

# Lucent/Avaya Definity G3si V9 PBX with CallManager using the Cisco 3640-T1 PRI as an MGCP Gateway

This application note discusses the integration of the Lucent/Avaya Definity G3si V9 PBX with CallManager using the Cisco 3640-T1 PRI as an MGCP Gateway.

### Integration Description

Connectivity is achieved by using the industry standard PRI NI-2 protocol. The Lucent/Avaya Definity G3si can be configured as either the NETWORK or USER side. The figure below shows the general network layout for the integration.

### Features

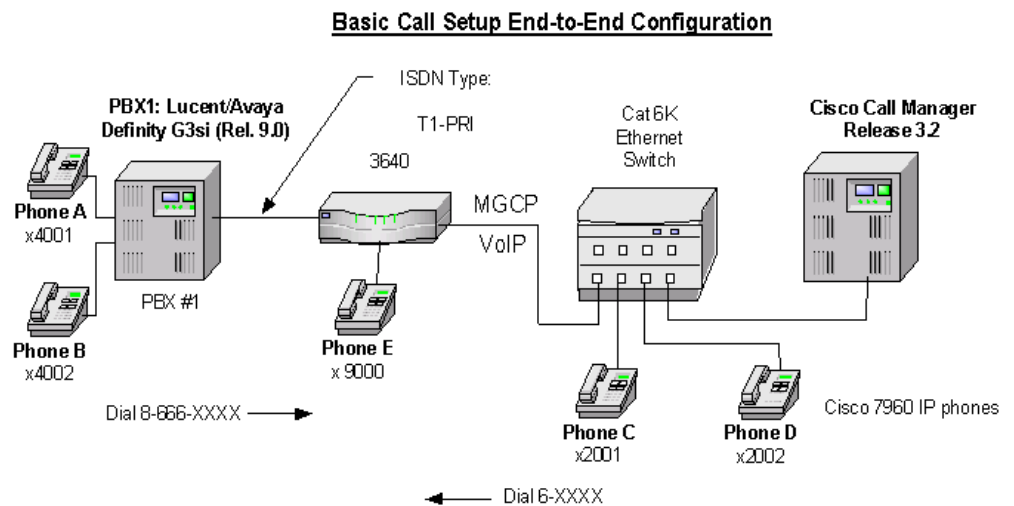
Key features supported:

- Calling/Called Number
- Calling Name
- Connected Name

Key features not supported:

- Connected Number

### Network Layout



### Cisco Systems Equipment Needed

- Hardware (Gateway): Cisco 3640 Gateway with 2MFT T1 Port
- Software: CallManager Release 3.2, Cisco IOS image c3640-js-mz.122-2.XN

### PBX Requirements

- Hardware: TN464F, DS1 INTFC 24/32
- Software: Version V9



## Configuring the Lucent/Avaya Definity G3si PBX

To configure the Lucent/Avaya Definity G3si PBX, do the following:

- Step 1.** Add the new circuit pack.
- Step 2.** Add the new signaling group.
- Step 3.** Add the new trunk group.
- Step 4.** Add the Uniform Dialing Plan.

### Circuit Pack

The following figures show the configuration of the DS1 circuit pack.

#### DS1 Circuit Pack

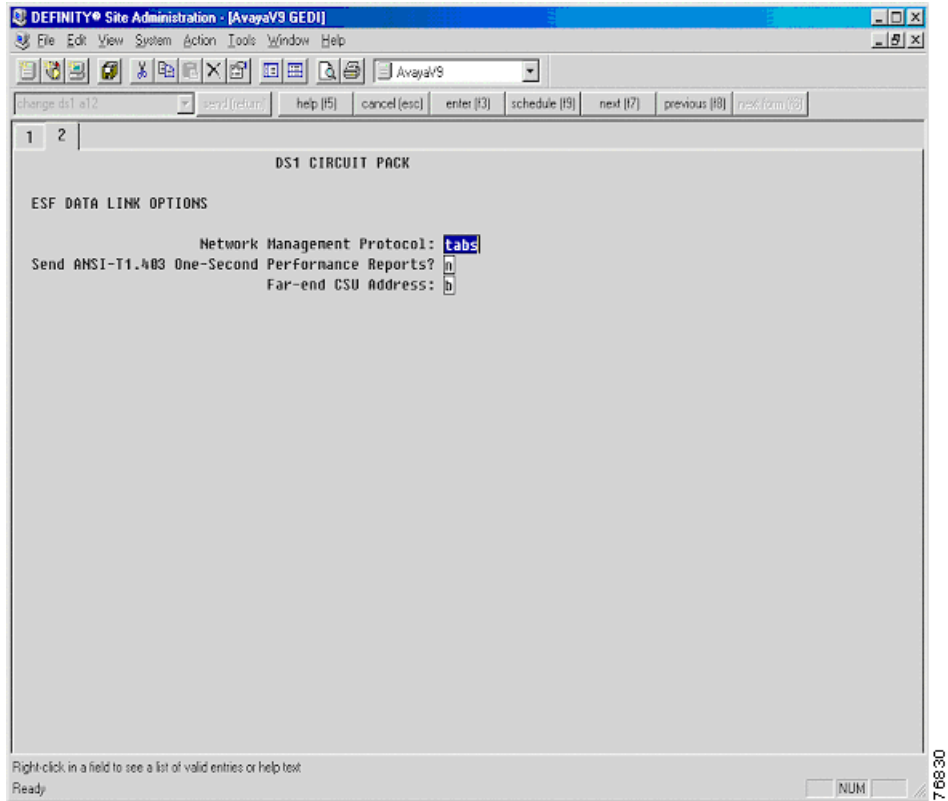
The screenshot shows the 'DEFINITY Site Administration - [AvayaV9 GEDI]' window. The main area is titled 'DS1 CIRCUIT PACK' and contains the following configuration fields:

Location:	01A12	Name:	ISDN PRI
Bit Rate:	1.544	Line Coding:	b8zs
Line Compensation:	1	Framing Mode:	esf
Signaling Mode:	isdn-pri		
Connect:	line-side		
CentreU Long Timers?	n	Country Protocol:	1
Interworking Message:	PROGRESS	Protocol Version:	3
Interface Companding:	mulaw	CRC?	n
Idle Code:	11111111	DCP/Analog Bearer Capability:	3.1kHz
Slip Detection?	n	Near-end CSU Type:	other
		Alarm When PRI Endpoint Detached?	y

At the bottom of the window, there is a status bar with 'Ready' and a 'NUM' button. A small number '76829' is visible in the bottom right corner of the window frame.



### DS1 Circuit Pack—ESF Data Link Options





## Signaling Group

The following figure shows the configuration of the signaling group.

### Signaling Group

The screenshot displays the 'DEFINITY Site Administration' window for 'AvayaV9 GEDI'. The 'SIGNALING GROUP' configuration page for group 12 is shown. The configuration includes:

- Group Number: 12
- Associated Signaling?
- Primary D-Channel: 01A1224
- Trunk Group for Channel Selection: 7
- Supplementary Service Protocol: 0
- Max number of NCA TSC: 0
- Max number of CA TSC: 0
- Trunk Group for NCA TSC: (empty)

At the bottom of the window, there is a status bar with the text 'Right-click in a field to see a list of valid entries or help text' and 'Ready'. A 'NUM' button is visible in the bottom right corner.



## Trunk Group

The following figures show the configuration of the trunk group.

### Trunk Group

The screenshot displays the configuration for Trunk Group 7 in the DEFINITY Site Administration application. The window title is "DEFINITY Site Administration - [AvayaV9 GEDI]". The interface includes a menu bar (File, Edit, View, System, Action, Tools, Window, Help), a toolbar, and a command line with various shortcuts. The main configuration area is titled "TRUNK GROUP" and contains the following fields:

- Group Number: 7
- Group Type: isdn
- CDR Reports:
- Group Name: ISDN T1 PRI
- COR: 1
- TN: 1
- TAC: 668
- Direction: Two-way
- Outgoing Display?
- Dial Access?
- Busy Threshold: 99
- Night Service:
- Queue Length: 0
- Service Type: tie
- Auth Code?
- TestCall ITC: rest
- Far End Test Line No:
- TestCall BCC:

TRUNK PARAMETERS

- Codeset to Send Display: 0
- Codeset to Send National IES: 7
- Max Message Size to Send: 260
- Charge Advice: none
- Supplementary Service Protocol: a
- Digit Handling (in/out): enbloc/enbloc
- Trunk Hunt: ascend
- Digital Loss Group: 13
- Calling Number - Delete:  Insert:  Numbering Format:
- Bit Rate: 1200
- Synchronization: async
- Duplex: Full
- Disconnect Supervision - In?  Out?
- Answer Supervision Timeout: 0

At the bottom of the window, there is a status bar with the text "Right-click in a field to see a list of valid entries or help text" and "Ready". A small "NUM" button is visible in the bottom right corner.



### Trunk Group—Trunk Features

DEFINITY Site Administration - [AvayaV9 GED]

File Edit View System Action Tools Window Help

AvayaV9

change trunk group 7 [any] [return] help [F5] cancel [esc] enter [F3] schedule [F9] next [F7] previous [F8] next form [F6]

1 2 3 4 5 6 7 8 9 10

TRUNK FEATURES

ACA Assignment?  Measured:  Wideband Support?  n

Internal Alert?  n Maintenance Tests?  y

Data Restriction?  n NCA-TSC Trunk Member:

Send Name:  Send Calling Number:

Used for DCS?  n

Suppress # Outpulsing?  n Numbering Format:

Outgoing Channel ID Encoding:  UUI IE Treatment:

Replace Restricted Numbers?  n

Replace Unavailable Numbers?  n

Send Connected Number:

Send UCID?  y

Send Codeset 6/7 LAI IE?  y

Ds1 Echo Cancellation?  n

US NI Delayed Calling Name Update?  n

Right-click in a field to see a list of valid entries or help text

Ready

76832



### Trunk Group—Group Member Assignments

The screenshot shows the Avaya V9 GEDI Site Administration interface. The window title is "DEFINITY Site Administration - [AvayaV9 GEDI]". The menu bar includes File, Edit, View, System, Action, Tools, Window, and Help. The toolbar contains various icons for file operations and navigation. The main content area displays "TRUNK GROUP" information, including "Administered Members (min/max): 1/23" and "Total Administered Members: 23". Below this, a table titled "GROUP MEMBER ASSIGNMENTS" lists 15 members with columns for Port, Code, Sfx, Name, Night, and Sig Grp. The first member, Port 01A1201, is highlighted. The interface also includes a status bar at the bottom with the text "Right-click in a field to see a list of valid entries or help text" and "Ready".

	Port	Code	Sfx	Name	Night	Sig Grp
1:	01A1201	TN464	F			12
2:	01A1202	TN464	F			12
3:	01A1203	TN464	F			12
4:	01A1204	TN464	F			12
5:	01A1205	TN464	F			12
6:	01A1206	TN464	F			12
7:	01A1207	TN464	F			12
8:	01A1208	TN464	F			12
9:	01A1209	TN464	F			12
10:	01A1210	TN464	F			12
11:	01A1211	TN464	F			12
12:	01A1212	TN464	F			12
13:	01A1213	TN464	F			12
14:	01A1214	TN464	F			12
15:	01A1215	TN464	F			12

76833



Trunk Group—Group Member Assignments Continued

The screenshot shows the 'DEFINITY Site Administration - [AvayaV9 GED]' window. The main area displays 'TRUNK GROUP' information, including 'Administered Members (min/max): 1/23' and 'Total Administered Members: 23'. Below this is a table titled 'GROUP MEMBER ASSIGNMENTS' with columns for Port, Code, Sfx, Name, Night, and Sig Grp. The table lists ports 16 through 30, with ports 16-23 having assigned values.

Port	Code	Sfx	Name	Night	Sig Grp
16:	01A1216	TN464	F		12
17:	01A1217	TN464	F		12
18:	01A1218	TN464	F		12
19:	01A1219	TN464	F		12
20:	01A1220	TN464	F		12
21:	01A1221	TN464	F		12
22:	01A1222	TN464	F		12
23:	01A1223	TN464	F		12
24:					
25:					
26:					
27:					
28:					
29:					
30:					

Right-click in a field to see a list of valid entries or help text.  
Ready

76834





## Uniform Dialing Plan

The following figures show the configuration of the uniform dialing plan.

### Dial Plan Record

DEFINITY Site Administration - [AvayaV9 GEDI]

File Edit View System Action Tools Window Help

change dialplan send(return) help (F5) cancel(esc) enter (F3) schedule (F9) next (F7) previous (F8) refresh (F5)

1

DIAL PLAN RECORD

Local Node Number: 1  
ETA Node Number:   
Uniform Dialing Plan: 4-digit  
ETA Routing Pattern:   
UDP Extension Search Order: udp-table-first

FIRST DIGIT TABLE

First Digit	Length - 1 -	Length - 2 -	Length - 3 -	Length - 4 -	Length - 5 -	Length - 6 -
1:						
2:				extension		
3:				extension		
4:				extension		
5:						
6:			dac			
7:						
8:	fac					
9:	fac					
0:	attd					
*						
#:						

Right-click in a field to see a list of valid entries or help text

Ready

NUM

76836



### Uniform Dialing Plan

The screenshot shows the 'UNIFORM DIALING PLAN' configuration window in the DEFINITY Site Administration application. The window title is 'DEFINITY Site Administration - [AvayaV9 GED]'. The main content area displays the following information:

- UNIFORM DIALING PLAN
- Ext Codes: 2ddx
- Ext Code: 2xxx Type: **UDPCode** 222

Below this information is a grid of input fields for configuring extension codes. The grid has five columns, each with a 'dd' label and a 'Type' label. The columns are labeled 0x, 1x, 2x, 3x, and 4x. Each column contains ten rows of input fields, labeled from 00 to 09, 10 to 19, 20 to 29, 30 to 39, and 40 to 49. Each input field is a small rectangular box.

At the bottom of the window, there is a status bar with the text 'Right-click in a field to see a list of valid entries or help text' and 'Ready'. A 'NUM' button is visible on the right side of the status bar. The number '76836' is printed vertically on the right edge of the window.



Pattern Number

DEFINITY Site Administration - [AvayaV9 GEDI]

File Edit View System Action Tools Window Help

change route-pattern 2 send (return) help (F5) cancel (esc) enter (F3) schedule (F9) next (F7) previous (F8) refresh (F5)

1

Pattern Number: 2

Grp. No.	FRL	NPA	Pfx	Hop	Toll	No. Del	Inserted Digits	IXC
1:	7	0	401	1			3	user
2:								user
3:								user
4:								user
5:								user
6:								user

Grp. No.	BCC VALUE				TSC	CA-TSC	ITC	BCIE	Service/Feature	BAND	No. Dgts	Numbering Format	LAR
	0	1	2	3	4	M							
1:	y	y	y	y	n	n	rest						none
2:	y	y	y	y	n	n	rest						none
3:	y	y	y	y	n	n	rest						none
4:	y	y	y	y	n	n	rest						none
5:	y	y	y	y	n	n	rest						none
6:	y	y	y	y	n	n	rest						none

Subaddress

Right-click in a field to see a list of valid entries or help text

Ready NUM 76837



## Configuring Cisco CallManager

To configure Cisco CallManager, do the following:

- Step 1.** Configure the gateway.
- Step 2.** Configure the route pattern.

### Gateway Configuration

The following figures show the configuration of the Cisco 3640 MGCP Gateway.

#### Cisco 3640 MGCP Gateway Configuration

The screenshot displays the Cisco CallManager 3.2 Administration interface for MGCP Configuration. The browser window title is "Cisco CallManager 3.2 Administration - MGCP Configuration - Microsoft Internet Explorer". The address bar shows the URL: `http://Ningon/CCMAdmin/mgcpconfig.asp?MGCP={664EEA32-8D58-4A50-9987-98D60D28ADA6}`. The main content area is titled "MGCP Configuration" and includes a "Back to Find/List Gateways" link. The configuration details are as follows:

- Product:** Cisco 364X
- MGCP :** MGCP\_3640
- Status:** Ready
- Buttons:** Update, Delete, Reset Gateway, Cancel Changes
- MGCP Domain Name\*:** MGCP\_3640
- Description:** MGCP Gateway
- Cisco CallManager Group\*:** Default

Below the configuration fields is a table for "Installed Voice Interface Cards" and "Endpoint Identifiers":

Installed Voice Interface Cards		Endpoint Identifiers	
Module in Slot 0	< None >		
Module in Slot 1	< None >		
Module in Slot 2	NM-2V		
Sub-Unit 0	VIC-2FXS	(2/0/0)	(2/0/1)
Sub-Unit 1	VIC-2FXO	(2/1/0)	(2/1/1)

The browser status bar at the bottom shows "Done" and "Local intranet". A vertical number "78638" is visible on the right edge of the screenshot.



### Cisco 3640 MGCP Gateway Configuration Continued

The screenshot shows the Cisco CallManager 3.2 Administration interface for MGCP Configuration. The browser address bar shows the URL: <http://Ningen/CCMAdmin/mgcpconfig.asp?MGCP={664EEA32-8D58-4A50-9987-98D60D28ADA6}>. The configuration is organized by slots and sub-units:

Slot	Module	Sub-Unit	Product	Port 1	Port 2
Slot 1	<None>				
Slot 2	NM-2V	Sub-Unit 0	VIC-2FXS	(2/0/0)	(2/0/1)
		Sub-Unit 1	VIC-2FXO	(2/1/0)	(2/1/1)
Slot 3	NM-HDV	Sub-Unit 0	VWIC-2MFT-T1	(3/0)	(3/1)

**Product Specific Configuration**

Global ISDN Switch Type	NI2
Switchback Timing*	Graceful
Switchback uptime-delay (min)	10
Switchback schedule (hh:mm)	12:00

\* indicates required item

[Back to Find/List Gateways](#)

### ISDN PRI Configuration

The screenshot shows the Cisco CallManager 3.2 Administration interface for Gateway Configuration. The browser address bar shows the URL: <http://ASE06-464A-4F1C-8108-830978BF872E?&Action=Update&Type=52&MGCP={664EEA32-8D58-4A50-9987-98D60D28ADA6}>. The configuration details are as follows:

**Gateway Configuration**

Product : Cisco 364X  
Gateway : S3/DS1-0@MGCP\_3640  
Device Protocol: Digital Access PRI  
Registration: Registered with Cisco CallManager 10.1.1.2  
IP Address: 10.1.1.200

Status: Ready

Buttons: Update, Delete, Reset Gateway, Cancel Changes

End-Point Name*	S3/DS1-0@MGCP_3640
Description	S3/DS1-0@MGCP_3640
Device Pool*	Default
Media Resource Group List	<None>
Network Hold Audio Source	<None>
User Hold Audio Source	<None>
Calling Search Space	<None>
Location	<None>

[Back to MGCP Configuration](#)  
[Back to Find/List Gateways](#)



### ISDN PRI Configuration Continued

Load Information	
Channel Selection Order*	Top Down
Protocol Side*	User
Caller ID DN	
Calling Party Selection*	Originator
Channel IE Type*	Use Number when 1B
MCDN Channel Number Extension Bit Set to Zero**	<input type="checkbox"/>
Interface Identifier Present**	<input type="checkbox"/>
Interface Identifier Value**	0
Display IE Delivery	<input checked="" type="checkbox"/>
Redirecting Number IE Delivery - Outbound	<input checked="" type="checkbox"/>
Redirecting Number IE Delivery - Inbound	<input type="checkbox"/>
Delay for first restart (1/8 sec ticks)	32
Delay between restarts (1/8 sec ticks)	4
Num Digits*	23

### ISDN PRI Configuration Continued

Sig Digits	<input checked="" type="checkbox"/>
Prefix DN	
Presentation Bit*	Allowed
Called party IE number type unknown*	Cisco CallManager
Calling party IE number type unknown*	Cisco CallManager
Called Numbering Plan*	Cisco CallManager
Calling Numbering Plan*	Cisco CallManager
PRI Protocol Type*	PRI NI2
Send Extra Leading Character In Display IE***	<input checked="" type="checkbox"/>
Inhibit restarts at PRI initialization	<input checked="" type="checkbox"/>
Enable status poll	<input type="checkbox"/>
Number of digits to strip*	0
Network Locale	< None >
Setup non-ISDN Progress Indicator IE Enable****	<input type="checkbox"/>



## ISDN PRI Configuration Continued

Cisco CallManager 3.2 Administration - Gateway Configuration - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites History

Address [ASB06-464A-4F1C-810B-E30978BF872E}&Action=Update&Type=52&MGCP={664EEA32-8D58-4A50-99B7-98D60D28ADA6}](#) Go Links

Enable status poll

Number of digits to strip\*

Network Locale

Setup non-ISDN Progress Indicator IE Enable\*\*\*\*

**Product Specific Configuration** [i](#)

Line Coding\*

Framing\*

Clock\*

\* indicates required item  
\*\* applicable to DMS-100 protocol only  
\*\*\* applicable to DMS-100 protocol and DMS-250 protocol only  
\*\*\*\* may be required to force ringback from some PBXs

[Back to MGCP Configuration](#)  
[Back to Find/List Gateways](#)

Local intranet 7/8/04



## Route Pattern Configuration

The following figures show the configuration of the route pattern.

### Route Pattern Configuration

Cisco CallManager Administration - Route Pattern Configuration - Microsoft Internet Explorer

Address: http://Ningon/CCMAdmin/routepatternconfig.asp?pkid={A4F20148-A516-482E-82A5-26FFF0723031}

System Route Plan Service Feature Device User Application Help

Cisco CallManager Administration  
For Cisco IP Telephony Solutions

**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

Copy Update Delete Cancel Changes

**Pattern Definition**

Route Pattern\* 6XXXX  
Partition <None >  
Numbering Plan\* North American Numbering Pl  
Route Filter <None >  
Gateway/Route List\* S3/DS1-0@MGCP\_3640 (Edit)  
Route Option  Route this pattern  Block this pattern

Done Local intranet 7 6844

### Route Pattern Configuration Continued

Cisco CallManager Administration - Route Pattern Configuration - Microsoft Internet Explorer

Address: http://Ningon/CCMAdmin/routepatternconfig.asp?pkid={A4F20148-A516-482E-82A5-26FFF0723031}

Partition <None >  
Numbering Plan\* North American Numbering Pl  
Route Filter <None >  
Gateway/Route List\* S3/DS1-0@MGCP\_3640 (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.

Done Local intranet 7 6845





## Considerations

### Calling Name and Number Feature

When calling from a Cisco 7960 IP phone to a Lucent/Avaya digital phone, both phones display Calling Name and Number after the call is answered as expected.

When calling from a Lucent/Avaya digital phone to a Cisco 7960 IP phone, the IP phone displays the Connected Name and Number after the call is answered. The Lucent/Avaya phone, however, displays the Called Name but does not display the Called Number. It was verified using ISDN protocol analyzer that the CallManager was not sending the Connected Number information in the connect message back to PBX.

### Integration Testing

This section contains information about the setup used in testing the integration of the Lucent/Avaya Definity G3si V9 PBX with CallManager using the Cisco 3640-T1 PRI as an MGCP Gateway.

### CallManager Software Release:

The following figure shows the information about the release of CallManager being used.

#### CallManager Software Release



### Lucent/Avaya Definity G3si Software Release

The following release of the Lucent/Avaya Definity G3si was used:

- System: G3siV6
- Software Version: G3V9i.02.0.033.2



## Cisco 3640 Router Configuration

The following shows the configuration of the Cisco 3640 router.

```
MGCP_3640#show version
Cisco Internetwork Operating System Software
IOS (tm) 3600 Software (C3640-JS-M), Experimental Version 12.2(20020124:013600)
[accheung-v122_xn_throttle.build 101]
Copyright (c) 1986-2002 by cisco Systems, Inc.
Compiled Wed 23-Jan-02 17:57 by accheung
Image text-base: 0x60008948, data-base: 0x61608000

ROM: System Bootstrap, Version 11.1(19)AA, EARLY DEPLOYMENT RELEASE SOFTWARE (fc1)

MGCP_3640 uptime is 4 days, 2 hours, 11 minutes
System returned to ROM by power-on
System image file is "flash:c3640-js-mz.122-2.XN"

cisco 3640 (R4700) processor (revision 0x00) with 59392K/6144K bytes of memory.
Processor board ID 10620494
R4700 CPU at 100Mhz, Implementation 33, Rev 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 Ethernet/IEEE 802.3 interface(s)
24 Serial network interface(s)
2 Channelized T1/PRI port(s)
2 Voice FXO interface(s)
2 Voice FXS interface(s)
DRAM configuration is 64 bits wide with parity disabled.
125K bytes of non-volatile configuration memory.
16384K bytes of processor board System flash (Read/Write)
16384K bytes of processor board PCMCIA Slot0 flash (Read/Write)

Configuration register is 0x2102
```

---

```
MGCP_3640#show diag
Slot 0:
  Combo 2E, 2W Port adapter, 4 ports
  Port adapter is analyzed
  Port adapter insertion time unknown
  EEPROM contents at hardware discovery:
  Hardware revision 1.2          Board revision B0
  Serial number      7687836     Part number      800-01171-04
  Test history       0x0         RMA number       00-00-00
  EEPROM format version 1
  EEPROM contents (hex):
    0x20: 01 1E 01 02 00 75 4E 9C 50 04 93 04 00 00 00 00
    0x30: 58 00 00 00 98 02 28 17 FF FF FF FF FF FF FF FF
```



Slot 2:

4 PORT Voice PM for MARs Port adapter  
Port adapter is analyzed  
Port adapter insertion time unknown  
EEPROM contents at hardware discovery:  
Hardware revision 1.1                      Board revision C0  
Serial number        10689987              Part number        800-02491-02  
Test history         0x0                              RMA number        00-00-00  
EEPROM format version 1  
EEPROM contents (hex):  
  0x20: 01 65 01 01 00 A3 1D C3 50 09 BB 02 00 00 00 00  
  0x30: 60 00 00 00 98 11 22 17 FF FF FF FF FF FF FF FF

WIC Slot 0:

FXS Voice daughter card (2 port)  
Hardware revision 1.1                      Board revision C0  
Serial number        11291019              Part number        800-02493-01  
Test history         0x0                              RMA number        00-00-00  
Connector type       Wan Module  
EEPROM format version 1  
EEPROM contents (hex):  
  0x20: 01 0E 01 01 00 AC 49 8B 50 09 BD 01 00 00 00 00  
  0x30: 60 00 00 00 99 01 05 01 FF FF FF FF FF FF FF FF

WIC Slot 1:

FXO Voice daughter card (2 port)  
Hardware revision 1.1                      Board revision C0  
Serial number        8421533                Part number        800-02495-01  
Test history         0x0                              RMA number        00-00-00  
Connector type       Wan Module  
EEPROM format version 1  
EEPROM contents (hex):  
  0x20: 01 0D 01 01 00 80 80 9D 50 09 BF 01 00 00 00 00  
  0x30: 60 00 00 00 98 06 02 01 FF FF FF FF FF FF FF FF

Slot 3:

High Density Voice Port adapter  
Port adapter is analyzed  
Port adapter insertion time unknown  
EEPROM contents at hardware discovery:  
Hardware Revision        : 1.0  
Top Assy. Part Number    : 800-03567-01  
Baord Revision           : A0  
Deviation Number        : 0-0  
Fab Version              : 02  
PCB Serial Number       : JAB03350B9K  
RMA Test History        : 00  
RMA Number              : 0-0-0-0  
RMA History             : 00  
EEPROM format version 4  
EEPROM contents (hex):  
  0x00: 04 FF 40 00 CC 41 01 00 C0 46 03 20 00 0D EF 01  
  0x10: 42 41 30 80 00 00 00 00 02 02 C1 8B 4A 41 42 30  
  0x20: 33 33 35 30 42 39 4B 03 00 81 00 00 00 00 04 00  
  0x30: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  
  0x40: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF  
  0x50: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF



```
0x60: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
0x70: FF FF FF FF FF FF FF FF FF FF FF FF FF FF FF
```

```
WIC Slot 0:
T1 (2 Port) Multi-Flex Trunk (Drop&Insert) WAN Daughter Card
Hardware revision 1.0          Board revision A0
Serial number 19621702        Part number 800-04614-02
Test history 0x0              RMA number 00-00-00
Connector type PCI
EEPROM format version 1
EEPROM contents (hex):
 0x20: 01 24 01 00 01 2B 67 46 50 12 06 02 00 00 00 00
 0x30: 50 00 00 00 00 05 20 00 FF FF FF FF FF FF FF FF

HDV firmware: Compiled Fri 23-Mar-01 00:20 by miriyala
HDV memory size 524280 heap free 175065
```

---

```
MGCP_3640#show controller t1
```

```
T1 3/0 is up.
  Applique type is Channelized T1
  Cablelength is long gain36 0db
  No alarms detected.
  alarm-trigger is not set
  Version info Firmware: 20010315, FPGA: 15
  Framing is ESF, Line Code is B8ZS, Clock Source is Line.
  Data in current interval (5 seconds elapsed):
    0 Line Code Violations, 0 Path Code Violations
    0 Slip Secs, 0 Fr Loss Secs, 0 Line Err Secs, 0 Degraded Mins
    0 Errored Secs, 0 Bursty Err Secs, 0 Severely Err Secs, 0 Unavail Secs
```

---

```
MGCP_3640#show configuration
```

```
Using 1874 out of 129016 bytes
!
version 12.2
no parser cache
no service single-slot-reload-enable
service timestamps debug uptime
service timestamps log uptime
no service password-encryption
no service dhcp
!
hostname MGCP_3640
!
logging rate-limit console 10 except errors
!
!
!
voice-card 3
!
ip subnet-zero
!
!
!
```



```
no ip dhcp-client network-discovery
mgcp
mgcp call-agent 10.1.1.2 2427 service-type mgcp version 0.1
mgcp dtmf-relay voip codec all mode out-of-band
mgcp rtp unreachable timeout 1000 action notify
mgcp modem passthrough voip mode cisco
mgcp sdp simple
mgcp package-capability rtp-package
mgcp package-capability sst-package
no mgcp timer receive-rtcp
no mgcp explicit hookstate
isdn switch-type primary-ni
call rsvp-sync
!
!
!
!
!
ccm-manager mgcp
ccm-manager music-on-hold
ccm-manager config server 10.1.1.2
ccm-manager config
!
!
controller T1 3/0
 framing esf
 linecode b8zs
 pri-group timeslots 1-24 service mgcp
!
controller T1 3/1
 framing sf
 linecode ami
!
!
!
interface Ethernet0/0
 ip address 10.1.1.200 255.255.255.0
 no ip mroute-cache
 half-duplex
!
interface Ethernet0/1
 ip address 171.69.231.23 255.255.255.0
 no ip mroute-cache
 half-duplex
!
interface Serial3/0:23
 no ip address
 no logging event link-status
 isdn switch-type primary-ni
 isdn incoming-voice voice
 isdn T306 30000
 isdn T310 40000
 isdn bind-13 ccm-manager
 no cdp enable
!
ip classless
no ip http server
```



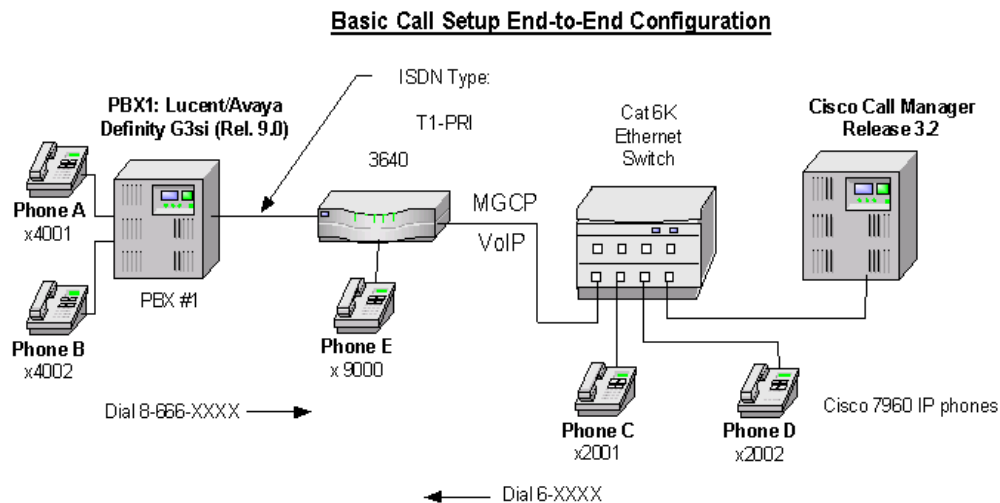
```
!  
snmp-server manager  
!  
voice-port 2/0/0  
!  
voice-port 2/0/1  
!  
voice-port 2/1/0  
!  
voice-port 2/1/1  
!  
voice-port 3/0:23  
!  
dial-peer cor custom  
!  
!  
!  
dial-peer voice 2 pots  
  application mgcpapp  
  port 2/0/0  
!  
dial-peer voice 1 pots  
  application mgcpapp  
!  
dial-peer voice 3 pots  
  application mgcpapp  
  port 2/0/1  
!  
dial-peer voice 999200 pots  
  application mgcpapp  
  port 2/0/0  
!  
dial-peer voice 9993023 pots  
  application mgcpapp  
  port 3/0:23  
!  
!  
line con 0  
line aux 0  
line vty 0 4  
  login  
!  
!  
end  
MGCP_3640#
```



## Test Configuration

The following figure represents the various configurations used for testing.

### Testbed Network Configuration



As shown in the figure above, a Lucent/Avaya Definity G3si PBX was connected via an ISDN T1 PRI link to a Cisco 3640 Gateway, 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 3640 and the PBX.

#### Layer 1 (Physical Layer)

The Lucent/Avaya Definity G3si PBX configuration screen for the DS1 trunk interface is reached using **change the ds1 a12** command, which sets the T1 physical layer parameters.

#### Layers 2 & 3 (Q.921 and Q.931)

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/3640 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 3640 Gateway, and a check was made to ensure that there was an audio path in both directions for each call.

#### User/Network Settings

The Cisco 3640 Gateway with ISDN protocol type setting of PRI-NI2 supports both protocol sides by selecting "Network/User" in the protocol side field when configuring the Gateway via CallManager.

The Lucent/Avaya Definity G3si PBX supports both "USER" and "NETWORK" protocol sides by using **change ds1 a12** command.



## Test Results

Testing was performed by Test Engineer(s): Samir Batio and Bob Graves, February 25, 2002

### Test 1

In test 1:

- The PBX1 country-protocol is set to 1a (US / AT&T TR 41449/41459) to emulate the Network.
- The Cisco 3640 Gateway was configured as a PRI NI2 to emulate the User.

The results are shown in the following tables..

**Table 1** Basic Calls (Enbloc Sending)

Calls Made	Call Comp?	Calling Number passed to final destination?	Calling Name passed to final destination?	Called Number passed to original side?	Called Name passed to the original side?
Phone A to Phone C	Yes	Yes	Yes	No <sup>1</sup>	Yes
Phone C to Phone A	Yes	Yes	Yes	Yes	Yes

1. CallManager is not sending "Connected Number" information in the connect message back to PBX.

**Table 2** Basic Calls (FXS Port)

Calls Made	Call Comp?	Number displayed on digital phone	Name displayed on digital phone
Pone E to Phone A	Yes	Yes	Yes
Phone A to Phone E	Yes	No	Yes
Phone E to Phone C	Yes	Yes	Yes
Phone C to Phone E	Yes	Yes	Yes

**Table 3** Call Transfers (Supervised Local Transfers)

Calls Made	Call Comp?	Original Calling Number displayed on final dest phone?	Original Calling Name displayed on final dest phone?	Called Number display on original phone updated after transfer?	Called Name display on original phone updated after transfer?
Phone C to Phone A Xfr to Phone B	Yes	Yes	Yes	No	No
Phone A to Phone C Xfr to Phone D	Yes	Yes	Yes	No	No





**Table 4** Call Conferencing (Local)

Calls Made	Call Comp?	Calling Number passed to the remaining conferee when the conferencing phone drops out?	Calling Name passed to the remaining conferee when the conferencing phone drops out?	Connected Number updated on original caller phone display when a conferee drops out?	Connected Name updated on original caller phone display when a conferee drops out?
Phone C to Phone A, Phone A conf Phone B	Yes	(A Drops out) Yes	(A Drops out) Yes	(A Drops out) No	(A Drops out) No
Phone C to Phone A, Phone C conf Phone D	Yes	(C Drops out) No	(C Drops out) No	(D Drops out) No	(D Drops out) No
Phone A to Phone C, Phone C conf Phone D	Yes	(C Drops out) No	(C Drops out) No	(C Drops out) No	(C Drops out) No
Phone A to Phone C, Phone A conf Phone B	Yes	(A Drops out) No	(A Drops out) No	(B Drops out) No	(B Drops out) No

**Table 5** Call Forward (Local)

Calls Made	Call Comp?	Original Calling Number passed to final dest?	Original Calling Name passed to final dest?	Forwarding Called Number passed to final dest?	Forwarding Called Name passed to final dest	Final destination Connected Number updated at original side?	Final destination Connected Name updated at original side?
Phone C to Phone A fwd to Phone B	Yes	No	Yes	No	Yes	No	Yes
Phone A to Phone C fwd to Phone D	Yes	Yes	Yes	No	No	No	Yes

Test 2

In test 2:

- The PBX1 country-protocol is set to 1a (US / AT&T TR 41449/41459) to emulate the User.
- The Cisco 3640 Gateway is configured as a PRI NI2 to emulate the Network.

The test results are identical to those in Test 1.

