

Provisioning VOIP Phones

Ian Darwin

RejmiNet Group Inc

<http://www.rejmi.net/>

Agenda

- About
- Caveats
- Nortel i2004
- Polycom IP[3456]0[01]

Caveats

- A VOIP phone is just a PC with a handset, LCD panel and keypad instead of sound card, LCD panel and keyboard.
- Your VOIP phone can be hacked if:
 - The vendor's firmware is buggy (can't happen?)
 - You don't keep the firmware up to date
 - You allow Internet traffic to reach it
 - You allow desktop computers on the same network (viruses, roguish employees, etc.)
 - Your luck runs out.

More Caveats

- I am a generalist, showing how I have done things
 - There may be better ways!
 - When you find them, give a TAUG Talk!
 - Or post to the list

Web Considered Harmful??



Configuring
Phone from
Browser:
Bad Idea!



Configuring
Server using
Browser:
OK

About Provisioning

- It's about setting up Asterisk & phones
- Most VOIP phones have a Web interface
 - *This is your #1 bad idea!*
 - Why did we get away from proprietary PBXs?
 - “The file's the thing”! Where is the file? Think CVS/SVN.
- Provisioning: **automate** the setup of phones
 - Prefer: Asterisk GUI (...)
 - Prefer: XML file (many phones)
 - Prefer: shell scripts to generate config files

About Asterisk GUIs

- TrixBox
 - formerly Asterisk @Home, now for business :-)
 - Complete Linux distro with * preinstalled
- FreePBX
 - Same: complete distro
 - Don't confuse with OpenPBX, an Asterisk “fork”
- Asterisk-GUI from Digium
 - Relatively new; available separately, needs 1.4.x
 - Available as a distro (“AsteriskNow”)

About XML Configuration Files

- XML is a tag-based language like HTML but much more finnickier
- Stored in plain text (usually)
- Possible to edit with vi or notepad
- There exist many good XML editors
 - I don't have a favorite

More About Provisioning

- Previous presentation by Stephen Monette featured TrixBox GUI module for provisioning Aastra phones –
 - *Phones never leave the box until installed*
 - Where you want to be, for large-scale setups
- I don't care how you provision *your* phones!
 - If you choose to use the do-it-all GUI I will state that you should know what's in the files “underneath”
 - In case the GUI messes up
 - For the case where the GUI doesn't handle your needs

Also Provisioning: OS, Asterisk Itself

- Need to be able to install/reinstall the operating system without much setup
 - Ghost (commercial) software
 - Live CD/DVD with auto-installer
- In most deployment scenarios you do not have time to compile your application software
 - Download RPMs
 - OpenBSD: `pkg_add` downloads and installs

Nortel i2002/i2004



Provisioning Nortel i2002/i2004

- Range of phones from Nortel
 - Good quality: “old line telco manufacturer”
- Widely deployed (“M72xx of 2000's”)
 - Ebay prices US \$50-120; “new in box” lots available
 - What two market opportunities does this create?
- Phones do not use SIP or any “open” protocol
 - Except through their proprietary Windows-based converter
 - Note: i2007 & some later phones have SIP loads
- So: how to use with Asterisk?

First some Background Issues

- Not designed for the Internet!
 - Do NOT work well with NAT!!
- Designed for closed IP network (VLAN support)
- Easy to reconfigure
 - Press 4 keys after power up; see my *User's Guide!*
- Support “full” or “partial” DHCP
 - Full: add config string telling where to find server
 - Partial: normal DHCP, enter server address from keyboard

To the rescue: chan_unistim

- chan_unistim module, mostly by Hans Cedric
- Not in Asterisk (may be in 1.4.1)
 - Download from <http://mlkj.net/UNISTIM/>
 - Linux: just type make, make install, make conf
- Supports many features:
 - Call Transfer, Three-way calling, Call Forwarding, MWI, MOH, Distinctive Ring Indicator, Call History, CallerID, Redial, Dynamic SoftKeys, and SendText()
 - SendText can reconfigure softkey labels

Provisioning with chan_unistim

- Simple provisioning: most work done by editing `/etc/asterisk/unistim.conf`
- Plain text file, like all underlying Asterisk configuration files
 - Organized in standard format
 - `[section]`
 - `name=value`

Unistim.conf

- Starts with required “general” section

[general]

port=5000 ; UDP port

keepalive=60 ; in seconds, default = 120

public_ip=192.168.1.42 ; if asterisk is behind a nat,
specify your public IP

;autoprovisioning=no ; Do not use

;ast_rtp_setnat=1 : "undocumented".

unistim.conf

- Each phone has its own section

```
[ians_nortel]
```

```
device=000ae4xyyzz ; mac address of the phone
```

```
rtp_method=3 ; If no sound, try 1, 2 or 3, default = 0
```

```
titledefault=DarwinAstrsk ; your ad banner! 12 char max
```

```
maintext1="lan 301" ; 24 characters max
```

```
callerid="lan Darwin" <555-5678>
```

```
context=internal ; context, default="default"
```

```
mailbox=101 ; Mailbox number. Used by WMI
```

```
... continued...
```

unistim.conf

- Each phone has its own section

extension=line ; Add ext into dialplan: no need to edit extensions.conf!

linelabel="lan" ; Softkey label for Green button, 9 char max.

line => 301 ; Line#, must be last.

; Only bookmark and softkey entries are allowed after line=>

bookmark=Mailbox@101@54

bookmark=ServerTime@*22

- Half dozen other optional settings not shown here

Boilerplate Configuration

- No GUI; Automate entry using simple shell script

```
MAC=$1; LINE=$2; NAME="$3" # usage eg: addi2004 002430010203 234 lan
```

```
sed <<! > $TMPFILE
```

```
[nortel-${LINE}]
```

```
device=${MAC}
```

```
titledefault=Asterisk
```

```
maintext1="Line ${LINE}"
```

```
extension=line ; Add extension into the dialplan.
```

```
linelabel="${NAME}" ; Softkey label for the next line=> entry, 9 char max.
```

```
line => ${LINE} ; Line#, must be last.
```

```
bookmark=ServerTime@*22
```

```
!
```

```
cat $TMPFILE >> /etc/asterisk/unistim.conf; asterisk -r -x "unistim reload"
```


DHCPD for i2004 “full DHCP”

- Sample entry per-phone or per group

```
host i2004-0 {  
    hardware ethernet 00:0a:e4:xx:yy:zz;  
    option option-128 \  
    "Nortel-i2004-A,192.168.1.42:5000,1,10.";  
    fixed-address i2004_0; # optional  
}
```

- For Partial DHCP, nothing special needed

Security?

- Security does not seem to have been a major design criteria for the UNISTIM protocol :-(
 - Based on the hardware MAC address
 - “nobody could change that, right?” 
 - “Just don't use these on the public Internet, OK?”
 - How paranoid do you want to be?
 - Put a <table> of allowed MAC addresses between the net and your server – does that really help?
 - No wonder they wanted to keep the protocol secret!

Auto-provisioning

- `chan_unistim` provides this feature; don't use
 - Or only on a very trusted network; anybody with a phone can use your PBX.
- But it's easy to set up :-) Just add one phone entry called [template].
 - Set a least `line=> n #` starting line number
- By default, the phone will ask for a number, & will go into the dialplan. Add `extension=line` for using the generated line number instead.

Free-for-all Autoprovisioning Example

[general]

port=5000

autoprovisioning=yes

[template]

line => 100

bookmark=HelpDesk@222

More Reading - Nortel

- www.nortel.com
- <http://etel.wiki.oreilly.com/wiki/index.php/UsingNorteli2000Phones>
- <http://www.voip-info.org/wiki-Asterisk+UNISTIM+c>
- Numerous web sites offer downloads of Nortel manuals
- For the bold of heart, consult the source code of `chan_unistim`

Polycom



Provisioning Polycom

- Polycom phones have a good reputation, especially for sound quality
- Can in theory only get latest firmware from dealer (or be a dealer)
- “n-1” firmware freely available from Polycom's web site and elsewhere

Polycom Config Files

- Phones get XML config file from server
 - By FTP or by HTTPS
 - Identify server by phone setup or DHCP

```
option boot-server "ftp://polycom:polypass@192.168.1.42";
```
- The magnitude of configuration files is “interesting” or intimidating.
- Basic setup requires:
 - Files downloaded from Polycom
 - 2 or 3 files per phone

00000000000000000000-directory.xml – Directory, searchable

00000000000000000000.cfg – default master, copy to MACADDR.cfg

0004f202167d-app.log – work log, uploaded by phone

0004f202167d-boot.log – bootup log, also uploaded.

0004f202167d-phone.cfg – overrides, maintained by phone

SoundPointIPLocalization – language files, from Polycom

SoundPointIPWelcome.wav – boot-up noise file, from Polycom

bootrom.ld – download software, from Polycom

distrib – optional, place to keep originals of edited files

phone201.cfg – main config file for one phone

sip.cfg – SIP parameters for all phones

sip.ld – download software, from Polycom

sip.ver – tiny version numbering file

phone201.cfg

- File is about 10KB of XML, beginning:

```
<phone><reg
```

```
  reg.1.displayName="Ian Darwin"
```

```
  reg.1.address="201"
```

```
  reg.1.label=""
```

```
  reg.1.type="private"
```

```
  reg.1.thirdPartyName=""
```

```
  reg.1.auth.userId="201"
```

```
  reg.1.auth.password="somethinSecrett"
```

```
  reg.1.server.1.address="tel.company.com" ...
```

- Phone can have several registrations (lines)

sip.cfg

- Huge (100KB) XML file, applies to all phones
- `<sip><volpProt><local volpProt.local.port=""/>`
- `<server`
- `volpProt.server.1.address="1.2.3.4" .../>`
- `<SIP`
- `<outboundProxy`
`volpProt.SIP.outboundProxy.address="1.2.3.`
`volpProt.SIP.outboundProxy.port="5060"`
`volpProt.SIP.outboundProxy.transport="DNSSnapt`
`r"/>`

Are we done yet?

- Now the phone will load this configuration at boot time
- Still have to tell Asterisk about the phone!
 - Fortunately, it is a standard SIP phone
- How can we simplify all this XML stuff?

The Challenge

- Challenge GUI writers to integrate this well
 - Could do one of these by phones by hand, but not dozens or hundreds
 - XML not as easy to fake up as Asterisk config files
 - Very finicky about syntax!
- Digium-Polycom interop deal will presumably lead to full support in Asterisk-GUI/AsteriskNow

For More Reading on Polycom

- www.polycom.com
- <http://www.voip-info.org/wiki/view/Asterisk%40Hor>
- Consult your friendly local Polycom dealers
 - See archives on biz list

Demo

(time & luck permitting)

No matter how you configure..

- Be sure your plain text or XML config files are backed up
- Use a Revision Control System
- RCS for single user
- CVS or Subversion for multiuser/distributed
- No need to back up the whole disk image

Summary

- Provisioning == AUTOMATE
 - Don't do it by hand, particularly via a web screen
 - Or, do it once by hand and record that as a script
- Nortel i200x – only one configuration file
 - Relatively simple to configure
 - Don't use on public Internet due to NAT, security
- Polycom IP – lots of files
 - Needs FTP or HTTPS server
 - Complex – use TrixBox or Asterisk-GUI
 - Hope these come to support all needed XML files!