

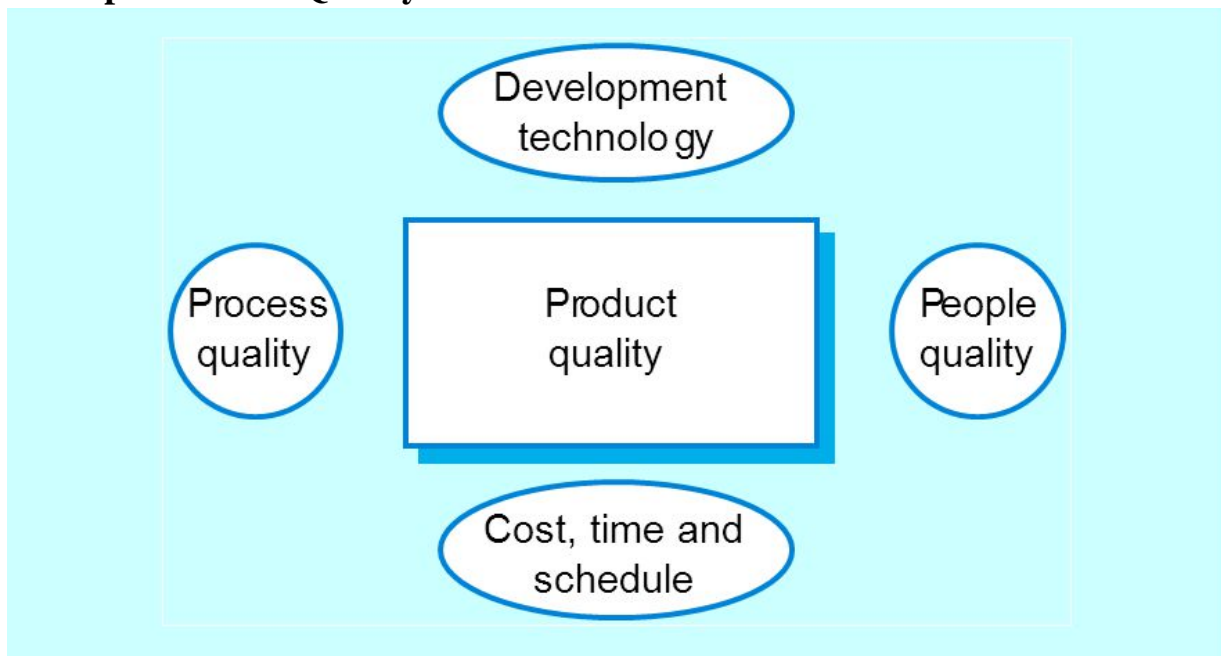
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1. Process Attributes

Process characteristic	Description
Understandability	To what extent is the process explicitly defined and how easy is it to understand the process definition?
Visibility	Do the process activities culminate in clear results so that the progress of the process is externally visible?
Supportability	To what extent can CASE tools be used to support the process activities?
Acceptability	Is the defined process acceptable to and usable by the engineers responsible for producing the software product?
Reliability	Is the process designed in such a way that process errors are avoided or trapped before they result in product errors?
Robustness	Can the process continue in spite of unexpected problems?
Maintainability	Can the process evolve to reflect changing organizational requirements or identified process improvements?
Rapidity	How fast can the process of delivering a system from a given specification be completed?

2. Principal Product Quality Factors



Process quality:

- A good process is usually required to produce a good product.
- For manufactured goods, process is the principal quality determinant.
- For design-based activity (like software development), other factors are also involved especially the capabilities of the designers.
- For large projects with 'average' capabilities, the development process determines product quality.

People quality:

- For small projects, the capabilities of the developers are the main determinant.
- Corollary: you need lower quality people (and higher quality process) in larger projects?
- $\text{Project Size} \times \text{People Quality} = \text{Constant?}$

Development technology

- Is particularly significant for small projects.

Budget and schedule

- In all projects, if an unrealistic schedule is imposed then product quality will suffer.

3. Question 3: Software process classification?**1. Basic process**

- + Software processes for developing, implementing, and maintaining software
- + Supporting process
- + Support process is applied continuously throughout the software product life cycle to support the basic process.
- + Includes processes such as software configuration management, quality assurance, testing and validation.

2. Organizational process

- + Training process.
- + Measurement analysis process.

+ Process infrastructure management, portfolio management and reuse.

3. Process for Cross-Project

+ Reuse, product-line, domain engineering, related to many projects in the organization.

4. The software process complements

+ Project management processes including planning and estimating processes, resource management, metering and control, leadership, risk management, stakeholder management, key coordination, support, organization, and cross-project processes of software development and maintenance projects.

+ Software process can be developed for some special needs: for example, if a project needs information confidentiality, the software process also needs to be modified to comply with information security needs.

4. Question 4: Process improvement stages?

1. Organize and Priorities

This stage consists of identifying three key facets: First, define both short- and long-term objectives. Second, identify the process of how to accomplish your objective. Finally, customize the process for your staff, give each person a task with which he can succeed.

2. Design the process

An approach for breaking down a large project into manageable chunks. Architects, engineers, scientists, and other thinkers use the design process to solve a variety of problems. Use this process to define the steps needed to tackle each project, and remember to hold to all of your ideas and sketches throughout the process.

3) Assess

Strategy evaluation and control actions include performance measurements, consistent review of internal and external issues and making corrective actions when necessary. Any successful evaluation of the strategy begins with defining the parameters to be measured. These parameters

should mirror the goals set in Stage 1. Determine your progress by measuring the actual results versus the plan.

4) Develop change plans

Having clearly communicated and developed a shared understanding of the change, you need to detail the change plans. The first aspect of developing a change plan is to detail where you want to be. Be exact. What precisely will be different? What are the objectives you want to achieve? What will be the performance measures? Specify the change you want to see and understand the change.

Take a look at the project planning framework to help schedule activities.

5) Evaluate progress

Even after thorough testing, process improvements require daily monitoring in the early weeks of a rollout to catch any issues that may have been missed during the test phase. Also, it's an opportunity to see how the new changes can be further enhanced.

5. Question 5: What's CMMI ? Developed by any organization?

- CMMI (Capability Maturity Model® Integration) is a quality management model for organizations.
- CMMI is created and maintained by a team comprising members of industry, government, and the Software Engineering Institute (SEI).

6. Question 6: CMMI for what? Apply for any company?

- It can be used to direct the management, the development direction for a project, part of the organization, or the whole organization.

- CMMI included in each business for each business object. Enterprises cannot self-certify CMMi. Therefore, the firm needs to be defined at levels 1 to 5. These verification results will be presented by the verifying bodies.

7. Question 7: CMMI Process Areas

Process management	Organisational process definition
	Organisational process focus
	Organisational training
	Organisational process performance
	Organisational innovation and deployment
Project management	Project planning
	Project monitoring and control
	Supplier agreement management
	Integrated project management
	Risk management
	Integrated teaming
	Quantitative project management
Engineering	Requirements management
	Requirements development
	Technical solution
	Product integration
	Verification
	Validation
Support	Configuration management
	Process and product quality management
	Measurement and analysis
	Causal analysis and resolution
	Decision analysis and resolution
	Organizational environment for integration

8. Question 8: Levels in CMMI

1. Level 1- Initial

As the starting level, all individuals and organizations only need to work on software to reach this level. Characteristics:

- no process
- Often over budget
- Lax management
- Sales are not stable

2. Level 2- Managed

As the next level after level 1, at this level the evaluation and analysis process are applied in the software development process. Characteristics:

- There are requirements management, progress management, and product and service management processes in place.
- There are milestones for each product status, product or service delivery milestones.
- Establishment and consideration of constraints between stakeholders.
- Products are reviewed by all stakeholders and must be controlled.
- The product or service, the result of the process to be developed must satisfy the requirements, the standard.

3. Level 3- Defined

The level at which in addition to the processes applied at level 2, there are also other processes such as requirements development, technical solutions, system integration, testing, approval, risk management. and decision analysis. Characteristics:

- Project standards, procedures, and procedures adapted to conform to the standard procedures of a particular project or for each part of the organization.
- Processes are defined in more detail and rigor in comparison to level 2
- Process is managed more actively
- Process is managed only by conjecture

4. Level 4- Quantitatively Managed

The level at which the management process is quantified, analyzed by numbers. Characteristics:

- Sub processes are selected and built upon the execution of the entire development process

- Quantitative objectives for quality and process are set and used as standards in process management
- Quality and process are measured and managed throughout the development
- Controlled development using statistics and quantitative techniques, Proactively managed

5. Level 5- Optimizing

The level at which problem solving and analysis is conducted based on standards that have been qualifying at the previous level. Characteristics:

- The process continues to be refined based on an understanding of the common problems of process change
- Focuses on process perfection in terms of both magnitude and engineering
- Quality process improvement standards for the organization are set and reviewed to reflect business changes and are used as standards for process management.
- The optimization process is flexible and motivated based on the economic values and standards of the organization
- The organization's actions must respond to change in a timely manner by finding pathways for change and sharing knowledge. Complete processes to promote growth within each member of the organization, thereby promoting the development of the organization.

9. Difference between Waterfall Model and Spiral Model

Both the models, **Waterfall model** and **Spiral model** are used in software development. Waterfall model is also known as classical or linear model because it follows sequential stages while the spiral model does not follow the sequential stages it follows the evolutionary way. The amount of risk in waterfall model is more as compared to spiral model because the errors or risks are identified and refined after the completion of each stages.

There is some difference between these two model's waterfall and spiral model which are given below:

NO.	WATERFALL MODEL	SPIRAL MODEL
1.	Waterfall model works in sequential method.	While spiral model works in evolutionary method.
2.	In waterfall model errors or risks are identified and rectified after the completion of stages.	In spiral model errors or risks are identified and rectified earlier.
3.	Waterfall model is adopted by customers.	While spiral model is adopted by developers.
4.	Waterfall model is applicable for small project.	While Spiral model is used for large project.
5.	In waterfall model requirements and early stage planning is necessary.	While in spiral model requirements and early stage planning is necessary if required.
6.	Flexibility to change in waterfall model is Difficult.	Flexibility to change in spiral model is not Difficult.
7.	There is high amount risk in waterfall model.	There is low amount risk in spiral model.
8.	Waterfall model is comparatively inexpensive.	While cost of spiral model is very expensive.