Quality Engineering in DevOps Why? How?

TestBustersDay&Night

9 September 2021

TMAP: the body of knowledge for quality engineering in IT delivery

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sogeti Part of Capgemini

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Quality Engineering in DevOps... Why? How?

Why?

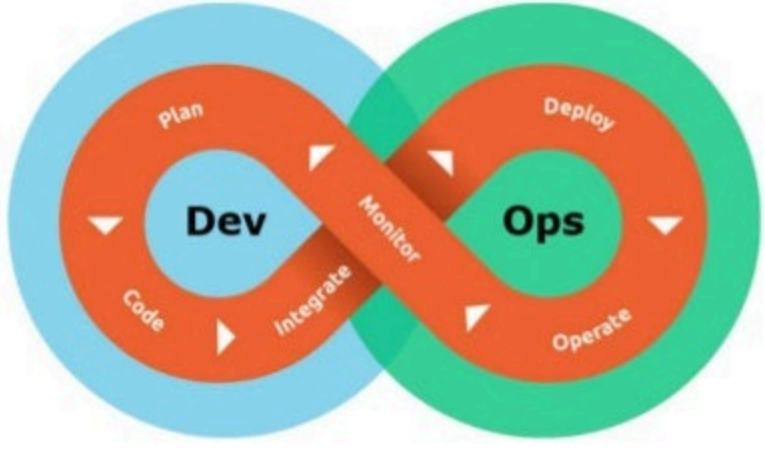
Challenges of today's high-performance IT delivery

The business demands:
- Deliver business value
- Deliver quality at speed

The team challenges are:
- Quality engineering is everyone's responsibility
- QA & testing is integrated in people and process

The focus is:
- Organize high-performing cross-functional teams *(you build it, you run it!)*
- Automate everything *(as long as it is useful)*

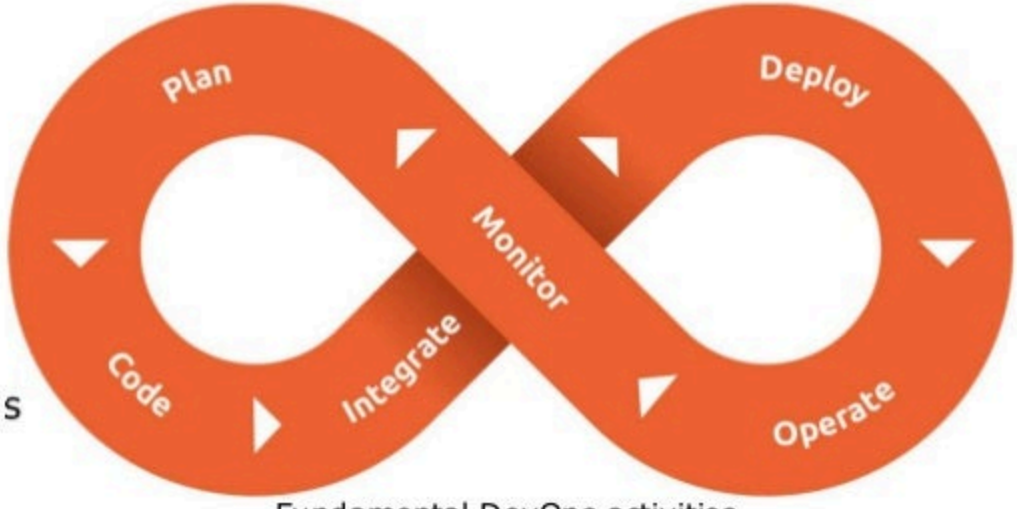
Thus ➔ implement the DevOps culture



DevOps – highlights

The six DevOps principles:
(source: the DevOps handbook)

1. Customer-centric action
2. Create with the end in mind
3. End-to-end responsibility
4. Cross-functional autonomous teams
5. Continuous improvement
6. Automate everything you can



Fundamental DevOps activities

DevOps is a **cross-functional systems engineering culture** that aims at unifying systems development (Dev) and systems operations (Ops) with the ability to create and deliver fast, cheap, flexible and with adequate quality, whereby the team as a whole is responsible for the quality. Other areas of expertise, such as business analysis and quality assurance (including testing) are usually integrated in the team. A DevOps culture has an **Agile mindset** that can be supported/implemented by e.g. the **Scrum framework**.

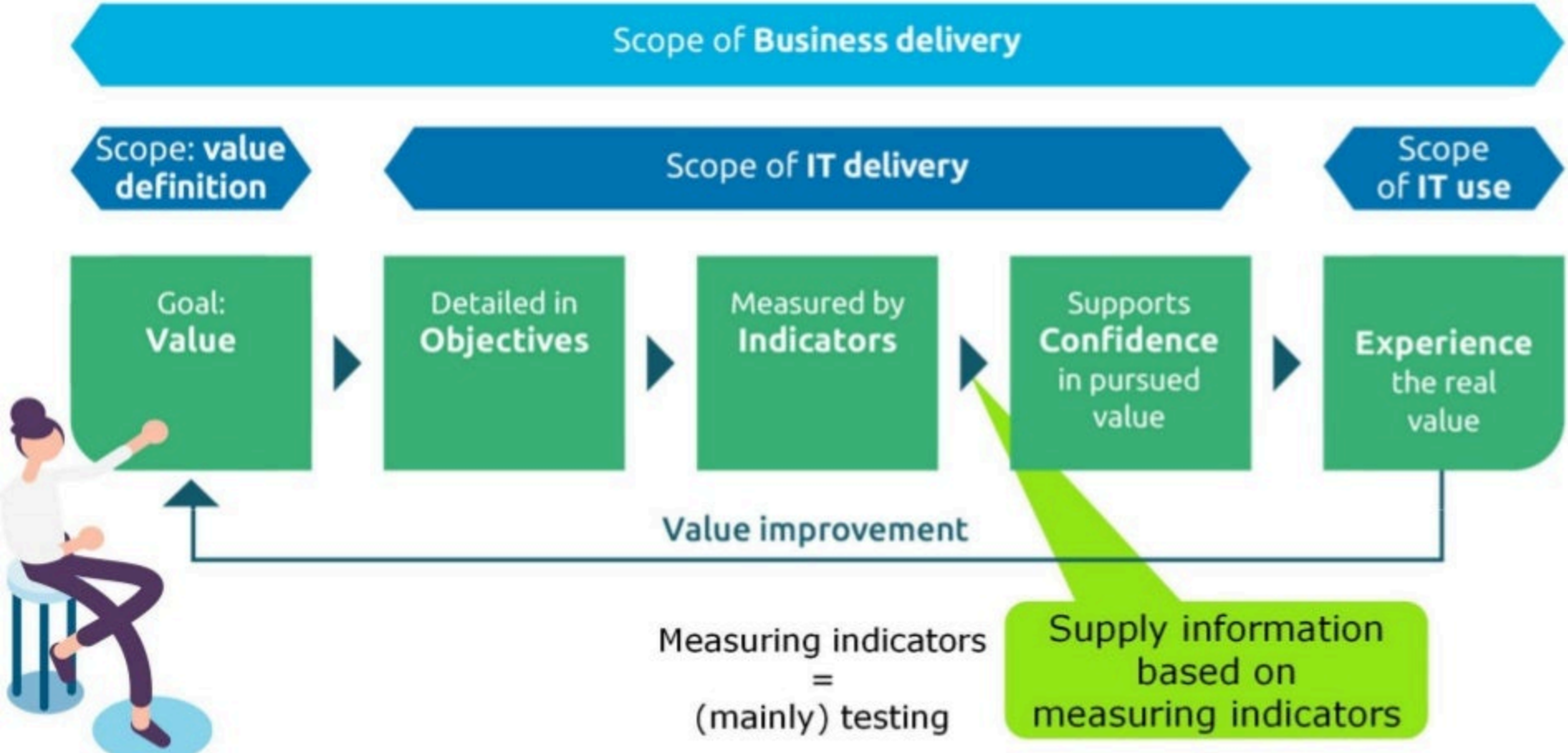
Take BUSINESS VALUE as the starting point

Scope of **Business delivery**

Scope: **value definition**

Goal:
Value

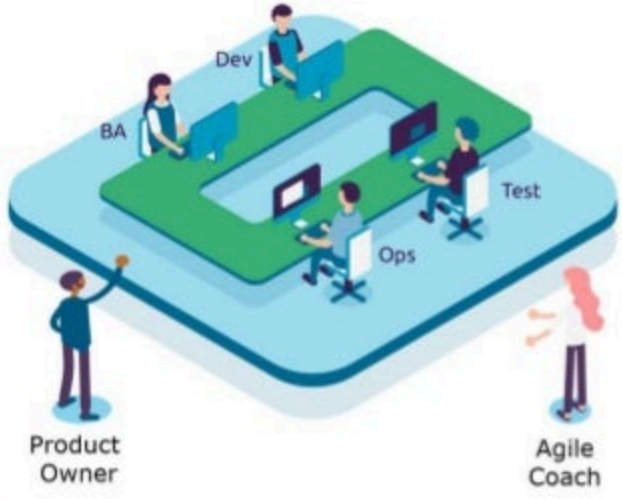
VOICE model: align IT delivery activities with business value



Measure indicators to supply information about quality and risks

Implement quality engineering ➔ part of high-performance IT delivery

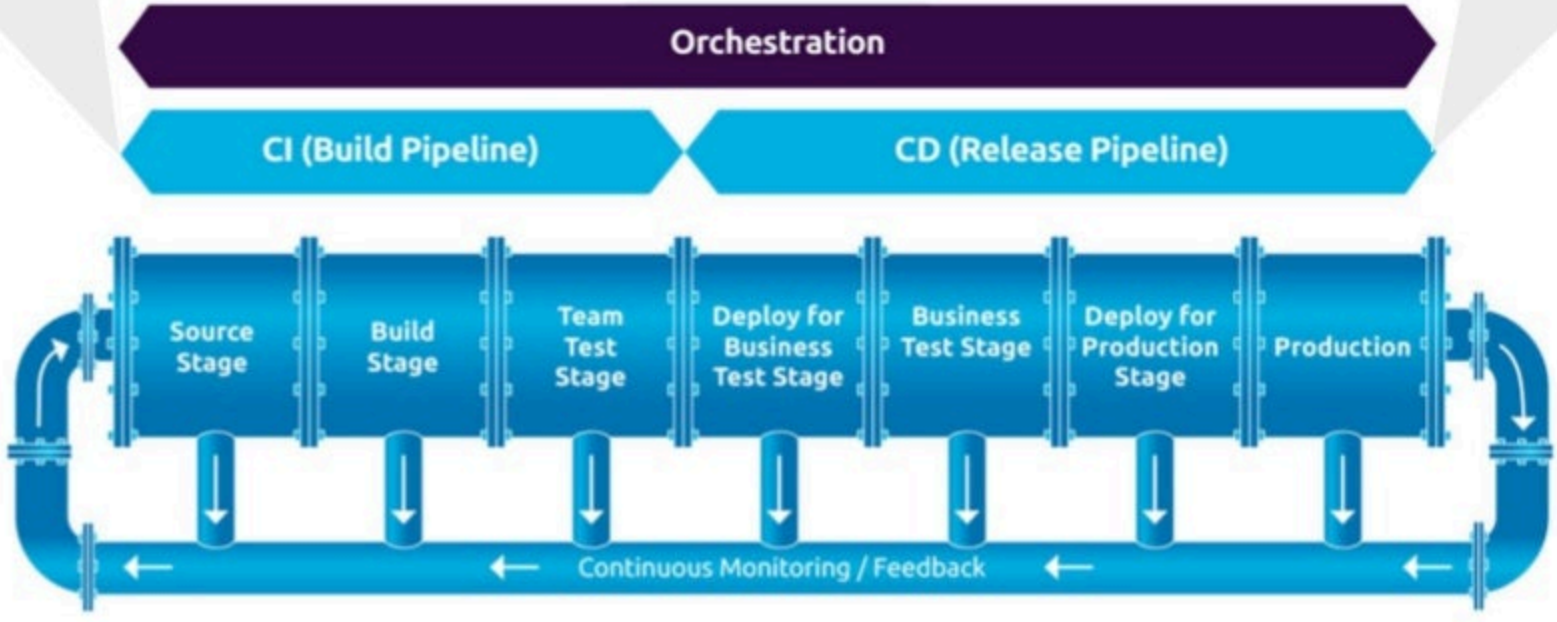
High-performance IT delivery is an approach that enables
cross-functional teams
to **continuously improve**
products, processes and people
that are required to **deliver value** to the end users.



To achieve "Quality @ Speed" you need a CI/CD pipeline (don't you?)

CI = Continuous Integration

CD = Continuous Delivery/Deployment



CI is team-focus (one build pipeline per team)
CD is multiple team focus (one release pipeline per business solution)

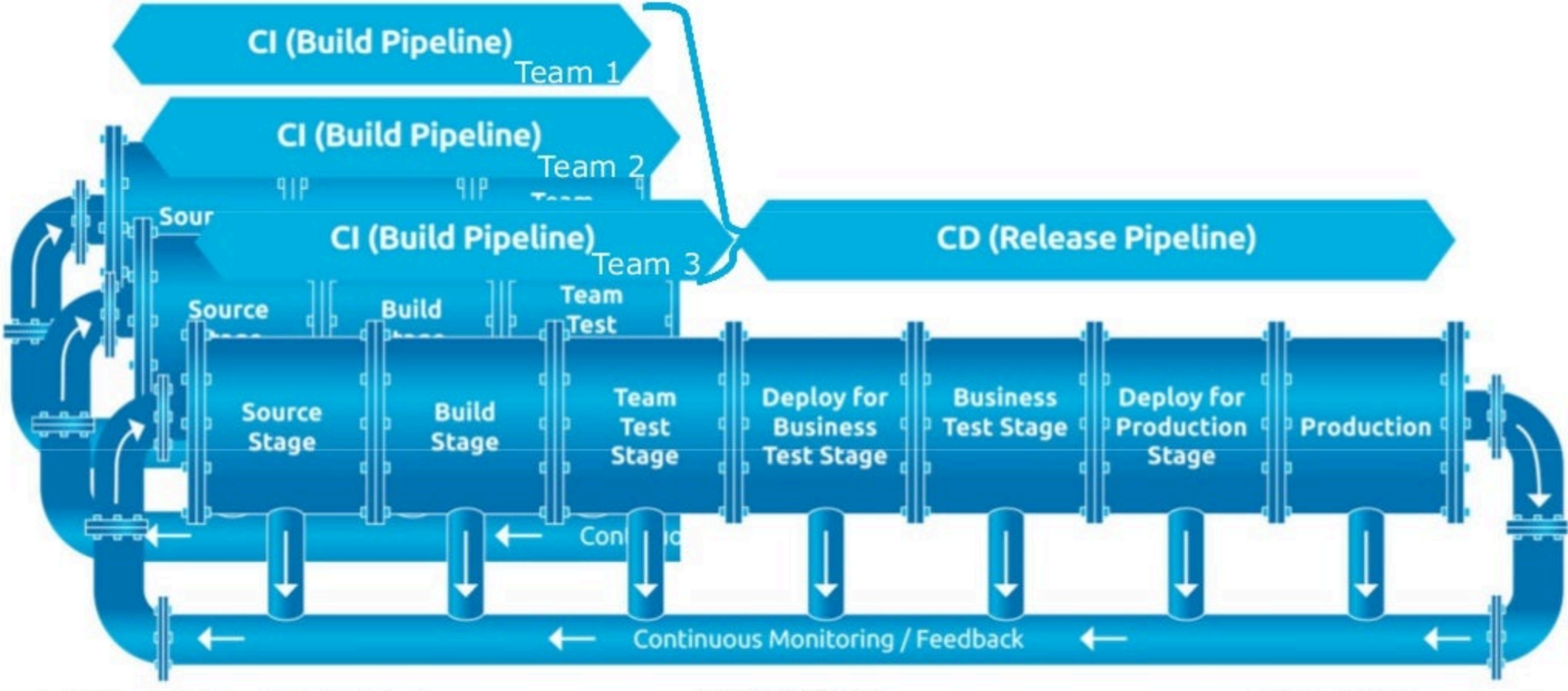
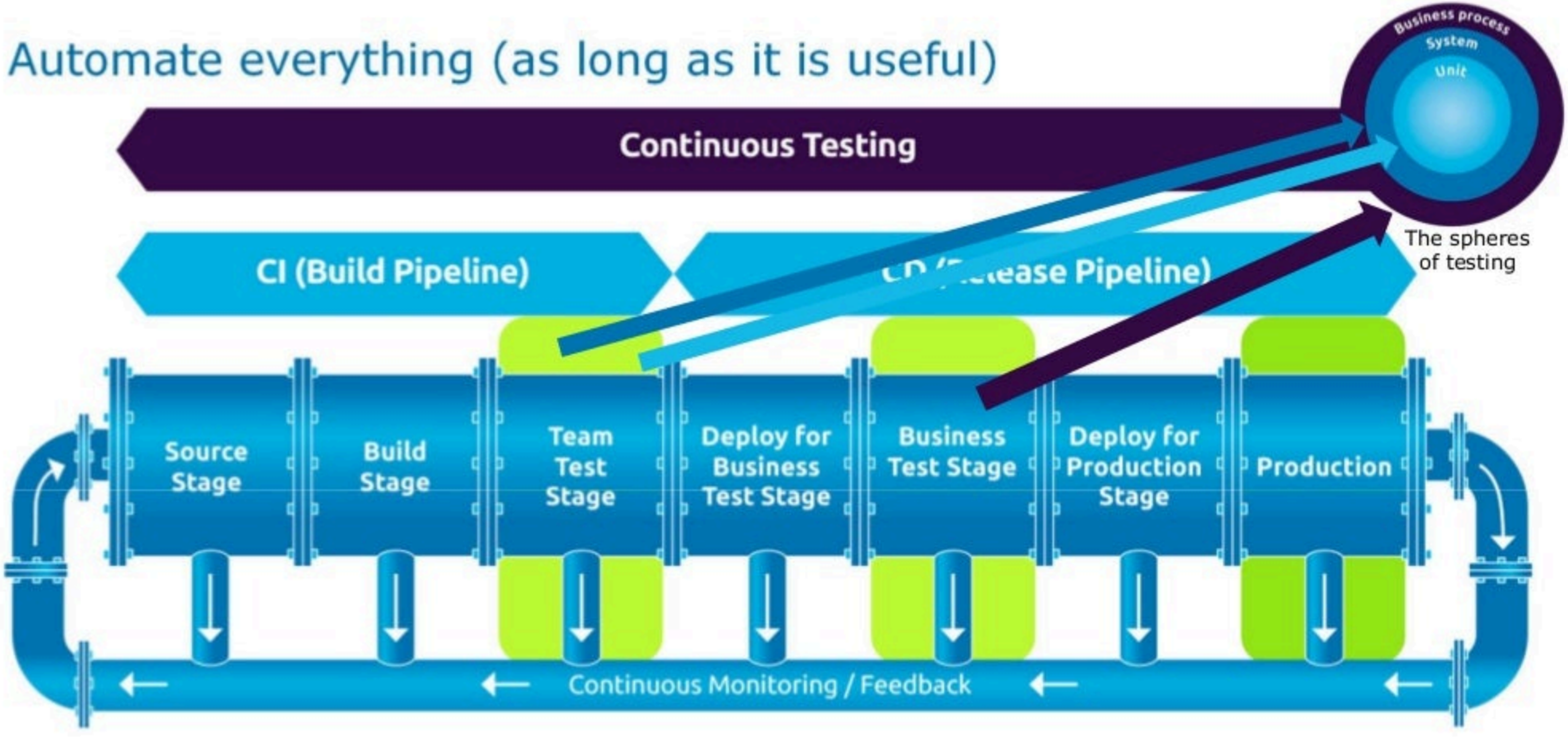


Figure 6.1 from the book

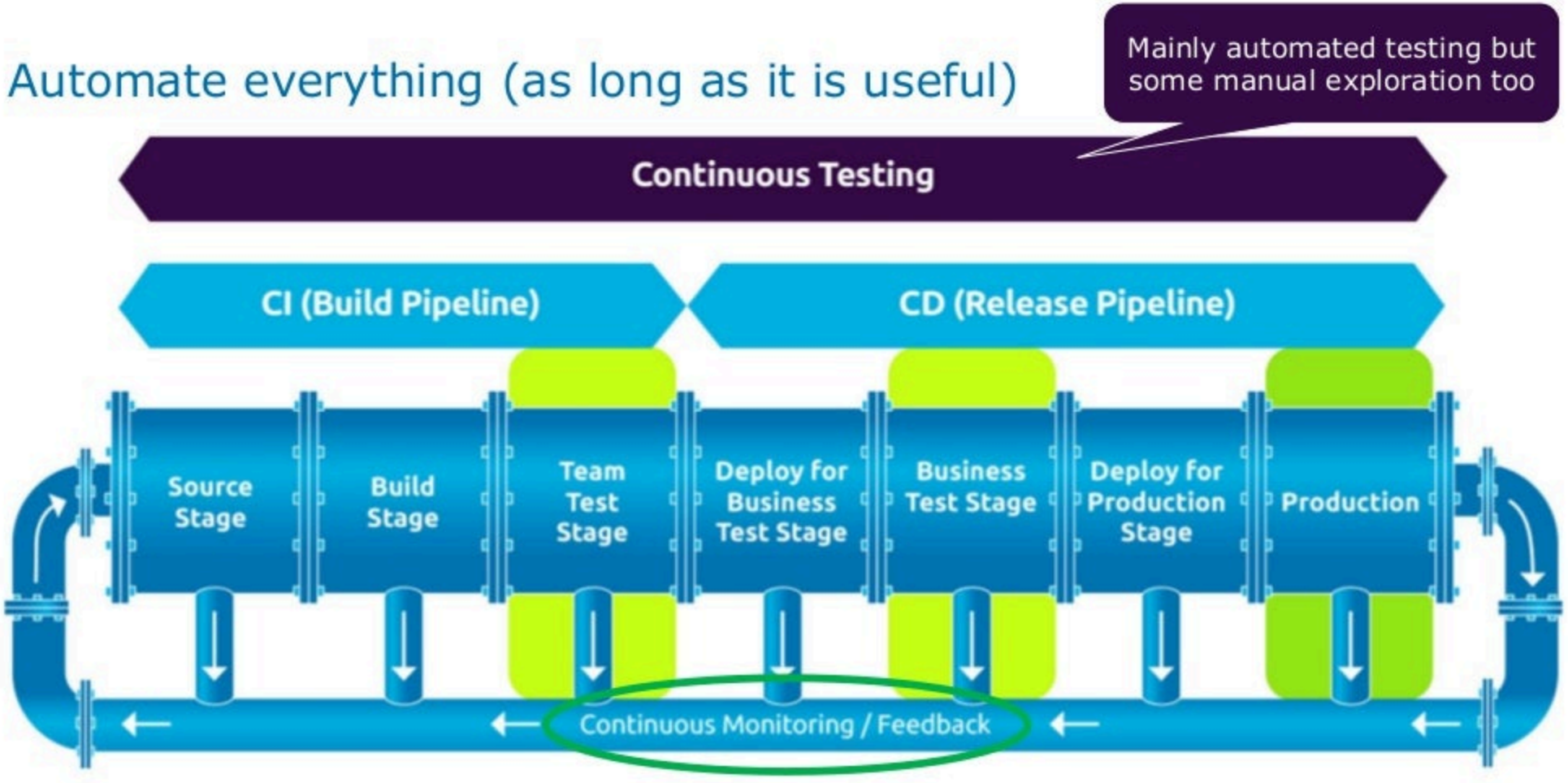
Automate everything (as long as it is useful)



An automated pipeline enables:

- Elimination of errors due to manual task execution
- Provisioning of standardized development feedback loops
- Enabling of fast product iterations

Automate everything (as long as it is useful)



By continuous testing and continuous monitoring gather information on various indicators from both test environment and live environment.

Quality Engineering in DevOps... Why? How?

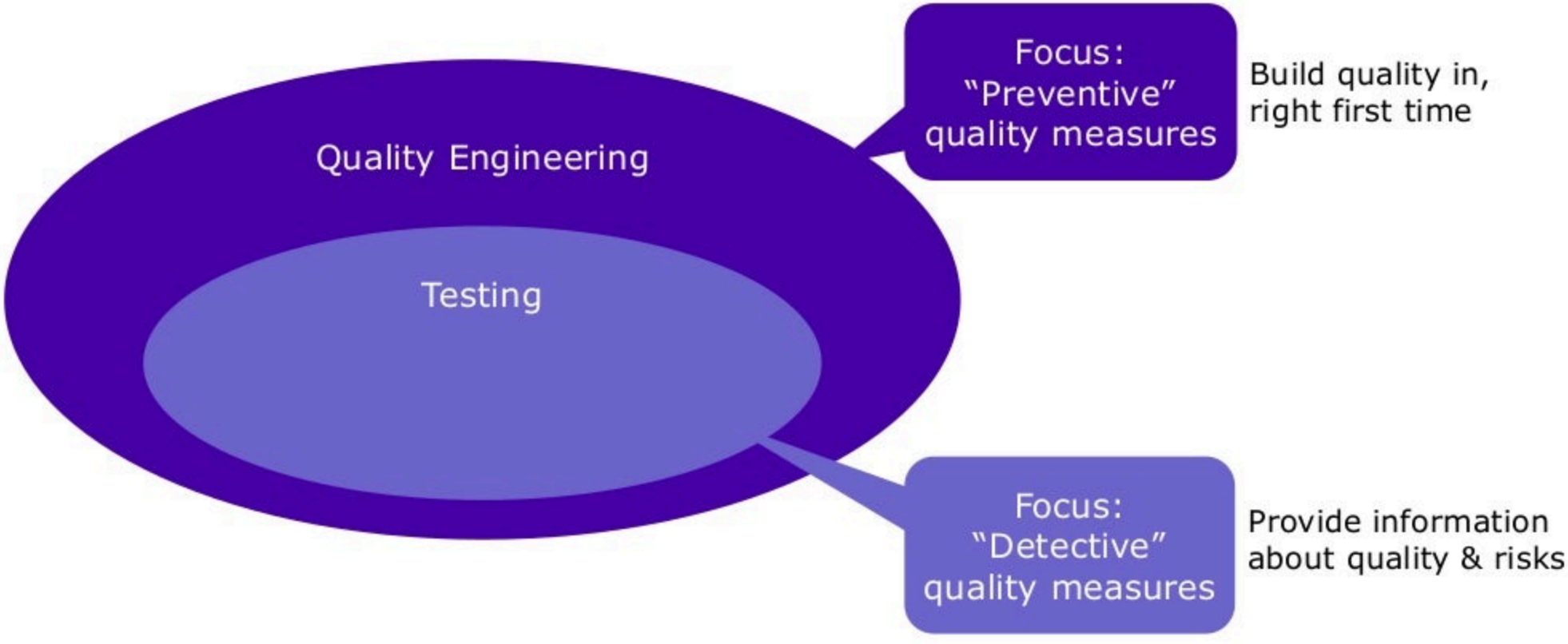
How?

Quality engineering - definition

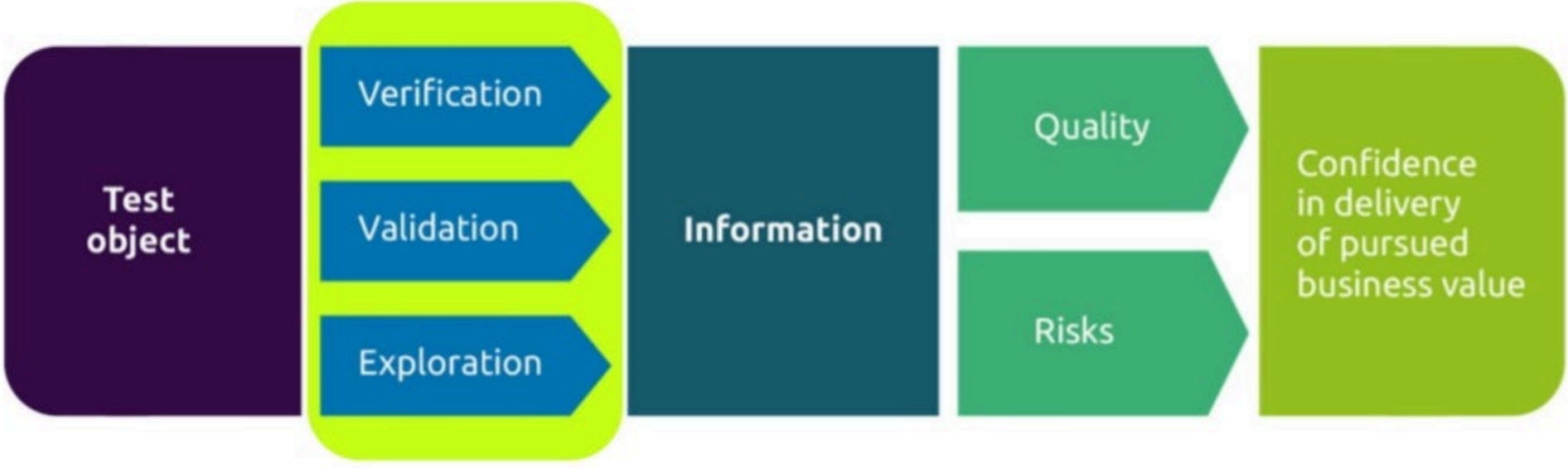
Quality Engineering is about
team members and their stakeholders
taking joint responsibility
to continuously deliver IT systems
with the right quality at the right moment
to the businesspeople and their customers.

It is a principle of software engineering
concerned with applying quality measures
to assure built-in quality.

Quality Engineering & Testing support delivering business value



Definition of testing as part of quality engineering



Testing consists of verification, validation and exploration activities
that provide information about the quality and the related risks,
to establish the level of confidence
that a test object will be able to deliver the pursued business value.

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Quality engineering topics

Two groups of topics:

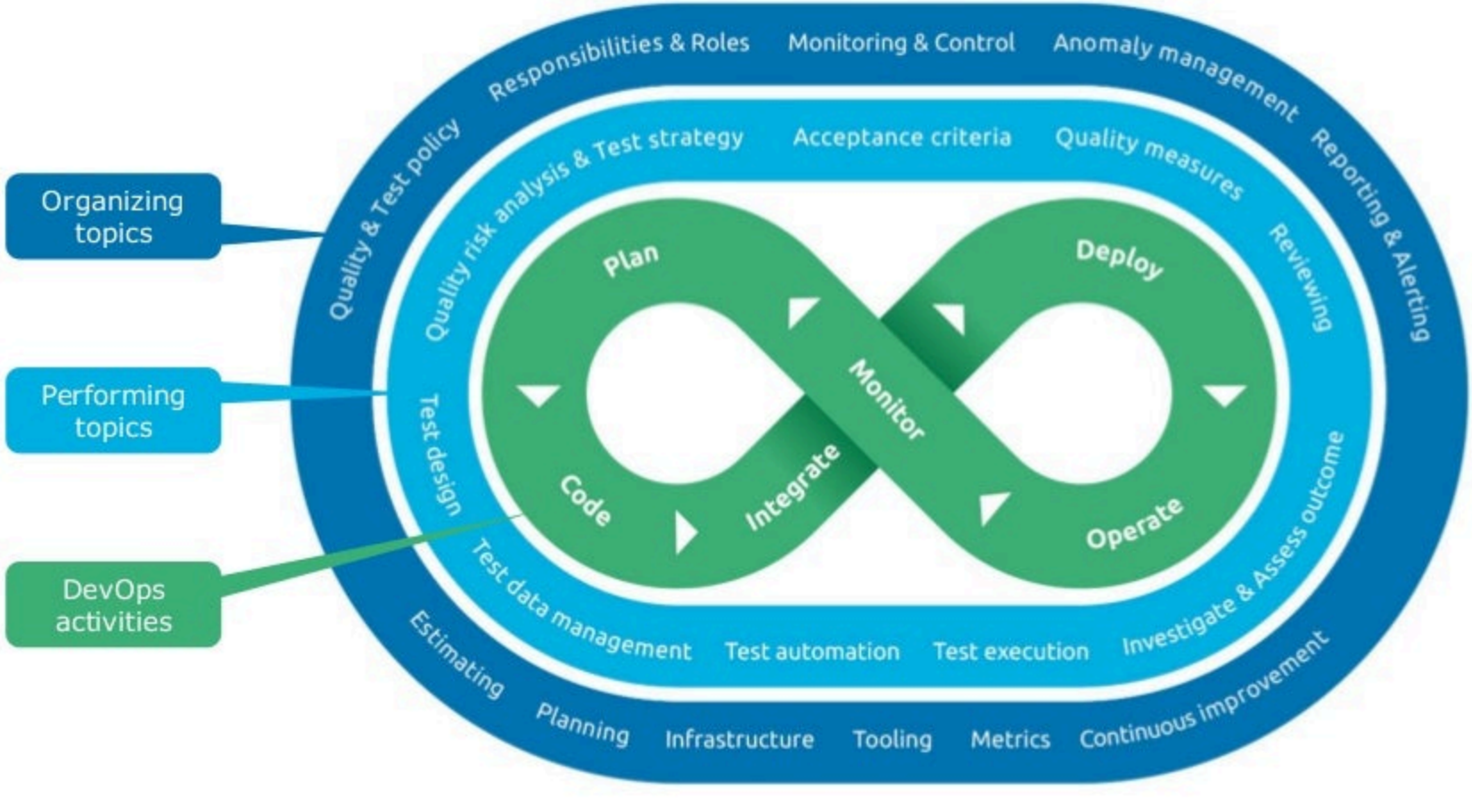
- **Organizing** — Multi-team scope
  Aimed at: orchestrating, arranging, planning, preparing and controlling
- **Performing** — Team scope
  Aimed at the operational QA & testing activities.

Note: it is not black-and-white, some topics may be relevant for both, but the emphasize is on one or the other.

These topics are always relevant for quality engineering, regardless of the IT development, operations and maintenance approach.

For effective and efficient IT delivery all of these topics need to be addressed in one way or another.

The QA & testing topics related to the DevOps activities



Quality measures

Examples of quality measures that are described by TMAP:

- Orchestration
- Specification and Example
- Quality risk analysis & test strategy
- Test design approaches & techniques
- unit testing & mutation testing
- Test automation
- Feature toggles
- Monitoring
- and many many more…

Specification and Example: guiding the team

To understand what "it" is that should be built and try to build "it" right the first time,
the team(s) can use Specification and Example mapping approaches.
These are collaborative approaches to define requirements and business-oriented functional tests for software products, based on capturing and illustrating requirements using realistic examples instead of abstract statements.

Some commonly used approaches are:

- Specification by Example (SbE)
- Example-driven development (EDD)
- Executable requirements
- Acceptance test-driven development (ATDD)
- Behavior-driven development (BDD)
- Agile acceptance testing
- Test-driven requirements

Keywords:

- **Common understanding of stories/features**
- **Test-first**
- **Exploring ideas**

Unit testing

Code coverage demonstrates the percentage of program code that is covered by tests. Different test design techniques guarantee less or more coverage.

Keep in mind that the statement "we have reached 100% code coverage" in itself doesn't give useful information.

The type of code coverage achieved is what matters

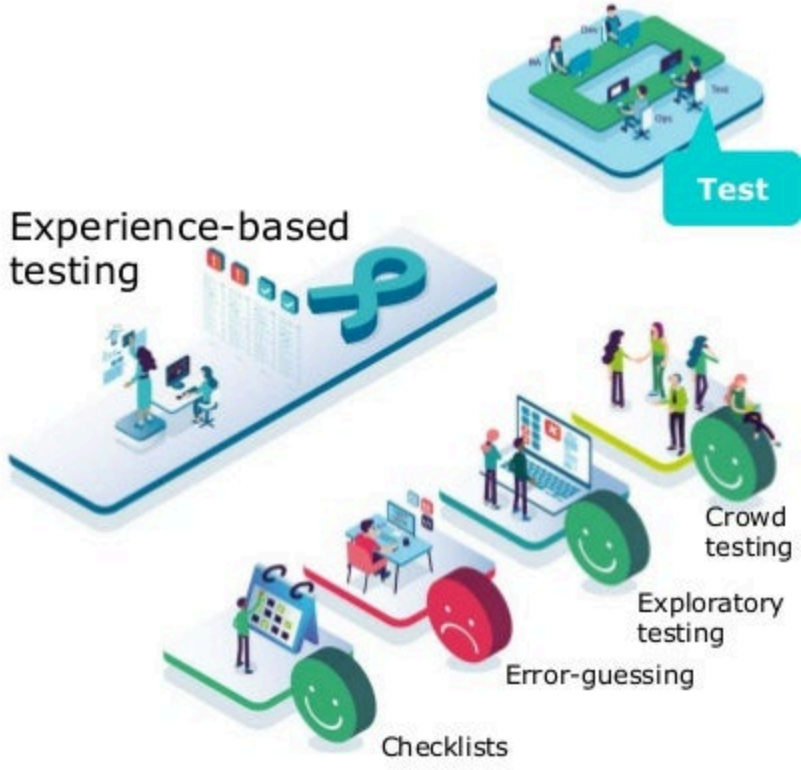
Suppose we have the following code:

```
IF A > 10 PRINT "YES" ENDIF
```

Test approaches and techniques

Coverage-based groups of test design techniques

- Process
- Condition
- Data
- Appearance



Test approaches

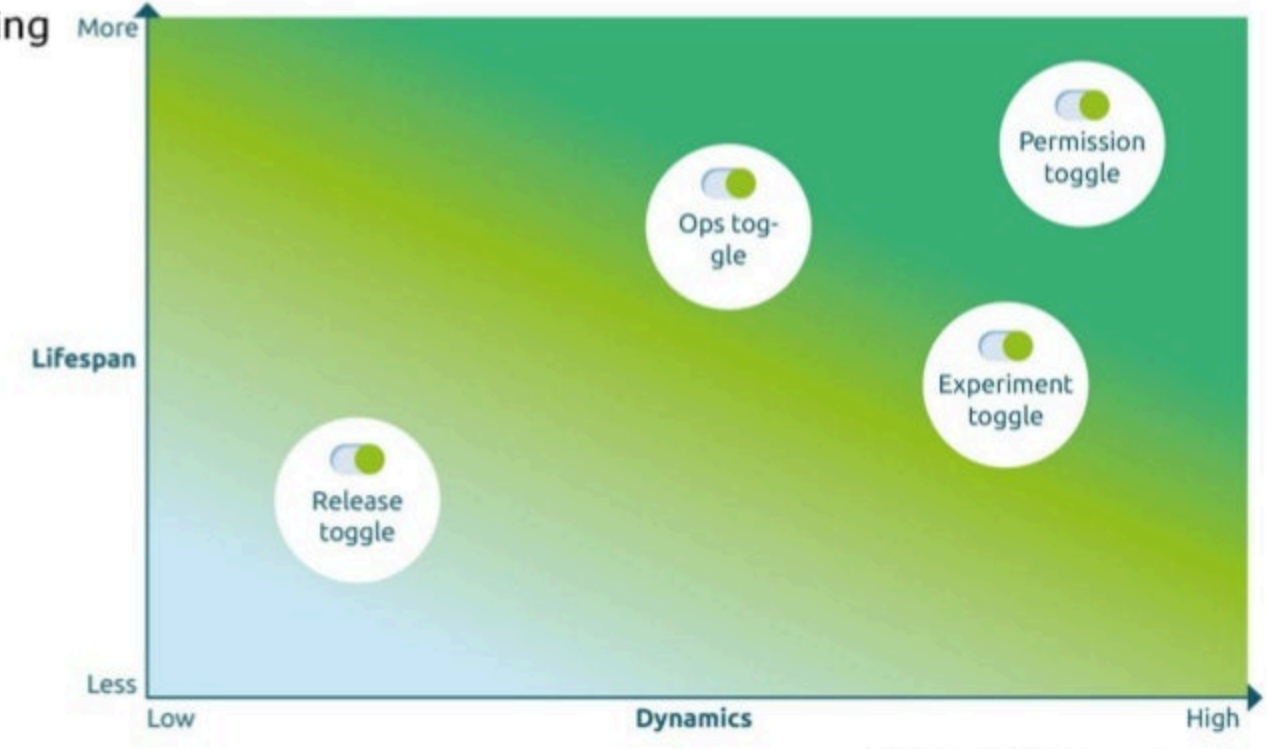
- Experience-based testing
- Coverage-based testing

Always combine

Quality measures

Examples of quality measures that are described in TMAP:

- Specification and Example (SaE)
- unit testing & mutation testing
- Test design techniques
- Feature toggles
- Monitoring
- and many many more…



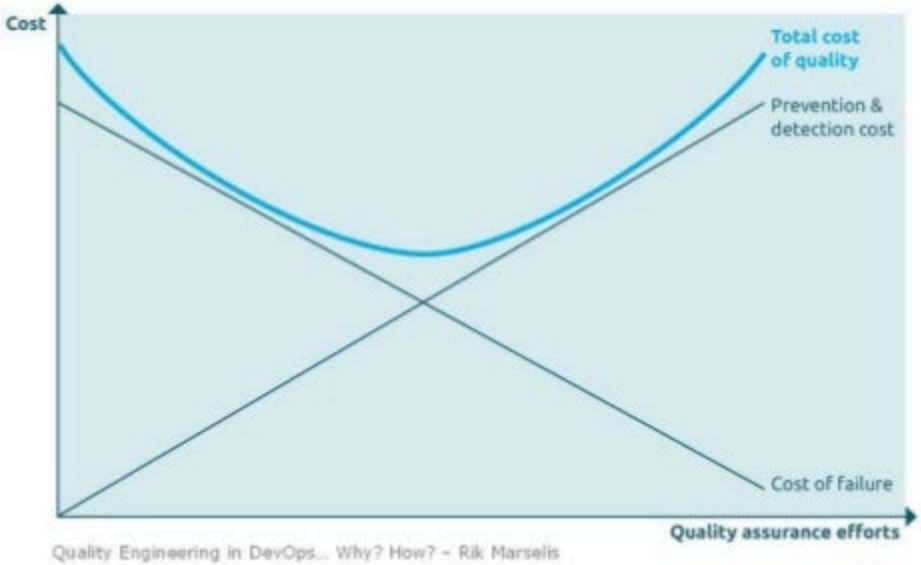
Quality & Test policy ➔ for example: Risk-based development & testing

High quality risk – high test intensity

Medium quality risk – medium test intensity

Low quality risk – low test intensity

No quality risk – no testing & no development !!!



Item	Characteristic	Risk Class	Static Testing	Dynamic Testing	Other Quality Measures
US 1	Functionality	A	●●	●●●	●●●
	Usability	C	●	●	
US 2	Functionality	B	●	●●	●
	Security	B	●	●●	●
US 3	Functionality	C	●	●	
Spike 1	Performance	C	●	●	
Feature 1	Performance	C	●	●	
Feature 2	Functionality	B	●	●●	●
	Suitability	B	●	●●	●
...	...	...	...	...	...

Conclusion: The change that quality engineering achieves

No more

Testing = Messenger of bad news

Instead

Quality engineering = Enabler of an adequate quality level that delivers Business Value

Quality Engineering in DevOps... Why? How?

So this is why and how...
Want to know more?

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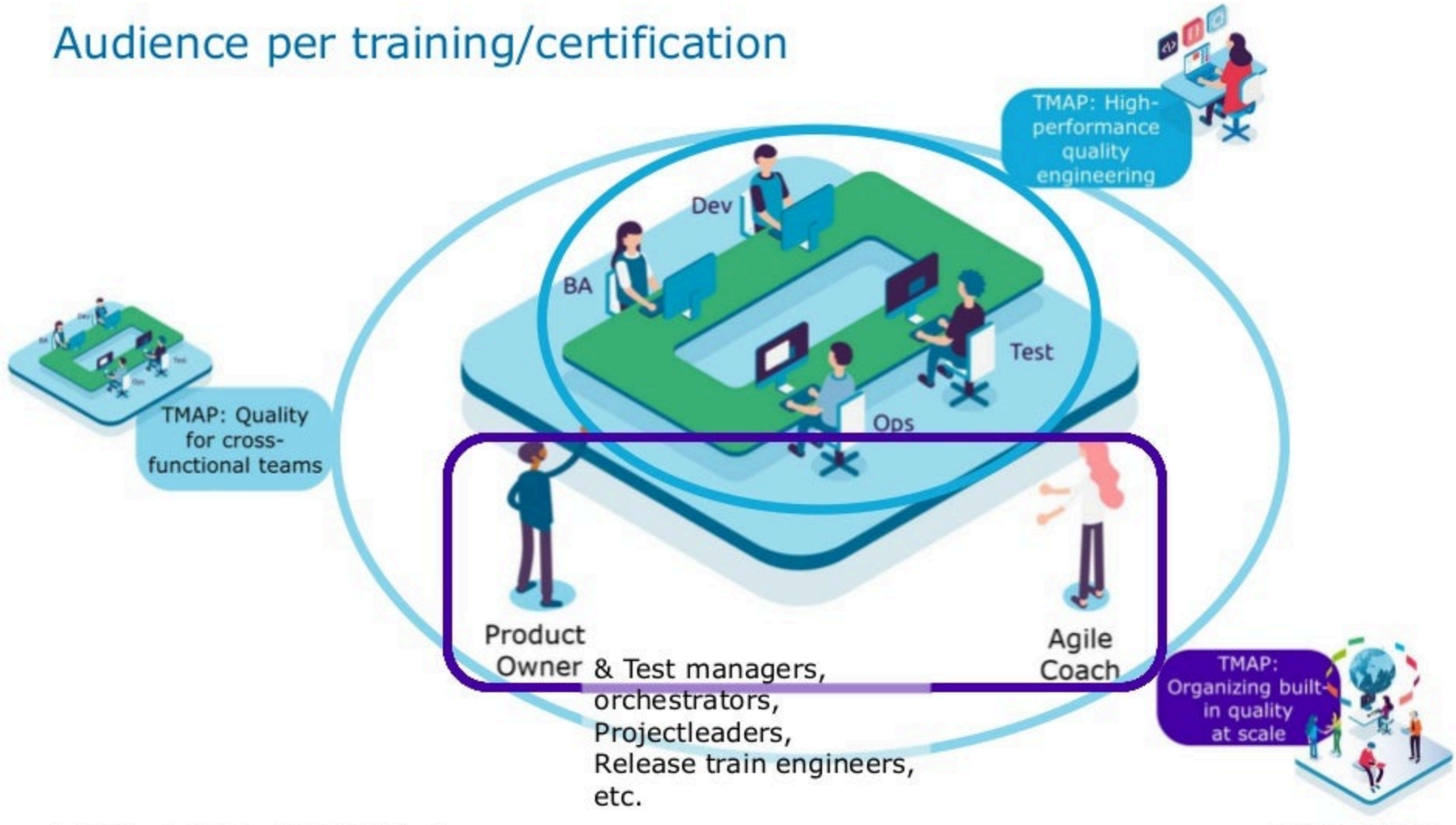

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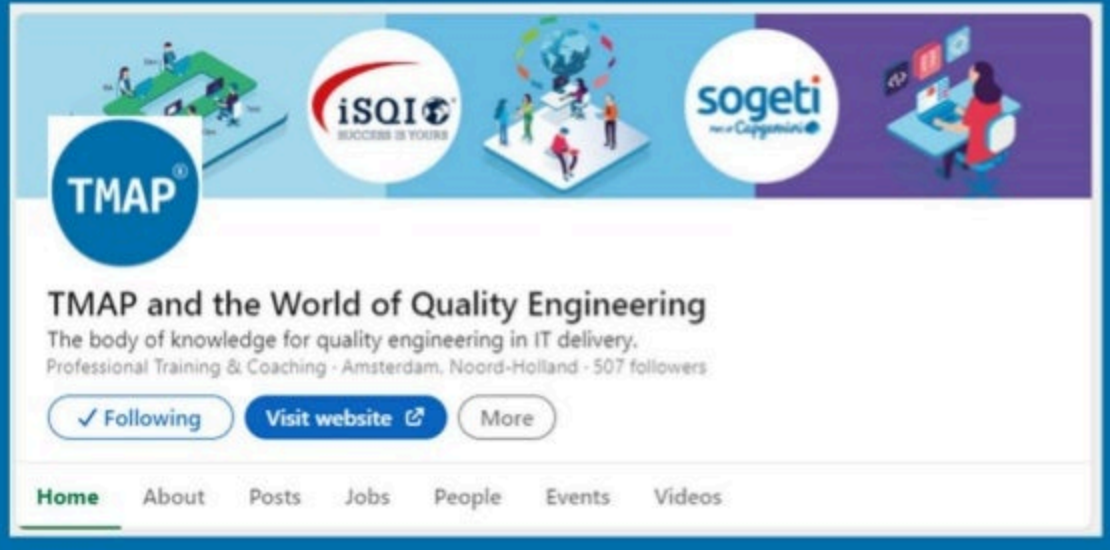
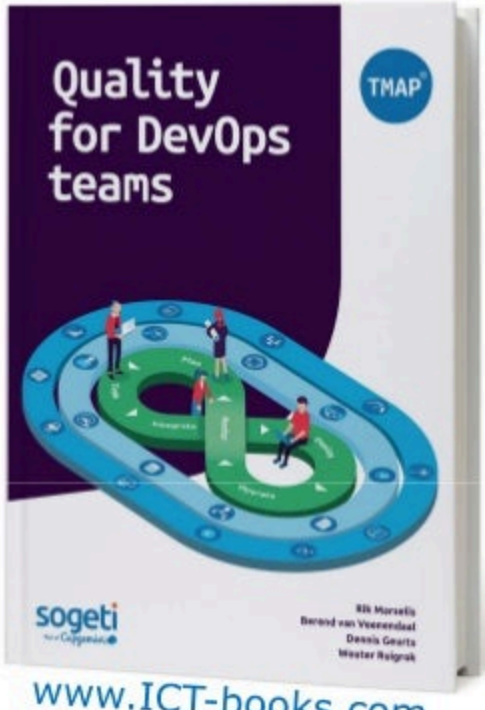


Questions & Answers



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TMAP: body of knowledge for quality engineering

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2020

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TEST NET

ISTQB

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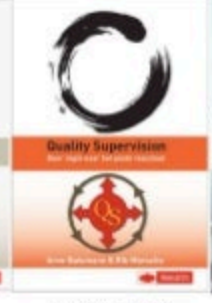
2009

2012



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