Blaise 5 Load Testing

How to set up a load test for a Blaise 5 web survey with JMeter

IBUC 2023
DURHAM, NC, USA

What is JMeter

- Apache JMeter™ is an application for load testing functional behavior and measuring performance
- Simulates a group of users sending requests to a server
- Monitors the server responses
- Logs information about the performance of the server
- Open source
- Java application

Installing JMeter

- Download and install Java 8 from https://www.java.com/en/download/manual.jsp
- Download apache-jmeter-5.6.2.zip from the Apache JMeter website https://dlcdn.apache.org//jmeter/binaries/ and extract it to your desired location
- Download plugins-manager.jar from https://jmeter-plugins.org/install/Install/ to the *..\lib\ext directory*
- Start JMeter with *..\bin\jmeter.bat*

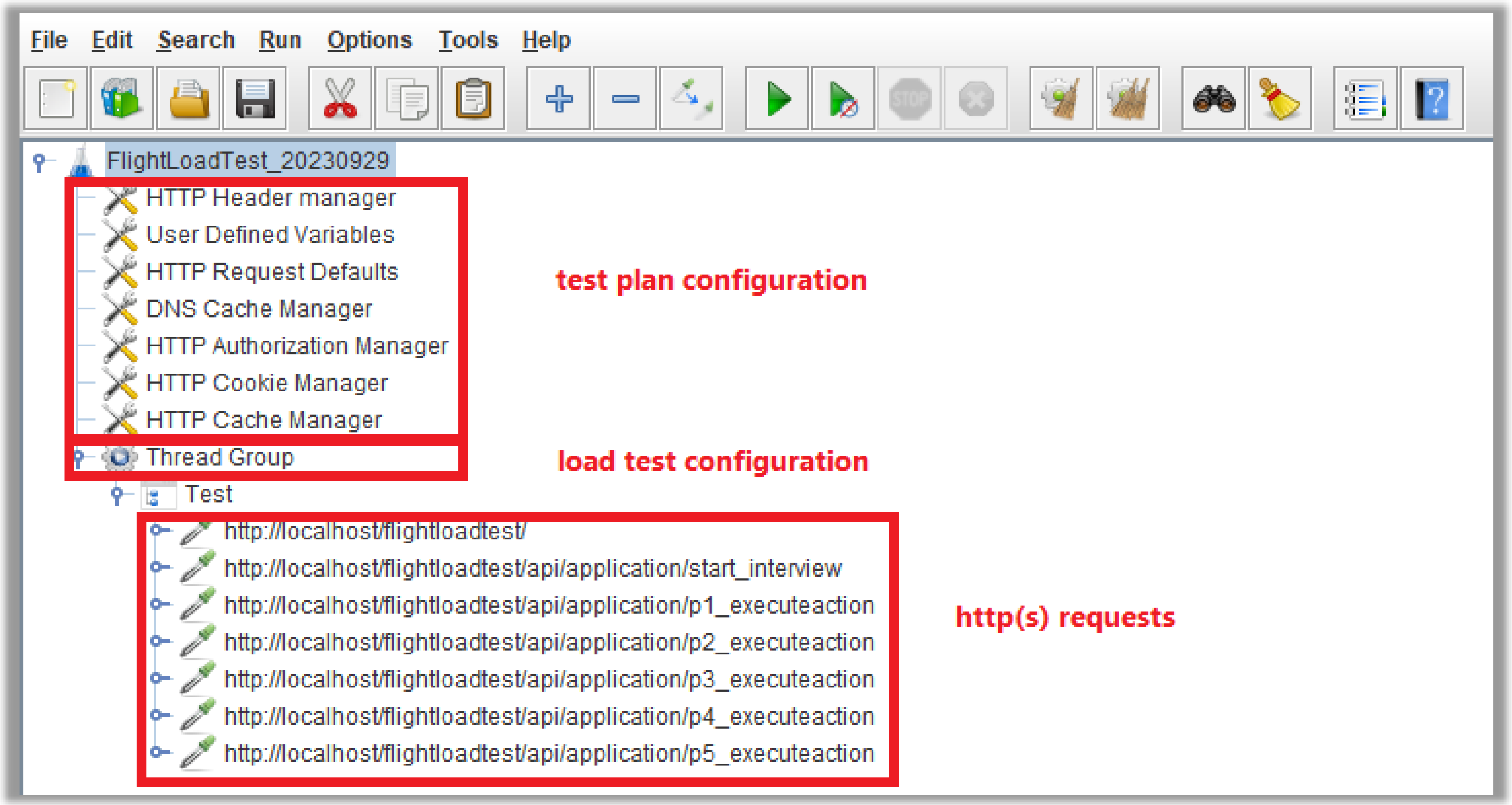
Installing BlazeMeter Chrome Extension

- Records HTTP requests to a server
- Install the BlazeMeter Chrome extension from https://chrome.google.com/webstore/detail/blazemeter-the-continuous/mbopgmdnpcbohhpnfglgohlbhfongabi
- Pin the extension to your toolbar
- Create a free account on https://a.blazemeter.com/app/sign-up
- Login and check your username in the extension

Recording a JMeter script

- Make sure the Blaise instrument is properly installed in the server park
- Open the Chrome browser and open the BlazeMeter extension
- Enter a name for your test
- Start the BlazeMeter recording
- Enter the URL to start the Blaise instrument
- Fill out the instrument with your desired route
- Stop the BlazeMeter recording
- Save the recording as a JMeter file (.jmx)
- Copy the JMeter file from the Downloads folder to your desired location

The JMeter script



FlightLoadTest_20230929
- HTTP Header manager
- User Defined Variables
- HTTP Request Defaults
- DNS Cache Manager
- HTTP Authorization Manager
- HTTP Cookie Manager
- HTTP Cache Manager
- Thread Group
  - Test
    - http://localhost/flightloadtest/
    - http://localhost/flightloadtest/api/application/start_interview
    - http://localhost/flightloadtest/api/application/p1_executeaction
    - http://localhost/flightloadtest/api/application/p2_executeaction
    - http://localhost/flightloadtest/api/application/p3_executeaction
    - http://localhost/flightloadtest/api/application/p4_executeaction
    - http://localhost/flightloadtest/api/application/p5_executeaction

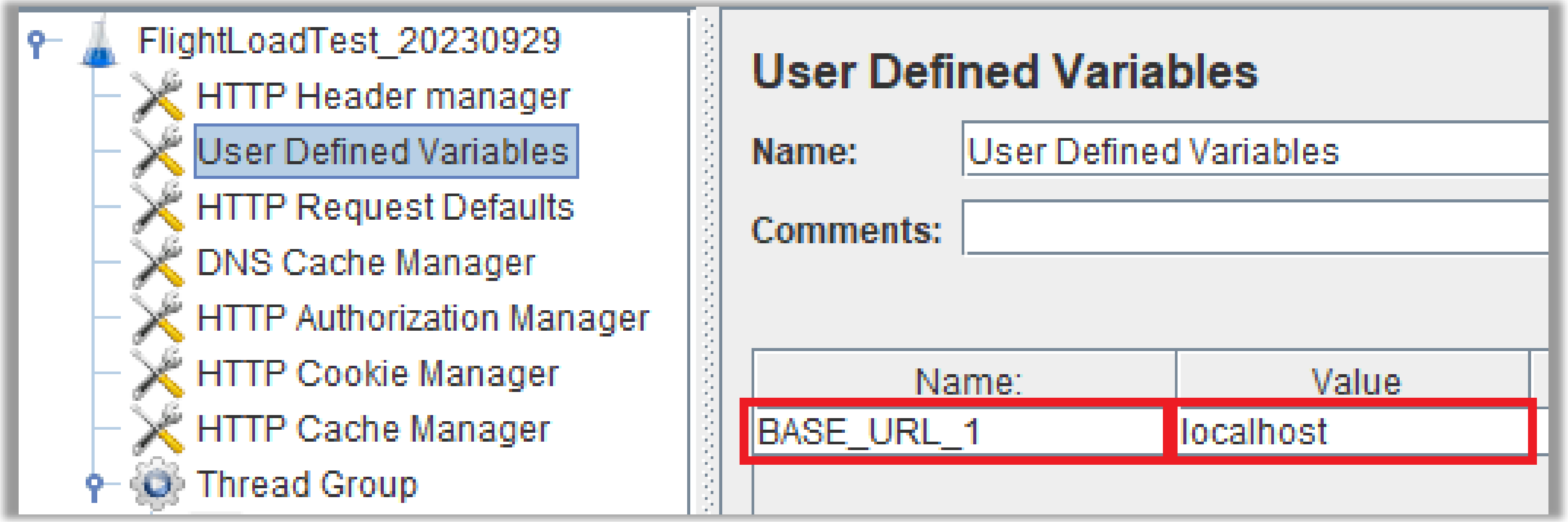
test plan configuration

load test configuration

http(s) requests

Test Plan Configuration: User Defined Variables

- Make sure the right web server is used in your test
- The value is assigned to variable *BASE_URL_1*



FlightLoadTest_20230929
- HTTP Header manager
- User Defined Variables
- HTTP Request Defaults
- DNS Cache Manager
- HTTP Authorization Manager
- HTTP Cookie Manager
- HTTP Cache Manager
- Thread Group

User Defined Variables

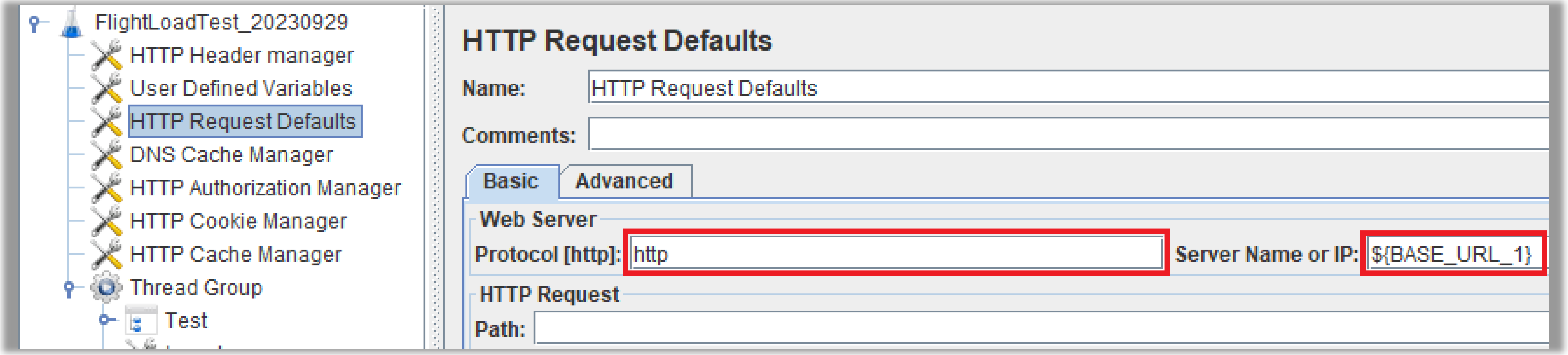
Name: User Defined Variables

Comments:

Name:	Value
BASE_URL_1	localhost

Test Plan Configuration: HTTP Request Defaults

- To make sure this web server variable is used in all requests in your script, add the variable to the *Server Name or IP* field:



FlightLoadTest_20230929
- HTTP Header manager
- User Defined Variables
- HTTP Request Defaults
- DNS Cache Manager
- HTTP Authorization Manager
- HTTP Cookie Manager
- HTTP Cache Manager
- Thread Group
  - Test

HTTP Request Defaults

Name: HTTP Request Defaults

Comments:

Basic | Advanced

Web Server

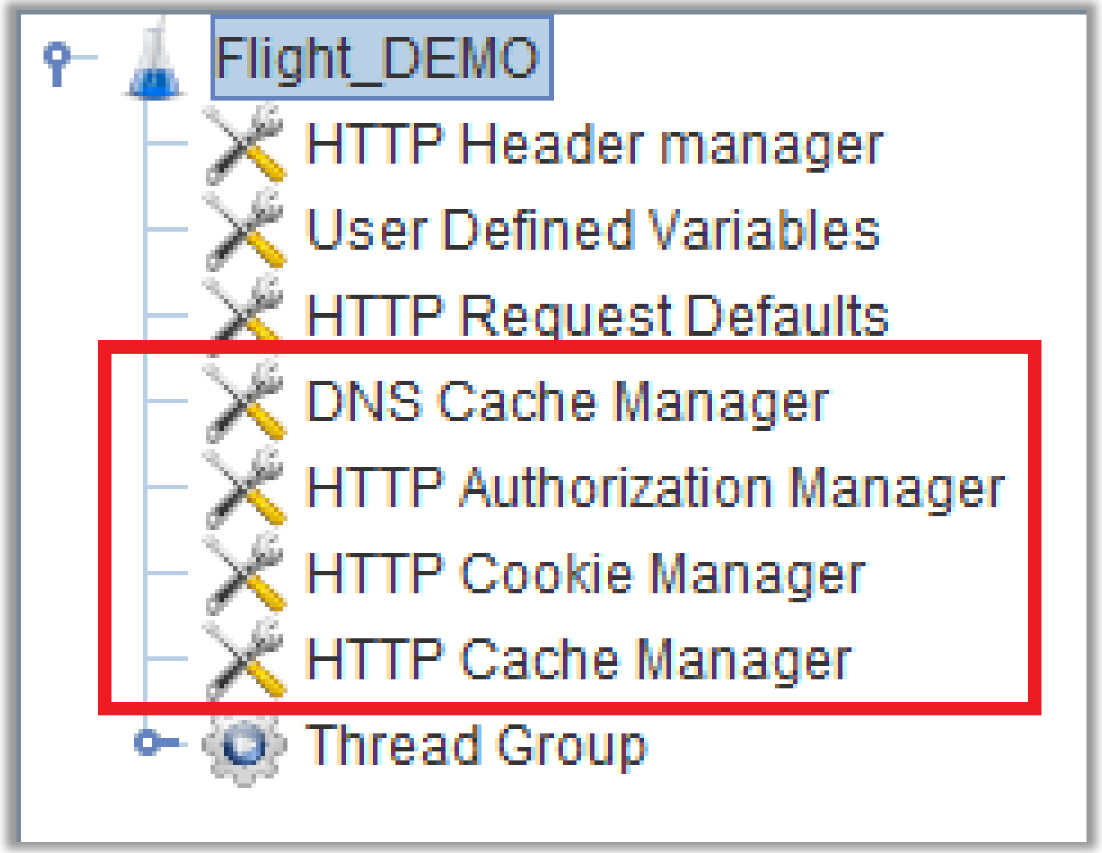
Protocol [http]: http

Server Name or IP: ${BASE_URL_1}

HTTP Request

Path:

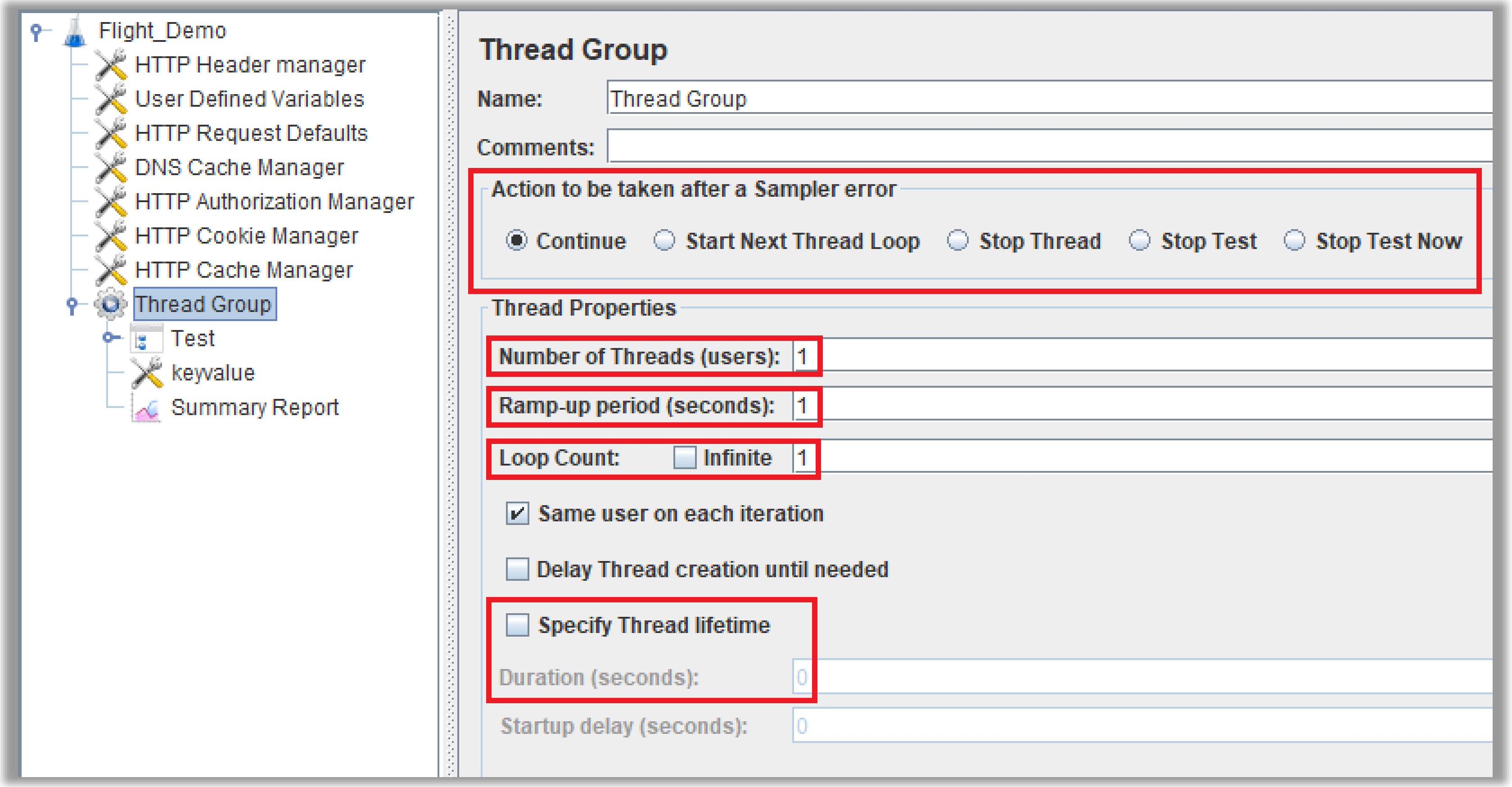
Test Plan Configuration: Remove Unnecessary Config Elements


Flight_DEMO
HTTP Header manager
User Defined Variables
HTTP Request Defaults
DNS Cache Manager
HTTP Authorization Manager
HTTP Cookie Manager
HTTP Cache Manager
Thread Group

Load Test Configuration: Thread Group

- Set the error behavior
- Set the number of threads (concurrent users)
- Set the ramp-up period (time it takes to reach full number of threads)
- Set the number of times or duration that a thread is executed

Load Test Configuration: Thread Group



Flight_Demo
- HTTP Header manager
- User Defined Variables
- HTTP Request Defaults
- DNS Cache Manager
- HTTP Authorization Manager
- HTTP Cookie Manager
- HTTP Cache Manager
- Thread Group
  - Test
  - keyvalue
  - Summary Report

Thread Group

Name: Thread Group

Comments:

Action to be taken after a Sampler error

[✓ Continue] Start Next Thread Loop Stop Thread Stop Test Stop Test Now

Thread Properties

Number of Threads (users): 1

Ramp-up period (seconds): 1

Loop Count: ☐ Infinite 1

☑ Same user on each iteration

☐ Delay Thread creation until needed

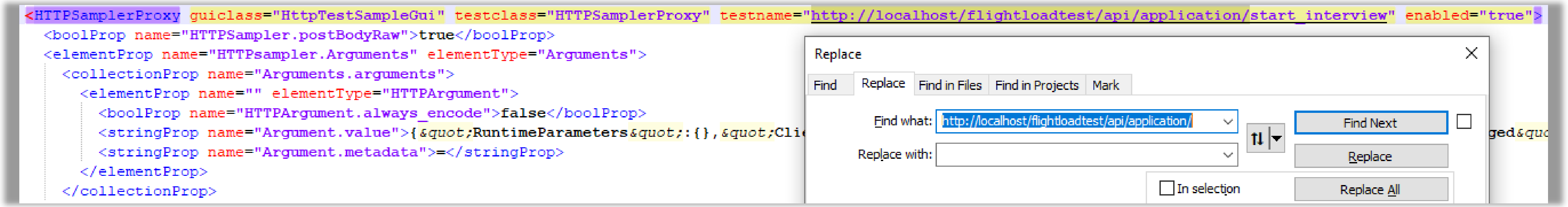
☐ Specify Thread lifetime

Duration (seconds): 0

Startup delay (seconds): 0

Renaming HTTP Requests

- Names of HTTP requests are quite generic (*executeaction*) and a bit hard to read
- Renaming helps you keep track of the steps that are executed during a test run
- Renaming can be done in Notepad since JMX files are actually XML files:

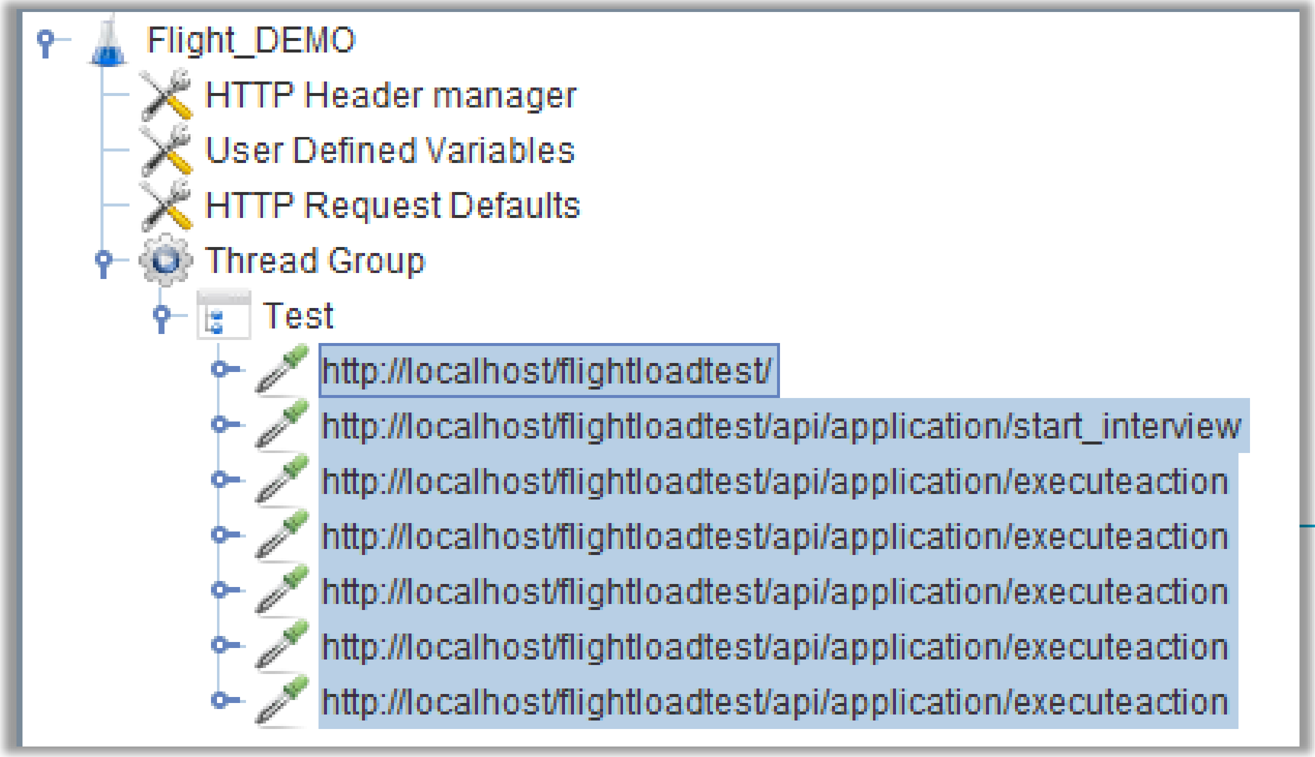


```
<HTTPSamplerProxy guiclass="HttpTestSampleGui" testclass="HTTPSamplerProxy" testname="http://localhost/flightloadtest/api/application/start_interview" enabled="true">
  <boolProp name="HTTPSampler.postBodyRaw">true</boolProp>
  <elementProp name="HTTPsampler.Arguments" elementType="Arguments">
    <collectionProp name="Arguments.arguments">
      <elementProp name="" elementType="HTTPArgument">
        <boolProp name="HTTPArgument.always_encode">false</boolProp>
        <stringProp name="Argument.value">{&quot;RuntimeParameters&quot;:{},&quot;Cli
        <stringProp name="Argument.metadata">=</stringProp>
      </elementProp>
    </collectionProp>
```

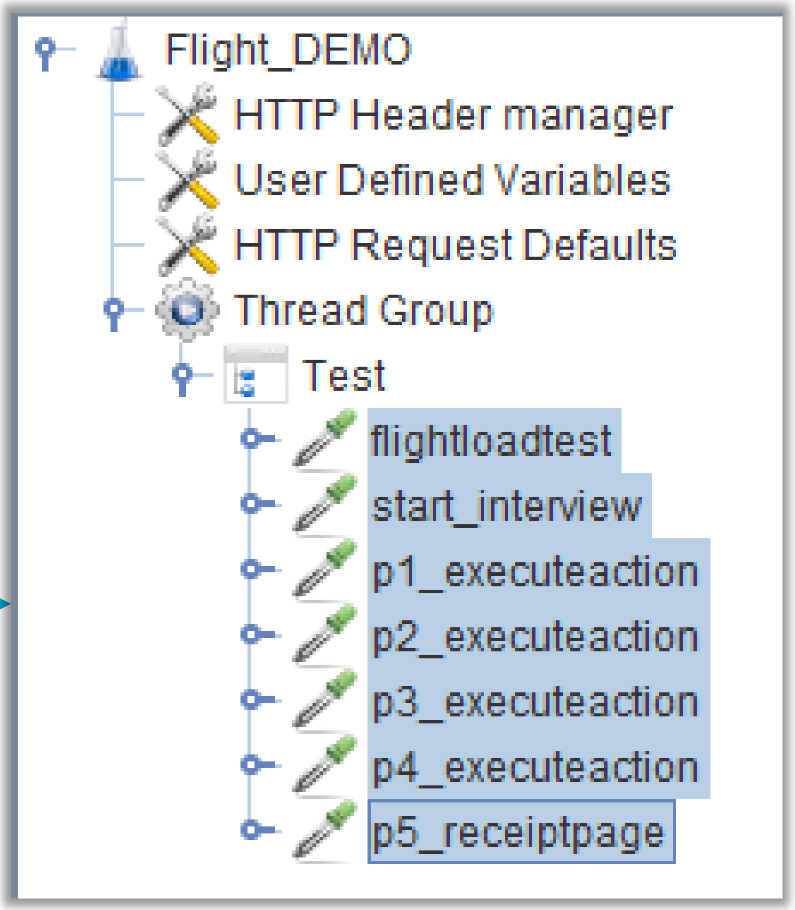
Find what: http://localhost/flightloadtest/api/application/

Replace with:

Renaming HTTP Requests



```
Flight_DEMO
  HTTP Header manager
  User Defined Variables
  HTTP Request Defaults
  Thread Group
    Test
      http://localhost/flightloadtest/
      http://localhost/flightloadtest/api/application/start_interview
      http://localhost/flightloadtest/api/application/executeaction
      http://localhost/flightloadtest/api/application/executeaction
      http://localhost/flightloadtest/api/application/executeaction
      http://localhost/flightloadtest/api/application/executeaction
      http://localhost/flightloadtest/api/application/executeaction
```



```
Flight_DEMO
  HTTP Header manager
  User Defined Variables
  HTTP Request Defaults
  Thread Group
    Test
      flightloadtest
      start_interview
      p1_executeaction
      p2_executeaction
      p3_executeaction
      p4_executeaction
      p5_receiptpage
```

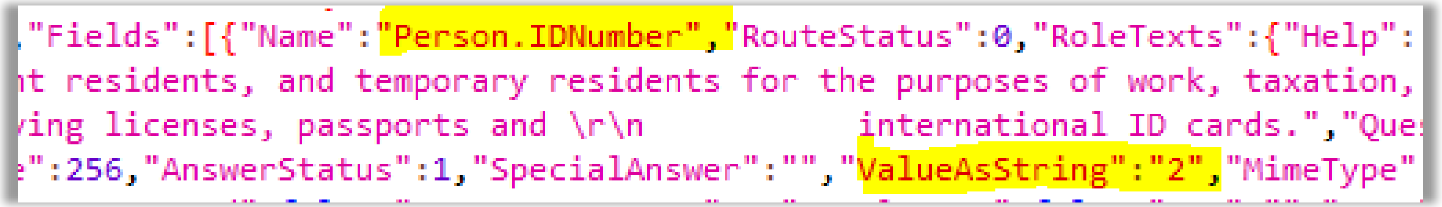
Modifying HTTP Requests of a JMeter script (manually)

- *KeyValue, RuleSessionId*, *AccesToken*, *RefreshToken* and *ParkId* are recorded in the HTTP requests
- These parameters need to be dynamic

KeyValue (Primary Key)

Problem:

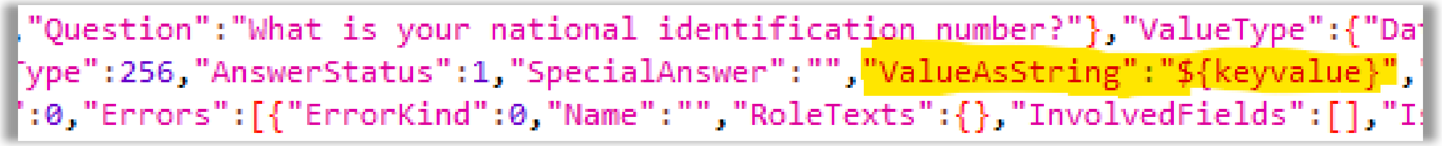
- The *KeyValue* (PK) is recorded in the HTTP Requests. All simulated users will use the same KeyValue



```
,"Fields":[{"Name":"Person.IDNumber","RouteStatus":0,"RoleTexts":{"Help":
nt residents, and temporary residents for the purposes of work, taxation,
ving licenses, passports and \r\n            international ID cards.","Que
e":256,"AnswerStatus":1,"SpecialAnswer":"","ValueAsString":"2","MimeType"
```

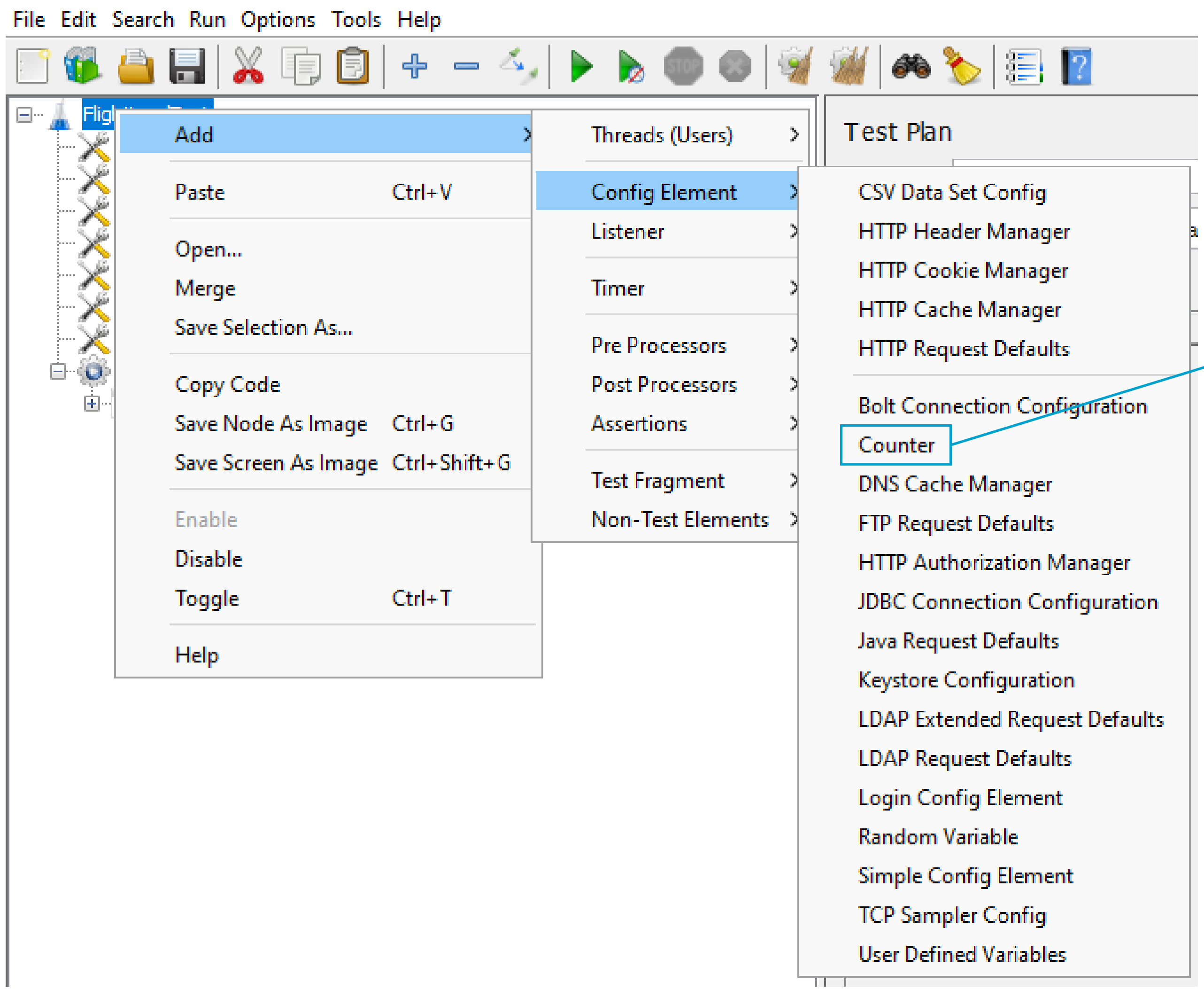
Solution:

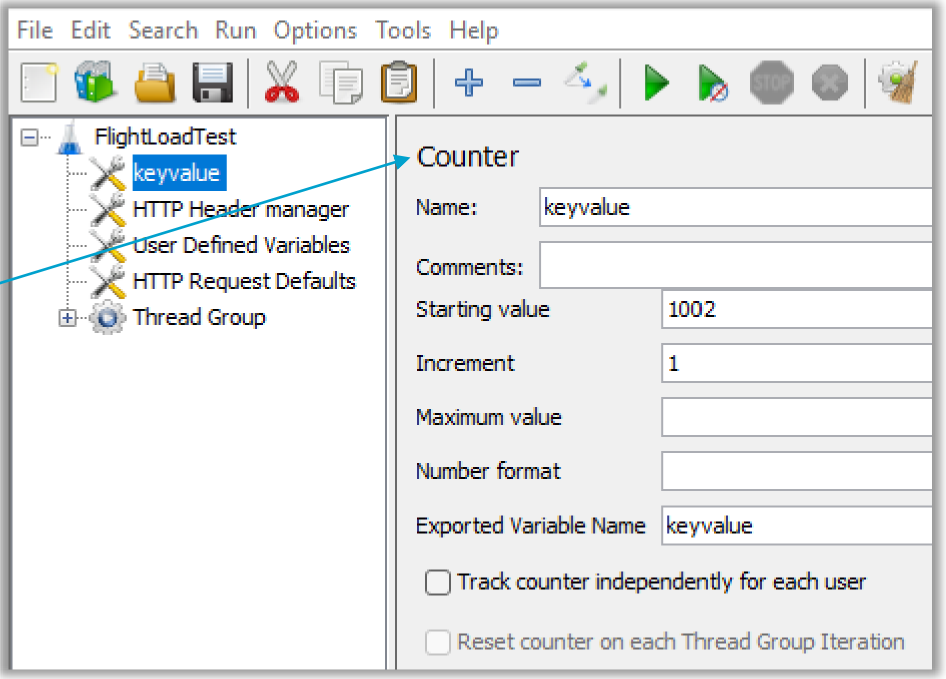
- Make the *KeyValue* variable



```
,"Question":"What is your national identification number?"},"ValueType":{"Da
Type":256,"AnswerStatus":1,"SpecialAnswer":"","ValueAsString":"${keyvalue}",
":0,"Errors":[{"ErrorKind":0,"Name":"","RoleTexts":{},"InvolvedFields":[],"I
```

Adding a KeyValue counter





Counter

Name:	keyvalue
Comments:	
Starting value	1002
Increment	1
Maximum value	
Number format	
Exported Variable Name	keyvalue

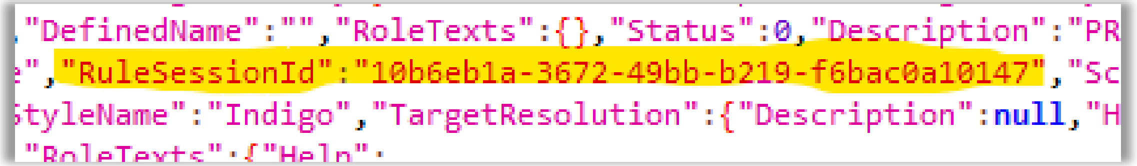
☐ Track counter independently for each user

☐ Reset counter on each Thread Group Iteration

RuleSessionId, AccesToken, RefreshToken and ParkId

Problem:

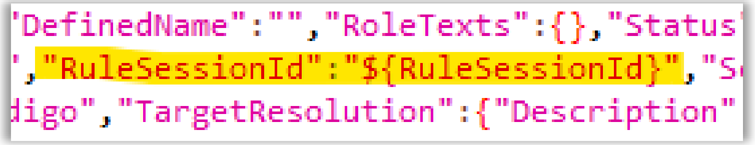
- The *RuleSessionId*, *AccesToken*, *RefreshToken* and *ParkId* are also recorded in the HTTP Requests. However, every user has to receive different Ids and Tokens from the server.



```
,"DefinedName":"","RoleTexts":{},"Status":0,"Description":"PR
e","RuleSessionId":"10b6eb1a-3672-49bb-b219-f6bac0a10147","Sc
styleName":"Indigo","TargetResolution":{"Description":null,"H
"RoleTexts":{"Help":
```

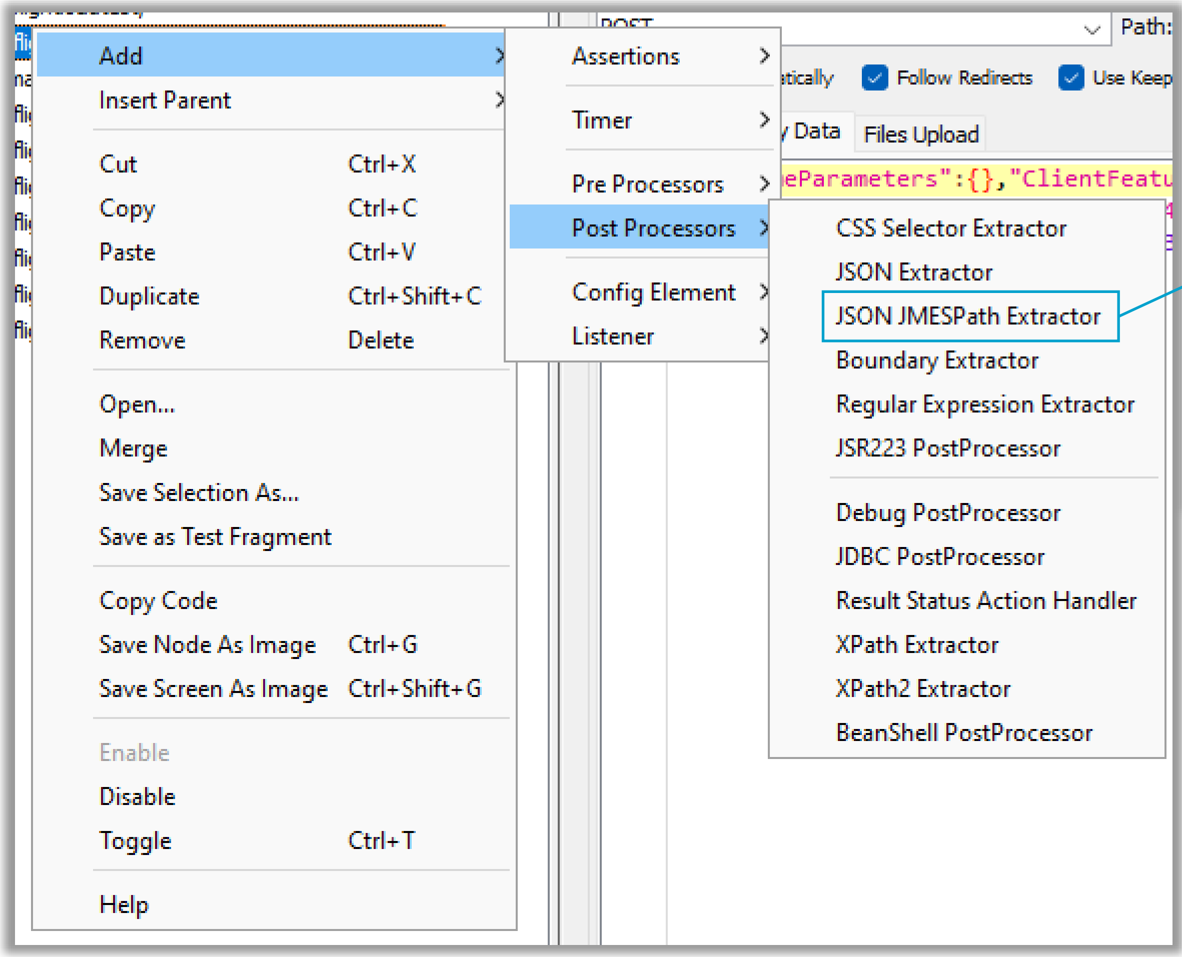
Solution:

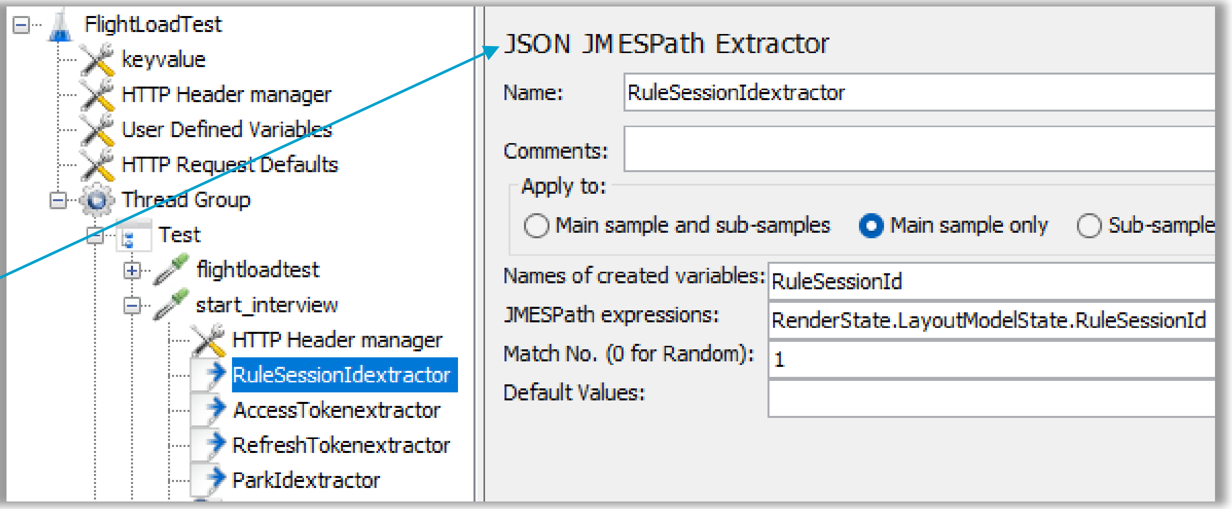
- Make the Ids and Tokens variable
- Extract Ids and Tokens from the server response to our *start_interview* request
- Use them in the consecutive requests we send to the server



```
'DefinedName":"","RoleTexts":{},"Status
',"RuleSessionId":"${RuleSessionId}","S
digo","TargetResolution":{"Description"
```

Adding Extractors

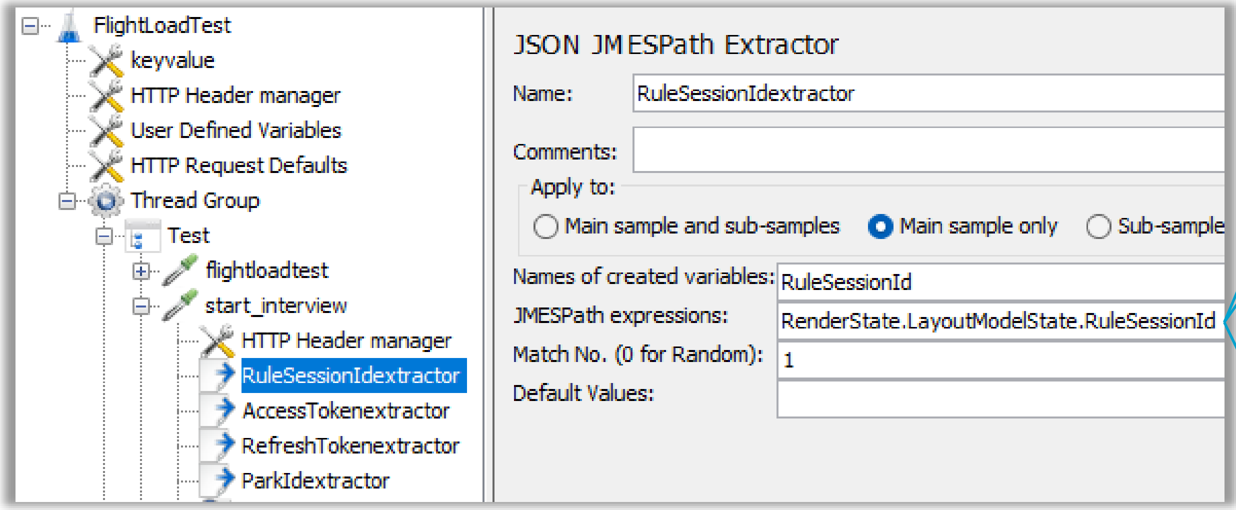




JSON JMESPath Extractor

Name:	RuleSessionIdextractor
Comments:	
Apply to:	Main sample and sub-samples [✓ Main sample only] Sub-sample
Names of created variables:	RuleSessionId
JMESPath expressions:	RenderState.LayoutModelState.RuleSessionId
Match No. (0 for Random):	1
Default Values:	

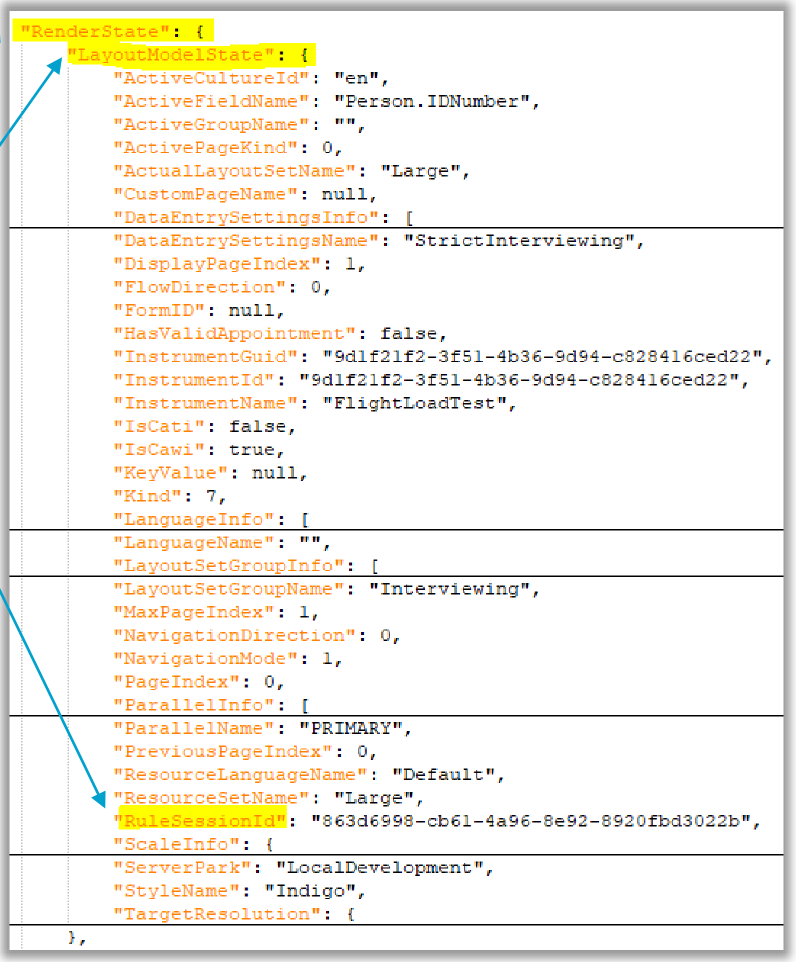
Adding Extractors



FlightLoadTest
- keyvalue
- HTTP Header manager
- User Defined Variables
- HTTP Request Defaults
- Thread Group
  - Test
    - flightloadtest
    - start_interview
      - HTTP Header manager
      - RuleSessionIdextractor
      - AccessTokenextractor
      - RefreshTokenextractor
      - ParkIdextractor

JSON JMESPath Extractor

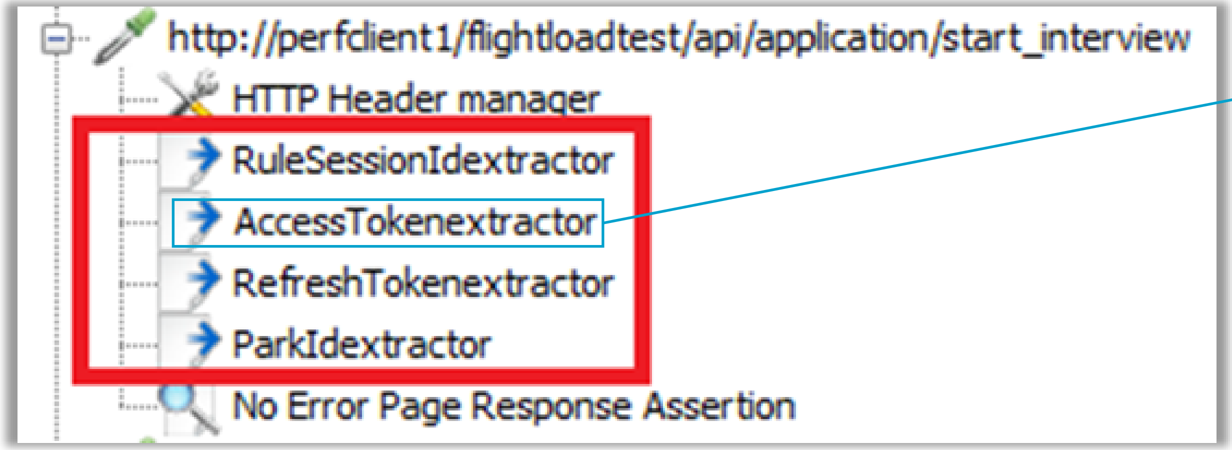
Name:	RuleSessionIdextractor
Comments:	
Apply to:	Main sample and sub-samples [✓ Main sample only] Sub-sample
Names of created variables:	RuleSessionId
JMESPath expressions:	RenderState.LayoutModelState.RuleSessionId
Match No. (0 for Random):	1
Default Values:	



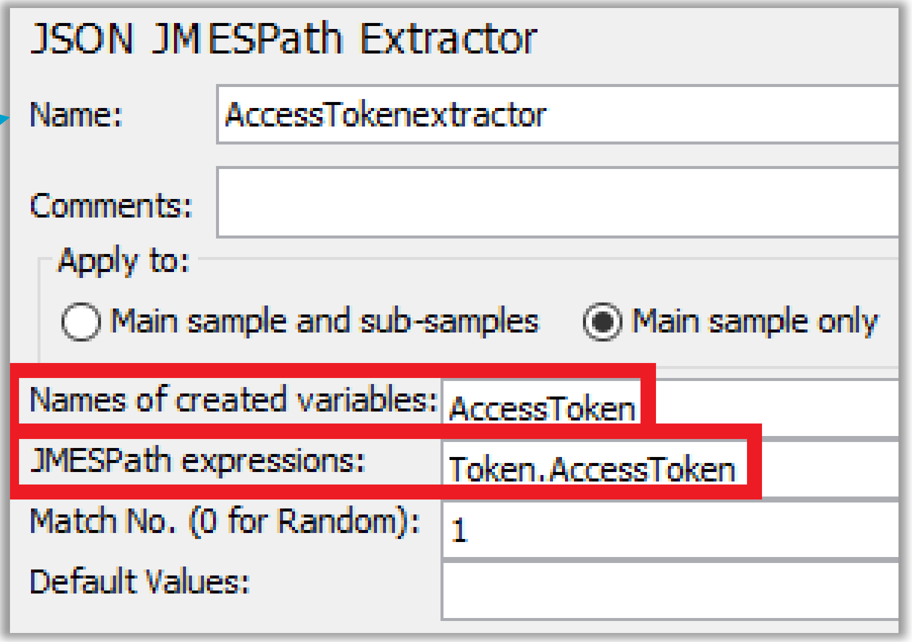
```
"RenderState": {
    "LayoutModelState": {
        "ActiveCultureId": "en",
        "ActiveFieldName": "Person.IDNumber",
        "ActiveGroupName": "",
        "ActivePageKind": 0,
        "ActualLayoutSetName": "Large",
        "CustomPageName": null,
        "DataEntrySettingsInfo": [
        "DataEntrySettingsName": "StrictInterviewing",
        "DisplayPageIndex": 1,
        "FlowDirection": 0,
        "FormID": null,
        "HasValidAppointment": false,
        "InstrumentGuid": "9d1f21f2-3f51-4b36-9d94-c828416ced22",
        "InstrumentId": "9d1f21f2-3f51-4b36-9d94-c828416ced22",
        "InstrumentName": "FlightLoadTest",
        "IsCati": false,
        "IsCawi": true,
        "KeyValue": null,
        "Kind": 7,
        "LanguageInfo": [
        "LanguageName": "",
        "LayoutSetGroupInfo": [
        "LayoutSetGroupName": "Interviewing",
        "MaxPageIndex": 1,
        "NavigationDirection": 0,
        "NavigationMode": 1,
        "PageIndex": 0,
        "ParallelInfo": [
        "ParallelName": "PRIMARY",
        "PreviousPageIndex": 0,
        "ResourceLanguageName": "Default",
        "ResourceSetName": "Large",
        "RuleSessionId": "863d6998-cb61-4a96-8e92-8920fbd3022b",
        "ScaleInfo": {
        "ServerPark": "LocalDevelopment",
        "StyleName": "Indigo",
        "TargetResolution": {
    },
```

1. Calling field *RuleSessionId* from the *start_interview* server response and extracting the value
2. Assigning value to variable, calling variable in the consecutive requests

Adding Extractors



```
http://perfclient1/flightloadtest/api/application/start_interview
    HTTP Header manager
    RuleSessionIdextractor
    AccessTokenextractor
    RefreshTokenextractor
    ParkIdextractor
    No Error Page Response Assertion
```

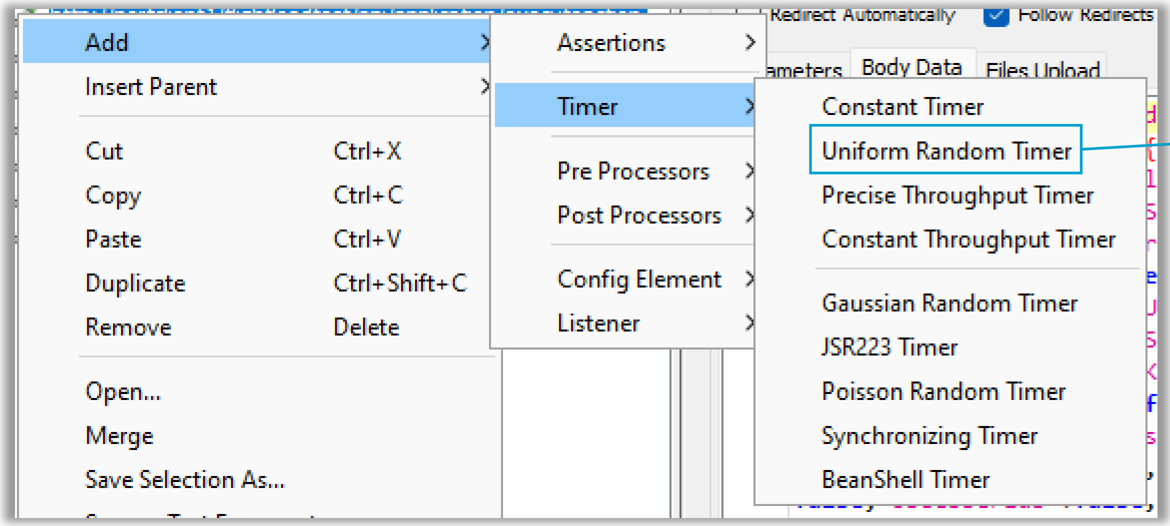


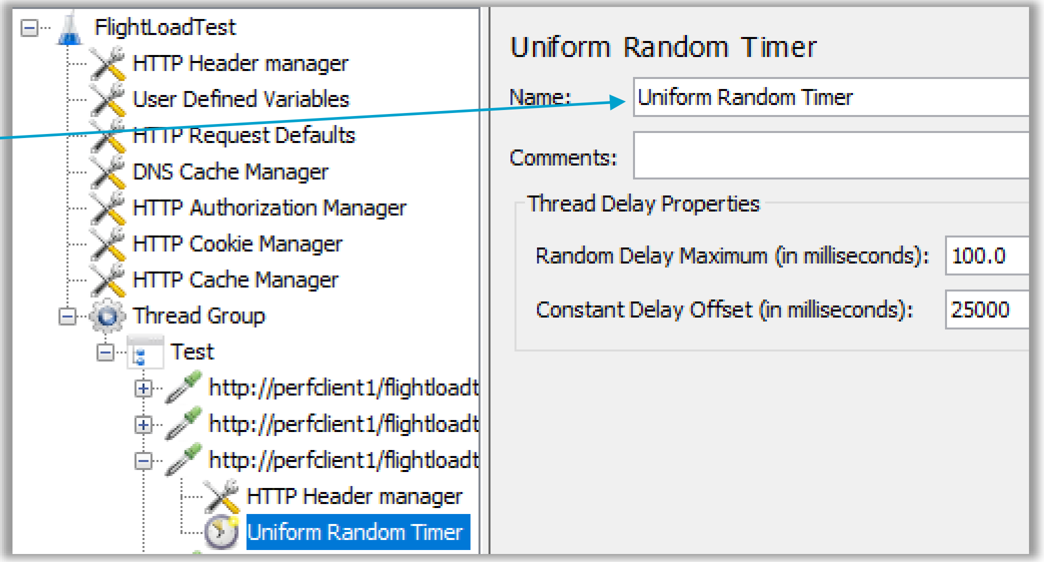
JSON JMESPath Extractor

Name:	AccessTokenextractor
Comments:	
Apply to:	( ) Main sample and sub-samples [✓ Main sample only]
Names of created variables:	AccessToken
JMESPath expressions:	Token.AccessToken
Match No. (0 for Random):	1
Default Values:	

Adding a Timer

- Set a delay to simulate a respondent's think time in the *executeaction* requests





Uniform Random Timer

Name: Uniform Random Timer

Comments:

Thread Delay Properties

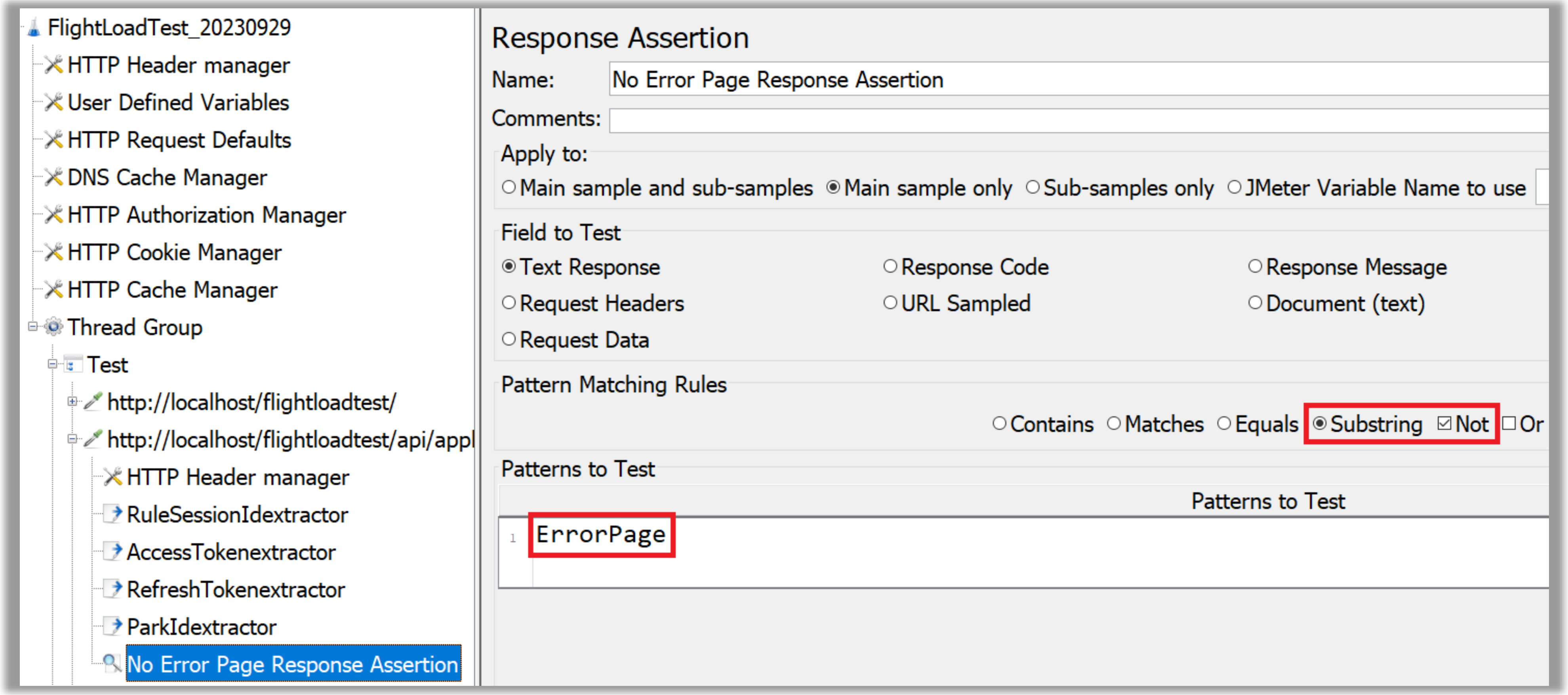
Random Delay Maximum (in milliseconds): 100.0

Constant Delay Offset (in milliseconds): 25000

- Random number of ms in range 0..99 * Random Delay Maximum + Constant Delay Offset

Adding a Server Response Assertion: No Error Page

- The server response should **not** contain the substring ‘ErrorPage’



- FlightLoadTest_20230929
  - HTTP Header manager
  - User Defined Variables
  - HTTP Request Defaults
  - DNS Cache Manager
  - HTTP Authorization Manager
  - HTTP Cookie Manager
  - HTTP Cache Manager
  - Thread Group
    - Test
      - http://localhost/flightloadtest/
      - http://localhost/flightloadtest/api/appl
        - HTTP Header manager
        - RuleSessionIdextractor
        - AccessTokenextractor
        - RefreshTokenextractor
        - ParkIdextractor
        - No Error Page Response Assertion

Response Assertion

Name: No Error Page Response Assertion

Comments:

Apply to:

○ Main sample and sub-samples [✓ Main sample only] ○ Sub-samples only ○ JMeter Variable Name to use

Field to Test

[✓ Text Response] ○ Response Code ○ Response Message
○ Request Headers ○ URL Sampled ○ Document (text)
○ Request Data

Pattern Matching Rules

○ Contains ○ Matches ○ Equals [✓ Substring] [✓ Not] ☐ Or

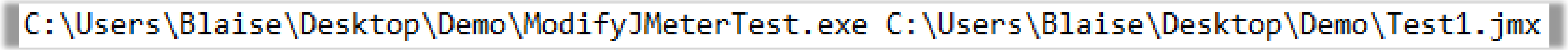
Patterns to Test

Patterns to Test

```
ErrorPage
```

Modifying HTTP Requests of a JMeter script (automatically)

- We can also add the necessary controllers and modify the JMeter script by using a tool that does this for us: **ModifyJMeterTest.exe**
- Built by the Blaise team
- CMD line application

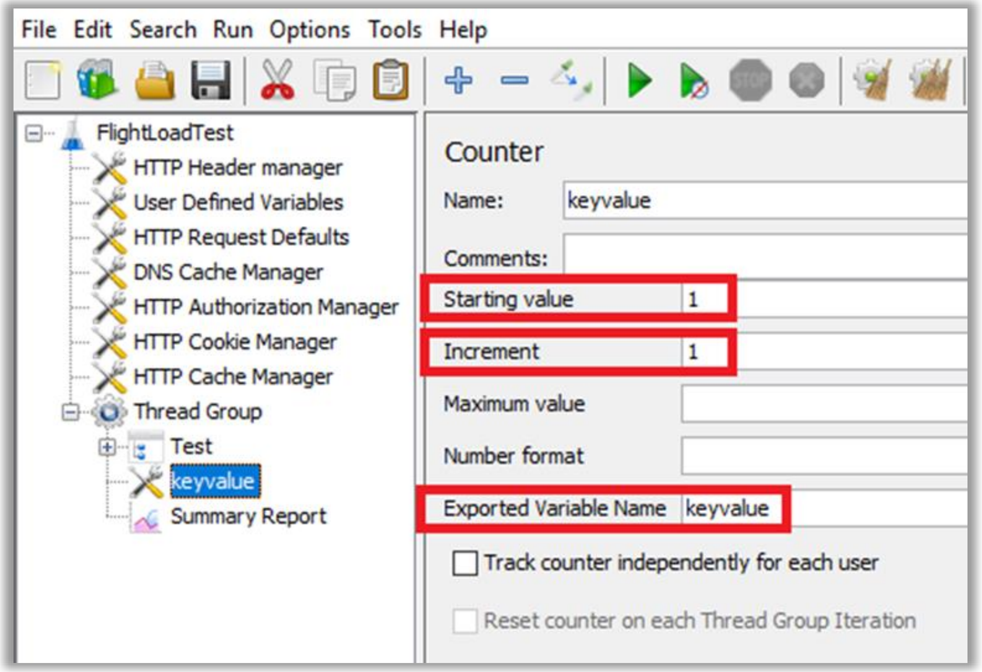


```
C:\Users\Blaise\Desktop\Demo\ModifyJMeterTest.exe C:\Users\Blaise\Desktop\Demo\Test1.jmx
```

- A modified JMX file will be generated with '_m' added to the filename

KeyValue

- **ModifyJMeterTest.exe** has added a counter called *keyvalue…*



- FlightLoadTest
  - HTTP Header manager
  - User Defined Variables
  - HTTP Request Defaults
  - DNS Cache Manager
  - HTTP Authorization Manager
  - HTTP Cookie Manager
  - HTTP Cache Manager
  - Thread Group
    - Test
    - keyvalue
    - Summary Report

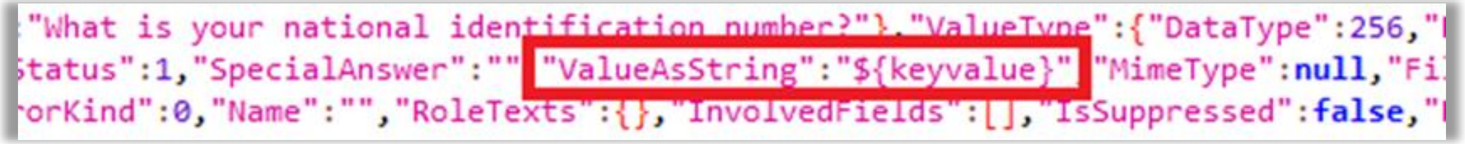
Counter

Name:	keyvalue
Comments:	
Starting value	1
Increment	1
Maximum value	
Number format	
Exported Variable Name	keyvalue

☐ Track counter independently for each user

☐ Reset counter on each Thread Group Iteration

- … and has replaced the key values in the server requests with a variable

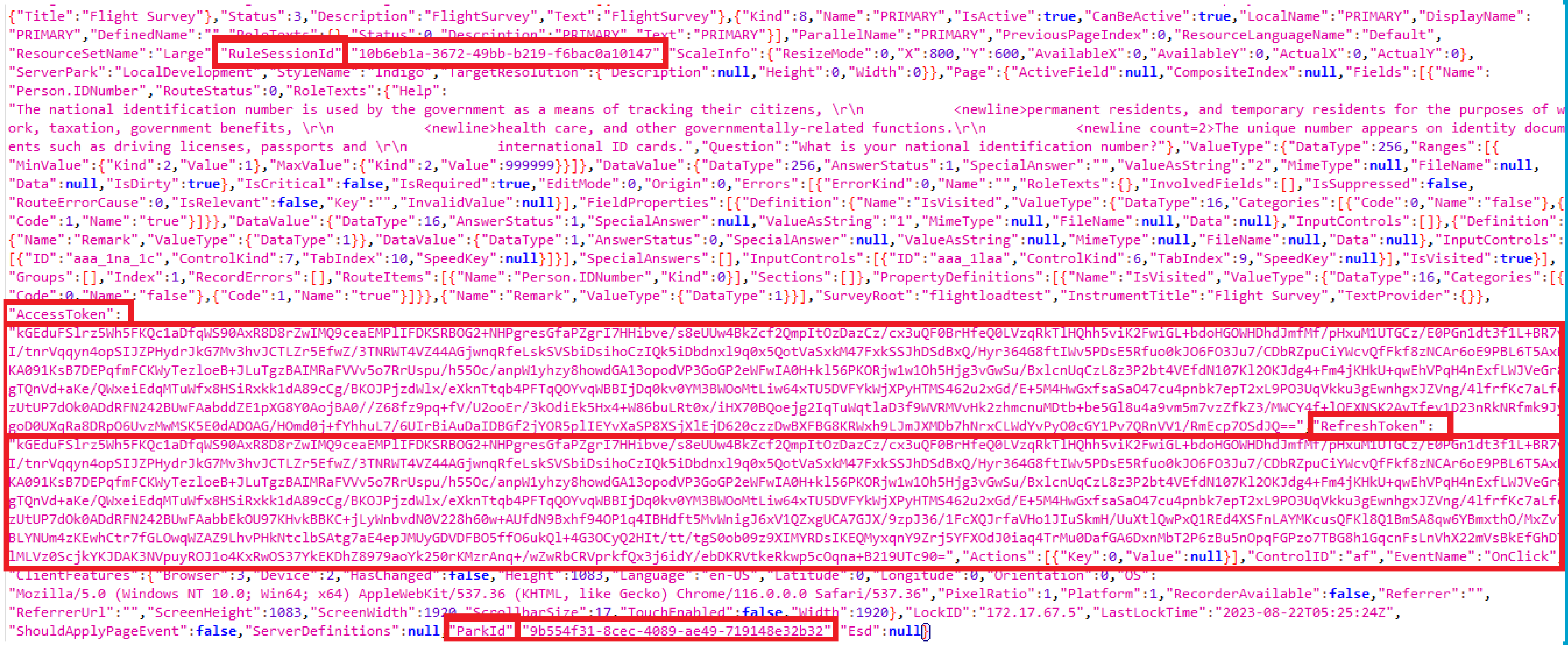


```
:"What is your national identification number?"},"ValueType":{"DataType":256,"
tatus":1,"SpecialAnswer":"","ValueAsString":"${keyvalue}","MimeType":null,"Fi
orKind":0,"Name":"","RoleTexts":{},"InvolvedFields":[],"IsSuppressed":false,"
```

Extractors

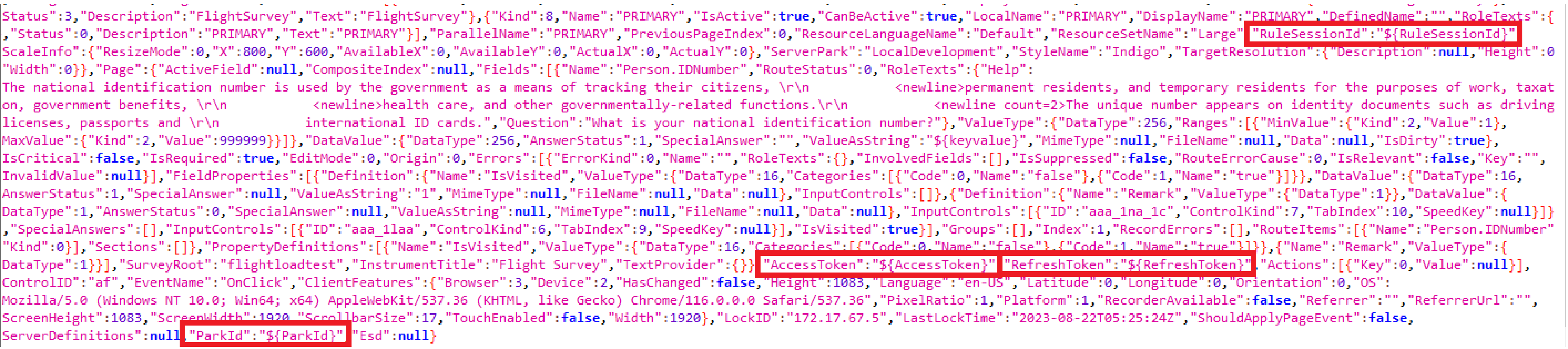
- The tool automatically extends the *start_interview* HTTP request with four *JSON JMESPath Extractor* actions for the *RuleSessionId*, *AccessToken*, *RefreshToken* and *ParkId*
- It automatically assigns those to variables which will be used in the successive requests

HTTP Request Before



```
{"Title":"Flight Survey"},"Status":3,"Description":"FlightSurvey","Text":"FlightSurvey"},{"Kind":8,"Name":"PRIMARY","IsActive":true,"CanBeActive":true,"LocalName":"PRIMARY","DisplayName":
"PRIMARY","DefinedName":"","RoleTexts":{},"Status":0,"Description":"PRIMARY","Text":"PRIMARY"}],"ParallelName":"PRIMARY","PreviousPageIndex":0,"ResourceLanguageName":"Default",
"ResourceSetName":"Large","RuleSessionId":"10b6eb1a-3672-49bb-b219-f6bac0a10147","ScaleInfo":{"ResizeMode":0,"X":800,"Y":600,"AvailableX":0,"AvailableY":0,"ActualX":0,"ActualY":0},
"ServerPark":"LocalDevelopment","StyleName":"Indigo","TargetResolution":{"Description":null,"Height":0,"Width":0}},"Page":{"ActiveField":null,"CompositeIndex":null,"Fields":[{"Name":
"Person.IDNumber","RouteStatus":0,"RoleTexts":{"Help":
"The national identification number is used by the government as a means of tracking their citizens, \r\n          <newline>permanent residents, and temporary residents for the purposes of w
ork, taxation, government benefits, \r\n          <newline>health care, and other governmentally-related functions.\r\n          <newline count=2>The unique number appears on identity docum
ents such as driving licenses, passports and \r\n          international ID cards.","Question":"What is your national identification number?"},"ValueType":{"DataType":256,"Ranges":[{
"MinValue":{"Kind":2,"Value":1},"MaxValue":{"Kind":2,"Value":999999}}]},"DataValue":{"DataType":256,"AnswerStatus":1,"SpecialAnswer":"","ValueAsString":"2","MimeType":null,"FileName":null,
"Data":null,"IsDirty":true},"IsCritical":false,"IsRequired":true,"EditMode":0,"Origin":0,"Errors":[{"ErrorKind":0,"Name":"","RoleTexts":{},"InvolvedFields":[],"IsSuppressed":false,
"RouteErrorCause":0,"IsRelevant":false,"Key":"","InvalidValue":null}],"FieldProperties":[{"Definition":{"Name":"IsVisited","ValueType":{"DataType":16,"Categories":[{"Code":0,"Name":"false"},{
"Code":1,"Name":"true"}]}},"DataValue":{"DataType":16,"AnswerStatus":1,"SpecialAnswer":null,"ValueAsString":"1","MimeType":null,"FileName":null,"Data":null},"InputControls":[]},{"Definition":
{"Name":"Remark","ValueType":{"DataType":1}},"DataValue":{"DataType":1,"AnswerStatus":0,"SpecialAnswer":null,"ValueAsString":null,"MimeType":null,"FileName":null,"Data":null},"InputControls":
[{"ID":"aaa_1na_1c","ControlKind":7,"TabIndex":10,"SpeedKey":null}]}],"SpecialAnswers":[],"InputControls":[{"ID":"aaa_1laa","ControlKind":6,"TabIndex":9,"SpeedKey":null}],"IsVisited":true}],
"Groups":[],"Index":1,"RecordErrors":[],"RouteItems":[{"Name":"Person.IDNumber","Kind":0}],"Sections":[]},"PropertyDefinitions":[{"Name":"IsVisited","ValueType":{"DataType":16,"Categories":[{
"Code":0,"Name":"false"},{"Code":1,"Name":"true"}]}},{"Name":"Remark","ValueType":{"DataType":1}}],"SurveyRoot":"flightloadtest","InstrumentTitle":"Flight Survey","TextProvider":{}},
"AccessToken":
"kGEduFSlrz5Wh5FKQc1aDfqWS90AxR8D8rZwIMQ9ceaEMPlIFDKSRBOG2+NHPgresGfaPZgrI7HHibve/s8eUUw4BkZcf2QmpItOzDazCz/cx3uQF0BrHfeQ0LVzqRkTlHQhh5viK2FwiGL+bdoHGOWHDhdJmfMf/pHxuM1UTGCz/E0PGn1dt3f1L+BR7
I/tnrVqqyn4opSIJZPHydrJkG7Mv3hvJCTLZr5EfwZ/3TNRWT4VZ44AGjwnqRfeLskSVSbiDsihoCzIQk5iDbdnxl9q0x5QotVaSxkM47FxkSSJhDSdBxQ/Hyr364G8ftIWv5PDsE5Rfuo0kJO6FO3Ju7/CDbRZpuCiYWcvQfFkf8zNCAr6oE9PBL6T5Ax
KA091KsB7DEPqfmFCKWyTezloeB+JLuTgzBAIMRaFVVv5o7RrUspu/h55Oc/anpW1yhzy8howdGA13opodVP3GoGP2eWFwIA0H+kl56PKORjw1w1Oh5Hjg3vGwSu/BxlcnUqCzL8z3P2bt4VEfdN107Kl2OKJdg4+Fm4jKHkU+qwEhVPqH4nExfLWJVeGr
gTQnVd+aKe/QWxeiEdqMTuWfx8HSiRxkk1dA89cCg/BKOJPjzdWlx/eXknTtqb4PFTqQOYvqWBBIjDq0kv0YM3BWOoMtLiw64xTU5DVFYkWjXPyHTMS462u2xGd/E+5M4HwGxfsaSaO47cu4pnbk7epT2xL9PO3UqVkku3gEwnhgxJZVng/4lfrfKc7aLf
zUtUP7dOk0ADdRFN242BUwFAabddZE1pXG8Y0AojBA0//Z68fz9pq+fV/U2ooEr/3kOdiEk5Hx4+W86buLRt0x/iHX70BQoejg2IqTuWqtlaD3f9WVRMVvHk2zhmcnuMDtb+be5Gl8u4a9vm5m7vzZfkZ3/MWCY4f+lOEXNSK2AvTfev1D23nRkNRfmk9J
goD0UXqRa8DRpO6UvzMwMSK5E0dADOAG/HOmd0j+fYhhuL7/6UIrBiAuDaIDBGf2jYOR5plIEYvXaSP8XSjXlEjD620czzDwBXFBG8KRWxh9LJmJXMDb7hNrxCLWdYvPyO0cGY1Pv7QRnVV1/RmEcp7OSdJQ==","RefreshToken":
"kGEduFSlrz5Wh5FKQc1aDfqWS90AxR8D8rZwIMQ9ceaEMPlIFDKSRBOG2+NHPgresGfaPZgrI7HHibve/s8eUUw4BkZcf2QmpItOzDazCz/cx3uQF0BrHfeQ0LVzqRkTlHQhh5viK2FwiGL+bdoHGOWHDhdJmfMf/pHxuM1UTGCz/E0PGn1dt3f1L+BR7
I/tnrVqqyn4opSIJZPHydrJkG7Mv3hvJCTLZr5EfwZ/3TNRWT4VZ44AGjwnqRfeLskSVSbiDsihoCzIQk5iDbdnxl9q0x5QotVaSxkM47FxkSSJhDSdBxQ/Hyr364G8ftIWv5PDsE5Rfuo0kJO6FO3Ju7/CDbRZpuCiYWcvQfFkf8zNCAr6oE9PBL6T5Ax
KA091KsB7DEPqfmFCKWyTezloeB+JLuTgzBAIMRaFVVv5o7RrUspu/h55Oc/anpW1yhzy8howdGA13opodVP3GoGP2eWFwIA0H+kl56PKORjw1w1Oh5Hjg3vGwSu/BxlcnUqCzL8z3P2bt4VEfdN107Kl2OKJdg4+Fm4jKHkU+qwEhVPqH4nExfLWJVeGr
gTQnVd+aKe/QWxeiEdqMTuWfx8HSiRxkk1dA89cCg/BKOJPjzdWlx/eXknTtqb4PFTqQOYvqWBBIjDq0kv0YM3BWOoMtLiw64xTU5DVFYkWjXPyHTMS462u2xGd/E+5M4HwGxfsaSaO47cu4pnbk7epT2xL9PO3UqVkku3gEwnhgxJZVng/4lfrfKc7aLf
zUtUP7dOk0ADdRFN242BUwFAabbEkOU97KHvkBBKC+jLyWnbvdN0V228h60w+AUfdN9Bxhf94OP1q4IBHdft5MvWnigJ6xV1QZxgUCA7GJX/9zpJ36/1FcXQJrfaVHo1JIuSkmH/UuXtlQwPxQ1REd4XSFnLAYMKcusQFKl8Q1BmSA8qw6YBmxthO/MxZv
BLYNUm4zKEwhCtr7fGLOwqWZAZ9LhvPHkNtclbSAtg7aE4epJMUyGDVDFBO5ffO6ukQl+4G3OCyQ2HIt/tt/tgS0ob09z9XIMYRDsIKEQMyxqnY9Zrj5YFXOdJ0iaq4TrMu0DafGA6DxnMbT2P6zBu5nOpqFGPzo7TBG8h1GqcnFsLnVhX22mVsBkEfGhD
lMLVz0ScjkYKJDAK3NVpuyROJ1o4KxRwOS37YkEKDhZ8979aoYk250rKMzrAnq+/wZwRbCRVprkfQx3j6idY/ebDKRVtkeRkwp5cOqna+B219UTc90=","Actions":[{"Key":0,"Value":null}],"ControlID":"af","EventName":"OnClick",
"ClientFeatures":{"Browser":3,"Device":2,"HasChanged":false,"Height":1083,"Language":"en-US","Latitude":0,"Longitude":0,"Orientation":0,"OS":
"Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/116.0.0.0 Safari/537.36","PixelRatio":1,"Platform":1,"RecorderAvailable":false,"Referrer":"",
"ReferrerUrl":"","ScreenHeight":1083,"ScreenWidth":1920,"ScrollbarSize":17,"TouchEnabled":false,"Width":1920},"LockID":"172.17.67.5","LastLockTime":"2023-08-22T05:25:24Z",
"ShouldApplyPageEvent":false,"ServerDefinitions":null,"ParkId":"9b554f31-8cec-4089-ae49-719148e32b32","Esd":null}
```

HTTP Request After

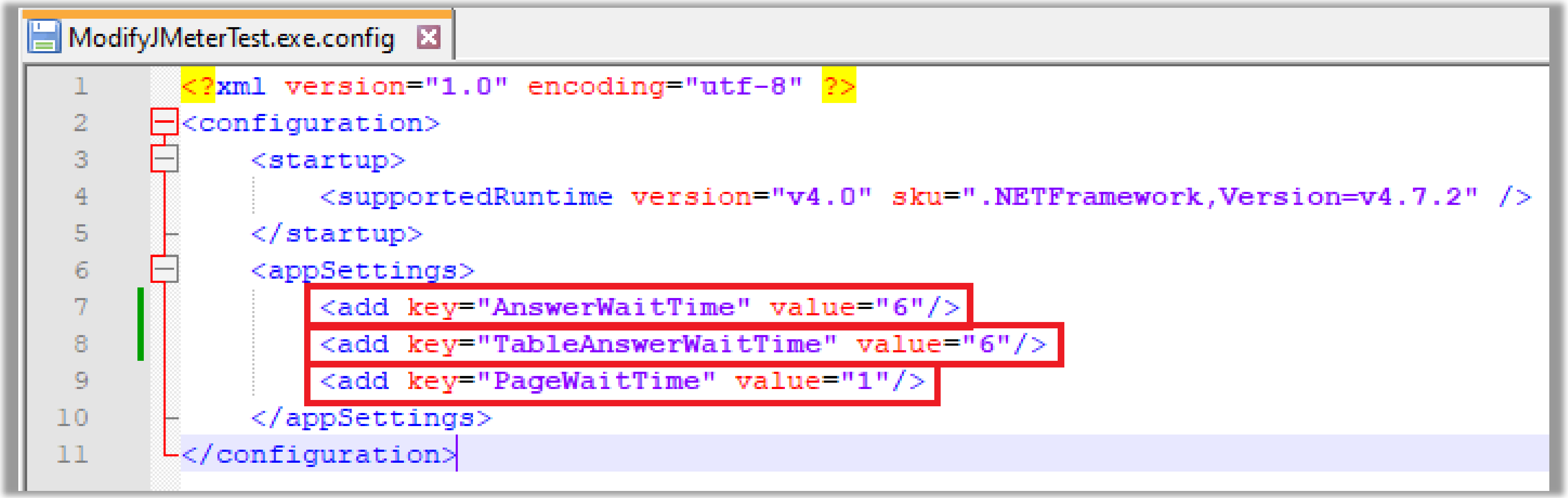


```
Status":3,"Description":"FlightSurvey","Text":"FlightSurvey"},{"Kind":8,"Name":"PRIMARY","IsActive":true,"CanBeActive":true,"LocalName":"PRIMARY","DisplayName":"PRIMARY","DefinedName":"","RoleTexts":{
,"Status":0,"Description":"PRIMARY","Text":"PRIMARY"}],"ParallelName":"PRIMARY","PreviousPageIndex":0,"ResourceLanguageName":"Default","ResourceSetName":"Large","RuleSessionId":"${RuleSessionId}"
ScaleInfo":{"ResizeMode":0,"X":800,"Y":600,"AvailableX":0,"AvailableY":0,"ActualX":0,"ActualY":0},"ServerPark":"LocalDevelopment","StyleName":"Indigo","TargetResolution":{"Description":null,"Height":0
"Width":0}},"Page":{"ActiveField":null,"CompositeIndex":null,"Fields":[{"Name":"Person.IDNumber","RouteStatus":0,"RoleTexts":{"Help":
The national identification number is used by the government as a means of tracking their citizens, \r\n          <newline>permanent residents, and temporary residents for the purposes of work, taxat
on, government benefits, \r\n           <newline>health care, and other governmentally-related functions.\r\n           <newline count=2>The unique number appears on identity documents such as driving
licenses, passports and \r\n           international ID cards.","Question":"What is your national identification number?"},"ValueType":{"DataType":256,"Ranges":[{"MinValue":{"Kind":2,"Value":1},
MaxValue":{"Kind":2,"Value":999999}}]},"DataValue":{"DataType":256,"AnswerStatus":1,"SpecialAnswer":"","ValueAsString":"${keyvalue}","MimeType":null,"FileName":null,"Data":null,"IsDirty":true},
IsCritical":false,"IsRequired":true,"EditMode":0,"Origin":0,"Errors":[{"ErrorKind":0,"Name":"","RoleTexts":{},"InvolvedFields":[],"IsSuppressed":false,"RouteErrorCause":0,"IsRelevant":false,"Key":"",
InvalidValue":null}],"FieldProperties":[{"Definition":{"Name":"IsVisited","ValueType":{"DataType":16,"Categories":[{"Code":0,"Name":"false"},{"Code":1,"Name":"true"}]}},"DataValue":{"DataType":16,
AnswerStatus":1,"SpecialAnswer":null,"ValueAsString":"1","MimeType":null,"FileName":null,"Data":null},"InputControls":[]},{"Definition":{"Name":"Remark","ValueType":{"DataType":1}},"DataValue":{
DataType":1,"AnswerStatus":0,"SpecialAnswer":null,"ValueAsString":null,"MimeType":null,"FileName":null,"Data":null},"InputControls":[{"ID":"aaa_1na_1c","ControlKind":7,"TabIndex":10,"SpeedKey":null}]}
,"SpecialAnswers":[],"InputControls":[{"ID":"aaa_1laa","ControlKind":6,"TabIndex":9,"SpeedKey":null}],"IsVisited":true}],"Groups":[],"Index":1,"RecordErrors":[],"RouteItems":[{"Name":"Person.IDNumber"
"Kind":0}],"Sections":[]},"PropertyDefinitions":[{"Name":"IsVisited","ValueType":{"DataType":16,"Categories":[{"Code":0,"Name":"false"},{"Code":1,"Name":"true"}]}},{"Name":"Remark","ValueType":{
DataType":1}}],"SurveyRoot":"flightloadtest","InstrumentTitle":"Flight Survey","TextProvider":{}},"AccessToken":"${AccessToken}","RefreshToken":"${RefreshToken}","Actions":[{"Key":0,"Value":null}],
ControlID":"af","EventName":"OnClick","ClientFeatures":{"Browser":3,"Device":2,"HasChanged":false,"Height":1083,"Language":"en-US","Latitude":0,"Longitude":0,"Orientation":0,"OS":
Mozilla/5.0 (Windows NT 10.0; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/116.0.0.0 Safari/537.36","PixelRatio":1,"Platform":1,"RecorderAvailable":false,"Referrer":"","ReferrerUrl":"",
ScreenHeight":1083,"ScreenWidth":1920,"ScrollbarSize":17,"TouchEnabled":false,"Width":1920},"LockID":"172.17.67.5","LastLockTime":"2023-08-22T05:25:24Z","ShouldApplyPageEvent":false,
ServerDefinitions":null,"ParkId":"${ParkId}","Esd":null}
```

Uniform Random Timer

- **ModifyJMeterTest.exe** has added Uniform Random Timers to the server requests
- The ‘think time’ needed on a page is determined by the number of questions on the page and the settings in **ModifyJMeterTest.exe.config**

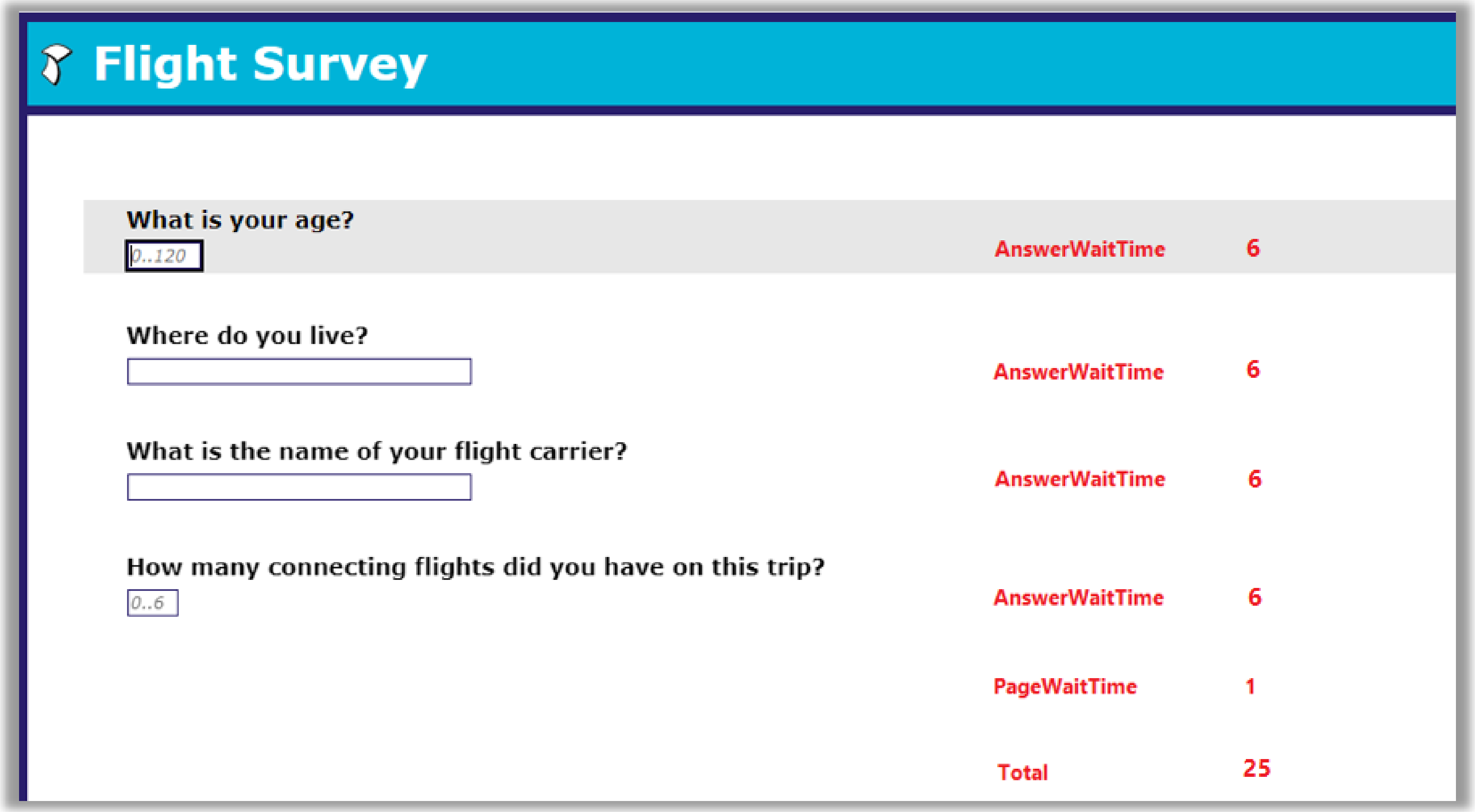
ModifyJMeterTest.exe.config



ModifyJMeterTest.exe.config

```xml
<?xml version="1.0" encoding="utf-8" ?>
<configuration>
    <startup>
        <supportedRuntime version="v4.0" sku=".NETFramework,Version=v4.7.2" />
    </startup>
    <appSettings>
        <add key="AnswerWaitTime" value="6"/>
        <add key="TableAnswerWaitTime" value="6"/>
        <add key="PageWaitTime" value="1"/>
    </appSettings>
</configuration>
```

Think Time



Flight Survey

What is your age?

0..120

Where do you live?

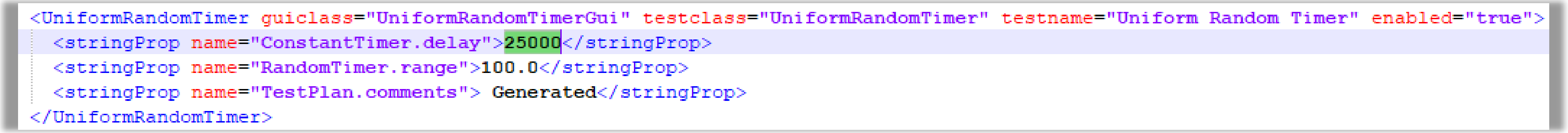
What is the name of your flight carrier?

How many connecting flights did you have on this trip?

0..6

AnswerWaitTime	6
AnswerWaitTime	6
AnswerWaitTime	6
AnswerWaitTime	6
PageWaitTime	1
Total	25

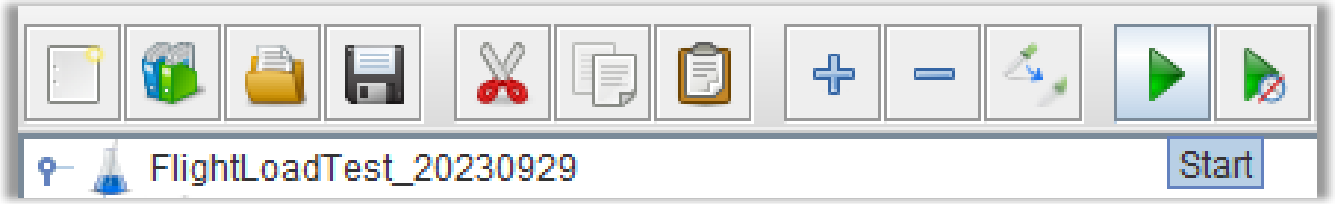
Think Time



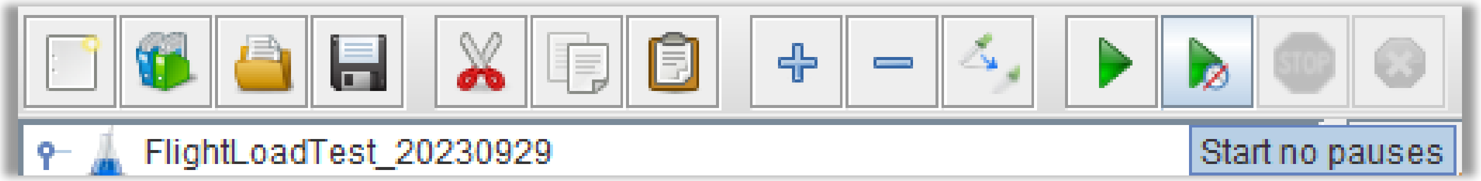
```
<UniformRandomTimer guiclass="UniformRandomTimerGui" testclass="UniformRandomTimer" testname="Uniform Random Timer" enabled="true">
  <stringProp name="ConstantTimer.delay">25000</stringProp>
  <stringProp name="RandomTimer.range">100.0</stringProp>
  <stringProp name="TestPlan.comments"> Generated</stringProp>
</UniformRandomTimer>
```

Test Execution

- Start button with think times enabled:



- Start button with think times disabled (excellent for debugging):

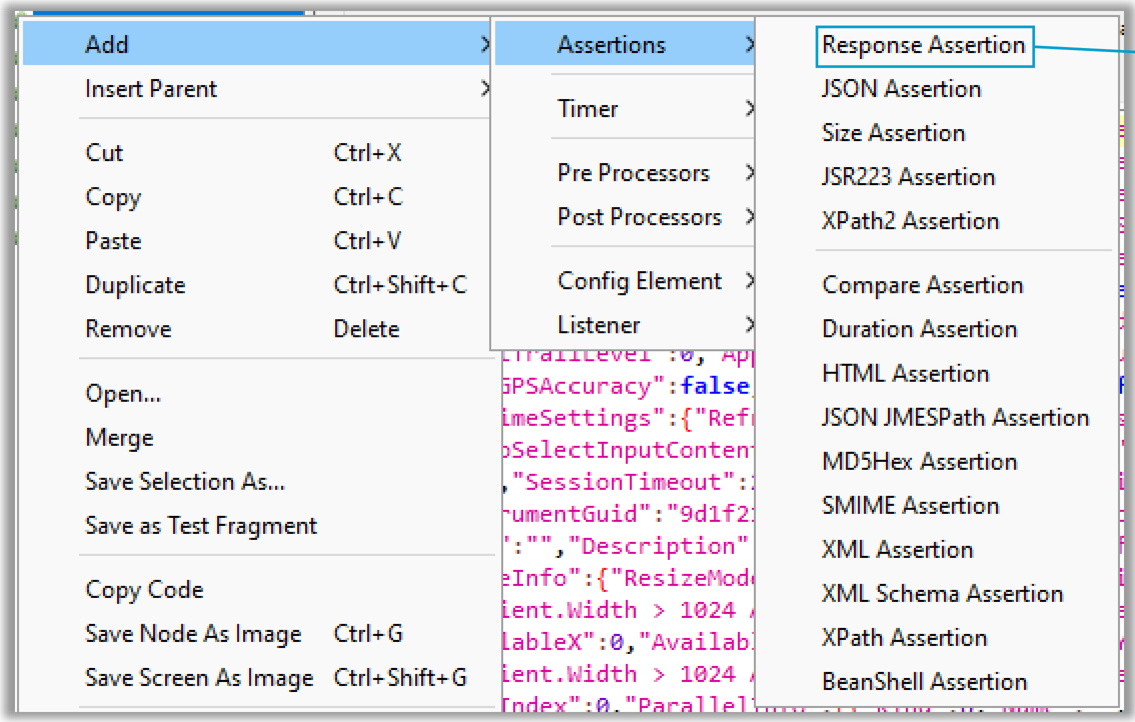


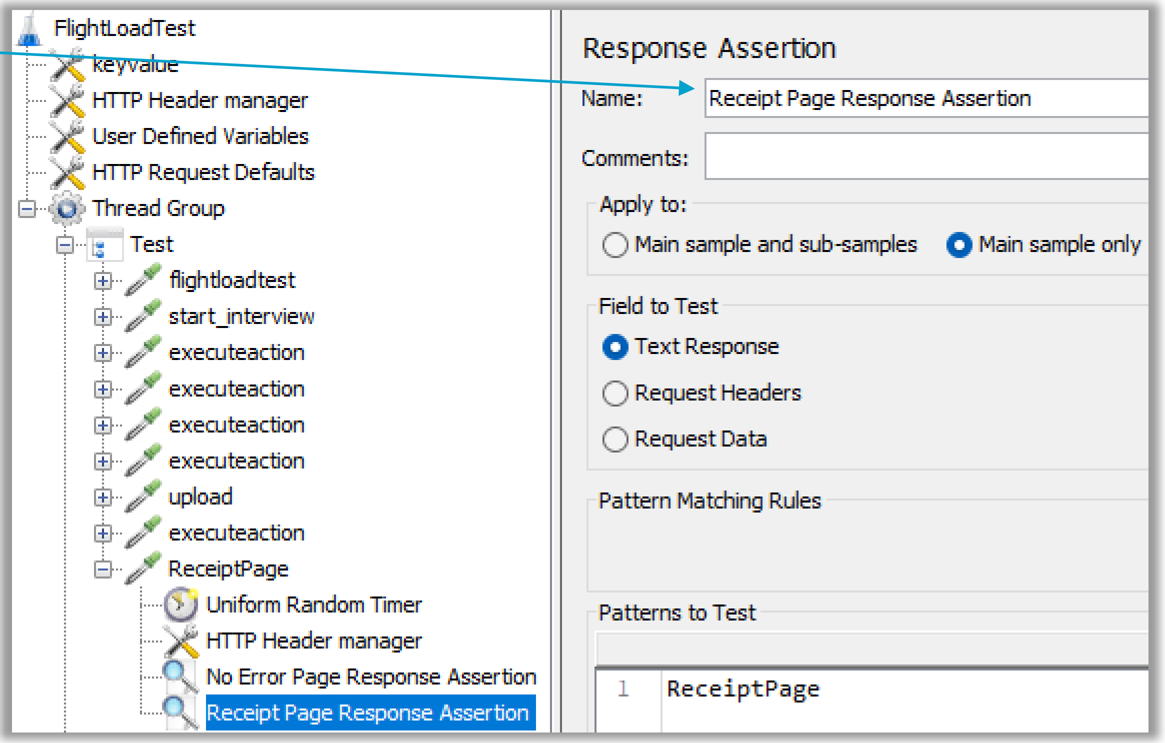
Server Response Assertion

- A ‘No Error Page’ assertion is added automatically to each request
- A ‘Receipt Page’ assertion is not added by the tool and should thus be added manually

Adding a Server Response Assertion: ReceiptPage

- The server response to the last request should contain substring "ReceiptPage"





```
FlightLoadTest
  keyvalue
  HTTP Header manager
  User Defined Variables
  HTTP Request Defaults
  Thread Group
    Test
      flightloadtest
      start_interview
      executeaction
      executeaction
      executeaction
      executeaction
      upload
      executeaction
      ReceiptPage
        Uniform Random Timer
        HTTP Header manager
        No Error Page Response Assertion
        Receipt Page Response Assertion
```

Response Assertion

Name: Receipt Page Response Assertion

Comments:

Apply to: ( ) Main sample and sub-samples [✓ Main sample only]

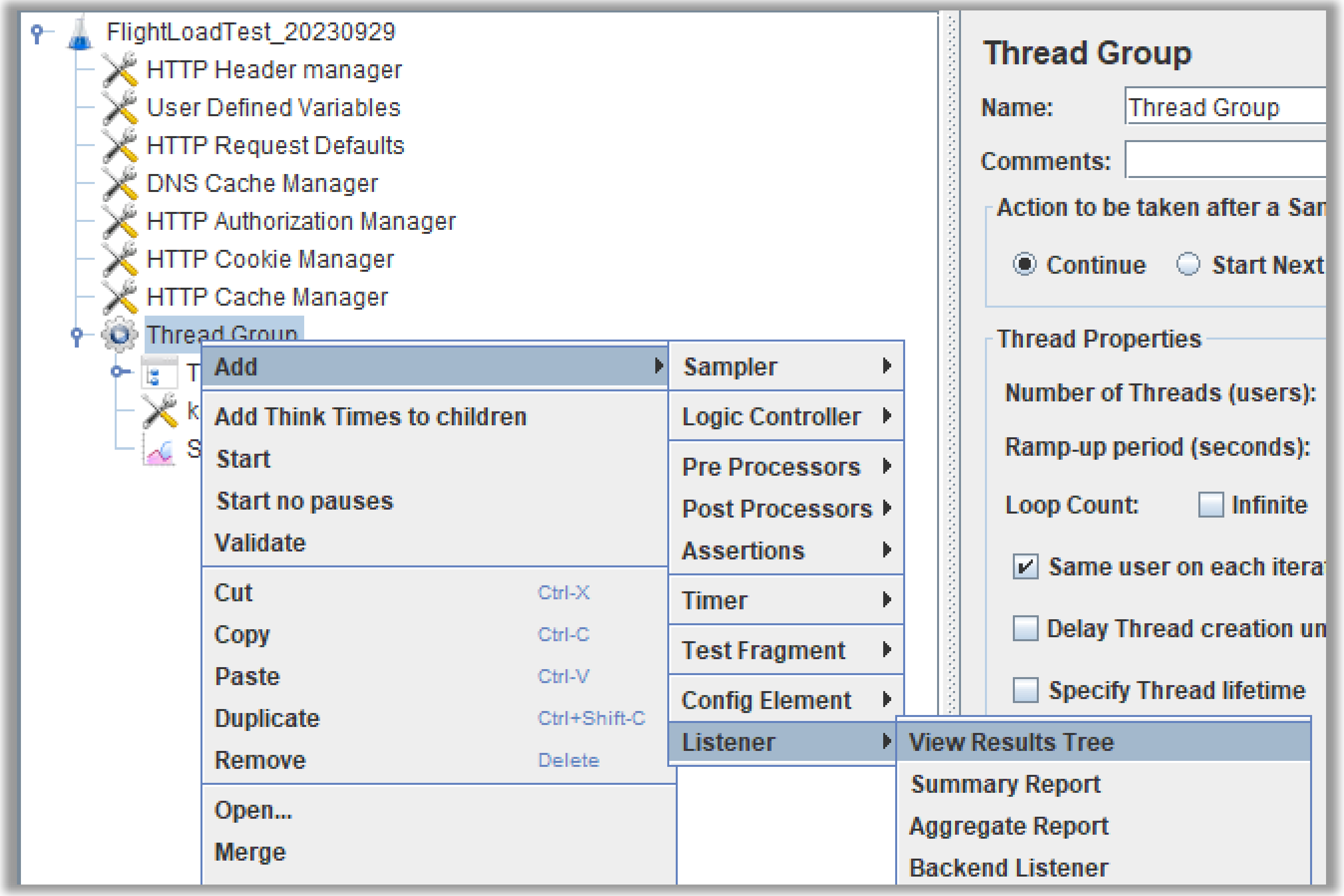
Field to Test: [✓ Text Response] ( ) Request Headers ( ) Request Data

Pattern Matching Rules

Patterns to Test

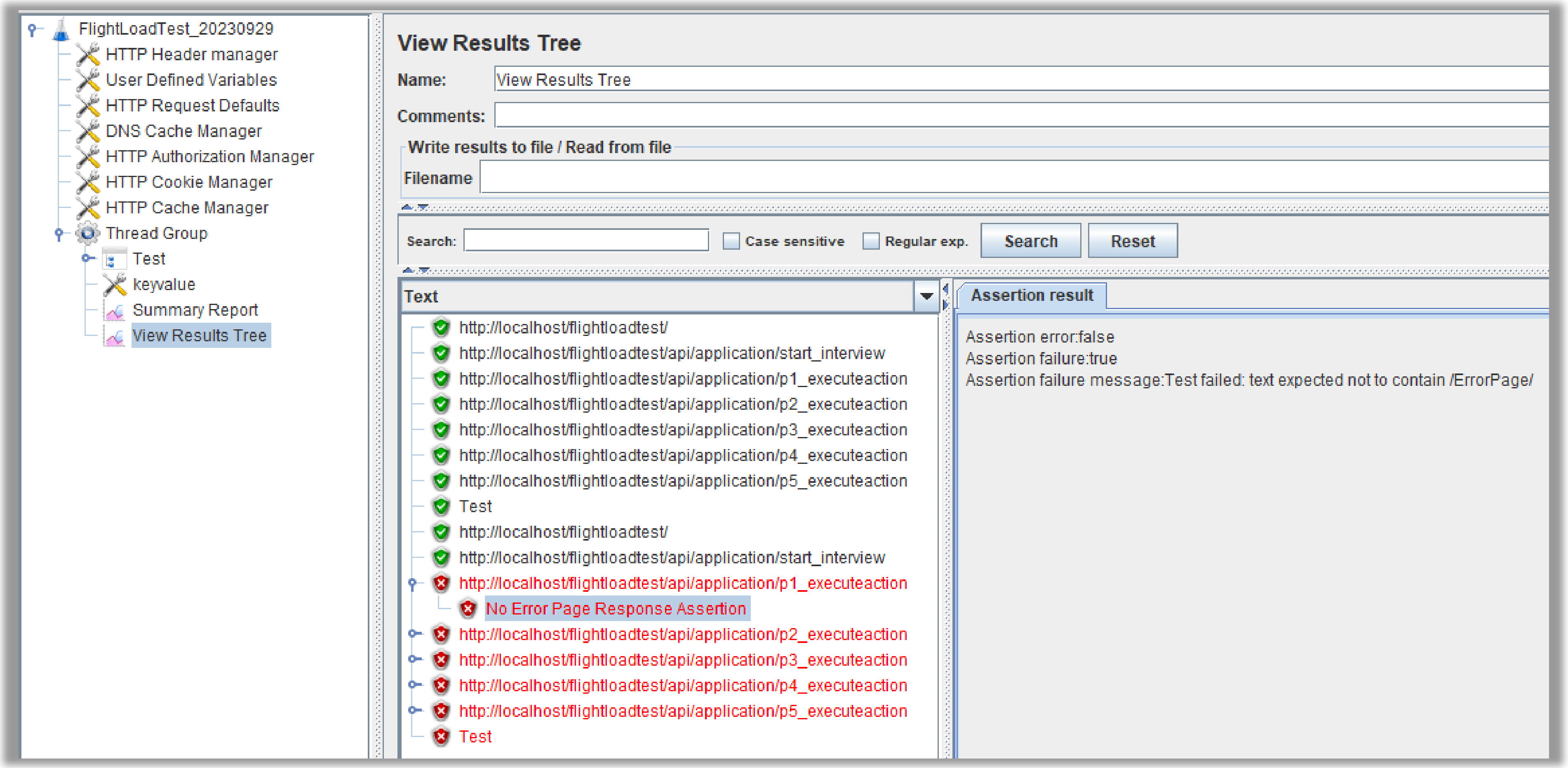
```
ReceiptPage
```

Adding a View Results Tree



Test Results

- 2 sequential runs – with the same keyvalue



FlightLoadTest_20230929
HTTP Header manager
User Defined Variables
HTTP Request Defaults
DNS Cache Manager
HTTP Authorization Manager
HTTP Cookie Manager
HTTP Cache Manager
Thread Group
Test
keyvalue
Summary Report
View Results Tree

View Results Tree

Name: View Results Tree

Comments:

Write results to file / Read from file

Filename

Search: ☐ Case sensitive ☐ Regular exp. Search Reset

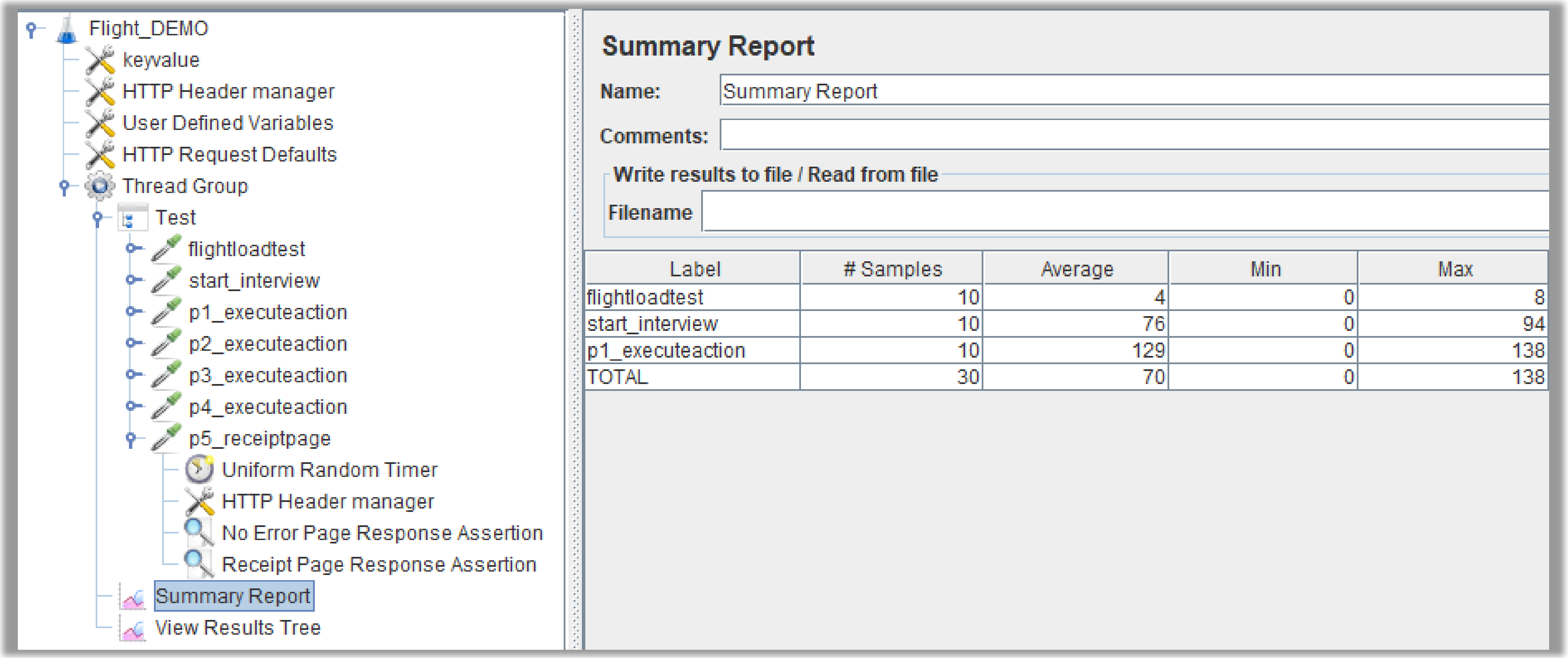
Text

```
http://localhost/flightloadtest/
http://localhost/flightloadtest/api/application/start_interview
http://localhost/flightloadtest/api/application/p1_executeaction
http://localhost/flightloadtest/api/application/p2_executeaction
http://localhost/flightloadtest/api/application/p3_executeaction
http://localhost/flightloadtest/api/application/p4_executeaction
http://localhost/flightloadtest/api/application/p5_executeaction
Test
http://localhost/flightloadtest/
http://localhost/flightloadtest/api/application/start_interview
http://localhost/flightloadtest/api/application/p1_executeaction
    No Error Page Response Assertion
http://localhost/flightloadtest/api/application/p2_executeaction
http://localhost/flightloadtest/api/application/p3_executeaction
http://localhost/flightloadtest/api/application/p4_executeaction
http://localhost/flightloadtest/api/application/p5_executeaction
Test
```

Assertion result

```
Assertion error:false
Assertion failure:true
Assertion failure message:Test failed: text expected not to contain /ErrorPage/
```

Summary Report



- Flight_DEMO
  - keyvalue
  - HTTP Header manager
  - User Defined Variables
  - HTTP Request Defaults
  - Thread Group
    - Test
      - flightloadtest
      - start_interview
      - p1_executeaction
      - p2_executeaction
      - p3_executeaction
      - p4_executeaction
      - p5_receiptpage
        - Uniform Random Timer
        - HTTP Header manager
        - No Error Page Response Assertion
        - Receipt Page Response Assertion
    - Summary Report
    - View Results Tree

Summary Report

Name: Summary Report

Comments:

Write results to file / Read from file

Filename

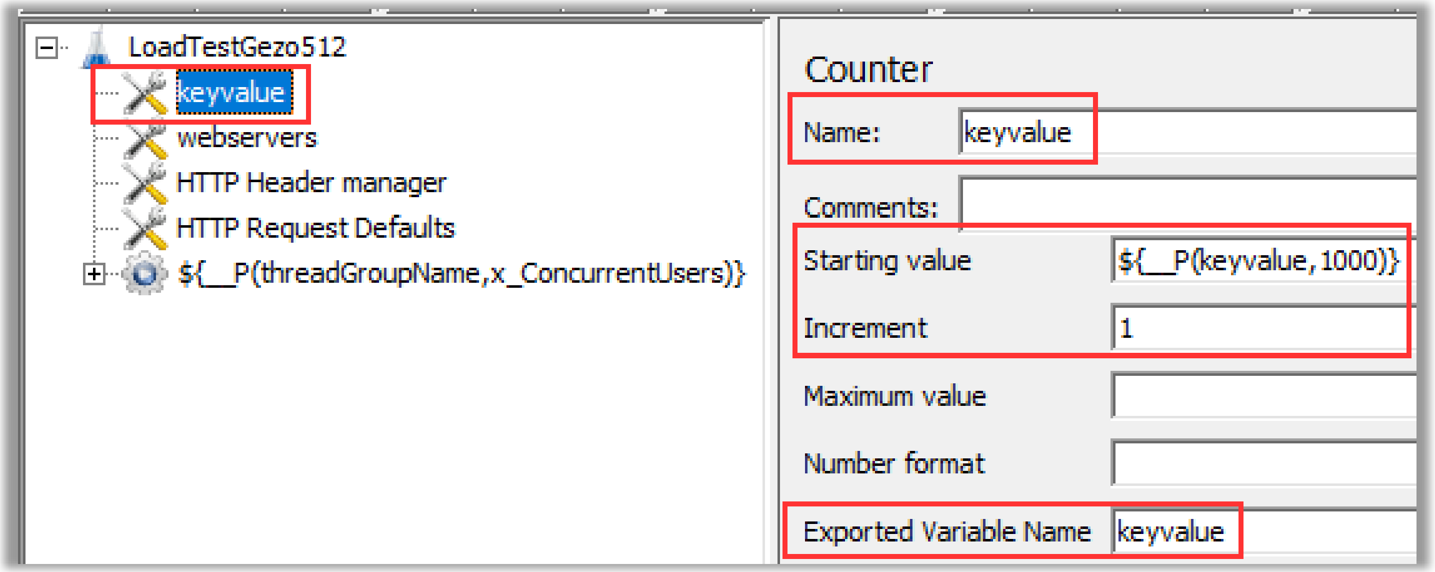
Label	# Samples	Average	Min	Max
flightloadtest	10	4	0	8
start_interview	10	76	0	94
p1_executeaction	10	129	0	138
TOTAL	30	70	0	138

Load Test Optimization

- It’s now possible to run a load test against 1 web server using the configuration in the *Thread Group*
- However, it’s not recommended to start a prod-like load test from the JMeter GUI, it will take a lot of memory
- Using the CMD line to run load tests is advised

Load Test Optimization: CMD Line Parameters

- Edit the Counter *keyvalue = ${__P(keyvalue,1000)}*
- This is now a CMD line variable
  - If no value is passed, the default value 1000 will be used
  - If you run a test in the GUI, the value 1000 will be used

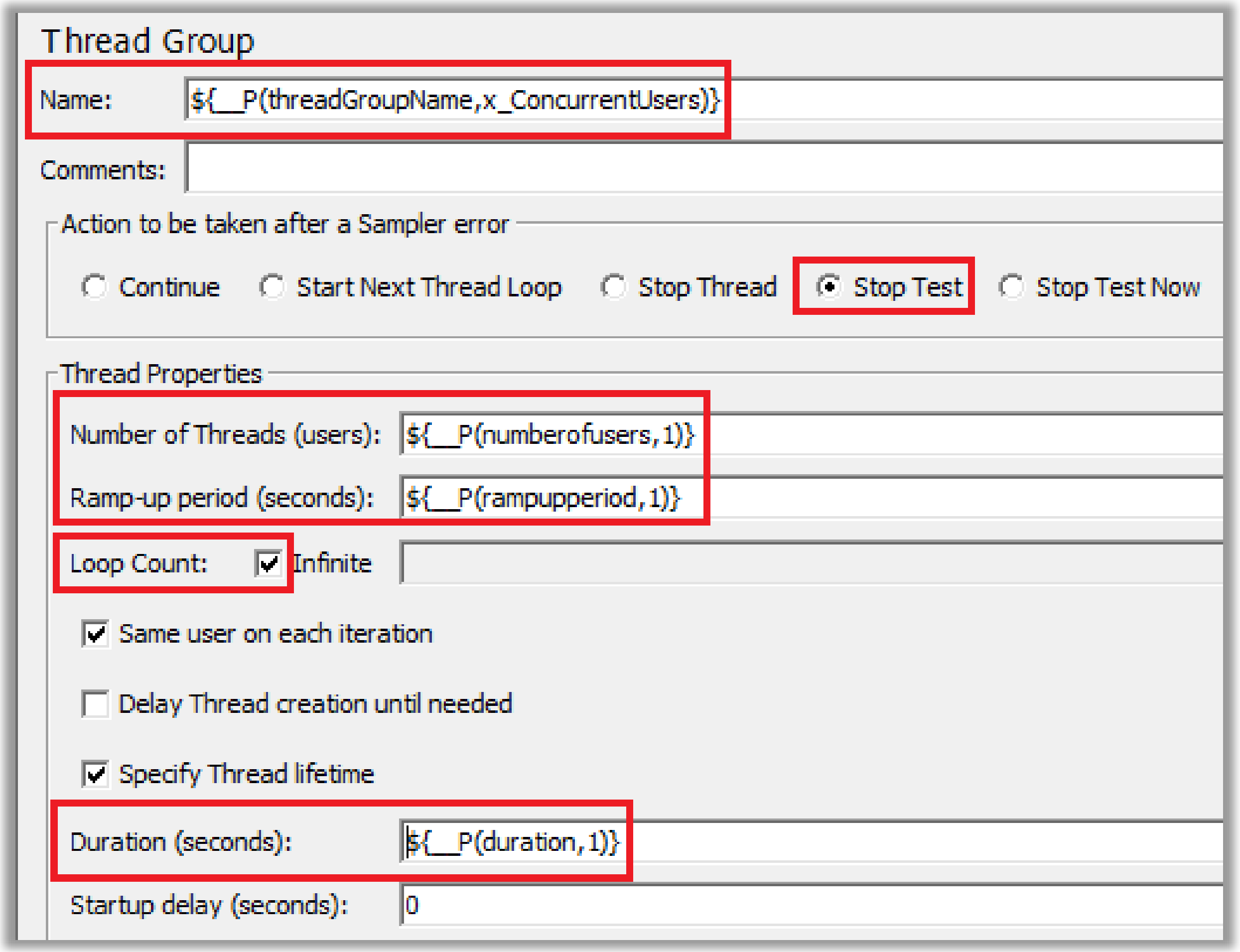


Counter

Name:	keyvalue
Comments:	
Starting value	${__P(keyvalue,1000)}
Increment	1
Maximum value	
Number format	
Exported Variable Name	keyvalue

Load Test Optimization: CMD Line Parameters

- Pass parameters like:
  -J<variablename>=<value>



Thread Group

Name: ${__P(threadGroupName,x_ConcurrentUsers)}

Comments:

Action to be taken after a Sampler error

○ Continue ○ Start Next Thread Loop ○ Stop Thread [✓ Stop Test] ○ Stop Test Now

Thread Properties

Number of Threads (users): ${__P(numberofusers,1)}

Ramp-up period (seconds): ${__P(rampupperiod,1)}

Loop Count: ✓ Infinite

✓ Same user on each iteration

☐ Delay Thread creation until needed

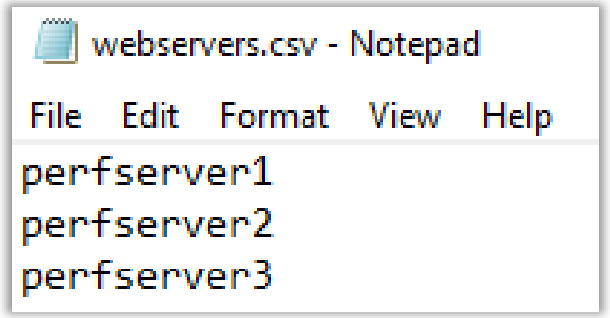
✓ Specify Thread lifetime

Duration (seconds): ${__P(duration,1)}

Startup delay (seconds): 0

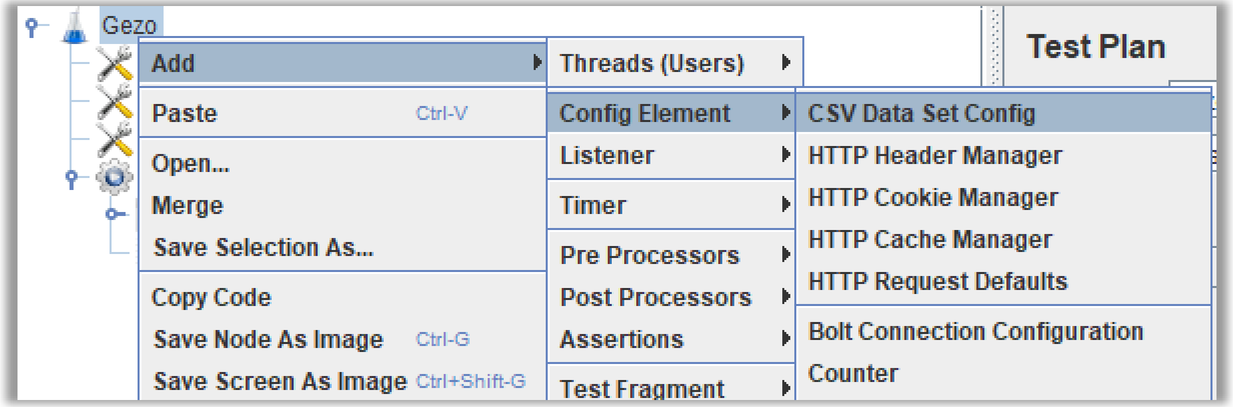
Load Test Optimization: Using Multiple Web Servers

- Add names of web servers to a .csv file:


webservers.csv - Notepad

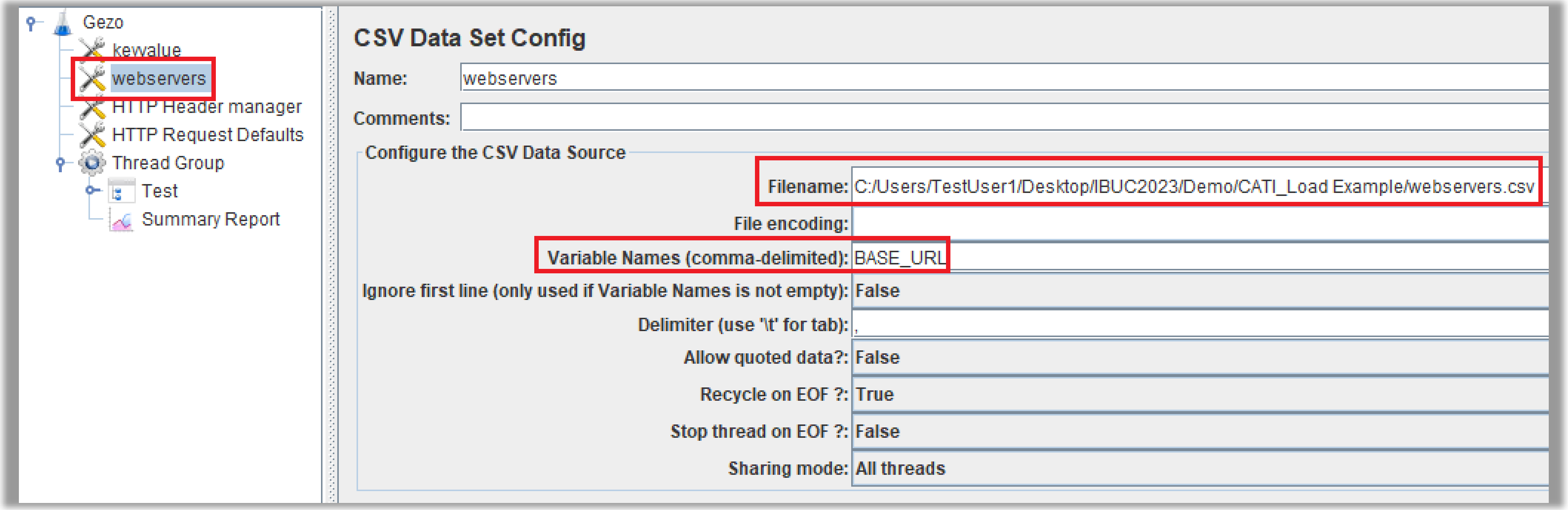
```
perfserver1
perfserver2
perfserver3
```

- Add a **CSV Data Set Config** to your test plan:



Load Test Optimization: Using Multiple Web Servers

- Add ‘webservers.csv’ to the *Filename* field
- Set a value in the field *Variable Names*



CSV Data Set Config

Name: webservers

Comments:

Configure the CSV Data Source

Filename: C:/Users/TestUser1/Desktop/IBUC2023/Demo/CATI_Load Example/webservers.csv

File encoding:

Variable Names (comma-delimited): BASE_URL

Ignore first line (only used if Variable Names is not empty): False

Delimiter (use '\t' for tab): ,

Allow quoted data?: False

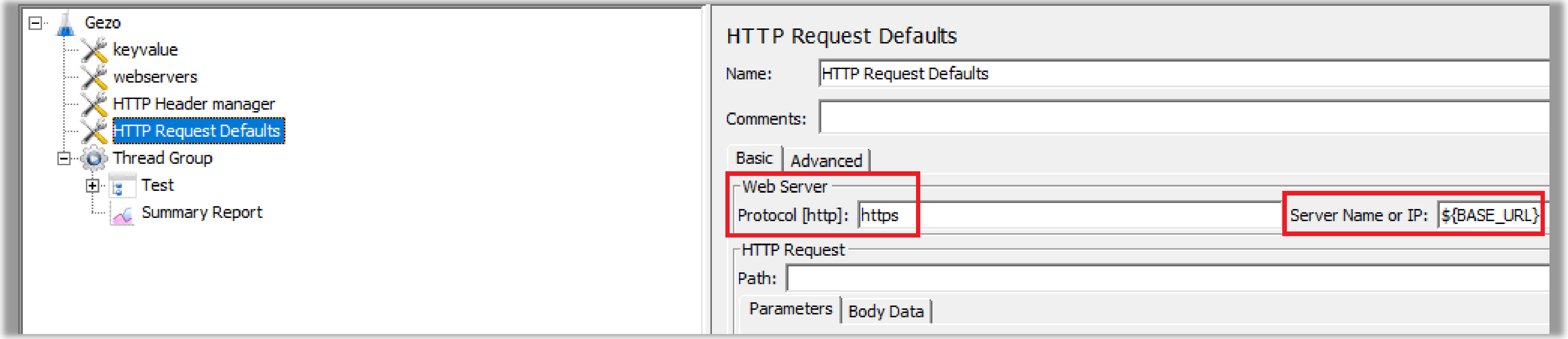
Recycle on EOF ?: True

Stop thread on EOF ?: False

Sharing mode: All threads

Load Test Optimization: Using Multiple Web Servers

- Set the value for *Server Name or IP* to ${BASE_URL}
- For each session, a web server from the 'webservers.csv' file is now linked to the HTTP Request Defaults



HTTP Request Defaults

Name: HTTP Request Defaults

Comments:

Basic | Advanced

Web Server

Protocol [http]: https

Server Name or IP: ${BASE_URL}

HTTP Request

Path:

Parameters | Body Data

Thank you
for your time

Blaise

Gaining deeper understanding

www.blaise.com

blaise@cbs.nl

@blaisecbs

@Blaise5