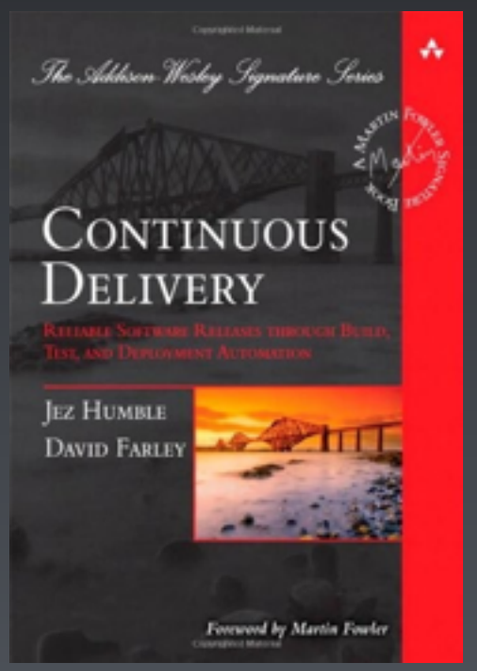
The Rationale For Continuous Delivery

Or

What Does ‘Good’ Look Like?

Dave Farley
http://www.davefarley.net
@davefarley77



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http://www.continuous-delivery.co.uk

The State of Software Development

Source: KPMG (New Zealand)
Date: 2010

In a study of pro

1) 70% of or
project fai

2) 50% of re
consistent
achieve.

Source: KPMG – Global IT Management
Survey
Date: 2005

In a survey of 60

1) 49% of org
in the past

2) 2% of orga
projects ac

Source: Logica Management Consulting
Date: 2008

In a survey of 380 senior execs in Western Europe:

1) 35% of organisa
in the last 3year

2) 37% of business
deliver benefits.

Source: The McKinsey Group with Oxford University
Date: 2012

In a study of 5,400 large scale projects (> $15m):

1) 17% of projects go so badly that they threaten the existence of the company performing them.

2) On average large projects run 45% over budget and 7% over time while delivering 56% less value than predicted.

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The State of Software Development Has Been Err…. Sub-Optimal

But there are signs of change…

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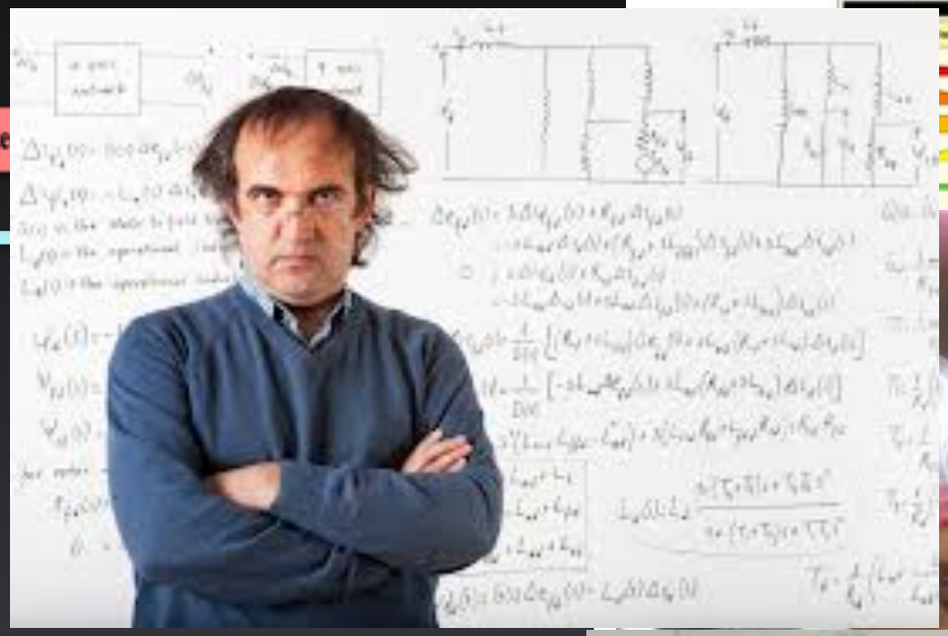
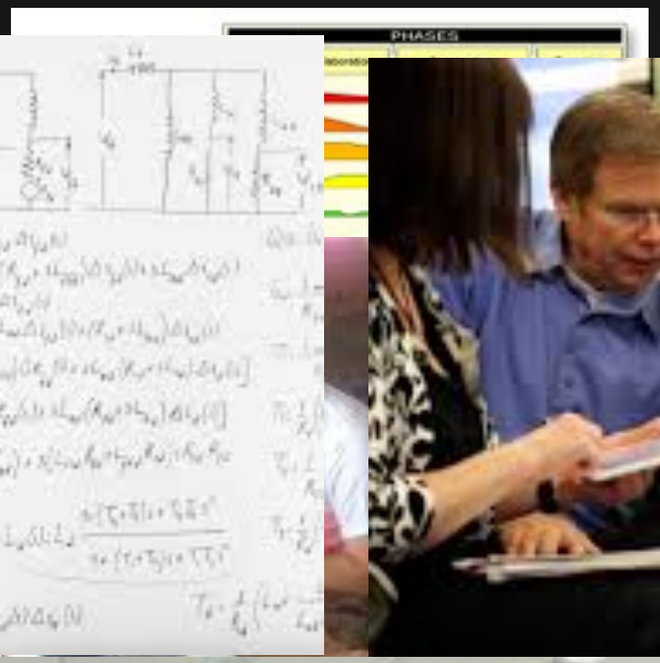
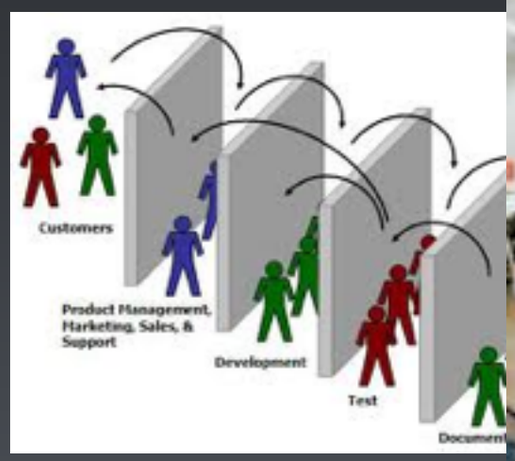
What Have We Tried?







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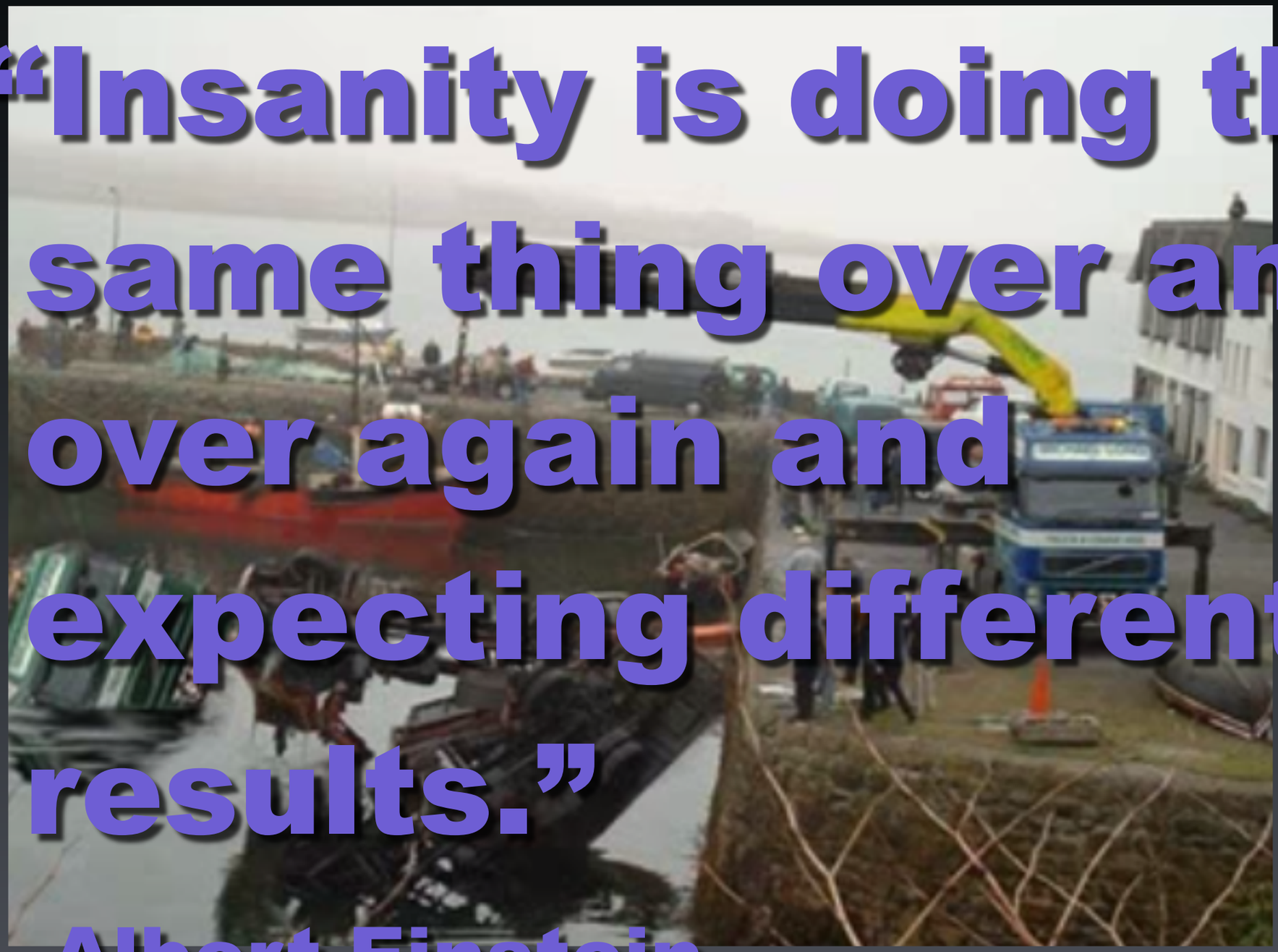
Learning From Our Mistakes



“Insanity is doing the same thing over and over again and expecting different results.”

Albert Einstein

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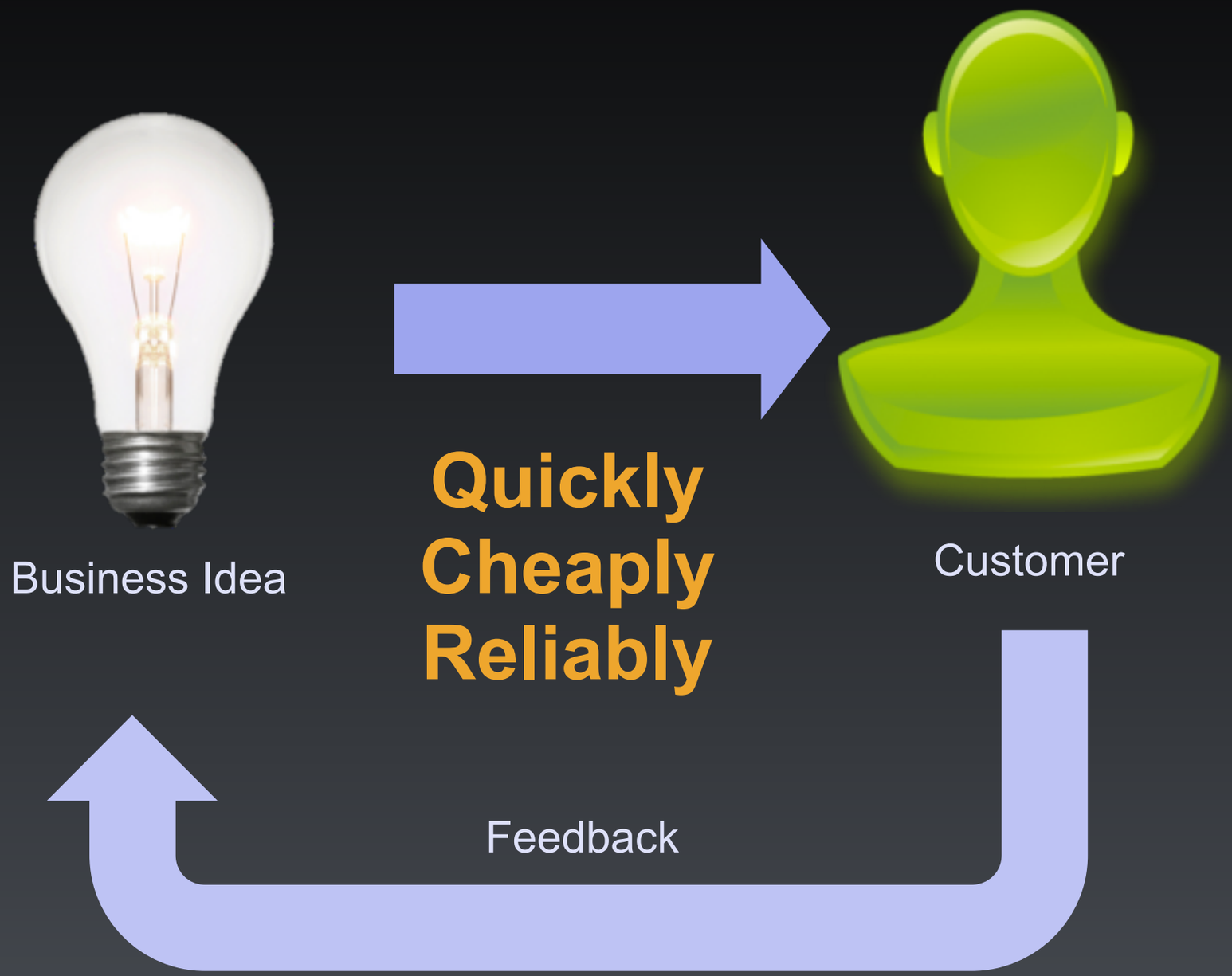
What Do We Really Want?



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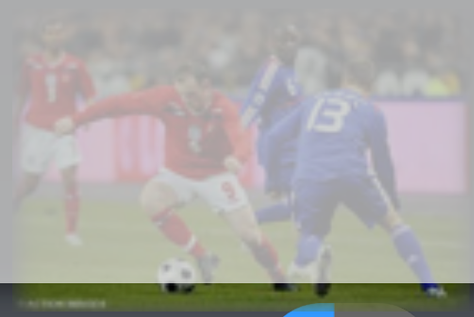
A Question....

What is the most successful invention in human history?

SCIENCE



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The Scientific Method

- **Characterisation** Make a guess based on experience and observation.
- **Hypothesis** Propose an explanation.
- **Deduction** Make a prediction from the hypothesis.
- **Experiment** Test the prediction.

Repeat!

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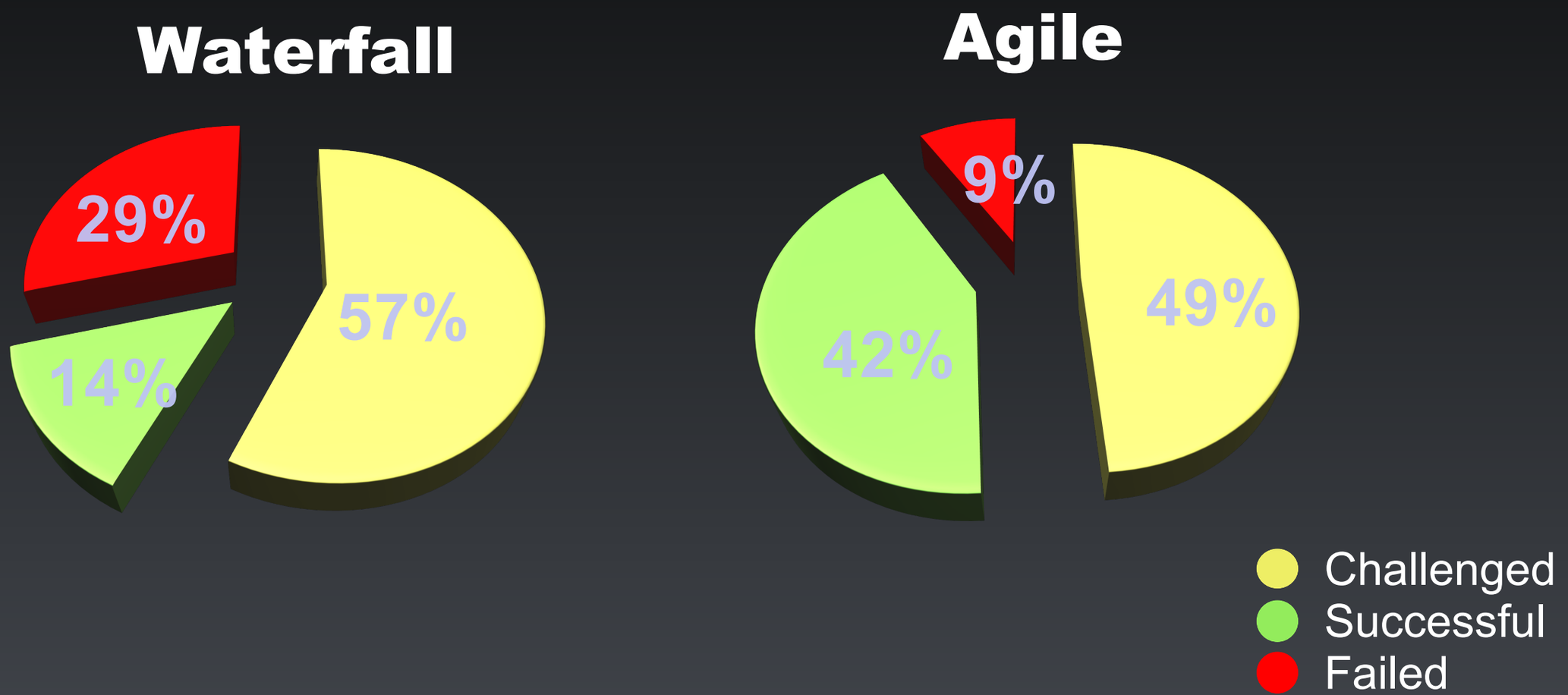
What Works?



Source: The CHAOS Manifesto, The Standish Group 2012

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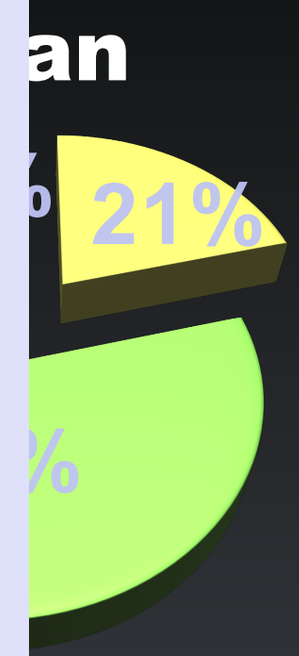
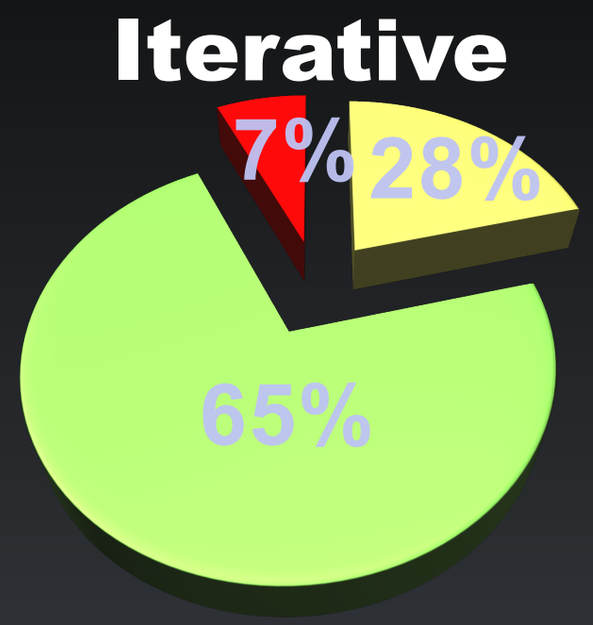
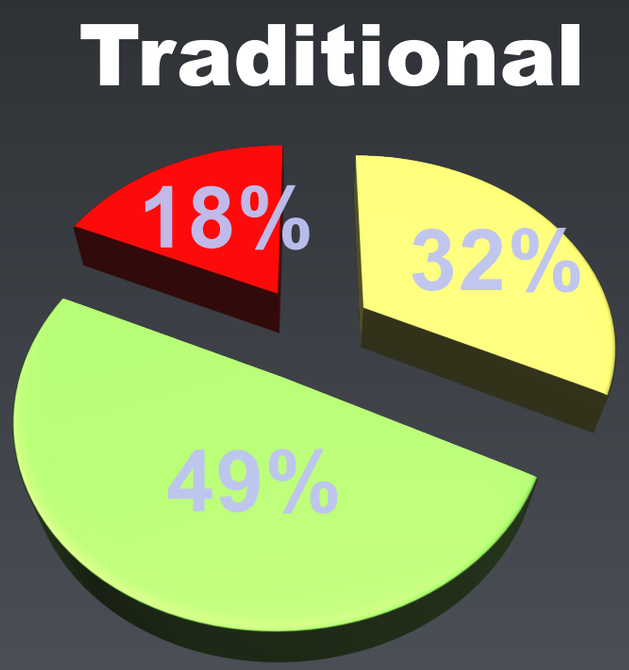
What Works? - More Data

Lean Thinking …

- **Deliver Fast**
- **Build Quality In**
- **Optimise the Whole**
- **Eliminate Waste**
  - **Unnecessary Variations (Mura)**
  - **Overburden (Muri)**
  - **Wasteful activities (Muda)**
- **Amplify Learning**
- **Decide Late**
- **Empower the Team**







Source: Scott Ambler, Dr. Dobbs Journal, Feb 2014
(http://www.drdobbs.com/architecture-and-design/the-non-existent-software-crisis-debunki/240165910)

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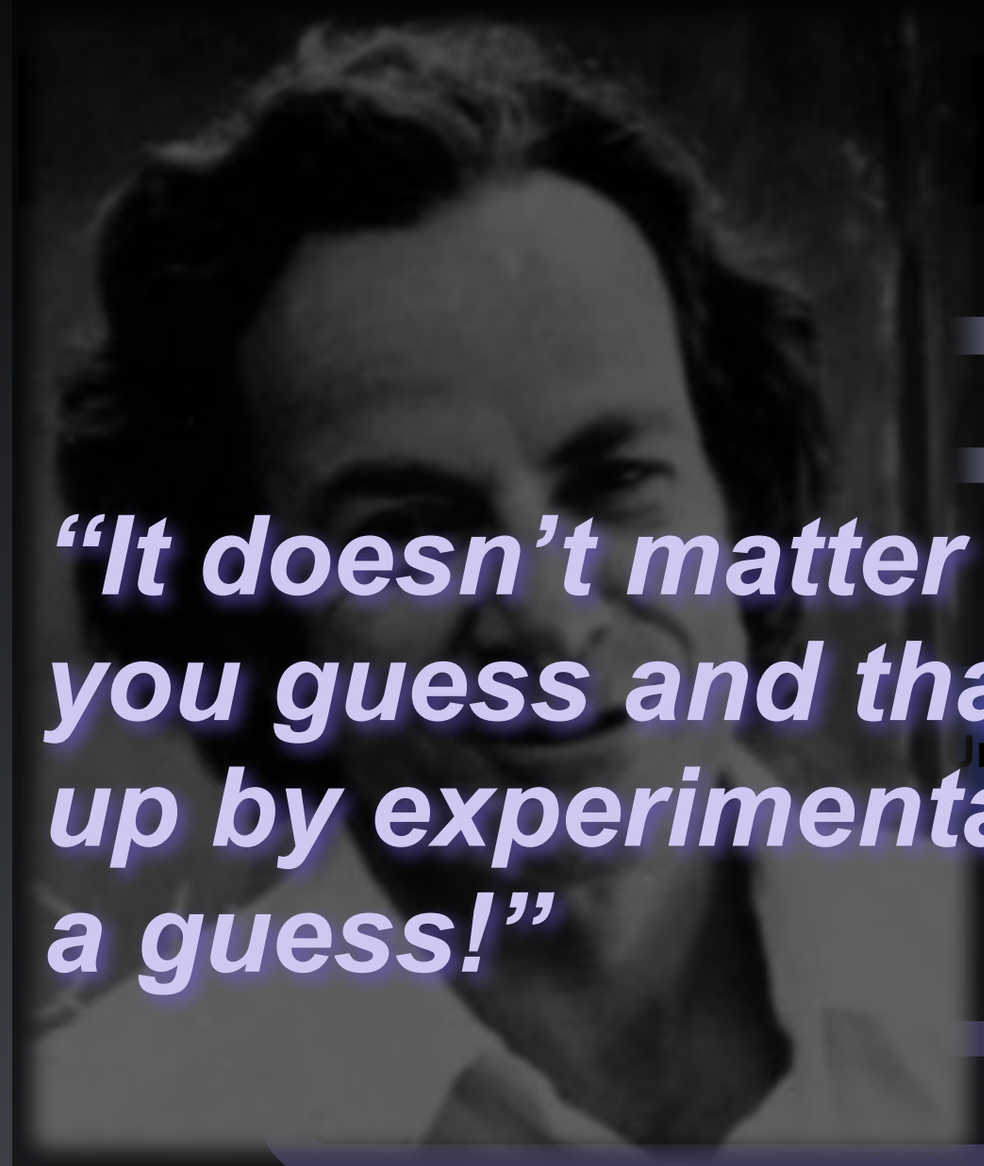
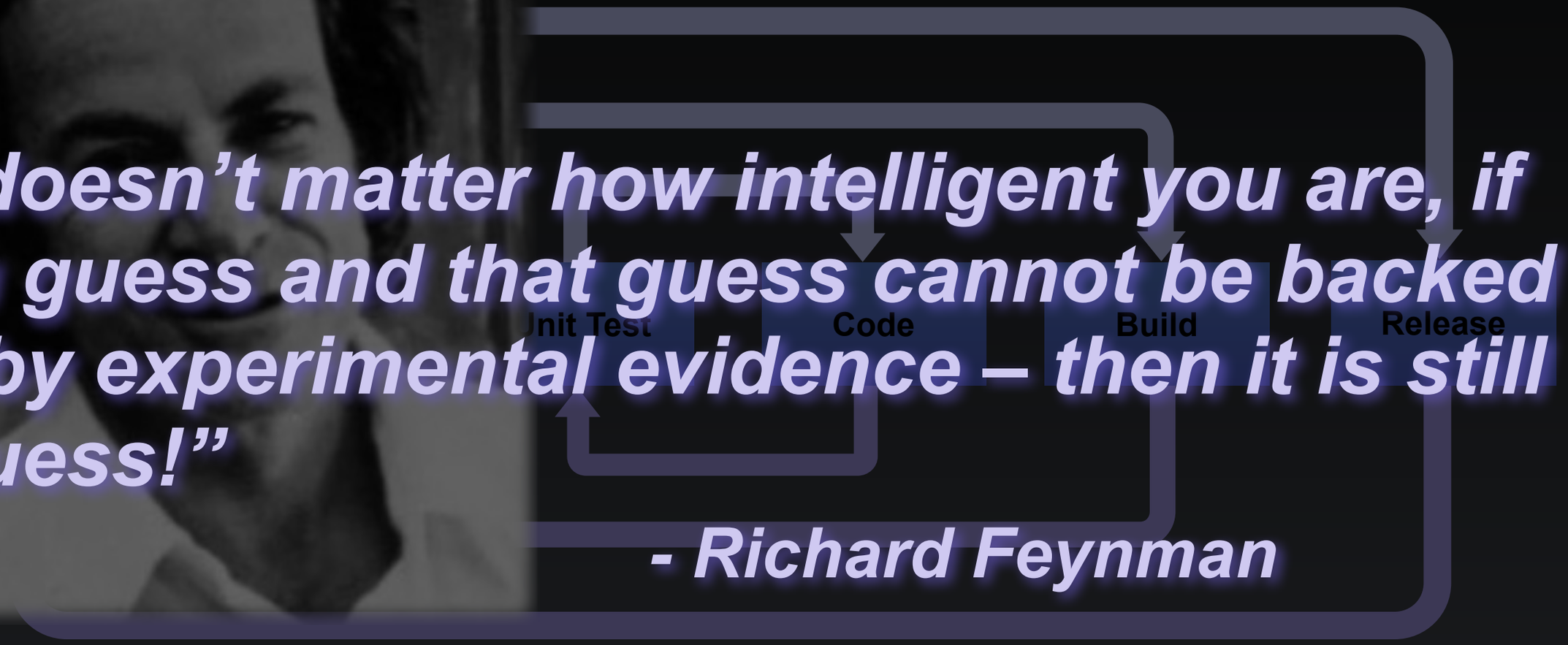
What Really Works?



"It doesn't matter how intelligent you are, if you guess and that guess cannot be backed up by experimental evidence – then it is still a guess!"

- Richard Feynman



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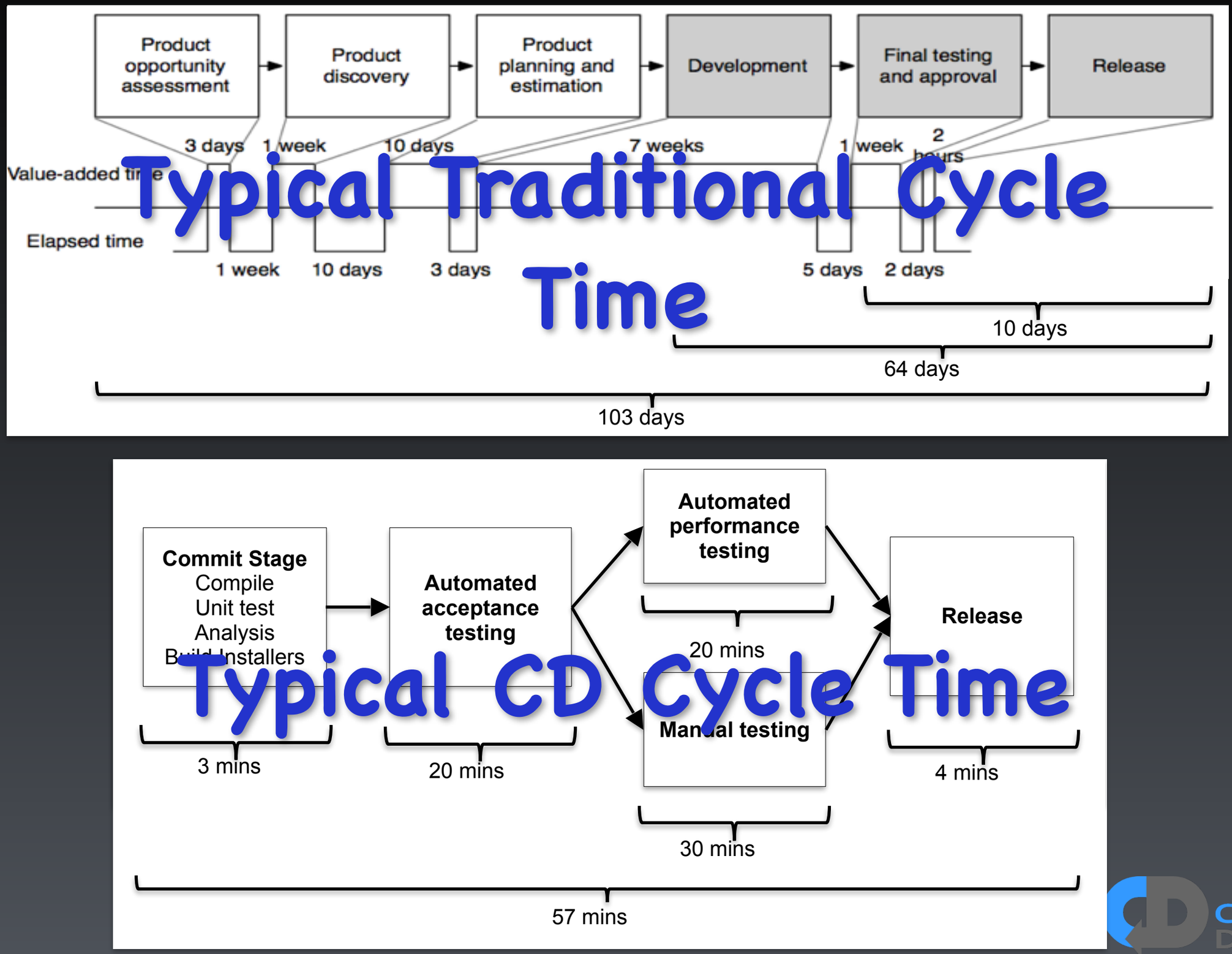
Cycle-Time



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What Is Continuous Delivery?

> ***"Our highest priority is to satisfy the customer through early and continuous delivery of valuable software."***

- **The first principle of the agile manifesto.**
- **The logical extension of continuous integration.**
- **A holistic approach to development.**
- **Every commit creates a release candidate.**
- **Finished means released into production!**

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The Principles of Continuous Delivery

- Create a repeatable, reliable process for releasing software.
- Automate almost everything.
- Keep everything under version control.
- If it hurts, do it more often – bring the pain forward.
- Build quality in.
- Done means released.
- Everybody is responsible for the release process.
- Improve continuously.

Forrester Research 2013

“If Agile software development was the opening act to a great performance, Continuous Delivery is the headliner.”

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What Does This Look Like?

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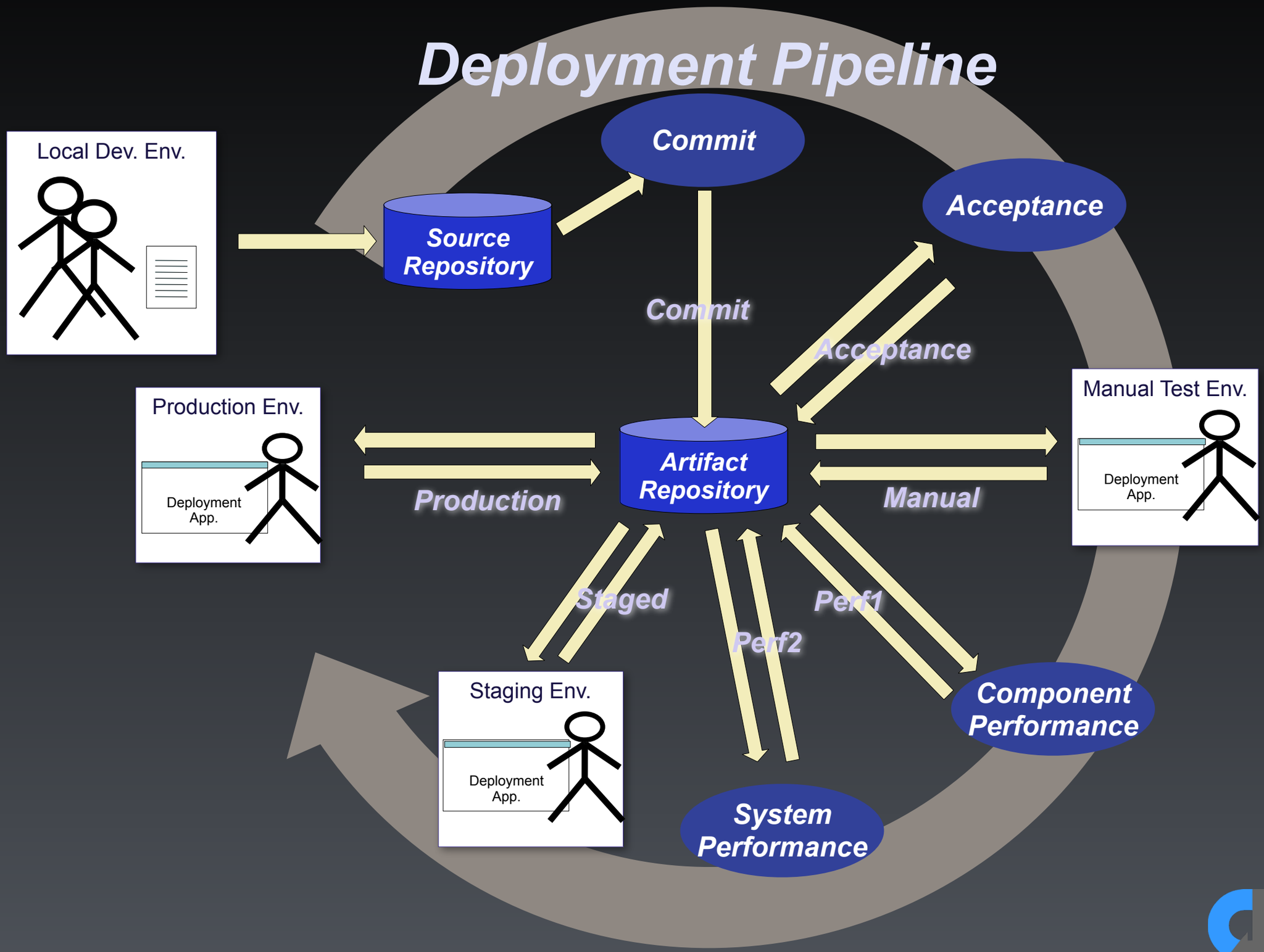
Example Continuous Delivery Process



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“This may work for small projects but can’t possibly scale”

The Google Build Process

- Single Monolithic Repository
- Continuous Build & Test on Commit For:
  - > 60 Million builds per year and growing exponentially.
  - > 100 Million lines of code.
- All tests are run on every commit, (>20 commits per minute).
- > 100 Million test cases executed per day.

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“This is too risky, releasing all the time is a recipe for disaster”

The Amazon Build Process

- Mean time between deployment - 11.6 seconds
- Mean hosts simultaneously receiving a deployment - 10,000
- 75% reduction in outages triggered by deployment between 2006 and 2011
- 90% reduction in outage minutes triggered by deployment
- ~0.001% of deployments cause an outage
- Instantaneous rollback
- Reduction in complexity

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“This may work for simple web sites but my technology is too complex”

HP Laserjet Firmware Team Experience

- Transformation of Development Approach for all LaserJet Firmware Products
- Large Complex Project
- Multiple Products
- Four Year Timeframe
- 10x Developer Productivity Increase

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HP LaserJet Firmware Team

2008

10% Code Integration
20% Detailed Planning
25% Porting Code
25% Product Support
15% Manual Testing
~5% Innovation

2011

2% Continuous Integration
5% Agile Planning
15% Architectural Integrity
10% Unified Support
5% Automated Testing
3% Improving Tools
10% Writing Tests
~40% Innovation

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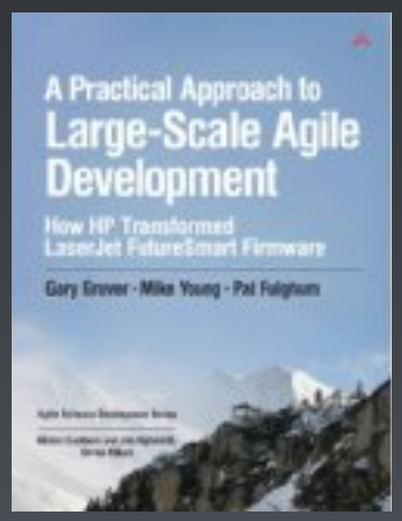
The Results

- Overall development costs reduced by ~40%
- Programs under development increased by ~140%
- Development cost per program down by 70%
- Resources now driving innovation increased by 5x



A Practical Approach to Large scale Agile Development (Gruver, Young and Fulgrhum)

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The Effect on Business - Part 1

- Continuous Delivery changes the economics of software delivery.
- 87% of companies who's development & operations functions were rated as "excellent" saw revenue growth > 10% in 2013[1]
- In contrast, 13% of companies who's development & operations functions were rated "average" or worse saw similar growth.

- 8x more frequent production deployments
- 8000x faster deployment lead times (i.e., time required from "code committed" to "successfully running in production")
- 50% lower change failure rates

Source: [1]"DevOps and Continuous Delivery: Ten Factors Shaping the Future of Application Delivery.", Enterprise Management Associates' Report (2014)

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The Effect on Business - Part 2

- Higher throughput[2]
- Higher reliability[2]
- 12x faster service restoration times when something went wrong (i.e., MTTR)
- “Organizational culture is one of the strongest predictors of both IT performance and overall performance of the organization”[2]
- “We can now assert with confidence that high IT performance correlates with strong business performance, helping to boost productivity, profitability and market share.”[2]

Source: [2]“2014 State of DevOps report”, Jez Humble, Gene Kim, Nicole Forsgren Velasquez, Puppet Labs (2014)

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Who Practices CD?

Google

amazon

stackoverflow

NOKIA

facebook

The New York Times

hp invent

flickr

Etsy

NETFLIX

NYSE New York Stock Exchange

ING

LMAX EXCHANGE

ancestry.com

SAP

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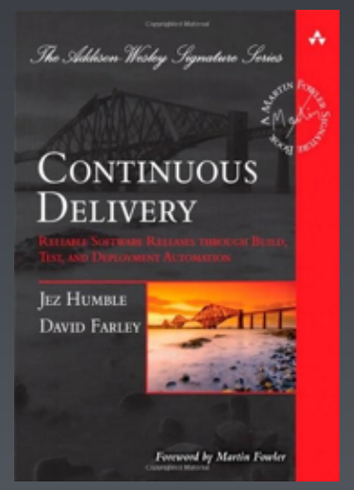
Dave Farley

http://www.davefarley.net

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