Thryve QA Case Study

Task 1 & 2

Ngumbah Michael Nyika

Task 1: Java Solution

General Characteristics

Language Used: Java

Java Testing Framework: JUnit 4.8.1

Java SDK: Oracle OpenJDK 22.0.1

Project Build Tool: Maven 4.0.0

Test Runner Plugin Type: Surefire

Test Runner Plugin Version: 3.2.5

Integrated Development Environment (IDE): IntelliJ (JetBrains)

Web Client Library Type: OKHttp

Web Client Library Version: 4.12.0

Task 1: Haskell Solution

General Characteristics

GHC (Glasgow Haskell Compiler) Version: 9.4.8

Haskell Stack Tool Version: 2.9.3

Testing Framework: HUnit 1.6.2

Integrated Development Environment (IDE): Visual Studio Code 1.90.1 Universal

Web Client Library Type: HTTPConduit 2.3.8.3

JSON Unmarshalling Library: Aeson 2.2.3.0

Task 1

Artifacts (Java & Haskell)

Delivery Formats: Zip

Project Names: Thryve_UploadData_TestProject and Thryve-UploadData-Haskell

Java Version Size: 12KB
Haskell Version Size: 2.7MB

Hardware

Macbook Pro 16-Inch
Apple Silicon

Tests (Java & Haskell)

Java Test Class: PositiveUploadtest.java
Java Test Method Name: check_Uploaded_HealthDataSample_Corresponds_ExactlyTo_Downloaded_Sample

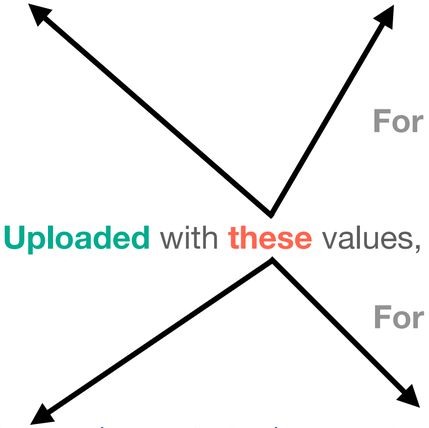
Haskell Test Module: Main.hs
Haskell Test Function Name: test_Uploaded_Values_Matches_Downloaded_Values_Exactly

Task 1

General Test Intention

```
"{\"height\": "175",\"weight\": “73.2”,\”birthdate\": \"1974-09-14\",\"gender\": \"female\"}";
```

Example of User Health Data Upload JSON Content



For Java

Check that Health Data **Uploaded** with **these** values, corresponds to the Height and Weight values in the **Downloaded** content, f**or that specific Thryve User**

For Haskell


```
"{\"height\": "167",\"weight\": “75.6”,\”birthdate\”: \"1974-09-14\",\"gender\": \"female\"}";
```

*Simple, static numerical values were used for height and weight:
One way to improve the test is to generate values within a numerical range that are valid (for both height and weight parameters);
It does not make the test any more valuable functionally, but it varies the output interestingly enough to ward off bugs at the edge of the valid ranges, for example, a weight of *0kg or 1kg is technically feasible*, but **not -1kg**

Task 1

How to run the Java Implementation with Maven

```
michaelnyika@michaelnyika-T0JM Thryve_UploadData_TestProject % mvn clean test
```

Thryve_UploadData_TestProject — -zsh — 190×35

```
[INFO] --- resources:3.3.1:testResources (default-testResources) @ Thryve_UploadData_TestProject ---
[INFO] skip non existing resourceDirectory /Users/michaelnyika/IdeaProjects/Thryve_UploadData_TestProject/src/test/resources
[INFO]
[INFO] --- compiler:3.13.0:testCompile (default-testCompile) @ Thryve_UploadData_TestProject ---
[INFO] Recompiling the module because of changed source code.
[INFO] Compiling 1 source file with javac [debug target 22] to target/test-classes
[INFO] /Users/michaelnyika/IdeaProjects/Thryve_UploadData_TestProject/src/test/java/PositiveUploadTest.java: /Users/michaelnyika/IdeaProjects/Thryve_UploadData_TestProject/src/test/java/Positi
veUploadTest.java uses or overrides a deprecated API.
[INFO] /Users/michaelnyika/IdeaProjects/Thryve_UploadData_TestProject/src/test/java/PositiveUploadTest.java: Recompile with -Xlint:deprecation for details.
[INFO]
[INFO] --- surefire:3.2.5:test (default-test) @ Thryve_UploadData_TestProject ---
[INFO] Using auto detected provider org.apache.maven.surefire.junit4.JUnit4Provider
[INFO]
[INFO] -------------------------------------------------------
[INFO]  T E S T S
[INFO] -------------------------------------------------------
[INFO] Running PositiveUploadTest
Authentication Token : -> 207ad3c2209ff8c74032e3f2ebb3b629
Response Code: [204] : Data Upload Success: -> true
We Uploaded data just after timestamp: -> 1718449227067
Downloaded data: -> {"authenticationToken":"207ad3c2209ff8c74032e3f2ebb3b629","dataSources":[{"dataSource":1001,"data":[{"startTimestampUnix":1718449227000,"createdAtUnix":1718449227119,"dyn
amicValueType":5020,"value":"73.2","valueType":"DOUBLE"},{"startTimestampUnix":1718449227000,"createdAtUnix":1718449227119,"dynamicValueType":5030,"value":"175","valueType":"LONG"}]}]}
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.617 s -- in PositiveUploadTest
[INFO]
[INFO] Results:
[INFO]
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO] ------------------------------------------------------------------------
[INFO] BUILD SUCCESS
[INFO] ------------------------------------------------------------------------
[INFO] Total time:  1.608 s
[INFO] Finished at: 2024-06-15T13:00:27+02:00
[INFO] ------------------------------------------------------------------------
```

Task 1

How to run the Haskell Implementation with Stack

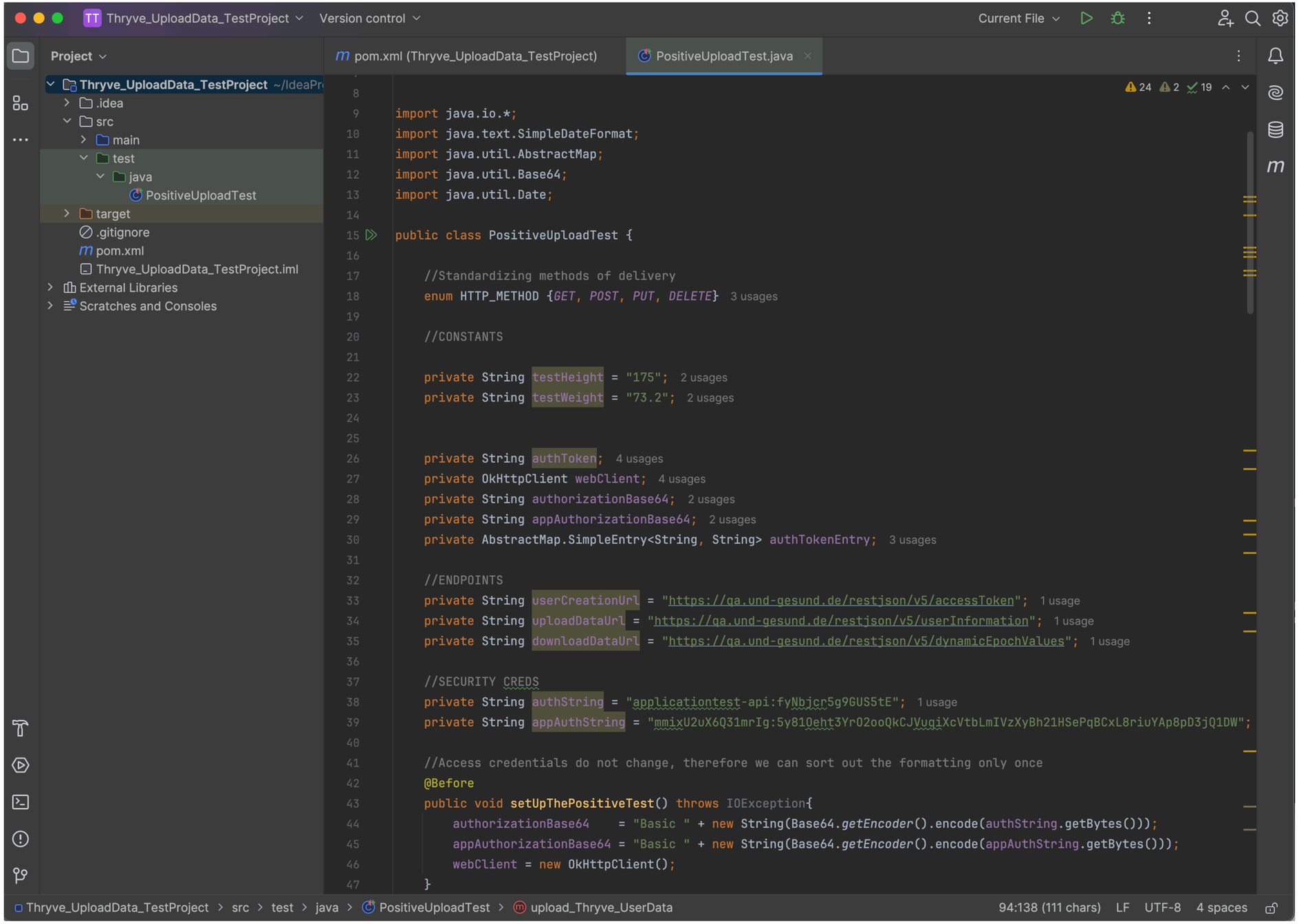
```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS

michaelnyika@michaelnyika-T0JM Thryve-UploadData-Haskell % stack build
The 'package-indices' key is deprecated in favour of 'package-index'.
Specified source-dir "test" does not exist
Stack has not been tested with GHC versions above 9.4, and using 9.6.5, this may fail
Stack has not been tested with Cabal versions above 3.8, but version 3.10.3.0 was found, this may fail

Warning: Directory listed in Thryve-UploadData-Haskell.cabal file does not exist: test
michaelnyika@michaelnyika-T0JM Thryve-UploadData-Haskell %
```

After running **stack build**, an executable file is Placed in the **.stack-work** hidden directory (this directory lies in the project root folder). Simply access the full path to it to run it.

```
PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS                                                    zsh

michaelnyika@michaelnyika-T0JM Thryve-UploadData-Haskell % /Users/michaelnyika/Downloads/Thryve-UploadData-Haskell/.stack-work/install/x86_64-osx/8c66de0f31f52daa83e5190383c9636731b10b
ac32af5a8d5dee537ef427bc9f/9.6.5/bin/Thryve-UploadData-Haskell-exe
Cases: 1  Tried: 0  Errors: 0  Failures: 0
 Thryve User Created : Access Token for Session : -> b8406bad90e39cfd2162f2ea6c6de2b2

Response Code After Upload: -> 204
Thryve User Health Data Uploaded at TimeStamp: -> 1718625668520

Just (ThryveHealthData {authenticationToken = "b8406bad90e39cfd2162f2ea6c6de2b2", dataSources = [DataSource {dataSource = 1001, data' = [Data {startTimestampUnix = 1718625669000, creat
edAtUnix = 1718625668541, dynamicValueType = 5020, value = "75.6", valueType = "DOUBLE"},Data {startTimestampUnix = 1718625669000, createdAtUnix = 1718625668541, dynamicValueType = 503
0, value = "167", valueType = "LONG"}]}]})

Cases: 1  Tried: 1  Errors: 0  Failures: 0
michaelnyika@michaelnyika-T0JM Thryve-UploadData-Haskell %
```

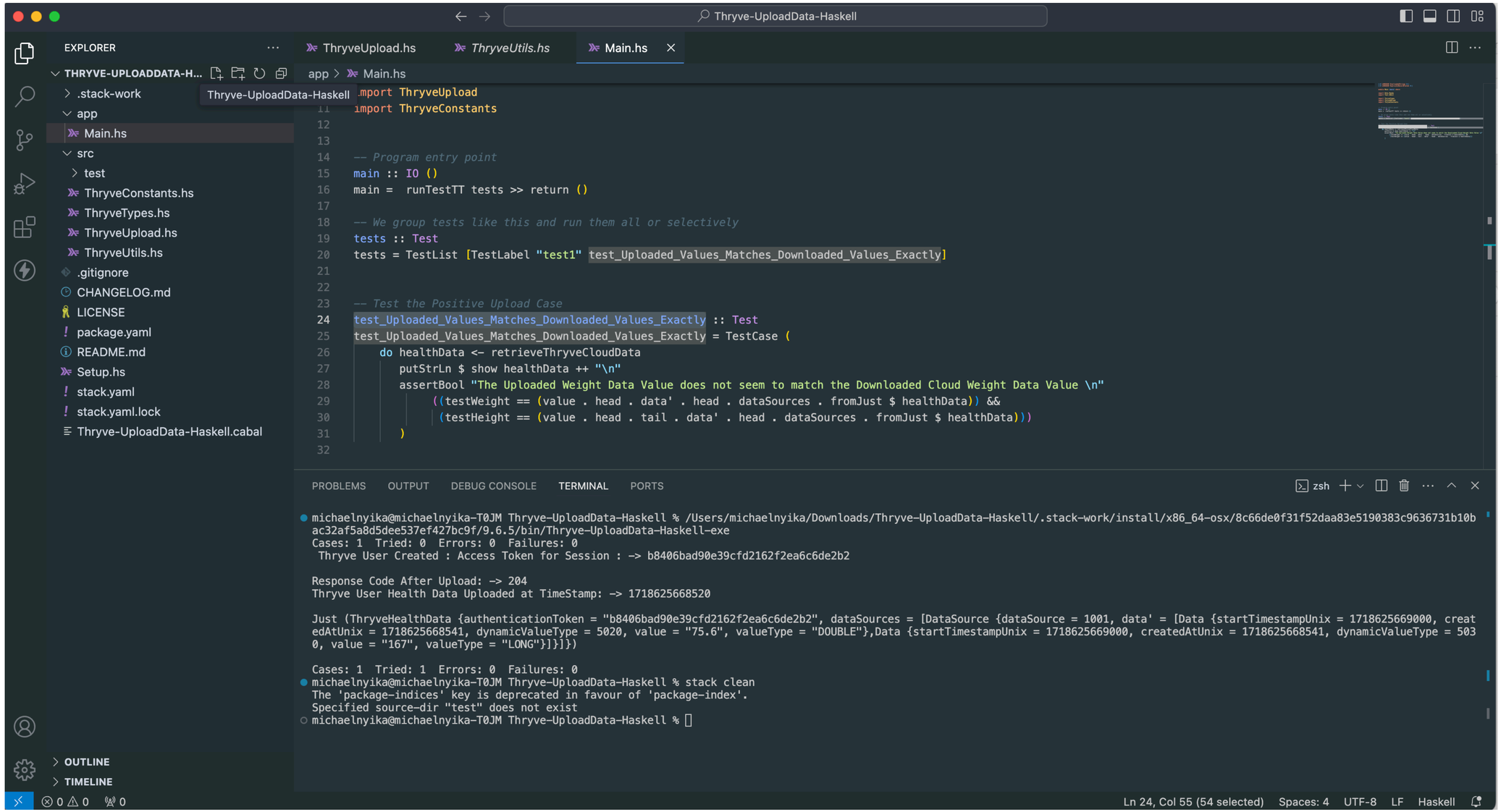
Task 1

Java IDE



Task 1

Haskell IDE



Task 2

Functional Cases Brainstorm

Task 2

Areas of Coverage (1)

[Required Params] Authentication Credentials: Secured versus Unsecured

[Required Params] Authentication Credentials: Partly Missing Credentials

[Optional Params] Authentication Credentials: Single, Correct Size Values, Correct Content-Type

[Optional Params] Single Param: Correct Size Values, Invalid Content-Type (eg: invalid chars)

[Optional Params] Single Param: Incorrect Size Values (too short, too long)

[Optional Params] Single Param: No content

[Optional Params] Multiple Params: Correct Size Values, Correct Content-Type *

[Optional Params] Multiple Params: Correct Size Values, Invalid Content-Type (eg: invalid chars) *

[Optional Params] Multiple Params: Incorrect Size Values (too short, too long) *

[Optional Params] Multiple Params: No content *

*All Optional parameters can/should be manipulated in a consistent manner, across the board; however, *exploratory testing* would expand that technique to include *irregular* patterns combinations: for example, one parameter has fewer characters than normal, another has more characters but invalid symbols, another is missing, etc.

Task 2

Areas of Coverage (2)

[Required & Optional] Operational Error Code: Check correct HTTP Response codes (500, 403, 401, 301, etc) correctness

[Optional] Valid Standard Language Values work with correct HTTP Response codes (eg: *en*, *de*, *dk*)

[Optional] Invalid Language Values work with correct HTTP Response codes (eg: *zz*, *qq*, *mm*)

} For example: language Option in Query Parameter for Thryve User Generation

[Required] Upload: JSON: Proper format, all values filled with correct values within boundary ranges

[Required] Upload: JSON: Missing values

[Required] Upload: JSON: Missing entire key-value JSON objects

[Required] Upload: JSON: Empty lists (JSONArrays)

[Required] Upload: Missing Content / No Content at all

[Required] Upload: JSON: Very Large *valid* payloads (gigabytes)

[Required] Upload: JSON: Successful upload, check Response Code (204 No-Content code, rather than 200)

[Required] Upload: Duplicate Required fields with valid values, for example, multiple authenticationToken fields supplied when uploading simple data

Task 2

Areas of Coverage (3) : Special Note on Time/Date Fields

[Optional Params] Test Using a Date representing Epoch (Jan 1 1970), though one cannot retrieve records older than 31 days

[Optional Params] Retrieve records exactly 31 days old, slightly older (literally by seconds or minutes) or slightly under the limit

[Optional Params] Retrieve records for Leap Years

[Optional Params] Retrieve records when request has duplicated fields (for example, multiple startTimestampUnix field values)

[Optional Params] Missing half of a pair of dates combination, required to make a valid query (for example, not specifying endTimestampUnix even though startTimestampUnix was specified

[Outlier Monkey TestCase] Send a valid upload request with valid payload and credentials, but add headers not accounted for in the API Requirements (for example, Cache-Control, Keep-Alive, Cross-Origin-Embedder-Policy, etc)

Task 2

Non Functional Cases Brainstorm

Task 2

Non-Functional Cases Brainstorm

100,000+ Thryve users created simultaneously: Check Response Times

100,000+ Thryve users created simultaneously: Check all responses are HTTP 200 (valid credentials presented)

100,000+ Thryve users created simultaneously: At least 50% invalid credentials; Check HTTP Responses

10,000+ Thryve users created simultaneously and consistently every second for 1 minute

10,000+ Thryve users created simultaneously: Vary the load distribution of User creation requests pseudo-randomly

100+ Thryve users created with Gigabytes of Payload Data (JSON), sent intermittently

Error Performance Handling: 10,000+ Thryve users attempted creation with bad payloads, bad authentication credentials

Manual Test: Error Performance Handling: Upload large payload over a slow internet connection (wired broadband or low-bandwidth wifi); repeat the test with internet connection that breaks and resumes; see if any partial payloads can be successfully downloaded

! Thank You for the Challenge !

Ngumbah Michael Nyika

June 2024