System Test Plan

(Systemtest Plan)

(TINF19C, SWE I Praxisprojekt 2020/2021)

Project: *OPC UA Server Farm*

Customer: *Rentschler & Holder*
Rotebühlplatz 41
70178 Stuttgart

Supplier: Team 3 – by Daniel Zichler
(Fischer Nico, Huber Niklas, Foerster Phillip, Hoerber Niclas, Zichler Daniel, ~~Knöpfle Kay~~)
Rotebühlplatz 41
70178 Stuttgart

Version	Date	Author	Comment
0.1	12.03.2021		created
0.2	12.05.2021	Zichler	Basic structure established
0.3	19.05.2021	Zichler	Test Cases added
1.0	20.05.2021	Zichler	Finalization

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1. Scope

The STP (System Test Plan) specifies the test strategy and test planning. It references tests to be performed to verify the accordance of the demanded features given by the SRS (System Requirements Specification) to the implemented features. The document derived from the STP is the STR (System Test Report) where additionally the results are given.

2. Definitions

AML Automation Markup Language

Test Client for testing and developing the *OPC UA Client UA-Expert* was used

UI User Interface

GUI Graphical User Interface

CLI Command Line Interface

3. Product Names and Attributes

The following test objects must be verified:

Ref.-Id.	Product Number	Product Name	Product Description
1	Build v1.0	Core Library: Parser	Part of the Core Library, parses AML configuration files and checks if the files syntax is valid
2	Build v1.0	Core Library: Server Host	Part of the Core Library, loads properties from parsed AML configuration files, handles start-ups and shut-downs of servers, redirects AML files from the User Interface to the Parser, redirects logs from the Parser to the Logger module
3	Build v1.0	User Interface	User Interface to select one to up to ten AML configuration files as input, shows logs received from the Server Host, controls only AML files are sent to the Server Host

4	Build v1.0	Logger	Deals with warnings, error messages and logging information and displays understandable information in the GUI

4. Features

The following requirements must be verified, as long as they are not classified as “Not to be tested”. This table shows the test coverage between functionality and test suites or test cases.

Req. – ID	Functionality	Prior-ity	Testsuite ID
LF10: Command Line Interface	checks if User Input is valid, User Interface is **not to be tested**	A	TS-001: Command Line Inter-face
LF20: File validation	Checks the input file for validity	A	TS-002: Core Library
LF30: Server configuration	Configures the Server according to given input configuration	A	TS-002: Core Library
LF40: Server start-up	Starts Server after finishing con-figuration	A	TS-002: Core Library
LF50: Server shutdown	Stops Server after external in-terrupt	B	TS-002: Core Library
LF60: Logging	Errors and other Events are dis-played in a log file	B	TS-001: Command Line Inter-face

5. Test Preparation Strategy

The creation of tests will be application case-based. Two main application cases can be identified, the User Interface and the Core Library.

The User Interface contains selecting of configuration AML files and redirecting the selected files to the Core Library. Furthermore, Errors and other Events are displayed in the User Interface.

The Core Library contains the main functions which are made of parsing AML configuration files, configuring Servers with the parsed files and starting these Servers. The functionalities can be tested using the Test Client.

6. Test Execution Strategy

Since it is a further development of an already existing software, a complete test is not necessary, but it is still useful. The test should be divided into the following phases:

1) Graphical User Interface
2) Core Library

Since the GUI will not be tested, there will only be a check if the CLI takes multiple AML files as Input. In the end, the Core Library is tested using the provided Test Client.

7. Test Equipment

The following equipment must be available for testing:

- A computer with Linux
- OPC UA Demo Client (Download Here)
- 10 different Automation ML files

8. Test Schedule and Budget

Test	Date	Tester
GUI	Not to be tested	Daniel Zichler
Core Library	Wed, 19.05.2021	Daniel Zichler

The GUI will not be tested as it is not a necessary product requirement. The Core Library can be tested once the files have been input using the CLI. Using the Test Client, the output of the Core Library will be tested.

No budget is needed for the tests, as they are all performed by hand.

9. Test Planning

Testsuite	Test objective	Testplan Creator	Testplan Reviewer	Tester
TS-001	Core Library	Zichler Daniel	Zichler Daniel	Zichler Daniel

10. Appendix: Testcases

10.1. Testsuite <TS-001> Core Library

10.1.1. <TC-001-001> File validation of valid input file

Testcase ID:	TC-001-001	
Testcase Name:	File validation of valid input file	
Req.-ID:	LF10, LF20, LF30, LF60	
Description	The test case verifies that errors are detected during the validation of the input file. A corresponding log file will be created containing information of the error.	
Test Steps		
Step	**Action**	**Expected Result**
1	Install the OPC UA Server Farm and open the CLI.	The OPC UA Server Farm is installed on the system and the CLI is open.
2	Select a valid input file to configure the Server with.	The validation is executed successfully and the server will start configurated
3	Then open the logs which can be found under:	The log file is open and contains information about the start up
4	Find the message that the server has been configured correctly.	A Log message should be found within in the first few lines containing information about the start up

Testdata:	TD-001-001			
Dataset	File	Validation	Permission Input	Permission Output
1	Balluff-BNI_PNT-508-105-Z015-CAEX30-20201207.aml	valid	given	given

10.1.2. <TC-001-002> File validation of invalid input file

Testcase ID:	TC-001-002
Testcase Name:	File validation of invalid input file
Req.-ID:	LF10, LF20, LF60
Descrip-tion	The test case verifies that errors are detected during the validation of the input file. A corresponding log file will be created containing information of the error.

Test Steps		
Step	**Action**	**Expected Result**
1	Install the OPC UA Server Farm and open the CLI.	The OPC UA Server Farm is installed on the system and the CLI is open.
2	Select a valid input file to configure the Server with.	The validation is executed successfully and the server will start configurated
3	Then open the logs which can be found under: <install-directory>/Serverfarm/LogFile.txt	The log file is open and contains information about the start up
4	Find the message that the server has been configured correctly.	An error message should be found within in the first few lines containing information about the failure.

Testdata:	TD-001-002			
Dataset	File	Validation	Permission Input	Permission Output
1	Broken_Data.aml	invalid	given	given

10.1.3. <TC-001-003> Server Start-up with valid input file

Testcase ID:	TC-001-003
Testcase Name:	Server Start-up
Req.-ID:	LF10, LF20, LF30, LF40
Descrip-tion	The test case verifies that input files are parsed correctly and can be read in the Test Client.

Test Steps		
Step	**Action**	**Expected Result**
1	Open the CLI and select two valid input files.	The validation is executed successfully and the server will start configurated.
2	Open the Test Client and connect to the started Servers with the Test Client.	The started Servers are shown on the left side of the Test Client.

Testdata:	TD-002-001			
Dataset	File	Validation	Permission Input	Permission Output
1	KaffeeMaschinen.aml	valid	given	given
2	Test_aml.aml	valid	given	given

10.1.4. <TC-001-004> Server Shut-Down

Testcase ID:	TC-001-004
Testcase Name:	Server Shut-Down
Req.-ID:	LF10, LF20, LF30, LF50
Descrip-tion	The test case verifies that the server can be shut down using an external interrupt.

Test Steps		
Step	**Action**	**Expected Result**
1	Open the CLI and select two valid input files.	The validation is executed successfully and the server will start configurated.
2	Open the Test Client and connect to the started Servers with the Test Client.	The started Servers are shown on the left side of the Test Client.
3	Using the CLI command “Ctrl+C” in the CLI.	The Program Stops and the Servers should not be available anymore.
4	Try to reconnect to the now Shut Down Servers.	The Servers are not reachable.

Testdata:	TD-002-001			
Dataset	File	Validation	Permission Input	Permission Output
1	KaffeeMaschinen.aml	valid	given	given
2	Test_aml.aml	valid	given	given

10.1.5. <TC-001-005> Server Start-up with ten different input files

Testcase ID:	TC-001-005
Testcase Name:	Server Start-up with ten different input files
Req.-ID:	LF10, LF20, LF30, LF40
Descrip-tion	The test case verifies that input files are parsed correctly and can be viewed in the Test Client.

Test Steps		
Step	**Action**	**Expected Result**
1	Open the CLI and select ten valid input files.	The validation is executed successfully and the server will start configurated.
2	Open the Test Client and connect to the started Servers with the Test Client.	The started Servers are shown on the left side of the Test Client.

Testdata:	TD-002-001			
Dataset	File	Validation	Permission Input	Permission Output
1	KaffeeMaschinen.aml	Valid	Given	Given
2	Test_aml.aml	Valid	Given	Given
3	10Level_Last6Attri.aml	Valid	Given	Given
4	10Level_ea1Att.aml	Valid	Given	Given
5	empty_data.aml	Invalid	Given	Denied
6	1Level_multipleAttri-Level.aml	Valid	Given	Given
7	10Level_Last6At-triWithMultiLevel.aml	Valid	Given	Given
8	Balluff.aml	Valid	Given	Given
9	Balluff-BNI_PNT-508-105-Z015-CAEX30-20201207.aml	Valid	Given	Given
10	Balluff-BNI_PNT-507-005-Z040-20201207-CAEX30.aml	Valid	Given	Given