

Effective Test Automation in DevOps

MOVING TOWARDS CONTINUOUS TESTING

About Me...

- CTO of Utopia Solutions – QA/testing focused service provider
- Involved in software quality and testing for over 25 years
- Most of that time focused on test automation
- Passionate about learning and helping organizations benefit from thinking about automation the right way

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Topics

- Test Automation in DevOps
- Common Automation Obstacles
- Pillars of Effective Test Automation
 - Scope
 - Approach
 - Test Environment and Data Management
- Wrap Up

Testing in DevOps

DevOps testing activities must provide

- ✓ Fast
- ✓ Accurate feedback
- ✓ Actionable

Importance of Effective Automation

Continuous Integration requires three capabilities:

- A **comprehensive and reliable set of automated tests** that validate we are in a deployable state
- A culture that “**stops the entire production line**” when our validation tests fail
- Developers working in small batches on trunk rather than long-lived feature branches

The DevOps Handbook (Kim, Humble, Debois & Willis)

Automation Impact on DevOps Performance

Type of Manual Activity	Elite	High	Medium	Low
Configuration Management	5%	10%	30%	30%
Testing	10%	20%	50%	30%
Deployments	5%	10%	30%	30%
Change Approvals	10%	30%	75%	40%

- 2018 Accelerate State of DevOps Report

What's the Big Deal?

Some alarming statistics

The level of test automation is below 20%

2017-2018 World
Quality Report

The value generated by test automation is largely
unchanged

2017-2018 World
Quality Report

Almost 80% of test automation implementations
fail

Unknown

What is “Test Automation”

Software Testing	Using our knowledge, experience, and critical thinking to design experiments with the purpose of exposing issues in software systems
Automation	Operating or controlling a process by highly automatic means, reducing human intervention to a minimum.

We are NOT automating the TESTING!

Obstacles to Test Automation Success

Common Automation Traps



- Too much / not enough automation
- Automating the wrong tests
- Focusing on UI interaction
- Unstable test environments and data
- Not treating automation as code
- Forgetting to improve

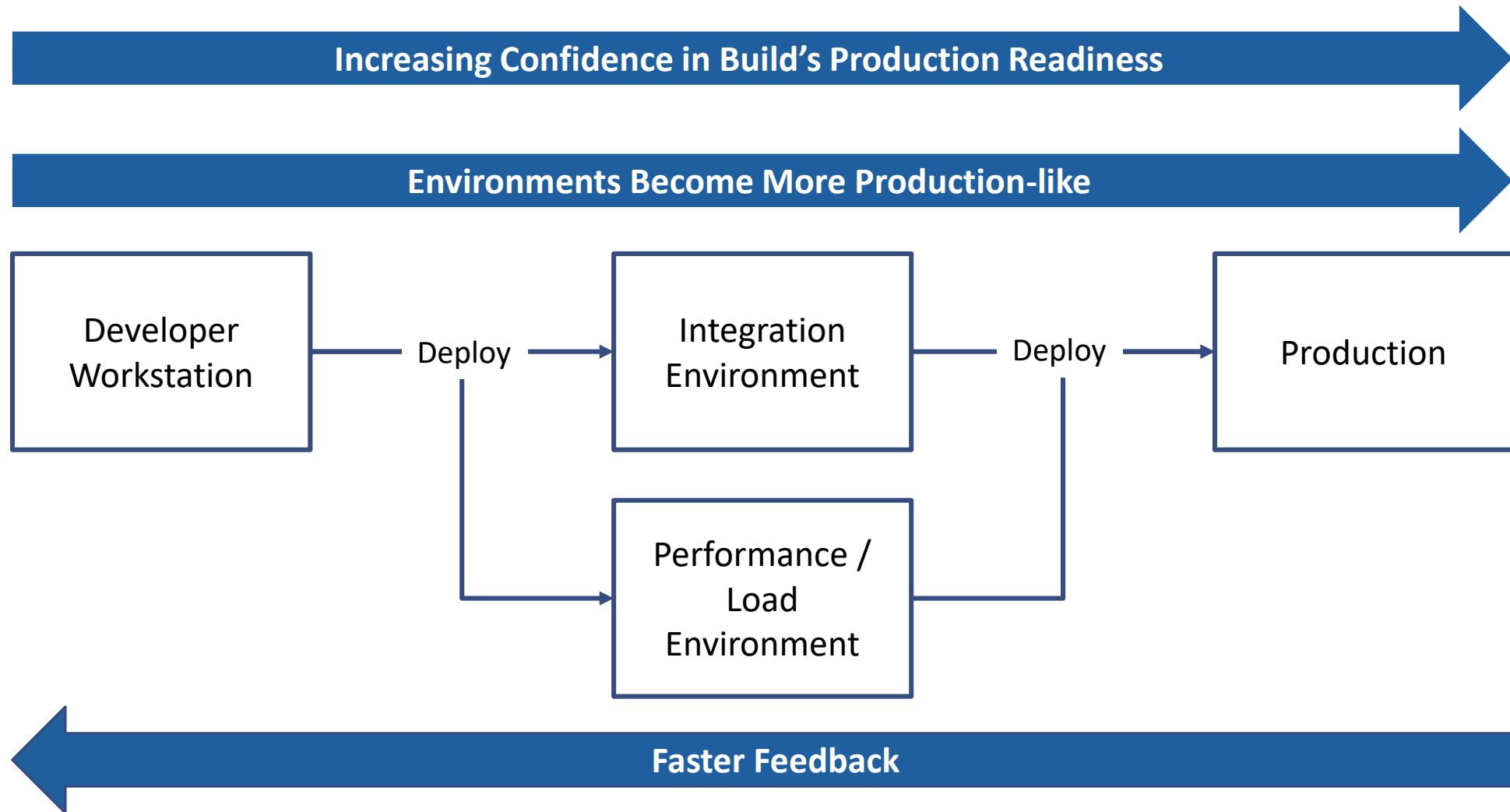
Effective Test Automation

Pillars of Effective Automation



Scope and Approach

Pipeline Tradeoffs



- Continuous Delivery by Jez Humble and David Farley

Which Test Suites Do We Need?

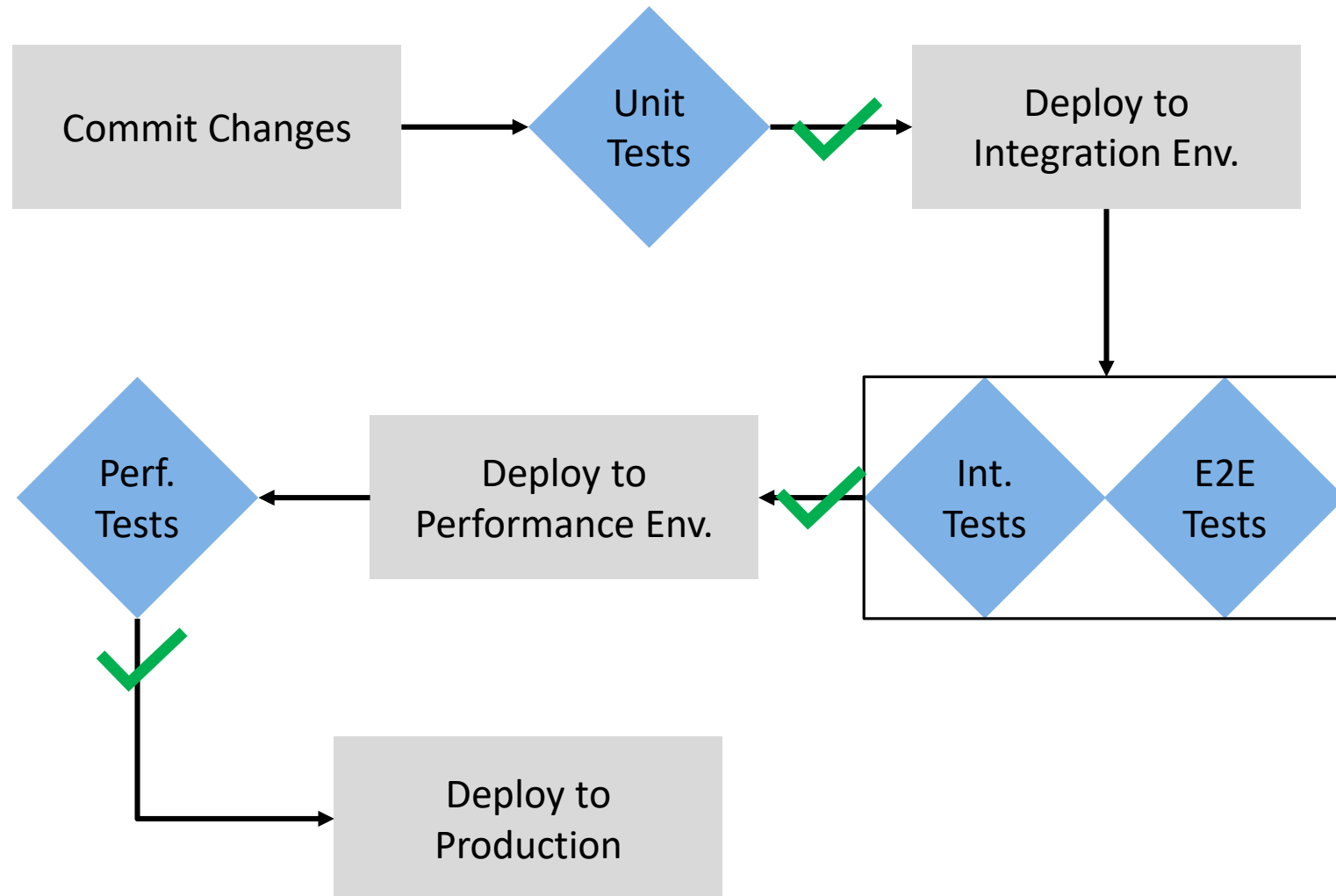
Test Suite Canvas for evaluating test suites

Purpose	Dependencies	Constraints	Pipeline / Execution	Environment / Data
What business risk does this test suite mitigate?	What systems or tools must be in place for this test suite to run successfully?	What can prevent us from implementing this test suite in an ideal way?	Will this test suite be part of a pipeline? When will it be triggered? How often will it run?	What environment will the test suite run in? How will test data be managed?
Ownership and Response		Maintainability		Effectiveness
Who will create the test suite? Who should own it? Who will address test failures and how?	What will the process be to review code? What documentation needs to exist?		How will we know the test suite is effective?	

- Ashley Hunsberger (adapted from original concept by Katrina Clokie)

Test Suites Mapped to the Pipeline

Suite	Purpose
Unit Tests	Is the change being pushed ready for a code review?
Integration Tests	Are the integrated system components ready for further testing?
End-to-End Tests	Is the system functionally ready for deployment?
Performance	Does the system meet performance SLAs?
...	...



Which Tests Do We Need?

Using **FITR** to assess your automated tests for inclusion

- Focused** Test is tied as close to the functionality being tested as possible ► UI, API, unit, etc.
- Informative** Test clearly and concisely communicates its intent and result
- Trustworthy** Test executes reliably and doesn't provide false negatives / positives
- Repeatable** Test can be executed on demand ► environment and data dependencies

- Bas Dijkstra

<https://www.stickyminds.com/sites/default/files/volume-issue/pdf/V2013.pdf>

Environment and Data

Biggest Challenge to Automation?

Test environment and data availability continue to be top challenges to achieving desired levels of automation

- 2018-19 World Quality Report

Well... it worked on my machine!

Test Environment and Data Spectrum

Static
Shared
Stale

Environment / Data Issues

- Data staleness and instability
- Scheduling conflicts
- Not production-like

Automation Averse

- Unreliable execution
- Long/complex setup
- False positives
- Prolonged analysis

Dynamic
Dedicated
Fresh

Automation Friendly

- Create clean environments on demand
- Dedicate environments to single purpose
- Production-like (if needed)
- Load with clean/fresh data

Test Data Challenges

Three of the top test data challenges according to the World Quality Report 2017-18

- Keeping test data in sync with tests
- Lack of test data for complex integration testing
- Maintaining consistent test data across systems under test



Inability to reliably execute automated tests on demand

Test Data Management Strategy

Key Strategy Input Questions

What data do your tests require?

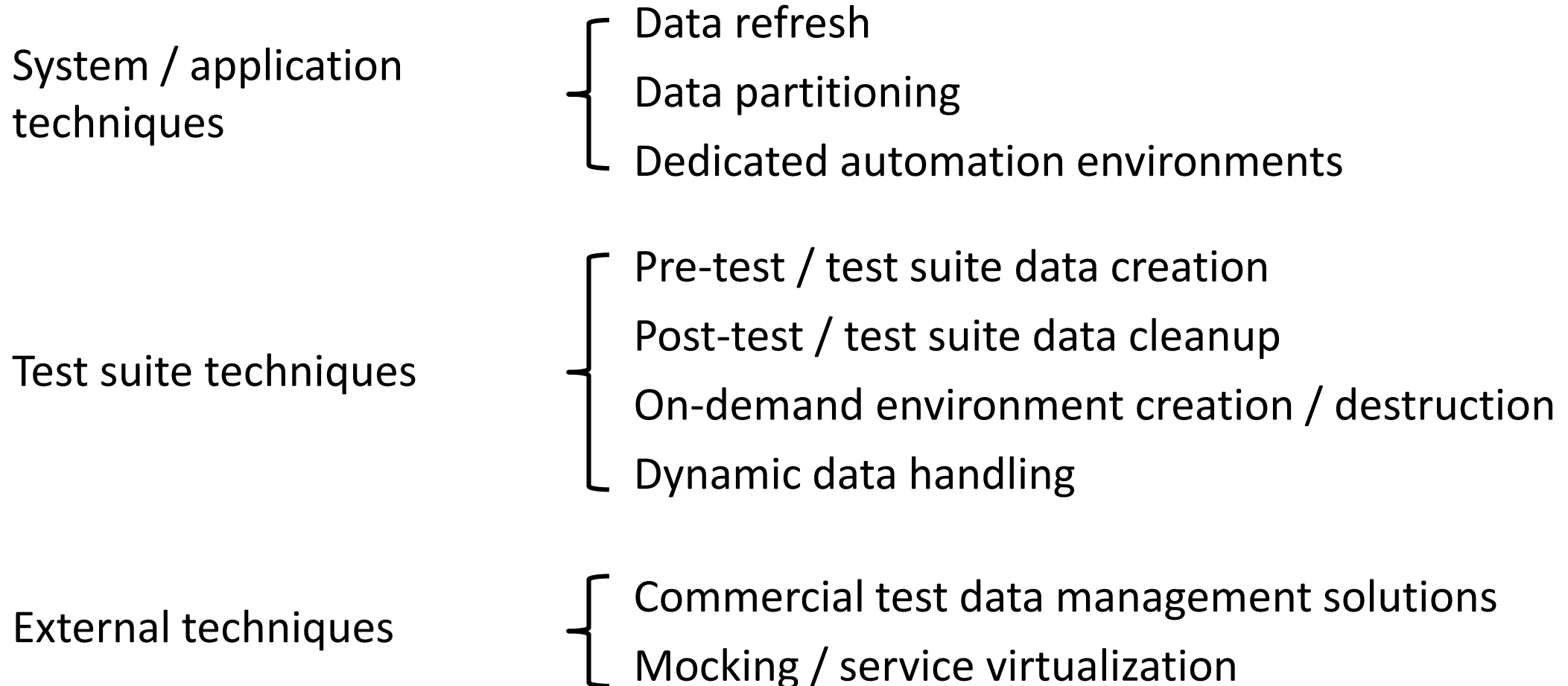
What are the dimensions of the required data?

What are the data sources?

}	Type	is data structured or unstructured?
	Value	what specific values or class of data are required?
	Time	does data change over time?
	Reuse	Can data be used more than once?
	Volume	how much do data you need?

Test Data Management Strategy

Common Data Management Techniques



Key Takeaways

- Effective test automation is required to achieve success in DevOps
- Create the right test suites that contain the right tests
- Ensure you understand your test environment & data requirements AND have created a strategy to manage them
- Continuously improve
- Notice that we didn't talk about specific tools...

Continuing the Conversation

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