Test Plan

- My web server -

Software Development Company™

Table of contents

Objective

The purpose of this document is to plan and describe how the testing of the system will be implemented and executed, as well as which of the requirements will be tested and which will not be tested from the provided requirements list (see list). The document will also describe the assigned responsibility of each team member regarding the test cases.

Background

The small Software Development Company (SDC) aims to redistribute a found server named "My web server" on a wide range of Internet Of Things devices (IoT) in order to present, among other things, information from sensors. The SDC wishes for the server to be evaluated so that their requirements are fulfilled.

Goals

The goals of the SDC are to have

- ❏ an easy to deploy java-web-server that can be deployed on many different devices,
- ❏ to attract a wide range of IoT developers.

Whereas, the IoT developers want

- ❏ minimal configuration,
- ❏ easy integration and adaptation of the web-server.

Lastly, the end-customers require

- ❏ easy access,
- ❏ absolute security.

Scope

Testing will take place both at a manual level as well as an automated one. Manual testing will be done to ensure the functionality through different use cases, and automated testing will be done to simulate a heavy load on the server to test its strength and to analyze overall performance under different load types.

Furthermore, both static and dynamic analysis will be undertaken. This means that the server will be tested without executing the code, statically, namely by finding and eliminating errors or ambiguities in documents (requirements, test cases etc.), but also with the execution of the code, or dynamically, by compiling and running the server.

Testing levels

The following subsections describe the various testing levels at which the product testing will take place.

1. Functional Testing

Test Objective	Ensure functionality and data retrieval.
Technique	Execute each use case using valid and invalid input data to verify that: ➔ The expected results occur when valid data is used. ➔ The expected error or warning messages are displayed when incorrect input is given. ➔ Each business rule applies.
Completion Criteria	All planned tests have been executed, and all issues found have been exposed.
Special Consideration	Due to lack of equipment the test will be executed only on Windows 10.
Testers	Test engineers: X, Y, Z
Test elements	❏ Req 2. The web server must follow minimum requirements for HTTP 1.1. ❏ Req 3. The web server must work on Linux, Mac, Windows (XP, Vista, 7, 8, 10, Server 2008). ❏ Req 5. The access log should be viewable from a text editor. ❏ UC1 Start Server ❏ UC2 Stop Server

2. Unit Testing

Test Objective	Ensure functionality and code coverage of JUnit test suites.
Technique	Execute each JUnit test suite.
Completion Criteria	All planned tests have been executed, and all issues found have been exposed.
Special Consideration	The JUnit tests must be executed while the server is up to simulate real scenarios. All tests can be found in the source code.
Testers	Test engineers: X, Y

3. Integration Testing

Test Objective	Ensure the integration of the software modules.
Technique	Execute the individual software modules as a group to verify the aggregation of the system.
Completion Criteria	All planned tests have been executed, and all issues found have been exposed.
Special Consideration	*None at the moment.*
Testers	Test engineers: Z, Y

4. System Testing

Test Objective	Ensure the functional and technical specifications of the system and detect defects and bugs within the software as a whole.
Technique	Execute all test cases.
Completion Criteria	All planned tests have been executed, and all issues found have been exposed.
Special Consideration	Unit and integration testing must be completed before the beginning of system testing.
Testers	Test engineers: X, Z
Test elements	*See the Test Cases document.*

5. Regression Testing

Test Objective	Ensure that a change (such as a bug fix) does not result in another fault being uncovered in the application.
Technique	Retest all or a few relevant test cases.
Completion Criteria	All planned tests have been executed, and all issues found have been exposed.
Special Consideration	Communicate to the responsible department to perform this type of testing and handle the found issues in the next iteration.
Testers	*None at the moment.*

6. Acceptance Testing

Test Objective	Evaluate the system’s compliance with the business requirements and assess whether it is acceptable for delivery.
Technique	Ad-hoc black box testing (check not only for spelling mistakes but also bugs that might appear without a plan but rather intuitively).
Completion Criteria	All found issues have been addressed and solved.
Special Consideration	The customer themselves or their customers should be the ones responsible to perform this type of testing, but since we have no means to execute this, the test engineers will act as customers instead.
Testers	Test engineers: X, Y
Test elements	Ad-hoc.

7. Alpha Testing

Test Objective	Ensure the quality of the product.
Technique	White box and black box testing performed at the developer’s site.
Completion Criteria	All the test cases have been executed and passed. All severity issues are fixed and closed. Delivery of Test summary report. Make sure that no more additional features can be included.
Special Consideration	Communicate to the responsible department (which handles white box testing) to execute the necessary tests and handle the found issues in the next iteration.
Testers	*None at the moment.*

8. Non-functional Testing

Test Objective	Evaluating the non-functional attributes of the system.
Technique	Security, performance, stress and load testing the system.
Completion Criteria	All planned tests have been executed, and all issues found have been exposed.
Special Consideration	*None at the moment.*
Testers	Test engineers: X, Z

9. Performance Testing

Test Objective	Identifying possible bottlenecks and performance issues.
Technique	Load and stress tests will be executed using the automated tool SmartMeter.io.
Completion Criteria	The system meets an adequate response time.
Special Consideration	*None at the moment.*
Testers	Test engineers: Z, Y
Test elements	❏ Req 1. The web server should be responsive under high load.

10. Load Testing

Test Objective	Evaluating the system's responsiveness and stability under a certain workload.
Technique	The use cases will be executed while using the automated tool jMeter.
Completion Criteria	All planned tests have been executed within acceptable time, and all issues found have been exposed.
Special Consideration	At the time of testing, the data used should be realistic.
Testers	Test engineers: X, Y, Z
Test elements	*See the Test Cases document.*

11. Stress Testing

Test Objective	Evaluating the system's responsiveness and stability under abnormal working conditions.
Technique	The use cases will be executed while using the automated tool jMeter.
Completion Criteria	All planned tests have been executed within acceptable time, and all issues found have been exposed.
Special Consideration	Should be tested on clients with low memory or low disc space to reveal the defects which cannot be found under normal conditions.
Testers	Test engineers: X, Y
Test elements	*See the Test Cases document.*

12. Usability Testing

Test Objective	Evaluating the accessibility and convenience of the system.
Technique	Black-box testing performed at the developer’s site.
Completion Criteria	The application is easy to use, and the errors are diagnosed correctly.
Special Consideration	No specific test cases have been made for usability. It is assumed to be implicitly verified through the previous tests.
Testers	*None at the moment.*

13. Security Testing

Test Objective	Evaluating the vulnerability of the system.
Technique	Testing performed using an automated tool named Vega.
Completion Criteria	All possible tests using the tool at hand have been executed, and all issues found have been exposed.
Special Consideration	Since the application is in its early stage most tests will probably pass. It is advised to conduct this testing type when the application is more developed.
Testers	Test engineers: Z
Test elements	*See the Test Cases document.*

14. Portability Testing

Test Objective	Evaluating the reusability of the system from one machine to another.
Technique	Installing and running the system on different platforms and operating systems, namely, Windows, Linux, and Mac.
Completion Criteria	The software runs as expected on each operating system. Any issues found are reported and handled by the responsible parties.
Special Consideration	The current equipment is limited to testing only on Windows. Communicate to the responsible department to perform this type of testing and handle the found issues in the next iteration.
Testers	*None at the moment.*
Test elements	❑ Req 3. The web server must work on Linux, Mac, Windows (XP, Vista, 7, 8, 10, Server 2008).

15. Ad-hoc Testing

Test Objective	Evaluating different aspects of the system.
Technique	Testing aspects that do not have use cases in a random manner.
Completion Criteria	All found issues have been exposed.
Special Consideration	The success of this test relies on the capabilities and the intuition of the tester(s) carrying it out.
Testers	Test engineers: X, Y, Z
Test element	Ad-hoc.

Features to be tested

Following the requirements and use cases, the next features will be tested and documented.

- Minimum requirements during high load
- Minimum requirements for HTTP 1.1
- Access to the log
- Server multiplatform
- Open Source code following the licence GPL 2.0

Features not to be tested

Requirement 3 includes a high risk activity. The group of testers may not be able to test the server in different operative systems due to the hardware and software required for that. This issue will be addressed to the project manager and fixed during following iterations.

Prioritization

Test Case	Name	Priority
TJU.1	Integration	High
TJU.2	Response	High
TJU.3	View	High
TJU.4	Grouped	High
TSS.1.1	Start Server	High
TSS.2.1	Stop Server	High
TSS.1.4	Access log written	High
TS.1	HTTP 1.1 Status 200	High
TS.2	HTTP 1.1 Status 400	High
TS.3	HTTP 1.1 Status 403	High
TS.4	HTTP 1.1 Status 404	High
TS.5	HTTP 1.1 Status 405	High
TOS.1.1	Test Operating System	High
TA.1	Acceptance	High
TP.1	Performance	Medium
TSS.1.2	Wrong Socket	Medium
TSS.1.3	Taken Socket	Medium
TL.1	High Load	Medium
TL.2	High Load	Medium
TV.001	Vulnerability check	Low
TSS.2.2	Server is stopped - Access log is written	Low
TGPL2.0	Test GPL-2.0	Low
TB.1.1	Test Browsers	Low

Traceability matrix

Requirement Identifiers	Reqs Tested	Req 1	Req 2 UC 1	Req 2 UC 2	Req 2 UC 3	Req 3	Req 4	Req 5
Test Cases	23	5	9	6	9	8	3	3
TJU.1	1	x						
TJU.2	1		x	x	x			
TJU.3	-							
TJU.4	1		x	x	x			
TSS.1.1	2		x			x		
TSS.1.2	2		x			x		
TSS.1.3	2		x			x		
TSS.1.4	2		x					x
TGPL2.0	1						x	
TSS.2.1	2			x		x		
TSS.2.2	2			x		x		
TS.1	1				x			
TS.2	1				x			
TS.3	1				x			
TS.4	1				x			
TS.5	1				x			
TL.1	1	x						
TL.2	1	x						
TV.001	1		x					
TB.1.1	-							
TOS.1.1	1					x		
TP.1	5	x	x	x	x	x	x	x
TA.1	5	x	x	x	x	x	x	x

Test environment

Web Server: My web server

OS: Windows 10

Browser:

- ❏ Chrome Version 63.0.3239.84 (Official Build) (64-bit)
- ❏ Firefox Quantum Version 57.0.2 (64-bit)
- ❏ Microsoft Edge Version 40.15063.674.0 (64-bit)
- ❏ Microsoft EdgeHTML Version 15.15063 (64-bit)

Java version: 1.7 and 1.8

Responsibilities

Testing Manager:

Person responsible for coordination, communication with the project manager, final responsible of documentation, design and evaluation of the tests.

Testing engineer:

Group of persons responsible of design and execution of automated and manual test.

Schedule

The schedule of this project would be divided in 4 cycles in 4 weeks, in which the Test Manager will communicate with the Project Manager and create the proper documentation with the participation of the testing engineers during the stand-up meeting.

The application MyWebServer is already deployed, so the entry criteria is not needed. The tests exit criteria would be all the test planned have been run and documentation has been written down and revised by the Test manager.

In the course of the iteration, the testing engineers may create ad hoc tests that will not be strictly included in the schedule for its own nature.

Iteration	Objective
1	Test basic http 1.1 implementation: ● Start server, close server, check if server is online ● Responsible: Testing engineers X, Y and Z.
2	Test basic http 1.1 implementation: ● Server response when error encountered. ● Responsible: Testing engineers X, Y and Z.
3	Test basic http 1.1 implementation; ● Test response when server success. ● Responsible: Testing engineer Z. Test server during high load ● Responsible: Testing engineer Y Test the log of the server. ● Responsible: Testing engineer X.
4	Check the license of the server. ● Responsible: Testing engineer X. Possible ad hoc testing and/or regression testing after fixes. ● Responsible: Testing engineer Y, Z.

Version control

The table below represents the document version history table, containing the major dates regarding the development of the current document.

Version #	Implemented by	Revision Date	Comments
1.0	*Confidential*	2017-11-21	First draft of the document
1.1	*Confidential*	2017-11-28	Updating the document
1.2	*Confidential*	2017-12-07	Updating the document
1.3	*Confidential*	2017-12-14	Updating the document
1.4	*Confidential*	2017-12-20	Final draft

Glossary

Ad-hoc testing	Software testing performed without any planning and documentation (rather intuitively), but which can be applied to early scientific experimental studies.
Portability testing	The process of determining the degree of ease or difficulty to which a software component or application can be effectively and efficiently transferred from one hardware, software or other operational or usage environment to another.
Traceability matrix	A document, usually in the form of a table, used to assist in determining the completeness of a relationship by correlating any two baselined documents using a many-to-many relationship comparison.