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STLC - Software Testing Life Cycle

Software Testing is not just a single activity.

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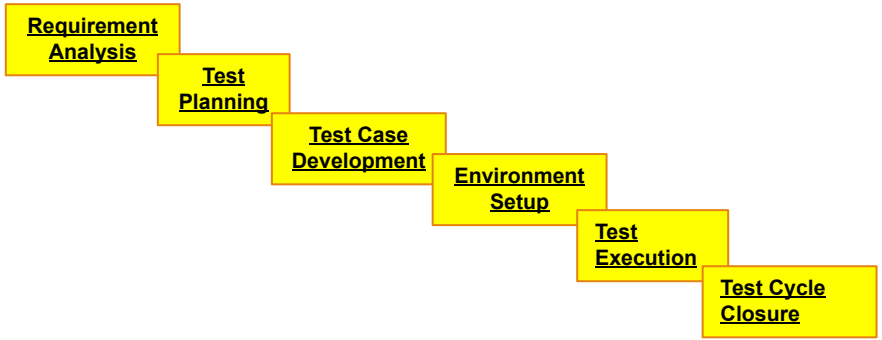
Overview

- Software Testing Life Cycle.
- Entry/Exit Criteria.
- Requirement Analysis.
- Test Planning.
- Test Case Development.
- Test Environment Setup.
- Test Execution.
- Test Cycle Closure.
- STLC Stage Chart.

Software Testing Life Cycle

Software Testing Life Cycle (STLC) is defined as a sequence of activities conducted to perform software testing. It consists of a series of activities carried out methodologically to help certify the software product.

- Different stages in Software Test Life Cycle



Each of the stages has a definite entry and exit criteria, as well as associated activities and deliverables.

Entry and Exit Criteria

Software Testing Life Cycle (STLC) stages generally flow in sequence. In order to understand when one stage is complete, and it is time to start on the next stage, we need to understand entry and exit criteria.

Entry Criteria: Gives the prerequisite items that must be completed before testing can *begin*.
Exit Criteria: Defines the items that must be completed before testing can be *concluded*.

There is entry and exit criteria for all levels in the STLC.

In an ideal world, you will not enter the next stage until the exit criteria for the previous stage has been met. However, practically, this is not always possible. For this course module, we will focus on activities and deliverables for the different stages in the STLC. Let's look into them in detail.

Requirement Analysis

During the Requirement Analysis phase, the test team studies the requirements from a testing point of view to identify the testable requirements. The quality assurance (QA) team may interact with various stakeholders (e.g., client, business analyst, technical leads, system architects, etc.) to understand the requirements in detail. Requirements could be either **functional** (defining what the software must do) or **non-functional** (defining system performance/security availability).

Automation feasibility for the given testing project is also performed during this stage.

Activities:

- Identify the types of tests to be performed.
- Gather details about testing priorities and focus.
- Prepare Requirement Traceability Matrix (RTM).
- Identify test environment details where testing is supposed to be carried out.
- Perform automation feasibility analysis (if required).

Deliverables
- RTM.
- Automation feasibility report (if applicable).

Test Planning

The Test Planning phase is also referred to as the *Test Strategy* phase. Typically, in this stage, a senior QA manager will determine effort and cost estimates for the project, and prepare and finalize the test plan.

Activities

- Preparation of test plan/strategy document for various types of testing.
- Test tool selection.
- Test effort estimation.
- Resource planning and determination of roles and responsibilities.
- Training requirements.

Deliverables

- Test plan /strategy document.
- Effort estimation document.

Test Case Development

The Test Case Development phase involves creation, verification, and rework of test cases and test scripts. Test data, is identified/created, and reviewed, and is then reworked.

Activities:

- Create test cases and automation scripts (if applicable).
- Review and baseline test cases and scripts.
- Create test data (if test environment is available).

Deliverables

- Test cases/scripts.
- Test data.

Test Environment Setup

The Test Environment Setup decides the software and hardware conditions under which a work product is tested. The test environment setup is one of the critical aspects of the testing process and can be done in conjunction with the Test Case Development Stage.

Test teams may not be involved in this activity if the customer/development team provides the test environment; in which case, the test team is required to do a readiness check (smoke testing) of the given environment.

Activities:

- Understand the required architecture and environment setup, and prepare hardware and software requirements list for the test environment.
- Setup test environment and test data.
- Perform smoke test on the build.

Deliverables
- Test environment with data.
- Smoke test results.

Test Execution

During this phase, the testers will carry out the testing based on the test plans and the test cases prepared. Bugs will be reported back to the development team for correction and retesting will be performed.

Activities:

- Execute tests as per Test Plan.
- Document test results and log defects for failed test cases.
- Map defects to test cases in RTM.
- Retest the defects submitted and fixed by the development group.
- Track the defects to closure.

Deliverables
- Completed RTM.
- Test cases with results.
- Defect report.

Test Cycle Closure

The testing team will meet, and discuss and analyze testing artifacts to identify strategies that have to be implemented in the future, taking lessons from the current test cycle. The idea is to remove the process bottlenecks for future test cycles and share best practices for any similar, future projects.

Activities:

- Evaluate cycle completion criteria based on time, test coverage, cost, software, critical business objectives, and quality.
- Prepare test metrics based on the cycle completion criteria.
- Document the learning out of the project.
- Prepare the test closure report.
- Provide qualitative and quantitative reports of quality to the customer.
- Test the results analysis for the defect distribution by type and severity.

Deliverables
- Test Closure report.
- Test metrics.

STLC Stage	Entry Criteria	Activity	Exit Criteria	Deliverables
Requirement Analysis	Requirements Document available (functional and non-functional). Acceptance criteria defined. Application architectural document available.	- Analyze business functionality to know the business modules and module-specific functionalities. - Identify all transactions in the modules. - Identify all the user profiles. - Gather user interface/authentication, geographic-spread requirements. - Identify types of tests to be performed. - Gather details about testing priorities and focus. - Prepare Requirement Traceability (RTM). - Identify test environment details where testing is supposed to be carried out. - Automation feasibility analysis (if required).	- Signed-off RTM. - Signed-off test automation feasibility report.	- RTM. - Automation Feasibility report (if applicable).

STLC Stage	Entry Criteria	Activity	Exit Criteria	Deliverables
Test Planning	Requirements Document. Requirement Traceability Matrix (RTM). Test automation feasibility report.	- Analyze various approaches available. - Finalize on the best-suited approach. - Prepare test plan/strategy document for various types of testing. - Test tool selection. - Test effort estimation. Determine resource planning and roles and responsibilities.	- Approved Test plan/strategy document. - Signed-off effort estimation document.	- Test plan/strategy document. - Effort estimation document.

STLC Stage	Entry Criteria	Activity	Exit Criteria	Deliverables
Test Case Develop-ment	Requirements Document. RTM and Test Plan. Test automation feasibility report.	- Create test cases, test design, and automation scripts (where applicable). - Review and baseline test cases and scripts. - Create test data.	- Reviewed and signed test cases/scripts. - Reviewed and signed test data.	- Test cases and scripts. - Test data.

STLC Stage	Entry Criteria	Activity	Exit Criteria	Deliverables
Test Environment setup	- System design and architecture documents are available. - Environment set-up plan is available.	- Understand the required architecture, environment setup. - Prepare hardware and software development requirement list. - Finalize connectivity requirements. - Prepare environment setup checklist. - Set up test environment and test data. - Perform smoke test on the build. - Accept/reject the build depending on smoke test result.	- Environment setup is working per the plan and checklist. - Test data setup is complete. - Smoke test is successful.	- Environment ready with test data setup. - Smoke test results.

STLC Stage	Entry Criteria	Activity	Exit Criteria	Deliverables
Test Execution	- Baselined RTM, Test Plan, and Test case/scripts are available. - Test environment is ready. - Test data setup is done. - Unit/Integration test report for the build to be tested is available.	- Execute tests per plan. - Document test results and log defects for failed cases. - Update test plans/test cases, if necessary. - Map defects to test cases in RTM Retest the defect fixes. - Regression Testing of application. - Track the defects to closure.	- All tests planned are executed. - Defects logged and tracked to closure.	- Completed RTM with execution status. - Test cases updated with results. - Defect reports.

STLC Stage	Entry Criteria	Activity	Exit Criteria	Deliverables
Test Cycle closure	Testing has been completed. Test results are available. Defect logs are available.	- Evaluate cycle completion criteria based on time, test, cost, software quality, and critical business objectives. - Prepare test metrics based on the above parameters. - Document the learning out of the project. - Prepare test closure report. - Provide qualitative and quantitative reporting of quality of the work product to the customer. - Review test result analysis to find out the defect distribution by type and severity.	N/A	- Test Closure Report.