

Erlang Factory SF 2011

3/25/2011

aptelaTM 



Superior phone service – clear and simple!

- Aptela delivers business-class phone service over the internet.
- Dynamic, growing customer base of 3,000 small businesses calling over 100 million minutes per year.
- Named Deloitte “Fast Growth” company in 2010 for third year in a row with 504% growth over 5 yrs (2005-2009).
- CTO is founding member of company and recognized VoIP industry visionary.
- Headquartered in Herndon, VA.

2001 –
Aptela
service
launched

2005 –
Voice as
a Service
offering
launched

2008 –
Service
over 2,000
SMBs

2009 – Named
Deloitte “Fast
Growth”
company

2010 – v5.0
Launched



Home History Settings Department: Customer Service (*203) aptela™

Department Dashboard: Customer Service (*203)

Members [Add / Remove Members](#)

<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Ally A. Acorn	101
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Burts Bees	102
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Cookie Cutler	103
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Greg Gannt	107
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	John Jalopy	110
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Nancy Nunn	114
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Zilda Zoiper	126
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Dan Dork	104
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Ellie Esterhous	105
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Frankie Fernando-Cisco 501	106
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Buddy Buckbeak	30001
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Henry Hull	108
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Kelly Kirk X-Lite	111
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Paul Potter 504g	116
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Mahesh Paolini-Subramanya	100

Incoming Department Calls (2)

<input checked="" type="checkbox"/>	Call from Charles T	Burts Bees (*102)	28:06
<input checked="" type="checkbox"/>	Call from Amanda	John Jalopy (*110)	0:17

Voicemails & Faxes

2 new voicemails (3 total) 2 new faxes (3 total)

Call Activity For July 6 [Full History](#)

Total Calls: 19 - Answered: 13 - Missed: 6 - Avg Length: 4:22

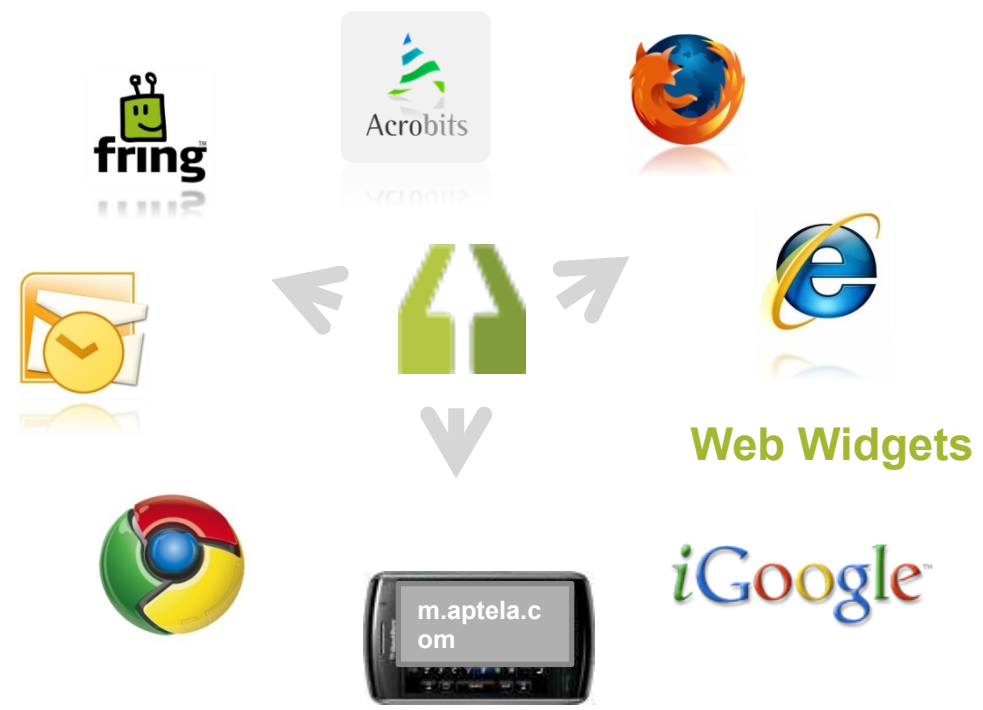
	Caller	Answered By	Length	Date / Time
→	Charles Taylor (703-386-1500)	Burts Bees	0:20:25	Today, 03:04 PM
→	Charles Taylor (703-386-1500)	Nancy Nunn	0:11:00	Today, 02:44 PM
→	Charlie (571-643-0667)		0:10:00	Today, 02:13 PM
→	Victor Vuvuzela (571-643-0667)	John Jalopy	0:00:41	Today, 02:04 PM
→	571-643-0667		-	Today, 02:01 PM
→	571-643-0667	Nancy Nunn	0:07:35	Today, 01:52 PM
→	571-643-0667	Burts Bees	0:03:31	Today, 01:45 PM
→	Adam Ant (303-532-5522)	Nancy Nunn	0:00:35	Today, 01:32 PM
→	Unavailable (571-643-0667)	Dan Dork	0:00:29	Today, 12:51 PM





The Aptela AnywhereSM Experience

- ▶ Addressing the Communication and Collaboration Needs of Small Businesses and Mobile Professionals:
 - ▶ Stay Connected Anywhere/Anytime
 - ▶ Call Management On-The-Go
 - ▶ Physical Location is Irrelevant
 - ▶ Open Integration is Key...





Hosted PBX Taxonomy

- Named Box
 - ▶ Pure hosting
 - ▶ Clustering/Virtual
 - ▶ Big Honking Box

- Application Server
 - ▶ Calls generate events
 - ▶ Events interact with application server
 - ▶ Predefined spaces/features



Aptela v1 – v4

- Circa 1999
- “Classic” web application
- EJB/JMS/Tomcat/Postgres/Apache/VXML





Issues - Updates and Deployment





Issues - Updates and Deployment



“Hey guys. I dropped my wrench!”



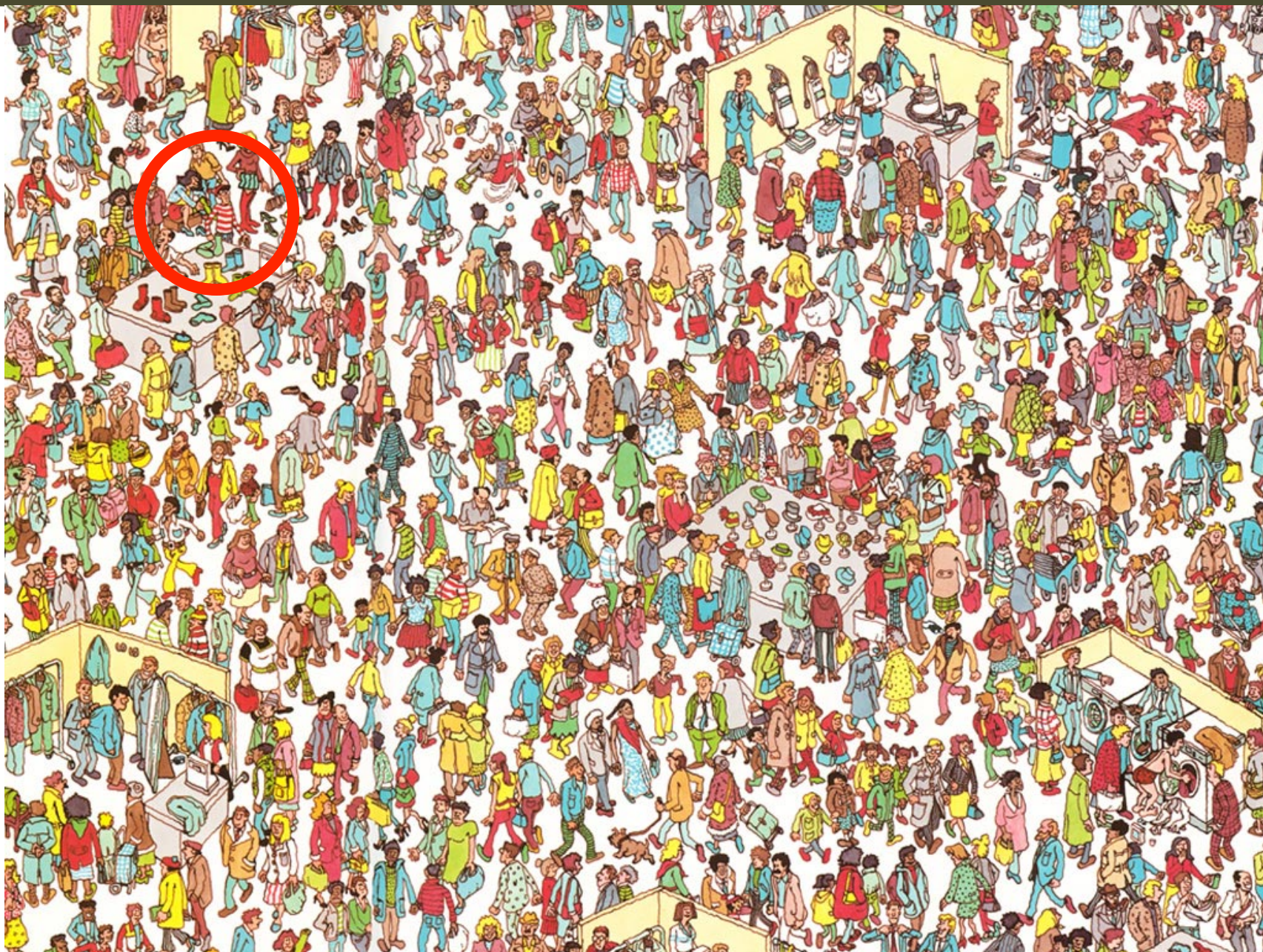
Issues - Updates and Deployment

- 1999
- Legacy issues
- Unexpected side effects
- Cold Restarts



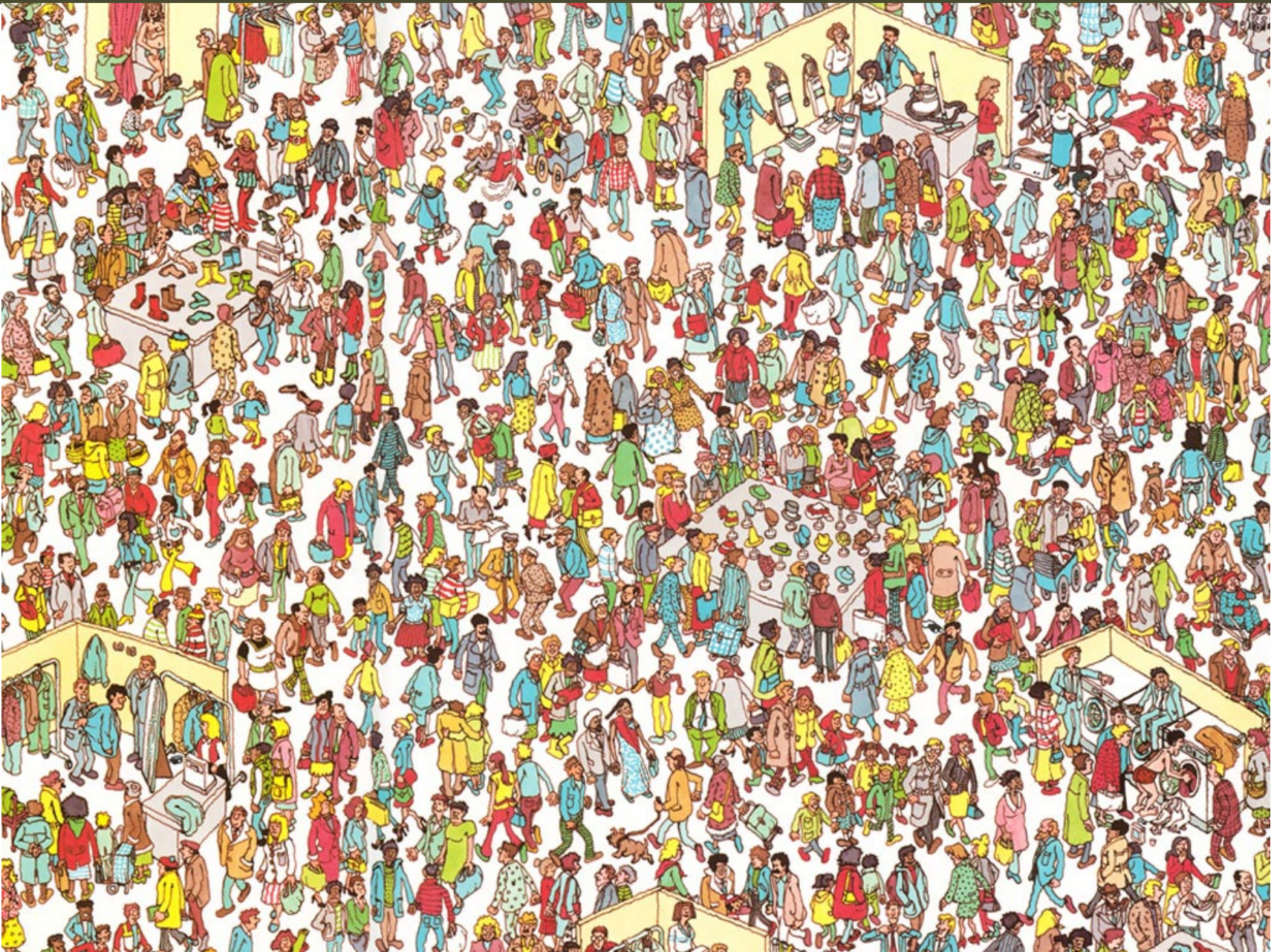


Issues – Testing and Debugging





Issues – Testing and Debugging





Issues – Testing and Debugging

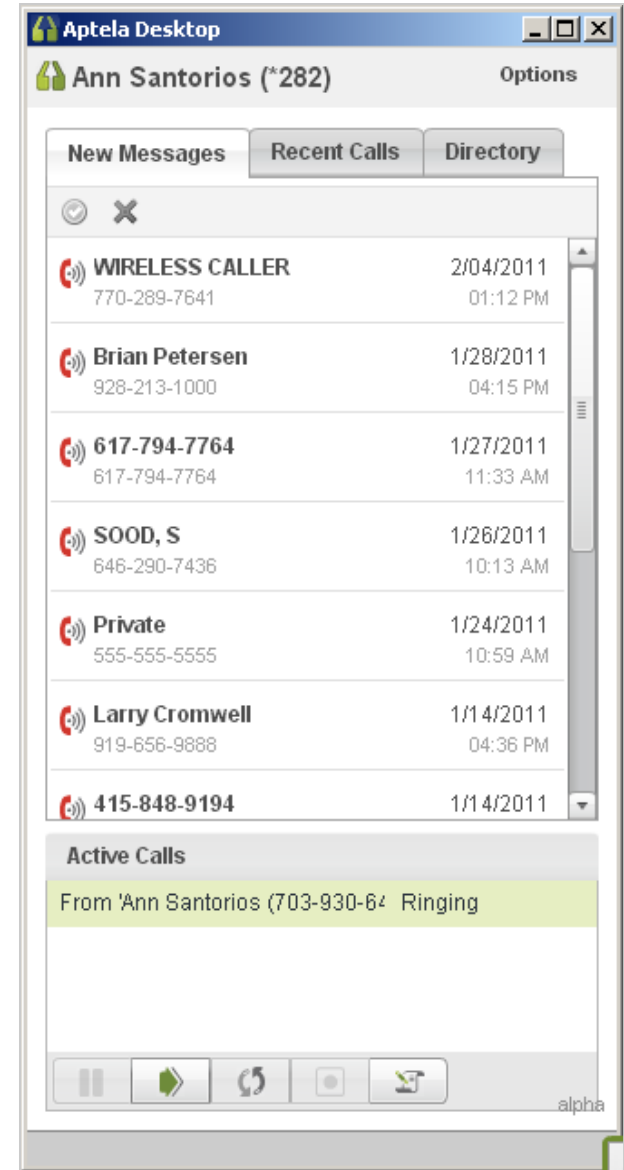
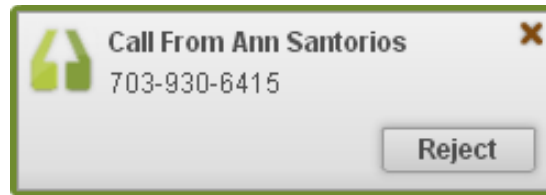
- Arrrggh
- Arrrggh
- Arrrggh
- Arrrggh
- Arrrggh
- Arrrggh





Issues – Concurrency

- ▶ Live displays of calls
- ▶ Interactivity with calls
 - ▶ Transfers
 - ▶ Conferences
 - ▶ Recording
 - ▶ Monitoring
 - ▶ Notifications





Issues - Scaling



- VS -





Issues - Persistence

- Voicemails and faxes in the file system
- Databases
 - ▶ Telco ::= Reporting
 - ▶ We've become Postgres gurus
- Replication hell

Count of Company / Account	Column Labels	Completed	Not Started	Grand Total
Brandon Brennan		153	11	164
Call		55	9	64
Call		51	6	57
Call new lead: fdgd dfgbcv at frt ***HOT***			1	1
Chat Transcript on 1/10/2011		1		1
Chat Transcript on 1/4/2011		1		1
Email		1	2	3
Service Quote		1		1
Demo		3		3
Demo		3		3
Email		87	2	89
Email		3		3
Email Other		84	2	86
Quote		8		8
Quote		8		8
Jeff McGaffic		118	10	128
Call		84	10	94
Call		65		65
Call Contact Attempt		4	1	5
Call - Other		2	2	4
Call Qualification		3	2	5
Call Quote Follow-up		7	3	10
Call new lead: 4 4 at 4 ***HOT***			1	1
Call new lead: Morten Bekholm at Wilke ***HOT***			1	1
Email Contact Attempt		1		1
Email Other		1		1
Email- Contact Attempt		1		1
Email		27		27
Call		1		1
Email Contact Attempt		15		15
Email Other		9		9
Email Quote Follow-up		2		2
Other		2		2
Email Other		2		2
Quote		5		5
Email Other		5		5
Jim Regan		4	2	6
Call		4	2	6
Call new lead: Jeff Freeman at Up-Link Internet ***HOT***			1	1
Call new lead: mike miers at david miers inc ***HOT***			1	1
Call new lead: Tester Tests@tsa.com at TSA ***HOT***				
Service Quote		4		4
Jonathan Jacobs		123	2	125

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Issues – Testing and Debugging

- Arrrggh
- Arrrggh
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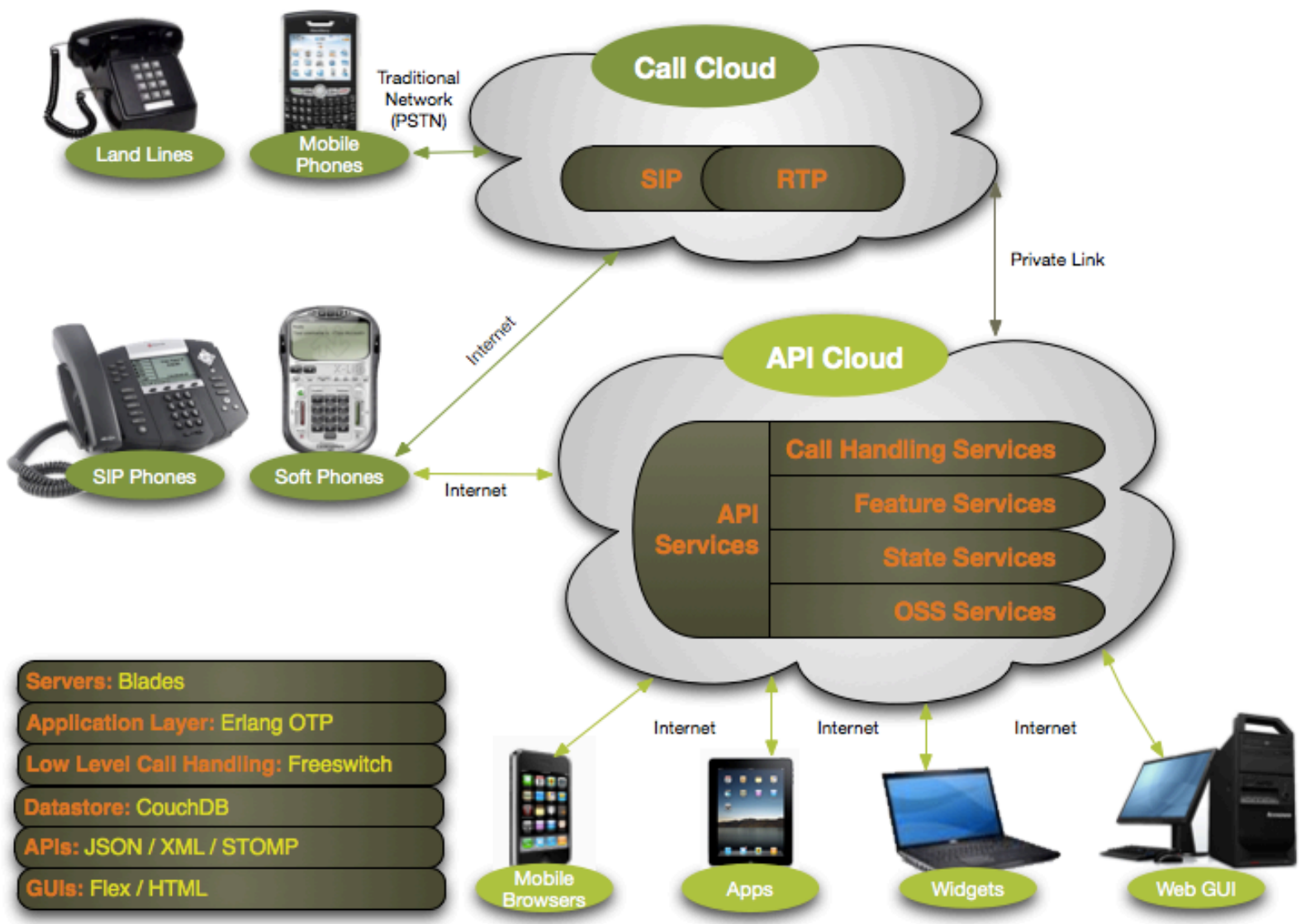


Why erlang?

- Testing
- Code deployment
- Concurrency
- State Management
- Predictable Performance
- Fault tolerance
- Testing



The Aptela v5 Platform





A5 - Clean APIs

➤ Administrative

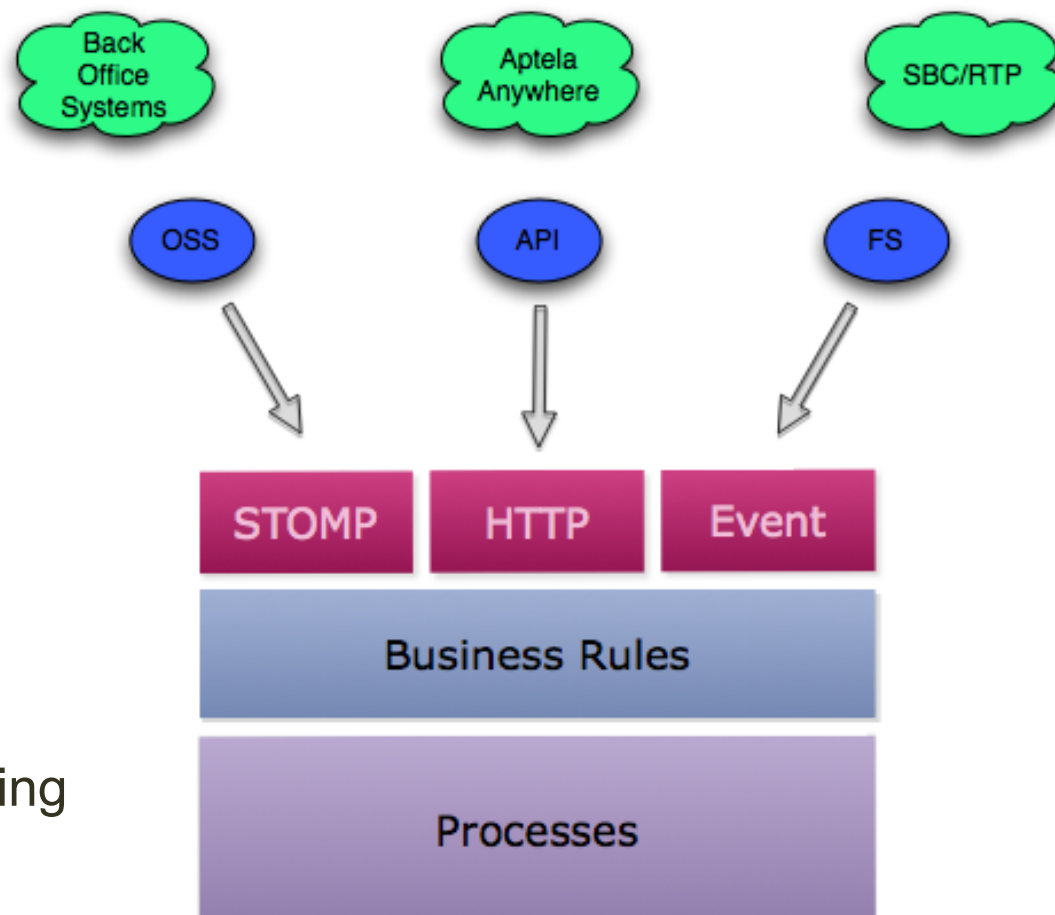
- ▶ CRUD – Users, Depts, ...
- ▶ Regulatory – E911, TRS, ...
- ▶ OSS

➤ Informative

- ▶ Notifications
- ▶ High Level Events
- ▶ Messages – History, Reporting

➤ Interactive

- ▶ Communications – Calls, Contacts, ...
- ▶ Profile – Blacklist, FML, Media, ...
- ▶ Messages – History, Reporting, ...





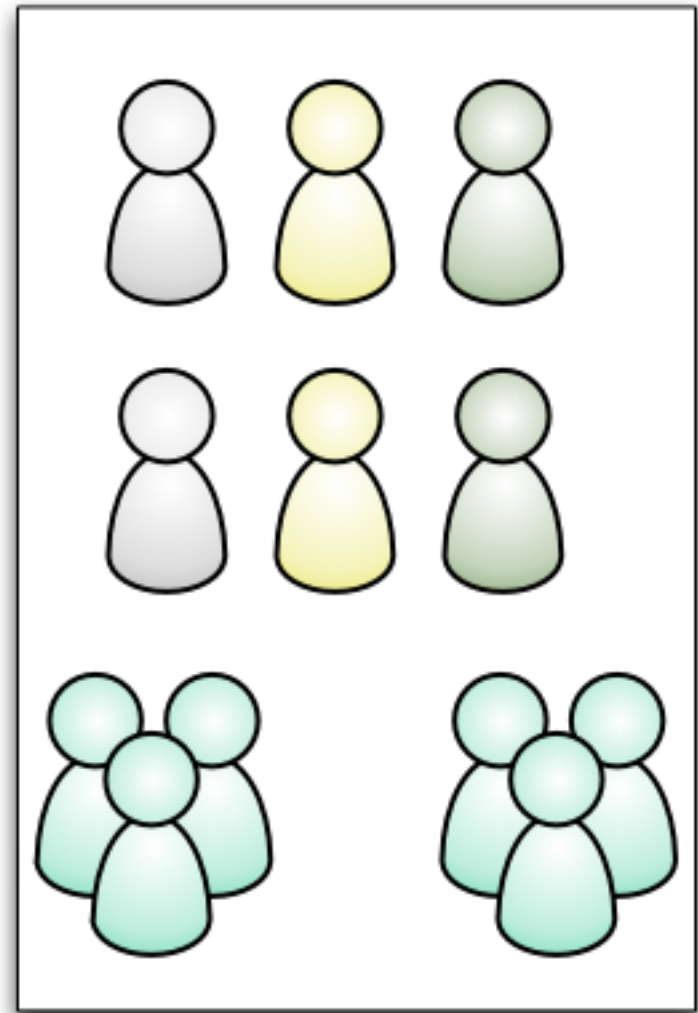
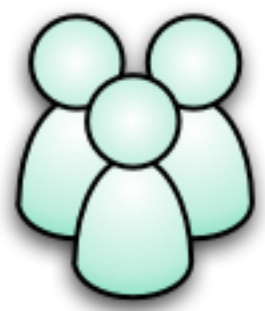
A5 - Overview



Users



Department



Client



A5 - Processes

- They synchronize activities
 - ▶ Actors

- They perform tasks
 - ▶ Calls
 - ▶ Voicemails
 - ▶ Faxes
 - ▶ Notifications
 - ▶ Audio conversions
 - ▶ Dial limiters
 - ▶ Presence
 - ▶ Authentication





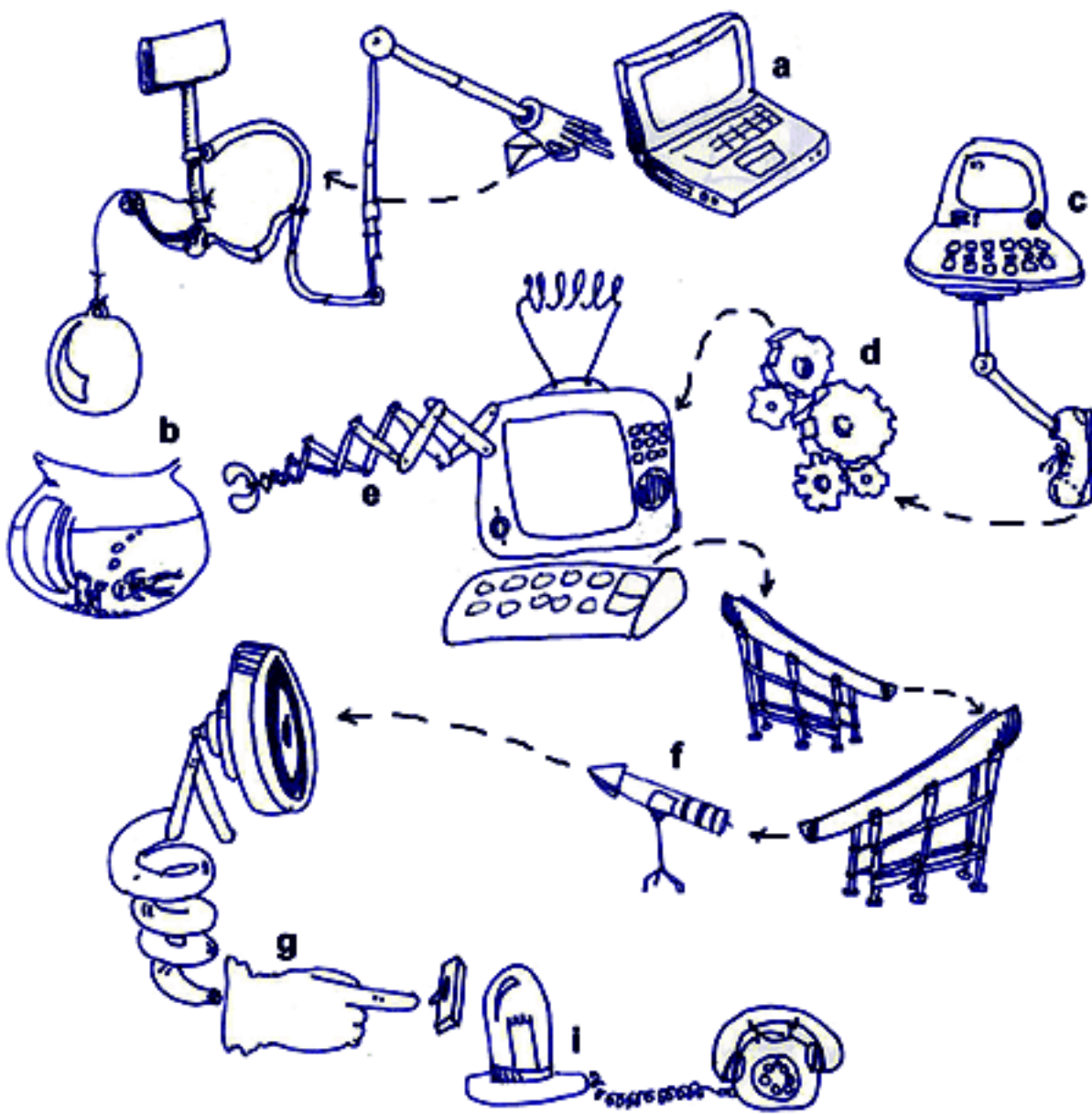
A5 - FSMs

► Call States

- Init
- Blacklist
- Redirect
- Cancelled

► Many many many FSMs

- auto_attendant
- bridge
- check_voicemail
- conference
- default_phone
- dial_transfer





A5 – Event Handlers

- ▶ They get information to endpoints
 - ▶ GUI
 - ▶ Application
 - ▶ Telephony



User Dashboard

Call	Status
To 202-292-4855	On Call

Find Me List

- ✓ desk phone
- ✓ Mobile
- ✓ Bob
- ✓ Charlotte
- ✗ Mobile 2

Options

- Add New Entry
- Edit 'desk phone'
- Remove 'desk phone'
- Set 'Follow Me'
- Do Not Disturb
- Manage Smart

David Davidson	
Slade Jenkins	
Gregory Bledsoe	x363
Sam Bradley	x245
Brandon Brennan	x414
Elinor Canicosa	x114
Albert Carter	x244
David Castelhana	x612
Stefan Cleveland	x231
On the phone with:	
WIRELESS CALLER (301-875-1930)	x262

Drag & Drop to reorder. Click icon to enable/disable.



A5 - Persistence

- CDRs
- Replication
- OSS interaction
 - ▶ State-Event interaction



CouchDB
relax

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Email Other		1		1
Email- Contact Attempt		1		1
Email		27		27
Call		1		1
Email Other Contact Attempt		15		15
Email Other		9		9
Email Other Quote Follow-up		2		2
Other		2		2
Email Other		2		2
Quote		5		5
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Lessons learned – Utility libraries

- Everyone does things differently
- Binary/String Handling
 - ▶ File paths are lists
 - ▶ Every library has its own type usage
 - ▶ <https://github.com/jcomellas/bstr>
- Time management
- Loggers
- <http://erlagner.org> ??





Lessons learned – Purist Programmers

- Everything must reference or pass a function. Everything!
- Intermediate variables are a sin
- Its too readable!
- No references to the actual code being called
- Heck, dereference everything!





Lessons learned – Memory

- 2GB limit
 - ▶ Cant avoid having the VM crash
 - ▶ Binaries and references
- Explicit garbage collection and/or Processes
- Caches Caches everywhere....



Lessons learned – Timeouts

- Processes used to synchronize activities
- Quasi real-time performance
- Sometimes things take time
- RO vs RW processes
- Caches



Lessons learned - Misc

- Language makes it easy to abuse the system
 - ▶ Register your processes globally
 - ▶ `global:whereis_name/1` vs `gen_server:call/2` w/ `{global, Name}`
 - `whereis_name` vs. `safe_whereis_name`. Who knew?
- Mnesia and network partitioning
- Systemic race conditions
- Good Enough is good enough
 - ▶ Don't underestimate the power of Business Rules



Conclusion

- Development gains
 - ▶ Everybody loves the developers
- Components scale near-linearly
 - ▶ Performance! W00t!
- Uptime is not a four letter word
 - ▶ Hardware failures predominate



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