Software development process

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Software Project Management

Abstract

"In software engineering, a software development methodology (also known as a system development methodology, software development life cycle, software development process, software process) is a splitting of software development work into distinct phases (or stages) containing activities with the intent of better planning and management. It is often considered a subset of the systems development life cycle. The methodology may include the pre-definition of specific deliverables and artifacts that are created and completed by a project team to develop or maintain an application.[1] Common methodologies include waterfall, prototyping, iterative and incremental development, spiral development, rapid application development, extreme programming and various types of agile methodology. Some people consider a life-cycle "model" a more general term for a category of methodologies and a software development "process" a more specific term to refer to a specific process chosen by a specific organization. For example, there are many specific software development processes that fit the spiral life-cycle model." [Wikipedia b]

Keywords: software engineering, project management, planning, risk assessment

1 Introduction

Approaches Several software development approaches have been used since the origin of information technology, in two main categories. Typically an approach or a combination of approaches is chosen by management or a development team. [Bob Hughes 2009]

"Traditional" methodologies such as waterfall that have distinct phases are sometimes known as software development life cycle (SDLC) methodologies, though this term could also be used more generally to refer to any methodology. A "life cycle" approach with distinct phases is in contrast to Agile approaches which define a process of iteration, but where design, construction, and deployment of different pieces can occur simultaneously. [Kenwright a]

The project schedule is a calendar that links the tasks to be done with the resources that will do them.

- Before a project schedule can be created, the project manager must have a work breakdown structure (WBS) and estimates.
- The schedule is part of the project plan.

2 Waterfall model

The sequence of events for the waterfall model:analysis,design,coding,testing,maintenance Waterfall model has follow features:

- classical

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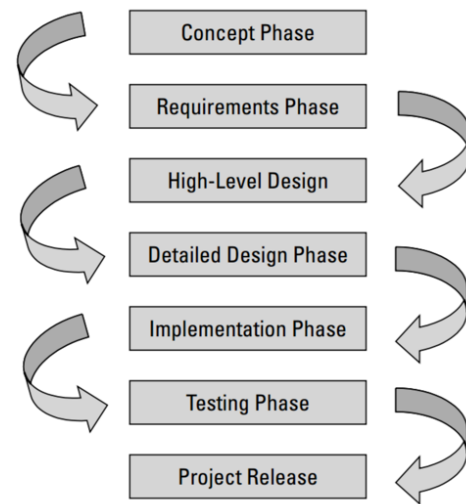
Figure 1: *Waterfall model - the classic waterfall approach to programming. The waterfall model uses a series of phases to move the project along. Each phase creates a deliverable, usually a document that captures what the phase has accomplished.*

- one-shot approach
- effective control
- limited scope of iteration
- long cycle time
- not suitable for system of high
- uncertainty

3 V Model
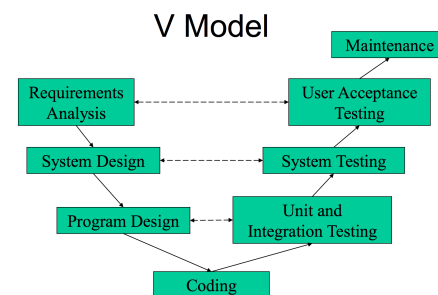
Figure 2: *Thise V-model is considered to be an extension of the Waterfall model. Instead of a downward linear path the process moves downward until it reaches the coding stage whereupon it begins moving upward until it passes user acceptance.Significant difference between V- and Waterfall models is that the former includes well-defined Verification and Validation phases.*

Advantages V-model is easy to understand and provides a great deal of structure.It is most suitable when requirements are stable and unchanging and when potential problems can be reasonably predicted. The V-model presents verification and validation processes with more

specificity than does the Waterfall model.

Dissadvantages Same disadvantages as the Waterfall model.Like Waterfall does not allow enough flexibility and that projects can't move forward at a satisfactory pace.Most companies that want to turn a profit don't want to spend too much time and effort in the planning stage.Not only that but most software projects are complex and often change requirements or make enhancement requests throughout the development life cycle.

V model has follow features:

- Additional validation process introduced
- Relate testing to analysis and design
- Loop back in case of discrepancy

4   Spiral Model
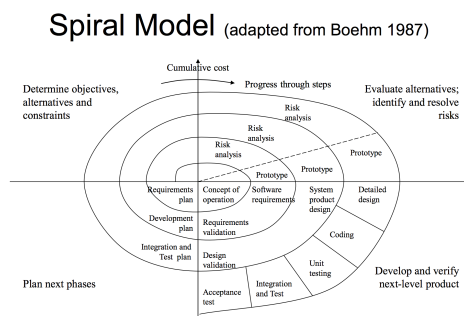
Figure 3: *The most important feature of spiral model is risk management.In the spiral model risk analysis is performed in every loop.*

Spiral model has follow features:

- Evolutionary approach
- Iterative development combined with risk management
- Risk analysis results in go, re-do, nogo decision

5   Prototyping Model

Goals

1. meet (some) user requirements at an early stage
2. reduce risk and uncertainty
3. verify a design or implementation approach should always answer specific questions; goals must be identified.

Benefits of Prototyping

- Demonstration of the consistency andcompleteness of a specification
- Reduced need for documentation
- Reduced maintenance costs
- Feature constraint
- Production of expected results for testing real system

Drawbacks of Prototyping

- Users sometimes misunderstand the role of the prototype
- Lack of project standards possible
- Lack of control
- Additional expense
- Machine efficiency
- Close proximity of developers

The prototyping model of software development is a useful approach when a customer cannot define requirements clearly.

6   Incremental Model

Break system into small components. Implement and deliver small components in sequence. Every delivered component provides extra functionality to user.

The incremental model of software development is a good approach when a working core product is required quickly.

The linear sequential model of software development is a reasonable approach when requirements are well defined

7   Iterative Model

Deliver full system in the beginning Enhance functionality in new releases Every new release includes

- extra functionality
- enhancement of existing functionality
- Popularly used in software industry

[Kenwright b]

8   Work Breakdown Structure

A work breakdown structure (WBS), in project management and systems engineering, is a deliverable-oriented decomposition of a project into smaller components. A work breakdown structure is a key project deliverable that organizes the team's work into manageable sections. The Project Management Body of Knowledge (PMBOK 5) defines the work breakdown structure as a "A hierarchical decomposition of the total scope of work to be carried out by the project team to accomplish the project objectives and create the required deliverables." [**?**]

A work breakdown structure element may be a product, data, service, or any combination thereof. A WBS also provides the necessary framework for detailed cost estimating and control along with providing guidance for schedule development and control.

The Work Breakdown Structure (WBS): A hierarchical description of all the tasks to be performed. The WBS is needed for all projects and is a detailed list of tasks with their deliverables.

9   Critical path method

CPM is commonly used with all forms of projects, including construction, aerospace and defense, software development, research projects, product development, engineering, and plant maintenance, among others. Any project with interdependent activities can apply this method of mathematical analysis. Although the original CPM program and approach is no longer used,[6] the term is generally applied to any approach used to analyze a project network logic diagram. [Wikipedia a]

Acknowledgements

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