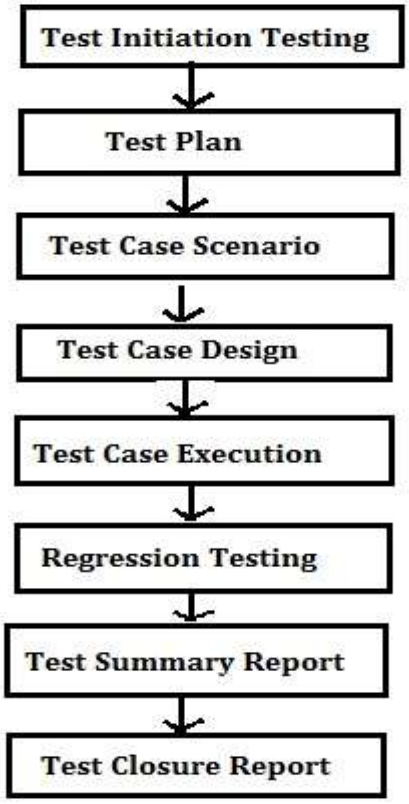
- **Software Testing Life Cycle (STLC):**



1. **Test initiation testing:** Project manager is involved in test initiation testing. It includes
   a. **Requirements of project:** In which domain we are going to make project is decided. Various domains such as banking, healthcare, telecom, e-commerce etc.
   b. **Scope of project:** In this project manager decides the scope of the project. That is strategy used to develop the project. For example, if the project is related to banking domain then he selects only those test cases which are related to banking domain only.
   c. **Risk involved in project:** Risk is involved into project due to following factors.
      Lack of resources: When less no of people working then we have to assign extra work to current working people.
      Lack of knowledge: If people do not have knowledge about the project then KT is given to people.
      Lack of test data: If we do not have complete test data then we have to perform only Ad-hoc testing.

2. **Test Plan:** Team leader is involved in test planning. Test plan includes:
   a. **Job allocation:** Depending upon the scope of the projects jobs is allocated. In job allocation, which type of testing jobs we are going to perform is decided.
   b. **Resource allocation:** In this team leader decides who is going to perform decided job. He distributes the work among the people.
   c. **Estimation:** In this team lead decides the start date and end date of the project. We have to complete given tasks within given time. If we failed to do so then we have to give escalation to the customer.

3. **Test case scenario and Test case design:** Software tester is involved in this. Test case scenario and test case design are designed by using SRS document. While writing we only write positive test scenario but while executing we check positive as well as negative scenarios.

4. **Test case execution:** After the test case scenario and test case design we review our own document. Then we perform test case execution as per test cases. If we found any defect then assign defect to the developer. Then developer solve defect.

5. **Regression testing:** If we found any valid defect then we assign it to the developer. He solves that defect and new corrected build is send to the tester. After receiving corrected build we perform regression testing on it to check whether issue is solved or not. We also perform regression when new scenario is get added. In regression we check high priority test cases first and if time permits then we check medium as well as low priority test cases.

6. **Test summary report:** After completing the test case execution software tester makes test summary report. Our daily and monthly working record is present in this report. This report is submitted to the team leader. For example

Report	Total test cases	Executed test cases	Passed test cases	Failed test cases	No Run
Monthly	500	300	250	50	200
Daily	40	40	35	5	---

7. **Test closure report:** Team leader prepares test closure report depending on test summary report. He receives test summary reports from various testers working on various modules. He checks whether all the process is correct or not. For this purpose he use HP ALM tool. He sends daily test closure report to project manager.

Project	Total test cases	Executed test cases	Passed test cases	Failed test cases	No Run
Mobile	500	300	250	50	200
Electricity	600	350	250	100	250

- **Depth part of testing:**

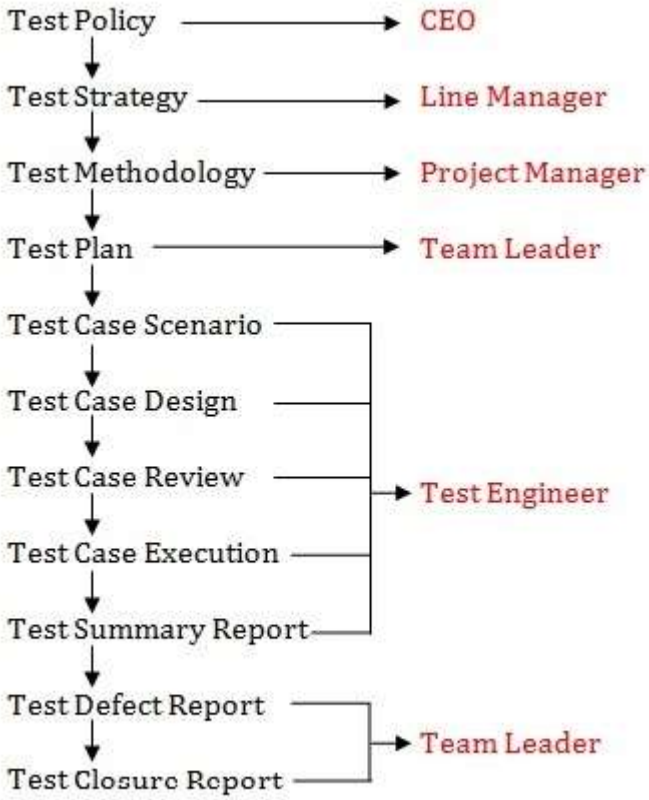


Figure: Depth of Testing

1. **Test Policy:** It is a company level document. CEO of the company is involved in it. This document consists of objectives of the project such as how to earn revenue? In which domain we are going to implement our project? Different domains are Telecom, banking, insurance, healthcare and e-commerce etc.

2. **Test Strategy:** The objectives decided by CEO are forwarded to project manager. Depending upon this project manager decides test strategy. Test strategy is nothing but different types of rule and regulations used to achieve the project. We can simply say that it is the approaches used to achieve the objectives. Following are the different test approaches are used:

   I. **Scope and objectives:** In this project manager decides the scope of the project. For example, if the project is related to banking domain then he selects only those test cases which are related to banking domain only.

   II. **Business Issues:** Business issue is also defines as cost analysis of project. It depends upon the domain of the project and resources involved in the projects. These resources are nothing but test and developer.

   III. **Test Responsibility Matrix:** Test responsibility matrix is mapping of test factor and development stages. As we know that we have six development stages such as information gathering, analysis, design, coding, testing and maintenance.

Company	Information Gathering	Analysis	Design	Coding	Testing	Maintenance
Traditional	√	√	√	√	√	X
Off the shelf	√	√	X	X	√	X
Maintenance	X	X	X	X	X	√

IV. **Test deliverables:** As we know that we have four environmental stages that is DIT, SIT, UAT and production. But we can't move to the next stage without completing first stage.

V. **Roles and Responsibilities:** Every team member gets assigned with specific tasks. For example we have three testers in our project then one each will work in SIT, UAT and regression respectively.

VI. **Communication status reporting:** Reporting the status between two consecutive jobs is comes under this.

VII. **Defect tracking and reporting:** When we get show stopper defect we can't move forward to next stage. We perform retesting to avoid bad defect. If defect is valid then we mail it to the development team as well as testing team. To handle these defects we have a team and that team is called as defect management team. This team makes daily triage call with testing and development team. For this purpose they use Q messenger tool. Defect manager team member ask developer about the status of previous defect or defect is valid or not. The responsible person will reply to the member and give information. Developer can maintain defect or cancel it. If developer cancel/reject defect then it does not mean that defect is bad. We again perform retesting on it and send back to developer. When developer accepts the defect then he has to solve that defect and send to tester then tester perform regression testing on it. We can't move to next stage until all defects get solved first.

VIII. **Implementation of automation:** In this they are going to decide whether we can use automation in our project. Because automation have many advantages over manual such as high accuracy, less human efforts, less time, less cot of project etc.

IX. **Test Measurement:** In test measurement they are going to calculate the DRE. At which level tester did the testing. For example, if 2000 defects are found by the tester out of which 1800 are accepted by developer as a valid defect and 200 defects rejected / cancelled then we can say that tester achieved DRE of 0.9 or 90%.

X. **Risk And mitigation:**

XI. **Training plan and training session:**

Sr no	Test Factor	Testing performed	Purpose
1	Audit trial	Database Testing	Audit trial means maintaining metadata. Meta data means data about data. Ex. Mini statement (out of 100 data only fetch 10)
2	Correctness	Functional Testing	Checking correctness & completeness of application w.r.to internal functionality.
3	Continuity of processing	Integration testing	Check whether data processing happen within two processes or not. It is done using XML language.
4	Coupling	Intersystem testing	Check whether application share resources with other application or not
5	Easy to operate	Installation testing	Check whether installation of application is as per customer requirement or not.
6	Ease of use	Usability testing	Check user friendliness of screen / build
7	File integrity	Recovery/Backup testing	Used to check can we create backup or not
8	Performance	Performance testing	Used to check speed of processing
9	Portability	Compatibility testing	Used to check whether application runs on customer expected HW and SW platform

10	Service Level	Service level testing	
11	Authorization	Security Testing	
12	Access Control	Security testing	
13	File Reliability	Recovery testing	
14	Maintenance		
15	Methodology		

3. Test Methodology: It is a project level document. Project manager is involved in this. Based on the requirement of the project he is going to decide which test factor used in the project. Depending on this factor he has to select a team of people, who work on it. While preparing test methodologies project manager focus on following key points.

I. **Acquiring testing strategy document and determine the type of project:** In this project manager going to decide type of project. If project is traditional, then development and testing is done in same company. If project is off the shelf, then development and testing is done at different companies.

II. **Determine the project requirement:** In this they are going to decide the domain requirement of the project. For example, Banking, telecom, Healthcare etc. According to project requirement project manager decides the team of developer and tester.

III. **Determine the scope of the application:** We know that in banking domain project different departments are present such as Saving account, current account, home loan, car loan etc. Each department has some extra feature/ functionality. So there is no need to use all test factor (testing types) for one department. We select those test factors which are require to test functionality of particular department.

IV. **Finalize TRM:** Test responsibility matrix is mapping of test factor and development stages. Finalization of TRM is done under test methodology.

4. Test Plan: This is a project level document. Test plan includes following three factors:

Job allocation: Depending upon the scope of the projects jobs is allocated. In job allocation, which type of testing jobs we are going to perform is decided.

Resource allocation: In this team leader decides who is going to perform decided job. He distributes the work among the people.

Estimation: In this team lead decides the start date and end date of the project. We have to complete given tasks within given time. If we failed to do so then we have to give escalation to the customer.

There are two types of test plan. 1. V model test plan, 2. Agile test plan

A. V model Test Plan: At first grooming session is done in which Business analyst, testing team and development team is involved. BA gives all information of project. Development team and testing team member collects requirement/information from BA. As we know that duration of V model is 3 month, then development team get a time of 1.5 month to develop the application. Testing team get 1 month for testing, 10 days are reserved to UAT and last 5 days kept for production. This time management is nothing but estimation. This meeting is also called as SRS analysis meeting. It is very important to decide start and end date of project because customer processes are depends on it.

For example, Amazon offering great Indian sale on 25 November, then 5 days before (20 November) regression testers forward build for production. Production team deploys that

build but in disable mode. At 25 November midnight this build is enabled and offer start for customer. When project manager finalize the TRM then team leader accepts two documents.

Input From Project Manager	Process	Output
Finalized TRM	Team Formation	System output test plan
	Risk involved in project	
Development Document (SRS)	Prepare test plan	
	Review test plan	

1. **Team formation:** Depending on finalized TRM and development document he decides what type of jobs are available (job allocation) and makes a team for development and testing. Then he assigns work to both the teams (Resource allocation). Team leader also checks for availability of test environment, required OS platforms and browsers.
2. **Risk involved in the project:** Following factors are calculated by team leader
   a) Lack of test data: if we have lack of test data then based on the previous application ad-hoc testing is done.
   b) Lack of knowledge: If team member doesn't have good knowledge about the project then Knowledge Transfer (KT) must be given to team members.
   c) Lack of resources: if team had lack of resources then team lead assigns extra work to existing team members.
   d) Lack of communication between development and testing team: if there is lack of communication between development and testing team then delay in delivery occurs. When developer finish is work within time but not communicate with tester then tester do not have any idea about completion of work. This will happen due to lack of communication.
   e) Delay in delivery: Due to change in requirement or if any internal issues are occurs then delay in the delivery of project is occurs. If it is due to change in requirement then customer has to pay extra money to the company. If this delay occurs due to internal issues then company has to pay escalation to customer.
3. **Prepare Test Plan:** while making test plan team leader follows following factors:
   a) Test Plan ID: Test IDs are written in excel sheet. Let's assume that we are working on paytm mobile recharge then test id uses release year and month, project name, department name, sub department name as follows

      2102_paytm_Services_Mobile Recharge

   b) Iterations: Iterations are nothing but modules. Team lead select one of the module in such way 2102_paytm_Services_Mobile_Recharge_prepaid
   c) Test item: In this team lead decides which factors are going to be checked. For example for prepaid recharge what are the sub modules are present such as mobile number, operator, circle, amount, submit.
   d) Features to be tested: Features means Functionality of each sub modules must be check by the tester. What to check and what do not check is decided here.
   e) Finalize the TRM: Project manager send finalized TRM to the team leader. He has to just map the used test factors with the development stages.

f) Test Pass/Fail criteria: Test scenario has multiple test cases. We have to check these test cases one by one. If all the test cases are passed then we can say that scenario is also pass but if one of the test case fails then total scenario is failed. We have to perform retesting to avoid bad defect and assign the defect to developer. As a proof we have to take a screenshot of failed test case.

Along with these basic factors team leader has to concentrate on following factors to complete the test plan.

A. Test Environments: Test environments means software and hardware requirements to perform testing. Hardware requirements such as PC. Laptop, mobile etc where as software requirement such as Rally tool, Avas tool, postmen tool, browsers, OS, VMware etc.
B. Suspension criteria: Suspension criteria means possible abnormal situation which may occurs during execution. If we are working on build and suddenly build update starts then we can't continue our work. This situation is treated as possible abnormal situation.
C. Test Durable: We can't move to the next stage if we not complete the first stage. That means if our test case design is not ready then we can't review it. Without reviewing test cases we can't execute them.
D. Assignment of testing tasks: Generally one person is assigned with one task only. He will get another task after finishing his current task. In case of lack of resources, team leader can assign more than one task to one team member.
E. Staffing & training needs: if new person joins the current project then KT is given to him. Who is going to provide KT to new member is decided by the team leader. Each member has to complete his work with his own responsibility.
F. Signature and approval: after preparing a test plan team has to send mail to project manager and take the approval from him.

4. **Prepare test plan review:** Project manager is involved in test plan review. After the completion of test plan team leader send the test plan to project manager. In review, project manager focus on three main factors.

BRS Base coverage: He checks whether test plan is prepared as per customer requirement (development document).

TRM Base coverage: He checks for whether the test plan is prepared as per finalized TRM or not.

Risk base coverage: He checks for whether test plan consists of all possible risks with their solutions or not. If he thinks all the conditions are fulfilled in the test plan then he permits to finalize the test plan.

B. Agile Test Plan: Agile test plan is created by the test engineer. As the duration of agile sprint is one month, duration of test plan is also one month. At first we arrange grooming session with product owner and development team. Product owner gives all information to team member and we collect requirement from product owner and clear our doubts.

a) **Week 1(day 1 to 5):** In this week we are going to do detailed analysis of user story. If we have any doubts in that story then we ask it to product owner by using Q messenger tool. After clearing doubts we start test case design. Day 6 and 7 are weekend days.
b) **Week 2(day 8 to 12):** In this week we are going to review test cases designed in last week. After that we start writing test cases for regression testing if any new scenario/requirement

is get added into current sprint. After that we review the test case written for regression testing. Day 13 and 14 are weekend days.

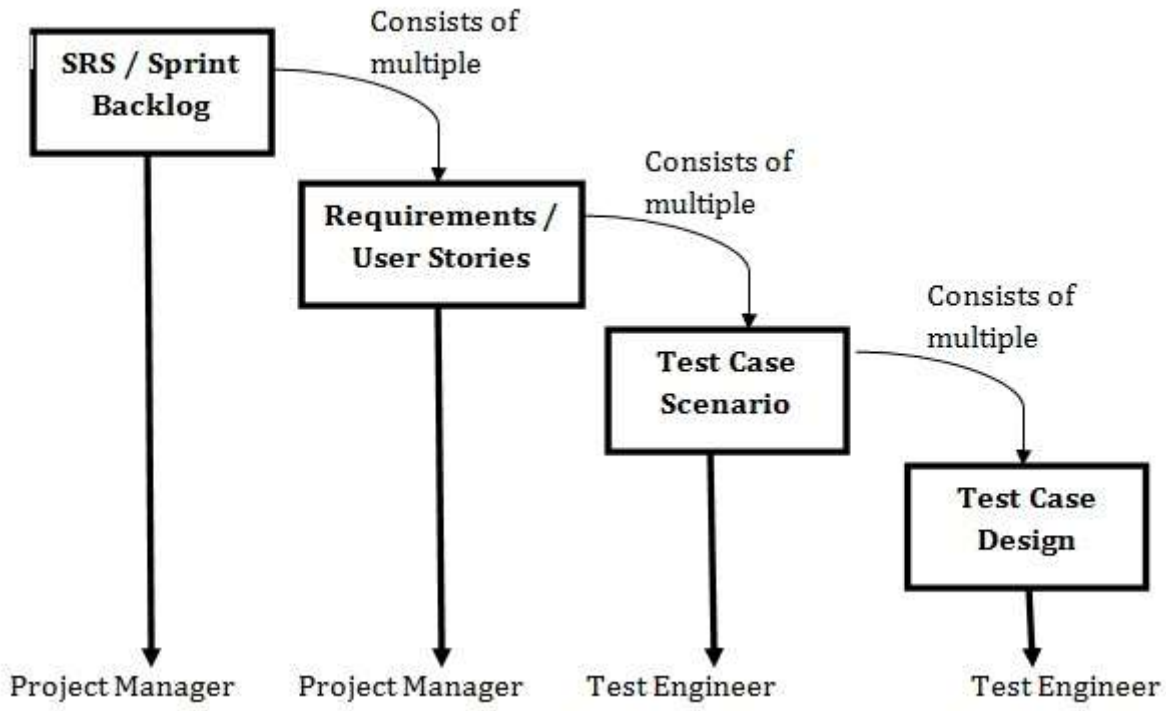
c) **Week 3(day 15 to 19):** In this week we are going to perform sanity testing. Generally it will take 4 to 6 hours to complete. We will check for basic and core functionality. If we found any defect then it is treated as critical show stopper defect. We mail to all team member and development team. This defect should be resolved on same day. Then we perform system and functional testing on assigned modules. We also execute regression test cases when new scenarios get added or developer fixes the bug. Day 20 and 21 are weekend days.

d) **Week 4 (Day 22 to 27):** UAT team performs user acceptance testing. Tester and user involve in this testing. User can select the test cases for execution. If user doesn't select the test cases then tester has to select test cases for execution in UAT. After UAT we make defect report and test summary report and submit it to the team leader. Team leader submit test closure report to scrum master. After that new sprint is assigned to us on next working day.

5. Test case Scenario:

Scenario means different way to achieve the functionality as per customer expectations. If we have requirements and its desire output then we have check that functionality by using different methods/ ways/ approaches. These ways are called as Test case scenarios. One test scenario consists of multiple test cases. While writing test case scenarios we only write positive scenarios but while execution we check for positive as well as negative scenarios also. In this section we decide what we are going to test?

For example, If we have requirement to check payment page of paytm then when we go to payment page then different ways of payments are present there such as credit card, debit card, UPI, paytm wallet etc. these all the different ways to make payment. Hence they are called as test case scenario.



6. **Test case Design:** Depending on the test case scenario we perform test case design. Test case design means step used to achieve functionality of requirement (scenario). What types of conditions are required to check the functionality? What are the types of navigational conditions are required to achieve the functionality? It is mentioned in test case design. These test cases must be simple and easy. Test cases should be easy to understand. Test cases must cover all the functionality as per customer requirement. We are going to use two approaches to write the test cases.

1. With the HP ALM tool
2. with the help of excel sheet

1. With the help of HP ALM tool: There are three steps are used to design test cases using HPALM (HP application Life cycle Management) tool that is Step name, description and expected result.

Example 1, Write a test cases for launching a paytm web application.

Description: As I customer I enter valid URL in any browser that time application should open successfully.

Acceptance Criteria: The application should open successfully and home page should be displayed in given format only. For homepage format please check attachment of this mail.

Test case Scenarios: 1. US001_Launching paytm web application_chrome
2. US001_Launching paytm web application_mozilla Firefox
3. US001_Launching paytm web application_Internet Explorer

Test case Design: for 1. US001_Launching paytm web application_chrome

Step Name	Description	Expected result
Step 1	Open chrome browser and clear the cache and cookies	--------
Step 2	Enter the valid URL as tst02.paytm.com	Application should open successfully and homepage display as per customer requirement

Example 2, Write a test cases to validate login credentials for paytm web application.

Description: As I user I enter valid username and password in any browser that time user successfully login to the application and can use the services.

Acceptance Criteria: The user successfully login to the application and his name should appear at the top right corner of the screen.

Test case Scenarios: 1. US002_Validate login credentials _Chrome
2. US002_ Validate login credentials _Mozilla Firefox
3. US002_ Validate login credentials _Internet Explorer

Test case Design: for 1. US002_ Validate login credentials _chrome

Step Name	Description	Expected result
Step 1	Open chrome browser and clear the cache and cookies	--------
Step 2	Enter the valid URL as tst02.paytm.com	Application should open successfully
Step 3	Click on login button	Login page should be displayed
Step 4	Enter Valid username and password and click on sign in button	User successfully login to the application and his name should appear at the top right corner