Building Continuous Delivery: rock-solid builds with Gradle

David Norton
Principal Consultant
Object Partners, Inc.

I am here to put you back on schedule.

What is Continuous Delivery?

Continuous Delivery

- If you add a feature, how quickly can you get it in front of users?
- How confident are you that nothing else was broken?
- If you have an infrastructure change, how confident are you that nothing else broke?
- If you don't look at this code for a year, will you be able to check out the repository and get things working again?

Continuous Delivery

“Our highest priority is to satisfy the customer
through early and continuous delivery
of valuable software.”

http://www.agilemanifesto.org/principles.html

Continuous Delivery

- != Cowboy-coding in production
- != Continuous Deployment

Continuous Delivery

- "Continuous Delivery is a software development discipline where you build software in such a way that the software can be released to production at any time." - Martin Fowler

  http://martinfowler.com/bliki/ContinuousDelivery.html

Continuous Delivery

- vs. Continuous Deployment
  - Continuous Deployment can be a subset of a delivery pipeline, but rarely can you automate the whole pipeline to production.
  - Some applications don’t lend themselves to continuous deployments (native apps, firmware, OSS…)

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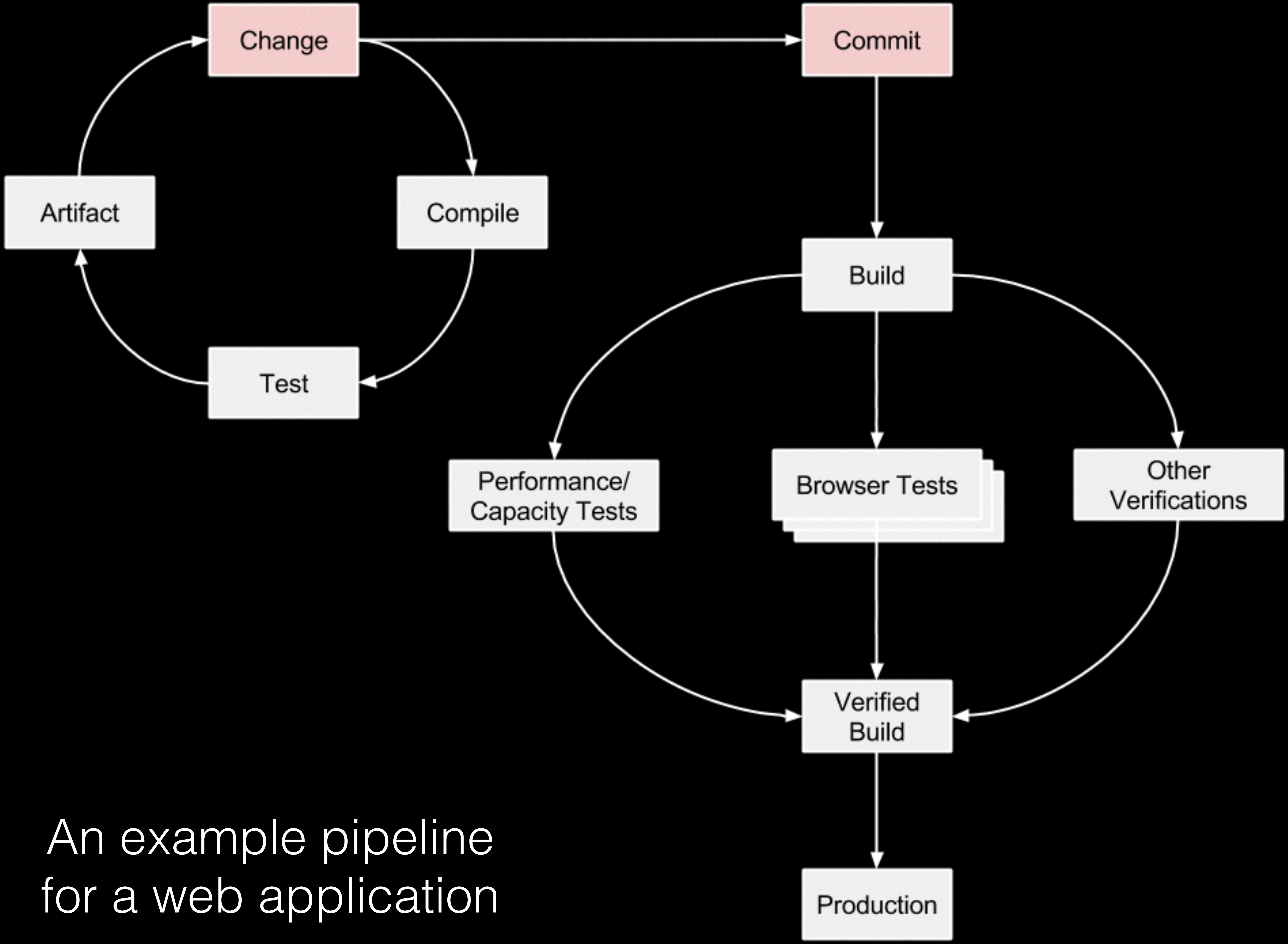
BRAZILIAN STEAKHOUSE
Yes Please!
Sim Por Favor

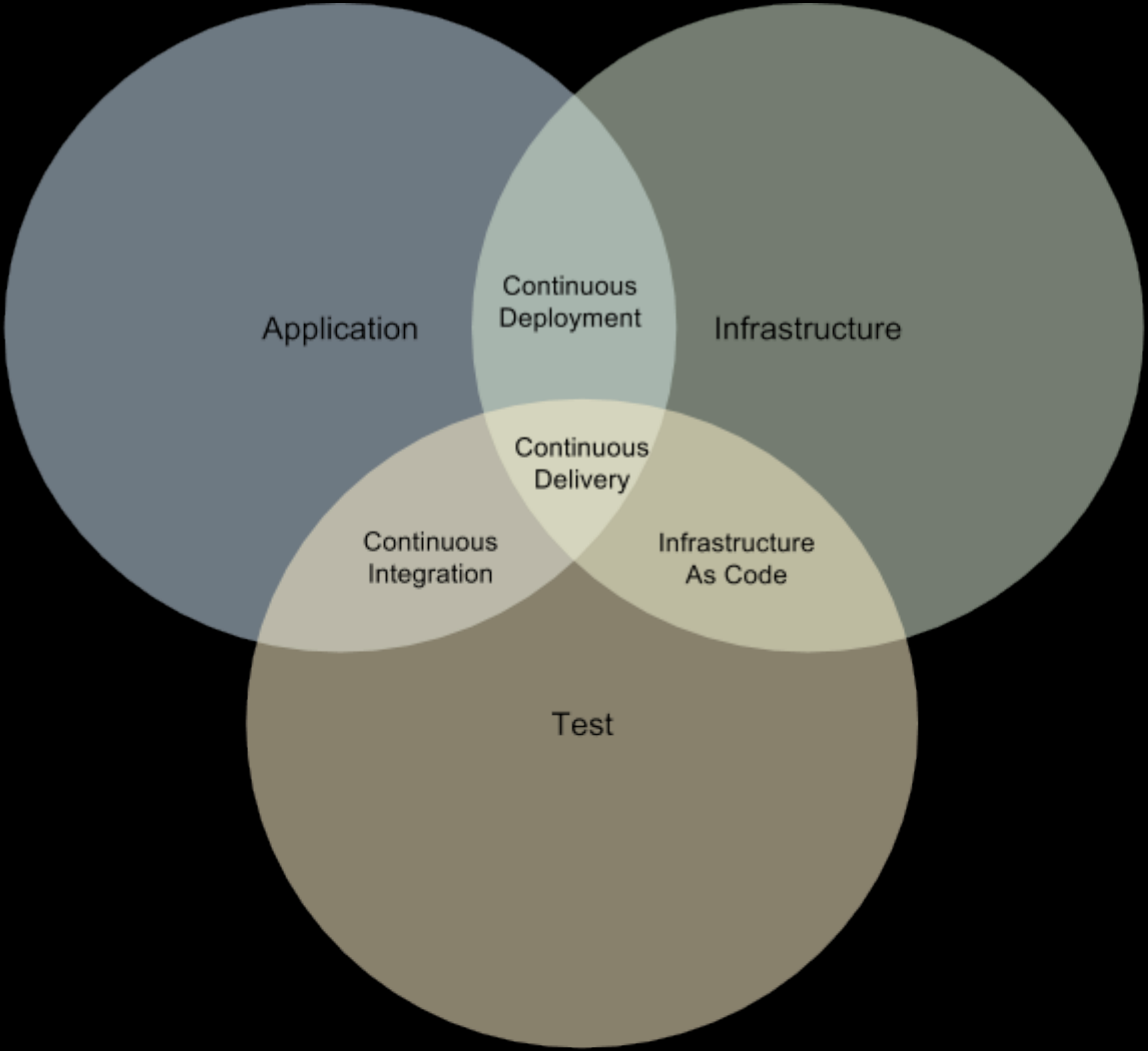
Pipelines

Pipelines

- One size does not fit all
- The sooner you catch a problem, the simpler it is to fix it.
- Might look something like the following:
  - Commit/Build
  - Integration / deployment to lower environment
  - Validation (acceptance, performance, code style)
  - Deployment to production



An example pipeline
for a web application


Application
Continuous Deployment
Infrastructure
Continuous Delivery
Continuous Integration
Infrastructure As Code
Test

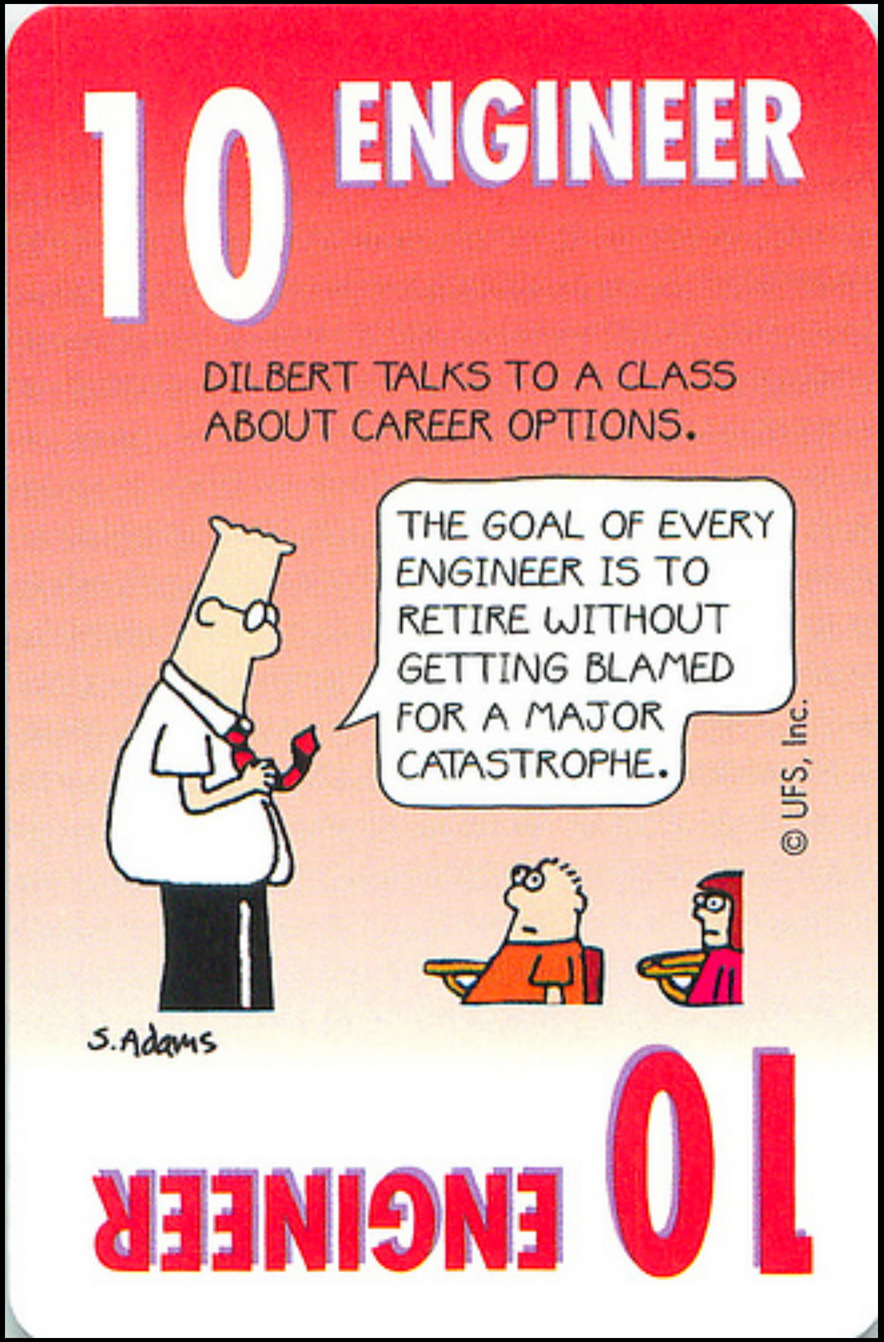
Pipelines

- Pipeline automation
  - Automate as much as possible: build, deployment, testing.
  - If necessary, some manual validation/approval checkpoints. After that, the release can continue along the pipeline.

"Works on my machine"

…says the lazy programmer

Continuous Delivery for Enterprise Peasants


10 ENGINEER
DILBERT TALKS TO A CLASS ABOUT CAREER OPTIONS.
THE GOAL OF EVERY ENGINEER IS TO RETIRE WITHOUT GETTING BLAMED FOR A MAJOR CATASTROPHE.
© UFS, Inc.
S. Adams
10 ENGINEER

But I’m just an engineer!

- You may not control the entire ecosystem
- But you can always improve your continuous delivery practices
- You will influence others

Source Control

Source Control

- Everything necessary to build project is in source control (or retrievable in a repeatable way)
- Use a README!
- Master-based development

Master-Based Development

- Avoid long-lived feature branches
  - (Avoid Git Flow)
  - Separate deployment from release with feature flags
  - Branch by abstraction

Master-Based Development

- Release branches
  - For fast-tracked fixes to releases
  - Become less necessary as cycle time decreases (automation down the pipeline improves)

Idempotent Builds

- For a given commit (input), the ability to rebuild the same artifact (output)

The build phase

The build phase

- Download dependencies
- Compile
- Unit and Integration Test
- Package
- Functional Test
- Archive Artifacts

Dependencies

Dependencies

- Avoid -SNAPSHOT, open-ended, “latest”, range dependencies. These introduce unreliable results.
- If you use a URL to load a dependency, you must be reasonably confident that resource is stable.
- Not just for libraries! Use hard versions for build tool, plugins

Dependencies

- Gradle plugin dependencies
  - Core plugins: versioned with Gradle
    - So use the Gradle wrapper!
  - Shared Build Logic - be careful
    - NOT: apply from: “https://corpsite/my-plugin.jar”

Compiling

Compiling

- Really there’s not a lot here to screw up.
- Specify sourceCompatibility/targetCompatibility or else it will default to the current JVM.

Testing

Testing

- Unit test: Single class
  - No application framework, no database
  - Mocked dependencies
- Integration test:
  - Configured application using framework
  - Local/in-memory DB with each test rolled back via transactions
  - Mocked/stubbed external services

Testing

- Functional Testing
  - Test against application running on a running app server
  - Test APIs and UIs
  - More like an acceptance test

Testing

- Isolate the build from others:
  - Databases: in-memory or Docker container
  - Mock or stub third-party services
    - Betamax, MockServer
  - Email: GreenMail

Packaging

Packaging

- You want your build to produce an artifact that can then be deployed to every environment.
- Externalized config vs. system property
  - API keys or other credentials might need to be externalized for security or other reasons.
  - Most configuration could be bundled into app as a profile or environment

Archive Artifacts

Archive Artifacts

- Archive a versioned artifact that can be used for the next steps of your pipeline
- Version: specify on command line
    - e.g.: `-Pversion=1.0.$BUILD_NUMBER`
- Destination
    - Artifactory, Nexus, S3, npm…

Archive Artifacts

- Gradle
    - set rootProject.name in settings.gradle. otherwise root artifact name comes from directory name

Gradle Demo

Next Steps

Next Steps

- github.com/davidnortonjr/continuous-gradle
- email me, david.norton@objectpartners.com
- Read *Continuous Delivery* by Jez Humble and David Farley

- http://paulhammant.com/2013/04/05/what-is-trunk-based-development/
- http://martinfowler.com/bliki/BranchByAbstraction.html
- https://axelfontaine.com/blog/final-nail.html
- Images courtesy of Disney and Wizards of the Coast