Siemens Realitis / GPT iSDX using DPNSS to Westell
IiQ2000plus using QSIG to Cisco Unified CallManager 4.1

October 26, 2007 Revision 4

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Introduction

Although specific gateway router models were used to validate its content, this application note also applies to all Cisco 1700/2600/3600/3700/2800/3800 series Cisco IOS voice gateways, the Catalyst 6608 module, the Catalyst 6500 CMM Module and any future MGCP-controlled ISO Q.Sig device registered to Cisco Unified CallManager 4.X above 4.1(2).

This application note provides configuration guidelines for interconnecting the iSDX/Realitis PBX using DPNSS to standard BTNR 188. As Cisco Unified CallManager does not natively support this protocol, use of an external protocol converter, the Westell Interchange, is required. This converts DPNSS to Q.Sig, mapping DPNSS features to their Q.Sig equivalent, where available.

A single GPT iSDX-S was connected to a Cisco 2600 router with an NM-HDV, running MGCP backhaul to a Cisco Unified CallManager 4.1(3)SR1 cluster. The iSDX-S hosted analogue phones and a standard three-piece operators console. The DLI (Digital Line Interface) was then connected on G.703 to the Westell converter. The Westell converter was connected to the Cisco IOS gateway using a standard E1 cross-over cable, with the Cisco Unified CallManager cluster hosting a Cisco 7912G and a Cisco 7940 phone. In order to prove MWI, a Unity 4.0(5) system was registered into Cisco Unified CallManager. MWI from the PBX was tested using operator feature codes to switch on/off MWI across the DPNSS trunk.

Using the iSDX PBX configurations, Cisco IOS voice gateway configurations, Westel IiQ2000plus parameters and Cisco Unified CallManager settings in this application note, successful integration was achieved. This includes basic call, call transfer, call conference, call forward, calling and connected names and numbers with some limitations on Caller ID features during transfer, forward, and conference scenarios. MWI was also passed from Cisco Unified CallManager to PBX phones and from the PBX to Cisco Unified CallManager, allowing possible integration with voicemail solutions on either side of the DPNSS connection to be considered. Additionally, inter-working of DPNSS Route Optimisation with Q.Sig Path Replacement was demonstrated. Call Back services were shown to work – the exception being Call Back Next Used initiated by the IPT side, which produces an immediate response from the PBX.
Network Topology

Figure 1. Network Topology or Test Setup

Limitations

On Supervised Transfers from a PBX extension to any other destination, the Connected Name displayed on the originating IP Phone does not update, and will continue to show the name of the first called destination. This is a limitation of Cisco Unified CallManager.

Call Back When Next Used between an IP Phone and a PBX extension where the IP Phone is calling a free PBX extension and then initiates a Call Back Request will cause the PBX to alert Cisco Unified CallManager that the PBX phone is free immediately after the IP Phone clears down following the Call Back request. This is due to DPNSS expecting the PBX not to be in the alerting state when the Call Back request is sent, and Q.Sig sending the request during the alerting phase. Consequently, the PBX sees the change from alerting state to free as evidence that the PBX phone has been used, and therefore alerts immediately. This is due to the state machine used in the iSDX for this particular service.

For Call Back to work correctly, the Service Parameter “Connection Response Type” in the “Clusterwide Parameters (Feature – Call Back)” needs to be set to “Default to Connection Release.”

For Call Forwarding to work correctly, the Service Parameter “Forward by Reroute Enabled” needs to be set to True.

A dedicated DN needs to be allocated to act as a Q.Sig PINX ID on the Cisco Unified CallManager. This should be in the same number range as the Cisco Unified CallManager phones, and is required for Path Replacement.

Path Replacement on Cisco Unified CallManager will by default be disabled.

Various iSDX Operator Console services are not supported due to either limitations in Q.Sig or Cisco Unified CallManager. Specifically, attempts to intrude on an IPT extension, over-ride diverts set on Cisco Unified CallManager, Camp-On to a busy IPT extension and request the Status of Destination from an IPT extension (e.g. dialing “100” followed by the IPT extension) will fail. However, Return will function correctly – this is where a call is extended to an IPT extension which rings without answering. The Return timer on the PBX will force the call back to the operator showing as “Ring No Answer.”

Calls from the IPT phones to the iSDX Operator which are forwarded to PBX phones will not return to the console on Ring No Answer. This is due to the way in which incoming DPNSS calls are seen by the iSDX.
Conference calls which are initiated by the PBX where the PBX host drops out leaving just IPT users will retain all connections between the PBX and Cisco Unified CallManager.

Conference calls which are initiated by Cisco Unified CallManager where the IPT host drops out leaving just PBX users will retain all connections between the PBX and Cisco Unified CallManager.

Although any mode of PBX side (A/B) or Glare configuration (X/Y) is supported, fractional DPNSS and/or Q.Sig trunks are not supported.

MWI requirements vary between both PBX models, configuration and combination of voicemail platform and PBX. By default, the Westell iQ2000plus sends/receives both NSI and CallBack MWI messages – this may not work in a particular deployment and will require modification. Please see later section for details.

System Components

Hardware Requirements

(1) Cisco IOS voice gateways with E1 VWICs (voice/WAN interface cards) or Catalyst 6500 CMM module with E1 ports, or Catalyst 6608 E1 module

(1) GPT iSDX.

(2) Standard Analogue Telephones

(1) Three-piece Operator Console

Westell Interchange iQ2000plus

Software Requirements

GPT/Siemens PBXs: iSDX 3.6/Realitis 6.1 or later.

Cisco IOS voice gateways: Cisco IOS Release Version 12.3(9)T or later for the majority of gateways.

Cisco Unified CallManager 4.1(3) SR1 or later (requirement is to support CISCO IOS Q.Sig backhaul using MGCP.

Westell software, version R3.0.0 or later.

Westell VisionIQ Management software.

Features

Features Supported

Basic Call (ENBLOC and Overlap)

Calling/Connected Number Display and Update

Calling/Connected Name Display and Update see limitations

Call Transfer: Supervised Local Transfer

Call Transfer: Supervised Network/External Transfer

Call Conference: Local

Call Conference: Network/External

Call Forward: Local

Call Forward: Network/External

Call Back When Free

Call Back Next Used see limitations
Return To Console – no answer see limitations

MWI

Route Optimisation
**Configuration**

**Configuring the GPT iSDX PBX**

Figure 2. Local Access Code from iSDX to Cisco Unified CallManager

UNPUBLISHED WORK. COPYRIGHT GPT LIMITED.
ALL RIGHTS RESERVED.
iSDX BDPCGS013 47123.01 01.033
3.6.201 0000100 UK 04 01/02/92 A M 110
15/10/05 18:24:40

OSL, PLEASE.
?

laca
CODE:172
CODE TQU TCB LCR IRD
172 N N N N

Figure 3. Ensure Trunk Group has correct Trunk Access (TAC)

?LTGA
GROUP:0999
ZONE:00
TAC 0000000000000011111111122222222233
   01234567890123456789012345678901
MG099
Z 00

Figure 4. Configure Trunk Main Group

?ltmg 099
   D                      A  R      D   D      D T     M  N  D
MG  TYPE CODE  /  OUT SRCH  SEND PSD  S T IN  D  T REG T S OG D L C PE
   A                                T   T        T     M  T
099 DPNS 172 D HRS FXD      A      DDI  07  N N 00 N 03
Figure 5. Configuration of individual Trunk Channels showing X/Y setting (DIR) and Trunk Main Group number

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Figure 6. Display of DLI, showing DPNSS Side Setting

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Figure 7. System Digit Translation Patterns, showing routing for 5XXX via Access Code 172

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5998  1725998
5990  1725990
5001  1725001
5002  1725002

?ldt 02 5
5991  1725991
5998  1725998
5990  1725990
5001  1725001
5002  1725002

?ldt 03 5
5991  1725991
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5001  1725001
5002  1725002

?ldt 04 5
5991  1725991
5998  1725998
5999  1725999
5990  1725990
5001  1725001
5002  1725002
Configuring the Westell liQ2000 Plus

Figure 8. Initial Connection to Westell via VisionIQ – define shelf
Figure 9. Connect to shelf and configure iQ2000plus.
Figure 10. Connect ion warning

![Connect ion warning](image)
Figure 11. iQ2000plus Off-line Configuration Screen

**SYSTEM CONFIGURATION**

**READING EEPROM(S)...**

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<th>BLD</th>
<th>ADDRESS</th>
<th>MAP_DATE</th>
<th>CSK</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRESENT</td>
<td>16003013</td>
<td>2</td>
<td>7</td>
<td>16</td>
<td>080013000EA7</td>
<td>FAB 02/05</td>
<td>GO</td>
<td></td>
</tr>
</tbody>
</table>

*SELFTEST COMPLETE: READY FOR SERVICE*

*iQ 2000plus G3-EP R3.0.1*

Hit RETURN to continue
Figure 12. Select QUICK configuration mode

Select QUICK configuration mode.
Figure 13. Instructions

This quick start 'wizard' will help you set up your InterChange 10 2000plus application by asking a series of questions to find out how you want to use this unit. When you have answered all the questions it will list the results and ask you for confirmation before storing them.

This procedure covers most applications, but will inform you if you need to use the advanced configuration menus to complete the configuration process.

At any stage you can type:
- UNDO to go back to the previous question
- QUIT to exit to the top-level menu without making any changes
- ? to list the current menu options again

Press <Enter> or <Return> to continue
Figure 14. Select CCM for predefined options

Please choose the option that best describes how your equipment is attached.

MENU

---

I.SDN Attach as to a public Euro-ISDN network
VoIP Attach as to a packet voice network (IP or ATM) via a router or gateway
CCM Attach as to a Cisco AVVID VoIP PBX network
QSIG Attach as to a private network which uses QSIG signalling
Q.931 Attach as to a private network using Q.931 signalling
DIPES Attach as to a DIPES network or VPN (e.g. Featurenet)
PBX InterChange iO 2000plus is sited in a direct connection between two PBXs
CUSTOM Select predefined custom configuration
QUIT None of the above

Select an application description:
Figure 15. MGCP Gateway required for Q.Sig
Figure 16. QSig protocol selection

![QSig protocol selection](image)

- QSIG
- QSIG to CAT switch or IOS Router
- H.323
- H.323 to IOS Router

Select connection method:
- MGCP

*********

Does the switch provide QSIG or Q.931 signalling?

MENU

- QSIG
- Public network signalling
- QSIG private network signalling

Select switch signalling protocol:
Figure 17. CCM 4.1 required for Q.Sig functionality
Select ISDN Side (Westell to CCM)

**Figure 18.**

Select switch signalling protocol:

G703

Is your Call Manager at software version 4.1 or higher [Y/N]? Y

********

Is the router/gateway configured as "network end" or "user end" at layer 2?

WEBU

---

NETWORK Router is configured as "network"

USER Router is configured as "user"

Is the router configured as "network" or "user"?

NET

Information to Target

NET

Send
Figure 19. Define Overlap Sending

Is your Call Manager at software version 4.1 or higher [Y/N/O]? Y

Is the router/gateway configured as "network end" or "user end" at layer 2?

NET    Router is configured as "network"
USER   Router is configured as "user"

Is the router configured as "network" or "user"?

NET

Is Call Manager configured to accept overlap signalling?

Y

Information to Target

Send

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Figure 20.  DPNSS A/B End Setting

```
To Call Manager configured to accept overlap signalling?
Y

*********
Please explain how your DPNSS PBX is configured
  Identify the PBX’s link level orientation.
  Select UNDO or QUIT if your PBX does not present DPNSS signalling

MENU

-------
A  The PBX is A end
B  The PBX is B end

Is the PBX’s level 2 configured as A end or B end?

Information to Target

```

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Page 21 of 52
Figure 21. DPNSS XY Settings

Please identify the PBX's call collision avoidance strategy.
If it is none of the options above here, select OTHER -
after you have finished QuickStart setup you will have to enter the
ADVanced configuration menu to configure InterChange port 2 X/Y priorities
channel-by-channel

MENU

XX  All channels are X priority
YY  All channels are Y priority
XY  Channels 1-15 are X, remainder Y
YX  Channels 1-15 are Y, remainder X
OTHER  None of the above

How are the DPNSS PBX's channel priorities set?
Figure 22. Configuration confirmation (1 of 2)

InterChange IQ 2000plus is being used to attach DPNS equipment to a network and ISO QSIG AVVID Call Manager gateway using ISO QSIG via a CAT switch or IOS router with MGCP IP signalling. Your DPNS PBX is configured as A end: all channels X priority.

IQ 2000plus will provide Basic Call and simple Supplementary Services interworking plus advanced Supplementary Services interworking.

Enter YES if your application is described correctly, otherwise QUIT or UNDO.
### Find and List Gateways

1 matching record(s) for Device Name begins with ""

Find gateways where Device Name begins with

and show 20 items per page. Hide endpoints.

To list all items, click Find without any search text, or use "Device Name is not empty" as the search criteria.

#### Matching record(s) 1 to 1 of 1
Real-time Information Service returned information for 0 of 1 devices listed below.

<table>
<thead>
<tr>
<th>Device Name</th>
<th>Description</th>
<th>Device Pool</th>
<th>Status</th>
<th>IP Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>mgcpgw1</td>
<td>mgcpgw1</td>
<td></td>
<td>See Endpoints</td>
<td></td>
</tr>
</tbody>
</table>

Delete Selected    Reset Selected

First Previous Next Last

Page 1 of 1
Figure 25. MGCP Gateway Configuration (2 of 9)

Gateway Configuration

Product: Cisco 26XX
Protocol: MGCP
MGCP: mgcpgw1

Status: Ready

<table>
<thead>
<tr>
<th>Update</th>
<th>Delete</th>
<th>Reset Gateway</th>
</tr>
</thead>
</table>

Domain Name*: mgcpgw1
Description: mgcpgw1
Cisco CallManager Group*: Default

Installed Voice Interface Cards
Module in slot: 0
Endpoin Identifiers

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### MGCP Gateway Configuration (3 of 9)

<table>
<thead>
<tr>
<th>Description</th>
<th>mgcpgw1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisco CallManager Group*</td>
<td>Default</td>
</tr>
</tbody>
</table>

#### Installed Voice Interface Cards

<table>
<thead>
<tr>
<th>Module in slot 0</th>
<th>&lt;None&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module in slot 1</td>
<td>NM-HDV</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Subunit</th>
<th>VWIC-1MFT-E1</th>
</tr>
</thead>
</table>

#### Product Specific Configuration

- **Switchback Timing***: Graceful
- **Switchback uptime-delay (min)**: 10
- **Switchback schedule (hh:mm)**: 12:00

* indicates required item

[Back to Find/List Gateways](#)
Figure 27. MGCP Gateway Configuration (4 of 9)

Gateway Configuration

Product: Cisco 26XX
Gateway: S1/DS1-0@mgcpgw1
Device Protocol: Digital Access PRI
Registration: Not Registered
IP Address: 10.1.1.199

Status: Ready
Update | Delete | Reset Gateway

Device Information
End-Point Name*: S1/DS1-0@mgcpgw1
Description: S1/DS1-0@mgcpgw1
Device Pool*: Default
### Figure 28. MGCP Gateway Configuration (5 of 9)

<table>
<thead>
<tr>
<th>Device Pool*</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>Call Classification*</td>
<td>Use System Default</td>
</tr>
<tr>
<td>Network Locale</td>
<td>&lt;None&gt;</td>
</tr>
<tr>
<td>Signal Packet Capture Mode</td>
<td>None</td>
</tr>
<tr>
<td>Packet Capture Duration</td>
<td>60</td>
</tr>
<tr>
<td>Media Resource Group List</td>
<td>&lt;None&gt;</td>
</tr>
<tr>
<td>Location</td>
<td>&lt;None&gt;</td>
</tr>
<tr>
<td>AAR Group</td>
<td>&lt;None&gt;</td>
</tr>
<tr>
<td>Load Information</td>
<td></td>
</tr>
<tr>
<td>V150 (subset)</td>
<td></td>
</tr>
</tbody>
</table>

#### Multilevel Precedence and Preemption (MLPP) Information

- **MLPP Domain (e.g., "0000FF")**: 
- **MLPP Indication**: Not available on this device
- **MLPP Preemption**: Not available on this device

#### Interface Information

- **PRI Protocol Type***: PRI QSIG E1
- **E1 (if configured)**: 

---

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Page 29 of 52
### Interface Information

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRI Protocol Type*</td>
<td>PRI QSIG E1</td>
</tr>
<tr>
<td>Protocol Side*</td>
<td>Network</td>
</tr>
<tr>
<td>Channel Selection Order*</td>
<td>Top Down</td>
</tr>
<tr>
<td>Channel IE Type*</td>
<td>Use Number when 1D</td>
</tr>
<tr>
<td>PCM Type*</td>
<td>A-law</td>
</tr>
<tr>
<td>Delay for first restart (1/8 sec ticks)</td>
<td>32</td>
</tr>
<tr>
<td>Delay between restarts (1/8 sec ticks)</td>
<td>4</td>
</tr>
<tr>
<td>Inhibit restarts at PRI initialization</td>
<td>✓</td>
</tr>
<tr>
<td>Enable status poll</td>
<td>□</td>
</tr>
</tbody>
</table>

### Call Routing Information

**Inbound Calls**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Significant Digits*</td>
<td>All</td>
</tr>
<tr>
<td>Calling Search Space</td>
<td>&lt; None &gt;</td>
</tr>
<tr>
<td>AAR Calling Search Space</td>
<td>&lt; None &gt;</td>
</tr>
<tr>
<td>Call Routing Information</td>
<td></td>
</tr>
<tr>
<td>--------------------------</td>
<td>-----------</td>
</tr>
<tr>
<td><strong>Inbound Calls</strong></td>
<td></td>
</tr>
<tr>
<td>Significant Digits*</td>
<td>All</td>
</tr>
<tr>
<td>Calling Search Space</td>
<td>&lt;None&gt;</td>
</tr>
<tr>
<td>AAR Calling Search Space</td>
<td>&lt;None&gt;</td>
</tr>
<tr>
<td>Prefix ON</td>
<td></td>
</tr>
<tr>
<td><strong>Outbound Calls</strong></td>
<td></td>
</tr>
<tr>
<td>Calling Line ID Presentation*</td>
<td>Default</td>
</tr>
<tr>
<td>Calling Party Selection*</td>
<td>Last Redirect Number</td>
</tr>
<tr>
<td>Called party IE number type unknown*</td>
<td>Cisco CallManager</td>
</tr>
<tr>
<td>Called party IE number type unknown*</td>
<td>Cisco CallManager</td>
</tr>
<tr>
<td>Called Numbering Plan*</td>
<td>Cisco CallManager</td>
</tr>
<tr>
<td>Calling Numbering Plan*</td>
<td>Cisco CallManager</td>
</tr>
<tr>
<td>Number of digits to strip*</td>
<td>0</td>
</tr>
<tr>
<td>Caller ID CN</td>
<td></td>
</tr>
<tr>
<td>SMID Base Port*</td>
<td>0</td>
</tr>
</tbody>
</table>
Figure 31. MGCP Gateway Configuration (8 of 9)

**PRI Protocol Type Specific Information**
- Display IE Delivery
- Redirecting Number IE Delivery - Outbound
- Redirecting Number IE Delivery - Inbound
- Send Extra Leading Character In DisplayIE**
- Setup non-ISDN Progress Indicator IE Enable****
- MCDN Channel Number Extension Bit Set to Zero**
- Send Calling Name In Facility IE
- Interface Identifier Present**

**Interface Identifier Value**

**Connected Line ID Presentation (QSIG Inbound Call)**
- Default

**UUIE Configuration**
- Passing Precedence Level Through UUIE
- Security Access Level
### UUIE Configuration

- Passing Precedence Level Through UUIE
- Security Access Level: [Input field]

### Product Specific Configuration

- **Line Coding**: HDB3
- **Framing**: CRC4
- **Clock**: External
- **Input Gain (−6..14 db)**: 0
- **Output Attenuation (−6..14 db)**: 0
- **Echo Cancellation Enable**: Enable
- **Echo Cancellation Coverage (ms)**: Default

* 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
**Find and List Route Patterns**

5 matching record(s) for Pattern begins with ""

Find Route Patterns where

<table>
<thead>
<tr>
<th>Pattern</th>
<th>Begins with</th>
</tr>
</thead>
</table>

and show [20] items per page

To list all items, click Find without entering any search text.

Matching record(s) 1 to 5 of 5

<table>
<thead>
<tr>
<th>Route Pattern</th>
<th>Partition</th>
<th>Description</th>
<th>Route Filter</th>
<th>Gateway/Route List</th>
<th>Copy</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td></td>
<td>S1/DS1-0@mcpgw1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td></td>
<td></td>
<td>S1/DS1-0@mcpgw1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2XXX</td>
<td></td>
<td></td>
<td>S1/DS1-0@mcpgw1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3XXX</td>
<td></td>
<td></td>
<td>S1/DS1-0@mcpgw1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8XXX</td>
<td></td>
<td></td>
<td>S1/DS1-0@mcpgw1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Route Pattern Configuration**

**Route Pattern:** 2XXX

**Status:** Ready

*Note:* Any update to this Route Pattern automatically resets the associated gateway or Route List

<table>
<thead>
<tr>
<th>Pattern Definition</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Route Pattern*</td>
<td>2XXX</td>
</tr>
<tr>
<td>Partition</td>
<td>(None)</td>
</tr>
<tr>
<td>Description</td>
<td></td>
</tr>
<tr>
<td>Numbering Plan*</td>
<td>North American Numbering Plan</td>
</tr>
<tr>
<td>Route Filter</td>
<td>(None)</td>
</tr>
<tr>
<td>MIPE Precedence</td>
<td>Default</td>
</tr>
<tr>
<td><strong>Figure 35.</strong> Route Pattern (3 of 4)</td>
<td></td>
</tr>
<tr>
<td>--------------------------------------</td>
<td></td>
</tr>
<tr>
<td><strong>MLPP Precedence</strong></td>
<td></td>
</tr>
<tr>
<td>Default</td>
<td></td>
</tr>
<tr>
<td><strong>Gateway or Route List</strong></td>
<td></td>
</tr>
<tr>
<td>S1/DS1-0@mgcpgw1 (Edit)</td>
<td></td>
</tr>
<tr>
<td><strong>Route Option</strong></td>
<td></td>
</tr>
<tr>
<td>Route this pattern</td>
<td></td>
</tr>
<tr>
<td>Block this pattern</td>
<td></td>
</tr>
<tr>
<td><strong>Call Classification</strong></td>
<td></td>
</tr>
<tr>
<td>OnNet</td>
<td></td>
</tr>
<tr>
<td><strong>Provide Outside Dial Tone</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Allow Overlap Sending</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Require Forced Authorization Code</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Authorization Level</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Calling Party Transformations</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Use Calling Party's External Phone Number Mask</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Calling Party Transform Mask</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Prefix Digits (Outgoing Calls)</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Calling Line ID Presentation</strong></td>
<td></td>
</tr>
<tr>
<td>Default</td>
<td></td>
</tr>
<tr>
<td><strong>Calling Name Presentation</strong></td>
<td></td>
</tr>
<tr>
<td>Default</td>
<td></td>
</tr>
<tr>
<td><strong>Connected Party Transformations</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Connected Line ID Presentation</strong></td>
<td></td>
</tr>
<tr>
<td>Default</td>
<td></td>
</tr>
</tbody>
</table>
**Route Pattern (4 of 4)**

| **Calling Line ID Presentation** | Default |
| **Calling Name Presentation** | Default |

### Connected Party Transformations
| **Connected Line ID Presentation** | Default |
| **Connected Name Presentation** | Default |

### Called Party Transformations
| **Discard Digits** | "< None >" |
| **Called Party Transform Mask** | |
| **Prefix Digits (Outgoing Calls)** | |

### ISDN Network-Specific Facilities Information Element

| **Carrier Identification Code** | |
| **Network Service Protocol** | "— Not Selected —" |
| **Network Service** | "— Not Selected —" |

| **Service Parameter Name** | "< Not Exist >" |
| **Service Parameter Value** | |

* indicates required item.
### Clusterwide Parameters (Feature - Forward)

<table>
<thead>
<tr>
<th>Parameter Name</th>
<th>Parameter Value</th>
<th>Suggested Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forward Maximum Hop Count*</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Forward No Answer Timer (sec)*</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Max Forward Hops to DN*</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Retain Forward Information*</td>
<td>True</td>
<td>False</td>
</tr>
<tr>
<td>Forward By Reroute Enabled*</td>
<td>True</td>
<td>False</td>
</tr>
<tr>
<td>Transform Forward by Reroute*</td>
<td>True</td>
<td>True</td>
</tr>
</tbody>
</table>
### Clusterwide Parameters (Feature - Path Replacement)

<table>
<thead>
<tr>
<th>Parameter Name</th>
<th>Parameter Value</th>
<th>Suggested Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Path Replacement Enabled*</td>
<td>True</td>
<td>False</td>
</tr>
<tr>
<td>Path Replacement on Tromboned Calls*</td>
<td>False</td>
<td>True</td>
</tr>
<tr>
<td>Start Path Replacement Minimum Delay Time (sec)*</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Start Path Replacement Maximum Delay Time (sec)*</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Path Replacement</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Service Parameters – Path Replacement (2 of 2)

<table>
<thead>
<tr>
<th>Path</th>
<th>Replacement T1 Timer (sec)</th>
<th>30</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T2 Timer (sec)</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>PNX ID</td>
<td>5996</td>
</tr>
</tbody>
</table>

#### Clustervie Parameters (Feature - Call Back)

<table>
<thead>
<tr>
<th>Parameter Name</th>
<th>Parameter Value</th>
<th>Suggested Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Call Back</td>
<td>True</td>
<td>True</td>
</tr>
</tbody>
</table>
Figure 40. PINX Call Pick-up Group

Find and List Call Pickup Numbers

1 matching record(s) for Call Pickup Number begins with ""

Find Call Pickup Numbers where Call Pickup Number \(\text{begins with } \) \[\quad\]
and show 20 \(\text{items per page}\)

To list all items, click Find without entering any search text.

Matching record(s) 1 to 1 of 1

<table>
<thead>
<tr>
<th>Call Pickup Number</th>
<th>Partition</th>
<th>Pickup Group Name</th>
<th>Copy</th>
</tr>
</thead>
<tbody>
<tr>
<td>5998</td>
<td>PINX</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Delete Selected

First Previous Next Last

Page 1 of 1
Configuring the Cisco 2600

Current configuration : 1649 bytes
!
version 12.3
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname mgcpgw1
!
boot-start-marker
boot-end-marker
!
enable password cisco
!
memory-size iomem 10
voice-card 1
!
no aaa new-model
ip subnet-zero
ip tcp synwait-time 13
!
!
no ip domain lookup
ip host ukpeccm41 10.1.1.1
ip host mgcpgw1 10.1.1.199
!
ip cef
isdn switch-type primary-qsig
!
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!
interface Serial1/0:15
no ip address
 isdn switch-type primary-qsig
 isdn overlap-receiving
 isdn protocol-emulate network
 isdn incoming-voice voice
 isdn bind-l3 ccm-manager
 no cdp enable
!
ip http server
 ip classless
 ip route 0.0.0.0 0.0.0.0 10.1.1.10
 ip route 0.0.0.0 0.0.0.0 10.1.1.100
!
!
!
!
!
voice-port 1/0:15
!
mgcp
 mgcp call-agent ukpeccm41 service-type mgcp version 0.1
 mgcp dtmf-relay voip codec all mode out-of-band
 mgcp rtp unreachable timeout 1000 action notify
 mgcp package-capability rtp-package
 no mgcp package-capability res-package
 mgcp package-capability sst-package
 no mgcp package-capability fxr-package
 no mgcp timer receive-rtcp
 mgcp sdp simple
 mgcp fax t38 inhibit
 mgcp rtp payload-type g726r16 static
!
 mgcp profile default
!
!
dial-peer voice 1 pots
 application mgcapp
!
!
line con 0
line aux 0
line vty 0 4
 password cisco
 login
 length 0
!
!
e nd
Message Waiting Indication

Within DPNSS, two systems exist for notifying Message Waiting Indication; Call Back Message Waiting (171B and 172B messages) and NSI encoded Message Waiting.

Callback message waiting follows the same standard for all types of PBX/Voicemail combinations; however, it is only supported on a small subset of PBXes.

NSI indication consists of PBX specific combinations of encoded information to indicate MWI on/off states – not only do the exact NSI strings vary from PBX to PBX, they vary according to the combination of voicemail platform and PBX.

By default, the Westell iIQ2000 sends a combination of NSI and Callback message waiting signals encoded for the GPT iSDX. In most cases, this will work without modification.

In cases of existing installations where the PBX MWI settings have been changed, it will be necessary to ascertain the MWI sequence in use, and then mimic these through the advance settings options on the Westell.

First, it will be necessary to determine the MWI strings in use.

For the iSDX, this can be achieved as follows:

On the MMI terminal, run a DPNSS trace for Virtual messages on the first channel in use for outbound calls from the PBX to the Westell converter
From the Operator Console, send a MWI On request to one of the IPT numbers; this can be actioned by dialing “##61<IPT Number>”
Note the DPNSS sequence seen
From the Operator Console, send a MWI Off request to the same IPT number; this can be actioned by dialing “##60<IPT Number>”
Note the DPNSS sequence seen

It will then be necessary to modify the MWI NSI settings to mimic those seen. In some cases, the COS/TAC will prevent DPNSS devices from activating MWI on PBX phones – in these cases, appending a valid COS string to the MWI message (*18) may be required. For PBX hosted Voicemail systems, the ports connected to the voicemail platform may be required to be moved to a difference TAC. Please see site documentation for details.
Figure 41. Advanced Options

Line Configuration

Information from Target

Press <Enter> or <Return> to continue

QUIT

Select configuration option?

? 

MENU

-------

QUICK quick-start protocol setup
ADV perform advanced configuration
CONS console setting (ethernet/serial)
TIME configure date and time
RESET reset to defaults
EXIT configuration menu

Select configuration option?

Information to Target

ADV

Send 

Close
Figure 42. Interworking

**Line Configuration**

Information from Target

Advanced Configuration Menu:

```
MENU
    Q931 configure Q931 layer 3
    DPNSS configure DPNSS layer 3
    IPvX configure Interworking task
    CTRACE configure Call Tracing service
    Q921 configure Q921 layer 2
    LINFO configure dpass link layer
    C2 configure C2 layer 1
    MGMT configure system management
    EVNT configure event reporting
    EXIT quit advanced configuration

Select advanced configuration option?
```

Information to Target:

```
\wRM
```

Send

Save Log  Close
Figure 43: NSI Selection

Figure 43 - Connected to Westell [Configuration Mode]

Online Configuration

Information from Target
Configure Interworking

Change which interworking parameters?

MENU

SRV enable and disable services
NSI DPNSS NSI strings for WNI
COM Cisco Call Manager WNI addresses
ENS engineering settings
DISP display all settings
EXIT done all changes

Change which interworking parameters?
Figure 44. MWI Settings

**Figure 44. MWI Settings**

```
ERROR - no match found

Change which interworking parameters?
NSI

Change which string?
?

MENU

ON NSI Message Waiting on String
OFF NSI Message Waiting off String
DISP display current settings
EXIT completed NSI editing

Change which string?
```

Information to Target

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Figure 45. Display of Raw NSI settings for iSDX-S
# Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>DPNSS</td>
<td>Digital Private Network Signaling System as detailed in BTNR 188 and 189</td>
</tr>
<tr>
<td>NSI</td>
<td>Non-Specified Information – vendor specific free-form PBX-to-PBX messaging</td>
</tr>
<tr>
<td>IPT</td>
<td>IP Telephony</td>
</tr>
<tr>
<td>CCM</td>
<td>Cisco Unified CallManager</td>
</tr>
<tr>
<td>Q.931</td>
<td>ITU ISDN protocol at level 3</td>
</tr>
<tr>
<td>Q.Sig</td>
<td>ITU ISDN protocol enhancement to q.931 carrying additional features</td>
</tr>
<tr>
<td>MGCP</td>
<td>Media Gateway Control Protocol</td>
</tr>
<tr>
<td>PBX</td>
<td>Private Branch Exchange</td>
</tr>
<tr>
<td>MMI</td>
<td>Man Machine Interface – specifically on iSDX/Realitis, a VT100 style console</td>
</tr>
<tr>
<td>COS</td>
<td>Class Of Service – on an iSDX, the ability to activate features on a particular line</td>
</tr>
<tr>
<td>TAC</td>
<td>Trunk Access Class – the ability for an extension to use a specific trunk</td>
</tr>
</tbody>
</table>
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