Web Service

Prowadzący
Michał Czyżykowski

Wprowadzenie

- Kim jestem?
- Kim jesteście Wy?
- Co robicie?
- Czego oczekujecie?

Data

- Soap UI 5.5.0
- https://www.soapui.org/downloads/soapui.html

git clone https://github.com/czyzyk29/SoapUI_Workshop.git

- https://hub.docker.com/repository/docker/czyzyk/car

Wprowadzenie

- Co to Usługi? I dlaczego są fajne?
- API, REST, SOAP?

Restauracja as service

- Stolik
- Kelner
- Kuchnia

- Żądania / Odpowiedzi (Requests / Responses)
- Kody odpowiedzi (HTTP) 200, 404, 500…

Kino - service

- Klient rezerwuje/kupuje bilet w aplikacji web
- Użytkownik wykonuje akcje na GUI – usługi zaszyte zwracają dane o wolnych miejscach w sali na konkretna godzinę i film
- Po rezerwacji następuje zakup – klient przenoszony jest do okna płatności które są wystawionymi interfejsami bankowymi -> kolejne usługi

- Usługi mogą być re-używalne w innych miejscach i u innych partnerów

SOA - Service Oriented Architecture

- architektura zorientowana na serwisy
- może być używana niezależnie od innych
- usługi są dostępne w sieci
- wiedza o interface, a nie o implementacji usługi
- niezależne od języka i systemu operacyjnego
- możliwe połącznia wiele do wiele (brak spójności możliwy)

Usługi - WebService

- Client <-> Server
- Usługi są dostępne w sieci
- Niezależne od języka, systemu operacyjnego i sprzętu
- Dla aplikacji internetowych i systemów rozproszonych
- Usługi rejestrowane jako płatne
- dostępny przez protokoły sieciowe HTTP, SMTP, FTP
- implementacja przez WSDL / WADL - SOAP REST – dostawca nie musi znać GUI

Usługi - WebService

- Google Maps
- Youtube
- FB

SOAP

- Simple Object Access Protocol
- Protokół do komunikacji z usługami internetowymi -> HTTP
- Wykorzystuje XML
- Przesyłanie standardów SOAP

SOAP – przykłady

- http://www.dneonline.com/calculator.asmx?wsdl
- http://webservices.oorsprong.org/websamples.countryinfo/CountryInfoService.wso?WSDL
- http://wsf.cdyne.com/WeatherWS/Weather.asmx?WSDL

REST

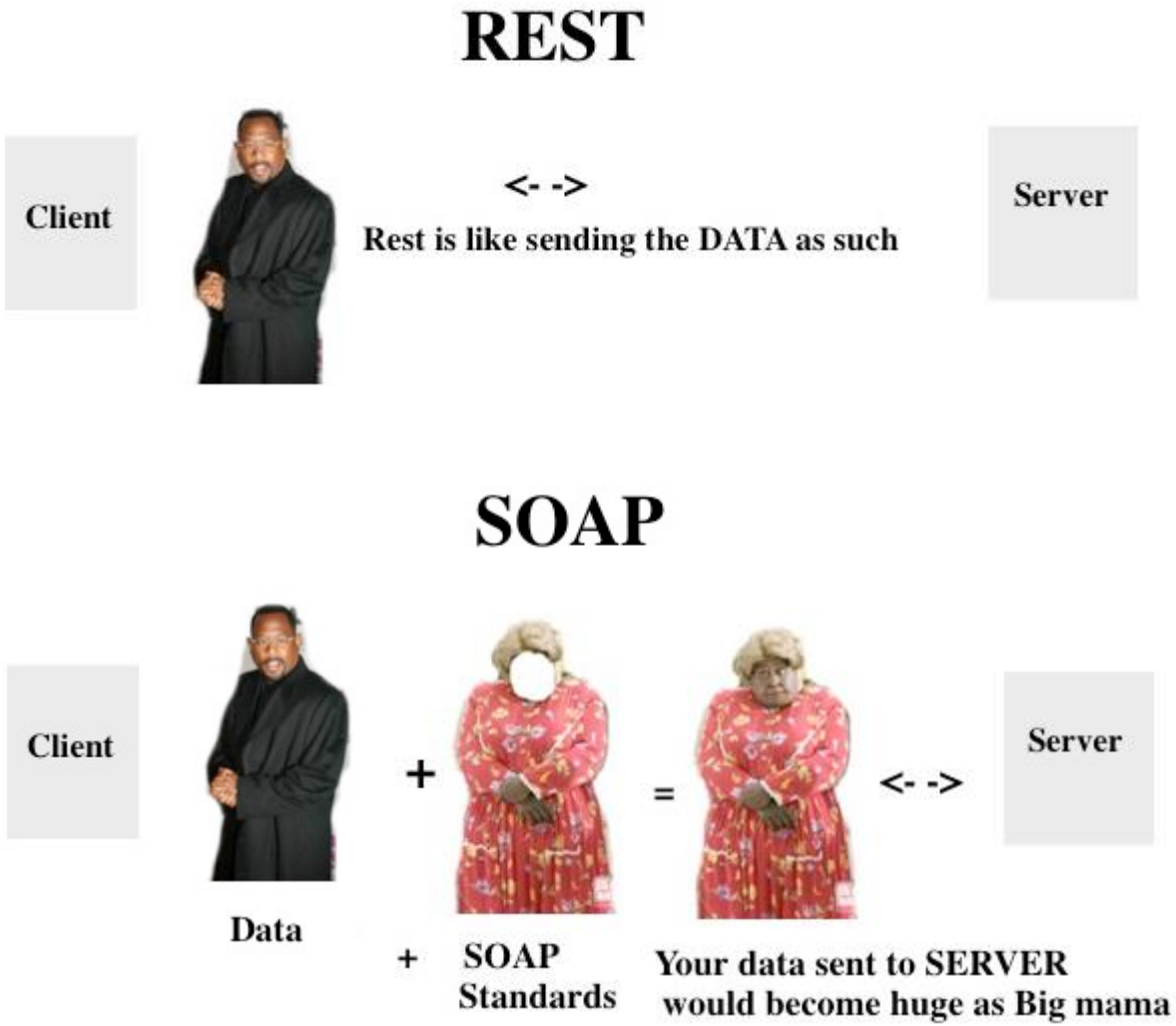
- Representational State Transfer
- Luźny styl ☺
- Wszystko czego potrzebujesz żeby przesyła dane od A do B i dostać odpowiedz
- Jasne i proste
- Wykorzystuje XML, Json, Yaml
- Metody GET/POST/DELETE/PUT

REST

https://gorest.co.in/
https://jsonplaceholder.typicode.com/
https://httpbin.org/
https://reqres.in/
https://petstore.swagger.io/#/ GET http://petstore.swagger.io/v2/pet/id

docker pull czyzyk/car:newone
docker run -p 8080:80 czyzyk/car:newone
http://localhost:8080/

REST vs SOAP


REST
Client
<- ->
Server
Rest is like sending the DATA as such
SOAP
Client
+
=
<- ->
Server
Data
+ SOAP Standards
Your data sent to SERVER would become huge as Big mama

REST vs SOAP

- REST
  - Lekki, prosty bez security, otwarty, cache
- SOAP
  - Protokół, ciężki, udokumentowany, security, zamknięty, transferowany

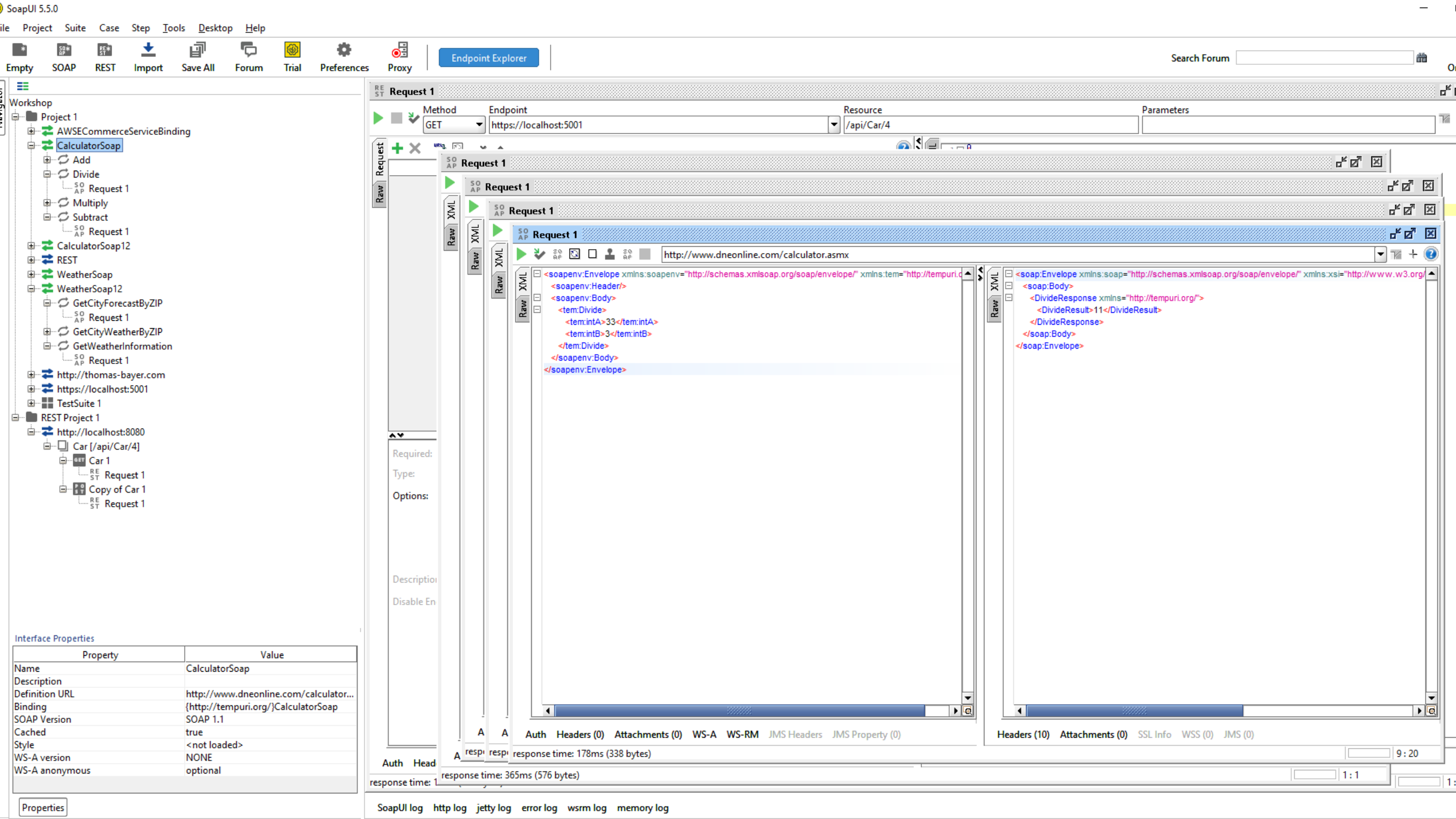
Narzędzia

- Fiddler
- Soap UI – baza testów
- Jmeter
- Postman

Pro vs. Free

Zielone

Niebieskie


SoapUI 5.5.0
File Project Suite Case Step Tools Desktop Help
Empty SOAP REST Import Save All Forum Trial Preferences Proxy
Endpoint Explorer
Search Forum
Workshop
Project 1
AWSECommerceServiceBinding
CalculatorSoap
Add
Divide
Request 1
Multiply
Subtract
Request 1
CalculatorSoap12
REST
WeatherSoap
WeatherSoap12
GetCityForecastByZIP
Request 1
GetCityWeatherByZIP
GetWeatherInformation
Request 1
http://thomas-bayer.com
https://localhost:5001
TestSuite 1
REST Project 1
http://localhost:8080
Car [/api/Car/4]
Car 1
Request 1
Copy of Car 1
Request 1
Interface Properties
Property
Value
Name
CalculatorSoap
Description
Definition URL
http://www.dneonline.com/calculator...
Binding
{http://tempuri.org/}CalculatorSoap
SOAP Version
SOAP 1.1
Cached
true
Style
<not loaded>
WS-A version
NONE
WS-A anonymous
optional
Properties
Request 1
Method
GET
Endpoint
https://localhost:5001
Resource
/api/Car/4
Parameters
Request
Raw
XML
Required:
Type:
Options:
Description
Disable En
http://www.dneonline.com/calculator.asmx
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/" xmlns:tem="http://tempuri.o
<soapenv:Header/>
<soapenv:Body>
<tem:Divide>
<tem:intA>33</tem:intA>
<tem:intB>3</tem:intB>
</tem:Divide>
</soapenv:Body>
</soapenv:Envelope>
<soap:Envelope xmlns:soap="http://schemas.xmlsoap.org/soap/envelope/" xmlns:xsi="http://www.w3.org/
<soap:Body>
<DivideResponse xmlns="http://tempuri.org/">
<DivideResult>11</DivideResult>
</DivideResponse>
</soap:Body>
</soap:Envelope>
Auth Headers (0) Attachments (0) WS-A WS-RM JMS Headers JMS Property (0)
Headers (10) Attachments (0) SSL Info WSS (0) JMS (0)
response time: 178ms (338 bytes)
9 : 20
response time: 365ms (576 bytes)
1 : 1
SoapUI log http log jetty log error log wsrm log memory log

GUI – co tu widać?

- Workshop - Project
  - Soap
  - REST
  - Properties
- Editor
  - Request
  - Response
- Log

Services / TestSuites – co tu kliknąć?

- Dodawanie usługi
- Dodawanie bazy testów

Struktura drzewiasta

- Projekt
  - Service
    - REST Endpoint
      - Resource
        - Metod -> Request
    - Soap Metods
  - TestSuite -> TS
    - TestCase -> TC
      - TestStep -> TS

Proste sprawdzenia – SOAP online

- http://www.dneonline.com/calculator.asmx?wsdl

- Projekt dla WS SOAP
- Test Suite - Calculator
- Test Case – Add
- Test Step – Add 2+2
- Run
- Simple assertion - Contains/Http Status

Proste sprawdzenia – REST Docker

Dostępne metody w docker

- docker pull czyzyk/car:latest
- docker run -p 8080:80 czyzyk/car:latest
- http://localhost:8080/

- Troubleshoting:
  - Switching to Windows/Linux containers

Proste sprawdzenia – REST - docker

Dostępne metody w docker

- GET: api/Car
  - Zwróć całą listę
- GET: api/Car/3
  - Zwróć id = 3
- POST: api/Car

  {"name":"Polonez"}
  - dodaj pojazd nazwa „Polonez”

Proste sprawdzenia – REST - docker

Dostępne metody w docker

- PUT: api/Car/3
  - Aktualizacja id=3

- DELETE: api/Car/3
  - Usuwanie id=3

Poste sprawdzenia REST - online

POST https://gorest.co.in/public-api/users HTTP/1.1
Content-Type: application/json
Authorization: Bearer z0bROAWgHDjTBrbIAgC14nRRI4IxTDTSq5h0

```
{
        "first_name": "imie",
        "last_name": "nazwisko",
        "gender": "male",
        "email": ”warsztat@test.com"
}
```

Poste sprawdzenia REST - online

- Add Oauth 2.0
  - Add pass
- Follow redirects: false

Assertions – asercje co tu sprawdzać?

- Walidowanie
  - Rezultat vs oczekiwany wynik
- Valid HTTP Status Code (Invalid)
- Contains (not Contains)

Assertions

- Soap Fault (Not)
- Schema Compliance
- Response SLA

- JsonPatch
  - Count
  - Existance Match
  - Match
  - RegEx match

Assertions – Xpath Soap

- Xpath Match

  declare namespace soap='http://schemas.xmlsoap.org/soap/envelope/';
  declare namespace ns1='http://tempuri.org/';
  //ns1:MultiplyResult

  - Or //ns1:MultiplyResult[1] -> more then 1 to choose this if first position
  - Or // ns1:MultiplyResult/ns1:ScoreResult -> more nodes remember about additional ns1 if then more then 1 to choose

Assertions – XpathQuery Soap

- XQuery Match
  - Check all multiply data in same nodes
  - Declare weather

```
declare namespace soap='http://schemas.xmlsoap.org/soap/envelope/';
declare namespace m='http://www.oorsprong.org/websamples.countryinfo';
<Result>
{
for $a in
//m:FullCountryInfoAllCountriesResponse/m:FullCountryInfoAllCountriesResult/m:tCountry
Info/m:sName/text()
return $a
}
</Result>
```

Assertions

- Script – Groovie SOAP

```
def groovyUtils = new com.eviware.soapui.support.GroovyUtils(context)
def holder = groovyUtils.getXmlHolder(messageExchange.responseContent)
holder.namespaces["ns"] = 'http://tempuri.org/';
def resultAdd = holder.getNodeValue("//ns:MultiplyResult")
assert resultAdd == "4"
```

Assertions - REST

- Script – Groovie REST

```
import groovy.json.JsonSlurper
def resp = messageExchange.response.responseContent
def js = new JsonSlurper().parseText(resp)
assert js.name[0] == "Porsche"
```

Propreties – parametry

- Global
  ${#Global#parameter}
- Project
  ${#Project#parameter}
- TestSuite
  ${#TestSuite#parameter}
- TestCase
  ${#TestCase#parameter}
- TestStep - properties
  ${Properties#test}

Property Transfer – przekazywanie w SOAP

- Xpath -> helpers ☺
  - https://xmlgrid.net/xpath.html <-BEST
  - http://xpather.com/
  - https://codebeautify.org/Xpath-Tester

- Soap
  - Source From -> Target To
  - XPath
  - Property
  - ns – name spaces
  - XPath
    - //*:AddResult

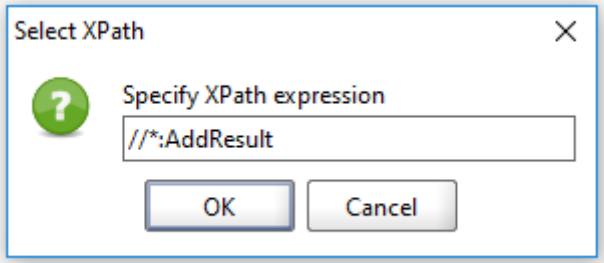
Property Transfer – przekazywanie w REST

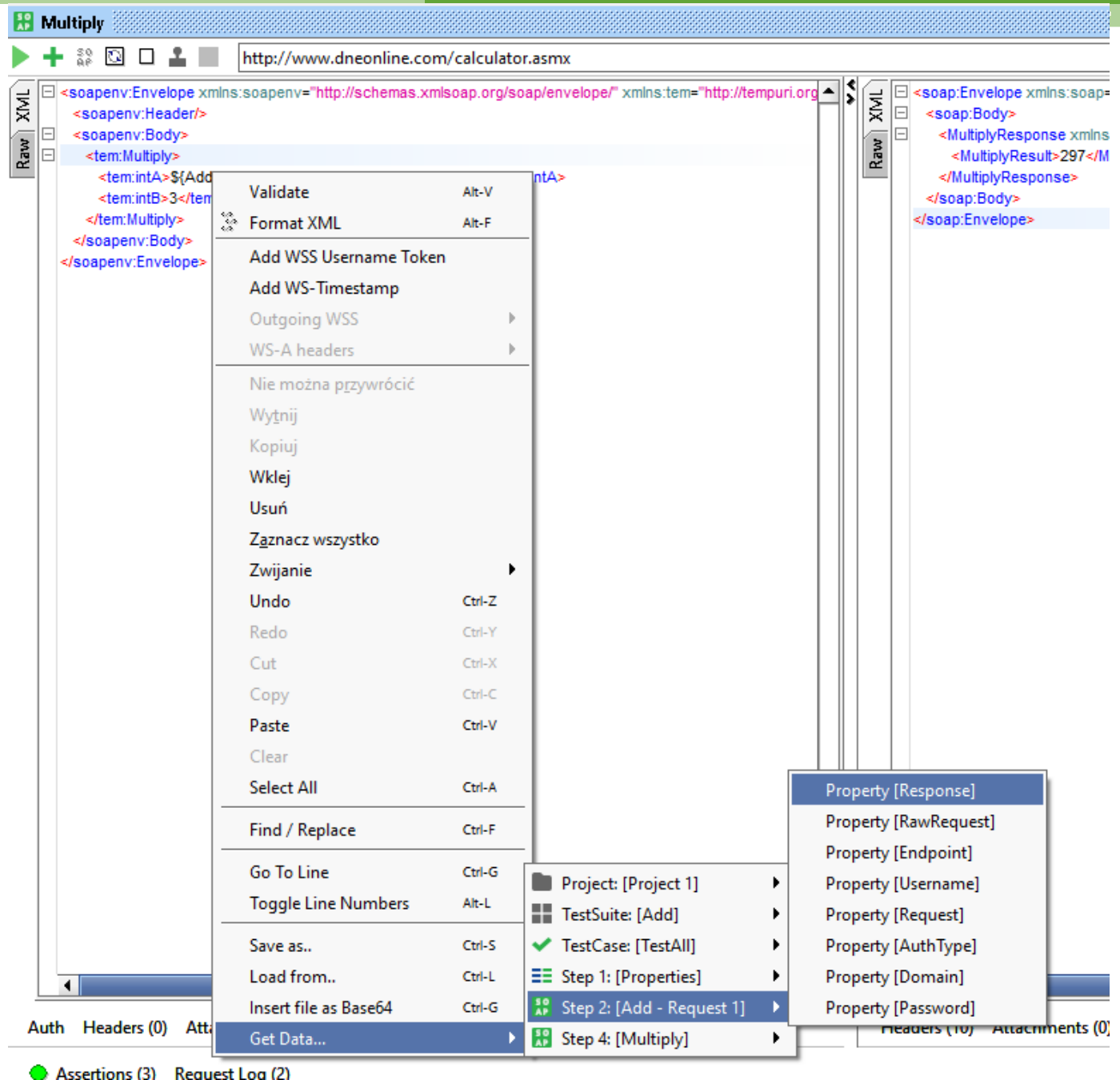
- JSONPath Finder – chrome addon helps ☺

- REST
  - Source From -> Target To
  - JsonPath
  - Property
  - [1].id

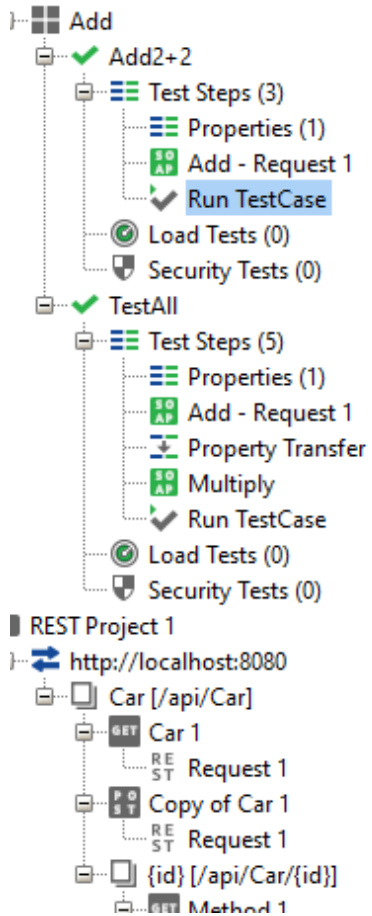
Get Data

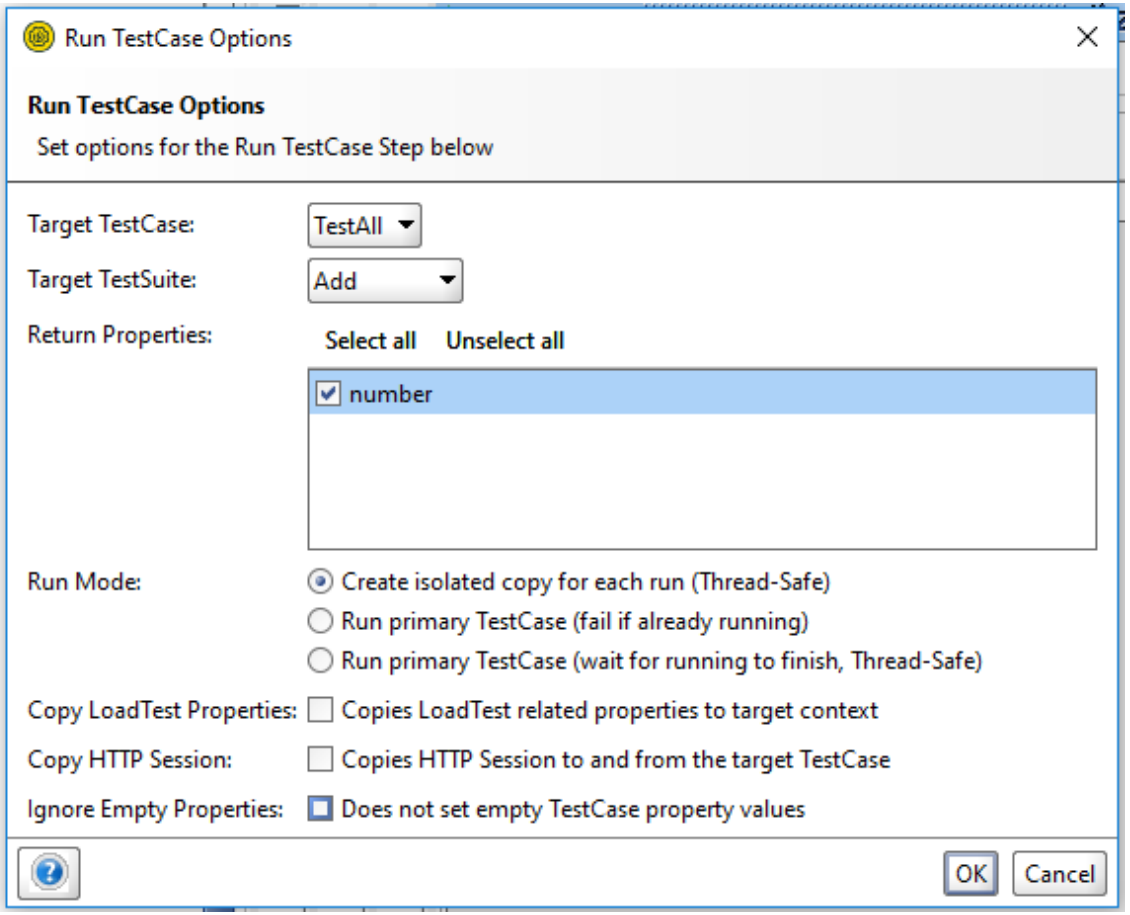
- If you know Xpath expression





Run TestCase – uruchamianie innego TC





JDBC - docker

- docker pull mysql
- docker run -p 3306:3306 --name=mysqltest -e MYSQL_ROOT_PASSWORD=pass -d mysql
- Lauch HeidiSQL / or skip to next page
  - https://www.heidisql.com/download.php?download=portable-64

JDBC – no heidi

docker exec –it mysqltest /bin/bash

mysql –uroot –ppass

(...) see on the next page

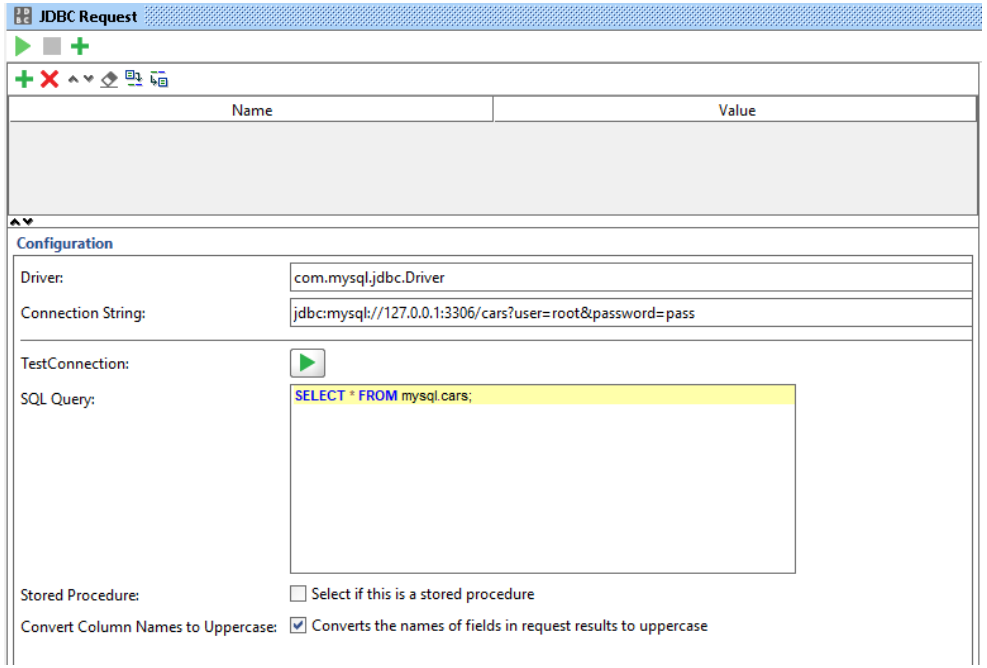
JDBC – Create Table

```
USE mysql;
CREATE TABLE cars (
ID INT AUTO_INCREMENT PRIMARY KEY,
carname VARCHAR(200),
prodyear VARCHAR(50)
);
INSERT INTO cars (carname, prodyear)
VALUES ('Polo', '1999');
INSERT INTO cars (carname, prodyear)
VALUES ('Golf', '2003');
```

Line by line

JDBC – Driver & Select

- Add mysql-connector-java-5.1.48.jar
  - SoapUI-5.5.0\bin\ext



- com.mysql.jdbc.Driver
- jdbc:mysql://127.0.0.1:3306?user=root&password=pass
- SELECT * FROM mysql.cars;

JDBC – transfer

- ResponseAsXML
- XPath

- Transfer
- //Results/ResultSet/Row[@rowNumber=2]/CARS.CARNAME

Groovie - script

- Log.info
- Get Properties
  - Project - testRunner.testCase.testSuite.project.getPropertyValue(”PropName”)
  - TestSuite - testRunner.testCase.testSuite.getPropertyValue(”PropName”)
  - TestCase - testRunner.testCase.getPropertyValue(”PropName”)
  - TestStep
    - testRunner.testCase.getTestStepByName(”TCName”). getPropertyValue(”PropName”)

Groovie - script

- Set Properties
  - Project
    - testRunner.testCase.testSuite.project.setProperyValue("PropName", "PropValue")
  - TestSuite
    - testRunner.testCase.testSuite.setProperyValue("PropName", "PropValue")
  - TestCase – ☺
  - TestStep
    - testRunner.testCase.getTestStepByName("TCName"). setProperyValue("PropName", " PropValue")

Groovie – script

- If else
  - *if ()*
    {}
    Else {}

- For / while

```
(0..3).each {
    log.info "it"
}
```

- *Collection colection = new String[2]*

Groovie – run TestStep, TestCase

- Run Test Step

```
def testStep = testRunner.testCase.testSteps['Run TestCase']
testStep.run( testRunner, context )
```

- Run Test Case

```
project =
testRunner.getTestCase().getTestSuite().getProject().getWorkspace().getProjectByN
ame("CarAPI_REST")
testSuite = project.getTestSuiteByName("Service_Add");
testCase = testSuite.getTestCaseByName("Add Positive");
runner = testCase.run(new
com.eviware.soapui.support.types.StringToObjectMap(), false);
```

Groovie – context XML (3 different ways)

```
def response = context.expand( '${Add#Response}' )
def xmlSlurper = new XmlSlurper().parseText(response)
log.info xmlSlurper.Body.AddResponse.AddResult

def groovyUtils = new com.eviware.soapui.support.GroovyUtils( context )
responseContent = testRunner.testCase.getTestStepByName("Add").getPropertyValue("response")
def holder = groovyUtils.getXmlHolder(responseContent)
log.info holder.getNodeValue("//*:AddResult")


def response =
testRunner.testCase.getTestStepByName('ListOfContinentsByCode').getPropertyValue("response")
def xml = new XmlSlurper().parseText(response)
def code=
xml.Body.ListOfContinentsByCodeResponse.ListOfContinentsByCodeResult.tContinent[1].sCode
```

Groovie – context JSON

```
import groovy.json.JsonSlurper
def response = context.expand( '${Car#Response}' )
def jsonSlurper = new JsonSlurper().parseText(response)
```

Groovie – script data sink file

```
import java.io.File;

new File("C:\\Cars.txt").eachLine { line ->
        log.info line
}
```

Groovie – Excel Data Source JXL

```
import jxl.*
import jxl.write.*
import jxl.Workbook;

def groovyutils = new com.eviware.soapui.support.GroovyUtils(context)
def projectpath = groovyutils.projectPath

def f = new File("C:\\test.xls");
def wk = Workbook.getWorkbook(f);

def s1 = wk.getSheet(0);
def r = s1.getRows();
def c1
for(def i=0;i<r;i++)
{
        c1 = s1.getCell(0, i).getContents()
        log.info c1
}
```

Groovie – Excel Data Sink JXL

```
import jxl.*
import jxl.write.*
import jxl.write.Label
import jxl.Workbook;
import java.io.File;
import groovy.json.*

def f = new File("C:\\test.xls");
WritableWorkbook wk = Workbook.createWorkbook(new File("c:\\test.xls"))
WritableSheet sheet = wk.createSheet("Worksheet", 0)

testRunner.runTestStepByName("car")
def response = context.expand( '${car#Response}' ).toString()
def json = new JsonSlurper().parseText (response)
def carName = json.name
Label label = new Label(0, 0, carName); //col=0=A,row=0=1
sheet.addCell(label);
wk.write()
wk.close()
```

Groovie – CSV

- \bin\ext -> opencsv2.3.jar & groovycsv-1.1.jar & restart soapUI

```
import static com.xlson.groovycsv.CsvParser.parseCsv
def csv = '''id,carName,prodyear
1,Saab,2009
2,Opel,2005'''
def data = parseCsv(csv)
for(line in data) {
    log.info "$line.id $line.carName $line.prodyear"
}
```

Groovie – JDBC

```
com.eviware.soapui.support.GroovyUtils.registerJdbcDriver("com.mysql.jdbc.Driver")

import groovy.sql.Sql

def sql = Sql.newInstance('jdbc:mysql://127.0.0.1:3306', 'root', 'pass', 'com.mysql.jdbc.Driver')

def query = sql.rows("select * from mysql.cars")
query.each { it ->
 log.info it.id + " " + it.carname
}
```

Groovie – JsonSlurper read json

- https://groovy-lang.org/json.html

```
import groovy.json.*
def response = context.expand( '${AddCAR#Response}' ).toString()
def json = new JsonSlurper().parseText (response)
log.info json.name
```

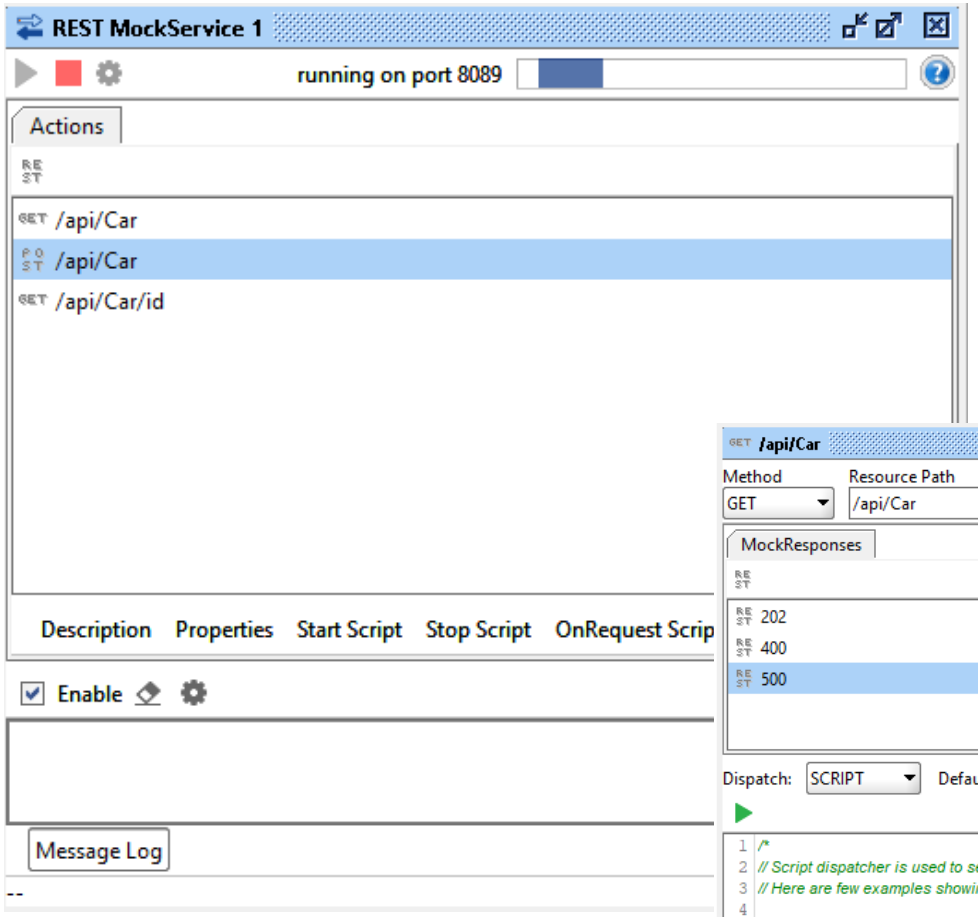
Groovie – JsonSlurper build json

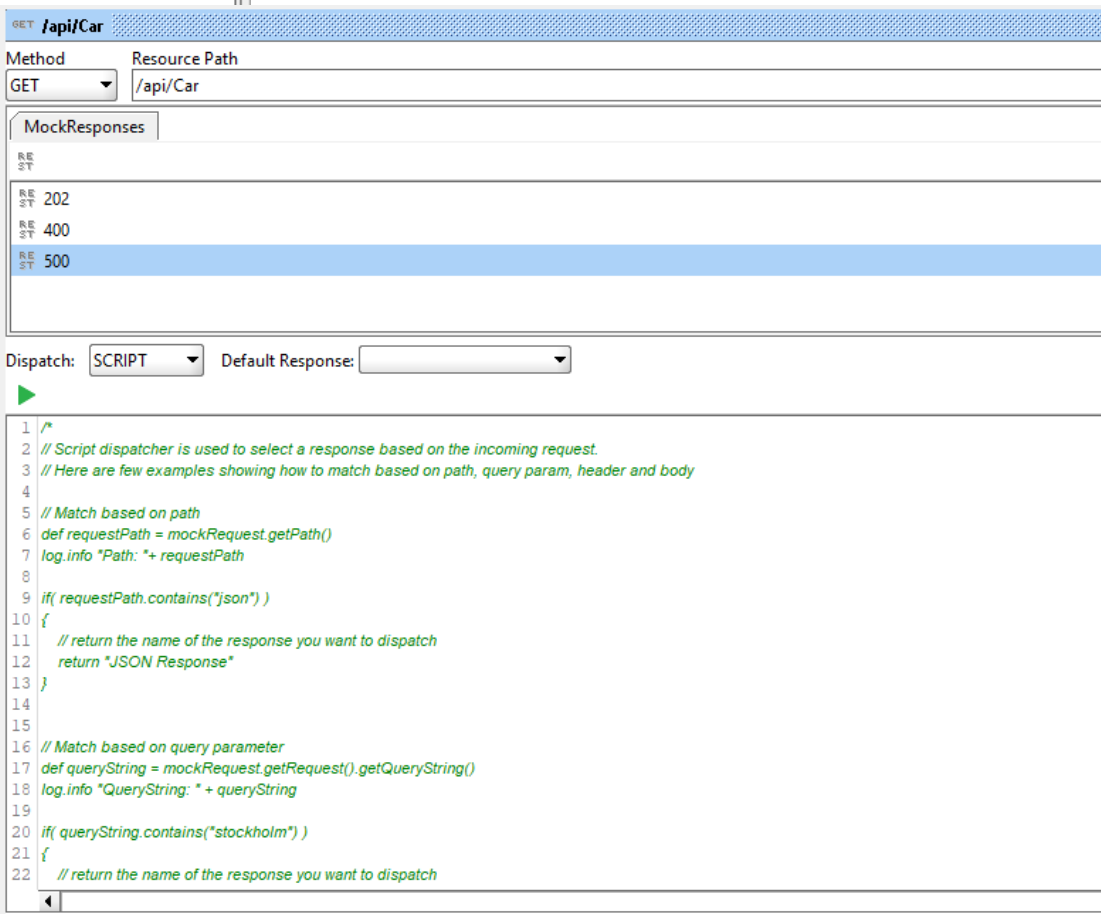
```
import groovy.json.*

def jsonSlurper = new JsonSlurper()
def object = jsonSlurper.parseText '''
  {
       "id": 1,
       "nameCar": "fiat",
       "prodYear": "1987"
   }'''
```

Dokumentacja / Usługi

- Dokumentacja <> Service
- GUI <> Dokumentacja
- GUI == Service
- F12 -> filtr XHR

Mocks


REST MockService 1
running on port 8089
Actions
GET /api/Car
POST /api/Car
GET /api/Car/id
Description
Properties
Start Script
Stop Script
OnRequest Scrip
Enable
Message Log
--


GET /api/Car
Method
Resource Path
GET
/api/Car
MockResponses
202
400
500
Dispatch:
SCRIPT
Default Response:
/*
// Script dispatcher is used to select a response based on the incoming request.
// Here are few examples showing how to match based on path, query param, header and body
// Match based on path
def requestPath = mockRequest.getPath()
log.info "Path: "+ requestPath
if(requestPath.contains("json"))
{
// return the name of the response you want to dispatch
return "JSON Response"
}
// Match based on query parameter
def queryString = mockRequest.getRequest().getQueryString()
log.info "QueryString: " + queryString
if(queryString.contains("stockholm"))
{
// return the name of the response you want to dispatch

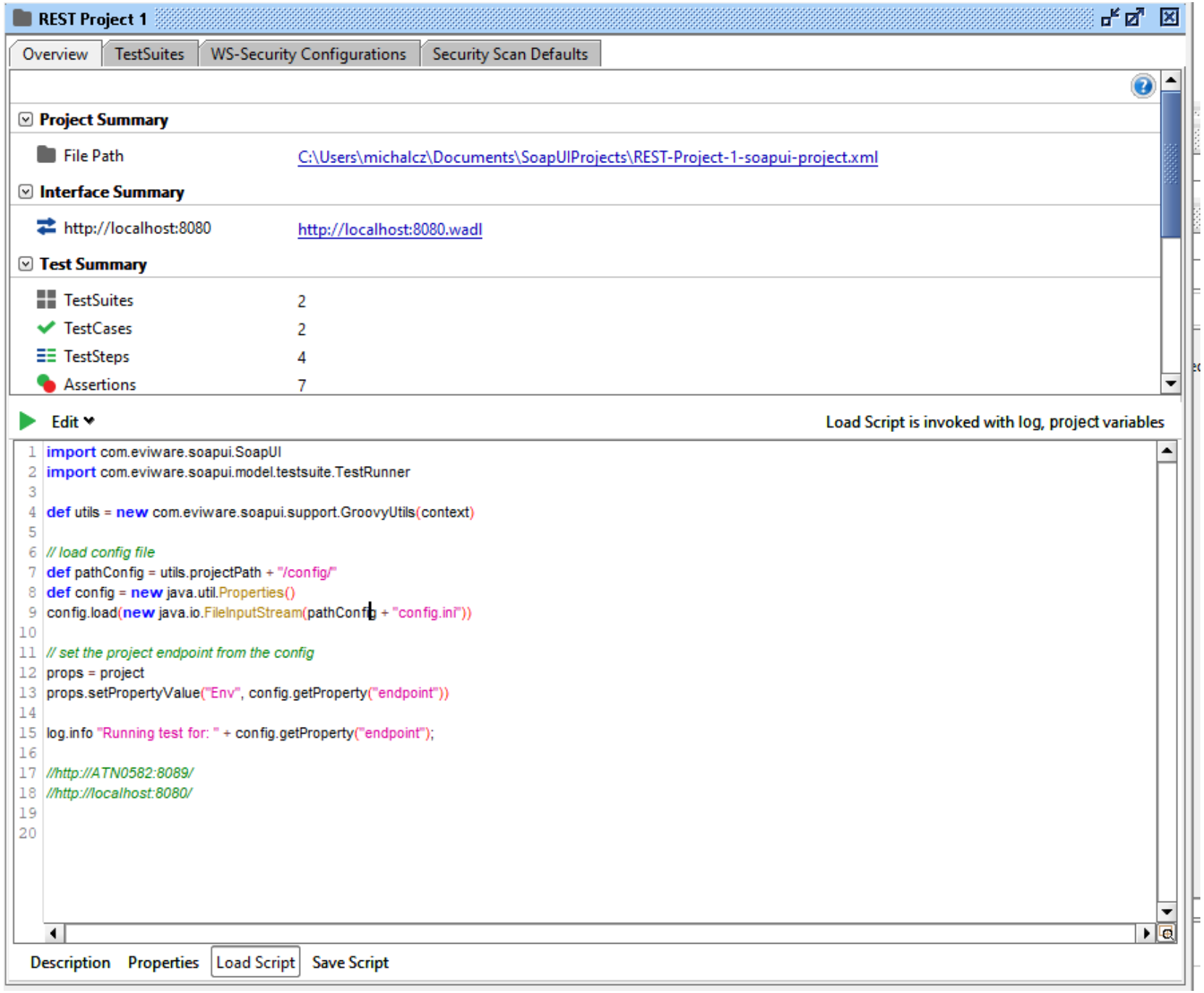
Mocks – scripts

```
// Match based on body
def requestBody = mockRequest.getRequestContent()
log.info "Request body: " + requestBody

if( requestBody.contains("Porshe") )
{
	// return the name of the response you want to dispatch
	return "Response 1"
}
else
	return "Response 2"
```

Enviroments

- Add folder and file
  - config/config.ini
  - endpoint = endpoint:port
- Project -> Load Script

Enviroments

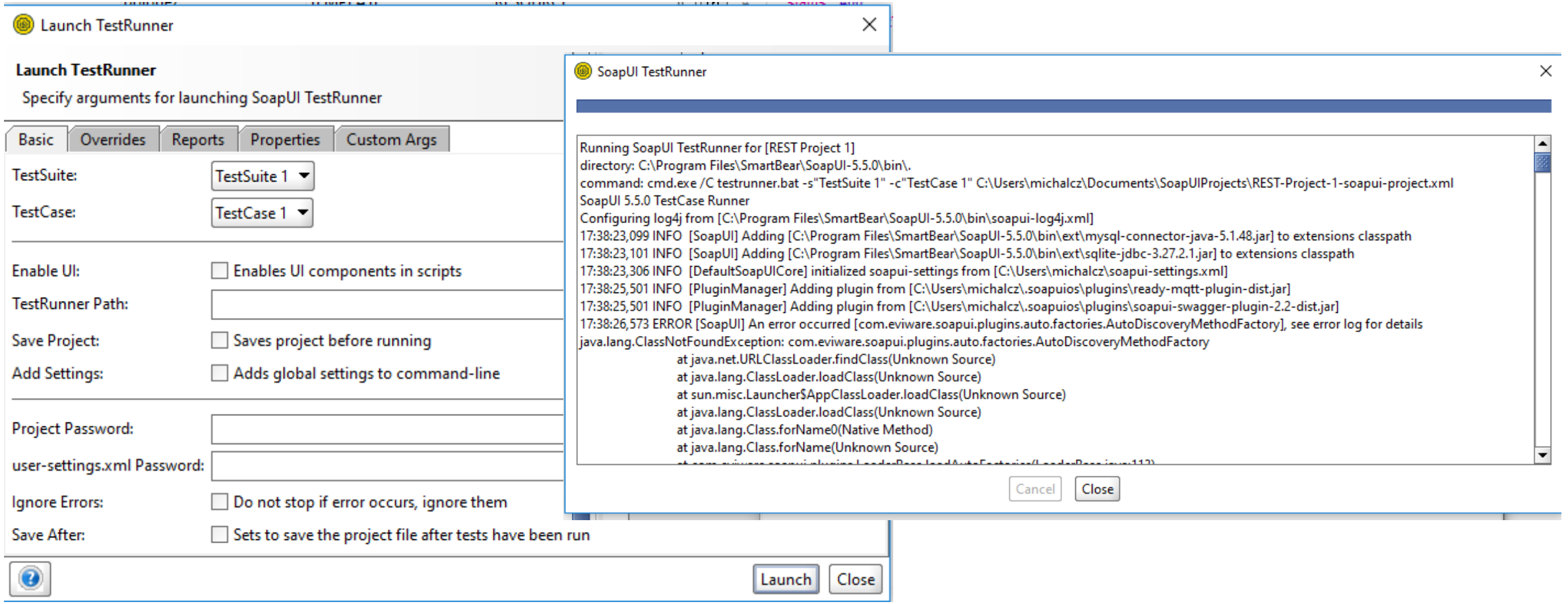


Enviroments

```
import com.eviware.soapui.SoapUI
import com.eviware.soapui.model.testsuite.TestRunner

def utils = new com.eviware.soapui.support.GroovyUtils(context)

//load config file
def pathConfig = utils.projectPath + "/config/"
def config = new java.util.Properties()
config.load(new java.io.FileInputStream(pathConfig + "config.ini"))

// set the project endpoint from the config
props = project
props.setPropertyValue("Env", config.getProperty("endpoint"))

log.info "Running test for: " + config.getProperty("endpoint");
```

http://mock:8089/
http://localhost:8080/

Testrunner - GUI



Testrunner – Jenkins.war

- https://jenkins.io/download/
  - Generic Java package (.war)
  - java -jar jenkins.war --httpPort=9292

  cd C:\Program Files\SmartBear\SoapUI-5.5.0\bin\

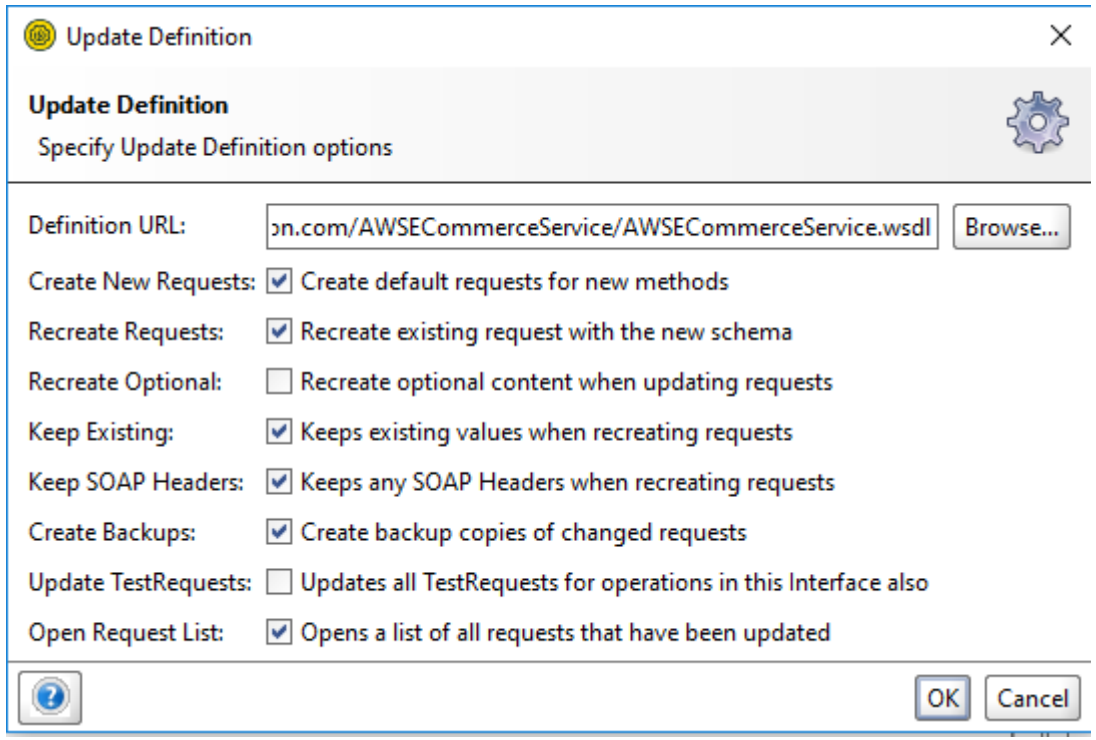
  cmd.exe /C testrunner.bat -s"TestSuite 1" -c"TestCase 1" C:\Users\michalcz\Documents\SoapUIProjects\REST-Project-1-soapui-project.xml

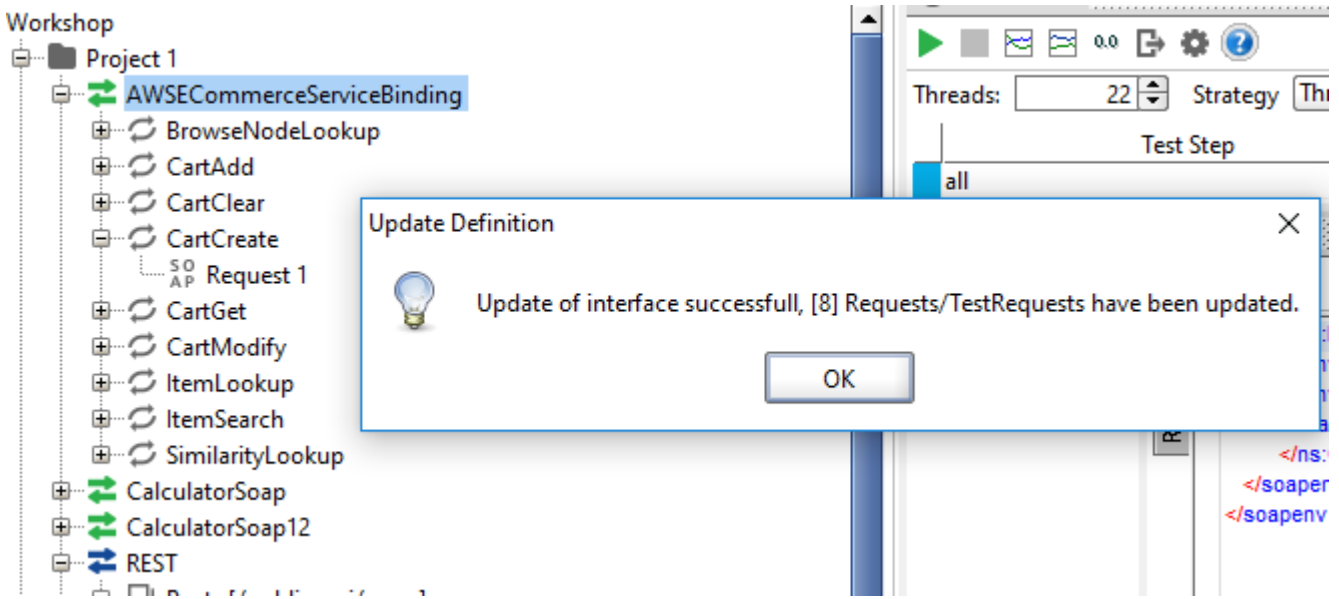
Testrunner – docker Jenkins

- Docker
  - Mkdir Jenkins_home
  - Shared C: docker settings
  - Reset credintials
- docker run --name Jenkins -p 8080:8080 -p 50000:50000 -v C:/Jenkins_home:/var/jenkins_home Jenkins

- Powershell
- set-executionpolicy remotesigned

Update definition

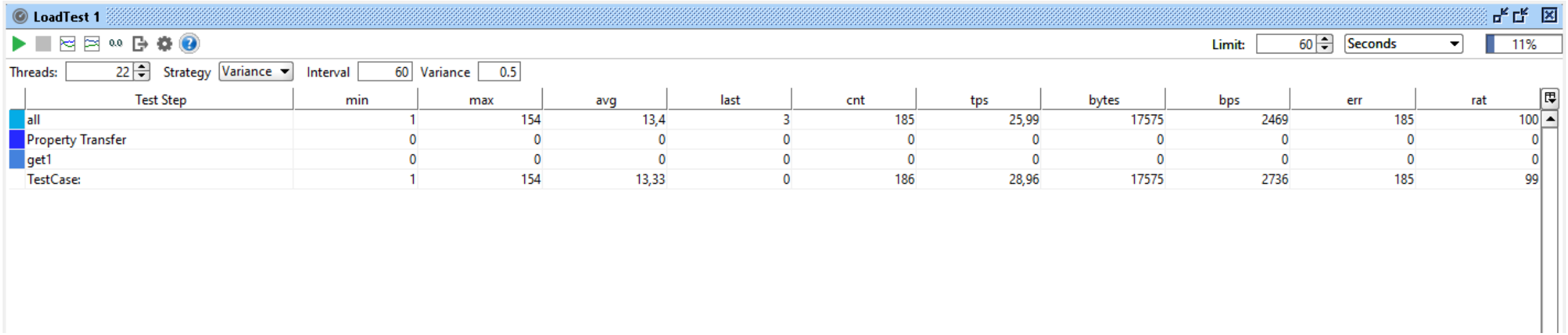




Git

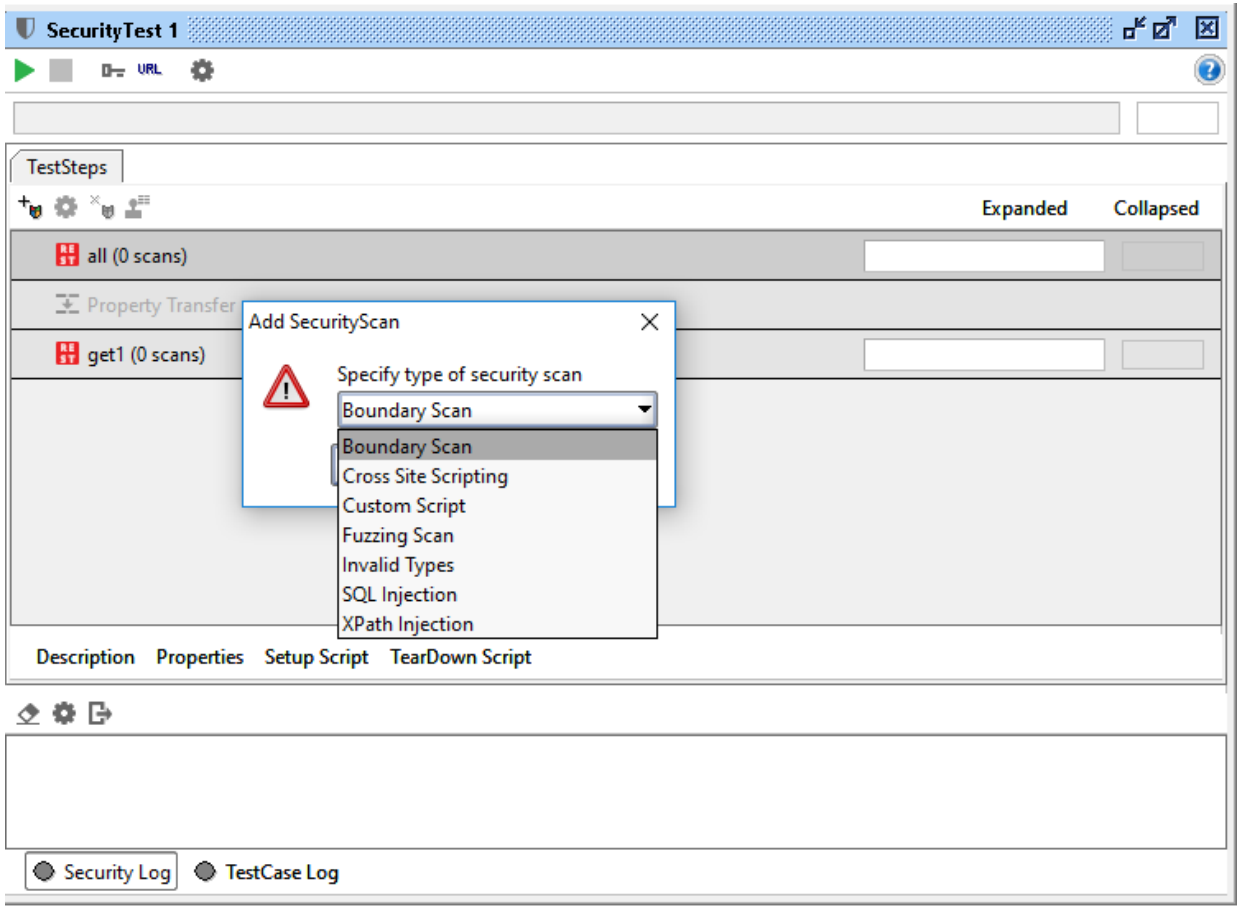
- One project in XML
- Nothing special here ☺

Load Testing



Test Step	min	max	avg	last	cnt	tps	bytes	bps	err	rat
all	1	154	13,4	3	185	25,99	17575	2469	185	100
Property Transfer	0	0	0	0	0	0	0	0	0	0
get1	0	0	0	0	0	0	0	0	0	0
TestCase:	1	154	13,33	0	186	28,96	17575	2736	185	99

Security Testing



Dobry test

- Statusy
- Nagłówki
- Parametry
- Izolacja
- Dymne
- Regresja
- Data Driven Tests
- Integracja
- 1 Test vs 1 Assert

Pro vs. Free

Zielone

Niebieskie

That’s all folks!!!