What is Software development processes?

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Software development processes

Abstract

This short report gives a brief and concise explanation to what is software development process and how to optimizes software process. There are many models in software development process,such as Waterfall models, V models ,Spiral models,Prototyping ,Incremental development models,Iterative development models. Besides,this report will gives some advantages and disadvantages in each models.

Keywords: software development process , models

1 Introduction

Software process defines a series of activities,methods, and practices which lead to production of the software. Software process is the glue that holds the technology layers together and enables rational and timely development of software. How to describe the software development process ? So process should used models to describe it.[1]

We address the following concepts in this report:

- What is software development process ?
- Why Modeling?
- What is the Waterfall Model?
- What is the V Model and what is advantage about it?
- What is the Spiral model?
- What is the Prototyping model?
- What is the different between Incremental development model and Iterative development model?

Software Process Model

one specific embodiment of a software process architecture.

Why modeling? It has four reasons for:

1.To provide a common understanding
2.To locate any inconsistencies,redundancies and omissions
3.To reflect the development goals and provide early evaluation
4.To assist the development team to understand any special situation

There are some software process models:

Waterfall Model
V Model
Spiral Model
Prototyping Model
Phased Development Model
-incremental development model
-iterative development model
Operational Specification Model
Transformation Model

2 Waterfall Model

The waterfall model is a sequential design process, used in software development processes, in which progress is seen as flowing steadily downwards (like a waterfall) through the phases of conception, analysis, design, coding, testing, maintenance.

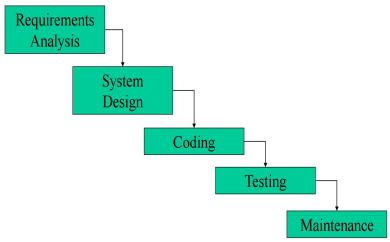

Figure 1: phases of Waterfall Model

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Figure1 shows this process is liner model but includes lots of iteration.Software designer needs to finish the stage one by one ,it must make very part finished and validated ,which considers the and involve significant rework.Therefor ,after a small number of iteration ,it is normal to freeze parts of the development ,such as the specification,and to continue the later development stages.Some problem can be left for the next stages.

Advantage of Waterfall Model

1.classical
2.one-shot approach
3.effective control

Disadvantage of Waterfall Model

1.have long cycle time
2.not suitable for system of high uncertainty

Waterfall Variations

1.Sashimi waterfall: activities are allowed to overlap
2.Waterfall with sub projects: implementation of different components proceeds in parallel
3.Waterfall with risk reduction: an initial risk analysis helps mitigate risks in later phases of implementation

3 V Model

The V-model is a term applied to a range of models, from a conceptual model designed to produce a simplified understanding of the complexity associated with systems development to detailed, rigorous development life-cycle models and project management models.

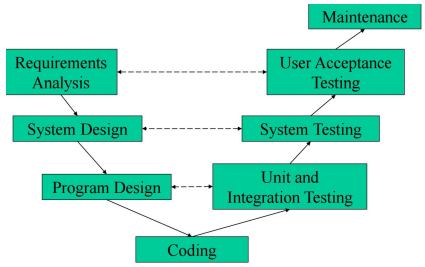

Figure 2: phases of V Model

Figure 2 shows this process has testing after each step.

Advantage of V Model

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

Disadvantage of V Model

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

4 Spiral Model

The spiral model is a risk-driven process model generator for software projects. Based on the unique risk patterns of a given project, the spiral model guides a team to adopt elements of one or more process models

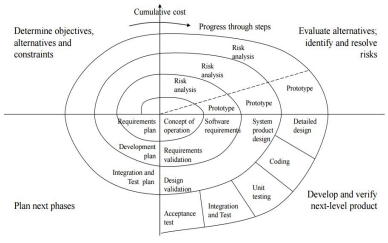

Figure 3: phases of Spiral I Model

Figure 3 shows emphasizes the risk management , so this model is fit to the development of large system.

Advantage of spiral Model
1.Evolutionary approach
2..Iterative development combined with risk management
Disadvantage of spiral Model
1..Risk analysis results in “go, re-do, no-go” decision
Four major activities in spiral Model
1.Planning
2.Risk analysis
3.Engineering
4.Evaluation

4 Prototyping Model

The Prototyping Model is a systems development method (SDM) in which a prototype is built, tested, and then reworked as necessary until an acceptable prototype is finally achieved from which the complete system or product can now be developed. This model works best in scenarios where not all of the project requirements are known in detail ahead of time. It is an iterative, trial-and-error process that takes place between the developers and the users.
Classification of Prototype
1.Throw-away
After users agree the requirements of the system, the prototype will be discarded.
2.Evolutionary
Modifications are based on the existing prototype.
3.Incremental
Functions will be arranged and built accordingly.

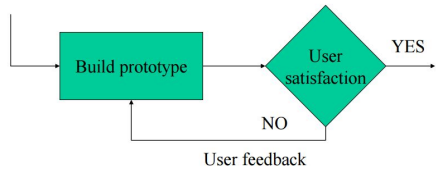

Figure 4: Prototyping Model

Figure 4 shows the prototyping model is technological process

Advantage of Prototyping Model
1.Demonstration of the consistency and completeness of a specification
2.Reduced need for documentation
3.Reduced maintenance costs
4.Feature constraint
5.Production of expected results for testing real system
Disadvantage of Prototyping Model
1.Users sometimes misunderstand the role of the prototype
2.Lack of project standards possible
3.Lack of control
4.Additional expense
5.Machine efficiency
6.Close proximity of developers

5. Phased Development

Phased development has two approaches :
1.Incremental
2.Iterative
Incremental Model
Incremental model combines the iteration characteristics of the basic components of the waterfall model and a prototyping model, the model uses a linear sequence with the progress of time schedule and staggered, each a linear sequence generating software a can be released "incremental".

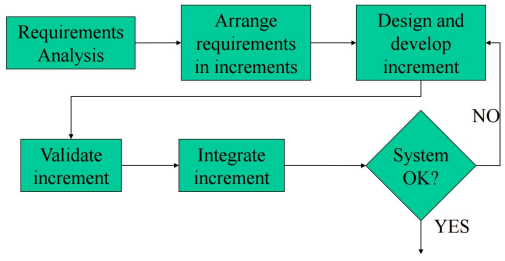

Figure 5: Incremental model

Figure 5 shows the process of Incremental model .

The incremental model of software development is a good approach when a working core product is required quickly.
Iterative Model
Iterative model is a periodic model recommended by RUP.In RUP, iteration is defined as an iteration that includes all development activities that produce a product release (stable, executable version of the product), and all other peripheral elements that are required to be used. So in some degree, iterative development is a complete after all the work flow process:demand the work flow, analysis design the work flow, the implementation process and testing process.

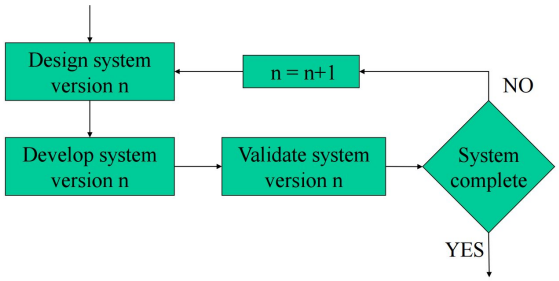

Figure 6: Iterative model

Figure 6 shows the process of Iterative model .
Combined Incremental and Iterative Model
1.Every new release includes extra functionality as well as enhancement of existing functionality
2.Popularly used in software industry
Advantages of Phased Development
1.it has an early feedback
2.It has less possible requirement changes
3.it improved cash flow
Disadvantages of Phased Development
1. It will reduce productivity

6. Conclusion

Though many models,software development process can describe very well.The very classical model is Waterfall model. It very simple,but it don’t use in complexly project.V-model is better than Waterfall model .After V-model’s each step,testing is very important thing to do.Spiral model can plan and do some risk management,but it is complex process. Incremental Model has the same point as the Iterative Model has.Also they have different.

References

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