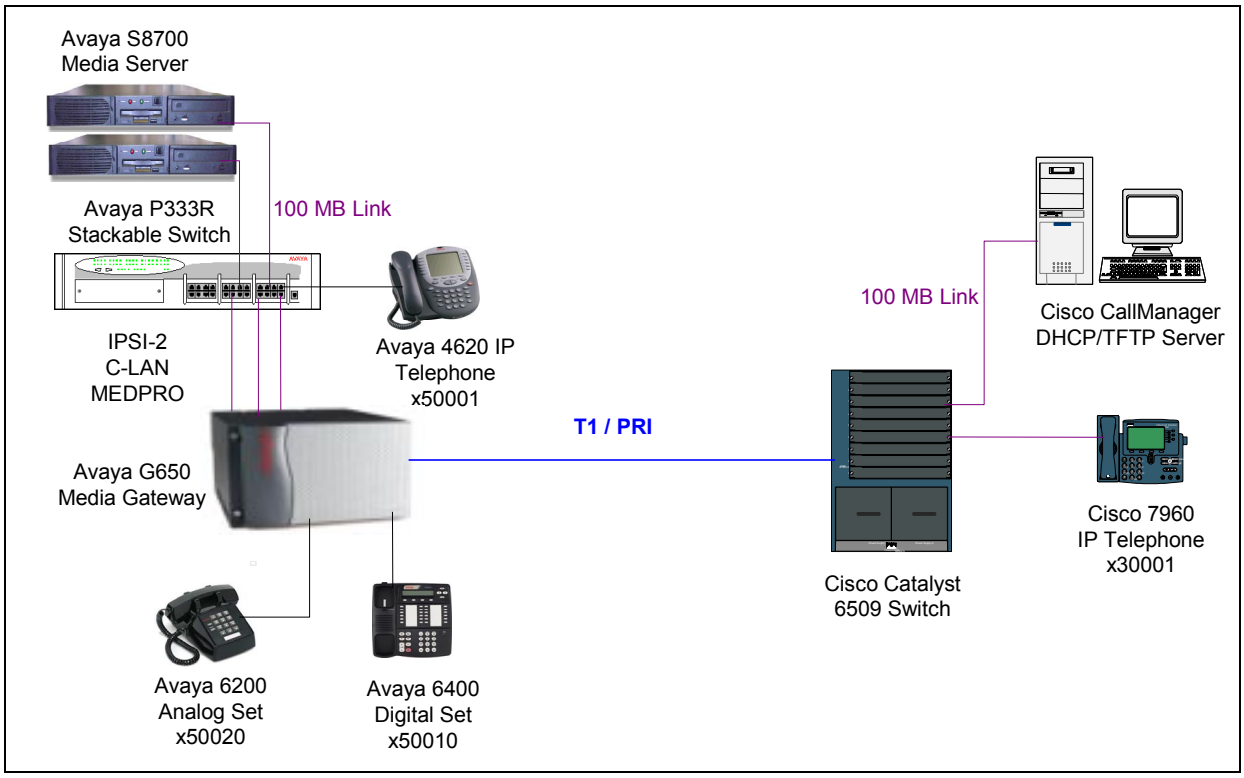


Figure 1: Network Diagram for T1/PRI Configuration

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2. Hardware and Software Used for Verification

Table 1 lists the equipment and software used for the verification.

Equipment	Software
Avaya S8700 Media Server	R012x.00.0.218.0
Avaya G650 Media Gateway with • IPSI-2 • C-LAN • MEDPRO	 HW36 FW052 HW01 FW009 HW03 FW055
Avaya 4620 IP Telephone	R1.81
Avaya P333R Stackable Switch	R4.0.8
Cisco Catalyst 6509 Switch	OS 7.1
Cisco CallManager	V.3.3
Cisco 7960 IP Telephone	V.5.0(1.1)

Table 1: Hardware and Software Used for Verification

3. Configure T1 on Avaya Communication Manager

This section presents the T1 related configuration on Avaya Communication Manager. Avaya Site Administration is used for this configuration.

3.1. Add DS1 Circuit Board

After inserting a DS1 circuit board (**TN464F**) into the G650 gateway cabinet, use the command "**list configure all**" to verify the DS1 board location. **Figure 2** shows that the DS1 board is located in cabinet 1, carrier A and slot 9 **(01A09)**.

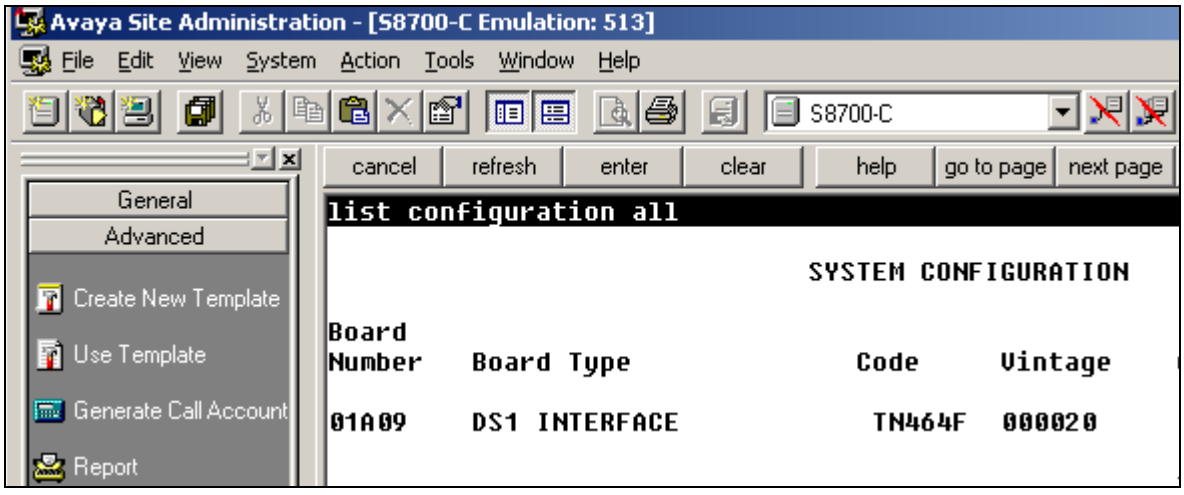


Figure 2: DS1 Circuit Board Location

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Use the command "**add ds1 01a09**" to add the DS1 circuit board on the G650 Media Gateway. **Figure 3** displays the information already configured for this T1 interface.

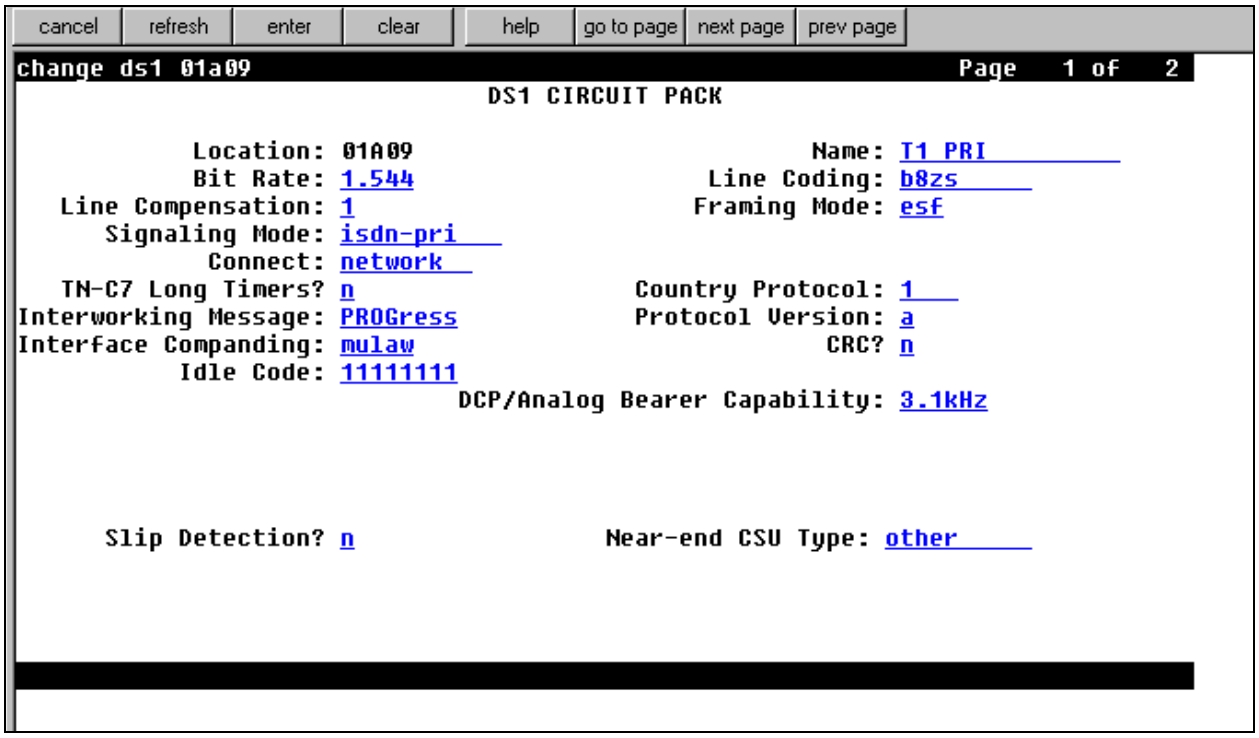


Figure 3: DS1 Circuit Board Configuration

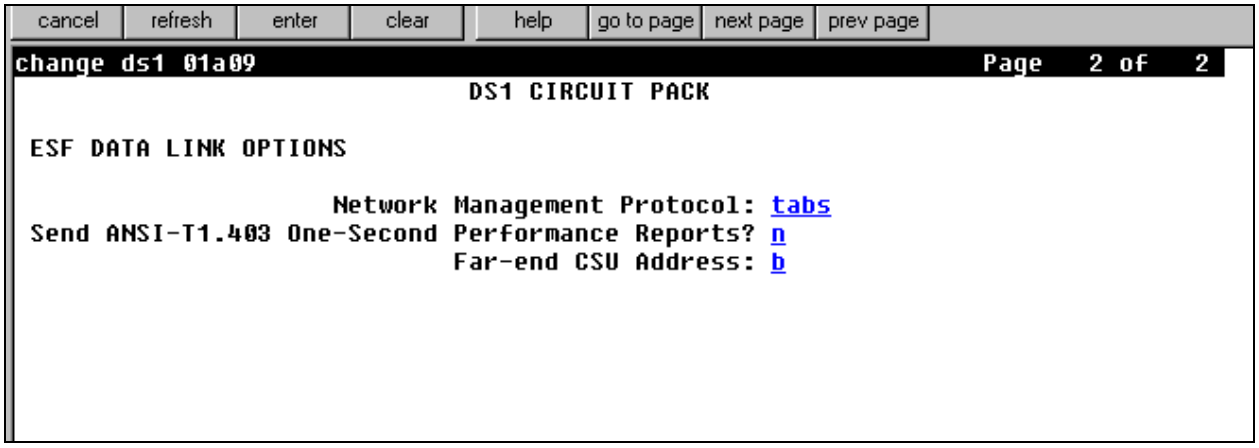


Figure 3 (continued): DS1 Circuit Board Configuration

The non-default values entered in this form are: **Signaling Mode**, **Connect**, **Name, Line Coding**, **Framing Mode and Near-end CSU Address**.

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3.2. Configure Signaling Group

After the DS1 circuit board is configured, an ISDN PRI signaling group is needed between the T1 interfaces on the G650 gateway and the Catalyst 6509 switch. Use the command "**add signaling-group 1**" to add the signaling group, as shown in **Figure 4**.

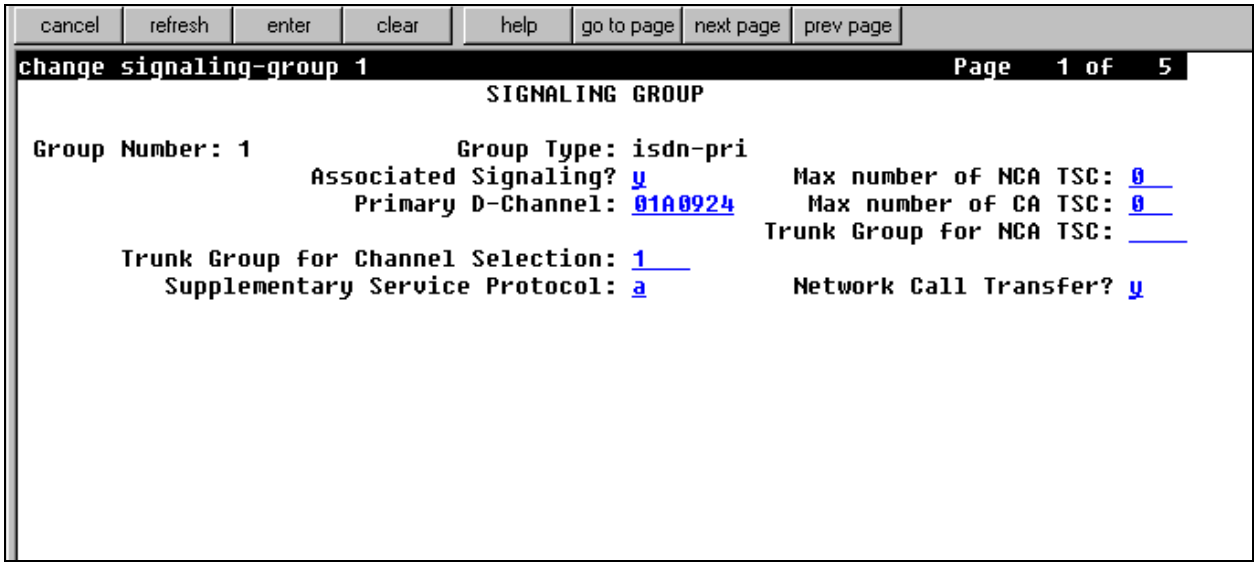


Figure 4: ISDN-PRI Signaling Group Configuration

The **Group Type** for the signaling group is defined as **isdn-pri** and the **Associated Signaling** is set to "**y**" for this group. Channel 24 is used as the D-channel (signaling channel **01A0924**). Trunk group 1 is selected to carry voice calls, and the configuration of the trunk group is presented in Section 3.3 below.

3.3. Configure Trunk Group

Use the command "**add trunk-group 1**" to create an ISDN PRI trunk group on the S8700 Media Server. **Figure 5** shows the trunk configuration. Note that the trunk **Carrier Medium** is **PRI/BRI** and that **signaling group 1** is used for this trunk. Data has been entered in the fields shown in blue. Note that the "Codeset to Send Display" field is set to "0" as shown on page 1. If this field is left at the default value of 6, the Cisco CallManager will not display the calling party name or connected party name sent in the Q.931 SETUP and CONNECT messages, respectively. When set to 0, the Cisco CallManager will display the calling party name on incoming calls from Avaya to Cisco telephones. Similarly, the Cisco CallManager will display the connected party name on Cisco telephones when calls from Cisco telephones to Avaya telephones are answered.

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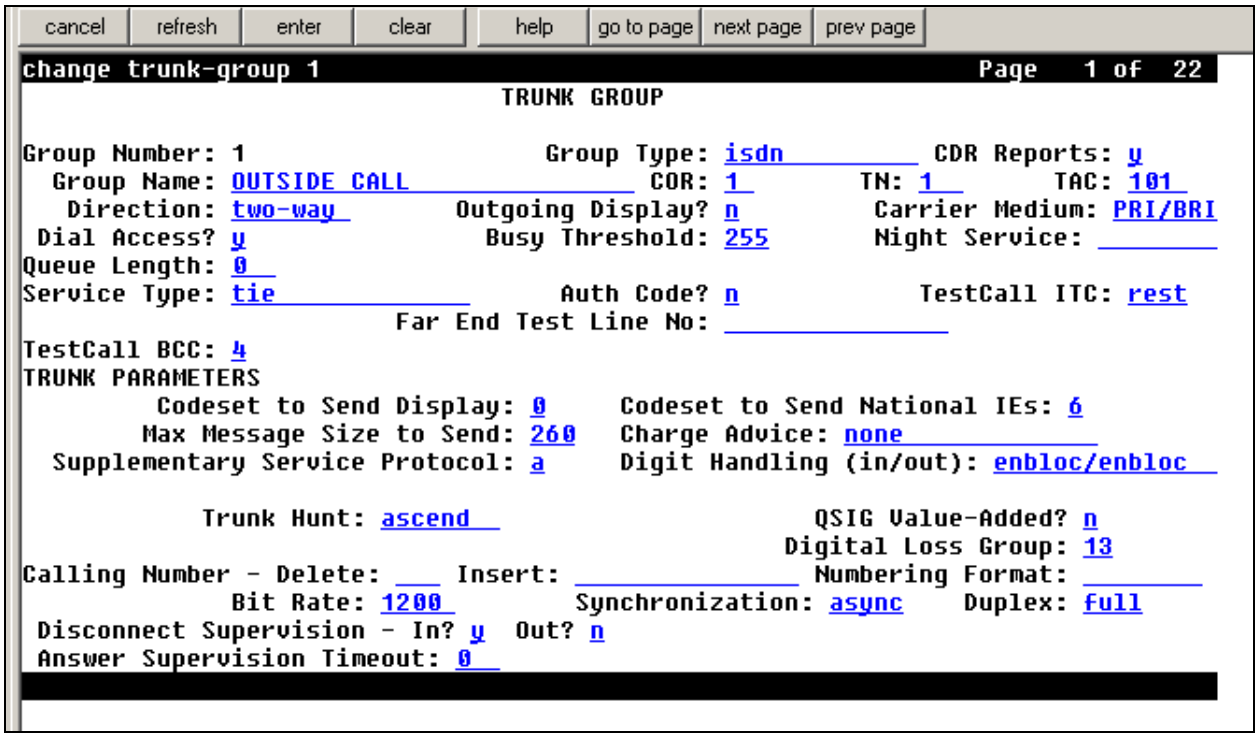


Figure 5: ISDN PRI Trunk Configuration

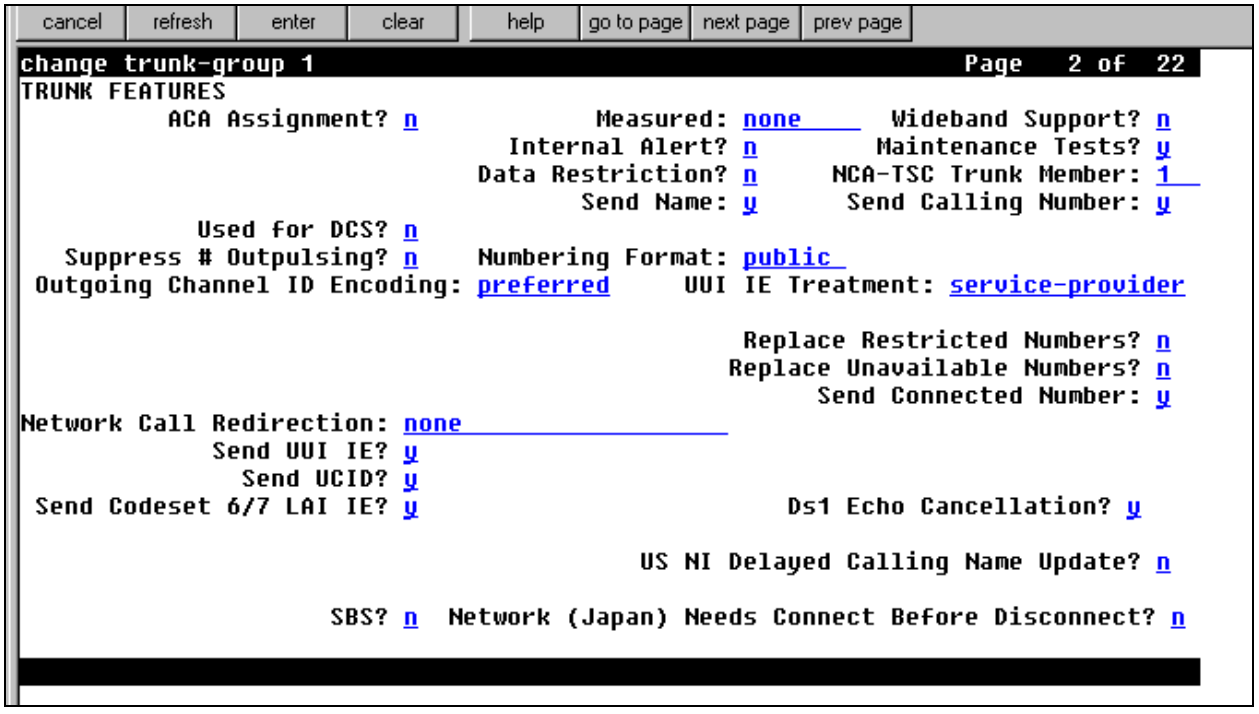


Figure 5 (continued): ISDN PRI Trunk Configuration

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```
change trunk-group 1                                          Page   6 of  22
                                    TRUNK GROUP
                                         Administered Members (min/max):   1/23
GROUP MEMBER ASSIGNMENTS                     Total Administered Members:  23

      Port    Code Sfx Name         Night           Sig Grp
 1: 01A0901  TN464  F                                  1
 2: 01A0902  TN464  F                                  1
 3: 01A0903  TN464  F                                  1
 4: 01A0904  TN464  F                                  1
 5: 01A0905  TN464  F                                  1
 6: 01A0906  TN464  F                                  1
 7: 01A0907  TN464  F                                  1
 8: 01A0908  TN464  F                                  1
 9: 01A0909  TN464  F                                  1
10: 01A0910  TN464  F                                  1
11: 01A0911  TN464  F                                  1
12: 01A0912  TN464  F                                  1
13: 01A0913  TN464  F                                  1
14: 01A0914  TN464  F                                  1
15: 01A0915  TN464  F                                  1
```

Figure 5 (continued): ISDN PRI Trunk Configuration

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```
change trunk-group 1                                          Page   7 of  22
                                    TRUNK GROUP
                                         Administered Members (min/max):   1/23
GROUP MEMBER ASSIGNMENTS                     Total Administered Members:  23

      Port    Code Sfx Name         Night           Sig Grp
16: 01A0916  TN464  F                                  1
17: 01A0917  TN464  F                                  1
18: 01A0918  TN464  F                                  1
19: 01A0919  TN464  F                                  1
20: 01A0920  TN464  F                                  1
21: 01A0921  TN464  F                                  1
22: 01A0922  TN464  F                                  1
23: 01A0923  TN464  F                                  1
24:
25:
26:
27:
28:
29:
30:
```

Figure 5 (continued): ISDN PRI Trunk Configuration

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4. Configure T1 PRI Gateway on Cisco CallManager

This section illustrates the Cisco CallManager configuration to control the Catalyst 6509 switch as a VoIP gateway, and to route calls to the Avaya side using this T1 PRI trunk.

4.1. Add T1 module as a Digital Access PRI Gateway.

Start the CallManager Administration program and select **Add a New Device** from the Device menu. Use the drop down menu to select **Gateway** as **Device type** and click the **Next** button as shown in **Figure 6**.

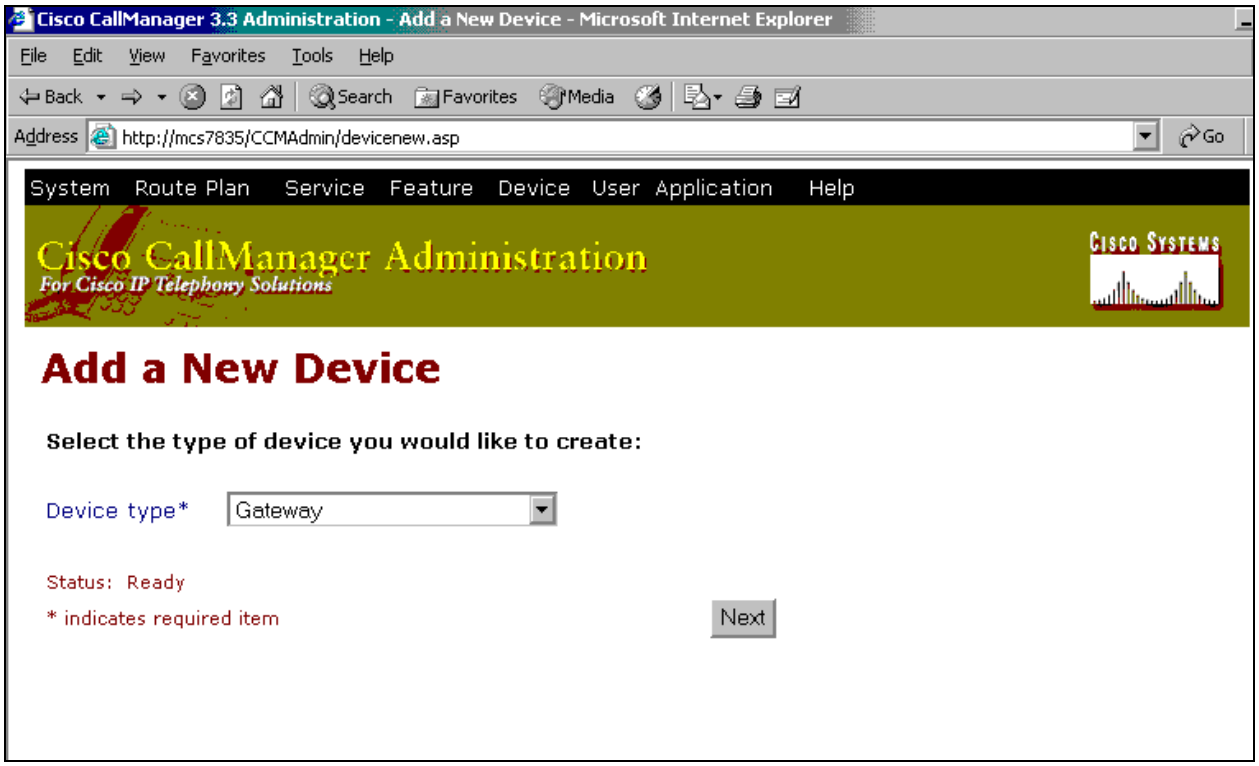


Figure 6: Add New Gateway

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After clicking "**Next**", use the drop down menu to select **Cisco Catalyst 6000 T1 VoIP Gateway** in the **Gateway type** field and **Digital Access PRI** in the **Device Protocol** field as shown in **Figure 6**. Click the "**Next"** button when done.

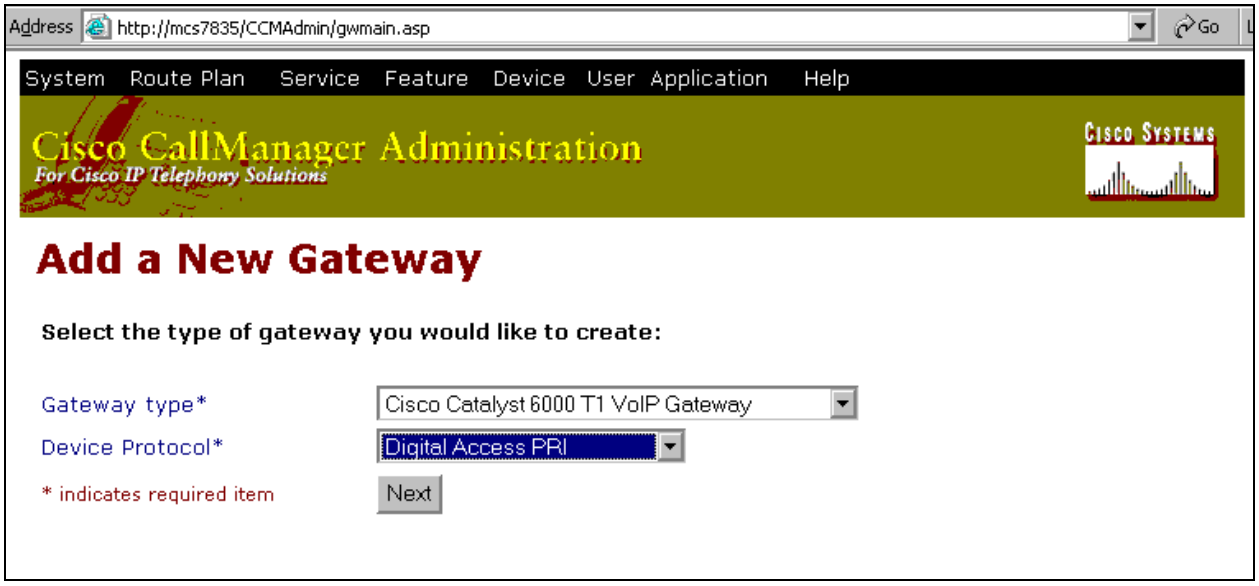


Figure 6 (continued): Add New Gateway

After clicking "**Next**", enter the gateway configuration information as shown in **Figures 7** and **8.** In order for the T1 module to register to the Cisco CallManager, the T1 interface MAC address must be entered in the **MAC Address** field, as shown in **Figure 7**.

Note: The T1 module MAC address can be obtained from the Catalyst switch console command ***show port x/x,*** as shown below. In these Application Notes, the T1 module is installed in slot 4 and the first T1 port is used for configuration.

```
Cat6509>(enable) show port 4/1
* = Configured MAC Address

Port  Name                 Status     Vlan       Duplex Speed Type
----- -------------------- ---------- ---------- ------ ----- ------------
 4/1                       connected  1            full 1.544 T1

Port      DHCP    MAC-Address        IP-Address      Subnet-Mask
--------- ------- ------------------ --------------- ---------------
 4/1      enable  00-01-c9-d9-18-a6 135.8.31.13     255.255.255.0

Port      Call-Manager(s)    DHCP-Server     TFTP-Server     Gateway
--------- ------------------ --------------- --------------- ---------------
 4/1      135.8.31.20        135.8.31.22     135.8.31.20     135.8.31.2
```

Figure 7: Show Port on T1 Module

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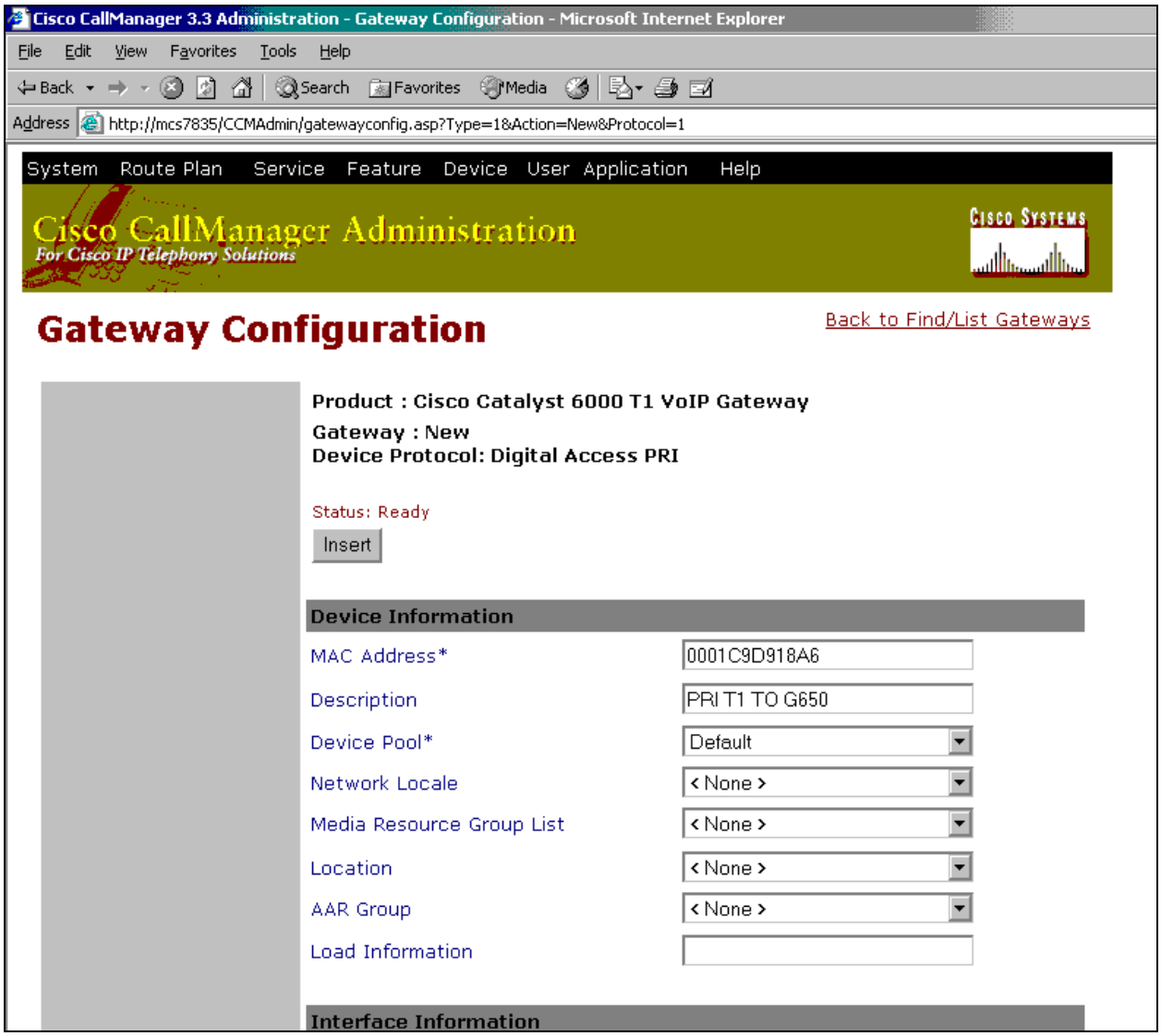


Figure 8: Add New Gateway

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Select other related parameters as shown below.

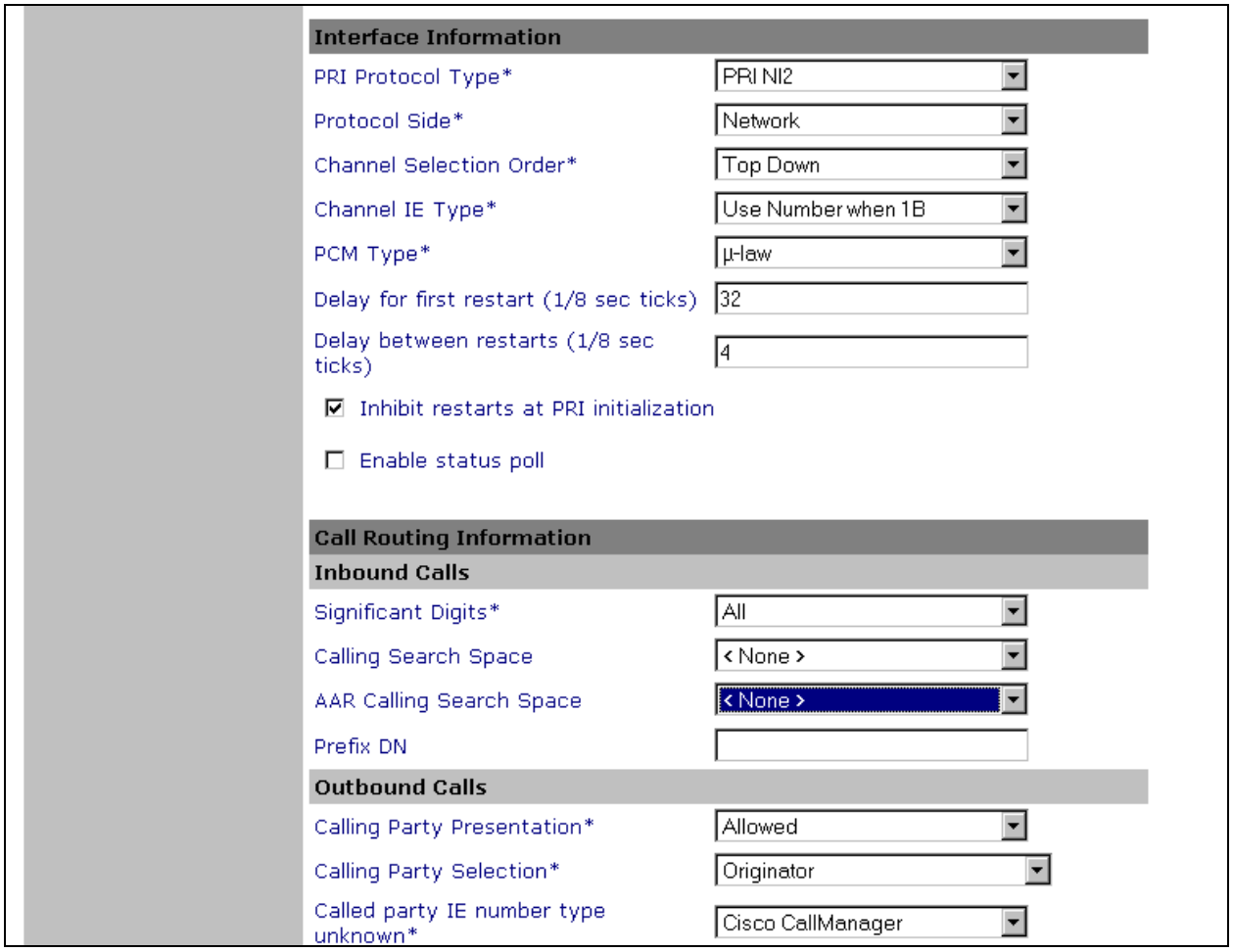


Figure 8 (continued): Add New Gateway

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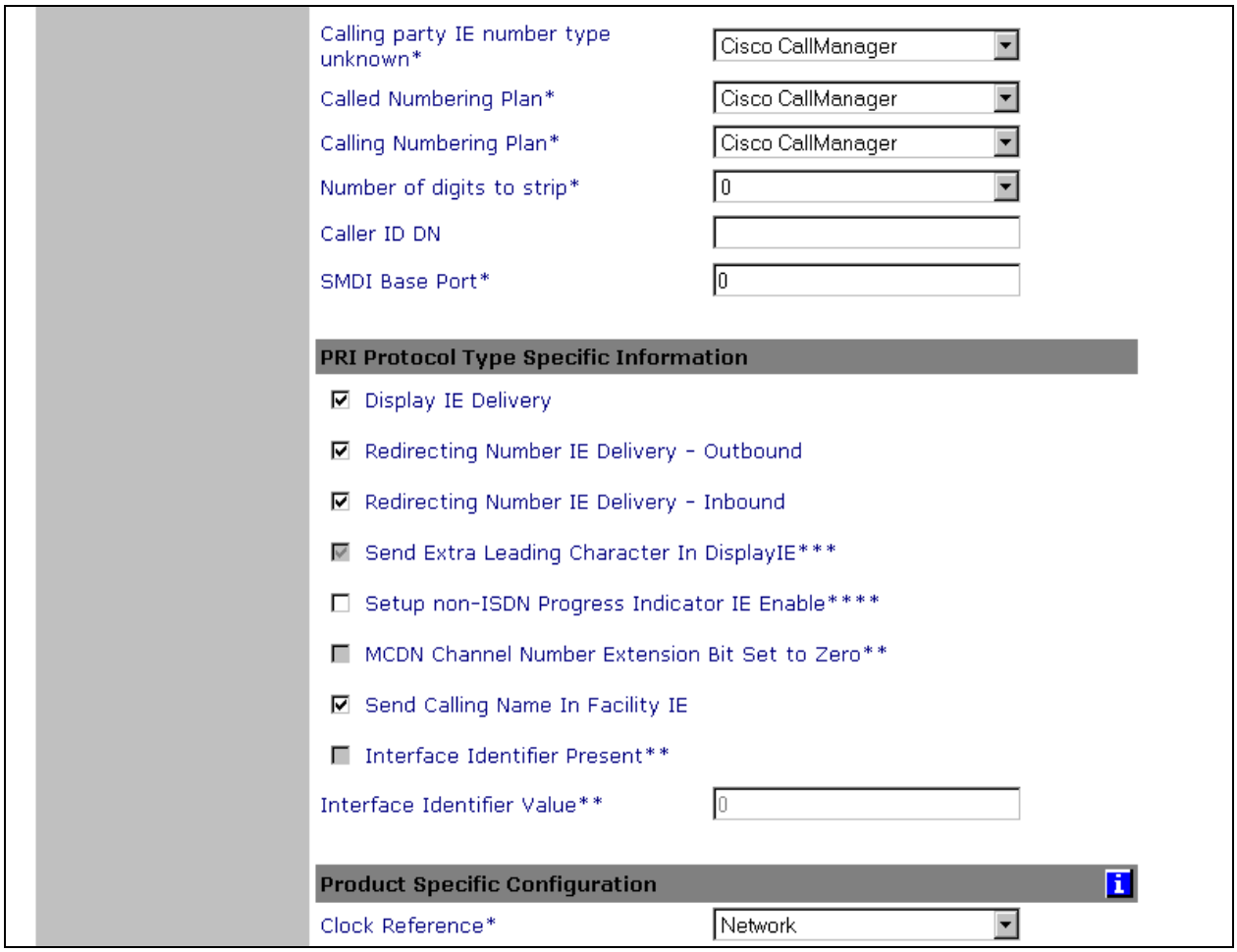


Figure 8 (continued): Add New Gateway

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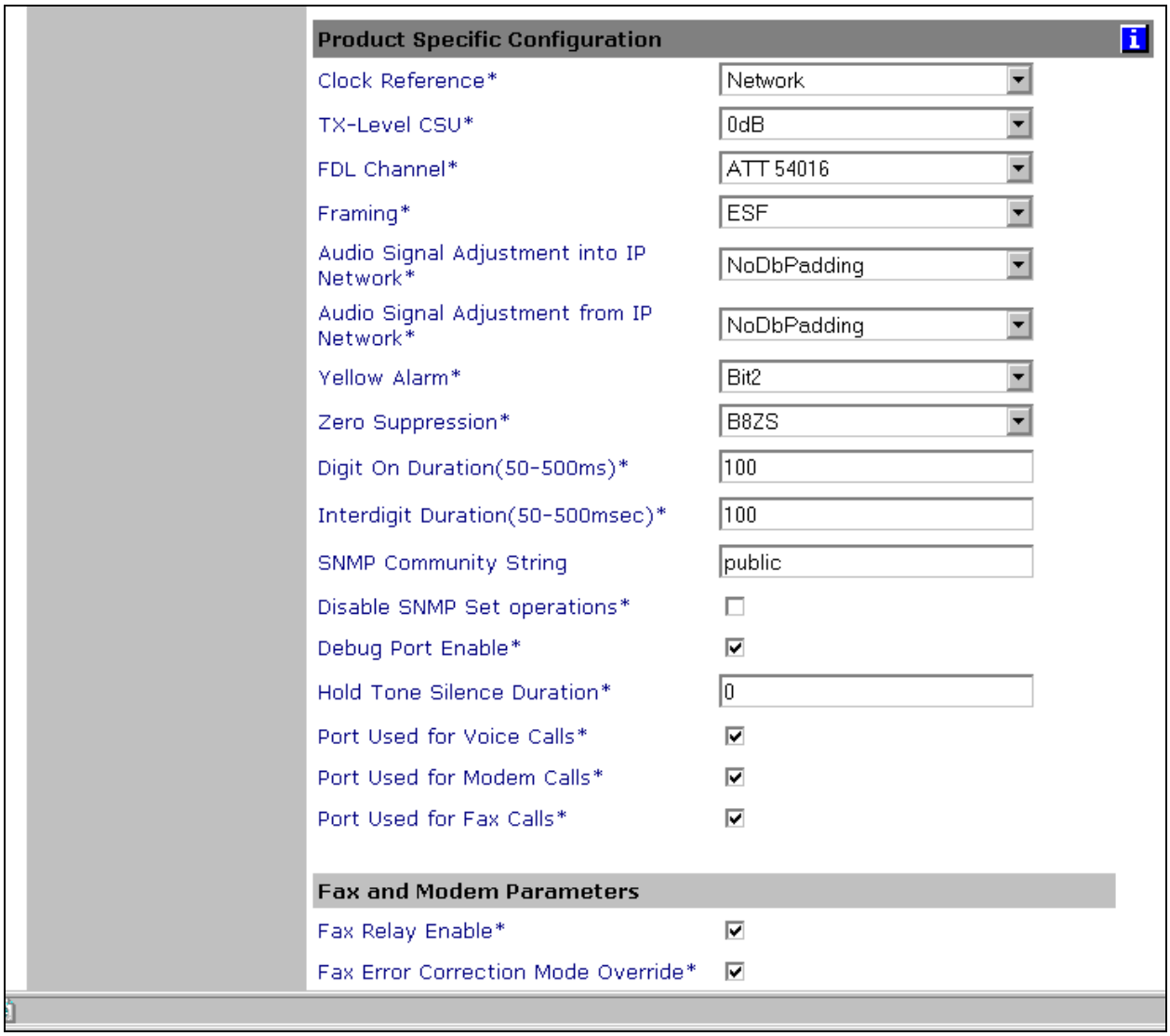


Figure 8 (continued): Add New Gateway

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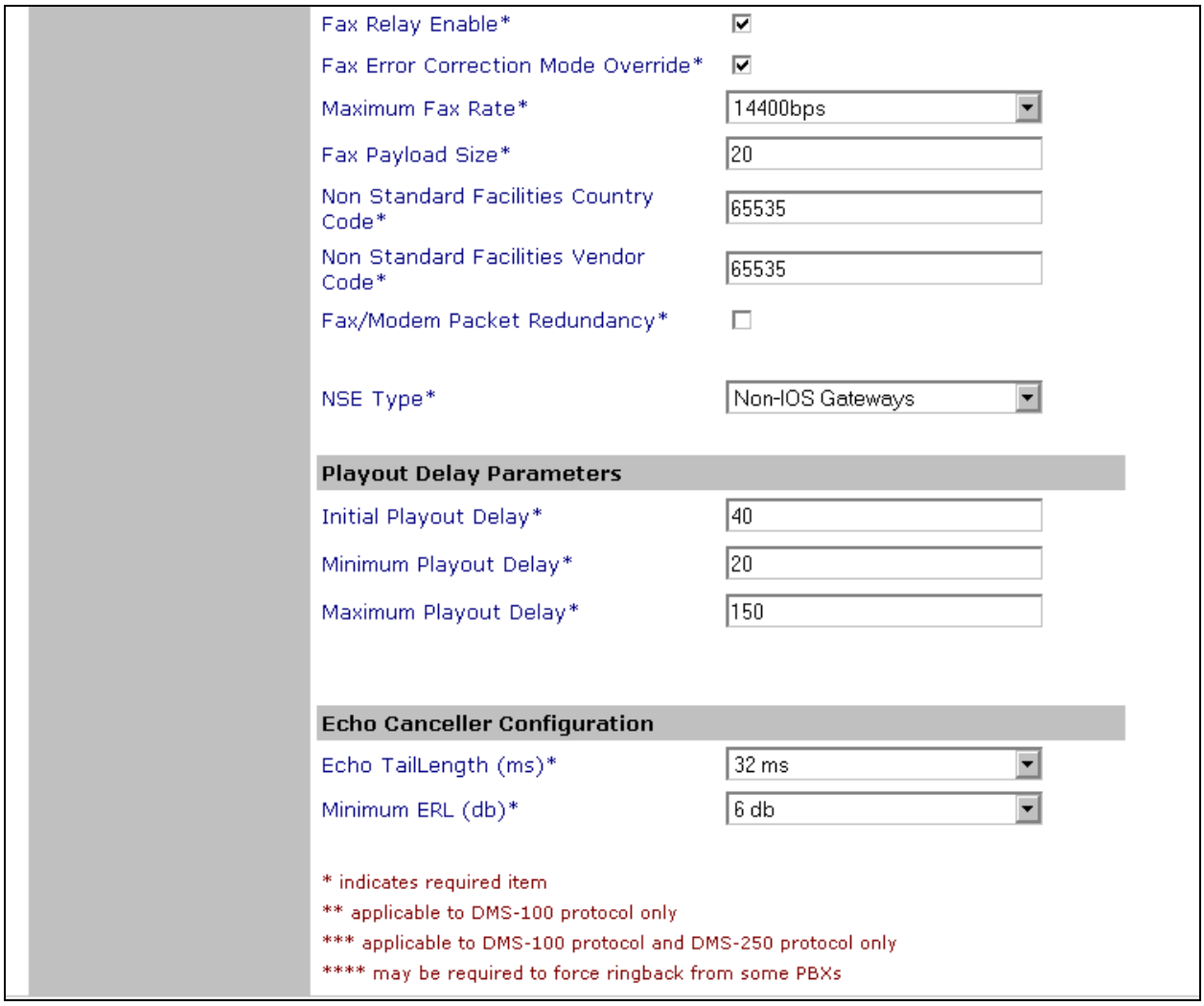


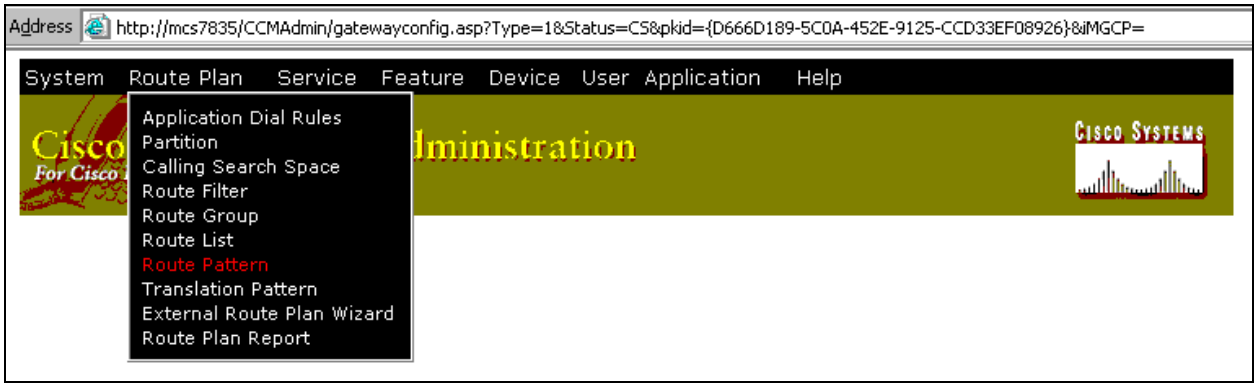
Figure 8 (continued): Add New Gateway

Click the **Insert** button to add this gateway to CallManager as shown in **Figure 8**.

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4.2. Configure Route-pattern on CallManager

The routing pattern is configured such that calls from Cisco IP phones to extension range 5xxxx (Avaya side) are directed to the T1 PRI VoIP gateway on the Catalyst 6509 switch. Click the **Route Plan** and select **Route Pattern** as shown in **Figure 9**.



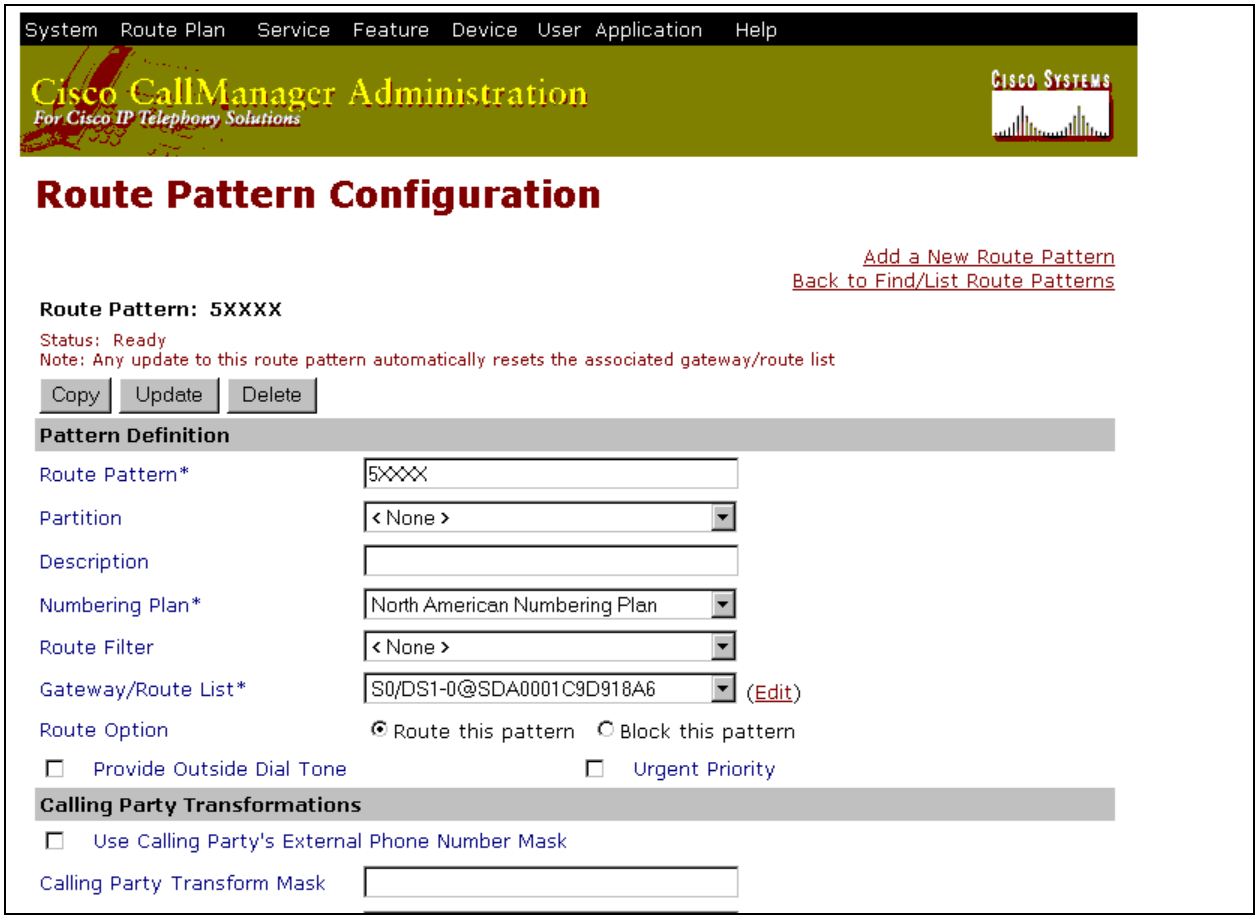


Figure 9: Add Route Pattern

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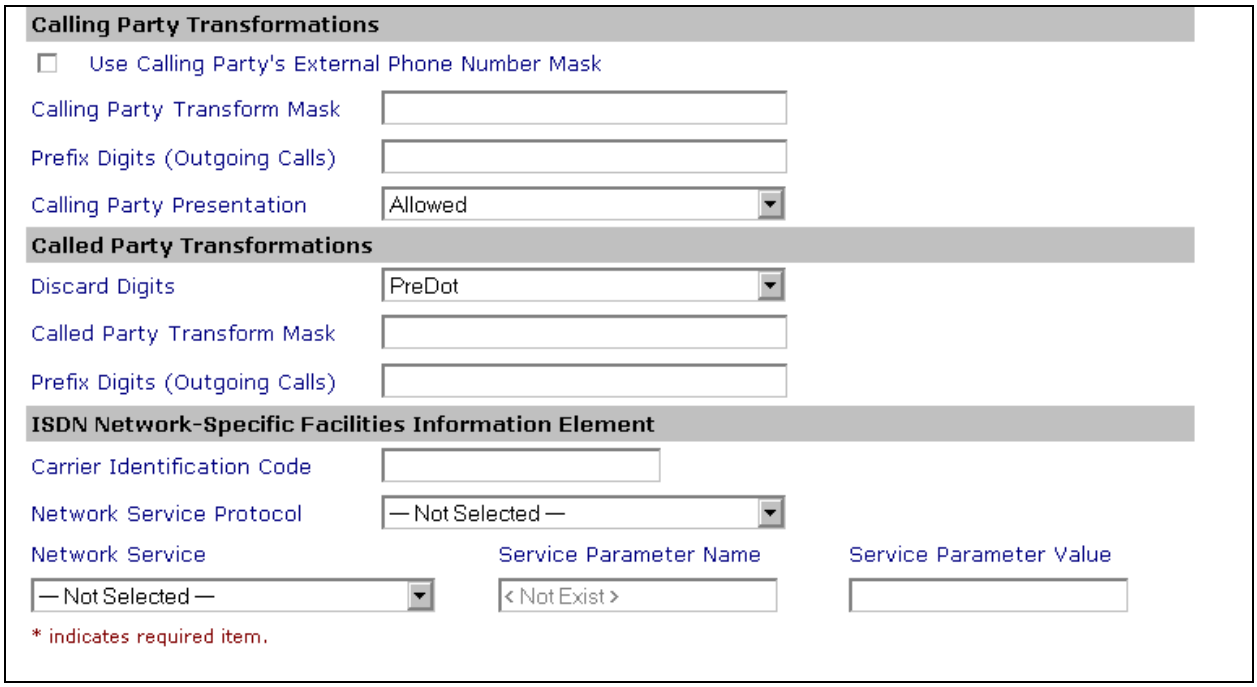


Figure 9 (continued): Add Route Pattern

After entering all the information above, click the button **Update** to have the configuration take effect.

5. Verification Steps

The following steps can be used to verify the configurations.

- From the CallManager, use "**List Gateway**" to display the status of the port 4/1 on the T1 module as shown in **Figure 10**. Note that the DHCP server, the CallManager in this case, has assigned the IP address 135.8.31.13 to this gateway.

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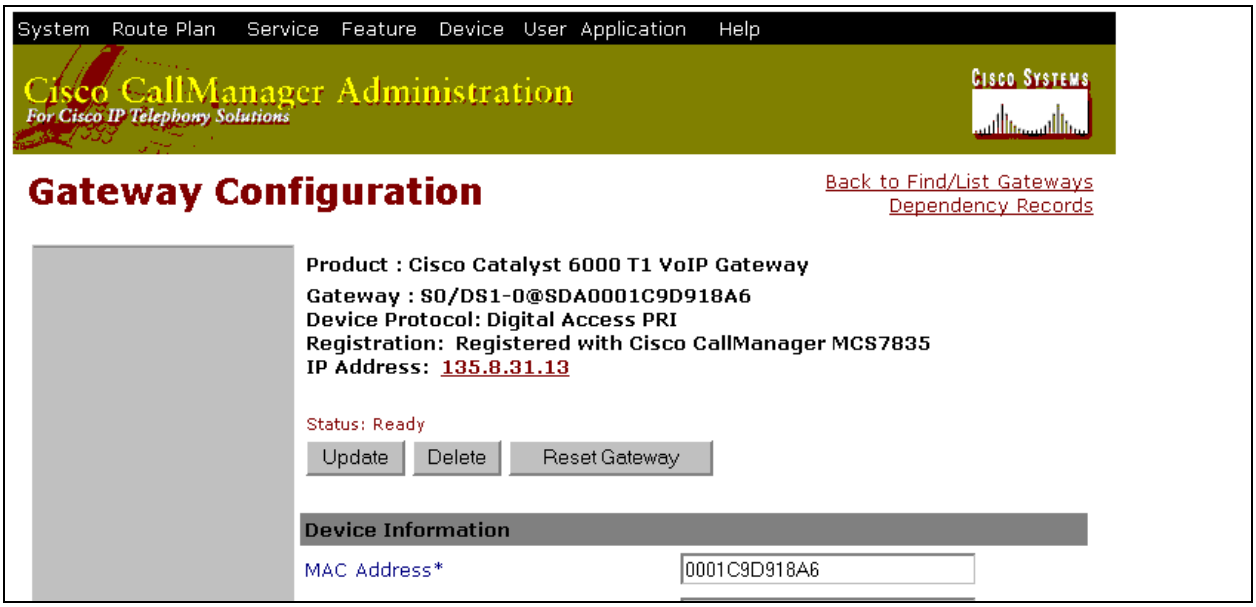


Figure 10: List Gateway

- Make a phone call from the Avaya 4620 IP phone to the Cisco 7960 IP phone, and verify the voice quality is good and the T1 trunk is used to carry this call. While the call is active, press the keypad from both phones and verify that both sides hear DTMF tones. Verify that caller and called names are displayed on both IP telephones.

- Make a phone call from the Cisco 7960 IP phone to the Avaya 6400 digital phone, and verify the call quality is good and the T1 trunk is used to carry this call. **Figure 11** shows the display of trunk group 1 status from the S8700 Media Server. Note that voice channel 1 is in service and active.

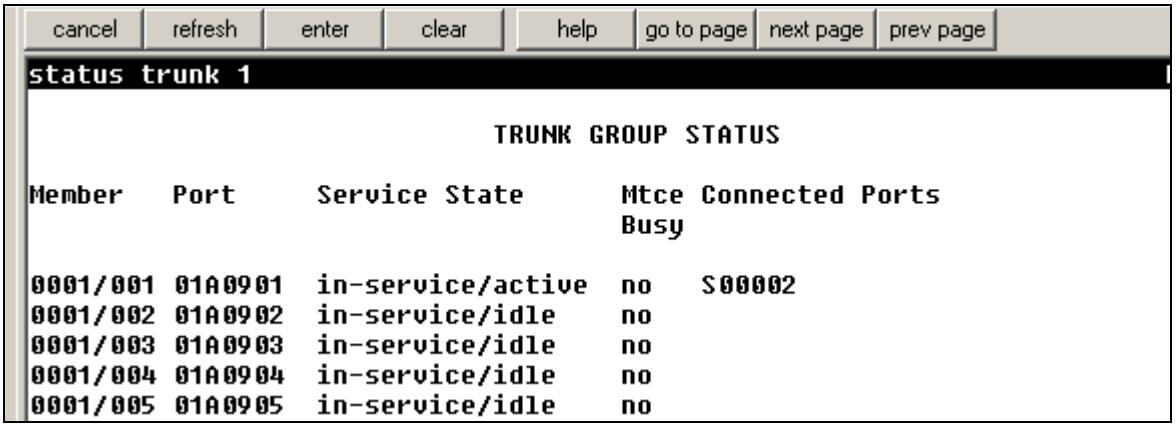


Figure 11: Communication Manager Trunk Group Status

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- Make a phone call from the Cisco 7960 IP phone to the Avaya analog phone, and verify the voice quality is good. Press the keypad from both phones and verify that both phones hear DTMF tones.

6. Conclusion

As illustrated in these Application Notes, the Avaya S8700 Media Server and Avaya G650 Media Gateway can interoperate with Cisco CallManager using a T1 ISDN PRI digital trunk. The Catalyst 6509 switch can be configured as a VoIP gateway to provide digital voice T1 service. The calling party name and number can be displayed for calls in both directions, and DTMF tones are passed through the T1 trunk between the Avaya and Cisco telephones.

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