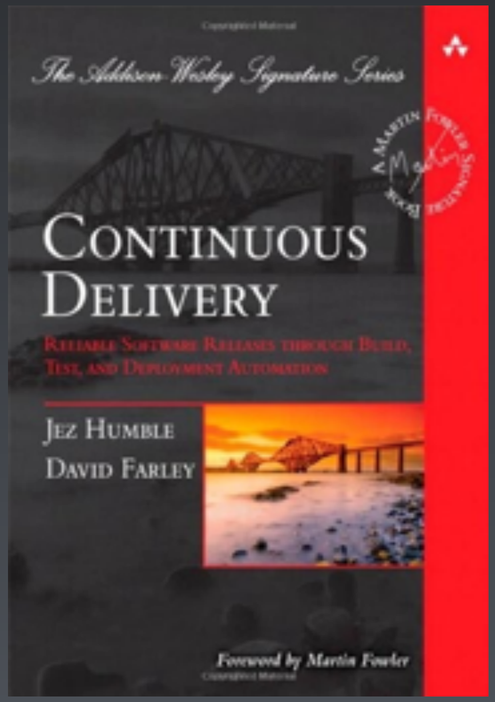
The Rationale For Continuous Delivery

Or

What Does ‘Good’ Look Like?

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


The Addison-Wesley Signature Series
A Martin Fowler Signature Book
Continuous Delivery
Reliable Software Releases through Build, Test, and Deployment Automation
Jez Humble
David Farley
Foreword by Martin Fowler

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

The State of Software Development

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The State of Software Development

Source: KPMG (New Zealand)
Date: 2010

In a study of project management practices:

1) 70% of organizations have suffered at least one project failure in the last 12 months

2) 50% of respondents indicated that their projects consistently failed to achieve what they set out to achieve.

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 600 projects worldwide:

1) 49% of organisations had suffered a project failure in the past 12 months

2) 2% of organisations reported that all of their projects achieved their desired benefits.

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The State of Software Development

Source: KPMG (New Zealand)
Date: 2010

In a study of pro

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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 organisations abandoned a major project in the last 3years

2) 37% of business change programmes fail to deliver benefits.

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The State of Software Development

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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.

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

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

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

But there are signs of change…

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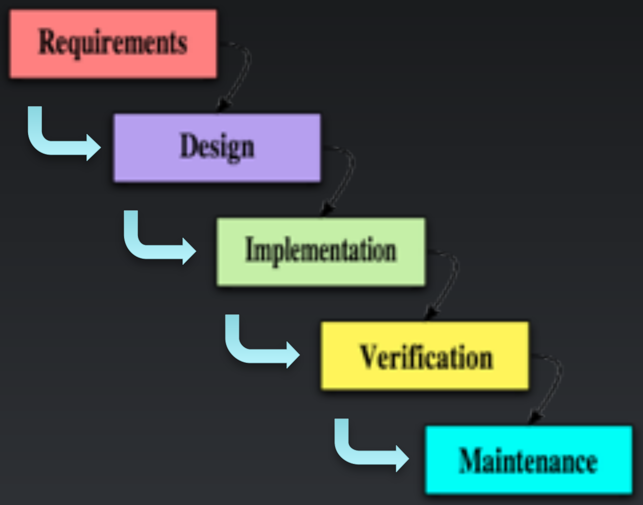
What Have We Tried?

What Have We Tried?

What Have We Tried?



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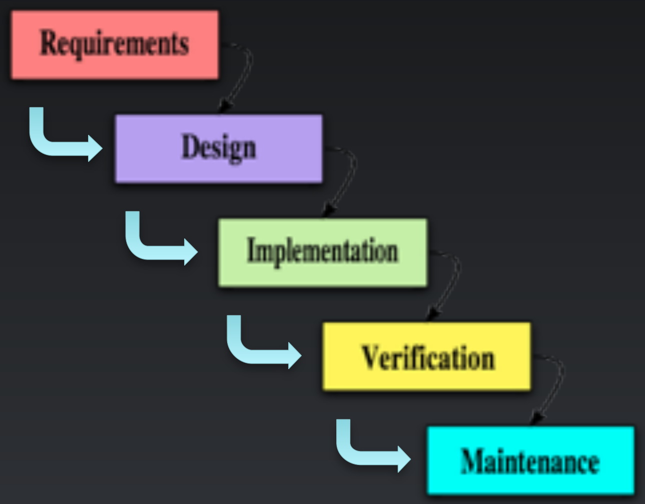


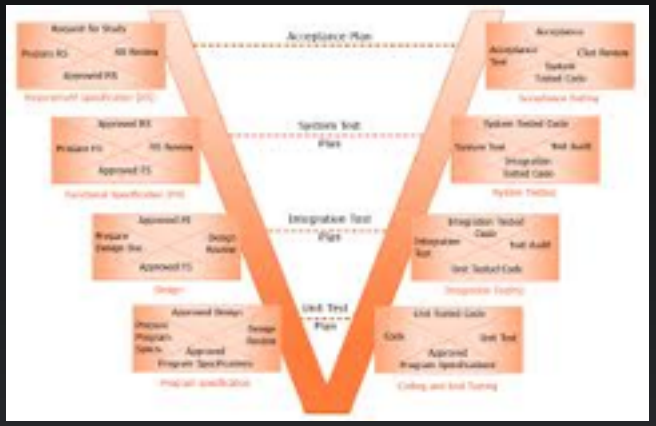
Requirements

Design

Implementation

Verification

Maintenance



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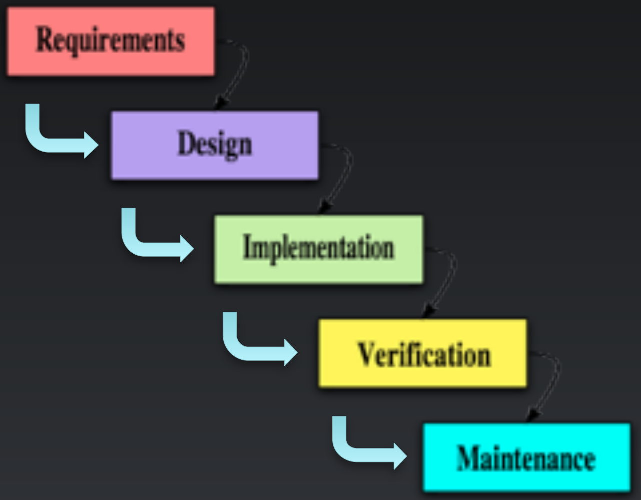

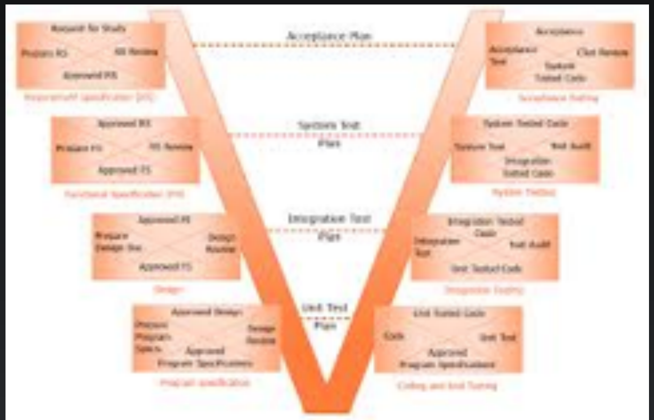

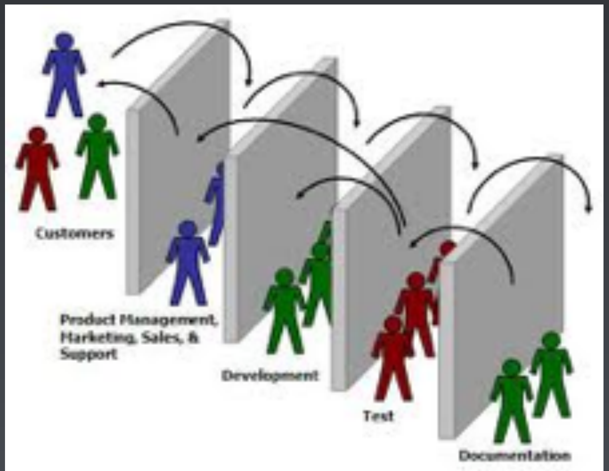

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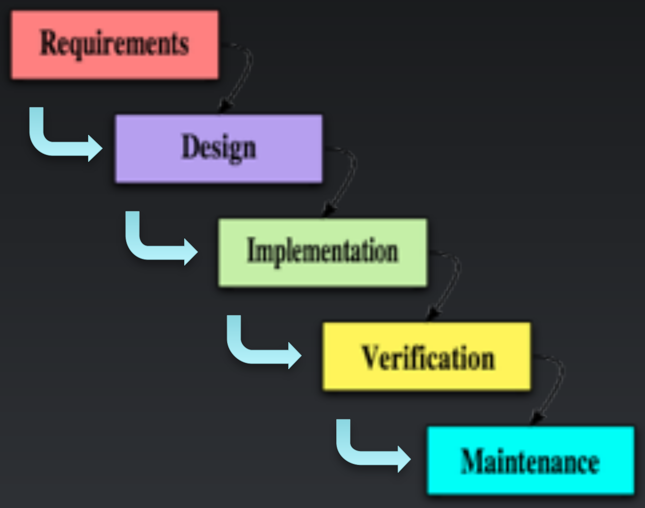

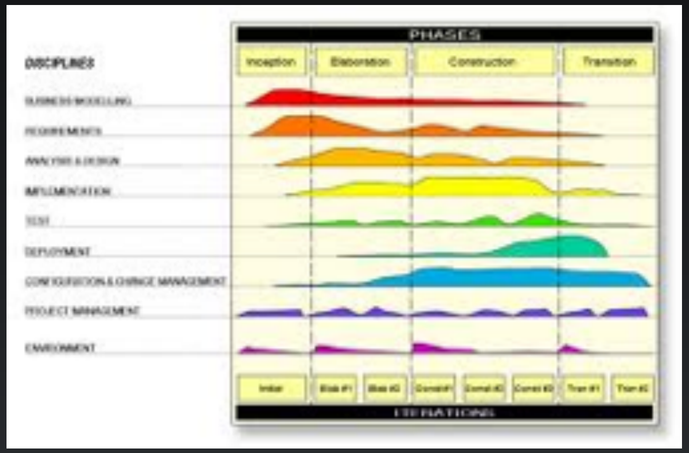

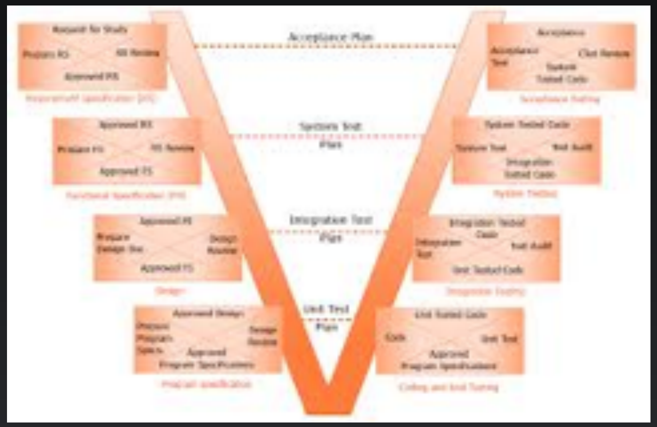

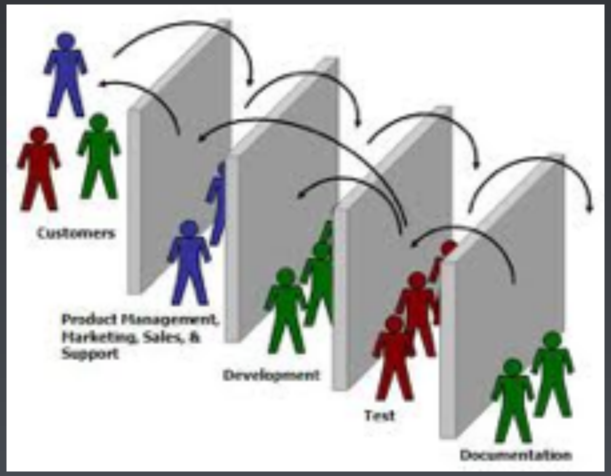

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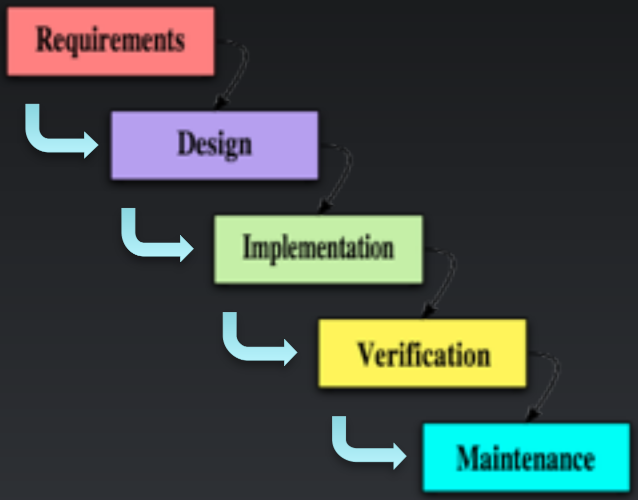

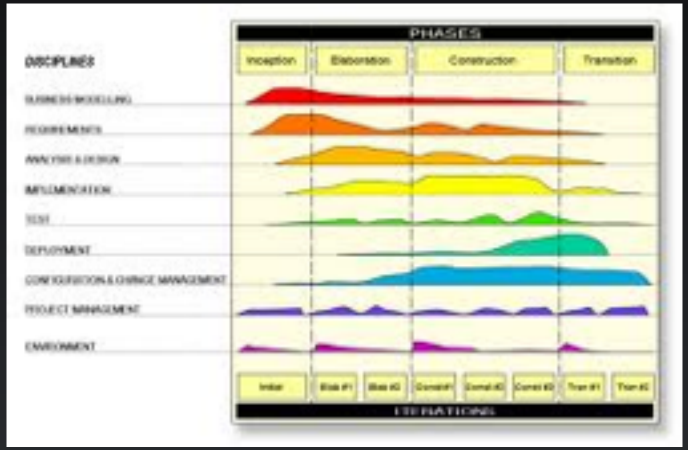

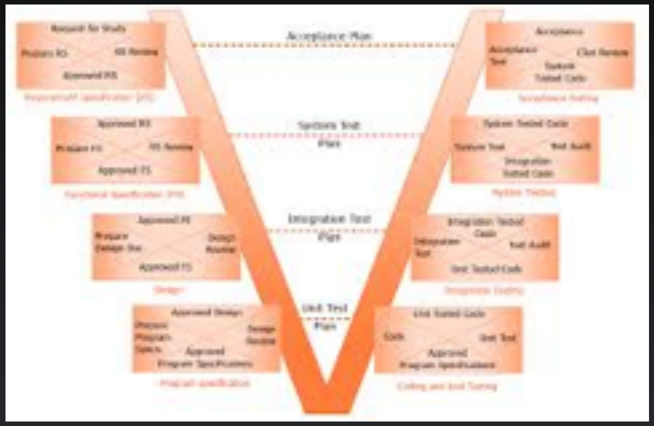

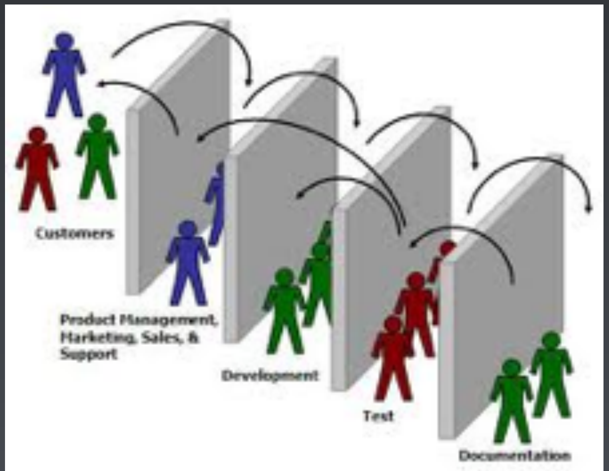

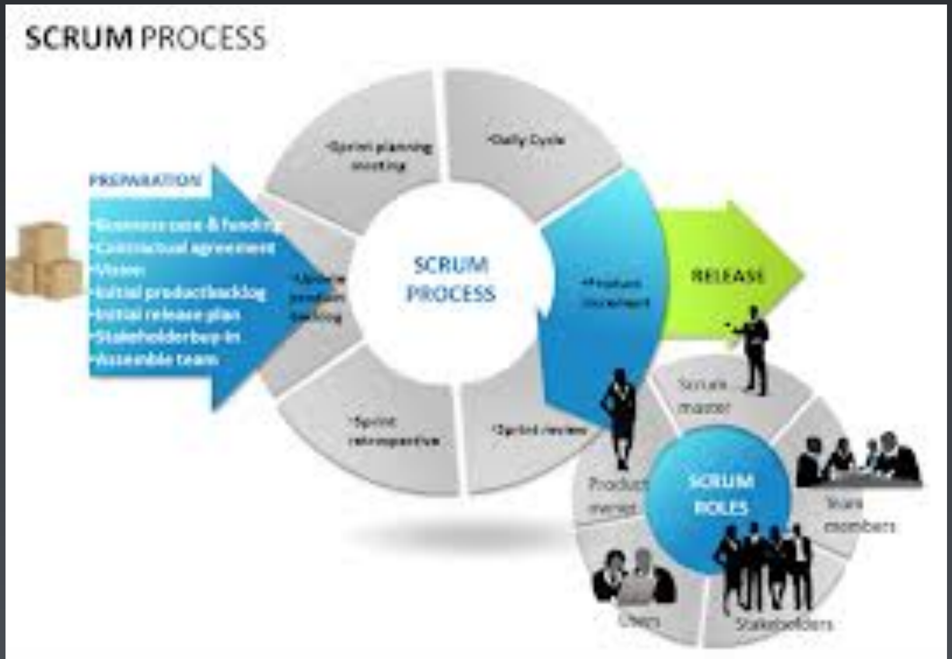

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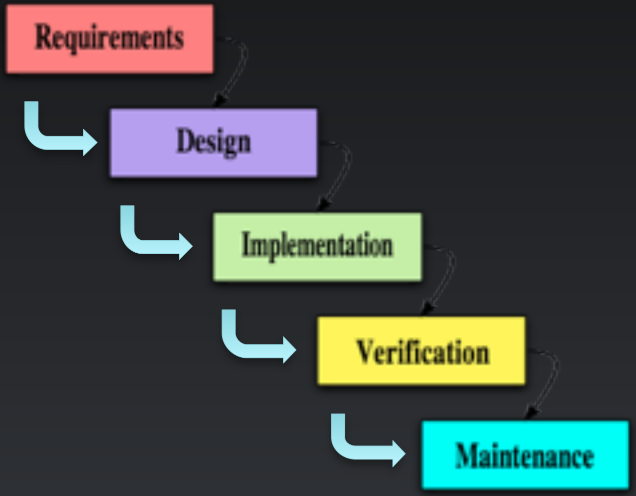
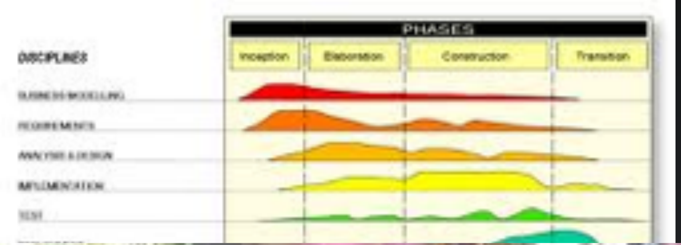
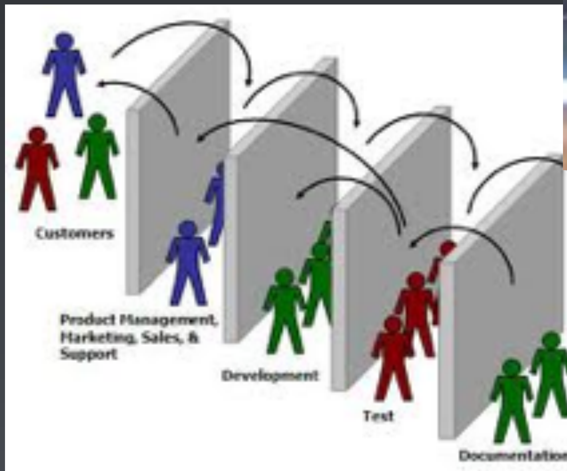


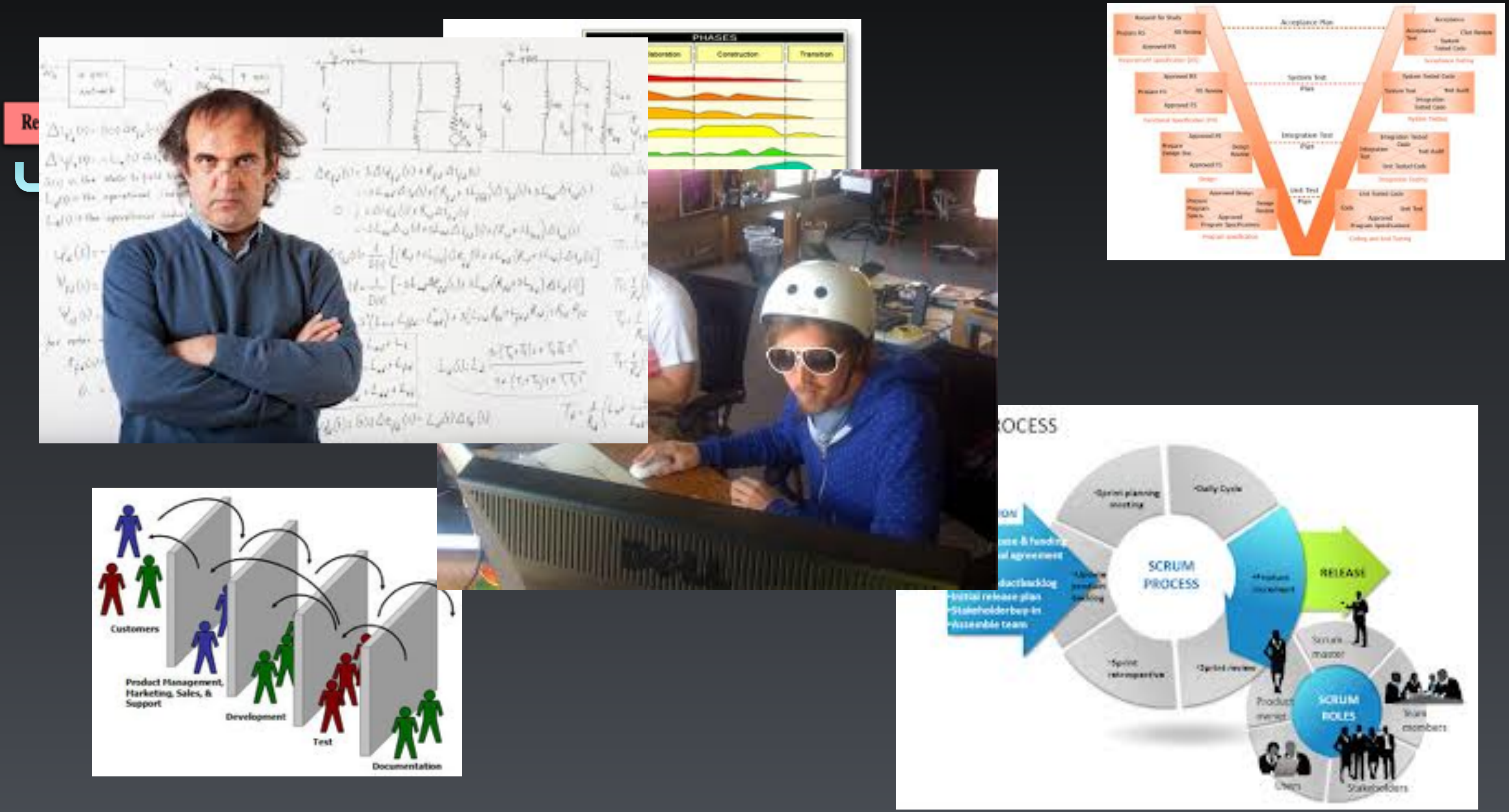


Acceptance Plan
System Test Plan
Integration Test Plan
Unit Test Plan



OCESS
ON
ase & funding
al agreement
duct backlog
Initial release plan
Stakeholder buy-in
Assemble team
Sprint planning meeting
Daily Cycle
SCRUM PROCESS
Product increment
RELEASE
Sprint retrospective
Sprint review
Scrum master
SCRUM ROLES
Product owner
Team members
Users
Stakeholders

What Have We Tried?



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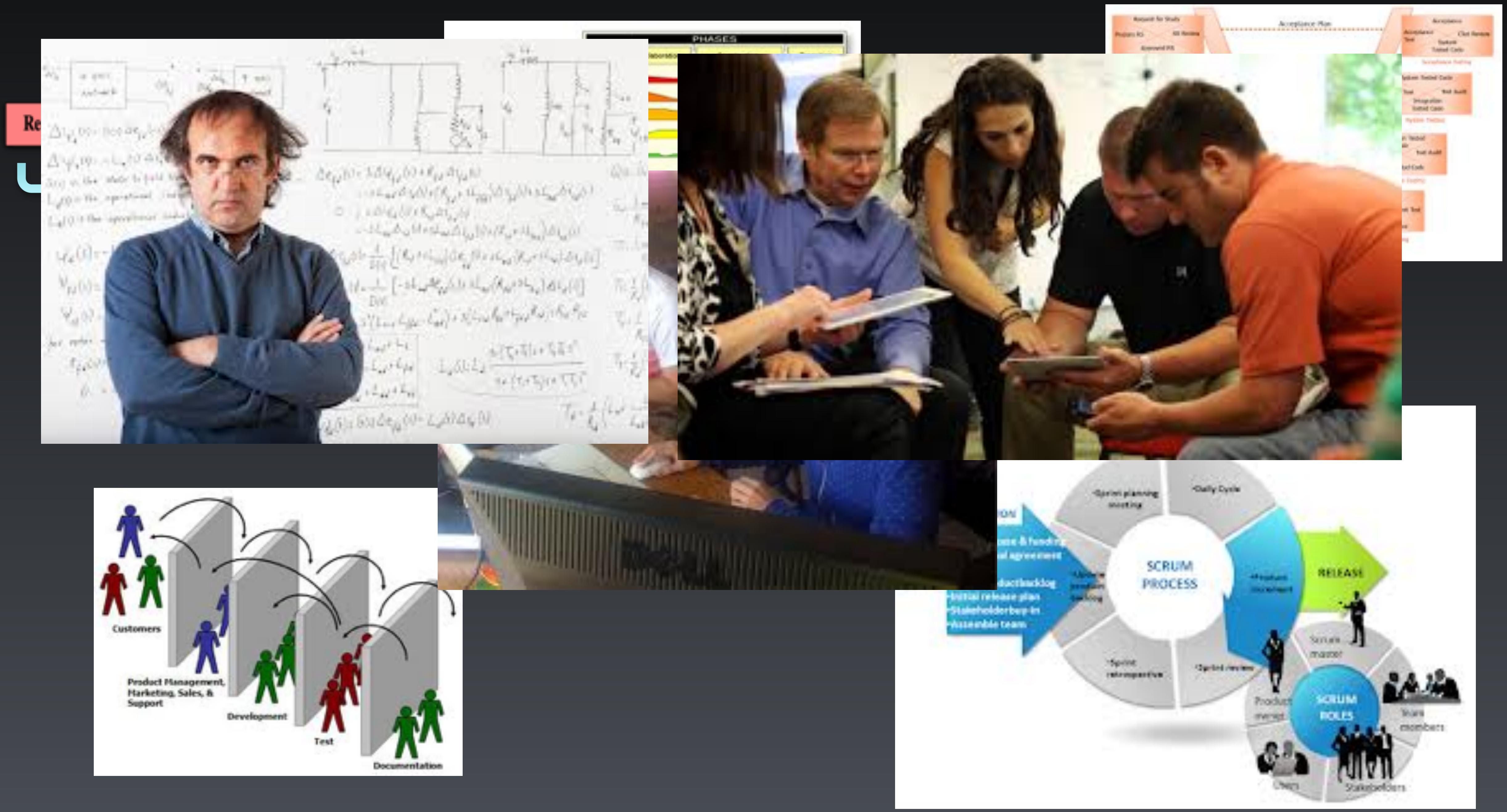

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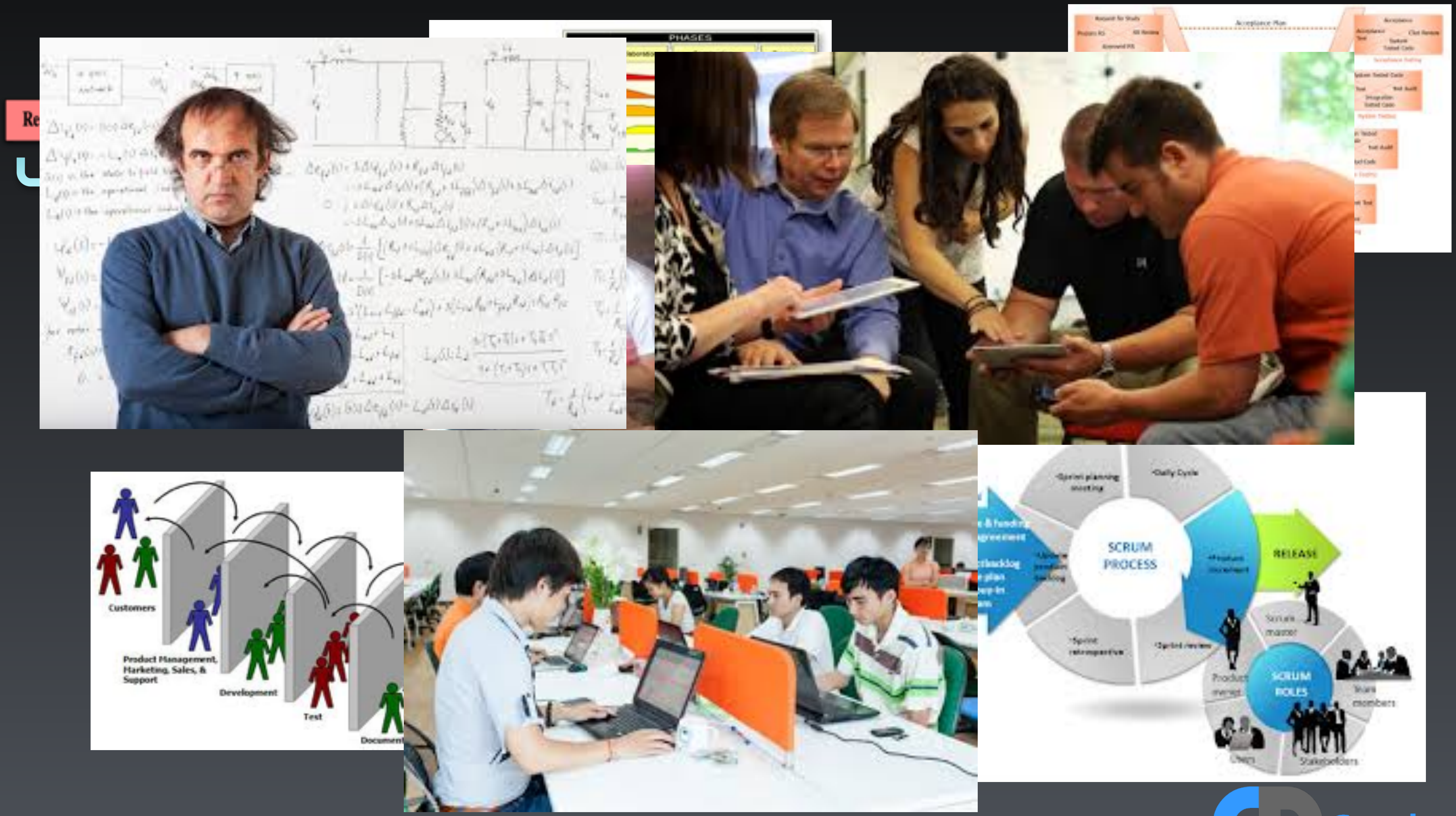

Learning From Our Mistakes

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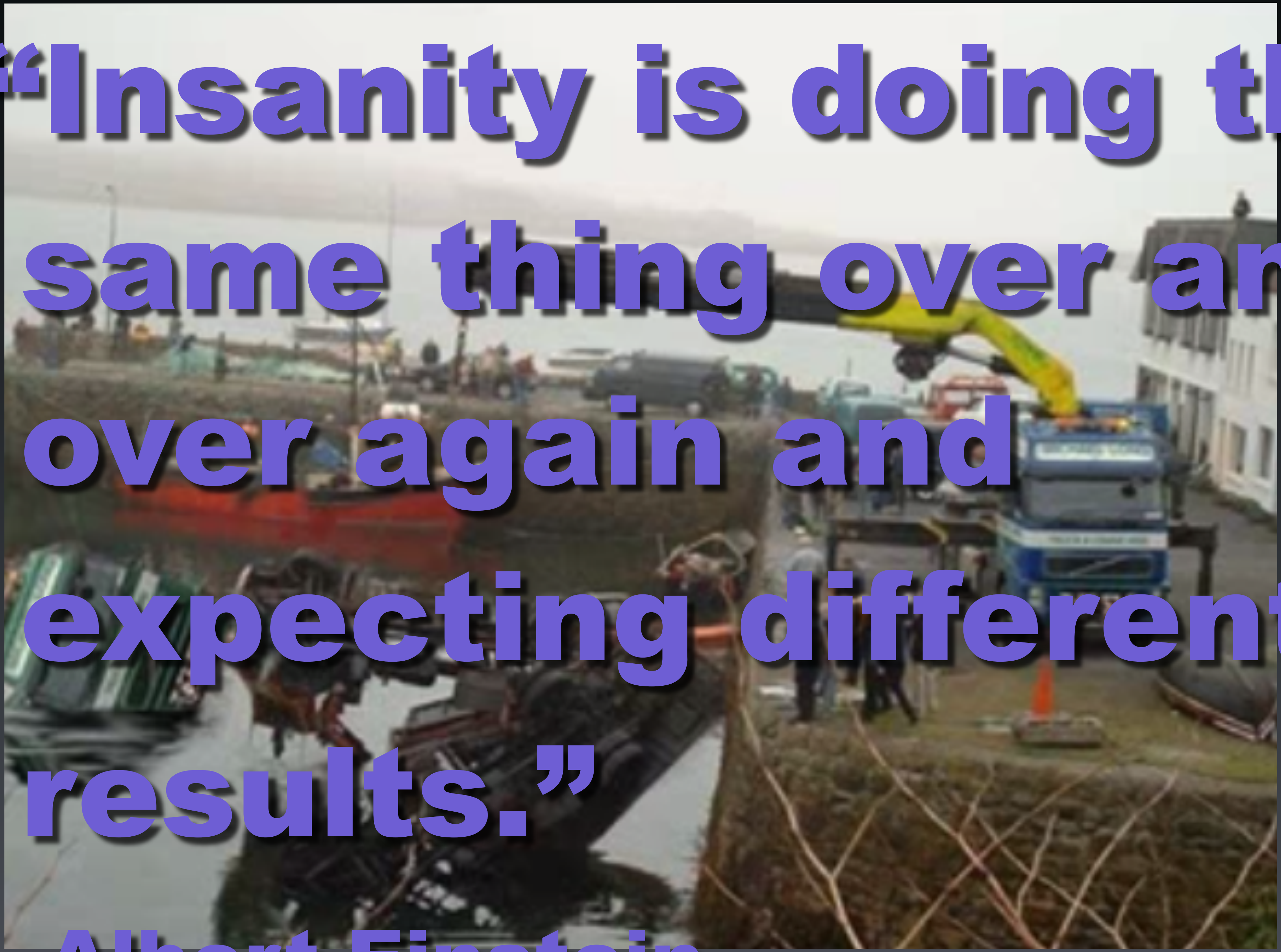
Learning From Our Mistakes



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

Albert Einstein

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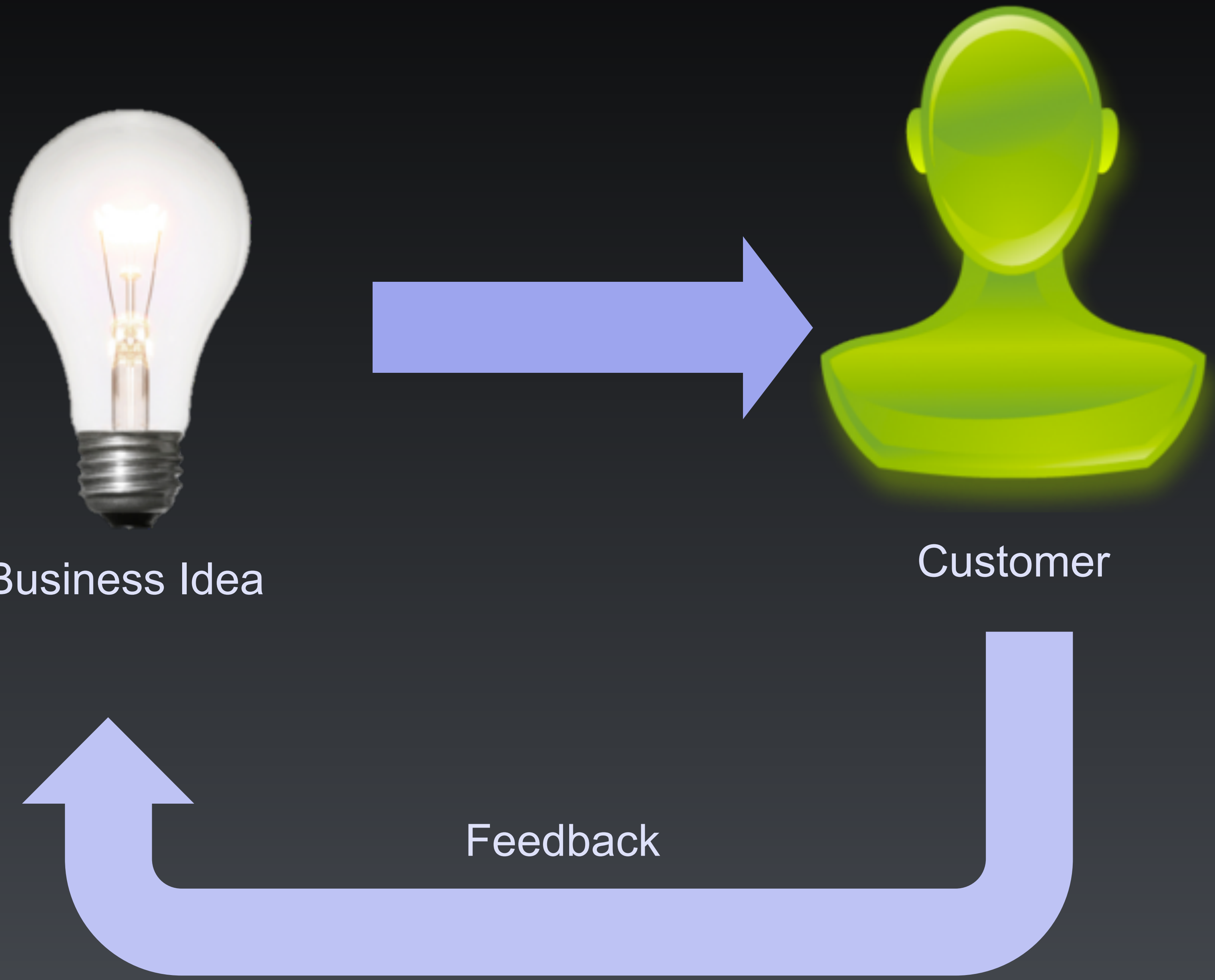
What Do We Really Want?



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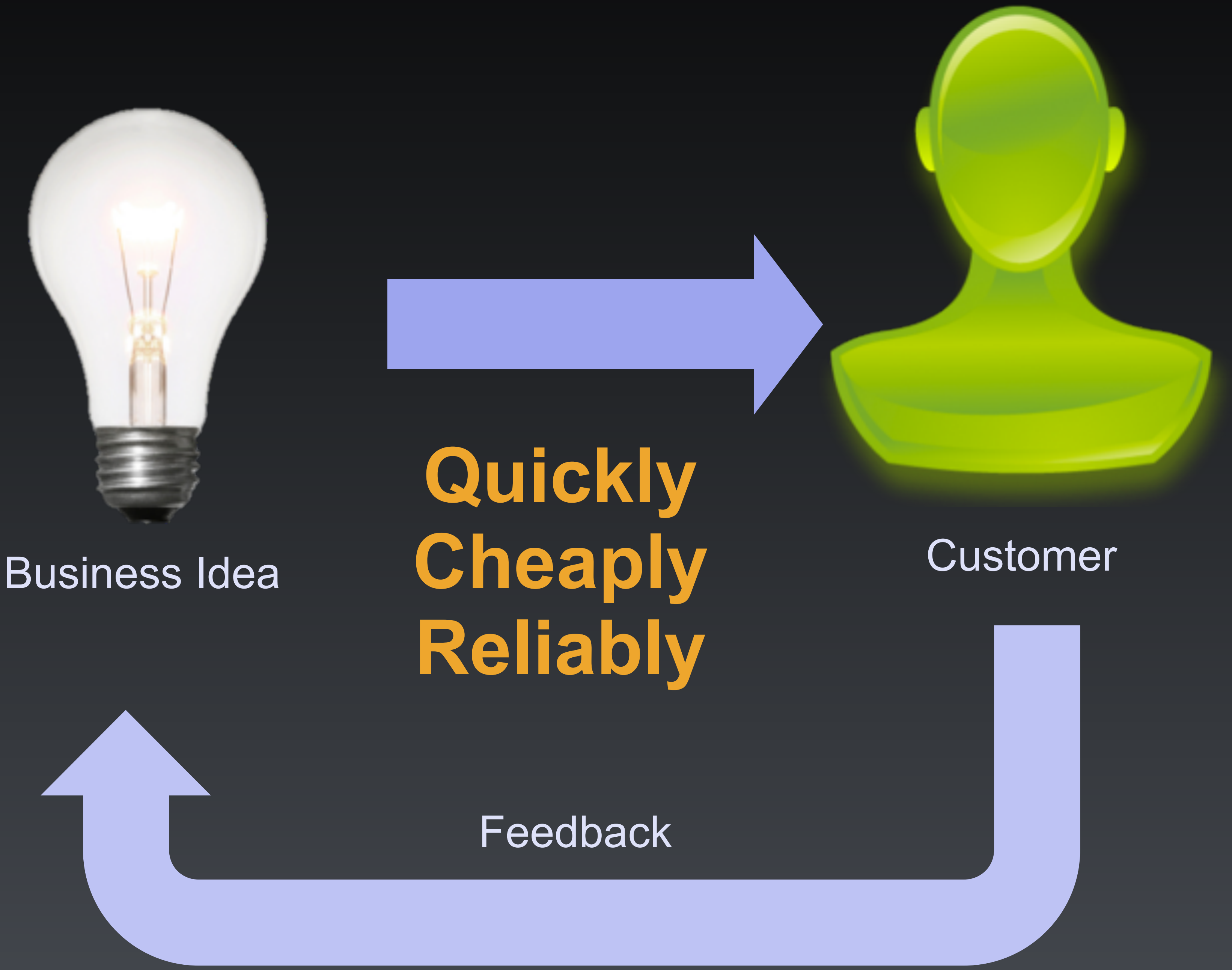

Business Idea

Quickly
Cheaply
Reliably

Customer

Feedback

A Question….

A Question….

What is the most successful invention in human history?

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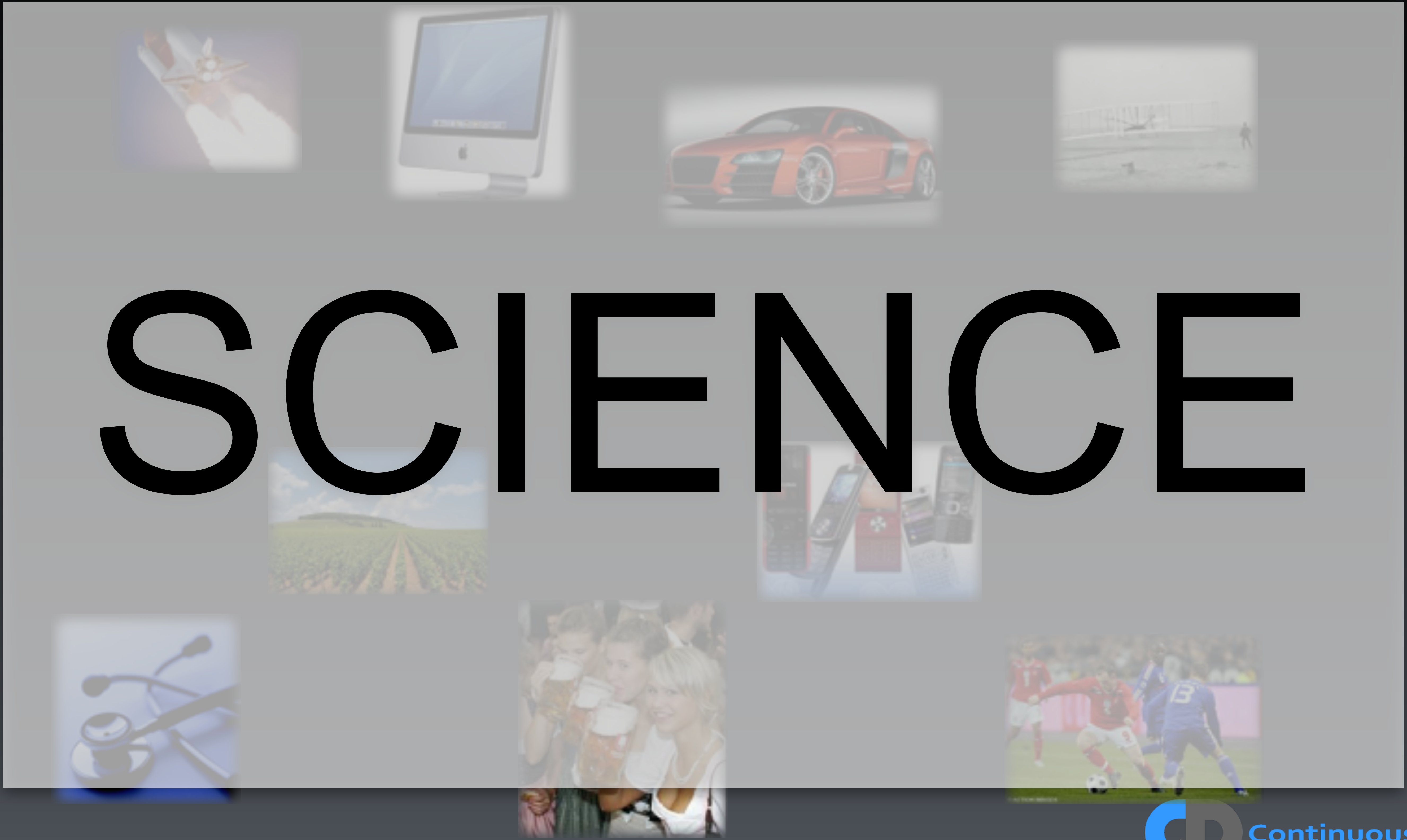
A Question….



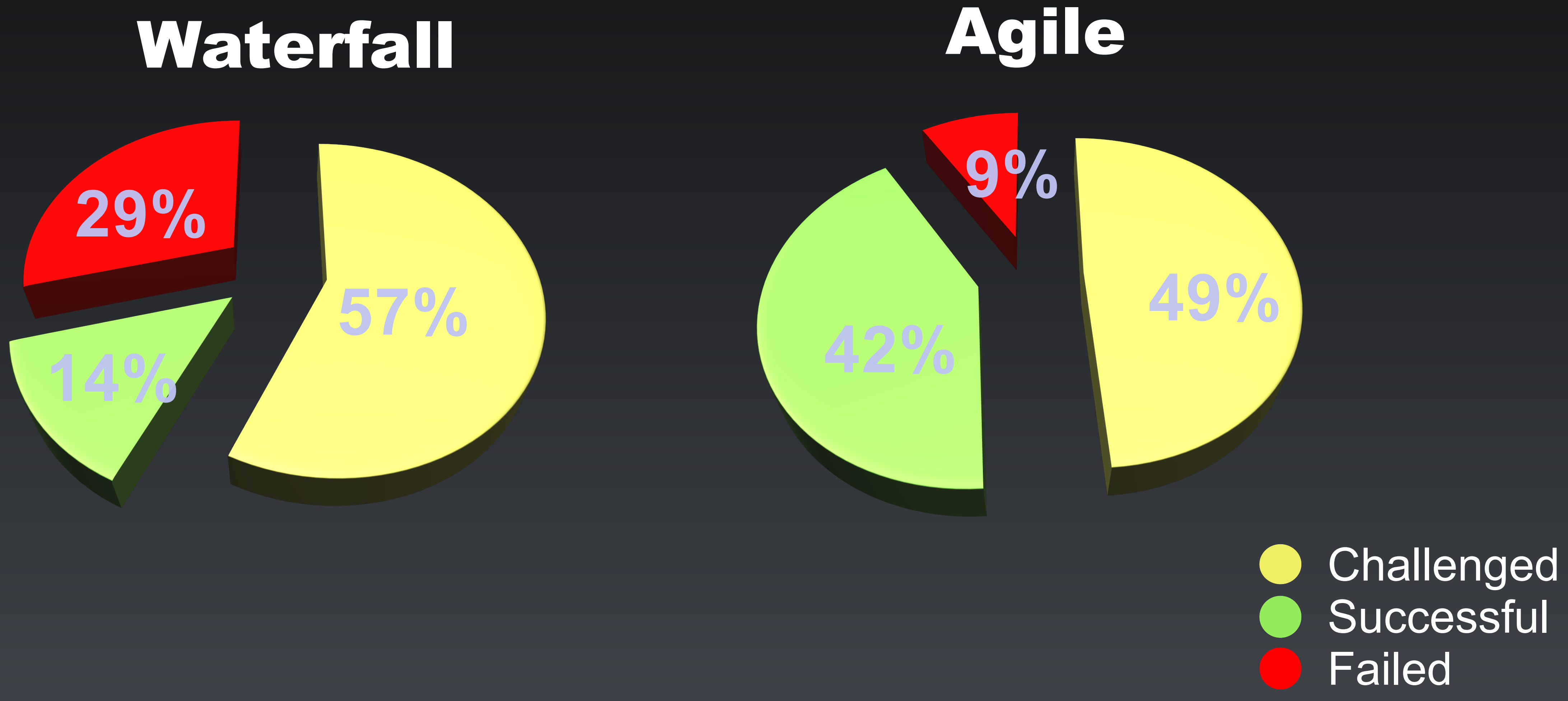
SCIENCE

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!

What Works?



Source: The CHAOS Manifesto, The Standish Group 2012

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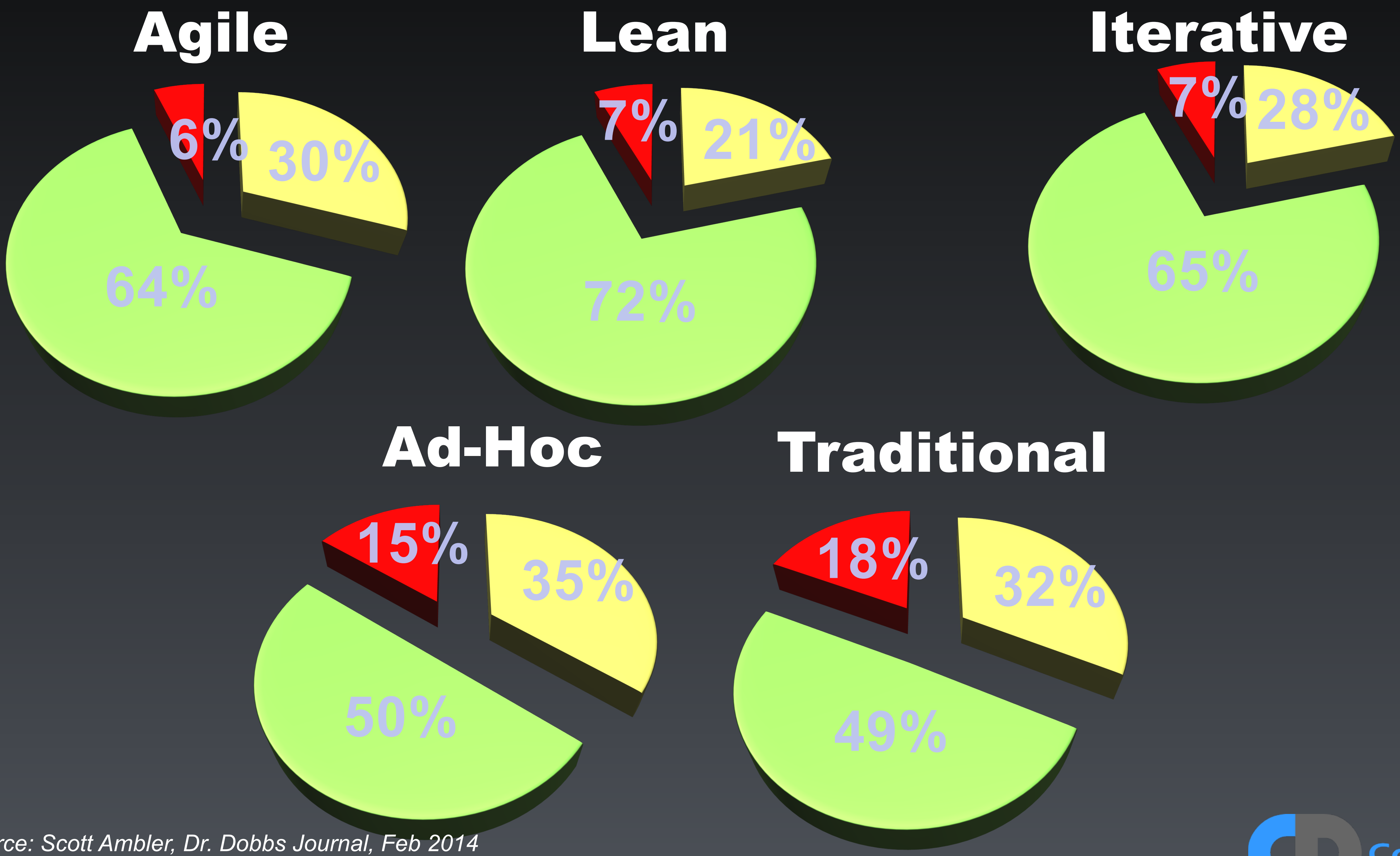
What Works? - More Data



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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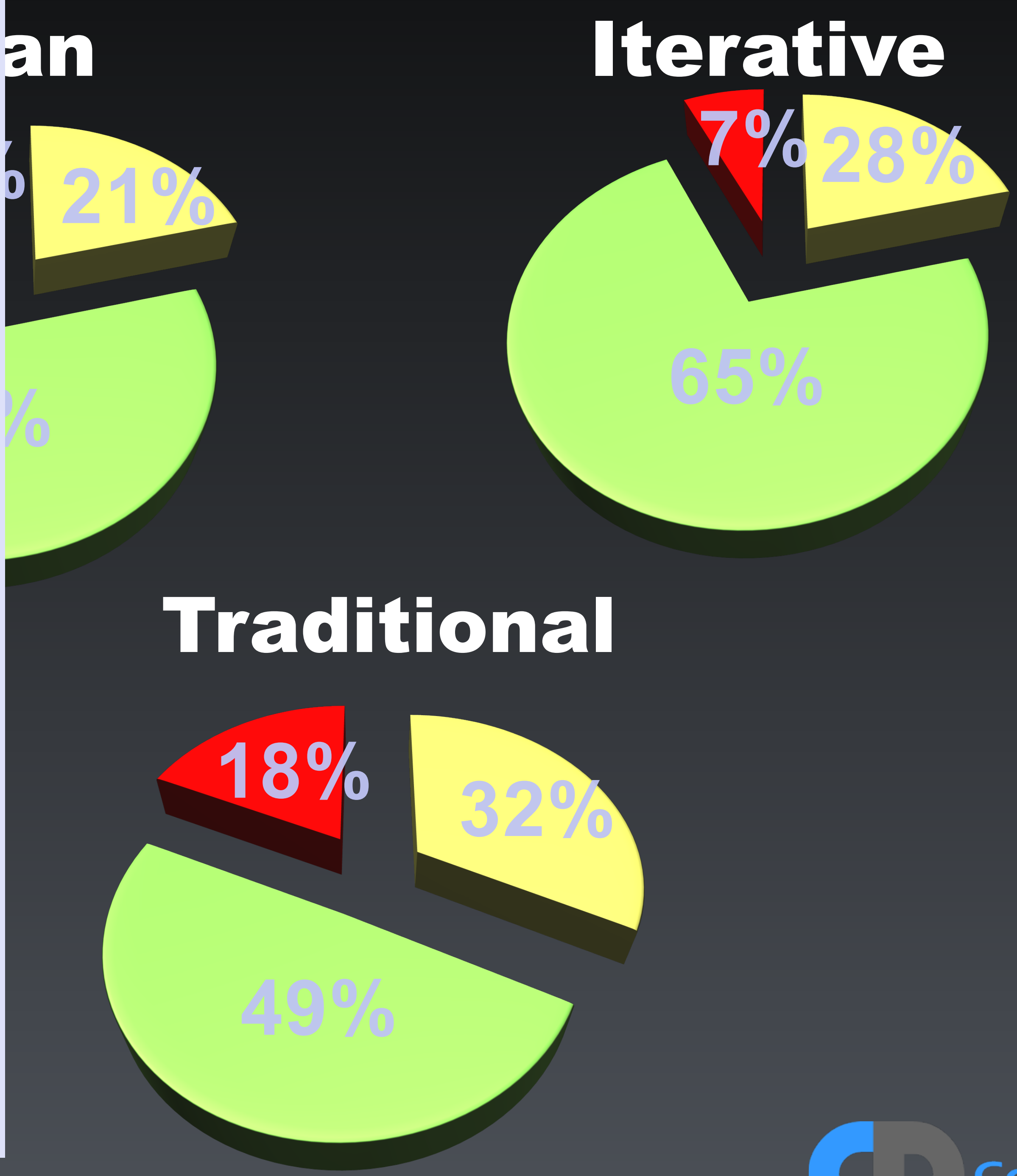
What Works? - More Data

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



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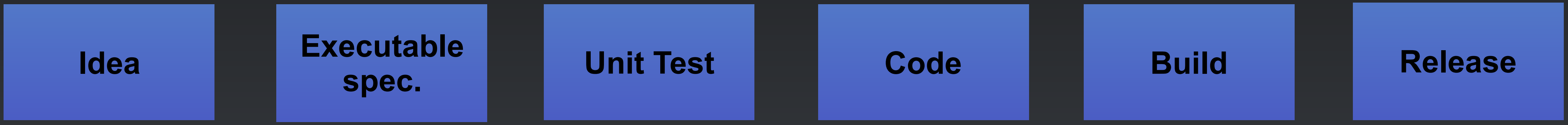
What Really Works?

Smart Automation - a repeatable, reliable process for releasing software



Idea

Executable spec.

Unit Test

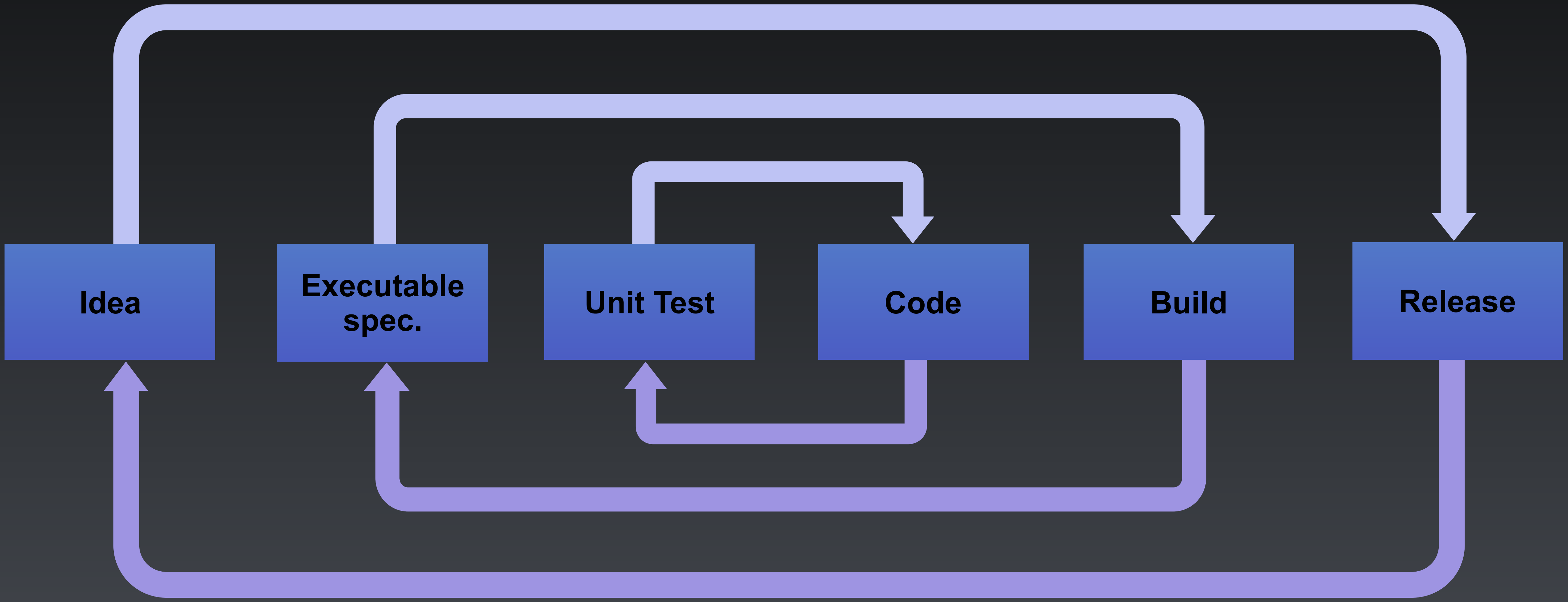
Code

Build

Release

What Really Works?

Smart Automation - a repeatable, reliable process for releasing software



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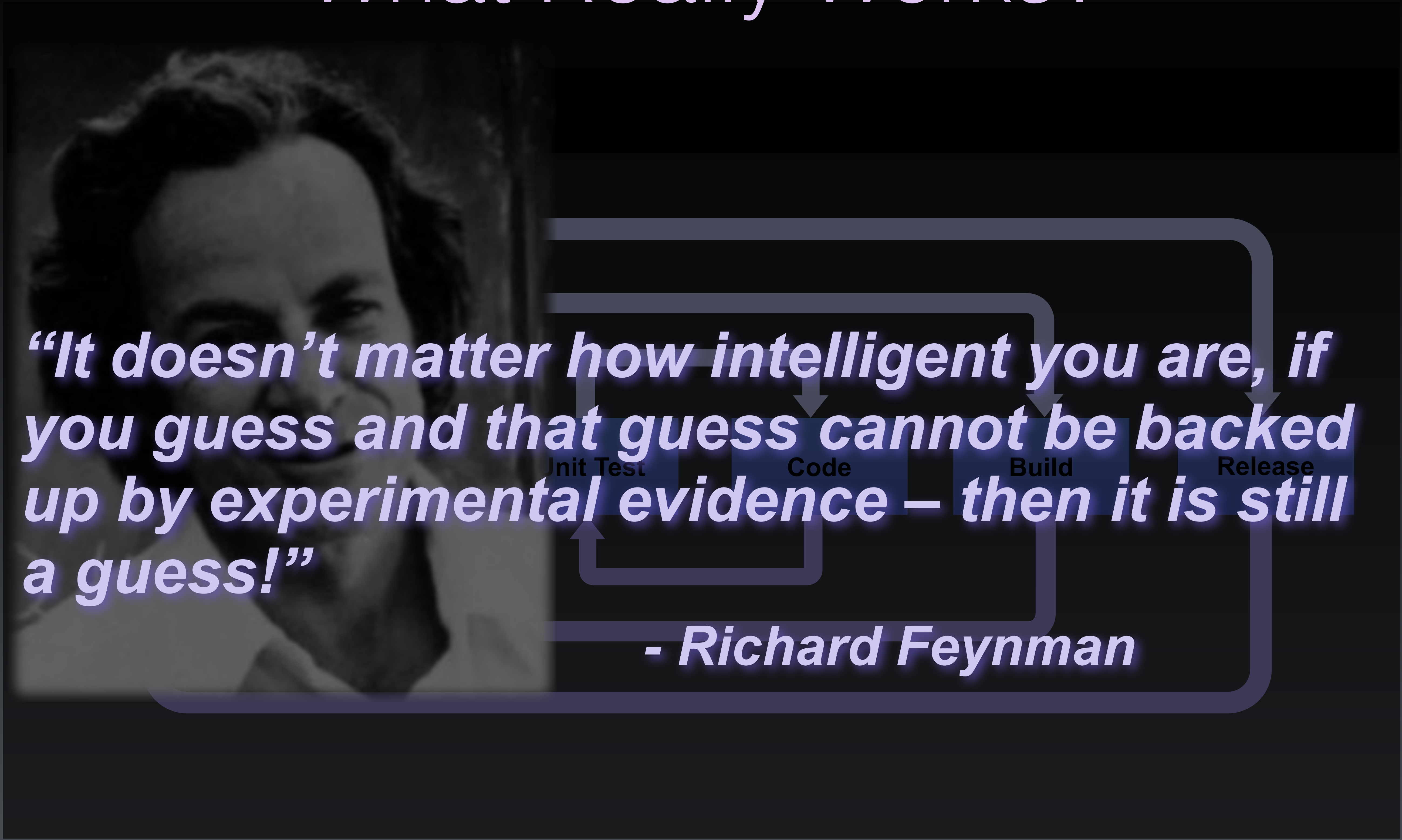
What Really Works?



"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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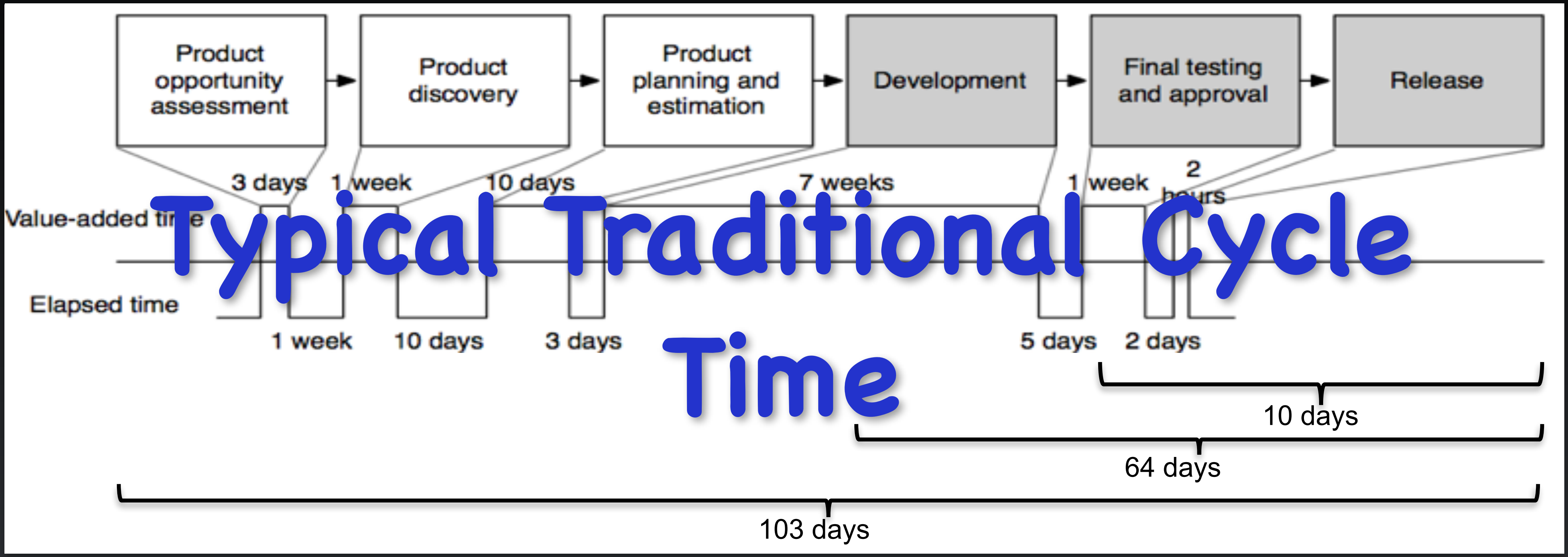
Cycle-Time



Typical Traditional Cycle Time

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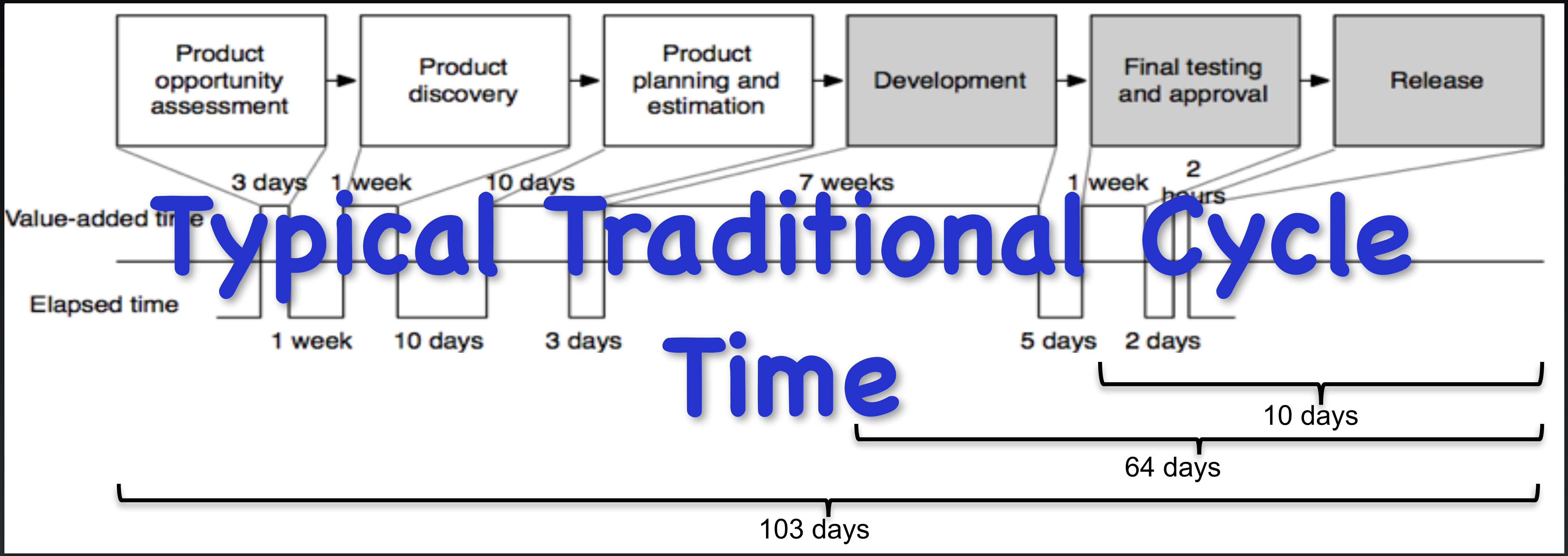
Cycle-Time



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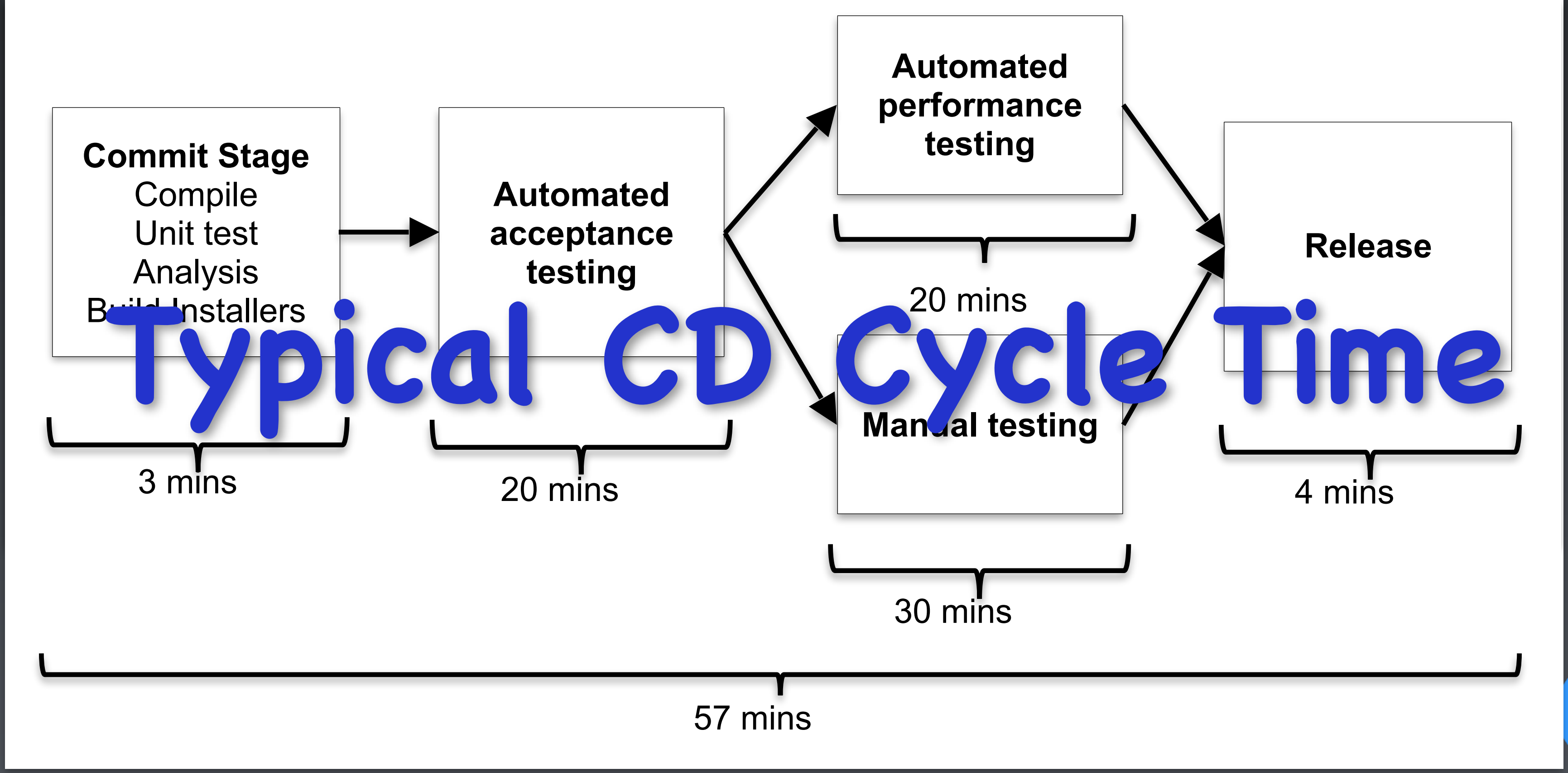

Typical CD Cycle Time

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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!

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.

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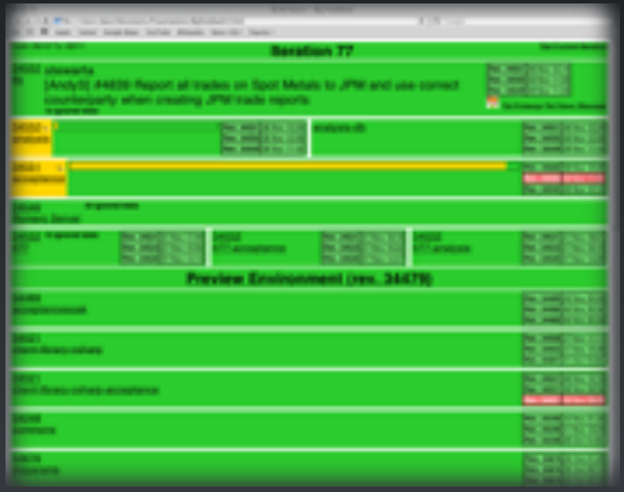
> “If Agile software development was the opening act to a great performance, Continuous Delivery is the headliner.”
>
> Forrester Research 2013

What Does This Look Like?



Iteration 77

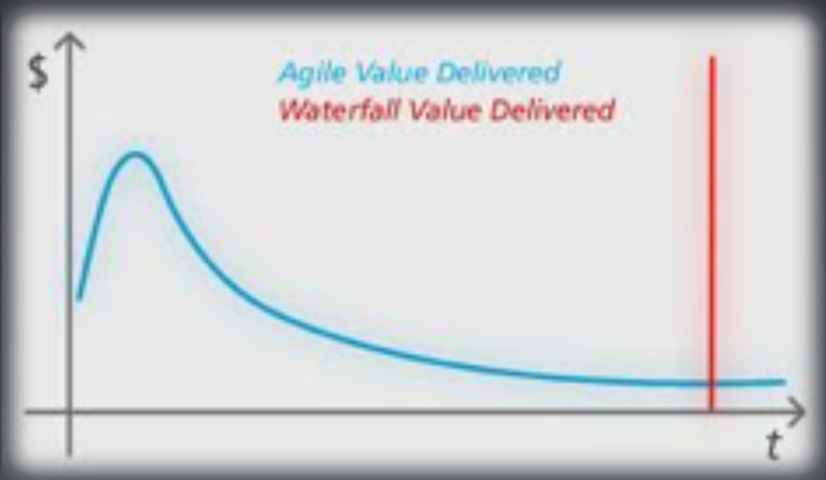
[AndyS] #4839 Report all trades on Spot Metals to JPM and use correct counterparty when creating JPM trade reports

analysis-db

ST acceptance

ST analysis

Preview Environment (rev. 34479)



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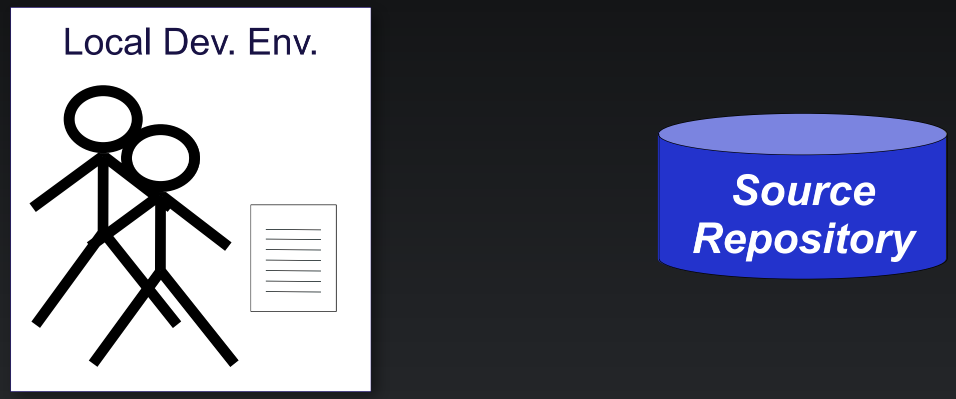
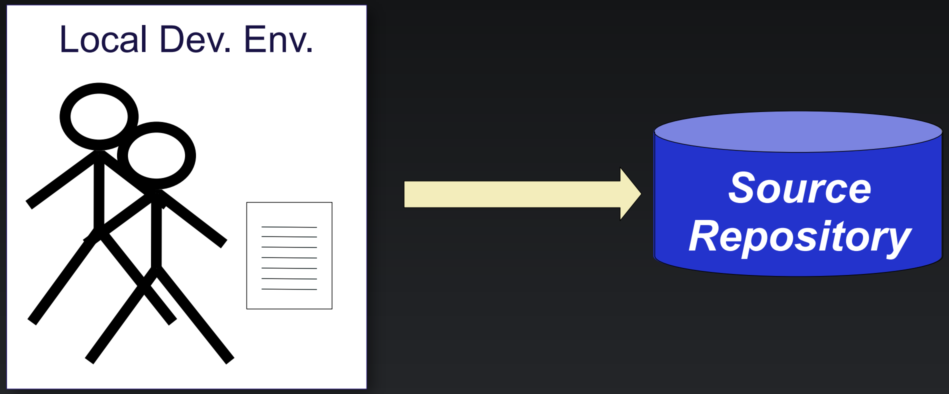
Example Continuous Delivery Process



Local Dev. Env.

Source Repository

Example Continuous Delivery Process



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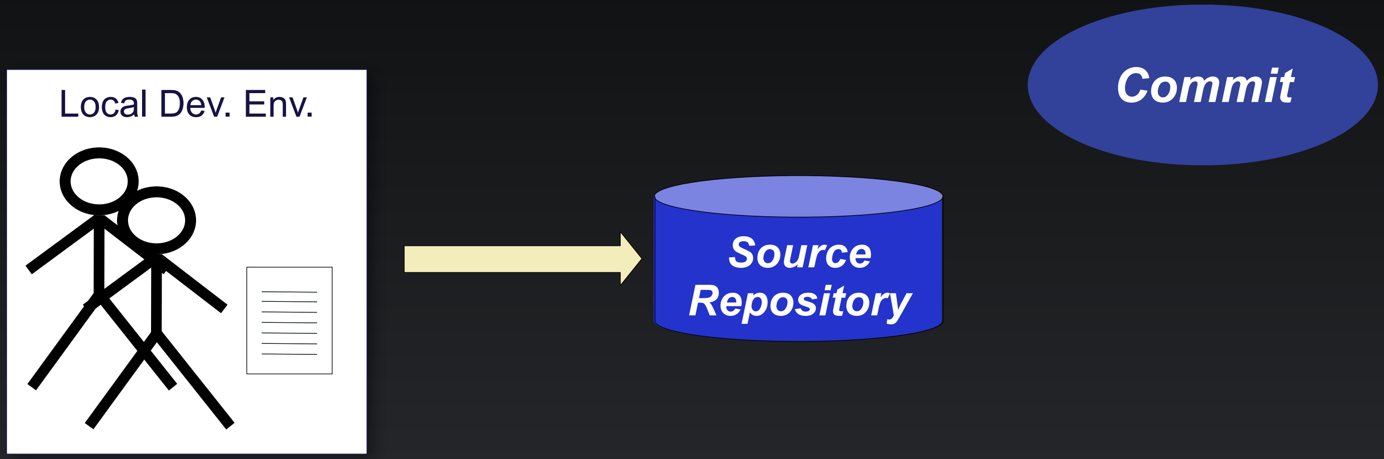

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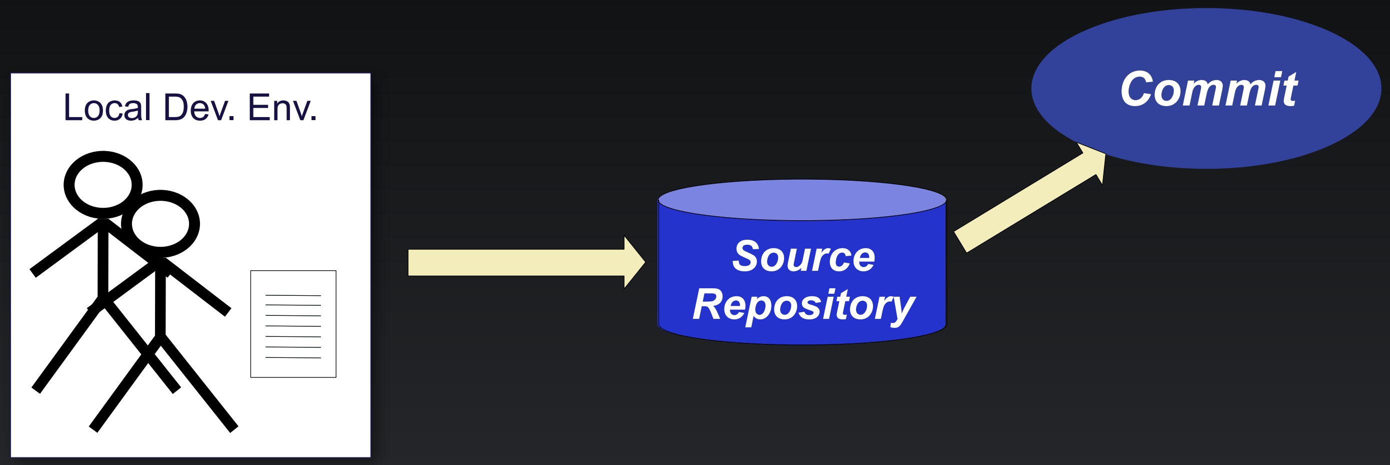

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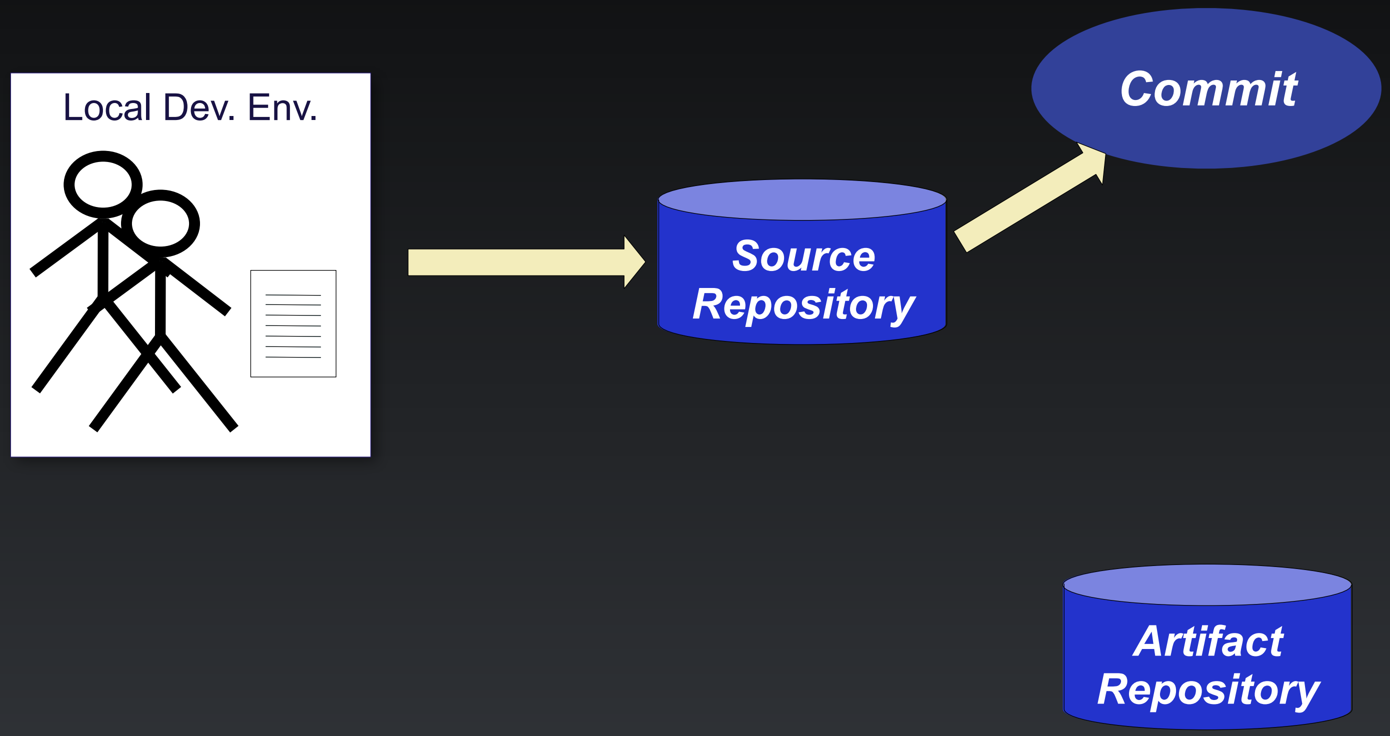

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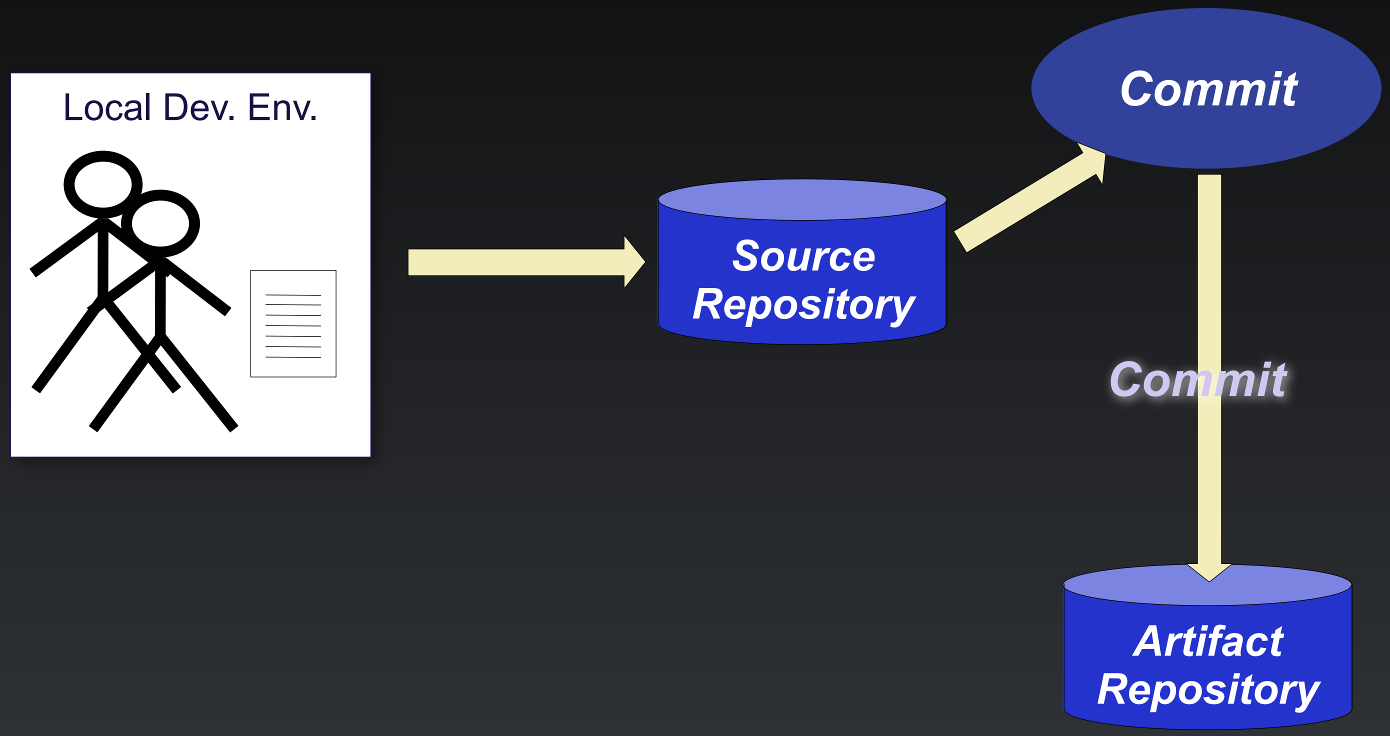

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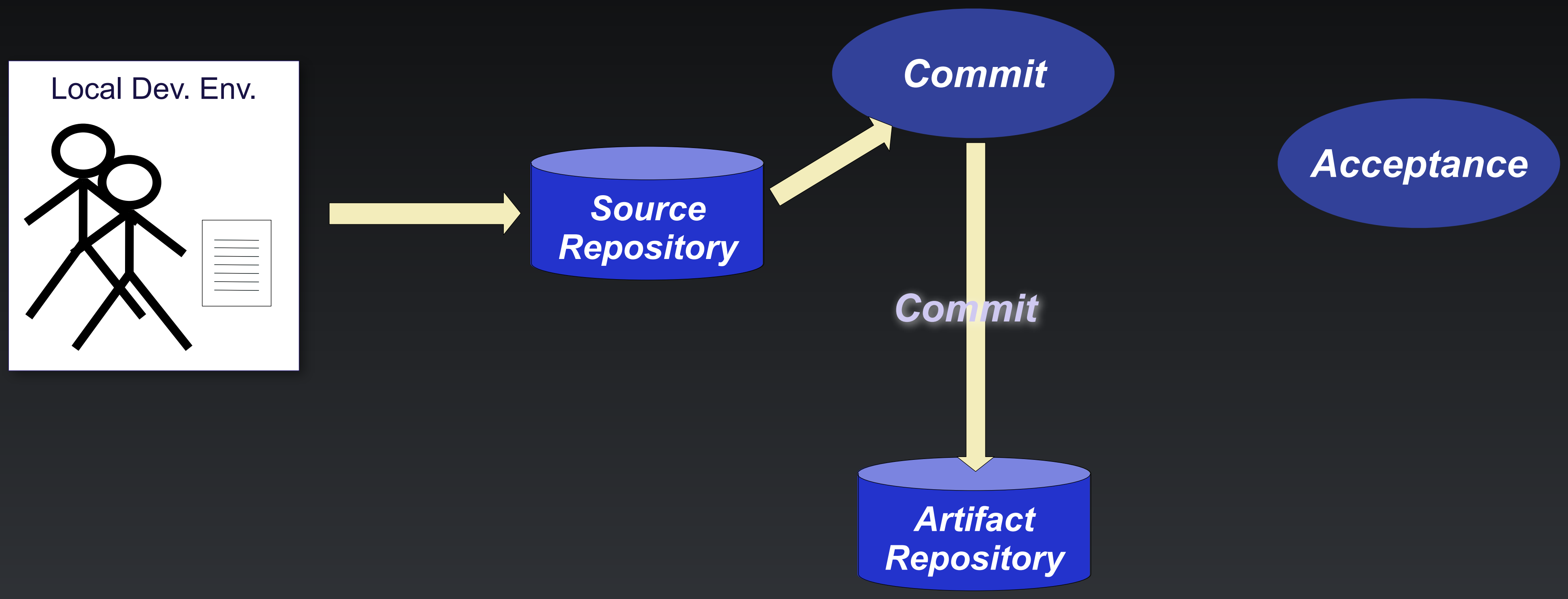

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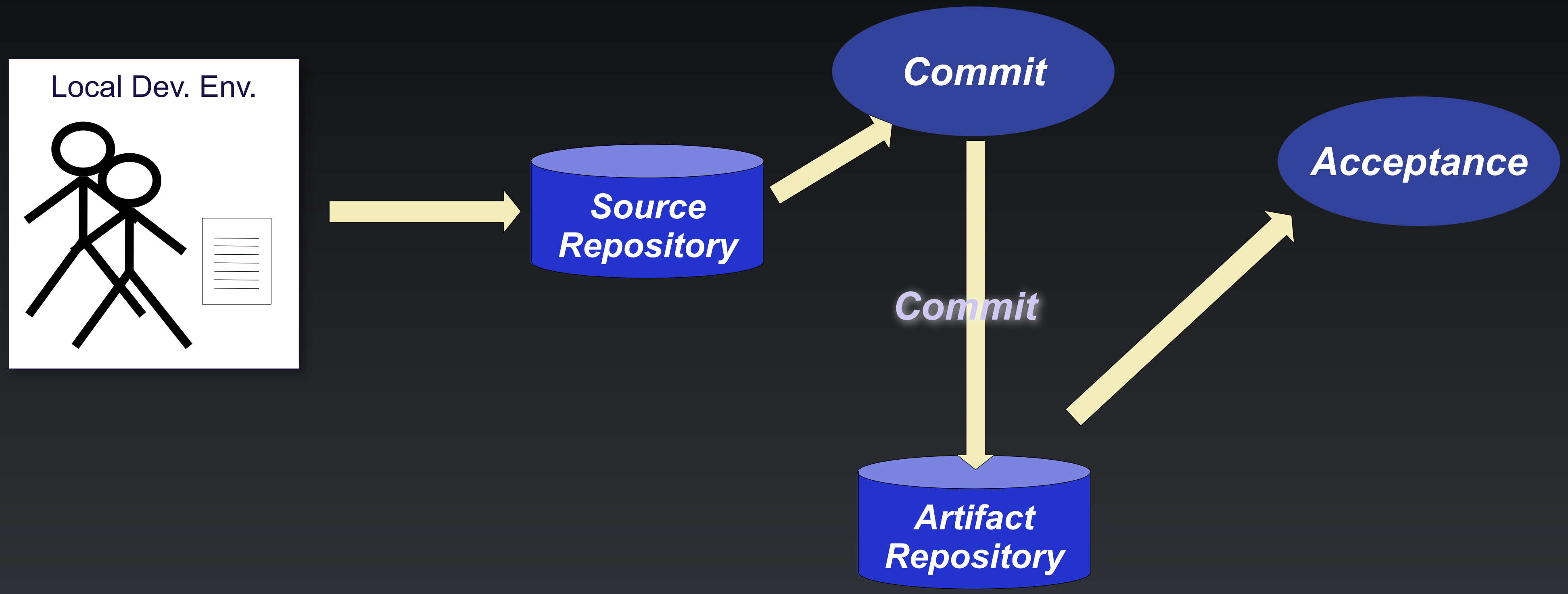

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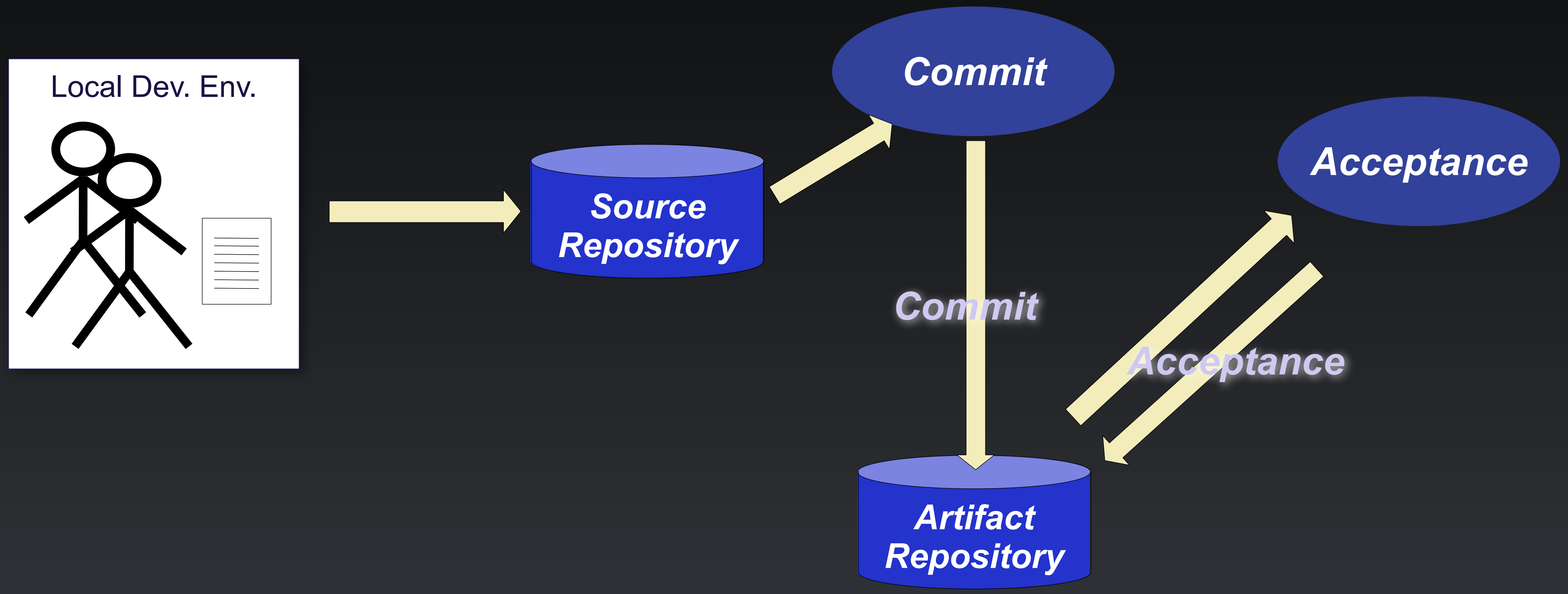

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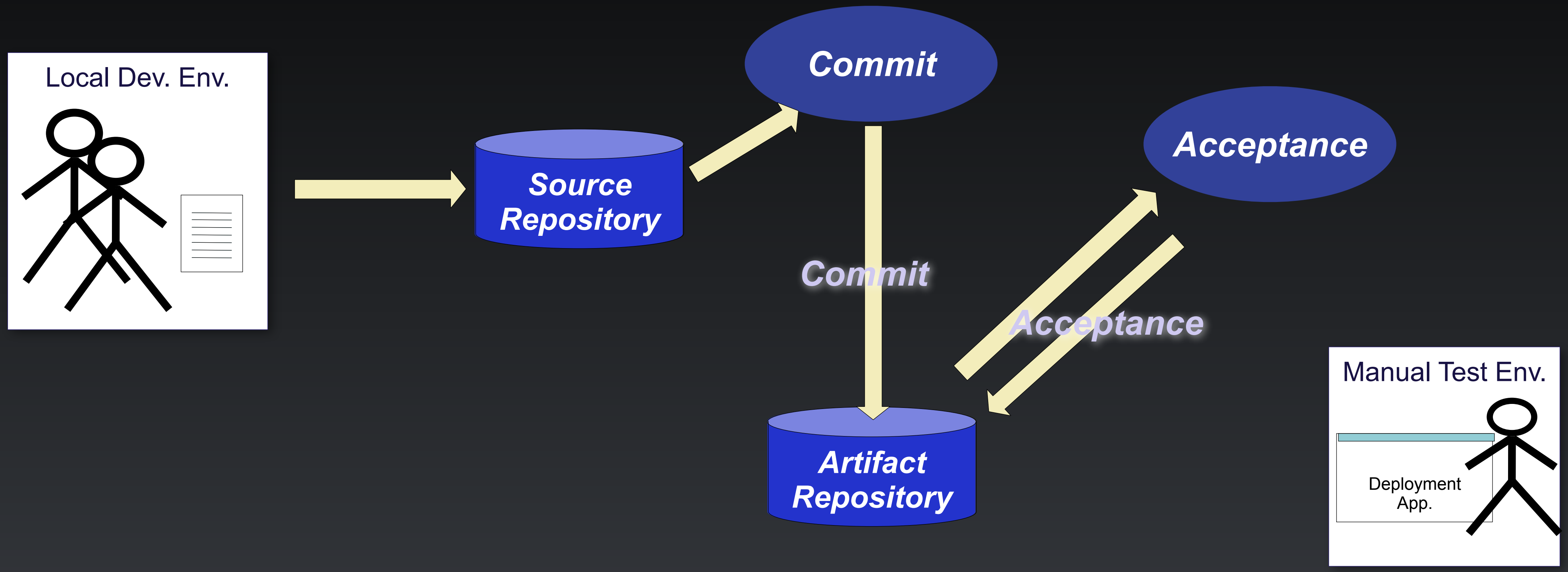

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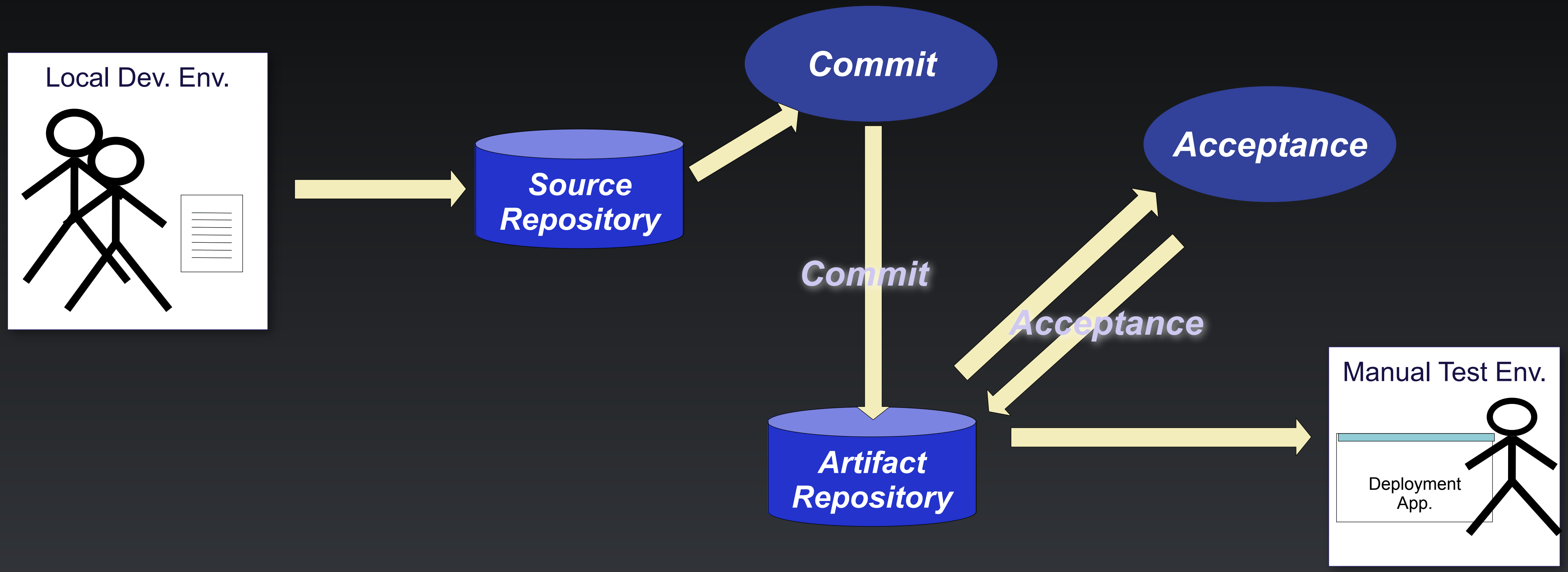

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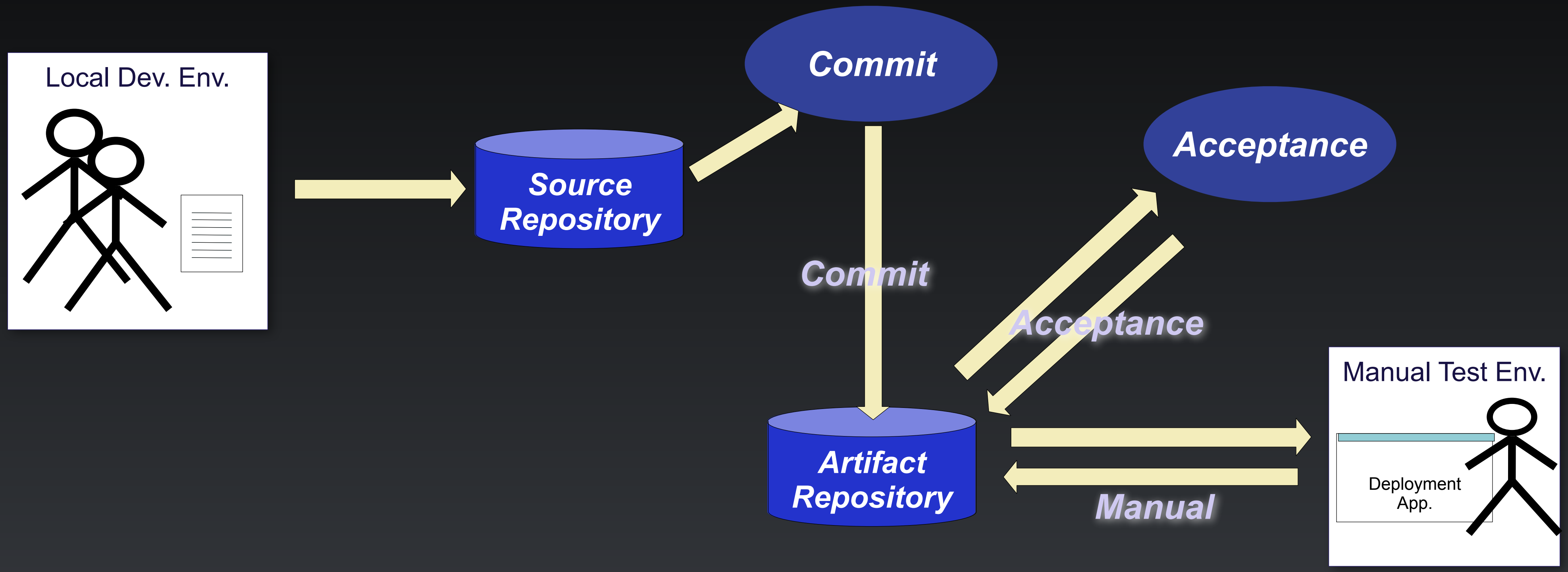

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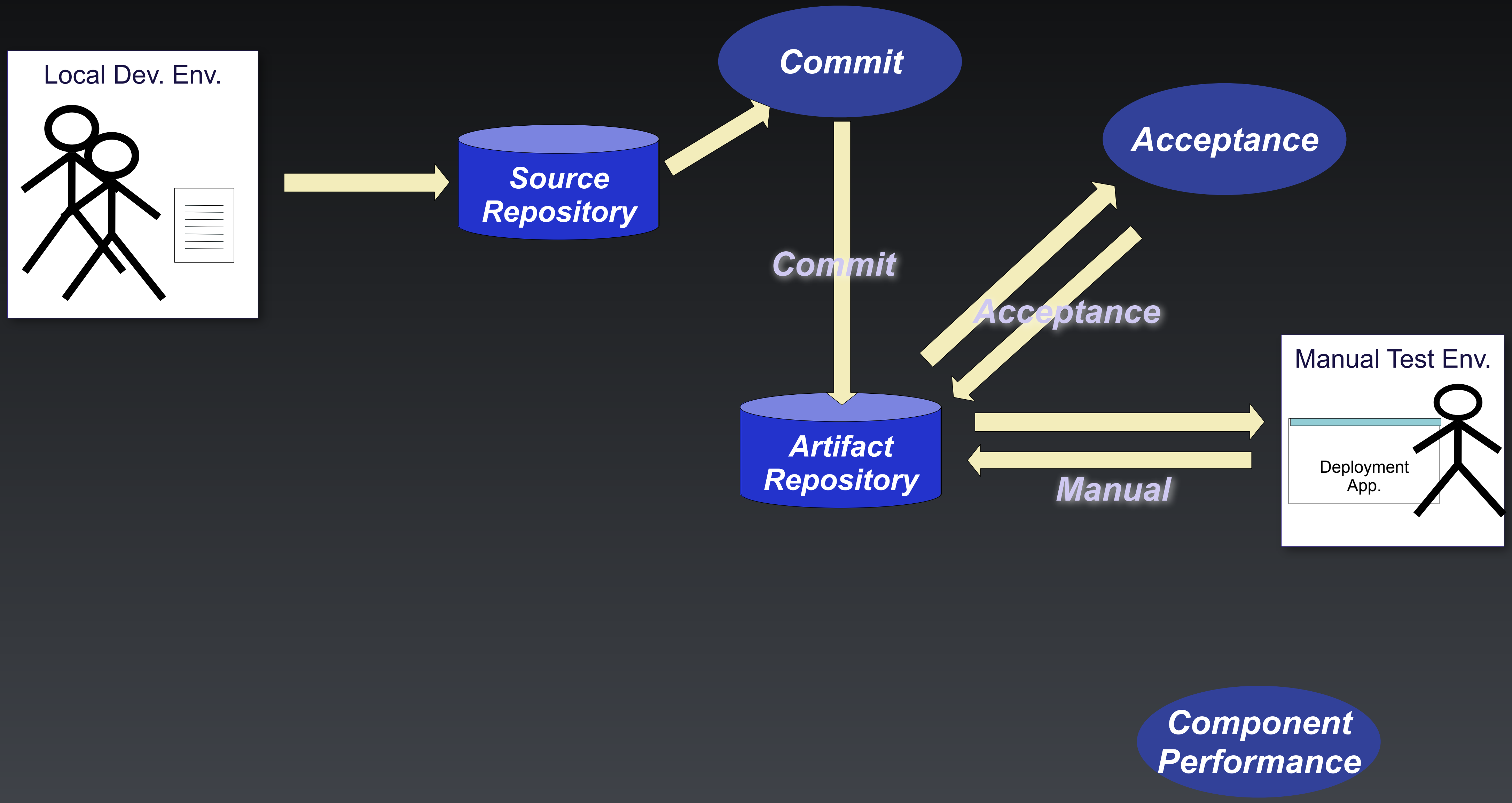

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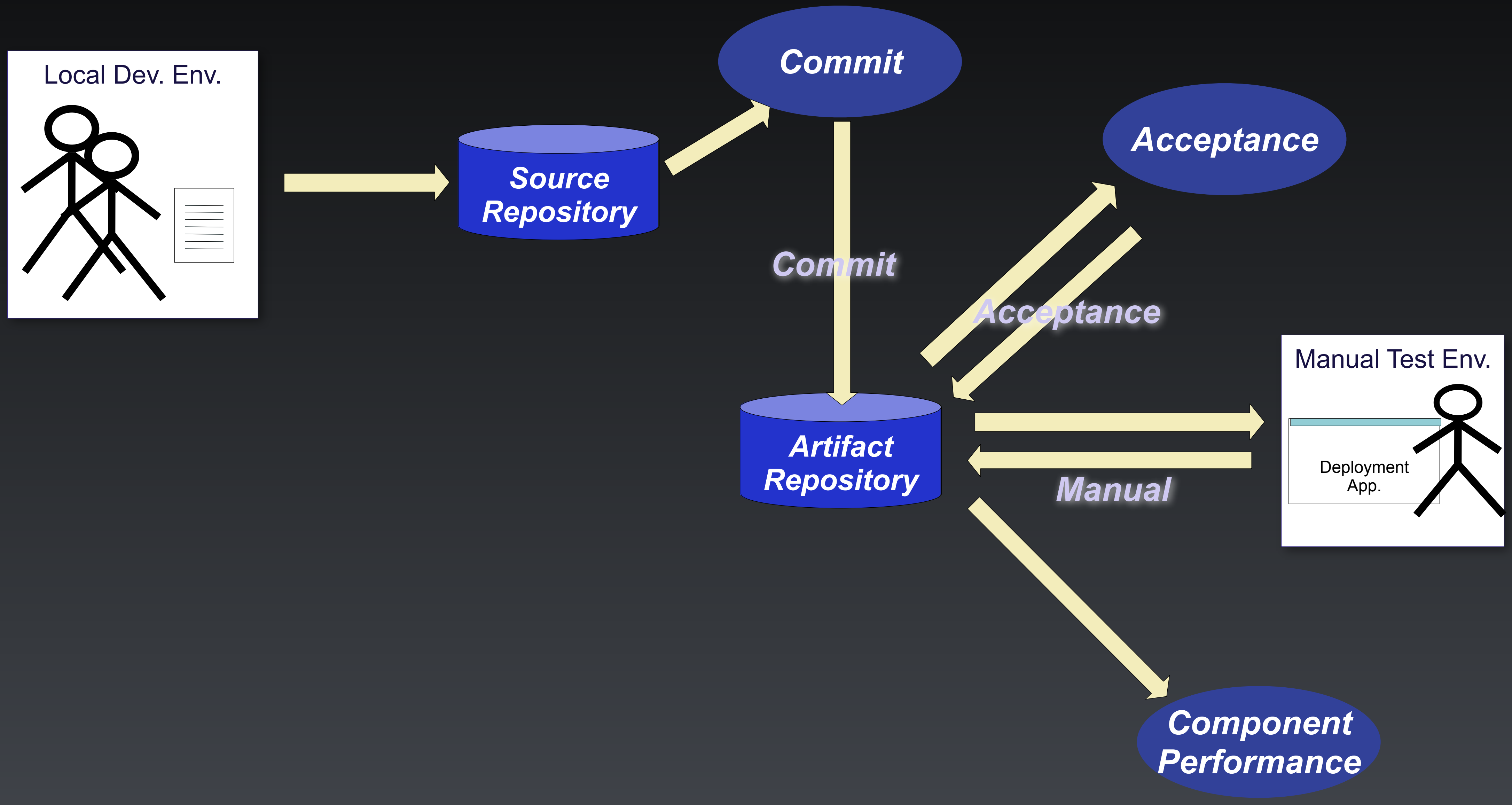

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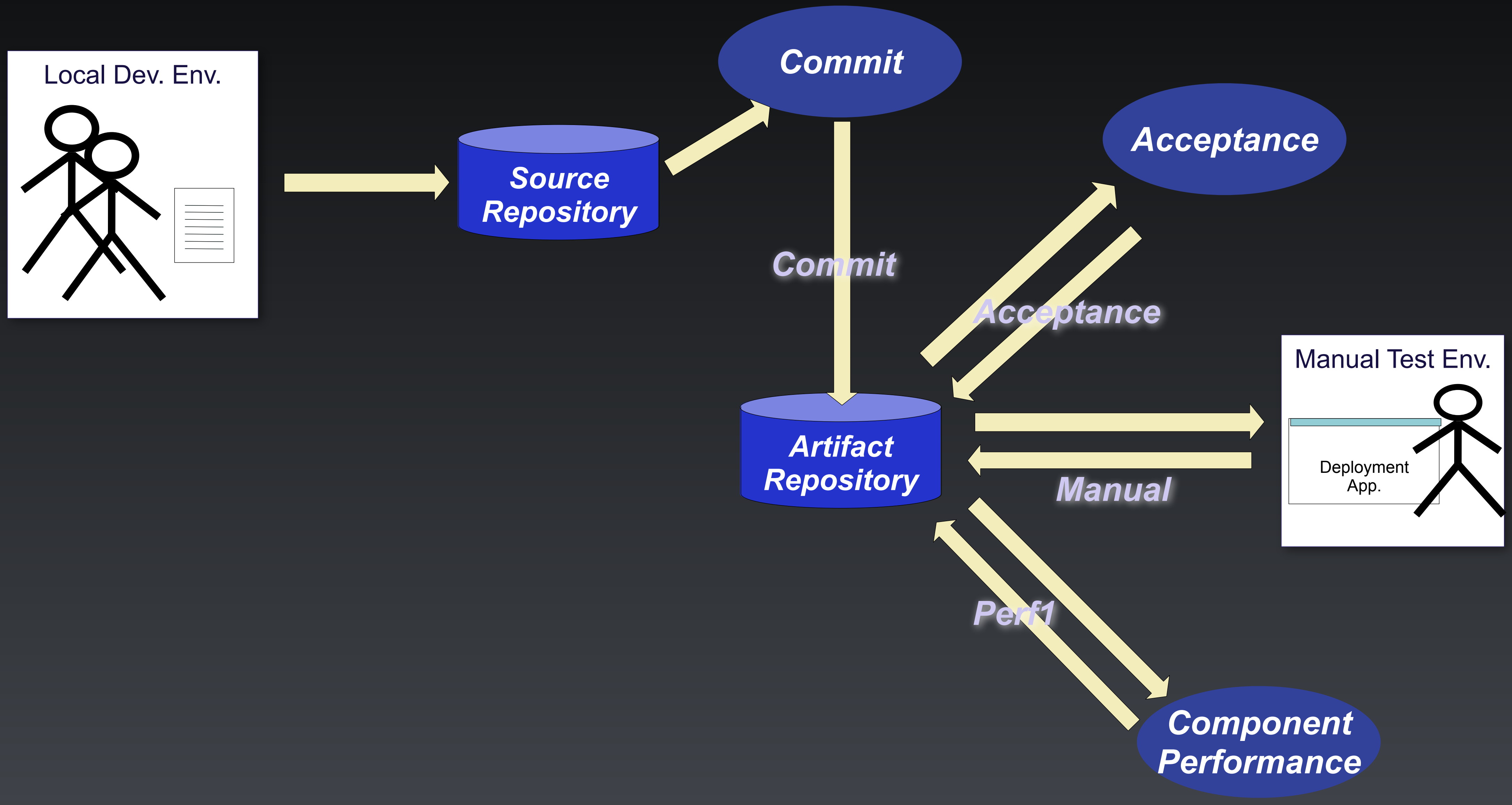

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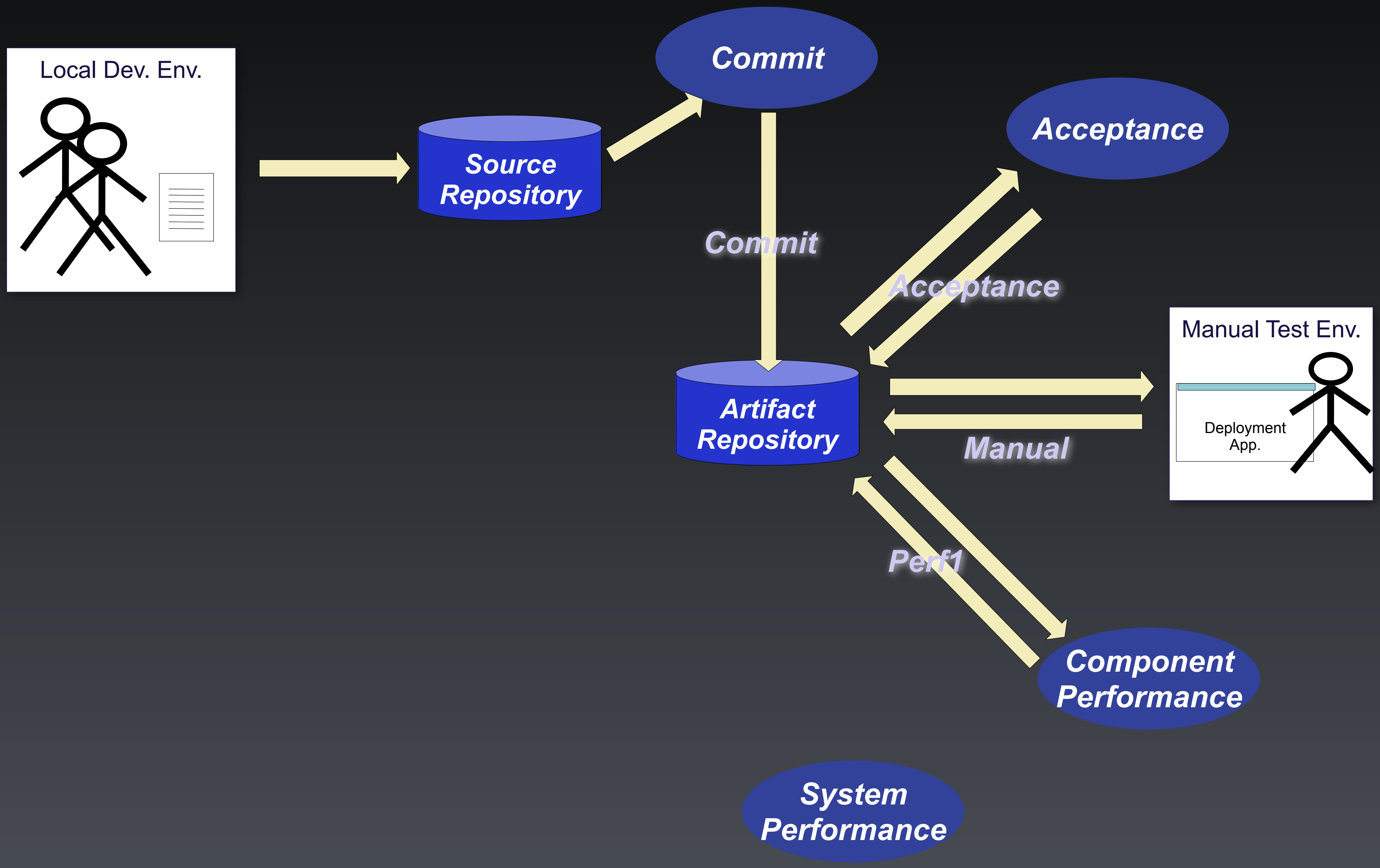

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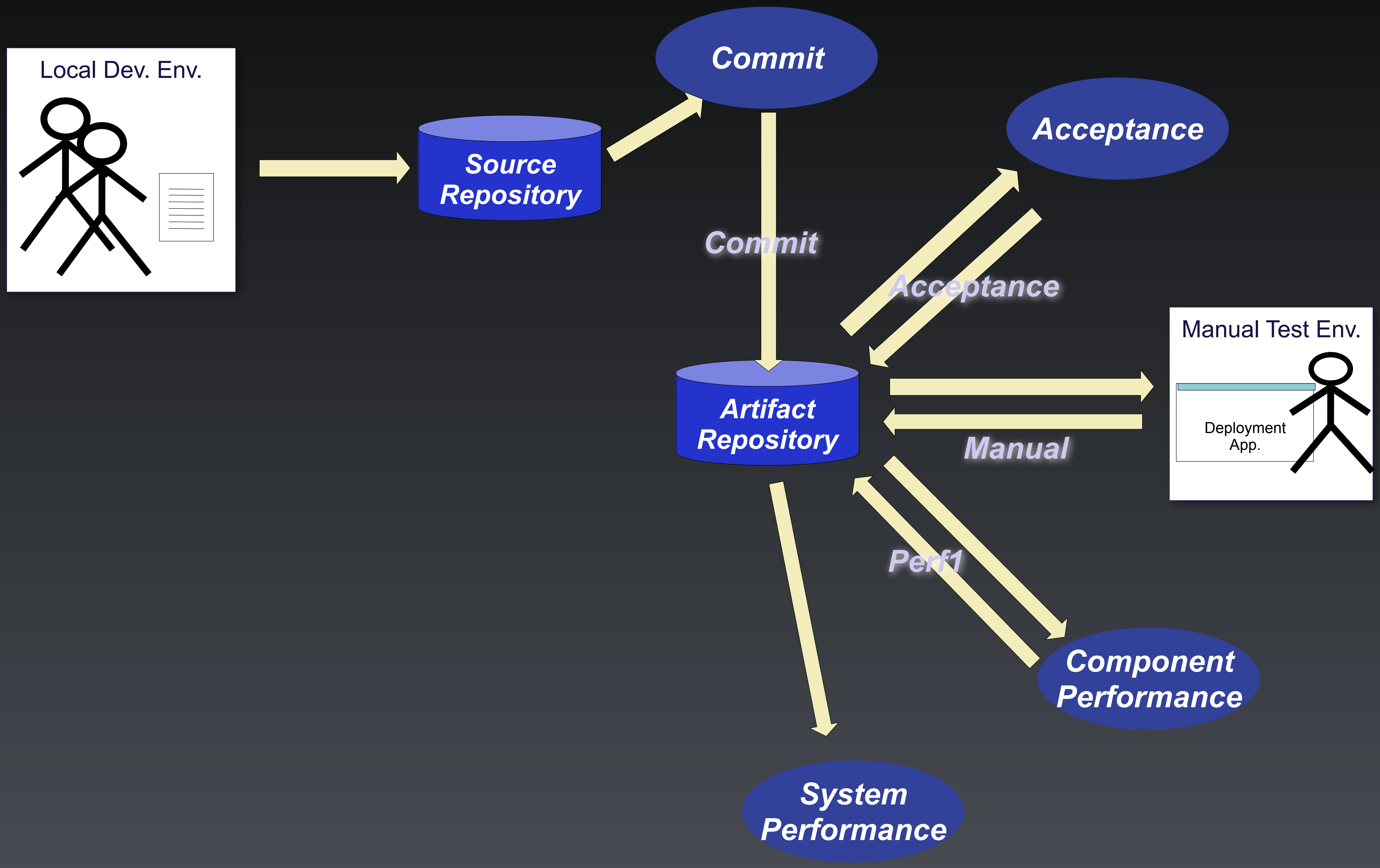

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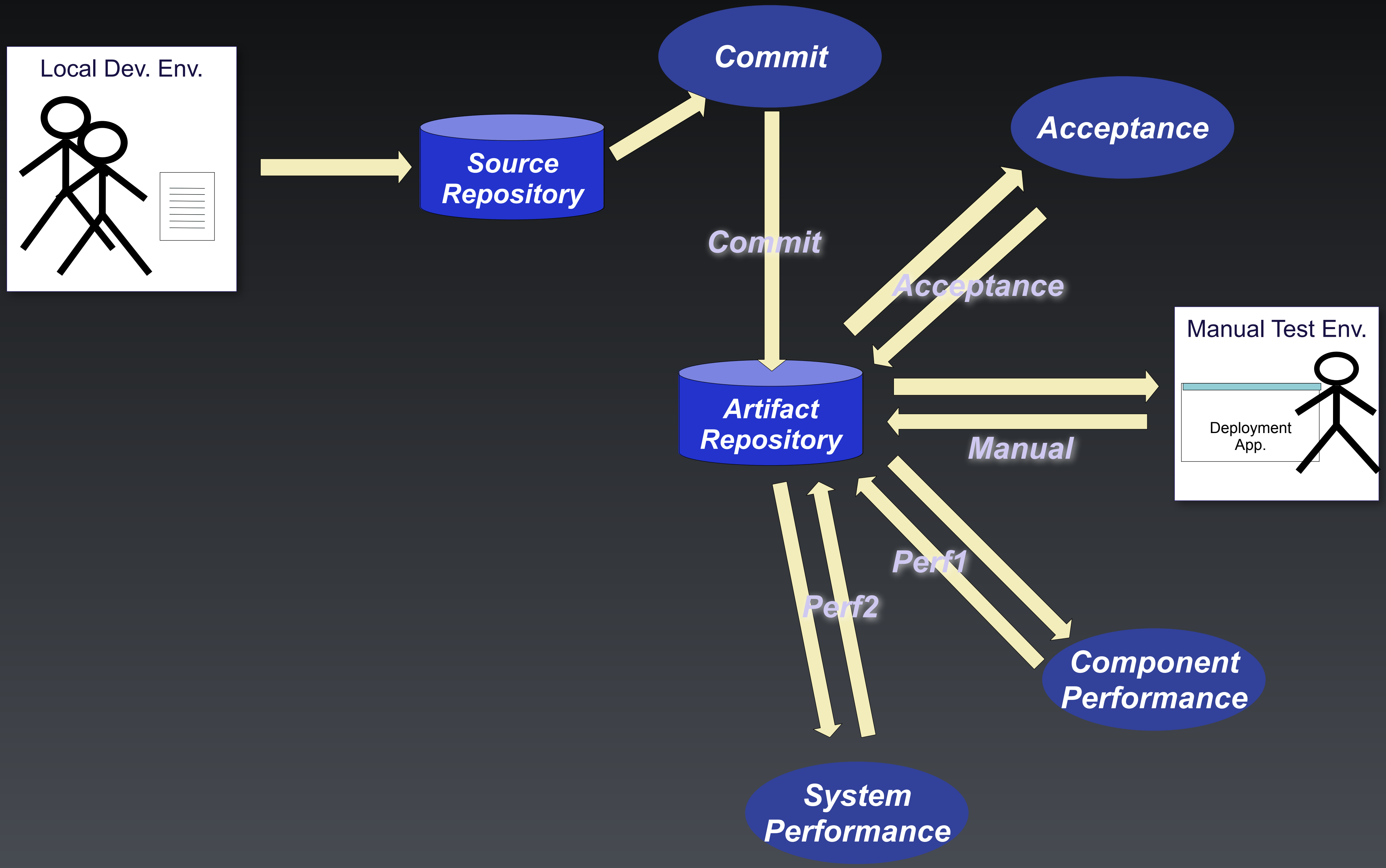

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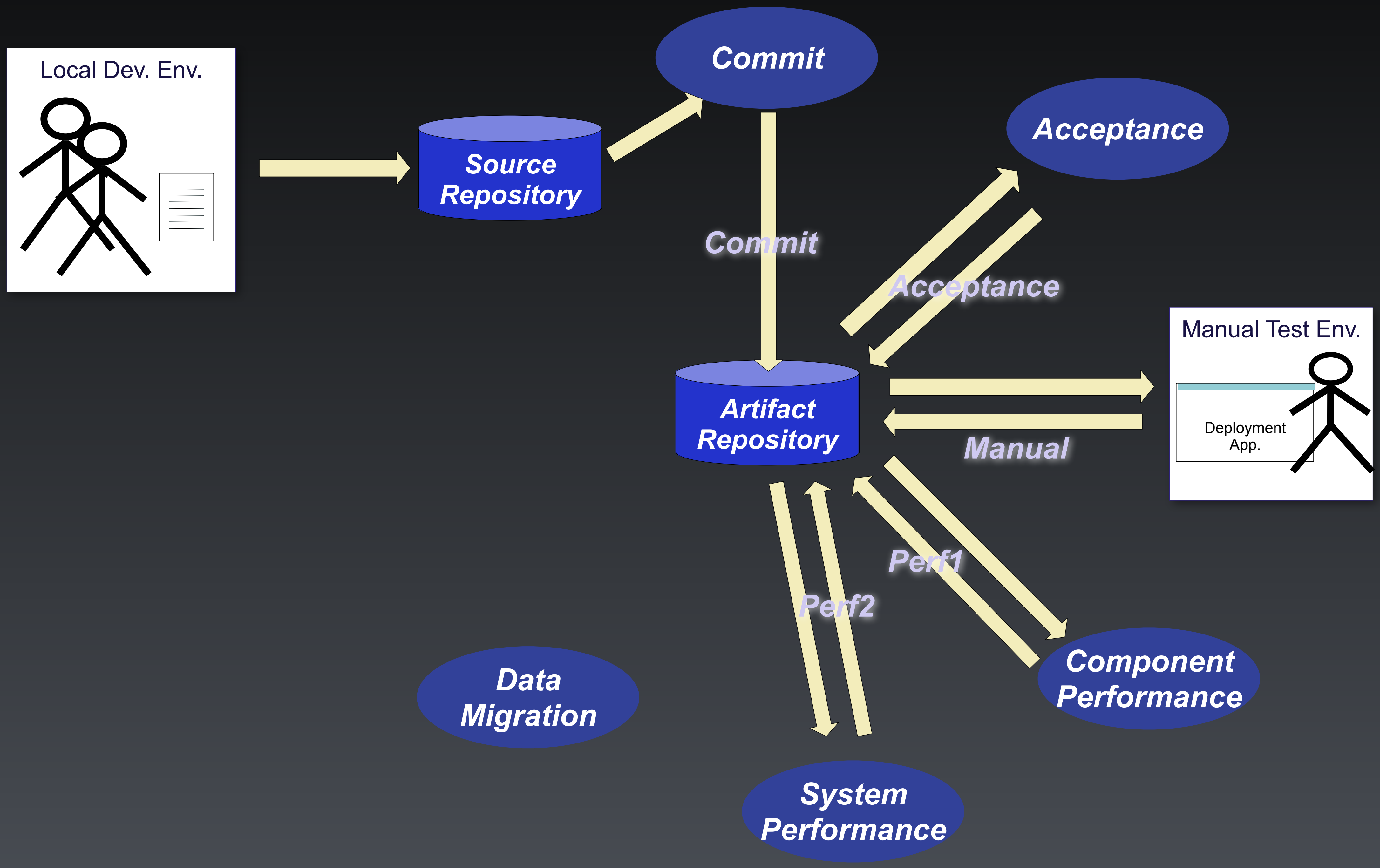

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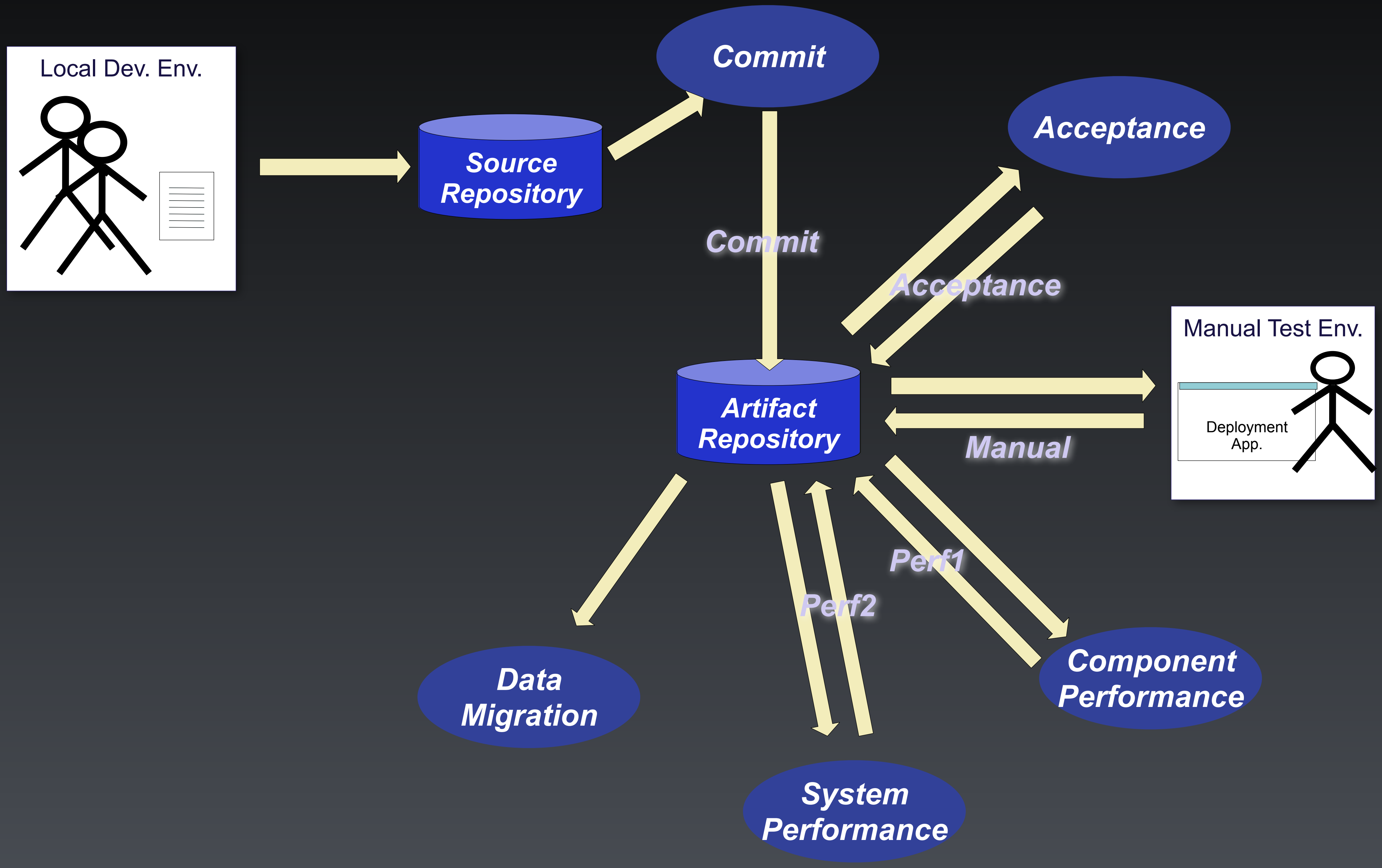
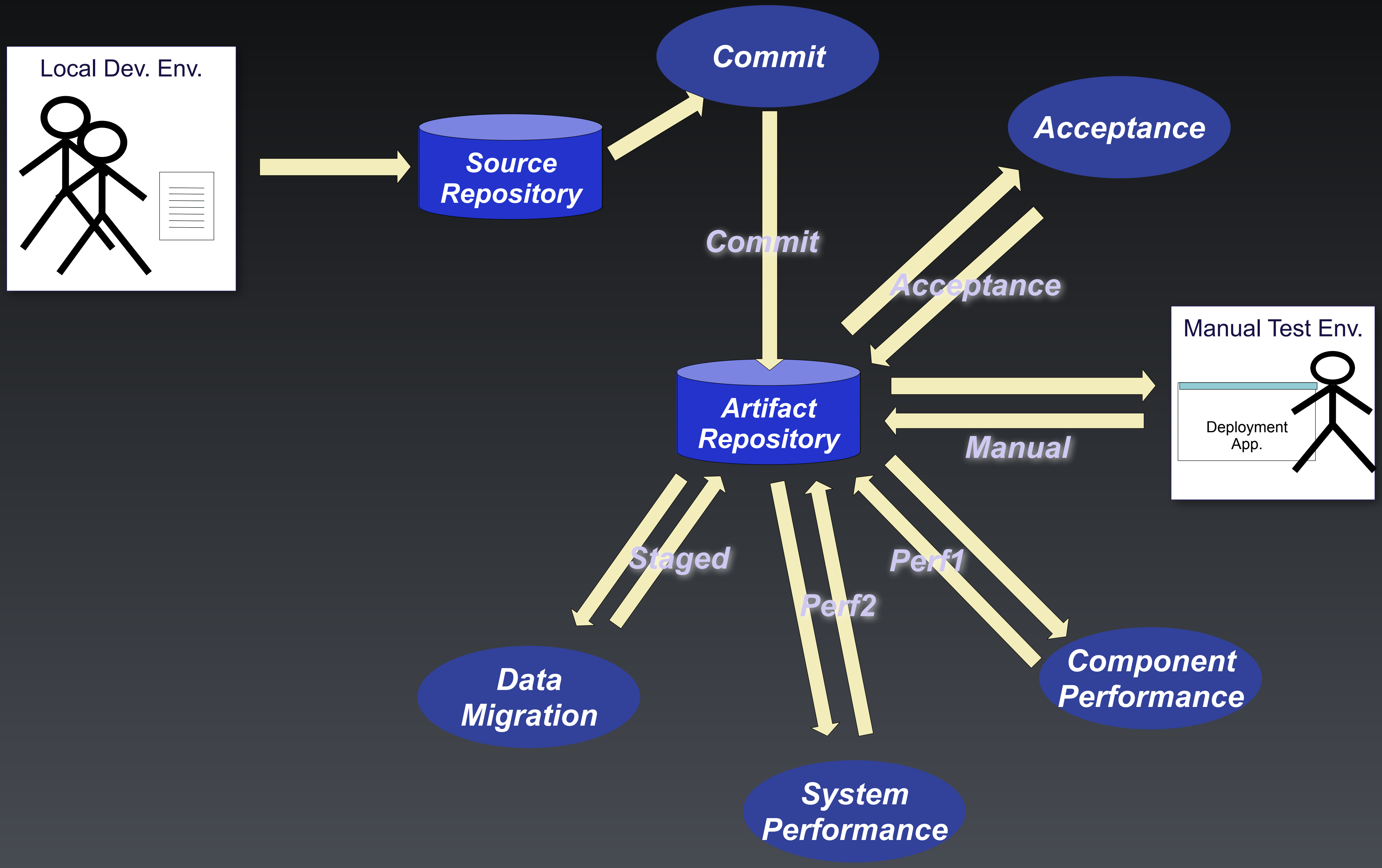
Example Continuous Delivery Process



Example Continuous Delivery Process


Local Dev. Env.

Source Repository

Commit

Acceptance

Manual Test Env.

Deployment App.

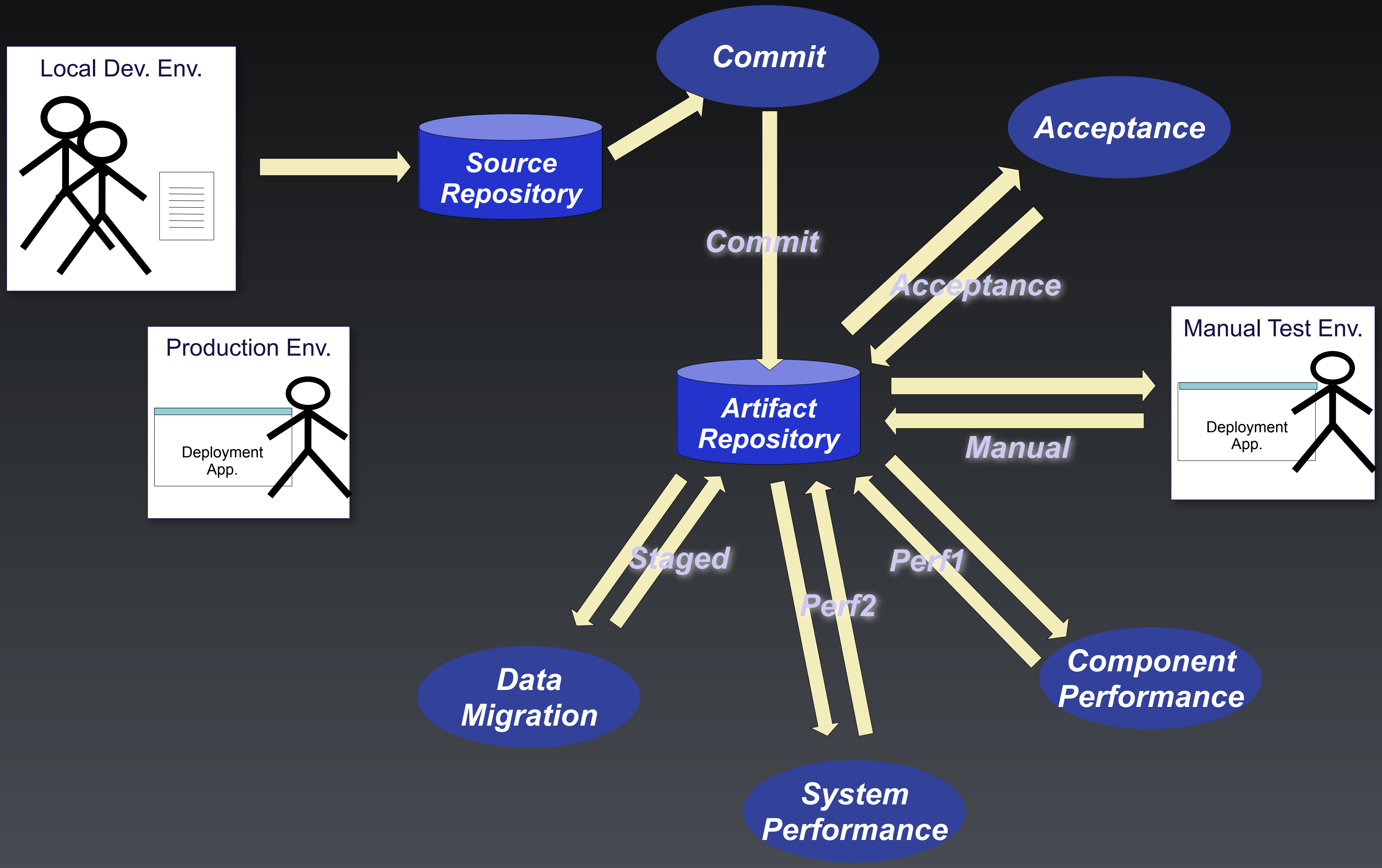
Artifact Repository

Data Migration

System Performance

Component Performance

Example Continuous Delivery Process



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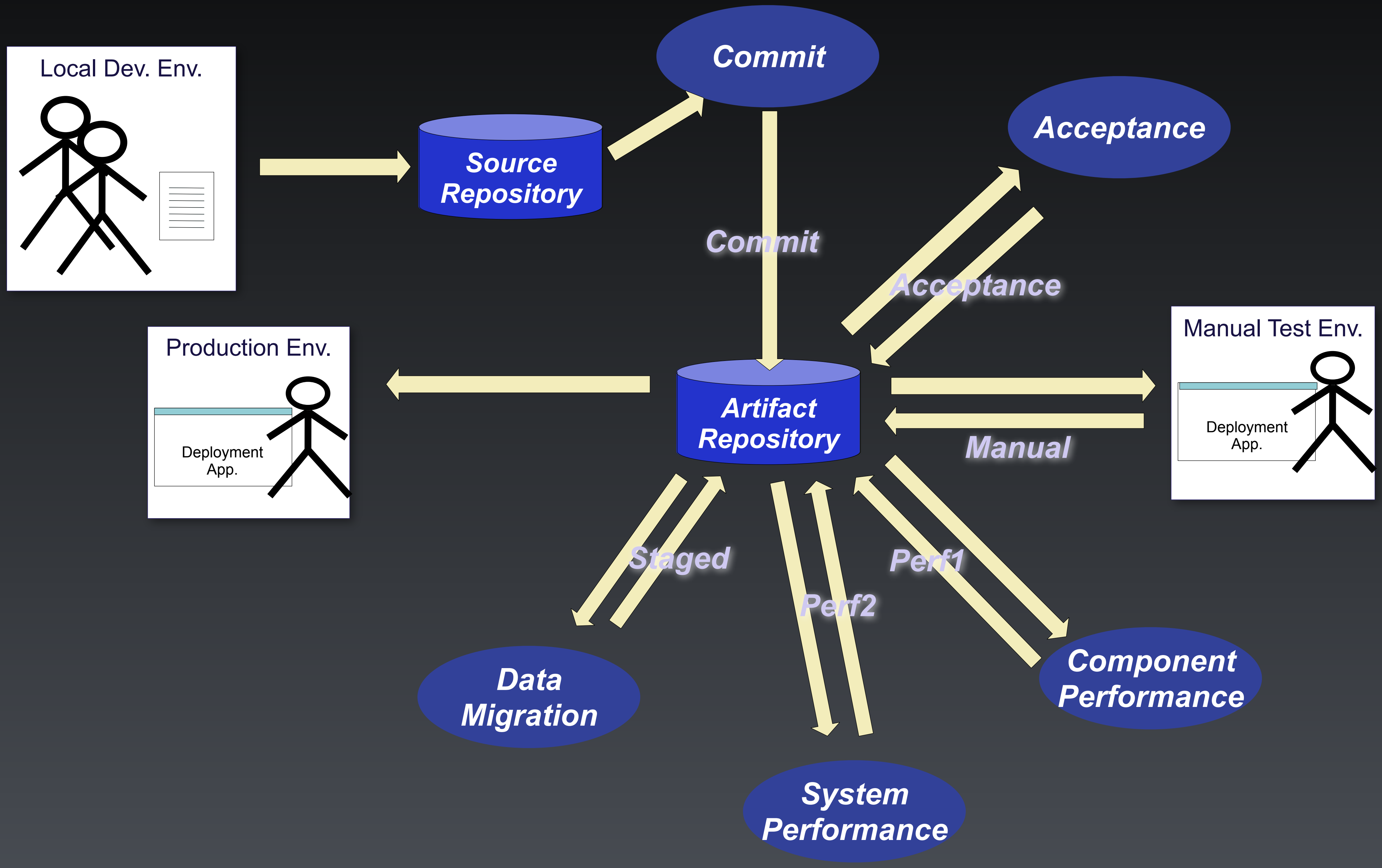
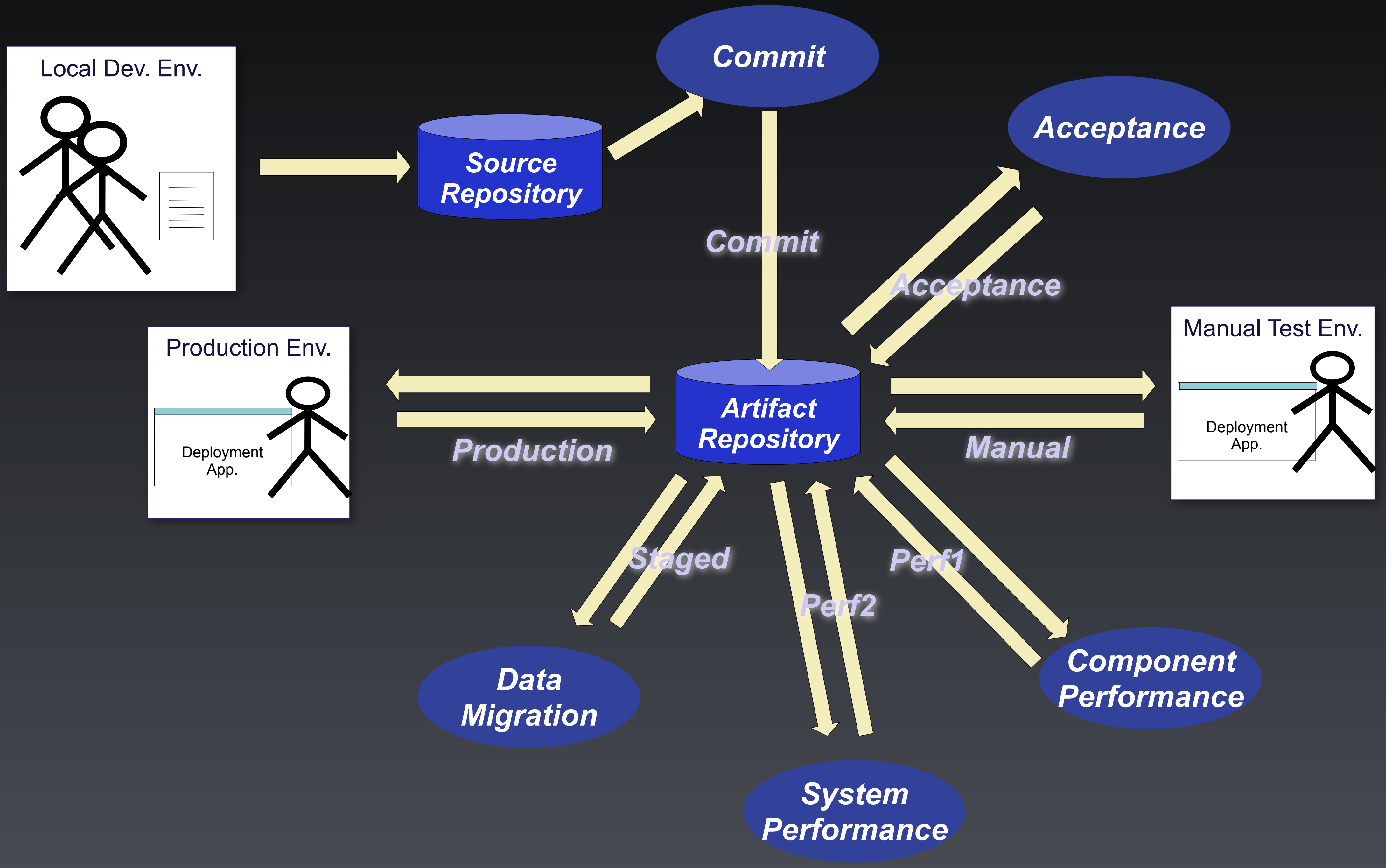
Example Continuous Delivery Process



Example Continuous Delivery Process



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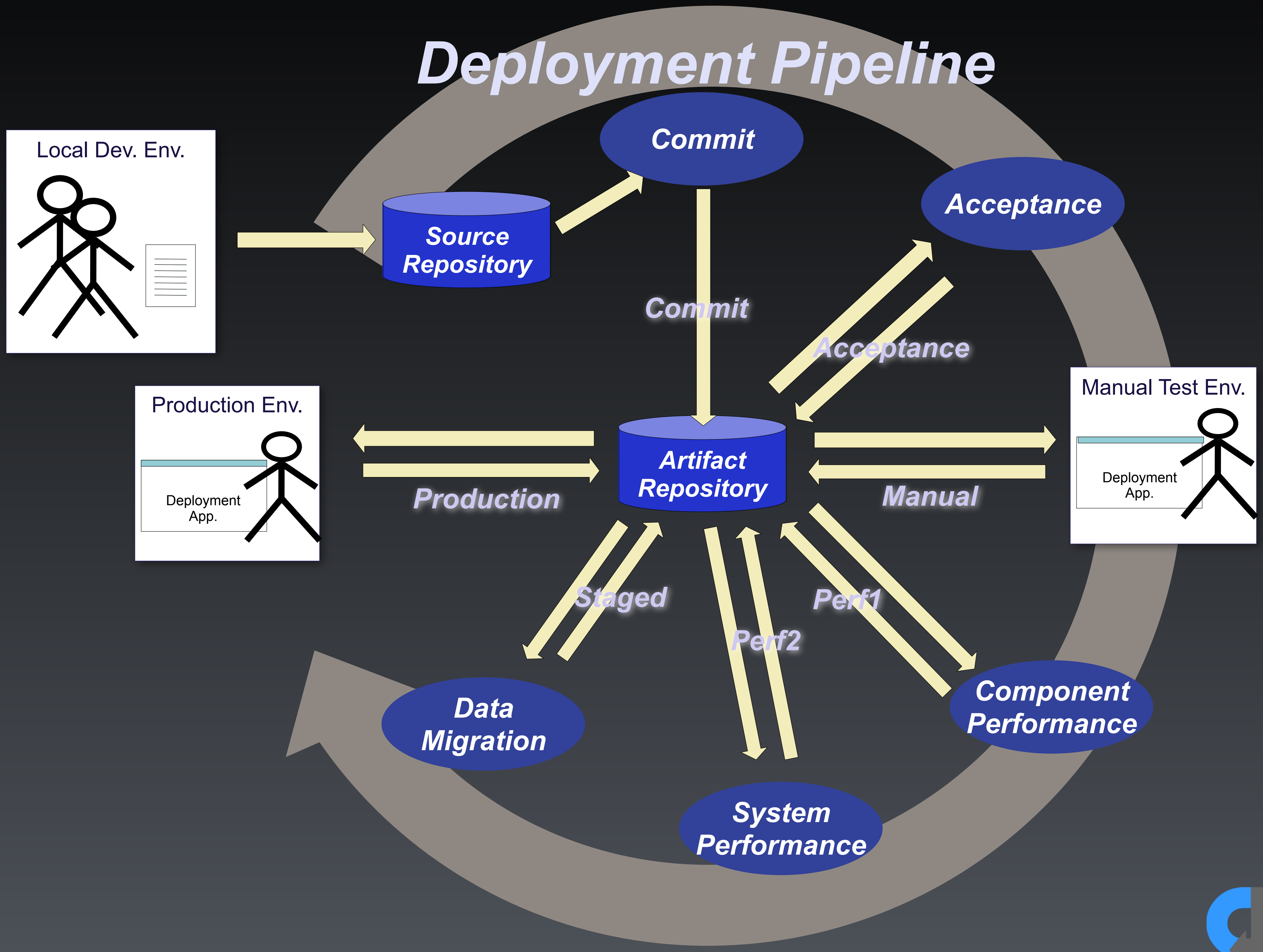
Example Continuous Delivery Process



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

“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.

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

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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

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

“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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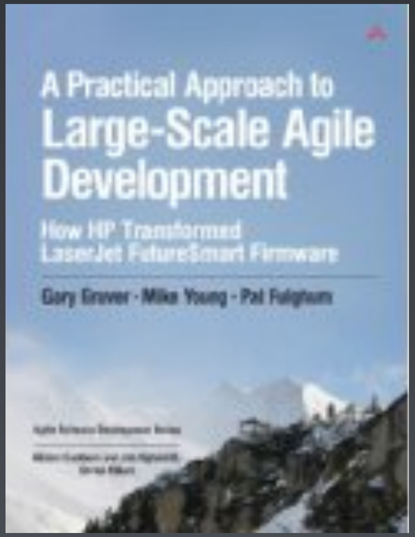
The Results

- 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
How HP Transformed
LaserJet FutureSmart Firmware
Gary Gruver · Mike Young · Pat Fulghum

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

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

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

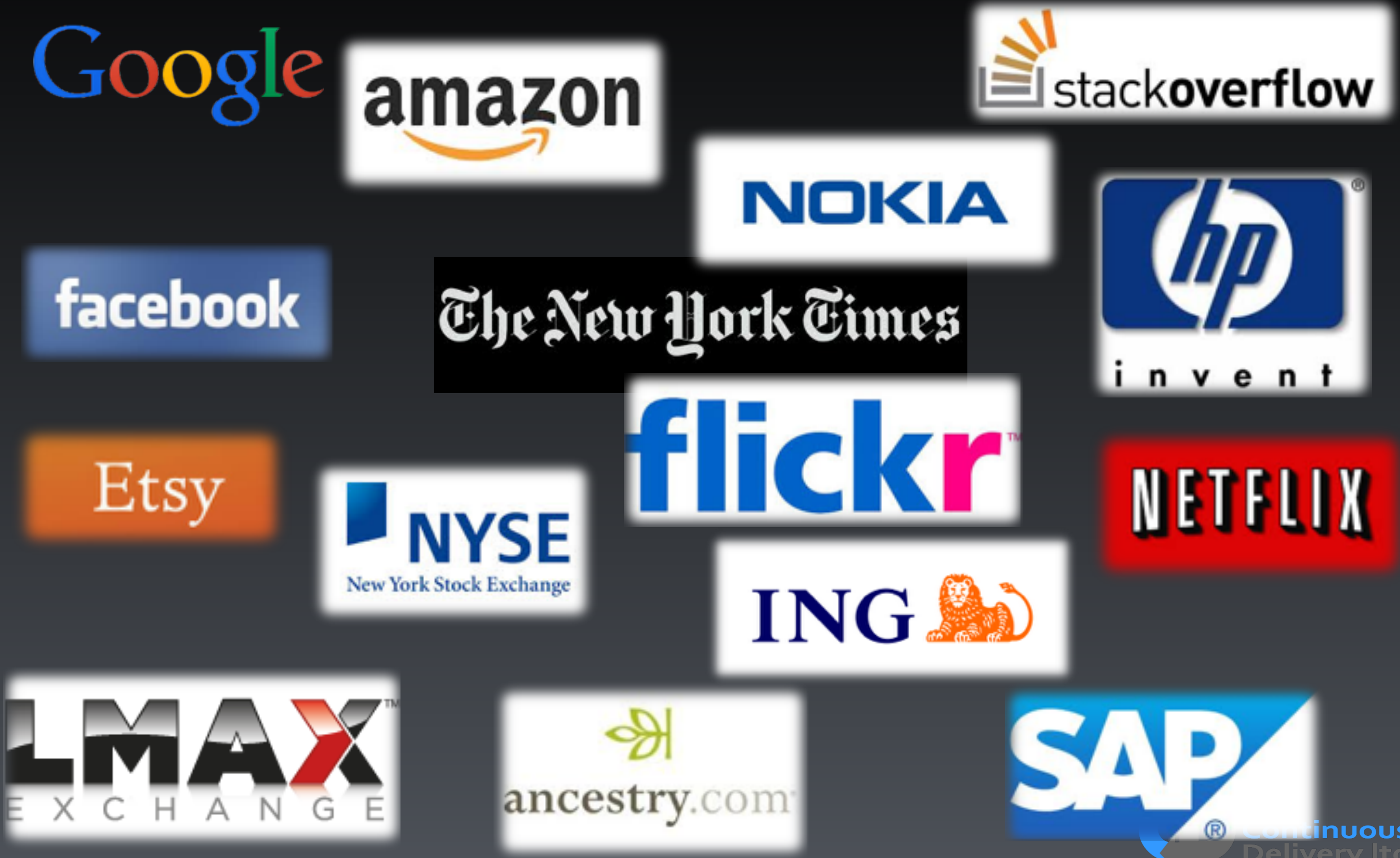
The Effect on Business - Part 2

- 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)

Who Practices CD?

Who Practices CD?



Q&A

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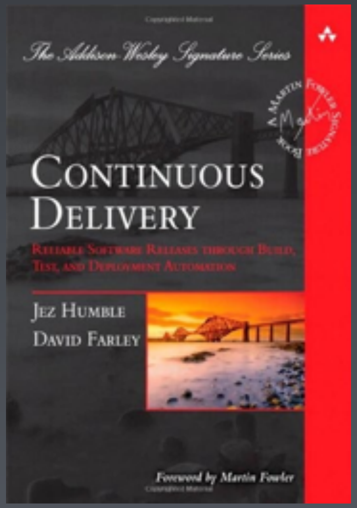
http://www.continuous-delivery.co.uk

Dave Farley

http://www.davefarley.net

@davefarley77


The Addison Wesley Signature Series
Continuous Delivery
Jez Humble
David Farley
Foreword by Martin Fowler