

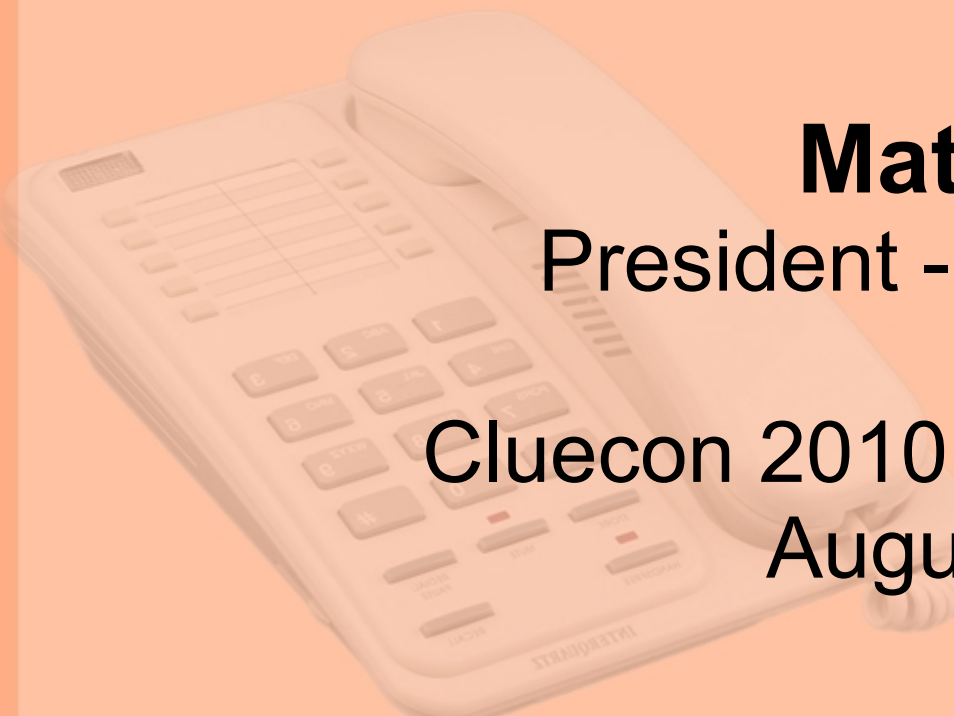
# Building a Scalable Hosted Call Center Platform

Presented by

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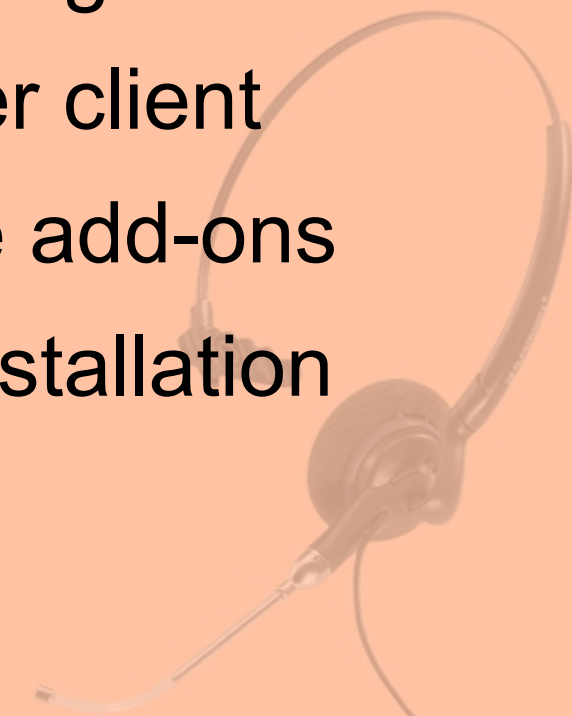
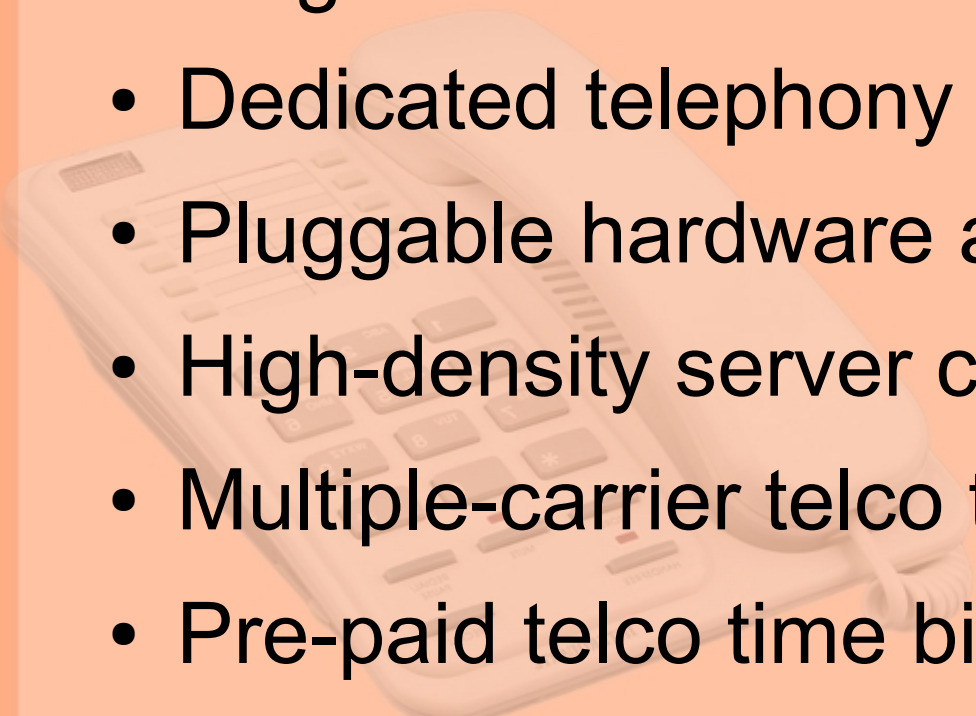
President - ViciDial Group

Cluecon 2010 \* Chicago, IL, USA  
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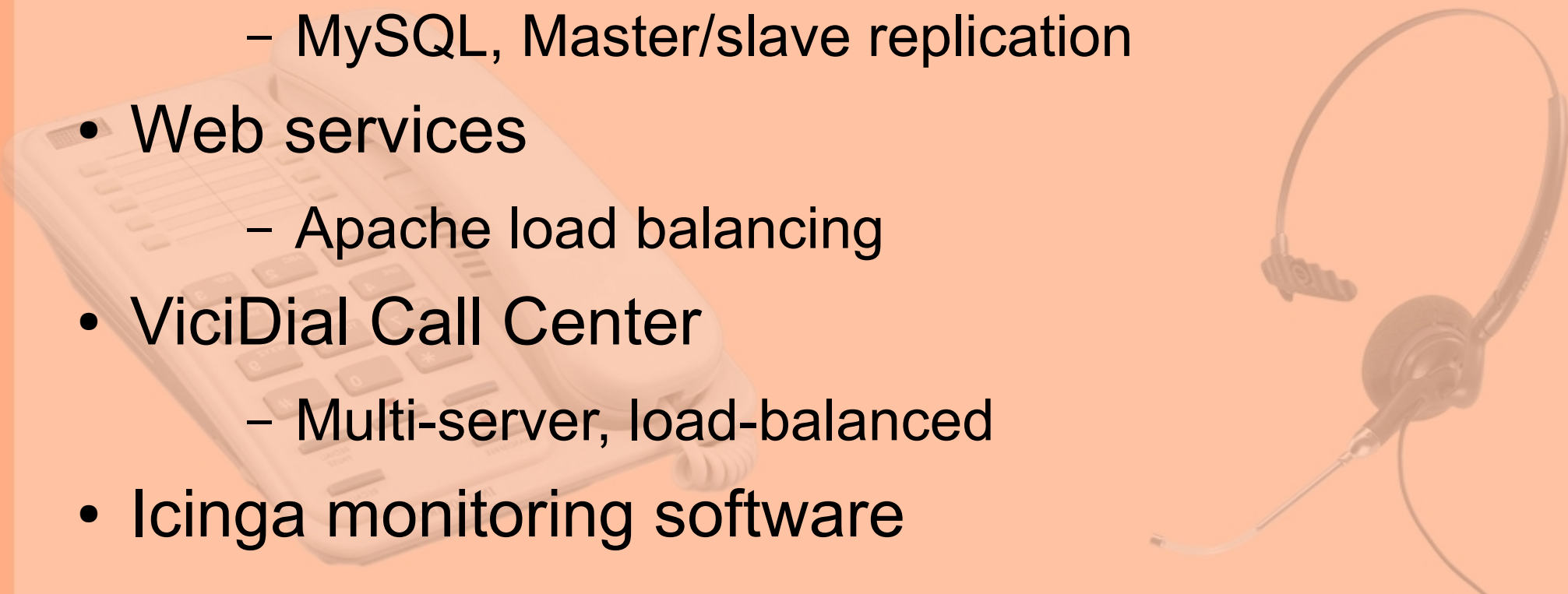
# Project Requirements

- 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

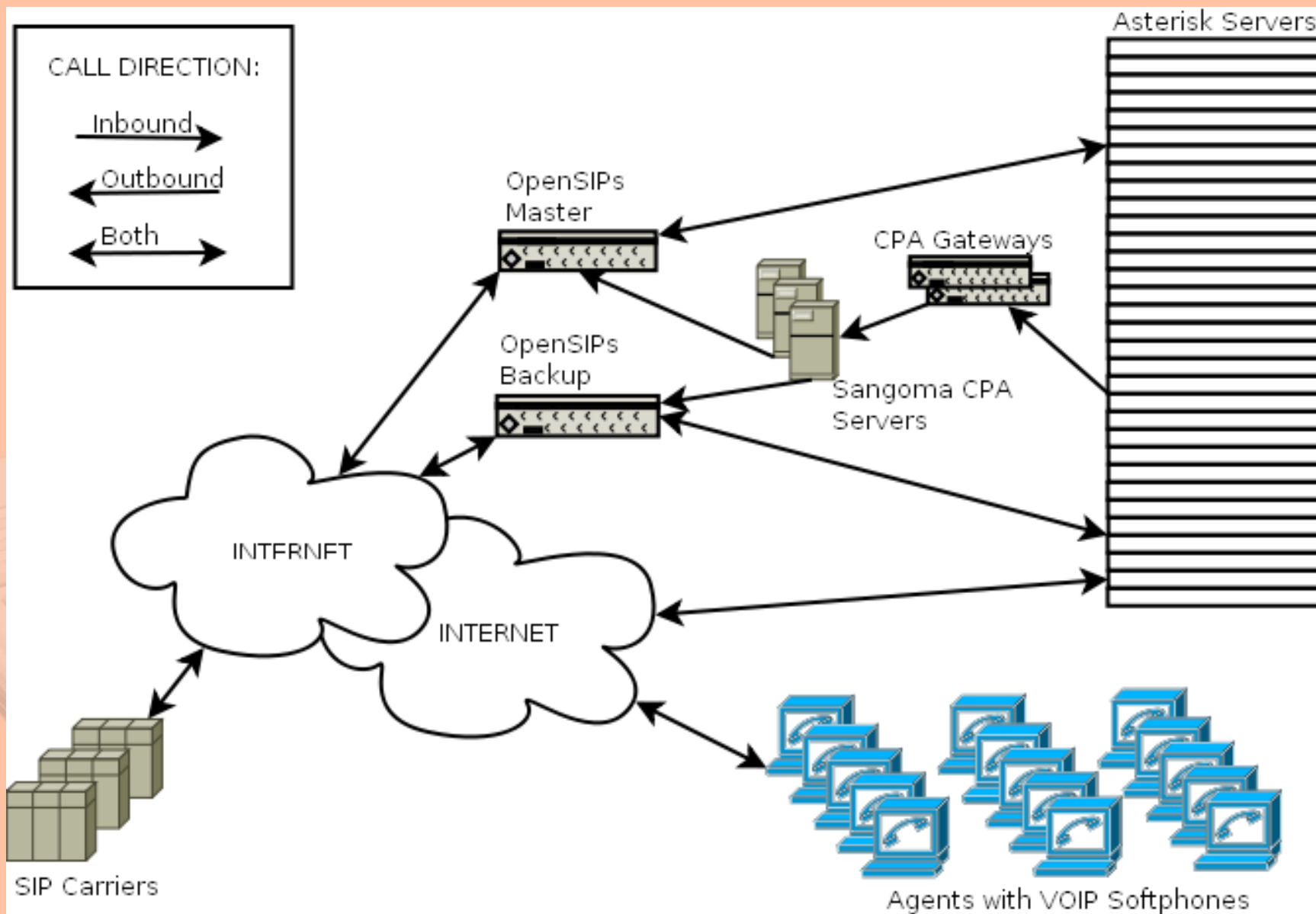


# Scalable/Redundant Architecture

- 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(dependent 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





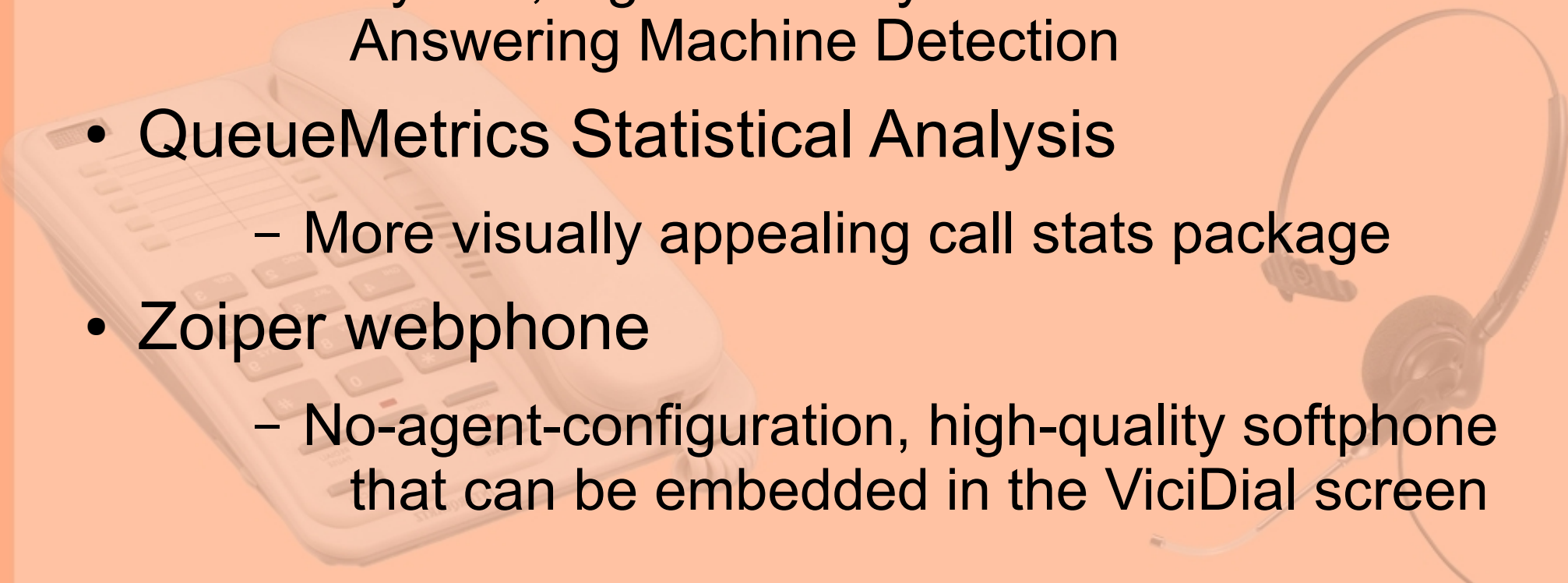
# Hardware Add-ons

- 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





# 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 [refresh](#)

**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  [help+](#) Appointment Time   [help+](#)

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

Appointment Notes  [help+](#)

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

Contact ID  [help+](#)

Nearest City  [help+](#)

**WebPhone View -**

Web Phone:

**ZOIPER**

Phone to dial

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
<a href="#">TAKE CALL</a> 7275551212	Testing	0:18	7275551113 -	TEST_IN3 - TEST inbound 3	IN



# High-Density Co-Location

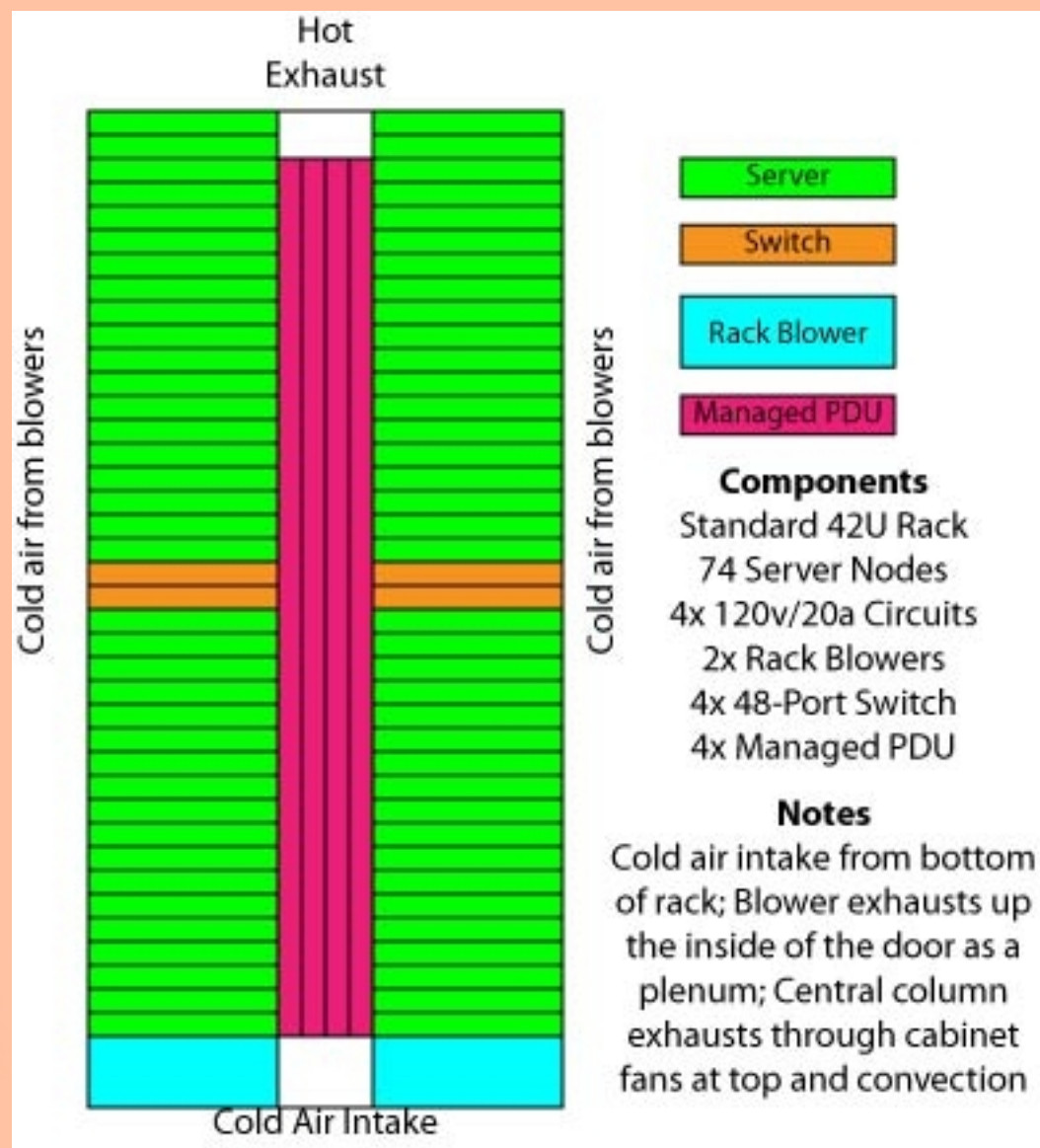
- Tier 3 Co-location facility in Tampa, FL, USA
- 3 cabinets
- Double-racked small 1U servers allows for 74+ servers per rack





# 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

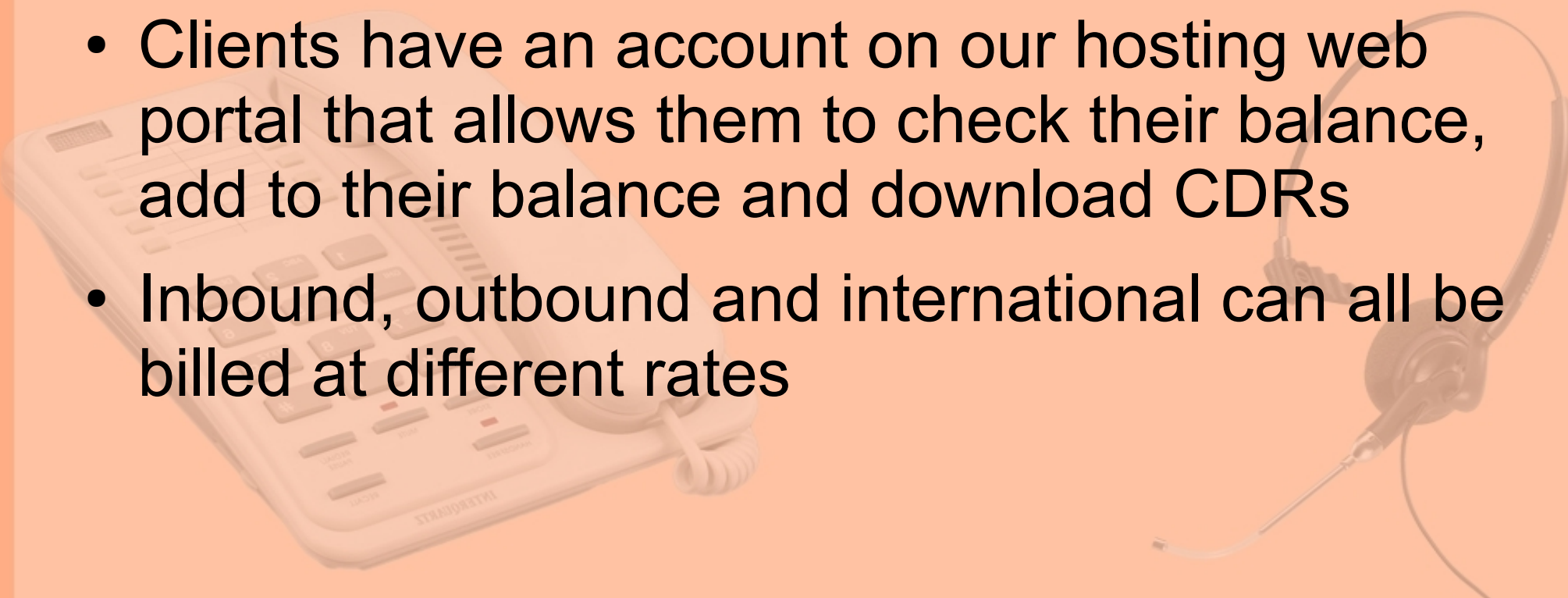


# Multiple Carrier Telco Termination

- 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



# Thank you!

**For more information, go to:**

**<http://www.vicidial.org>**

