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) connected directly to the PSTN for use with IBM® Lotus® Sametime® Unified Telephony application.

2. Configuration Details

Listed below are the specific details related to the PSTN and the gateway used in constructing the following documentation.

2.1 PSTN

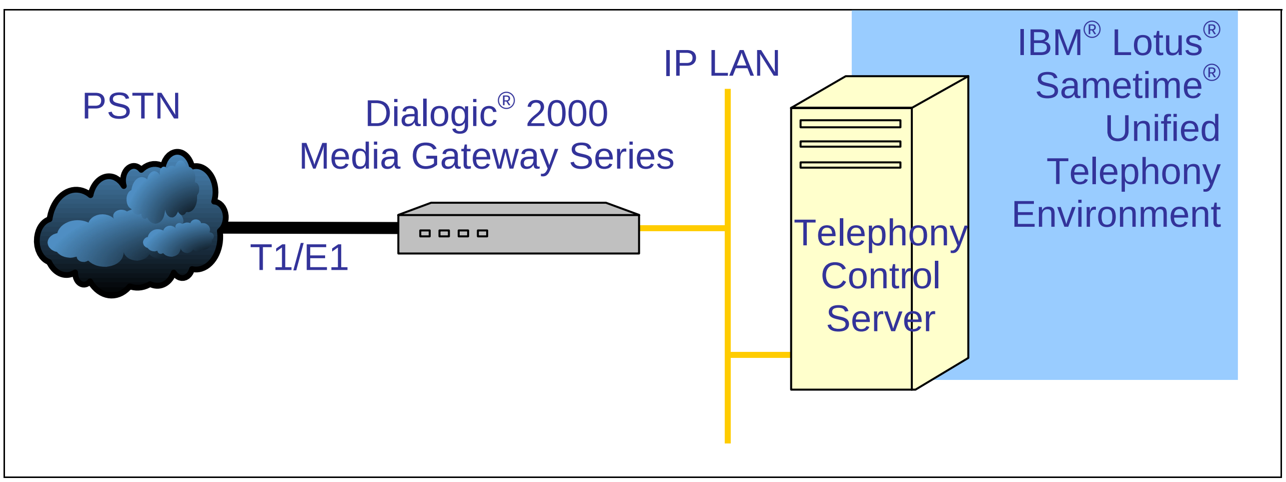
Service Provider	Any
Protocol	NI2, DMS100, 5ESS, EuroISDN

2.2 Gateway

Gateway Model	Dialogic® 2000 Media Gateway Series (DMG2000)
Software Version	Version 6.0 SU3 (6.0.128) or later
Protocol	T1/E1

2.3 System Diagram

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



3. Prerequisites

3.1 PSTN Prerequisites

The PSTN must support T1 (NI2, DMS100, or 5ESS) or E1 (ETSI EuroISDN).

3.1.2 PSTN Cabling Requirements

Cabling for T1/E1 ISDN 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.

Table 1. T1/E1 Connector Pin Designations

Pin	Description
1	RCV_RING
2	RCV_TIP
3	No Connection
4	XMIT_RING
5	XMIT_TIP
6	No Connection
7	No Connection
8	No Connection

4. Gateway Setup Notes

Steps for setting up the gateway:

- Connecting to Gateway
- Initial Gateway Configuration
- Parameter Configuration
- Routing Engine Configuration

4.1 Connecting to Gateway

There are two ways for performing the initial configuration of the gateway; serial or IP.

4.1.1 Connecting with Serial Port

- Connect a DB9 serial cable to the COM 2 port on the gateway.
- Establish a connection to the gateway (Baud=115200, Data Bits=8, Stop Bits=1, Parity=none, Flow Control=none) using a terminal emulation program (e.g. HyperTerminal). See Table 2 for the serial port pin outs.

Table 2. Serial Port Pin Outs

Pin	Signal
1	Data Carrier Detect
2	Transmit Data
3	Receive Data
4	Data Terminal Ready
5	Signal Ground
6	Data Set Ready
7	Clear to Send
8	Request to Send
9	Ring Indicator

4.1.2 Connecting with Ethernet

- Connect gateway to Network using LAN 1.
- Configure computer connecting to the gateway on the 10.12.13.x subnet (e.g. 10.12.13.75) and subnet mask of 255.255.255.0.
- Use telnet and connect to gateway at 10.12.13.74.

4.2 Initial Gateway Configuration

- Configure initial gateway. Press Enter key until you get to the “PIMG” prompt. Follow the steps below and modify the settings in **red** to match your environment. The values in **bold** are what you will be entering.

```
PIMG> pwd
Enter Password: IpodAdmin
Admin level accepted.
PIMG-admin> quickcfg
LAN 1 IP Address[10.2.2.3] : (Enter new IP Address
LAN 1 Subnet Mask[255.255.255.0] : (Enter new Subnet Mask)
LAN 1 Default Network Gateway Address[10.2.2.5] : (Enter new Default
Network Gateway Address)
LAN 2 IP Address[10.2.2.2] :
LAN 2 Subnet Mask[255.255.255.0] :
Select Line Mode ...
  Valid entries:
    1. T1
    2. E1
Enter Number for Line Mode Selection [T1] : 1
Select Protocol ...
  Valid entries:
    1. CAS - Loop Start
    2. CAS - Ground Start
    3. CAS - E&M Immediate
    4. CAS - E&M Delay
    5. CAS - E&M Wink
    6. ISDN - QSIG
    7. ISDN - NI-2
    8. ISDN - 5ESS
    9. ISDN - DMS-100
Enter Number for Protocol Selection [ISDN - NI-2] : 7
Saving parameters now...
Parameters successfully configured!
******* Restart Required ******* (Type 'restart')
PIMG-admin> restart
rebooting...
```

- Clear ARP Table on computer connecting to gateway (e.g. on Windows® machine, the command is “arp -d*” from a Command Shell).
- Change the IP address on the computer connecting to the gateway to match the newly configured gateway IP address.

4.3 Parameter Configuration

To get the gateway connected to the PSTN for use with IBM Lotus Sametime Unified Telephony, there are a few configuration options that are required. During the solution-specific setup of the Dialogic® gateway using the web interface, you must:

- In the Config -> IP Settings page:
  - Set the `BOOTP Enabled` parameter to '`No`' the (default is Yes) under the LAN1 settings block. LAN 2 can also be configured at this point for maintenance only.

IP Settings, LAN1	
MAC	00-a0-e6-89-10-42
* Client IP Address	10.242.202.40
* Client Subnet Mask	255.255.255.0
* Default Network Gateway Address	10.242.202.250
* BOOTP Enabled	No
* SNTP Server IP Address	

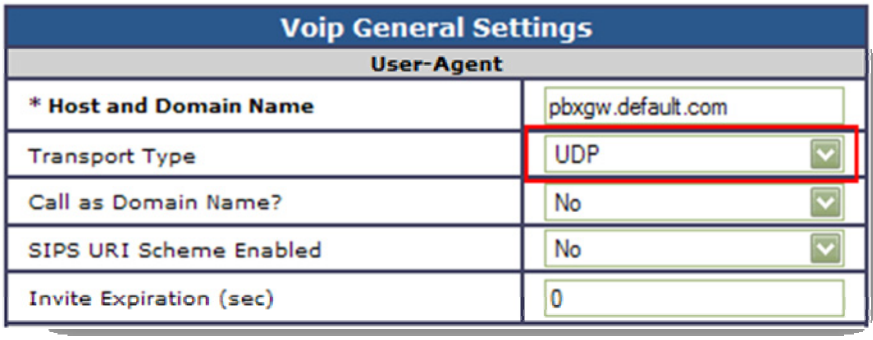
IP Settings, LAN2	
MAC	00-a0-e6-89-10-43
* Client IP Address	0.0.0.0
* Client Subnet Mask	255.255.255.0

- In the TDM -> T1/E1 page:
  - Under `Select Port to Modify`, leave this set to '`all ports`' for now. Set the `Line Encoding and Framing` as required by your T1/E1 Interface provider. Typical settings for T1 are `Line Encoding` = `B8ZS` and `Framing` = `ESF`.

T1/E1 Port Selection	
Select Port to Modify	all ports

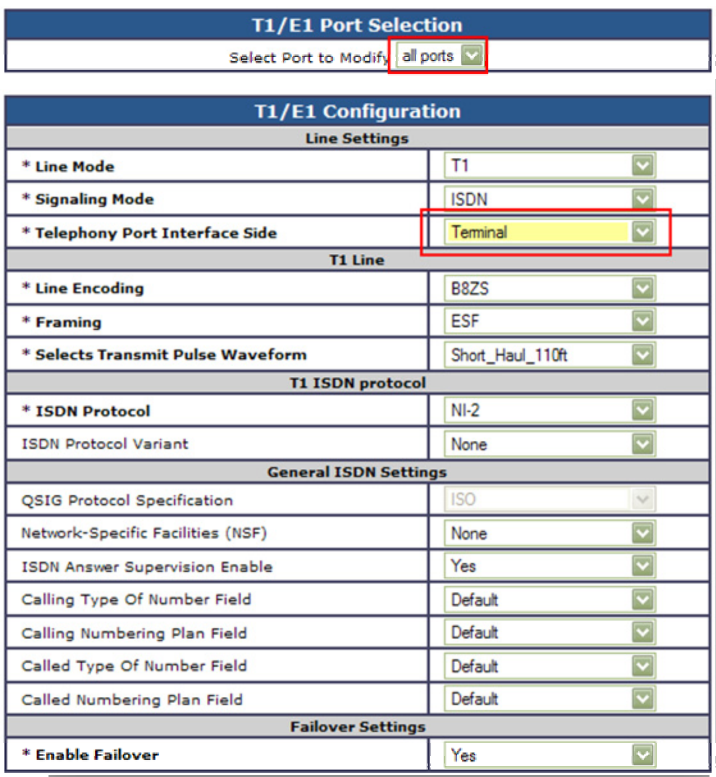
T1/E1 Configuration	
Line Settings	
* Line Mode	T1
* Signaling Mode	ISDN
* Telephony Port Interface Side	
T1 Line	
* Line Encoding	B8ZS
* Framing	ESF
* Selects Transmit Pulse Waveform	Short_Haul_110ft
T1 ISDN protocol	
* ISDN Protocol	NI-2
ISDN Protocol Variant	None
General ISDN Settings	
QSIG Protocol Specification	ISO
Network-Specific Facilities (NSF)	None
ISDN Answer Supervision Enable	Yes
Calling Type Of Number Field	Default
Calling Numbering Plan Field	Default
Called Type Of Number Field	Default
Called Numbering Plan Field	Default
Failover Settings	
* Enable Failover	Yes

- In the VoIP -> General page:
  - Set the `Transport Type` to match IBM Lotus Sametime Unified Telephony requirements (the default is UDP).



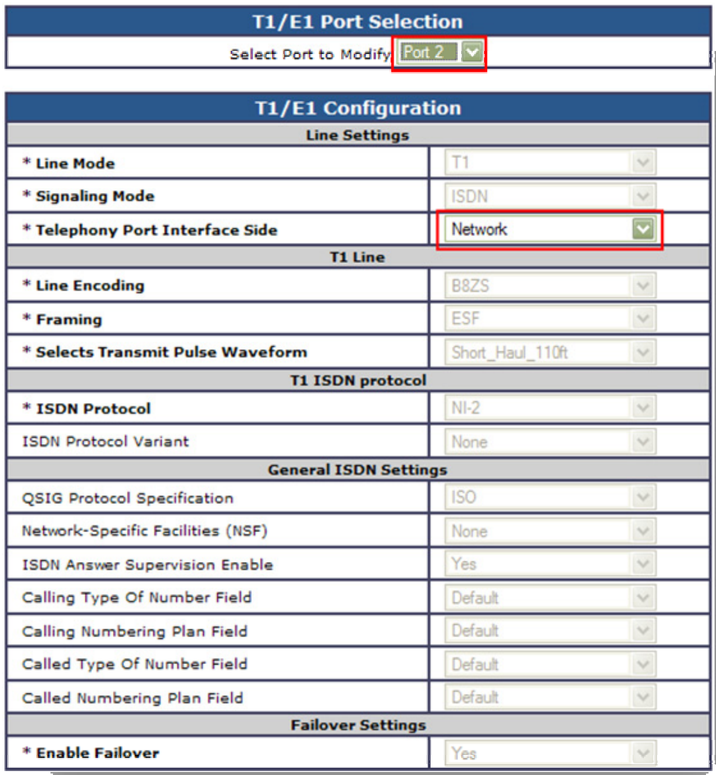
  - Set the `Telephony Port Interface Side` (either all ports or individually). If configuring the interface side for all ports on the gateway, select '`all ports`' from the `Select Port to Modify` drop down. Then, configure the interface side to be either **`Terminal`** or **`Network`**.

    NOTE: This has to be opposite of the PSTN trunk configuration. So if the PSTN trunk is network, then the gateway interface must be terminal.

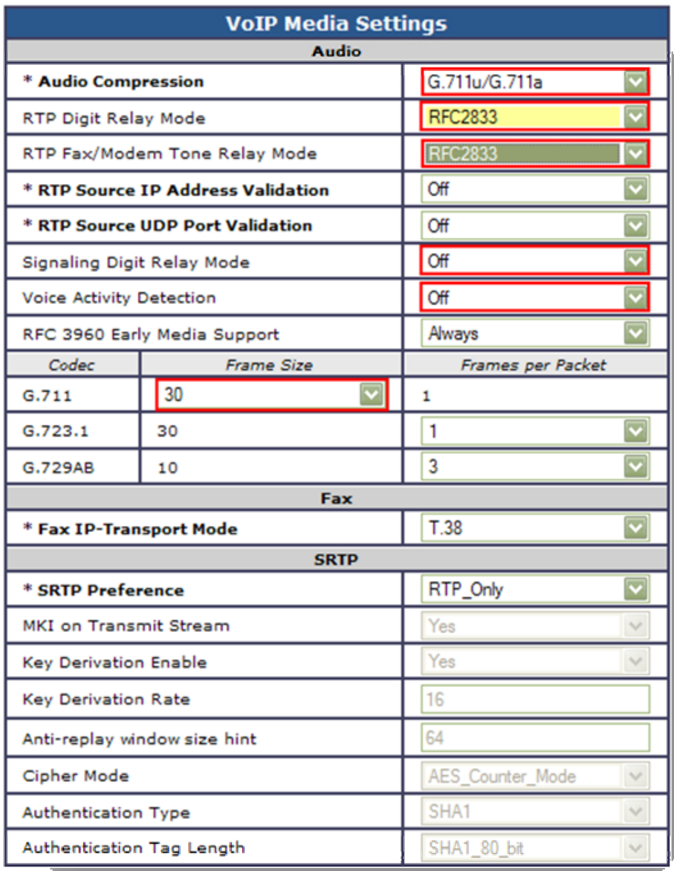


- If configuring each T1/E1 port on the gateway individually, please read on. Otherwise, skip to the next step. If each port on the gateway requires different interface side configurations, select the port to be configured from the `Select Port to Modify` drop down menu (port 2 in the example below). The, set the `Telephony Port Interface Side` for port 2 (**`Terminal`** `or` **`Network`**).

  NOTE: This has to be opposite of the PSTN / PBX trunk configuration. So if the PSTN / PBX trunk is terminal, then the gateway interface must be network.



- In the VoIP -> Media page:
  - Set the `Audio Compression` parameter to match IBM Lotus Sametime Unified Telephony requirements (the default is G.711u/G.711a).
  - Set the `RTP Digit Relay Mode` parameter to match IBM Lotus Sametime Unified Telephony (the default is RFC2833).
  - Set the `RTP Fax/Modem Tone Relay Mode` parameter to match IBM Lotus Sametime Unified Telephony (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)
  - Set the `G.711 Frame Size` to match the requirement of IBM Lotus Sametime Unified Telephony (the default is 30ms).



4.4 Routing Engine Configuration

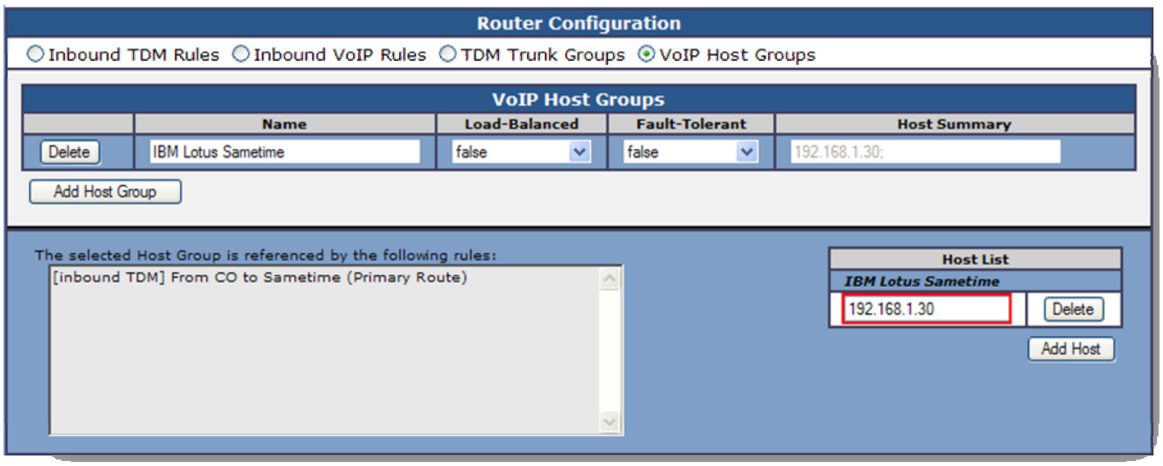
In this step, we will configure the routing table to handle inbound PSTN TDM calls destined for IBM Lotus Sametime Unified Telephony VoIP, as well as inbound VoIP calls destined for VoIP users, as well as inbound VoIP calls destined for the PSTN.

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.

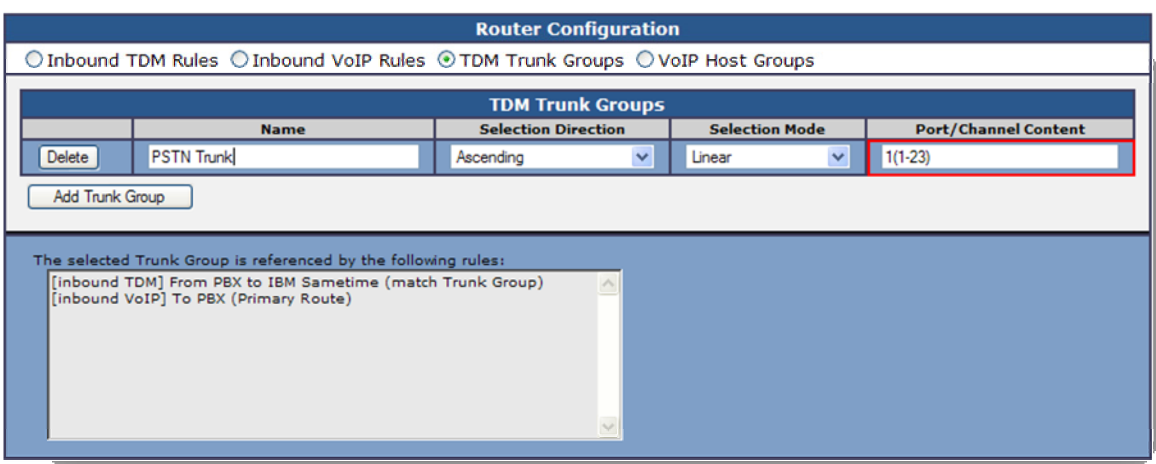
4.4.1 Media Gateway Connected to the PSTN

- **VoIP Host Group -** The first item is to set up the IP address (IBM Lotus Sametime Unified Telephony Control Server) to use as our IP destination for inbound calls to IBM Lotus Sametime Unified Telephony Control Server. This is done in the routing table under the section VoIP Host Groups. We define a single host group (using the default group is fine) that includes the IP address of the IBM Lotus Sametime Unified Telephony Control Server; in our example case we are using the IP address 192.168.1.30.

  NOTE: If using redundant Telephony Control Server (TCS) for use with load balancing or failure tolerance, add the IP address of the redundant TCS to the Host List by clicking on Add Host.

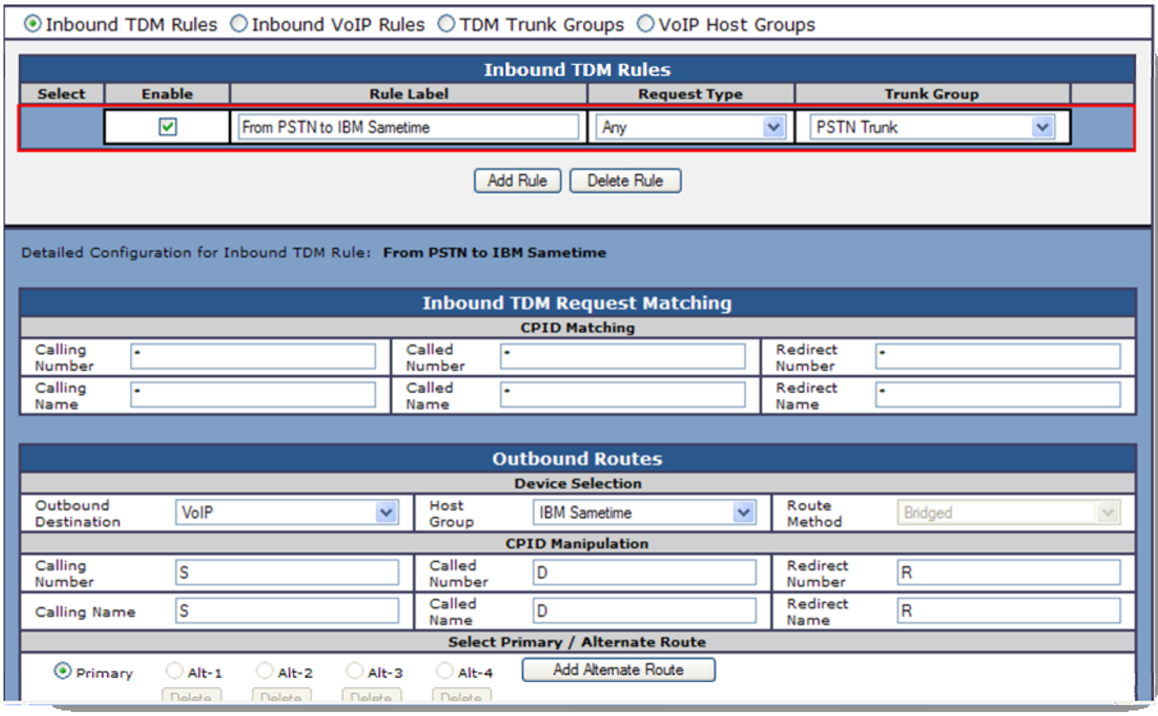


- **TDM Trunk Groups -** The second item we need to configure is the TDM Trunk Group. This is what the gateway will use to route calls to the PSTN. This is done in the routing table under the section TDM Trunk Groups. We define a trunk group that includes the Port / Channel that will be used to make outbound calls to the PSTN. In our example below, we have one trunk group configured for all PSTN bound calls - 1(1-23).



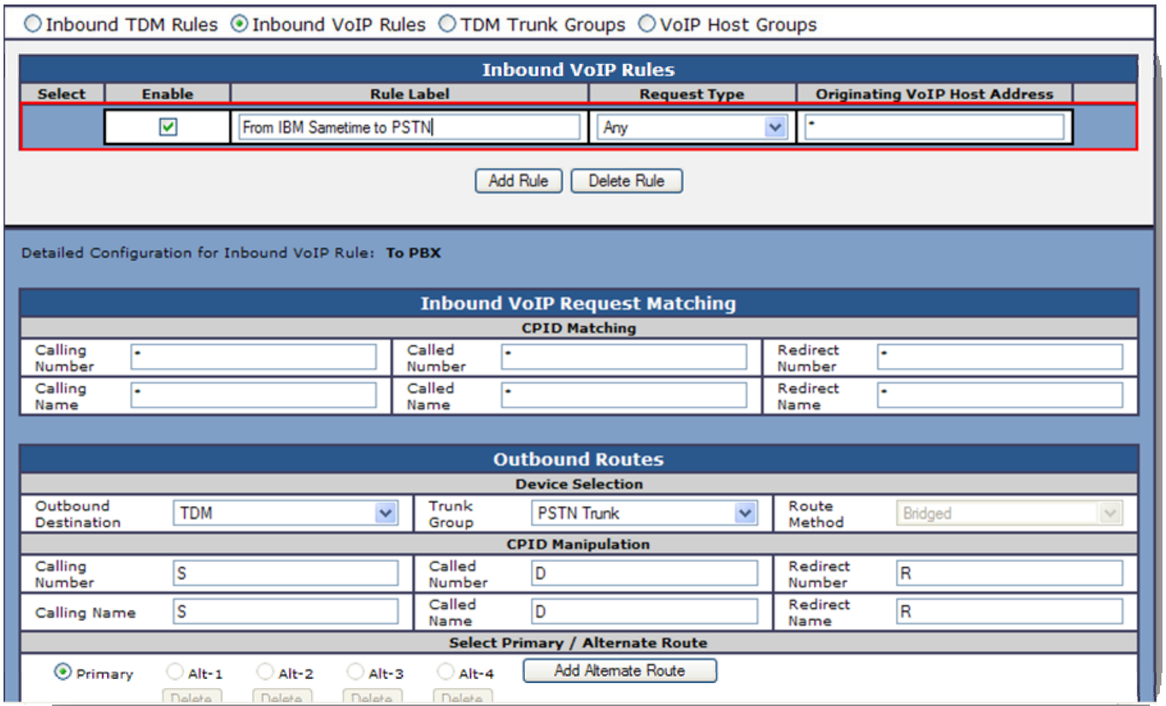
- **Inbound TDM Rules** - When an inbound call comes in to the gateway from the PSTN, an Inbound TDM rules need to be defined in order to route the call to its proper destination. In our example, when using IBM Lotus Sametime Unified Telephony with the gateway directly connected to the PSTN, create the following rule:

From PSTN to IBM Sametime



- **Inbound VoIP Rules** - When an outbound call comes in to the gateway from an IBM Lotus Sametime Unified Telephony Control Server, an Inbound VoIP rule needs to be created in order to route the call to its proper destination. In our example, we route all outbound IP calls to the PSTN and pass all received calling and called information using the following rules:

From IBM Sametime to PSTN



NOTE: For more information regarding configuration, please refer to the Dialogic® 1000 and 2000 Media Gateway Series User's Guide: http://www.dialogic.com/manuals/mediagateway/UsersGuide_6x.pdf

5. Restarting the Gateway

- For the configuration changes to take effect, you will be prompted to restart the gateway. Select the Restart menu option through the web interface and proceed to click on Restart Unit Now.
- After restarting the gateway, examine the T1 link in front of the gateway and make sure that the T1 LED is green. If it is yellow or red, please check your cable and gateway T1 configuration or consult with your PBX vendor. Once you have a green LED, you can begin making PSTN to IBM Lotus Sametime Unified Telephony application calls.

6. Troubleshooting

6.1 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.

6.2 Important Gateway Trace Masks

These keys are helpful during all troubleshooting scenarios and should be considered keys to activate by default for 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…)
- `RouteTable (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 IBM Lotus Sametime Unified Telephony 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.

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