

COMPARATIVE STUDY ON SOFTWARE PROCESS MODELS

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Abstract:

The software engineering process can be considered at two distinct levels. At the start or first level activities related to the gaining information, development and maintenance of software; in the next stage or second level the activities related to the definition, functioning, measurement, and upgrading the software process itself. This paper presents the comparative study of various process models in software development based on various parameters; also listed various factors for choosing partial software model in the world of software development.

Keywords: Design, Analysis, Process Model, Software, Engineering.

I. INTRODUCTION

The term software specifies to the set of computer programs, procedures and associated documents (flowcharts, manuals, etc.) that describe the program and how they are to be used. A software process is the set of activities and associated outcome that produce a software product.

Any software process must include the following four activities:

1. Software specification (or requirements engineering): Define the main functionalities of the software and the constraints around them.
2. Software design and implementation: The software is to be designed and programmed.

3. Software verification and validation: The software must conform to its specification and meets the customer needs.
4. Software evolution (software maintenance): The software is being modified to meet customer and market requirements changes.



Figure 1: Software Engineering [1]

II. SOFTWARE PROCESS MODELS

A software process model is an abstraction representation of process which is used to develop the software. It simply follows the software development life cycle (SDLC) methodology which includes analysis, design, implementation, testing and maintenance.

III. BENEFITS OF USING SOFTWARE PROCESS MODELS

There are many benefits of software process models as follows:-

- It improves the productivity of the development team.
- It reduces the number of errors in final code.
- It increases the decomposition and modularization of the system.
- It improves the understandability of the system.

IV. DISCUSSION ON SOFTWARE PROCESS MODELS

WATERFALL MODEL

The waterfall is the oldest model and also known as mother of all models. It is also called as 'linear sequential model' or 'classic life cycle model'. It is very simple to understand and use. This model is used for small projects. In this each phase must be completed before the next phase can be begin and there is no overlapping in this phase. In this model, feedback is taken after each phase to ensure that the project is on right path.

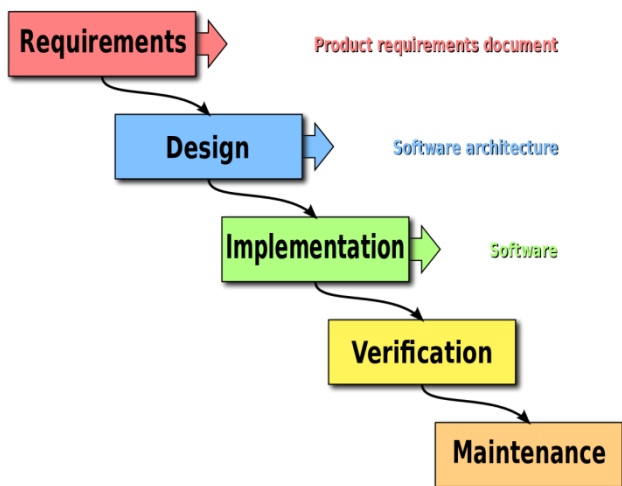


Figure 1: Steps in Waterfall Model [2]

INCREMENTAL MODEL

The Incremental model combines the elements of waterfall and they are applied in an iterative model.

It is the process of software development where requirement divided into multiple module of SDLC model.

In this model each module goes through requirement, design, implementation and testing phase every self sequent release of the module add function to the previous release. This process continuous until the complete system achieves. The process is repeated until the product is completed.

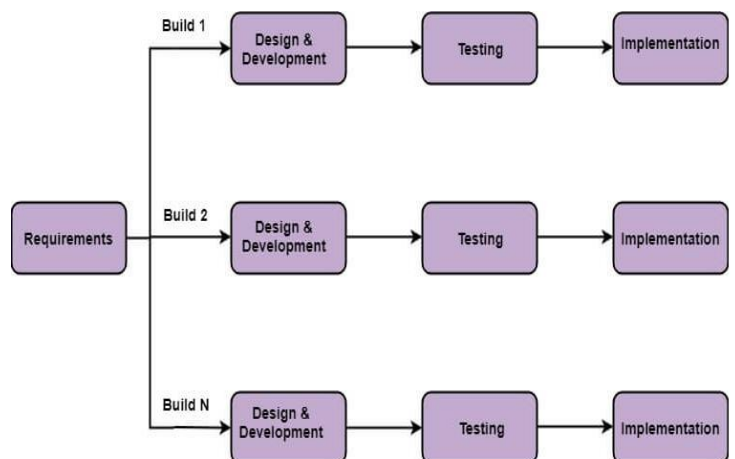


Figure 2: Phases of Incremental Model [3]

SPIRAL MODEL

The spiral model combines the idea of iterative development with systematic control aspects of the waterfall model. The waterfall with a very high emphasis or risks analysis. It allows incremental releases of the product.

A software projects repeatedly passes through these phases in iteration called spirals. At the initial spiral, starting with the planning, requirements are gathered and risk is considered. Each consequent spiral builds on the initial spiral. Requirement are collected during the planning phase, a process is going on to identify risk and their alternate solution. A prototype is produced at the end of the risk analysis. The evaluation phase permits the customer to access the output of the project to date before the project goes to the next spiral.

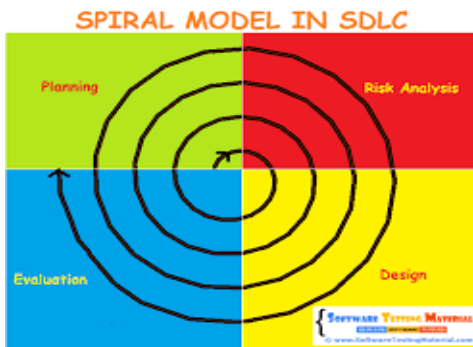


Figure 3: Layout of Spiral Model [4]

ITERATIVE MODEL

Iterative process starts with simple implementation of subset software requirement and iteratively and enhance the evolving version until the full system is implemented and each iteration design and modification are made and new function capabilities are added. The basic idea behind this model is to develop a system.

Iterative or incremental development is a combination of both design and iterative methods and incremental width model during software development.

More than one iteration of software development cycle may be in a program at the same time. This process may be described as incremental approach.

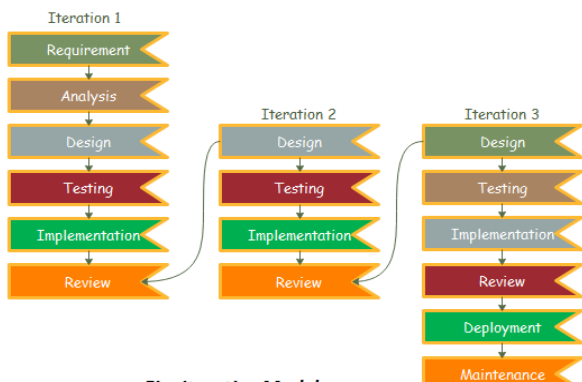


Figure 4: Steps in Iterative Model [5]

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PROTOTYPE MODEL

The prototyping model is one of the most popular used software development life cycle models. This model is used when the customer do not know the exact project requirement before end. In the model prototype of product is first develop, tested as per the customer feedback. Repeatedly, till the final acceptable prototype is achieved which form the basis for developing the final project.

A prototype model requirement gathering start with requirement analysis. In this phase the requirement of the system are defined in details during the process the user of the system is interviewed to know what expectation from the system.

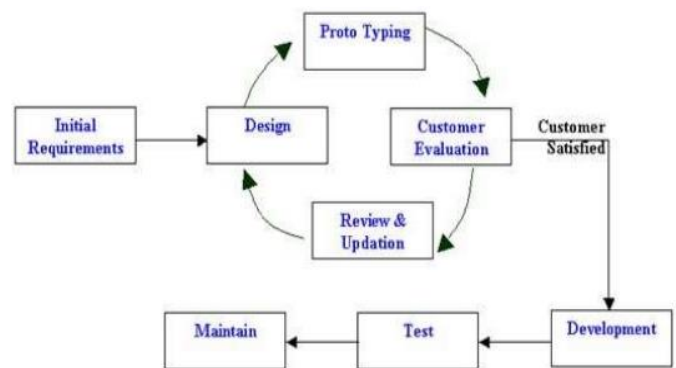


Figure 5: Steps in Prototyping Model [6]

CONCLUSIONS

The paper discussed the various software process models which help us in building the software system under the environment of software engineering. Each and every software process model has its advantages and disadvantages. The comparative study on the behavior and characteristics of discussed software process models in the paper help the software engineer in deciding the appropriate model as per their requirement in development of the proposed software system.

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