Quality for DevOps teams

Rik Marselis

25 September 2023

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

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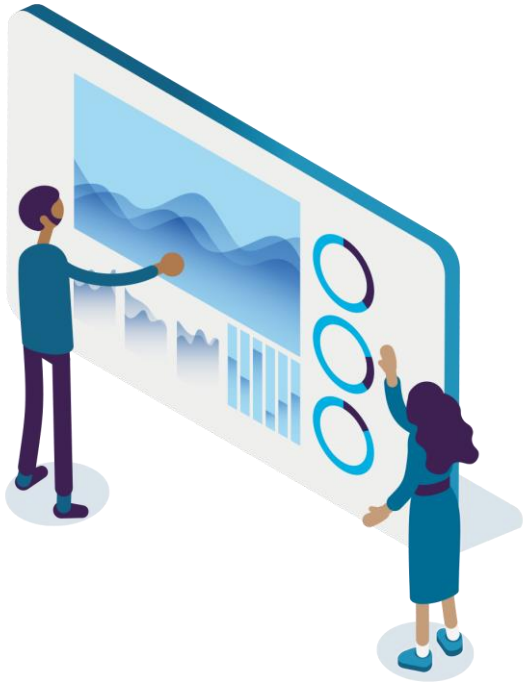
Challenges of today’s IT delivery



The business demands:

- Deliver business value
- Deliver quality at speed

Value & Speed

The team challenges are:

- Quality engineering is everyone's responsibility
- QA & testing is integrated in process and people

The focus is:

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

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High-performance IT delivery

is an approach

that enables **cross-functional** teams

to continuously **improve**

the **products**, **processes** and **people**

that are required to

deliver **value**

to the end users.

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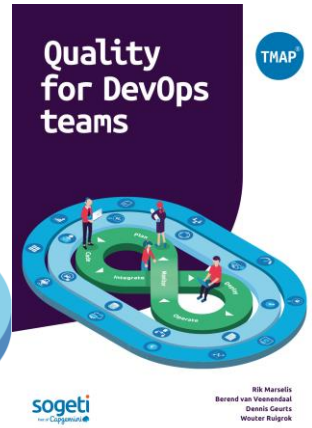
Rik Marselis
Principal Quality Consultant

sogeti
Part of Capgemini

1980

2018

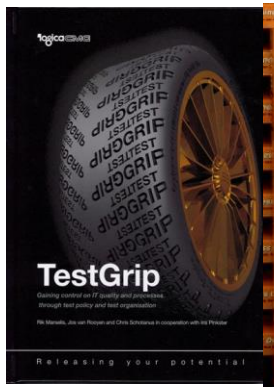


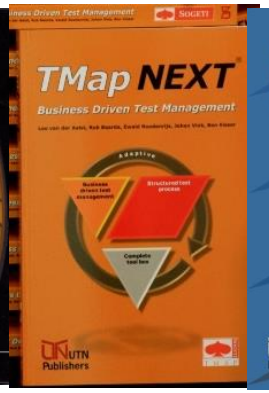
2020

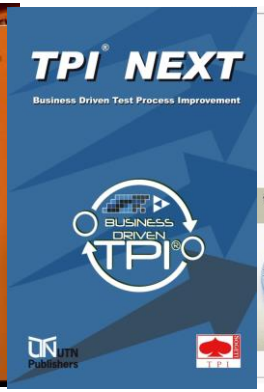
sogeti labs
Part of Capgemini

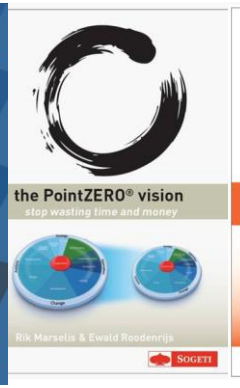
testnet

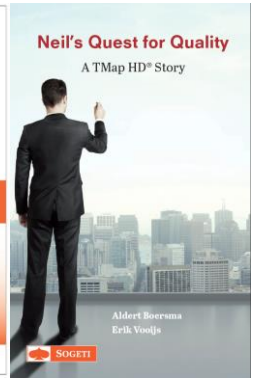
ISTQB











2007 2008 2009 2012 2012 2014

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ISTQB International Software Testing Excellence Award 2022

Olivier Denoo presents the award at the ISTQB general assembly in Marrakech on 20 October 2022

EuroSTAR 2023 Testing Excellence Award

Bob van de Burgt presents the award at the EuroSTAR Awards Gala night in Antwerp on 15 June 2023

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3 people will win a copy of this TMAP book!

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

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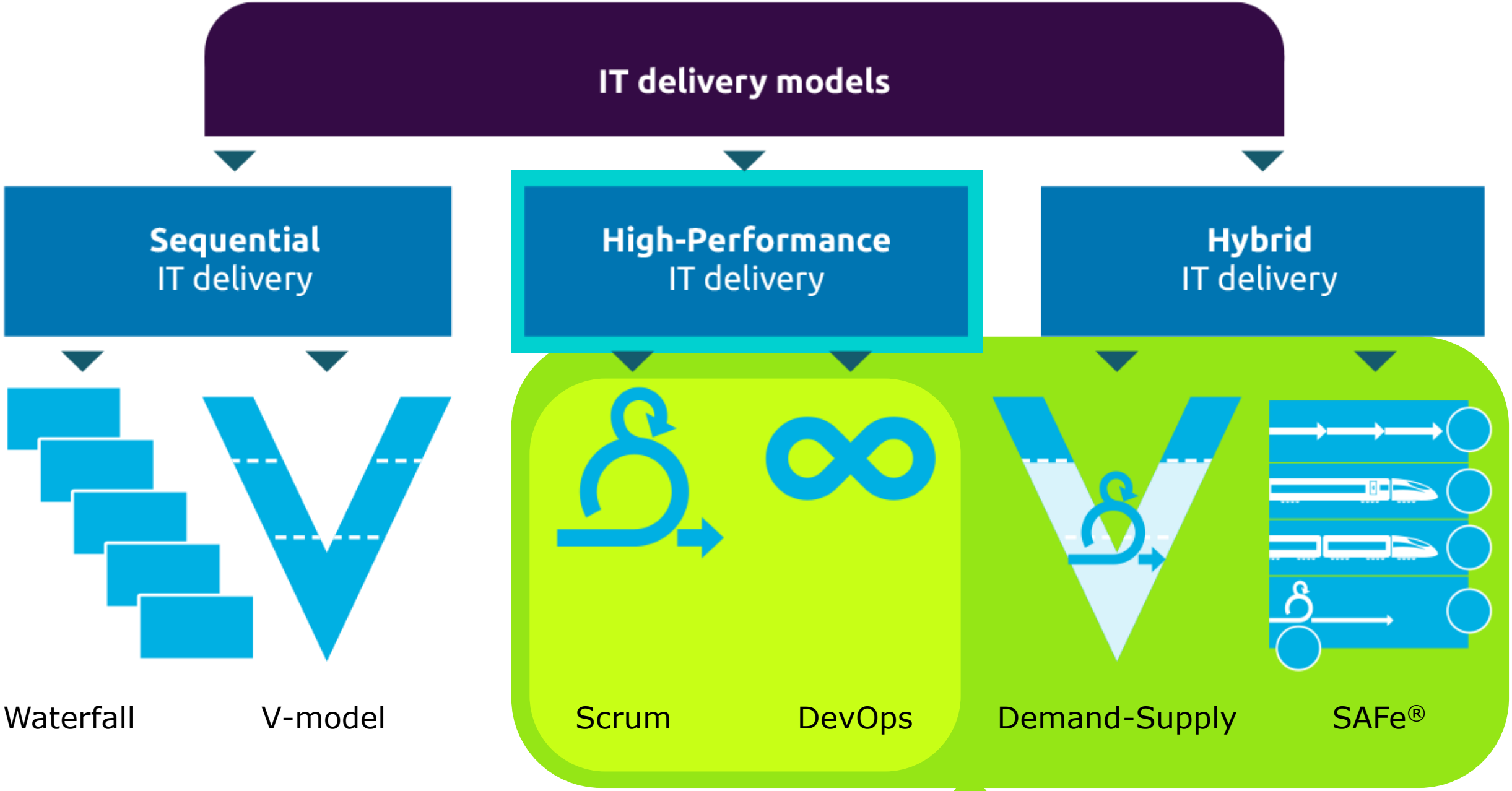

Figure 7.1 from the book Quality for DevOps teams

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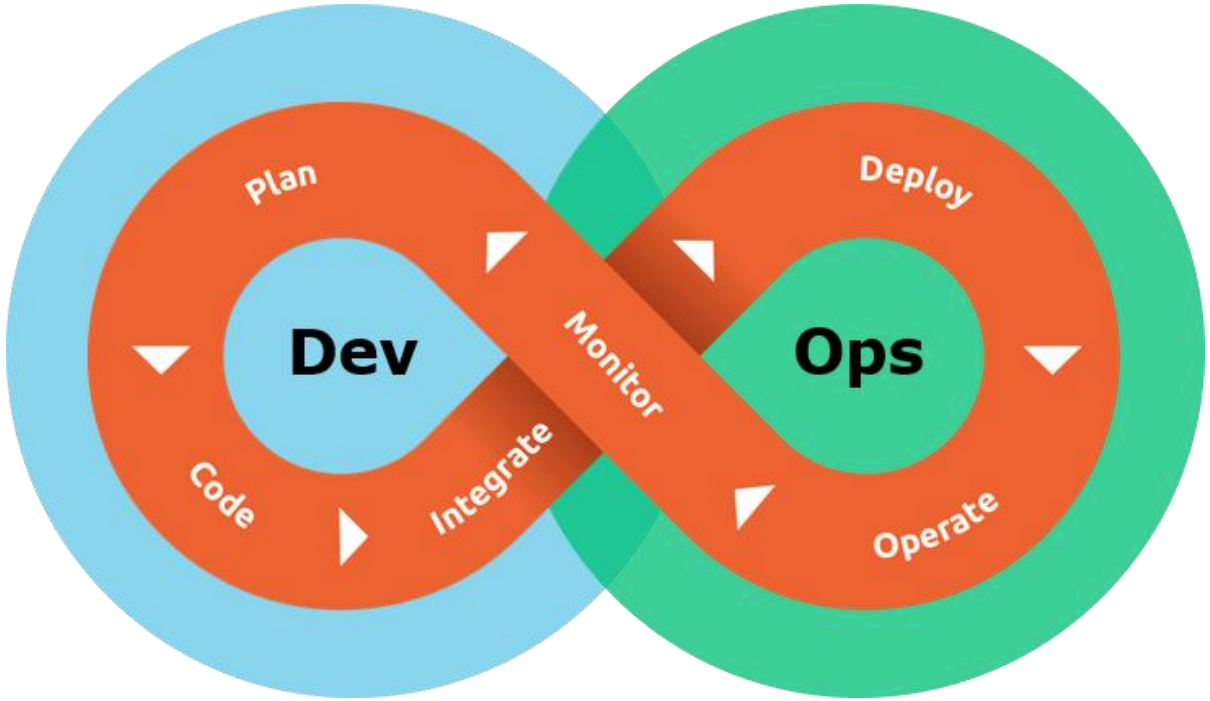
DevOps – highlights

The six DevOps principles:

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



The six 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**.

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High-performance IT delivery

is an approach

that enables **cross-functional** teams

to continuously **improve**

the **products**, **processes** and **people**

that are required to

deliver **value**

to the end users.

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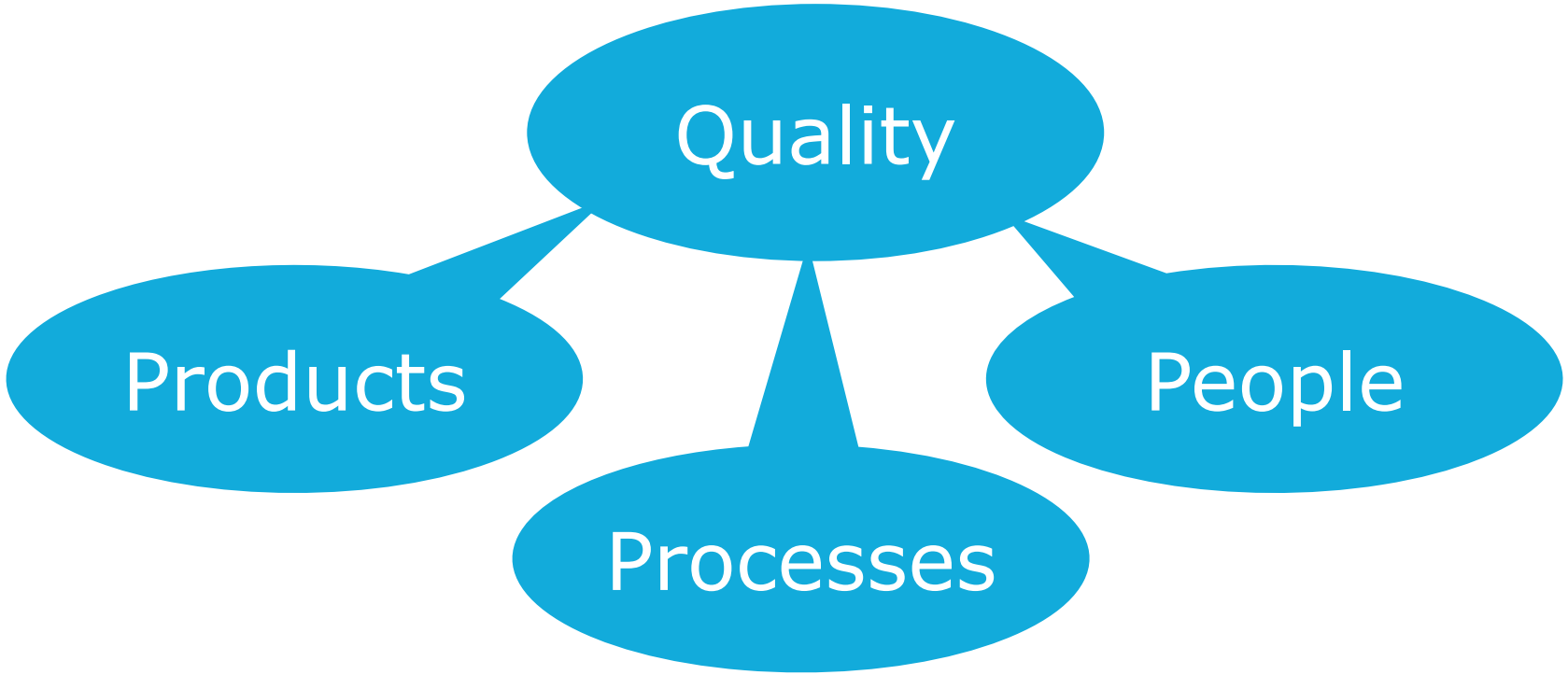
Business value depends on the **quality** of products, processes & people



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The starting point for DevOps:

A cross-functional team

takes joint responsibility

And for Agile in general

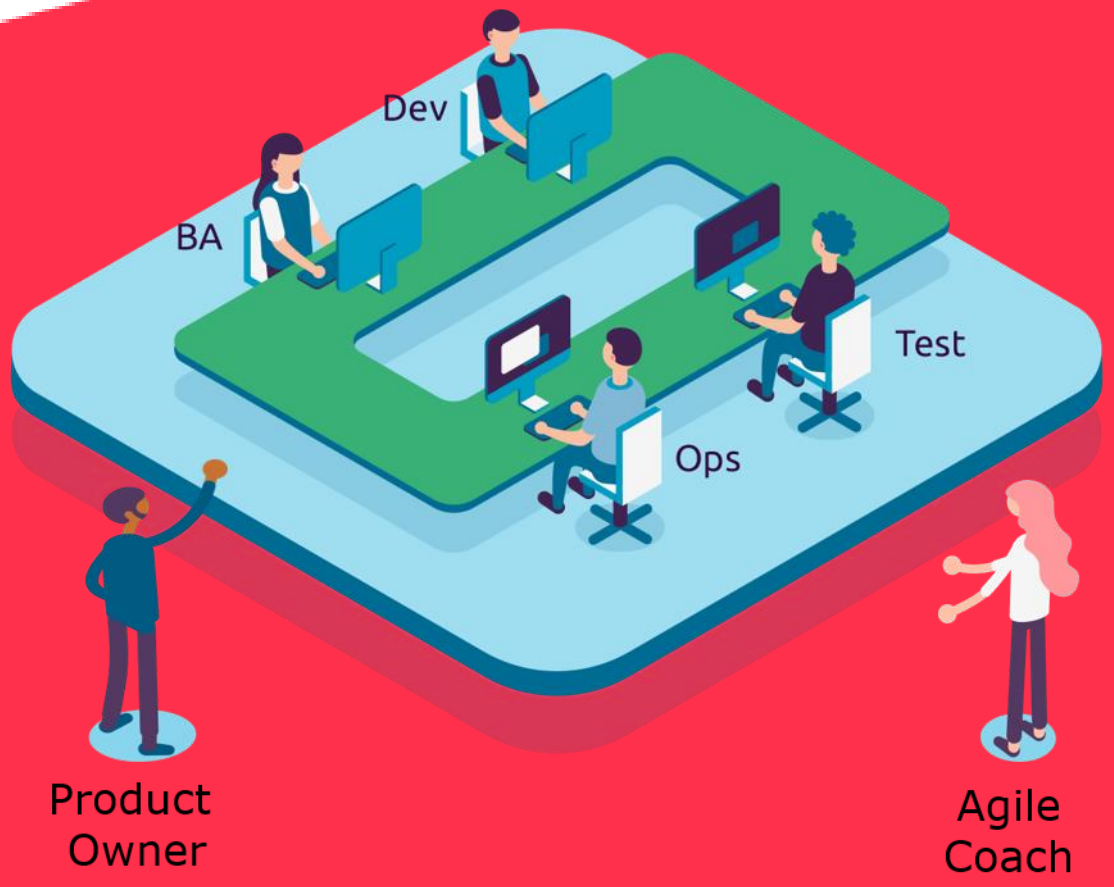
TEAM:

Together

Everyone

Achieves

More



Example of a cross-functional high-performance IT delivery team

Aligned with the DevOps culture of IT delivery – where roles are important and functions are not – keep in mind that if in TMAP you see a term such as developer or tester, we refer to the role of a team member at a specific moment in time, not to a function.

High-performance IT delivery

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the **products**, **processes** and **people**
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The starting point of organizations is to deliver **business value**

Scope of **Business delivery**

Scope: **value definition**

Goal:
Value

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Our “VOICE model” for delivering business value

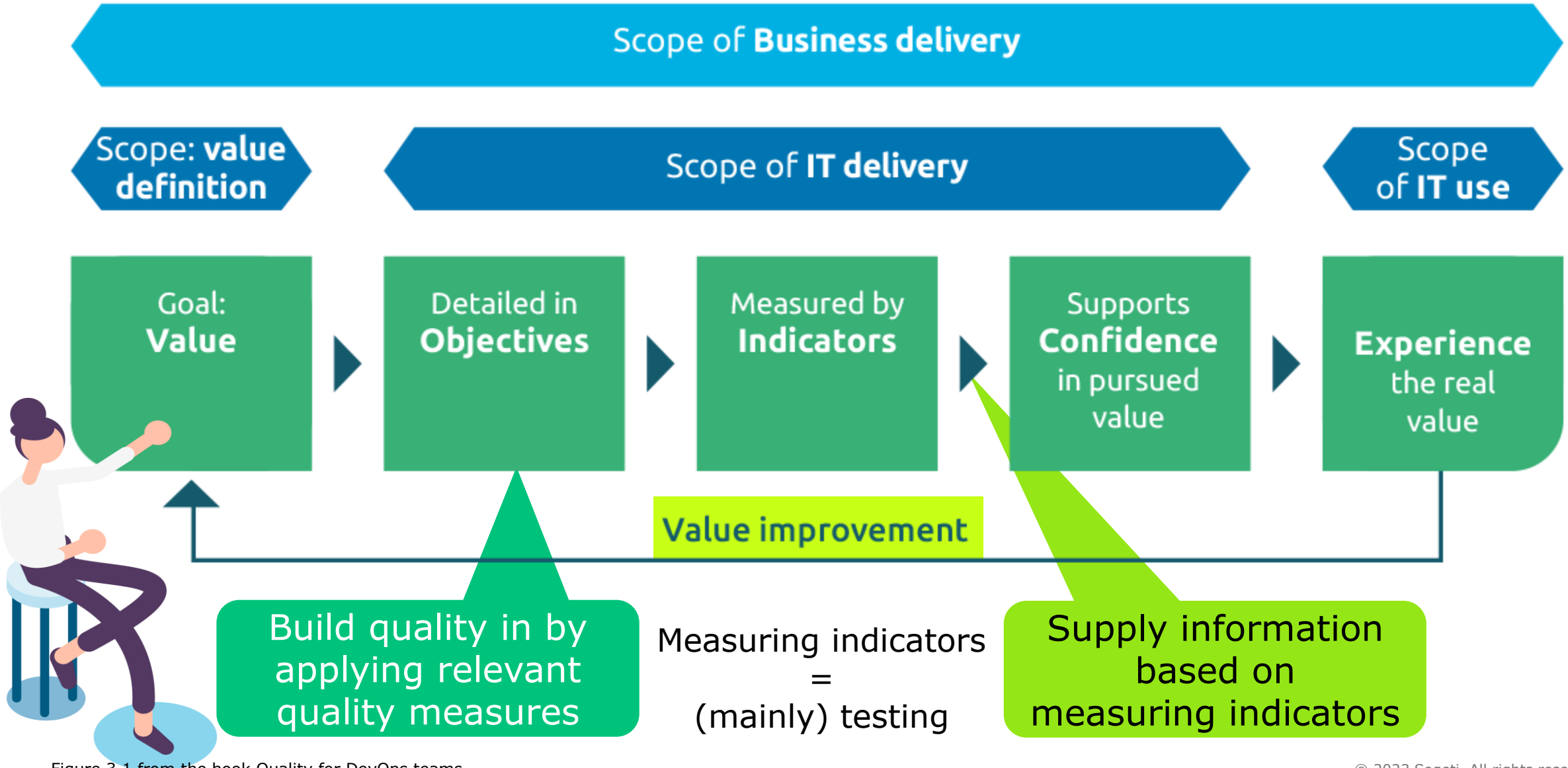

Figure 3.1 from the book Quality for DevOps teams

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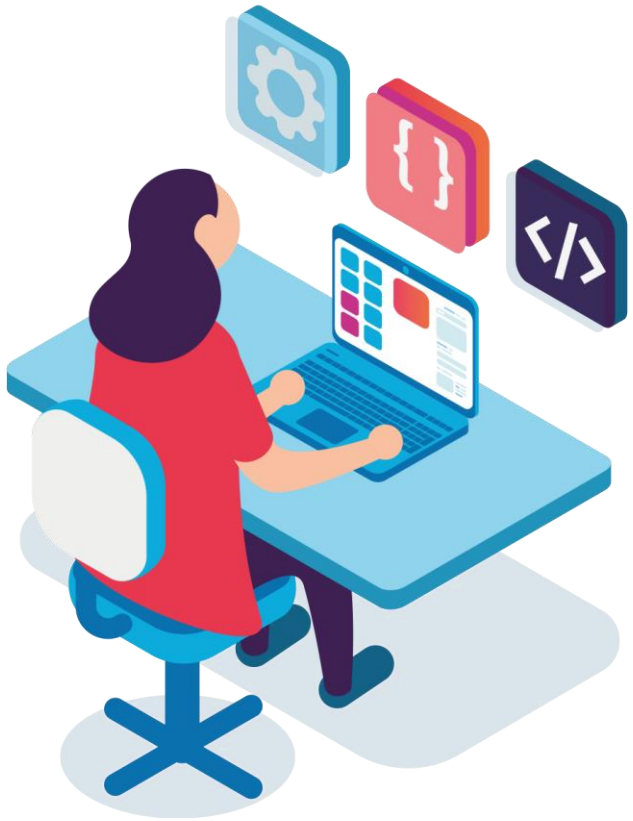
Menti-question

What words do you think of for the concept of

“Quality Engineering”



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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 the quality of IT systems.

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TMAP®
www.tmap.net

A Quality Measure is a group of activities that is aimed at achieving a certain level of quality.

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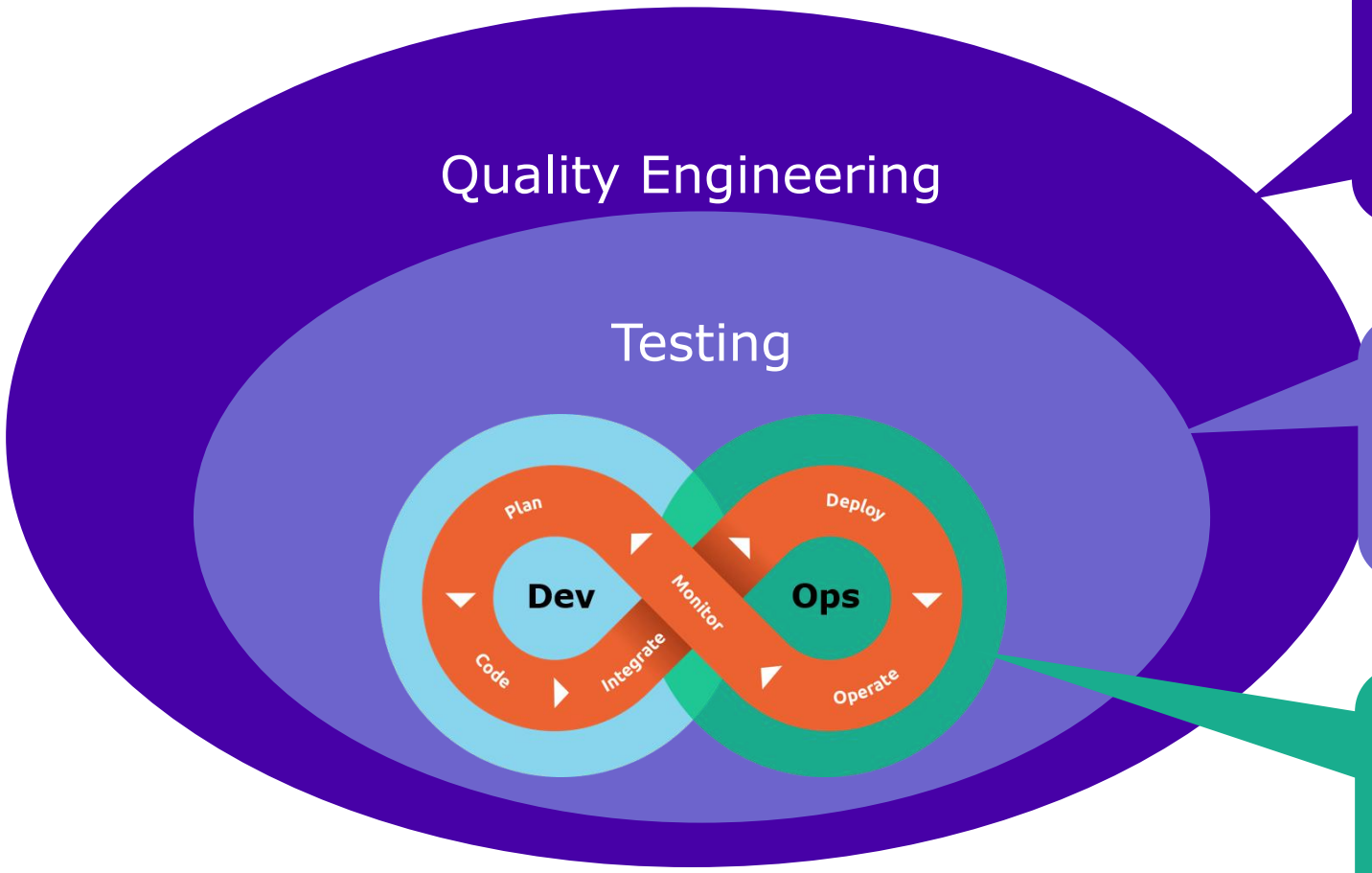
Quality Engineering & Testing support delivering business value



"Preventive" quality measures

Build quality in, right first time

"Detective" quality measures

Provide **information** about quality & risks

"Corrective" quality measures

Pro-active **quality improvement**

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Quality engineering consists of many activities ➔ grouped in **topics**

Multi-team scope

Organizing

Aimed at:
orchestrating, arranging, planning, preparing and controlling

Team scope

Performing

Aimed at:
operational QA & testing activities.

Figure 11.2 from the book Quality for DevOps teams

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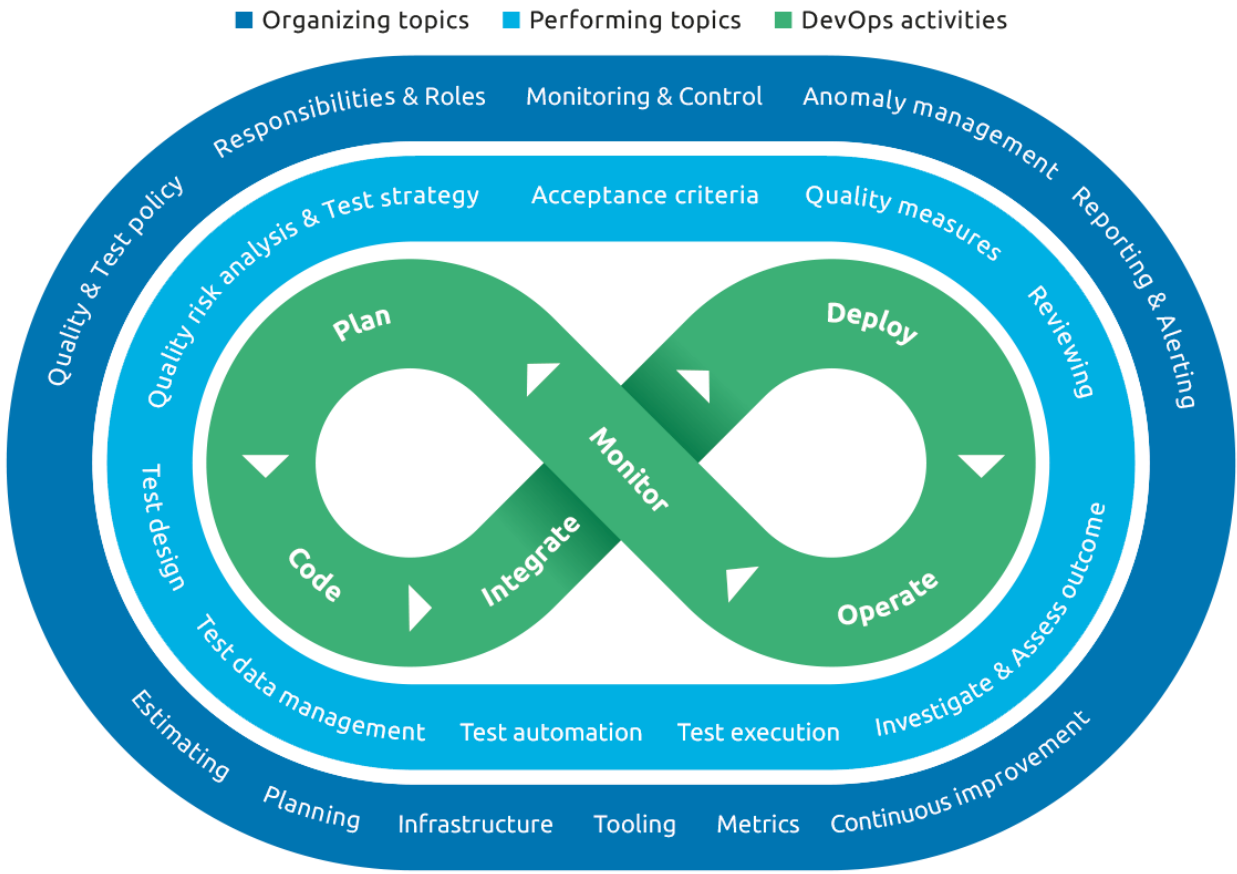
How quality engineering & testing topics align with DevOps activities



Figures 1.4 and 11.2 from the book Quality for DevOps teams

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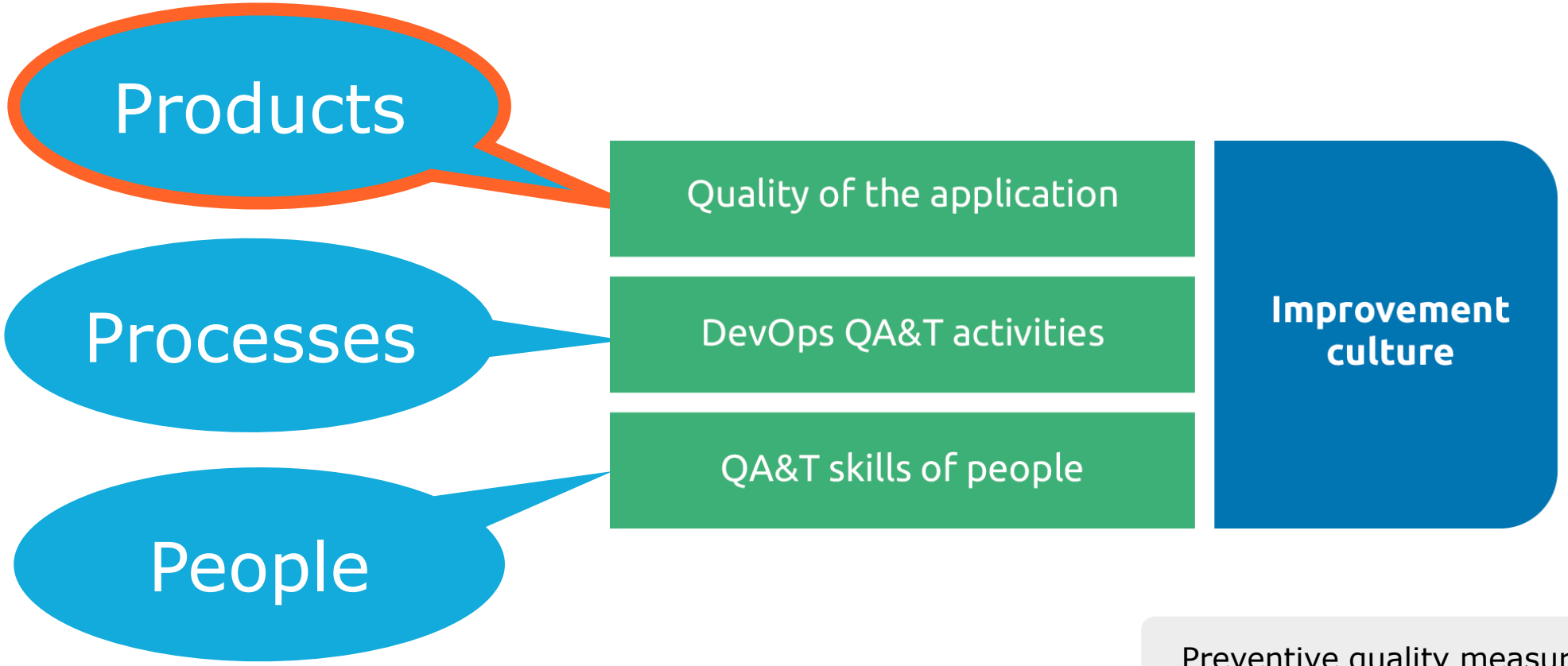
Continuous improvement of **products**



Preventive quality measure

Example: refinements

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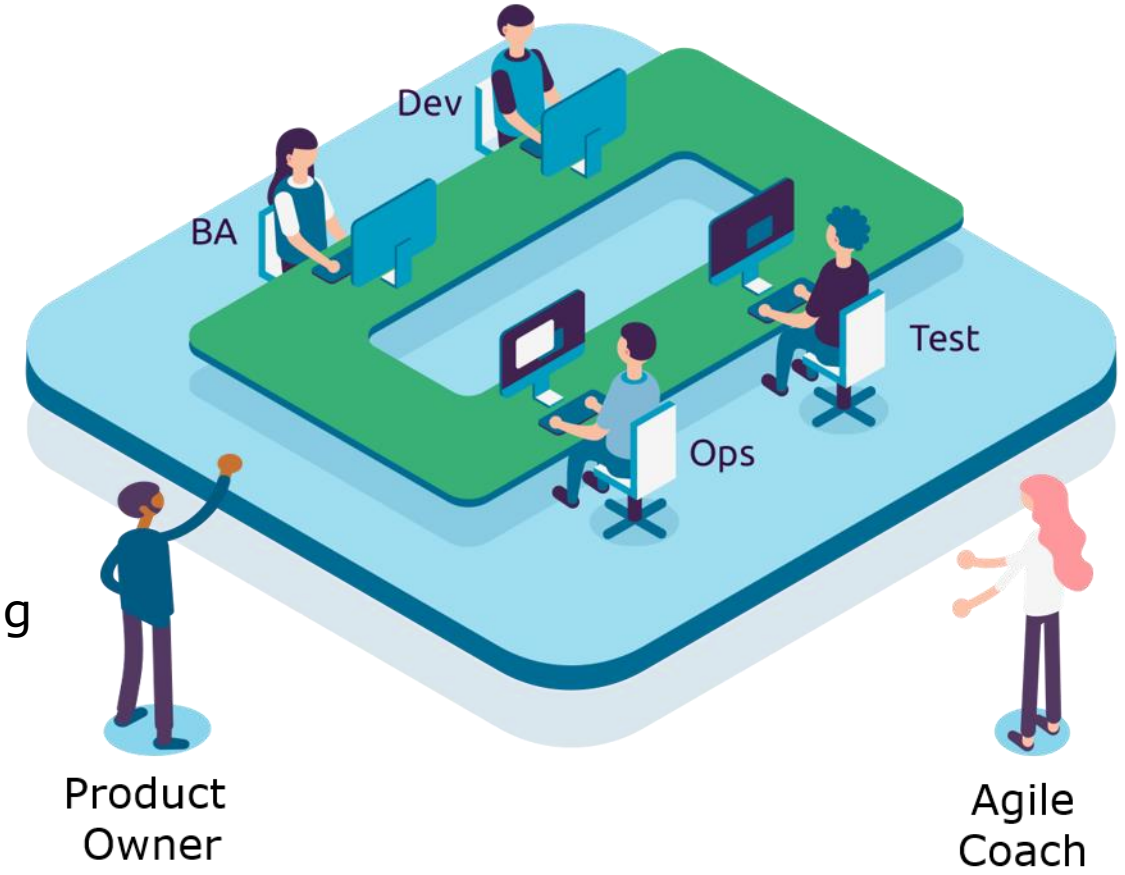
Build quality in from the start, do proper refinements

One concept that can be used is "**perspective based reviewing**"
Also known as the **4-amigos approach**

Every role of the team is involved in the review

Advantages:
- All relevant aspects are considered
- Unclear information is cleared up instantly
- All team members have a common understanding



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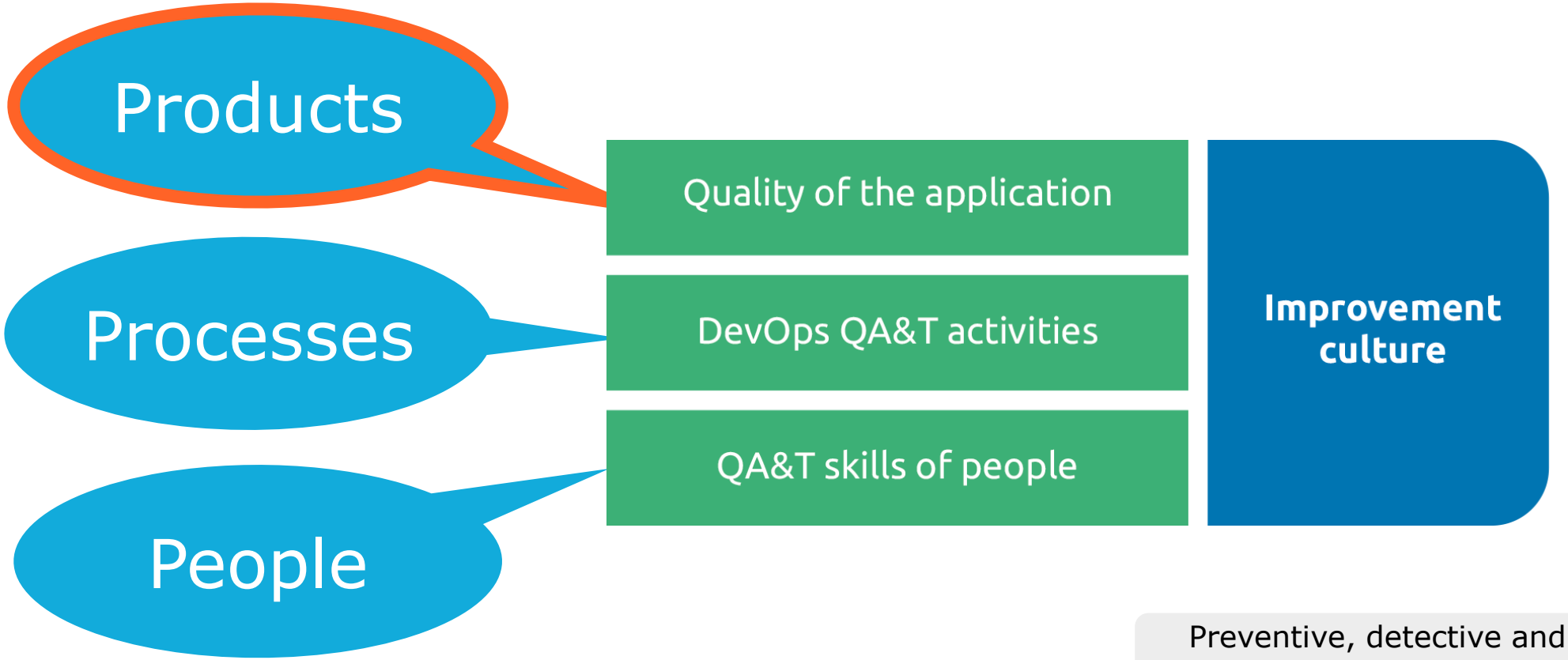
Continuous improvement of **products**



Preventive, detective and corrective quality measures

Example: align quality measures with risk level

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Build quality in from the start, aligned with risk level

- Do a quality risk analysis
- Low risk ➔ one developer creates the code, another reviews
- High risk ➔ pair programming, two developers create code together
- This way the effort of development of the product is aligned with the quality level needed to provide business value
- And what about “No Risk” ?
  - ➔ No testing, but also…
  - ➔ No development!!! (no risk means nobody really needs it!)

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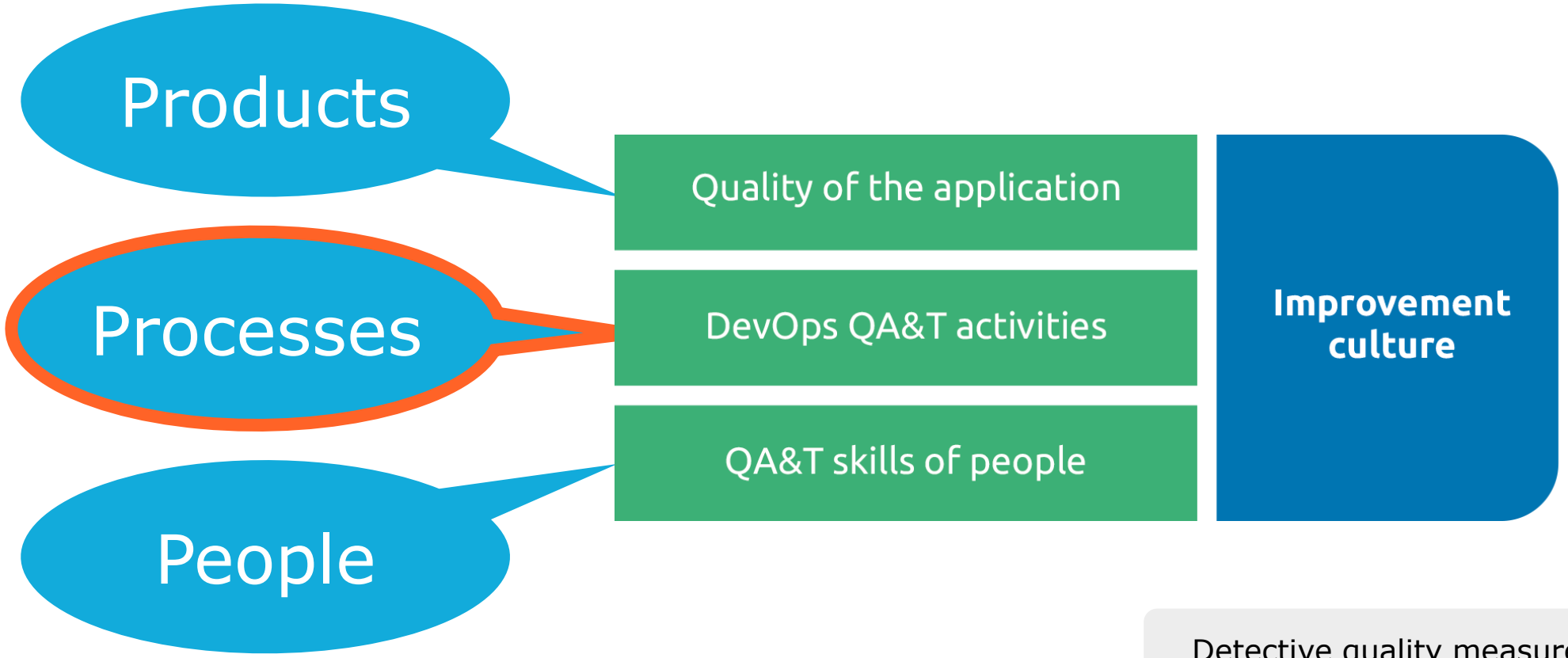
Continuous improvement of **processes**



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Definition of testing within business delivery & 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**.

Figure 5.6 from the book Quality for DevOps teams

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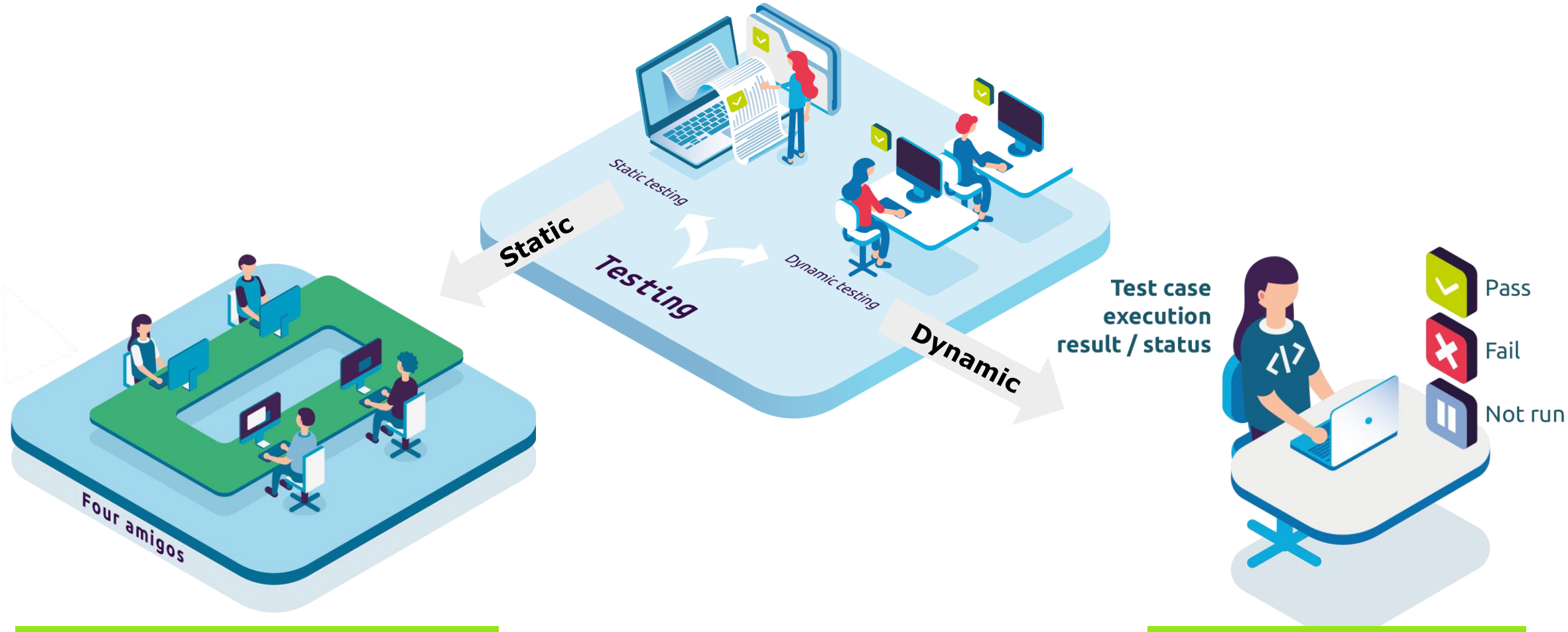
Static versus Dynamic testing
(examples)



Perspective based reviewing

"Running" the system

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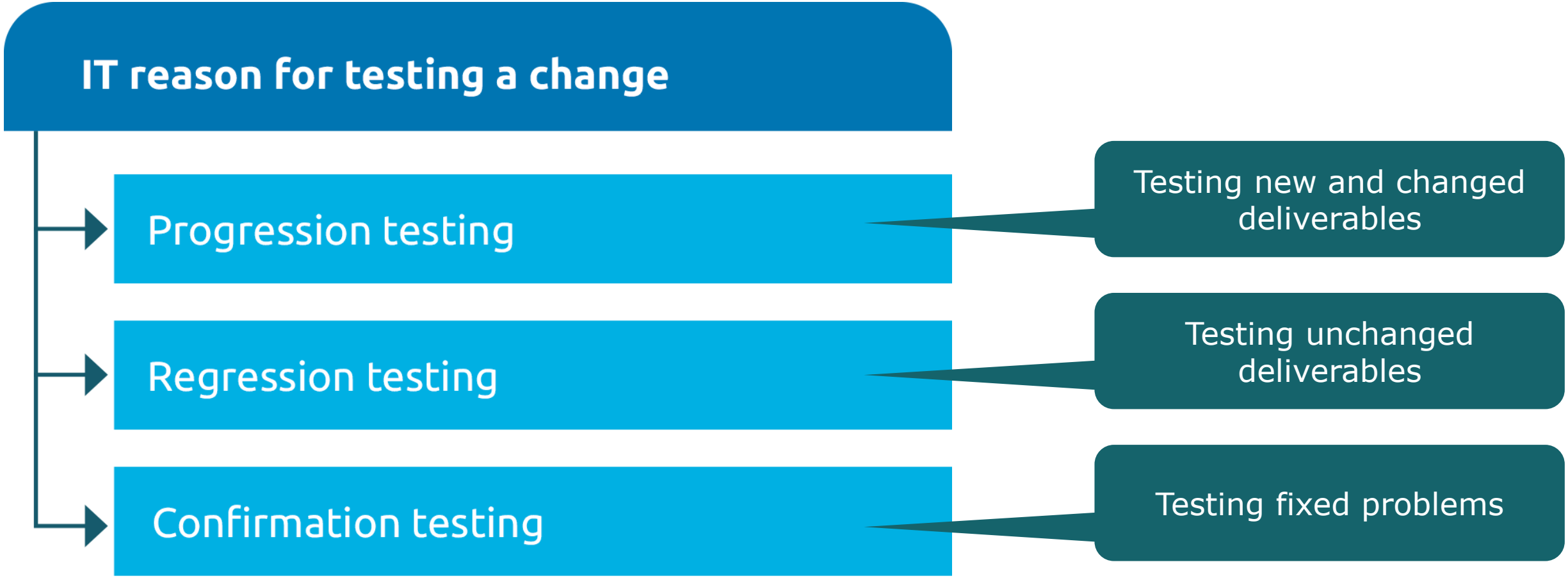
Testing **new & changed** versus **unchanged** deliverables



All three varieties of testing are important!!

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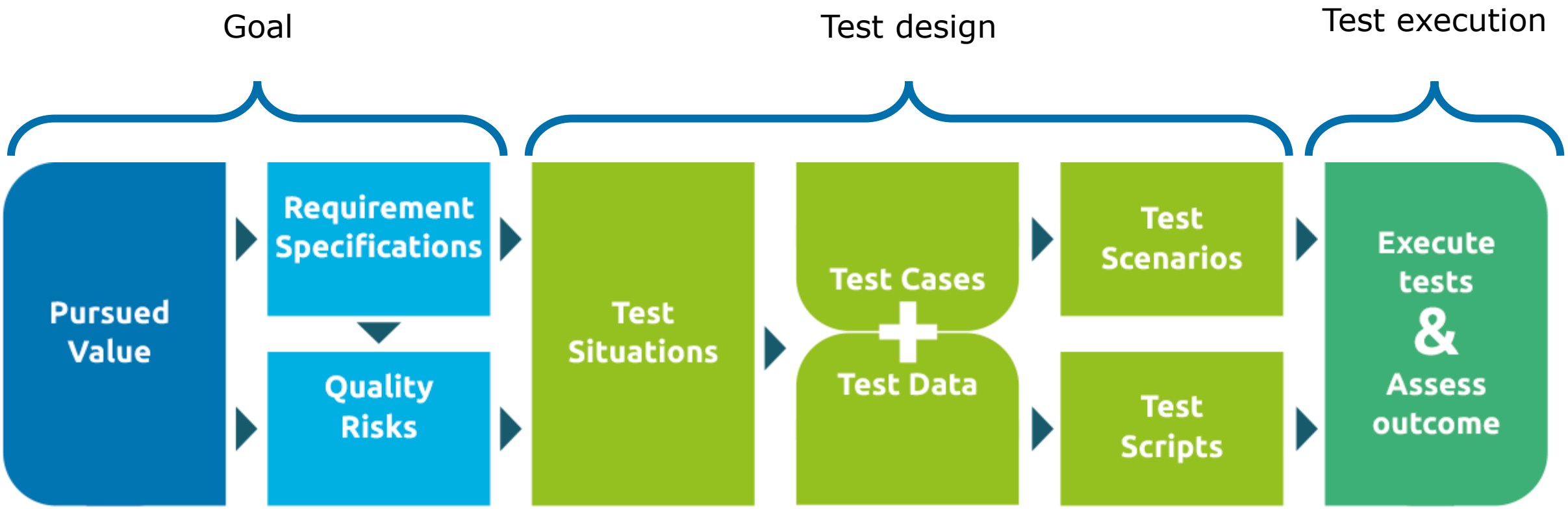
The process of testing: goal, test design and test execution



What is the most important part of a test case?

The **expected outcome**!! (which is compared to the actual outcome)

Figure 43.3 from the book Quality for DevOps teams

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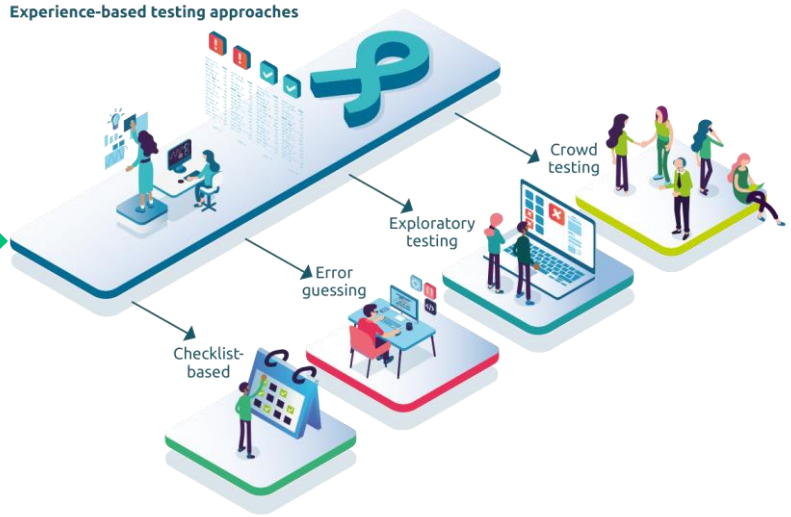
Test design approaches and test design techniques



- **Test approaches**
  - Experience-based testing
  - Coverage-based testing

Always combine

- **Coverage-based groups of test design techniques**
  - Process
    - State Transition Testing
    - Path testing
    - Statement testing
  - Condition
    - Control flow testing
    - Semantic Testing
    - Elementary Comparison Testing
    - Decision Table Testing
  - Data
    - Equivalence Partitioning
    - Boundary Value Analysis
    - Data Combination Testing
    - Data Cycle Testing
    - Data Flow Testing
  - Appearance
    - Syntactic Testing
    - Load models
    - A/B testing & Multivariate testing
    - Abuse & Misuse cases
    - Other non-functional Testing technique

Figures 43.1, 45.4 and 47.1 from the book

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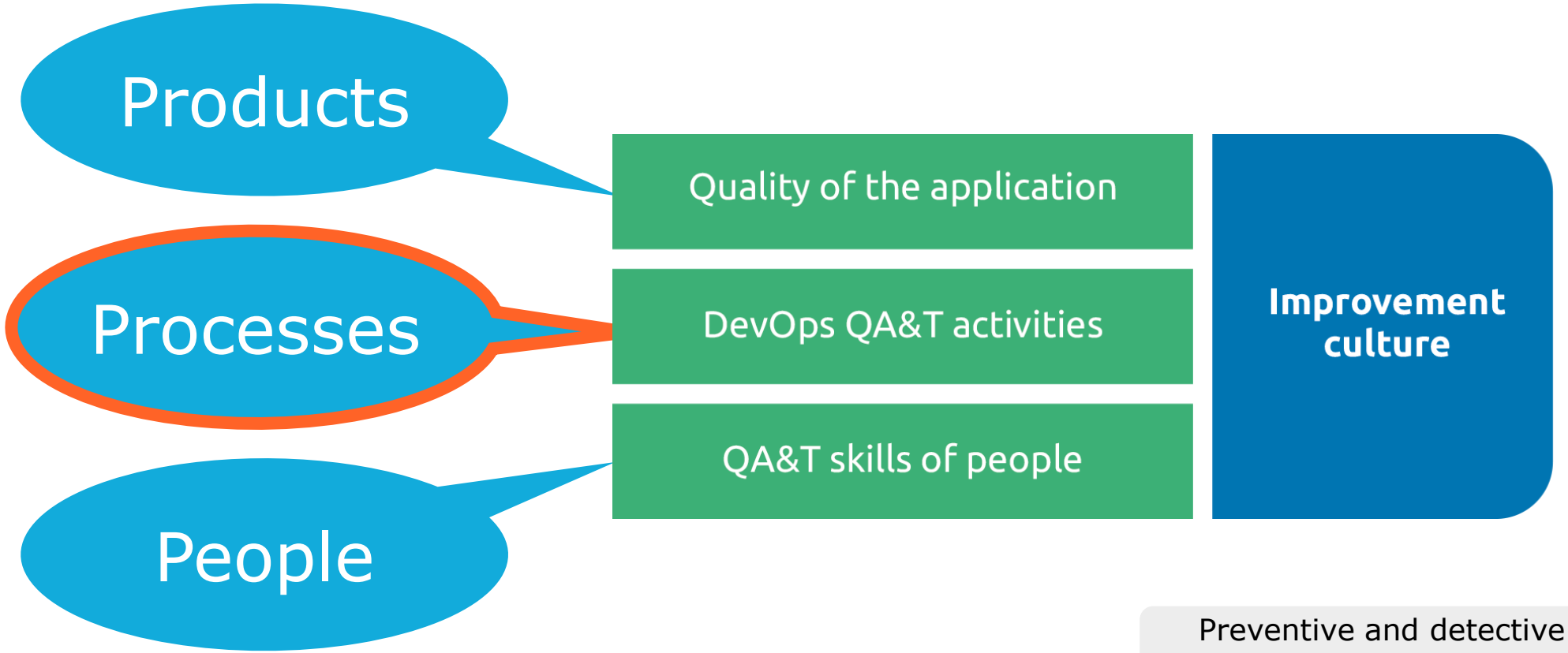
Continuous improvement of **processes**



Preventive and detective quality measures

Example: automate tests in your pipeline

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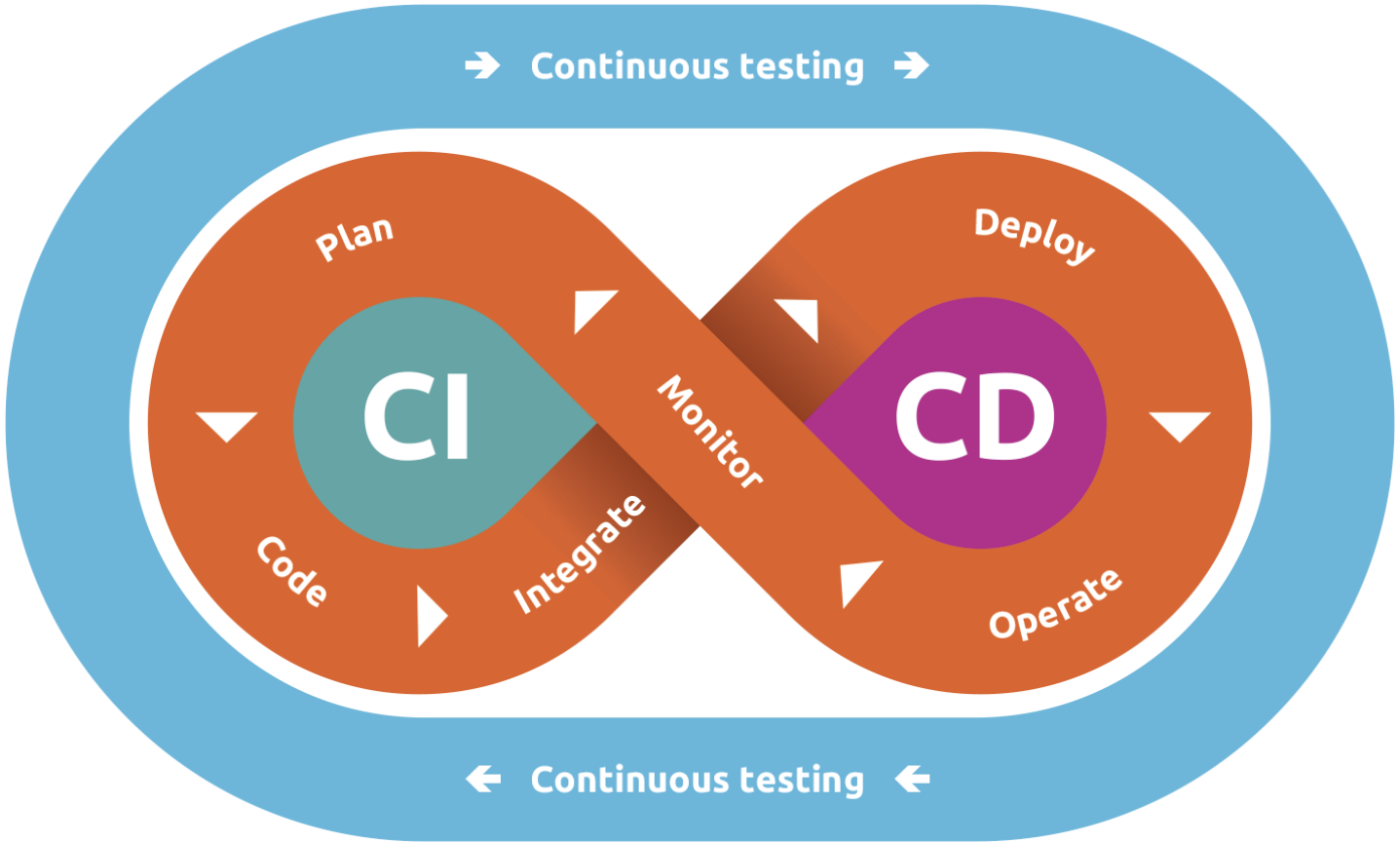
Continuous feedback & shift left



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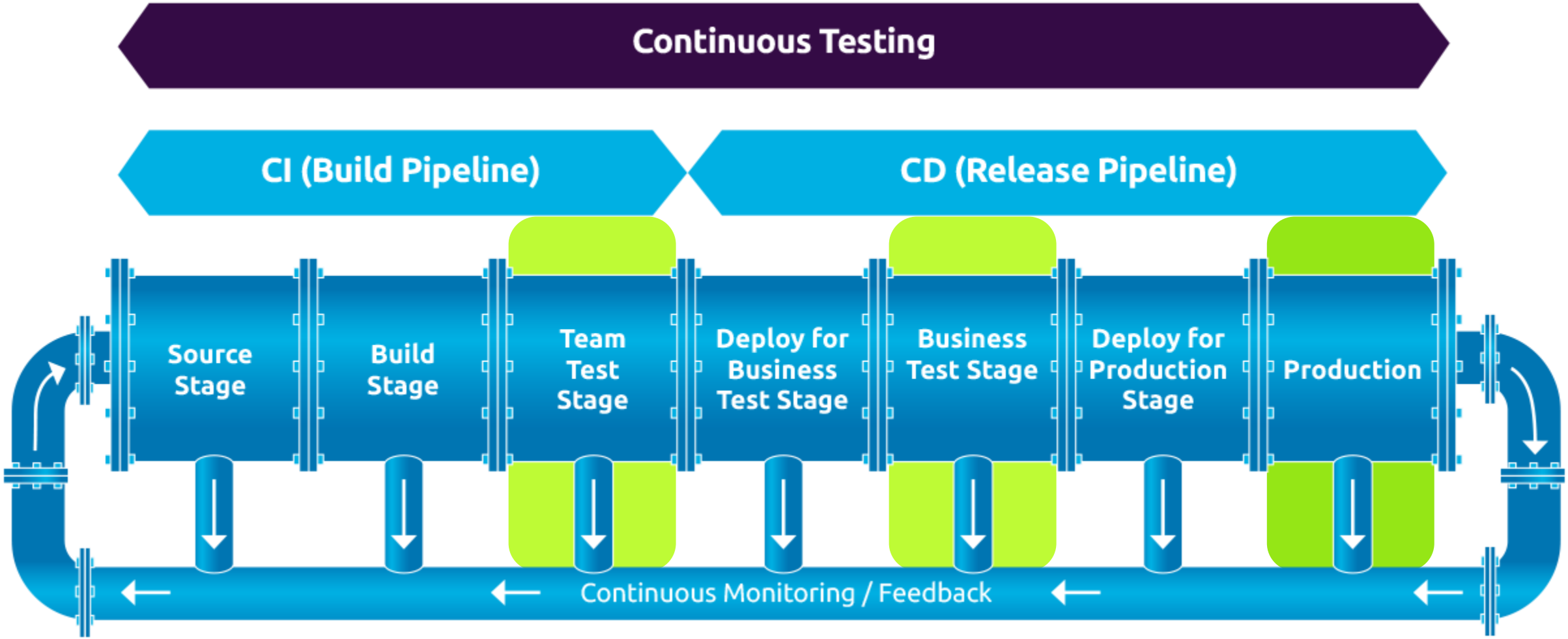
Quality at speed ➔ Automate everything (as long as it is useful)



An automated pipeline enables:

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

Figure 6.1 from the book

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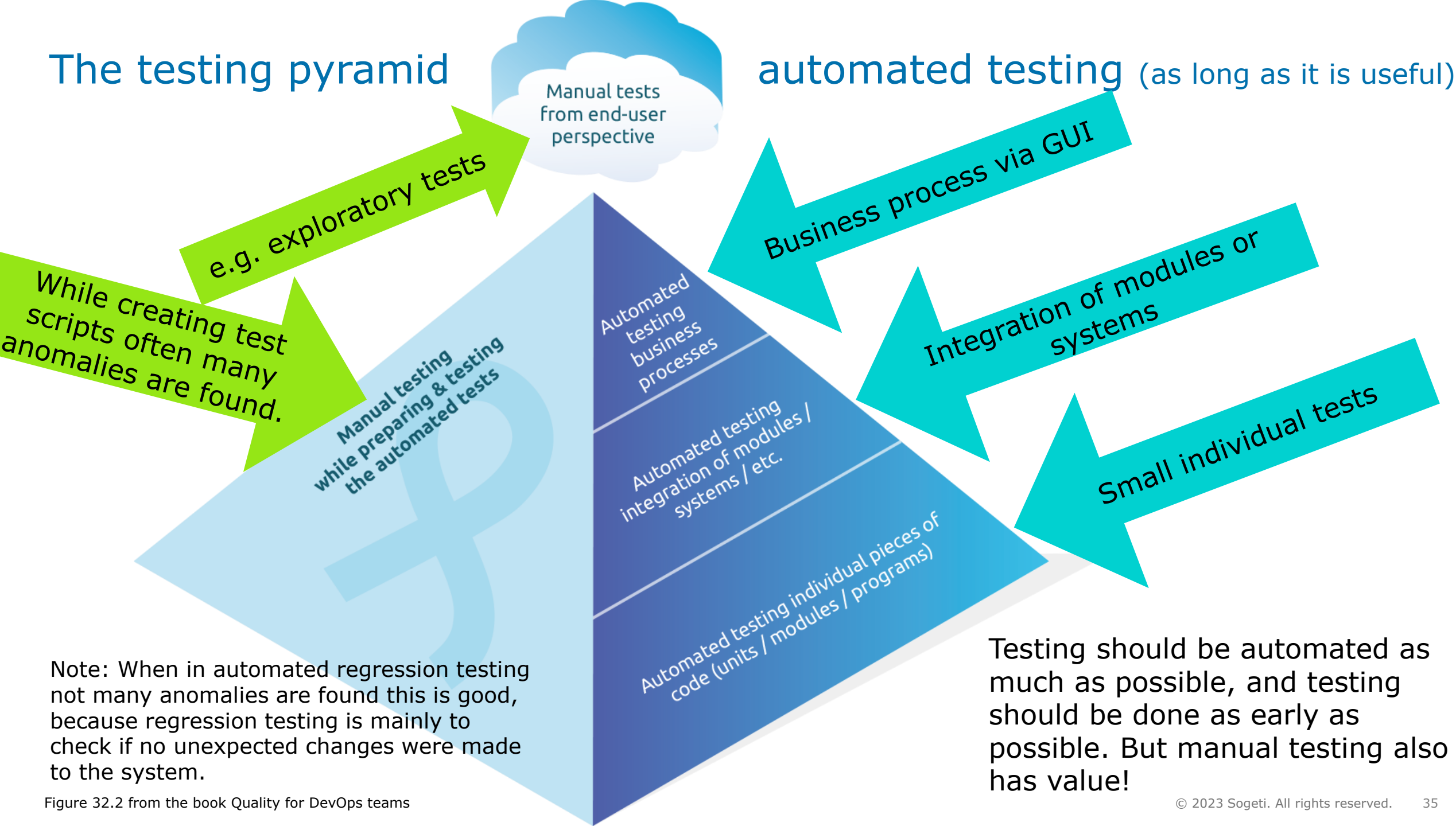
The testing pyramid

automated testing (as long as it is useful)



Note: When in automated regression testing not many anomalies are found this is good, because regression testing is mainly to check if no unexpected changes were made to the system.

Testing should be automated as much as possible, and testing should be done as early as possible. But manual testing also has value!

Figure 32.2 from the book Quality for DevOps teams

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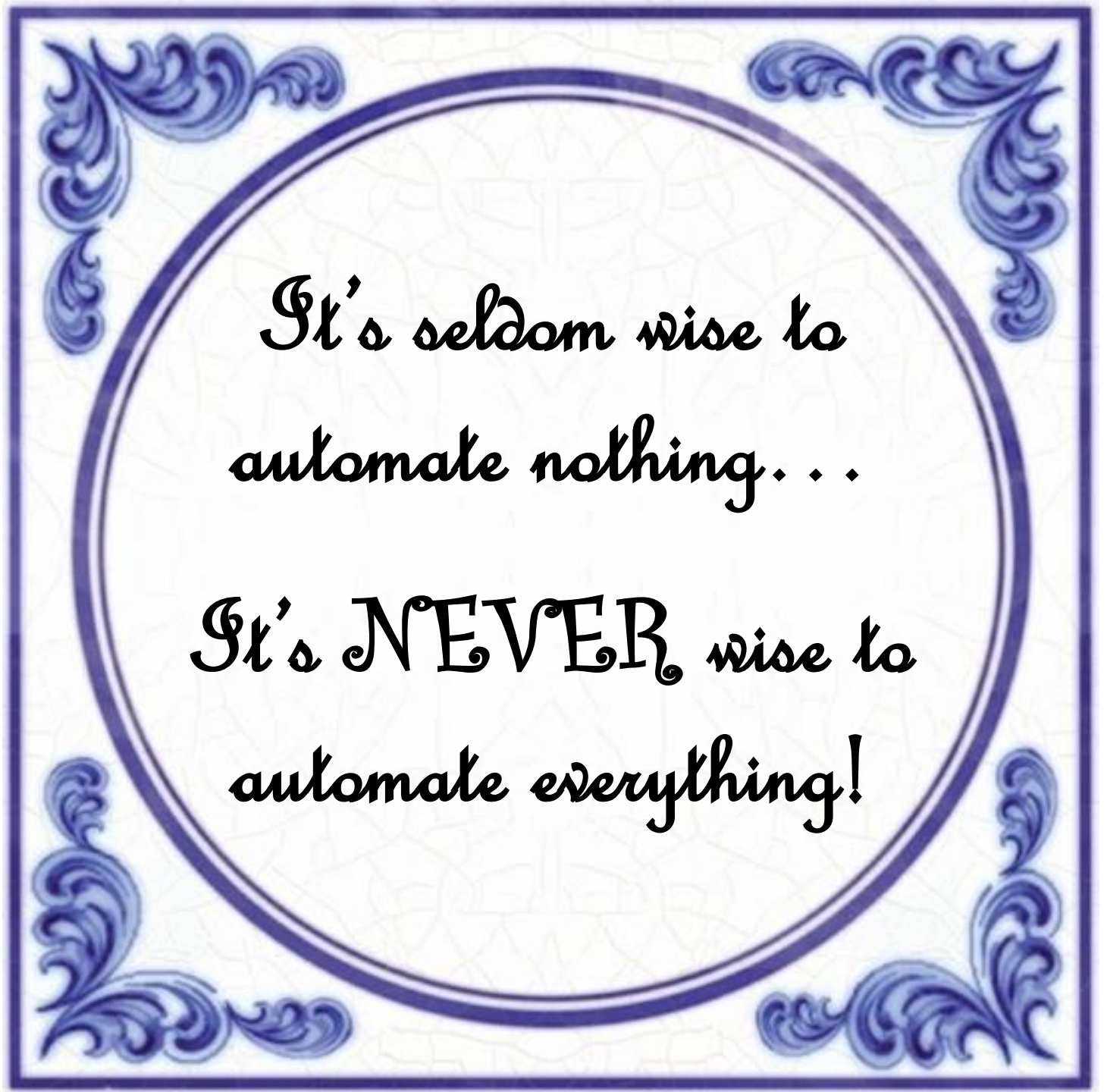

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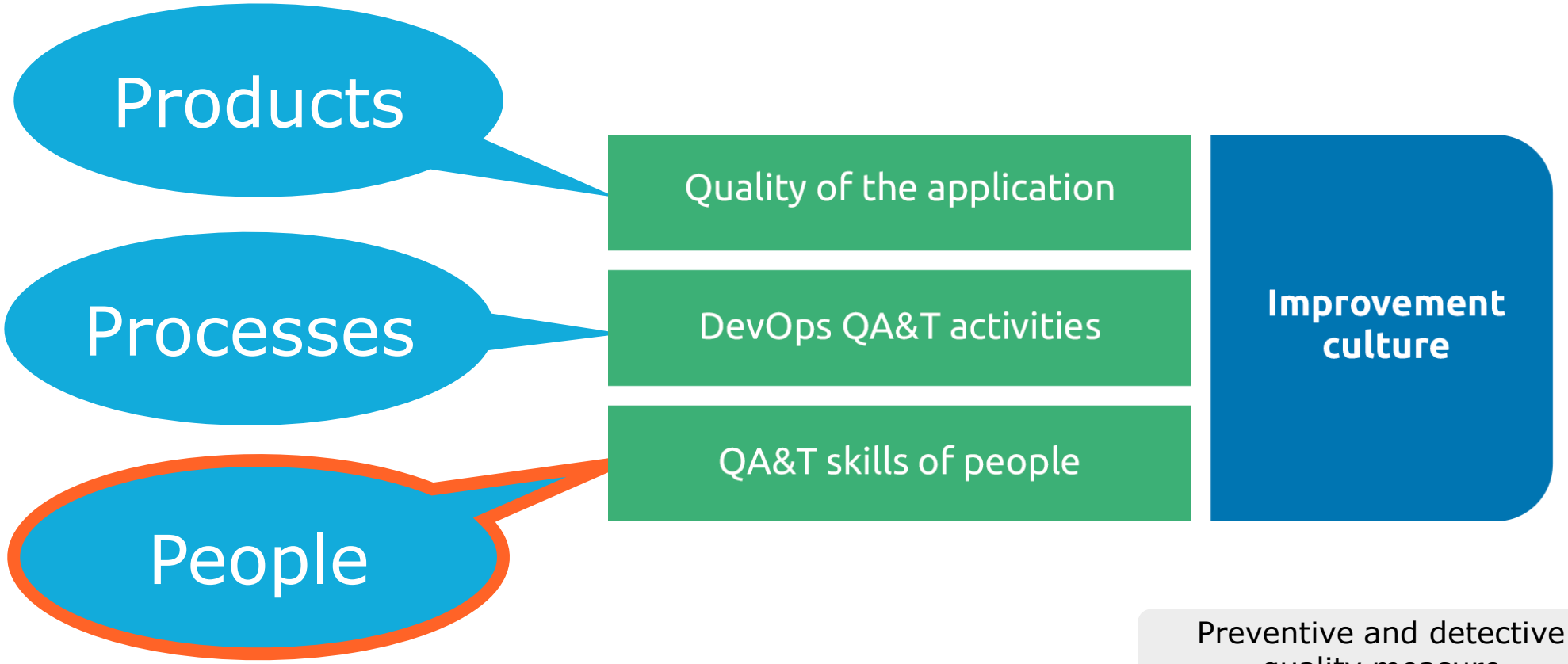
Continuous improvement of **people**



Preventive and detective quality measure

Example: Agile at scale …
Quality orchestration

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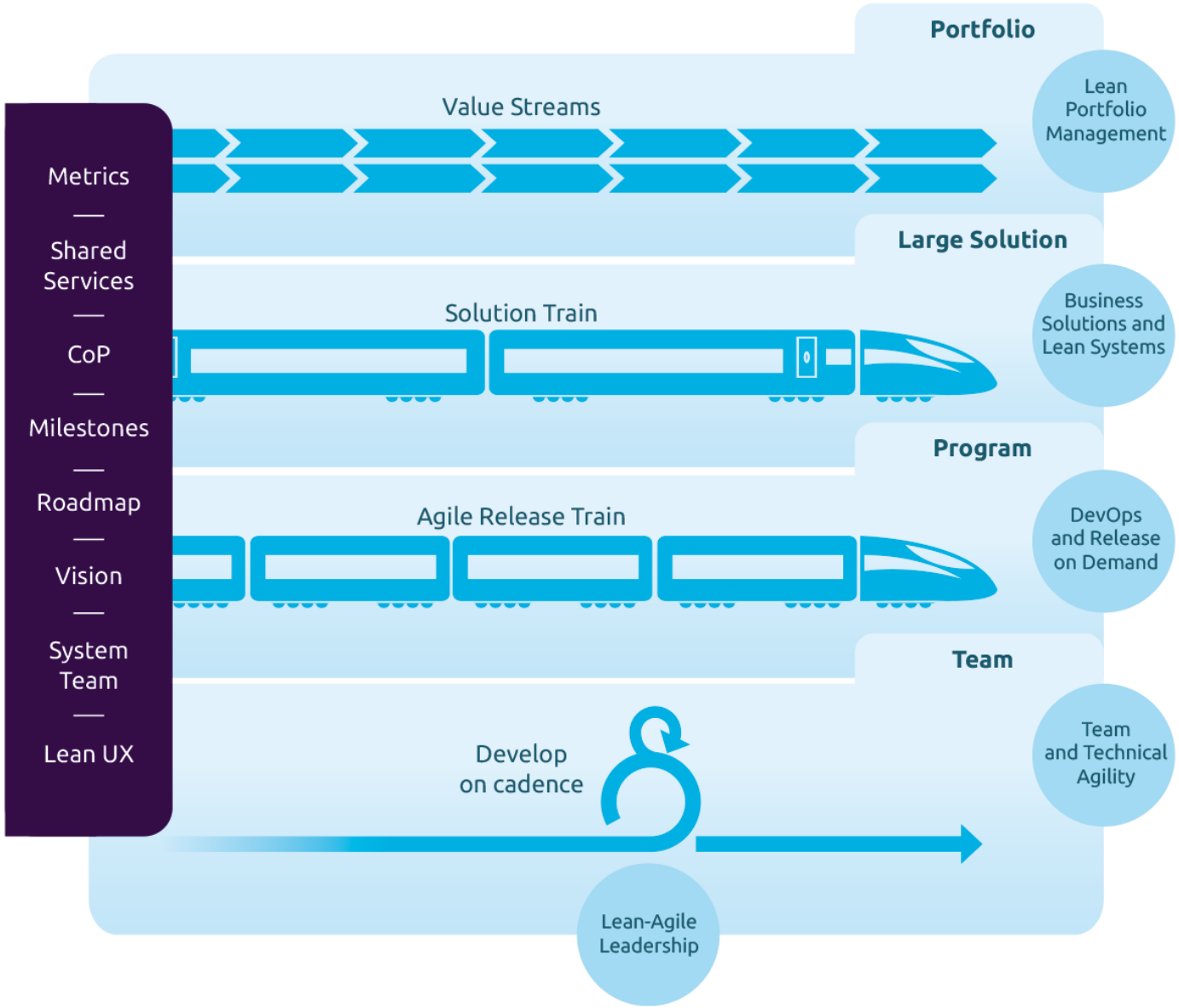
Agile at scale *(using the scaled agile framework as an example)*



Entire organisation

End-to-end business solution

Multiple teams

Team

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End-to-end quality orchestrator

Responsible for organizing end-to-end quality across multiple teams.

Can take care of governance together with, or instead of, the scrum-of-scrums.

Takes responsibility for making the end-to-end testing a recognizable, transparent, efficient and effective process.

Part of a virtual team or support team for end-to-end testing.

(more details about the quality orchestrator can be found in the syllabus for the “TMAP:Organizing built-in quality at scale” training & certification)

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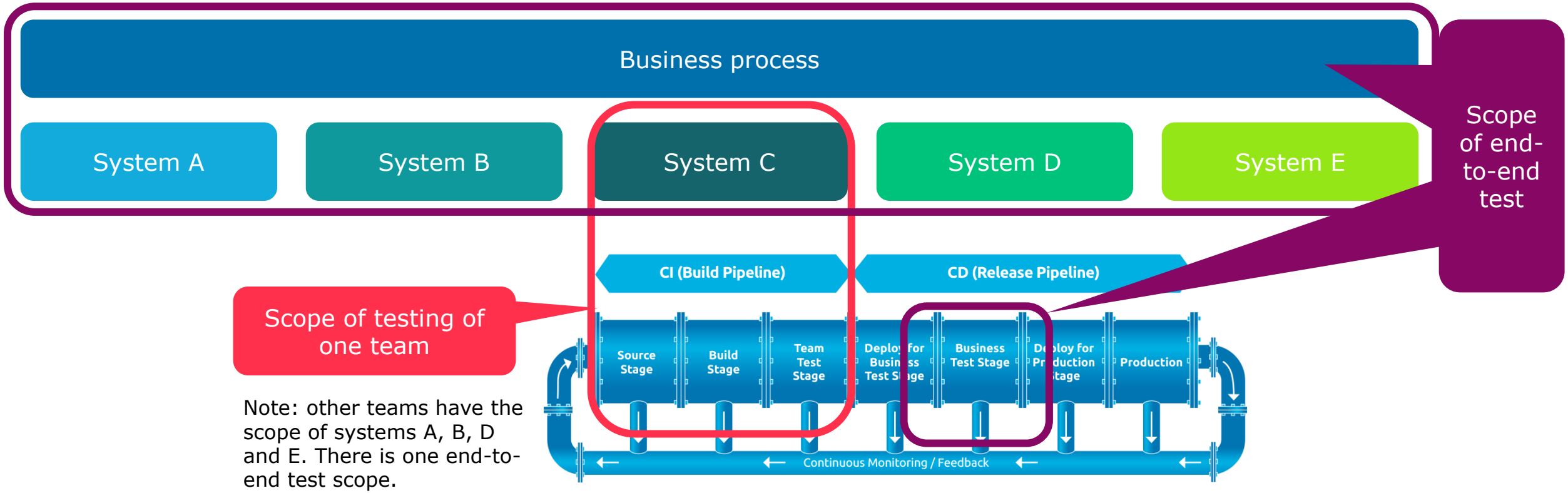
End-to-end testing of multiple systems that together support one business process.



Note: other teams have the scope of systems A, B, D and E. There is one end-to-end test scope.

Teams often don't have the knowledge, time and resources to properly organize and perform end-to-end tests. A separate dedicated team can organize and perform end-to-end-regression tests on demand of a team, for example after a change is integrated in the main branch.

Figure 6.1 of the book

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

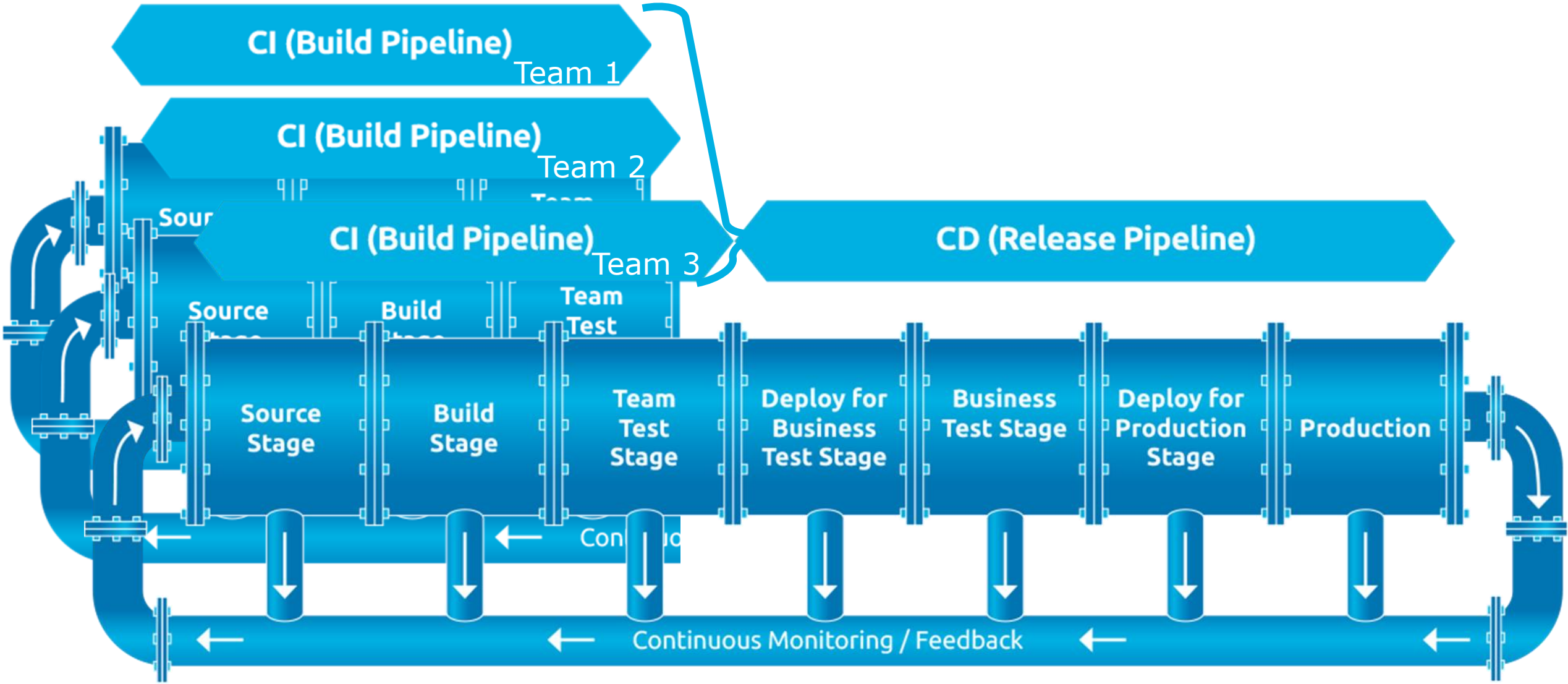

Figure 6.1 from the book

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End-to-end testing: what's your scope?

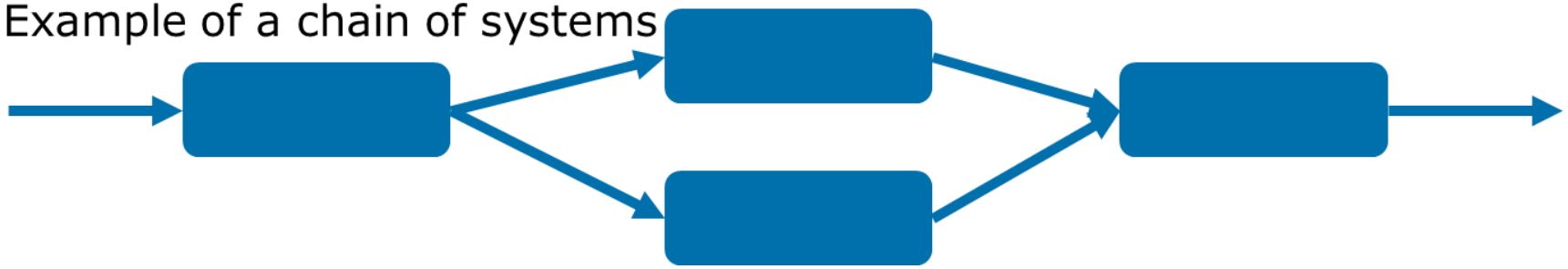
End-to-end testing is a specific test variety where the test object has a large scope.

Often people project the test object of an end-to-end-test as a simple chain of systems.

Example of a simple chain of systems

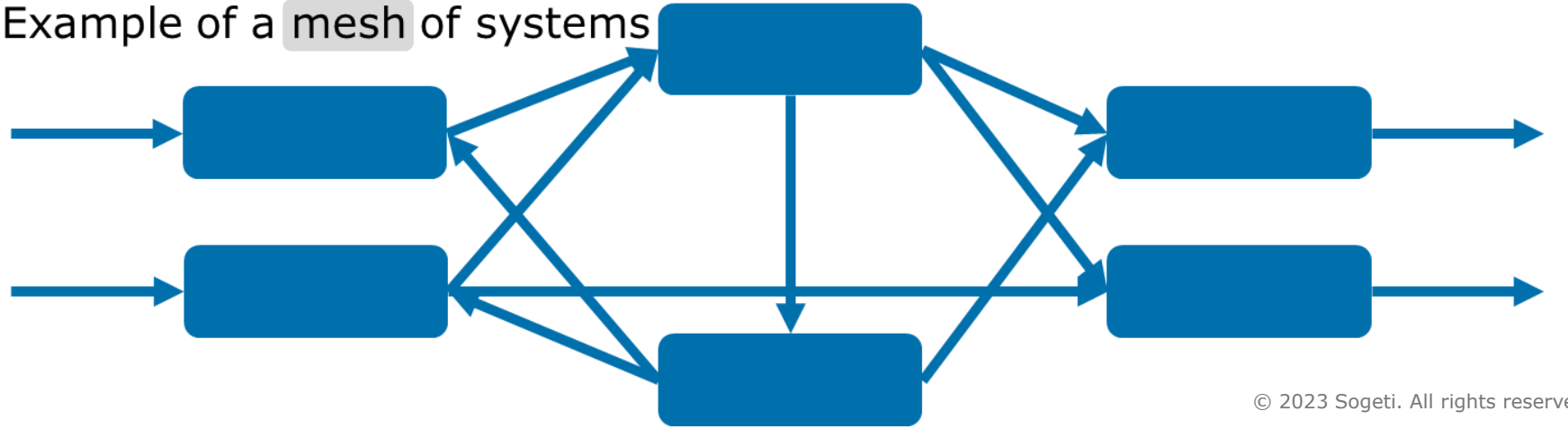
But in reality …

Example of a chain of systems



Or even …

Example of a mesh of systems



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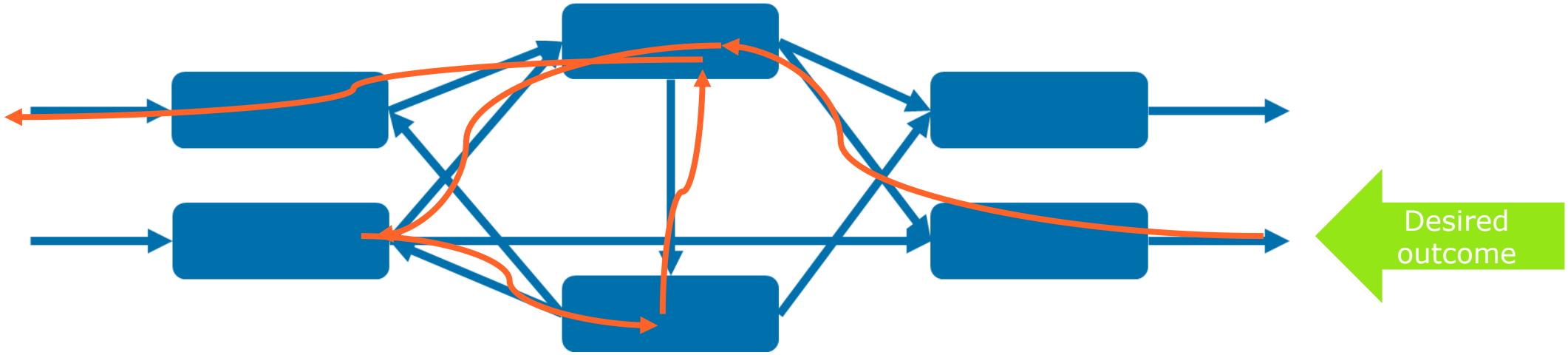
End-to-end testing: practical tip for complex situations

Determining end-to-end test cases may seem very difficult, especially in situations where a complex mesh of systems is the test object.

However, the way to approach this is to start defining the desired outcomes that are needed to build confidence in the end-to-end-process.

Then work backwards towards the start of the chain of systems, determining what inputs are needed to get the desired outcome. This generally will result in more focused testing and a much lower number of test cases.



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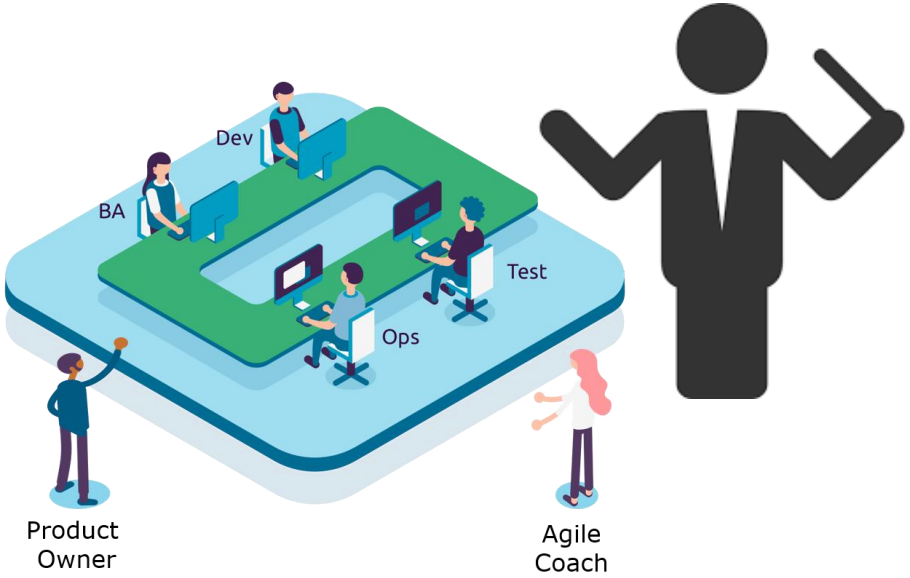
Wrap-up

Goals:

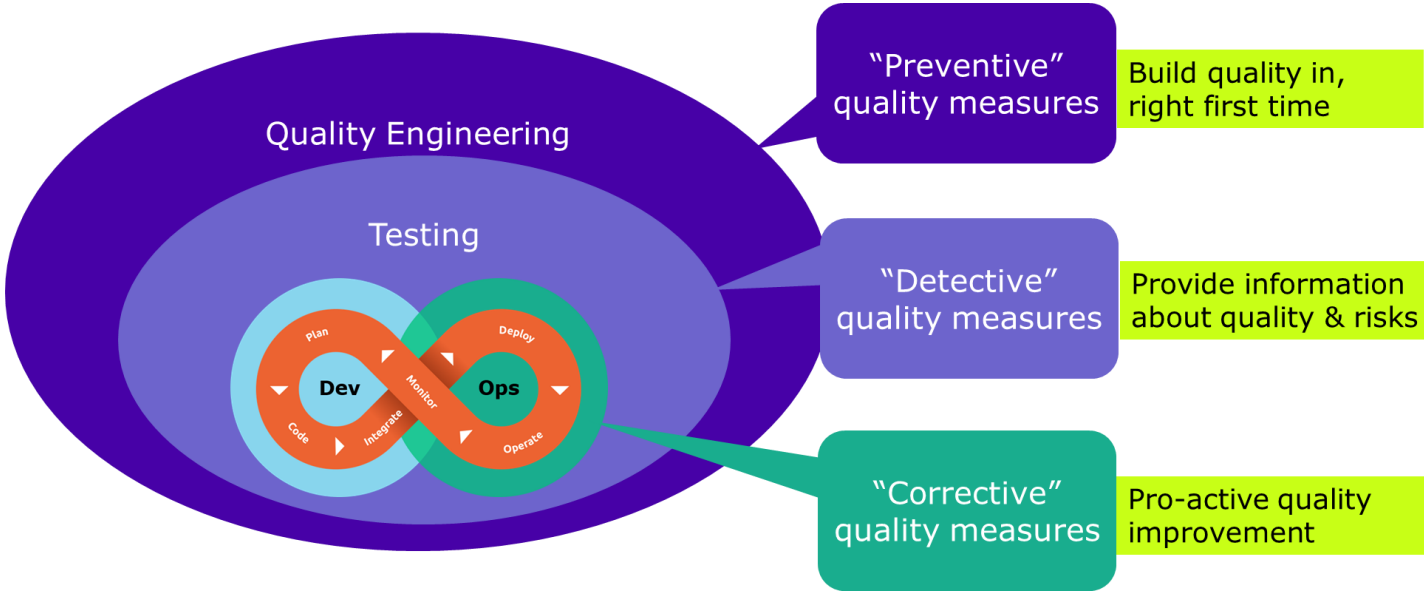
Deliver **business value**

Deliver **quality at speed**



How:

- Collaborate within and across cross-functional teams
- Apply quality measures



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Wrap-up: To deliver business value ➔ build quality in and supply information to support confidence

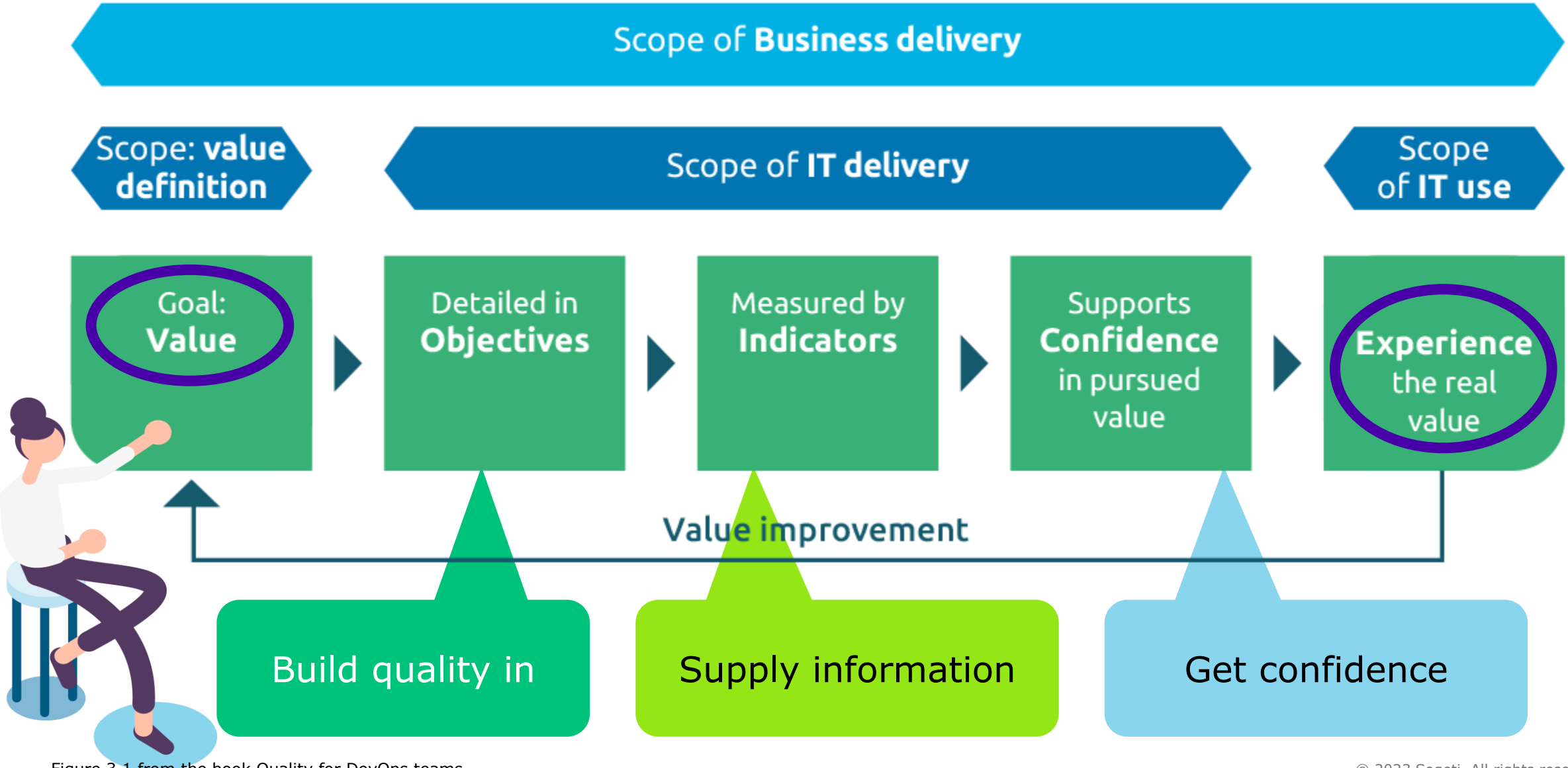

Figure 3.1 from the book Quality for DevOps teams

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Questions & Answers

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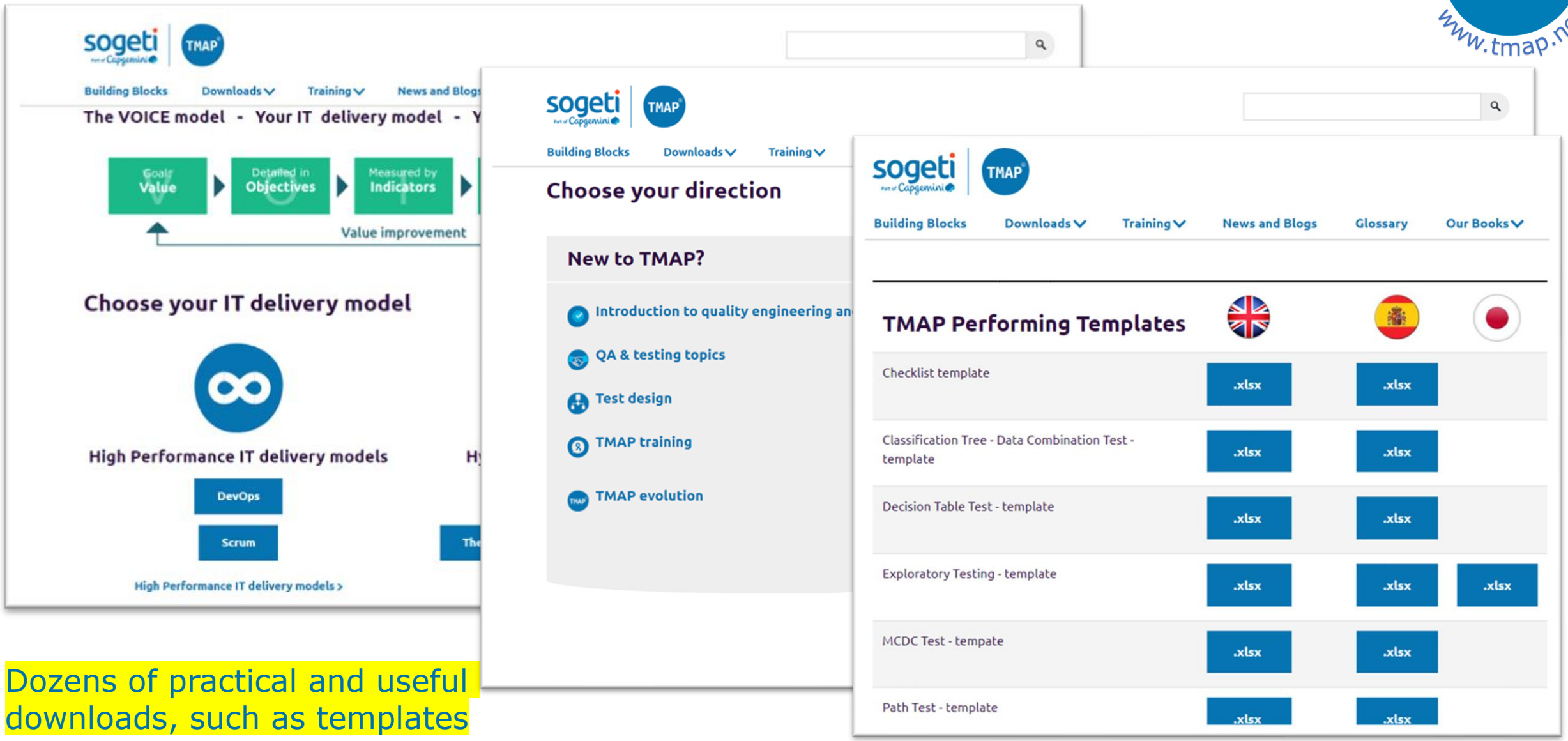

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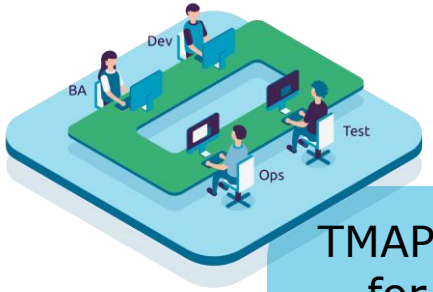

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TMAP: body of knowledge for **quality engineering** and **testing**

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