Cisco 2621 - PBX Interoperability: Ericsson MD-110 Rel BC9 PBX with Cisco CallManager using E1 PRI-NET5 Gateway

Introduction

This is an application note for the Ericsson MD-110 Release BC9 PBX with Cisco CallManager using the Cisco 2621 E1 PRI-NET5 Gateway. Connectivity is achieved by using the ETSI standard PRI protocol. The Ericsson MD-110 can be configured as either NETWORK or USER side.

This feature supports calling/called number.

Note: 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 know exactly what you are doing. A single number out of place in a command string can cause unusual behavior on the PBX.

Network Topology

Basic Call Setup End-to-End Configuration

EDCS# 158905
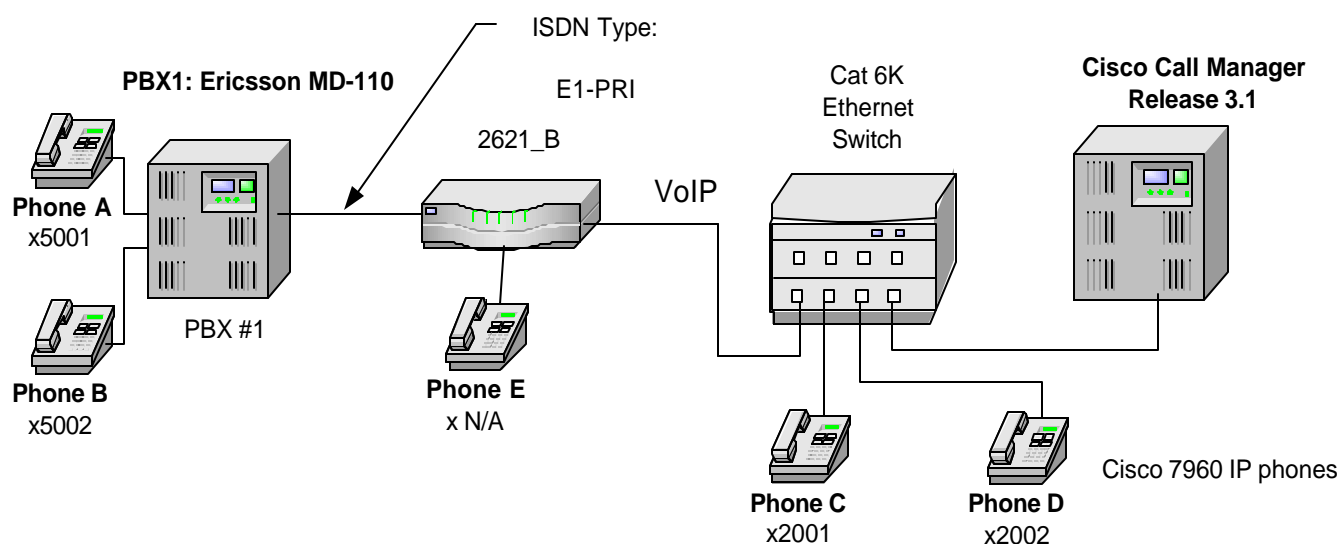
As shown in the diagram above, an Ericsson MD-110 PBX was connected via an ISDN E1 PRI link to a Cisco 2621, which in turn, was connected to an Ethernet switch. The interoperability testing involved Layers 1, 2 and 3 on the ISDN PRI link between a Cisco 2621 and the PBX.

The Ericsson MD-110 uses a command line interface where many switch features are changed with a single command. The PBX documentation must be consulted to make changes. Physical layer parameters (along with many other features) are controlled by using **RODAI** command.

Layer 2 and 3 packet exchanges were monitored using an Acacia Clarinet protocol analyzer, bridged across the PRI link in high impedance mode.

Layer 2 Q.921 packets were monitored to ensure that each PBX/2621 software configuration properly exchanged SABME/UA packets to initialize the ISDN link, and then RR packets were exchanged every 30 seconds.

Layer 3 Q.931 packets were monitored to ensure that the appropriate call setup/teardown packets were exchanged for each configuration, and that the SETUP packets contained the mandatory Information Elements with the necessary details, as well as optional IEs such as calling name and number.

Telephone calls were made end-to-end in both directions through the Cisco 2621 gateway, and a check was made to ensure that there was an audio path in both directions for each call.

Limitations
- Calling name delivery and presentation features are not supported by the Ericsson MD-110 PBX.
- When calling from Cisco 7960 IP phone to an Ericsson digital phone, calling/called number is displayed on both phones after the call is answered as expected.
- When calling from an Ericsson digital phone to a Cisco 7960 IP phone, IP phone displays the connected number after the call is answered. The Ericsson phone does not get updated when the call is answered. It displays the word "PRIVATE" instead. It was verified using ISDN protocol analyzer that the Cisco CallManager was not sending "connected number" information in the connect message back to the PBX.

System Components

Hardware Requirements
- Cisco 2621 with 2MFT E1 Port
- Ericsson MD-110 PBX, TLU76/1.

Software Requirements
- Cisco IOS Software Release `12.2(3.5)T`
- PBX Software Release BC9
- Cisco CallManager Release 3.1

Configuration

Configuring the Ericsson MD-110 PBX
The Ericsson MD-110, supports both "USER" (peer-slave) and "NETWORK" (peer-master) protocol sides by using **RODAI** command.

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
```

Route Data Initiate

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
```

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
```

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'000000000000

20             001-17         001-1-40-17                   H'000000000000

20             001-18         001-1-40-18                   H'000000000000

20             001-19         001-1-40-19                   H'000000000000

20             001-20         001-1-40-20                   H'000000000000
```

```
20              001-21       001-1-40-21                    H'000000000000

20              001-22       001-1-40-22                    H'000000000000

20              001-23       001-1-40-23                    H'000000000000

20              001-24       001-1-40-24                    H'000000000000

20              001-25       001-1-40-25                    H'000000000000

20              001-26       001-1-40-26                    H'000000000000

20              001-27       001-1-40-27                    H'000000000000

20              001-28       001-1-40-28                    H'000000000000

20              001-29       001-1-40-29                    H'000000000000

20              001-30       001-1-40-30                    H'000000000000

20              001-31       001-1-40-31                    H'000000000000


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      100500000000025000 0   1   0

30          1       100500000000025000 0   3   0

31          2       100500000000025000 0   3   0

32          3       100500000000025000 0   3   0

33          4       100500000000025000 0   3   0

34          5       100500000000025000 0   3   0

35          6       000500000000025000 0   3   0

36          7       000500000000025000 0   3   0

37          8       000500000000025000 0   3   0

39          21      100500000000025000 0   3   0
```

```
40          11          100500000000025000 0  3   0

41          12          000500000000025000 0  3   0

42          13          000500000000025000 0  3   0
```

END

Configuring Cisco CallManager

H.323 (Cisco 2621) Gateway Configuration

Network Hold Audio Source	< None >
User Hold Audio Source	< None >
Calling Search Space	< None >
Location	< None >
Caller ID DN	
Calling Party Selection*	Originator
Presentation Bit*	Allowed
Display IE Delivery	☑
Gatekeeper Name	< None >
Media Termination Point Required	☐
Num Digits*	23
Sig Digits	☐
Prefix DN	
Run H225D On Every Node	☑
Called party IE number type unknown*	Cisco CallManager

Restart succeeded.　　　　　　　　　　　　　　　　　Local intranet

Required

Num Digits*   23

Sig Digits   ☐

Prefix DN   [   ]

Run H225D On Every Node   ☑

Called party IE number type   Cisco CallManager
unknown*

Calling party IE number type   Cisco CallManager
unknown*

Called Numbering Plan*   Cisco CallManager

Calling Numbering Plan*   Cisco CallManager

* indicates required item

Back to Find/List Gateways

Restart succeeded.   Local intranet

Route Pattern Configuration

Configuring the Cisco 2621

The Cisco 2621 router with ISDN switch type setting of primary-net5 supports both protocol sides by using the "**isdn protocol-emulate network/user**" command.

```
2621_B# show version


Cisco Internetwork Operating System Software

IOS (tm) C2600 Software (C2600-JS-M), Version 12.2(3.5)T,  MAINTENANCE INTERIM S

OFTWARE

TAC Support: http://www.cisco.com/tac

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Compiled Fri 03-Aug-01 22:45 by ccai

Image text-base: 0x80008088, data-base: 0x81631DD8


ROM: System Bootstrap, Version 12.1(3r)T2, RELEASE SOFTWARE (fc1)
```

2621_B uptime is 16 hours, 6 minutes

System returned to ROM by power-on

System image file is "flash:c2600-js-mz.122-3.5.T"

cisco 2621 (MPC860) processor (revision 0x200) with 56320K/9216K bytes of memory

.

Processor board ID JAD051516TX (503811939)

M860 processor: part number 0, mask 49

Channelized E1, Version 1.0.

Bridging software.

X.25 software, Version 3.0.0.

SuperLAT software (copyright 1990 by Meridian Technology Corp).

TN3270 Emulation software.

Primary Rate ISDN software, Version 1.1.

2 FastEthernet/IEEE 802.3 interface(s)

31 Serial network interface(s)

2 Channelized E1/PRI port(s)

32K bytes of non-volatile configuration memory.

16384K bytes of processor board System flash (Read/Write)

Configuration register is 0x2102

2621_B# **show configuration**

Using 1813 out of 29688 bytes

!

version 12.2

no parser cache

service timestamps debug datetime msec localtime show-timezone

service timestamps log uptime

no service password-encryption

!

```
hostname 2621_B

!

no logging buffered

enable password cisco

!

!

!

memory-size iomem 15

voice-card 1

 dspfarm

!

ip subnet-zero

!

!

no ip domain-lookup

!

isdn switch-type primary-net5

!

!

voice class codec 1

 codec preference 1 g729r8

 codec preference 2 g711ulaw

 codec preference 3 g711alaw

!

!

!

!
```

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