Website performance testing for beginners

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Agenda

- What is performance testing? Why it is important?
- How to start performance testing? (JMeter example)
- What are the common pitfalls?
- What other tools can help you?

1. Performance teszteltél már valaha?

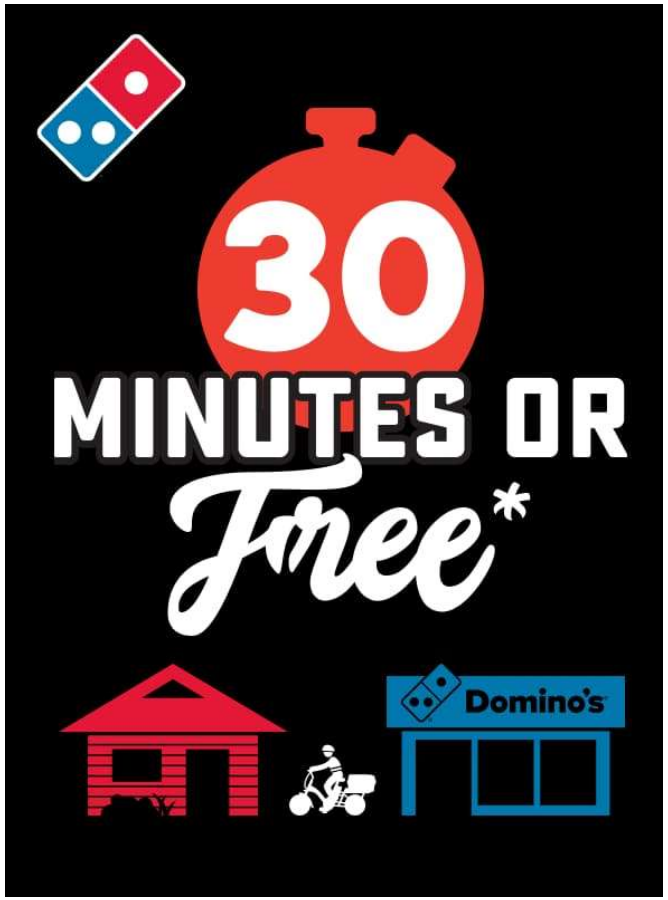
a) Igen, minden projektemen.
b) Igen, előfordult már.
c) Nem, de performance profiling eszközt már használtam.
d) Nem, soha.

Questions

- Send the questions in Zoom using the Q&A section and I will try to answer them at the end.

Performance Testing

- Non-Functional Testing (ISO/IEC 25010)

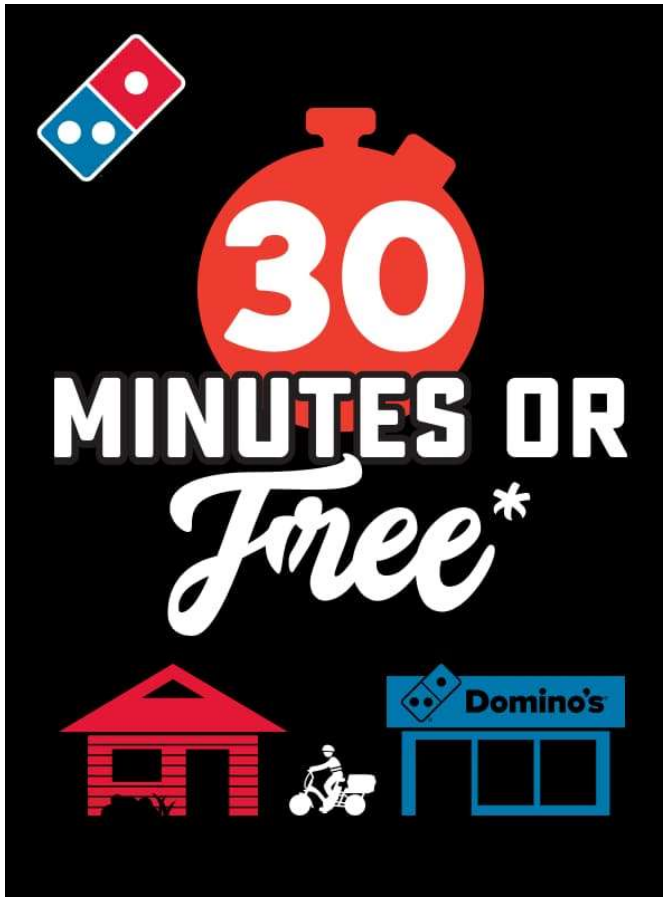


Pic: https://www.dominos.com.au/30-min-or-free

Performance Testing

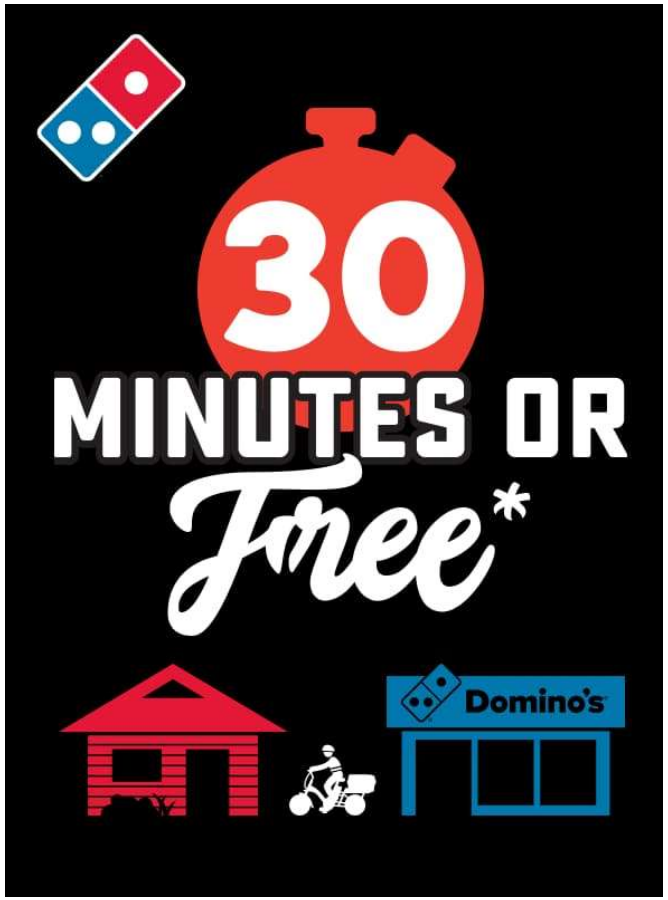
- Non-Functional Testing

- Performance testing is an umbrella term for testing focused on performance (responsiveness) of the system or component under different volumes of load.



Performance Testing

- Non-Functional Testing
- Performance testing is an umbrella term for testing focused on performance (responsiveness) of the system or component under different volumes of load.
- Time Behaviour, Resource Utilization, Capacity

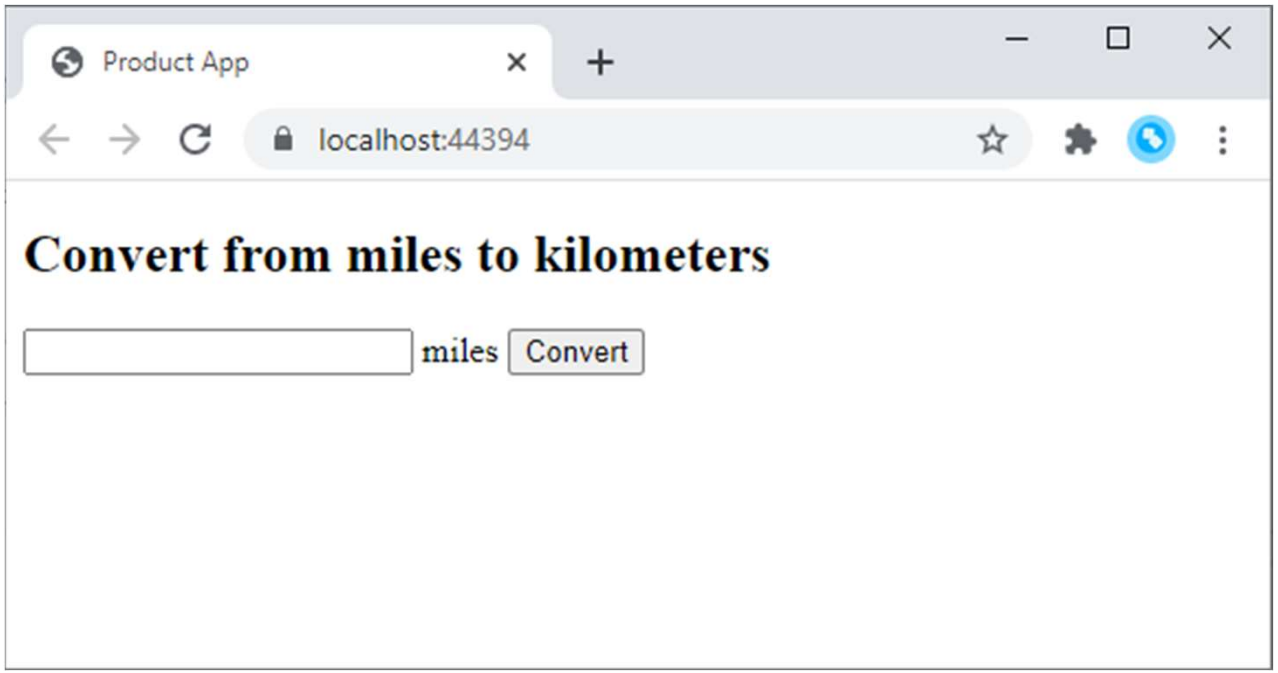


Why it is important?

Pics: https://www.neurosciencemarketing.com/blog/articles/if-your-customers-have-to-wait.htm and http://www.penzcentrum.hu/vasarlas/hatalmas_bukta_az_extreme_digital_akcioja.1042731.html and https://hvg.hu/tudomany/20181123_black_friday_mediamarkt_webshop_online_rendeles_akciok

So we get the task to do performance testing…

The Web Application to test



Analyze the requirements!

2. Fejlesztés során szoktátok vizsgálni az alkalmazás várható terhelését?

a) Igen, mindig.
b) Igen, de csak a teljesítmény kritikus részeket.
c) Nem, csak a monitoring rendszert figyeljük.
d) Nem, soha.

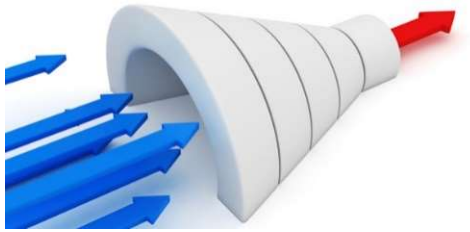
Requirements Analysis

Response
Time

Requirements Analysis

Response Time

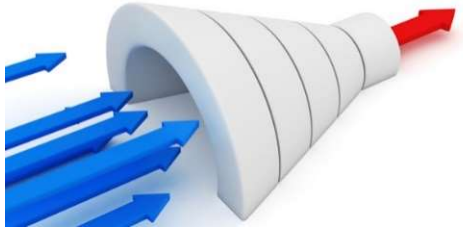
Throughput



Requirements Analysis

Response Time

Throughput



Resources

Choose a tool!

You have lot of option to choose from...

Try to create a test!

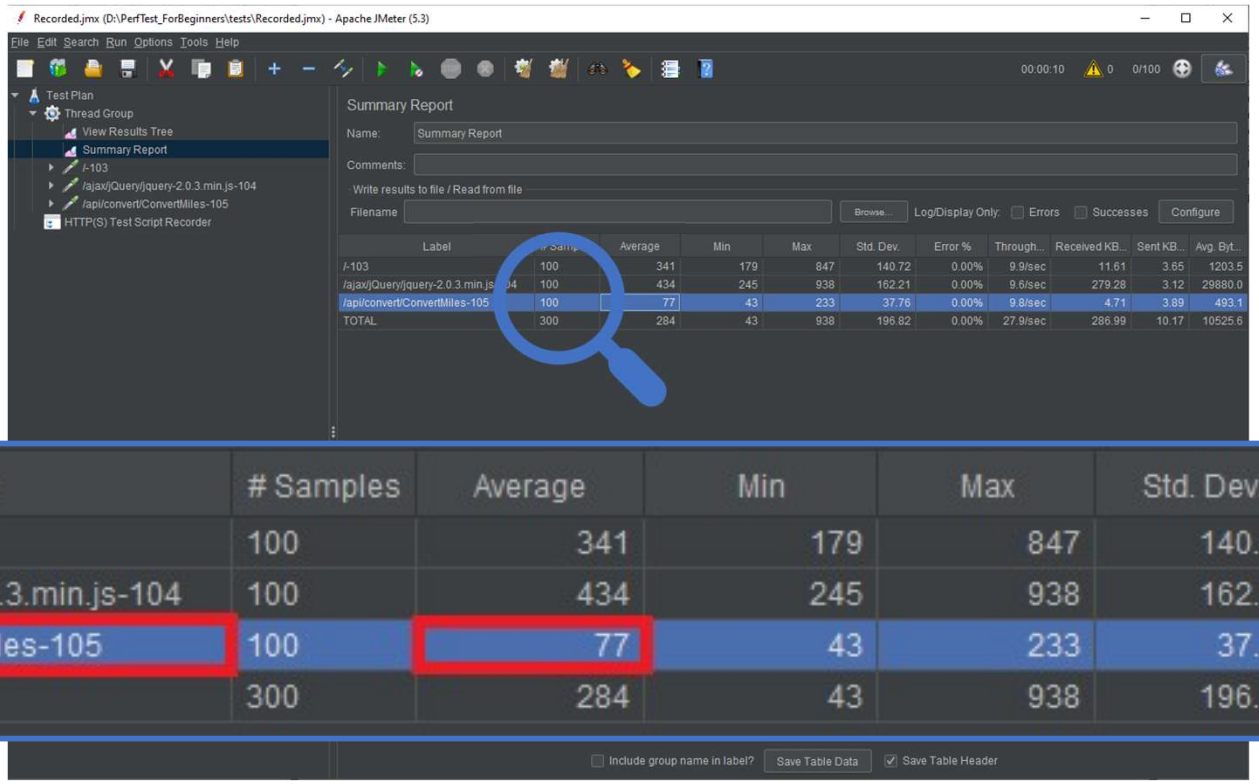
Let’s create a Perfomance Test!

Record and Playback

„Hello World!”

APACHE JMeter™

Execution results #1



Label	# Samples	Average	Min	Max	Std. Dev.	Error %	Through...
/-103	100	341	179	847	140.72	0.00%	9.9/sec
/ajax/jQuery/jquery-2.0.3.min.js-104	100	434	245	938	162.21	0.00%	9.6/sec
/api/convert/ConvertMiles-105	100	77	43	233	37.76	0.00%	9.8/sec
TOTAL	300	284	43	938	196.82	0.00%	27.9/sec

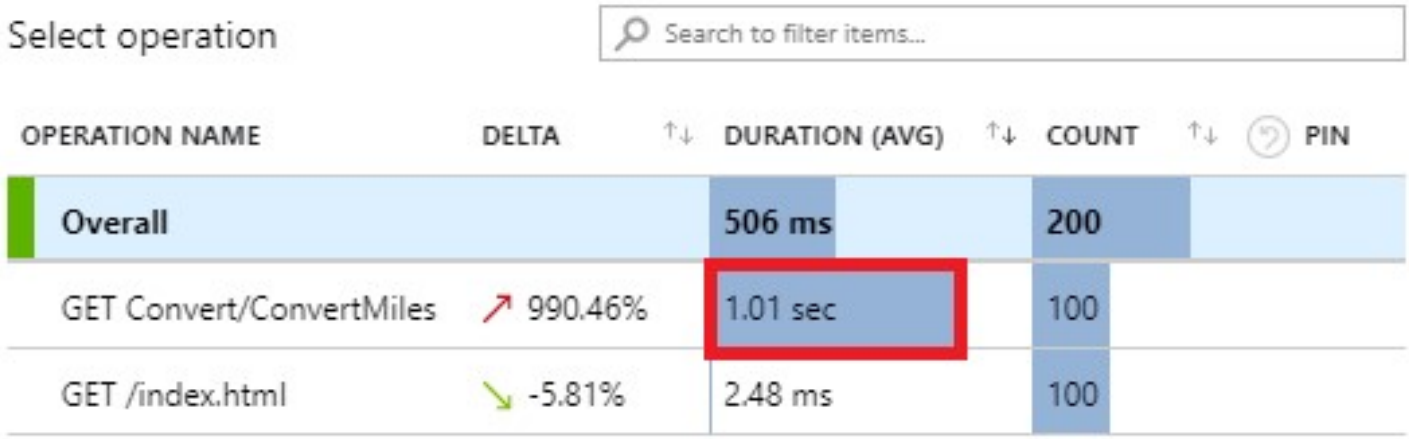
Enable proxy for localhost: https://stackoverflow.com/questions/57419408/how-to-make-firefox-use-a-proxy-server-for-localhost-connections
And import certificate from the JMeter bin directory!

Pic: https://www.memecreator.org/meme/booom-were-done-here/

Except….

Except #1 : Monitoring shows different data!

- **Monitoring on production shows different data!**
- Response time:
  - Monitoring avarage: 1010 ms
  - Performance test results: 1 ms



Investigation #1

- Why is that?

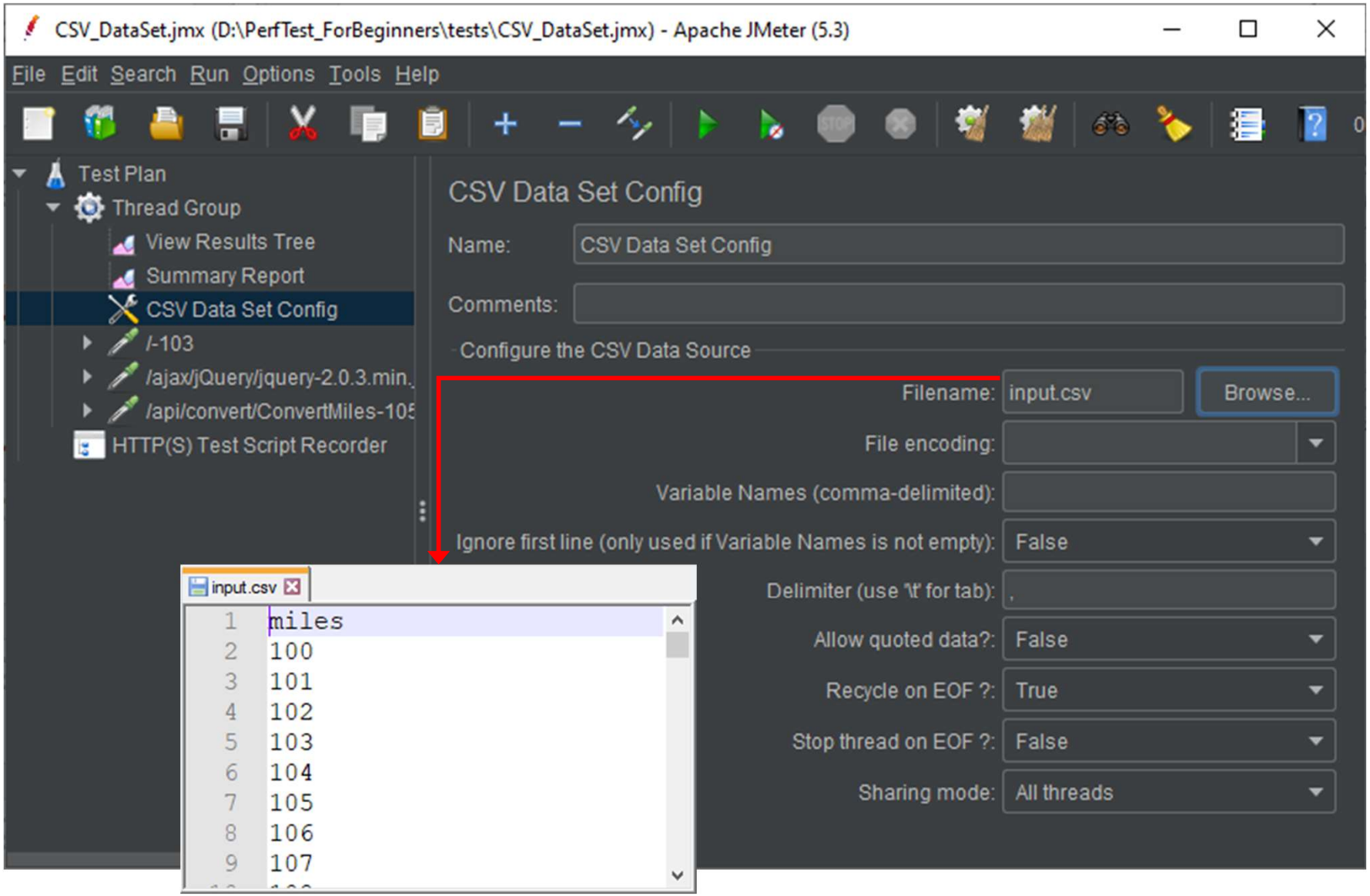
Investigation #1

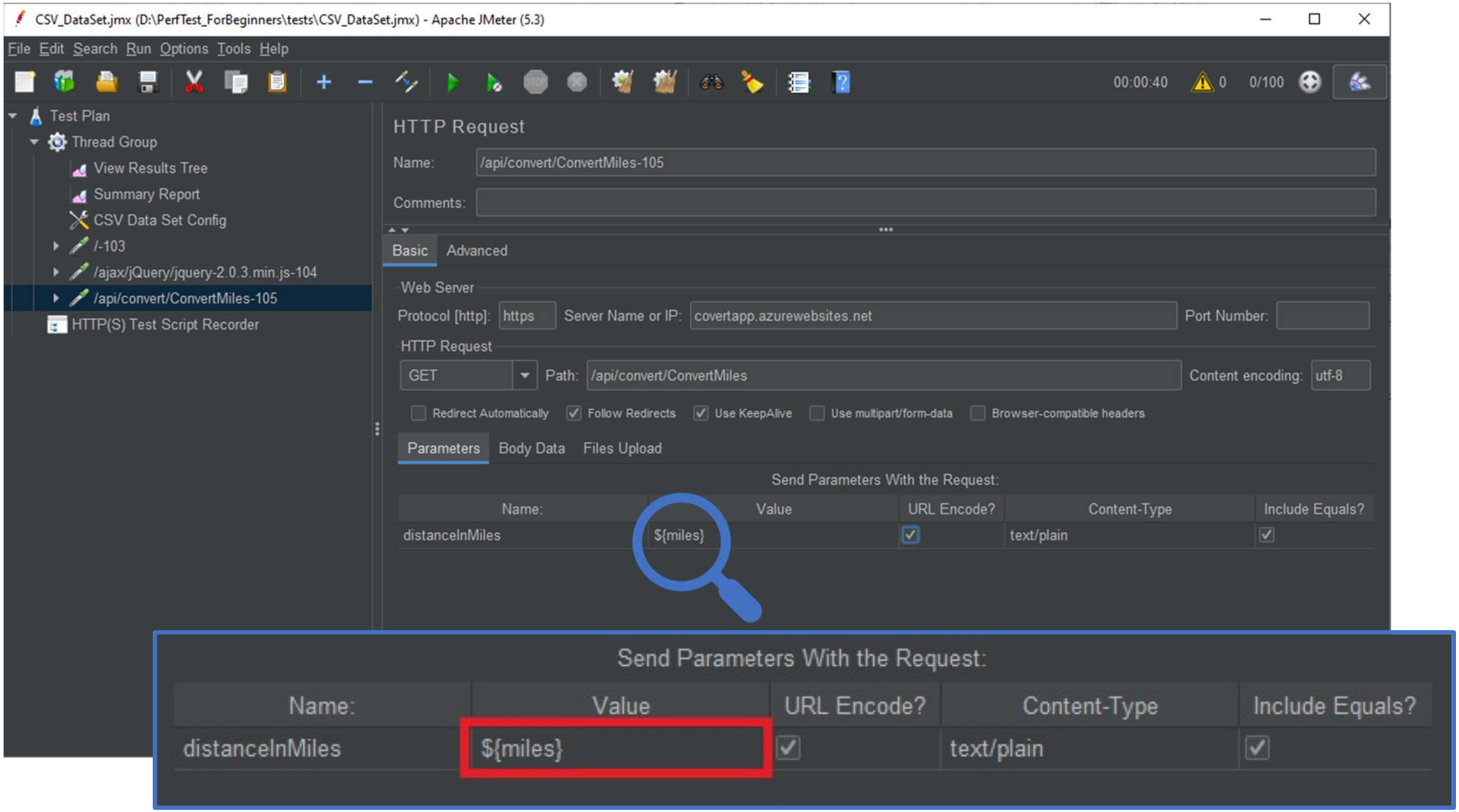
- Why is that?
- We are using Cache in the tested application!

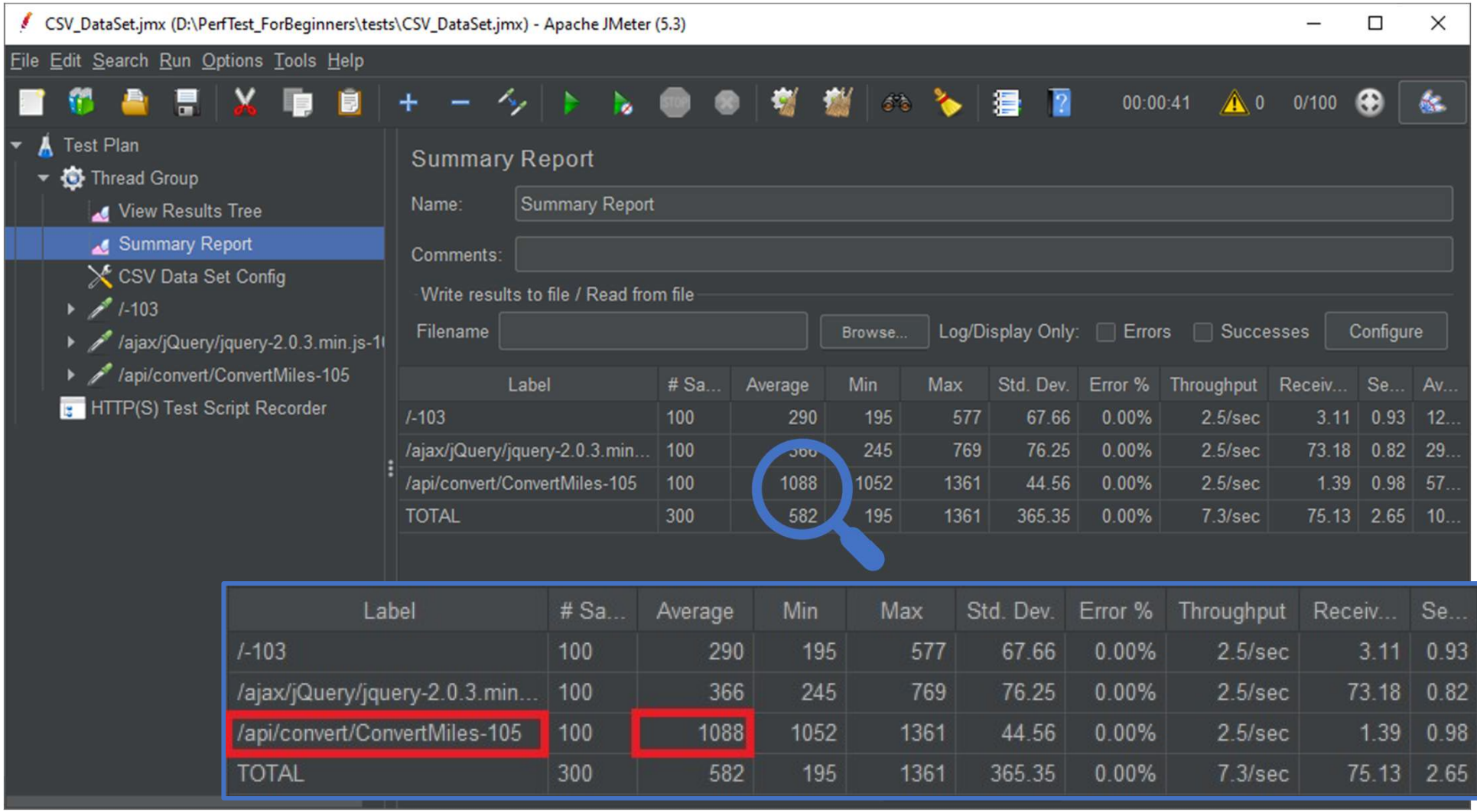
```
1 reference
public double GetCachedConvertedValue(double distanceInMiles)
{
    double cacheEntry;

    if (!_cache.TryGetValue(distanceInMiles, out cacheEntry))
    {
        Thread.Sleep(1000);

        // Key not in cache, so get data.
        cacheEntry = Converter.ConvertFromMilesToKm(distanceInMiles);

        // Set cache options.
        var cacheEntryOptions = new MemoryCacheEntryOptions()
            // Keep in cache for this time, reset time if accessed.
            .SetSlidingExpiration(TimeSpan.FromSeconds(30));

        // Save data in cache.
        _cache.Set(distanceInMiles, cacheEntry, cacheEntryOptions);
    }

    return cacheEntry;
}
```

Fix #1

- Generate test data and use test data feed!
- Always validate the results with Monitoring!


CSV_DataSet.jmx (D:\PerfTest_ForBeginners\tests\CSV_DataSet.jmx) - Apache JMeter (5.3)
File Edit Search Run Options Tools Help
Test Plan
Thread Group
View Results Tree
Summary Report
CSV Data Set Config
/-103
/ajax/jQuery/jquery-2.0.3.min.
/api/convert/ConvertMiles-105
HTTP(S) Test Script Recorder
CSV Data Set Config
Name:
CSV Data Set Config
Comments:
Configure the CSV Data Source
Filename:
input.csv
Browse...
File encoding:
Variable Names (comma-delimited):
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
input.csv
1 miles
2 100
3 101
4 102
5 103
6 104
7 105
8 106
9 107

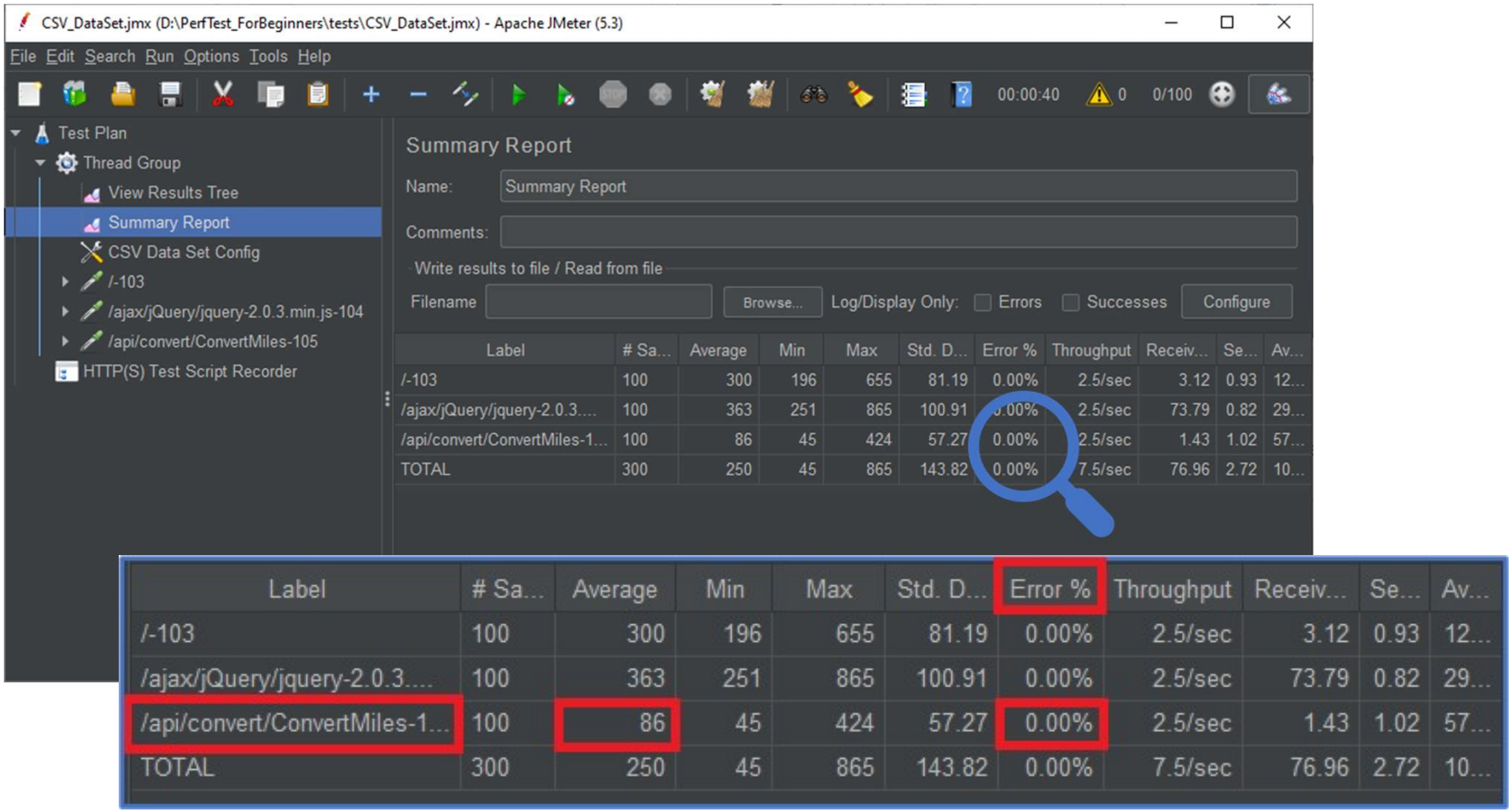

CSV_DataSet.jmx (D:\PerfTest_ForBeginners\tests\CSV_DataSet.jmx) - Apache JMeter (5.3)
File Edit Search Run Options Tools Help
00:00:40
0
0/100
Test Plan
Thread Group
View Results Tree
Summary Report
CSV Data Set Config
/-103
/ajax/jQuery/jquery-2.0.3.min.js-104
/api/convert/ConvertMiles-105
HTTP(S) Test Script Recorder
HTTP Request
Name: /api/convert/ConvertMiles-105
Comments:
Basic Advanced
Web Server
Protocol [http]: https
Server Name or IP: covertapp.azurewebsites.net
Port Number:
HTTP Request
GET
Path: /api/convert/ConvertMiles
Content encoding: utf-8
Redirect Automatically
Follow Redirects
Use KeepAlive
Use multipart/form-data
Browser-compatible headers
Parameters
Body Data
Files Upload
Send Parameters With the Request:
Name:
Value
URL Encode?
Content-Type
Include Equals?
distanceInMiles
${miles}
text/plain
Send Parameters With the Request:
Name:
Value
URL Encode?
Content-Type
Include Equals?
distanceInMiles
${miles}
text/plain



Label	# Sa...	Average	Min	Max	Std. Dev.	Error %	Throughput	Receiv...	Se...	Av...
/-103	100	290	195	577	67.66	0.00%	2.5/sec	3.11	0.93	12...
/ajax/jQuery/jquery-2.0.3.min...	100	366	245	769	76.25	0.00%	2.5/sec	73.18	0.82	29...
/api/convert/ConvertMiles-105	100	1088	1052	1361	44.56	0.00%	2.5/sec	1.39	0.98	57...
TOTAL	300	582	195	1361	365.35	0.00%	7.3/sec	75.13	2.65	10...

New colleague changes input.csv file...

Execution results #2



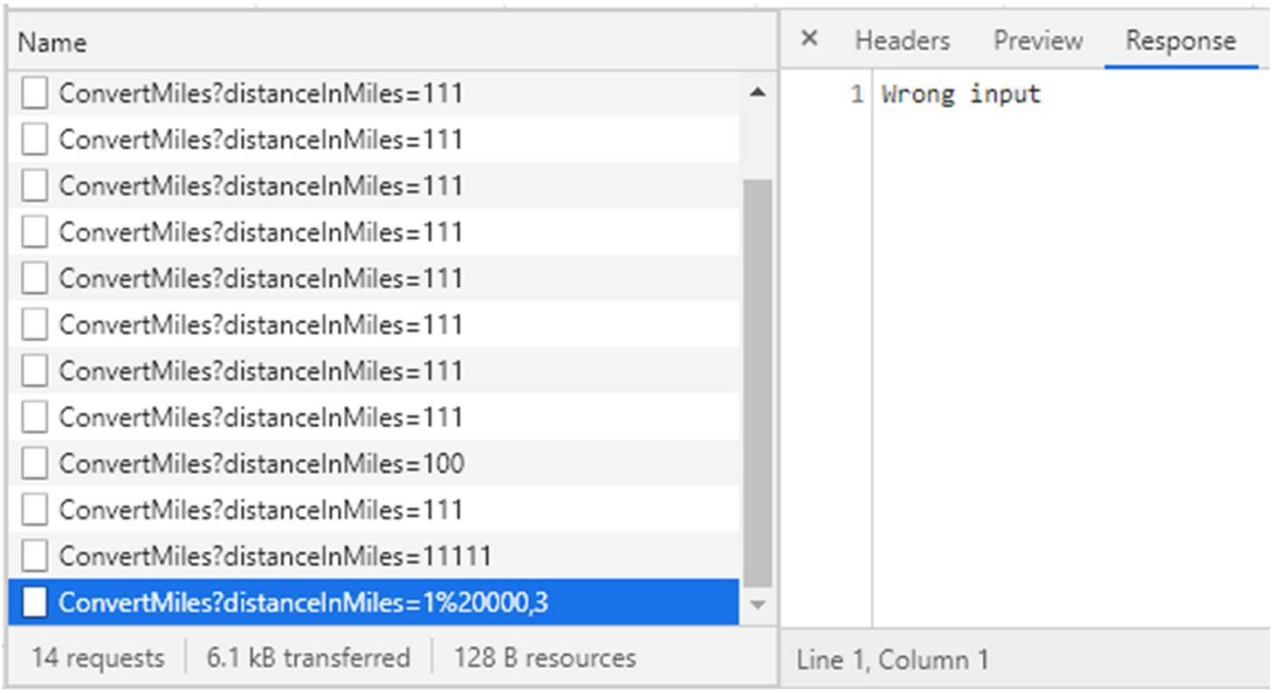
Label	# Sa...	Average	Min	Max	Std. D...	Error %	Throughput	Receiv...	Se...	Av...
/-103	100	300	196	655	81.19	0.00%	2.5/sec	3.12	0.93	12...
/ajax/jQuery/jquery-2.0.3....	100	363	251	865	100.91	0.00%	2.5/sec	73.79	0.82	29...
/api/convert/ConvertMiles-1...	100	86	45	424	57.27	0.00%	2.5/sec	1.43	1.02	57...
TOTAL	300	250	45	865	143.82	0.00%	7.5/sec	76.96	2.72	10...

Except #2 :

- Monitoring shows the same!
- But why are the responses times less than 1 sec?

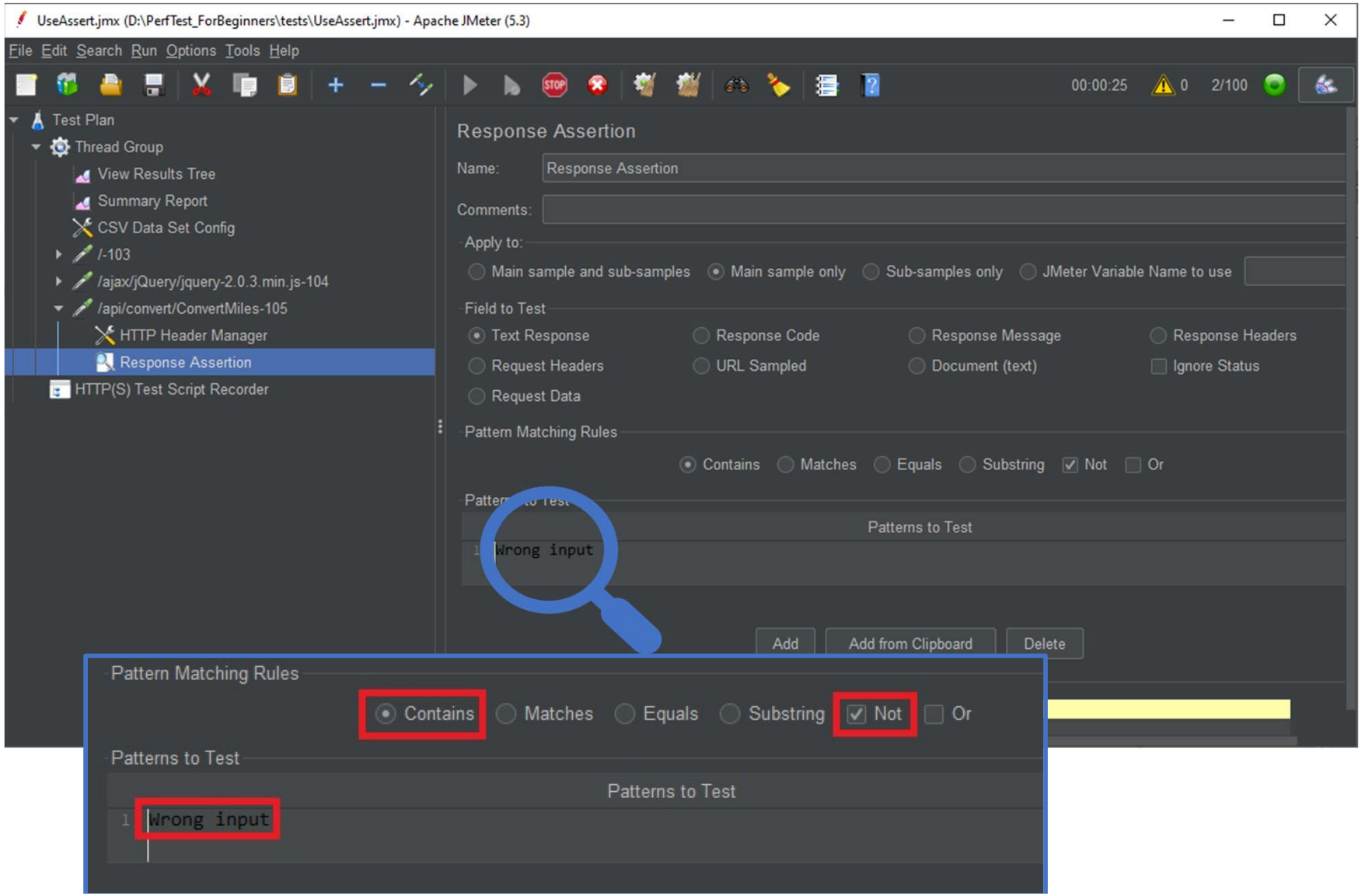
Investigation #2

- Why is that?
- "1,000.2" vs "1 000,3" (hungarian number formatting)
- Gives back error message in the response!

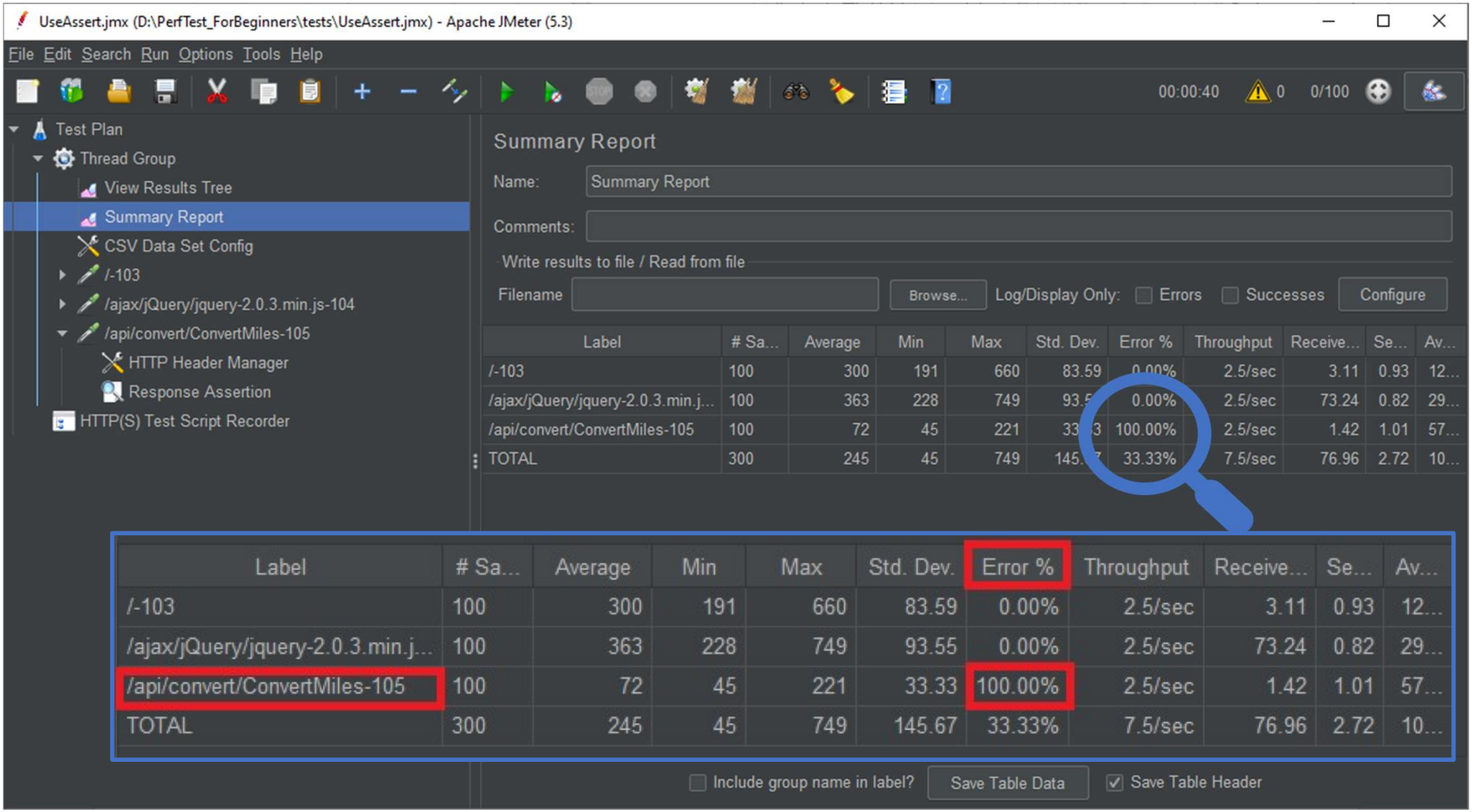


Fix #2

- Check the response: Use response assertions!

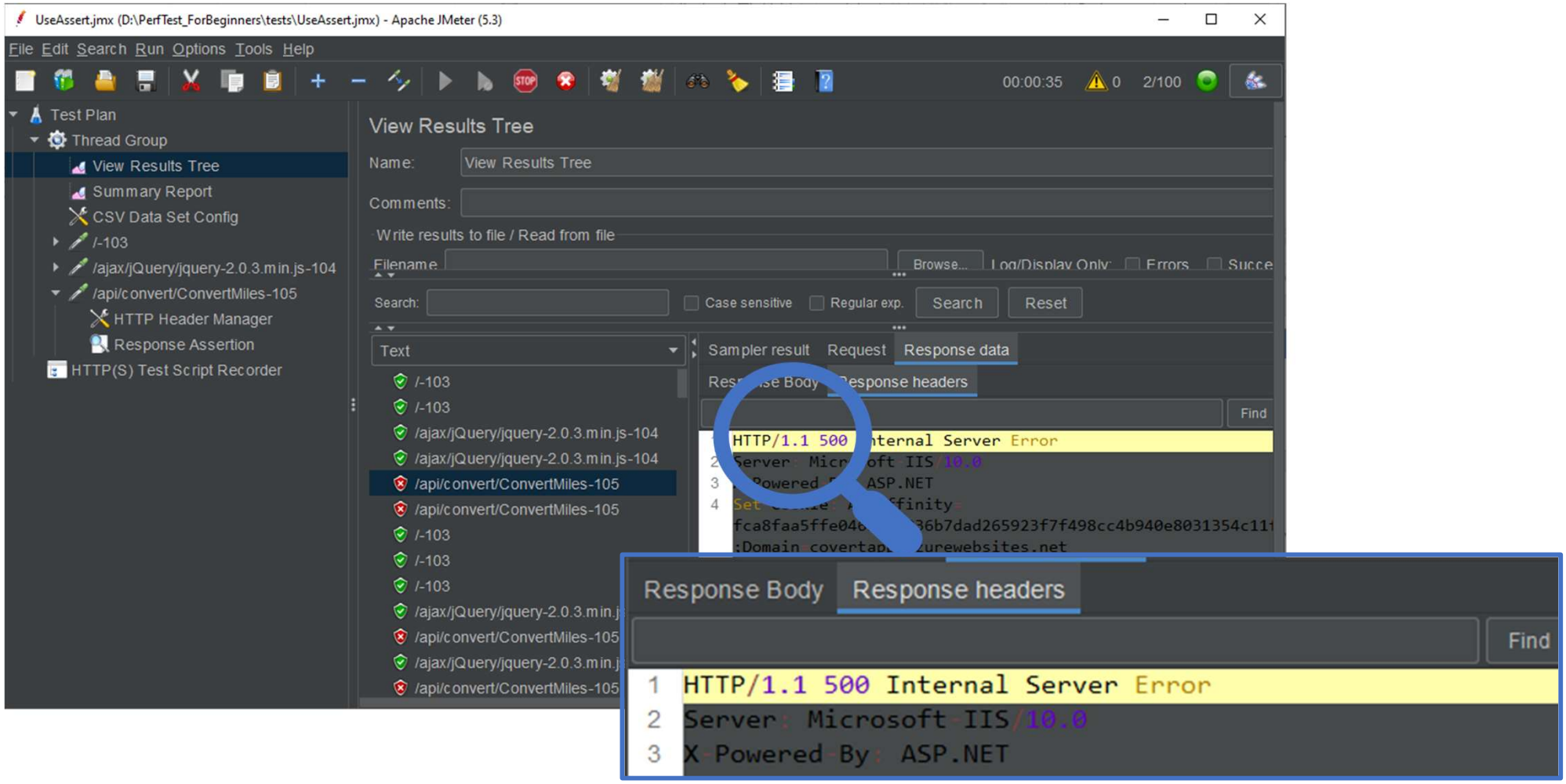

UseAssert.jmx (D:\PerfTest_ForBeginners\tests\UseAssert.jmx) - Apache JMeter (5.3)
File Edit Search Run Options Tools Help
00:00:25
0
2/100
Test Plan
Thread Group
View Results Tree
Summary Report
CSV Data Set Config
/-103
/ajax/jQuery/jquery-2.0.3.min.js-104
/api/convert/ConvertMiles-105
HTTP Header Manager
Response Assertion
HTTP(S) Test Script Recorder
Response Assertion
Name:
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
Response Headers
Request Headers
URL Sampled
Document (text)
Ignore Status
Request Data
Pattern Matching Rules
Contains
Matches
Equals
Substring
Not
Or
Patterns to Test
1 Wrong input
Add
Add from Clipboard
Delete

Pattern Matching Rules
Contains
Matches
Equals
Substring
Not
Or
Patterns to Test
Patterns to Test
1 Wrong input


UseAssert.jmx (D:\PerfTest_ForBeginners\tests\UseAssert.jmx) - Apache JMeter (5.3)
File Edit Search Run Options Tools Help
00:00:40 0 0/100
Test Plan
Thread Group
View Results Tree
Summary Report
CSV Data Set Config
/-103
/ajax/jQuery/jquery-2.0.3.min.js-104
/api/convert/ConvertMiles-105
HTTP Header Manager
Response Assertion
HTTP(S) Test Script Recorder
Summary Report
Name: Summary Report
Comments:
Write results to file / Read from file
Filename
Browse...
Log/Display Only: Errors Successes
Configure
Label # Sa... Average Min Max Std. Dev. Error % Throughput Receive... Se... Av...
/-103 100 300 191 660 83.59 0.00% 2.5/sec 3.11 0.93 12...
/ajax/jQuery/jquery-2.0.3.min.j... 100 363 228 749 93.55 0.00% 2.5/sec 73.24 0.82 29...
/api/convert/ConvertMiles-105 100 72 45 221 33.33 100.00% 2.5/sec 1.42 1.01 57...
TOTAL 300 245 45 749 145.67 33.33% 7.5/sec 76.96 2.72 10...
Include group name in label?
Save Table Data
Save Table Header

Test data is fixed, and
long test is executed...

Execution results #3



Problem #3 : Requests failed!

- The requests failed with HTTP 500 Internal Server Error

Investigation #3

- Why is that?
- " simulateError " input fails the request

```
{
    if(distanceInMiles == "simulateError")
    {
        throw new Exception("Intentionally throw exception when simulating error");
    }
```

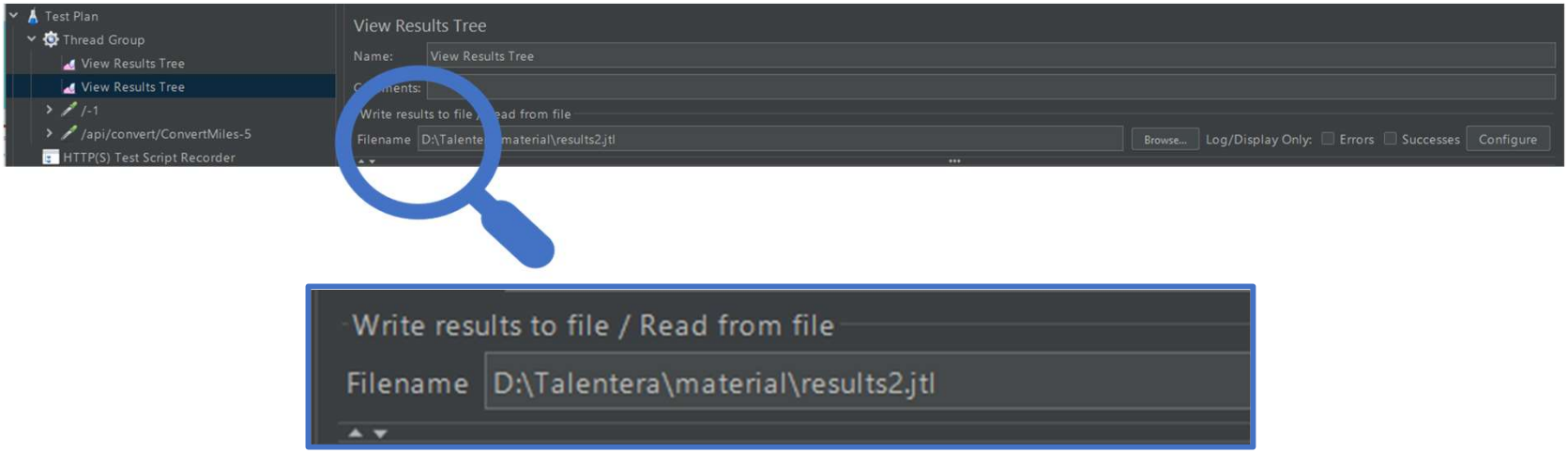
Fix #3

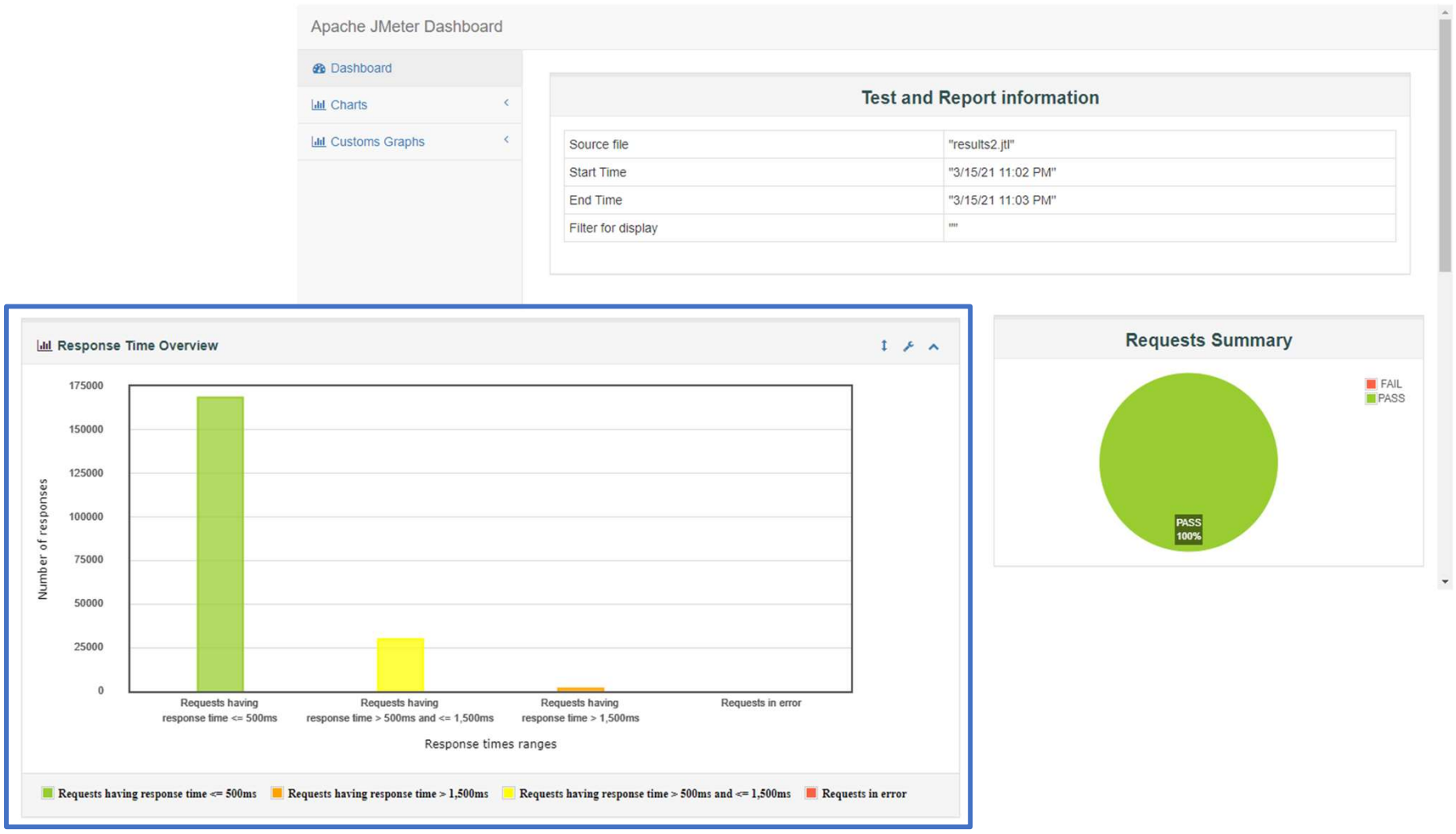
- Execute smaller smoke test before long running execution!

Next Steps…

Create informative reports for others!

- jmeter -g <log file> -o <Path to output folder>



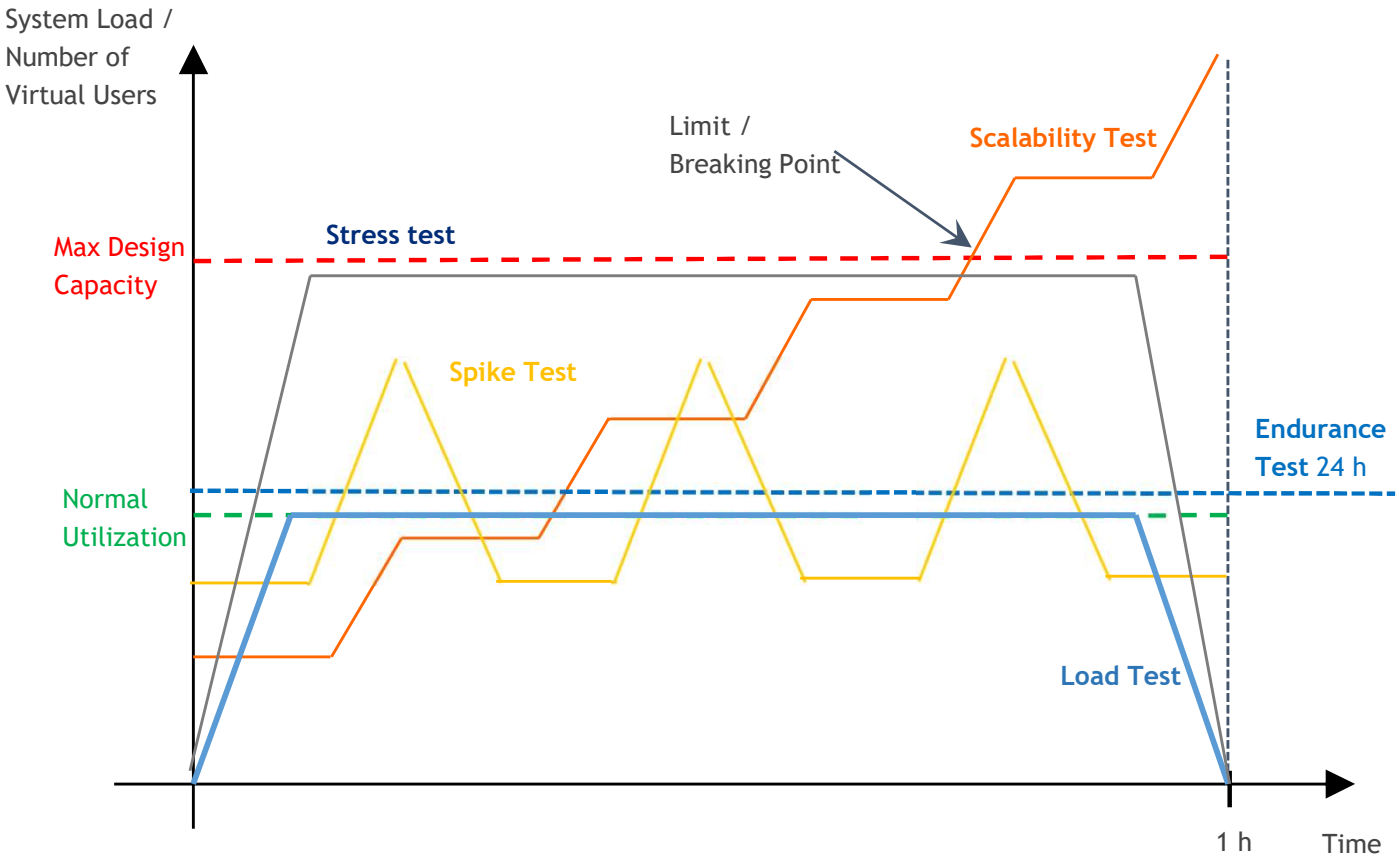

Apache JMeter Dashboard
Dashboard
Charts
Customs Graphs
Test and Report information
Source file
"results2.jtl"
Start Time
"3/15/21 11:02 PM"
End Time
"3/15/21 11:03 PM"
Filter for display
""
Response Time Overview
175000
150000
125000
100000
75000
50000
25000
0
Number of responses
Requests having response time <= 500ms
Requests having response time > 500ms and <= 1,500ms
Requests having response time > 1,500ms
Requests in error
Response times ranges
Requests having response time <= 500ms
Requests having response time > 1,500ms
Requests having response time > 500ms and <= 1,500ms
Requests in error
Requests Summary
FAIL
PASS
PASS
100%

Create more complex scanrios

- Execute scripts to manipulate test data/responses
- Authentication
- Cookie Managment
- (Web Driver Sampler)

Get familiar with performance test types

- **Load Testing**
- **Stress Testing**
- **Scalability Testing**
- **Spike Testing**
- **Endurance Testing**
- Concurrency Testing
- Capacity Testing



What we covered

- We discussed what is performance testing and why it is important.
- We created an example in JMeter.
- We checked some common issues.
- We see the importance of validating test results with monitoring.

Suggested material: ISTQB Performance Testing syllabus

Poll 3. Milyen témáról hallanál még szívesen?

a) Performance teszt típusok és implementálásuk
b) Autentikáció megoldások performance tesztekben
c) Egy bonyolultabb felhasználói interakció implementálása
d) Adatbázisok performance tesztelése

Questions

Access the material:

https://github.com/istvanhegedus/webperftesting

Thank you for your attention!

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