



# Nortel CS1000M Release 4.0 to a Cisco IAD243X using T1-ISDN 4ESS/5ESS with SIP

January 10, 2007 Initial Version

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## Introduction

This is an application note for connectivity to Nortel CS1000 Succession 4.0 PBX with the Cisco IAD243X Gateway via T1 ISDN 4ESS/5ESS-to-SIP communication (10/100baseT).

The network topology diagram (Figure 1) shows the test setup for end-to-end interoperability with the Cisco IAD243X Gateway connected to the PBX via ISDN 4ESS/5ESS (T1 PRI). IP trunk connectivity between the Cisco IAD243X devices is achieved by using SIP protocol.

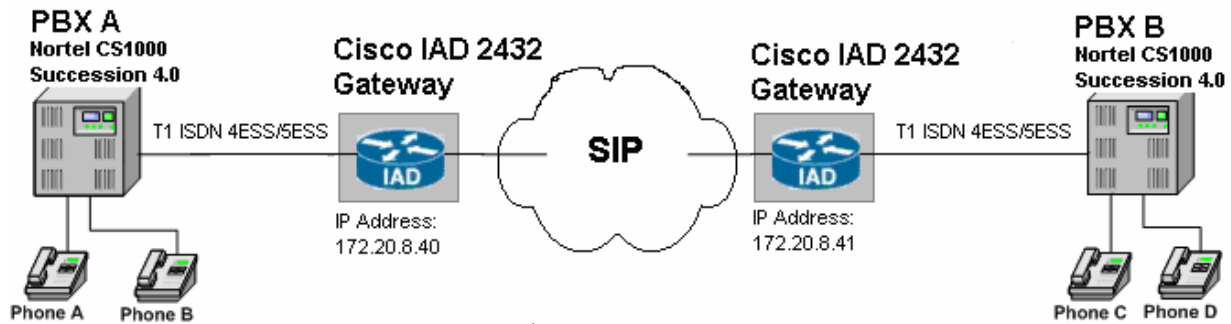
ISDN switch-types 4ESS and 5ESS testing yielded identical test results. So it was decided to incorporate both switch-types in one Application Note.



## Network Topology

Figure 1. Basic Call Setup

### Basic Call Setup End-to-End Configuration



## Limitations

When a 3-way call conference is initiated by the external calling phone to conference a local phone (e.g. Phone A calls Phone C, Phone C answers. Phone A conferences in Phone D), the call will be dropped on all phones if the external calling phone hangs-up.



### **Hardware Requirements**

- 2 Cisco IAD2432 24FXS
- 2 Nortel CS1000M PBX
- 2 Nortel 2616 Digital phones
- 1 Cisco Catalyst switch

### **Software Requirements**

- Nortel PBX: Succession 4.0
- Cisco IOS Release: c2430-ik9o3s-mz-124-9.T1

### **Features**

#### **Features Supported**

- Basic end-to-end calls CLIP (Calling Number)
- Calling Number Restricted
- Call Transfer – Local and Network/External
- Call on-hold
- Call Forward (Unconditional, Busy and No answer) – local and Network/External with Redirecting Number IE, on Call Forward All, Busy and No Answer
- 3-way Conference

#### **Features Not Supported**

- Connected Name
- Calling Name

### **Configuration**

#### **Configuring the Nortel Meridian 1 Option 11C PBX**

Configure in the following sequence:

1. Configure common equipment
2. Configure the D-Channel
3. Configure the Route Data Block.
4. Configure the Trunk Data Block
5. Configure the Coordinated Dialing Plan
6. Configure the Digital Station Phone



T1 PRI 5ESS

\*\*\*\*\*

Common Equipment Configuration

\*\*\*\*\*

REQ prt  
TYPE cequ

CEQU

MPED 8D  
SUPL 000 004 008 012  
016 032 036 040  
044 048 064 068  
072 V096  
TDS 000  
CONF 029 030 031 062  
094 095

DLOP	NUM	DCH	FRM	TMDI	LCMT	YALM	T1TE	TRSH
PRI	02	23	ESF NO	B8S		FDL	-	00
	05	23	ESF NO	B8S		FDL	-	00
	06	23	ESF NO	B8S		FDL	-	00
	07	23	ESF NO	B8S		FDL	-	00

PRI2 04  
DTI2  
MISP

\*\*\*\*\*

D-channel configuration

\*\*\*\*\*

REQ prt  
TYPE adan dch 5

ADAN DCH 5  
CTYP MSDL  
CARD 05  
PORT 1  
DES T15ESS  
USR PRI  
DCHL 5  
OTBF 32  
PARM RS422 DTE  
DRAT 64KC  
CLOK EXT  
IFC ESS5  
SIDE USR  
CNEG 1  
RLS ID \*\*  
RCAP ND2  
MBGA NO  
OVLN NO  
OVLN NO  
OVLN 0  
T200 3  
T203 10  
N200 3  
N201 260  
K 7



\*\*\*\*\*  
Route Data block configuration  
\*\*\*\*\*

REQ: prt  
TYPE: rdb  
CUST 0  
ROUT 105

TYPE RDB  
CUST 00  
DMOD  
ROUT 105  
DES T1-5ESS  
TKTP DID  
NPID\_TBL\_NUM 0  
SAT NO  
RCLS EXT  
VTRK NO  
NODE  
DTRK YES  
BRIP NO  
DGTP PRI  
ISDN YES  
    MODE PRA  
    IFC ESS5  
    SBN NO  
    PNI 00000  
    SRVC NNSF  
    NCNA YES  
    NCRD NO  
    CHTY BCH  
    ISAR NO  
    CPUB OFF  
    DAPC NO  
    BCOT 0  
DSEL VOD  
PTYP PRI  
AUTO NO  
DNIS NO  
DCDR NO  
ICOG IAO  
RANX NO  
SRCH LIN  
TRMB YES  
STEP  
ACOD 505  
TCPP NO  
PII NO  
TARG 01  
CLEN 1  
BILN NO  
OABS  
INST  
ICIS YES  
TIMR ICF 512  
    OGF 512  
    EOD 13952  
    NRD 10112



DDL 70  
ODT 4096  
RGV 640  
FLH 510  
GRD 896  
SFB 3  
NBS 2048  
NBL 4096

IENB 5  
VSS 0  
VGD 6  
DRNG NO

PAGE 002

CDR NO  
VRAT NO  
MUS NO  
EQAR NO  
OHQ NO  
OHQT 00  
TTBL 0  
ATAN NO  
PLEV 2  
MCTS NO  
ALRM NO  
ART 0  
SGRP 0  
AACR NO



```
*****  
Trunk Data block configuration  
*****
```

```
>ld 20
```

```
PT0000  
REQ: prt  
TYPE: tnb  
TN 5 1  
DATE  
PAGE  
DES
```

```
DES T1-5ESS  
TN 005 01  
TYPE DID  
CDEN SD  
CUST 0  
TRK PRI  
PDCA 1  
PCML MU  
NCOS 0  
RTMB 105 1  
B-CHANNEL SIGNALING  
NITE  
STRI/STRO OWK OWK  
AST NO  
IAPG 0  
CLS UNR DIP WTA LPR APN THFD HKD  
P10 VNL  
TKID 105  
AACR NO  
DATE 19 OCT 2006
```



T1 PRI 4ESS

\*\*\*\*\*  
Common Equipment Configuration  
\*\*\*\*\*

REQ prt  
TYPE cequ

CEQU  
MPED 8D  
SUPL 000 004 008 012  
016 032 036 040  
044 048 064 068  
072 V096  
TDS 000  
CONF 029 030 031 062  
094 095

DLOP	NUM	DCH	FRM	TMDI	LCMT	YALM	T1TE	TRSH
PRI	02	23	ESF NO	B8S		FDL	-	00
	05	23	ESF NO	B8S		FDL	-	00
	06	23	ESF NO	B8S		FDL	-	00
	07	23	ESF NO	B8S		FDL	-	00

PRI2 04  
DTI2  
MISP

\*\*\*\*\*  
D-channel configuration  
\*\*\*\*\*

REQ prt  
TYPE adan dch 5

ADAN DCH 5  
CTYP MSDL  
CARD 05  
PORT 1  
DES T14ESS  
USR PRI  
DCHL 5  
OTBF 32  
PARM RS422 DTE  
DRAT 64KC  
CLOK EXT  
IFC ESS4  
SIDE USR  
CNEG 1  
RLS ID \*\*  
RCAP ND2  
MBGA NO  
OVLN NO  
OVLN YES  
OVLN 0  
T200 3  
T203 10  
N200 3  
N201 260





K 7

\*\*\*\*\*

Route Data block configuration

\*\*\*\*\*

REQ: prt  
TYPE: rdb  
CUST 0  
ROUT 105

TYPE RDB  
CUST 00  
DMOD  
ROUT 105  
DES T1-4ESS  
TKTP DID  
NPID\_TBL\_NUM 0  
SAT NO  
RCLS EXT  
VTRK NO  
NODE  
DTRK YES  
BRIP NO  
DGTP PRI  
ISDN YES  
    MODE PRA  
    IFC ESS4  
    SBN NO  
    PNI 00000  
    SRVC NNSF  
    NCNA YES  
    NCRD NO  
    CHTY BCH  
    ISAR NO  
    CPUB OFF  
    DAPC NO  
    BCOT 0  
DSEL VOD  
PTYP PRI  
AUTO NO  
DNIS NO  
DCDR NO  
ICOG IAO  
RANX NO  
SRCH LIN  
TRMB YES  
STEP  
ACOD 505  
TCPP NO  
PII NO  
TARG 01  
CLEN 1  
BILN NO  
OABS  
INST  
ICIS YES  
TIMR ICF 512  
    OGF 512  
    EOD 13952  
    NRD 10112



DDL 70  
ODT 4096  
RGV 640  
FLH 510  
GRD 896  
SFB 3  
NBS 2048  
NBL 4096

IENB 5  
VSS 0  
VGD 6  
DRNG NO

PAGE 002

CDR NO  
VRAT NO  
MUS NO  
EQAR NO  
OHQ NO  
OHQT 00  
TTBL 0  
ATAN NO  
PLEV 2  
MCTS NO  
ALRM NO  
ART 0  
SGRP 0  
AACR NO



```
*****  
Trunk Data block configuration  
*****
```

```
>ld 20
```

```
PT0000  
REQ: prt  
TYPE: tnb  
TN 5 1  
DATE  
PAGE  
DES
```

```
DES T1-4ESS  
TN 005 01  
TYPE DID  
CDEN SD  
CUST 0  
TRK PRI  
PDCA 1  
PCML MU  
NCOS 0  
RTMB 105 1  
B-CHANNEL SIGNALING  
NITE  
STRI/STRO OWK OWK  
AST NO  
IAPG 0  
CLS UNR DIP WTA LPR APN THFD HKD  
P10 VNL  
TKID 105  
AACR NO  
DATE 19 OCT 2006
```

```
*****  
CDP config  
*****
```

```
>ld 87  
ESN000
```

```
MEM AVAIL: (U/P): 2827806 USED U P: 200312 68457 TOT: 3096575  
DISK RECS AVAIL: 1152
```

```
REQ prt  
CUST 0  
FEAT cdp  
TYPE dsc  
DSC 533  
DSC 533  
FLEN 0  
DSP LSC  
RLI 6  
NPA  
NXX
```



\*\*\*\*\*  
Station Data Config  
\*\*\*\*\*

REQ: prt  
TYPE: 2616

TN 19  
DATE  
PAGE  
DES

DES CS101A  
TN 001 0 00 09  
TYPE 2616  
CDEN 8D  
CUST 0  
AOM 0  
FDN 2332  
TGAR 1  
LDN NO  
NCOS 0  
SGRP 0  
RNPG 0  
SCI 0  
SSU  
XLST

CLS CTD FBA WTA LPR MTD FNA HTA ADD HFD  
MWA LMPN RMMD SMWD AAD IMD XHD IRD NID OLD VCE DRG1  
POD DSX VMD CMSD SLKD CCSD SWD LND CNDA  
CFTA SFD MRD DDV CNIA CDCA MSID DAPA BFED RCBD  
ICDD CDMD LLCN MCTD CLBD AUTU  
GPUD DPUD DNDA CFXA ARHD CLTD ASCD  
CPFA CPTA ABDD CFHD FICD NAID BUZZ AGRD MOAD AHD  
DDGA NAMA  
DRDD EXR0  
USRD ULAD RTDD RBDD RBHD PGND OCBF FLXD FTTC DNDY DNO3 MCBN CDMR

CPND\_LANG ENG

RCO 0  
EFD 2332  
HUNT 2332  
EHT 2332  
LHK 0  
PLEV 02  
CSDN  
AST  
IAPG 0  
AACS NO  
ITNA NO  
DGRP  
MLWU\_LANG 0  
DNDR 0

KEY 00 SCR 2333 0 MARP

CPND

NAME ZEUS\_2333

XPLN 9

DISPLAY\_FMT FIRST, LAST

01  
02



03 CFW 4 2332  
04 AO6  
05 TRN  
06  
07  
08  
09  
10  
11  
12  
13  
14  
15 RGA

### Cisco IAD2432 24FXS Configuration

#### T1 5ESS Configuration

```
IAD_cs101#sh run  
Building configuration...
```

Current configuration : 2425 bytes

```
!  
version 12.4  
service timestamps debug datetime msec  
service timestamps log datetime msec  
no service password-encryption  
!  
hostname IAD_cs101  
!  
boot-start-marker  
boot system flash:c2430-ik9o3s-mz-124-9.T1.bin  
boot-end-marker  
!  
card type t1 1
```



```
logging buffered 10000000 debugging
no logging console
enable secret 5 $1$WJPz$ZoIKHvDdxxTEDUc2AwOoM0
!
no aaa new-model
!
resource policy
!
network-clock-participate T1 1/0
network-clock-participate T1 1/1
network-clock-select 1 T1 1/0
!
!
no ip domain lookup
!
!
!
isdn switch-type primary-ni
isdn gateway-max-interworking
!
voice-card 0
!
!
!
!
!
voice service voip
  notify redirect ip2pots
!
!
!
!
!
controller T1 1/0
  framing esf
  linecode b8zs
  pri-group timeslots 1-24
!
controller T1 1/1
  framing esf
  linecode b8zs
!
!
interface FastEthernet0/0
  ip address 172.20.8.40 255.255.255.0
  ip broadcast-address 0.0.0.0
  duplex auto
  speed auto
!
interface FastEthernet0/1
  no ip address
  ip broadcast-address 0.0.0.0
  shutdown
  duplex auto
  speed auto
!
interface Serial1/0:23
  no ip address
  encapsulation hdlc
```



```
isdn switch-type primary-5ess
isdn protocol-emulate network
isdn incoming-voice voice
isdn send-alerting
no cdp enable
!
ip default-gateway 172.20.8.1
ip http server
no ip http secure-server
!
ip route 0.0.0.0 0.0.0.0 172.20.8.1
!
!
!
tftp-server flash:c2430-is-mz.sb93109
!
!
control-plane
!
!
!
voice-port 1/0:23
!
voice-port 2/0
!
voice-port 2/1
!
voice-port 2/2
!
voice-port 2/3
!
voice-port 2/4
!
voice-port 2/5
!
voice-port 2/6
!
voice-port 2/7
!
voice-port 2/8
!
voice-port 2/9
!
voice-port 2/10
!
voice-port 2/11
!
voice-port 2/12
!
voice-port 2/13
!
voice-port 2/14
!
voice-port 2/15
!
voice-port 2/16
!
voice-port 2/17
!
```



```
voice-port 2/18
!
voice-port 2/19
!
voice-port 2/20
!
voice-port 2/21
!
voice-port 2/22
!
voice-port 2/23
!
!
!
!
dial-peer voice 2330 pots
destination-pattern 2...
supplementary-service pass-through
direct-inward-dial
port 1/0:23
forward-digits all
!
dial-peer voice 5330 voip
destination-pattern 5...
session protocol sipv2
session target ipv4:172.20.8.41
dtmf-relay rtp-nte
supplementary-service pass-through
!
dial-peer voice 4000 voip
destination-pattern 4...
session protocol sipv2
session target ipv4:172.20.8.41
dtmf-relay rtp-nte
supplementary-service pass-through
!
!
!
!
line con 0
password cisco
login
line aux 0
line vty 0 4
exec-timeout 0 0
password cisco
login
!
end
```

IAD\_cs101#

#### T1 4ESS Configuration

```
IAD_cs101#sh run
Building configuration...
```





```
Current configuration : 2425 bytes
!
version 12.4
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname IAD_cs101
!
boot-start-marker
boot system flash:c2430-ik9o3s-mz-124-9.T1.bin
boot-end-marker
!
card type t1 1
logging buffered 10000000 debugging
no logging console
enable secret 5 $1$WJPz$ZoIKHvDdxxTEDUc2AwOoM0
!
no aaa new-model
!
resource policy
!
network-clock-participate T1 1/0
network-clock-participate T1 1/1
network-clock-select 1 T1 1/0
!
!
no ip domain lookup
!
!
!
isdn switch-type primary-ni
isdn gateway-max-interworking
!
voice-card 0
!
!
voice service voip
notify redirect ip2pots
!
!
!
controller T1 1/0
framing esf
linecode b8zs
pri-group timeslots 1-24
!
controller T1 1/1
framing esf
linecode b8zs
!
!
!
interface FastEthernet0/0
ip address 172.20.8.40 255.255.255.0
ip broadcast-address 0.0.0.0
duplex auto
speed auto
!
```



```
interface FastEthernet0/1
no ip address
ip broadcast-address 0.0.0.0
shutdown
duplex auto
speed auto
!
interface Serial1/0:23
no ip address
encapsulation hdlc
isdn switch-type primary-4ess
isdn protocol-emulate network
isdn incoming-voice voice
isdn send-alerting
no cdp enable
!
ip default-gateway 172.20.8.1
ip http server
no ip http secure-server
!
ip route 0.0.0.0 0.0.0.0 172.20.8.1
!
!
!
tftp-server flash:c2430-is-mz.sb93109
!
!
control-plane
!
!
!
voice-port 1/0:23
!
voice-port 2/0
!
voice-port 2/1
!
voice-port 2/2
!
voice-port 2/3
!
voice-port 2/4
!
voice-port 2/5
!
voice-port 2/6
!
voice-port 2/7
!
voice-port 2/8
!
voice-port 2/9
!
voice-port 2/10
!
voice-port 2/11
!
voice-port 2/12
!
```



```
voice-port 2/13
!
voice-port 2/14
!
voice-port 2/15
!
voice-port 2/16
!
voice-port 2/17
!
voice-port 2/18
!
voice-port 2/19
!
voice-port 2/20
!
voice-port 2/21
!
voice-port 2/22
!
voice-port 2/23
!
!
!
!
dial-peer voice 2330 pots
destination-pattern 2...
supplementary-service pass-through
direct-inward-dial
port 1/0:23
forward-digits all
!
dial-peer voice 5330 voip
destination-pattern 5...
session protocol sipv2
session target ipv4:172.20.8.41
dtmf-relay rtp-nte
supplementary-service pass-through
!
dial-peer voice 4000 voip
destination-pattern 4...
session protocol sipv2
session target ipv4:172.20.8.41
dtmf-relay rtp-nte
supplementary-service pass-through
!
!
!
!
line con 0
password cisco
login
line aux 0
line vty 0 4
exec-timeout 0 0
password cisco
login
!
end
```



IAD\_cs101#



## Acronyms

Acronym	Definitions
IAD	Integrated Access Device
SIP	Session Initiation Protocol



## Important Information

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