



Cisco Catalyst 6000 Series Gateway-PBX Interoperability: Ericsson MD-110 with E1 PRI Signaling

This document describes the interoperability and configuration of a Cisco Catalyst 6000 series voice gateway with an Ericsson MD-110 PBX using E1 PRI signaling. It includes the following sections:

- System Components
- Configuration Tasks
- Caveats

System Components

PBX Model	Ericsson MD-110
PBX Release	BC9
Telephony Signaling	E1 PRI
Voice Gateway	Cisco Catalyst 6608
Gateway Release	5.5(6)a
Call Manager Release	3.1.1
VoX Protocol	MGCP

Configuration Tasks

See the following sections for configuration tasks for this feature:

- Set Up
- Ericsson PBX Configuration
- Call Manager Configuration
- Cisco Catalyst 6608 Gateway Configuration

Set Up

This document contains the following

- Connectivity Diagrams
- Set Up Notes

Connectivity Diagrams

Figure 1: Test Configuration

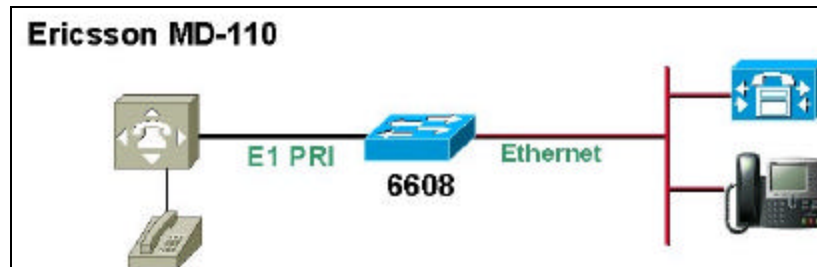


Figure 1 represents the configuration used for testing: an Ericsson MD-110 PBX connected to a Cisco Catalyst 6608 voice gateway via an E1 PRI connection.

Set Up Notes

- The Cisco 6608-E1 Gateway with an ISDN protocol type setting of PRI-EURO supports both protocol sides by selecting “Network/User” in the protocol field when configuring the Gateway via the Cisco CallManager.
- The Ericsson MD-110 PBX supports both “USER” (slave) and “NETWORK” (master) protocol sides by using the **RODAI** command.
- The following option is of particular interest:
 - Trunk **interface type** must be set to **TLU76/1**.

Ericsson PBX Configuration

Ericsson PBX Version Information

- Software: Version BC9
- Hardware: TLU76/1

Ericsson PBX Sample Configuration

Configure in the following sequence:

1. **ROCAI** Route Category Initiate
2. **RODAI** Route Data Initiate

3. **ROEQI** Route Equipment Initiate
4. **RODDI** Route External Destination Data Initiate

Route Category Initiate

Setup internal characteristics for the route. Ex. Traffic direction, services, Bearer capabilities.

```
< ROCAP:ROU=20;
ROUTE CATEGORY DATA

ROU SEL          TRM SERV          NODG DIST DISL TRAF          SIG          BCAP
20  711000000000 7   3110000010  0  5   20  03151515 211100000031 111111

END
```

Route Data Initiate

E1-PRI Route Protocol Characteristics, protocol side "User"

```
< RODAP:ROU=20;
ROUTE DATA

ROU  TYPE  VARC          VARI          VARO          FILTER
20   SL60  H'00000010  H'05400000  H'06110000  NO

END
```

E1-PRI Route Protocol Characteristics, protocol side "Network"

```
< RODAP:ROU=20;
ROUTE DATA

ROU  TYPE  VARC          VARI          VARO          FILTER
20   SL60  H'00000010  H'05400000  H'06310000  NO

END
```

Route Equipment Initiate

E1-PRI trunk lines (B-channels)

```
< ROEDP:ROU=20,TRU=ALL;
ROUTE EQUIPMENT DATA

ROU          TRU          EQU          SQU          INDDAT
20           001-1       001-1-40-01  H'000000000000
20           001-2       001-1-40-02  H'000000000000
20           001-3       001-1-40-03  H'000000000000
20           001-4       001-1-40-04  H'000000000000
20           001-5       001-1-40-05  H'000000000000
20           001-6       001-1-40-06  H'000000000000
20           001-7       001-1-40-07  H'000000000000
20           001-8       001-1-40-08  H'000000000000
20           001-9       001-1-40-09  H'000000000000
20           001-10      001-1-40-10  H'000000000000
20           001-11      001-1-40-11  H'000000000000
20           001-12      001-1-40-12  H'000000000000
20           001-13      001-1-40-13  H'000000000000
20           001-14      001-1-40-14  H'000000000000
```

```
20          001-15          001-1-40-15          H'00000000000000
20          001-17          001-1-40-17          H'00000000000000
20          001-18          001-1-40-18          H'00000000000000
20          001-19          001-1-40-19          H'00000000000000
20          001-20          001-1-40-20          H'00000000000000
20          001-21          001-1-40-21          H'00000000000000
20          001-22          001-1-40-22          H'00000000000000
20          001-23          001-1-40-23          H'00000000000000
20          001-24          001-1-40-24          H'00000000000000
20          001-25          001-1-40-25          H'00000000000000
20          001-26          001-1-40-26          H'00000000000000
20          001-27          001-1-40-27          H'00000000000000
20          001-28          001-1-40-28          H'00000000000000
20          001-29          001-1-40-29          H'00000000000000
20          001-30          001-1-40-30          H'00000000000000
20          001-31          001-1-40-31          H'00000000000000
```

END

Route External Destination Data Initiate

Route and Access Code for the trunk Information- Note PRI uses Route 20

```
< RODDP:DEST=ALL;
EXTERNAL DESTINATION ROUTE DATA
```

DEST	DRN	ROU	CHO	CUST	ADC	TRC	SRT	NUMACK	PRE
2		20			1005000000000025000	0	1	0	
30		1			1005000000000025000	0	3	0	
31		2			1005000000000025000	0	3	0	
32		3			1005000000000025000	0	3	0	
33		4			1005000000000025000	0	3	0	
34		5			1005000000000025000	0	3	0	
35		6			0005000000000025000	0	3	0	
36		7			0005000000000025000	0	3	0	
37		8			0005000000000025000	0	3	0	
39		21			1005000000000025000	0	3	0	
40		11			1005000000000025000	0	3	0	

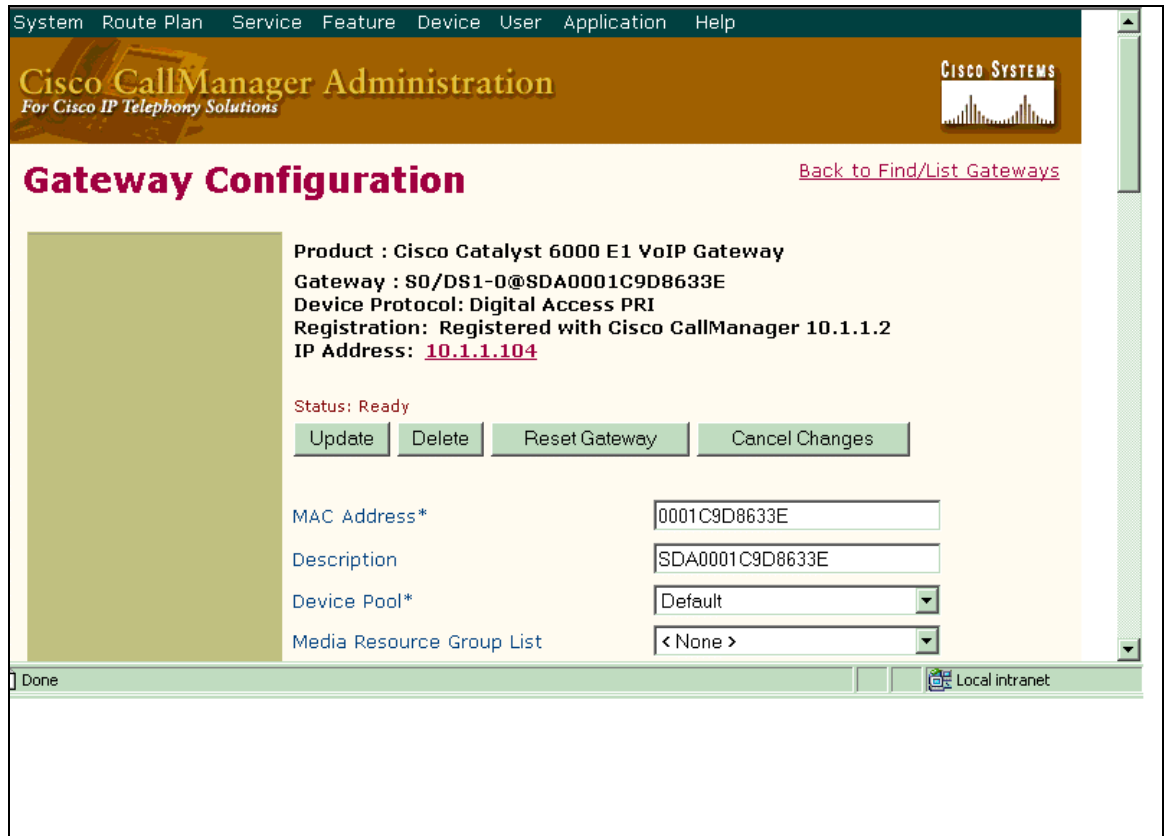
END

Call Manager Configuration

Call Manager Version Information



Cisco Catalyst 6608 Gateway Configuration



The screenshot shows the Cisco CallManager Administration web interface. At the top, there is a navigation menu with items: System, Route Plan, Service, Feature, Device, User, Application, and Help. Below the menu is a header banner with the Cisco CallManager Administration logo and the Cisco Systems logo. The main content area is titled "Gateway Configuration" and includes a link "Back to Find/List Gateways". The configuration details for a gateway are displayed:

- Product : Cisco Catalyst 6000 E1 VoIP Gateway
- Gateway : S0/DS1-0@SDA0001C9D8633E
- Device Protocol: Digital Access PRI
- Registration: Registered with Cisco CallManager 10.1.1.2
- IP Address: [10.1.1.104](#)

The status is "Ready". Below the status are four buttons: Update, Delete, Reset Gateway, and Cancel Changes. The configuration fields are as follows:

MAC Address*	<input type="text" value="0001C9D8633E"/>
Description	<input type="text" value="SDA0001C9D8633E"/>
Device Pool*	<input type="text" value="Default"/>
Media Resource Group List	<input type="text" value="< None >"/>


At the bottom of the interface, there is a "Done" button and a "Local intranet" icon.

Delay between restarts (1/8 sec ticks)	<input type="text" value="4"/>
Num Digits*	<input type="text" value="23"/>
Sig Digits	<input checked="" type="checkbox"/>
Prefix DN	<input type="text"/>
Presentation Bit*	<input type="text" value="Allowed"/>
Called party IE number type unknown*	<input type="text" value="Cisco CallManager"/>
Calling party IE number type unknown*	<input type="text" value="Cisco CallManager"/>
Called Numbering Plan*	<input type="text" value="Cisco CallManager"/>
Calling Numbering Plan*	<input type="text" value="Cisco CallManager"/>
PRI Protocol Type*	<input type="text" value="PRI EURO"/>
Inhibit restarts at PRI initialization	<input checked="" type="checkbox"/>
Enable status poll	<input type="checkbox"/>
Number of digits to strip*	<input type="text" value="0"/>
Country Code*	<input type="text" value="North America"/>
Setup non-ISDN Progress Indicator IE Enable***	<input type="checkbox"/>

Local intranet

Network Hold Audio Source	< None >
User Hold Audio Source	< None >
Calling Search Space	< None >
Location	< None >
Load Information	
Channel Selection Order*	Top Down
PCM Type*	A-law
Protocol Side*	User
Caller ID DN	
Calling Party Selection*	Originator
Channel IE Type*	Use Number when 1B
Interface Identifier Present**	<input type="checkbox"/>
Interface Identifier Value**	0
Display IE Delivery	<input type="checkbox"/>
Redirecting Number IE Delivery	<input checked="" type="checkbox"/>
Delay for first restart (1/8 sec ticks)	32

Local intranet

Product Specific Configuration 

Clock Reference*	Network
Framing*	CRC4
Audio Signal Adjustment into IP Network*	NoDbPadding
Audio Signal Adjustment from IP Network*	NoDbPadding
Zero Suppression*	HDB3

* indicates required item
** applicable to DMS-100 protocol only
*** may be required to force ringback from some PBXs

[Back to Find/List Gateways](#)

Local intranet

Route Pattern Configuration

System Route Plan Service Feature Device User Application Help

Cisco CallManager Administration
For Cisco IP Telephony Solutions

CISCO SYSTEMS

Route Pattern Configuration

[Add a New Route Pattern](#)
[Back to Find/List Route Patterns](#)

Route Pattern: 6.XXXX
Status: Ready
Note: Any update to this route pattern automatically resets the associated gateway/route list

Pattern Definition

Route Pattern*	<input type="text" value="6.XXXX"/>
Partition	<input type="text" value="< None >"/>
Numbering Plan*	<input type="text" value="North American Numbering Pl"/>
Route Filter	<input type="text" value="< None >"/>
Gateway/Route List*	<input type="text" value="S0/DS1-0@SDA0001C9D8633E"/> (Edit)
Route Option	<input checked="" type="radio"/> Route this pattern <input type="radio"/> Block this pattern

Local intranet

Partition: < None >
 Numbering Plan*: North American Numbering Plk
 Route Filter: < None >
 Gateway/Route List*: S0/DS1-0@SDA0001C9D8633E (Edit)
 Route Option: Route this pattern Block this pattern
 Provide Outside Dial Tone Urgent Priority

Calling Party Transformations

Use Calling Party's External Phone Number Mask
 Calling Party Transform Mask:
 Prefix Digits (Outgoing Calls):

Called Party Transformations

Discard Digits: PreDot
 Called Party Transform Mask:
 Prefix Digits (Outgoing Calls):

* indicates required item.

Cisco Catalyst 6608 Gateway Configuration

The following is the configuration of the Cisco Catalyst 6608 voice gateway connected to the Ericsson MD-110 PBX E1 PRI interface.

Cisco Catalyst 6608 Voice Gateway Version Information

```

Console> sh version
WS-C6006 Software, Version NmpSW: 5.5(6a)
Copyright (c) 1995-2001 by Cisco Systems
NMP S/W compiled on Feb 23 2001, 10:23:18
    
```

System Bootstrap Version: 5.3(1)

Hardware Version: 2.0 Model: WS-C6006 Serial #: TBA04511172

Mod	Port	Model	Serial #	Versions
1	2	WS-X6K-SUP1A-2GE	SAD05010NBK	Hw : 7.0 Fw : 5.3(1) Fw1: 5.4(2) Sw : 5.5(6a) Sw1: 5.5(6a)
3	48	WS-F6K-PFC WS-X6348-RJ-45	SAD05020221 SAD04420N7B	Hw : 1.1 Hw : 1.4 Fw : 5.4(2) Sw : 5.5(6a)

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```

4 24 WS-F6K-VPWR          Hw : 1.0
   WS-X6624-FXS          SAD050203M8 Hw : 3.0
                        Fw : 5.4(2)
                        Sw : 5.5(6a)
                        HP : A00203010007; DSP : A003C031 (3.3.30)
5 8 WS-X6608-T1          Hw : 1.1
   SAD04400EM0          Fw : 5.4(2)
                        Sw : 5.5(6a)
                        HP1: D00403010013; DSP1: D005C031 (3.3.30)
                        HP2: D00403010013; DSP2: D005C031 (3.3.30)
                        HP3: D00403010013; DSP3: D005C031 (3.3.30)
                        HP4: D00403010013; DSP4: D005C031 (3.3.30)
                        HP5: D00403010013; DSP5: D005C031 (3.3.30)
                        HP6: D00403010013; DSP6: D005C031 (3.3.30)
                        HP7: D00403010013; DSP7: D005C031 (3.3.30)
                        HP8: D00403010013; DSP8: D005C031 (3.3.30)
6 8 WS-X6608-E1          Hw : 1.1
   SAD04380DW1          Fw : 5.4(2)
                        Sw : 5.5(6a)
                        HP1: D00403010013; DSP1: D005C031 (3.3.30)
                        HP2: D00403010013; DSP2: D005C031 (3.3.30)
                        HP3: D00403010013; DSP3: D005C031 (3.3.30)
                        HP4: D00403010013; DSP4: D005C031 (3.3.30)
                        HP5: D00403010013; DSP5: D005C031 (3.3.30)
                        HP6: D00403010013; DSP6: D005C031 (3.3.30)
                        HP7: D00403010013; DSP7: D005C031 (3.3.30)
                        HP8: D00403010013; DSP8: D005C031 (3.3.30)

```

Module	DRAM			FLASH			NVRAM		
	Total	Used	Free	Total	Used	Free	Total	Used	Free
1	65408K	37541K	27867K	16384K	11546K	4838K	512K	198K	314K

Uptime is 27 days, 4 hours, 16 minutes
Console>

Cisco Catalyst 6608 Voice Gateway Sample Configuration

```

Console> sh module
Mod Slot Ports Module-Type          Model          Sub Status
-----
1 1 2 1000BaseX Supervisor WS-X6K-SUP1A-2GE yes ok
3 3 48 10/100BaseTX Ethernet WS-X6348-RJ-45 yes ok
4 4 24 FXS WS-X6624-FXS no ok
5 5 8 T1 WS-X6608-T1 no ok
6 6 8 E1 WS-X6608-E1 no ok

```

```

Mod Module-Name          Serial-Num
-----
1 SAD05010NBK
3 SAD04420N7B
4 SAD050203M8
5 SAD04400EM0
6 SAD04380DW1

```

```

Mod MAC-Address(es)          Hw Fw Sw
-----
1 00-04-c0-f8-42-02 to 00-04-c0-f8-42-03 7.0 5.3(1) 5.5(6a)
  00-04-c0-f8-42-00 to 00-04-c0-f8-42-01
  00-04-9b-f0-78-00 to 00-04-9b-f0-7b-ff
3 00-02-fc-20-5e-50 to 00-02-fc-20-5e-7f 1.4 5.4(2) 5.5(6a)
4 00-03-32-ba-2e-35 3.0 5.4(2) 5.5(6a)
5 00-01-c9-d9-3a-98 to 00-01-c9-d9-3a-9f 1.1 5.4(2) 5.5(6a)
6 00-01-c9-d8-63-3e to 00-01-c9-d8-63-45 1.1 5.4(2) 5.5(6a)

```

```

Mod Sub-Type          Sub-Model          Sub-Serial Sub-Hw
-----
1 L3 Switching Engine WS-F6K-PFC SAD05020221 1.1
3 Inline Power Module WS-F6K-VPWR 1.0
Console>

```

```

Console> sh port 6
Port  Name          Status      Vlan      Duplex  Speed  Type
-----
 6/1          connected   1          full    2.048  E1
 6/2          notconnect  1          full    2.048  E1
 6/3          notconnect  1          full    2.048  E1
 6/4          notconnect  1          full    2.048  E1
 6/5          notconnect  1          full    2.048  E1
 6/6          notconnect  1          full    2.048  E1
 6/7          notconnect  1          full    2.048  E1
 6/8          notconnect  1          full    2.048  E1

Port      DHCP      MAC-Address      IP-Address      Subnet-Mask
-----
 6/1      enable   00-01-c9-d8-63-3e  10.1.1.104      255.255.255.0
 6/2      enable   00-01-c9-d8-63-3f  10.1.1.118      255.255.255.0
 6/3      enable   00-01-c9-d8-63-40  10.1.1.123      255.255.255.0
 6/4      enable   00-01-c9-d8-63-41  10.1.1.117      255.255.255.0
 6/5      enable   00-01-c9-d8-63-42  10.1.1.120      255.255.255.0
 6/6      enable   00-01-c9-d8-63-43  10.1.1.121      255.255.255.0
 6/7      enable   00-01-c9-d8-63-44  10.1.1.122      255.255.255.0
 6/8      enable   00-01-c9-d8-63-45  10.1.1.124      255.255.255.0

Port      Call-Manager(s)  DHCP-Server      TFTP-Server      Gateway
-----
 6/1      10.1.1.2         10.1.1.2         10.1.1.2         10.1.1.7
 6/2      10.1.1.2         10.1.1.2         10.1.1.2         10.1.1.7
 6/3      10.1.1.2         10.1.1.2         10.1.1.2         10.1.1.7
 6/4      10.1.1.2         10.1.1.2         10.1.1.2         10.1.1.7
 6/5      10.1.1.2         10.1.1.2         10.1.1.2         10.1.1.7
 6/6      10.1.1.2         10.1.1.2         10.1.1.2         10.1.1.7
 6/7      10.1.1.2         10.1.1.2         10.1.1.2         10.1.1.7
 6/8      10.1.1.2         10.1.1.2         10.1.1.2         10.1.1.7

Port      DNS-Server(s)   Domain
-----
 6/1      -               -
 6/2      -               -
 6/3      -               -
 6/4      -               -
 6/5      -               -
 6/6      -               -
 6/7      -               -
 6/8      -               -

Port      CallManagerState  DSP-Type
-----
 6/1      registered        C549
 6/2      registered        C549
 6/3      registered        C549
 6/4      registered        C549
 6/5      registered        C549
 6/6      registered        C549
 6/7      registered        C549
 6/8      registered        C549

Port      NoiseRegen  NonLinearProcessing
-----
 6/1      enabled     enabled
 6/2      enabled     enabled
 6/3      enabled     enabled
 6/4      enabled     enabled
 6/5      enabled     enabled
 6/6      enabled     enabled
 6/7      enabled     enabled
 6/8      enabled     enabled
Console>

```

Caveats

- The Ericsson MD-110 PBX user interface is very cryptic. All parameters and options are mapped to position-dependent numeric fields within the various commands listed below. The user must have the correct revision of the Ericsson MD-110 PBX Administration manual to be able to decipher each field position to determine its meaning. Therefore it is advised not to make changes to an MD-110 PBX unless you are experienced in this interface. A single number out of place in a command string can cause unusual behavior on the PBX.
- Calling Name delivery and presentation features are not supported by the Ericsson MD-110 PBX.
- When calling from a Cisco 7960 IP phone to an Ericsson digital phone, Calling/Called Number is displayed on both phones after the call is answered.
- When calling from an Ericsson digital phone to a Cisco 7960 IP phone, the IP phone displays “Connected Number” after the call is answered. The Ericsson phone however does NOT get updated when the call is answered. It displays the trunk name.