Master Test Plan

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1. PURPOSE AND GOALS

The purpose of the Master Test Plan is to describe the overall Test Policy, Test Strategies and Test Processes to be followed by the DTS Scrum Teams.

The main goals are:

- To define a standard to test DTS software products, establishing the minimum requirements that need to be achieved in terms of quality control and resources needed.

- To provide a general agreement among team members, managers and the rest of the stakeholders regarding:

  - The Test strategy to be implemented
  - The Test approach to be followed
  - The Testing levels and Testing Types defined
  - The Test activities to be performed
  - The Tools that will support the testing activities
  - The Roles and Responsibilities of the team members that will perform the Testing Activities
  - The Testing Entry, Exit and Suspension/Resume criteria
  - The Testing Resources needed
  - Test Risks Management

2. SCOPE

Master Test Plan scope is defined for all Scrum Teams within Settle Network.

3. AUDIENCE

This document is intended to be distributed to all members within the Scrum Teams. The target's audience is defined below:

- QA Manager
- Product Owners
- Scrum Masters
- Business Analysts
- Technical Leaders
- Developers

- Test Analysts
- Automation Engineers

4. TEST STRATEGY

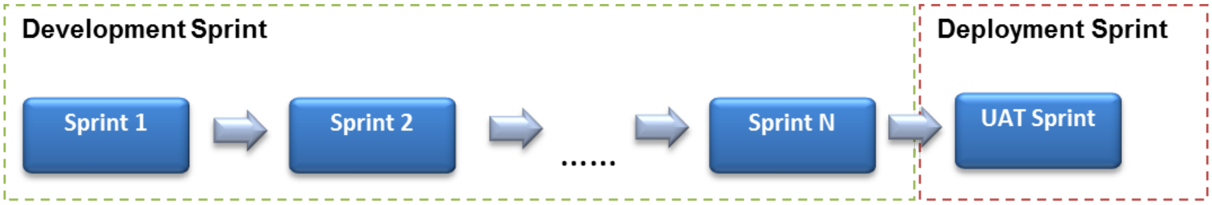
The Scrum Teams follow an Agile methodology for their Software Development Process and therefore, as in typical Agile development, Testing is integrated throughout the lifecycle.

Test Analysts will be embedded within Scrum Teams and will be working alongside with different roles such as developers, business and stakeholders.

Settle Network Development Software Cycle consists of two phases, which are described below:

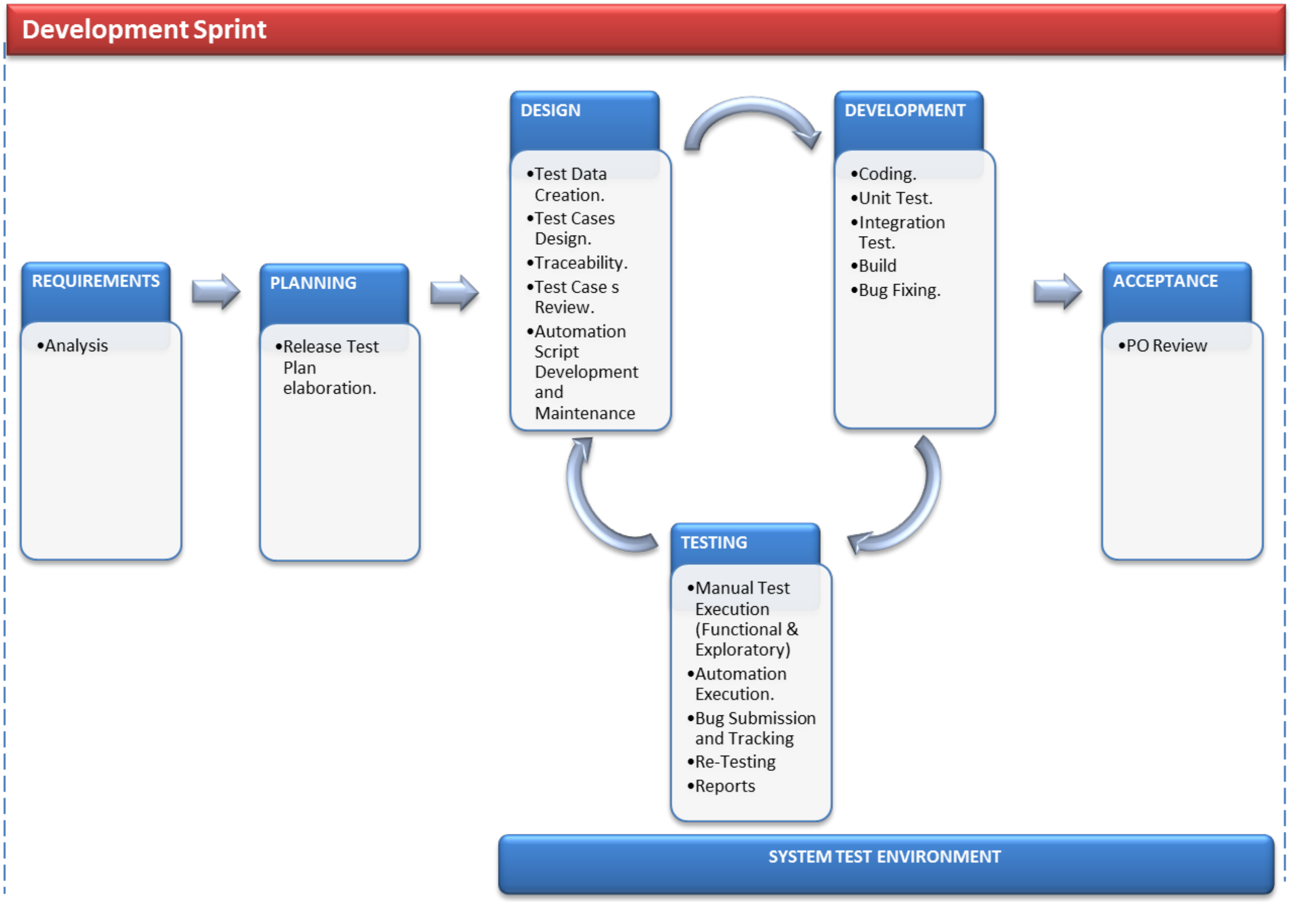
- Development Sprint: during this phase, the Scrum Teams are focused in the development of new features.

- Deployment Sprint or Release Stage: once all the Sprints Development planned has completed, the Scrum Teams moves to this phase with the aim of preparing the Release to go live.



The Test Strategy defined in this document is for both phases of the Development Software Cycle.

Development Sprint



The Release Test Plan will be made at the beginning of the Release aligned with the Carnival Master Test Plan, in which Test Scope is identified, Test Resources and Environment are defined and Test Schedule is established.

After defining the User Stories' Acceptance Criteria in which the Scrum Team will be working during Sprints, the Test Analysts assess the Test Conditions for each User Story and determine the Test Data needed to perform the testing.

Then Test Analysts works alongside with Business Analysts getting a common understanding of the intended functionality; Test Analyst designs Test Cases during the development activities and performing peer review of the Test Cases with the aim of assuring that all the User Story's Acceptance Criteria are under testing coverage.

Once specific functionality is deployed into the Testing Environment, Test Analysts execute the Test Cases for each User Story and check it for completeness, correctness and accomplishment of the Acceptance Criteria. In addition, based on the strategy defined, the Test Analyst should also perform Exploratory Testing with the purpose of deeply understanding the new features and finding more bugs.

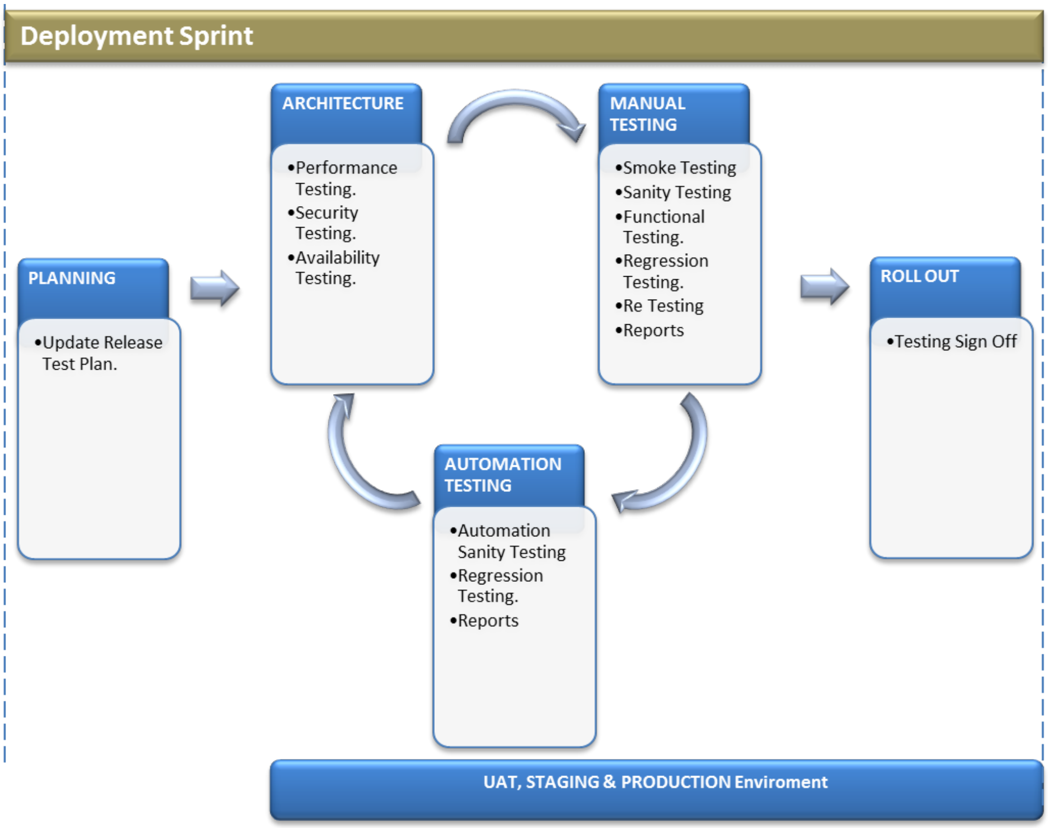
The interaction between Developers and the Test Analysts will be highly interlinked. Daily Scrum Meetings provide visibility both to the developers' work and of the testing status.

Automation Testing is also part of the Test Strategy and is carried out by the Automation Engineers. They will be responsible of the creation, maintenance and execution of the test automation scripts, as well as the reporting of the status of the test automation execution.

Automation Engineers will be embedded within DTS Scrum Teams[1] working in a collaborative environment alongside with Test Analysts, Developers, Business and Management.

At the end of each Sprint, a review is carried out to show the new functionality developed to the Product Owner in order to obtain his approval.

Deployment Sprint



During the UAT stage, the Test Analysts may need to execute a Smoke Test with the aim of validating the correctness of the Build. Then they execute the Test Cases for each new User Story that will be deployed to production and the regression testing to assure that the existing functionality continues working as expected. In the same way, Automation Engineers execute Automated Scripts to perform a Sanity Test and Regression Testing. Also, Architects execute

[1] Refer to Carnival Automation Strategy Document

Non-Functional Testing like Performance, Security and Availability in order to verify the correctness of the system in terms of these non-functional aspects.

For Staging and Production Testing, a different approach than UAT Testing is followed, Test Analysts will execute Smoke Test and Sanity Tests while Automation Engineers execute the Automated Sanity Tests. After Test Execution is completed, the status about the quality of the software product will be proved in order to determine whether it is ready to go live or not.

5. TEST APPROACH

This document specifies the Test Approaches to be followed by the DTS Scrum Teams. This includes:

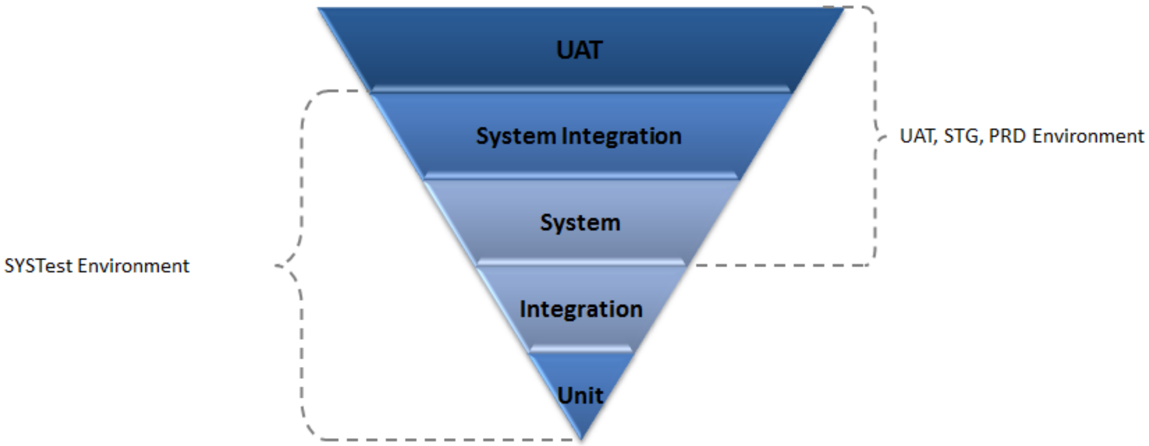
- Definition of the Test Levels applied in the DTS software lifecycle.
- Definition of the Test Types to be executed by the DTS Scrum Teams.

5.1 TEST LEVELS

The DTS Software Development Process includes the following Testing Levels:

LEVEL	RESPONSIBLE	OBJECTIVES	KEY AREAS OF TESTING
Unit	Developer	▪ Detects defective code components.	Functionality and resource utilization.
Integration	Developer	▪ Detects defects in components interfaces.	Functionality, components inter-operability and compatibility.
System	Test Analyst / Automation Engineer	▪ Detect defects in business cases and end-to-end scenarios.	Functionality, data quality, usability performance, security, resource utilization, portability and interoperability.
System Integration	Test Analyst / Automation Engineer	▪ Detects defects in systems interfaces	Functionality, system inter-operability and compatibility.
UAT[2]	Test Analyst / Automation Engineer	▪ Demonstrate readiness for production deployment. ▪ Detect user defects in user workflows.	Functionality, data quality, usability performance, security, resource utilization, portability and interoperability.

[2] The terminology used refers to the Testing Level and not to the Testing Type. UAT Test Level also can be defined as Acceptance Level.



The diagram above shows the Test Levels with their corresponding Testing Environment in which are performed.

5.2 TEST TYPES

The Test Types to be executed by the DTS Scrum Teams are listed in the following table:

TEST TYPE	DESCRIPTION	EXECUTION	PERFORMED BY
Unit Testing	The purpose of this test is to verify the functioning of software components. May include testing of functionality and specific non-functional characteristics.	Will be executed during the development; in the corresponding development branch once the component or specific piece of functionality is considered developed.	Developers
Integration Testing	The purpose of this test is to verify the interaction between software components.	Will be executed during the development; in the corresponding development branch once the components have being developed and the interfaces between them need to be verified.	Developers
Smoke Testing	First round of testing execution over a new build. The purpose is to verify that the correctness of the build and that the main flow of the core business functionality works as expected.	Will be executed once the new build is deployed to the UAT, Staging or Production Environment. Smoke Testing involves the execution of a sub-set of P1 Test Cases	Test Analysts
Sanity Testing	The purpose is to verify that the core business functionality works as expected.	Will be executed once the new build is deployed to the UAT, Staging and Production environments. Sanity Test execution involves all the P1 Test Cases.	Test Analysts
Automated Sanity Test	First round of automated test execution over new build. The purpose is to verify that the core business functionality works as expected.	Will be executed once the new build is deployed to the System Test, UAT, Staging and Production environments. Automation Sanity Test execution involves all the P1 Automated Scripts.	Automation Engineers
Functional Testing	The purpose is to verify if the User Story's Acceptance Criteria	Will be executed after new functionality or User Story is deployed to the System	Test Analysts

	have been correctly implemented.	Test and UAT environments. Functional Testing execution involves the P1, P2 and P3 Test Cases.	
Exploratory Testing	Testing related to get a better understanding of the product by conducting unguided test. It also has the purpose of finding defects that usually are not detected by the execution of guided test.	Will be executed after new functionality or User Story is deployed to the System Test Environments or as a complement of the functional test.	Test Analysts Product Owners Stakeholders
Regression Testing	The purpose of this test is to verify that existing functionality does not result impaired as a result of system changes.	Will be executed at the end of each sprint and during UAT, Staging and Production stages. Regression testing can be executed manually or automated. Depending of the impact analysis, the scope of the regression test may involve the execution of P1, P2 and P3 Test Cases.	Test Analyst Automation Engineer
Automation Testing	The purpose of automation testing is to verify backward integration of the new functionality and verify that the existing functionality continues working as expected.	Will be executed at the end of each sprint and during UAT, STG and PRD stages.	Automation Engineers
Re-Testing	The purpose of this test is to verify whether the defect was fixed or not.	Will be executed once the defect’s fix is deployed to the specified the testing environments.	Test Analysts
Performance Testing	The purpose of this test is to verify the correctness of non-functional requirements like responses time, throughput and resources utilization.	Will be executed once a new build is deployed to the UAT environments.	Technical Leads
Non -Functional Testing	The purpose of this test is to verify the correctness of non-functional requirements like security, availability, etc.	Will be executed once the new build is deployed to the UAT environments.	Technical Leads

6. TEST ACTIVITIES

Below are described, at a high level, the main test activities carried out by the Testing Team during the software development cycle:

a. **Elaboration of Release Test Plan:** The Release Test Plan will be created at the beginning of the release and updated during the Development and Deployment Sprints.

b. **User Story Analysis:** During the Grooming and the Sprint Planning meetings**,** the Test Analysts have to assess all the Acceptance Criteria described on each User Story. This analysis validates whether the requirements are sufficiently detailed or not, determines the testability degree, identifies ambiguous scenarios, will determine the test conditions and identifies the test data required that will serve later for the Test Cases design.

In addition, during the Sprint Planning, for each PBI committed to be worked during the Sprint, besides the development tasks, each the PBI will be decomposed in testing tasks which will contain the total effort (in hours) to complete them.
The main test tasks identified for a PBI are as follow:

- "Create Test Data",
- "Design Test Cases"
- "Execute Test Cases".

c. **Test Case Design:** A test case is a scenario that describes an input to the system, an action or event and the expected result required to evaluate the behavior of the feature or component. Test Cases must cover 100% of the Users Stories' Acceptance Criteria and also validate negative and additional scenarios.

Test Cases are classified based on the business priority:

- **P1:** The Test Cases that are identified as P1 cover the main scenarios of a feature that is considered critical for the business (Identified by the Business Analyst in the Acceptance Criteria section of the Requirements document for each PBI). P1 Test Cases are included into the Smoke and Sanity Test Suites, are to be executed in every testing cycle of the feature and are typically identified as candidates for the automation process.

- **P2:** The Test Cases that are identified as P2 cover the alternative /negative scenarios of a feature that is considered medium risk for the business. P2 Test Cases are included into the Regression Test Suites. Depending on which scenario they verify, these Test Cases can be considered as candidates for the automation process.

- **P3:** The Test Cases that are identified as P3 cover scenarios of a feature that is considered low risk for the business. Typically these Test Cases are one-time executed and don't need to be re-run in subsequent cycles.

All the Test Cases designed have to be linked to their corresponding PBI. Traceability is performed by the testing management tool (Test Manager) and the project management tool (TFS).

d. **Test Case Review:** The Test Cases designed by the Test Analyst have to be reviewed by the Business Analyst. The purpose of this review is to verify that all the Acceptance Criteria are covered by the Test Cases.

e. **Test Execution:** During this task, the Test Cases created and grouped by test suites, are run in the different environments. Also, Exploratory Testing can be performed. During the test execution phase, the Test Results are logged in the Test Management Tool.

f. **Defect Submission:** During Test Cases Execution or Exploratory Testing execution or Automated Execution, if the Test Analysts or Automation Engineers finds a defect, means that the actual results of the test defers of the expected result, then it must submit the defect in the Defect Tracking tool (TFS).

g. **Defect Tracking:** During the development cycle, the Test Analyst must track the defects reported during the Testing Execution until the fix is confirmed after it is re-tested.

h. **Report and Metrics**: Obtain meaningful indicators that will help Project Stakeholders and the Team to understand the project status in terms of quality of the software product. Tools and templates can directly provide these indicators according to the project needs.

i. **Testing Sign Off:** Provides the final acceptance of the software product. The testing sign off will be granted if the test execution results meet the Exit Criteria.

7. TEST CASES MANAGEMENT

The Test Cases Management is performed trough the Microsoft Test Manager Tool; which enable to perform the following operations:

- Create / Edit Test Cases.

- Create Test Suites in which the corresponding Test Cases will be grouped by functionality.

- Add Test Cases or Test Suites to the defined Execution Test Plan.

The Test Cases Storages is defined according to the “Carnival Specification of Test Script Repository” document.

8. TEST TOOLS

Below are listed the Testing Tool that will support the Testing Activities within DTS Software Development Lifecycle

- **Project Management Tool: “**Microsoft Team Foundation Server (TFS)” will be used for PBIs creation and tracking. Each PBI will have attached the corresponding User Story and will contain the list of required tasks to be implemented including Testing Tasks.

- **Bug Tracking Tool:** Defect submission and tracking will be made in “Microsoft Team Foundation Server (TFS)”. Traceability between defects and PBIs will be performed within this tool.

- **Test Cases Management:** Test Cases will be designed and documented in “Microsoft Test Manager Tool”. In addition, the Execution Test Plans will be created and Test Results will be stored within the tool. Test Cases and PBIs traceability can be made between this tool and TFS.

- **Testing Reports:** Testing Reports will be created in Excel Spreadsheets, which will be linked to TFS and Test Manager Tool in order to obtain data from there and then process and displayed into the spreadsheet.

- **Automation Testing Tool:** Automated testing will be implemented with Selenium Web Driver tool. This tool will provide a framework to develop automated test scripts for the different features developed by DTS Group.
  The Automation Test Strategy is defined in the “Carnival Automation Test Strategy” document.

- **Non Functional Test Tools:** the following non-functional test will be executed through the following tools:
  - **Performance Test:** Are executed using “Performance Profiler” and “Ants Profiler” tools.
  - **Availability Test:** is executed using “Keynotes” tool.
  - **Security Test:** Are executed using “Fortify” and “AppScan” tools.

9. TEST ENVIRONMENT

The following environments were defined for testing:

- **Development Environment:** environment managed by developers in which Unit Testing will be executed over each development branch.

- **System Test Environment:** Environment in which the User Stories are deployed and tested. In this environment the Test Analysts executes the Functional Testing and the Automation Engineers executes the Automated Sanity Testing and, at the end of each Sprint, the Regression Testing.

- **UAT Environment:** Environment where the Test Analysts execute the Smoke Test and then along with the Automation Engineers execute Sanity Testing and Regression Testing. In addition, the Architects executes Non-Functional testing like Performance, Availability and Security testing, once the completed functionality is deployed to this environment.

- **Staging and Production Environments:** Smoke and Sanity Testing will be executed over the Staging and Production environments.

10. TEST CONFIGURATION

The following configuration is required to set up the Test Analysts Works Station:

PLATFORM	DEVICE / OS VERSION	BROWSERS
Desktop PC	Windows 7	IE8, IE9, IE10 Firefox (latest version), Chrome (latest version), Safari (latest version)

11. BROWSERS IN SCOPE

The Business defines the browsers in scope based on marketing statistics. The following table displays the actual browsers under Testing Scope required to perform the Testing Execution:

		WINDOWS	
		v7*	v8*
Internet Explorer	9	X	
	10	X	
	11	X	
Firefox	LV	X	
Chrome	LV	X	
Safari	LV	X	

12. DEVICES IN SCOPE

The Business defines the devices in scope based on marketing statistics. The following table displays the actual devices under Testing Scope required to perform the Testing Execution:

The following matrix defines the cross-devices testing coverage:

		BROWSERS				
PLATFORM	DEVICE / OS version	Native	Safari	Firefox	Chrome	IE
iOS	iPhone 4s <iOS 7.0.4>		X			
	iPhone 5 <iOS 7.0.4>		X			
	iPad 2 <iOS 7.0.4>		X			
Android	Samsung S2 <Android 4.0.3>	X				
	Samsung S3 <Android 4.1>	X				

13.ROLES & RESPONSIBILITIES

The following table shows roles and responsibilities defined within DTS Test Teams:

ROLE	RESPONSIBILITIES
Test Lead	1. Elaborates Release Test Plan 2. Participates in Planning and status meetings. 3. Participates in Grooming meetings. 4. Analyzes requirements and Acceptance Criteria. 5. Defines and creates test data. 6. Designs and executes Test Cases. 7. Submits and tracks bugs. 8. Elaborates Testing Reports. 9. Elaborate Testing Sign Off.
Test Analyst	1. Participates in Planning and status meetings. 2. Analyzes requirements and Acceptance Criteria. 3. Defines and creates test data. 4. Designs and executes Test Cases. 5. Submits and tracks bugs.
Automation Lead (QE Tech Lead)	1. Have Framework ownership to understand new requirements and define the features to support them. 2. Provide test architecture guidance. 3. Participate in planning and status meetings. 4. Create and update Test Suites. 5. Plan testing activities, estimate testing tasks, design the testing strategy and test types to include. 6. Monitor the execution of the testing tasks during the duration of the project. 7. Update metrics and detects potential issues related to the testing activities. 8. Break down tasks and reassign them to testing team. 9. Perform test scripting. 10.Elaborate Automation Test Reports.
Automation Engineer (QE – Quality Engineer)	1. Acquire and document knowledge about the system. 2. Receive test cases and acceptance criteria as input. 3. Responsible for the estimation of time of QA automation scripting activities and documentation. 4. Perform test scripting. 5. Ensure test code quality and keep it compliant with defined coding and design standards. 6. Execute test scripts and analyze test suites results. 7. Report bugs found during testing execution.

	8. Perform maintenance activities on automated test suites and test frameworks. 9. Report daily progress of tasks to team leader.

14. ENTRY, SUSPENSION / RESUMPTION, AND EXIT CRITERIA

14.1 ENTRY CTRITERIA

The Entry Criteria is defined as the specific conditions that must be met before Test Execution begin.

Due to the DTS Software Development Lifecycle, it is required to define two different Testing Entry Criteria, one for the Development Sprint, which means the Entry Criteria for System Test environment and for the Deployment Sprint, which mean the Entry Criteria for UAT, Staging and Production environments.

a. System Test Entry Criteria :

1. Each User Story must have all the Acceptance Criteria clearly defined.
2. Release Test Plan (Sprint Test Plan section) approved.
3. System Test environment has been built and configured, and is available.
4. Test Data have been identified and created. Test Cases have been written and reviewed by the Business Analyst. Traceability between Test Cases and PBIs has been performed.
5. Execution Test Plan has been created in Test Manager Tool.
6. Release note provided including the list of features / bugs ready for testing.
7. All Unit Tests have been passed.

b. UAT, Staging and Production Entry Criteria:

1. Environment built, configured and all the PBI under release scope deployed.
2. Release Test Plan (UAT, STG and PRD Test Plan section) updated and approved.
3. Release note provided including the list of features / bugs ready for UAT, STG and PRD Testing.

4. UAT Execution Test Plan created in Test Manager Tool.
5. Automation Sanity Testing executed and passed (if existent).

6. Smoke Testing executed and passed (if required).

14.2 SUSPENSION / RESUMPTION CRITERIA

Suspension Criteria specify the criteria to be used to suspend all or a portion of the Testing Activities.

Suspension Criteria are defined as follows:

1. Environmental issues such as performance degradation or outages on both systems under testing system and external systems.

2. Denied access or insufficient permissions in Testing Environments or Testing Tools.

3. Critical or Highs severity defects where testing cannot be performed efficiently at the Tester Analysts discretion.

4. Incomplete features or features that are considered deployed, but are not.

Due to any of the points listed above the testing execution, in any environment, will be suspended and the corresponding defect(s) will be submitted.

If testing is suspended, resumption will only occur when the defect(s) that caused the suspension have been resolved.

14.3 EXIT CTRITERIA

The Exit Criteria is defined as the specific conditions that tell to the Test Analyst when stop testing and the criteria to consider the Testing officially completed.

The Testing Exit Criteria defined applies for both phases of the DTS Software Deployment Lifecycle: Development and Deployment Sprints, which mean that, the same Exit Criteria will used for System Test, UAT, Staging and Production environments.

Exit Criteria is defined as follow:

1. All planned tests have been successfully executed.
2. All planned testing activities have been completed.
3. Test Case Pass / Fail Ratio equals to 90% or higher.
4. No Critical or High Severity open bugs.

If the Exit Criteria are not satisfied, the Product Owner and Upper Management will need to decide and approve whether to move forward to the next stage or not.

The Testing Sign Off will be granted when the Build meet the Exit Criteria and the amount of defects open are equal or lower than the ones specified.

The following table shows the amount defects allowed by severity per PBI, Sprint and UAT

BUG SEVERITY	EXIT CRITERIA (PBI)	EXIT CRITERIA (SPRINT)	EXIT CRITERIA (UAT)
Critical	No defects	No defects	No defects
High	No defects	No defects	No defects
Medium	Maximum of 4	Maximum of 12	Maximum of 20
Low	Maximum of 6	Maximum of 18	Maximum of 30

15. TEST DELIVERABLES

Test Deliverables is any document / script / data related to testing which is handed over to the rest of the DTS Scrum Team and others stakeholders at the beginning, during or at the end of the Testing Phase.

The Testing Deliverables which will be provided during the DTS Software Development Lifecycle are listed as follow:

a. Release Test Plan.

b. Test Cases.

c. Automated Test Scripts.

d. Defect Log.

e. End of Day Test Report.

f. Manual Test Execution Status Report.

g. Manual Test Execution Summary Report.

h. Automation Test Execution Report.

i. Defects Report.

j. Testing Sign Off Report.

16. TEST METRICS AND REPORTS

The following Testing Metrics and Reports will be generated and delivered to the DTS Scrum Team and Managers:

a. **End of Day Testing Report:** will contain information about the Testing Activities during the Sprint that were performed in the day, such as:
   - # of Test Cases executed, pending and blocked per PBI.
   - Defects Submitted per PBI.
   - Defects re-tested.

b. **Manual Testing Execution Report**: will be generated periodically during the Sprint and will be generated in daily basis during UAT and Staging Testing, will contain information such as:
   - Test execution results per browser and device.

- Test Cases Pass / Fail Ratio.
- Percentage and description of functionality tested.
- Percentage and description of functionality untested.
- Defects Submitted by Severity and Priority sorted.
- Defects by Status.

c. **Defects Report:** will be generated per Sprint, during UAT, Staging and Production will contain information such as:
   - Open defects classified by severity and priority per PBI per Sprint.
   - Open defects classified by severity and priority found in UAT, Staging and Production Testing.
   - List of defects sorted by: Defect's Age, Invalid, Fix Fails, Cannot Reproduce, Need More Info per Sprint and per environment: UAT, Staging and Production.
   - Percentage of reopened defects: percentage of reopened defects against total defects during a Sprint and per environment: UAT, Staging and Production.
   - Defects open against closed.
   - Contention: number of defects found in Production environment that were not discovered during the previous stages.

d. **Manual Testing Execution Summary Report:** will be generated at the end of each Sprint and at the end of the UAT, Staging and Production Testing. Will contain information such as:
   - # Of Test Cases by status: pass, fail, block, not run.
   - Test Cases Pass/ Fail Ratio.
   - Percentage and description of functionality tested.
   - Percentage and description of functionality untested.
   - Defects Summary: classified by severity, priority and status.

e. **Automation Test Execution Report:** will be generated at the end of each Sprint and during the UAT, Staging and Production Testing. Will contain information such as:
   - Summary of the Automated Test Suites executed sorted by browsers and their results: pass, fail, block, not run.
   - # Automated Test Scripts by results: pass fail, block, not run.
   - Defects detected by Automation and submitted.

f. **Testing Sign Off Report:** will be generated at the end of UAT, Staging and Production Testing. It will contain information such as:
   - Release # and Build Version under test.
   - Open defects sorted by Severity and Priority.
   - Acceptance State.
   - Percentage of functionality tested.
   - Percentage of functionality untested.
   - Test Cases Pass / Fail Ratio.

17. DEFECT MANAGEMENT

Defect management is the process of identification, analysis, submission and tracking of defects found during Test Execution Cycles.

The DTS Defect management process and the classification of Defect’s Severities and Priorities are described in the “Carnival Defect Management Process” document.

18. TEST DATA

Test data knows as the data used for Testing Software. The DTS Test Data Preparation process is described in the “Carnival Test Data Preparation Process” document.