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A product is not a project is not a process

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Quality and entity

Quality ... is a topic for philosophy

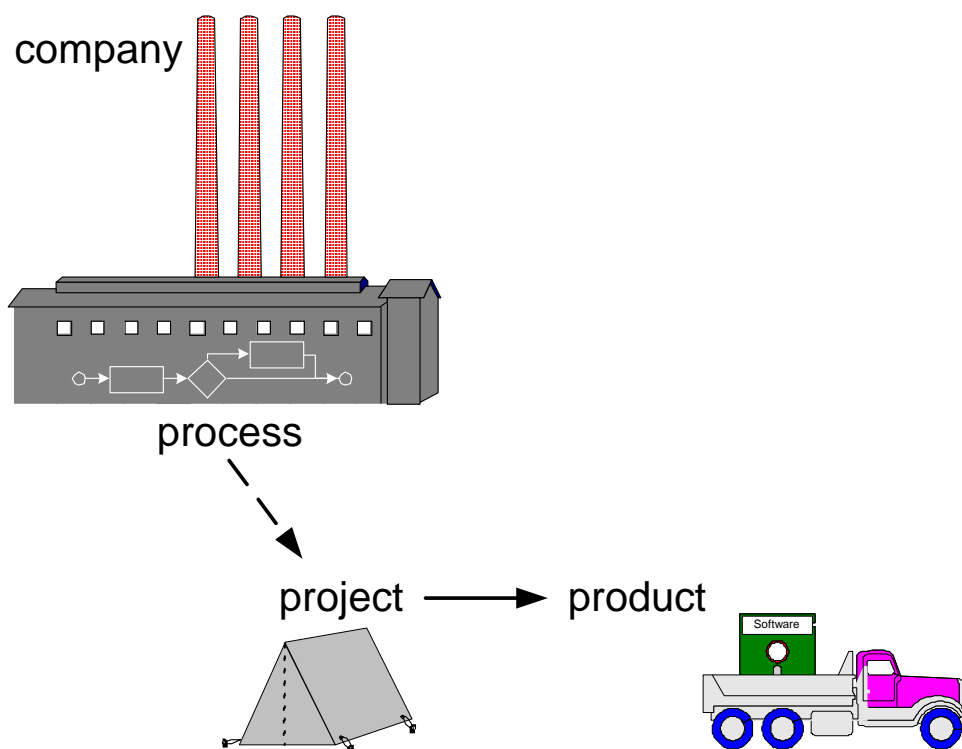
Quality of ... is a topic for engineering

Quality The totality of characteristics of an *entity* that bear on its ability to satisfy stated and implied needs.

Entity That which can be individually described and considered.

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Quality of ... three pro's



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The three pro's

- Product** A software package, consisting of code and publications, that eventually is delivered to a customer. In a broader sense, the definition of product also includes the product support materials that are related to such activities as marketing and maintenance.
- Project** The combined resources (people, machines, materials), processes, and activities that are dedicated to building and delivering a product. A project has a defined starting point and defined objectives from which completion is identified. Also, a group of people, typically comprised of two or more organizations, working on the same project.
- Process** A systematic approach that is designed to achieve a specific purpose.

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Quality aspects of the three pro's

entity	requirements stated in	evaluation techniques	evaluated objects
product	requirements specification	review; test	documents; source code; executable code
project	project initiation document; project plan	progress control meeting; milestone meeting	review and test reports; progress and forecast reports; audit and assessment reports; risk analysis reports
process	own process definition; standard; maturity model	audit; (self-) assessment	activities and their sequence; existence of the results; use of methods and tools

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Measurable characteristics of the product

approach	question to answer	example
front door	What do I want to observe?	feedback
back door	What I don't want to observe?	consistency
effort	What effort am I ready to afford for ...?	portability
constitution	How does it need to be that the effort for ... is acceptable?	flexibility
functionality	What functionality is needed to possess the property ...?	integrity
development environment	Which development environment supports the property ...?	testability

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Examples for measurable product characteristics

$$\text{feedback} = \frac{\text{number of actions with feedback}}{\text{total number of possible actions}}$$

$$\text{consistency} = 1 - \frac{\text{number of objects referenced with different names}}{\text{total number of objects}}$$

$$\text{portability} = \frac{\text{effort to port on a new release of the same operating system}}{\text{person days}} \leq$$

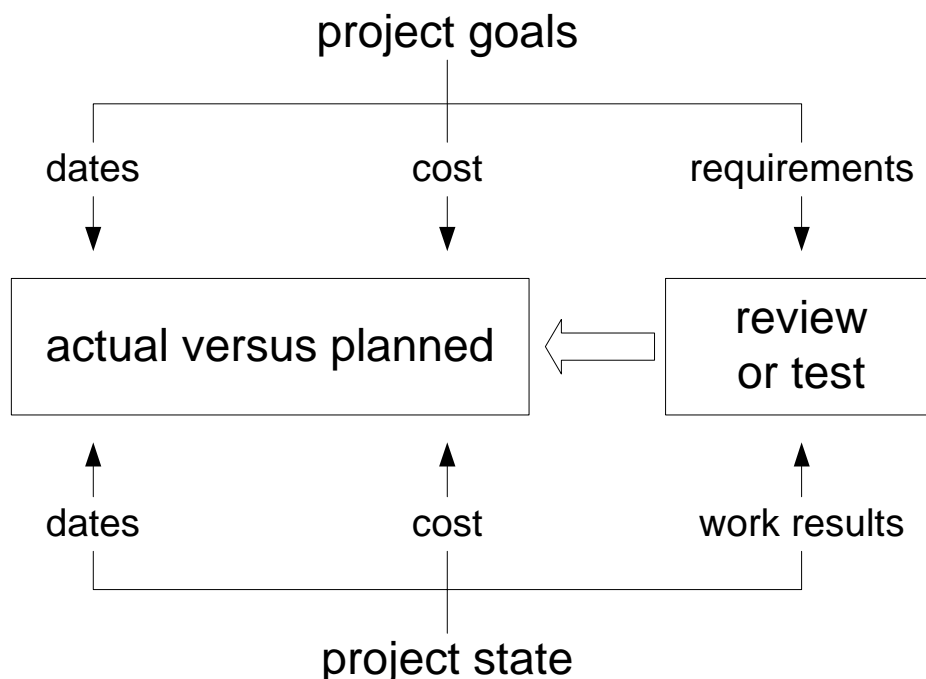
$$\text{flexibility} = 1 - \frac{\text{number of literals}}{\text{kil non-comment lines of source code}}$$

$$\text{integrity} = 1 - \frac{\text{number of trials of not admitted access}}{\text{total number of access trials}}$$

$$\text{testability} = \frac{\text{number of automated test cases}}{\text{total number of documented test cases}}$$

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Measurable characteristics of the project



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Basic project metrics after project completion

deadline faithfulness	deviation from the planned duration (<i>plus the duration "sold" on change requests</i>) in %
cost faithfulness	deviation from the planned costs (<i>plus the costs "sold" on change requests</i>) in %
product reliability	number of defects per unit of size and unit of time in operation
customer satisfaction	result of an inquiry

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Examples of project metrics during project execution

$$\text{degree of completion} = \frac{\text{number of completed work packages}}{\text{number of work packages}}$$

$$\text{quality of estimate} = \frac{\text{planned effort for completed work packages}}{\text{actual effort for completed work packages}}$$

$$\text{quality of planning} = \frac{\text{planned effort for completed work packages}}{\text{planned effort for work packages which should be completed according to the plan}}$$

$$\text{progress indicator 1} = \frac{\text{effort spent}}{\text{forecast effort at completion}}$$

$$\text{progress indicator 2} = \frac{\text{current duration}}{\text{forecast for overall duration}}$$

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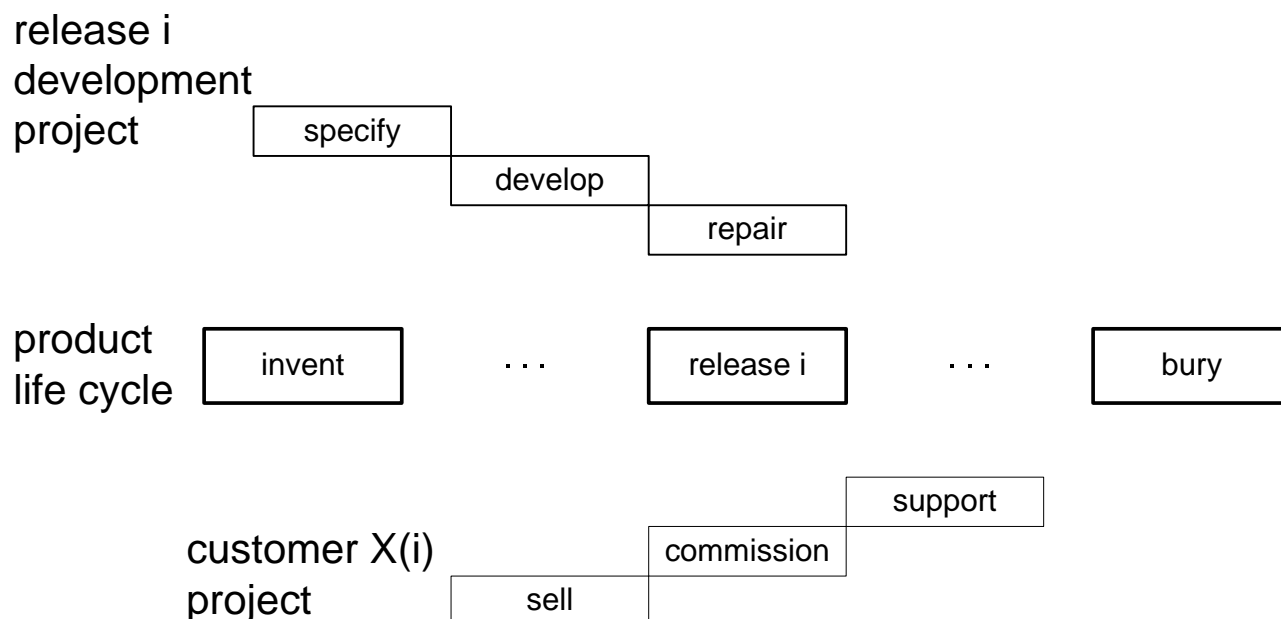
Measurable characteristics of the process

1. binary conformance to a standard, e.g. ISO 9001
2. on a scale capability models, e.g. CMM, BOOTSTRAP, SPICE
3. statistical percentage of projects / products within a bandwidth
 - deadline faithfulness
% of projects with less than $\pm X\%$ deviation from the planned duration
 - cost faithfulness
% of projects with less than $\pm X\%$ deviation from the planned cost
 - reliability faithfulness
% of product releases with less than $\pm X\%$ deviation from N defects per unit of size and unit of time in operation

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Conclusion (1)

Product life cycle is different from project life cycle



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Conclusion (2)

A product lives (hopefully) longer than a project.

- In its life the product is shaped by many projects.
 - A project employs a number of processes.
 - A process is employed in more than one project.

All processes are continuously improved

- ⇒ in order to improve projects
 - ⇒ in order to improve products
 - ⇒ in order to improve customer satisfaction
 - ⇒ in order to improve company results
 - ⇒ in order to improve ...