Dialogic® Media Gateway Installation and Configuration Integration Note

1.   Scope

This document is intended to detail a typical installation and configuration of Dialogic® 2000 Media Gateway Series (DMG2000) when used to interface between PBX and Microsoft® Office Communications Server 2007 (OCS) application.

2.   Configuration Details

Listed below are the specific details of the PBX and gateways used in the testing to construct the following documentation.
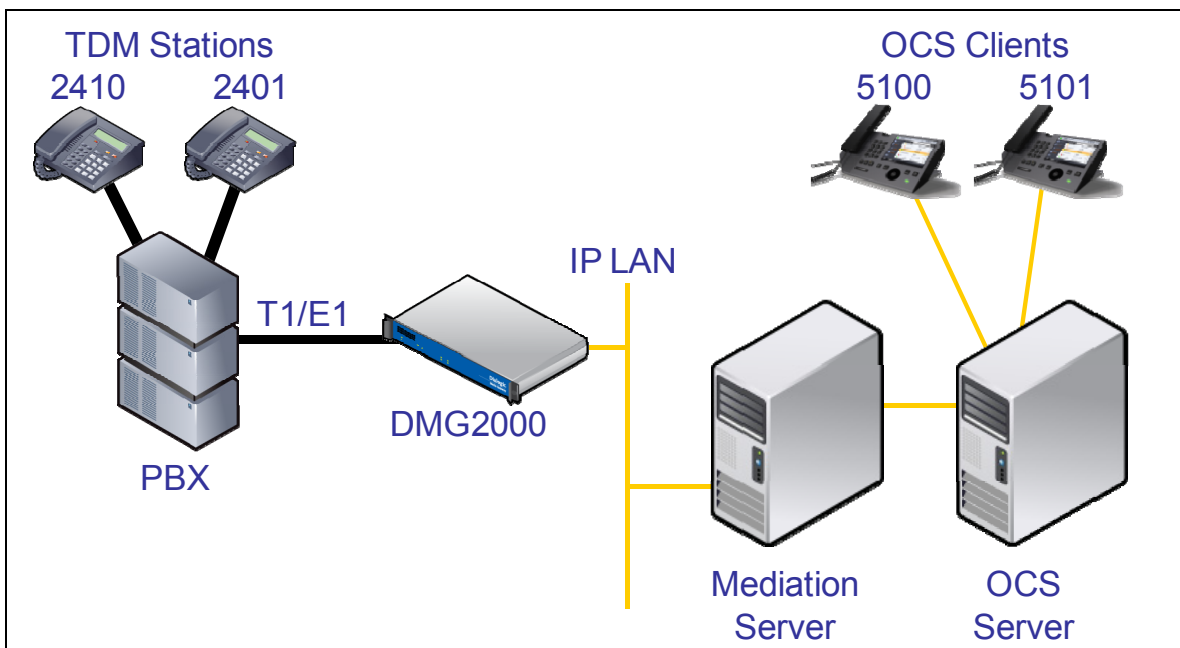
2.1   PBX

PBX Vendor	Alcatel
Model	OmniPCX Enterprise
Software Version	R6.1 f2.502
Additional Notes	N/A

2.2   Gateway

Gateway Model	Dialogic® 2000 Media Gateway Series (DMG2000)
Software Version	6.0 (6.0.103)
Protocol	E1 QSIG

2.3   System Diagram

The diagram below details the setup used in the testing and creation of the technical document.

TDM Stations
2410   2401

OCS Clients
5100   5101

IP LAN

T1/E1

DMG2000

PBX

Mediation
Server

OCS
Server

3.   Prerequisites

3.1   PBX Prerequisites

PBX must have all supplemental service packages installed for the QSIG protocol to operate properly and provide all advanced supplemental services.

3.1.1 PBX Equipment Required

To support the E1 QSIG configuration as documented you need the PRA2 (3BA 23076) interface card.

3.1.2 PBX Cabling Requirements

Cabling for QSIG connections must be CAT5e or better. Standard voice quality cable will not provide optimum signal quality and the gateway will have problems establishing connection on the D-Channel.

3.2   Gateway Prerequisites

The gateway needs to support a E1 QSIG interface.

4.   Summary of Limitations

No limitations noted as of the last update to this document.

5.   Gateway Setup Notes

Steps for setting up the gateway:

- Parameter Configuration
- Routing Engine Configuration

5.1   Parameter Configuration

To get the gateway connected between the PBX and mediation server there are only a few configuration options that are required.

During the initial setup of the Dialogic gateway using the serial port you must:

- Assign LAN 1 on the gateway a unique IP address, subnet mask and network gateway address (if the latter is required).
- Configure the gateway to use the SIP VoIP protocol.
- Set the Line Mode to E1.
- Set the Protocol to ISDN - QSIG.

During the solution specific setup of the Dialogic gateway using the web interface you must:

- In the IP Settings page:
    - Set the `BOOTP Enabled` parameter to 'No'. (the default is Yes)

IP Settings, LAN1	
MAC	00-0e-0c-ab-d2-3e
* Client IP Address	192.168.1.2
* Client Subnet Mask	255.255.255.0
* Default Network Gateway Address	192.168.1.250
* BOOTP Enabled	No
* SNTP Server IP Address	

IP Settings, LAN2

- In the T1/E1 General page:
  - Set the Line Encoding and Line Framing as required by your E1 Interface. Typical settings are Encoding = HDB3 and Framing = CRC_MF.
  - Set the ISDN Protocol Variant to Alcatel and Contiguous B-Channel to Yes.

T1/E1 Port Selection	
Select Port to Modify	all ports

T1/E1 Configuration	
Line Settings	
* Line Mode	E1
* Signaling Mode	ISDN
* Telephony Port Interface Side	Terminal
E1 Line	
* Line Coding	HDB3
* Framing	CRC_MF
* Selects Transmit Pulse Waveform	75_Ohm
E1 ISDN protocol	
* ISDN Protocol	QSIG
ISDN Protocol Variant	Alcatel
Contiguous B-Channel	Yes
General ISDN Settings	
QSIG Protocol Specification	ISO

- In the VoIP General page:
  - Set the Transport Type parameter to TCP (the default is UDP)

Voip General Settings	
User-Agent	
* Host and Domain Name	pbxgw.default.com
Transport Type	TCP
Call as Domain Name?	No
SIPS URI Scheme Enabled	No
Invite Expiration (sec)	120

Server

- In the VoIP Media page:
  - Set the `RTP Fax/Modem Tone Relay Mode` parameter to 'In band-Tone' (the default is RFC2833)
  - Set the `Signaling Digit Relay Mode` parameter to 'Off' (the default is On)
  - Set the `Voice Activity Detection` parameter to 'Off' (the default is On)

5.2 Routing Engine Configuration

NOTE: For all the examples in this document going forward the term 'inbound call' refers to a call in the TDM to IP direction and the term 'outbound call' refers to a call in the IP to TDM direction.

The example given in the system diagram at the start of this integration guide has the following dialing plans in the system:

- All TDM side stations have DID numbers assigned in the 2xxx extension range.
- All OCS side stations have DID numbers assigned in the 5xxx extension range.

All inbound calls need to be sent through to the Mediation Server at a specific IP address.

5.2.1 VoIP Host Group configuration

The first item to take care of is to set up the IP endpoint to use as the IP destination for all inbound calls. This is done in the routing table under the section VoIP Host Groups. Define a single host group (using the default group is fine) that includes the IP address of the gateway listening side of the Mediation Server; in this example case the IP address 192.168.1.21 is for this.

5.2.2 TDM and VoIP Routing Rule Configuration

The second item is to configure the routing rules that will associate inbound or outbound calls with the proper digit manipulation rules for the type of call they need to service. This will require that the gateway perform some digit manipulation on calls that go from the TDM side to the IP side as well as in the reverse direction, IP to TDM.

The major idea here to remember is that OCS expects to get, and will send out, all addresses in E.164 format. This means that the gateway needs to recognize the need to convert up and down as needed to and from this format as calls pass through. To do this you make use of the Routing engine's CPID manipulation rules.

5.2.2.1 Inbound TDM Rules

When a local user on the PBX picks up their phone and calls one of the extensions on the OCS side within the 5xxx range the gateway will receive a call with a calling party of 4 digits. It then needs to convert that number up to full E.164 format and send the call on to OCS.

This example will take any number and then convert it into the full E.164 format by concatenating a prefix of '+1716639' onto the front of the number where 716 is the area code and 639 is the local exchange.
Other calls, such as DIDs that arrive over TDM trunks from the PSTN may provide a full 10 digits to the PBX or they may only provide the extension number after the prefix has been stripped off by the PBX. Depending on your site specific requirements you may need to add or build different rules to handle these cases. An example of the inbound rule for local PBX users is shown below:

Router Configuration			
● Inbound TDM Rules ○ Inbound VoIP Rules ○ TDM Trunk Groups ○ VoIP Host Groups			

Inbound TDM Rules

Select	Enable	Rule Label	Request Type	Trunk Group
	☑	Inbound Local	Any	Any
	☑	Inbound Default	Any	Any

Add Rule   Delete Rule

Detailed Configuration for Inbound TDM Rule: **Inbound Local**

Inbound TDM Request Matching

CPID Matching

Calling Number	*	Called Number	*	Redirect Number	*
Calling Name	*	Called Name	*	Redirect Name	*

Outbound Routes

Device Selection

Outbound Destination	VoIP	Host Group	HostGroup-1	Route Method	Bridged

CPID Manipulation

Calling Number	S	Called Number	"+1716639"+D	Redirect Number	R
Calling Name	S	Called Name	D	Redirect Name	R

Select Primary / Alternate Route

● Primary   ○ Alt-1   ○ Alt-2   ○ Alt-3   ○ Alt-4   Add Alternate Route
Delete   Delete   Delete   Delete

The CPID matching rule is simply a * meaning that any dialed number from a local user presented to this trunk will be seen by this rule. The CPID manipulation rule then uses the digits that are being seen (in this example it will be a 4 digit number because that is how the trunk is programmed) and then adds the prefix of "+1716639" onto it to build the full E.164 number that is needed for OCS. This rule also sets the destination to the VoIP Host group defined previously that points to the inbound IP address of the Mediation Server.

In addition to this rule a default rule has been left in place that acts as a catch all. This rule performs no CPID manipulation at all and just tries to send the call to the VoIP host group as dialed.

5.2.2.2   Inbound VoIP Rules

When an OCS user dials a number OCS will, through the use of normalization rules in the Location profile, provide the gateway with a number in full E.164 format. The gateway needs to be able to recognize various number patterns in inbound IP calls and properly manipulate them for the outbound TDM call that results.

In the example here, OCS has been setup (as you will see later) with a route that directs all calls that meet the pattern 5xxx to the gateway in full E.164 format. The gateway then needs to know how to identify these numbers as extensions that are local on the PBX and manipulate them accordingly. To do this it needs to simply extract the right 4 digits from the called number provided to remove the prefix of "+1716639" and leave the last 4 digits remaining. Local, national and international numbers are going to need to be manipulated. At very least they will need a trunk access number, like a 9, pre-pended onto the front of them in order to dial an outside line. These can also be done using manipulation rules as follows:

Router Configuration

○ Inbound TDM Rules ◉ Inbound VoIP Rules ○ TDM Trunk Groups ○ VoIP Host Groups

Inbound VoIP Rules

Select	Enable	Rule Label	Request Type	Originating VoIP Host Address	
	☑	Outbound Internal	Any ⌄	*	
	☑	Outbound Local	Any ⌄	*	
	☑	Outbound National	Any ⌄	*	
	☑	Outbound International	Any ⌄	*	
	☑	Default	Any ⌄	*	

[Add Rule]   [Delete Rule]

Detailed Configuration for Inbound VoIP Rule: **Outbound Internal**

Inbound VoIP Request Matching

CPID Matching

Calling Number	*	Called Number	x17166395xxx	Redirect Number	*
Calling Name	*	Called Name	*	Redirect Name	*

Outbound Routes

Device Selection

Outbound Destination	TDM ⌄	Trunk Group	Any ⌄	Route Method	Bridged ⌄

CPID Manipulation

Calling Number	S	Called Number	rext(D,4)	Redirect Number	R
Calling Name	S	Called Name	D	Redirect Name	R

Select Primary / Alternate Route

◉ Primary   ○ Alt-1   ○ Alt-2   ○ Alt-3   ○ Alt-4   [Add Alternate Route]
[Delete]   [Delete] [Delete] [Delete]

In the screen shot above, the first rule 'Outbound Internal' is selected. Notice that the blue bar near the top of the screen highlights this rule. The lower half of the screen displays the details of the currently selected rule. This rule matches outbound calls that have a called party number that starts with '+17166395' followed by any three digits. This rule is designed to match the locally defined TDM extensions as shown in the first figure in this document. Calls that match this rule are meant to go to a local user on the PBX. The CPID manipulation section of this rule extracts the last four digits from the called party number. The extracted four digits are then dialed as a local extension on the PBX.

Router Configuration

○ Inbound TDM Rules   ● Inbound VoIP Rules   ○ TDM Trunk Groups   ○ VoIP Host Groups

Inbound VoIP Rules

Select	Enable	Rule Label	Request Type	Originating VoIP Host Address	
	☑	Outbound Internal	Any ▾	*	
	☑	Outbound Local	Any ▾	*	
	☑	Outbound National	Any ▾	*	
	☑	Outbound International	Any ▾	*	
	☑	Default	Any ▾	*	

[Add Rule]   [Delete Rule]

Detailed Configuration for Inbound VoIP Rule: **Outbound Local**

Inbound VoIP Request Matching

CPID Matching

Calling Number	*	Called Number	x1716xxxxxxx	Redirect Number	*
Calling Name	*	Called Name	*	Redirect Name	*

Outbound Routes

Device Selection

Outbound Destination	TDM ▾	Trunk Group	Any ▾	Route Method	Bridged ▾

CPID Manipulation

Calling Number	S	Called Number	"+9"+lrem(D,5)	Redirect Number	R
Calling Name	S	Called Name	D	Redirect Name	R

Select Primary / Alternate Route

● Primary   ○ Alt-1   ○ Alt-2   ○ Alt-3   ○ Alt-4   [Add Alternate Route]

[Delete]   [Delete]   [Delete]   [Delete]

In the screen shot above, the rule 'Outbound Local' is selected. This rule matches outbound calls that have a called party number that starts with '+1716' followed by seven digits. This rule is designed to match the calls within the same area code, but not from the same PBX. Calls that match this rule are meant to go to a local user that is not on the PBX. In the CPID manipulation area the trunk access code is added to the string and the leading 5 characters are stripped off (the '+1716'). The full string out as '+9xxxxxxx' is sent.

Router Configuration

○ Inbound TDM Rules   ● Inbound VoIP Rules   ○ TDM Trunk Groups   ○ VoIP Host Groups

Inbound VoIP Rules

Select	Enable	Rule Label	Request Type	Originating VoIP Host Address	
	☑	Outbound Internal	Any ▾	*	
	☑	Outbound Local	Any ▾	*	
	☑	Outbound National	Any ▾	*	
	☑	Outbound International	Any ▾	*	
	☑	Default	Any ▾	*	

[Add Rule]   [Delete Rule]

Detailed Configuration for Inbound VoIP Rule: **Outbound National**

Inbound VoIP Request Matching

CPID Matching

Calling Number	*	Called Number	x1xxxxxxxxxx	Redirect Number	*
Calling Name	*	Called Name	*	Redirect Name	*

Outbound Routes

Device Selection

Outbound Destination	TDM ▾	Trunk Group	Any ▾	Route Method	Bridged ▾

CPID Manipulation

Calling Number	S	Called Number	"+9"+lrem(D,1)	Redirect Number	R
Calling Name	S	Called Name	D	Redirect Name	R

Select Primary / Alternate Route

● Primary   ○ Alt-1   ○ Alt-2   ○ Alt-3   ○ Alt-4   [Add Alternate Route]

[Delete]   [Delete]   [Delete]   [Delete]

In this rule labeled as 'Outbound National' any number dialed that starts with '+1' and includes 10 digits indicates a number that is not in the local area code. In this case the CPID manipulation simply adds a +9 to the start of the number and strips off the leading + creating a result of '+91xxxxxxxxxx'.

Router Configuration

○ Inbound TDM Rules   ● Inbound VoIP Rules   ○ TDM Trunk Groups   ○ VoIP Host Groups

Inbound VoIP Rules

Select	Enable	Rule Label	Request Type	Originating VoIP Host Address	
	☑	Outbound Internal	Any ▼	*	
	☑	Outbound Local	Any ▼	*	
	☑	Outbound National	Any ▼	*	
	☑	Outbound International	Any ▼	*	
	☑	Default	Any ▼	*	

[Add Rule] [Delete Rule]

Detailed Configuration for Inbound VoIP Rule: **Outbound International**

Inbound VoIP Request Matching

CPID Matching

Calling Number	*	Called Number	x011.	Redirect Number	*
Calling Name	*	Called Name	*	Redirect Name	*

Outbound Routes

Device Selection

Outbound Destination	TDM ▼	Trunk Group	Any ▼	Route Method	Bridged ▼

CPID Manipulation

Calling Number	S	Called Number	"+9"+lrem(D,1)	Redirect Number	R
Calling Name	S	Called Name	D	Redirect Name	R

Select Primary / Alternate Route

● Primary   ○ Alt-1   ○ Alt-2   ○ Alt-3   ○ Alt-4   [Add Alternate Route]
[Delete] [Delete] [Delete] [Delete]

In this rule labeled as 'Outbound International' any number dialed that starts with '+011' and includes any number of digits indicates a number that is not in the local area code. In this case the CPID manipulation simply adds a +9 to the start of the number and strips off the leading + creating a result of '+9011xxxxxxxxxx'.

The last rule that is defined is another default rule that acts as a catch all and simply attempts to dial any number provided that has not matched the previous rules in the list.

Note 1: The last two rules labeled as 'Outbound National' and 'Outbound International' COULD have been combined into one rule since the CPID manipulation was the same in both. The rules have been split out here in this example simply for clarity of the example. Also, if the environment uses different trunks for local, national (long Distance) and international calls, breaking these rules out into separate segments allows you to also define trunk groups and direct calls of these specific types to those individual trunks.

Note 2: The rules are evaluated in the order they are listed, top down. The first rule that matches is used so the order is important. Always consider placing your more specific rules at the top of the order and the more general at the bottom.

6. PBX Setup Notes

The basic steps of setting up the PBX for use with this gateway and a voice messaging system are as follows:

- Configuring PRA2 Interface Card
- Configuring System Parameters
- Programming E1 Trunk Access

Note: Administration can be done through a serial connection using the telnet interface or through an Ethernet connection using the Graphical User Interface (GUI). The GUI is used in this section for illustration purposes, as it displays more information per capture.

6.1 Configuring PRA2 Interface Card

Step 1: In the System Configuration browser, expand **Shelf** and select **Board**.

Select the E1 board to be configured for use with the T1/E1 IP Media Gateway, **x PRA2** (where **x** is the slot number of the E1 board).
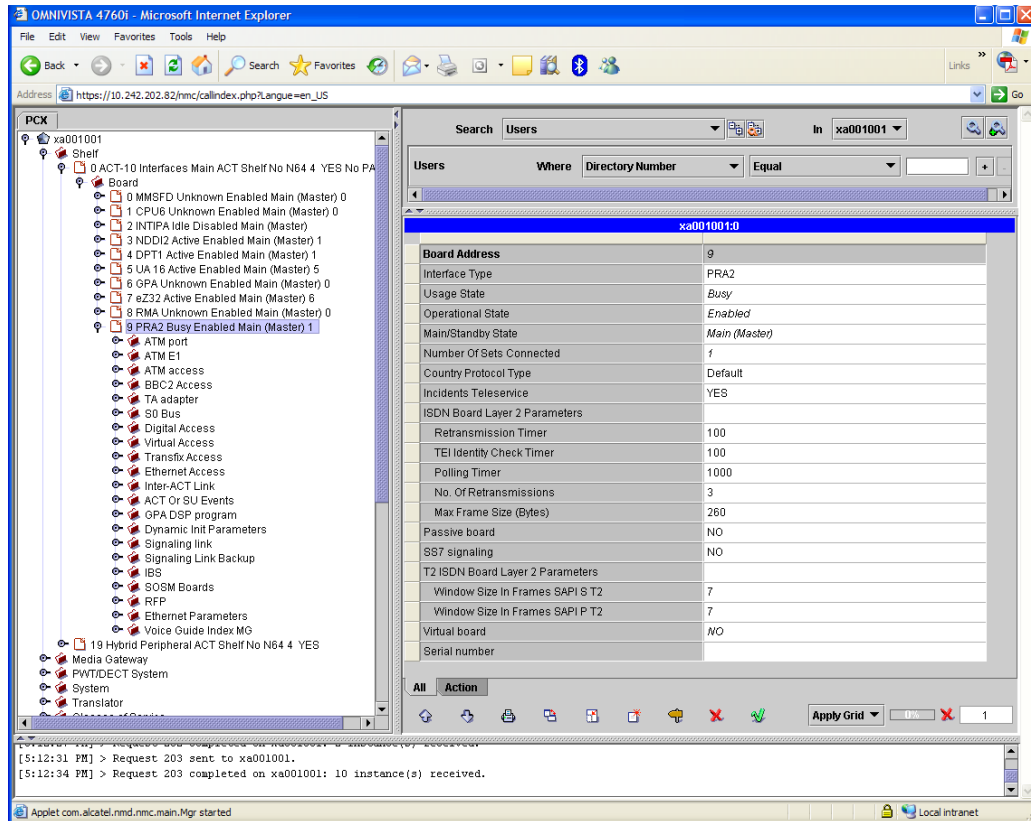
Note: Any field not listed below can remain the default setting.

Configure the **E1 Board** as follows:

- Set **Interface Type** to **PRA2**.
- Set **Country Protocol Type** to **Default**.
- Set **Incidents Teleservice** is **Yes**.
- Select **Save**.

Step 2: In the System Configuration browser, expand **x PRA2** and expand **Digital Access**.

Select the **T0/T2 Access Number** to be configured for use with the T1/E1 IP Media Gateway.
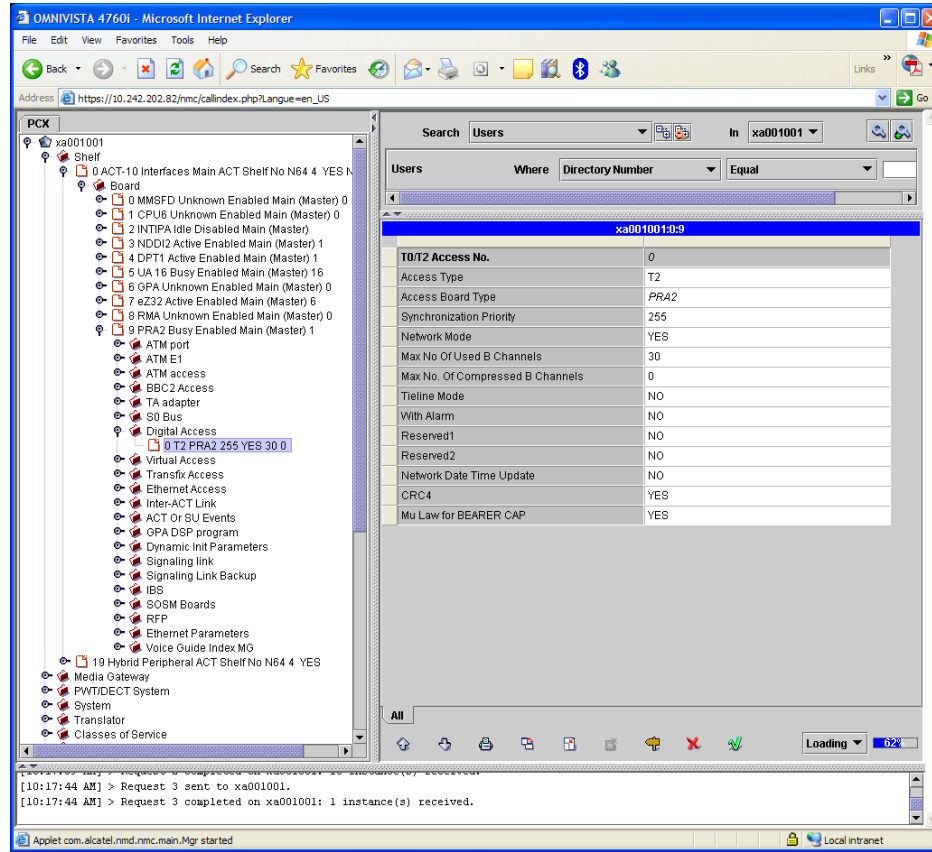
Note: Any field not listed below can remain the default setting.
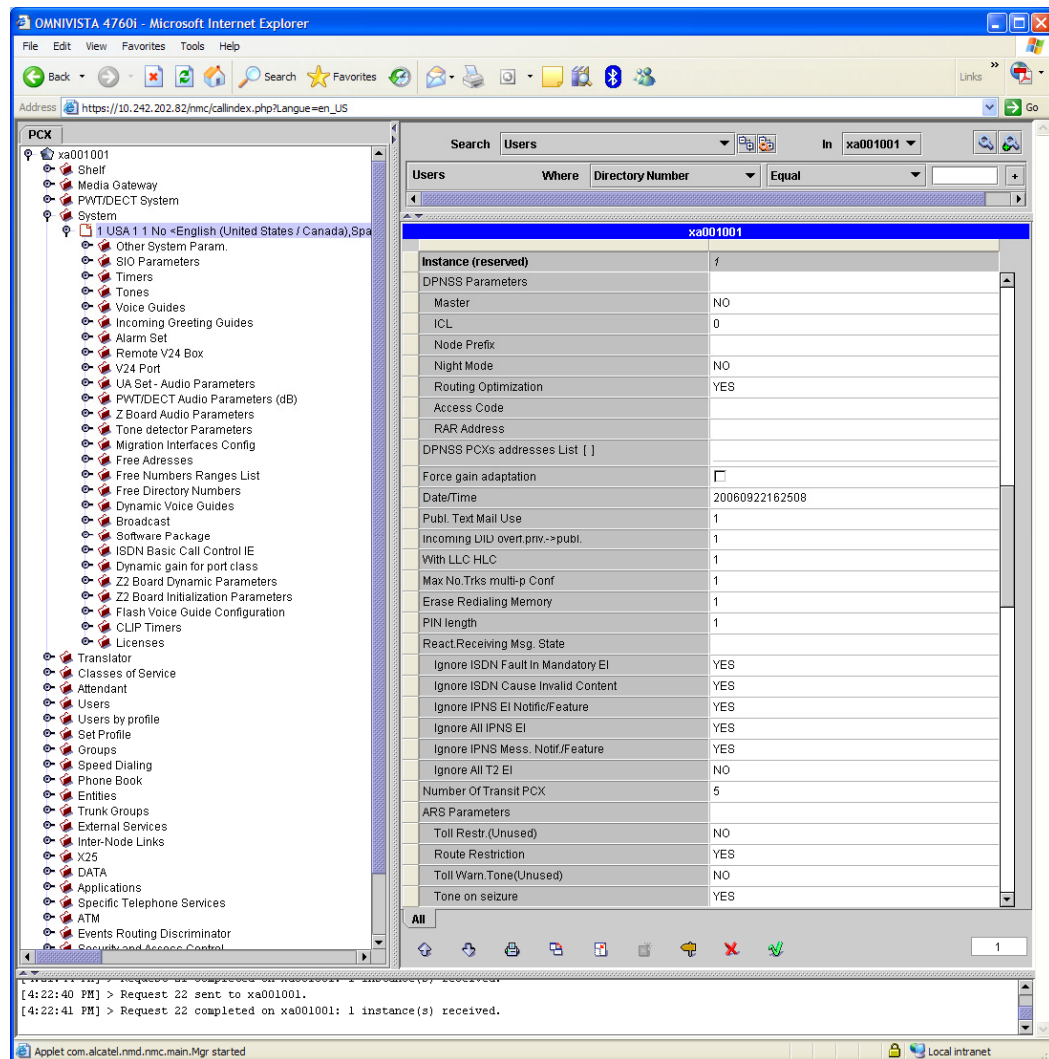
Configure the **T0/T2 Access Number** as follows:

- Set **Access Type** to **T2**.
- Set **Network Mode** to **Yes** (when the T1/E1 IP Media Gateway is set to "terminal" side)
- Set **Max No Of Used B Channels** to **30**.
- Set **Tieline Mode** to **No**.
- Set **CRC4** to **YES** (when the T1/E1 IP Media Gateway is set to "CRC_MF").
- Set **MuLaw for Bearer Cap** to **YES** (when the T1/E1 IP Media Gateway is set to "ulaw")
- Select **Save**.

11

6.2   Configuring System Parameters

Step 1: In the System Configuration browser, expand **System**.

Select the **System** to be configured for the T1/E1 IP Media Gateway.

Note: Any field not listed below can remain the default setting.

- Set DPNSS Parameter **Route Optimization** to **Yes** (to permit Path Replacement).
- Set ARS Parameter **Route Restriction** to **Yes**.
- Set ARS Parameter **Tone on Seizure** to **Yes**.
- Set **Transfer Right** to 1.
- Select **Save**.

Step 2: In the System Configuration browser, expand the **System** selected in the previous step, expand **Other System Param.**, and expand **System Parameters**.

Select the **Law** parameter to configure it for the T1/E1 IP Media Gateway.
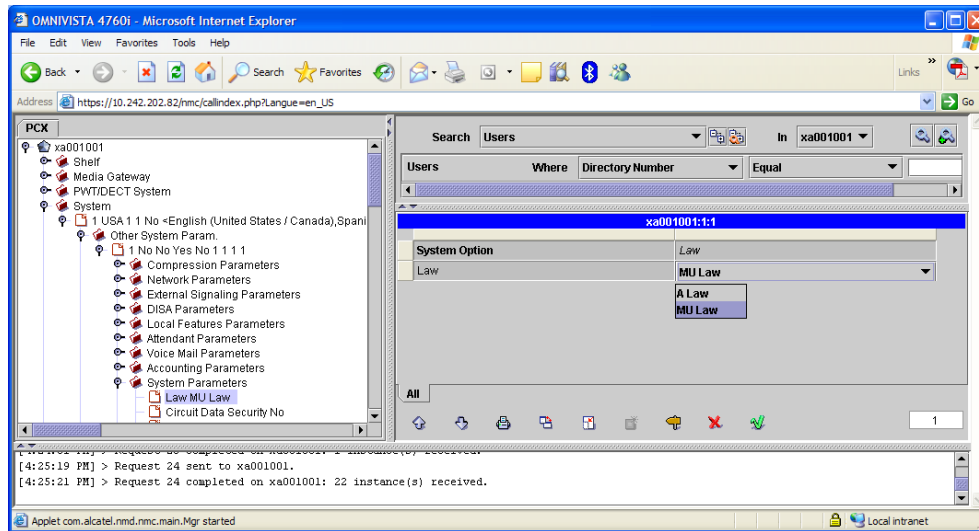
- Set **Law** to **MU Law** (when the T1/E1 IP Media Gateway is set to "ulaw").
- Select **Save**.

Step 3: In the System Configuration browser, expand **Translator** and expand **Prefix Plan**.

Select the **Prefix** to be used to identify Path Replacement attempts and status on the T1/E1 IP Media Gateway.

Note: If the desired Prefix does not exist, right-click in the System Configuration browser pane, select Create, and assign the settings as suggested below.
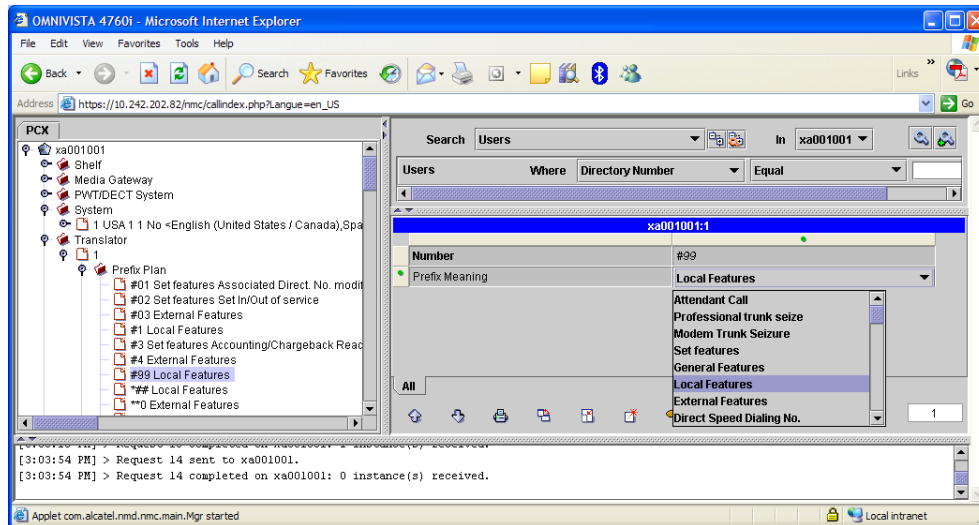
Configure the **Prefix** as follows:

- Set **Number** to *x* (where *x* is the prefix to identify Path Replacement attempts and status).
- Set **Prefix Meaning** to **Local Features**.
- Select **Save**.
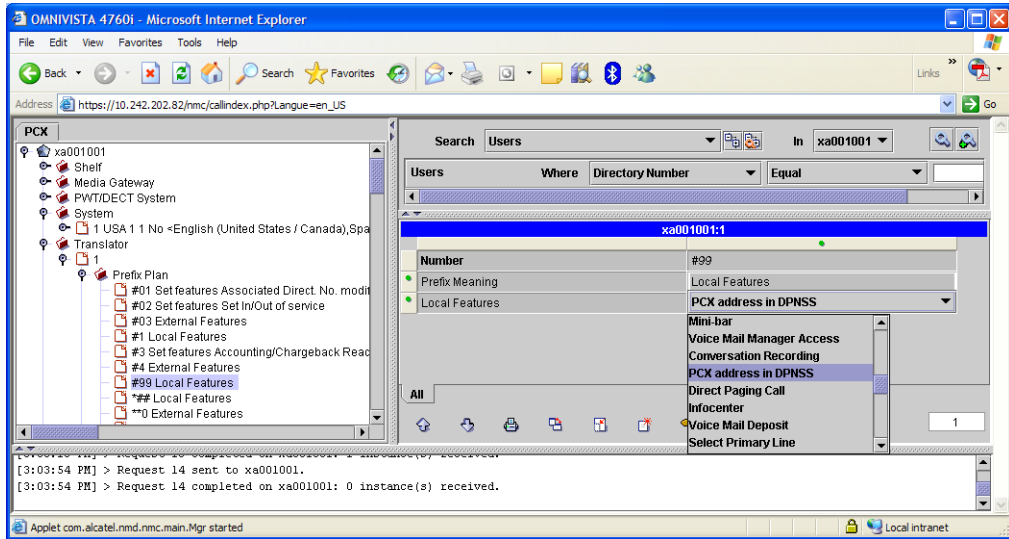
Continue configuring the **Prefix** as follows:

- Set **Local Features** to **PCX address in DPNSS**.
- Select **Save**.

6.3   Programming E1 Trunk Access

Step 1: In the System Configuration browser, expand **External Services** and select **Trunk COS**.

Select the **Trunk COS 18** to be configured for the T1/E1 IP Media Gateway.

Note: Each trunk has a pre-configured Trunk COS in the system. Trunk COS 18 corresponds to trunk type ABC_F, which is used with the T1/E1 IP Media Gateway product.
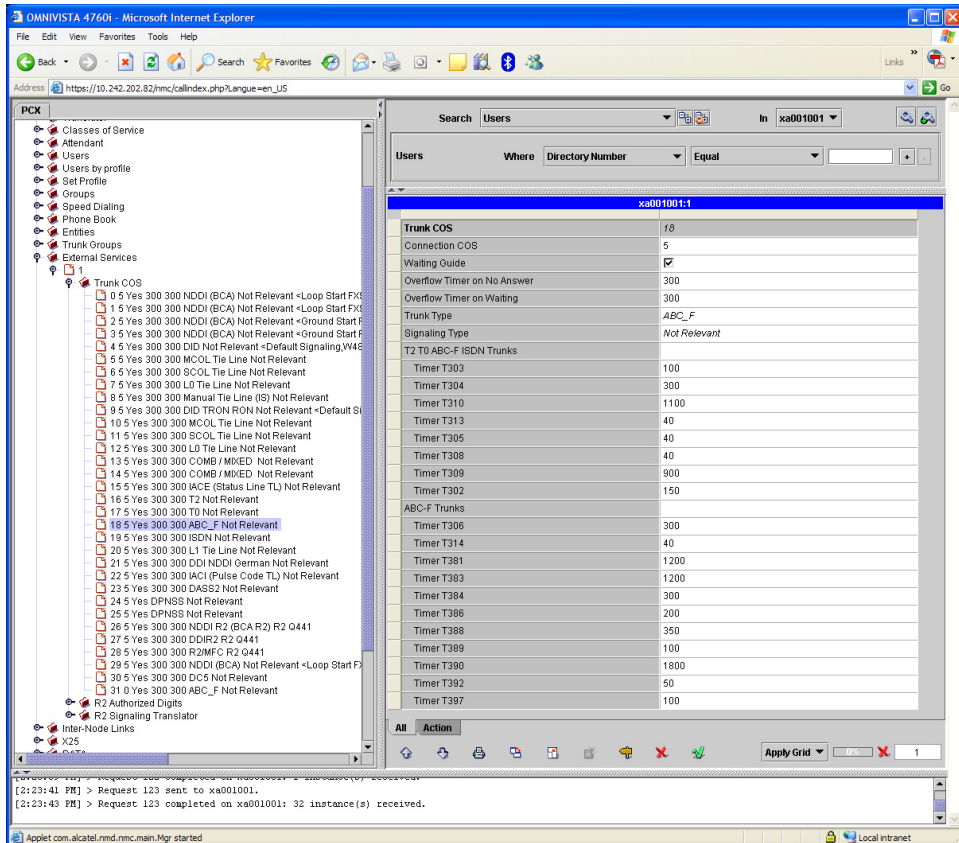
Note: Any field not listed below can remain the default setting.

- Set **Connection COS** to *x* (where *x* is the number of any Connection Class of Service where all attributes are assigned to TRUE (1); the Connection COS list can be found by expanding **Class of Service** in the System Configuration browser).
- Set **Waiting Guide** by checking the box.
- Select **Save**.

Step 2: In the System Configuration browser, expand **Trunk Groups**.

Select the **Trunk Group ID** to be configured for the T1/E1 IP Media Gateway.

Note: If no existing trunk groups can be modified, create a new trunk group, assign the Trunk Group ID to the next available number and assign the settings suggested below.

Note: Any field not listed below can remain the default setting.

Configure the **Trunk Group ID** as follows:

- Set **Trunk Group Name** to *x* (where *x* is the description for this Trunk Group).
- Set **Tone on Seizure** by checking the box.
- Set **Q931 Signal Variant** to **ABC-F**.
- Set **Number of Digits to Send** to *x* (where *x* is the number digits that must be dialed to access the trunk; often the same length as a phone extension).
- Set **Remote Network** to *x* (where *x* is the Remote Network number for this Trunk Group).
- Set **Auto. DTMF dialing on outgoing call** to **Yes**.

15

- Select **Save**.

Step 3: In the System Configuration browser, expand the **Trunk Group** (configured in the previous step) and expand **Trunk Group**.

Select the **Trunk Group Instance** to be configured for the T1/E1 IP Media Gateway.
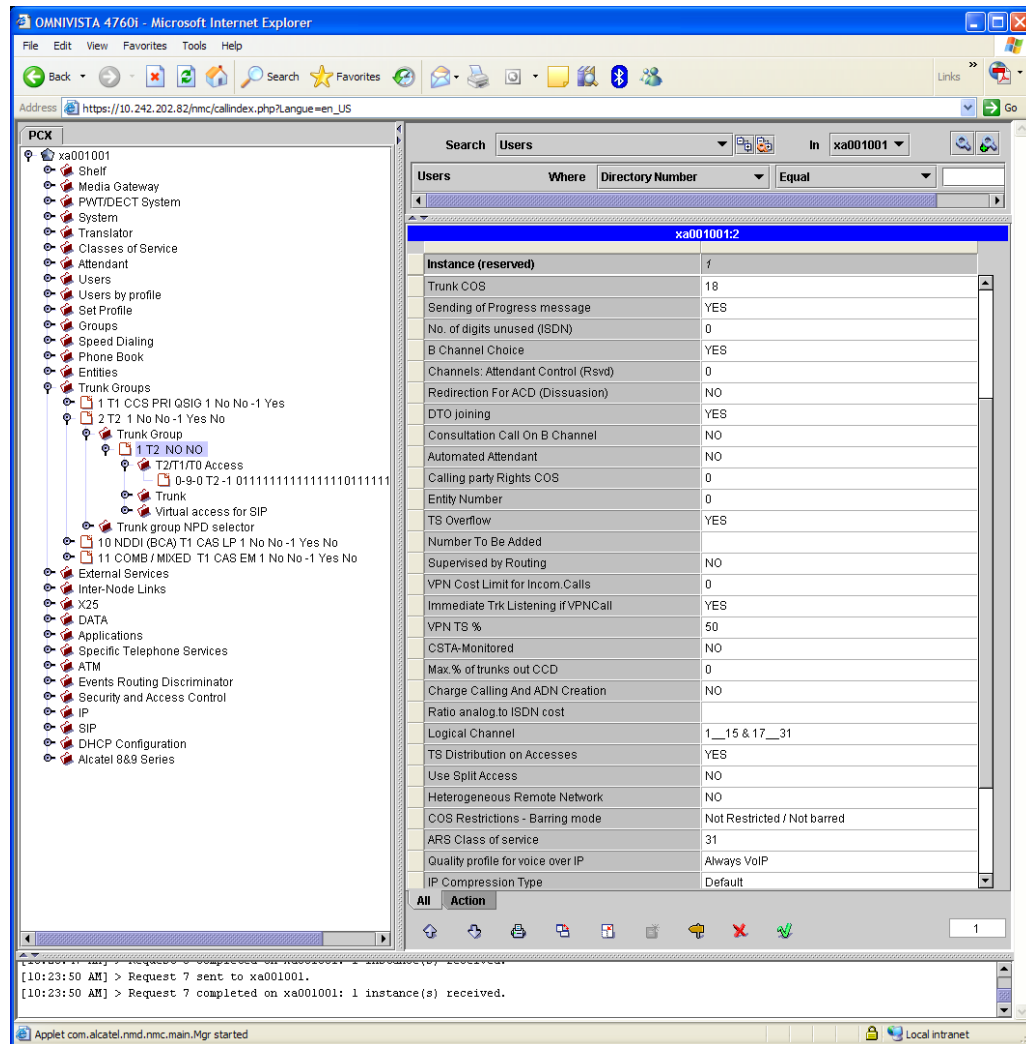
Note: Any field not listed below can remain the default setting.

Configure the **Trunk Group Instance** as follows:

- Set **Trunk COS** to **18** (defined in Step 1 of Program Access to the T1 Trunk).
- Set **No. of digits unused (ISDN)** to x (where x is the number of digits in a phone extension minus the **Number of Digits to Send** from the previous step, ex. 4 – 4 = 0).
- Set **B Channel Choice** to **Yes** (when **Network Mode** in Step 2 of Configure E1 Board is set to "yes").
- Set **Quality profile for voice over IP** to **Always VoIP**.
- Set **Save**.

Step 4: In the System Configuration browser, expand the **Trunk Group Instance** (configured in the previous step) and expand **T2/T1/T0 Access**.

Select the **T2/T1/T0 Access** to be configured for the T1/E1 IP Media Gateway.

Note: If no T2/T1/T0 Access exists, create one and assign the settings suggested below.
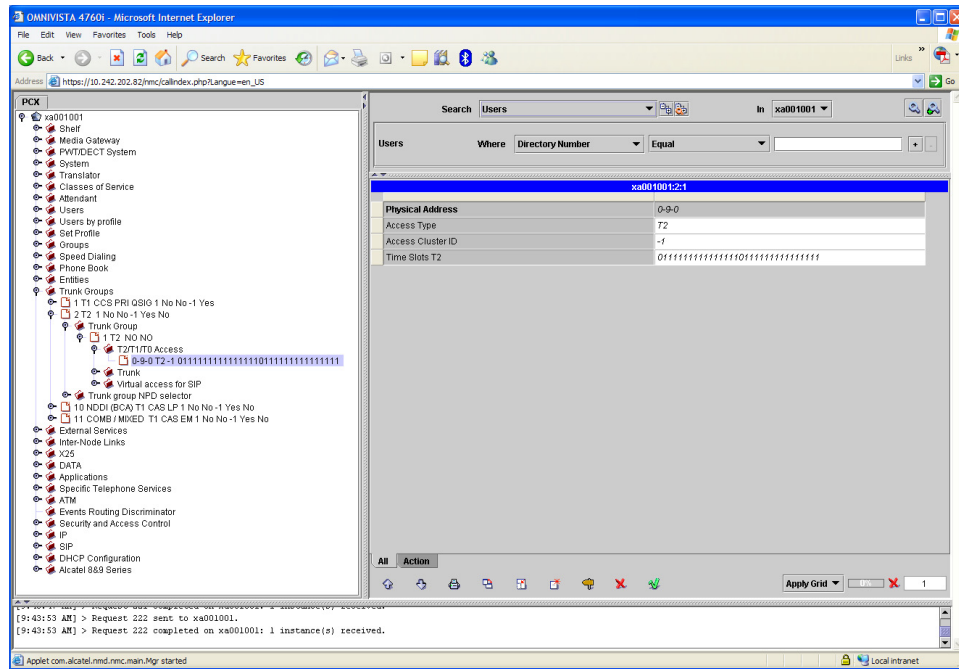
Note: Any field not listed below can remain the default setting.

Configure the **T2/T1/T0 Access** as follows:

- Set **Physical Address** to *x-y-z* (where *x* is the shelf where the E1 board is installed, *y* is the slot where the E1 board is installed, and *z* is the equipment number).
- Select **Save**.

Step 5: In the System Configuration browser, expand the **Trunk**, under the **Trunk Group Instance**.

Select the first **Trunk** in the list to be configured for the T1/E1 IP Media Gateway.

Note: If the Trunk List was automatically generated, a Trunk entry will exist for each B-Channel and each channel should be compared to the settings below. If the Trunk List was not generated, a Trunk entry will need to be created for each B-Channel using the settings below.
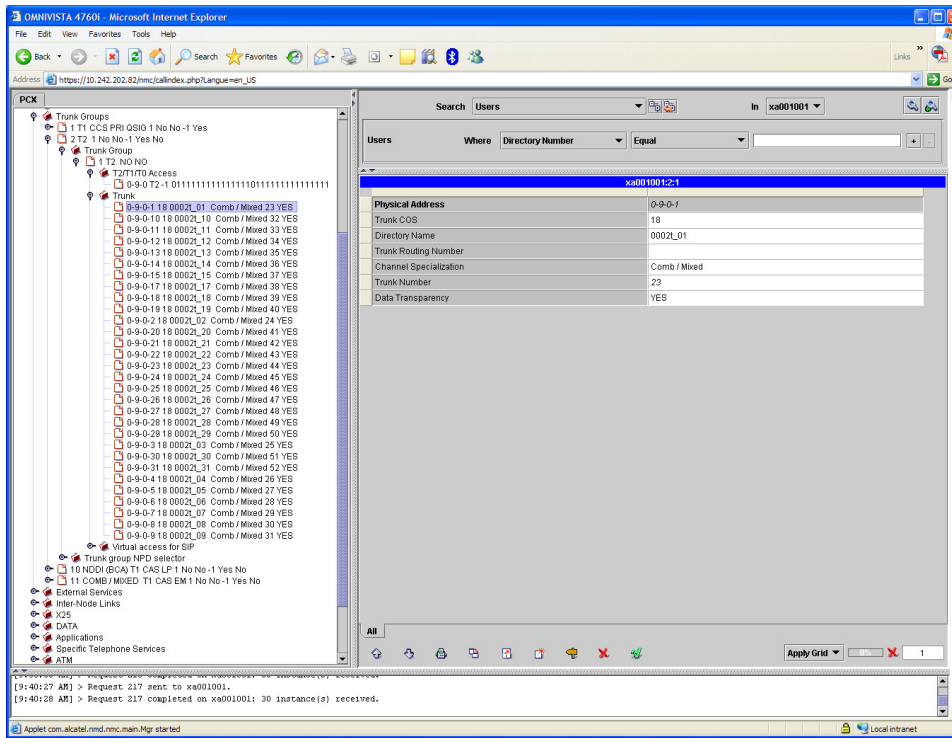
Note: Any field not listed below can remain the default setting.

- Set **Trunk COS** to **18** (defined in Step 1 of Program Access to the E1 Trunk).
- Set **Channel Specialization** to **Comb/Mixed**.
- Set **Data Transparency** to **Yes**.
- Select **Save**.

Step 6: In the System Configuration browser, expand **Translator** and expand **Prefix Plan**.

Select the **Prefix** to be configured for E1 Trunk Access on the T1/E1 IP Media Gateway.

Note: If the desired Prefix to access the E1 Trunk does not exist, right-click in the System Configuration browser pane, select Create, and assign the settings as suggested below.
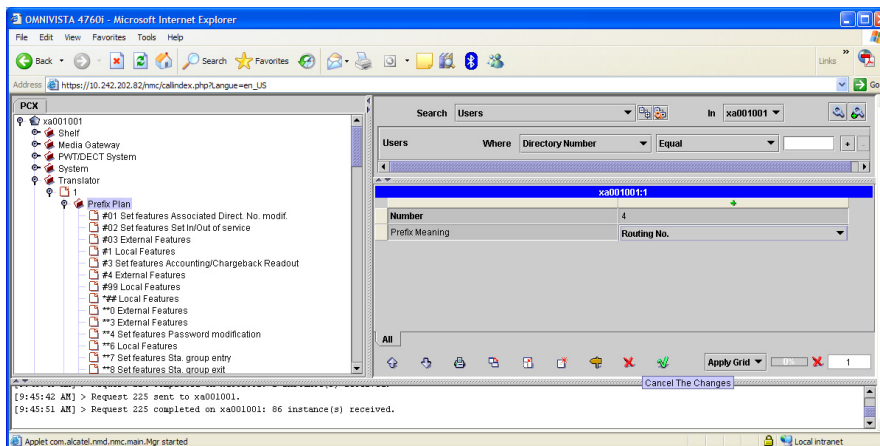
Configure the **Prefix** as follows:

- Set **Number** to *x* (where *x* is the prefix for the number dialed to access the E1 Trunk).
- Set **Prefix Meaning** to **Route No**.
- Select **Save**.
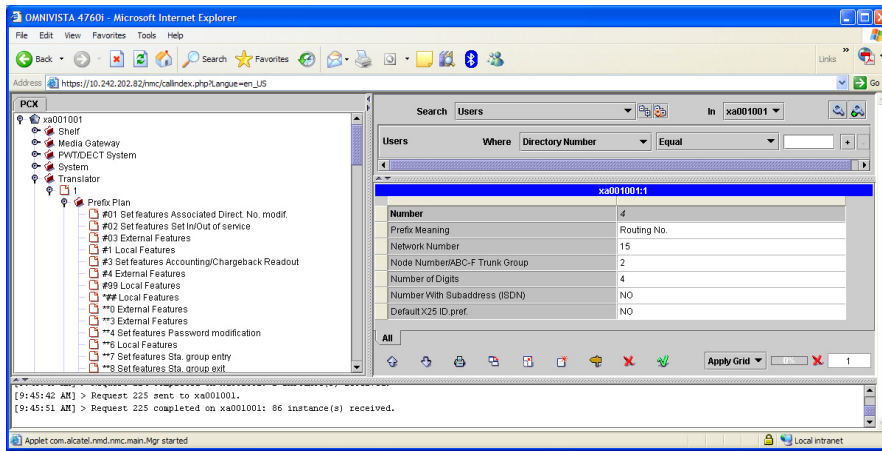
Note: Any field not listed below can remain the default setting.

Continue configuring the **Prefix** as follows:

- Set **Network Number** to *x* (where *x* is the **Remote Network** number, from Step 2 of Program Access to the E1 Trunk).
- Set **Node Number/ABC-F Trunk Group** to *x* (where *x* is the **Trunk Group ID** number, from Step 2 of Program Access to the E1 Trunk).
- Set **Number of Digits** to *x* (where *x* is the **Number of Digits to Send**, from Step 2 of Program Access to the E1 Trunk).
- Select **Save**.

*Note: In this example, **4** followed by **any 3 digits** (need 4 digits) will access the E1 Trunk line.*

7.   Microsoft OCS setup

7.1   Steps for configuring OCS

Normalization rules are used to convert all possible dial numbers into full E.164 formatted numbers. Microsoft OCS uses the standard E.164 format to search for all users listed in Active Directory (AD).

When an OCS user dials an internal extension number (normally 3-5 digits), the normalization rules convert it into full E.164 format. These normalization rules should cover dialed digits that are for internal extensions, local numbers, long distance numbers, and international numbers.

From the Start menu select the following to configure the OCS server:

- Programs → Administrative Tools → OCS 2007

On the tree presented in the configuration window right click on Forest then select `Properties` and then `Voice Properties` form the menu provided. Edit a location profile as shown in the example below.
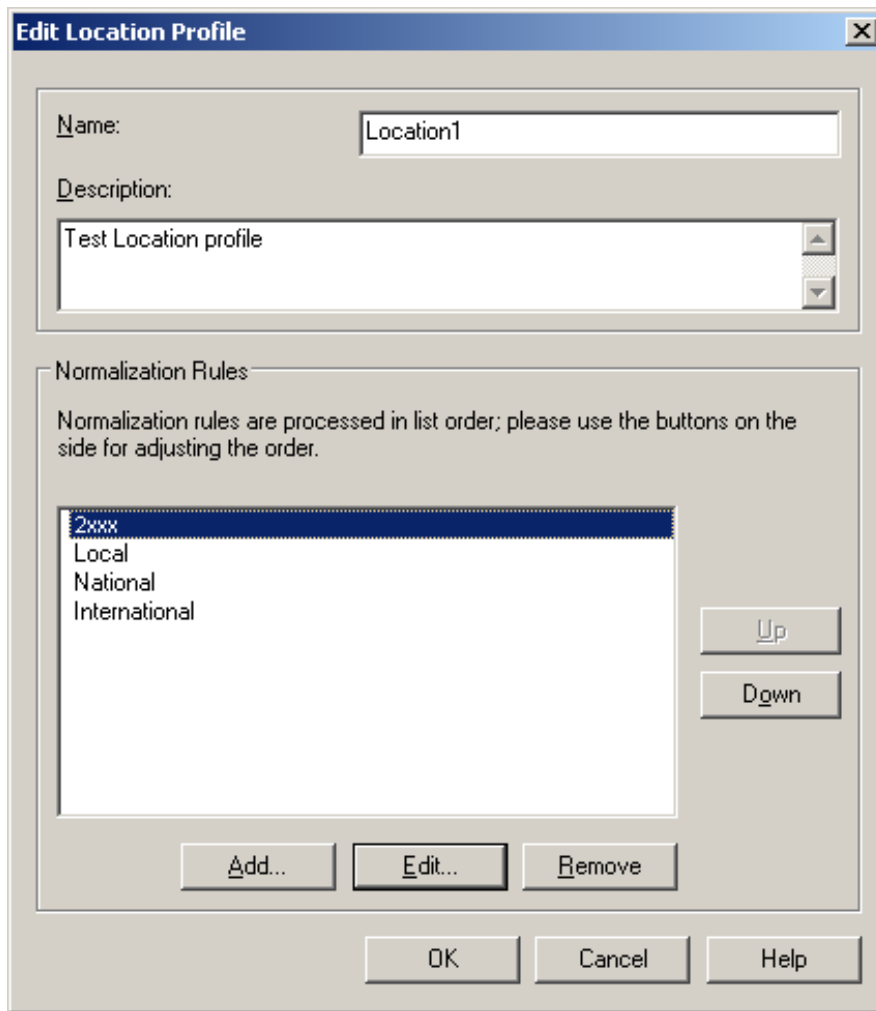
Click `Add` or `Edit` to create or change a particular rule.

Edit Phone Number Normalization Rule

Name: `2xxx`

Click to copy an existing rule.   [Copy...]

Description:

Normalize 2xxx to E.164

Translation

Phone pattern regular expression:

`^(2[0-9]{3})$`

Translation pattern regular expression:

`+1716639$1`

Valid translation characters are +, numbers, and $. Example: +1425$1.

Click Helper for assistance in creating common phone number regular expressions and translations.   [Helper...]

Test translation

To test the translation, enter a sample dialed number. If it matches the phone pattern, the translation will be shown.

Sample dialed number:

Translated number:

[OK]   [Cancel]   [Help]

In this example, when a user dials any 4-digit number starting with 2, it will be converted to its E.164 equivalent of +1716639xxxx and then that number will be searched for in AD.

More examples are shown in the following table:

Name	Phone Pattern	Translation Pattern	Descriptions
2xxx	`^(2[0-9]{3})$`	+1716639$1	Normalize 2xxx to E.164
Local	`^(\d{7})$`	+1716$1	Local number
National	`^1(\d*)$`	+1$1	Long distance number
International	`^011(\d*)`	+011$1	International number

A default route is used to route all calls to the Mediation server. If you need to route some calls to a different Mediation server, configure the Target phone numbers field accordingly.

From the Start menu select the following to configure the OCS server:

- Programs → Administrative Tools → OCS 2007

On the tree presented in the configuration window right click on Forest then select `Properties` and then `Voice Properties` form the menu provided. Edit a route as shown in the example below.

This entry routes any number with or without '+' prefix followed by any digits to Mediation server dmg4000.bufocs.local

Restart the Front End Services for the above changes to take effect, including all Normalization rules. This can be done from Window Services.

Note: Unless the dialed number from OCS client (such as Office Communicator) is in E.164 format, OCS must find a normalization rule to convert the dialed number to E.164.

7.2   Steps for configuring OCS clients

The domain users need to be enabled for making calls through OCS server.
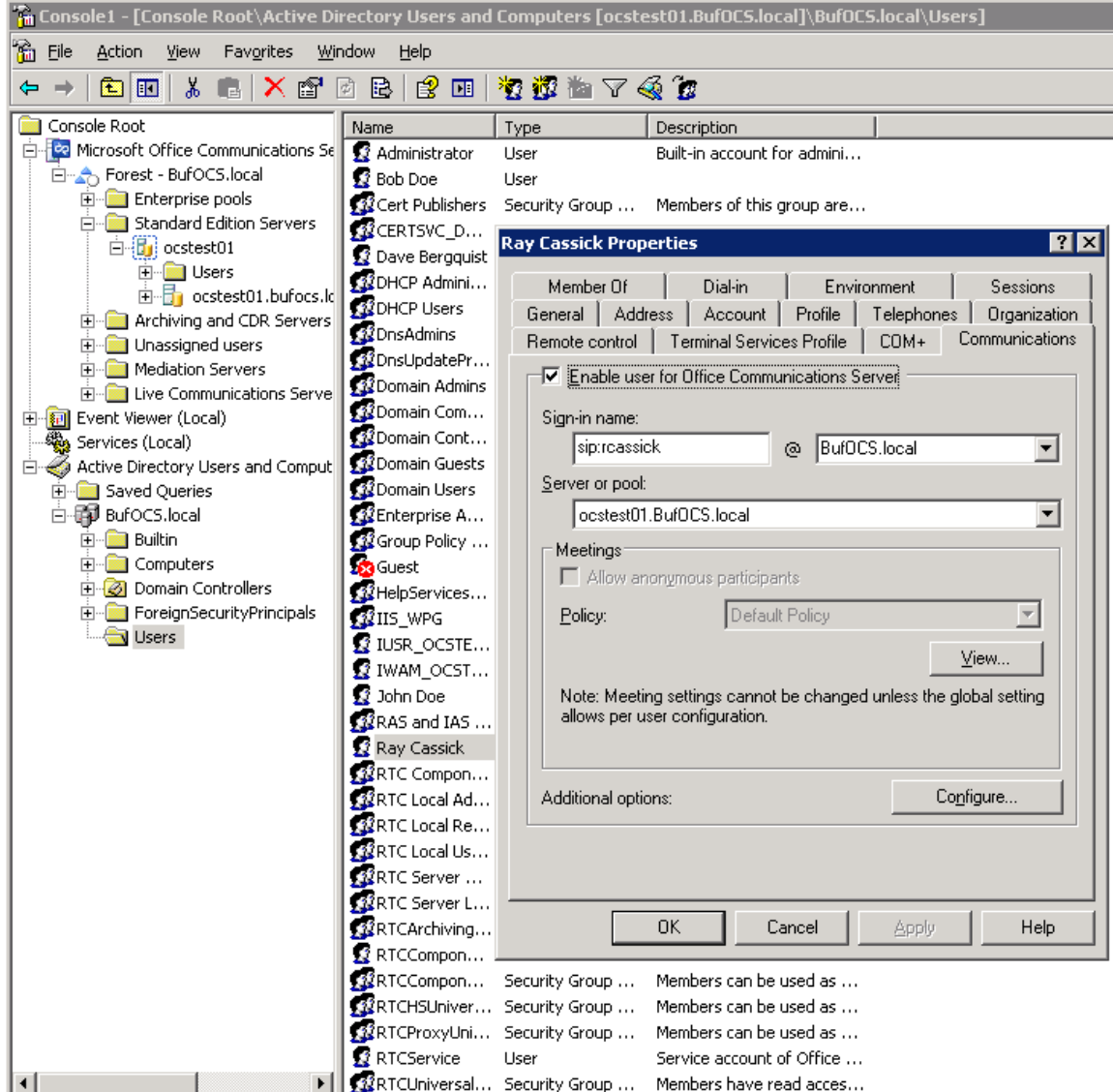
Under `Communications` tab, check the Enable user for `Office Communications Server` option and then click the `Configure` button.

User Options

Telephony

Select a telephony option. These settings affect only those calls that are routed through IP-PSTN or remote call control gateways.

- ○ Enable PC-to-PC communication only
- ○ Enable Remote call control
- ● Enable Enterprise Voice
  - ☐ Enable PBX integration

  Note: To enable both remote call control and PBX integration, you must specify a Server URI below.

Policy:	Default Policy ▼ [View...]
Server URI:	sip:4000
Line URI:	tel:+17166395100

Federation

- ☐ Enable federation
- ☐ Enable remote user access
- ☐ Enable public IM connectivity

Archiving

- ☐ Archive internal IM conversations
- ☐ Archive federated IM conversations

Note: Archiving settings cannot be changed unless the global setting allows per user configuration.

☑ Enable enhanced presence
Note: Enhanced presence cannot be changed once it has been set.

[OK]   [Cancel]   [Help]

In the above configuration for user Ray Cassick, when an inbound PSTN call for 5100, it will be converted by the gateway CPID manipulation and routing rules into +17166395100. OCS will match that number provided by the gateway to the `Line URI` parameter for this user and ring Ray Cassick if he is logged on to OCS from Office Communicator or any OCS supported device.

8. Testing Validation Matrix

The table below shows various test scenarios that are run as typical validation scenarios when the gateway is used in a voice messaging situation. The notes column specifies any notable parts of the test.

The test scenarios below assume that all gateway configuration parameters are at their default values. For a complete sample showing call flows and states please consult the Gateway SIP Compatibility Guide.

Test Number	Call Scenario Description	Notes
Inbound call scenarios		
1	Direct call from TDM station set to OCS client.	
2	Direct call from OCS client to TDM station set.	

9. Troubleshooting

9.1 Important Debugging Tools

- Ethereal/Wireshark – Used to view and analyze the network captures provided by the Dialogic gateway diagnostic firmware.
- Adobe Audition -- Used to review and analyze the audio extracted from the network captures to troubleshoot any audio related issues.

9.2 Important Gateway Trace Masks

These keys are helpful during all troubleshooting scenarios and should be considered keys to activate by default fro all troubleshooting cases.

- `voip prot` and `voip code` – this allows the collection of all SIP related messages as they are sent from and received by the gateway. This data is important in cases where you feel that the gateway is not able to communicate properly with the messaging server.
- `tel event` and `tel code` – This allows the collection of all circuit side activity of the emulated station set such as display updates, key presses, light transitions and hook state changes. This data is very important in the following scenarios:
    - Call control problems (dropped calls, failing transfers, etc…)
    - Integration problems (incorrect mailbox placement, missed auto-attendant greetings etc…)
- `teldrv prot` – This allows the collection of all ISDN messages both transmitted and received on the gateways front end interface. This data is very important in the following scenarios:
    - Call control problems (dropped calls, failing transfers, etc…)
    - Integration problems (incorrect mailbox placement, missed auto-attendant greetings etc…)
- `Routingtable (all keys)` – This allows you to look inside the routing table engine and see how matching rules and CPID manipulation rules work with respect to your call. This data is very important in the following scenarios:

- Call routing problem (reaching the incorrect OCS client or no client at all, etc…)

NOTE: Turning on all traces is not recommended. Doing this floods the debug stream with significant amounts of information that can cause delays in determining the root cause of a problem.

Copyright and Legal Notice