

Software Quality Management

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[Software Quality]

- Since the 1960's, software developers are concerned about software quality
 - Issues with performance, reliability, reusability, etc.
- New techniques for quality management have been adopted
 - Most of them are based on manufacturing industry

[Quality Management]

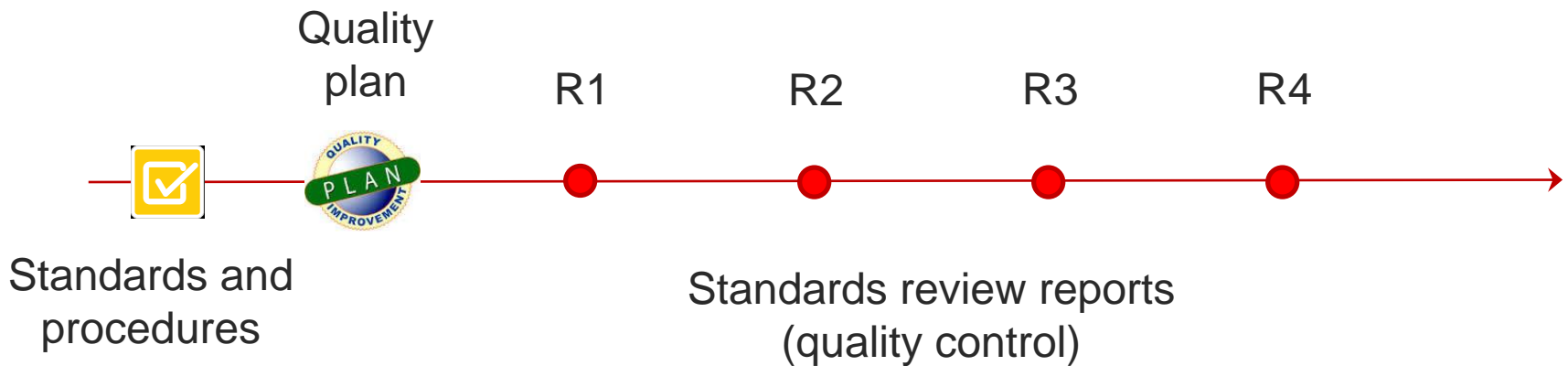
- Quality management is composed of three major activities
 - To define a framework to guide the organization processes
 - To define a plan with goals and standards to achieve quality in a specific project
 - To apply the plan the defined goals and standards in a specific project

Quality Management

- **Quality Assurance (QA)** defines processes and standards aiming to achieve high quality products
 - QA may also include configuration management, verification and validation
- **Quality Planning** defines a plan of quality for each specific project
- **Quality Control** aims to follow the plan in a specific project
 - It applies the processes and standards

Development and Quality Processes

Software Development Process



Quality Management Process

[QA Team]

- The QA team should work independently of the development team
 - They report quality issues to organization managers (above project managers)
 - They are not restricted by project budget and schedule
- In practice, QA and development are closely related

[Quality Planning]

- A quality plan defines
 - The most significant quality attributes
 - How they are assessed
- Example of the quality plan structure
 - Product introduction
 - Product plans
 - Process descriptions
 - Quality goals
 - Risks and risk management

[Software Quality]

- Quality means that a product should meet its specification
- This definition is not easy for software
 - Some quality requirements are difficult to specify in an unambiguous way
 - Software specifications are usually incomplete and often inconsistent
- The focus is on ‘fitness for purpose’ rather than specification conformance

[Fitness for Purpose]

- Have programming and documentation standards been followed?
- Has the software been properly tested?
- Is the performance of the software acceptable for normal use?
- Is the software usable?
- Is the software well-structured and understandable?

[Summary of Quality Attributes]

Safety	Understandability	Portability
Security	Testability	Usability
Reliability	Adaptability	Reusability
Resilience	Modularity	Efficiency
Robustness	Complexity	Learnability

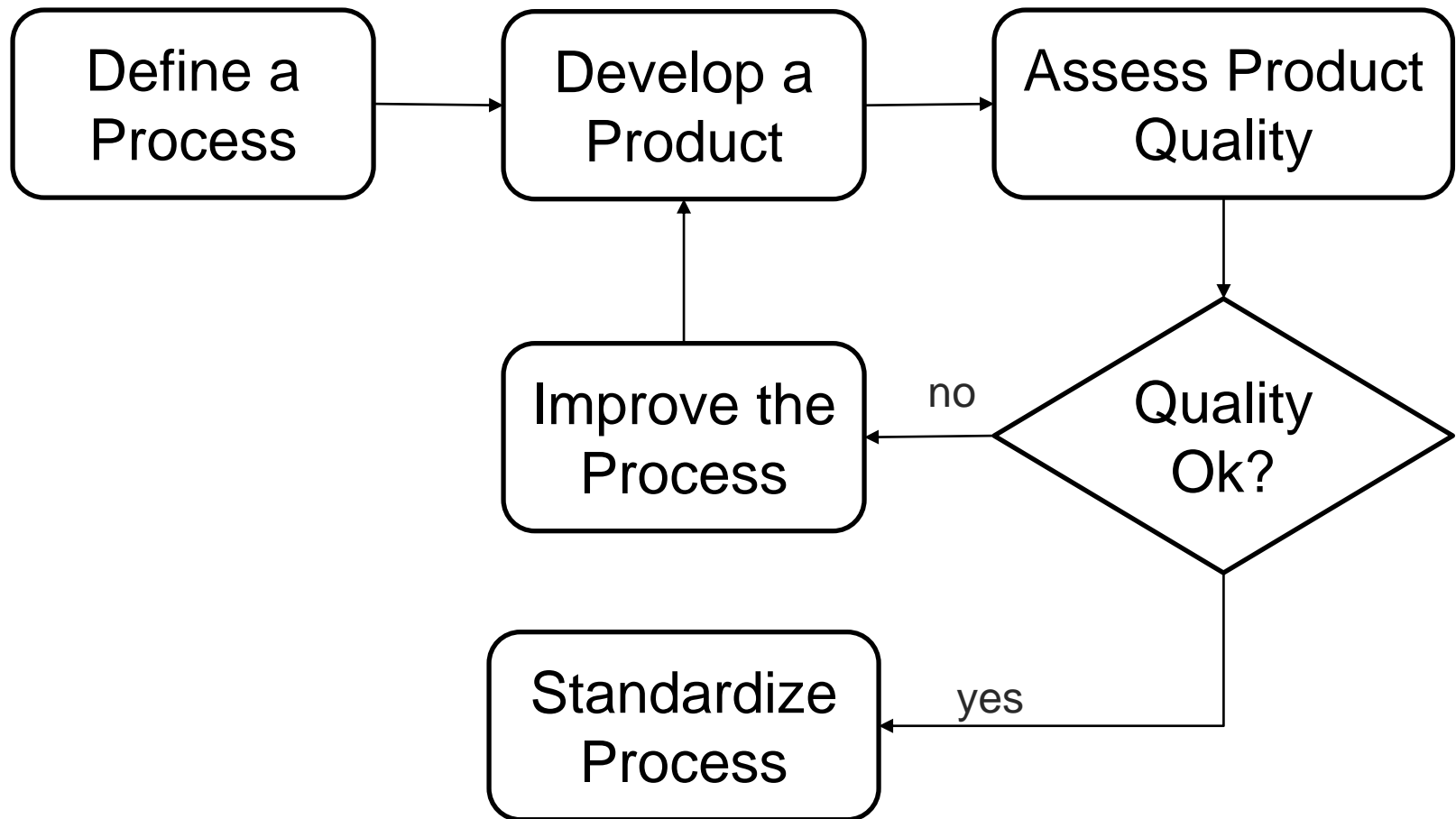
Conflicts of Quality Attributes

- It is not possible for any system to be optimized for all quality attributes
 - For example, improving robustness may lead to lower performance
- The quality plan has to define the most important quality attributes
 - The plan should also define how to assess each important quality attribute

[Quality: Process and Product]

- In general, the quality of a product is influenced by the quality of the process
- However, there is a very complex and poorly understood relationship between software processes and product quality
 - Individual skills and experience is important in software development
 - External factors, such as novelty of an application, may impact on product quality

[Process-based Software Quality]



[Bibliography]

- Ian Sommerville. Software Engineering, 9th Edition. Pearson Education, 2010.
 - Chapter 24 (up to Section 24.1)