Erlang Factory SF 2011

3/25/2011

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Aptela
Superior phone service – clear and simple!

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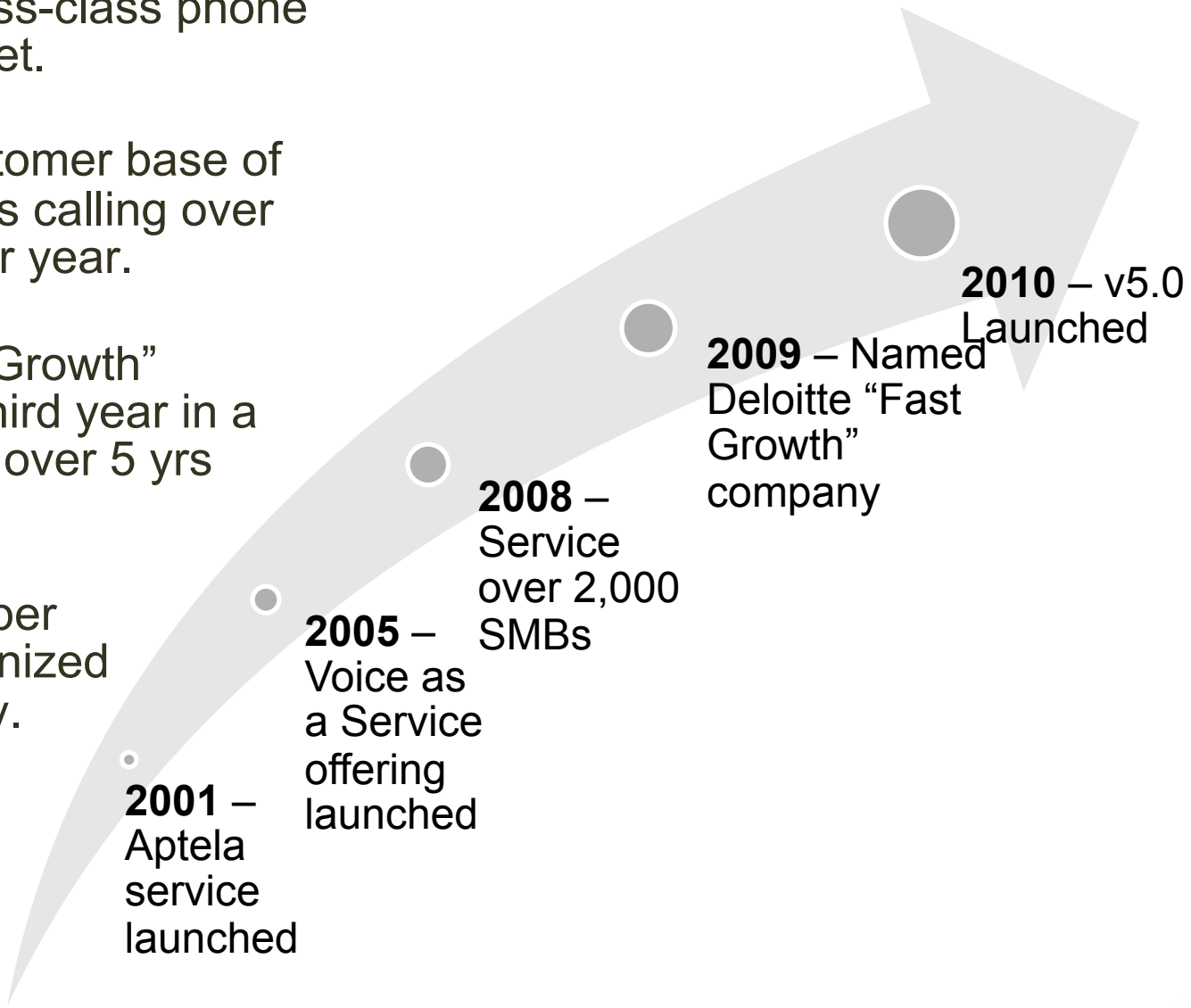
- Dynamic, growing customer base of 3,000 small businesses calling over 100 million minutes per year.
- Named Deloitte “Fast Growth” company in 2010 for third year in a row with 504% growth over 5 yrs (2005-2009).
- CTO is founding member of company and recognized VoIP industry visionary.
- Headquartered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



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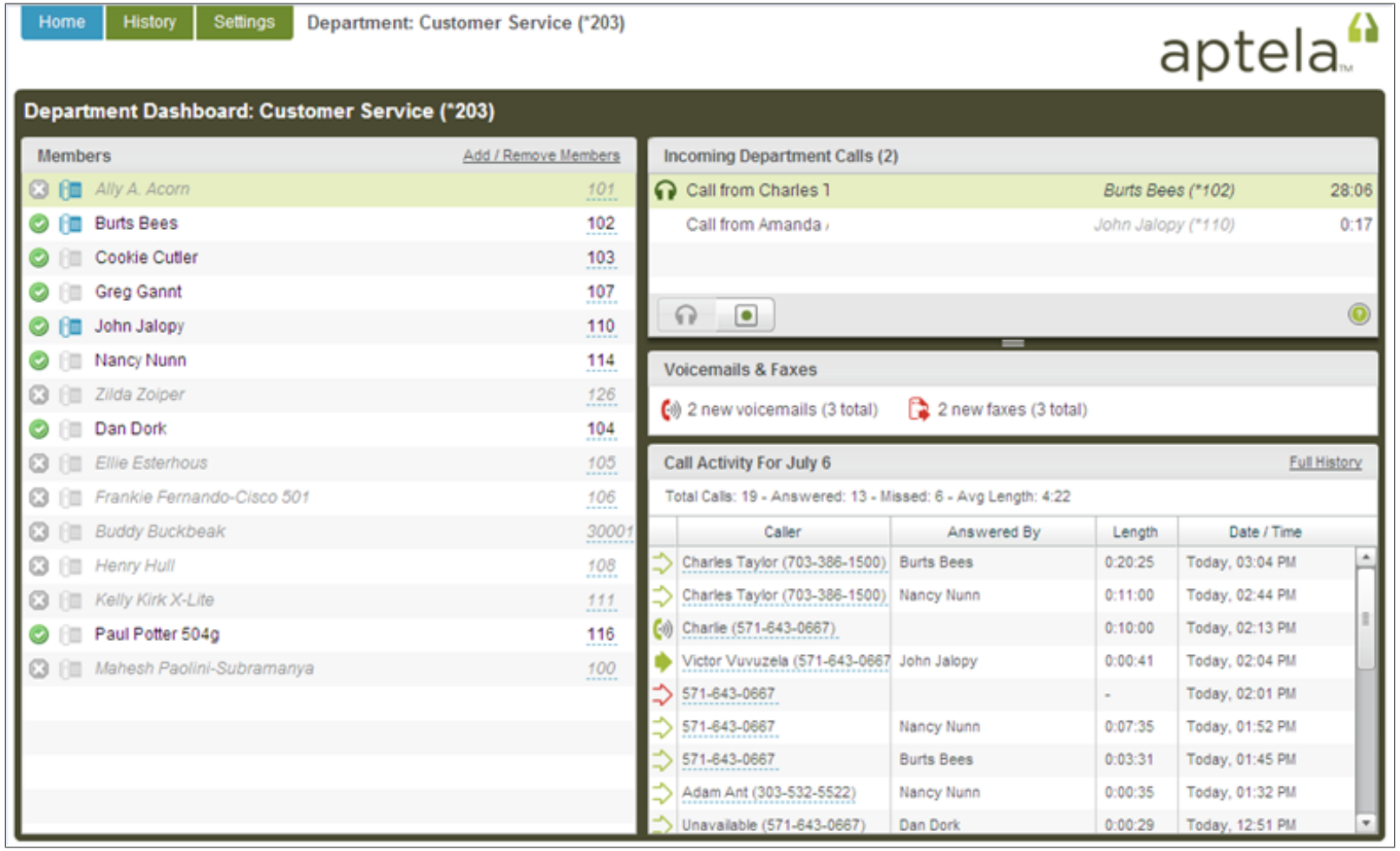
Aptela Inc



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The Aptela Anywhere^{SM} 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…

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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

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Aptela v1 – v4

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

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Issues - Updates and Deployment

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Issues - Updates and Deployment

"Hey guys. I dropped my wrench!

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Issues - Updates and Deployment

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

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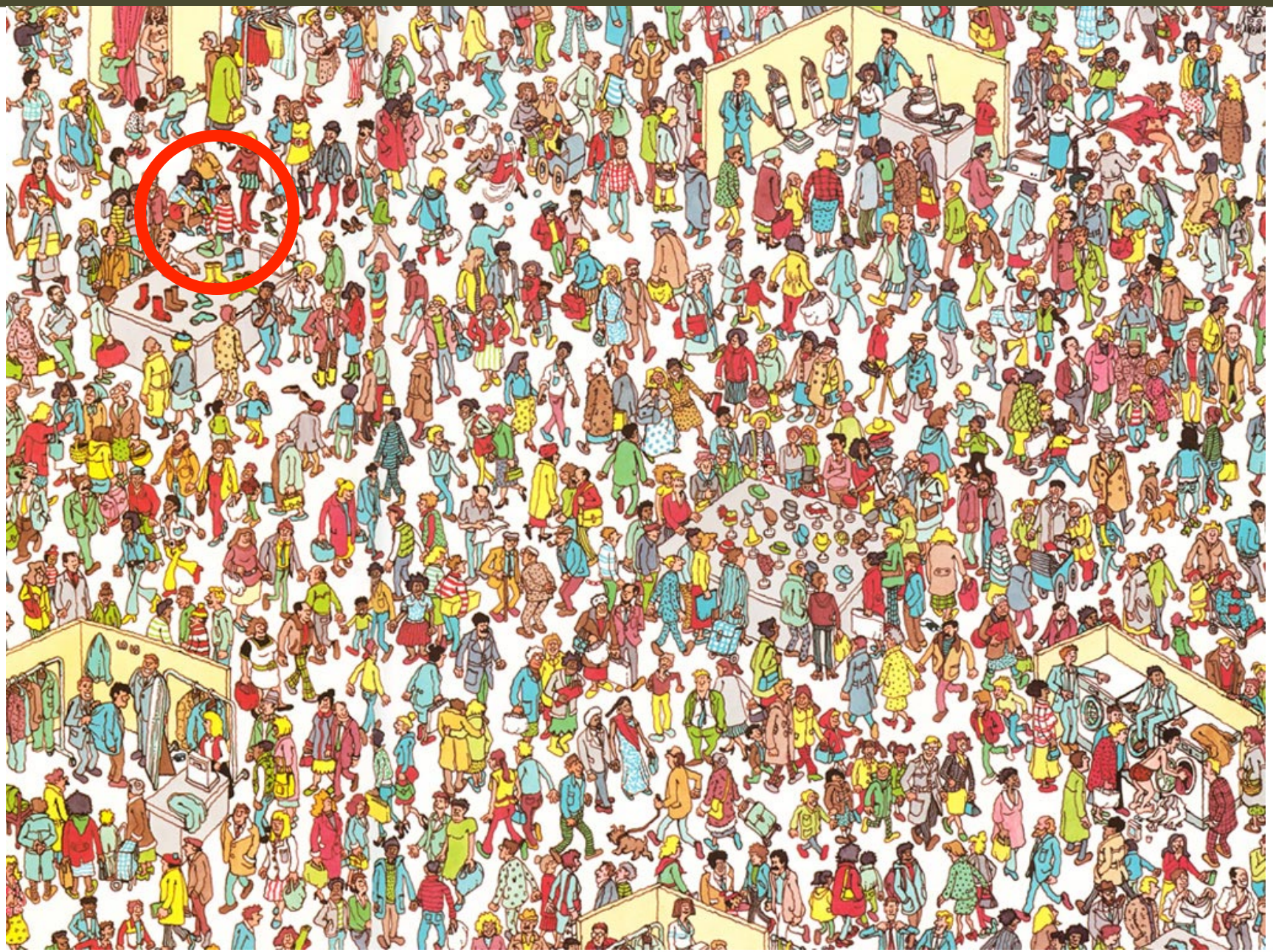
Issues – Testing and Debugging



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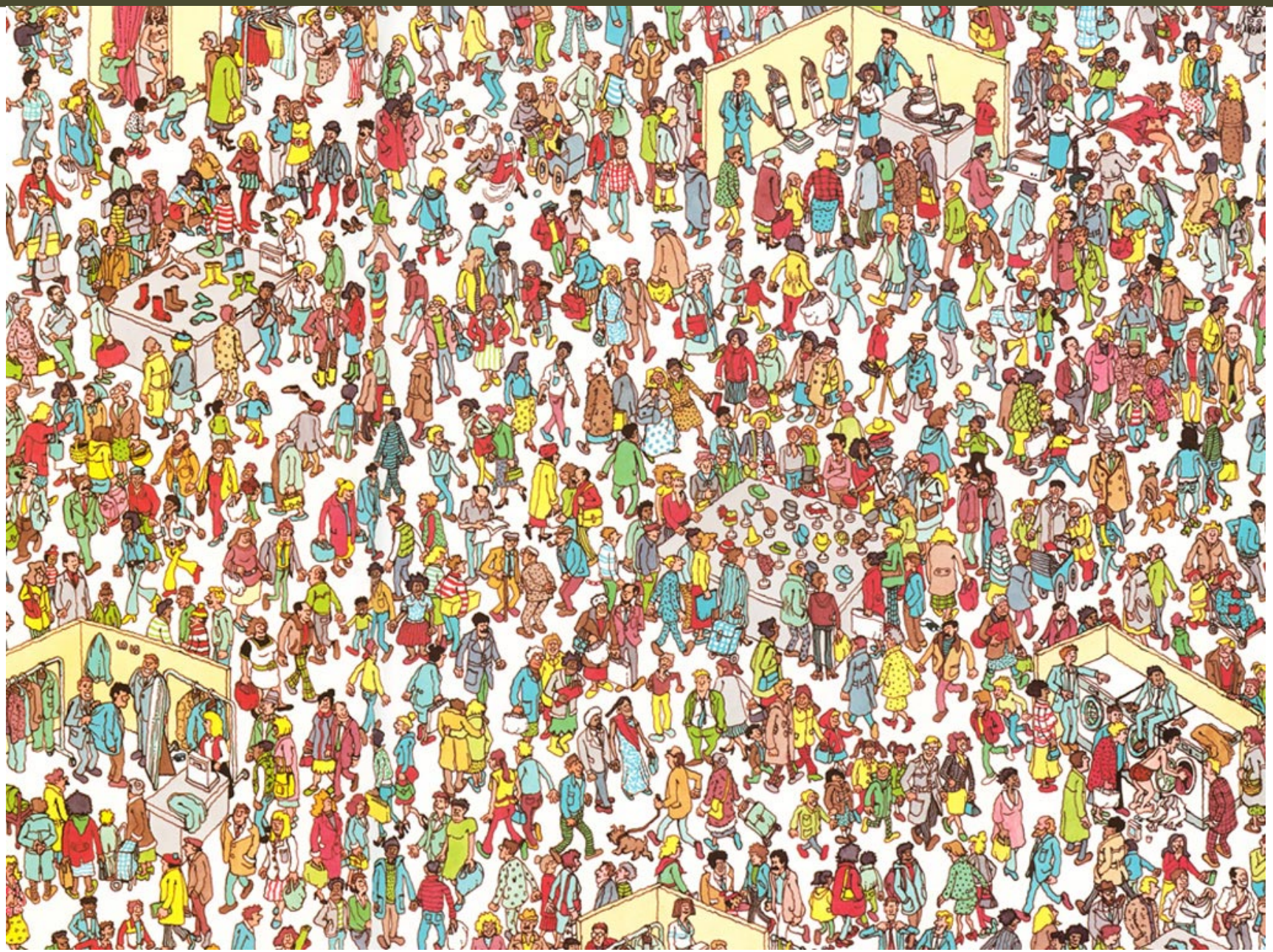
Issues – Testing and Debugging



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Issues – Testing and Debugging

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

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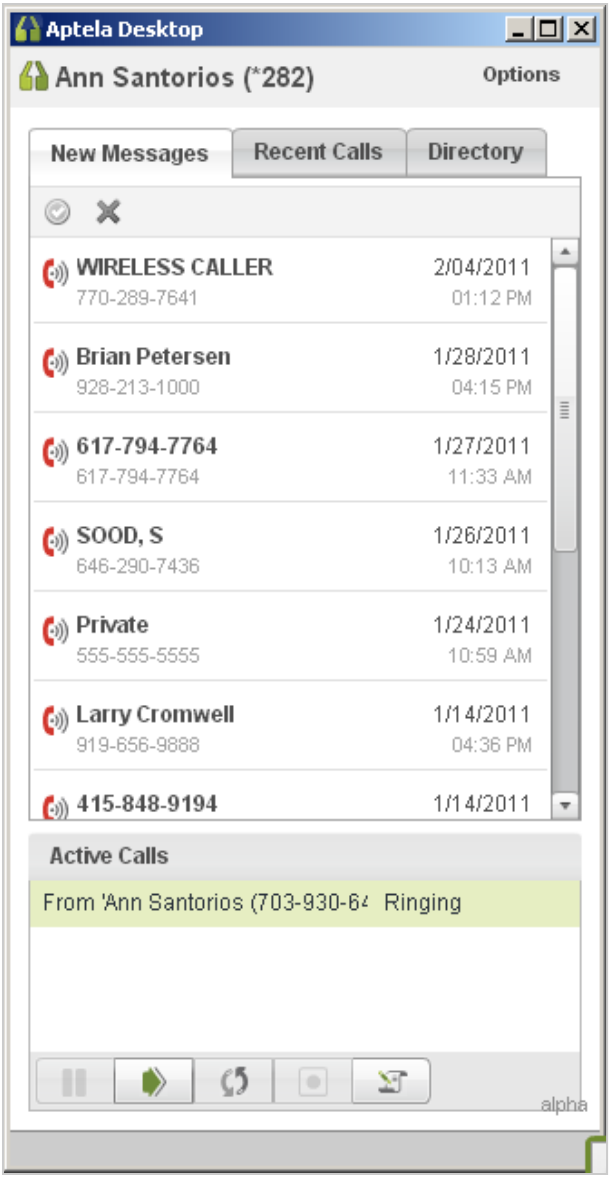
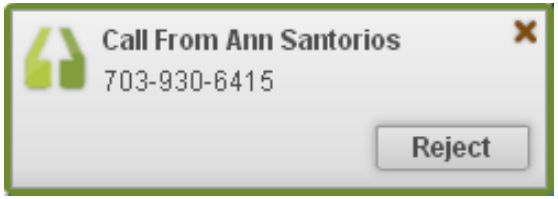
Issues – Concurrency

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





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Issues - Scaling

- VS -

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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		
Row 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
- Arrrggh
- Arrrggh
- Arrrggh
- Arrrggh

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Why erlang?

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

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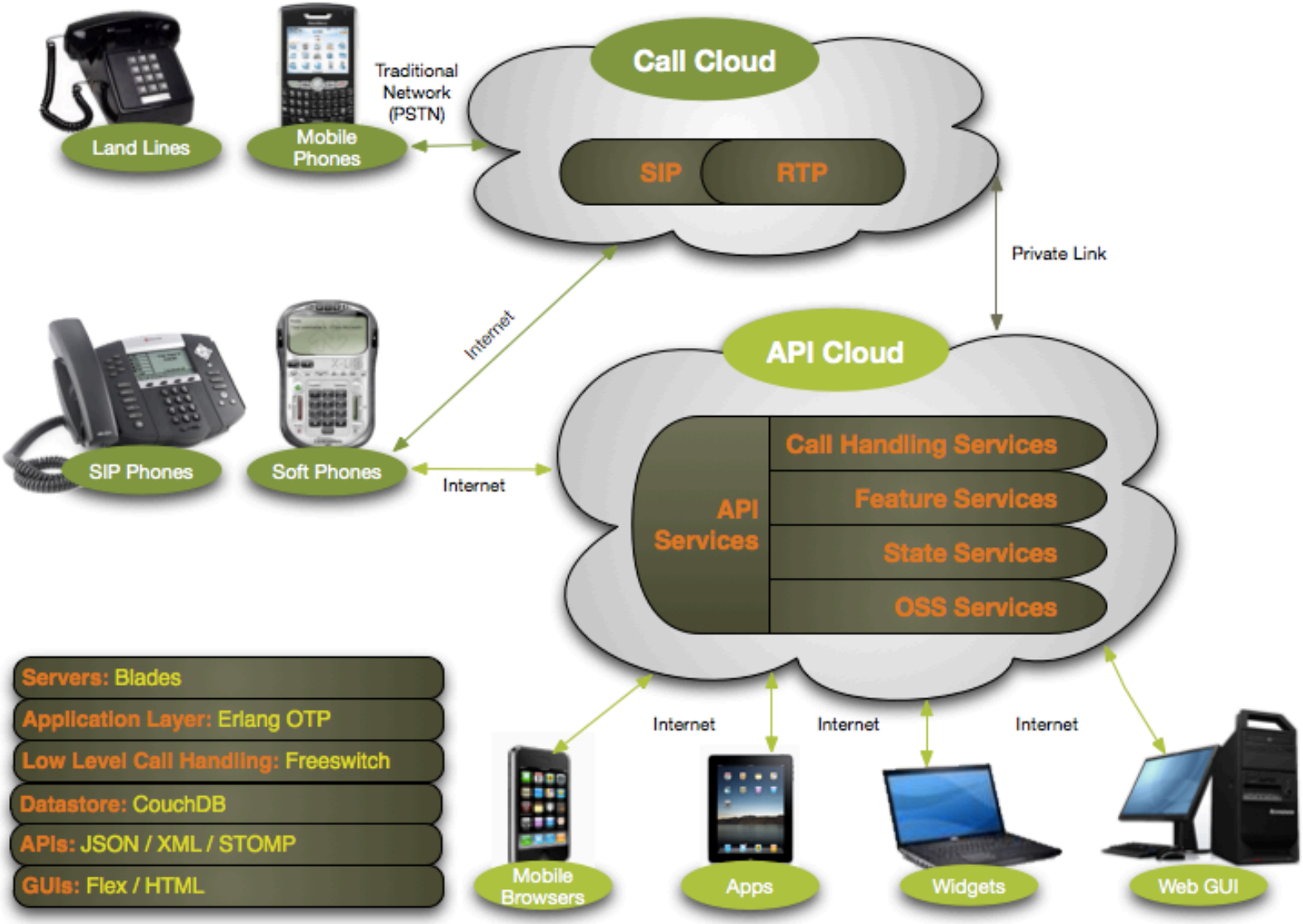
The Aptela v5 Platform



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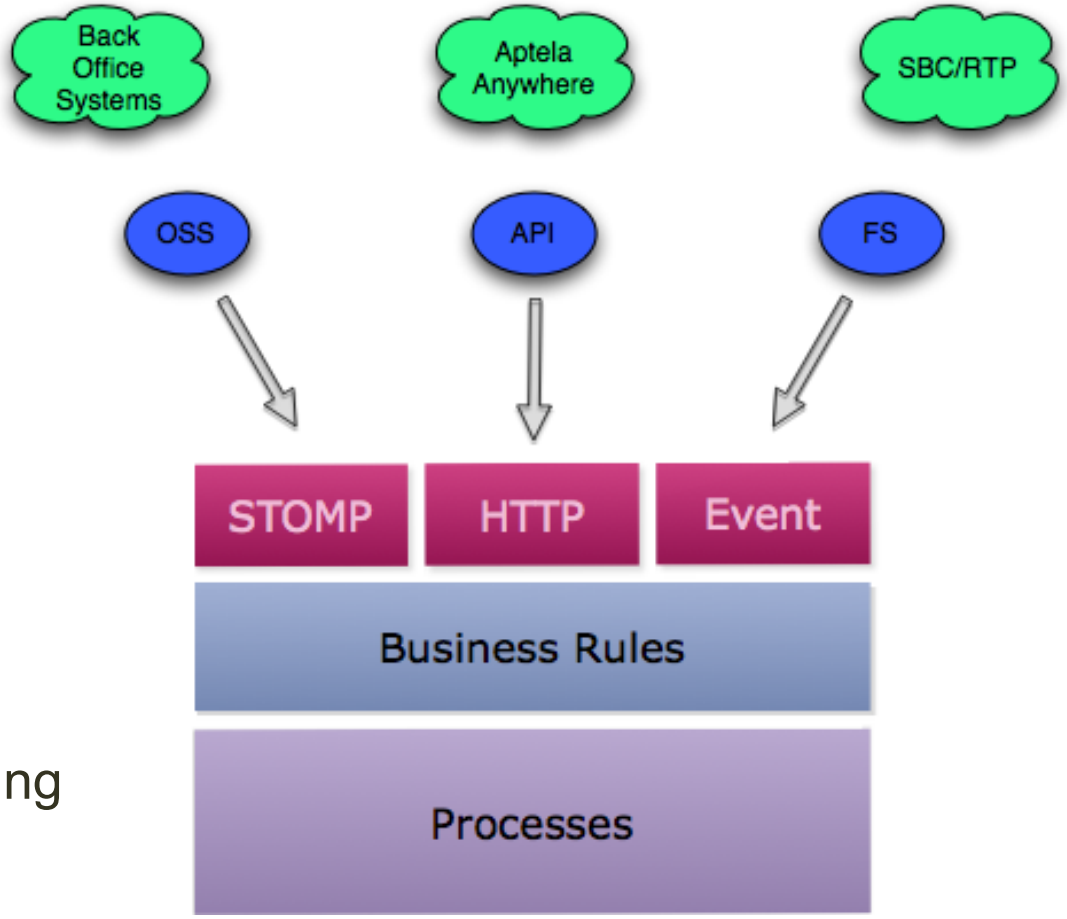
A5 - Clean APIs

- 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, …



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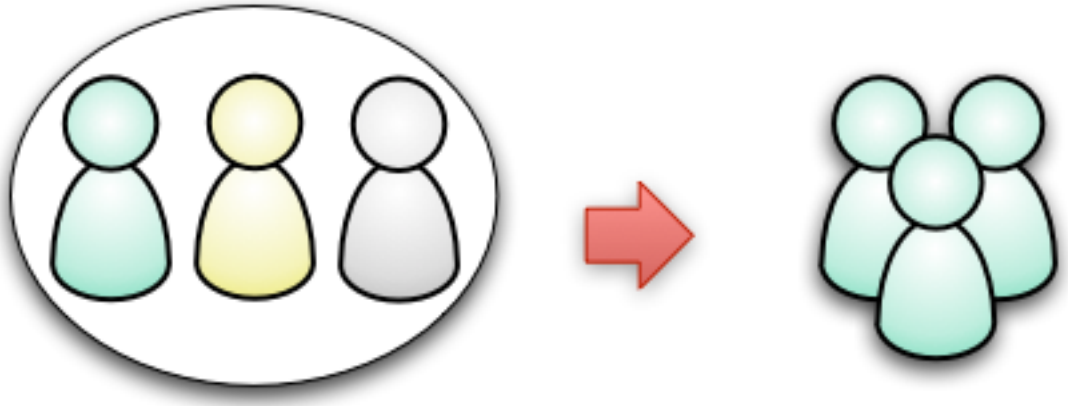
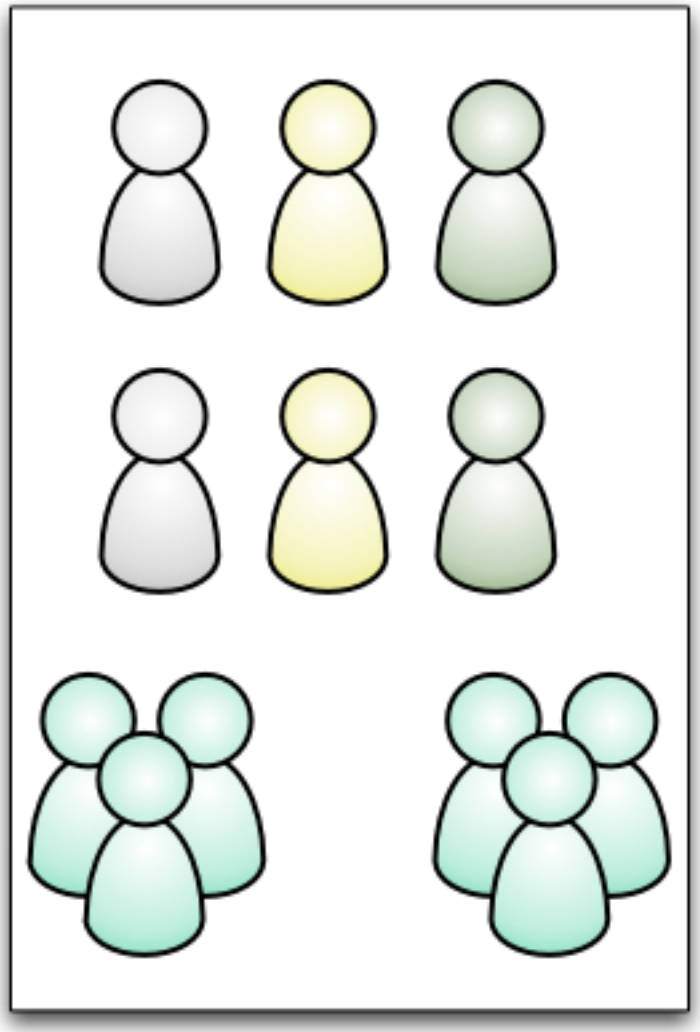
A5 - Overview

Users



Department



Client

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A5 - Processes

- They synchronize activities
  - Actors
- They perform tasks
  - Calls
  - Voicemails
  - Faxes
  - Notifications
  - Audio conversions
  - Dial limiters
  - Presence
  - Authentication

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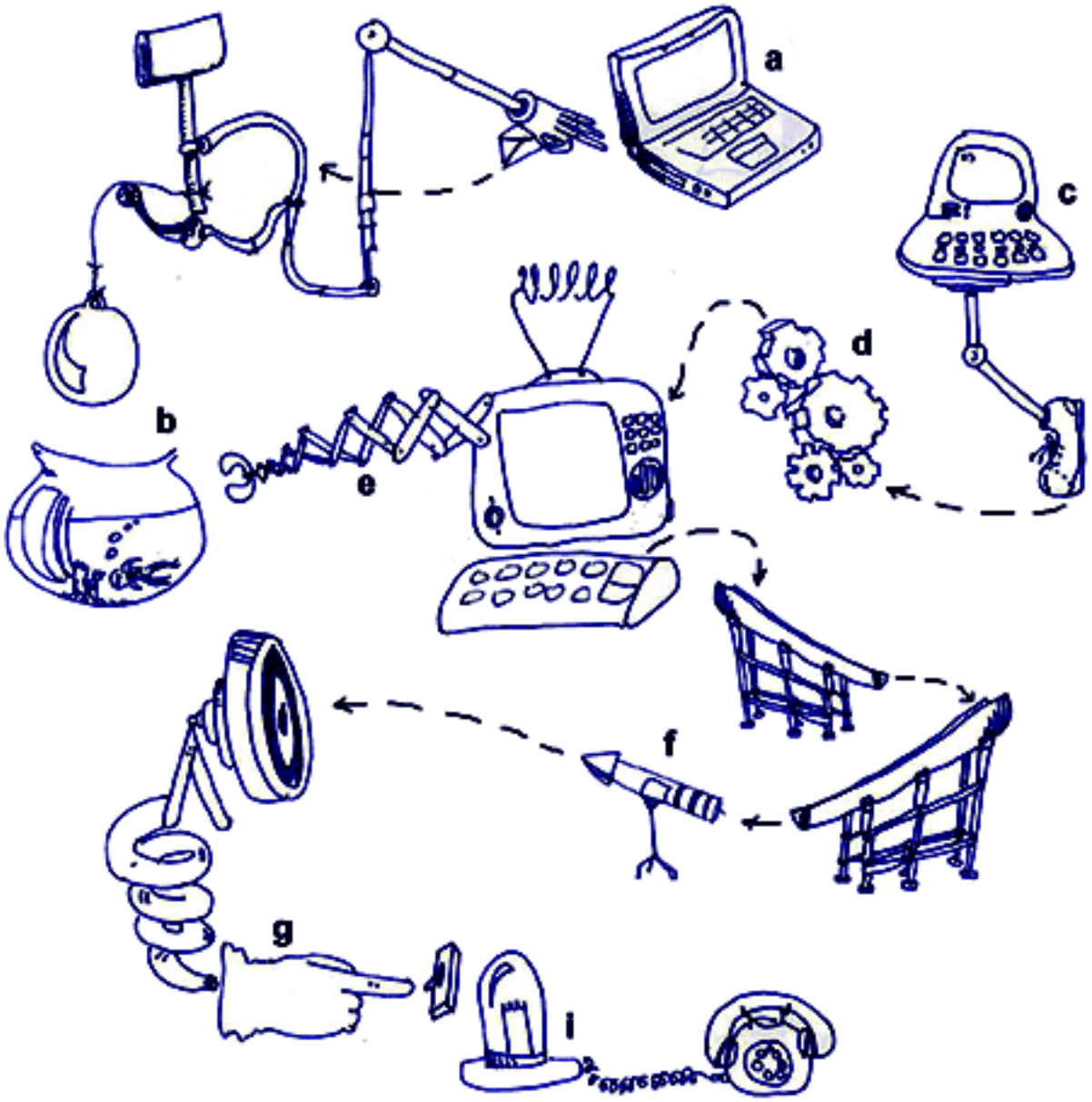
A5 - FSMs

- Call States
  - Init
  - Blacklist
  - Redirect
  - Cancelled
- Many many many FSMs
  - auto_attendant
  - bridge
  - check_voicemail
  - conference
  - default_phone
  - dial_transfer



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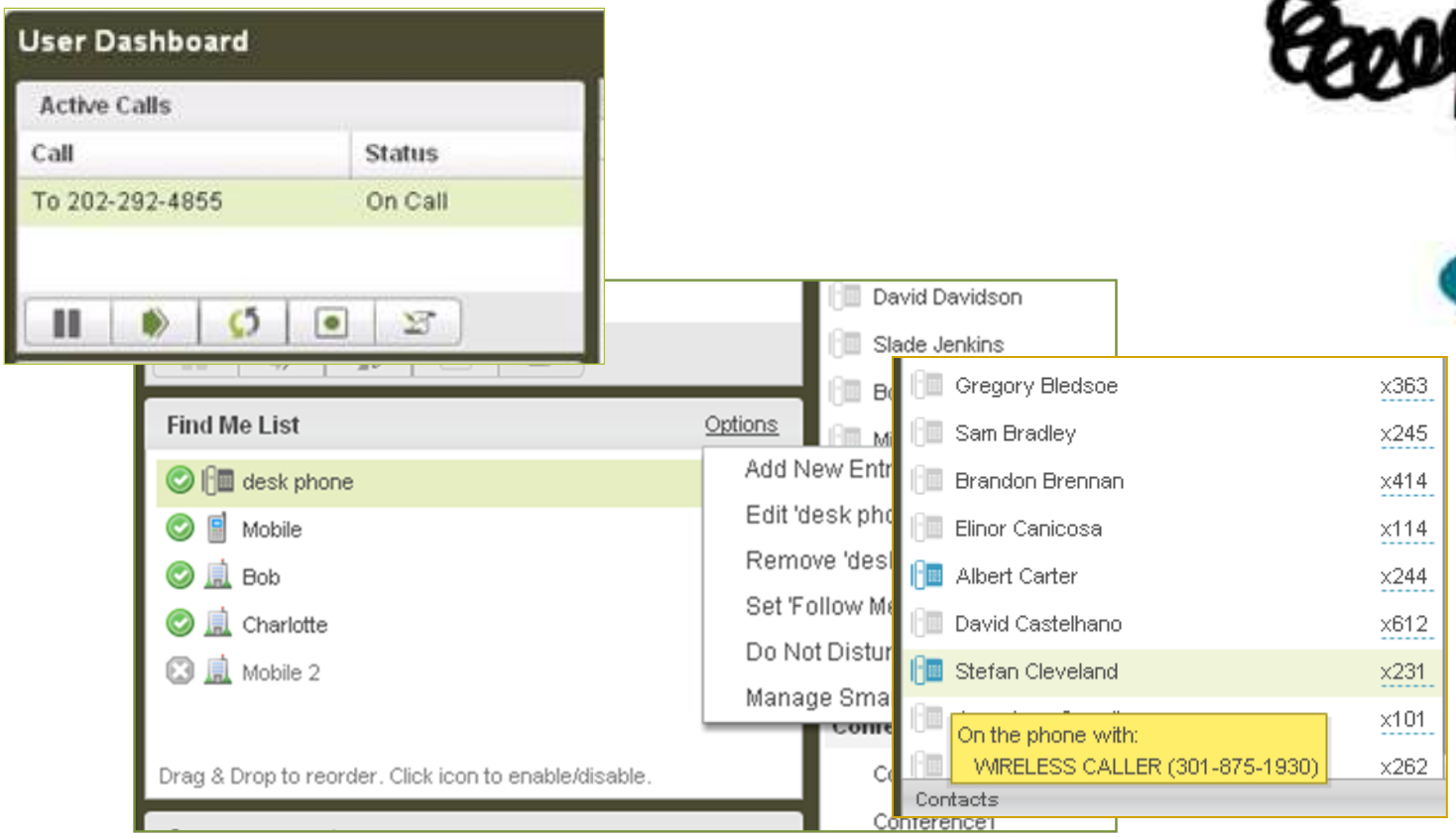
A5 – Event Handlers

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



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A5 - Persistence

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

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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
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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 ??

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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!

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Lessons learned – Memory

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

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Lessons learned – Timeouts

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

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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

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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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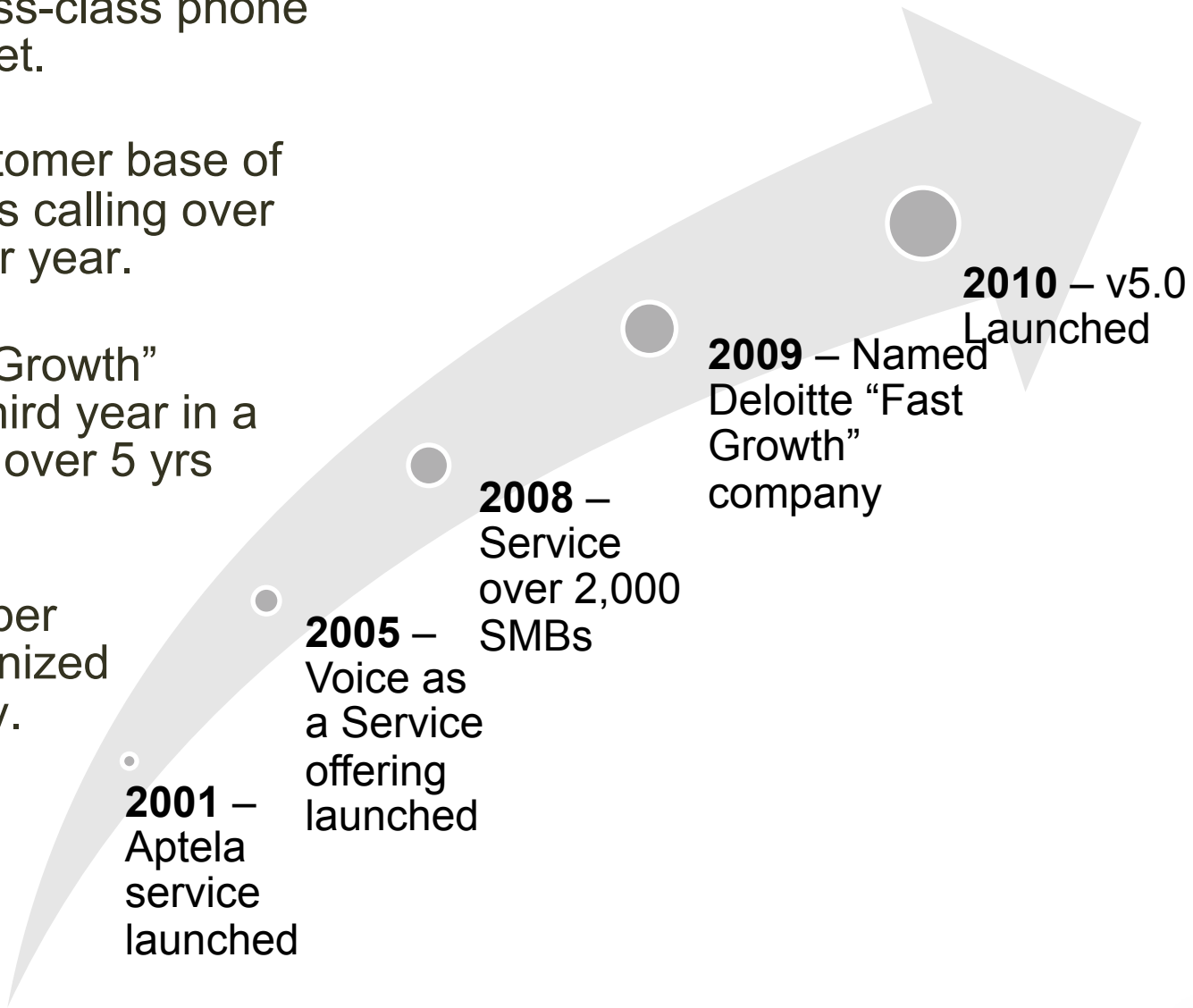

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