Week01 – Short Paper Assignment – Waterfall Model

SWEN 603 9041

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# Introduction

The Software development lifecycle (SDLC) generally consists of planning, analysis, design, and implementation. The waterfall model implements each of these phases thoroughly. This model has been being used predominantly in many software development firms as a default process. This model adheres to some very basic principles such as:

* The project by phases, which flow sequentially. Some overlap is allowed between phases.
* Each of the phases is planned with time schedules and deadlines.
* A budget for each phase is estimated and kept tightly firm for the lifetime of the project.
* This model does not keep any room for iterations. The project is scheduled to be completed with one-time effort.
* Extensive documentation is a very part of this process. The formal reviews and signoff of the documents before each phase must be completed by the stakeholders.

These principles made the process effective for many short term projects and to some extent for some of the long term projects too. However, for longer and continuous projects, this process became too hard to manage.

# Waterfall Model

As the name suggests waterfall model is a model which flows in a linear sequential life cycle model. It consists of many phases which are described below.

1. Initiation – This is the first and foremost phase where the analysts plan to create a project which can automate some of the manual tasks performed by the users. Typically, there is a sponsor who signs off a high level budget for the project.
2. Requirements – The business analysts meet with a group of real users and the stakeholders to get the exact and detailed business requirements. This is the phase where all the information about the repetitive tasks that users are performing on a daily basis. The business requirements are then converted to SRS documents (Software requirement specification).

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Description automatically generated

1. Design – As the requirements are created, the business analysts meet with a group of software developers and the architects to have a walk through of the SRS document. It is followed by a high level technical design of the desired system. In this phase, the test team are also involved to understand the testable scenarios based on the architecture of the application
2. Implementation – This is the most important and time taking phase of the whole process. The SRS document is then converted to a working application consisting of one ore more smaller components. Each of the components are designed to be reuseable within the application.
3. Test – There are many phases of testing. The structural testings are usually done by the development team who use small unit tests to validate each of the components. However, typically there is an independent testing team who perform black box testing acting as end users. In this phase, the goal is to find as many defects within the application that may cause bigger issues when released to production. The defects are then fixed based on their severity and priority. Besides the functional testing, the application needs to go through some of the non-functional testing, so that the tolerance level of the application is optimized.
4. Deployment – Once the exit criteria for the testing phase is complete, the system becomes ready to be deployed in the production environment. Usually, the organizations follow having two environments; pre-production and production. The application is initially deployed to pre-production environment, which is a replica of production environment. Once the smoke test suite is passed, the application is deployed to production.
5. Maintenance – This is integral part of the waterfall model where the application is constantly maintained with additional enhancements and bug fixes. As the business requirements change, the application is also changed. These change requests are well documented for any future references.

# Pros and Cons of Waterfall Model

The advantages of waterfall model are:

* Sufficient documentation for each of the phases and tasks performed.
* Strict timelines.
* The requirements being frozen in the beginning there are no unexpected expansion in the project scope.
* With enough estimation in the planning phase, there are no financial surprises.

Some of the advantages are disadvantages for the waterfall model in some sense.

* To adhere the process, analysts may end up writing documents for less important tasks and ineffective usage of time.
* Lack of flexibility. As the requirements are frozen at the beginning of the implementation (aka. Build) phase, the room for change requests is very minimal.
* Longer delivery time. End users get no experience of the application until all the business requirements are implemented.

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# Application of Waterfall model

Because of the above advantages and disadvantages, the waterfall model may be applied in certain specific cases.

* Fixed budget implementations
* Non varying business requirements
* Short term projects
* Window based applications

# References

1. Davis, Barbara & Radford, Darren. ( © 2014). Going beyond the waterfall: managing scope effectively across the project life cycle. [Books24x7 version] Available from http://library.books24x7.com.ezproxy.umuc.edu/toc.aspx?bookid=73143.