

**JMeter**  
Demos

## Document Revision History

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Date	Revision No.	Author	Summary of Changes
May 2022	1.0	Neelima Padmawar	New Content Creation

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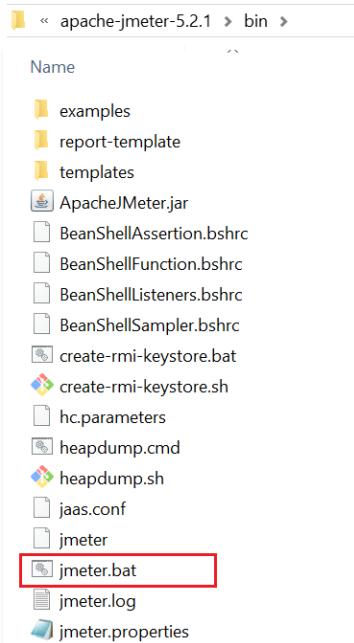
## DEMO 1. PERFORMANCE TEST FOR A WEB APPLICATION

### 1.1 Test Plan – Thread Group – Sampler - Listeners

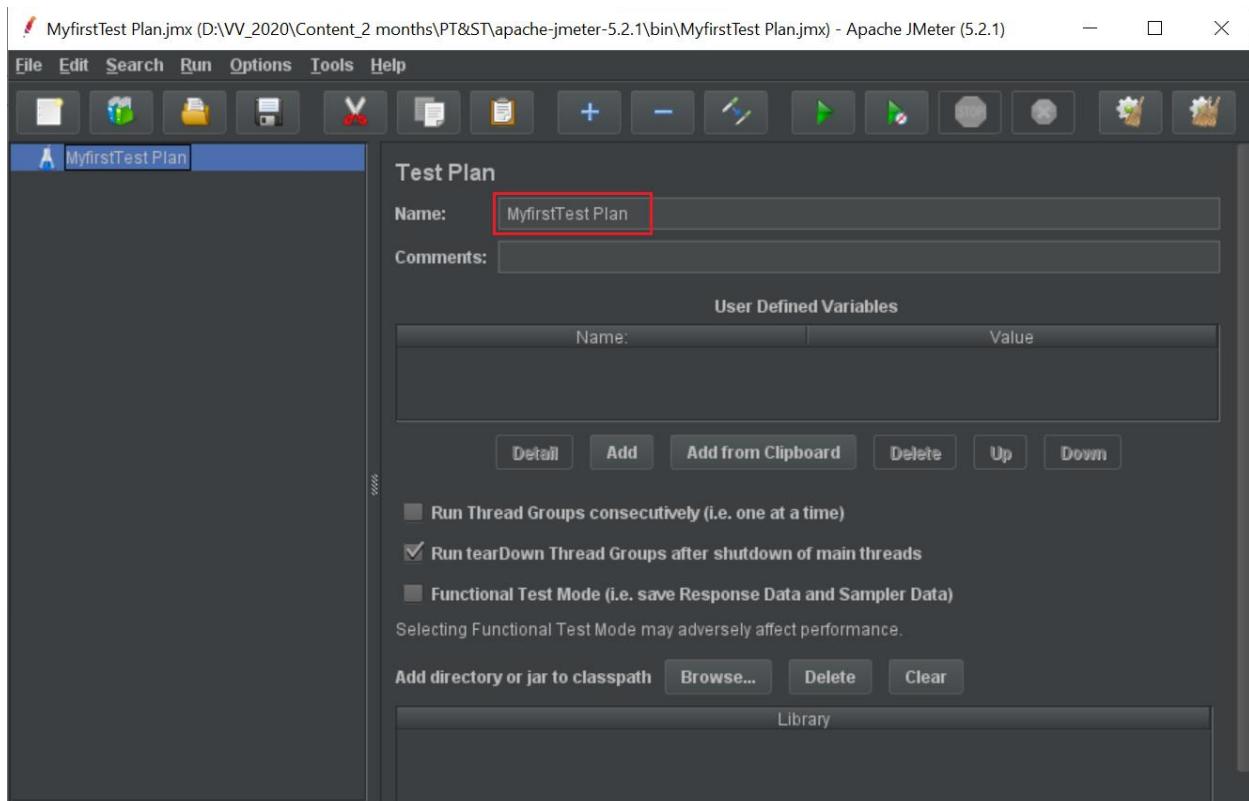
Steps:

- Step 1: Start Jmeter
- Step 2: Create Test Plan
- Step 3: Create a Thread Group
- Step 4: Add a Sampler (Http Request)
- Step 5: Add Listeners (Result Tree, Result Table)
- Step 6: Run Test

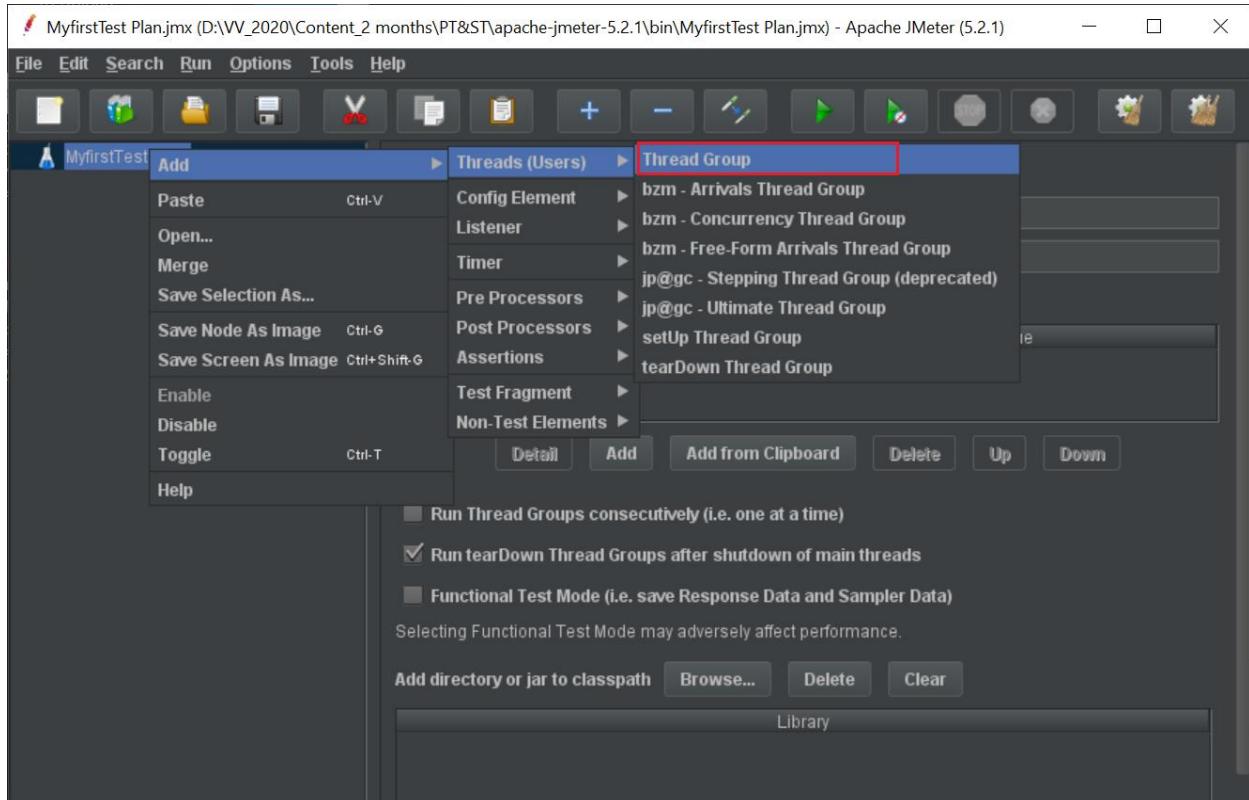
1. Click on **jmeter.bat** in **apache-jmeter-5.2.1\bin** folder :



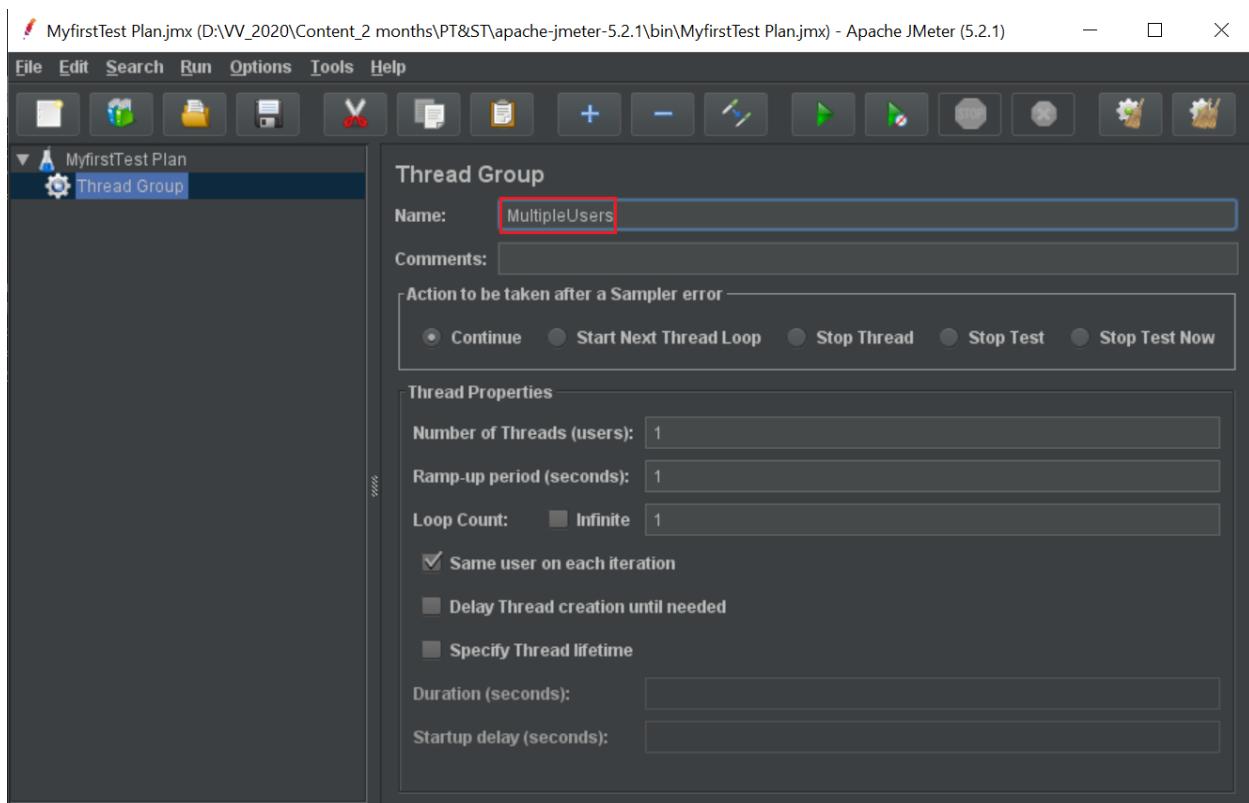
2. Creating/renaming a Test plan



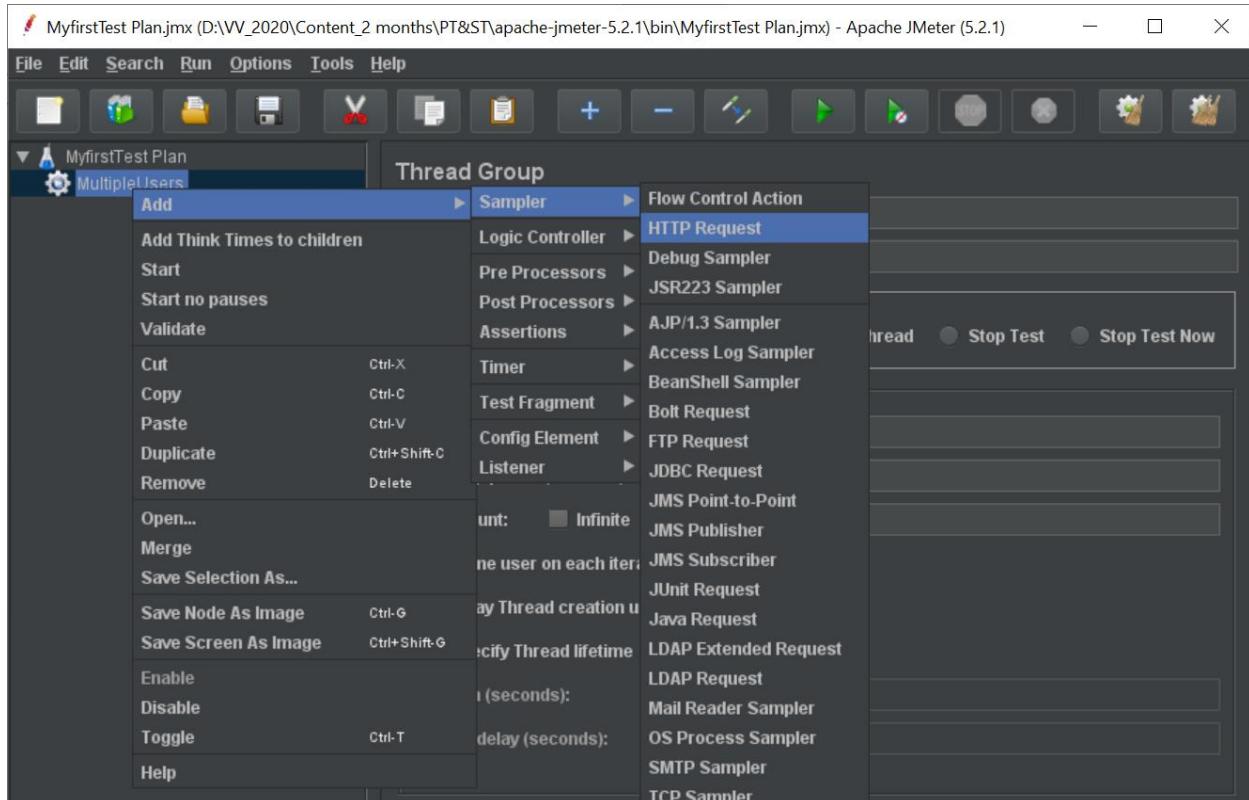
### 3. Add a Thread Group



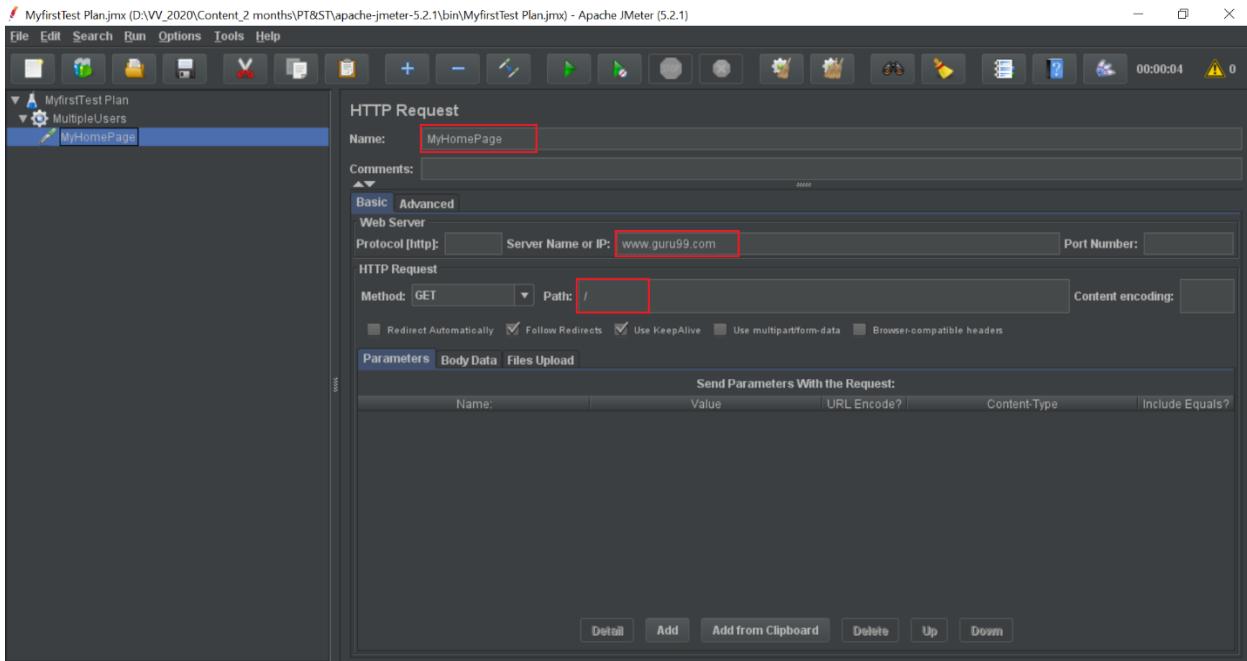
Rename the Thread Group :



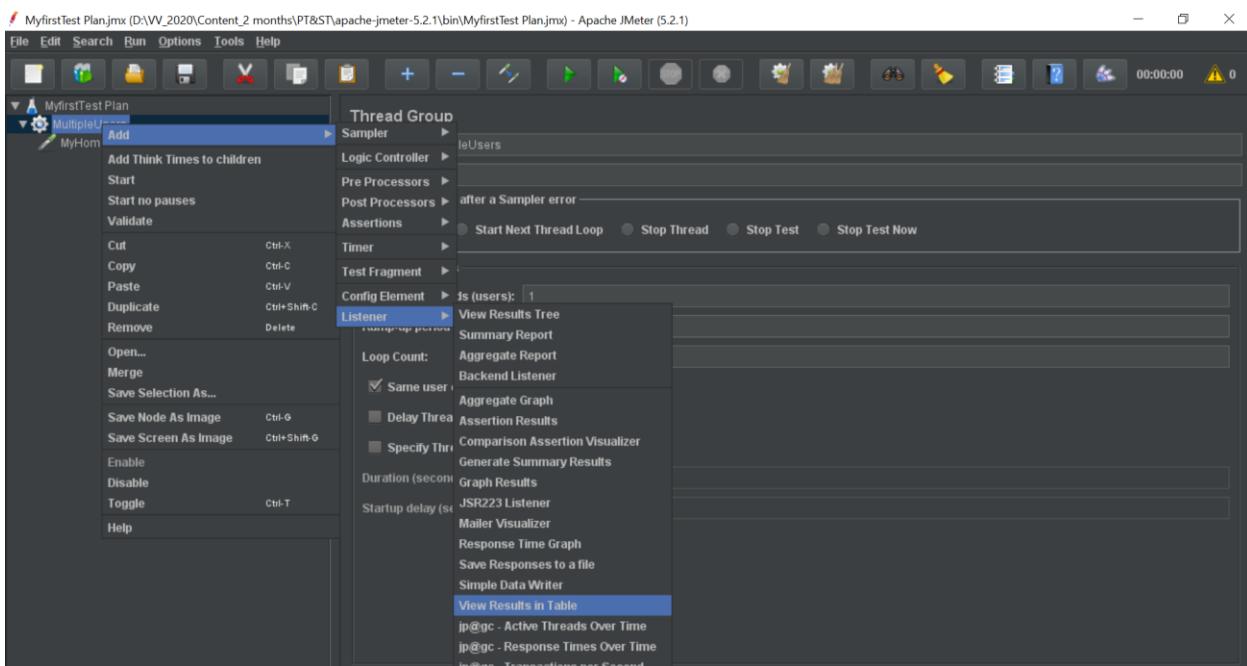
#### 4. Add a Sampler – Http Request



Add Server Name, Path.



## 5. Add Listeners to view the result : View Results in table, View Results Tree



## 6. Run Test : Click on Start Icon. View the results as below :

View Result Tree :

MyfirstTest Plan.jmx (D:\VV\_2020\Content\_2 months\PT&ST\apache-jmeter-5.2.1\bin\MyfirstTest Plan.jmx) - Apache JMeter (5.2.1)

File Edit Search Run Options Tools Help

View Results Tree

Name: View Results Tree

Comments:

Write results to file / Read from file

Filename:  Browse... Log Display Only:  Errors:  Successes:  Configure

Search:  Case sensitive:  Regular exp:  Search  Reset

Text  Sampler result  Request  Response data

MyHomePage

MyHomePage-0

MyHomePage-1

Thread Name:MultipleUsers 1-1  
Sample Start:2020-09-14 18:28:19 IST  
Load time:3420  
Connect Time:1594  
Latency:207  
Size in bytes:94645  
Sent bytes:119  
Headers size in bytes:1061  
Body size in bytes:93584  
Sample Count:1  
Error Count:0  
Data type ("text/html").text  
Response code:200  
Response message:OK

HTTPSSampleResult fields:  
Content-Type: text/html; charset=utf-8  
DataEncoding: utf-8

### View Result in Table :

MyfirstTest Plan.jmx (D:\VV\_2020\Content\_2 months\PT&ST\apache-jmeter-5.2.1\bin\MyfirstTest Plan.jmx) - Apache JMeter (5.2.1)

File Edit Search Run Options Tools Help

View Results in Table

Name: View Results in Table

Comments:

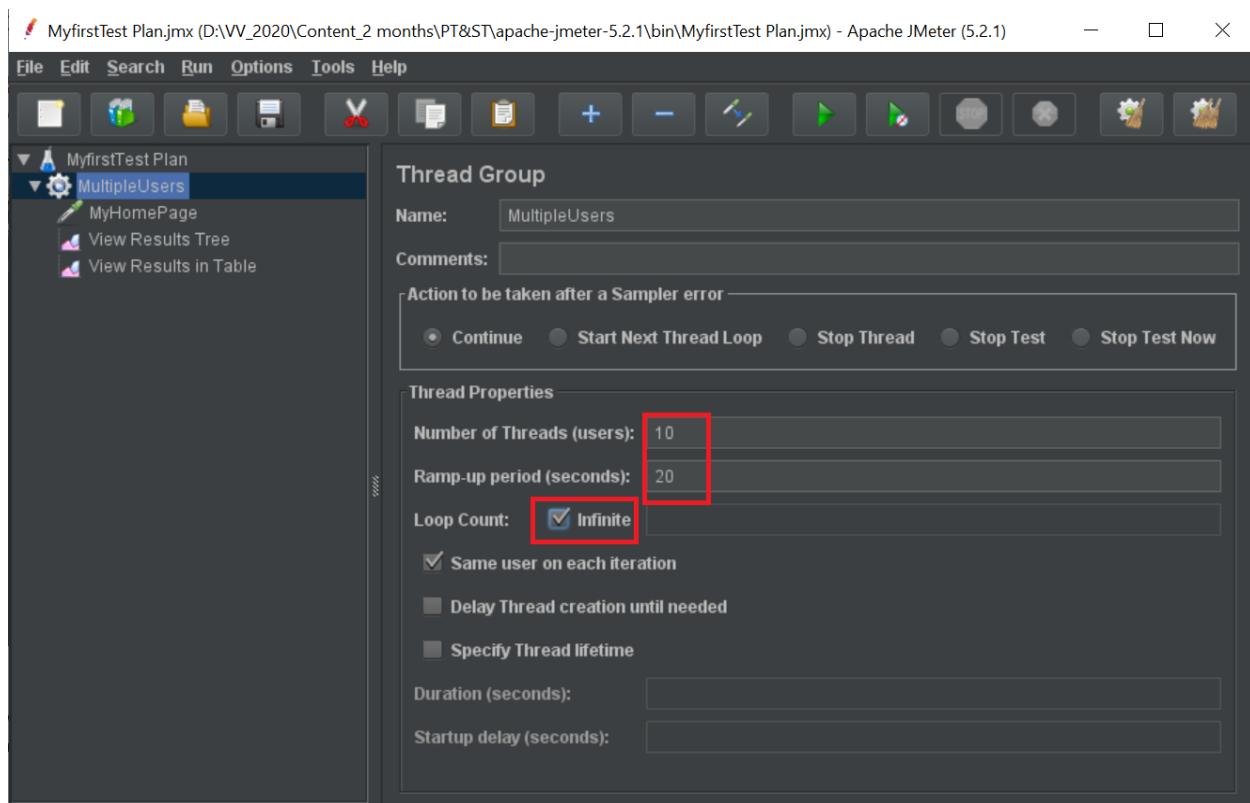
Write results to file / Read from file

Filename:  Browse... Log Display Only:  Errors:  Successes:  Configure

Sample #	Start Time	Thread Name	Label	Sample Time...	Status	Bytes	Sent Bytes	Latency	Connect Time
1	18:28:18.070	MultipleUsers	MyHomePage	4369	<span style="color: green;">OK</span>	95237	238	944	341

4369 mill seconds to test i.e. approx. 4 seconds

Make following changes in Thread Group :



Meaning:

- Number of Threads: 10 (Number of users connects to the target website: 10)
- Loop Count: Infinite (Number of time to execute testing)
- Ramp-Up Period: 20 (2 seconds of delay before starting the next user i.e. 20 seconds /10 users)

All 10 users will not access it simultaneously. Each user will access for 2 sec. so 10 users will be hitting the application in 20 seconds

STOP: forcefully stops all the execution

SHUT DOWN: very cleanly stops the currently running threads and then stops the test execution

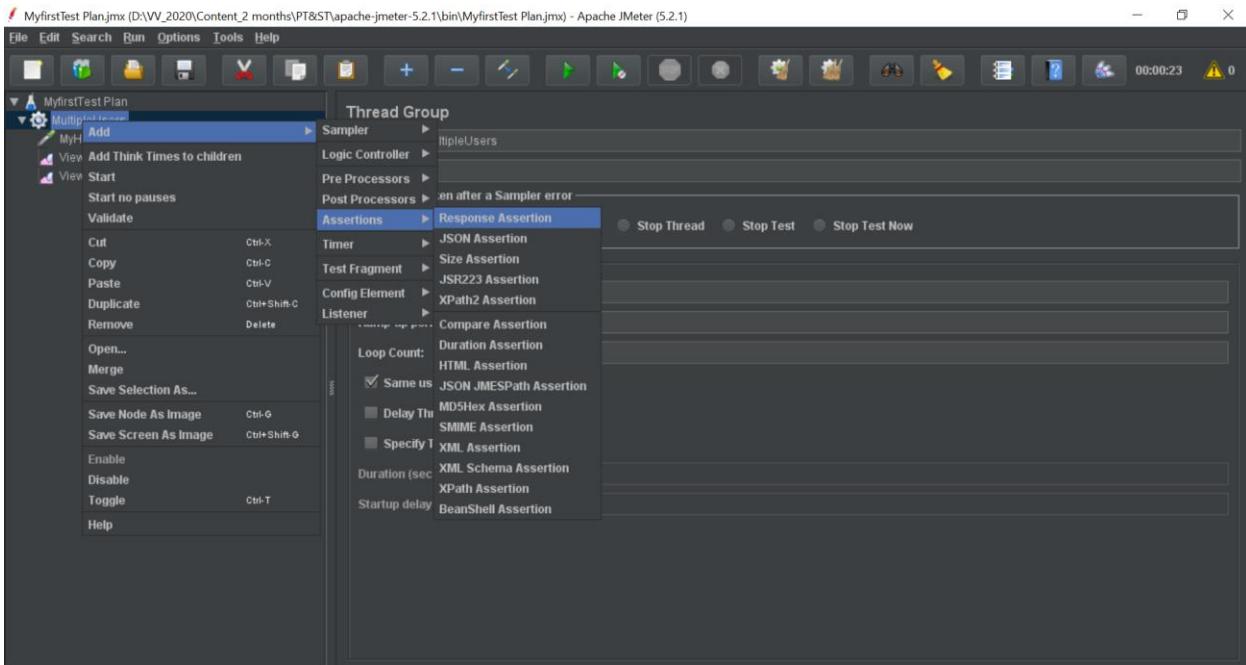
## DEMO 2. ASSERTIONS (CHECK ON RESPONSE)

### 2.1 Add various types of Assertions

Types of Assertions covered in this Lab :

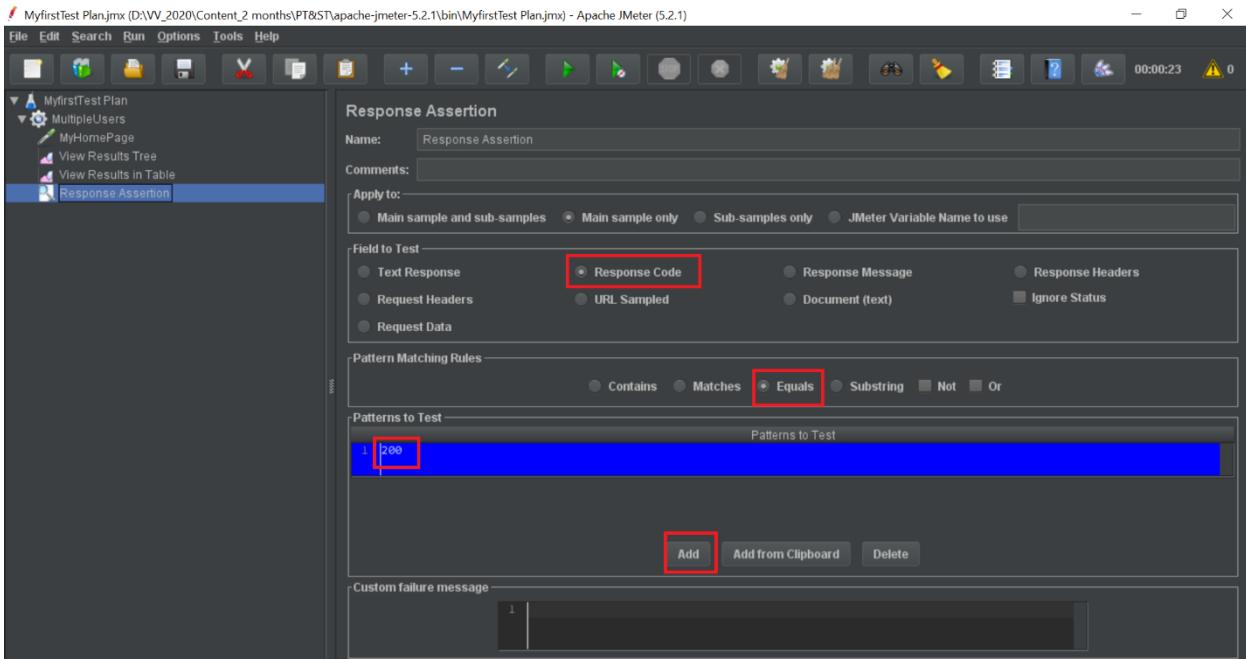
- RESPONSE ASSERTION
- DURATION ASSERTION
- SIZE ASSERTION
- HTML ASSERTION

1. Response Assertion

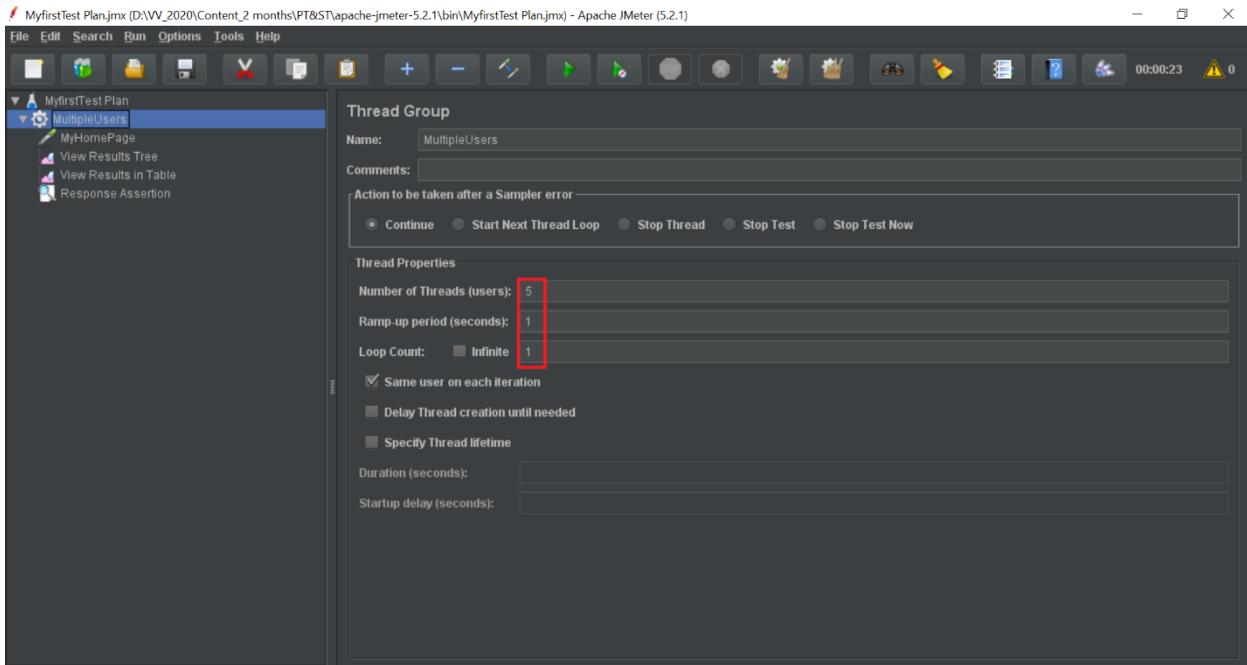


Few Response codes are as follows :

- **404:** Server error
- **200:** Server OK
- **302:** Web server redirects to other pages. This usually happens when you access google.com from the outside USA. Google re-directs to country-specific website – for example, google.com redirects to google.co.in for Indian Users.

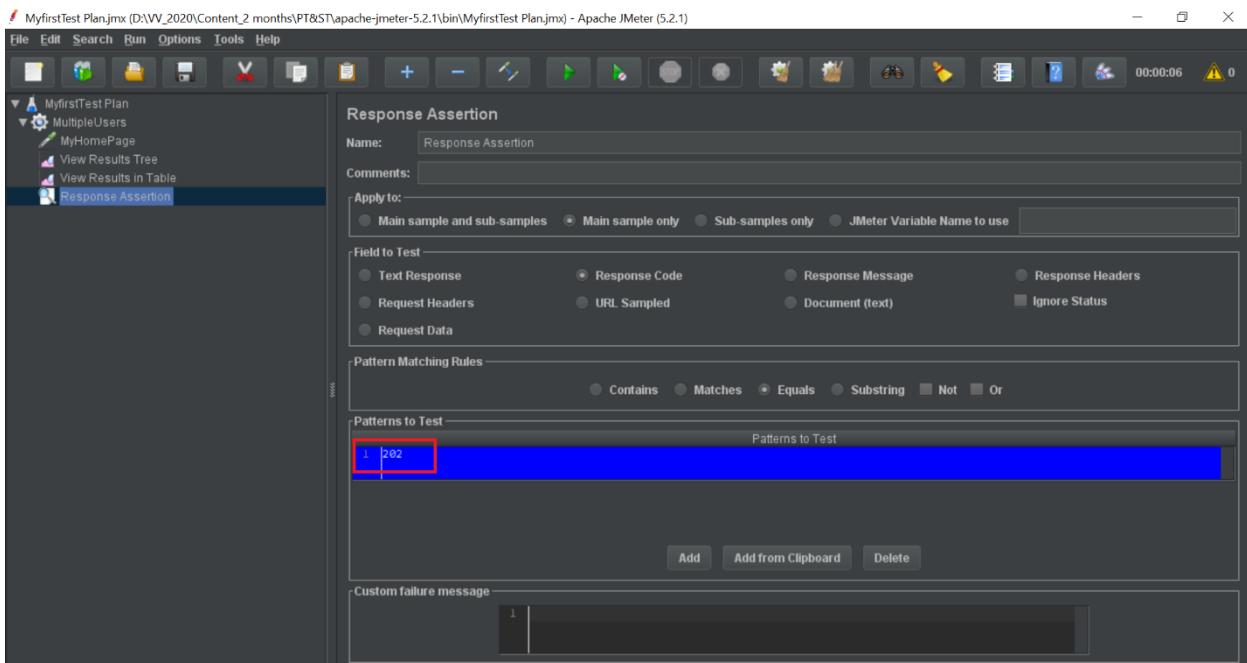


Making few changes in Thread Group(Multiple Users) :



All the tests will pass

Now, if you want to deliberately FAIL it, let's make a change in the response code i.e. expected response code is 202



Run Test and then Check the Result Tree :

MyfirstTest Plan.jmx (D:\VV\_2020\Content\_2 months\PT&ST\apache-jmeter-5.2.1\bin\MyfirstTest Plan.jmx) - Apache JMeter (5.2.1)

File Edit Search Run Options Tools Help

Name: View Results Tree

Comments:

Write results to file / Read from file

Filename:  Browse... Log/Display Only:  Errors  Successes  Configure

Search:  Case sensitive  Regular exp.

Text

MyHomePage  Assertion error: false  
 Assertion failure: true  
 Assertion failure message: Test failed: code expected to equal /

MyHomePage-0   
MyHomePage-1   
**Response Assertion**   
MyHomePage-2   
MyHomePage-3   
MyHomePage-4   
MyHomePage-5

\*\*\*\*\* received : 20[[0]]  
\*\*\*\*\* comparison: 20[[2]]

Raw  Scroll automatically?

Add Listener - ASSERTION RESULTS. This helps to check all the exceptions/results in one go for all the tests.

Because Google server response code doesn't contain this pattern of 202 Response code, you will see the test case **Failed**.

MyfirstTest Plan.jmx (D:\VV\_2020\Content\_2 months\PT&ST\apache-jmeter-5.2.1\bin\MyfirstTest Plan.jmx) - Apache JMeter (5.2.1)

File Edit Search Run Options Tools Help

MyFirstTest Plan

MultipleUsers

Add

Add Think Times to children

Add Start

Start no pauses

Validate

Cut Ctrl-X

Copy Ctrl-C

Paste Ctrl-V

Duplicate Ctrl+Shift-C

Remove Delete

Open...

Merge

Save Selection As...

Save Node As Image Ctrl-G

Save Screen As Image Ctrl+Shift-G

Enable

Disable

Toggle Ctrl-T

Help

Thread Group

Sampler

MultipleUsers

Logic Controller

Pre Processors

Post Processors

Assertion

Start Next Thread Loop

Stop Thread

Stop Test

Stop Test Now

Config Element

leads (users): 5

Listener

View Results Tree

Summary Report

Loop Count: Aggregate Report

Same user

Delay Thread  Assertion Results

Specify Thread Count  Comparison Assertion Visualizer

Duration (sec)  Generate Summary Results

Graph Results

Startup delay JSR223 Listener

Mailer Visualizer

Response Time Graph

Save Responses to a file

Simple Data Writer

View Results in Table

jp@gc - Active Threads Over Time

jp@gc - Response Times Over Time

jp@gc - Transactions per Second

Clear all – Run Test – check Assertion Result

Assertion Results

Name: Assertion Results

Comments:

Write results to file / Read from file

Filename:  Browse... Log/Display Only:  Errors  Successes  Configure

Assertions:

```

/
MyHomePage
    Response Assertion: Test failed: code expected to equal /
***** received : 20[[0]]
***** comparison: 20[[2]]

/
MyHomePage
    Response Assertion: Test failed: code expected to equal /
***** received : 20[[0]]
***** comparison: 20[[2]]

/
MyHomePage
    Response Assertion: Test failed: code expected to equal /
***** received : 20[[0]]
***** comparison: 20[[2]]

```

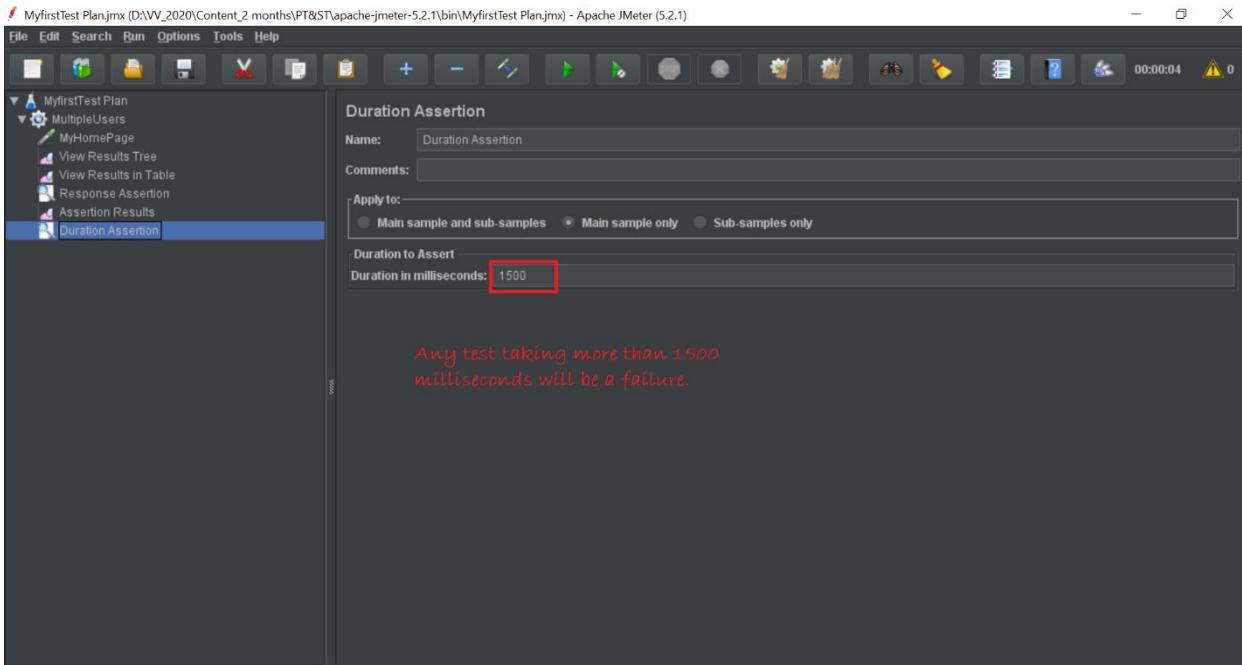
**{Note:** Just re-correct the response code to 200 after the above test so that it doesn't disturb our further tests.}

## 2. DURATION ASSERTION : to check the duration of the response

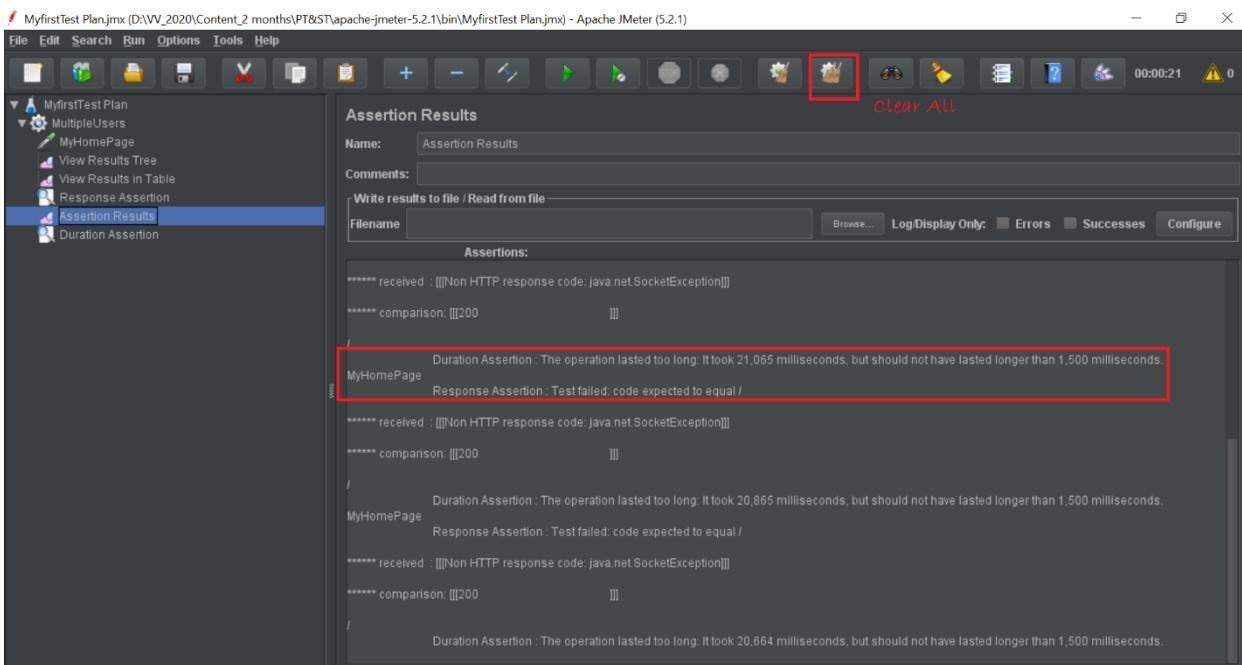
Assertions

Duration Assertion

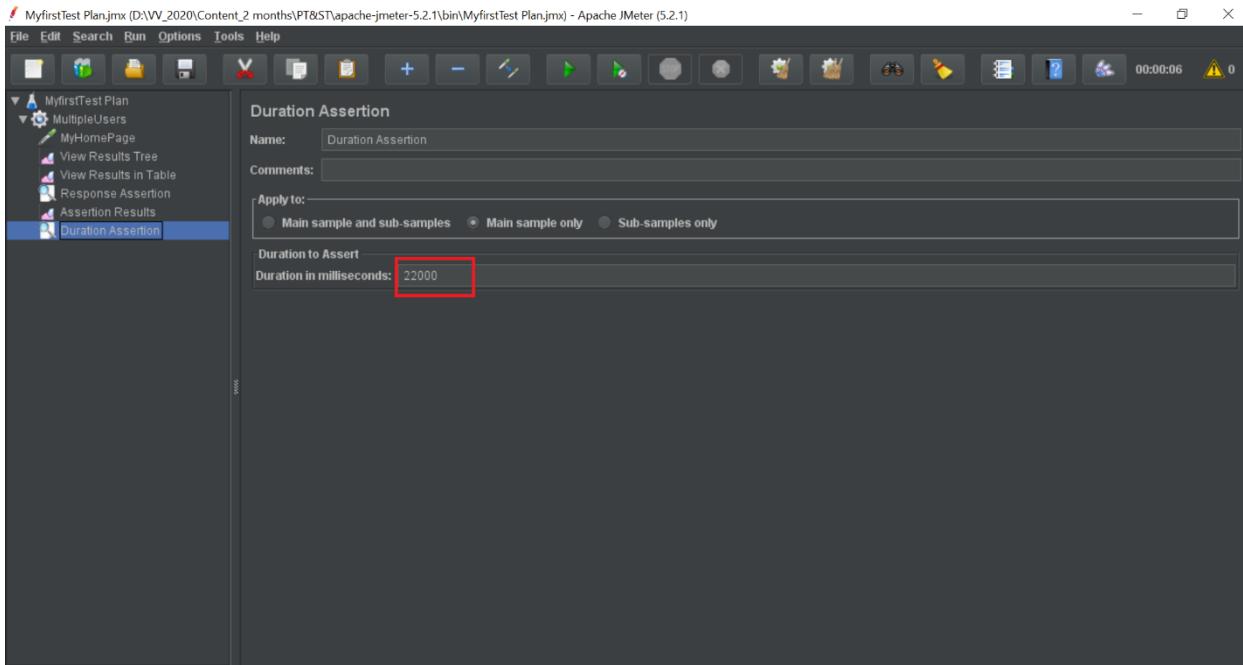
Stop Thread  Stop Test  Stop Test Now



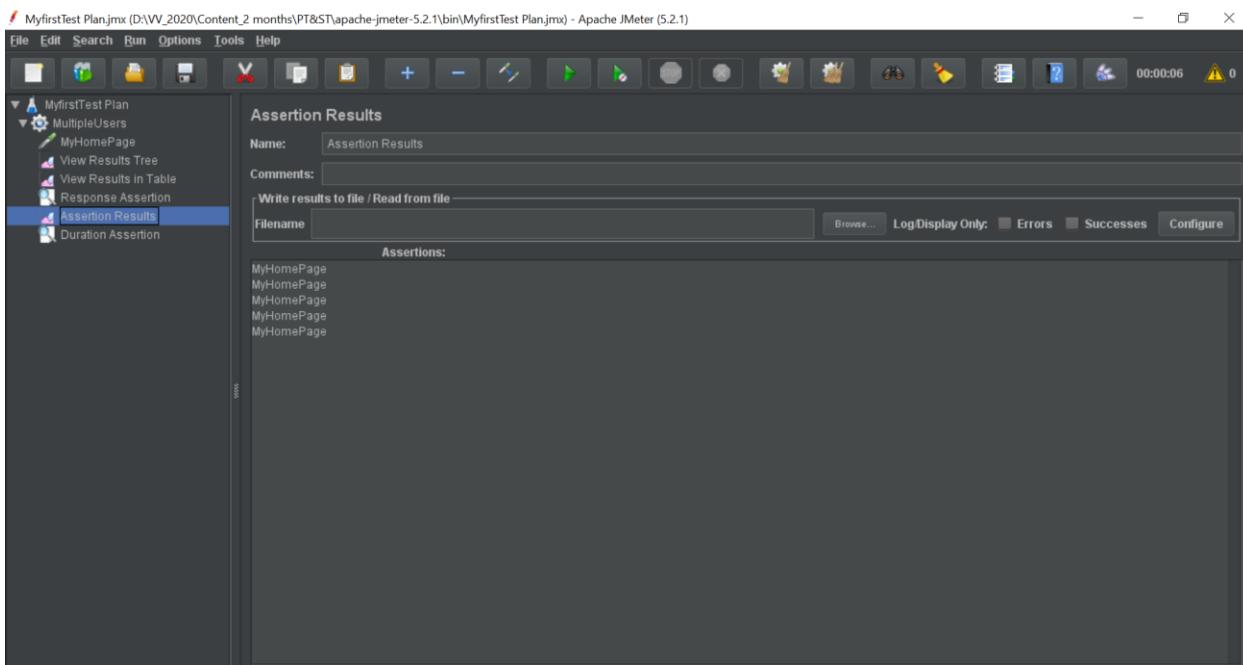
Clear all – Run Test – check ASSERTION RESULT :



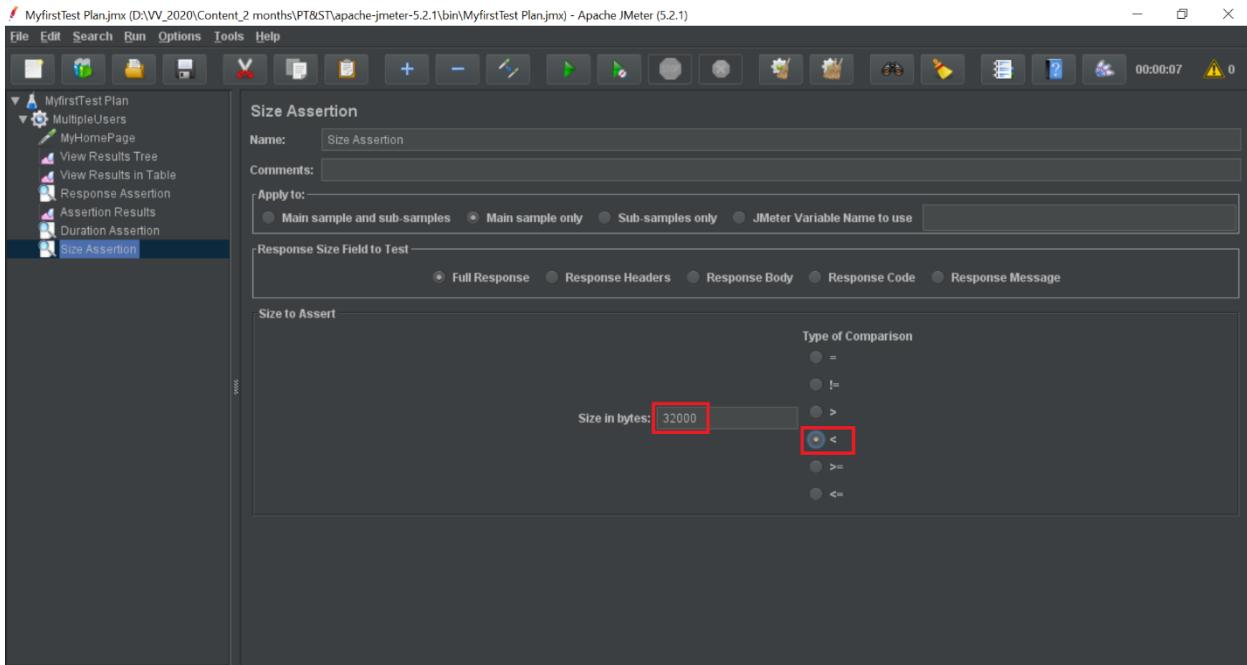
We can PASS the tests by extending the duration as below :



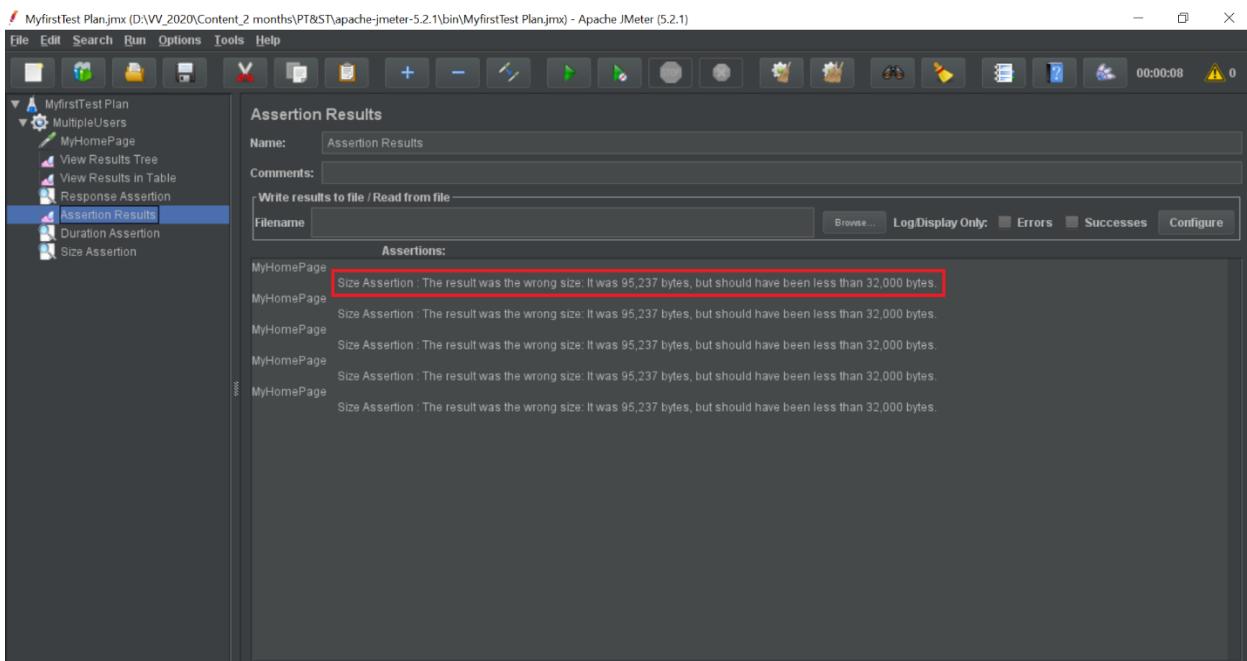
Clear all – Run Test – check ASSERTION RESULT :



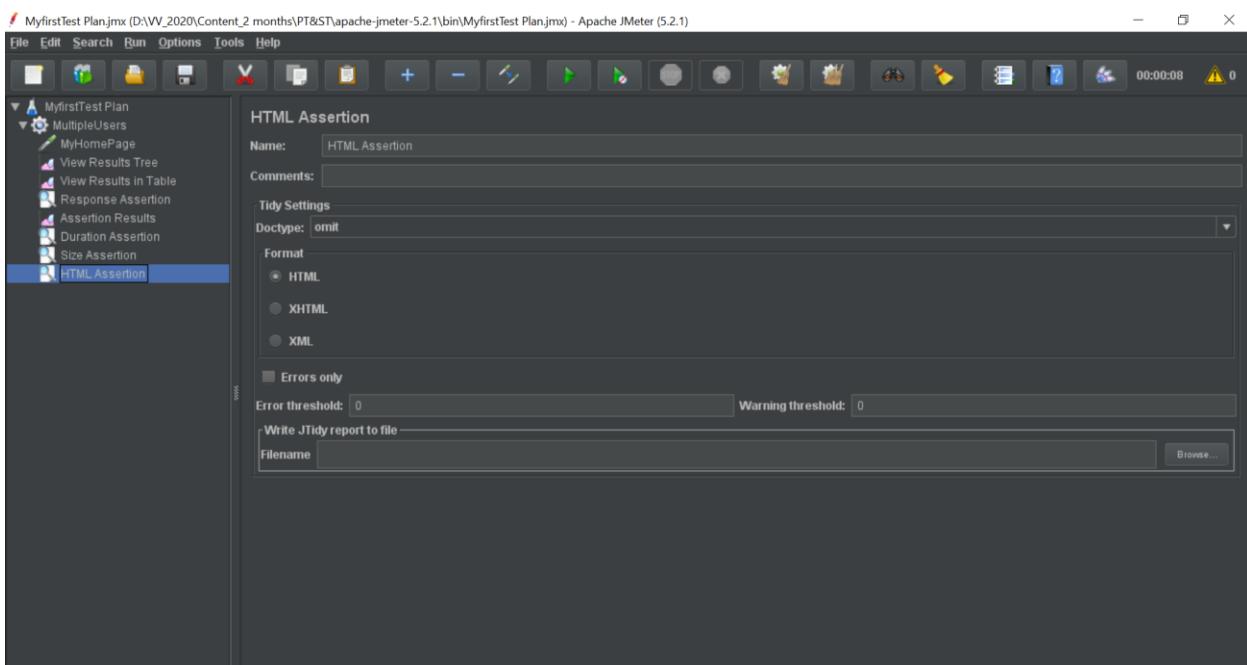
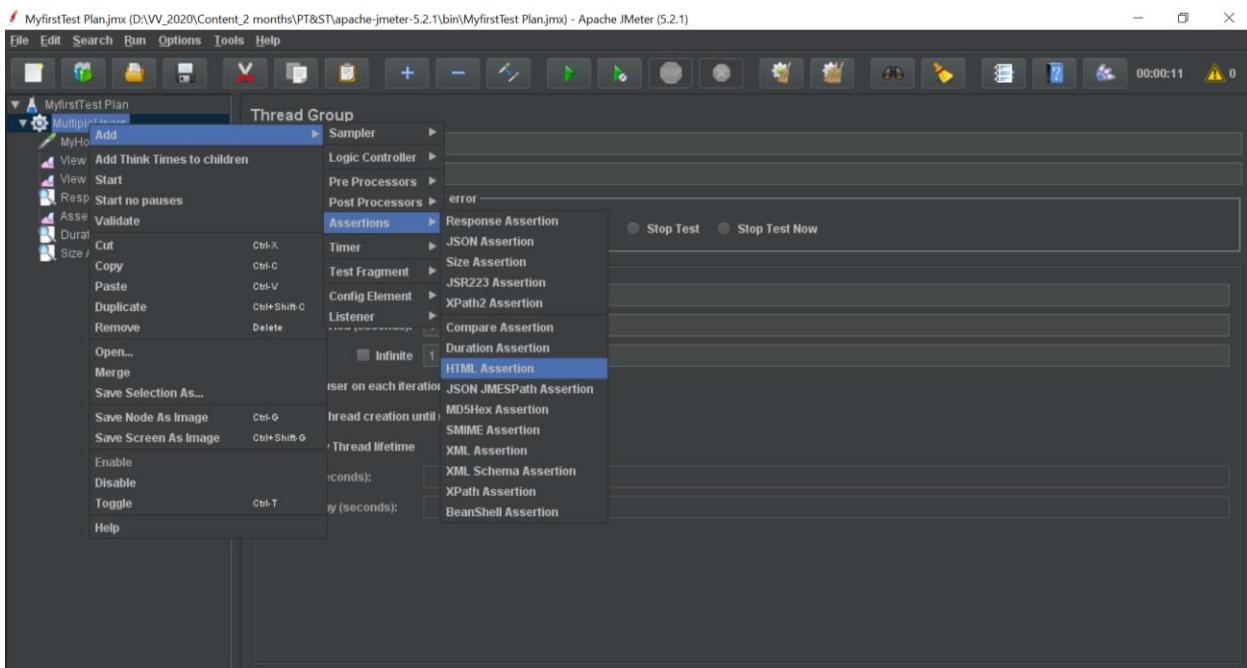
### 3. SIZE ASSERTION

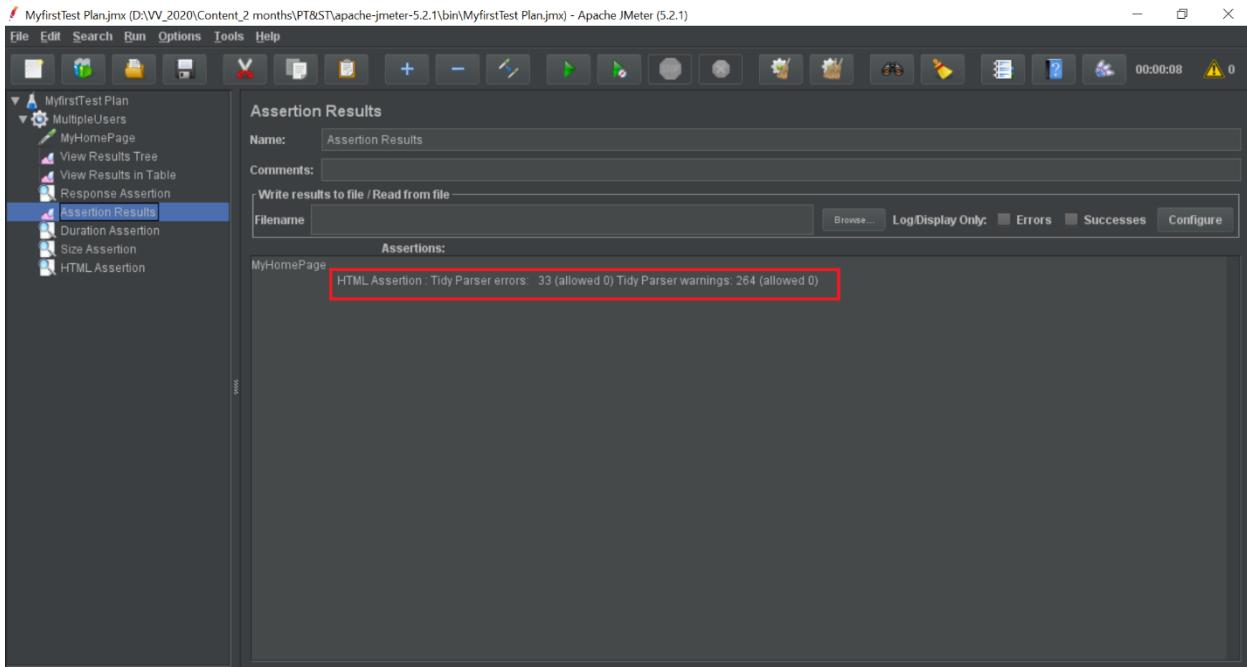


Clear all – Run Test – check ASSERTION RESULT :

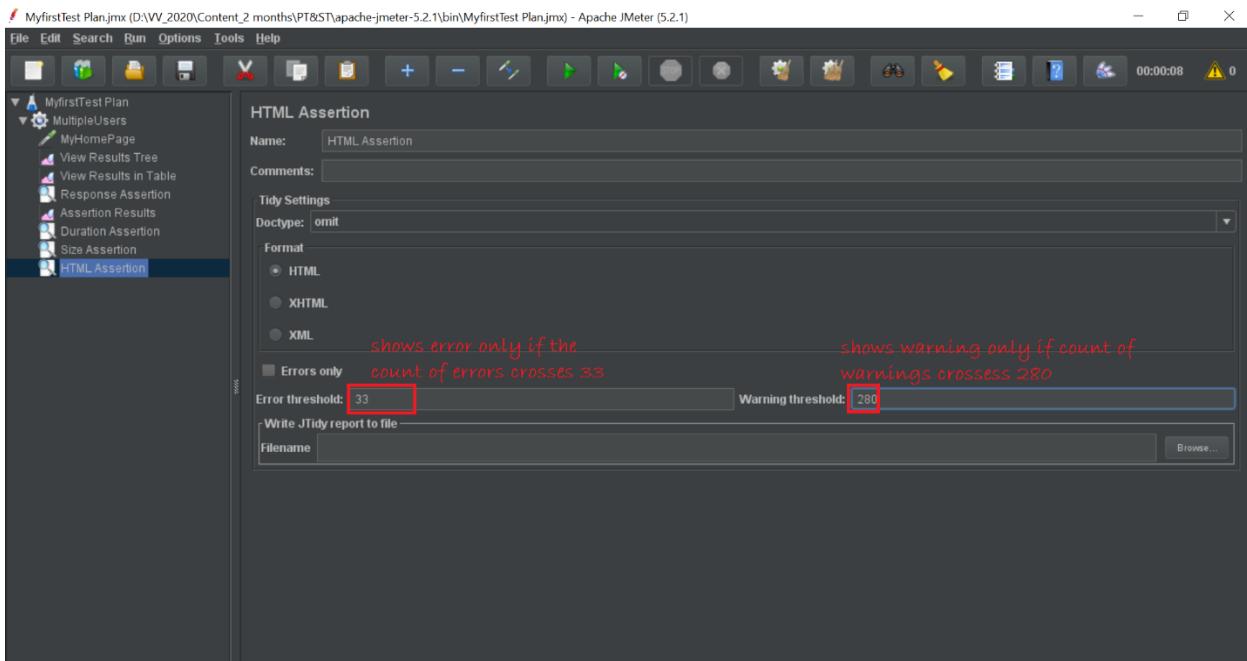


4. HTML ASSERTION : check if the application follows valid HTML standard format or not

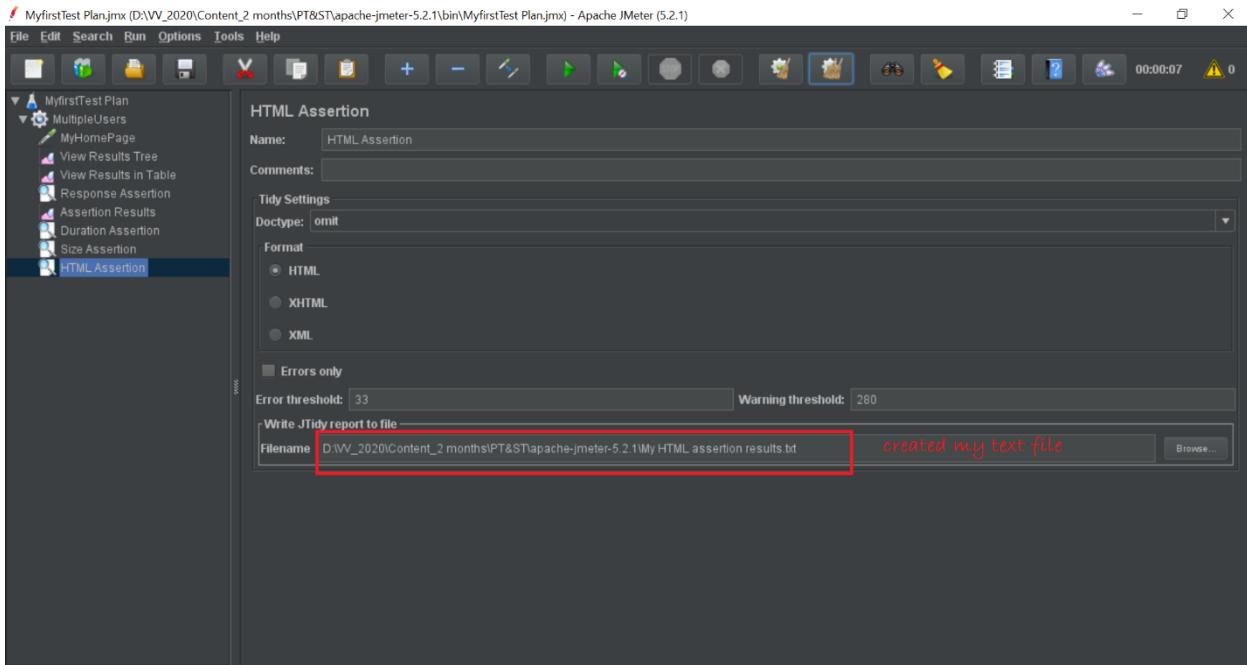




Let's make changes in HTML ASSERTION :



To check the details of the ERRORS and WARNINGS, you can log these in a .txt file :



Open the file from folder and see the details as below :

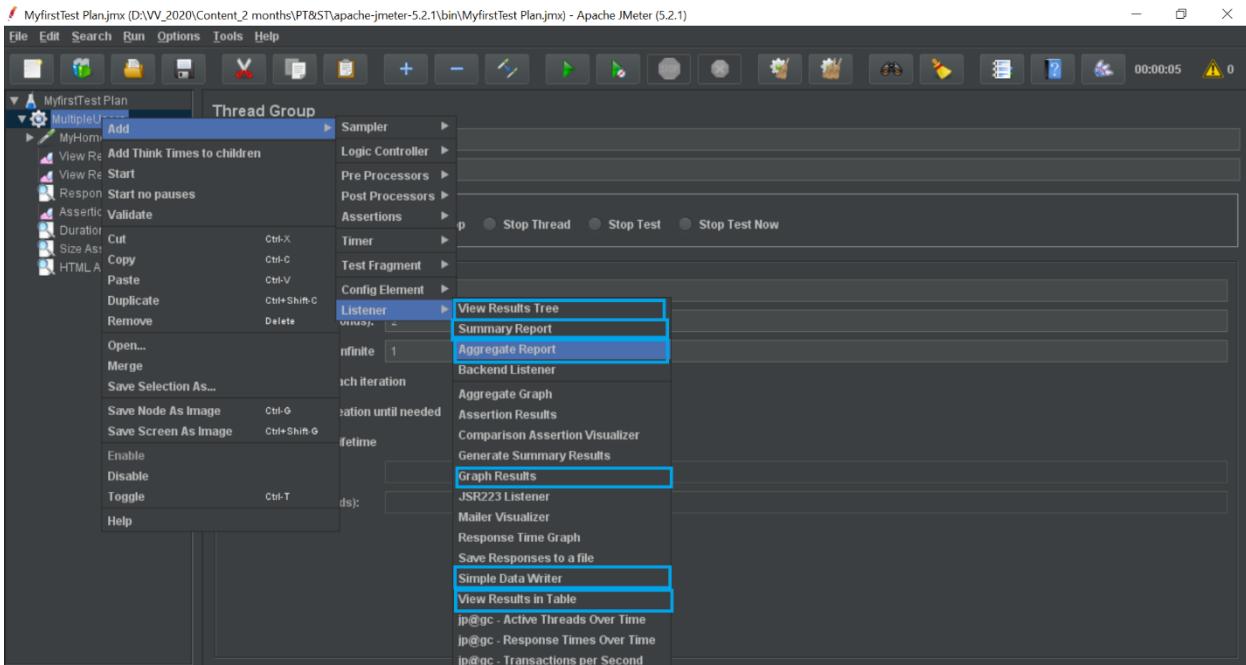
```
My HTML assertion results.txt - Notepad
File Edit Format View Help
line 29 column 9 - Warning: missing <!DOCTYPE> declaration
line 29 column 9 - Warning: plain text isn't allowed in <head> elements
line 30 column 1 - Warning: inserting missing 'title' element
InputStream: Document content looks like HTML 3.2
3 warnings, no errors were found!
```

{NOTE: LISTENERS consume lot of memory so DISABLE them when in no use.}

## DEMO 3. LISTENERS

### 3.1 Add various types of Listeners

You can try all the below highlighted Listeners to check the results :



Run Test.

VIEW RESULTS IN TABLE looks like below :

View Results in Table											
<input type="text" value="Name: View Results in Table"/> <input type="text" value="Comments:"/> <input type="checkbox"/> Write results to file / Read from file <input type="text" value="Filename: Start time of Request"/> <input type="button" value="Browse..."/> <input type="checkbox"/> Log/Display Only: <input type="checkbox"/> Errors <input type="checkbox"/> Successes <input type="button" value="Configure"/>											
Sample #	Start Time	Thread Name	Label	Sample Time(ms)	Status	Bytes	Sent Bytes	Latency	Connect Time(	Pass/Fail:	Time to first byte
1	14:20:21.495	MultipleUsers 1-2	MyHomePage	3751	Pass	95237	238	821	403	default status	similar. In this example there is only one
2	14:20:21.163	MultipleUsers 1-1	MyHomePage	4213	Pass	95237	238	1155	735	based on Response	code 200
3	14:20:21.904	MultipleUsers 1-3	MyHomePage	3711	Pass	95237	238	920	357	Request	MyHomePage'
4	14:20:22.302	MultipleUsers 1-4	MyHomePage	3408	Pass	95237	238	955	521	so the size is	similar.
5	14:20:22.703	MultipleUsers 1-5	MyHomePage	3495	Pass	95237	238	846	426		

VIEW RESULTS TREE looks like below :

The screenshot shows the JMeter interface with the 'View Results Tree' listener selected. The left sidebar shows a tree structure with 'MyFirstTest Plan' expanded, containing 'MultipleUsers' and 'MyHomePage'. Under 'MyHomePage', there are several 'View Results Tree' entries. The main panel displays the results for one of these entries. The results table has the following columns: Label, # Samples, Average, Median, 90% Line, 95% Line, 99% Line, Min, Maximum, Error %, Throughput, Received KB/sec, and Sent KB/sec. The data for 'MyHomePage' shows 5 samples, an average of 3748 ms, and a maximum response time of 3863 ms. The '99% Line' and 'Maximum' columns are highlighted with a blue border. A note at the bottom of the results panel states: 'Aggregate Report gives single line of response per Request (example: MyHomePage is the only request in this example), no matter what is the count of threads/users or loops.'

AGGREGATE REPORT looks like below :

The screenshot shows the JMeter interface with the 'Aggregate Report' listener selected. The left sidebar shows a tree structure with 'MyFirstTest Plan' expanded, containing 'MultipleUsers' and 'MyHomePage'. Under 'MyHomePage', there are several 'Aggregate Report' entries. The main panel displays the results for one of these entries. The results table has the following columns: Label, # Samples, Average, Median, 90% Line, 95% Line, 99% Line, Min, Maximum, Error %, Throughput, Received KB/sec, and Sent KB/sec. The data for 'MyHomePage' shows 5 samples, an average of 3748 ms, and a maximum response time of 3863 ms. The '99% Line' and 'Maximum' columns are highlighted with a blue border. A note at the bottom of the results panel states: 'Aggregate Report gives single line of response per Request (example: MyHomePage is the only request in this example), no matter what is the count of threads/users or loops.'

- Label – name of the url in the sampler
- Samples - indicates the number of virtual users per request.
- Average – average time taken by all the samples to execute specific label.
- Median – It is the time in the middle of a set of samples result. It indicates that 50% of the samples took no more than this time i.e the remainder took at least as long.
- 90% line – 90% of the samples took no more than this time. The remaining samples took at least as long as this. (90th percentile). To calculate 90%, list down all the transaction values and re-order by their values in descending order. Now exclude top 10% transactions of your total list. The highest value left is the 90th percentile.
- Min - out of 5 samples shortest response time one of the sample had was 3492 ms
- Max - out of 5 samples longest response time one of the sample had was 3863 ms
- Error% - % of failed requests per label

- Throughput - number of request that are processed per time unit(seconds, minutes, hours) by the server. This time is calculated from the start of first sample to the end of the last sample. Larger throughput is better.
- KB/Sec: This indicates the amount of data downloaded from server during the performance test execution.
- Std. Dev.: This shows the set of exceptional cases which were deviating from the average value of sample response time. The lesser this value more consistent the data. Standard deviation should be less than or equal to half of the average time for a label.

SUMMARY REPORT looks like below : (AGGREGATE REPORT & SUMMARY REPORT look bit similar.)

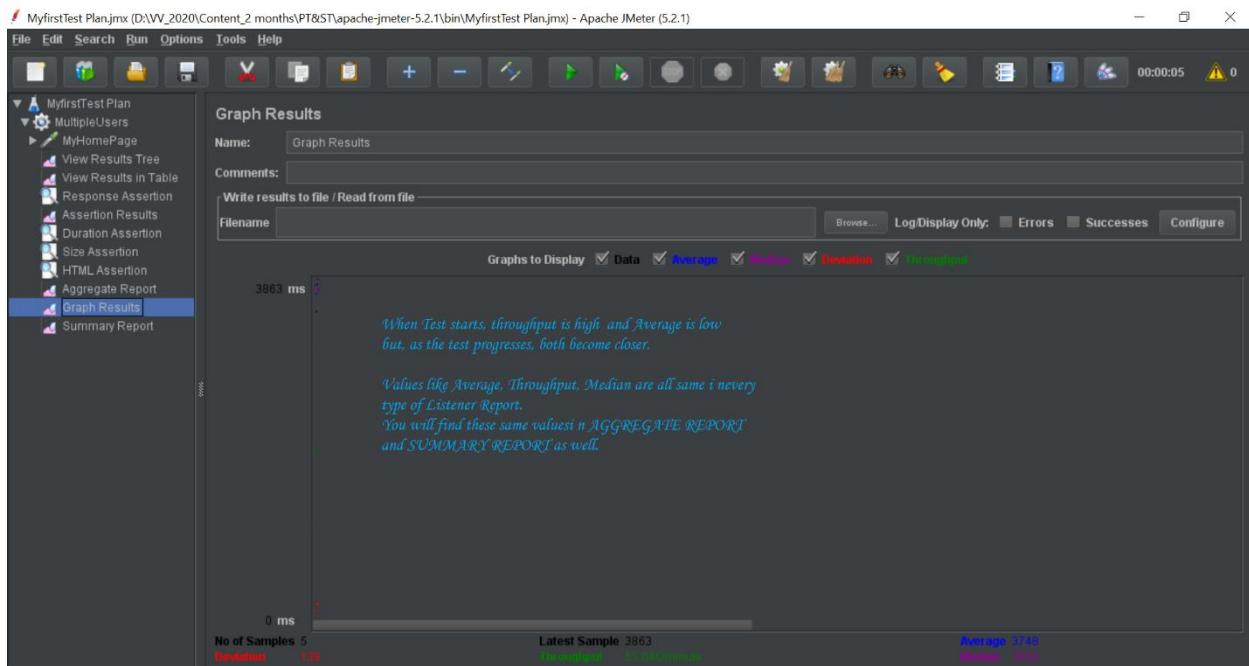
Label	# Samples	Average	Min	Max	Std. Dev.	Error %	Throughput	Received KB/sec	Sent KB/sec	Avg. Bytes
MyHomePage	5	3748	3492	3863	138.54	0.00%	55.0/min	85.33	0.21	95238.4
TOTAL	5	3748	3492	3863	138.54	0.00%	55.0/min	85.33	0.21	95238.4

In every Listener (Result), you can give a csv file name where you can save the results.

If you open the csv file from the folder, it looks like below :

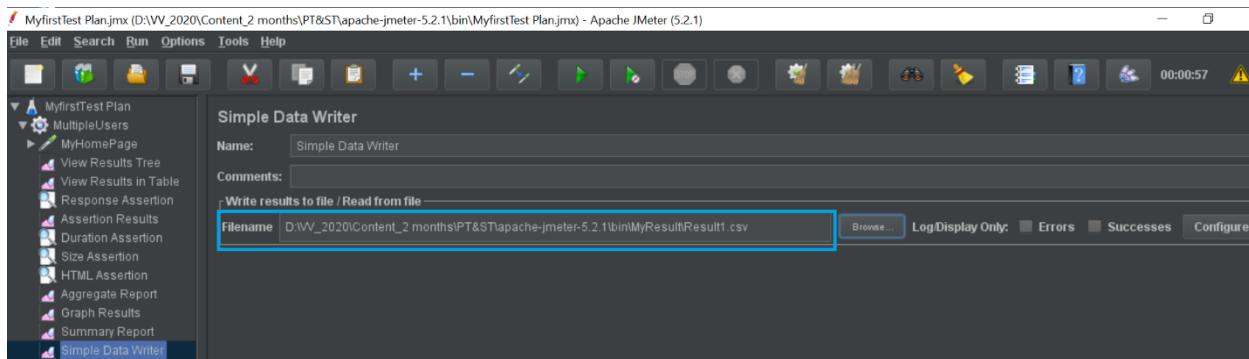
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	timeStam	elapsed	label	responseC	responseH	threadN	dataType	success	failureMe	bytes	sentBytes	grpThread	allThreads	URL	Latency	IdleTime	Connect
2	1.6E+12	23483	MyHomeF	200 OK	MultipleU text	FALSE	The opera	95237	238	3	3	https://www.guru99.com/	1125	0	524		
3	1.6E+12	1125	MyHomeF	301 Moved Pe	MultipleU text	TRUE		592	119	3	3	http://www.guru99.com/	1125	0	524		
4	1.6E+12	22355	MyHomeF	200 OK	MultipleU text	TRUE		94645	119	3	3	https://www.guru99.com/	6102	0	4896		
5	1.6E+12	36225	MyHomeF	200 OK	MultipleU text	FALSE	The opera	95200	238	2	2	https://www.guru99.com/	1240	0	619		
6	1.6E+12	1240	MyHomeF	301 Moved Pe	MultipleU text	TRUE		592	119	2	2	http://www.guru99.com/	1240	0	619		
7	1.6E+12	34984	MyHomeF	200 OK	MultipleU text	TRUE		94608	119	2	2	https://www.guru99.com/	25709	0	24628		
8	1.6E+12	55956	MyHomeF	200 OK	MultipleU text	FALSE	The opera	95237	238	1	1	https://www.guru99.com/	1197	0	517		
9	1.6E+12	1197	MyHomeF	301 Moved Pe	MultipleU text	TRUE		592	119	1	1	http://www.guru99.com/	1197	0	517		
10	1.6E+12	54755	MyHomeF	200 OK	MultipleU text	TRUE		94645	119	1	1	https://www.guru99.com/	31783	0	30452		
11																	

GRAPH RESULT looks like below :



- Throughput = (number of requests) / (total time). The time is calculated from the start of the first sample to the end of the last sample.
- Average - Average response time between request sent and getting reply response from server.
- No of Samples - Total number of requests sent to server during the load test.
- Deviation - Shows how much the response time varies. Deviation value should always be as low as possible. Higher values generally means system is under stress.

SIMPLE DATA WRITER (This is the Listener with no UI. You can just log the results into the csv file. Therefore, it consumes least memory. Click 'Configure' to choose how you want to configure) looks like below :



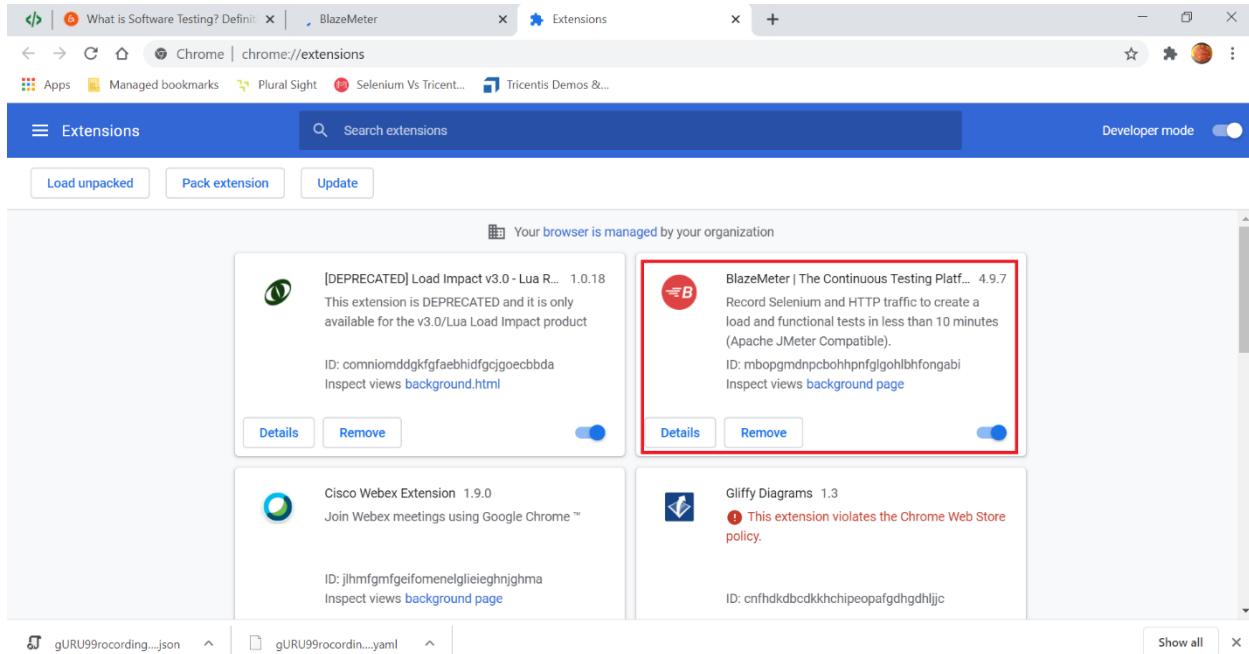
Check the result by opening the csv file from the folder

## DEMO 4. RECORD TEST

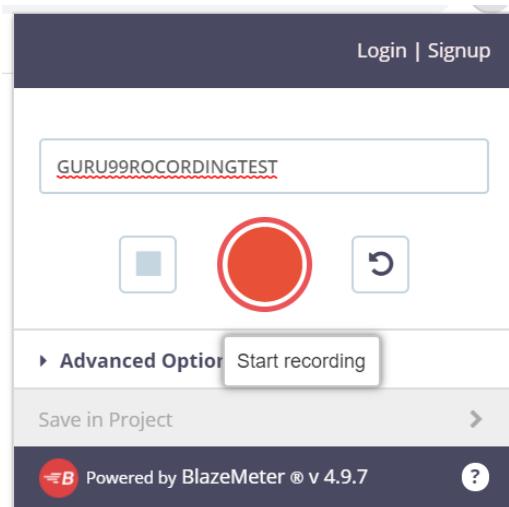
### 4.1 Use of Blazemeter extension in Chrome Browser

This is suitable when you want to test entire application and every user action on that application.

To opt for recording of tests, you can enable the **Blazemeter** extension in chrome browser. And then Register / Login to Blazemeter.



Step 1: Start Blazemeter in Chrome; Name the File; Start Recording.

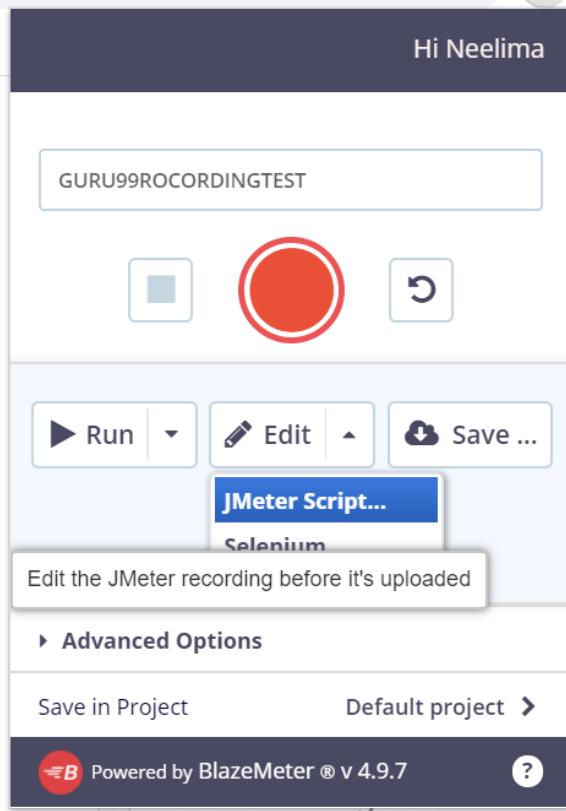


Step 2: Enter the website URL that you want to test in the chrome browser

Step 3: Perform few user actions

Step 4: Stop Recording

Step 5: Edit – JMeter Script

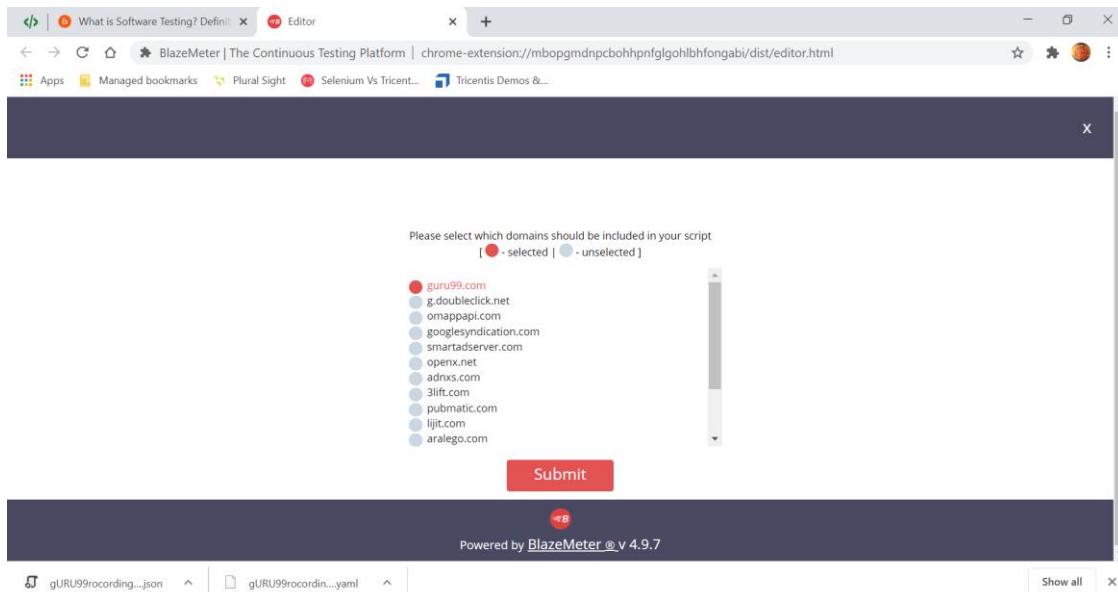


#### Step 6: Export to JMeter(.jmx)

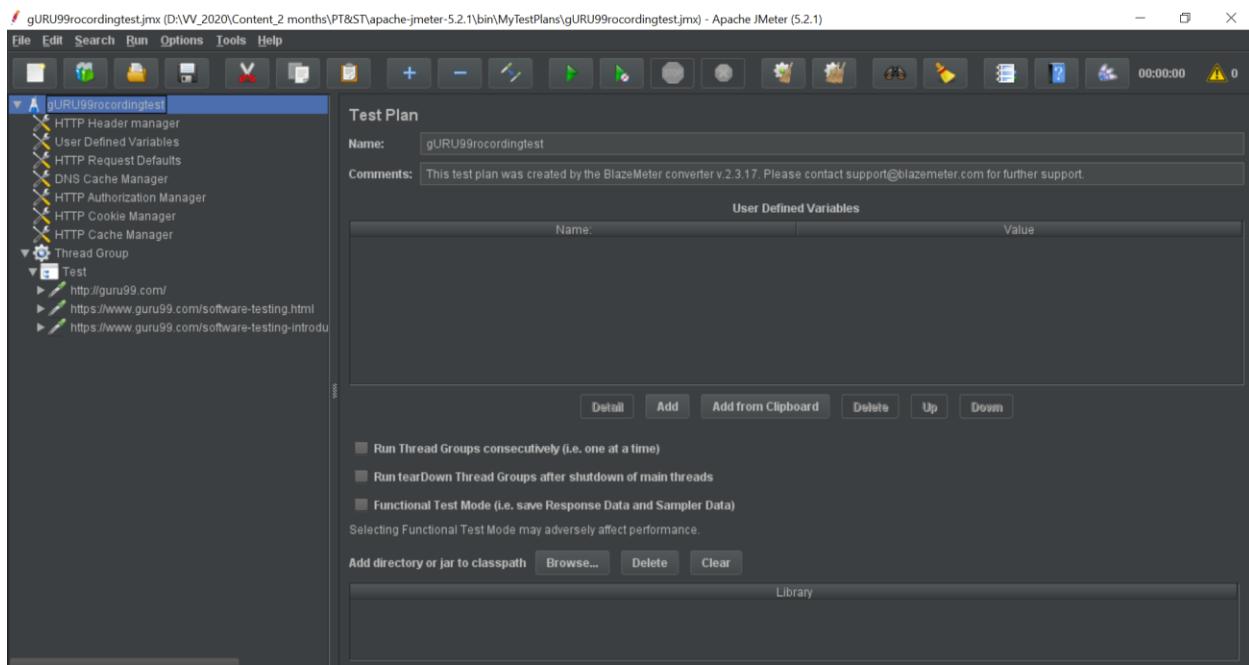
```

object {79}
  GET http://guru99.com/ [458] {9}
  POST https://stats.g.doubleclick.net/j/collect?t=dc&aip=18_r=3&v=18_v=j86&tid=UA-1248015-2&cid=1255323204.1557488644&jid=866500689&gjid [533] {8}
  GET https://www.guru99.com/software-testing.html [567] {9}
  GET https://api.omappapi.com/v2/embed/18980/hubx1ug8mxfgclcy1va [618] {8}
  GET https://api.omappapi.com/v2/embed/18980/etuppngfscafkp5wvxja [621] {8}
  HEAD https://pagead2.googlesyndication.com/pagead/js/adsbygoogle.js [625] {8}
  POST https://prg.smartadserver.com/prebid/v1 [641] {9}
  POST https://prg.smartadserver.com/prebid/v1 [642] {9}
  POST https://prg.smartadserver.com/prebid/v1 [643] {9}
  POST https://prg.smartadserver.com/prebid/v1 [644] {9}
  POST https://prg.smartadserver.com/prebid/v1 [645] {9}
  POST https://prg.smartadserver.com/prebid/v1 [646] {9}
  GET https://pubwise-d.openx.net/w/1.0/arj?ju=https%3A%2F%2Fwww.guru99.com%2Fsoftware-testing.html&ch=UTF-8&res=1280x720x24&ifr=false&t [647] {8}
  POST https://ib.adnxs.com/ut/v3/prebid [648] {9}
  POST https://tix.3lift.com/header/auction?lib=prebid&v=3.24.0&referrer=https%3A%2F%2Fwww.guru99.com%2Fsoftware-testing.html&tmax=1300 [649] {9}
  POST https://ib.adnxs.com/ut/v3/orebid [650] {9}

```



### Step 7: Go to JMETER; FILE – OPEN - select the recorded test script



### Step 8; Add listener : VIEW RESULTS IN TABLE to capture the result

### Step 9: Run Test

## DEMO 5. CMD LINE TEST

### 5.1 Run Test on Command line

Step 1: You can use test plan from Lab 1.

Create Test Plan, Thread Group, HTTP Request Sampler (Add servername, path), View Results in Table. Run Test just to check everything is working fine and all tests PASS.

Step 2: Remove Listener

Step 3: Open CMD prompt – go to your 'bin/ folder

Write the Command to execute : jmeter -n -t [location of .jmx] -l [location of result file without any extension]

As per my folder structure : jmeter -n -t /D:/VV\_2020/Content\_2months/JMETER/apache-jmeter-5.2.1/bin/MyTestPlans/MyfirstTestPlan.jmx -l /D:/VV\_2020/Content\_2months/JMETER/apache-jmeter-5.2.1/bin/MyResult/cmdResult1

Note: There should not be any space in the folder or file name else it will raise errors.

```

Command Prompt
Microsoft Windows [Version 10.0.18362.1016]
(c) 2019 Microsoft Corporation. All rights reserved.

C:\Users\npadmawa>cd..

C:\Users>d:

D:\>cd "D:\VV_2020\Content_2months\JMETER\apache-jmeter-5.2.1\bin" location of .jmx
D:\VV_2020\Content_2months\JMETER\apache-jmeter-5.2.1\bin\jmeter -n -t /D:/VV_2020/Content_2months/JMETER/apache-jmeter-5.2.1/bin/MyTestPlans/MyfirstTestPlan.jmx -l /D:/VV_2020/Content_2months/JMETER/apache-jmeter-5.2.1/bin/MyResult/cmdResult1 location of result file
Creating summariser <summary>
Created the tree successfully using /D:/VV_2020/Content_2months/JMETER/apache-jmeter-5.2.1/bin/MyTestPlans/MyfirstTestPlan.jmx
Starting standalone test @ Wed Sep 16 18:50:44 IST 2020 (1600262444622) Execution of Test Plan
Waiting for possible Shutdown/StopTestNow/HeapDump/ThreadDump message on port 4445
summary =      5 in 00:00:01 =  5.9/s Avg:  6 Min: 0 Max: 31 Err: 5 (100.00%)
Tidying up ... @ Wed Sep 16 18:50:45 IST 2020 (1600262445857)
... end of run
D:\VV_2020\Content_2months\JMETER\apache-jmeter-5.2.1\bin>

```

Step 4: Open the file using notepad and check the result :

```

cmdResult - Notepad
File Edit Format View Help
timeStamp,elapsed,label,responseCode,responseMessage,threadName,dataType,success,failureMessage,bytes,sentBytes,grpThreads,^
1600262445156,31,MyHomePage,Non HTTP response code: java.net.UnknownHostException,Non HTTP response message: www.guru99.com,^
1600262445249,0,MyHomePage,Non HTTP response code: java.net.UnknownHostException,Non HTTP response message: www.guru99.com,^
1600262445450,1,MyHomePage,Non HTTP response code: java.net.UnknownHostException,Non HTTP response message: www.guru99.com,^
1600262445650,1,MyHomePage,Non HTTP response code: java.net.UnknownHostException,Non HTTP response message: www.guru99.com,^
1600262445850,0,MyHomePage,Non HTTP response code: java.net.UnknownHostException,Non HTTP response message: www.guru99.com,^

```

**DEMO 6. TIMERS**

**DEMO 7. CONTROLLERS**

**DEMO 8. PARAMETERIZATION \*CONFIG ELEMENTS\***

**DEMO 9. CORRELATION WITH REGEx**

**DEMO 10. FTP SAMPLER**

**DEMO 11. API**

**DEMO 12. JDBC SAMPLER**

**DEMO 13. PLUGIN MANAGER - EXTENSIBILITY**

**DEMO 14. FILE UPLOAD / DOWNLOAD**

