

Unit-1 (SPPM)

Software Process Maturity :-

Software process is a set of related activities that leads to production of a software product.

There are four activities that are fundamental to software engineering.

1. Software Specification
2. Software Design and Implementation.
3. Software Validation
4. Software Evolution.

1. Software Specification :-

The functionality of a Software and constraints on its operation must be defined.

2. Software Design and Implementation :-

The software to meet the specification must be produced.

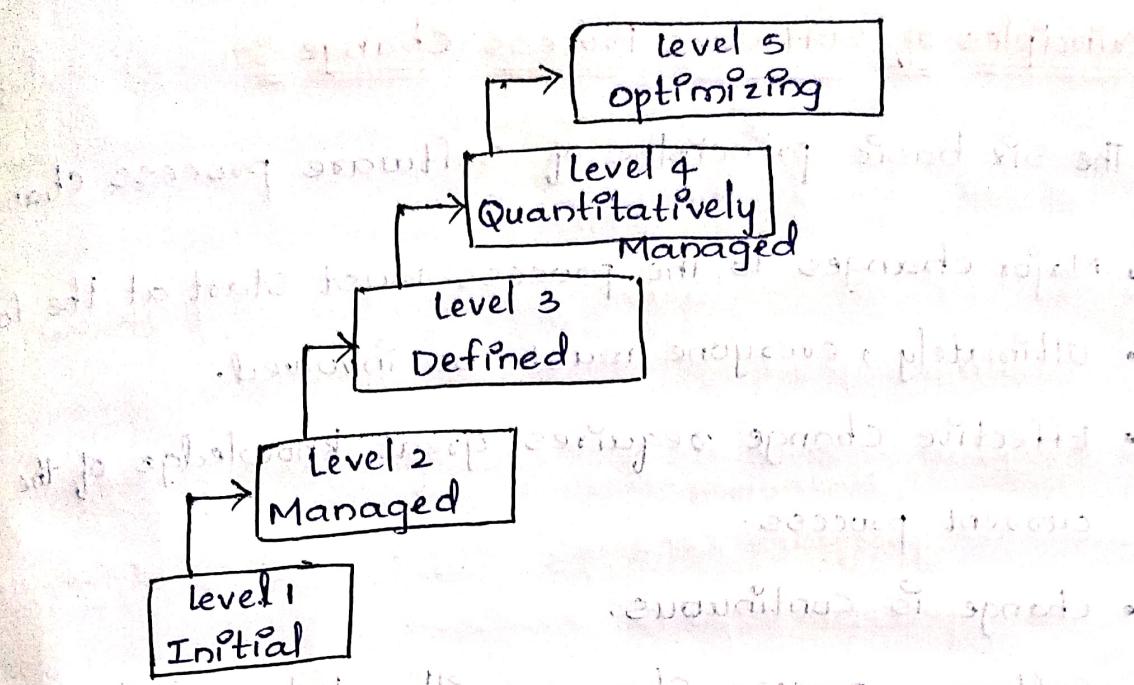
3. Software Validation :-

The software must be validated to ensure that what the customer wants.

4. Software Evolution :-

The software must evolve to meet changing the customer needs.

Software Maturity Framework :-



Level 1 :-

- Initial :-
- The processes are Unpredictable
 - It is poorly controlled and reactive.

Level 2 :-

- Managed :-
- The processes characterized for projects and it is often reactive, taking the necessary basic steps.

Level 3 :-

Defined :-

- The processes characterized for the Organisation.
- It is proactive.

Level 4 :-

Quantitatively Managed :-

- The processes are measured and controlled.

Level 5 :-

Optimizing :-

- It focus on the process improvement.

Principles of Software Process Change :-

The six basic principles of software process change.

- Major changes to the process must start at the top.
- Ultimately, everyone must be involved.
- Effective change requires great knowledge of the current process.
- Change is continuous.
- Software process change will not be attained without conscious effort and periodic reinforcement.
- Software process improvement requires investment.

It takes time, skill and Money!

- To improve the software process someone must work on it.
- Unplanned process improvement is wishful thinking.
- Poorly defined process will produce poorly defined results.
- Improvement should be made in small steps.
- Train!!!!

Software Process Assessment :-

Software Assessment helps the software Organisation to improve by identifying their crucial problems and establishing improvement priorities.

The basic Assessment objectives are:

- Learn how the organisation works.
- Identifies its major problems.
- Enroll its opinion leaders in the change process.

The structured interviews are conducted to learn their problems, concerns, and creative ideas.

Five Assessment Principles :-

- The need for a process model as a basis for assessment.
- The requirement for confidentiality.
- Senior management involvement.
- An attitude of respect for the views of people in the organisation be assessed.
- An action orientation.

The Initial Process :-

In the Initial process, professionals are driven from crisis to crisis by unplanned priorities and unmanaged change.

Why Organisations are Chaotic (Disorganised) :-

The Discipline is the common reason for chaotic behaviour.

- Under extreme pressure, software manager makes a guess instead of plan. The guess is usually low, so ~~the~~ chaos develops.
- The scale of Software process normally follows an escalating cycle.
- Programs take more code ~~than~~ than expected.
- As the program becomes larger, new technical and management issues arises.
- After higher maturity level reached then an Organisation revert to the Initial process.

Unplanned Commitments :-

- Gurus
- Magic
- As software knowledge is more widely distributed.

The way out :-

- Apply Systematic Project Management
 - The work must be estimated, planned and managed.
- Adhere to Carefull change control
 - Changes must be controlled, including, requirements, designs, implementation, and tests.
- Utilize independent software assurance
 - An independent technical means is to require all project activities must be performed properly.

The Repeatable Process :-

Managing software organisations :-

The basic principles of software organisation project management are :-

- Each project has plans based on hierarchy of commitments.

- A management system resolves the natural conflicts between the project and between the line and staff organisation.

- It tracks progress against the plans.

The foundation for software project management is the commitment discipline. Commitments are supported by plans, reviews and commitments met by people.

The elements of an effective commitments are :-

- Commitment is openly stated.
- Commitment is not made lightly.

Product and period plans

The distinction between product and period can be confusing.

The contention process :-

It requires a parallel connection system to encourage.

The Defined Process :-

There are lot of reasons why an organisation might decide that it's time to define a process.

- Defining a process overview

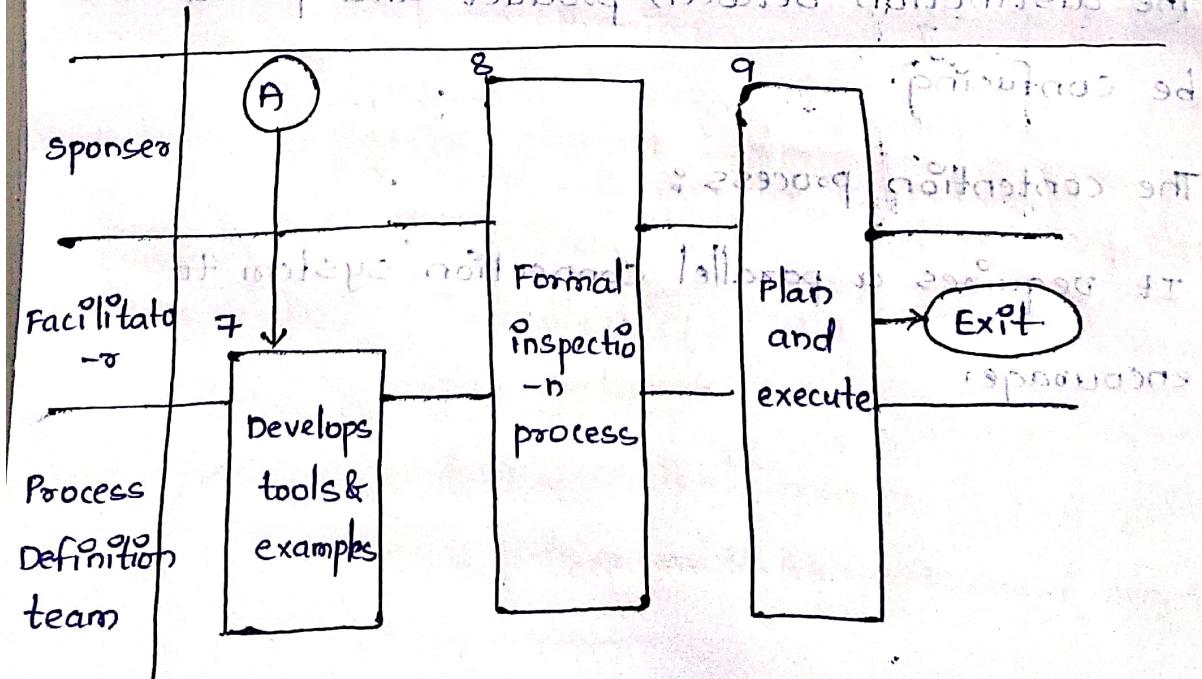
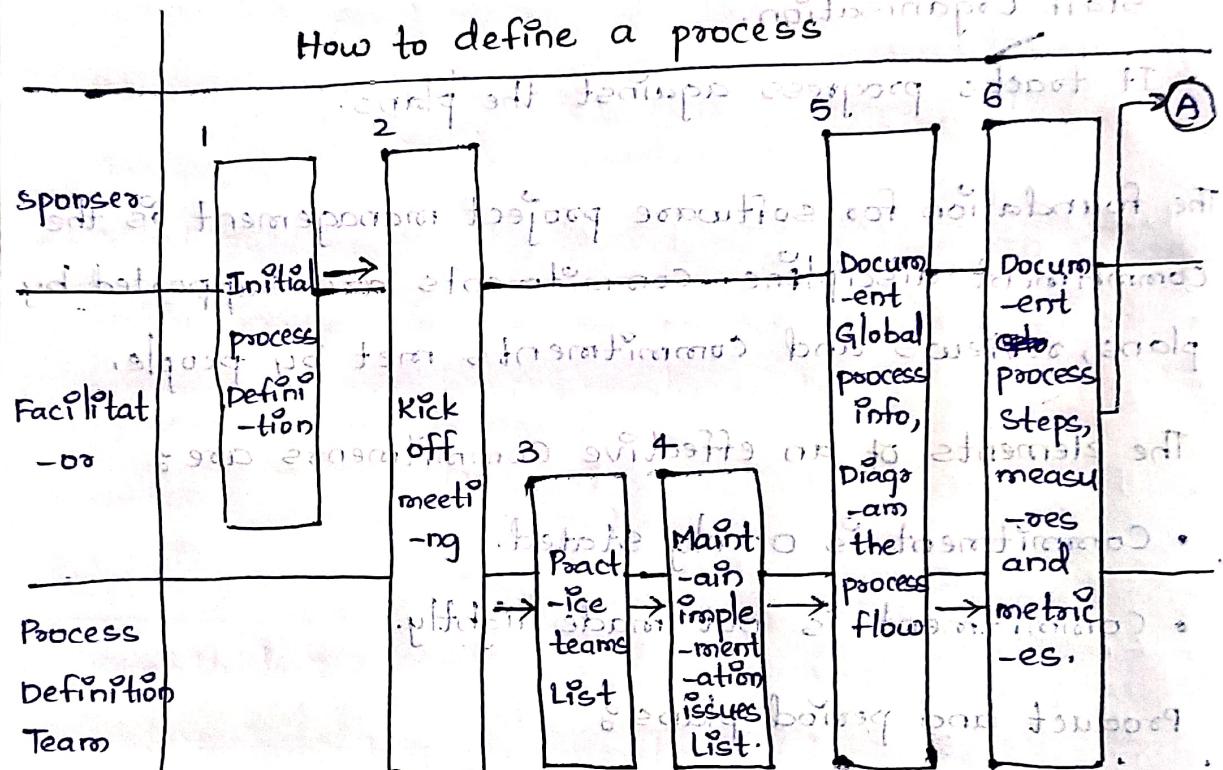
- The facilitators need clarity and having tool

- The process definition team

abilities to read the process diagrams

thus with associated tool helping with creating

How to define a process



The Managed Process :-

- A managed process is a performed process that is planned and executed in accordance with policy.
- Employees skilled people having resources ~~left to~~ to produce control outputs, involves stakeholders, are monitored, controlled and reviewed.
- The requirements and objectives for the process are established by the organisation.
- The status of the work products and services are visible to management at defined point.
- Commitments are established among those who perform the work.

The Optimizing Process :-

- The purpose of the optimization is to achieve the best design.
- These include maximising factors include such as productivity, strength, reliability, efficiency and utilization.

Goals of the Subject :-

- Modeling Issues
- Analysis of solutions
- Numerical methods.

Process Reference Models

Capability Maturity Models (CMM)

- It is used for measuring the maturity of an organization.
- It is a software process.
- It has 5 levels of maturity.
 - Initial
 - Repeatable
 - Defined
 - Managed
 - Optimized

Level 1 :-

Initial :-

processes are basic, poorly controlled and reactive

- immature

- not well defined.

Level 2 :-

Repeatable :-

Basic project management policies

- project planning.
- configuration management.
- SQA (Software Quality Assurance).

Level 3 :-

Defined :-

Documentations are done

- Peer reviews
- Intergroup Communication
- Training programs.

Level-4 :-

Managed :-

Quantitative and Qualitative goals are set.

- Software Quality Management

- Quantitative Management

Level-5 :-

Optimised :-

Continuous improvement is done by taking feedback.

- defect prevention.

CMMI (Capability Maturity Model Integration) :-

Refer to CMM

Same answer for CMM and CMMI.

PCMM :-

- PCMM stands for People Capability Maturity Model.
- It is used to improve the capability of the entire workforce.
- It is also defined as the level of knowledge.
- It has 5 levels of Maturity.

- Initial

- Repeatable

- defined

- Managed

- Optimised.

Level - 1 :-

Initial :-

Informal people management practices.

Level - 2 :-

Repeatable :-

Establishment of policies for developing the capability of the staff.

Level - 3 :-

Defined :-

Best people management practice across the organisation.

Level - 4 :-

Managed :-

Quantitative goals for people management.

Level - 5 :-

Optimizing :-

Continuous focus on improvement of individual competence and workforce motivation.

PSP :-

- PSP stands for personal software process.
- PSP shows engineers how to
 - maintain the quality of programs
 - Make commitments.
 - Improve estimating and planning
 - reduce the defects.

Objectives :-

- planning
- High level design
- High level design Review
- Development
- Postmortem

Planning :-

Initially doing a plan. Sequence of steps are planned

High level design :-

For each component external requirements are developed. Issues, errors are identified.

High level design Review :-

If there are any Issues, errors then they are rechecked in this level.

Developed :-

The components are developed. These developed components are reviewed and code is generated, it is compiled and tested.

Postmortem :-

Metrics are taken by the postmortem. It measures efficiency.

TSP :-

- TSP stands for Team software process.
- It concentrates on building a project teams that provides high quality software.

Objectives :-

- Building self directed teams.
- Motivate the teams.
- Accelerate the software process improvement.
- Provide improvement guidance to high maturity organisation.

Building self directed teams :-

The project teams are builded on their own.

Team has 20 to 30 members, depends on project.

Motivate the teams :-

Motivating the teams, are done by Management.

Accelerate the software process improvement :-

The continuous improvement is taken by feedback.

Provide improvement guidance to high maturity organisation :-

It provides how to improve the organisation.