Living on the Bleeding Edge In The Financial Industry

Using Clojure, AMQP, Chef, Cucumber and JRuby in the Financial Industry

Philly Emerging Technologies for the Enterprise, April 2010

Algorithmics, Inc.

Risk Management

Collateral Management

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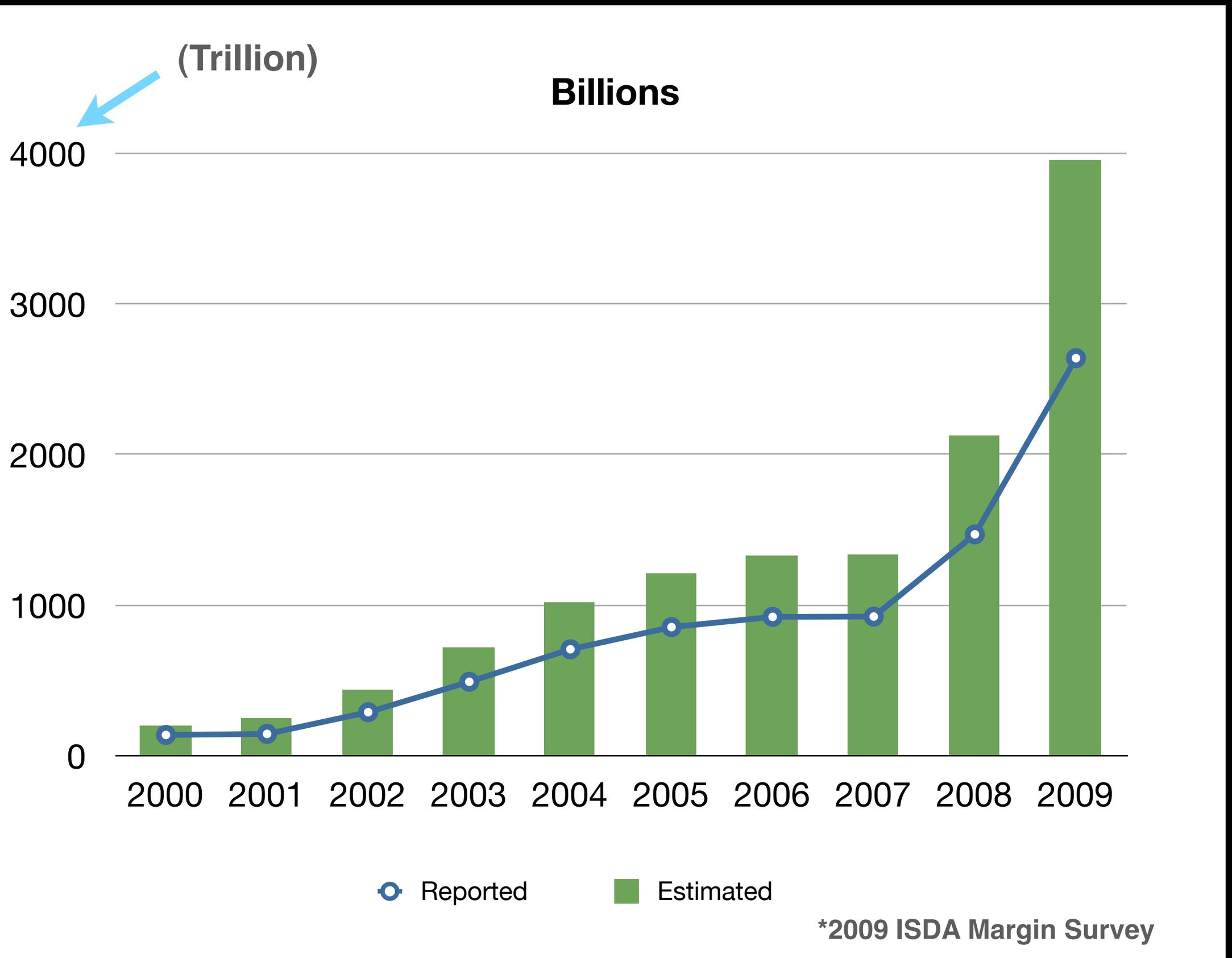
Kyle Burton

Ok, WTF is Collateral Management?

Mitigates Credit Risks for Unsecured Financial Transactions

Unsecured Financial Transactions are OTC (over the counter - there is no 'central exchange' for collateral)


(Trillion)
Billions
4000
3000
2000
1000
0
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
Reported
Estimated
*2009 ISDA Margin Survey

Collateral Management

- Today
  - Manual Processing
  - Email, Phone, Fax
- Tomorrow
  - Automated Processing
  - Secure Messaging
  - Standard Protocol

Overview

- What do we all want?
  - What Challenges Did we face
- How did we do/get it?
- What did we do?
  - What challenges did we face
- What has it done for us?

What do we Want?

- Best People
- Best Technologies
- To Create: new code, not legacy
- Interesting Problems
- Best Processes

Wednesday, April 7, 2010

“Operating System not Found”

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Challenges

- Programmers: Skeptical
- Financial Industry: Conservative
- Management: Conservative, Skeptical
- Technology Choices: Clojure, Ruby, AMQP
  - Gasp: Where do we go for developers? support?
- Competition Existed: Needed To Move Quickly

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How we did it: People

- Product Visionaries Sold Higher Ups on Idea
- Time To Market Critical

- Aaron Built a Prototype *very* Rapidly
  - All by His Lonesome
  - Demonstrated Value of Technologies

Project Given Green Light June 2009

How we did it: People

- Aaron Invested in Philly Lambda
  - Networked with Members
- Organized, Brought in Speakers
- Bought Lots of Pizza

First Two Developer Hires July 2009

Fourth Developer Hired August 2009

Fifth Developer Hired, when can you start?

How we did it: Support

- LShift: unlike many open source techs, a company sits behind RabbitMQ
- We knew RabbitMQ was great, it was built on Erlang
- Erlang devs don't grow on trees in Philly
- Contracted with LShift to extend and accelerate product roadmap

How we did it: Support

- Clojure
  - JVM Technology
    - Well Known and Supported
- JRuby
  - Also a JVM Tech
  - Rails a well known commodity

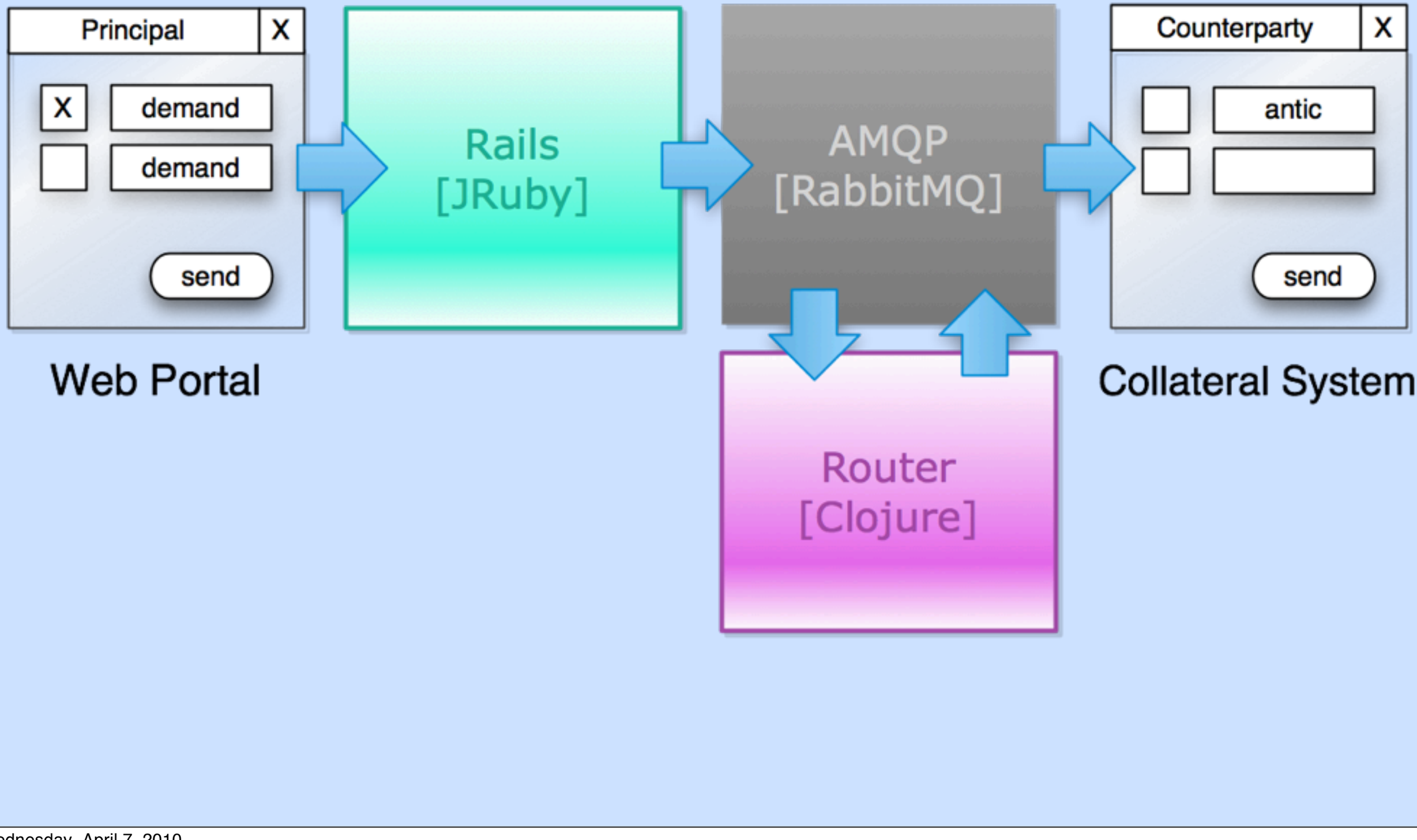
How we did it: Process

- Small Team (4 devs)
- Agile Methodology
- Pair Programming
- Continuous Improvement
- Automation

(unibomber)

"So that's what we wanted and how we got it, now Kyle's going to talk about what we did and what it did for us...."

(robot)


Principal
X
X
demand
demand
send
Rails
[JRuby]
AMQP
[RabbitMQ]
Counterparty
X
antic
send
Web Portal
Collateral System
Router
[Clojure]

What we did: Automation

- Focus on Automation
  - Frequent Releases
  - Provisioning
  - QA / Testing
  - A Mindset, Core Value of Team

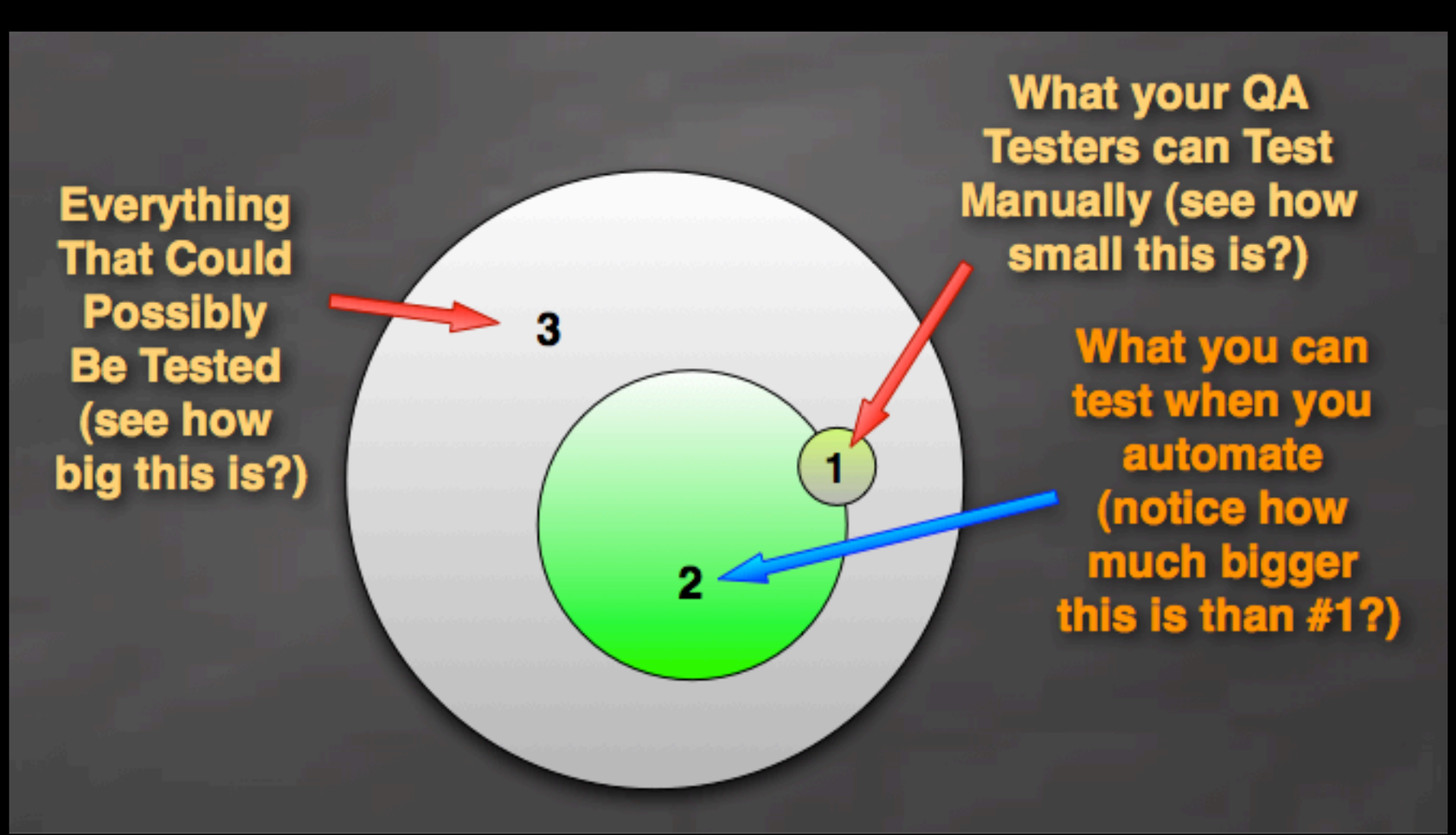
Automation: Provisioning

- Initially Scripted with Bash
- Migrated to Chef

Automation: QA / Testing

Reduced QA Resource Needs Initially (zero)
Suite Provided Regression Testing: Reduced Errors
Sped Up Development

- Cucumber
- RSpec



Testing: Cucumber

Default

```
1  Feature: Send Margin Calls
2    In order to request money
3    As an analyst
4    I want to be able to send a margin call demand request
5
6    Background:
7      Given I reset the data
8      And I am logged in as "guest"
9      And I am on the margin calls page
10     And I am on the "Unsent" tab
11
12   Scenario: Login and see margin call
13     Then "Guestbank vs Algobank" should be visible
14     And "Send Calls" should be visible
15
16   Scenario: Send Margin Call Demand with status
17     When I check the checkbox to the left of "Guestbank vs Algobank"
18     And I click "Send Calls"
19     Then "No records found" should be visible
20     When I go to the "Awaiting Demand Response" tab
21     Then "Guestbank vs Algobank" should be visible
22     And "sent" should be visible
23
                                                    1,1           Top
```

Testing: RSpec

Default

```
 3 describe DemandMarginCall do
 4   describe "An unsent MarginCall" do
 5     before do
 6       @margin_call = DemandMarginCall.new(valid_demand_margin_call_attri
 7     end
 8
 9     it "should be unsent" do
10       @margin_call.should be_unsent
11     end
12
13     it "should require a call amount" do
14       @margin_call.call_amount = nil
15       @margin_call.should_not be_valid
16     end
17
18     it "should require a numeric call amount" do
19       @margin_call.call_amount = "abcd"
20       @margin_call.should_not be_valid
21     end
22
23     it "should set message thread uid after create" do
24       @margin_call.message_thread_uid = nil
25       @margin_call.save
                                                  22,0-1          0%
```

What we did: Agile Process

- Pair Programming
  - Continuous Code Review
  - Skill Transfer Happens Quickly
  - Bus Factor == Team Size
  - Lost one of our best members in Feb: OMM*

* OMM: Oh! My!....meh.

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What we did: JRuby

- Web Portal for the low end of the market
  - Ruby on Rails (JRuby), jQuery, YUI
  - Lots of Plugins, Gems, Libraries
  - Avoided many CSS and JS issues by incorporating js-lint and the w3-css-validator into our build process

What we did: Clojure

- Immutability Strongly Encouraged
  - reduction of bugs caused by common errors
- FP: lots of small re-useable pieces, adapt quickly to changes
- JVM: It's the libraries!
- Concurrency is fantastically easy
- Live Image: easier introspection into running system (and sometimes modifications)

What it did for us: AMQP

- Lucky Accident
  - JPMorgan, iMatrix, 2004~2006
- Standards based Messaging (woot!)
- Platform and Language Neural
- Many (independent) Broker and Client Library Implementations

So, What Has all this Done For us?

Demo Time

- First Public Demo: Oct 2009, NYC
- Live Demo of Full End to End Stack for Many Wall St Banks and the FED

Automated Provisioning

- 2 Days Prior: Our Provider Experiences *Major* Network and System Issues
- 9am: Decision Made to procure alternate hosting
- 1pm: Full Stack Installed and Tested

NOT LOC Metrics Again!

- Widely Believed that LOC/Dev is Roughly Constant
- Two Devs of Equal Skill/Experience, the one using a higher level language will be more productive
- See also: Mythical Man Month

NOT LOC Metrics Again!

- sloccount
- For the first 9mo of the project:
  - 24kloc, 687loc per dev per month
  - 5.81 developer years
  - Our People, Tools & Process put us roughly 45% ahead of that estimate

So, uh,
Everything is great
right?

Agile: Hiring is Hard

- Pair Programming *very difficult* environment, not for everyone
- Scaling the team is hard
- Personality and fit is vital (and frequently not good)

Iterative Process

- You take on technical debt!
- (this is ok, because...)
- You admit it and evolve your architecture
- This is very uncomfortable to many
- Makes it harder to plan
  - (a fallacy: can you really predict the future?)

Functional Programming

- Clojure is new, it's changing
- FP is not mainstream
- Experienced Resources are Uncommon

Conclusion

- You can leverage these technologies
- Focus on Skill Transfer
- Focus on Delivering Business Value

Questions?

Thank you!

- All of you for listening to us!
- Chariot Solutions for inviting us

- Bonnie Aumann, Trotter Cashion, David Kerkeslager for reviewing the presentation

Picture Credits

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