IS4301 Agile IT with DevOps – Lecture 10

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Learning Objectives

At the end of this lecture, you will understand:

- Concepts of continuous integration
- Feature and Integration Branching
- Deployment Pipeline and Automation

Commit To Mainline

Bug fix on
Local workstation

Mainline Server

Commit To Mainline

Local workstation

Build on
Local workstation

Mainline Server

Commit To Mainline

Local workstation

Tests passed on
Local workstation

Mainline Server

Commit To Mainline

Local workstation

Tests passed on
Local workstation

Pull changes and merge

Mainline Server

Commit To Mainline

Local workstation

Tests passed on
Local workstation

Pull changes and merge

Mainline Server

Commit To Mainline

Local workstation

Tests passed on
Local workstation

Pull changes and merge

Ready to push into trunk

Mainline Server

Commit To Mainline

Local workstation

Tests passed on
Local workstation

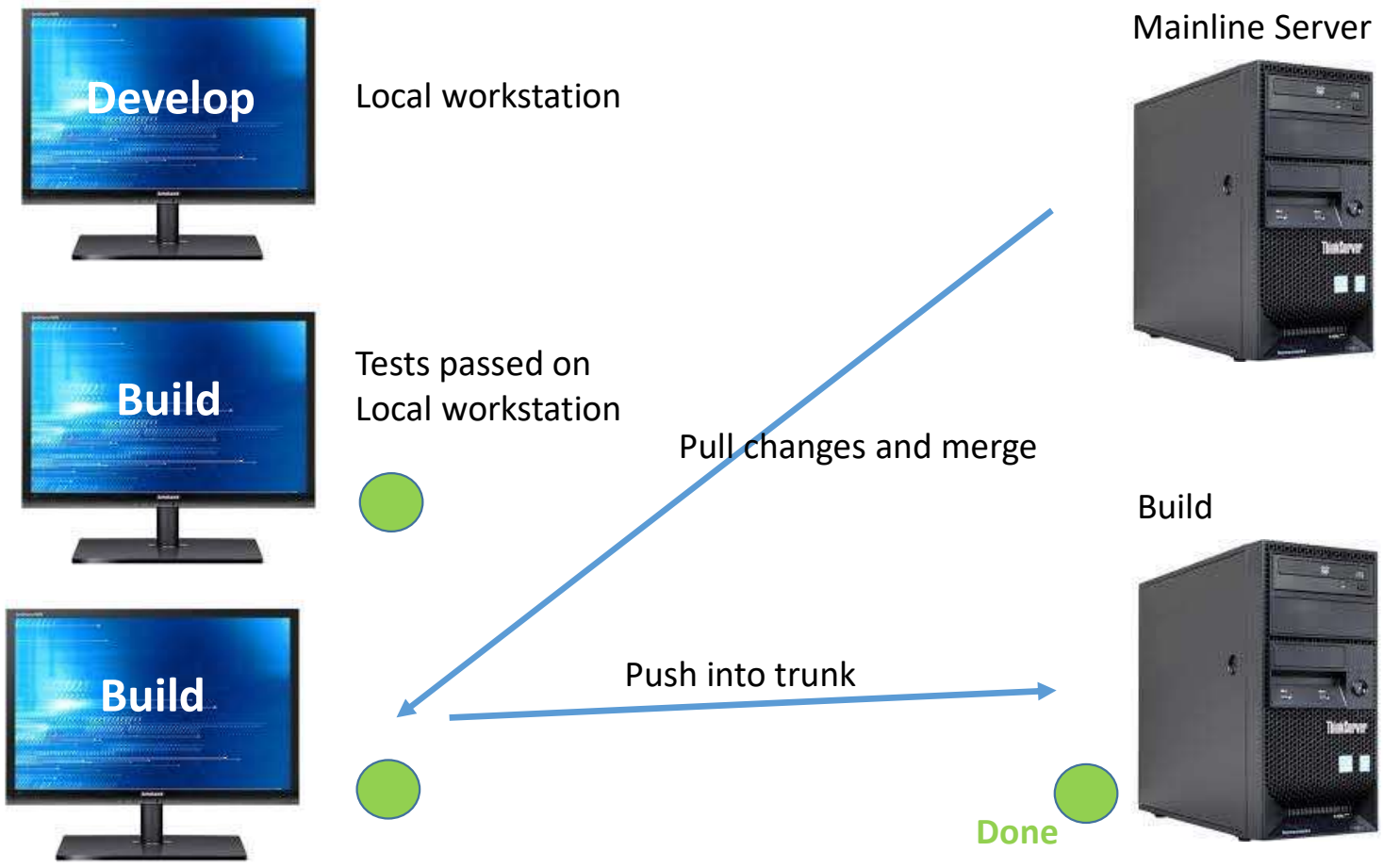
Mainline Server

Pull changes and merge

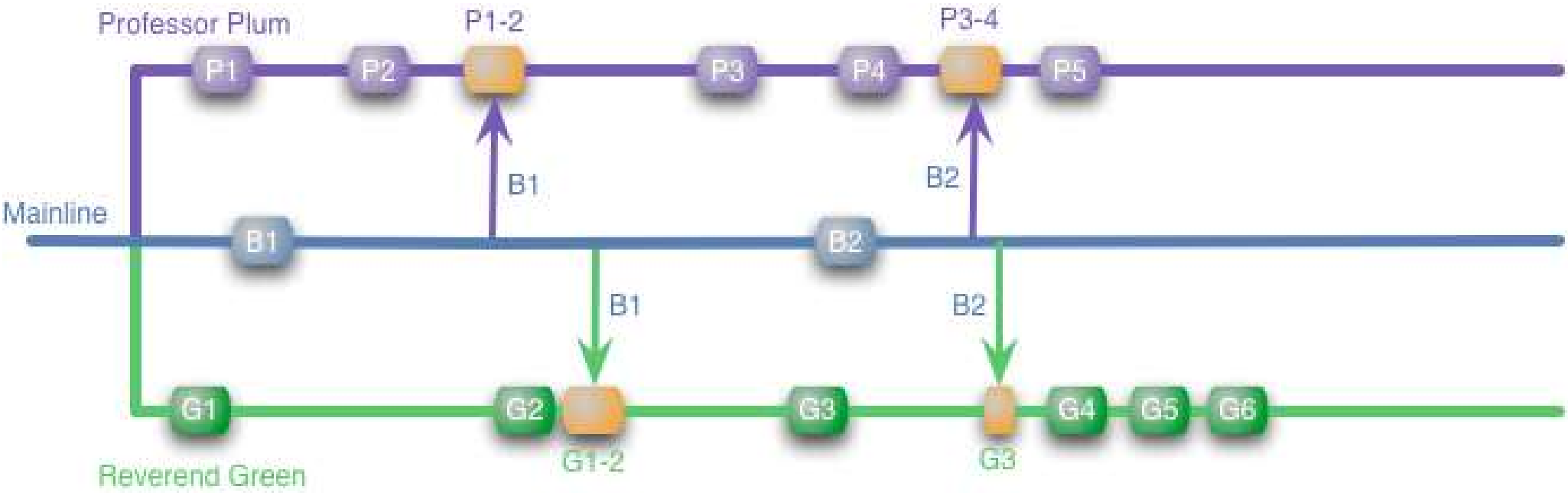
Build

Push into trunk

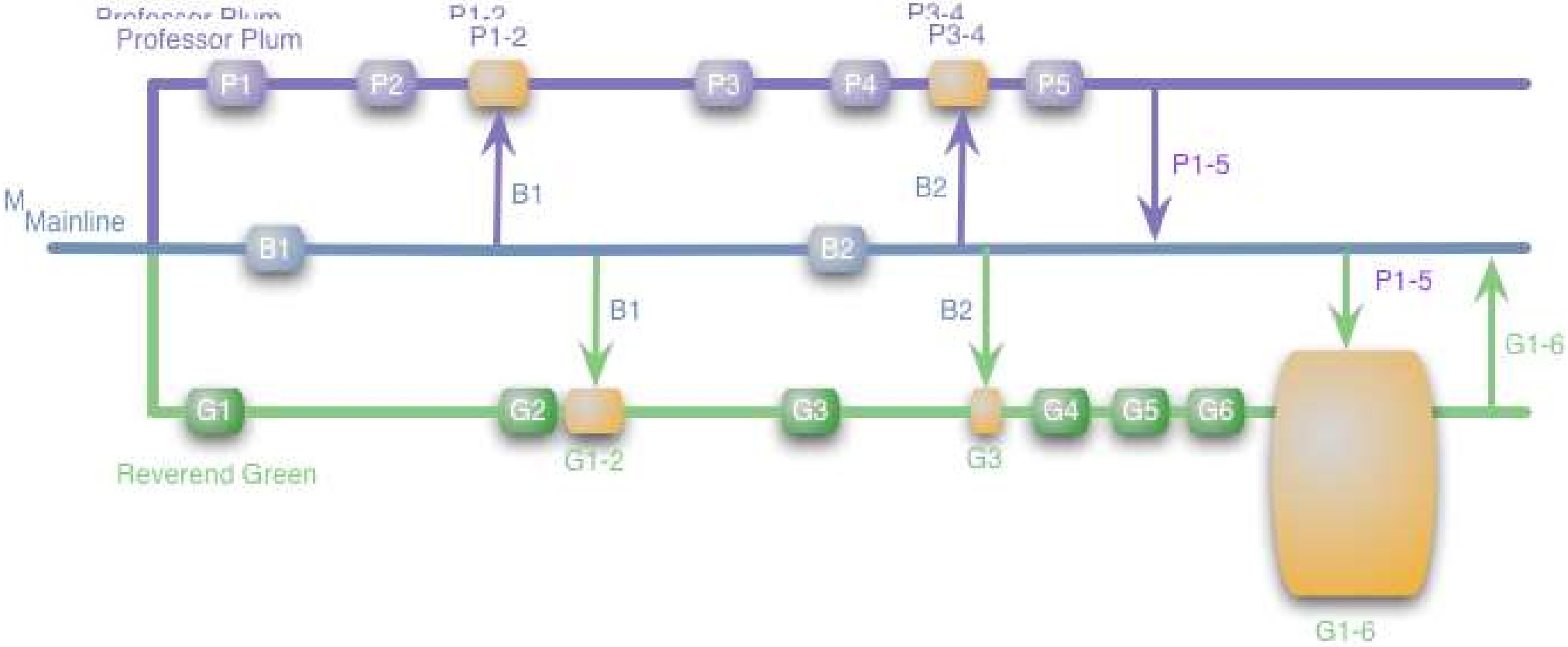
Commit To Mainline



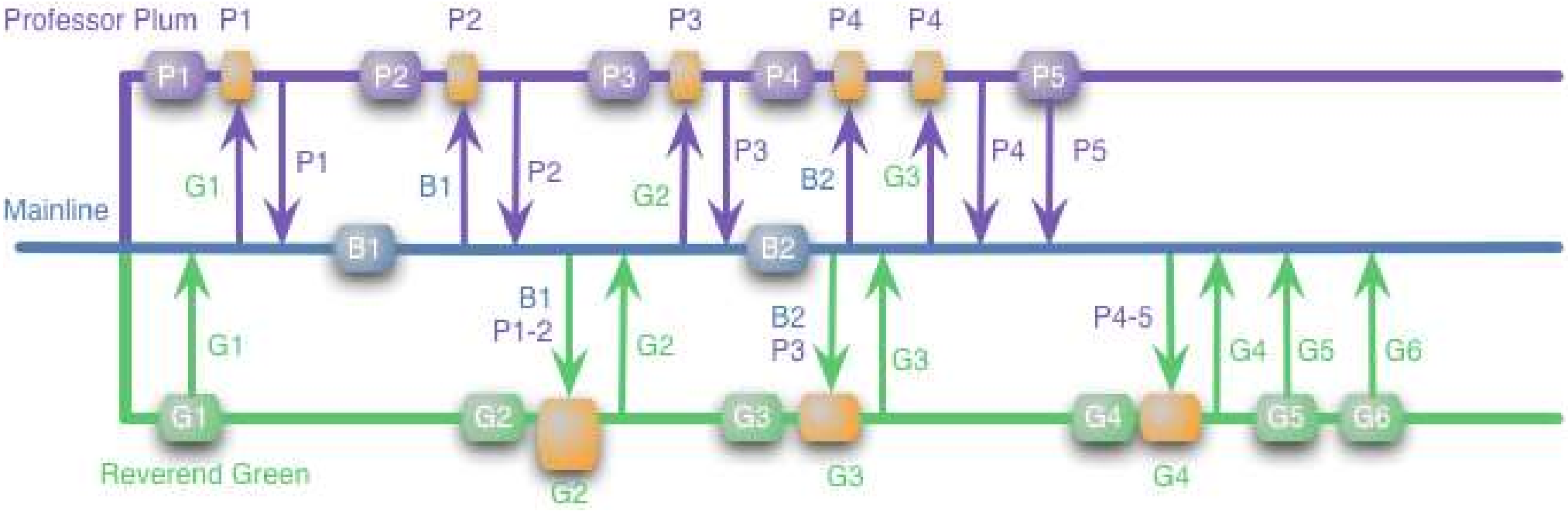
Feature Branching



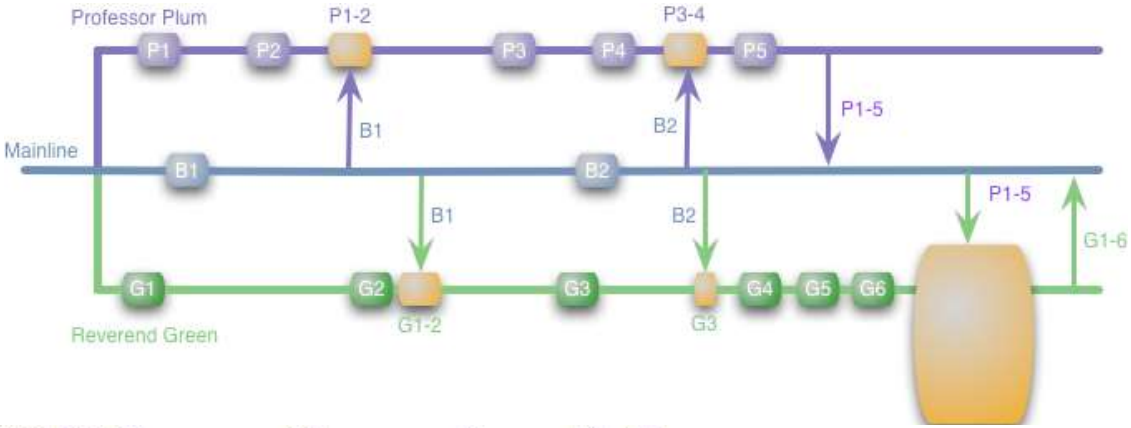
Feature Branch



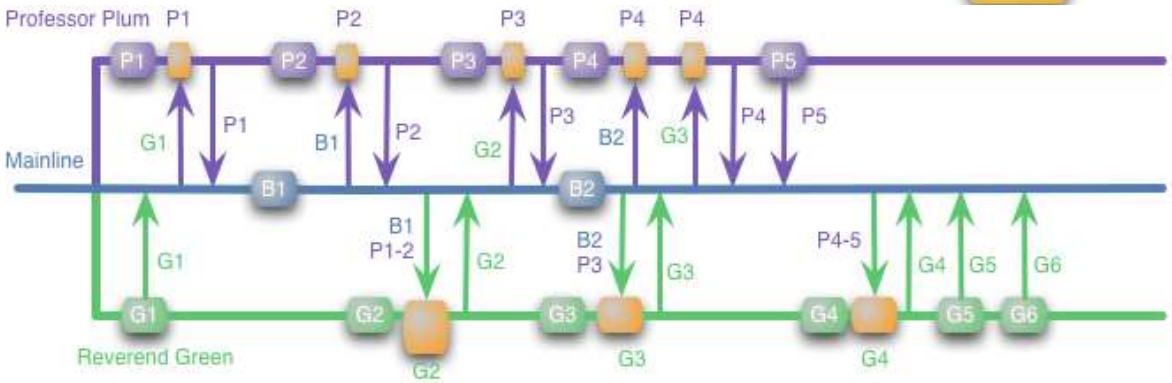
Continuous Integration



Feature Branching and Continuous Integration



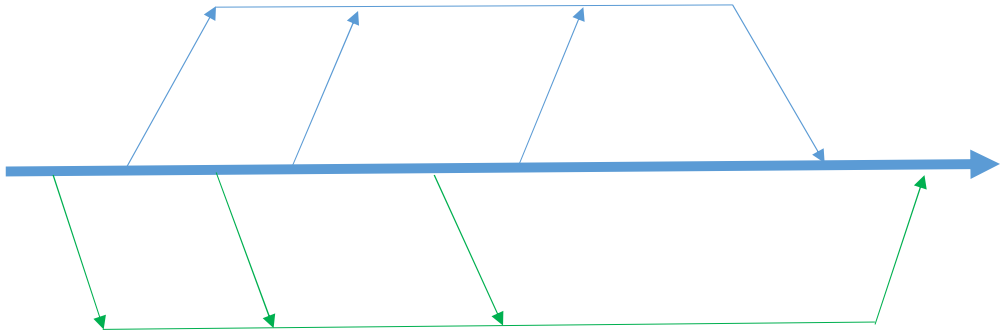
Feature Branching

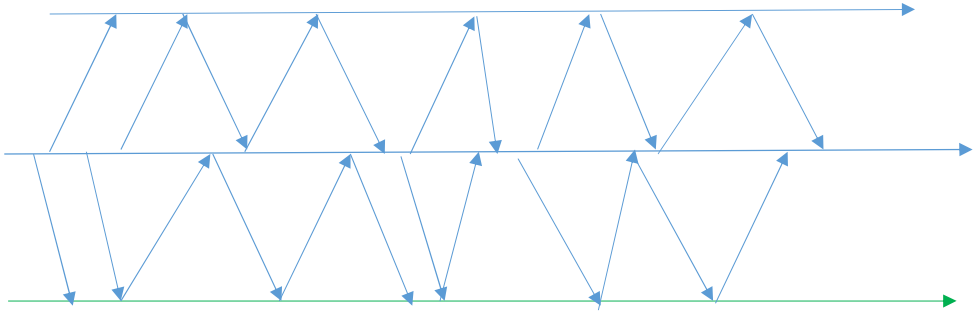


Continuous Integration

Feature Branching and Continuous Integration

Feature Branch

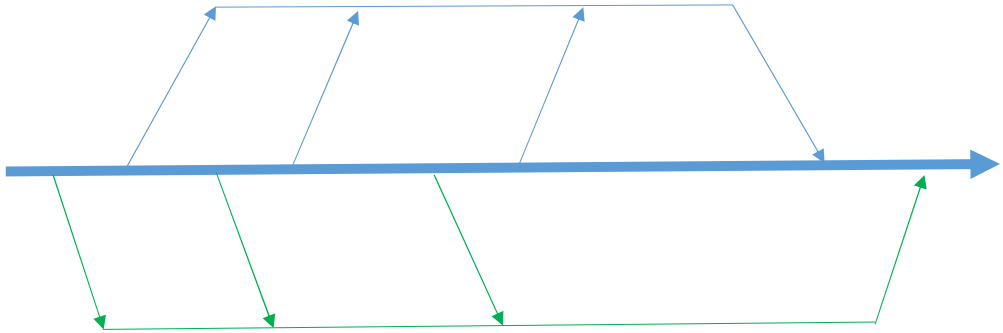




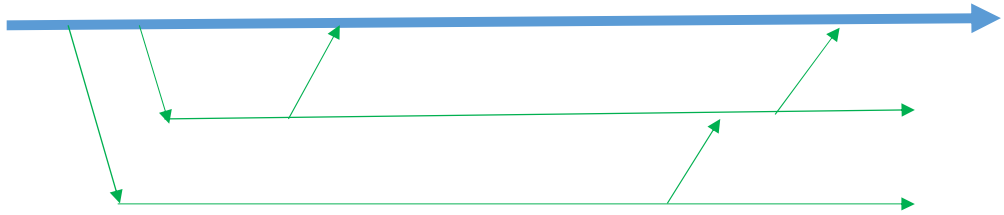
Continuous Integration

Types of Branches

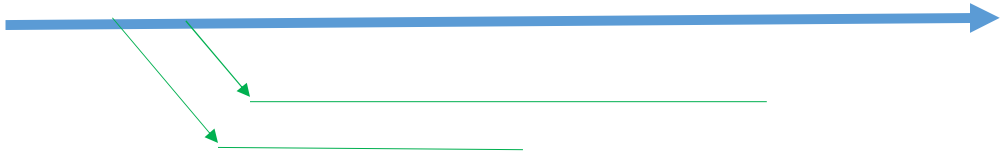
Feature Branch



Release Branch



Experimental Branch

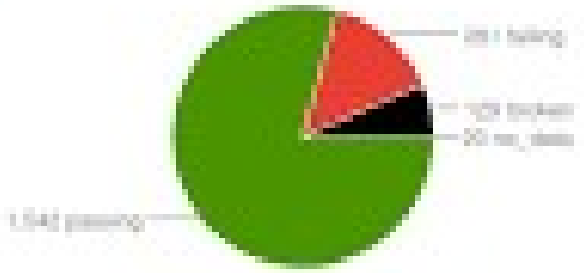


Google Speed and Scale

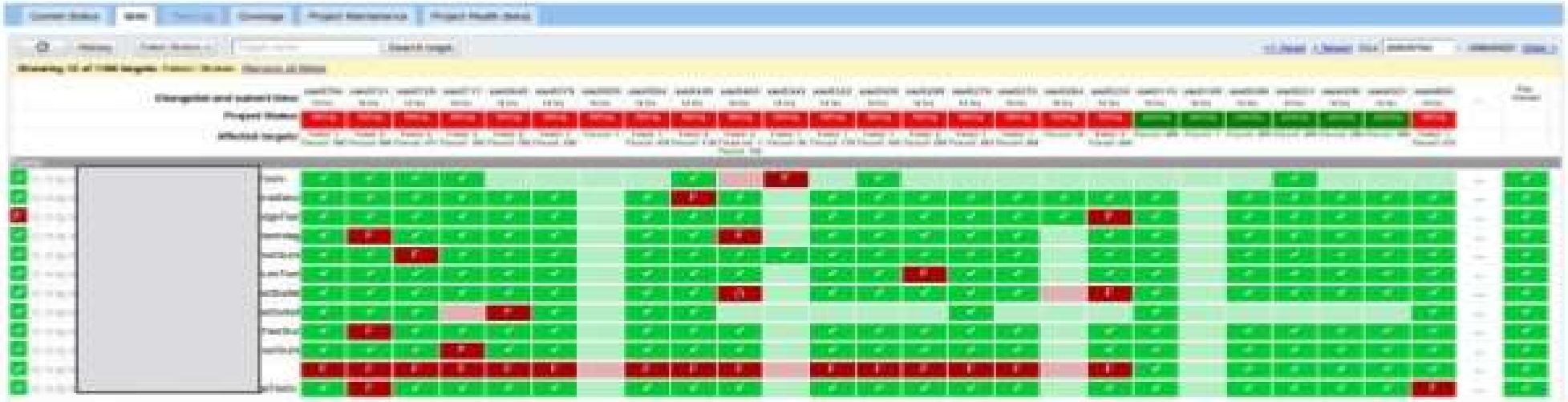
- >30,000 developers in 40+ offices
- 13,000+ projects under active development
- 30k submissions per day (1 every 3 seconds)
- Single monolithic code tree with mixed language code
- Development on one branch - submissions at head
- All builds from source
- 30+ sustained code changes per minute with 90+ peaks
- 50% of code changes monthly
- 150+ million test cases / day, > 150 years of test / day
- Supports continuous deployment for all Google teams!

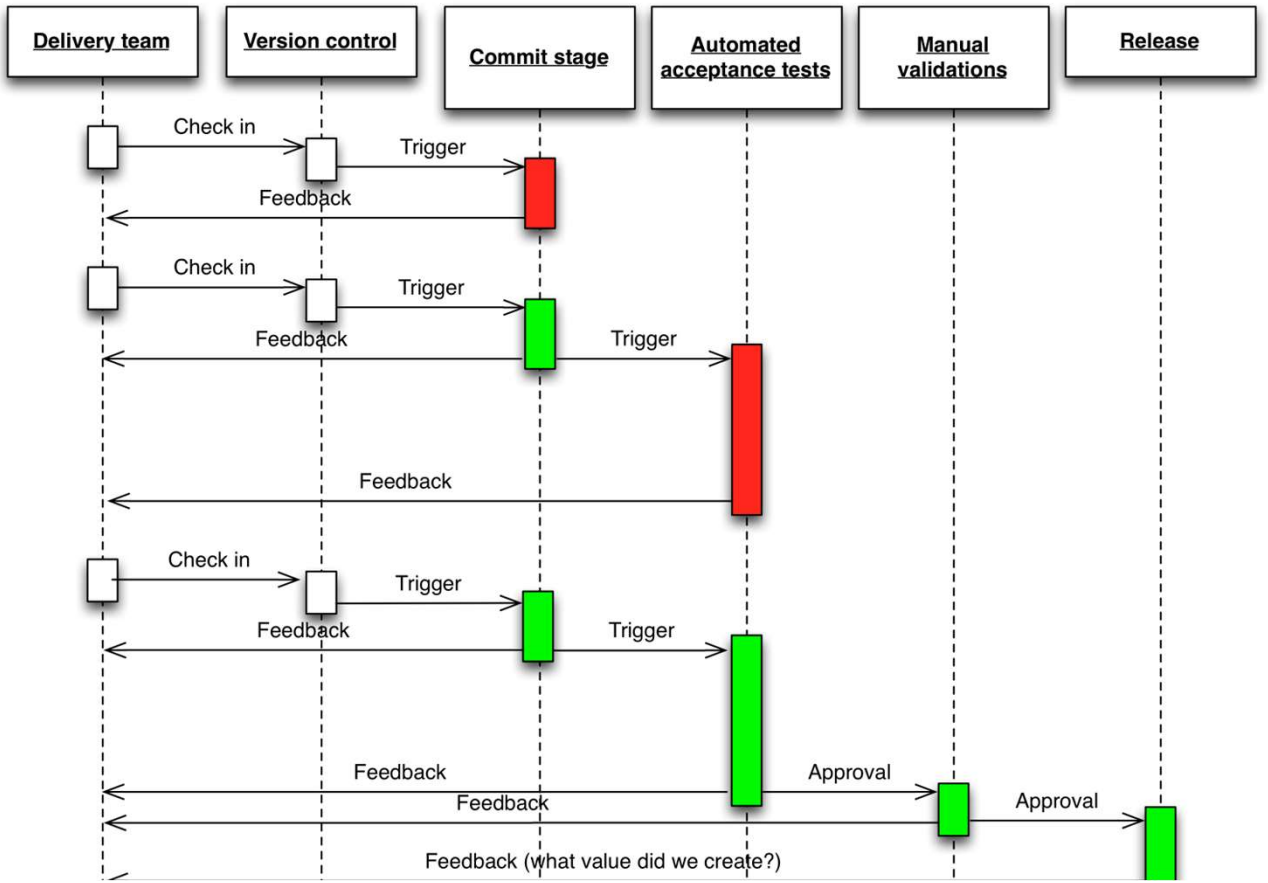
Continuous Integration at Scale

- 200K test suites in the code base
- Run 10M test suites per day
- > 60M individual test cases / day and growing
- > 4000 continuous integration builds



Google Continuous Integration Display

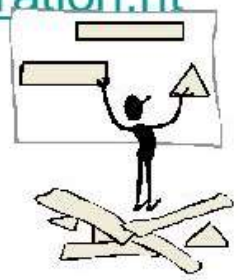




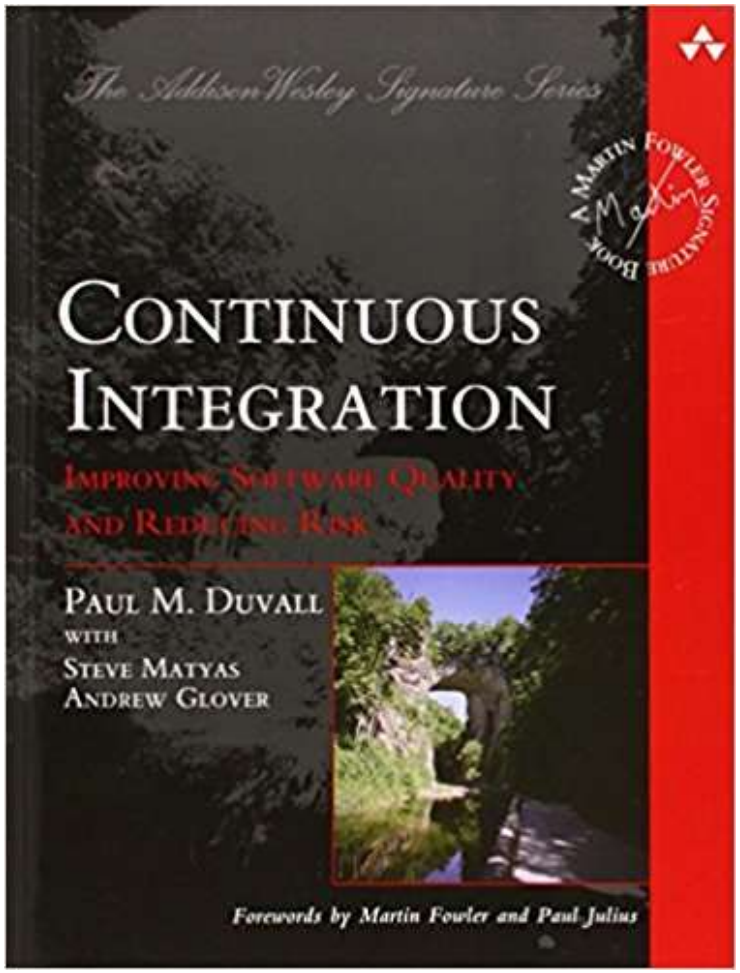
Deployment Pipeline

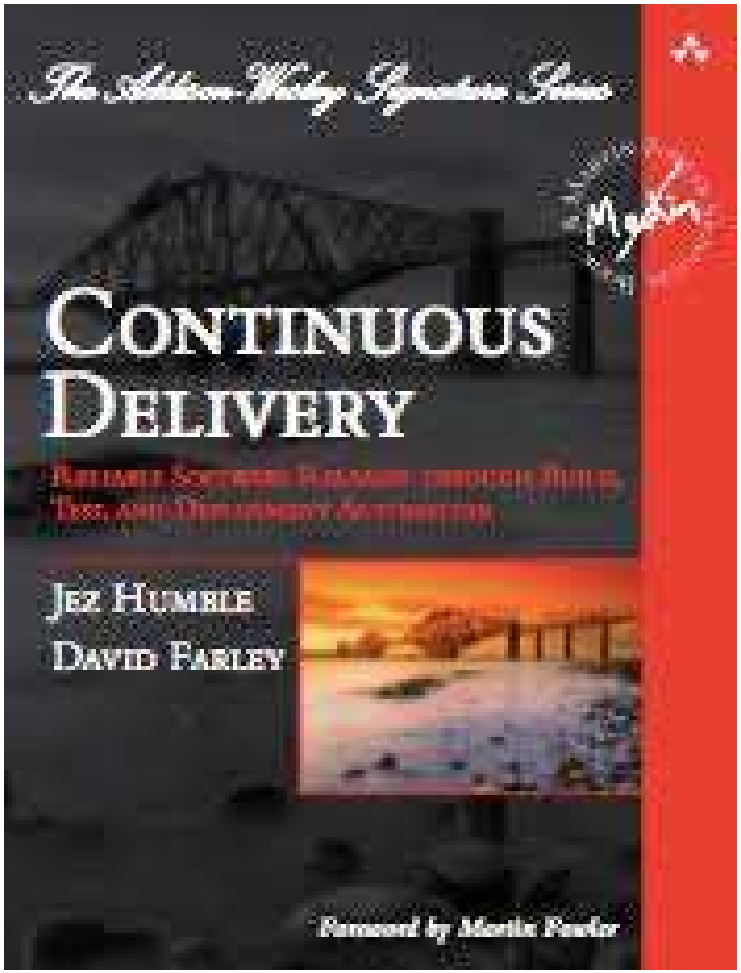
Fowler's 10 Best Practices for CI

From http://martinfowler.com/articles/continuousIntegration.html:



1. Maintain a Single Source Repository
2. Automate the Build
3. Make your Build Self-testing
4. Everyone Commits Everyday
5. Every Commit should Build the Mainline on an Integration Machine
6. Keep the Build Fast
7. Test in a Clone of the Production Environment
8. Make it easy for Anyone to get the Latest Executable
9. Everyone can see what's Happening
10. Automate Deployment


The Addison Wesley Signature Series
A Martin Fowler Signature Book
Continuous Integration
Improving Software Quality and Reducing Risk
Paul M. Duvall
with
Steve Matyas
Andrew Glover
Forewords by Martin Fowler and Paul Julius


The Addison Wesley Signature Series
Continuous Delivery
Jez Humble
David Farley
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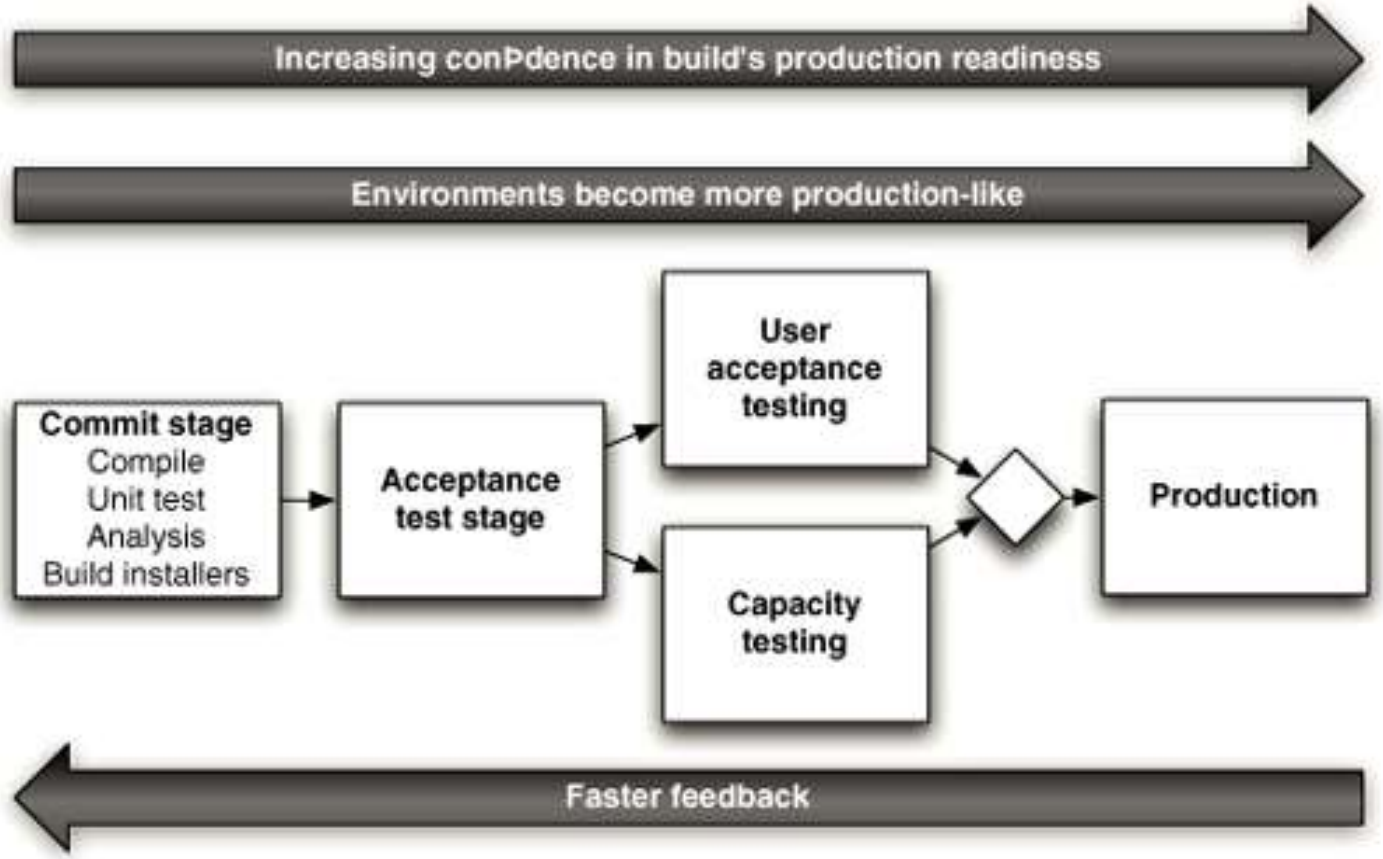
Deployment Pipeline



CI/CD Pipeline