



February 2-4, 2011 - Miami Beach Convention Center in Miami, FL

Building a Scalable Hosted Call Center Platform

Presented by

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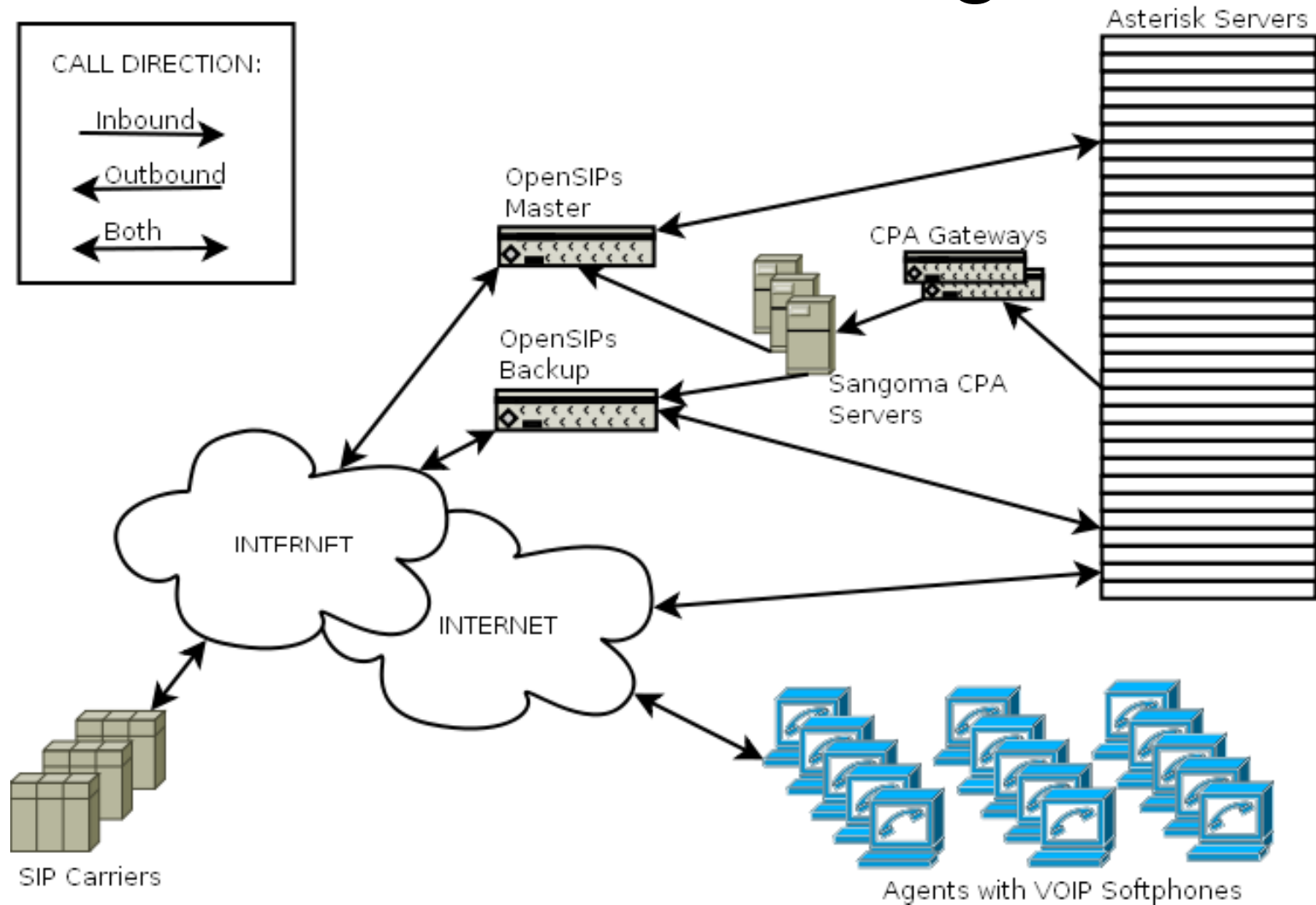
Project Requirements

- Scalable architecture for inbound, outbound and blended call centers
- Redundant and fail-over components
- Target call centers with 5 or more agents
- Dedicated telephony hardware per client
- Pluggable hardware and software add-ons
- High-density server co-location installation
- Multiple-carrier telco termination
- Pre-paid telco time billing

Scalable/Redundant Architecture

- RAID-1 or RAID-10 everywhere(except archive[RAID-6])
- Telco termination services
 - Multiple carriers, use of OpenSIPS with backup
- Database services
 - MySQL, Master/slave replication
- Web services
 - Apache load balancing
- ViciDial Call Center
 - Multi-server, load-balanced
- Icinga monitoring software

Call Path Diagram:



Dedicated Telephony Hardware

- A problem with many hosted multi-tenant call center services is control of resource allocation
- Poor audio quality and reduced total capacity of hardware if you use Virtual Machines
- Use of Sangoma VoiceTime USB module hardware timer for better audio quality at high load
- On-server audio recording
- 5-50+ agents per server (depending on type of call handling)
- Add more servers to scale a client to hundreds of seats in their own cluster

Small 1U Telephony Servers

- Single quad-core Intel CPU with 4GB RAM
- Software RAID-1 for redundancy of drives
- 1U form factor, 10 inches deep
- All ports in front except for power plug
- We add extra fans for better ventilation
- Very low power usage



Hardware Add-ons

- Sangoma VoiceTime USB module
 - For hardware timer to give better audio quality at higher loads
- Sangoma D100 Transcoding cards
 - For clients or carriers wanting G729 codec use
 - Includes licenses
 - Multiple capacities



Software Add-ons

- Cepstral Text-to-Speech
 - Broadcast outbound campaigns
- Sangoma Call Progress Analysis
 - Very fast, high-accuracy Pre-Answer and Answering Machine Detection
- QueueMetrics Statistical Analysis
 - More visually appealing call stats package
- Zoiper webphone
 - No-agent-configuration, high-quality softphone that can be embedded in the ViciDial screen



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Agent Screen with Embedded Phone

Logged in as User: 6666 on Phone: IAX2/cc330 to campaign: TESTCAMP

GROUPS LOGOUT

WebPhone View -

VICIdial SCRIPT FORM

2010-08-02 11:45:13 session ID: 8600051 Calls in Queue: 1

LIVE CALL

STATUS: Incoming: 727-555-1212 Group- TEST inbound 3 Fronter: - 7275551113

seconds: 21

PAUSE RESUME

☐ ALT PHONE DIAL

RECORDING FILE:

20100802-114450_727555...

RECORD ID: 1839

STOP RECORDING

WEB FORM

WEB FORM 2

PARK CALL

TRANSFER - CONF

QUICK TRANSFER

RE-QUEUE CALL

HANGUP CUSTOMER

SEND DTMF

Hello and thank you for calling ACME Widgets, My name is Admin, can I schedule an appointment for you to review our lovely widgets?

Appointment Date 2010-08-09 [help+](#)

Appointment Time 12 44 [help+](#)

- Favorite Color
- ☐ Red
 - ☐ Blue
 - ☐ Green
 - ☐ Purple
- [help+](#)

Appointment Notes

- Discussion Topics
- ☐ Price
 - ☐ Color
 - ☐ Texture
 - ☐ Shipping
- [help+](#)

Contact ID 7275551113 [help+](#)

Nearest City Chicago [help+](#)



Agent web-client version: 2.4-281 BUILD: 100726-1233

Server: 192.168.198.5

[Hide Calls In Queue](#)

HOT KEYS INACTIVE

MUTE

[Agents View +](#)

Calls In Queue:

PHONE	NAME	WAIT	AGENT	CALL GROUP	TYPE
TAKE CALL 7275551212	Testing	0:18	7275551113 -	TEST_IN3 - TEST inbound 3	IN

Web Phone:

ZOIPER

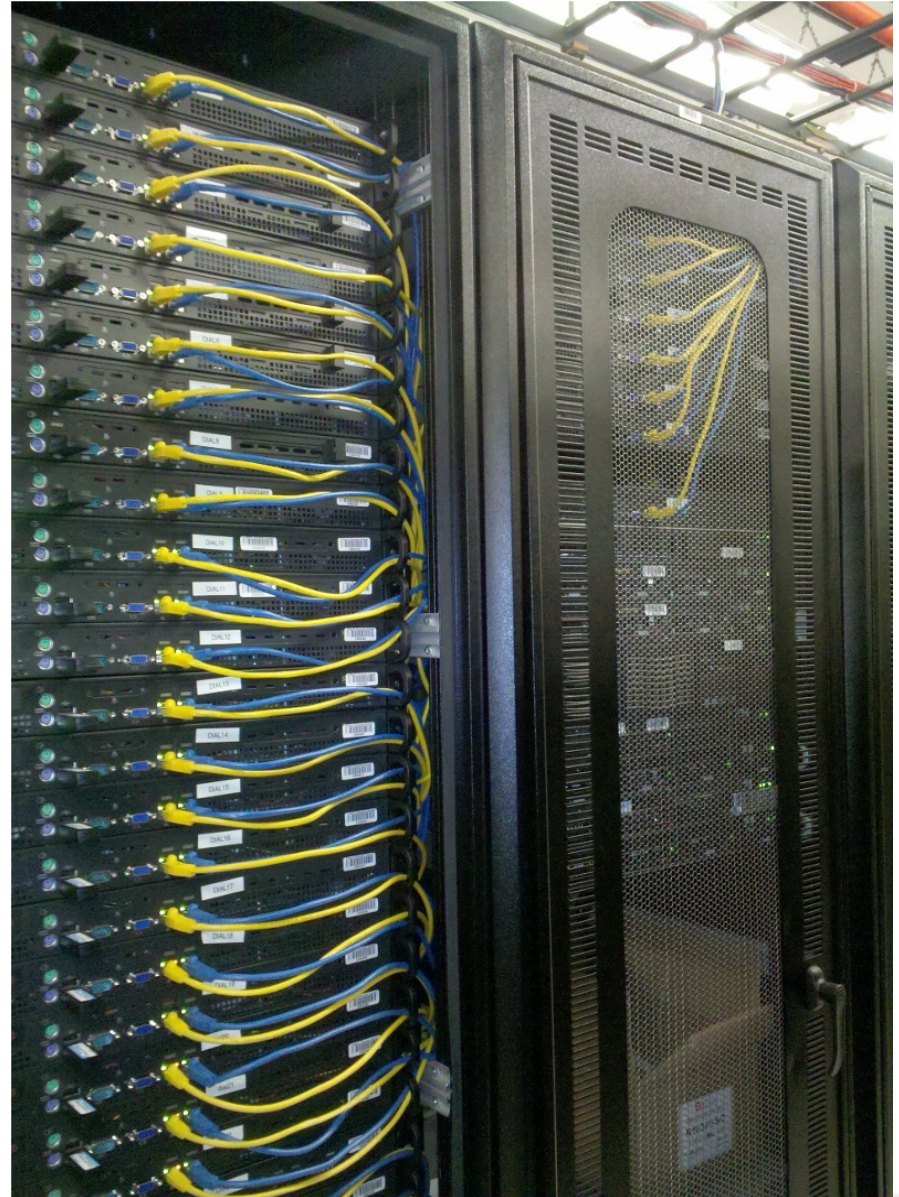
Phone to dial
Enter number to dial...

1 2 3 4

Account
Your Phone

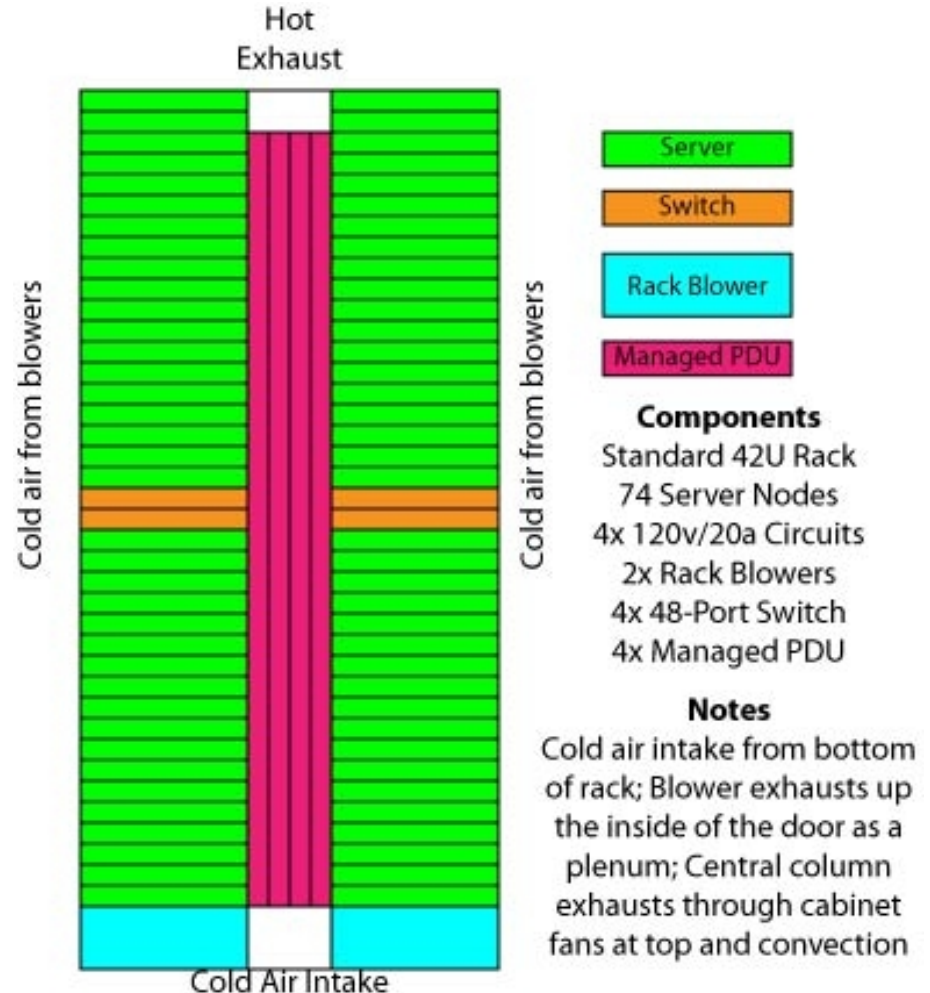
High-Density Co-Location

- Tier 3 Co-location facility in Tampa, FL, USA
- 3 cabinets
- Double-racked small 1U servers allows for 74+ servers per rack



High-Density Server Installation

- Similar to how many large data centers like Google are set up on a per-rack basis
- Center hot-air-column exhausting out the top



Multiple Carrier Telco Termination

- Several outbound carriers are used for placing outbound calls (some carriers do not like heavy or rapid outbound dialing)
- Calls can fail then retry another carrier depending on the return code
- For inbound there are not too many options for multi-carrier. Some clients have inbound numbers on more than one carrier, or use providers that distribute calls to multiple inbound numbers
- OpenSIPS is used for all telco termination routing to and from the ViciDial servers

Pre-Paid Telco Time Billing

- All customers inbound and outbound calls can be selectively allowed or denied traffic
- Logging of call time is done at the OpenSIPS layer for the best accuracy
- Clients have an account on our hosting web portal that allows them to check their balance, add to their balance and download CDRs
- Inbound, outbound and international can all be billed at different rates



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Thank you!

For more information, go to:

<http://www.vicidial.org>