

# **Assignment #3**

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**Date: 20-11-2023**

**Section Number: Section - 4**

## Screenshots of Summary Report table and graph of CPU and Memory usage

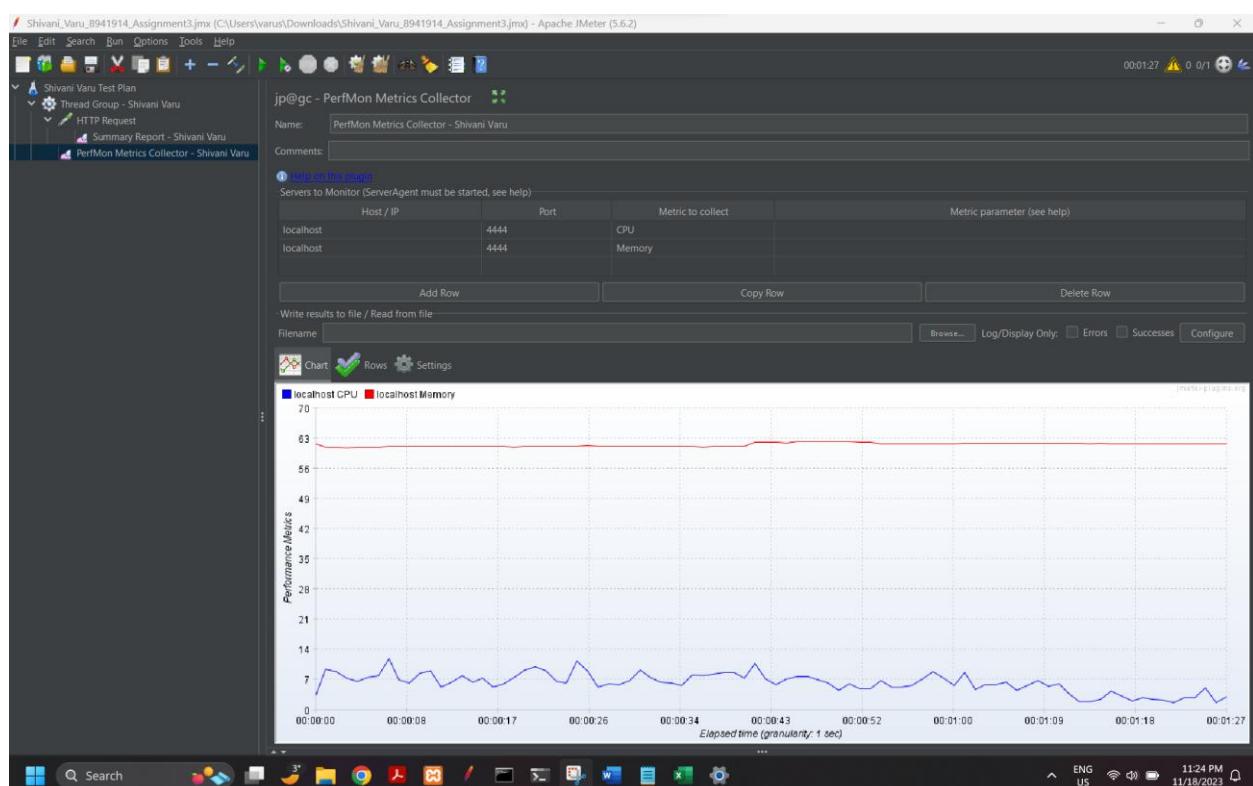
### A: Number of User: 1

#### I. Loop Count: 10000

The screenshot shows the Apache JMeter interface with the 'Summary Report' listener selected in the left tree view. The main panel displays a table of results for an 'HTTP Request' sampler. The table has the following data:

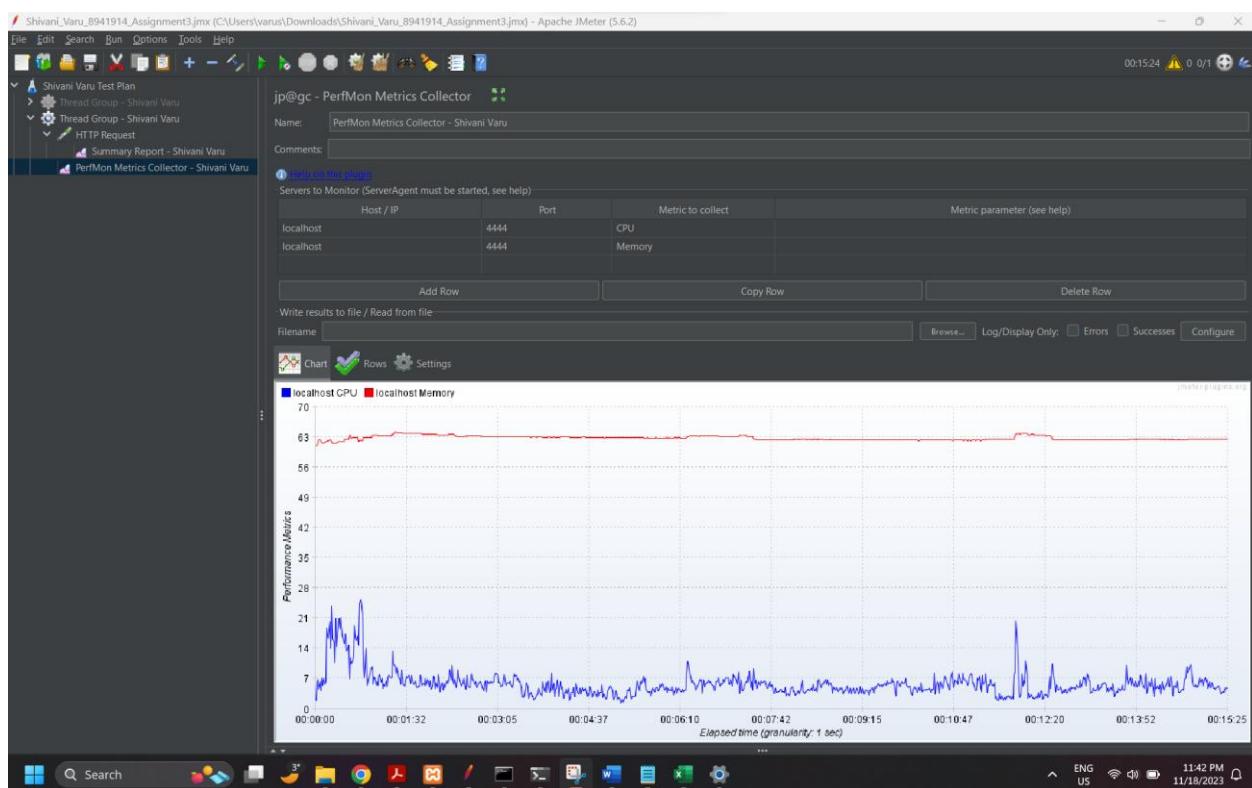
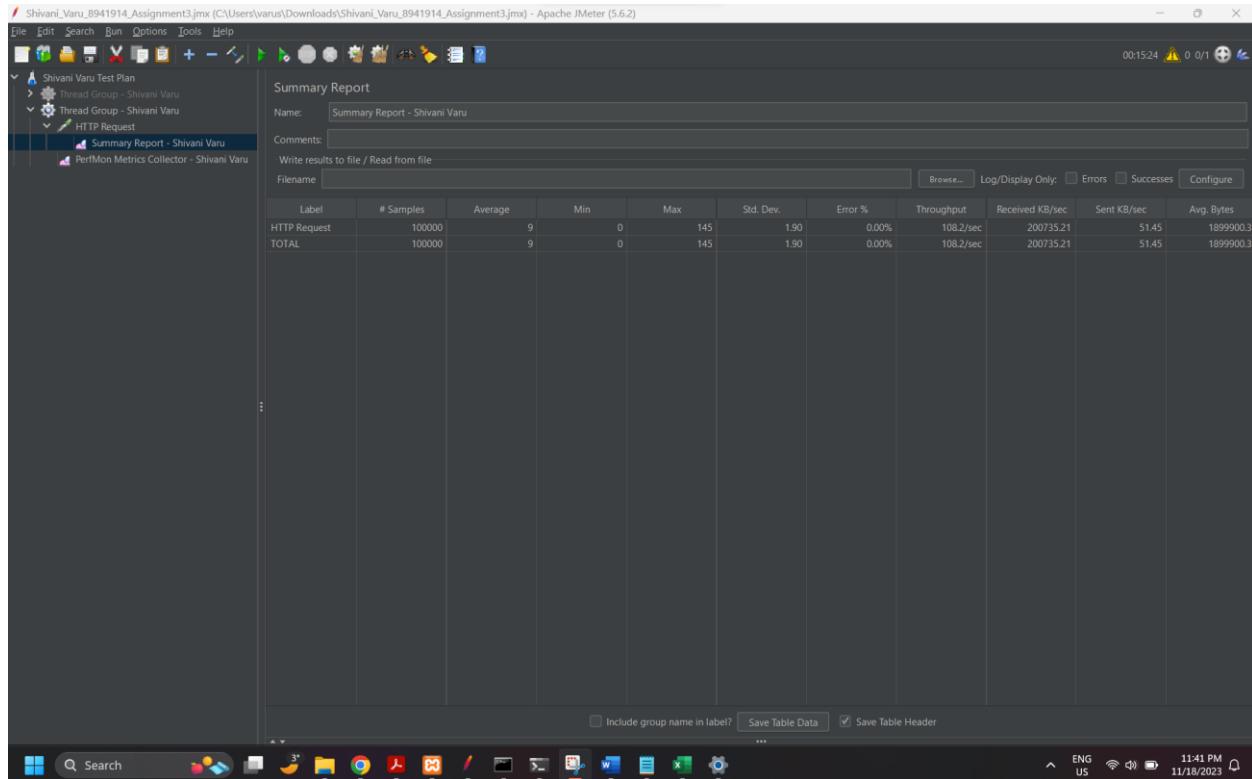
Label	# Samples	Average	Min	Max	Std. Dev.	Error %	Throughput	Received KB/sec	Sent KB/sec	Avg. Bytes
HTTP Request	10000	8	0	42	1.70	0.00%	113.5/sec	210615.83	53.99	1899950.3
TOTAL	10000	8	0	42	1.70	0.00%	113.5/sec	210615.83	53.99	1899950.3

At the bottom of the table, there are checkboxes for 'Include group name in label?', 'Save Table Data', and 'Save Table Header'. The status bar at the bottom right shows '11:24 PM 11/18/2023'.



## II. Loop Count: 100000

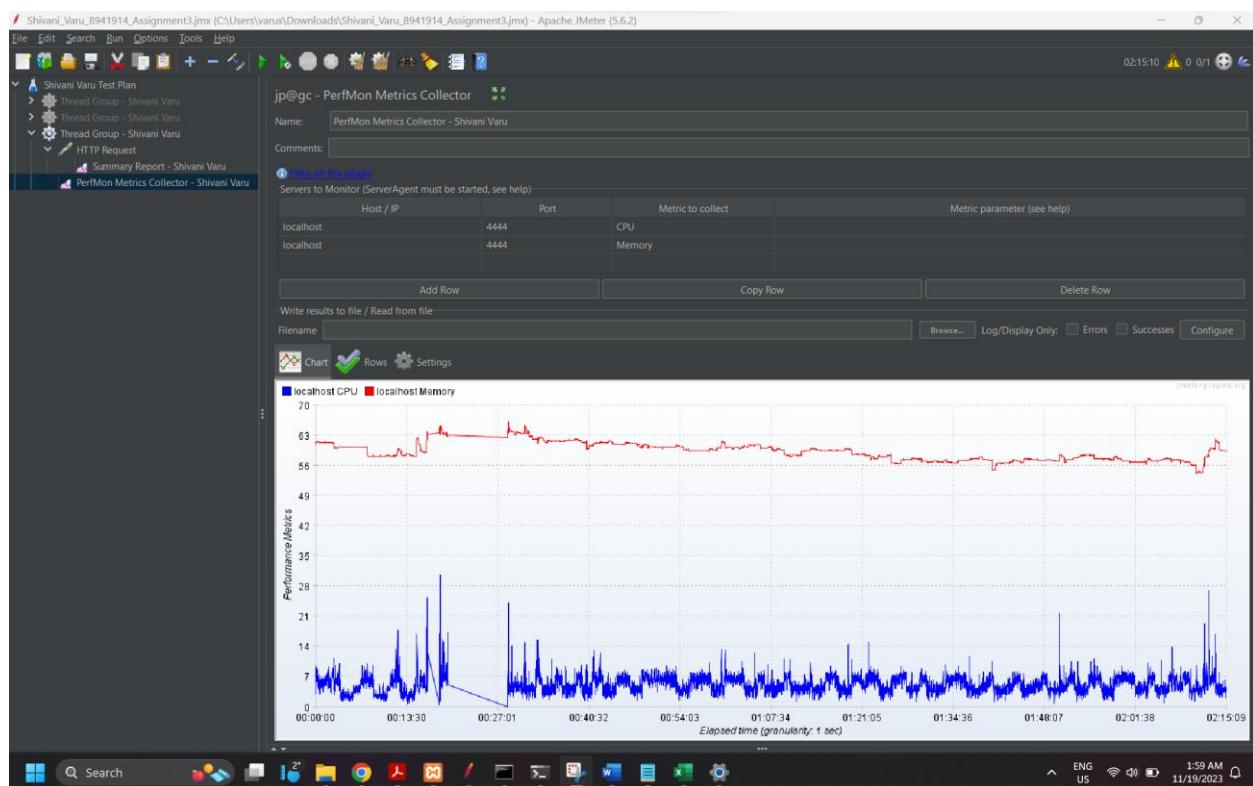
Screenshot of Apache JMeter 5.6.2 showing the Summary Report for a test plan named "Shivani Varu Test Plan". The test plan contains a single Thread Group named "Shivani Varu" with one HTTP Request sampler. The summary report shows 100000 samples with an average response time of 9 ms, a minimum of 0 ms, and a maximum of 145 ms. The error percentage is 0.00%, and the throughput is 108.2/sec. The total received KB/sec is 200735.21, and the total sent KB/sec is 51.45, resulting in an average byte count of 1899900.3.



### III. Loop Count:1000000

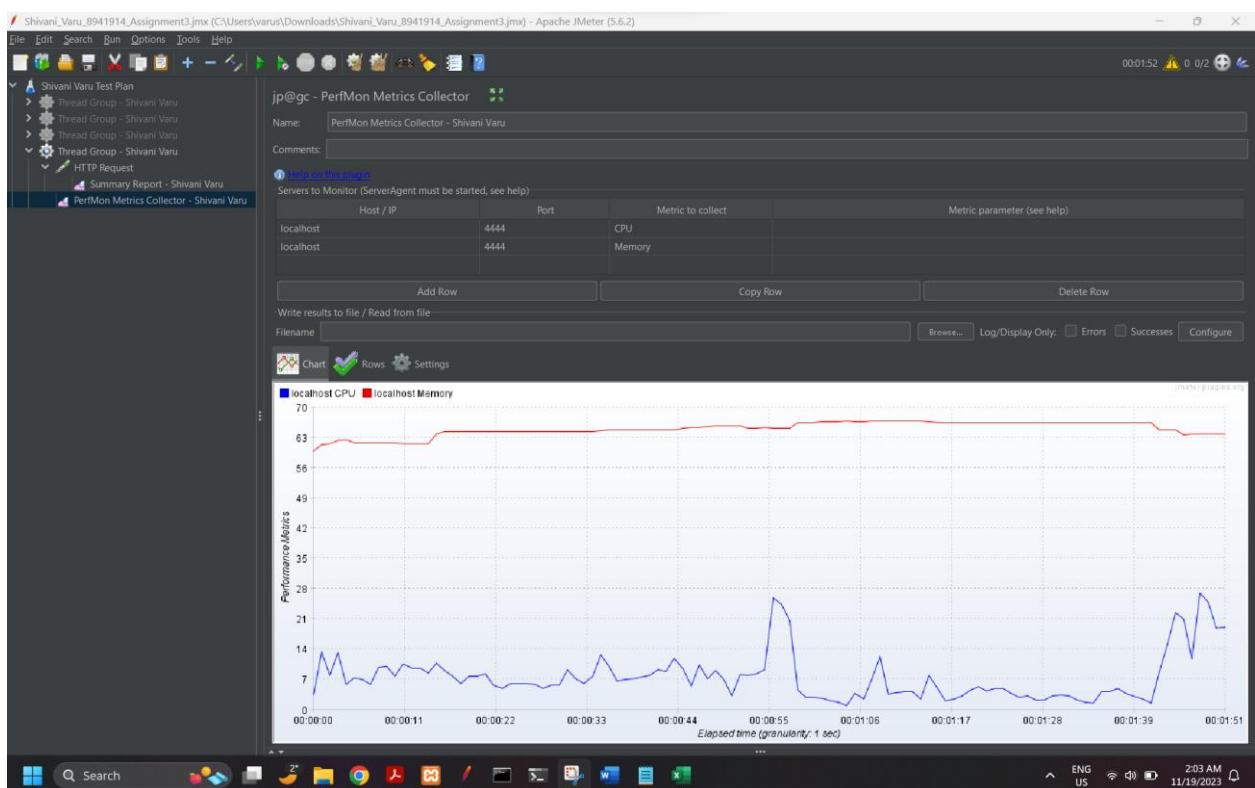
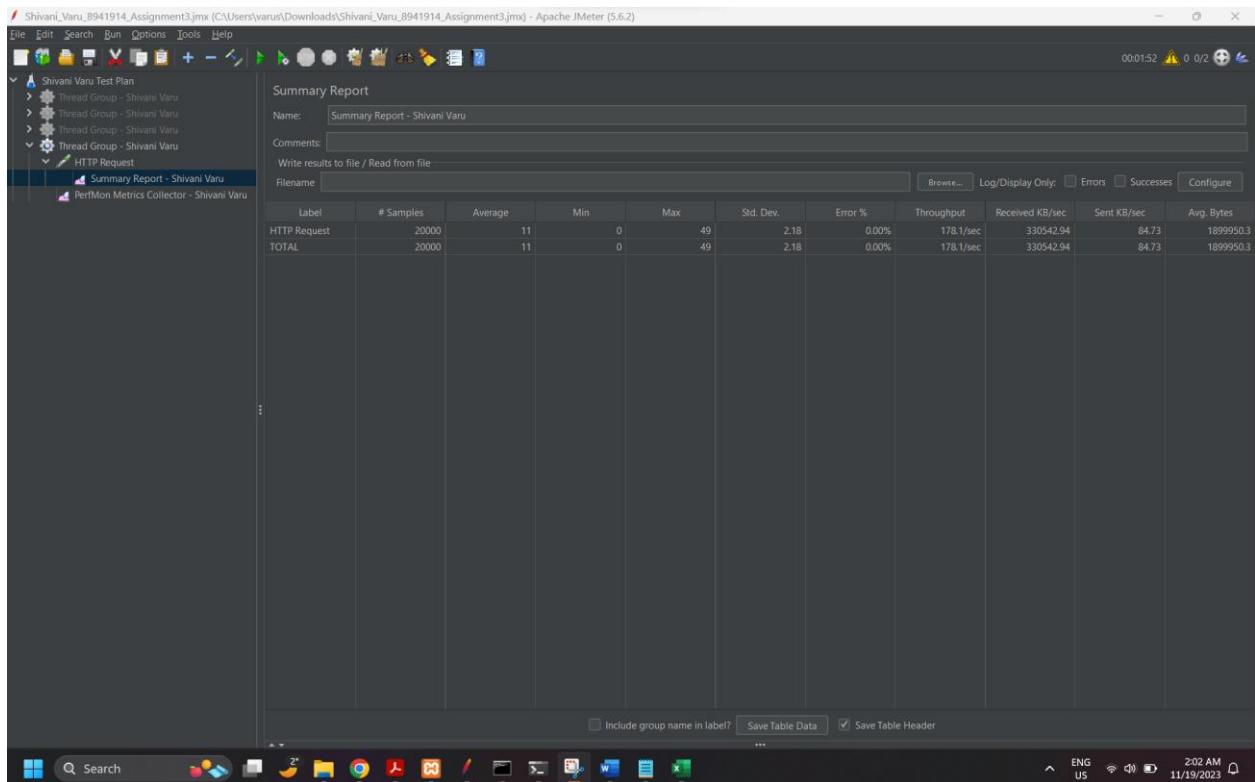
Screenshot of Apache JMeter 5.6.2 showing the Summary Report for a test plan named "Shivani Varu Test Plan". The test plan contains three Thread Groups and one PerfMon Metrics Collector. The Summary Report table shows the following data:

Label	# Samples	Average	Min	Max	Std. Dev.	Error %	Throughput	Received KB/sec	Sent KB/sec	Avg. Bytes
HTTP Request	1000000	7	0	527861	537.85	0.00%	123.3/sec	228780.22	58.64	1899943.5
TOTAL	1000000	7	0	527861	537.85	0.00%	123.3/sec	228780.22	58.64	1899943.5



## **B: Number of Users: 2**

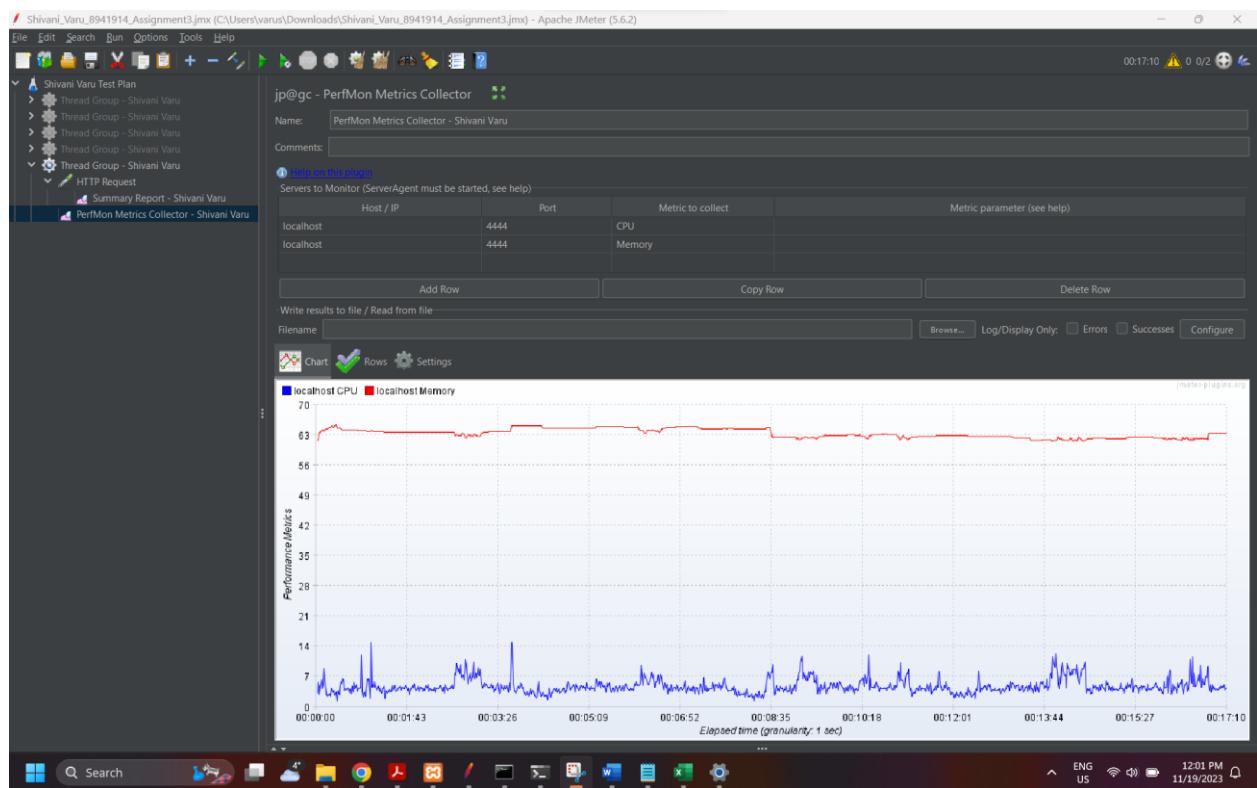
### **I. Loop Count: 10000**



## II. Loop Count: 100000

Screenshot of Apache JMeter 5.6.2 showing a Summary Report for a test plan with 200,000 samples. The report includes statistics for Average, Min, Max, Std. Dev., Error %, Throughput, Received KB/sec, Sent KB/sec, and Avg. Bytes.

Label	# Samples	Average	Min	Max	Std. Dev.	Error %	Throughput	Received KB/sec	Sent KB/sec	Avg. Bytes
HTTP Request	200000	10	0	55	2.15	0.00%	194.1/sec	360229.60	92.33	1899950.3
TOTAL	200000	10	0	55	2.15	0.00%	194.1/sec	360229.60	92.33	1899950.3



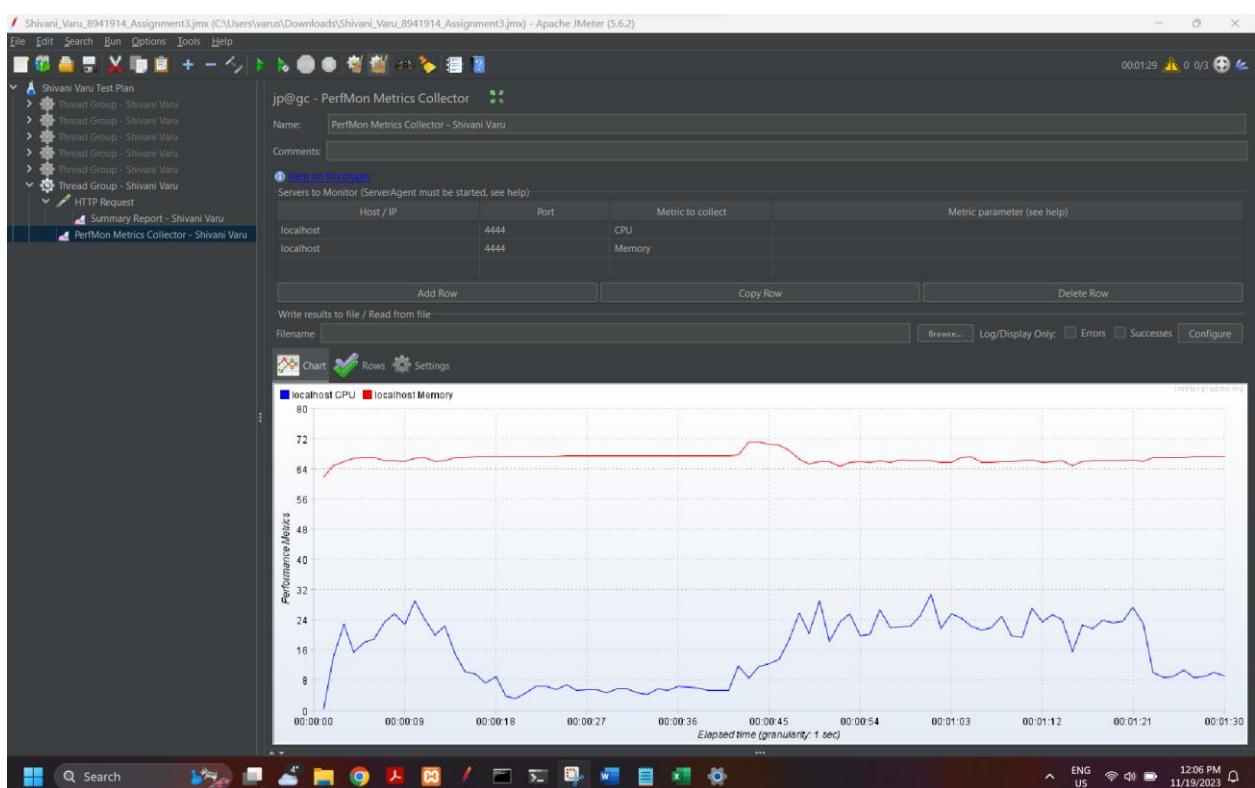
## **C: Number of Users: 3**

### **I. Loop Count: 10000**

Screenshot of Apache JMeter 5.6.2 showing the Summary Report for a test plan named "Shivani Varu Test Plan". The test plan contains three Thread Groups, each with three HTTP Requests. A PerfMon Metrics Collector is also present.

**Summary Report - Shivani Varu**

Label	# Samples	Average	Min	Max	Std. Dev.	Error %	Throughput	Received KB/sec	Sent KB/sec	Avg. Bytes
HTTP Request	30000	8	0	149	4.67	0.00%	333.2/sec	618134.43	158.44	1899942.8
TOTAL	30000	8	0	149	4.67	0.00%	333.2/sec	618134.43	158.44	1899942.8



## II. Loop Count: 100000

Screenshot of Apache JMeter 5.6.2 showing the Summary Report for a test plan with 300,000 samples.

**Summary Report**

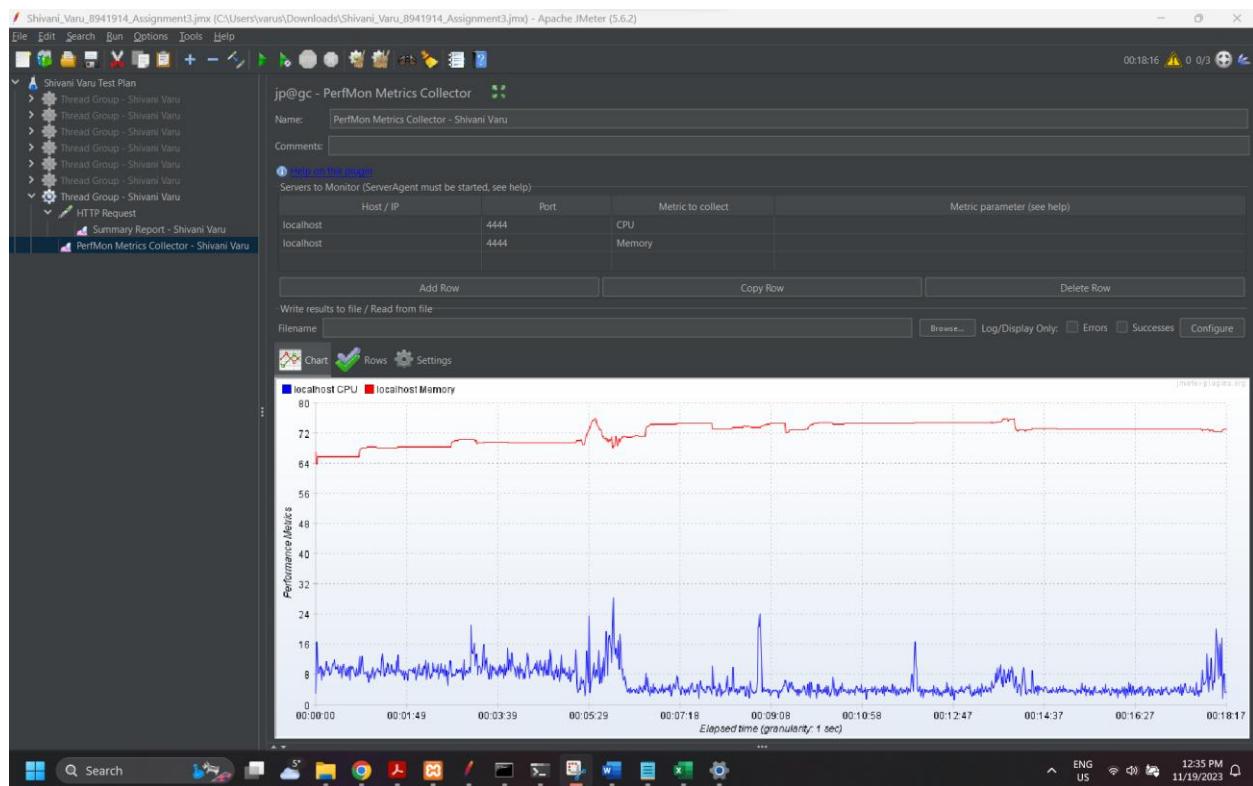
Label	# Samples	Average	Min	Max	Std. Dev.	Error %	Throughput	Received KB/sec	Sent KB/sec	Avg. Bytes
HTTP Request	300000	10	0	206	3.17	0.00%	273.4/sec	507362.66	130.05	1899950.3
TOTAL	300000	10	0	206	3.17	0.00%	273.4/sec	507362.66	130.05	1899950.3

Comments: Write results to file / Read from file

Filename:    Log/Display Only:  Errors  Successes

Include group name in label?  Save Table Data  Save Table Header

ENG US 12:35 PM 11/19/2023

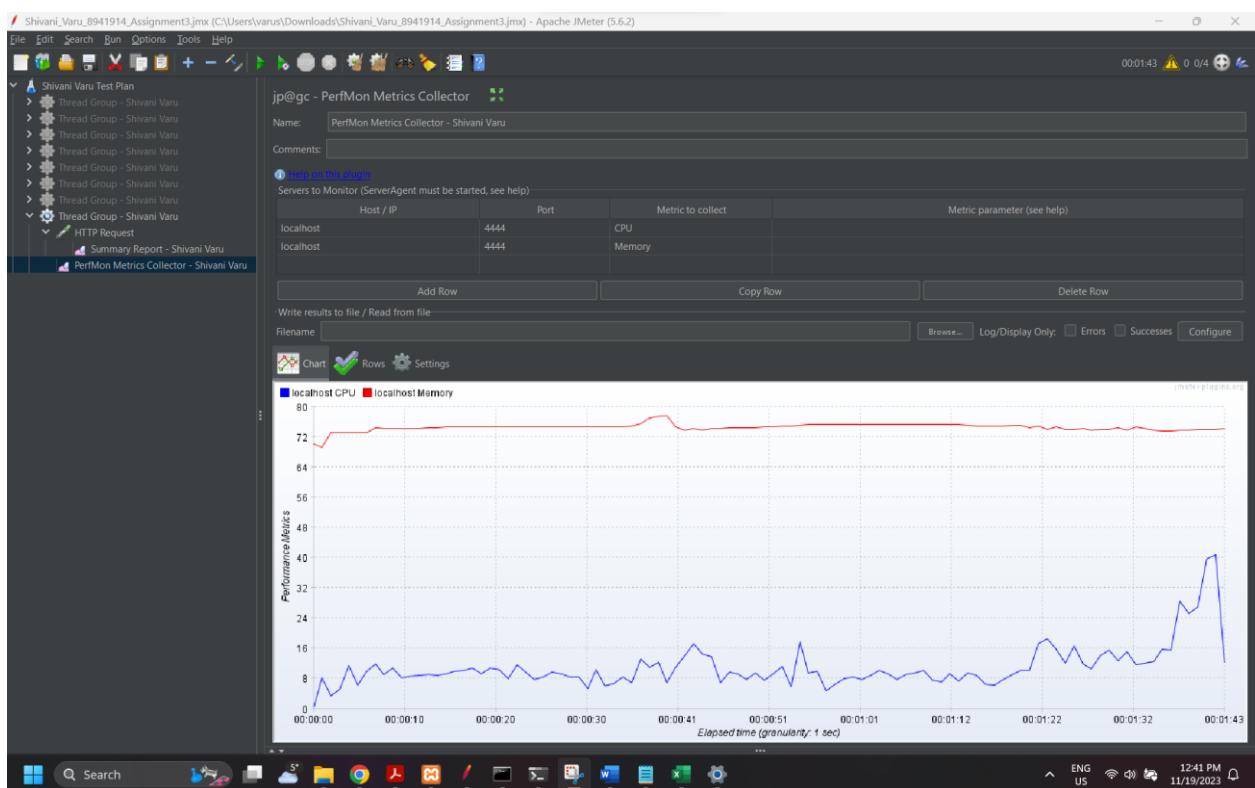


## **D: Number of Users: 4**

### **I. Loop Count: 10000**

Screenshot of Apache JMeter 5.6.2 showing the Summary Report for a test plan named "Shivani Varu Test Plan". The test plan contains four thread groups, each with 10000 loops. The summary report shows the following statistics:

Label	# Samples	Average	Min	Max	Std. Dev.	Error %	Throughput	Received KB/sec	Sent KB/sec	Avg. Bytes
HTTP Request	40000	10	0	62	2.93	0.00%	386.3/sec	716724.36	183.71	1899950.3
TOTAL	40000	10	0	62	2.93	0.00%	386.3/sec	716724.36	183.71	1899950.3



## II. Loop Count: 100000

Shivani.Varu.8941914.Assignment3.jmx (C:\Users\varus\Downloads\Shivani.Varu.8941914.Assignment3.jmx) - Apache JMeter (5.6.2)

File Edit Search Run Options Tools Help

Summary Report

Name: Summary Report - Shivani.Varu

Comments:

Write results to file / Read from file

Filename:

Label	# Samples	Average	Min	Max	Std. Dev.	Error %	Throughput	Received KB/sec	Sent KB/sec	Avg. Bytes
HTTP Request	400000	10	0	191	7.22	0.00%	380.7/sec	706354.37	181.05	1899950.0
TOTAL	400000	10	0	191	7.22	0.00%	380.7/sec	706354.37	181.05	1899950.0

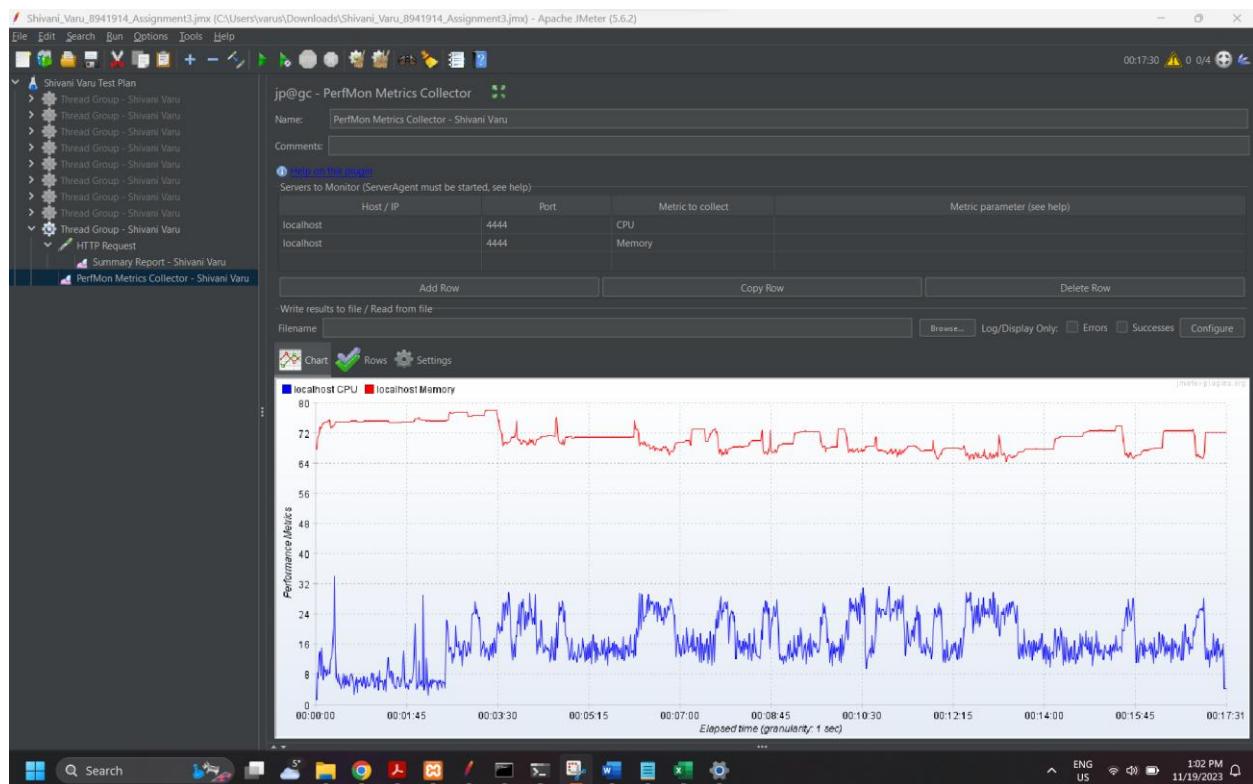
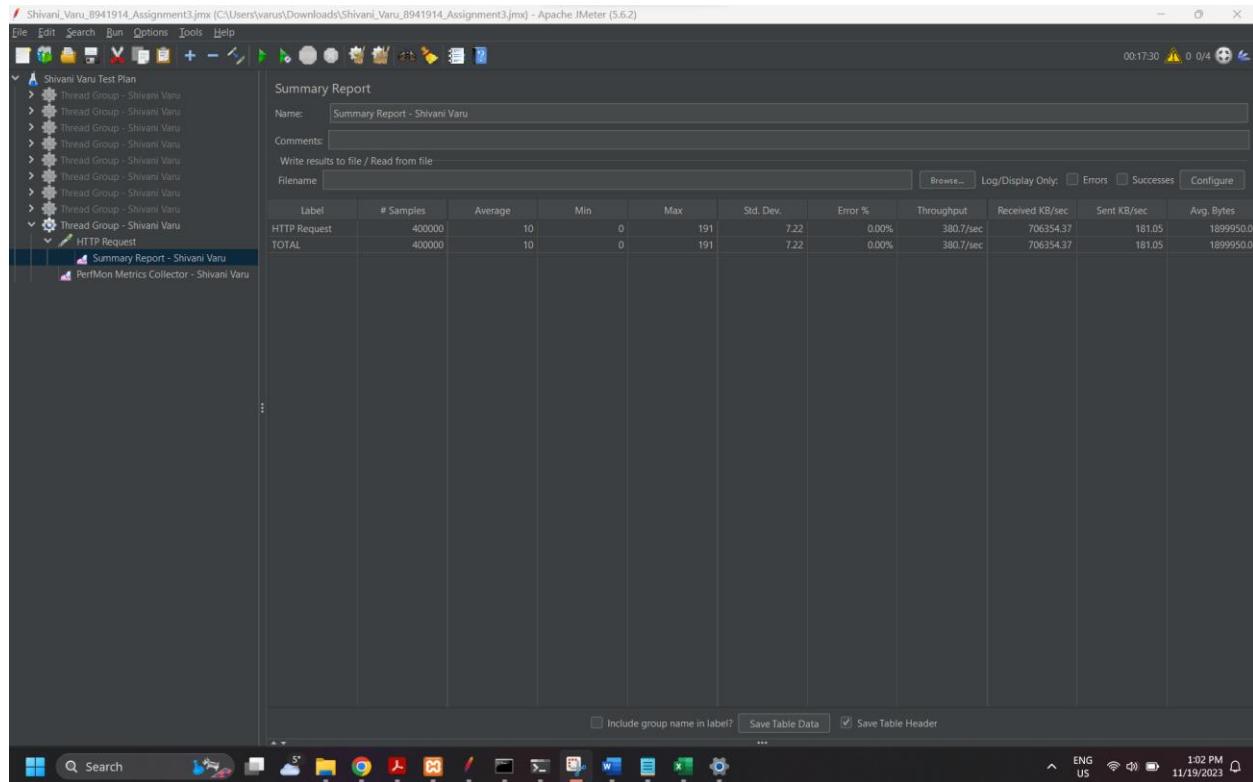
Include group name in label? Save Table Data Save Table Header

HTTP Request

Summary Report - Shivani.Varu

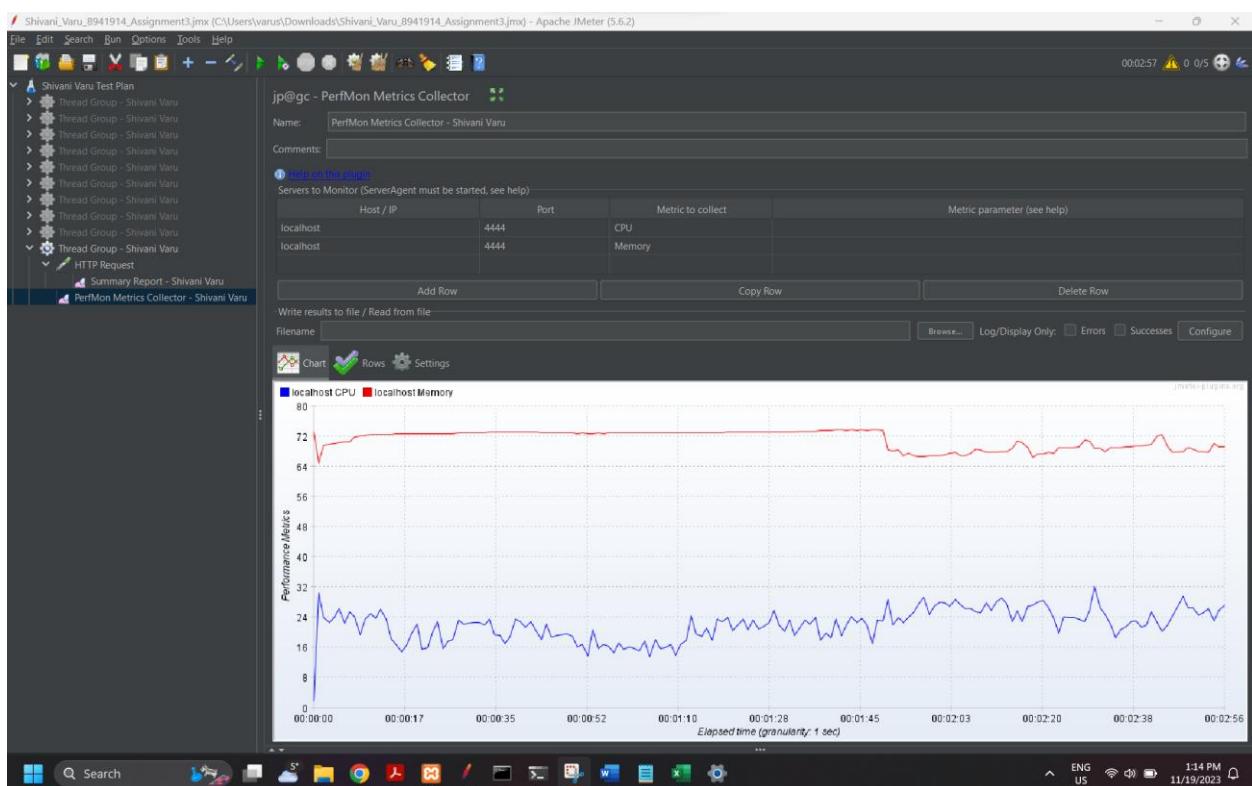
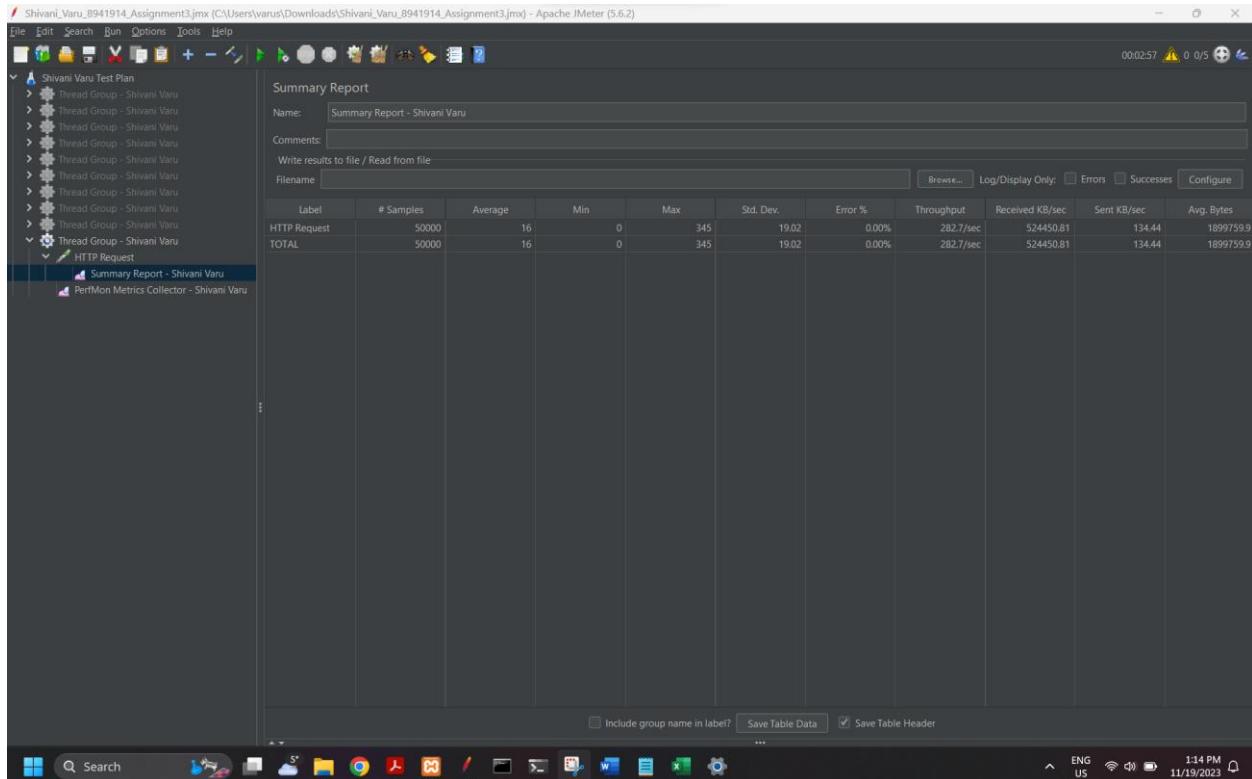
PerfMon Metrics Collector - Shivani.Varu

00:17:30 0/0/4 ENG US 11/19/2023 102 PM



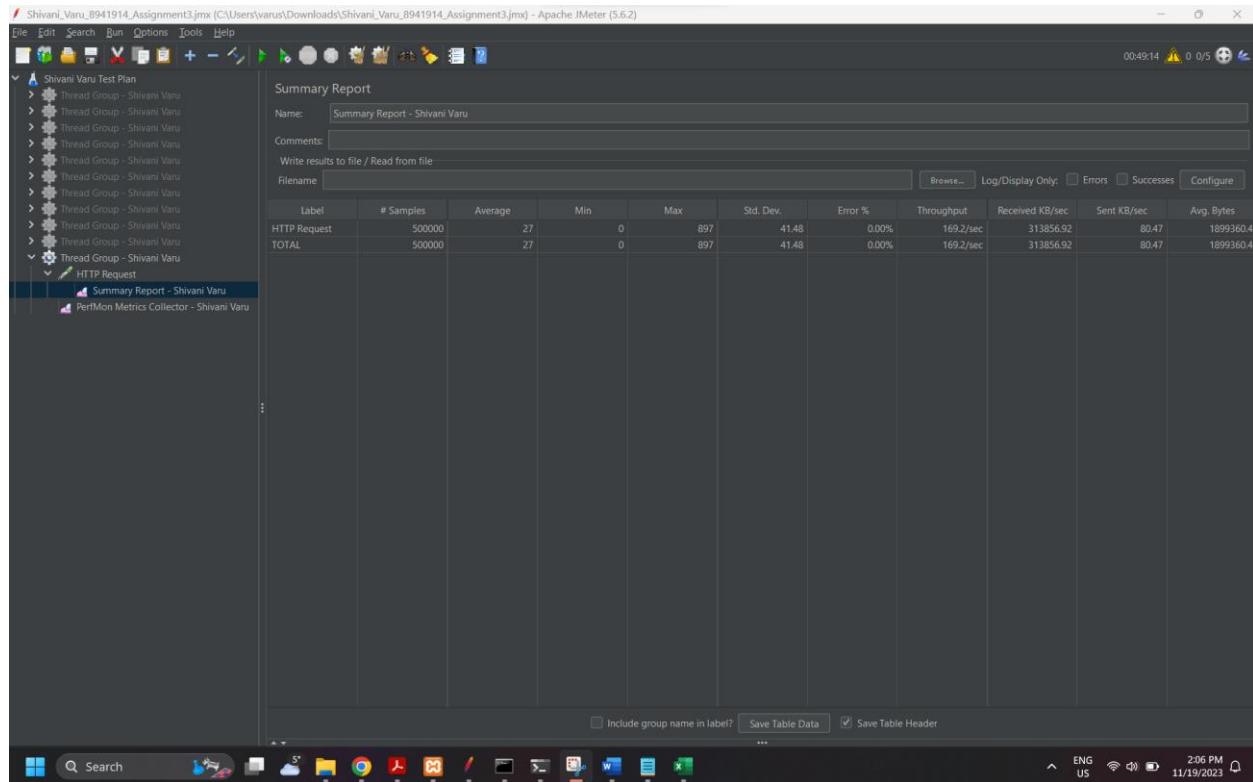
## **E: Number of Users: 5**

### **I. Loop Count: 10000**

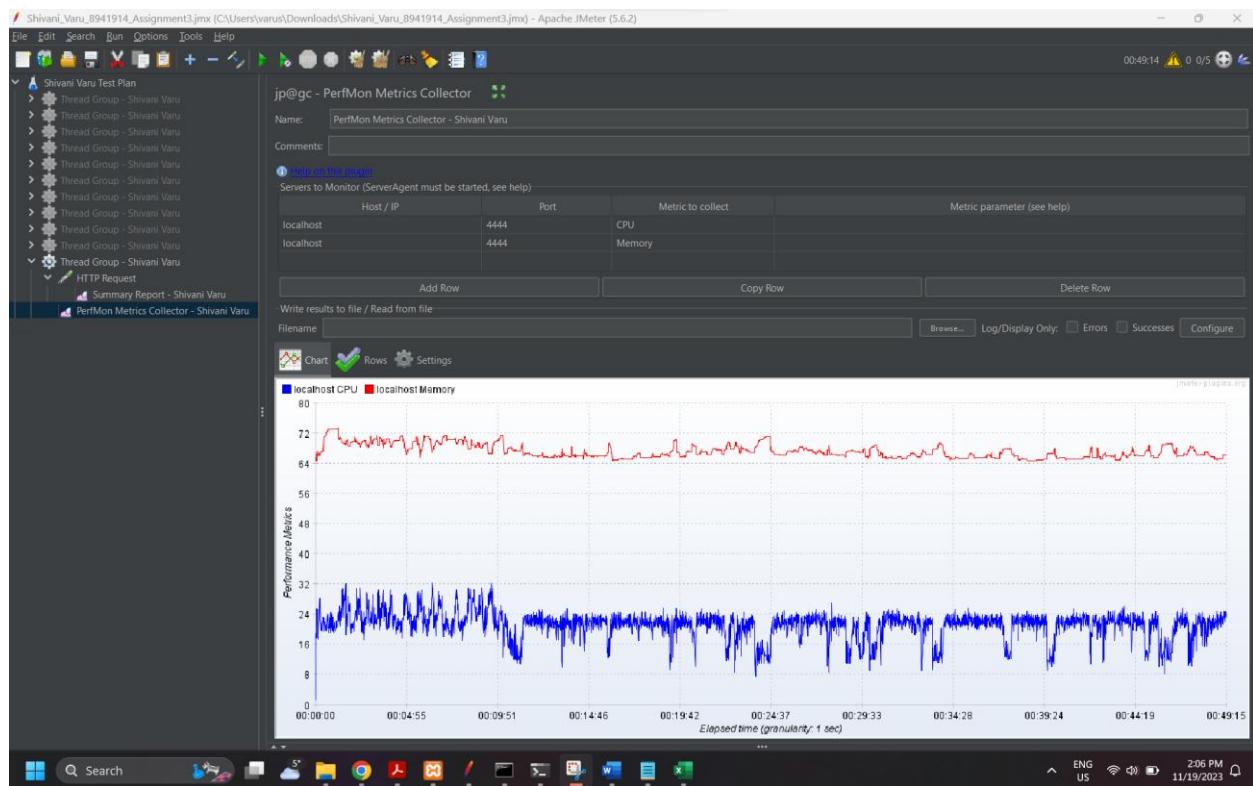


## II. Loop Count: 100000

Screenshot of Apache JMeter 5.6.2 showing the Summary Report for a test plan named "Shivani Varu Test Plan". The test plan contains 10 Thread Groups, all named "Shivani Varu". A single HTTP Request is present under each Thread Group. The summary report shows 500000 samples, an average response time of 27 ms, and a maximum response time of 897 ms. Throughput is 169.2/sec, and Received KB/sec is 313856.92. The configuration includes "Log/Display Only" checked, and "Errors" and "Successes" checkboxes.



Screenshot of Apache JMeter 5.6.2 showing the PerfMon Metrics Collector configuration for a test plan named "Shivani Varu Test Plan". The configuration includes monitoring services on localhost at port 4444 for CPU and Memory metrics. The performance metrics chart displays CPU usage (red line) fluctuating between 64% and 72% and Memory usage (blue line) fluctuating between 16 and 32 GB over a 49-second period.



## F: Number of Users: 10

### I. Loop Count: 10000

The screenshot shows the Apache JMeter interface with a summary report for a test plan named "Shivani Varu Test Plan". The report details 100000 samples, with an average response time of 34 ms, a minimum of 0 ms, a maximum of 698 ms, and a standard deviation of 45.26 ms. The throughput was 285.0/sec, and the total bytes transferred were 1899950.3. The report includes tabs for "Log/Display Only", "Errors", and "Successes". The desktop taskbar at the bottom shows various application icons and the date/time as 11/19/2023 2:20 PM.

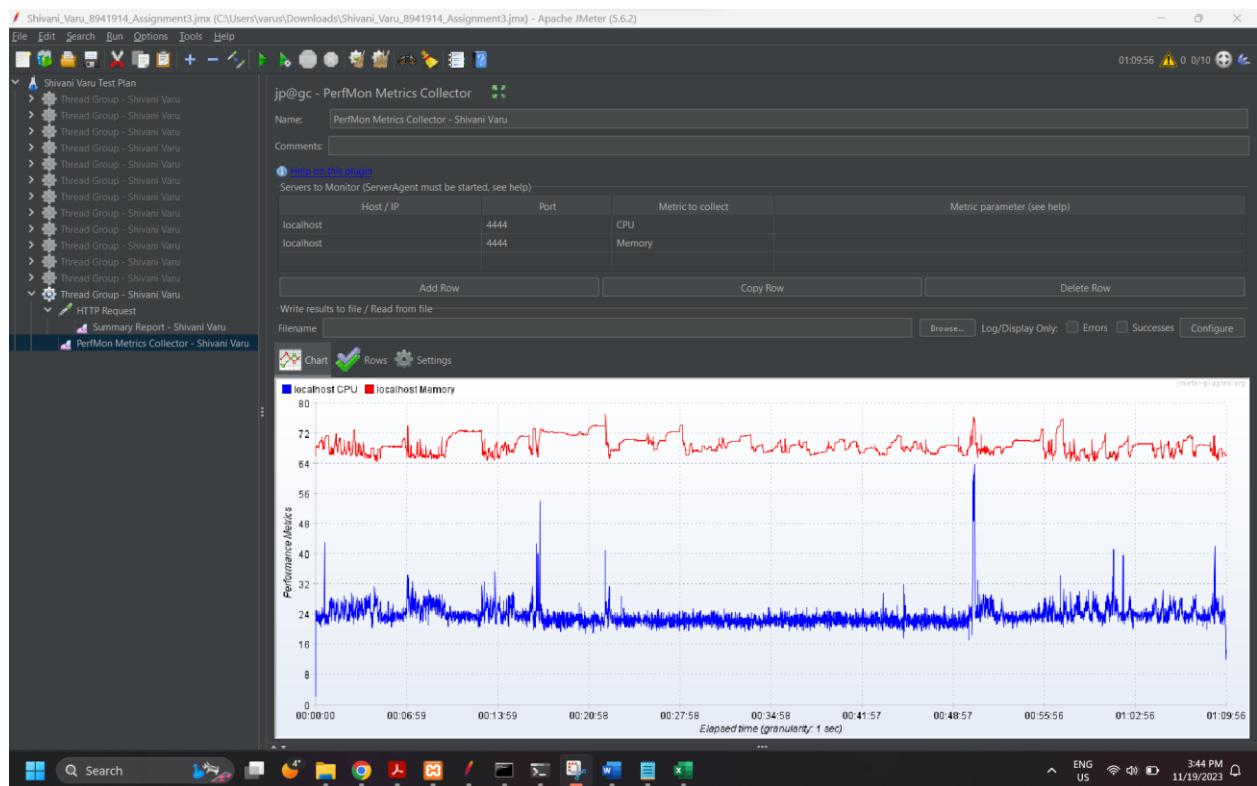
The screenshot shows the Apache JMeter interface with a "PerfMon Metrics Collector" report for a test plan named "Shivani Varu Test Plan". The report details monitoring of localhost ports 4444 for CPU and Memory metrics. The desktop taskbar at the bottom shows various application icons and the date/time as 11/19/2023 2:20 PM.

## II. Loop Count: 100000

Screenshot of Apache JMeter 5.6.2 showing a Summary Report for a test plan named "Shivani Varu Test Plan". The test plan contains 10 thread groups, each with 100000 HTTP requests. The summary report shows the following statistics:

Label	# Samples	Average	Min	Max	Std. Dev.	Error %	Throughput	Received KB/sec	Sent KB/sec	Avg. Bytes
HTTP Request	1000000	40	0	1694	58.41	0.00%	238.3/sec	442034.74	113.32	1899696.2
TOTAL	1000000	40	0	1694	58.41	0.00%	238.3/sec	442034.74	113.32	1899696.2

The desktop taskbar at the bottom shows various application icons and system status.



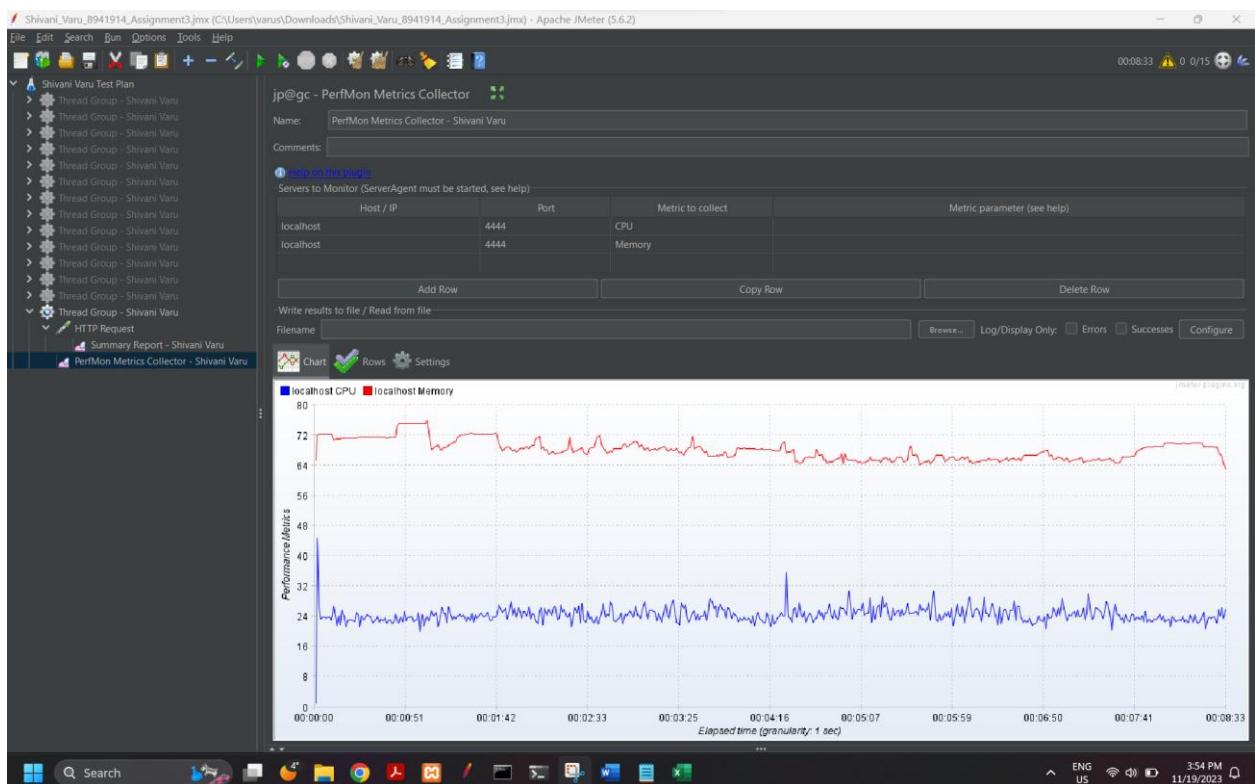
## G: Number of Users: 15

### I. Loop Count: 10000

Screenshot of JMeter 5.6.2 showing the Summary Report for a test plan named "Shivani Varu Test Plan". The test plan contains 15 thread groups, each with 10000 loops. The summary report shows the following statistics:

Label	# Samples	Average	Min	Max	Std. Dev.	Error %	Throughput	Received KB/sec	Sent KB/sec	Avg. Bytes
HTTP Request	150000	50	0	1036	68.44	0.00%	292.3/sec	542293.39	139.00	1899939.7
TOTAL	150000	50	0	1036	68.44	0.00%	292.3/sec	542293.39	139.00	1899939.7

The desktop taskbar at the bottom shows various application icons and the date/time: 11/19/2023, 3:54 PM.

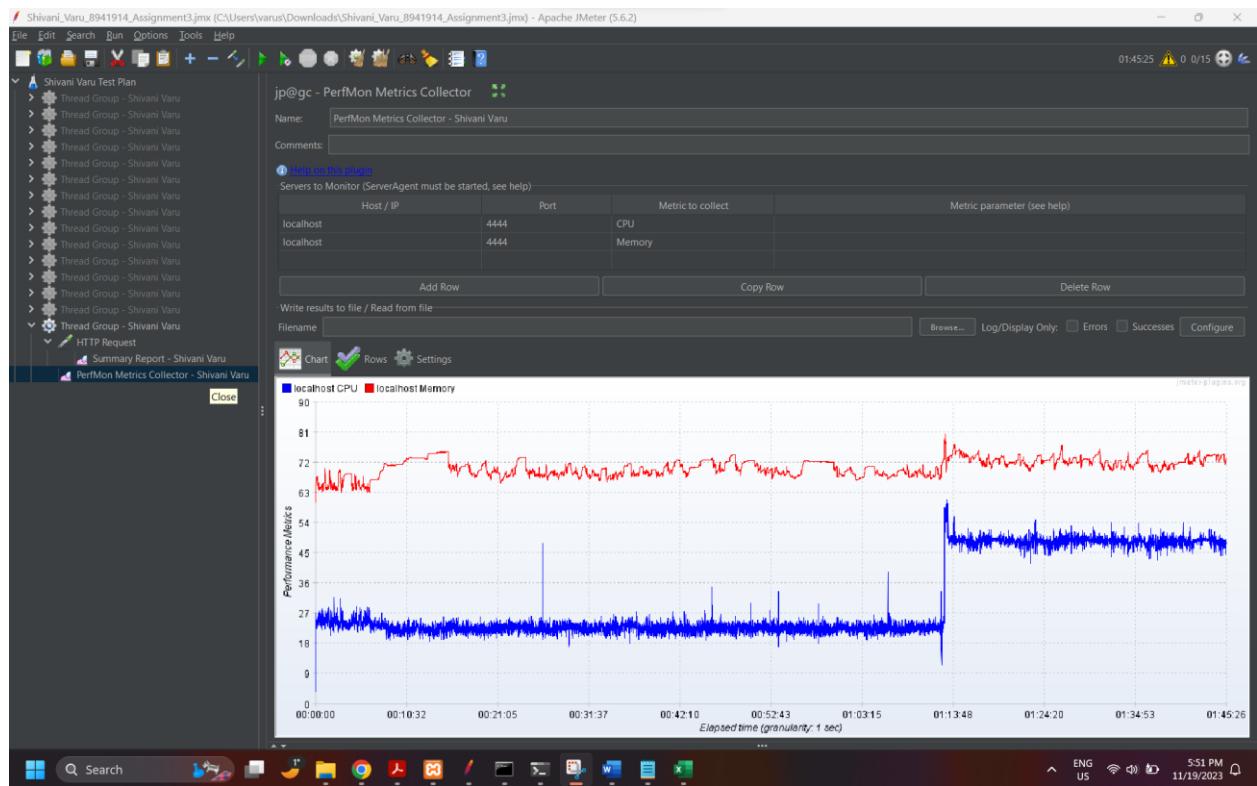


## II. Loop Count: 100000

Screenshot of Apache JMeter 5.6.2 showing the Summary Report for a test plan named "Shivani Varu Test Plan". The test plan contains 1500000 samples across multiple thread groups, all labeled "Shivani Varu". The summary report table shows the following data:

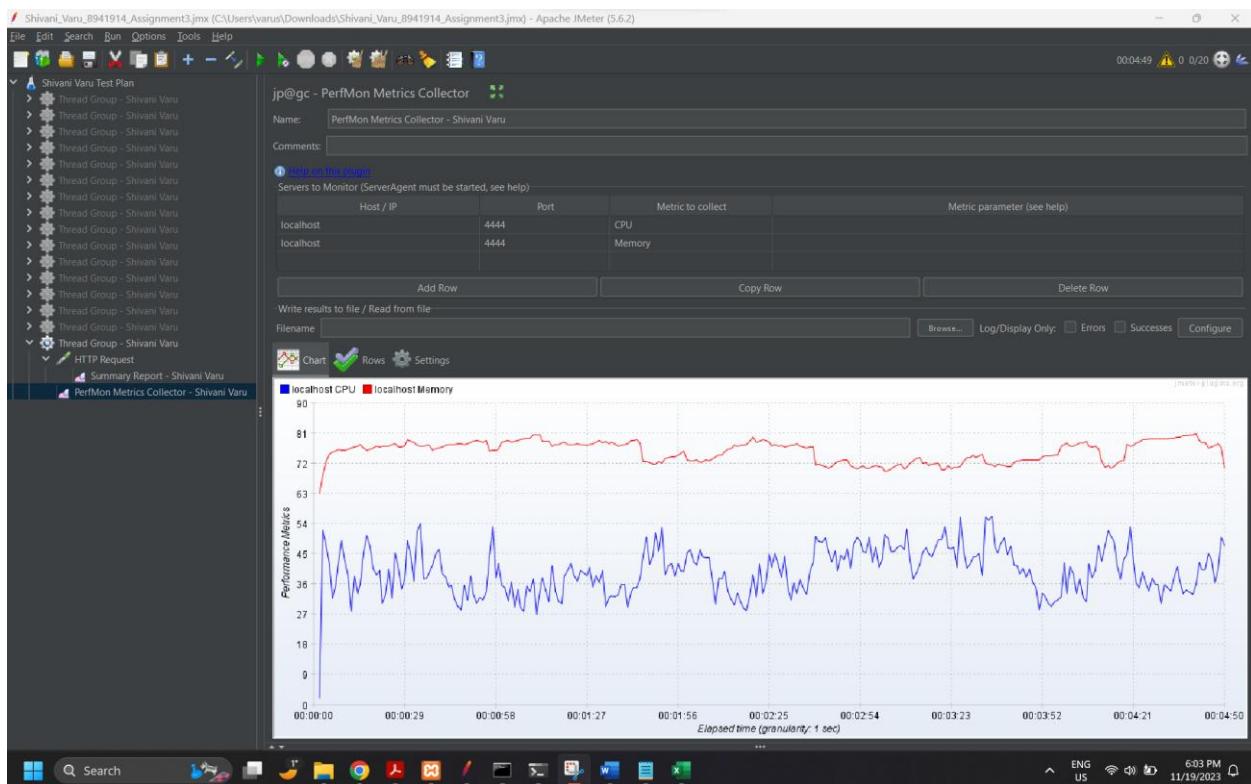
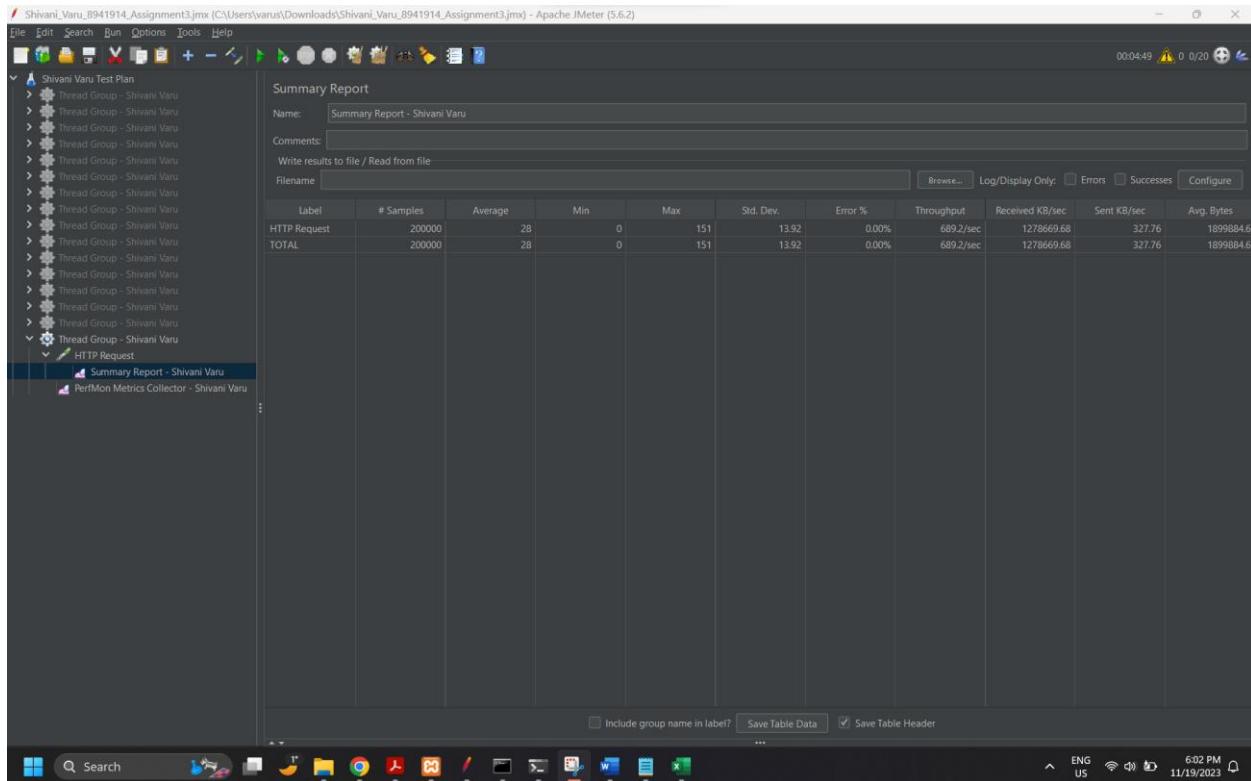
Label	# Samples	Average	Min	Max	Std. Dev.	Error %	Throughput	Received KB/sec	Sent KB/sec	Avg. Bytes
HTTP Request	1500000	60	0	3129	90.79	0.00%	237.1/sec	439875.13	112.78	1899494.5
TOTAL	1500000	60	0	3129	90.79	0.00%	237.1/sec	439875.13	112.78	1899494.5

The desktop taskbar at the bottom shows various application icons and system status.



## H: Number of Users: 20

### I. Loop Count: 10000

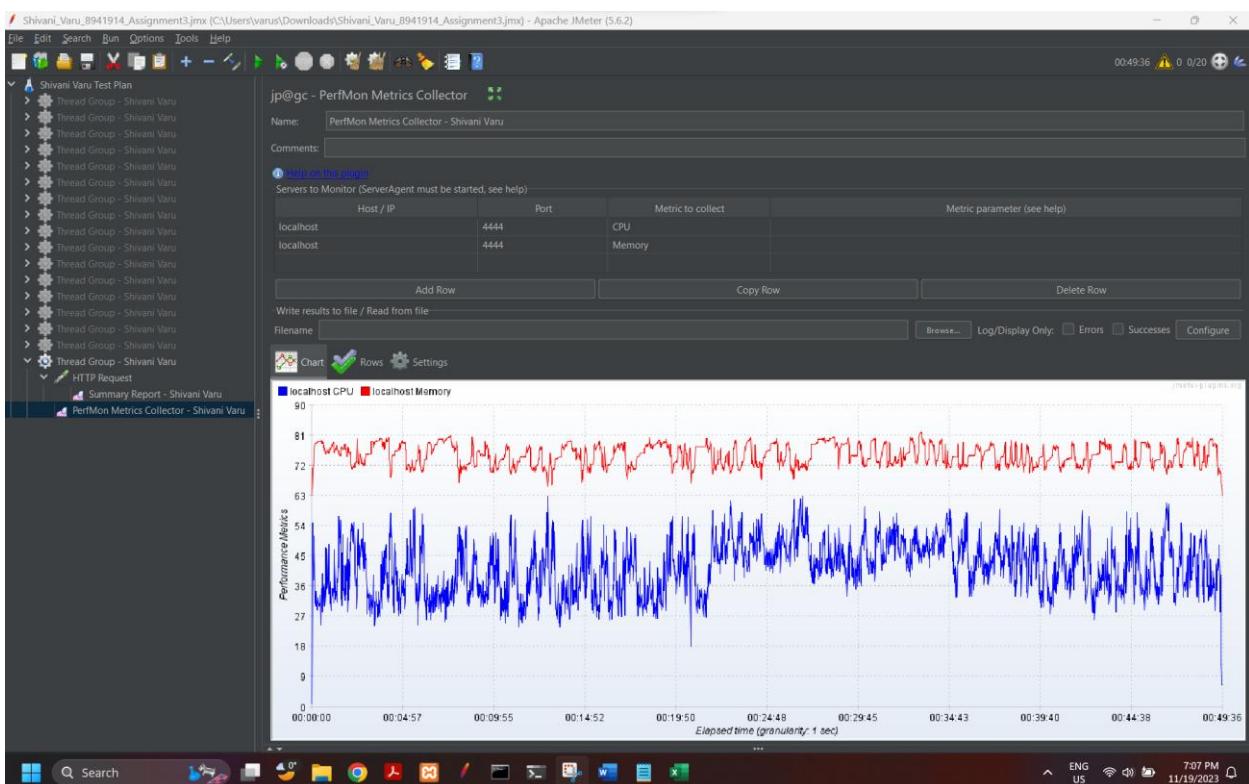


## II. Loop Count: 100000

Screenshot of JMeter 5.6.2 showing the Summary Report for a test plan named "Shivani Varu Test Plan". The test plan contains 2000000 HTTP Requests. The summary report table shows the following data:

Label	# Samples	Average	Min	Max	Std. Dev.	Error %	Throughput	Received KB/sec	Sent KB/sec	Avg. Bytes
HTTP Request	2000000	29	0	1431	15.68	0.00%	672.1/sec	1246926.94	319.63	1899864.3
TOTAL	2000000	29	0	1431	15.68	0.00%	672.1/sec	1246926.94	319.63	1899864.3

The desktop taskbar at the bottom shows various application icons and the system clock at 11:19 PM on 11/19/2023.



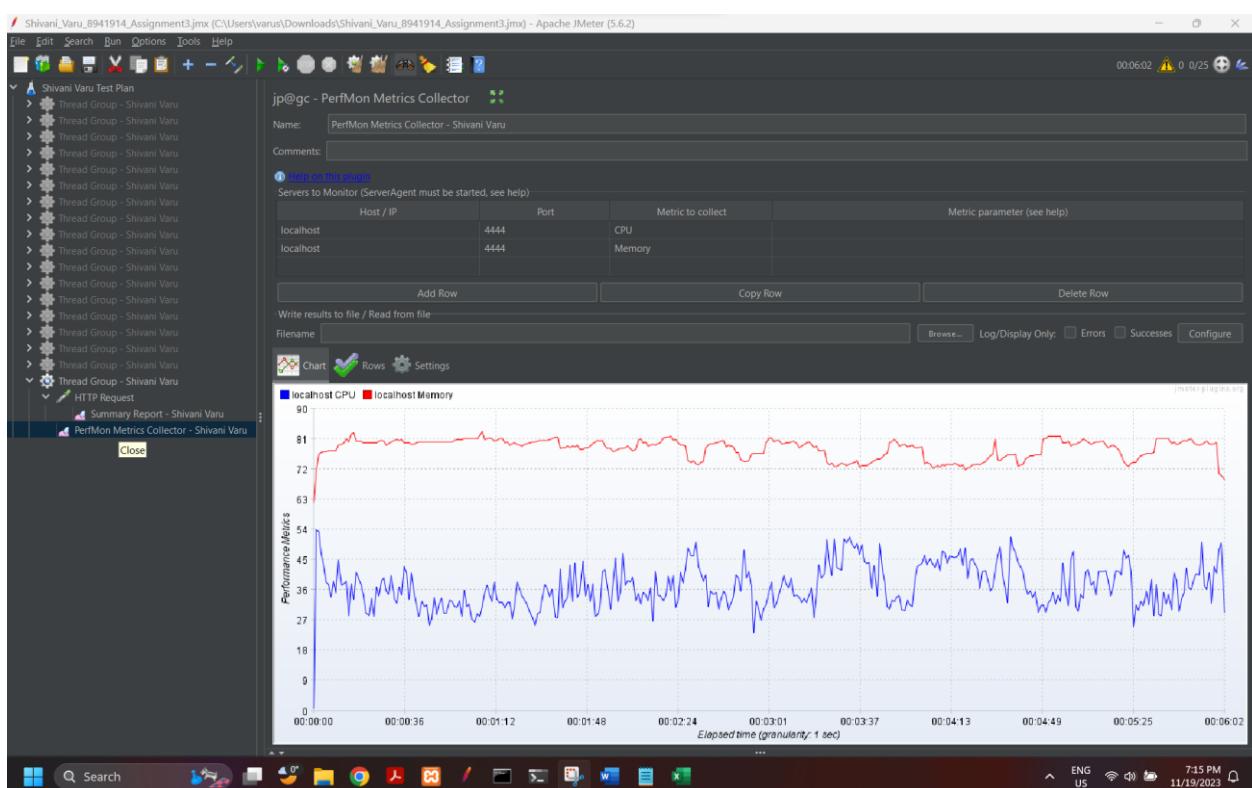
## I: Number of Users: 25

### I. Loop Count: 10000

The screenshot shows the Apache JMeter interface with a test plan titled "Shivani Varu Test Plan". The tree view on the left shows multiple thread groups under the main test plan. A summary report is displayed in the center, with the following details:

Label	# Samples	Average	Min	Max	Std. Dev.	Error %	Throughput	Received KB/sec	Sent KB/sec	Avg. Bytes
HTTP Request	250000	35	0	201	17.58	0.00%	689.6/sec	1279364.71	327.94	1899873.2
TOTAL	250000	35	0	201	17.58	0.00%	689.6/sec	1279364.71	327.94	1899873.2

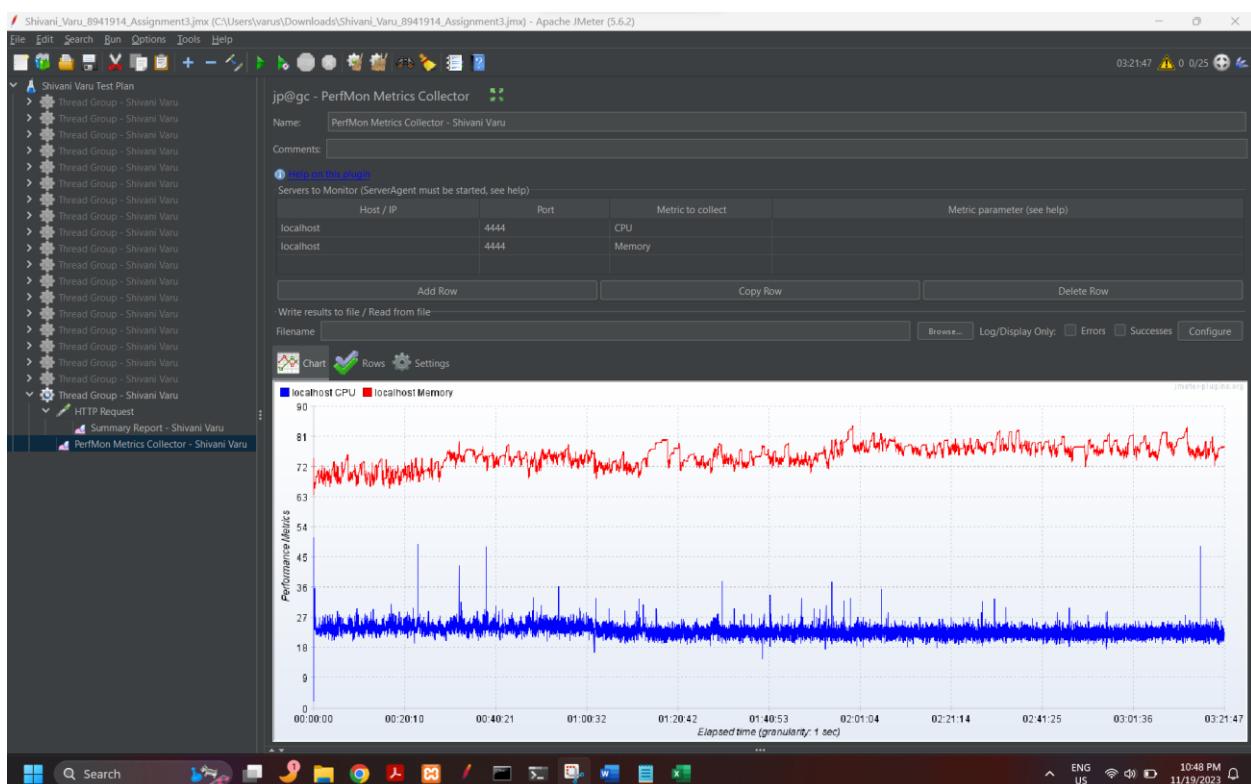
The status bar at the bottom indicates "00:06:02" and "0 0/25".



## II. Loop Count: 100000

Screenshot of Apache JMeter 5.6.2 showing the Summary Report for a test plan named "Shivani Varu Test Plan". The test plan contains 2500000 samples, with an average response time of 116 ms, a minimum of 0 ms, and a maximum of 3574 ms. The throughput is 206.5/sec, and the total time taken is 03:21:47. The summary report table includes columns for Label, # Samples, Average, Min, Max, Std. Dev., Error %, Throughput, Received KB/sec, Sent KB/sec, and Avg. Bytes.

Label	# Samples	Average	Min	Max	Std. Dev.	Error %	Throughput	Received KB/sec	Sent KB/sec	Avg. Bytes
HTTP Request	2500000	116	0	3574	158.18	0.00%	206.5/sec	383006.55	98.20	1899404.1
TOTAL	2500000	116	0	3574	158.18	0.00%	206.5/sec	383006.55	98.20	1899404.1



## J: Number of Users: 50

### I. Loop Count: 10000

Shivani Varu Test Plan

Summary Report

Name: Summary Report - Shivani Varu

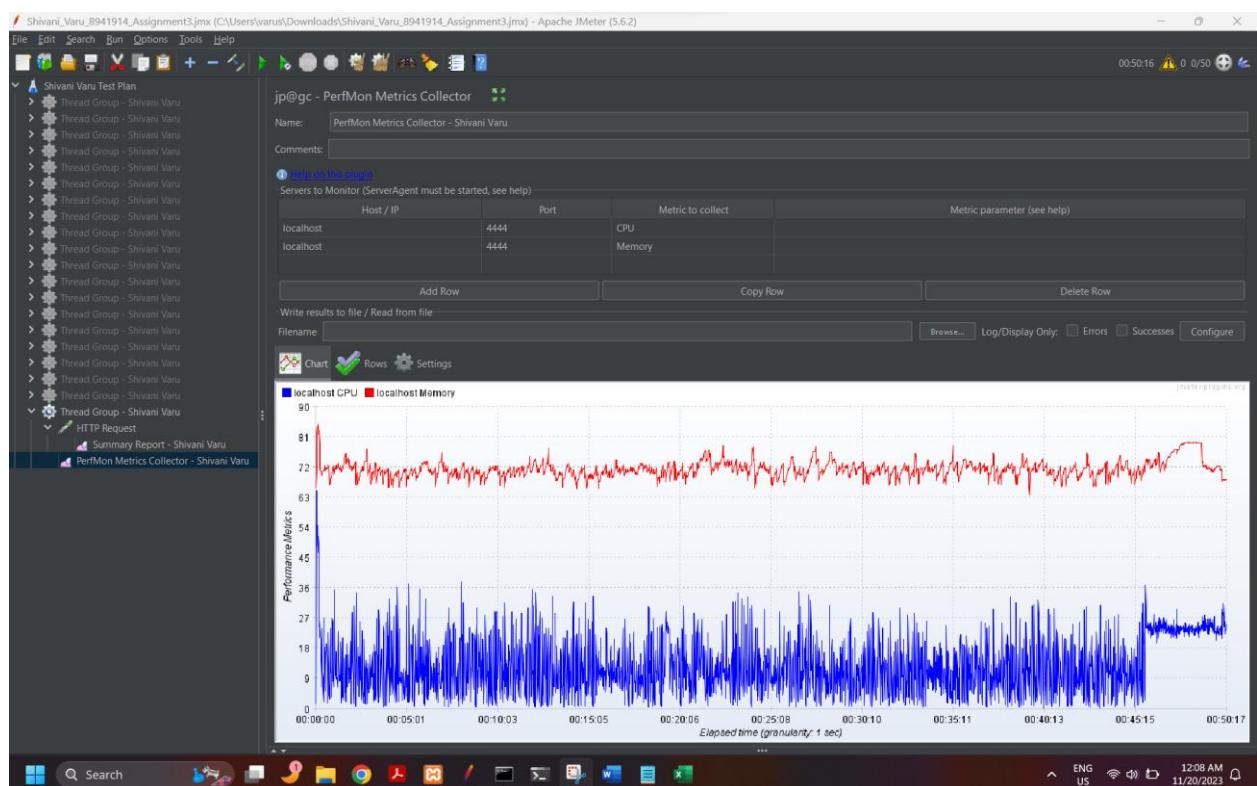
Comments:

Write results to file / Read from file

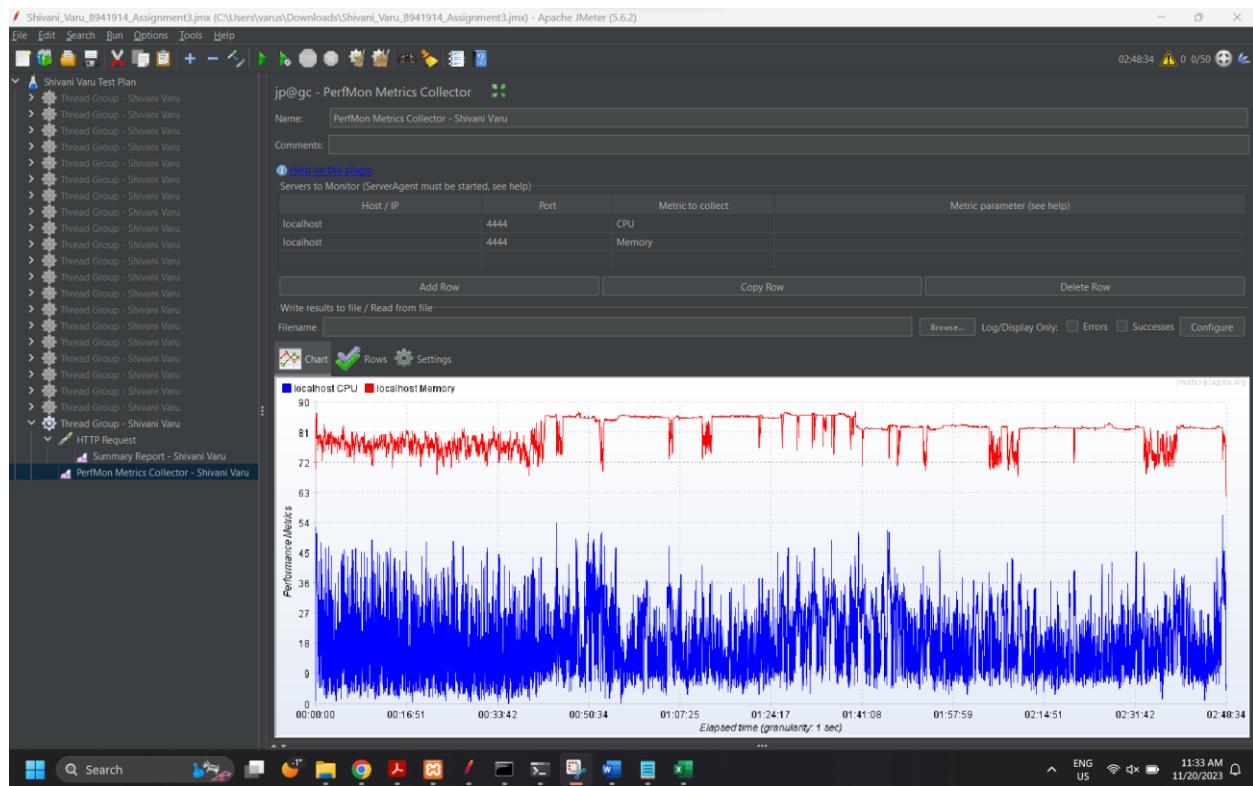
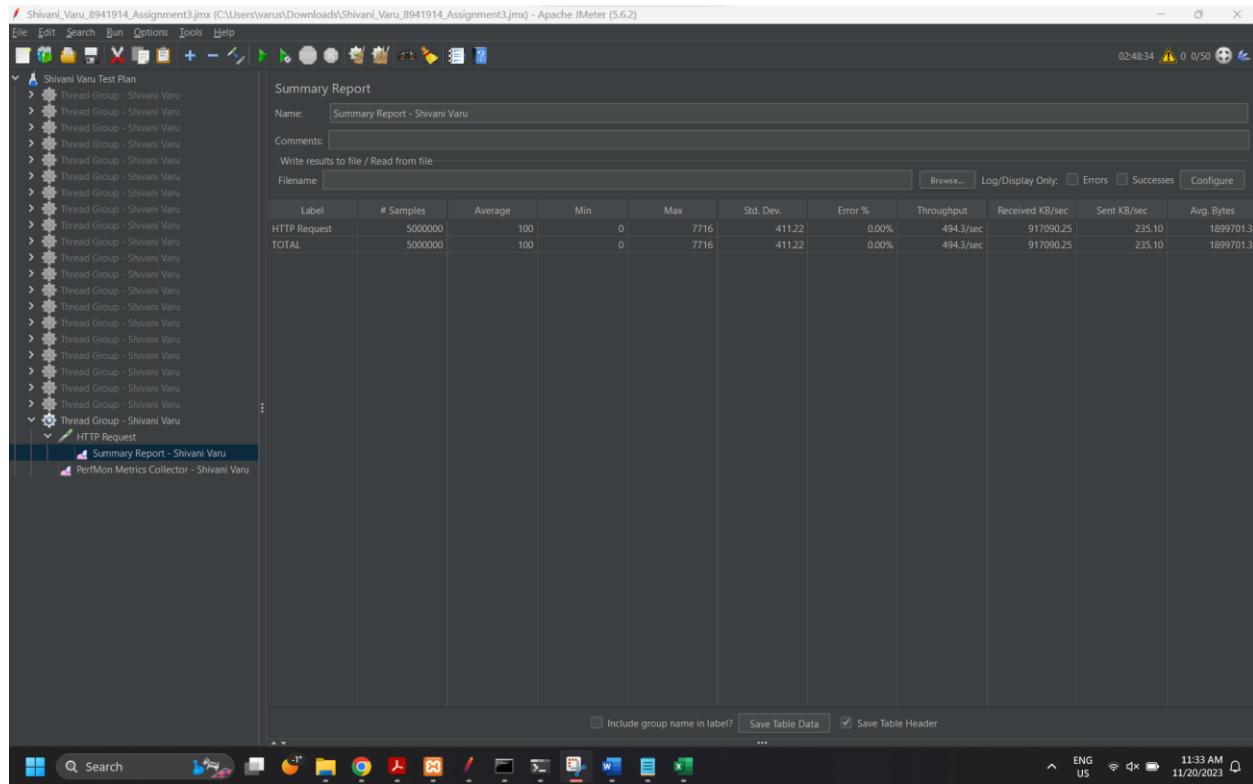
Filename:

Label	# Samples	Average	Min	Max	Std. Dev.	Error %	Throughput	Received KB/sec	Sent KB/sec	Avg. Bytes
HTTP Request	500000	292	0	12213	964.83	0.30%	165.7/sec	306636.68	78.75	1894491.5
TOTAL	500000	292	0	12213	964.83	0.30%	165.7/sec	306636.68	78.75	1894491.5

Include group name in label? Save Table Data Save Table Header



## II. Loop Count: 100000

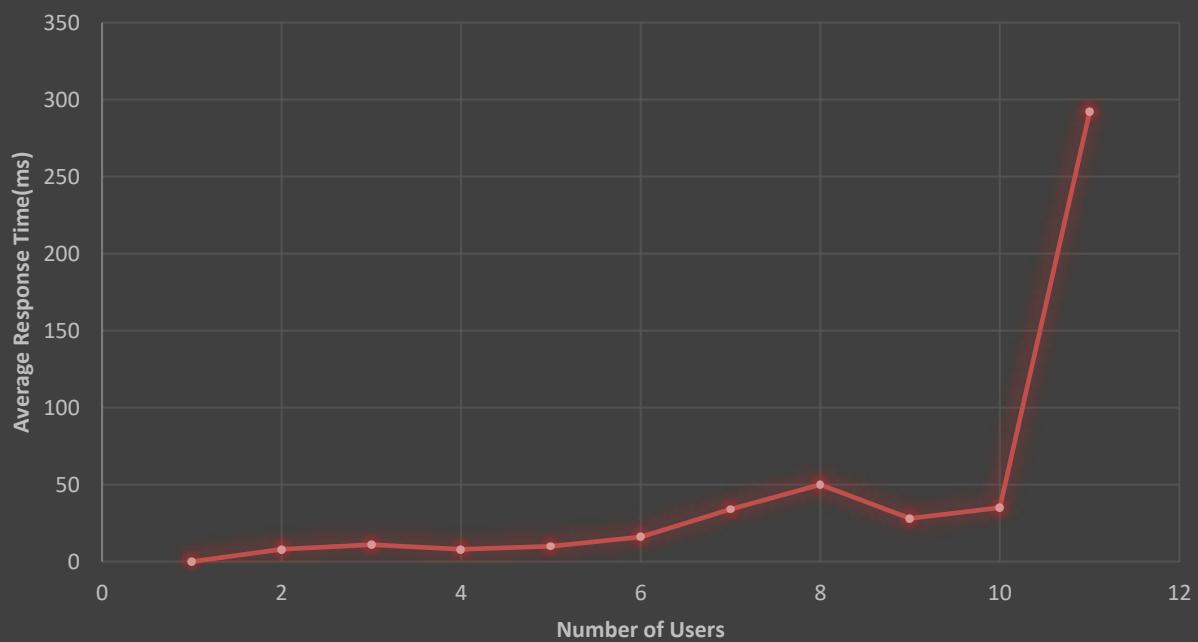


### **MS Excel Performing Chart ( For Loop Count:10000)**

Loop Count	10000
Number of Users	Average Response Time (ms)
1	8
2	11
3	8
4	10
5	16
10	34
15	50
20	28
25	35
50	292

### **Line Chart**

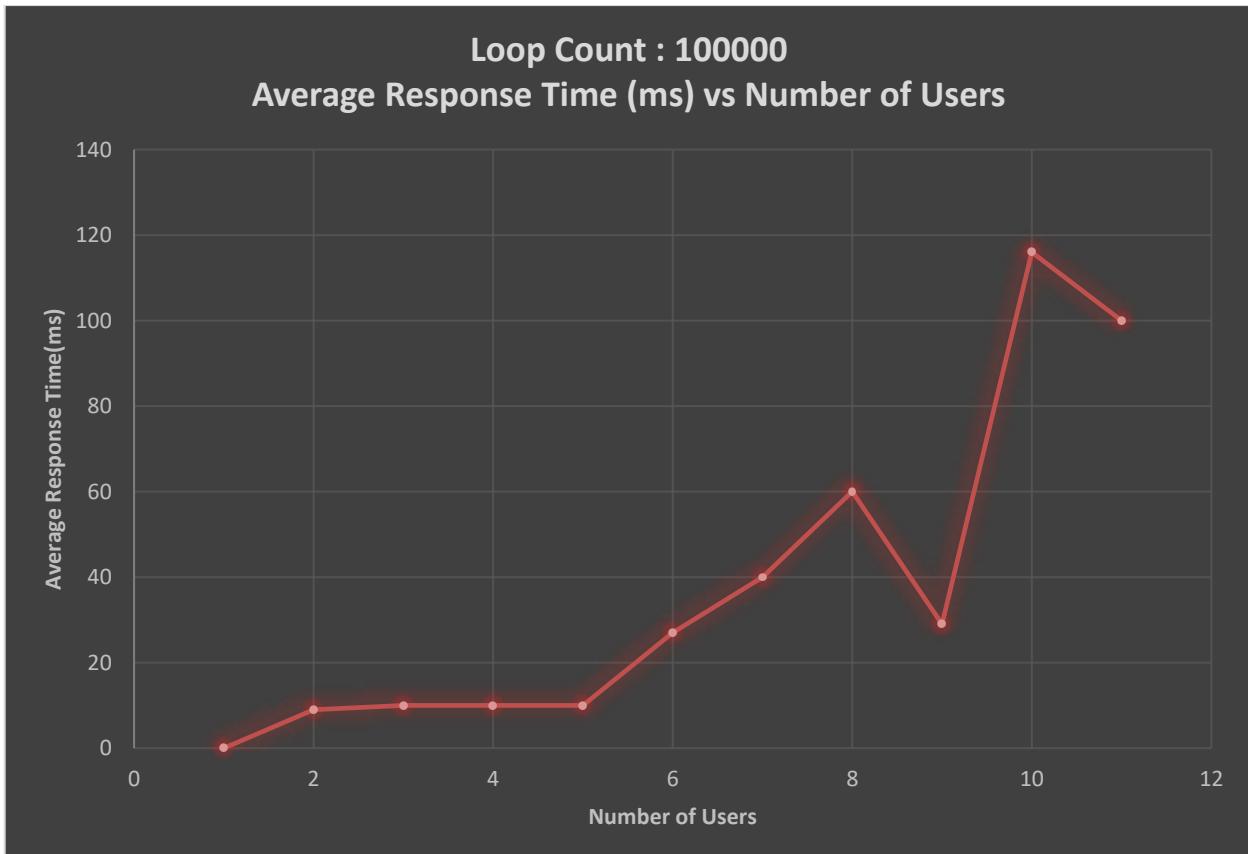
**Loop Count : 10000**  
**Average Response Time (ms) vs Number of Users**



### MS Excel Performing Chart ( For Loop Count:100000)

Loop Count	100000
Number of Users	Average Response Time (ms)
1	9
2	10
3	10
4	10
5	27
10	40
15	60
20	29
25	116
50	100

### Line Chart



## Explanation and conclusion

On executing the performance test by using Apache Jmeter for the HTML page <http://localhost/seng8030a03.html> with a particular set of data values reflecting a number of users and Sample likes, the Average Response Time(ms) and Throughput, I have received the summary report and a performance graph for every dataset. I have executed the following set of tests.

Number of Users	Iterations	Average	Throughput
1	10000	8	113.5/sec
1	100000	9	108.2/sec
1	1000000	7	123.3/sec
2	10000	11	178.1/sec
2	100000	10	194.1/sec
3	10000	8	333.2/sec
3	100000	10	273.4/sec
4	10000	10	386.3/sec
4	100000	10	380.7/sec
5	10000	16	282.7/sec
5	100000	27	169.2/sec
10	10000	34	285.0/sec
10	100000	40	238.3/sec
15	10000	50	292.3/sec
15	100000	60	237.1/sec
20	10000	28	689.2/sec
20	100000	29	672.1/sec
25	10000	35	689.6/sec
25	100000	116	206.5/sec
50	10000	292	165.7/sec
50	100000	100	494.3/sec

Based on the obtained results, throughput is inversely proportional to the average response time that is directly proportional to the number of users. While executing the performance tests, significant variations in numerical values were observed in both average response time and throughput metrics, ranging from a single user in the loop of 10,000 to 50 users in the

loop of 100,000. System Usage plots provide how stable the hardware and software are according to changes in the number of users and iterations. Here, it is crystal clear that the increased number of users and loop counts significantly affect average response time. However, suppose throughput is higher at any time due to the host computer's hardware support (good CPU and Memory usage below the exceeding criteria). In that case, it helps the increased average response time to settle down. For example, looking at the system usage plots for '20 users with loop counts of 10000 and 100000' and '25 users with loop counts of 10000', their system usage plots indicate higher CPU and Memory values. Therefore, their throughput is higher, so I get a lower average response time, even with higher numbers of users and iterations. From the plots, the memory usage remains consistently high across all test scenarios, while the CPU utilization displays variability depending on the specific dataset employed.

In Conclusion, the website's performance is based on factors such as average response time and throughput that depend on the host's computer specifications and network configurations, as well as the number of users and iterations. The good specifications of the host computer indicate a good amount of accessible throughput. However, it may include various other factors, such as network configurations, server capacity, and end-user behavior. The major bottleneck affecting the website can be the much higher CPU and memory usage of the host computer (exceedingly more than 90%). Such components like these, negatively impact the web page's response time and may cause problems when deployed in production.