Verification Techniques in the Software Development Lifecycle

Zoltán Micskei

Department of Measurement and Information Systems

Objectives

How can we develop good quality software?

- Lectures: overview of verification techniques
  - BDD, CI, review, static analysis, testing…
- Labs: get to know some technologies, tools

- Home assignment: apply techniques and tools
  - On a selected open-source project

Home Assignment

- Teams of 3-4
- Project to work on
  - From a selected list OR
  - Suggest one (-> email micskeiz AT mit.bme.hu)
    Condition: public project on GitHub
- Tasks: static and dynamic verification techniques
- Grading:
  - Presentation at the end of semester
  - Quality over quantity (!)
  - GO / NOGO (corrections until the end of semester)

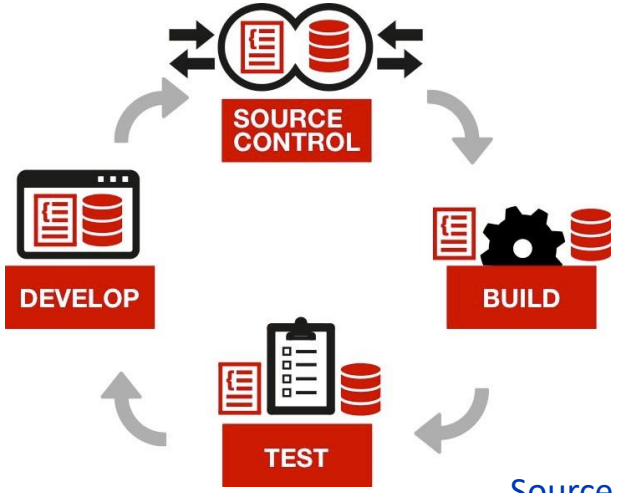
CONTINUOUS INTEGRATION

Continous Integration (CI)

- *„a software development practice where members of a team integrate their work frequently, usually each person integrates at least daily”*
- *„Each integration is verified by an automated build (including test) to detect integration errors as quickly as possible. ”*

Martin Fowler

https://martinfowler.com/articles/continuousIntegration.html

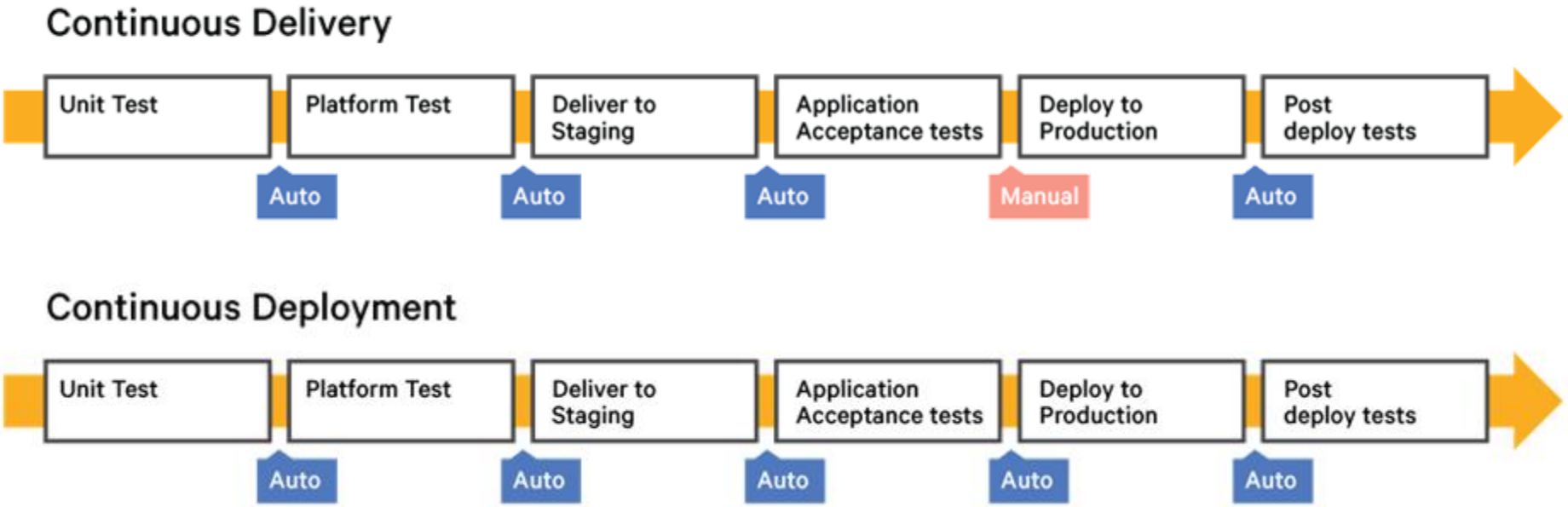


Source

Continuous Delivery (CD)

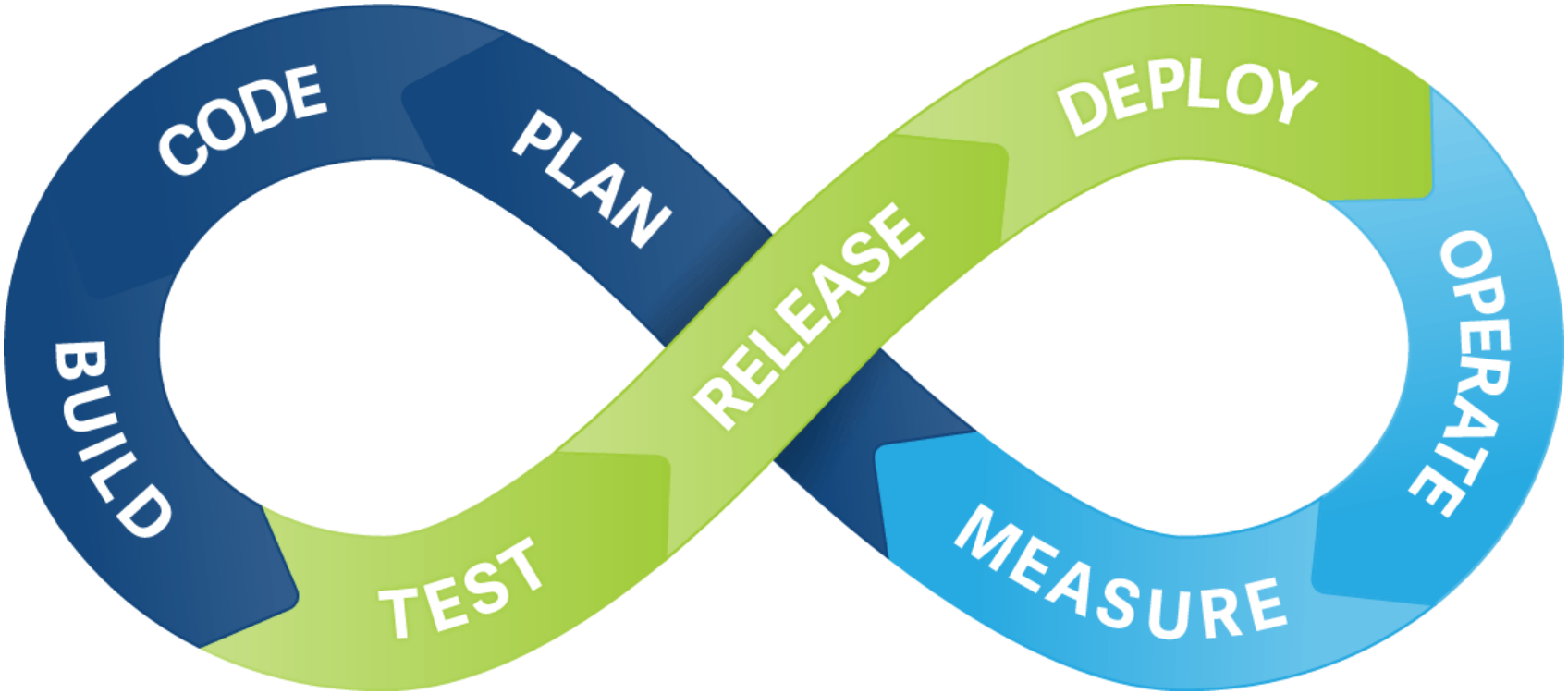
„build software so that it is always in a state where it could be put into production”

Source: https://martinfowler.com/bliki/ContinuousDelivery.html

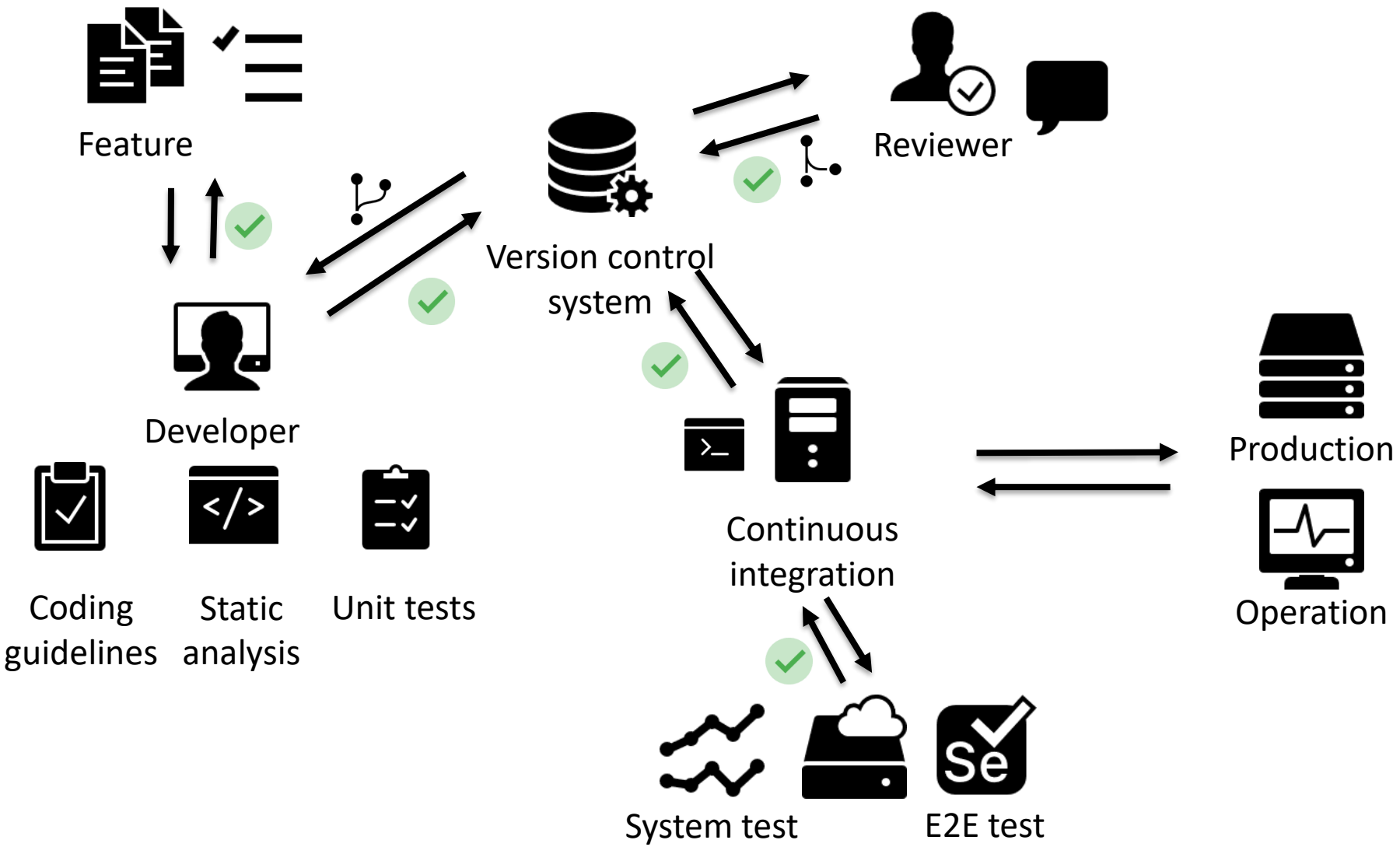


Forrás

CD + DevOps



Continuous Verification and Feedback



Icons: icons8.com

Definition of Done

Is the feature done?

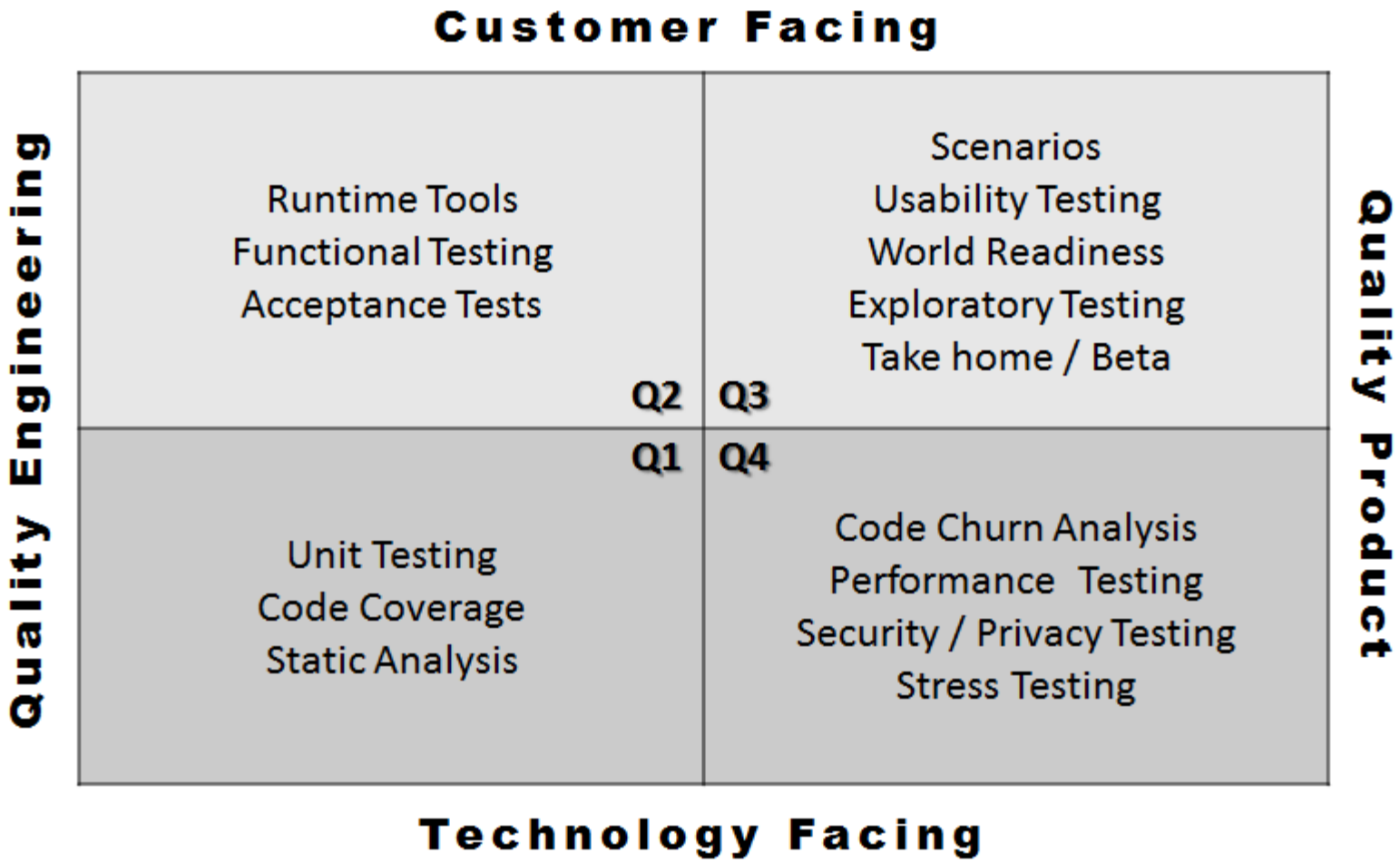
~~Of course, it is done 95%!~~
~~It works, it only needs some...~~

Definition of Done

- Checklist for when is it really done
- Code, tests, test runs, deploy to staging…
- Content depends on team

See: https://www.agilealliance.org/glossary/definition-of-done

Agile Testing Quadrants



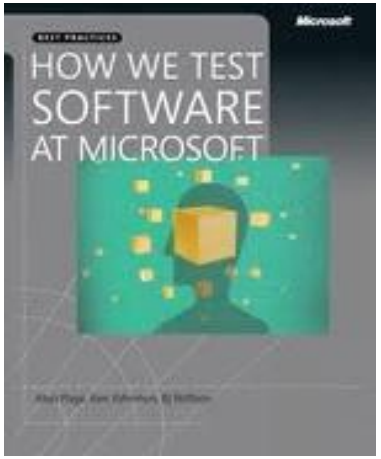
Forrás: http://angryweasel.com/blog/riffing-on-the-quadrants/

INDUSTRIAL PRACTICE

Testing @ Microsoft

„Hiring testers to pound quality into a product after it's been developed is a waste of money."

- Software Developer Engineer in Test (SDET)
- Developer and tester are equal carrier paths



„How we test software at Microsoft", Microsoft Press, ISBN 0735624259, 2008.

Testing @ Google

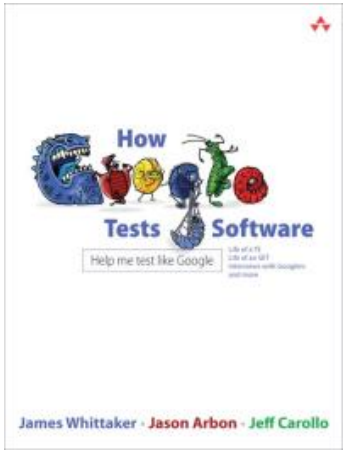
Google Testing Blog

If it ain't broke, you're not trying hard enough

„The burden of quality is on the shoulders of those writing the code."

Roles

- Software Engineer in Test & Infrastructure (SETI)
- Test Engineer (TE)



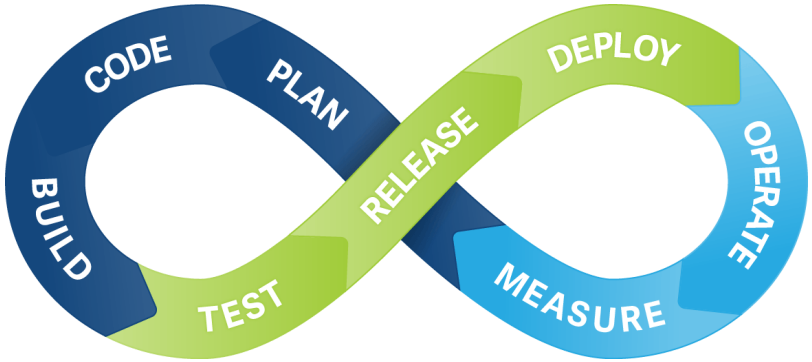
James A. Whittaker, Jason Arbon, Jeff Carollo. How Google Tests Software. Addison-Wesley Professional, 2012

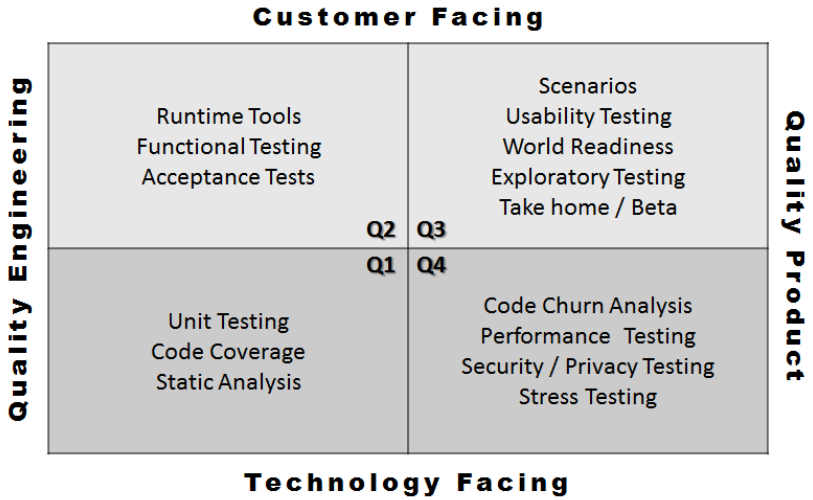
Useful materials (download now!)

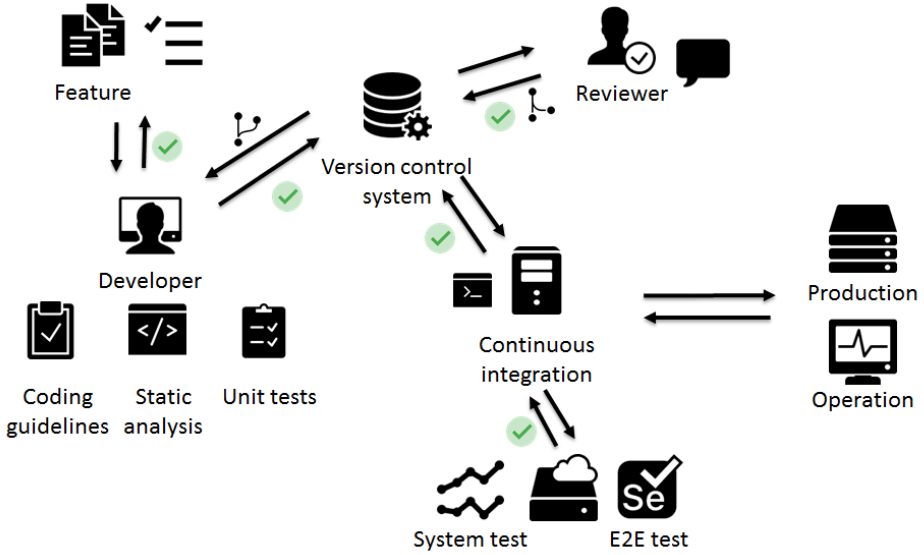
- IEEE standards
  - 24765-2010 Systems and SW engineering – Vocabulary
    - SE VOCAB – online, searchable definitions
  - 29119 Software testing
    - Part 1 Concepts and definitions, Part 2 Test processes, Part 3 Test documentation

- International Software Testing Qualifications Board (ISTQB)
  - Foundation Level Syllabus (2018)
  - Glossary of Testing Terms

Summary


CODE
PLAN
DEPLOY
BUILD
RELEASE
OPERATE
TEST
MEASURE


Customer Facing
Quality Engineering
Quality Product
Technology Facing
Runtime Tools
Functional Testing
Acceptance Tests
Q2
Scenarios
Usability Testing
World Readiness
Exploratory Testing
Take home / Beta
Q3
Q1
Unit Testing
Code Coverage
Static Analysis
Q4
Code Churn Analysis
Performance Testing
Security / Privacy Testing
Stress Testing


Feature
Reviewer
Version control system
Developer
Coding guidelines
Static analysis
Unit tests
Continuous integration
Production
Operation
System test
E2E test
Se