



NEC IPX 2400 R15 using T1-QSIG to Cisco Unified Communications Manager Express Release 4.1

August 27, 2007 Revision 2

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Introduction

This is an application note for connectivity between a NEC IPX 2400 release 15 with Cisco Unified Communications Manager Express Release 4.1 using a Cisco 3745 and a Cisco 2801 voice gateway via QSIG protocol.

The network topology diagram (Figure 1) shows the test setup for an end-to-end interoperability with Cisco Unified Communications Manager Express Release 4.1 connected to the NEC PBX via 2801 T1 QSIG link. The Cisco 2801 Cisco IOS voice gateway was connected via H.323 to a Cisco 3745 Cisco IOS voice gateway. The two gateways were running Cisco Unified Communications Manager Express (CUCME) 4.1. Cisco Unified IP phones (models 7960 and 7940) were connected to the two Cisco Unified Communications Manager Express gateways via SIP and SCCP (refer to Figure 1). A VWIC2-2MFT-T1/E1 was used for the T1 QSIG interface. Connectivity is achieved by using the PRI QSIG T1 protocol type on the CUCME gateway and ISO QSIG switch type on the of NEC IPX 2400 PBX. There are two NEC digital phones (model Dterm Series III) connected to the NEC PBX. A PSTN trunk is connected to NEC PBX via T1-PRI 5ESS. Calls were made to test basic call, caller ID, transfer, call forward, PSTN calls, and reroute features.

This Application Note uses the Cisco 3745 and Cisco 2801 voice gateways. However, the use of other Cisco voice gateways is also an option since Cisco Unified Communications Manager Express does not depend on the platform. See list below for platforms supporting Cisco Unified Communications Manager Express applications.

The inclusion of Cisco IP SIP phones in this application note is for reference only. Cisco Unified Communications Manager Express 4.1 supports SIP end-points with limited number of features.

[Cisco 2600XM Series Multiservice Platforms](#)

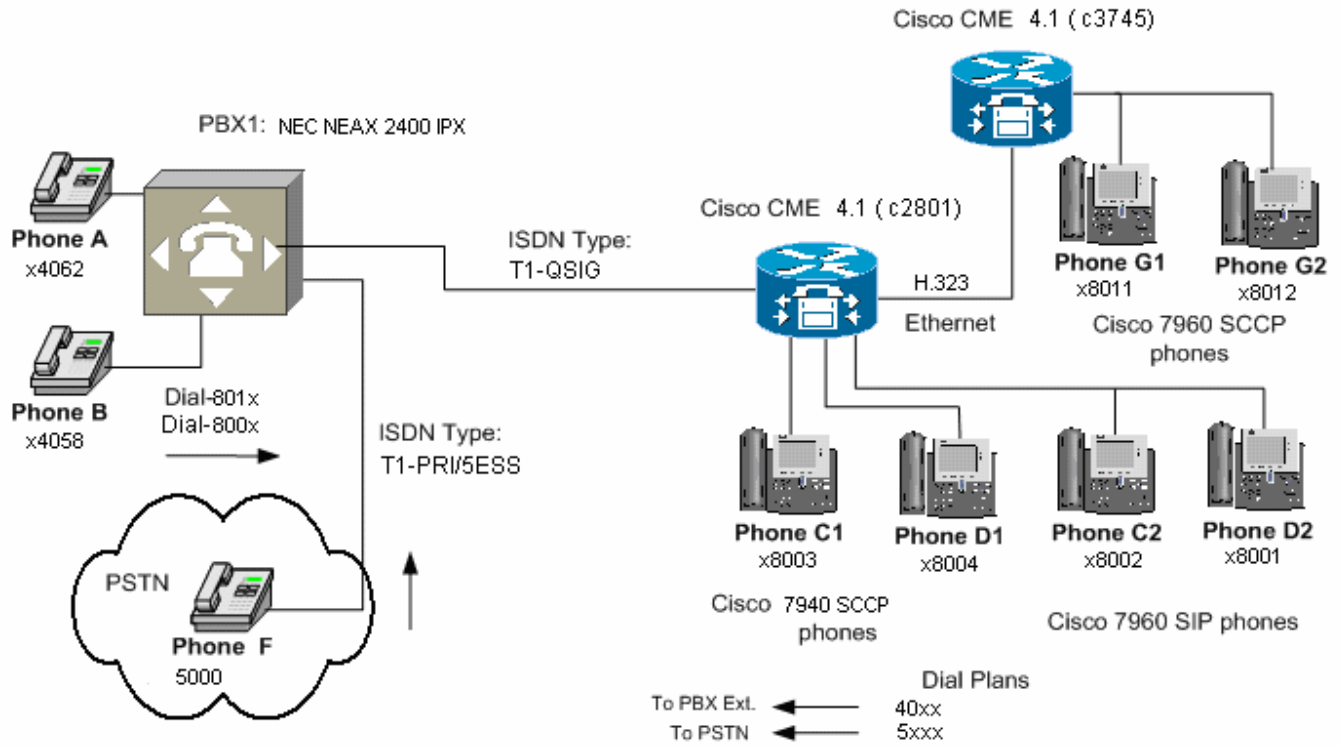
[Cisco 2800 Series Integrated Services Routers](#)

[Cisco 3800 Series Integrated Services Routers](#)

[Cisco 3700 Series Routers](#)

Network Topology

Figure 1. Network Topology





Limitations

Basic Calls

NEC PBX does not support Basic call with Overlap sending/receiving

NEC PBX does not allow the restriction setting of the connected name and connected number for basic calls.

On a call originating from an NEC phone calling a Cisco IP SIP phone for connected name and number restriction, the connected name and number will not be restricted on both the original side and the final destination. This is a SIP-ISDN interworking limitation.

Alerting name is not supported on calls between the NEC PBX and Cisco Unified IP Phone running on SIP.

Called/Connected Name is not supported on calls between the NEC PBX and Cisco Unified IP Phone running on SIP.

Call Forwards

For call forward CFU, CFB, and CFNR; the forwarding called name and number are not displayed on the final destination when the final destination is an IP SIP phone. This is a CUCME to SIP phone limitation.

For call forwards, the connected name and number are not updated on the originating phone when the originating phone is a SIP phone. On SCCP, phones only connected name is updated. This is a CUCME to PBX interworking limitation.

Forwarded calls originated from a PBX extension to a local Cisco Unified Communications Manager Express SIP extension, and forward to back to another PBX extension (e.g. A calls C2, and C2 forwards to B), Cisco Unified Communications Manager Express failed to perform a reroute, when reroute is enabled.

Call Transfers

Call Transfer attended; when a PBX phone calls a SCCP phone or a SIP phone and the call is transferred to another SIP phone the original calling name and number are not updated. (eg Phone A to Phone C1 Xfr to Phone B).

SCCP phones do not support blind transfer; however they can perform early-attended transfer.

Call Transfer for early-attended or blind; when a IP SIP phone calls a IP SIP phone then blind transfer to a PBX phone, a URL format (4062@172.20.0:00:54) displays on the originator after the destinator has answered the call. This is a limitation.

For all supervised and early-attended Network/External call transfers, the original calling name and number is not displayed on the final destination. The limitation is due to the Cisco Unified Communications Manager Express (CUCME) not supporting the QSIG operation "CallTransferComplete" carried in the Q931 FACILITY message for number/number update.

One way voice occurs when a SIP phone calls a SCCP phone and SCCP phone transfers (consultation) to a PBX phone. The SIP phone can not hear the PBX phone. CUCME debugs show "rtp_udp_unreachable:Entered: ICMP unreachable for dest port 17059". Refer to CSCsk62258 for more detail.

A 503 Service Unavailable error occurs when a PBX phone calls a SIP phone, and SIP phone call transfers (consultation) to a SCCP phone. This error is sent by the CUCME, and only occurs on local transfer. Please refer to CSCsk62352.

Disconnection after 16 seconds occur when a SCCP phone (eg phone C1) calls another SCCP phone (eg phone G1), and phone G1 transfers (early-attended) to a SIP phone. This only happens on early-attended transfers, and not consultative transfers. In addition, this only occurs for transfer from a SCCP phone that is outside of network. When transfer happens on the same network, this do not happen. Please refer to CSCsk62174.



System Components

Hardware Requirements

Cisco 3745 Cisco IOS voice gateway

VWIC2 – 2MFT – T1/E1

VIC2 – 2FXS

Cisco 2801 IOS voice gateway

(4) Cisco Unified IP Phone (model 7960)

(2) Cisco Unified IP Phone (model 7940)

NEC IPX2400 PBX

(2) NEC Phones (model Dterm Series III)

Software Requirements

Cisco Unified Communications Manager Express Release 4.1

Cisco IOS Software, 3745 Software (c3745-ipvoice_ivs-mz.124-11.XJ4)

Cisco IOS Software, 2801 Software (c2801-ipvoice_ivs-mz.124-11.XJ3)

G1, G2 – 7960 – SCCP

Cisco 7960 IP phone version 8.0 (6.0)

Cisco 7960 App load P00308000600

C1, D1 – 7940 - SCCP

Cisco 7960 IP phone version 8.0 (6.0)

Cisco 7960 App load P00308000600

C2, D2 – 7960 – SIP

App Load ID POS3-08-7-00

App Load ID POS3-08-6-02

NEC IPX2400 Release 15



Features

Feature Supported

- CLIP-Calling Line (Number) Identification Presentation (See Limitation for details.)
- CLIR-Calling Line (Number) Identification Restriction (See Limitation for details.)
- CNIP-Calling Name Identification Presentation
- CNIR-Calling Name Identification Restriction
- COLP-Connected Line (Number) Identification Presentation (See Limitation for details.)
- CONP-Connected Name Identification Presentation
- Basic Call – Local and Network/External.
- Calling Number and Calling Name Restrictions on Basic Calls.
- Connected Name and Connected Number Restrictions on Basic Calls.
- Alerting Name display on Basic Calls. (See Limitation for details.)
- Calls to and from the PSTN.
- Call Forward Unconditional, Busy, and No Reply on Local and Network/External – by join.
- Call Forward Unconditional, Busy, and No Reply on Local and Network/External – reroute.

Features Not Supported

- Basic calls with overlap sending and receiving calls.
- Name and Number updates on transferred calls.
- Connected Name and Number updates on forward calls.
- CLIP – Calling Line (Number) Identification Presentation on Forwarded Calls to a PBX station.
- CONP – Connected Name Identification Presentation (for calls between PBX and Cisco Unified IP Phones running SIP)
- Call Completion to Busy Subscriber (Callback when free)
- Call Completion on No Reply (Callback next used)
- Path Replacement on Call Transfers (Consultation local/network transfer via Xfr)
- Path Replacement on Call Transfers (Early-attended local/network transfer via Xfr)
- Path Replacement on Call Transfers (Blind local transfer via Xfr)
- Path Replacement on Call Transfer by join
- Path Replacement on Call Diversion by forward switch.
- Path Replacement on Trombone connection (accomplished by consultation transfer)
- Voice mail access with MWI de/activation on call forwards no reply.



Configuration

Configuring the NEC IPX 2400 PBX

Important Notice: It is important that the engineer/technician modifying the IPX 2400 configuration be well versed in the NEC MAT command line. The NEC MAT command line is very precise and should only be changed by a person who is certified by NEC and has the in-depth knowledge on how to troubleshoot the system in case erratic behavior results.

Physical Layer Set-up:

SW Mode→SW1→SW2→SW4

Note: You must set the switches on the PA-24PRT appropriately for QSIG operation

Enable QSIG services:

ASYD→ASFC

To build the QSIG route:

ARTD→ARTI→ATRK→ARSC→ARRC→ADPC→ACSC→ACIC1→ACIC2→MBRT

To build the dial plan to access the QSIG route (Assumes dummy route has been built and ARRC is assigned properly):

ANPD→ASPA→AMND→AFRS→AOPR→ARNP

Physical Layer Set-up:

SW Mode

Set to 10 (A in HEX)

SW1

Set switch 3 to 'off' (Sets 23B+D mode)

SW2

Set switch 4 'on' and switch 5 'on' (Sets ESF framing and B8ZS line code)

SW4

Set switch 2 to 'off' (This switch determines the ISDN protocol side emulation for the route Off=Network/On=User)

Note: To set other physical layer parameters such as LBO, alarm monitoring and Loss Pad settings please refer to the NEC USER GUIDE for the PA-24PRT. These parameters are not covered in this document. The value of these parameters will depend upon the installation of each individual Telephony network.

Enable QSIG services

ASYD

System 1, Index 186, bit 6 = 1 (ISDN service enabled)

System 1, Index 375, bit 0 = 1 (avoid Bch lockup)

ASFC

SFI 94 set to '0' (ANI)



Build QSIG Route

ARTD

Note: You must build two ARTD forms, one for the b-channels and one for the d-channel

RT 4 (B-Channels)

CDN		Data	CDN		Data	CDN		Data
001	OSGS	0	043	BT	1	085	CSEU	0
002	ONSG	2	044	PRV	0	086	CSEL	0
003	ISGS	0	045	A/D	1	087	CMP	0
004	INSG	2	046	CW	0	088	TALK	0
005	TF	3	047	TPQ	0	089	FOT	0
006	TCL	4	048	BL	0	090	RST	0
007	L/T	1	049	TRKS	0	091	TOCI	0
008	RLP	2	050	DPLY	1	092	TOCD	0
009	TQ	0	051	ACD	0	093	ODGD	0
010	SMDR	0	052	2w/4w	0	094	RLS	0
011	TD	0	053	FAAT	0	095	GWD	0
012	DR	0	054	GW	0	096	H1	0
013	AC	0	055	TCMA	0	097	DT	0
014	TNT	0	056	SMDR3	0	098	CI	0
015	LSG	12	057	HDT	0	099	OID	0
016	SMDR2	0	058	CD	0	100	TKS	0
017	H/M	0	059	CCH	0	101	PAD2	0
018	MC	0	060	TC/EC	0	102	TRM	0
019	ANI	0	061	IRE	0	103	TRPX	0
020	D	0	062	SCR	0	104	LDR	0
021	MSB	0	063	LYER1	0	105	TSC	0
022	MSW	0	064	NET	0	106	SATS	0
023	TR	0	065	INT	10	107	RVPX	0
024	OC	0	066	DC	4	108	DQ	0
025	R/L	0	067	HKS	0	109	SLOV	0
026	RVSD	0	068	SCF	0	110	SDTO	0
027	TL	0	069	SMDR4	0	111	ADVPR	0
028	ANS	1	070	TCMN	0	112	IND	1
029	TELP	0	071	TCMC	0	113	UUI	0
030	PAD	4	072	MFSP	0	114	DCH	0
031	OGRL	1	073	KPST	0	115	CMRT	0
032	ICRL	1	074	KPPT	0	116	PREF	0
033	HD	0	075	STC	0	117	DFS	0
034	GUARD	1	076	MC2	0	118	BOB	0
035	WINK	0	077	MT	0	119	HO1CH	0
036	VAD	0	078	TONE	0	120	IFR	0
037	CLD	0	079	PPTM	0	121	CONV	0
038	FA	0	080	MPTM	0	122	ORRT	0
039	BC	0	081	LPTM	0	123	CNI	0
040	TCM	0	082	RSAX	0	124	AOC	0
041	TDMQ	0	083	CST	0	125	MGCOT	0
042	TRSC	0	084	CSEG	0			

Note 1: On the B-channel ARTD table, parameter IND must be set to '1' for Name display, to disable Name display feature on the trunk change the value of IND to '0'.

Note 2: On the B-channel ARTD table, parameter DC must be set to equal the maximum number of digits in the PBX's station numbers.



RT 5 (D-channel)

CDN		Data	CDN		Data	CDN		Data
001	OSGS	0	043	BT	0	085	CSEU	0
002	ONSG	0	044	PRV	0	086	CSEL	0
003	ISGS	0	045	A/D	0	087	CMP	0
004	INSG	0	046	CW	0	088	TALK	0
005	TF	0	047	TPQ	0	089	FOT	0
006	TCL	4	048	BL	0	090	RST	0
007	L/T	1	049	TRKS	0	091	TOCI	0
008	RLP	0	050	DPLY	0	092	TOCD	0
009	TQ	0	051	ACD	0	093	ODGD	0
010	SMDR	0	052	2w/4w	0	094	RLS	0
011	TD	0	053	FAAT	0	095	GWD	0
012	DR	0	054	GW	0	096	H1	0
013	AC	0	055	TCMA	0	097	DT	0
014	TNT	0	056	SMDR3	0	098	CI	0
015	LSG	13	057	HDT	0	099	OID	0
016	SMDR2	0	058	CD	0	100	TKS	0
017	H/M	0	059	CCH	0	101	PAD2	0
018	MC	0	060	TC/EC	0	102	TRM	0
019	ANI	0	061	IRE	0	103	TRPX	0
020	D	0	062	SCR	0	104	LDR	0
021	MSB	0	063	LYER1	0	105	TSC	0
022	MSW	0	064	NET	0	106	SATS	0
023	TR	0	065	INT	10	107	RVPX	0
024	OC	0	066	DC	0	108	DQ	0
025	R/L	0	067	HKS	0	109	SLOV	0
026	RVSD	0	068	SCF	0	110	SDTO	0
027	TL	0	069	SMDR4	0	111	ADVPR	0
028	ANS	1	070	TCMN	0	112	IND	0
029	TELP	0	071	TCMC	0	113	UUI	0
030	PAD	7	072	MFSP	0	114	DCH	0
031	OGRL	0	073	KPST	0	115	CMRT	0
032	ICRL	0	074	KPPT	0	116	PREF	0
033	HD	0	075	STC	0	117	DFS	0
034	GUARD	0	076	MC2	0	118	BOB	0
035	WINK	0	077	MT	0	119	HO1CH	0
036	VAD	0	078	TONE	0	120	IFR	0
037	CLD	0	079	PPTM	0	121	CONV	0
038	FA	0	080	MPTM	0	122	ORRT	0
039	BC	0	081	LPTM	0	123	CNI	0
040	TCM	0	082	RSAX	0	124	AOC	0
041	TDMQ	0	083	CST	0	125	MGCOT	0
042	TRSC	0	084	CSEG	0			



ARTI							
RT 4							
RST	0	RSCT	0	IDRT	0	COT	0
HMT	0	ROCG	0	ECCISTD	0	SS7	0
TRCRST	0	RICG	0	MFCG2	0	NI2ID	0
TRSRST	0	STSENQ	0	OPCC	0	CLRF	0
T309LNK	0	MMNPASS	0	ICTCON	0	TRC	0
T309CON	0	DLTK	0	VRD	0	OID	0
LLCRST	0	CALN	0	INTD	1	PHG	0
VCM	0	NETINT	0	JECCIS	0	VIR	0
POOL	0	RETMSG	0	IPINT2	0	CSMDS	0
DTRT	0	ANI	0	IPTRK	0	FXD	0
TMPRT	0	SRV	0	CTCF	1	FXJS	0
CODEC	0	TON	0	RERT	1	FXPT	0
PASS	0	NPI	0	DCANS	0	FXPS	0
IRL	0	L/T	0	RND	0	CPI	0
MTC	0	ECCIS	0	CLBK	0	E911	0
TC	0	ECCISTM	0	UALAW	1	RA_RT	0
TS	0	ECCISOB	0	MCTFAC	0		
CDCSPD	0	ECCISIB	0	RE	1		
DVRST	0	SPMET	0	PR	1		

Note: The following parameters determine the state of the following QSIG-SS features: CTCF-Call forward/Call transfer, RERT-CF Reroute, PR-Path Replacement. To set the feature enabled you must set it to '1', if you want the feature disabled change the setting to '0'.

ATRK			
		Starting	Ending
		RT 4	RT 5
		TK 1	TK 23
RT	TK	LENS	TN
4	1	002130	1
4	2	002131	1
4	3	002132	1
4	4	002133	1
4	5	002134	1
4	6	002135	1
4	7	002136	1
4	8	002137	1
4	9	002140	1
4	10	002141	1
4	11	002142	1
4	12	002143	1
4	13	002144	1
4	14	002145	1
4	15	002146	1
4	16	002147	1
4	17	002150	1
4	18	002151	1
4	19	002152	1
4	20	002153	1
4	21	002154	1
4	22	002155	1
4	23	002156	1
5	1	002157	1
5	2	002120	1



ARSC

		Tenant 1					Tenant 1										
		Route 4					Route 4										
		RSC Data Settings															
TenantDay/NighRoute	RRI	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1 DAY 4	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	2	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	3	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0

ARRC

* Alternative Route Restriction List *

Starting		Ending	
going Route2		going Route4	

Incoming Route	Outgoing Route	RI A-Restriction	RI D-Restriction
4	2	1	1
4	4	1	1
4	31	1	1
31	2	1	1
31	4	1	1

ADPC

* Determinate Point Code Data List *

Starting		Ending	
RT 4		RT 5	
	RT		PC
	4		6
	5		6

ACSC

CSCG	GROUP:	0	1	2	3	4	5	6	7
140	CCH:	00212	00212	00212	00212	00212	00212	00212	00212
141	CCH:	00212	00212	00212	00212	00212	00212	00212	00212

Note: Because we are using circuit card PA-24PRT, you assign the same LENS number to each CSCG number. You must assign an even CSCG number for the b-channels and an odd CSCG number for the D-channel. If you are using circuit cards PA-2DCH + PA-24DTR the LENS assignment to the B-channels and D-channels differ, please contact NEC customer support for technical assistance.

ACIC1

		PC	6			PC	6
PC	CSCG			PC	CSCG		
6	140						



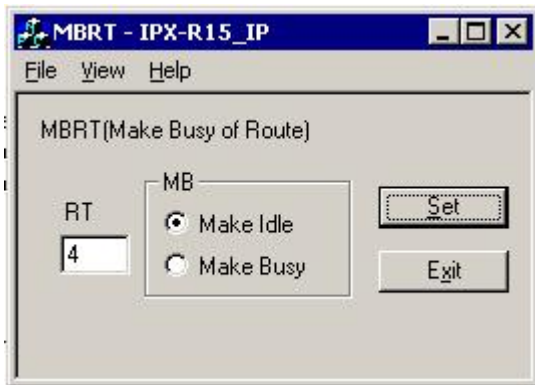
ACIC2

CIC 1

CIC 24

Terminate	Point	Cote	IdentificationCode	LENS
6		1		002130
6		2		002131
6		3		002132
6		4		002133
6		5		002134
6		6		002135
6		7		002136
6		8		002137
6		9		002140
6		10		002141
6		11		002142
6		12		002143
6		13		002144
6		14		002145
6		15		002146
6		16		002147
6		17		002150
6		18		002151
6		19		002152
6		20		002153
6		21		002154
6		22		002155
6		23		002156

MBRT





Build the dial plan to access the QSIG route (Assumes dummy route has been built and ARRC is assigned properly)

ANPD

* Numbering Plan Data List *	
Starting	Ending
Tenant 1	Tenant 1

Tenant	1stDC	Normal		Hooking		Busy	
		NND	BusyLamp Field	NND	BusyLamp Field	NND	BusyLamp Field
1	0	1	Out of Service	1	Out of Service	1	Out of Service
	1	5	In Service	5	In Service	5	In Service
	2	2	In Service	2	In Service	-	-
	3	4	Out of Service	4	Out of Service	4	Out of Service
	4	4	Out of Service	4	In Service	4	In Service
	5	4	Out of Service	4	Out of Service	4	Out of Service
	6	-	-	-	-	-	-
	7	-	-	-	-	-	-
	8	1	Out of Service	-	-	-	-
	9	-	-	-	-	-	-
	*	3	Out of Service	3	Out of Service	3	Out of Service
	#	-	-	-	-	-	-

ASPA

* Special Access Code List *	
Starting	Ending
Tenant 1 Access Code 3 Connection Index Normal	Tenant 1 Access Code 3 Connection Index Busy

TN	ACC	CI	SRV	RT	2ndDT	AH	SUB
1	3	Normal	LCR	: 31	: 1	: 0	: 0
1	3	Hooking	LCR	: 31	: 1	: 0	: 0
1	3	Busy	LCR	: 31	: 0	: 0	: 0



AMND

* Maximum Necessary Digits Data List *			
Starting		Ending	
Tenant	1	Tenant	1
DC	3	DC	3

Tenant DC MND TOLL AN RATE A/D
 1 3 4 0 0 0 1

AFRS

* Flexible Route Selection List *			
Starting		Ending	
Tenant	1	Tenant	1
Route	31	Route	31
NPC	3	NPC	3

Tenant Route Number Pattern Code OPR
 1 31 3 3

AOPR

* Outgoing Pattern Routing Data List *			
Starting		Ending	
TDPTN	0	TDPTN	0
OPR	3	OPR	3
RA Order	0	RA Order	0

TDPTN OPR RA Order RA End Route SKIP PNL OVFT PRSC
 0 3 0 0 4 0 0 0 0



ARNP

[IPX-R15_IP::LRNF]

May 17, 2006

* Reverse Numbering Plan Data List *	
Starting	Ending
Route 4	Route 4

Route Access Code
 4 3

Dterm Data (Digital Stations)

ASDT

* Station Data List *	
Starting	Ending
TN 1 STN 4050	TN 1 STN 4054

TN	STN	LENS	TEC	RSC	SFC	ETN	KD	CG	CE	HC	HP	HU	PH	HL	ND	NS	D1	D2	IC	SS	WS	IT	LNL	LNN
1	4050	000032	12	1	1	1									X									
1	4054	000031	12	1	1	1									X									

ANND (Name display for Dterms)



*** Name Display Data List ***

Starting	Ending
Tenant 1 Station 4050	Tenant 1 Station 4054

Tenant	Station	Name Display
1	4050	Pluto
1	4054	Donald Duck



ASFC SFI 94 (used to restrict Calling Number)

```

* Service Feature Restriction Class List *
Starting                               Ending

Tenant 1                               Tenant 1
SFI 94                                 SFI 94

SFC Attribute Settings
Tenant Mode SFI 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
1 Day 94 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1
  
```

Note: To restrict 'Calling Number' you assign SFC =15 (or any SFC set to '1'), under ASDT command for the Dterm station you want to restrict.

Call Back

ASYD

ASYD - System Data 1, Index 139. No Answer Timer for CALL BACK. Assign 00H. (RAM Data is 3FH = 30 seconds.)

System Data 1, Index 68, Bit 0. 0/1: SHF and Access Code/last digit of Telephone Number + Access Code.

System Data 2, Index 0, Bit 0. Is CALL BACK enabled on a per Tenant basis? 0/1: No/Yes.

System Data 2, Index 4, Bit 0. CALL BACK and OUTGOING TRUNK QUEUING [O-2] Access Codes are same or separate? 0/1: Separate/Same.

ASFC

SFI 2 allows/restricts Callback feature.

* Service Feature Restriction Class List *																		
Starting										Ending								
Tenant 1 SFI 2										Tenant 1 SFI 2								
SFC Attribute Settings																		
Tenant	Mode	SFI	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Day	2	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Note: On each Dterm station Assign a SFC that has SFI=2 set to '1', using a SFC with SFI=2 set to '0' restricts Callback.



ADSL (Assigning Callback feature on Dterm soft key)

* Dterm Soft Key on LCD Data in LDM List *	
Starting	Ending
SKP 1 SN 2	SKP 1 SN 3

SKP	SN	SKN	FKY	DISP
1	2	0	5	CB
1	2	1	0	00
1	2	2	0	00
1	2	3	0	00
1	2	4	0	00
1	2	5	0	00
1	2	6	0	00
1	2	7	0	00
1	2	8	0	00
1	2	9	0	00
1	2	10	0	00
1	2	11	0	00
1	2	12	0	00
1	2	13	0	00
1	2	14	0	00
1	2	15	0	00
1	3	0	5	CB
1	3	1	0	00
1	3	2	0	00
1	3	3	0	00
1	3	4	0	00
1	3	5	0	00
1	3	6	0	00
1	3	7	0	00
1	3	8	0	00
1	3	9	0	00
1	3	10	0	00
1	3	11	0	00
1	3	12	0	00
1	3	13	0	00
1	3	14	0	00
1	3	15	0	00



ADKS (Assigns soft key pattern to Dterm station)

* Dterm Key Status Data for LDM List *					
Starting			Ending		
Tenant	1		Tenant	1	
Station	4050		Station	4054	

Tenant	Station	Soft Key Pattern	Line Key Pattern	Page Scroll Key
1	4050	1	3	0
1	4054	1	1	0

Configuring Cisco IOS Software

Local Cisco Unified Communications Manager Express (Cisco 2801) Configuration

```
c2801-Local#sh run
Building configuration...
```

```
Current configuration : 3754 bytes
!
! Last configuration change at 22:34:13 UTC Tue Aug 21 2007
! NVRAM config last updated at 02:55:41 UTC Tue Aug 21 2007
!
version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname c2801-Local
!
boot-start-marker
boot-end-marker
!
card type t1 0 2
logging buffered 10000000
enable password cisco
!
no aaa new-model
network-clock-participate wic 2
network-clock-select 1 T1 0/2/0
```




```
!  
voice register dn 2  
  number 8002  
  name CME phone2  
  huntstop  
!  
voice register pool 1  
  id mac 0030.94C2.88E9  
  type 7940  
  number 1 dn 1  
  dtmf-relay rtp-nte  
  description Cisco7960  
  codec g711ulaw  
!  
voice register pool 2  
  id mac 000A.8A48.F9C9  
  type 7940  
  number 1 dn 2  
  dtmf-relay rtp-nte  
  description Cisco7960  
  codec g711ulaw  
!  
!  
!  
!  
!  
!  
!  
controller T1 0/2/0  
  framing esf  
  linecode b8zs  
  pri-group timeslots 1-24  
!  
controller T1 0/2/1  
  framing esf  
  linecode b8zs  
!  
!  
!  
!  
interface FastEthernet0/0  
  ip address 172.20.174.20 255.255.255.0  
  duplex auto  
  speed auto  
!  
interface FastEthernet0/1  
  no ip address  
  shutdown  
  duplex auto  
  speed auto  
!  
interface Serial0/2/0:23  
  no ip address  
  encapsulation hdlc  
  isdn switch-type primary-qsig  
  isdn timer T310 120000  
  isdn overlap-receiving  
  isdn protocol-emulate network  
  isdn incoming-voice voice
```



```
no cdp enable
!
ip route 0.0.0.0 0.0.0.0 172.20.174.1
!
!
ip http server
!
!
!
tftp-server flash:P00308000600.bin
tftp-server flash:P00308000600.loads
tftp-server flash:P00308000600.sb2
tftp-server flash:P00308000600.sbn
!
control-plane
!
disable-eadi
!
!
voice-port 0/0/0
!
voice-port 0/0/1
!
voice-port 0/2/0:23
!
!
!
!
!
dial-peer voice 40 pots
destination-pattern 40..
direct-inward-dial
port 0/2/0:23
forward-digits 4
!
dial-peer voice 801 voip
destination-pattern 80..
session target ipv4:172.20.174.10
incoming called-number .T
codec g711ulaw
no vad
!
dial-peer voice 5000 pots
destination-pattern 5...
direct-inward-dial
port 0/2/0:23
forward-digits all
!
!
!
gatekeeper
shutdown
!
!
telephony-service
load 7960-7940 P00308000600
max-ephones 30
max-dn 50
ip source-address 172.20.174.20 port 2000
```



```
max-conferences 4 gain -6
call-forward pattern T
time-webedit
transfer-system full-consult
transfer-pattern ....
create cnf-files version-stamp 7960 Aug 14 2007 04:15:52
!
!
ephone-dn 21 dual-line
number 8003
label 8003
description CME1 Phone21
name SCCP C1
huntstop channel
!
!
ephone-dn 22 dual-line
number 8004
label 8004
description CME1 Phone22
name SCCP D1
huntstop channel
!
!
ephone 21
mac-address 000D.284C.E0C7
type 7940
keep-conference
button 1:21
!
!
!
ephone 22
mac-address 000D.28BA.A097
type 7940
keep-conference
button 1:22
!
!
!
line con 0
exec-timeout 0 0
password cisco
logging synchronous
login
line aux 0
line vty 0 4
password cisco
login
!
scheduler allocate 20000 1000
end
```



Cisco Unified Communications Manager Express II (Cisco 3745) Configuration

```
3745-Remote#sh run
Building configuration...
```

```
Current configuration : 3203 bytes
!
version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
service internal
!
hostname 3745-Remote
!
boot-start-marker
boot system flash:c3745-ipvoice_ivs-mz.124-11.XJ4.bin
boot-end-marker
!
logging buffered 10000000
no logging monitor
!
no aaa new-model
clock timezone PST -8
no network-clock-participate slot 1
no network-clock-participate slot 2
voice-card 1
dspfarm
!
voice-card 2
no dspfarm
!
ip cef
!
!
no ip dhcp use vrf connected
ip dhcp excluded-address 172.20.174.1
ip dhcp excluded-address 172.20.174.10
ip dhcp excluded-address 172.20.174.255
!
ip dhcp pool Phone
network 172.20.174.0 255.255.255.0
default-router 172.20.174.1
option 150 ip 172.20.174.10
!
!
no ip domain lookup
multilink bundle-name authenticated
isdn switch-type primary-ni
!
!
!
voice service voip
qsig decode
allow-connections h323 to h323
allow-connections h323 to sip
```




```
allow-connections sip to h323
allow-connections sip to sip
h323
sip
  registrar server expires max 600 min 60
!
!
!
!
!
!
!
!
!
!
!
!
voice register global
mode cme
source-address 172.20.174.10 port 5060
max-dn 100
max-pool 168
tftp-path flash:
create profile sync 0330374215430651
!
!
!
!
!
!
controller E1 1/0
!
controller E1 1/1
vlan internal allocation policy ascending
!
!
!
!
interface FastEthernet0/0
ip address 172.20.174.10 255.255.255.0
duplex auto
speed auto
no keepalive
!
interface FastEthernet0/1
no ip address
shutdown
duplex auto
speed auto
!
ip route 0.0.0.0 0.0.0.0 172.20.174.1
!
ip http server
!
!
!
tftp-server flash:P0S3-07-4-00.sb2
tftp-server flash:P003-07-4-00.bin
```



```
tftp-server flash:P003-07-4-00.sbn
tftp-server flash:POS3-07-4-00.bin
tftp-server flash:POS3-07-4-00.loads
tftp-server flash:P0030702T023.sbn
tftp-server flash:P0030702T023.bin
tftp-server flash:P0030702T023.loads
tftp-server flash:P00308000600.sbn
tftp-server flash:P00308000600.sb2
tftp-server flash:P00308000600.loads
tftp-server flash:P00308000600.bin
!
control-plane
!
!
!
voice-port 2/0/0
!
voice-port 2/0/1
!
voice-port 2/0/2
!
voice-port 2/0/3
!
!
!
!
!
dial-peer voice 40 voip
destination-pattern 40..
session target ipv4:172.20.174.20
codec g711ulaw
no vad
!
dial-peer voice 800 voip
destination-pattern 80..
session target ipv4:172.20.174.20
codec g711ulaw
no vad
!
dial-peer voice 5000 voip
destination-pattern 5...
session target ipv4:172.20.174.20
codec g711ulaw
no vad
!
!
!
gatekeeper
shutdown
!
!
telephony-service
load 7960-7940 P00308000600
max-ephones 25
max-dn 50
ip source-address 172.20.174.10 port 2000
voicemail 7400
mwi relay
max-conferences 8 gain -6
```



```
call-forward pattern .T
moh music_on_hold.wav
dn-webedit
time-webedit
transfer-system full-consult
transfer-pattern ....
secondary-dialtone 9
create cnf-files version-stamp 7960 Aug 09 2007 13:51:56
!
!
ephone-dn 1 dual-line
number 8011
label 8011
description CME Phone1
name SCCP G1
huntstop channel
!
!
ephone 1
mac-address 0030.94C2.6261
type 7940
keep-conference
button 1:1
!
!
!
line con 0
exec-timeout 0 0
password cisco
logging synchronous
line aux 0
line vty 0 4
password cisco
login
!
!
End
```



Acronyms

Acronym	Definitions
CUCM	Cisco Unified Communication Manager
CCBS	Call Completion to Busy Subscriber
CCNR	Call Completion on No Reply
CFB	Call Forwarding on Busy
CFNR	Call Forwarding No Reply
CFU	Call Forwarding Unconditional
CLIP	Calling Line (Number) Identification Presentation
CLIR	Calling Line (Number) Identification Restriction
CNIP	Calling Name Identification Presentation
CNIR	Calling Name Identification Restriction
COLP	Connected Line (Number) Identification Presentation
COLR	Connected Line (Number) Identification Restriction
CONP	Connected Name Identification Presentation
CONR	Connected Name Identification Restriction
MWI	Message Waiting Indicator
PSTN	Public Switched Telephone Network
IOS	Internetworking Operating System



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