**System Test Plan**  
(Systemtest Plan)

**(TINF19C, SWE I Praxisprojekt 2020/2021)**

Project: OPC UA Server Farm

Customer: Rentschler & Holder

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| --- | --- | --- | --- |
| **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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# 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.

# 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

# 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 shutdowns 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 |

# 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 | Priority | Testsuite ID |
| LF10: Command Line Interface | checks if User Input is valid, User Interface is **not to be tested** | A | TS-001: Command Line Interface |
| 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 configuration | A | TS-002: Core Library |
| LF50: Server shutdown | Stops Server after external interrupt | B | TS-002: Core Library |
| LF60: Logging | Errors and other Events are displayed in a log file | B | TS-001: Command Line Interface |

# 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.

# 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.

# Test Equipment

The following equipment must be available for testing:

* A computer with Linux
* OPC UA Demo Client [(Download Here)](https://industrial.softing.com/de/produkte/opc-ua-und-opc-classic-sdks/opc-ua-demo-client.html#tx-dftabs-tabContent1)
* 10 different Automation ML files

# 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.

# Test Planning

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

# Appendix: Testcases

## Testsuite <TS-001> Core Library

### <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 |
|  | | | | |

### <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 | |
| **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: <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 |
|  | | | | |

### <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 | |
| **Description** | 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 |
|  | | | | |

### <TC-001-004> Server Shut-Down

|  |  |  |
| --- | --- | --- |
| **Testcase ID:** | TC-001-004 | |
| **Testcase Name:** | Server Shut-Down | |
| **Req.-ID:** | LF10, LF20, LF30, LF50 | |
| **Description** | 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 |
|  | | | | |

### <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 | |
| **Description** | 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\_multipleAttriLevel.aml | Valid | Given | Given |
| 7 | 10Level\_Last6AttriWithMultiLevel.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 |
|  | | | | |