

Which Methodology to Choose for Your Project: Waterfall vs RAD?



When companies are thinking of developing software they do thorough marketing research, analyse the end user needs, think how to further promote it to make their product or solution successful by all means.

However, they do not usually think of how the software will be built, who will be responsible for requirements preparation and project management and so on. It might cause serious delay in project release or even a project failure.

For instance, the Wellington survey states that only 40% of projects are developed on time, 46% of projects are developed according to the planned budget, and 36% of projects deliver their full value.

One of the most effective ways to decrease potential risks and costs is to choose the relevant software development methodology and follow it. However, there is no “silver bullet,” because each methodology has its characteristics and specifics.

In this article, we will analyze two popular software development methods – Waterfall and RAD (Rapid Application Development).

We will discuss their differences, as well as their strong and weak sides, and also explain in what situations it is better to choose this or that methodology.

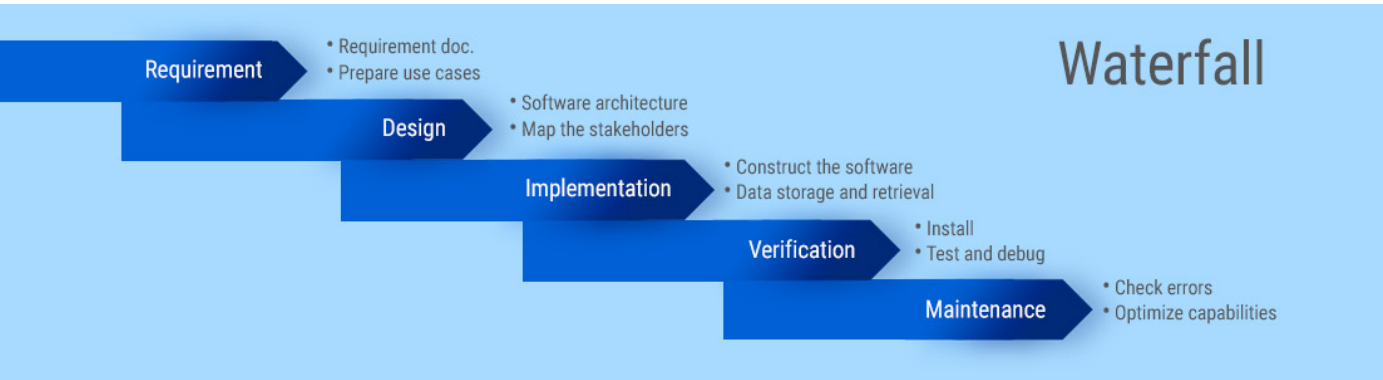
What Is the Waterfall Software Development Methodology?

The Waterfall methodology may be considered a traditional linear software development model.

It consists of several phases sequentially following each other.

The software development model Waterfall is called so because the development stages form a cascade, where each step gradually follows the previous one.

A developer can't get to the next development phase until the previous stage is completed. Moreover, development can go only forward, so engineers can't influence the already completed stages.



Here is how the development process based on the Waterfall model may look like. (Source: ukessays.com)

When using the Waterfall model, developers take a linear and straightforward approach to software development. In this methodology, the development process usually consists of the following steps:

- gathering document requirements;
- design creation;
- implementation;
- QA and testing;
- bug fixing and release;
- maintenance and support.

Now let's look at the other model – RAD – Rapid Application Development.

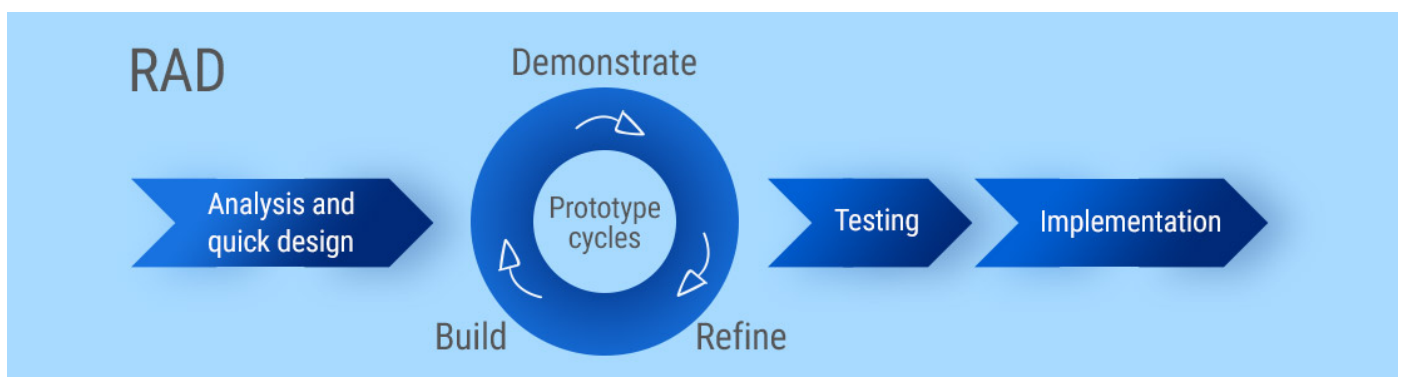
What Is the RAD Software Development Methodology?

RAD (stands for Rapid Application Development) is one of the varieties of Agile development methodology that is based on iterations and rapid prototype development.

Unlike the Waterfall model, this methodology doesn't imply strict adherence to the plan and requirements, but rather a verification of user reviews and rapid improvement of the software.

The main goal of this model is to create a product as quickly as possible and bring it to customers.

When applying the RAD approach, the client can see the approximate end results of the work in the early stages of the development.



The development process based on the RAD methodology looks like this. (Source: blog.capterra.com)

Here are the main steps of the RAD-based development process:

- defining project requirements;
- building prototypes;
- gathering user feedback;
- testing;
- presenting a system.

What Are the Main Differences Between Waterfall and RAD?

Given that both models are very different in their natures and structures, the decision between them can greatly affect the development process, the choice of a contractor, and so on.

Now let's compare Waterfall and RAD software development methodologies and see how they are used in practice:

Development Time

Project development timeframes can vary greatly depending on a particular software development methodology.

When utilizing the Waterfall model, there may be a long waiting time for software implementation. The thing is that Waterfall involves many stages and some of them are quite lengthy in time.

For instance, planning is one of the longest stages of Waterfall development and developers must go through it before moving to the execution phase.

On the other hand, the goal of the RAD approach is to deliver a product as soon as possible. Moreover, developers who choose RAD may work faster because they more often tend to reuse the code or utilize automatic code generators. Sometimes, the customer may get the first versions of the product within the first two months of development.

Regarding the time of development, there are some more points that can affect the speed of the project completion. First, companies need to understand that the completion of the project is perceived differently when using this or that development methodology.

A process based on Waterfall implies a clear structure of the development process, well-defined deadlines, and a clear result.

In contrast to the Waterfall model, development projects based on the principles of RAD are open ended because they are completed only when the client is satisfied with the result.

On the other hand, if the company isn't fully satisfied with the result of work of the Waterfall team, the developers will have to make changes until they get approval from the client.

Making changes during the development phase can also greatly affect the timing of product completion. For example, when using the RAD approach, the client and engineers can quickly make adjustments, which significantly saves time.

In the worst cases, the development has to be started again from scratch, which drastically lengthens the development process.

Development Costs

Most often, software development that is based on the Waterfall development methodology implies fixed development costs which means that the budget can't be increased, even for large projects.

With the RAD model, projects don't have fixed budgets since many changes and iterations are possible. In general, the RAD approach is supposed to ensure minimum development cost and faster delivery time.

Required Skills

Both development methodologies have different requirements regarding the skills and experience of developers.

Regarding Waterfall, if the specifications are clear, companies may hire both senior and junior developers which greatly facilitates the process of finding a relevant contractor.

On the other hand, if a company wants to develop a product using a RAD approach, it is very important to find a flexible, experienced, and multi-talented team.

Risk

All software development methodologies deal with risks in different ways, and this must be taken into account before choosing any of them.

On the one hand, when relying on Waterfall, customers and contractors have to clearly plan the development process, consider possible pitfalls, and estimate the final result in advance.

This approach to planning makes the development process straightforward.

However, if the development doesn't go as planned, the entire project may be in danger of failure, because many changes can't be made at later stages. From that perspective, the Waterfall model involves higher risks.

On the other hand, the RAD model implies continuous planning and responding to risks. Even if the client makes adjustments to the requirements or the developers are faced with certain problems, all this can be quickly corrected on the spot.

Thus, there may be lower risks in the RAD approach.

Approach to Change

In Waterfall, changes aren't welcome, therefore, all processes should be thoroughly planned from the very start.

In the RAD model, any changes and corrections can be made anytime. Moreover, it is believed that such an approach can help make the product more valuable, and the client more satisfied.

Quality Control

In the Waterfall model, QA activities such as testing are most often carried out at the end of the development process. Thus, if changes are required, the development process may take much time.

Developers who rely on the RAD approach perform all quality control activities throughout the development process.

Which Development Methodology Might Be the Best for Your Project?

Given the many differences between the Waterfall and RAD development methodologies, the choice of the most relevant one may depend on many factors. Let's now discuss when it is better to use each of the two software development methodologies.

When to Use Waterfall

The methodology may be relevant for short projects because they are much easier to plan than the larger ones. Companies are recommended to choose this methodology when they have a clear idea of what their products should be like.

In that case, the development team can create a detailed and consistent specification.

In addition to that, it is advisable to choose this methodology when companies have a clear budget that they do not want to exceed.

Also, the Waterfall development methodology may be suitable for those companies that want to track the progress of the product development.

When to Choose RAD

RAD will be a good fit for projects that need to get software developed in the shortest possible time.

RAD requires highly-skilled developers and more budget. Besides that, it is a better fit for large projects that can be split into modules.

Also, it is not recommended to use this methodology if it is difficult to collect user feedback because the whole point of RAD is to collect user feedback and move development forward accordingly.

Also, the search for a contractor may be time-consuming, because it is important to make sure that the development team has the necessary expertise.

If you still have questions regarding the difference between the Waterfall and RAD development methods please feel free to contact us. Our experts will be happy to help you choose the development methodology based on your project requirements.

Feel free to contact us and ask any questions: info@scand.com