Waterfall Model

The waterfall model is a common project methodology and it is a sequential design project method that was originally conceived for software development but is now used for a variety of project types (“Study.com”, n.d). It has 6 phases:

- Requirements
- Design
- Implementation
- Verification
- Deployment
- Maintenance

The unique feature of the waterfall model is the sequential nature of the phases when one phase finishes another phase begins. Organizations continue to use the waterfall model because it is: suitable for simple or smaller projects, requirements are well understood, easy to understand, easy to manage, clear milestones and comprehensive documentation.

There are several problems associated with the waterfall model for example, it’s not the perfect model for software development because the waterfall modal maintains that it only can move to another phase when it’s completed and correct so you cannot go back a step if the design phase has gone. The issue in practice that it is not possible for any non-trivial project to get one phase of a software products lifecycle perfected before moving to the next phase, in other words software development can’t be perfect in the first try you must try, test or to start over sometimes which it means you may face a high amount of risks. Other problem is that it is not designed for complex and big projects.

Rational Unified Process

The primarily responsible for introducing Rational Unified Process (RUP) is Rational Software Corporation, a division of IBM. In addition, it was introduced in 2003 (“Rational Unified Process”, 2018).

The Rational Unified Process is a Software Engineering Process. It provides a disciplined approach to assigning tasks and responsibilities within a development organization. Its goal is to ensure the production of high-quality software that meets the needs of its end-users, within a predictable schedule and budget (“Rational Software”, 1998). In addition, the Rational Unified Process helps in designing, planning, implementation, evaluation and execution of these test

types. Moreover, quality assessment is built in all activities, including all participants, using objective criteria and measurements and not patronize as separate activity performed by a separate group and it works for wide range of projects and organizations.

The Rational Unified Process is better than Waterfall Model because it supports an iterative approach that increase understanding of the problem through sequential refinements and it gives effective solutions over multiple repetition. An iterative approach is required that allows an increasing understanding of the problem through successive refinements, and to incrementally grow an effective solution over multiple iteration (“Rational Software”, 1998). Moreover, using iterative approach solve the highest risk items at every stage in the lifecycle and it is helpful to attack danger through frequent verifiable progress, and through executable releases that qualify continuous end user participation and feedback; so, the development team stays focused on making results because each iteration ends with an executable release, and frequent status checks helps to ensure that the project stays on schedule. Furthermore, iterative approach makes it easier to make changes in features, requirements and schedule.

(Structure of Iterative Model graph from Rational Software)

The Rational Unified Process divides one development cycle in four consecutive phases:

- Inception phase: establish the business case for the system; Identify all external entities with which the system will interact.
- At the end of the inception phase is the first major project milestone which is the Lifecycle Objectives Milestone. The evaluation criteria for the inception phase are:
- Stakeholders
- The amount of development of any architecture
- Planned expenditures vs. actual expenditures.
- Elaboration phase: analyze the problem domain; Develop project plan.

At the end of the elaboration phase is the second important project milestone, the Lifecycle Architecture Milestone. Studying the choice of architecture, and find solution of the major risks.

Construction phase: All components features are developed and integrated into the product. At the end of the construction phase is the third major project milestone Initial Operational Capability Milestone. - Deciding if the software, the users and the sites are ready to operate, without showing the project to high risks.

Transition phase: To transfer the software product to user community.

At the end of the transition phase is the fourth important project milestone, the Product Release

Milestone. - Deciding if the objectives were met, if not start another development cycle.

There are several disadvantages of Rational Unified Process for example, the developers need to be an expert in their work to develop software under this methodology, it is complex and not organized, hard to understand, development adds the confusion that causes more issues during the stages of testing and does not provide any clear implementation guidelines.