

# Quality Assurance

## SWEN90016-S1

*Week 11 - Rachelle Bosua*



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# Outline

- Last week recap
- This week:
  - What is Quality software/software quality?
  - Quality models
  - Product versus Process
  - Tools and Techniques
  - Improvement



# Question?

What does ‘Fit for purpose’ mean?



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# Introduction

For most organizations today, executing business strategy and developing new business opportunities is intricately linked with the capabilities offered by information technology. Day-to-day operations are highly dependent on existing ICT infrastructure and applications, while developing new business unavoidably requires investing in ICT capabilities. Ximedes helps organizations achieve their business goals by creating bespoke software products, fit for use and purpose, whose elegant design and quality of implementation make them capable of supporting multi- year business cases in an ever-changing world.

In this whitepaper we describe the Ximedes approach for software development, delivering high- quality software, maintenance and operational support, during the complete lifecycle of your product.

[https://www.ximedes.com/wp-content/uploads/2016/04/  
Ximedes\\_Brochure\\_Fit\\_for\\_purpose\\_use\\_and\\_change\\_websitePDF.pdf](https://www.ximedes.com/wp-content/uploads/2016/04/Ximedes_Brochure_Fit_for_purpose_use_and_change_websitePDF.pdf)



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# What is quality? - 1

***“Quality is not an act, it is a habit” – Aristotele***

- SW Products are designed ‘for the world’
- Multiple constraints
- *Quality standards*



# What is quality? - 2

- Achieving quality impossible *post-hoc*
- Built into the Design
- Privacy-by-design
- Quality-by-design



# Software Quality Assurance

**SQA an umbrella activity applied through the SW process:**

- 1) A quality management approach
- 2) Effective SE methods & tools
- 3) Apply formal technical reviews
- 4) A multi-tiered testing strategy
- 5) Control of SW documentation & changes
- 6) A procedure to ensure compliance with SW standards
- 7) Measurement and report mechanisms



# What is quality? - 2

- Achieving quality impossible *post-hoc*
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# What is quality?

- “A characteristic or attribute of something”
  - Similar to attribute of something
  - Is measurable
  - Can be compared to known standards
  - Measures do exist (eg FP's...)



# Kinds of quality

- Measuring quality gives:

## 1) QUALITY OF DESIGN

grade of materials, tolerances,  
performance spec's → quality of design

## 2) QUALITY OF CONFORMANCE

did we follow design spec's during  
manufacturing, complying with  
Standards



# Perspective on quality

- 1) The end user perspective  
they judge product quality–fit for purpose
- 2) The developer's perspective  
includes # faults of the system,  
ease to: modify, test & understand the  
system design  
re-usability of components, conformance  
to requirements, resource usage and  
performance



**PLEASE say ‘hi’ to your  
NEIGHBOUR**



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# Peter Drucker - 1

*“Quality in a product or service is not what the supplier puts in. It is what the **customer gets out and is willing to pay for**. A product is not quality because it is hard to make and costs a lot of money, as manufacturers typically believe. This is incompetence. Customers pay only for what is of use to them and gives them value. Nothing else constitutes quality”*

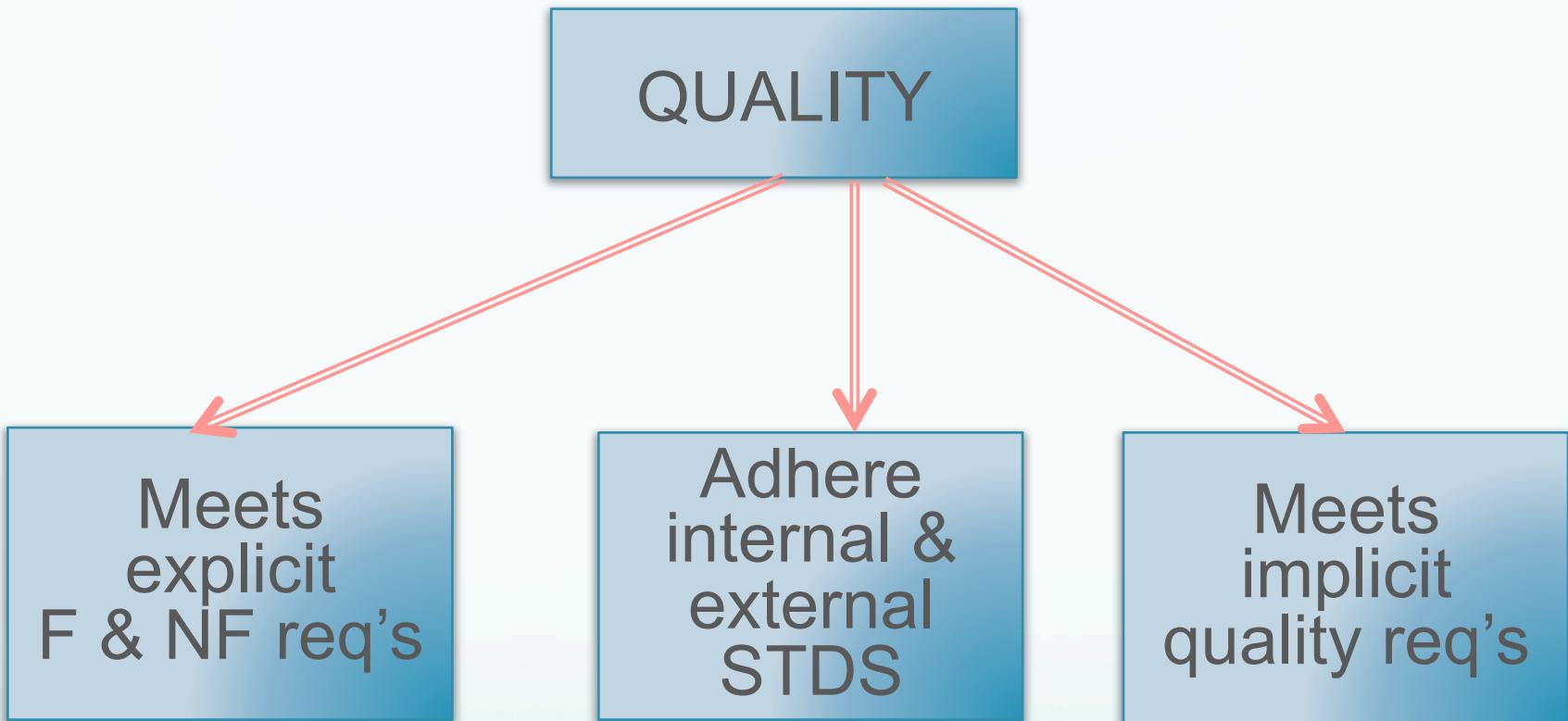


# Peter Drucker - 2

- May seem developer perspective is relevant but is not the case
- An understandable system for developers & maintainers will ++ the user satisfaction in the end
- SE's choose tools & techniques to monitor & control [measure + assess]<sup>1</sup>



# Quality models



*Correct, complete  
and consistent with  
explicit system req's*

*E.g. IEC61508  
(Safety)  
Rainbow stds (US  
security) and  
IEEE, internal stds*

*Req's for  
performance –  
reliable, usable,  
Extendable etc.*

# McCall Quality model

Quality Attributes	Definition According to McCall et al.
Correctness	The extent to which a program satisfies its specifications and fulfils the user's mission objectives.
Reliability	The extent to which a program can be expected to perform its intended function with required precision.
Efficiency	The amount of computing resources and code required by a program to perform a given function.
Integrity	The extent to which access to software or data by unauthorised persons can be controlled.
Usability	The effort required to learn, operate, prepare input, and interpret output of a program.
Maintainability	The effort required to locate and fix an error in an operational program.
Testability	The effort required to test a program to ensure that it performs its intended function.
Flexibility	The effort required to modify an operational program.
Portability	The effort required to transfer a program from hardware and/or software environment to another.
Reusability	The extent to which a program (or parts thereof) can be reused in other applications.
Interoperability	The effort required to couple one system with another.



# ISO-9126 std for SW Quality

<b>Characteristics</b>	<b>Sub-characteristics</b>
Functionality	Suitability Accuracy Interoperability Security
Reliability	Maturity Fault Tolerance Recoverability
Usability	Understandability Learnability Operability Attractiveness
Efficiency	Time Behaviour Resource Utilisation
Maintainability	Analysability Changeability Stability Testability
Portability	Adaptability Installability Co-existence Replaceability



# SW Quality dilemma

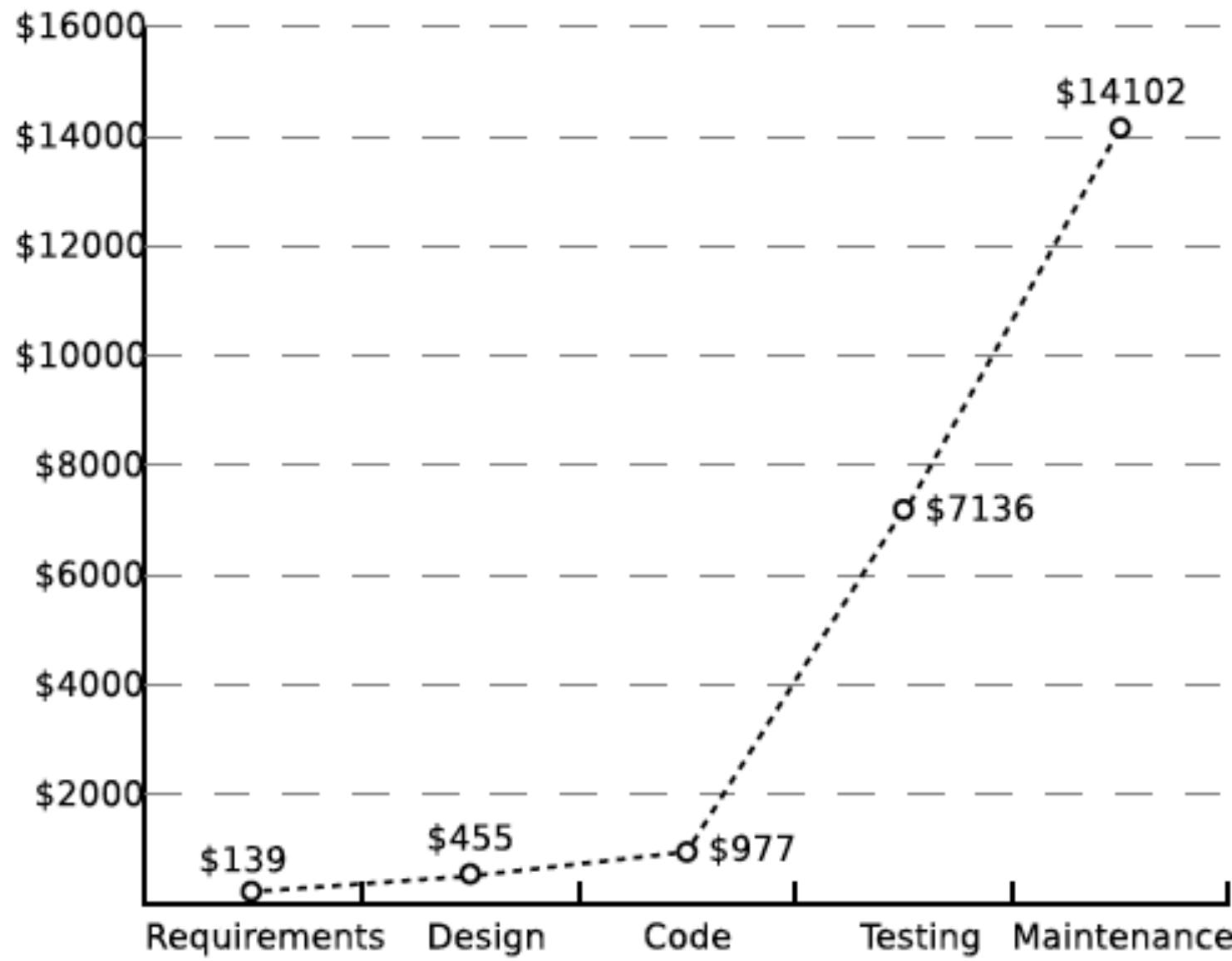
- Drucker's quote dilemma for SE's
- Adding Quality to the design process is costly (\$\$)
  - Salaries of workers, cost of SW licenses, HW tools used + time to push back completion date
- Lack of Quality also a cost (\$\$)
  - Low quality (users), no purchase or no upgrade buys, supplier cost to maintain, correcting faults, adding features → ++costs & effort



# The cost of Quality

- Some SW developers will claim – “its too expensive...”
- E.g no formal team reviews, ask user instead for feedback and correct faults
- OR release the system and correct errors as users find/report them





The cost of finding and fixing faults during the SDLC



# What is Quality Assurance

*“Quality assurance is the monitoring and evaluation of the various aspects of a project, service or facility to ensure that standards of quality are being met”*

## Quality assurance vs control



# Product vs Process

*“The quality of the product depends on the quality of the process”*

- The process can be defined, managed, measured and improved
- Improve quality through improving quality attributes
- Poor understanding SW process And product quality



# Achieving quality-1

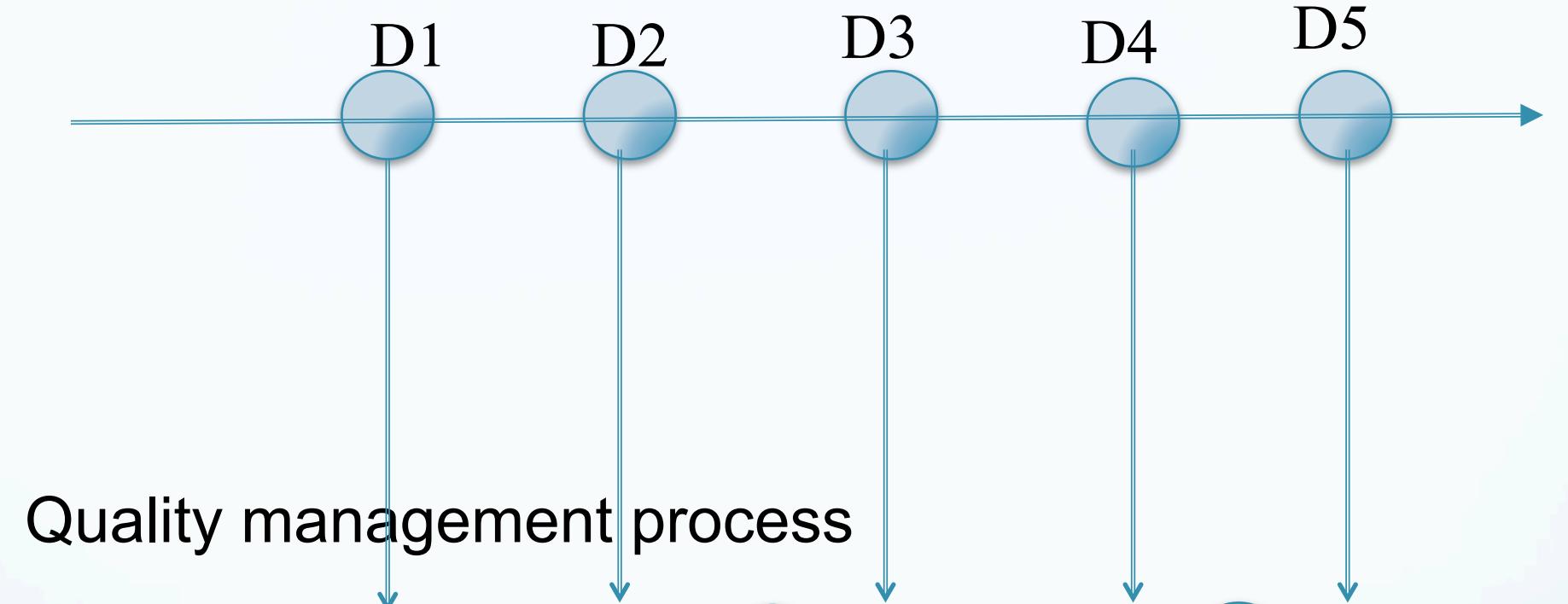
- Project team must:
  - 1) Decide on targets for PROCESS measures
  - 2) Decide on targets for PRODUCT measures

# SW Quality Management techniques

- Do you know their origin?
- Procedures, processes & STDs
- QM team is important
- Checks project deliverables
- Manage release testing process



# SW development process



STD's  
and  
Proce-  
dures

Quality  
Plan

Quality review reports



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# Outline Quality Plan

- Product introduction
- Product plans
- Process descriptions
- Quality goals
- Risks and risk Management



**Some questions?  
We continue on Friday...**



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