Building an Asterisk Based Call Center

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Inbound Only Call Center

- Base Asterisk
- Proprietary options
- Open-Source Inbound/Outbound options

Base Asterisk Inbound Only

- Base Asterisk is the easy choice
  - Positive points
    - Thousands of companies use it
    - Relatively simple setup
    - Works with many GUI configuration tools
    - Works with QueueMetrics reporting
  - Negative points
    - Very difficult to use multiple servers with same Queues
    - Strictly inbound only
    - Limited features
    - Interfaces are limited by configuration options
    - Any changes to standard options requires altering Asterisk source code
    - No built-in Agent computer interface

Asterisk Inbound Setup
(agents/queues)

- ## agents.conf

```
[general]
persistentagents=yes
[agents]
wrapuptime=5000
agent => 100,8100,John Wilson
agent => 101,8101,Jennifer Smith
```

- ## queues.conf

```
[general]
persistentmembers = yes
[test-queue]
musiconhold = default
strategy = rrmemory
timeout = 20
retry = 5
wrapuptime = 2
announce-frequency = 90
joinempty = strict
leavewhenempty = yes
member => Agent/100
member => Agent/101
```

Asterisk Inbound Setup
(extensions)

- extensions.conf

```
; Test queue
exten => 123,1,Wait(1)
exten => 123,2,Queue(test-queue|tTnr|||120)
exten => 123,3,Voicemail,u100
exten => 123,4,Hangup

;Agent Login then stay offhook on the phone
exten => _5XXX,1,AgentLogin(${EXTEN:1})
;Agent Login then stay onhook, phones will ring
exten => _6XXX,1,AgentCallbackLogin(||${EXTEN:1}@office)
;Agent Logout then stay onhook
exten => _7XXX,1,AgentCallbackLogin(||)
```

Outbound and Blended Call Centers

- Proprietary Asterisk-based options
  - Aheeva
  - DACX
  - DragonSuite
  - Indosoft
  - SineDialer
  - SkyyConsulting
  - OmegaDial
  - several others not listed here
- Open-Source GPL options
  - GnuDialer
  - VICIDIAL

Aheeva CCS
http://www.aheeva.com

- The first Asterisk-based Predictive Dialer
- Company based in Montreal, Canada
- Pricing per quote per system
- Paid support available
- Features
  - Audio and screen-capture recording
  - Inbound/outbound/blended
  - Skills-based routing
  - Multiple server load-balance capable
  - Web-based Agent interface
  - Many add-ons available(CRM, Workforce, ...)

DACX CCS
http://drishti-soft.com

- Company based in Gurgaon, India
- Pricing per quote
- Paid support available
- Features
    - Multi-server capable
    - Web-based Agent interface
    - IVR module available

DragonSuite
http://dragontech-la.com

- Company based in Bogota, Columbia
- Priced at about $300 per seat
- Paid Support Available
- Features
  - Available in Spanish and English
  - Agent interface requires Java JRE
  - Runs on standard Asterisk server

Indosoft
http://www.indosoft.ca

- Company based in Fredericton, Canada
- Price is about $500/seat for 50-seat setup
- Basic support included for first year
- Features
  - Web-based Agent Interface
  - English and limited Spanish versions available
  - Unified messaging add-ons available (email/fax/voicemail/etc...)

SineDialer
http://www.sineapps.com

- Company based in Dunedin, New Zealand
- Priced per quote
- Features
  - Designed around a Dialing engine
  - User interface customized per customer
  - Claims to be "The World's Most Advanced Predictive Dialer"
  - Multi-server Load-balance capable
  - Several versions of the dialing engine with different features

Skyy Consulting Dialer
http://www.skyyconsulting.com

- Company based in Los Angeles,CA USA
- Hosted dialer is cost per minute only
- Standalone dialer is per quote
- Features
  - Web-based client interface
  - Capable of extremely high call volumes with multiple servers

OmegaDial
http://www.asteriasgi.com

- Company based in Huntsville, AL USA
- Pricing per quote
- Features
  - Available add-on agent web interface
  - IVR builder

Other Asterisk-Compatible Solutions

- Aspect
- Presence

GnuDialer

http://www.gnudialer.org

- Open-Source GPL Licensed
- Price is free
- Support available from several consultants
- Features
  - Agent web interface
  - Integrated into Asterisk
  - Multi-server capable

VICIDIAL

http://astguiclient.sourceforge.net

- Open-Source GPL Licensed
- Price is free
- Support is available from many consulting companies around the world
- Features
  - Web-based administration and Agent interface
  - Agent interface in 9 languages, admin in 4
  - Load-balancing and multi-server capable

Server Hardware

- Outbound calling requires more resources than inbound-only
- For large installations it is best to separate functions onto many servers (Database, Web server, Asterisk)
- Recording to drives is very resource-intensive and hard on the drives
- Limitations of TDM boards
  - Physical size (TDM2400 or 1U/2U PCI capacity)
  - Resource usage (interrupts, transcoding, bridging)

Agent Station Hardware

- Phones
  - Softphones running on Agent computers can require good audio chipset and faster CPU than if no softphone.
  - Voip Hardphones, no extra wiring, but provisioning an replacing can take longer
  - Channelbanks with basic analog phones are an option, but require separate wiring and T1 port
- Computers
  - Not required for Base-Asterisk inbound-only
  - Some packages require Windows
  - 800MHz, 256MB RAM should be adequate

Inbound-Only Scaling

- Base Asterisk Queues does not scale easily across multiple servers
- Inbound VOIP trunks may need calls diverted to separate servers
- Real-world example: 300 inbound seats
  - Single quad CPU server
  - SIP phones and SIP trunks only
  - Asterisk Queues/Agents
  - Recording to RAM drive then offloaded to NFS
  - Reports through QueueMetrics

Outbound Scaling

- Suggested 120 channels maximum for a P4 3.2GHz server (30 agents, ratio dialing 3:1)
  - Assumes Ulaw codec and not recording all calls
- Real-world example: 120 outbound seats
  - 6 Asterisk servers, P4, 2GB RAM, Quad T1 card
  - 2 Apache/PHP servers (P4 2.6GHz, 1GB RAM)
  - 1 MySQL server (Core 2, 4GB RAM, SCSI RAID)
  - Maximum dial ratio 5:1
  - All trunks are PRI
  - Recording to hard drives then archived off-server

Recording Issues

- Limits of concurrent recordings per server
  - Hard drive limit of 50-60 recordings per server
  - SCSI drives much better for intense recording
  - RAM drive with no write to hard drive, over 200
  - RAM drives with fast copying to NFS is best but more expensive
- Recording quality can be reduced if server load is too high
- Where to put all of the recordings?
  - Offload recordings, NFS or FTP archive servers
  - Retrieving recordings off of live production server can hurt recording and audio quality

Monitoring Issues

- Monitoring adds load to a server
- Chanspy is unstable on some installations
- ZapBarge for blind monitoring on TDM Zaptel channels(PSTN, T1/E1, PRI, BRI)
- Barge-in requires meetme conference
- How to Monitor across multiple servers
    - Custom AGI script with IAX trunks between servers

Compliance Issues – USA FTC
(Not required for political/survey/nonprofit)

- Safe-Harbor for outbound telemarketing
  - Must send call to agent within 3 seconds of the end of the customer greeting. If not, then must play message with company name and purpose of the call.
  - Must send valid CallerID number
  - Must have an abandon(drop) rate no higher than 3% per campaign per day
  - Must ring customer's phone no less than 4 rings
  - No calling before 8AM or after 9PM local time
- Must filter leads against Federal Do-Not-Call(DNC) list

Compliance Issues – US States

- Many US States require registration and possibly a bond to allow outbound telemarketing within their state
- Several states maintain their own DNC lists independent of the USA FTC DNC list
- Several states have different allowable calling times and days
- Several states have Holidays when telemarketing is not allowed

Multiple Language Issues

- Multiple sets of prompts needed
  - For multi-server use central NFS for audio files
- Skills-based routing for different languages
- Agent interfaces in multiple languages
- Database and Asterisk issues with using latin-based and non-latin-based(like Russian or Chinese) languages

Reporting

- For Base-Asterisk Inbound-only, QueueMetrics(http://queuemetrics.loway.it) is very robust and detailed and works with many Asterisk-based call center suites
- Most outbound dialers offer integrated reports and stats display screens
- Asterisk CDR records can be used for at least basic reports on all Asterisk-based call centers

Costs – 300 seat outbound
Hardware (to allow 2:1 dialing ratio)

- 6 Asterisk servers (Dual CPU, Dual core, 4GB RAM, 4 T1 ports, SCSI RAID) $48,000
- 4 Apache/PHP servers (single CPU) $4,000
- 2 MySQL servers (Dual CPU, 16GB RAM, SCSI RAID) $20,000
- 1 Recording Archive server (single CPU, 1GB RAM, 2TB SATA RAID) $6,000
- 300 Agent computers(800MHz workstations, using softphone, headset included) $90,000
- Hardware Total: $168,000

Costs – 300 seat outbound
Software

- For Proprietary solutions, costs vary greatly depending on the features and the level of support.
  - Indosoft solution with basic support: $150,000
- For Open-Source solutions the costs are even more variable. If in-house setup and support, the costs can be $0 for software. Using a consulting company and costs are variable depending on the level of customer involvement.

Thank You

See me at the VICIDIAL/astGUIclient project table in the Open-Source Showcase area