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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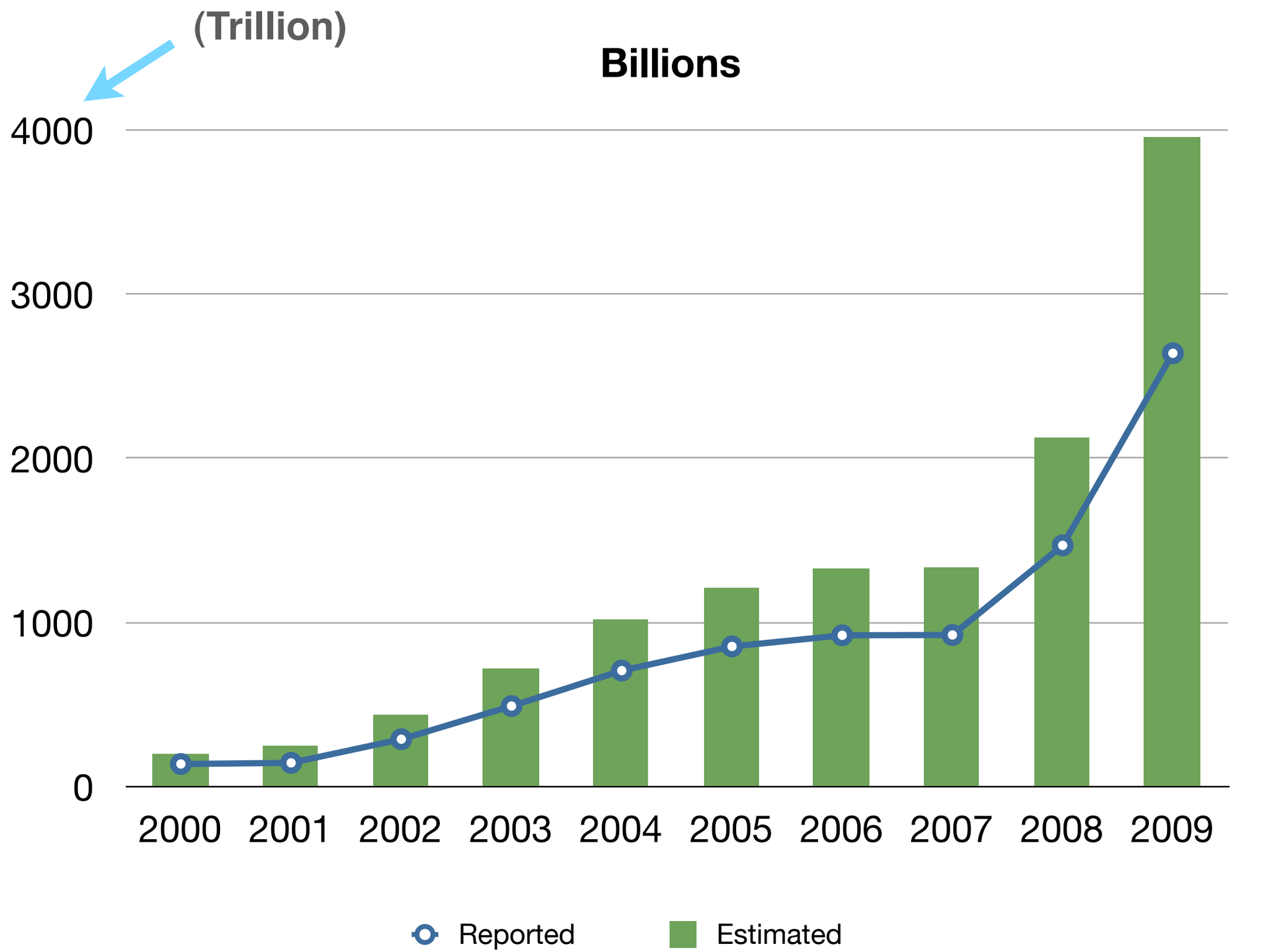
Ok, WTF is Collateral Management?

Reduces Credit Risks for
Unsecured Financial Transactions

Credit Risk == Debtor Fails to Pay

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



*2009 ISDA Margin Survey

Collateral Management

- Today
  - Manual Processing
  - Email, Phone, Fax

- Tomorrow
  - Automated Processing
  - Secure Messaging
  - Formalized Workflow
  - 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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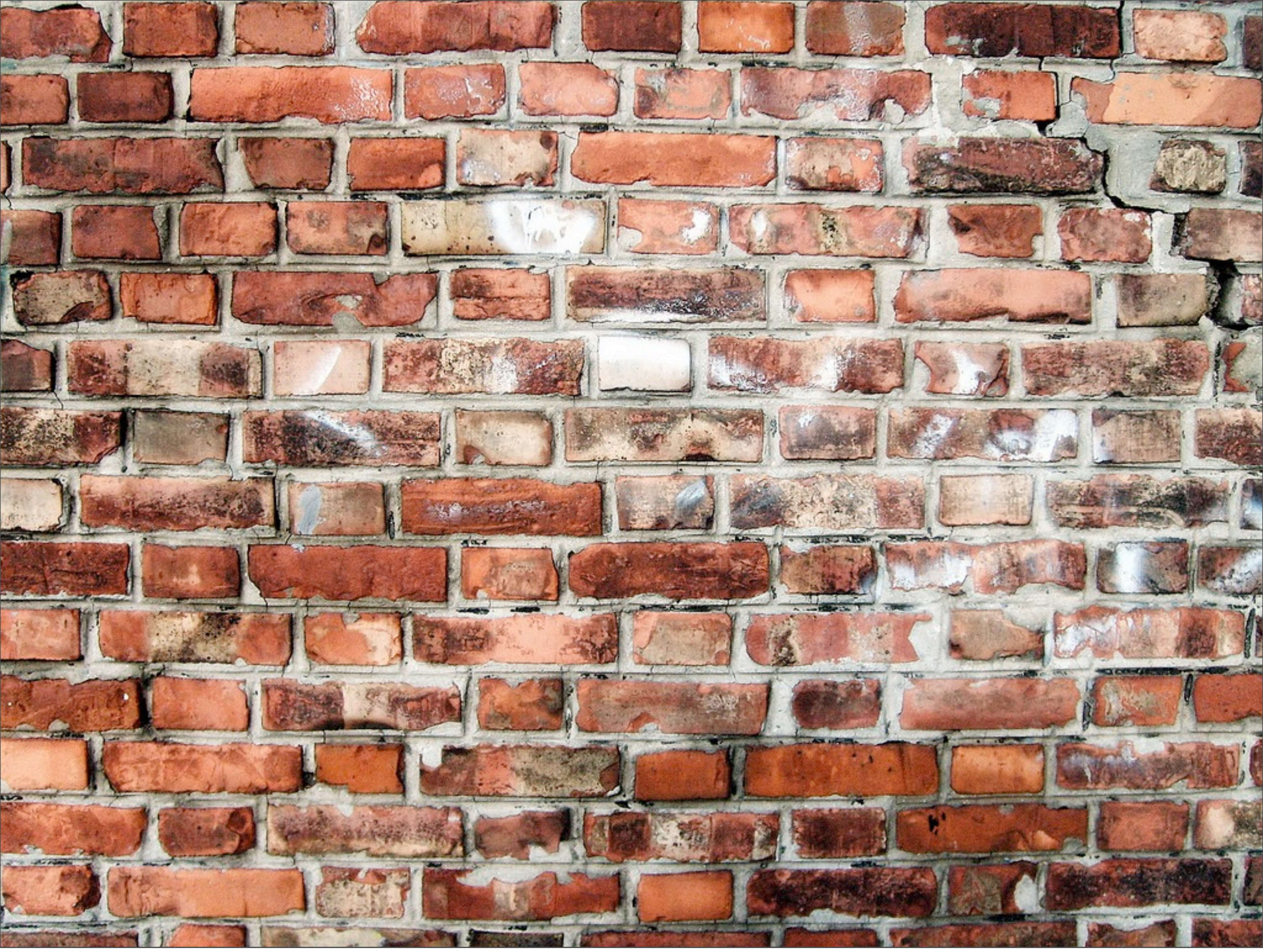


Monday, March 15, 2010

Challenges

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

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

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: Process

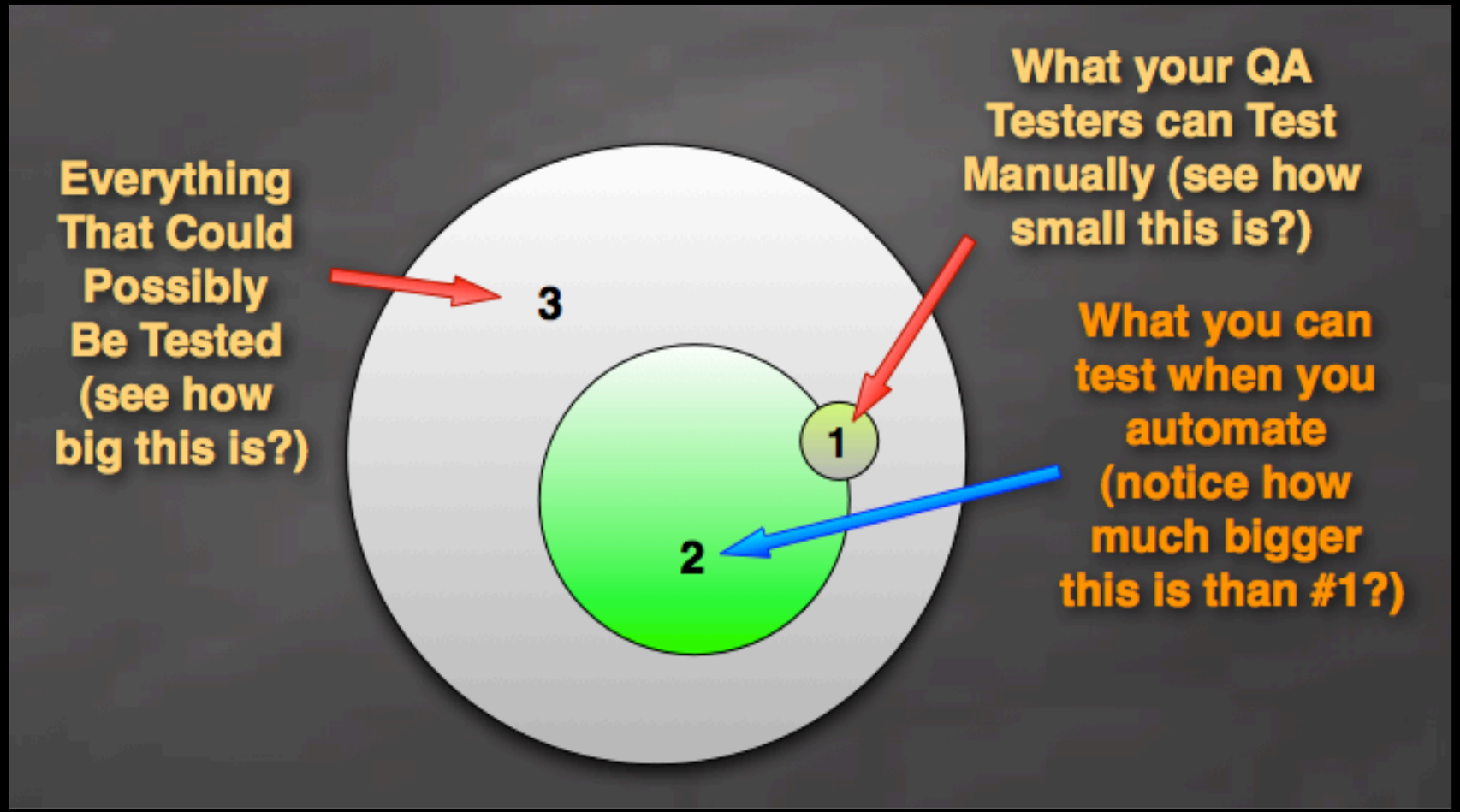
- Small Team
- Agile Methodology
- Pair Programming
- Continuous Improvement
- Automation

What we did: Small Team

- Focus on Automation
  - Frequent Releases
  - Chef for Provisioning
  - Cucumber for Acceptance Tests
  - Lots of Other Tools / Automations
    - A Mindset, Core Value of Team

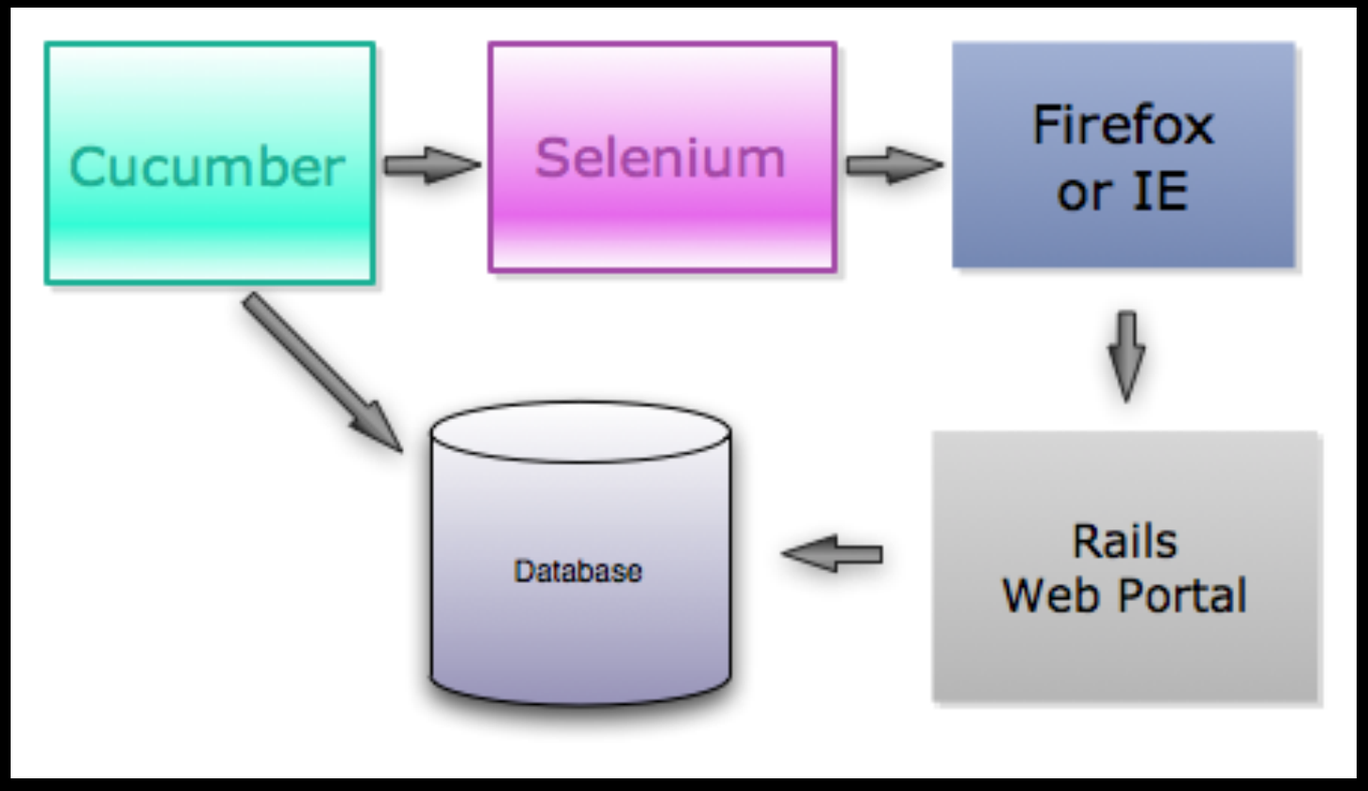
Focus On Automation: QA

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



Focus On Testing: TDD

Core Value: Test Driven Development
- Cucumber: Front End Integration Testing
- Rspec: Behavior Driven Unit Testing



Testing: BDD With 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: BDD With 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: Small Team

- 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.

What we did: Web

- Web Portal for the low end of the market
  - Ruby on Rails (JRuby), jQuery, YUI
  - Lots of Plugins, Gems, Libraries
  - Cucumber for automated testing
  - Avoided many CSS and JS issues by using js-lint and the w3-css-validator

What we did: Clojure

- Immutability by default => 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 has it done for us?

- Automated Testing and why it is win
- Automated Provisioning and why it is win
- Functional Programming and the reduction of errors
- Tiny components and ability to quickly adapt to changes in the product

What it did for us: Testing

- Reduced QA Resource Needs
- Better Captured Business Requirements
- Effective as a Regression Suite: keeps bugs from making it into releases
- TDD Drives Design, Creates Asset (regression suite)

What it did for us: Provisioning

- First Public Demo: Oct 2009, NYC
- Live Demo of Full End to End Stack for Many Wall St Banks and the FED
- 2 Days Prior: Our Provider Experiences *Major* Network and System Issues

What it did for us: Provisioning

- 9am: Decision Made to procure alternate hosting
- 1pm: Full Stack Installed and Tested
- Demo: Success

What it did for us: FP

- YMMV, but our belief is...
  - Immutable by Default eliminated several categories of bugs
  - Encouraged Smaller Re-useable and composeable parts, lead to faster adaptation to changes in requirements
  - Eased Concurrency Issues

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

Conclusion

- We Came
- We ‘re Learning
- We ‘re Succeeding
- We ‘re hiring