Testing Process - STLC

Software Testing Life Cycle (STLC) refers to a testing process which has specified steps to be executed in a definite sequence to ensure that the quality goals have been met. In the STLC process, each activity is carried out in a planned and systematic way. Each phase has different goals and deliverables. Different organizations have~~s~~ different phases in STLC and below are the phases of STLC adopted by scrum teams in Scrum team.

1. Refinement Phase
2. Planning and Prioritization Phase
3. Pair programming Phase
4. Execution Phase
5. Closure Phase

Each phase has a set of activities and artefacts enabling the agile team to meet their objectives and move on to the next phase. This section of the document focuses on the specific activities and deliverables that are related to the software testing.

The testing process is built such that the QA/SDET engineers can start together with the programmers and integrate with the specific scrum teams to achieve the overall objectives of the teams and blend into the sign off process as defined by the teams in their Definition of Done. Therefore, making the testing agile and continuous. Some of the key features in agile testing process are :

* **Quality-Oriented:** Agile testing involves minimum up-front planning and design, unlike traditional waterfall / Iterative models. This is achieved by QA/SDET engineers participating in the key meetings such as 3-Amigos, Sprint planning meeting, Refinement sessions and Developer whiteboard sessions to name some. QA/SDET engineers have access to details from very beginning contributing to quality validations resulting in early defects detection and reducing overall time to market.
* **Test-driven**: All aspects of software testing is to be carried out within the stipulated time for the sprint allowing the features to be built, tested and implemented with more frequent releases into production. Unit / Component / Integration tests are written, reviewed and executed within the team environments to give more confidence and improved delivery times by adopting SHIFT LEFT approach to testing. Acceptance tests are also carried out within the team environments leaving very little validation outside the team environments.
* **Automation-First:**Teams are empowered to build necessary automation test suites to provide a comprehensive test coverage of functional and non-functional tests. Teams are to adopt pair programming and peer reviews to conduct and collaborate to improve overall automation test coverage and handle comprehensive functional tests that are executed either in-memory using stubs/mocks for Unit/Component level testing or resolving dependencies on microservices to run Integration and regression testing. Teams are asked to collect, measure and monitor the SLOs for their services and evaluate the SLOs against their baseline metrics to certify on performance attributes of their software.
* **Customer-friendly**: Agile test processes are adopted within each scrum team to provide constant feedback about ongoing QA and evaluating that the product meets business needs.  QA/SDET engineers are constantly engaging with developers and product owners to check if the testing is relevant, risk-based and comprehensive and adjusting these as they test and make any necessary changes to the test approach.

The overall testing process is deliberately kept lean for the team to focus more on the delivery and enabling them to achieve higher velocity sprints. The teams are encouraged to review the test strategy that is defined and keep it relevant to the changes happening within the scrums. All the scrum teams follow the same SDLC principles, Delivery process and prioritization process.

The emphasis is on achieving high quality automation driven scrum teams, with this in mind and each scrum teams are at different levels of testing and automation maturity, teams are to adopt the test process and tailor this to their individual needs to achieve better software delivery without impacting on the overall quality objectives set out at the organizational level.

1. **Refinement Phase:**

 The testing activities starts as early as the refinement stage where the QA engineers or anyone who is performing testing conduct in a collaborative discussion process with product owners, scrum master, business analyst and other team members. The aim of the meeting is to manage and update the backlog items to confirm whether the backlog is ready for the next sprint. Refinement meetings sometimes can be time consuming especially when backlogs are not well managed. The role of a QA in the refinement meetings includes, but is not just limited to :

* To understand the upcoming priority for the next sprint
* To understand the business objectives of the upcoming work items and identify any business / technology impact.
* To discuss with Product owners and understanding how they are going to test and signoff the change.
* To understand the test requirements, how testing can be carried out, what types of testing needs to be conducted.
* To discuss the resource availability for testing activities.
* Identify test data requirements
* To steer the discussion towards testability and observability to ensure they are included within the scope of the work item
* To validate and enshrine scrum team acceptance criteria by following the DOR and DOD defined by the scrum teams.192
* To estimate the testing effort and any additional NFR requirements for testing.

Although the above list is not exhaustive, It is scrum team that scrum teams that involve QA in their refinement process are more likely to succeed in achieving their sprint goal with very low rate of production defects/issues. Some of the other tangible benefits of involving QA in the refinement process are:

* Improved quality of stories and product backlog items with scrum team acceptance criteria
* Better estimated stories with understood dependencies and conflicts of delivery
* Enhanced knowledge share between QA and rest of the team.
* Better collaboration between Product owners, BA's and QA's with scrum team path to quality objectives and achieving signoff~~'~~s.
* Reduced time on future sprint planning sessions, as QA objectives are well understood and included as part of story writing.

1. **Planning and Prioritization Phase:**

In some scrum teams this not a separate meeting and carried out as part of product backlog refinement meeting. Where the Planning and prioritization is not undertaken as part of refinement, this is organised by the scrum masters to go through the backlog with the goal to have a list of prioritised feature work or bugs that needs to be assigned to the team in the next sprint. The main objective is to Plan and prioritise the backlog items which are already estimated and refined in a separate process. QA engineers or personals who conduct testing should work with the Team lead and scrum masters to agree on the priority and the overall test approach during the sprint.

It is at this stage the QA engineers will discuss on the detailed test approach on the below aspects of testing:

* What is the overall test approach and how this will be carried out.
* Highlight the testing requirements such as need for special test setup, test data, stubs or tools to carry out testing.
* Discuss the limitations, assumptions, Risks and dependencies for testing.
* Where the testing will be carried out
* Details on how testing is performed to story level and what regression / end2end testing is required.
* Religiously follow the DOR and DOD throughout the sprint
* Agree on how to raise and resolve the issues that come out of the testing.
* What is the approach on collaboration with UAT testers and POs. How testing outcome is reviewed and signed off.
* Agree on the approach on how to build / improve automation test coverage for new feature work. Or gaps in Bug re-tests.
* Assess NFR requirements in testing and drive the testing discussion on resilience and performance aspects of the platform.

Although test planning activity can take more time in a traditional SDTC setup, by adopting Agile best practices, planning test activities during the refinement and planning stages can be productive and effective . Where possible rather than having a separate document detailing the test approach, this can be incorporated into the various artefacts in the agile scrum methodologies such as :

* **Stories / Product Backlog Items:** Detail the testing requirements as scrum team acceptance criteria. Estimation of stories for testing effort. recording the evidence of testing on the work item before signing off the work. Providing links to external artefacts such as test features, test data used in testing (where the tests are not run as part pf the CI/CD pipelines).
* **Automated Tests**: Identify and enhance automation test coverage to detail the Unit/Component/Integrate tests relevant for the work item.
* **Change Request / SR:** Document the testing carried out during the sprint for the scope of the change. Provide details of the test outcomes and any details of outstanding unresolved issues.
* **PO Review Meetings / Demos:** Record the outcome of the test review meetings and agreements /actions as part of these discussions.

1. **Pair Programming Phase:**

In most of the teams testing is carried out by one of more QA engineers. In some teams where there are no dedicated QA engineers, testing is carried out by one of the other team members. Irrespective of who conducts testing the person who is signing off testing is responsible and accountable for the test coverage and test completion within their scrum. In order to adopt the best practices in testing, It is advisable that teams actively engage in pair programming sessions with QA / Person who is responsible for QA in their teams to go through the test coverage and review that all necessary testing is carried out to the highest standards. This involves activities not limited to:

* Identifying tests to be covered for Unit/Component/Integration testing
* Identifying who is going to write the tests
* Conduct pair programming sessions to code tests and review test outcomes
* Conduct peer reviews of tests written by other team members
* Identify what manual tests needs to be carried out, who is performing these tests and how the test evidence is recorded.
* Conduct test coverage and test outcome review meetings with UAT users and PO's.
* Record the testing signoff and any actions on unresolved issues.

The obvious benefits on such activities for testing can be:

* Increased automated test code quality.
* Improved test coverage
* Knowledge within the team members on what testing should be done and challenges in testing
* Better transfer of skills, as junior developers pick up micro-techniques or broader skills from more experienced team members

1. **Execution Phase:**

As part of SMART principles and SHIFT LEFT approach all testing activities are to be carried out in the team environments prior to any Acceptance tests conducted by users or End 2 End regression tests that are executed by automation suites in staging environment. QA engineers are responsible for tests run in the build and release pipelines for the components that the team are responsible for deploying into SIM and PROD environments. All tests are to be executed regularly and monitored for any failures, this includes health checks of their services that are deployed in their team environments. Any failed tests are to be remediated and resolved before the change is merged into master and later deployed to staging. All functional testing are to be carried out within the team environments and signed off before the code is reviewed by other team members as part of the pull request. QA engineers are to look for the package versions that are deployed and tested in team environments against the version deployed into staging. Any outstanding bugs/issues to be raised as work items and to be triaged as part of daily stand-ups.

1. **Closure Phase:**

Once all testing is complete update the related work items to capture the testing evidence and outstanding defects. Follow the DOD defined by the teams before signing off the testing activities. All code changes are to be reviewed by QA team by following the published QA pull request guidelines. Where required QA to provide the testing signoff on the SR before the change is deployed into SIM/PROD environments.