

# Gateways for SIP.edu

Karl Krueger, WHOI  
kkrueger@whoi.edu

Ed Guy, Pulver  
edguy@pulver.com

05/05/05

# Gateways for SIP.edu

- ◀ Dedicated Gateways
  - PRI
  - POTS/FXO
- ◀ PRI Basics open discussion
- ◀ Asterisk-based Gateways
  - POTS/FXO
  - PRI/T1/E1
  - IAX
  - Asterisk Setup
- ◀ Gateway and PRI debugging

# Asterisk Config

## **/etc/asterisk/zapata.conf**

```
switchtype=national
pridialplan=national
;switchtype=5ess
;signalling=pri_cpe
signalling=pri_net
group=1
context=from-pri
channel=>1-23
```

## **/etc/zaptel.conf**

```
# span=<span num>,<timing>,<line build out (LBO)>,<framing>,<coding>[,yellow]
span=1,1,0,esf,b8zs
bchan=1-23
dchan=24
loadzone = us
```

## **init file**

```
modprobe zaptel
modprobe wcfxo
modprobe wcusb
modprobe wctel1xp
ztcfg -vv
```

# Asterisk Extensions.conf

[from-sip] ; continued...

```
exten => _,1,NoOp("Incoming call to ${EXTEN}")
exten => _91XXXXXXXXXX,2,DIAL,ZAP/g1/${EXTEN}
exten => _9NXXXXXX,2,DIAL,ZAP/g1/${EXTEN}
exten => _XXXXX,2,DIAL,ZAP/g1/${EXTEN}
exten => _,3,congestion
exten => _,t,hangup
exten => _,i,hangup
exten => _,h,hangup
include => from-sip-badnumber
```

[from-sip-badnumber]

```
exten => _,2,congestion
```

[from-pri]

```
exten => _,1,NoOp("Incoming pri call for ${EXTEN}")
exten => _839XX,2,DIAL(SIP/97945${EXTEN}@sipedu-univ10.tamu.edu)
exten => _,3,answer ; replace with congestion
exten => _,4,wait(1)
exten => _,5,playback(tt-weasels)
exten => _,6,hangup
```

# Debugging PRI in \*

- ▶ sipedu-gw\*CLI> **pri debug span 1**
- ▶ Enabled debugging on span 1
- ▶ sipedu-gw\*CLI> **set verbose 999**
- ▶ Verbosity was 0 and is now 999

-- now place a call...

- ▶ -- Executing Dial("SIP/5061-08154188", "ZAP/g1/93248632") in new stack
- ▶
- ▶

# PRI Debugging - SETUP

```
-- Making new call for cr 32779
> Protocol Discriminator: Q.931 (8) len=38
> Call Ref: len= 2 (reference 11/0xB) (Originator)
> Message type: SETUP (5)
> [04 03 80 90 a2]
> Bearer Capability (len= 5) [ Ext: 1 Q.931 Std: 0 Info transfer capability: Speech (0)
>                               Ext: 1 Trans mode/rate: 64kbps, circuit-mode (16)
>                               Ext: 1 User information layer 1: u-Law (34)
> [18 03 a1 83 81]
> Channel ID (len= 5) [ Ext: 1 IntID: Implicit, PRI Spare: 0, Preferred Dchan: 0
>                               ChanSel: Reserved
>                               Ext: 1 Coding: 0 Number Specified Channel Type: 3
>                               Ext: 1 Channel: 1 ]
> [1e 02 80 83]
> Progress Indicator (len= 4) [ Ext: 1 Coding: CCITT (ITU) standard (0) 0: 0 Location: User (0)
>                               Ext: 1 Progress Description: Calling equipment is non-ISDN. (3) ]
> [6c 02 00 c3]
> Calling Number (len= 4)[Ext: 0 TON:Unknown Number Type(0) NPI: Unknown Number Plan
(0)
>                               Presentation: Number not available (67) " ]
> [70 0d a1 39 31 36 33 31 36 34 35 37 32 39 32]
> Called Number (len=15) [ Ext: 1 TON: National Number (2) NPI: ISDN/Telephony Numbering
Plan (E.164/E.163) (1) '916316457292' ]
```

# PRI Debugging – Alerting -> Connect

```
< Protocol Discriminator: Q.931 (8) len=10
< Call Ref: len= 1 (reference 32779/0x800B) (Terminator)
< Message type: CALL PROCEEDING (2) [18 04 e9 80 83 81]
< Channel ID (len= 6) [ Ext: 1 IntID: Explicit, PRI Spare: 0, Exclusive Dchan: 0
<     ChanSel: Reserved
<     Ext: 1 DS1 Identifier: 0
<     Ext: 1 Coding: 0 Number Specified Channel Type: 3
<     Ext: 1 Channel: 1 ]
-- Processing IE 24 (cs0, Channel Identification)
< Protocol Discriminator: Q.931 (8) len=8
< Call Ref: len= 1 (reference 32779/0x800B) (Terminator)
< Message type: PROGRESS (3) [1e 02 81 81]
< Progress Indicator (len= 4) [ Ext: 1 Coding: CCITT (ITU) standard (0) 0: 0 Location: Private \
<     Ext: 1 Progress Description: Call is not end-to-end ISDN; further call progress information may
be available inband. (1) ]
-- Processing IE 30 (cs0, Progress Indicator)
< Protocol Discriminator: Q.931 (8) len=18
< Call Ref: len= 1 (reference 32779/0x800B) (Terminator)
< Message type: CONNECT (7)
< [0c 0c a2 39 36 33 31 36 34 35 37 32 39 32]
< Connected Number (len=14) [ Ext: 1 TON: National Number (2) NPI: Unknown (2)
'96316457292' ]
-- Processing IE 12 (cs0, Connected Number)
> Protocol Discriminator: Q.931 (8) len=5
> Call Ref: len= 2 (reference 11/0xB) (Originator)
> Message type: CONNECT ACKNOWLEDGE (15)
```

# PRI Debugging – Call End

```
-- Zap/1-1 answered SIP/sipedu-univ10.tamu.edu-08179dc0
< Protocol Discriminator: Q.931 (8) len=8
< Call Ref: len= 1 (reference 32779/0x800B) (Terminator)
< Message type: DISCONNECT (69)
< [08 02 81 90]
< Cause (len= 4) [ Ext: 1 Coding: CCITT (ITU) standard (0) 0: 0
                        Location: Private network serving the local user (1)
<           Ext: 1 Cause: Normal Clearing (16), class = Normal Event (1) ]

-- Processing IE 8 (cs0, Cause)
-- Channel 0/1, span 1 got hangup
> Protocol Discriminator: Q.931 (8) len=9
> Call Ref: len= 2 (reference 11/0xB) (Originator)
> Message type: RELEASE (77)
> [08 02 81 90]
> Cause (len= 4) [ Ext: 1 Coding: CCITT (ITU) standard (0) 0: 0 Location: Private network serving
the local user (1)
>           Ext: 1 Cause: Normal Clearing (16), class = Normal Event (1) ]

-- Hungup 'Zap/1-1'
== Spawn extension (from-sip, 916316457292, 2) exited non-zero on 'SIP/sipedu-un...u.edu-
08179dc0'
< Protocol Discriminator: Q.931 (8) len=4
< Call Ref: len= 1 (reference 32779/0x800B) (Terminator)
< Message type: RELEASE COMPLETE (90)
```