Agile Model and Methodologies: Guide for Developers and Testers

To understand the concept of agile testing, first let's understand-

What is Agile?

AGILE is a methodology that promotes **continuous iteration** of development and testing throughout the software development life cycle of the project. Both development and testing activities are concurrent unlike the Waterfall model

I hope we got an idea of Agile!!! Now, we can step on to Agile Testing.

The agile software development emphasizes on four core values.

1. Individual and team interactions over processes and tools
2. Working software over comprehensive documentation
3. Customer collaboration over contract negotiation
4. Responding to change over following a plan

Agile versus Waterfall Method

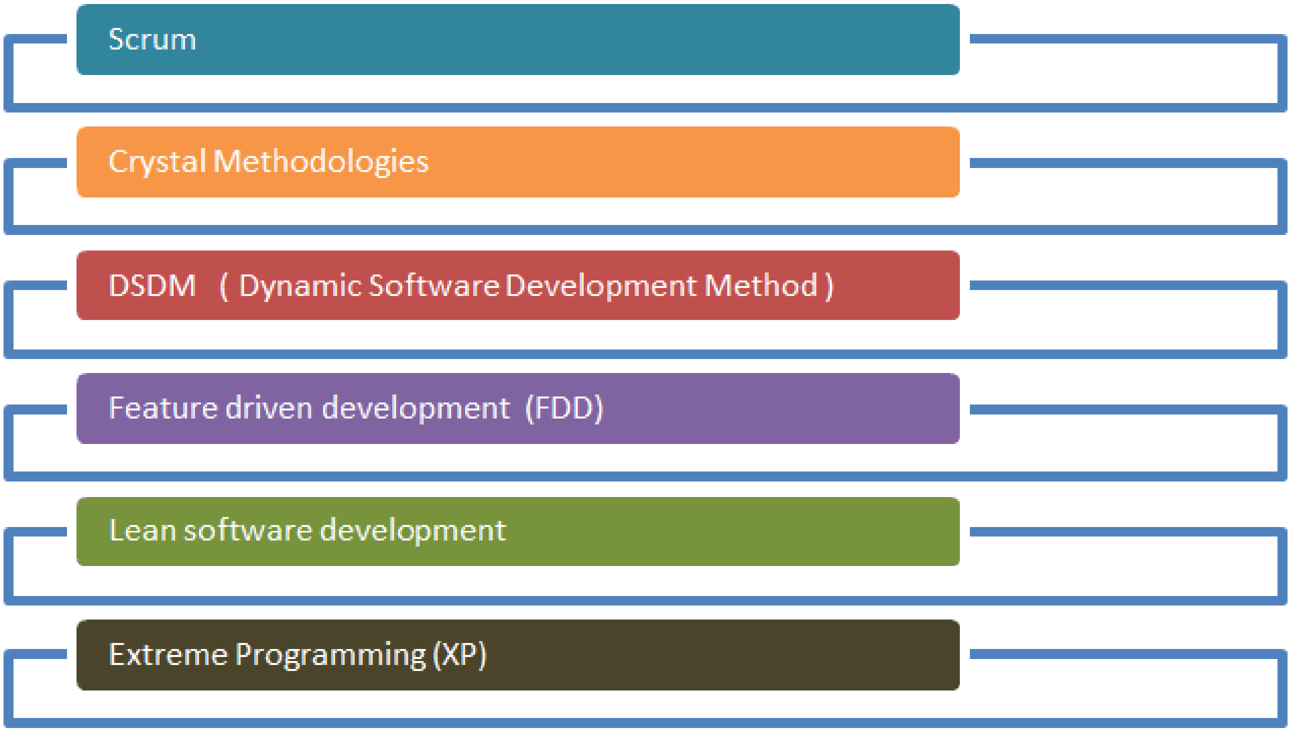
Agile and Waterfall model are two different methods for software development process. Though they are different in their approach, both methods are useful at times, depending on the requirement and the type of the project.

Agile Model	Waterfall Model

• Agile method proposes incremental and iterative approach to software design	• Development of the software flows sequentially from start point to end point.
• The **agile process** is broken into individual models that designers work on	• The design process is not broken into an individual models
• The customer has early and frequent opportunities to look at the product and make decision and changes to the project	• The customer can only see the product at the end of the project
• Agile model is considered unstructured compared to the waterfall model	• Waterfall model are more secure because they are so plan oriented
• Small projects can be implemented very quickly. For large projects, it is difficult to estimate the development time.	• All sorts of project can be estimated and completed.
• Error can be fixed in the middle of the project.	• Only at the end, the whole product is tested. If the requirement error is found or any changes have to be made, the project has to start from the beginning
• Development process is iterative, and the project is executed in short (2-4) weeks iterations. Planning is very less.	• The development process is phased, and the phase is much bigger than iteration. Every phase ends with the detailed description of the

	next phase.
• Documentation attends less priority than software development	• Documentation is a top priority and can even use for training staff and upgrade the software with another team
• Every iteration has its own testing phase. It allows implementing regression testing every time new functions or logic are released.	• Only after the development phase, the testing phase is executed because separate parts are not fully functional.
• In agile testing when an iteration end, shippable features of the product is delivered to the customer. New features are usable right after shipment. It is useful when you have good contact with customers.	• All features developed are delivered at once after the long implementation phase.
• Testers and developers work together	• Testers work separately from developers
• At the end of every sprint, user acceptance is performed	• User acceptance is**performed** at the end of the project.
• It requires close communication with developers and together analyse requirements and planning	• Developer does not involve in requirement and planning process. Usually, time delays between tests and coding

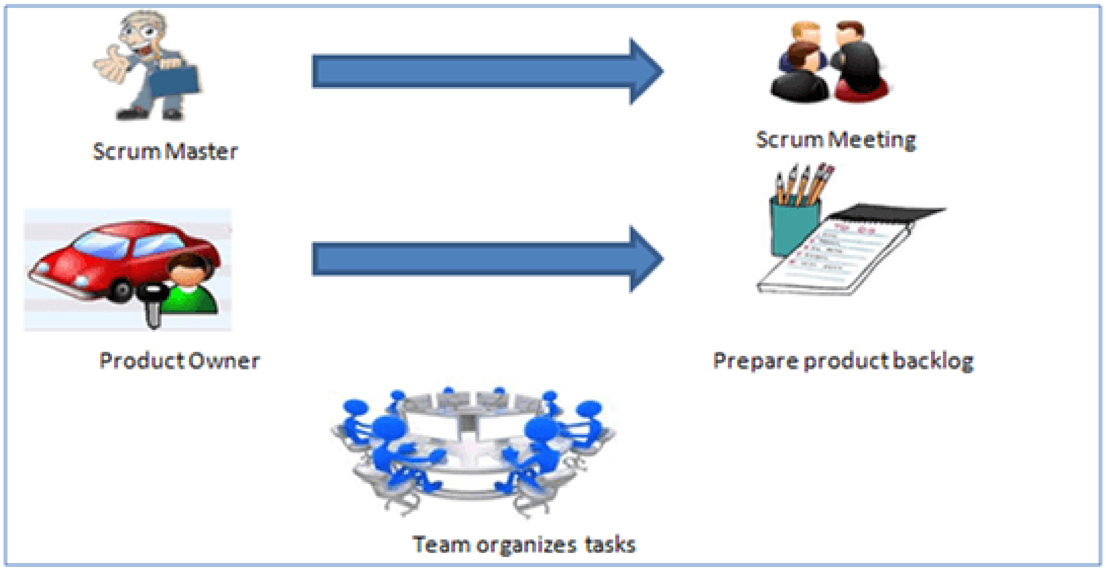
Methodologies of Agile Testing


Scrum
Crystal Methodologies
DSDM (Dynamic Software Development Method)
Feature driven development (FDD)
Lean software development
Extreme Programming (XP)

There are various **methods** present in agile testing, and those are listed below:

Scrum

SCRUM is an agile development method which concentrates specifically on how to manage tasks within a team based development environment. Basically, Scrum is derived from activity that occurs during a rugby match. Scrum believes in empowering the development team and advocates working in small teams (say- 7 to 9 members). It consists of three roles, and their responsibilities are explained as follows:



- Scrum Master
    - Master is responsible for setting up the team, sprint meeting and removes obstacles to progress
- Product owner

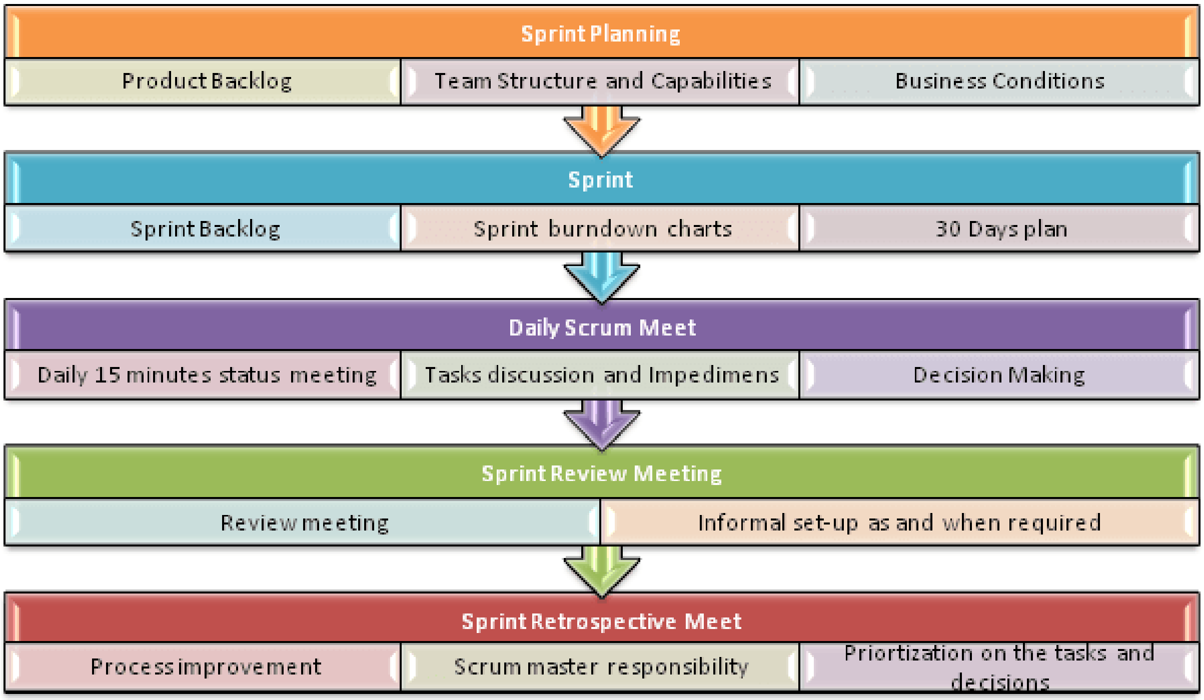
  - The Product Owner creates product backlog, prioritizes the backlog and is responsible for the delivery of the functionality at each iteration
- Scrum Team
  - Team manages its own work and organizes the work to complete the sprint or cycle

Product Backlog

This is a repository where requirements are tracked with details on the no of requirements to be completed for each release. It should be maintained and prioritized by product owner, and it should be distributed to the scrum team. Team can also request for a new requirement addition or modification or deletion

Scrum Practices

Practices are described in detailed:


Sprint Planning
Product Backlog
Team Structure and Capabilities
Business Conditions
Sprint
Sprint Backlog
Sprint burndown charts
30 Days plan
Daily Scrum Meet
Daily 15 minutes status meeting
Tasks discussion and Impedimens
Decision Making
Sprint Review Meeting
Review meeting
Informal set-up as and when required
Sprint Retrospective Meet
Process improvement
Scrum master responsibility
Priortization on the tasks and decisions

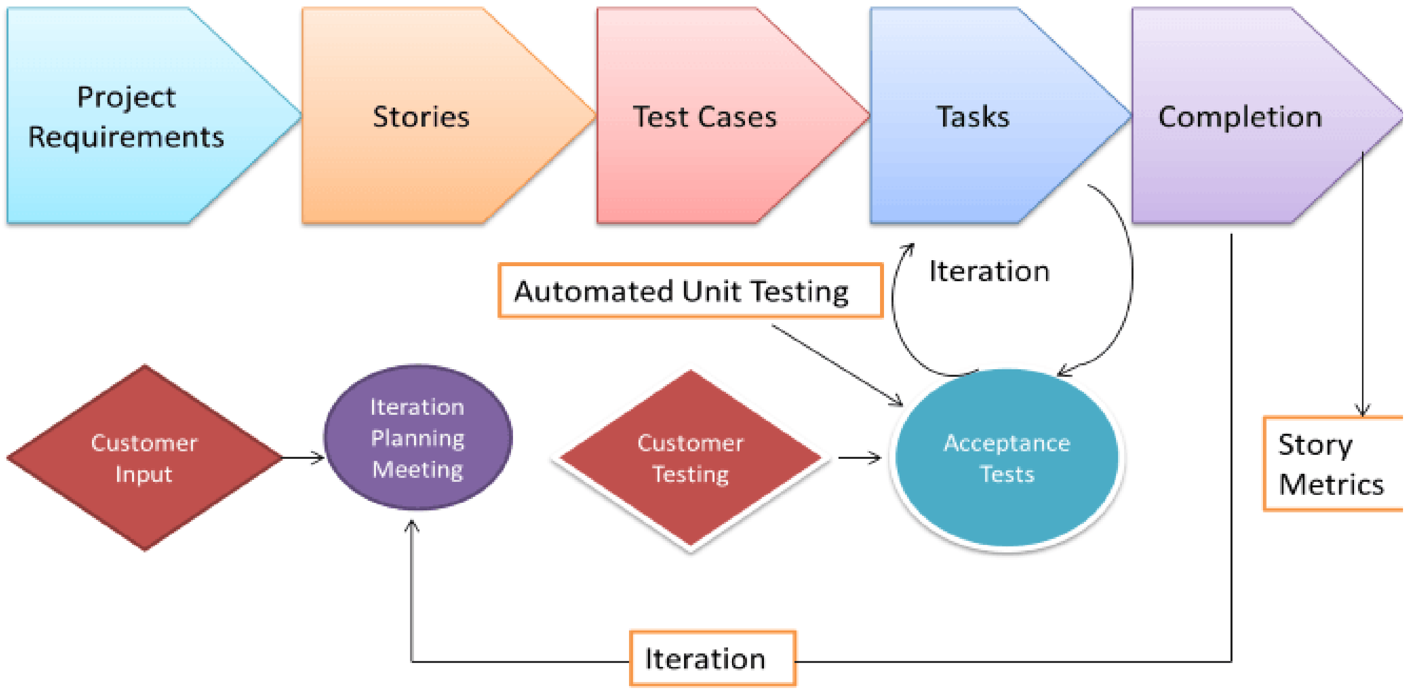
Process flow of Scrum:

Process flow of scrum testing is as follows:

- Each iteration of a scrum is known as Sprint
- Product backlog is a list where all details are entered to get end product
- During each Sprint, top items of Product backlog are selected and turned into Sprint backlog
- Team works on the defined sprint backlog
- Team checks for the daily work
- At the end of the sprint, team delivers product functionality

eXtreme Programming (XP)

Extreme Programming technique is very helpful when there is constantly changing demands or requirements from the customers or when they are not sure about the functionality of the system. It advocates frequent "releases" of the product in short development cycles, which inherently improves the productivity of the system and also introduces a checkpoint where any customer requirements can be easily implemented. The XP develops software keeping customer in the target.



Extreme Programming (XP)

Business requirements are gathered in terms of stories. All those stories are stored in a place called the parking lot.

In this type of methodology, releases are based on the shorter cycles called Iterations with span of 14 days time period. Each iteration includes phases like coding, unit testing and system testing where at each phase some minor or major functionality will be built in the application.

Phases of eXtreme programming:

There are 6 phases available in Agile XP method, and those are explained as follows:

Planning

- Identification of stakeholders and sponsors
- Infrastructure Requirements
- Security related information and gathering
- Service Level Agreements and its conditions

Analysis

- Capturing of Stories in Parking lot
- Prioritize stories in Parking lot
- Scrubbing of stories for estimation
- Define Iteration SPAN(Time)
- Resource planning for both Development and QA teams

Design

- Break down of tasks
- Test Scenario preparation for each task
- Regression Automation Framework

Execution

- Coding
- Unit Testing
- Execution of Manual test scenarios
- Defect Report generation
- Conversion of Manual to Automation regression test cases
- Mid Iteration review
- End of Iteration review

Wrapping

- Small Releases
- Regression Testing
- Demos and reviews
- Develop new stories based on the need
- Process Improvements based on end of iteration review comments

Closure

- Pilot Launch
- Training
- Production Launch
- SLA Guarantee assurance
- Review SOA strategy
- Production Support

There are two storyboards available to track the work on a daily basis, and those are listed below for reference.

- Story Cardboard
  - This is a traditional way of collecting all the stories in a board in the form of stick notes to track daily XP activities. As this manual activity involves more effort and time, it is better to switch to an online

form.

- Online Storyboard
    - Online tool Storyboard can be used to store the stories. **Several teams can use it** for different purposes.

Crystal Methodologies

Crystal Methodology is based on three concepts

1. **Chartering:** Various activities involved in this phase are creating a development team, performing a preliminary feasibility analysis, developing an initial plan and fine-tuning the development methodology
2. **Cyclic delivery:** The main development phase consists of two or more delivery cycles, during which the
    1. Team updates and refines the release plan
    2. Implements a subset of the requirements through one or more program test integrate iterations
    3. Integrated product is delivered to real users
    4. Review of the project plan and adopted development methodology
3. **Wrap Up:** The activities performed in this phase are deployment into the user environment, post-deployment reviews and reflections are performed.

Dynamic Software Development Method (DSDM)

DSDM is a Rapid Application Development (RAD) approach to software development and provides an agile project delivery framework. The important aspect of DSDM is that the users are required to be involved actively, and the teams are given the power to make decisions. Frequent delivery of product becomes the active focus with DSDM. The techniques used in DSDM are

1. Time Boxing
2. MoSCoW Rules
3. Prototyping

The DSDM project consists of 7 phases

1. Pre-project
2. Feasibility Study
3. Business Study
4. Functional Model Iteration
5. Design and build Iteration
6. Implementation
7. Post-project

Feature Driven Development (FDD)

This method is focused around "designing & building" features. Unlike other agile methods, FDD describes very specific and short phases of work that has to be accomplished separately per feature. It includes domain walkthrough, design inspection, promote to build, code inspection and design. FDD develops product keeping following things in the target

1. Domain object Modeling
2. Development by feature
3. Component/ Class Ownership
4. Feature Teams
5. Inspections
6. Configuration Management
7. Regular Builds
8. Visibility of progress and results

Lean Software Development

Lean software development method is based on the principle "Just in time production". It aims at increasing speed of software development and decreasing cost. Lean development can be summarized in seven steps.

1. Eliminating Waste
2. Amplifying learning
3. Defer commitment (deciding as late as possible)
4. Early delivery
5. Empowering the team
6. Building Integrity
7. Optimize the whole

Kanban

Kanban originally emerged from Japanese word that means, a card contain**ing all the information needed**> to be done on the product at each stage along its path to completion. This framework or method is quite adopted in software testing method especially in agile testing.

Difference between Scrum and Kanban

Scrum	Kanban
• In scrum technique, test must be broken down so that they can be completed within one sprint	• No particular item size is prescribed

Prescribes a prioritized product backlog	Prioritization is optional
Scrum team commits to a particular amount of work for the iteration	Commitment is optional
Burndown chart is prescribed	No particular item size is prescribed
Between each sprint, a scrum board is reset	A Kanban board is persistent. It limits the number of items in workflow state
It cannot add items to ongoing iteration	It can add items whenever capacity is available
WIP limited indirectly	WIP limited directly
Timeboxed iterations prescribed	Timeboxed iterations optional

Agile metrics:

Metrics that can be collected for effective usage of Agile is:

- Drag Factor
  - Effort in hours which do not contribute to sprint goal
  - Drag factor can be improved by reducing number of shared resources, reducing the amount of non-contributing work
  - New estimates can be increased by percentage of drag factor -New estimate = (Old estimate+drag factor)
- Velocity
  - Amount of backlog converted to shippable functionality of sprint
- No of Unit Tests added
- Time taken to complete daily build

- Bugs detected in an iteration or in previous iterations
- Production defect leakage