Continuous Integration Best Practices in Agile Environments

Ben Reich @ AgileSparks

Who Am I?

years leadership experience in software development & startup operations with Gantt charts

7 Years of searching and finding ways to improve life quality, predictability and efficiency

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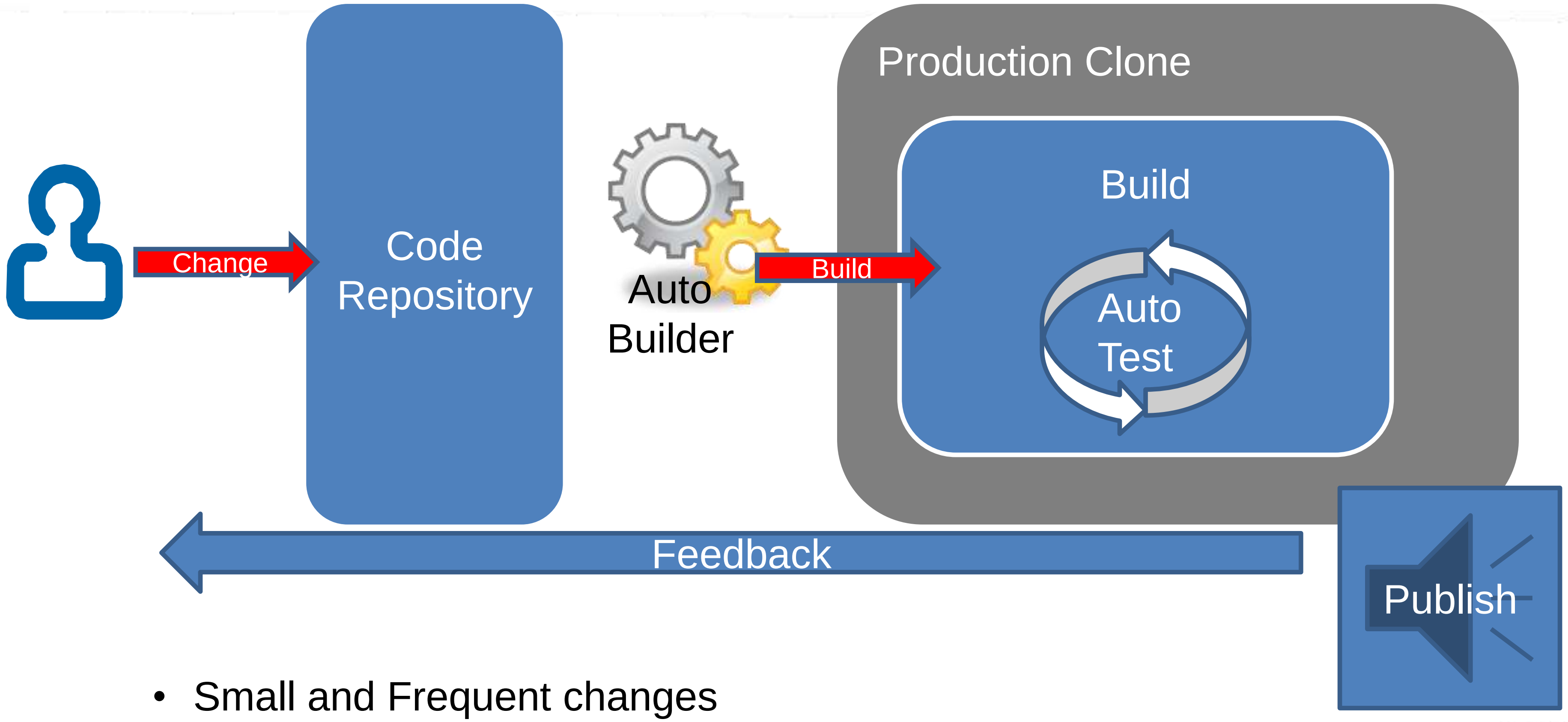
What is this about?

Ideas and best practices on implementing continuous integration in an agile way

Continuous Integration 101



- Small and Frequent changes
- Fast and immediate build
- Immediate feedback

So, why is it Agile?

Small Iterations

Rapid Delivery

Continuous Integration

Encourage Cooperation

Working Software

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BUT: IS A BUNCH OF PROGRAMMERS CONSTANTLY MIXING SOME CODE TOGETHER REALLY GETTING US WHERE WE WANT TO BE?

The Challenges of CI

- Distance from the end user
- Automatic tests are difficult
- Large and complex products
- Diverse organization
- Insufficient review
- Inter-team synchronization issues

You know its becoming irrelevant if:

Nobody is consuming it and people are waiting for your “real release”

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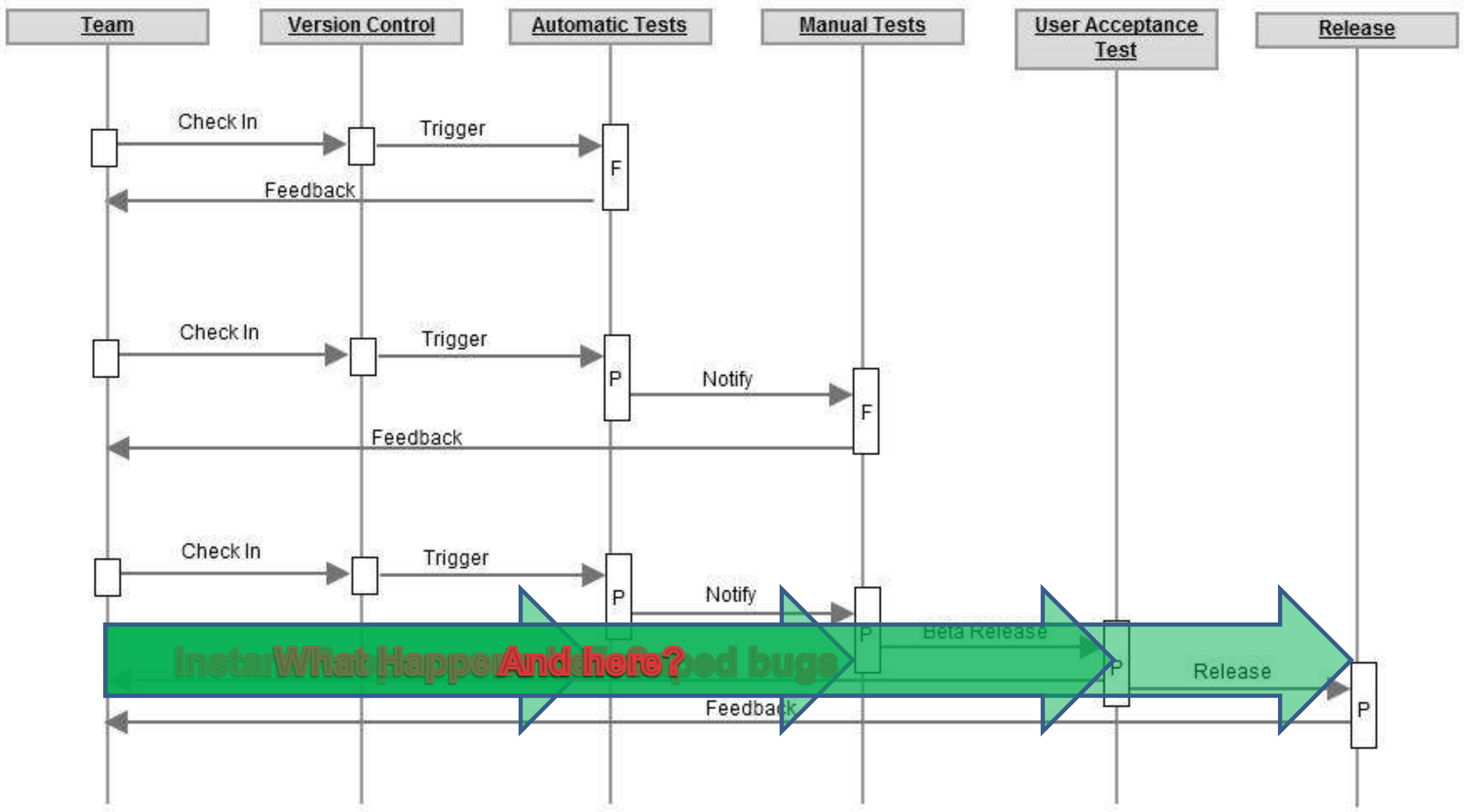
Simple Value Stream

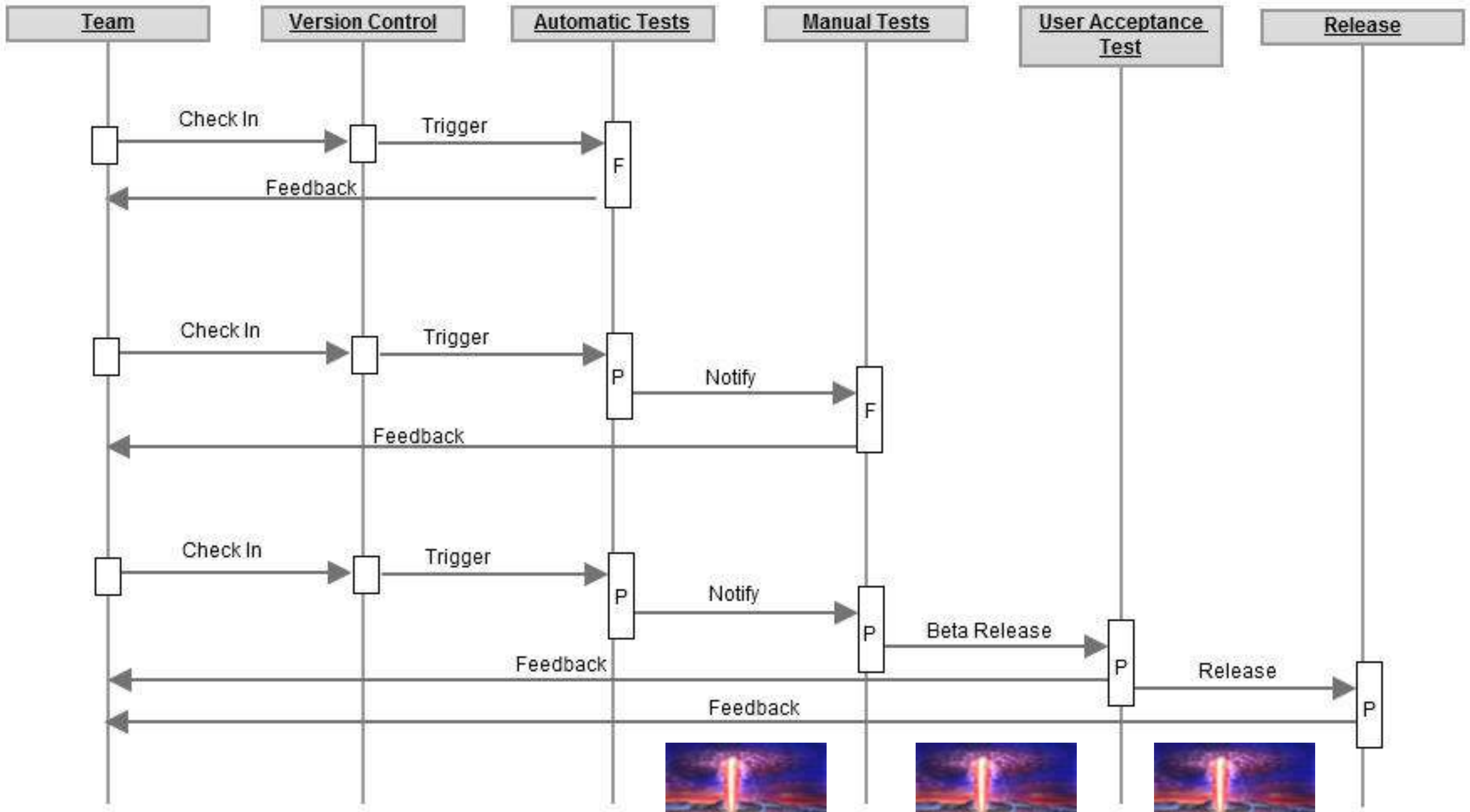


Best
Practice

Holy Place" Culture - Done means Released

- Identify the "holy place"
  - Designated delivery target
  - Always up and running
  - As Releasable as possible
  - Replica of Production
  - Demo-able and accessible
- Identify the Stakeholder
  - Represents the customer
  - Is motivated to succeed
  - Can deliver UAT
  - Has the bandwidth to review

Simple Value Stream

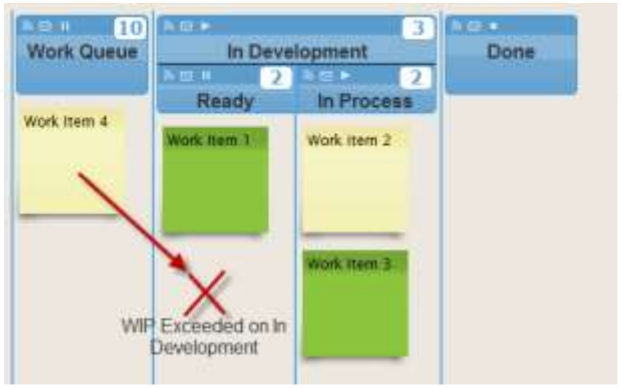


Put it where its accessible, demoable, won't break but will be updated regularly in days

The Delivery Gap

- Manual testing takes longer and there is no synchronization
- Developers need to program before testers need to test
- Large projects need constant integration testing
- Too many changes can disrupt the flow

Ingredients to Fill the Gap



WIP Limits

Time Box

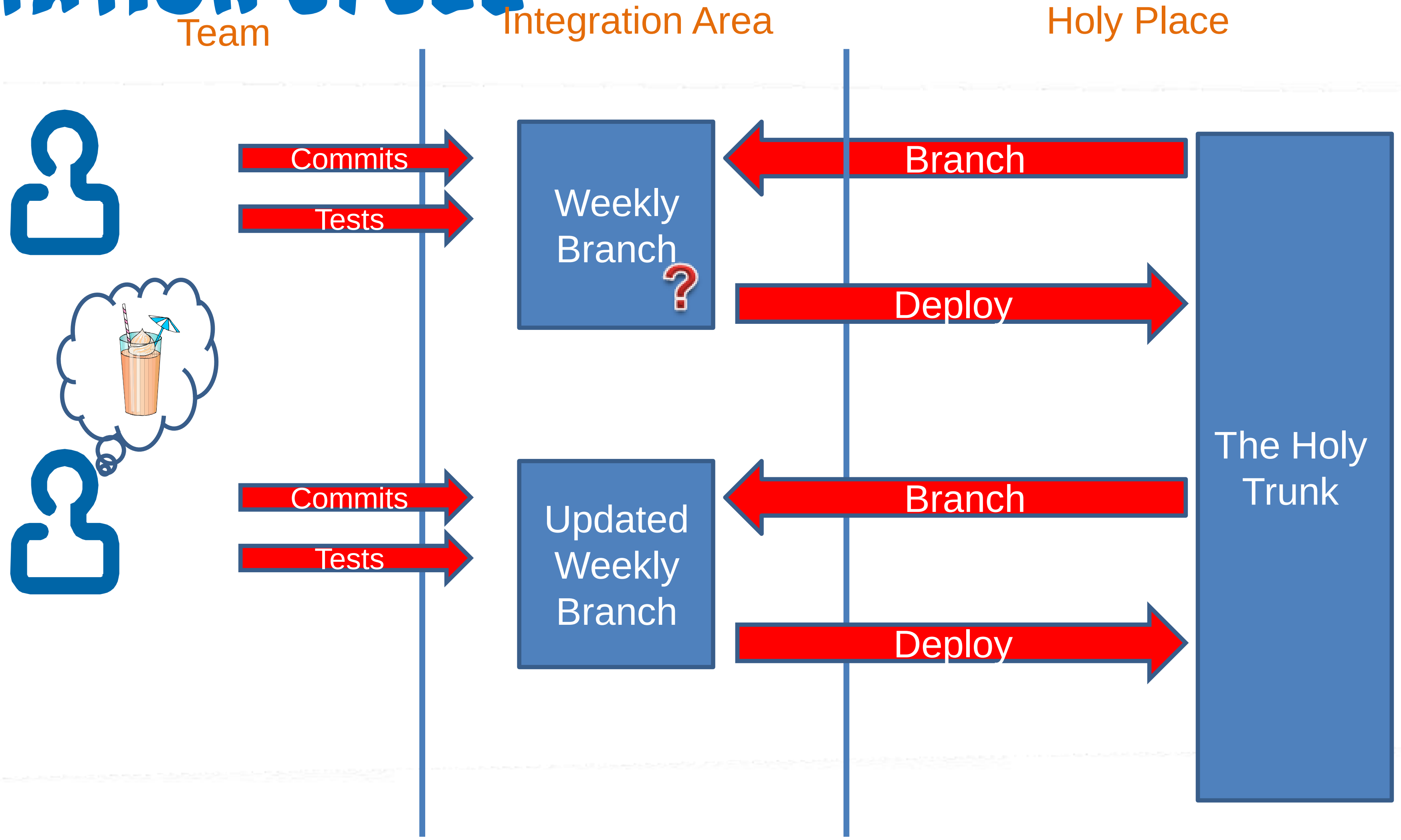
Agile Communication

Case Study – The Demo Cycle

- 8 man team
- 1 month sprint
- 1 week demo cycle
- 1 week deployment cycle
- Typically 2-4 user stories deployed per week

Day 1	Day 2	Day 3	Day 4	Day 5
Coordinate Commit Test	Commit Test	Commit Test	Commit Test Evaluate Freeze	Demo Decide Deploy

The Continuous Delivery Train Station Cycle



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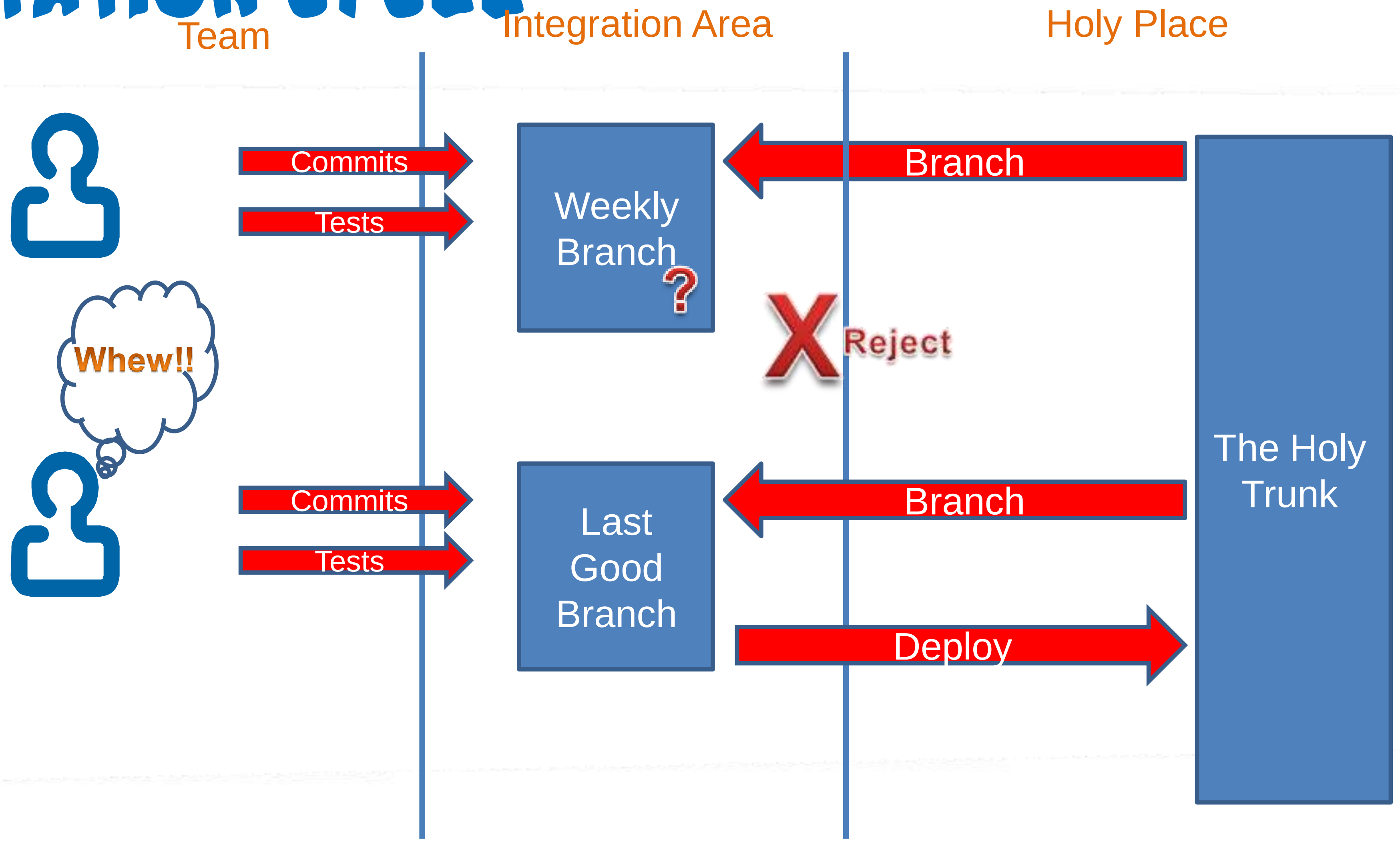
The Continuous Delivery Train Station Cycle



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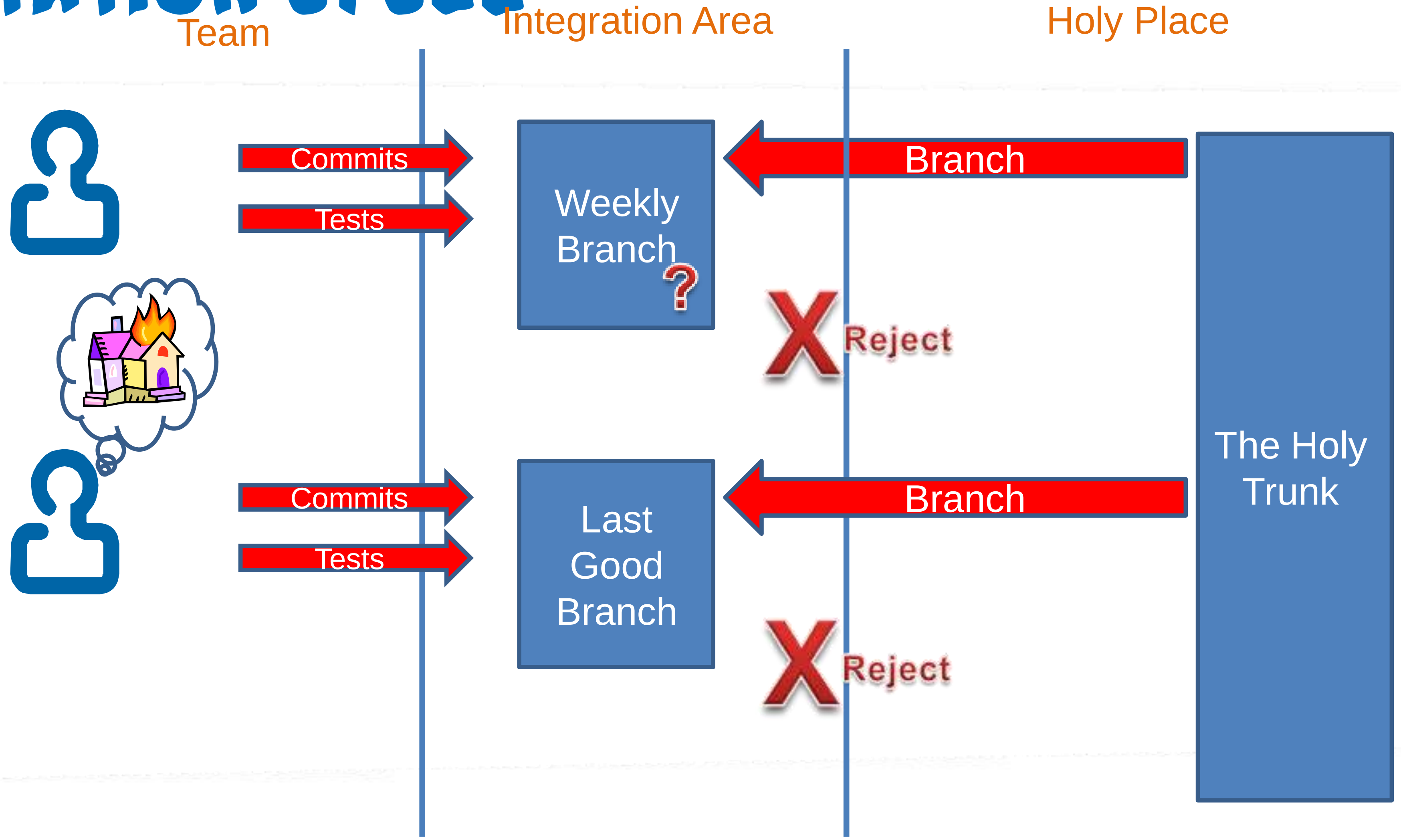
The Continuous Delivery Train Station Cycle



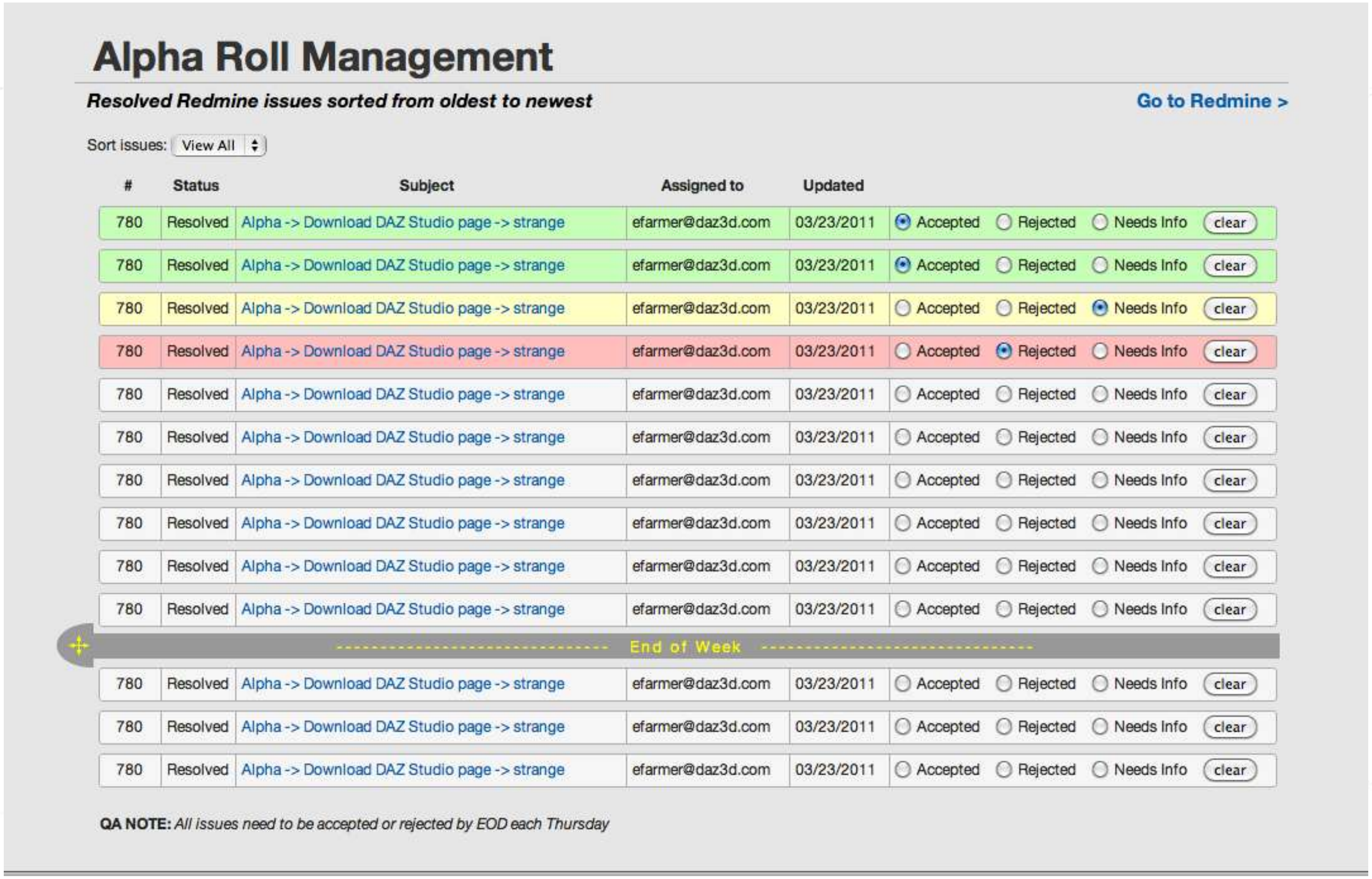
ALERT

CONDITION: RED

STOP

Swarm!!

Electronic WIP Dashboard



Alpha Roll Management

Resolved Redmine issues sorted from oldest to newest

Go to Redmine >

Sort issues: View All

#	Status	Subject	Assigned to	Updated				
780	Resolved	Alpha -> Download DAZ Studio page -> strange	efarmer@daz3d.com	03/23/2011	[✓ Accepted]	Rejected	Needs Info	clear
780	Resolved	Alpha -> Download DAZ Studio page -> strange	efarmer@daz3d.com	03/23/2011	[✓ Accepted]	Rejected	Needs Info	clear
780	Resolved	Alpha -> Download DAZ Studio page -> strange	efarmer@daz3d.com	03/23/2011	Accepted	Rejected	[✓ Needs Info]	clear
780	Resolved	Alpha -> Download DAZ Studio page -> strange	efarmer@daz3d.com	03/23/2011	Accepted	[✓ Rejected]	Needs Info	clear
780	Resolved	Alpha -> Download DAZ Studio page -> strange	efarmer@daz3d.com	03/23/2011	Accepted	Rejected	Needs Info	clear
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780	Resolved	Alpha -> Download DAZ Studio page -> strange	efarmer@daz3d.com	03/23/2011	Accepted	Rejected	Needs Info	clear
		---------------------------- End of Week ----------------------------						
780	Resolved	Alpha -> Download DAZ Studio page -> strange	efarmer@daz3d.com	03/23/2011	Accepted	Rejected	Needs Info	clear
780	Resolved	Alpha -> Download DAZ Studio page -> strange	efarmer@daz3d.com	03/23/2011	Accepted	Rejected	Needs Info	clear
780	Resolved	Alpha -> Download DAZ Studio page -> strange	efarmer@daz3d.com	03/23/2011	Accepted	Rejected	Needs Info	clear

QA NOTE: *All issues need to be accepted or rejected by EOD each Thursday*

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Large Projects - Scrum of Scrum

- Frequency – 1 to 3 days
- What is discussed?
  - What has your team done since we last met?
  - What will your team do before we meet again?
  - Is anything slowing your team down or getting in their way?
  - Are you about to put something in another team’s way?
- The last two items will feature:
  - Broken APIs
  - Synchronization issues
  - Current build status
  - Story and Epic issues

Working with Large Remote Teams

Linux

jQuery

Is it Impossible?

Rails

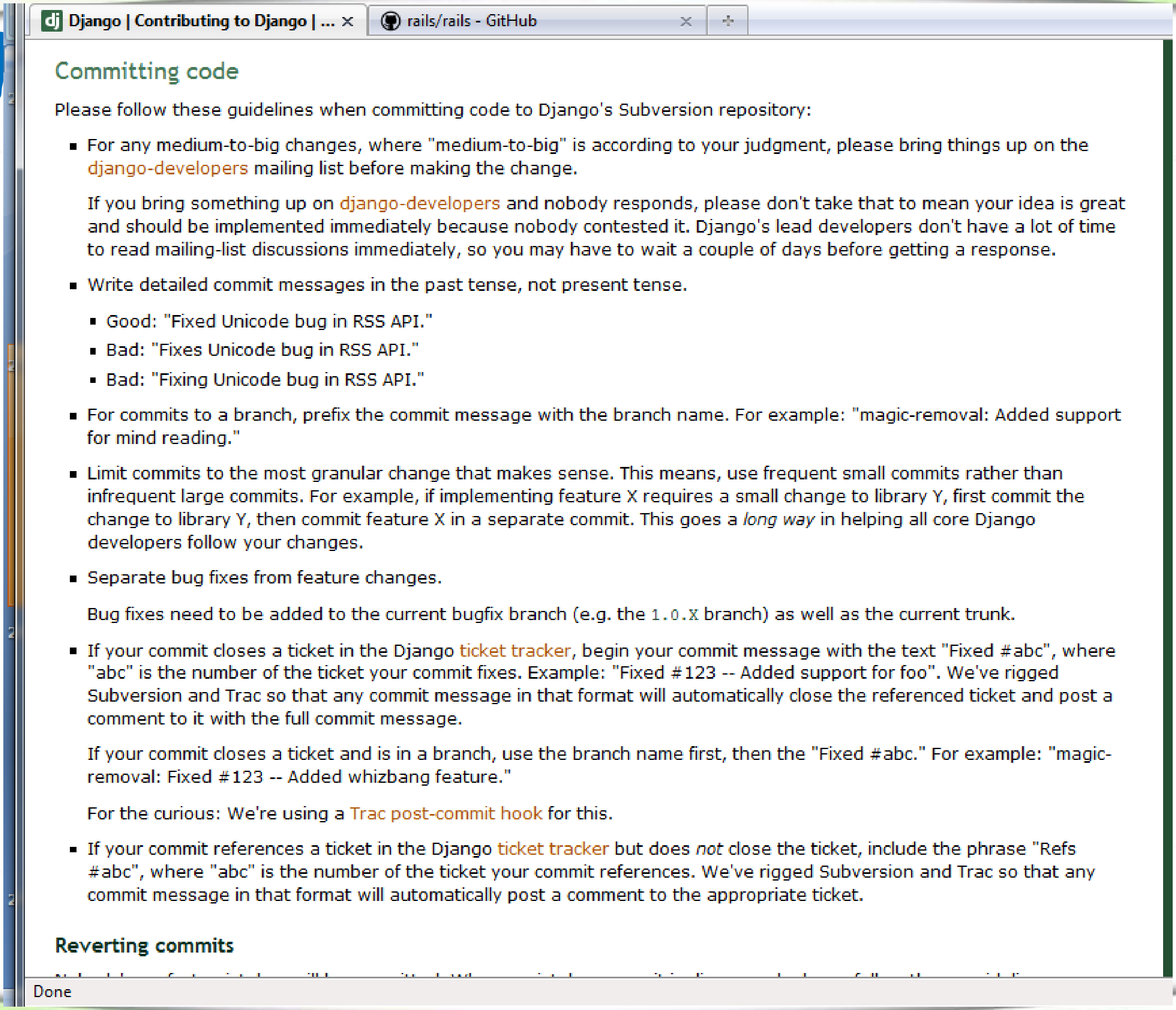
Python

Django

Learning from Open Source

- Manage by committee
- Dedicate resources to CI
- Set strict rules and enforce them
- Enforce and encourage communication
- Never go home with a broken build

Rules of Engagement - Exa



Committing code

Please follow these guidelines when committing code to Django's Subversion repository:

- For any medium-to-big changes, where "medium-to-big" is according to your judgment, please bring things up on the django-developers mailing list before making the change.

  If you bring something up on django-developers and nobody responds, please don't take that to mean your idea is great and should be implemented immediately because nobody contested it. Django's lead developers don't have a lot of time to read mailing-list discussions immediately, so you may have to wait a couple of days before getting a response.

- Write detailed commit messages in the past tense, not present tense.
  - Good: "Fixed Unicode bug in RSS API."
  - Bad: "Fixes Unicode bug in RSS API."
  - Bad: "Fixing Unicode bug in RSS API."
- For commits to a branch, prefix the commit message with the branch name. For example: "magic-removal: Added support for mind reading."
- Limit commits to the most granular change that makes sense. This means, use frequent small commits rather than infrequent large commits. For example, if implementing feature X requires a small change to library Y, first commit the change to library Y, then commit feature X in a separate commit. This goes a *long way* in helping all core Django developers follow your changes.
- Separate bug fixes from feature changes.

  Bug fixes need to be added to the current bugfix branch (e.g. the `1.0.X` branch) as well as the current trunk.

- If your commit closes a ticket in the Django ticket tracker, begin your commit message with the text "Fixed #abc", where "abc" is the number of the ticket your commit fixes. Example: "Fixed #123 -- Added support for foo". We've rigged Subversion and Trac so that any commit message in that format will automatically close the referenced ticket and post a comment to it with the full commit message.

  If your commit closes a ticket and is in a branch, use the branch name first, then the "Fixed #abc." For example: "magic-removal: Fixed #123 -- Added whizbang feature."

  For the curious: We're using a Trac post-commit hook for this.

- If your commit references a ticket in the Django ticket tracker but does *not* close the ticket, include the phrase "Refs #abc", where "abc" is the number of the ticket your commit references. We've rigged Subversion and Trac so that any commit message in that format will automatically post a comment to the appropriate ticket.

Reverting commits

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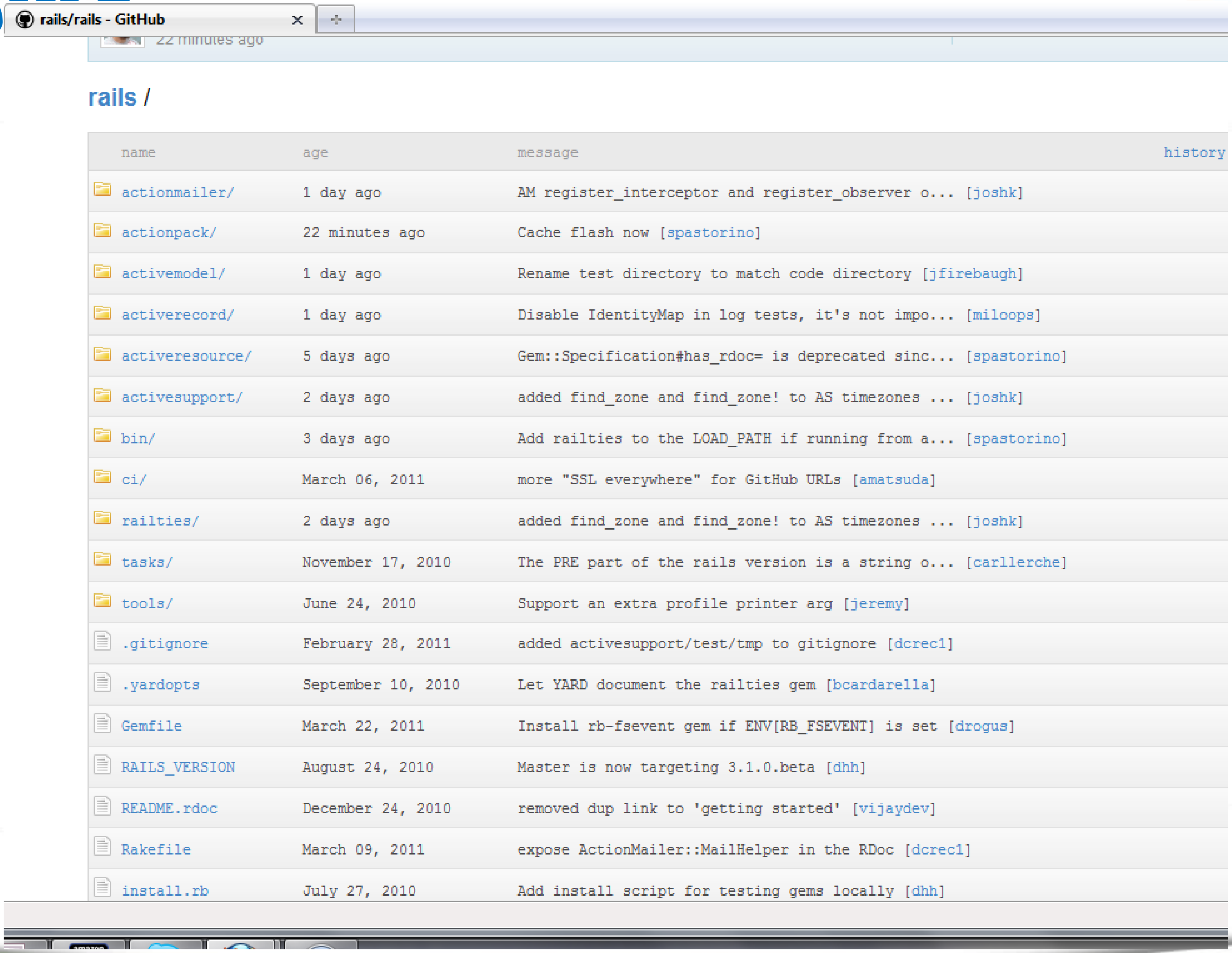
GitHub change log - Social coding



rails /

name	age	message	history
actionmailer/	1 day ago	AM register_interceptor and register_observer o... [joshk]	
actionpack/	22 minutes ago	Cache flash now [spastorino]	
activemodel/	1 day ago	Rename test directory to match code directory [jfirebaugh]	
activerecord/	1 day ago	Disable IdentityMap in log tests, it's not impo... [miloops]	
activeresource/	5 days ago	Gem::Specification#has_rdoc= is deprecated sinc... [spastorino]	
activesupport/	2 days ago	added find_zone and find_zone! to AS timezones ... [joshk]	
bin/	3 days ago	Add railties to the LOAD_PATH if running from a... [spastorino]	
ci/	March 06, 2011	more "SSL everywhere" for GitHub URLs [amatsuda]	
railties/	2 days ago	added find_zone and find_zone! to AS timezones ... [joshk]	
tasks/	November 17, 2010	The PRE part of the rails version is a string o... [carllerche]	
tools/	June 24, 2010	Support an extra profile printer arg [jeremy]	
.gitignore	February 28, 2011	added activesupport/test/tmp to gitignore [dcrec1]	
.yardopts	September 10, 2010	Let YARD document the railties gem [bcardarella]	
Gemfile	March 22, 2011	Install rb-fsevent gem if ENV[RB_FSEVENT] is set [drogus]	
RAILS_VERSION	August 24, 2010	Master is now targeting 3.1.0.beta [dhh]	
README.rdoc	December 24, 2010	removed dup link to 'getting started' [vijaydev]	
Rakefile	March 09, 2011	expose ActionMailer::MailHelper in the RDoc [dcrec1]	
install.rb	July 27, 2010	Add install script for testing gems locally [dhh]	

Source Control Management Recipes

Quiz - Which Tree Looks More Target Oriented?

Eshel

Brosh

1 trunk – No Deviations

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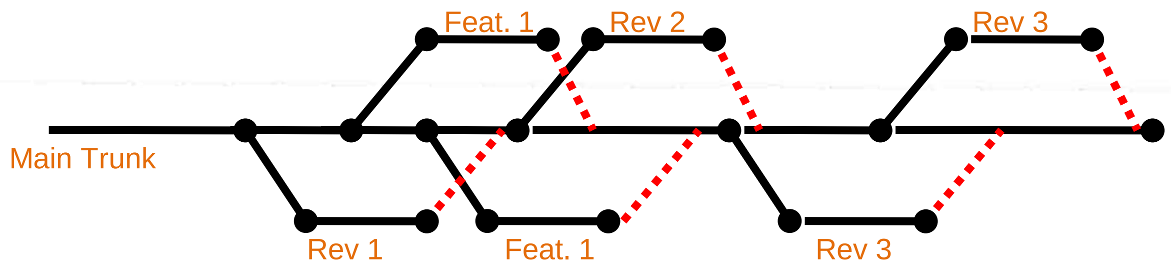
Incremental Changes



- Rule no. 1 – Do not branch for features.
- Rule no. 2 – If you breached Rule no. 1:
  - Merge quickly – Put an expiration date on branches
  - Only one level
  - Police the branches
  - Pull Trunk before merging
  - Test branches before merging

Hiding New Features

- Not usually recommended
- Better than Branching
  - Gradual integration
  - Passes some tests
  - Lower Stabilization Cost

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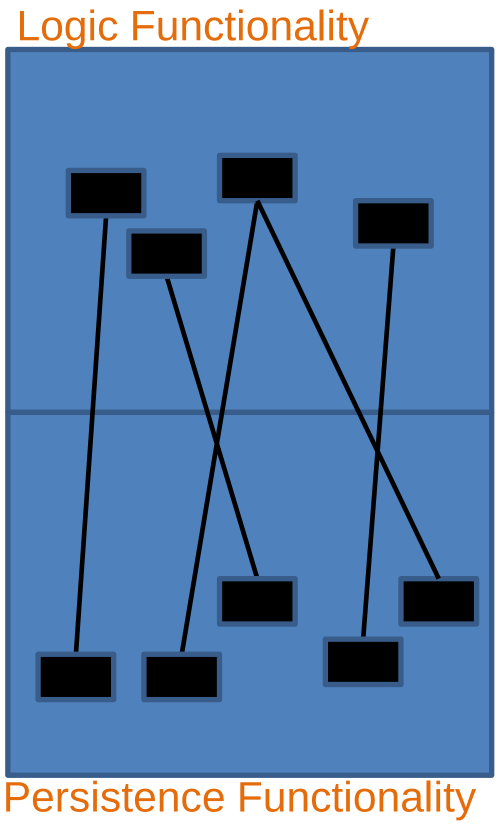
Branching by Abstraction

Spaghetti



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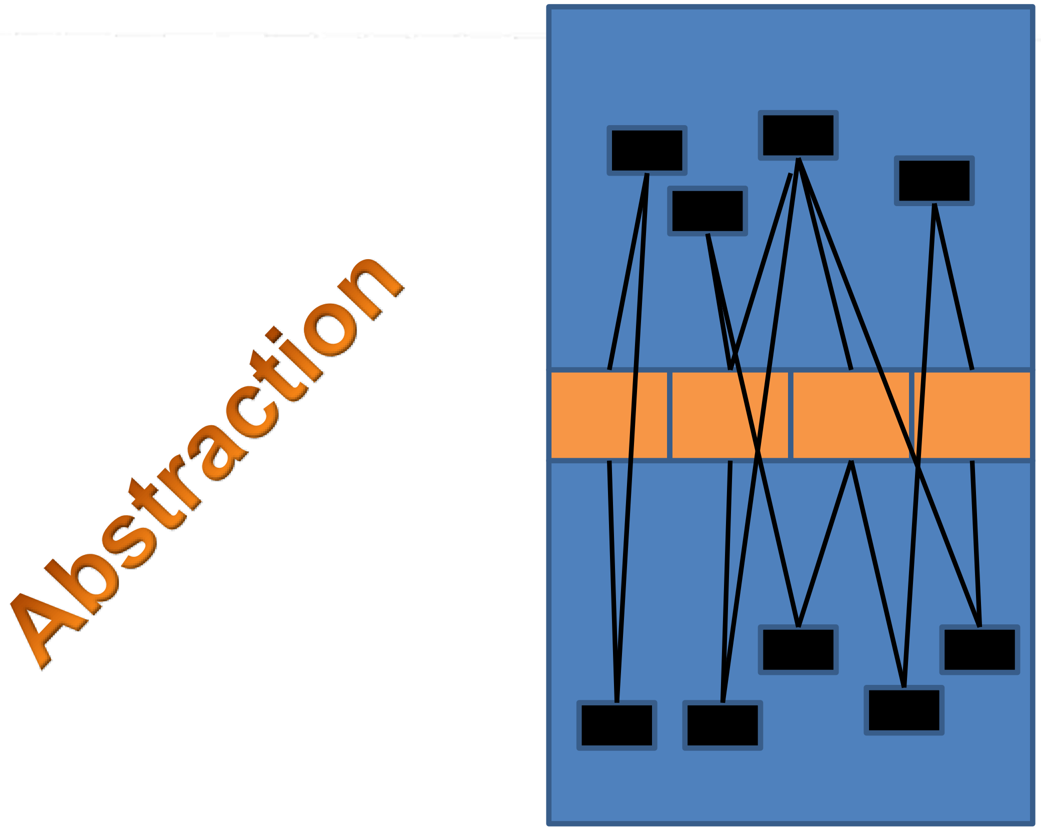
Branching by Abstraction



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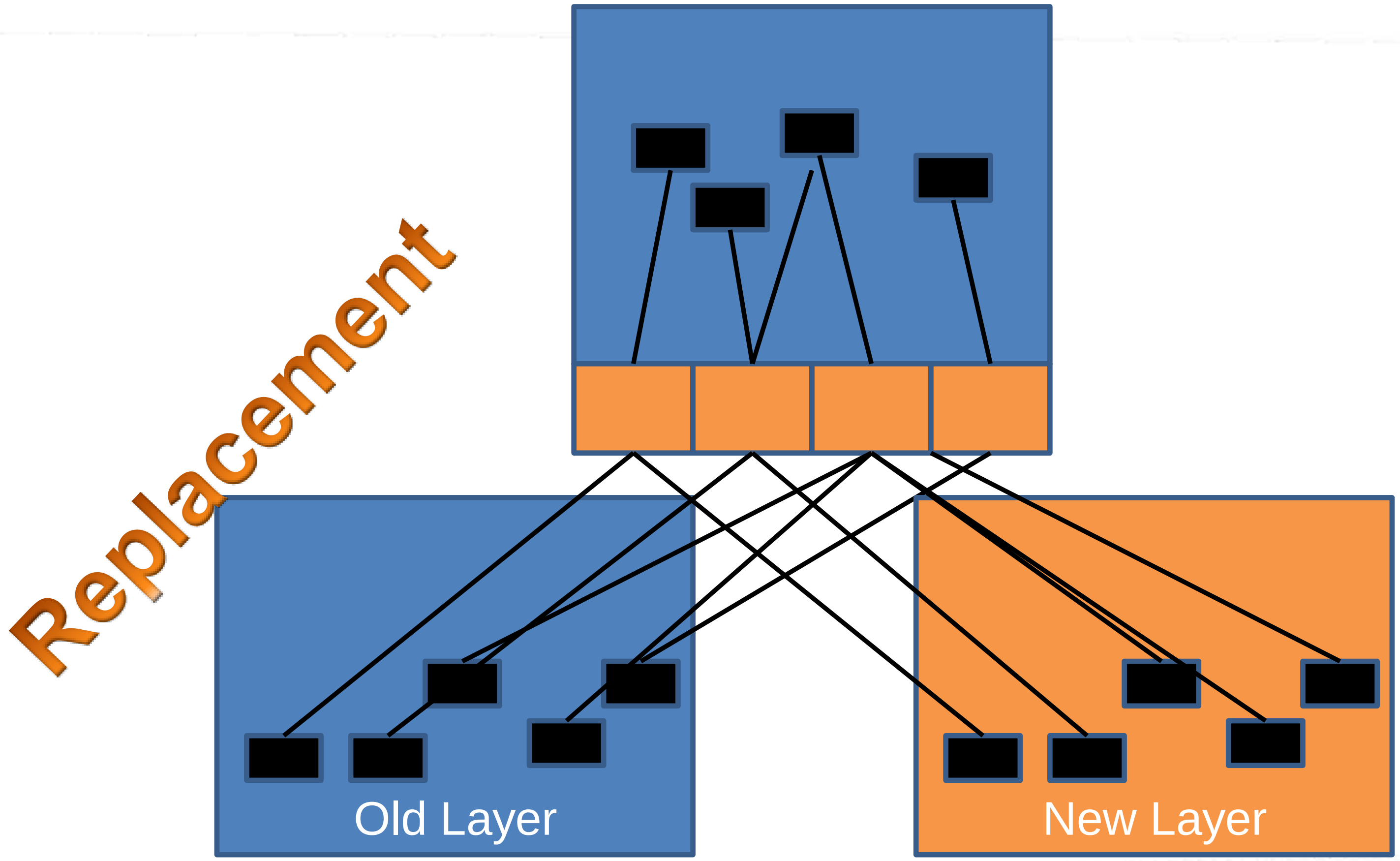

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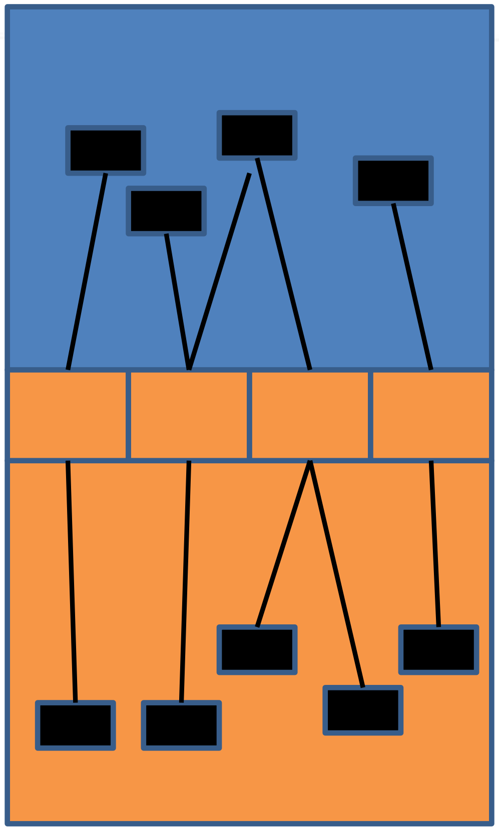
BRANCHING BY ABSTRACTION

Replacement



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Auto testing – The Key to Success

Test	Auto-mated?
Build Tests	✓
Unit Tests	✓
Functional Test	✓
Non-Functional tests	✓
Acceptance tests	✓

- Automate in order
- Automate the happy path first
- Maximize coverage with data and not complex scripting
- Look for repeating manual tests
- Spec test together with PO
- Automate when functionality is frozen

What Next?

- Visualize your value stream
- Choose tools
  - Continuous Integration
  - Auto testing
  - Deployment
- Invest in automatic testing
- Tailor fit a process to your needs

Questions?

Thank You!

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