



Ericsson MD110 MX-One SP2/SP3 to Cisco IAD880 using BRI-ISDN NET3 with SIP

December 11, 2008 Initial Version

Table of Contents

| | |
|--|----|
| Introduction | 2 |
| Network Topology | 3 |
| Limitations | 3 |
| Hardware Components | 4 |
| Software Requirements | 4 |
| Features supported | 4 |
| Features Not Supported | 4 |
| Configuration | 5 |
| Configuration Sequence and Tasks for the Ericsson System | 5 |
| Configuration of Cisco IAD880 | 9 |
| Acronyms | 13 |



Introduction

- This application note provides interoperability information and documented configurations for a toll bypass solution using Cisco IAD880 BRI Voice Gateways tunneling NET3 over SIP between two Ericsson MD110 PBXs. The integration consists of two Cisco IAD880 BRI Voice Gateways connecting to the Ericsson MD110 PBXs using BRI NET3 trunks. The IOS gateways establish the NET3 connection between the two PBXs via SIP. An end-to-end connection is thus established between Ericsson MD110 PBXs. The SIP protocol used between Cisco IOS Voice Gateways “tunnels” the NET3, resulting in a connection similar to connecting the PBXs directly. Figure 1 shows the integration topology.
- The following basic call and supplementary services features were verified: proper establishing and disconnecting of calls (see limitations section); calling number presentation and restriction; call transfer (consultation and early-attended); call forwarding (all, busy, and no reply). Please note that this document does not address performance and scalability, which are part of a broader criterion for a deployment-ready solution.
- This application note uses the Cisco IAD881 BRI Voice Gateways. However, the implementation is not platform-dependent, so you may also choose other Cisco IOS Voice Gateways. Be careful when selecting a voice gateway platform and consider the capacity and capability required for the intended deployment.

Network Topology

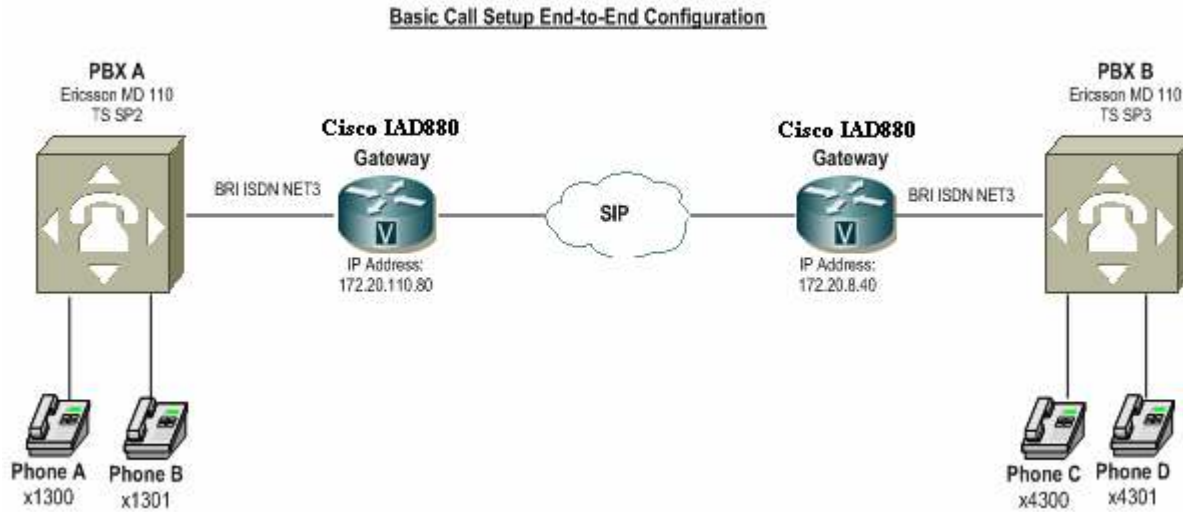


Figure 1. Network Topology

Limitations

These are the known limitations, caveats, or integration issues.

- On a basic call (Phone A calls Phone C, Phone C answers) the Ericsson MD110 PBX does not send a Q931 DISCONNECT message if Phone C attempts to end the call, instead the MD110 PBX sends a NOTIFY message with Notification indication value of 0x80 (call suspend) placing the call on hold. The call must be ended from the originating side in order to idle the BRI b-channel.
- Ericsson MD110PBX does not support calling and connected name presentation, connected number presentation, call waiting and call forward (busy and no reply) over network/external



Hardware Components

- 2 Cisco IAD880 BRI
- 2 Ericsson MD110
- 4 Ericsson DBC 203 digital phones
- 1 Cisco Catalyst Switch (CAT6500)

Software Requirements

- Cisco IOS Release: c880voice-universalk9-mz.124-20.T.bin
- Ericsson MD110 TS SP2/3

Features supported

- Basic calls – Enbloc sending
- Basic calls – Overlap sending
- DTMF
- Call transfers: Local (Consultation and Early attendant)
- Call transfers: Network/External (Consultation and Early attendant)
- Call forward (Unconditional by join) – Local and Network/External
- Call forward (Busy and No Reply) – Local
- Call on-hold
- 3-way Conference.

Features Not Supported

- Calling Name and Connected Name presentation
- Connected Number presentation
- Call waiting
- Basic call with Name and Number restrictions
- Call Forward (Busy and No Reply) – Network/External



Configuration

Configuration Sequence and Tasks for the Ericsson System

1. **ROCAI** Route Category Initiate
2. **RODAI** Route Data Initiate
3. **ROEQI** Route Equipment Initiate
4. **NADAP** Number Analysis (dialing plan)
5. **RODDI** Route External Destination Data Initiate
6. **KSCAP** Digital Station



Ericsson PBX Configuration

ROCAI =====> Begin editing configs here

<ROCAP:ROU=1;
ROUTE CATEGORY DATA

ROU SEL TRM SERV NODG DIST DISL TRAF SIG BCAP

1 7110000000000010 5 2110030000 0 30 128 03151515 111110000031 111111

END

RODAI

<RODAP:ROU=1;
ROUTE DATA

ROU TYPE VARC VARI VARO FILTER

1 SL60 H'00000A14 H'3A820000 H'46414000 NO

END

ROEQI

<ROEDP:ROU=1,TRU=ALL;
ROUTE EQUIPMENT DATA

ROU TRU EQU IP ADDRESS SQU INDDAT CNTRL

1 001-1 001-1-70-00 H'000000000000
1 001-2 001-1-70-01 H'000000000000

END

NADAP

<NADAP;
NUMBER ANALYSIS DATA

TYPE OF SERIES NUMBER SERIES

EXTENSION NUMBER SERIES 4200 - 4230
4250 - 4310

EXTERNAL DESTINATION CODE 106
11 - 13
20
235
30
35



40
44
450
50
53
550 - 560
60
750
777
888
950

OPERATOR INDIV. NUMBER SERIES 100

OWN EXCHANGE NUMBER SERIES 666

TYPE OF SERVICE CODE SERVICE CODE

EXTERNAL NUMBER LENGTH DATA

EXTERNAL NUMBER NUMBER LENGTH

| | |
|-----------|--------------|
| 10 | 4 - 4 |
| 11 | 4 - 4 |
| 12 | 4 - 4 |
| 13 | 4 - 4 |
| 20 | 4 - 4 |
| 235 | 7 - 7 |
| 30 | 4 - 4 |
| 35 | 4 - 4 |
| 40 | 4 - 4 |
| 44 | 5 - 5 |
| 450 | 5 - 5 |
| 50 | 4 - 4 |
| 53 | 4 - 4 |
| 550 | 3 - 7 |
| 551 | 3 |
| 750 | 5 - 5 |
| 777 | 3 - 7 |
| 888 | 7 - 7 |
| 950 | 7 |

PROCEED TO SEND SIGNAL DATA

EXTERNAL NUMBER POS. TYPE

CALL DISCRIMINATION DATA

EXTERNAL/INTERNAL NUMBER CAT

END



RODDI

<RODDP:DEST=13;
EXTERNAL DESTINATION ROUTE DATA

DEST DRN ROU CHO CUST ADC TRC SRT NUMACK PRE

13 1 14070000000002501040010010 0 1 0

END

Digital Station

<KSCAP:DIR=4300;
KEY SYSTEM CATEGORY PRINT

DIR TRAF SERV CDIV ROC ITYPE TRM ADC LANG BSEC

4300 00151515 0202720500 011151111 000001 20 0 00100013011000 F 0

END

<KSCAP:DIR=4301;
KEY SYSTEM CATEGORY PRINT

DIR TRAF SERV CDIV ROC ITYPE TRM ADC LANG BSEC

4301 03151515 0211120700 011151111 720004 20 0 00100013011000 F 0

END



Configuration of Cisco IAD880

IAD881BRI_2#show version

Cisco IOS Software, C880 Software (C880VOICE-UNIVERSALK9-M), Version 12.4(20)T, RELEASE SOFTWARE (fc3)
Technical Support: <http://www.cisco.com/techsupport>
Copyright (c) 1986-2008 by Cisco Systems, Inc.
Compiled Fri 11-Jul-08 06:46 by prod_rel_team

ROM: System Bootstrap, Version 12.4(15r)XZ2, RELEASE SOFTWARE (fc1)

IAD881BRI_2 uptime is 1 day, 20 hours, 54 minutes
System returned to ROM by reload at 23:40:40 UTC Tue Dec 9 2008
System image file is "flash:c880voice-universalk9-mz.124-20.T.bin"
Last reload reason: Reload Command

This product contains cryptographic features and is subject to United States and local country laws governing import, export, transfer and use. Delivery of Cisco cryptographic products does not imply third-party authority to import, export, distribute or use encryption. Importers, exporters, distributors and users are responsible for compliance with U.S. and local country laws. By using this product you agree to comply with applicable laws and regulations. If you are unable to comply with U.S. and local laws, return this product immediately.

A summary of U.S. laws governing Cisco cryptographic products may be found at:

<http://www.cisco.com/wwl/export/crypto/tool/stqrg.html>

If you require further assistance please contact us by sending email to export@cisco.com.

Cisco IAD881B (MPC8300) processor (revision 0x100) with 249856K/12288K bytes of memory.

Processor board ID FHK123429DN

5 FastEthernet interfaces
2 ISDN Basic Rate interfaces
1 DSP, 16 Voice resources
256K bytes of non-volatile configuration memory.
253008K bytes of ATA CompactFlash (Read/Write)

License Information for 'c880-iad'

License Level: advsecurity Type: Permanent
Next reboot license Level: advsecurity

Configuration register is 0x2102

IAD881BRI_2#show run

Building configuration...



Current configuration : 2345 bytes

```
!  
version 12.4  
no service pad  
service timestamps debug datetime msec  
service timestamps log datetime msec  
no service password-encryption  
!  
hostname IAD881BRI_2  
!  
boot-start-marker  
boot system flash c880voice-universalk9-mz.124-20.T.bin  
boot-end-marker  
!  
logging message-counter syslog  
logging buffered 10000000  
no logging console  
!  
no aaa new-model  
network-clock-participate wic 0  
!  
ip source-route  
!  
ip cef  
no ip domain lookup  
!  
isdn switch-type basic-NET3  
isdn gateway-max-interworking  
!  
voice service voip  
    sip  
!  
voice-card 0  
!  
archive  
    log config  
    hidekeys  
!  
interface BRI1  
    no ip address  
!  
interface BRI2  
    no ip address  
    isdn switch-type basic-net3  
    isdn timer T310 120000  
    isdn overlap-receiving  
    isdn protocol-emulate network  
    isdn tei-negotiation preserve  
    isdn layer1-emulate network  
    isdn incoming-voice voice  
    isdn global-disconnect
```



```
isdn skipsend-idverify
!
interface FastEthernet0
!
interface FastEthernet1
!
interface FastEthernet2
!
interface FastEthernet3
!
interface FastEthernet4
ip address 172.20.8.40 255.255.255.0
duplex auto
speed auto
!
interface Vlan1
no ip address
!
ip forward-protocol nd
ip route 0.0.0.0 0.0.0.0 172.20.8.1
no ip http server
no ip http secure-server
!
control-plane
!
voice-port 1
!
voice-port 2
compand-type a-law
!
dial-peer voice 1100 voip
description to Ericsson 11XX
destination-pattern 13..
signaling forward unconditional
session protocol sipv2
session target ipv4:172.20.110.80
dtmf-relay rtp-nte
!
dial-peer voice 4200 pots
destination-pattern 43..
incoming called-number 11..
direct-inward-dial
port 2
forward-digits all
!
sip-ua
!
line con 0
password cisco
login
no modem enable
line aux 0
```



```
line vty 0 4
exec-timeout 0 0
password cisco
login
!
exception data-corruption buffer truncate
scheduler max-task-time 5000
end
```

```
IAD881BRI_2#
```



Acronyms

| Acronym | Definitions |
|-----------|--|
| Cisco IOS | Cisco Internetwork Operating System |
| 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 |
| CUBE | Cisco Unified Border Element (formerly Multi-Service IP-to-IP gateway, or Session Border Controller) |
| PBX | Private Branch Exchange |
| RTP | Real-Time Protocol |
| SIP | Session Initiation Protocol |
| UUIE | User-to-user information element |



Important Information

THE SPECIFICATIONS AND INFORMATION REGARDING THE PRODUCTS IN THIS MANUAL ARE SUBJECT TO CHANGE WITHOUT NOTICE. ALL STATEMENTS, INFORMATION, AND RECOMMENDATIONS IN THIS MANUAL ARE BELIEVED TO BE ACCURATE BUT ARE PRESENTED WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. USERS MUST TAKE FULL RESPONSIBILITY FOR THEIR APPLICATION OF ANY PRODUCTS.

IN NO EVENT SHALL CISCO OR ITS SUPPLIERS BE LIABLE FOR ANY INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES, INCLUDING, WITHOUT LIMITATION, LOST PROFITS OR LOSS OR DAMAGE TO DATA ARISING OUT OF THE USE OR INABILITY TO USE THIS MANUAL, EVEN IF CISCO OR ITS SUPPLIERS HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.



Corporate Headquarters

Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
www.cisco.com
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 526-4100

European Headquarters

Cisco Systems International
BV
Haarlerbergpark
Haarlerbergweg 13-19
1101 CH Amsterdam
The Netherlands
www-europe.cisco.com
Tel: 31 0 20 357 1000
Fax: 31 0 20 357 1100

Americas Headquarters

Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
www.cisco.com
Tel: 408 526-7660
Fax: 408 527-0883

Asia Pacific Headquarters

Cisco Systems, Inc.
Capital Tower
168 Robinson Road
#22-01 to #29-01
Singapore 068912
www.cisco.com
Tel: +65 317 7777
Fax: +65 317 7799

Cisco Systems has more than 200 offices in the following countries and regions. Addresses, phone numbers, and fax numbers are listed on the Cisco Web site at www.cisco.com/go/offices.

Argentina • Australia • Austria • Belgium • Brazil • Bulgaria • Canada • Chile • China PRC • Colombia • Costa Rica • Croatia • Czech Republic • Denmark • Dubai, UAE • Finland • France • Germany • Greece • Hong Kong SAR • Hungary • India • Indonesia • Ireland • Israel • Italy • Japan • Korea • Luxembourg • Malaysia • Mexico • The Netherlands • New Zealand • Norway • Peru • Philippines • Poland • Portugal • Puerto Rico • Romania • Russia • Saudi Arabia • Scotland • Singapore • Slovakia • Slovenia • South Africa • Spain • Sweden • Switzerland • Taiwan • Thailand • Turkey • Ukraine • United Kingdom • United States • Venezuela • Vietnam • Zimbabwe

© © 2006 Cisco Systems, Inc. All rights reserved.

CCSP, CCVP, the Cisco Square Bridge logo, Follow Me Browsing, and StackWise are trademarks of Cisco Systems, Inc.; Changing the Way We Work, Live, Play, and Learn, and iQuick Study are service marks of Cisco Systems, Inc.; and Access Registrar, Aironet, BPX, Catalyst, CCDA, CCDP, CCIE, CCIP, CCNA, CCNP, Cisco, the Cisco Certified Internetwork Expert logo, Cisco IOS, Cisco Press, Cisco Systems, Cisco Systems Capital, the Cisco Systems logo, Cisco Unity, Enterprise/Solver, EtherChannel, EtherFast, EtherSwitch, Fast Step, FormShare, GigaDrive, GigaStack, HomeLink, Internet Quotient, IOS, IP/TV, iQ Expertise, the iQ logo, iQ Net Readiness Scorecard, LightStream, Linksys, MeetingPlace, MGX, the Networkers logo, Networking Academy, Network Registrar, Packet, PIX, Post-Routing, Pre-Routing, ProConnect, RateMUX, ScriptShare, SlideCast, SMARTnet, The Fastest Way to Increase Your Internet Quotient, and TransPath are registered trademarks of Cisco Systems, Inc. and/or its affiliates in the United States and certain other countries.

All other trademarks mentioned in this document or Website is the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (0601R)

Printed in the USA