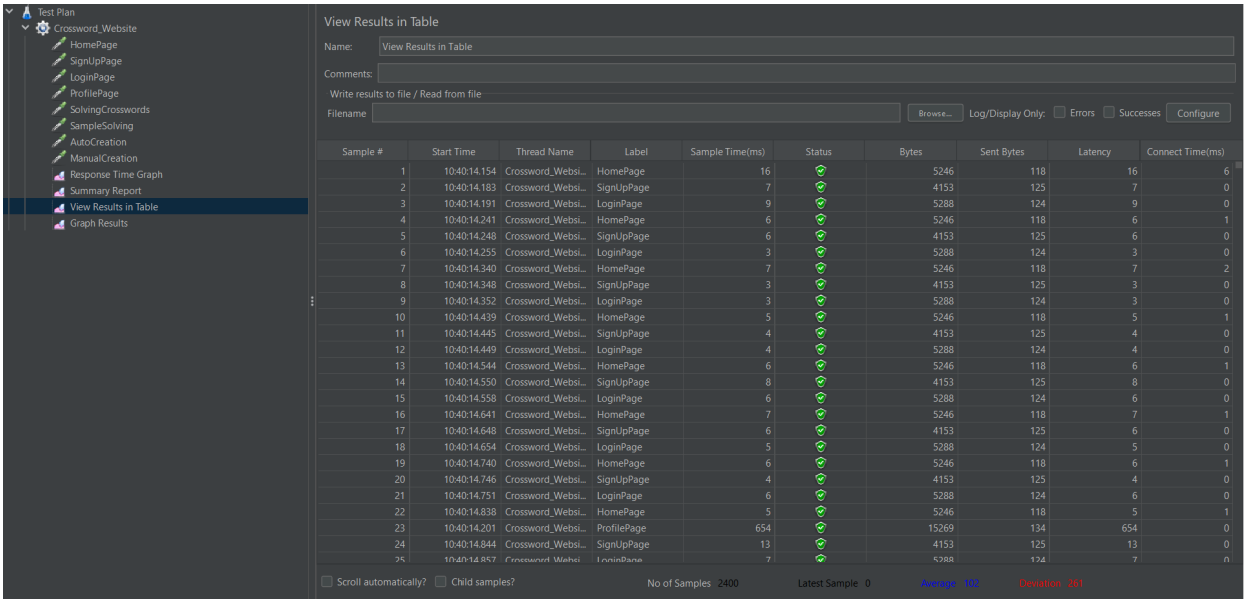
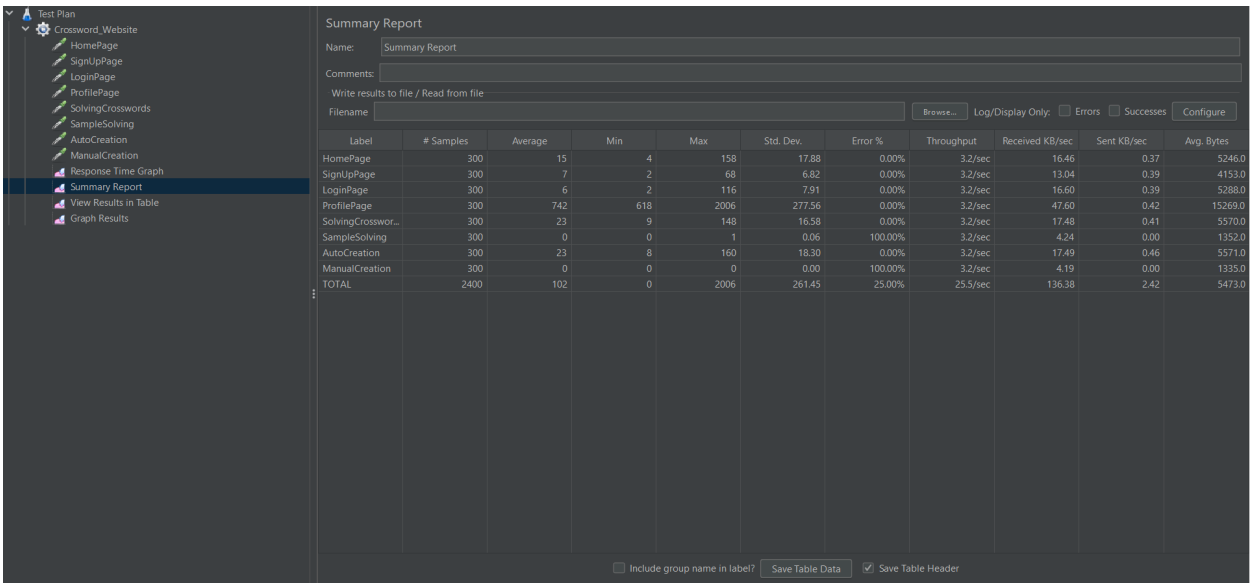
Non-functional testing:

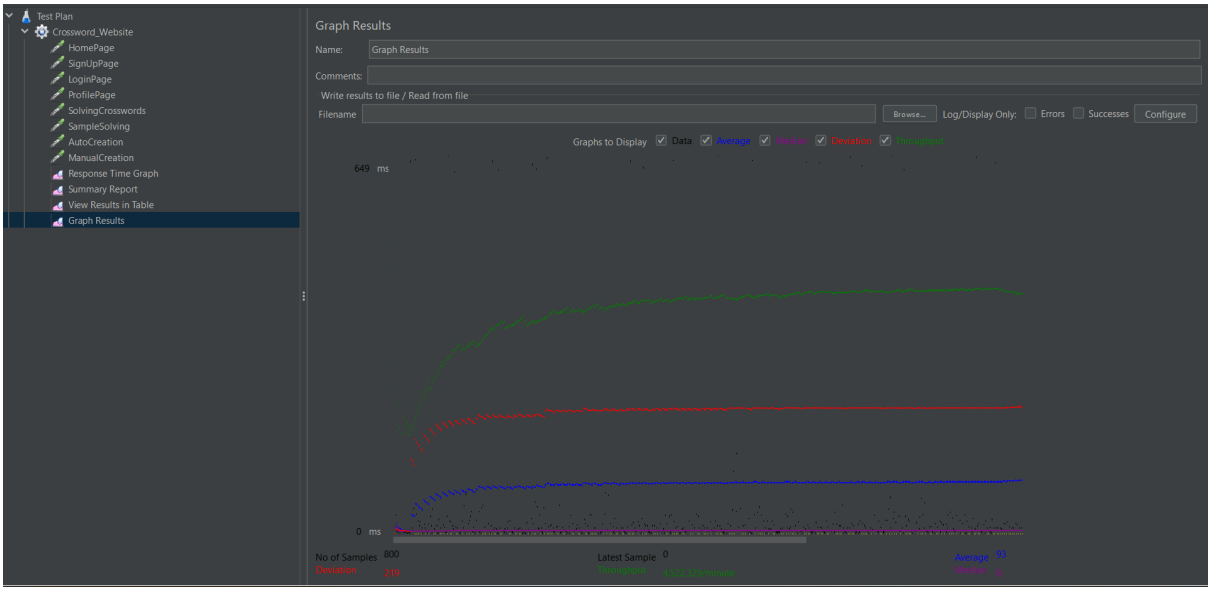
- ➢ **Load testing**
  - Testing a system or software programme to see if it can handle a large number of users or transactions is known as load testing.
  - Many tools, like Jmeter and Webload, can be used to perform load testing. In our case, load testing is being done using the Apache Jmeter tool.

- **Low traffic**

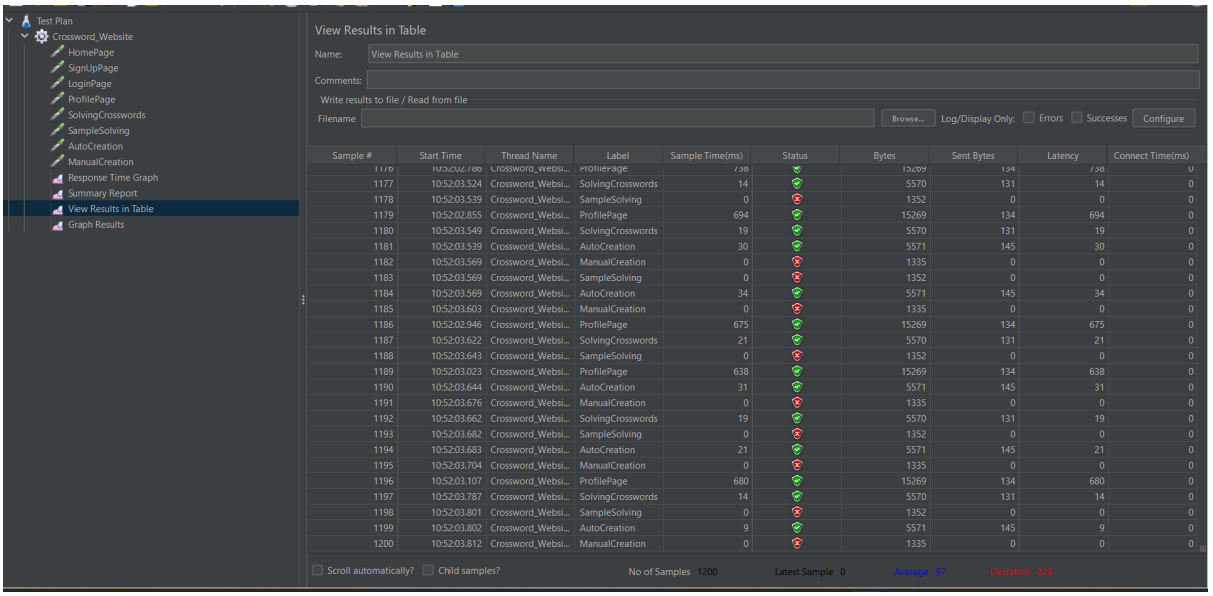
1. No. of users: 100
   Ramp-up period(seconds) : 10

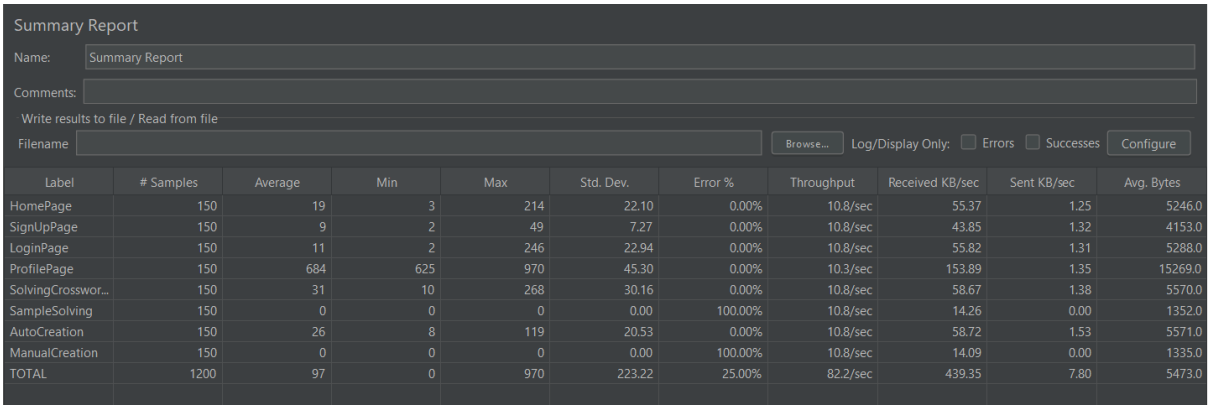




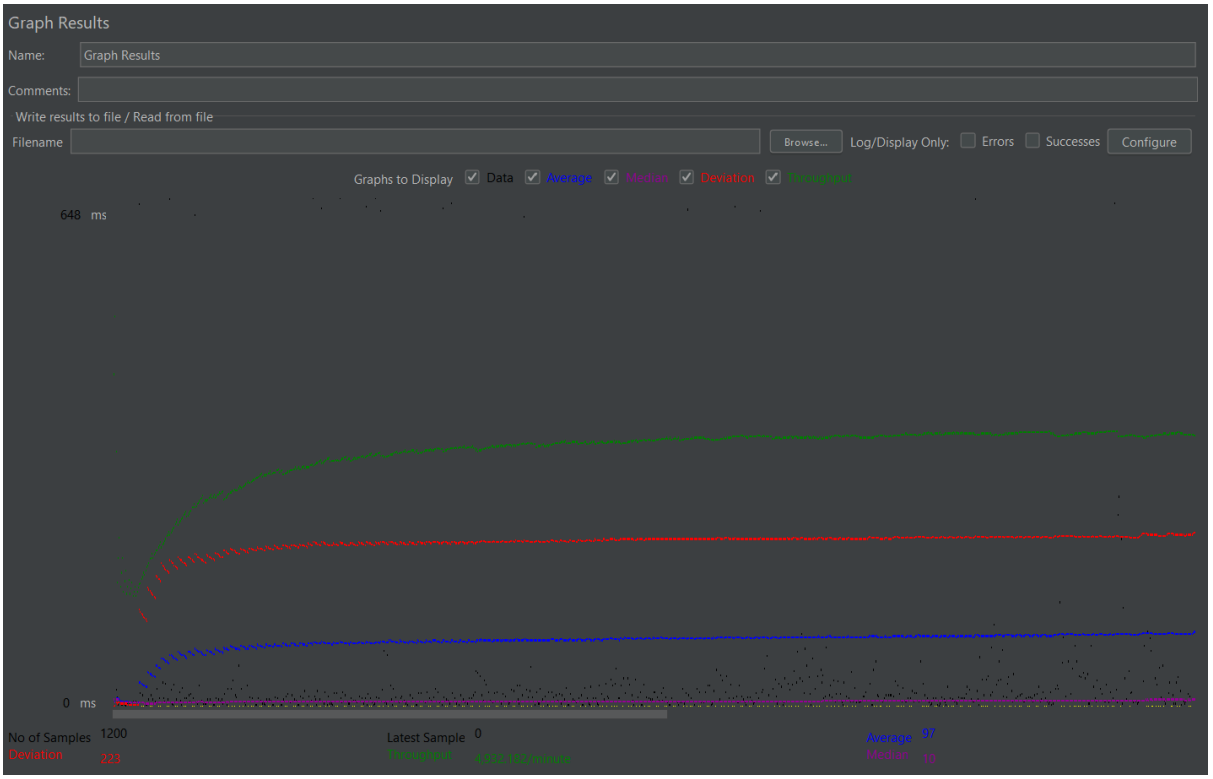


2. No. of users: 150
   Ramp-up period(seconds) : 14



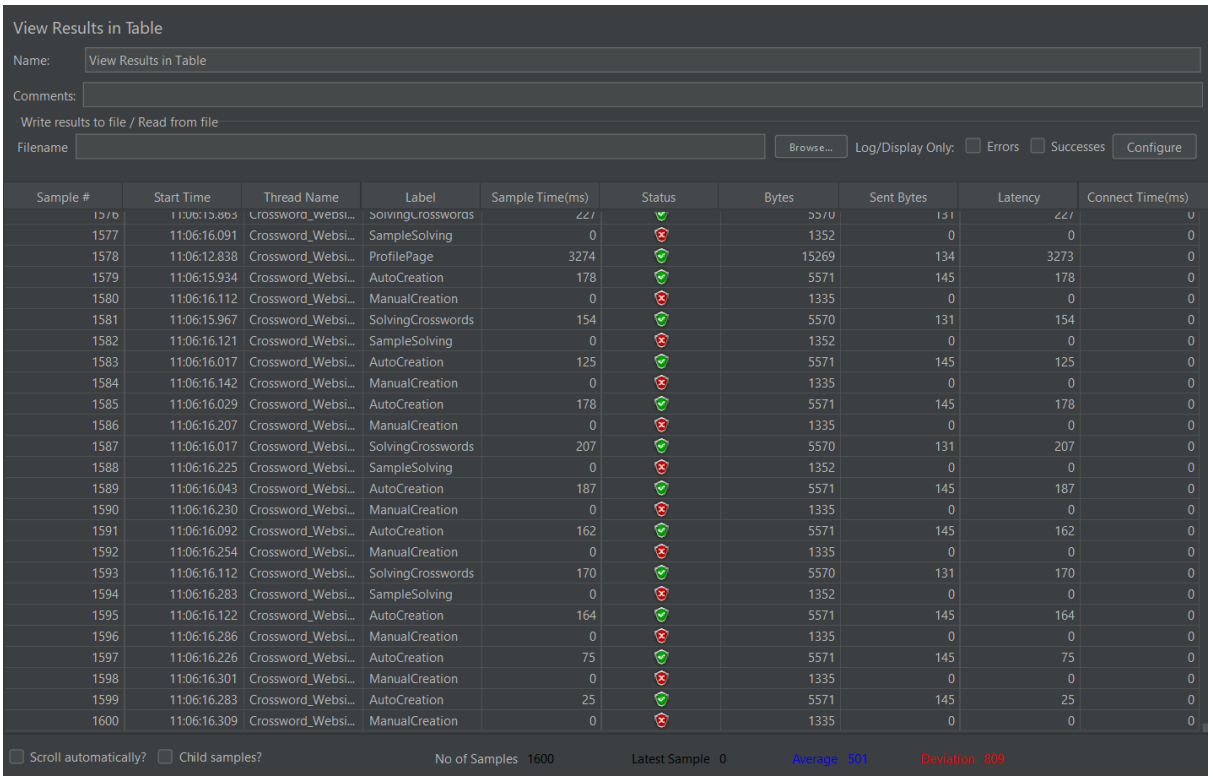


Label	# Samples	Average	Min	Max	Std. Dev.	Error %	Throughput	Received KB/sec	Sent KB/sec	Avg. Bytes
HomePage	150	19	3	214	22.10	0.00%	10.8/sec	55.37	1.25	5246.0
SignUpPage	150	9	2	49	7.27	0.00%	10.8/sec	43.85	1.32	4153.0
LoginPage	150	11	2	246	22.94	0.00%	10.8/sec	55.82	1.31	5288.0
ProfilePage	150	684	625	970	45.30	0.00%	10.3/sec	153.89	1.35	15269.0
SolvingCrosswor...	150	31	10	268	30.16	0.00%	10.8/sec	58.67	1.38	5570.0
SampleSolving	150	0	0	0	0.00	100.00%	10.8/sec	14.26	0.00	1352.0
AutoCreation	150	26	8	119	20.53	0.00%	10.8/sec	58.72	1.53	5571.0
ManualCreation	150	0	0	0	0.00	100.00%	10.8/sec	14.09	0.00	1335.0
TOTAL	1200	97	0	970	223.22	25.00%	82.2/sec	439.35	7.80	5473.0



- **Medium traffic**

3. No. of users: 200
   Ramp-up period(seconds) : 10



Sample #	Start Time	Thread Name	Label	Sample Time(ms)	Status	Bytes	Sent Bytes	Latency	Connect Time(ms)
1576	11:06:15.863	Crossword_Websi...	SolvingCrosswords	227		5570	131	227	0
1577	11:06:16.091	Crossword_Websi...	SampleSolving	0		1352	0	0	0
1578	11:06:12.838	Crossword_Websi...	ProfilePage	3274		15269	134	3273	0
1579	11:06:15.934	Crossword_Websi...	AutoCreation	178		5571	145	178	0
1580	11:06:16.112	Crossword_Websi...	ManualCreation	0		1335	0	0	0
1581	11:06:15.967	Crossword_Websi...	SolvingCrosswords	154		5570	131	154	0
1582	11:06:16.121	Crossword_Websi...	SampleSolving	0		1352	0	0	0
1583	11:06:16.017	Crossword_Websi...	AutoCreation	125		5571	145	125	0
1584	11:06:16.142	Crossword_Websi...	ManualCreation	0		1335	0	0	0
1585	11:06:16.029	Crossword_Websi...	AutoCreation	178		5571	145	178	0
1586	11:06:16.207	Crossword_Websi...	ManualCreation	0		1335	0	0	0
1587	11:06:16.017	Crossword_Websi...	SolvingCrosswords	207		5570	131	207	0
1588	11:06:16.225	Crossword_Websi...	SampleSolving	0		1352	0	0	0
1589	11:06:16.043	Crossword_Websi...	AutoCreation	187		5571	145	187	0
1590	11:06:16.230	Crossword_Websi...	ManualCreation	0		1335	0	0	0
1591	11:06:16.092	Crossword_Websi...	AutoCreation	162		5571	145	162	0
1592	11:06:16.254	Crossword_Websi...	ManualCreation	0		1335	0	0	0
1593	11:06:16.112	Crossword_Websi...	SolvingCrosswords	170		5570	131	170	0
1594	11:06:16.283	Crossword_Websi...	SampleSolving	0		1352	0	0	0
1595	11:06:16.122	Crossword_Websi...	AutoCreation	164		5571	145	164	0
1596	11:06:16.286	Crossword_Websi...	ManualCreation	0		1335	0	0	0
1597	11:06:16.226	Crossword_Websi...	AutoCreation	75		5571	145	75	0
1598	11:06:16.301	Crossword_Websi...	ManualCreation	0		1335	0	0	0
1599	11:06:16.283	Crossword_Websi...	AutoCreation	25		5571	145	25	0
1600	11:06:16.309	Crossword_Websi...	ManualCreation	0		1335	0	0	0

Summary Report

Name: Summary Report

Comments:

Write results to file / Read from file

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

Label	# Samples	Average	Min	Max	Std. Dev.	Error %	Throughput	Received KB/sec	Sent KB/sec	Avg. Bytes
HomePage	200	526	5	2167	506.65	0.00%	17.4/sec	89.30	2.01	5246.0
SignUpPage	200	88	3	455	108.26	0.00%	17.3/sec	70.22	2.11	4153.0
LoginPage	200	90	3	455	112.40	0.00%	17.3/sec	89.13	2.09	5288.0
ProfilePage	200	2285	764	4078	855.81	0.00%	14.6/sec	217.41	1.91	15269.0
SolvingCrosswor...	200	519	49	1749	312.57	0.00%	15.3/sec	83.05	1.95	5570.0
SampleSolving	200	0	0	0	0.00	100.00%	15.3/sec	20.23	0.00	1352.0
AutoCreation	200	499	25	1470	316.87	0.00%	15.3/sec	83.22	2.17	5571.0
ManualCreation	200	0	0	0	0.00	100.00%	15.4/sec	20.10	0.00	1335.0
TOTAL	1600	501	0	4078	809.15	25.00%	114.5/sec	611.96	10.86	5473.0

Graph Results

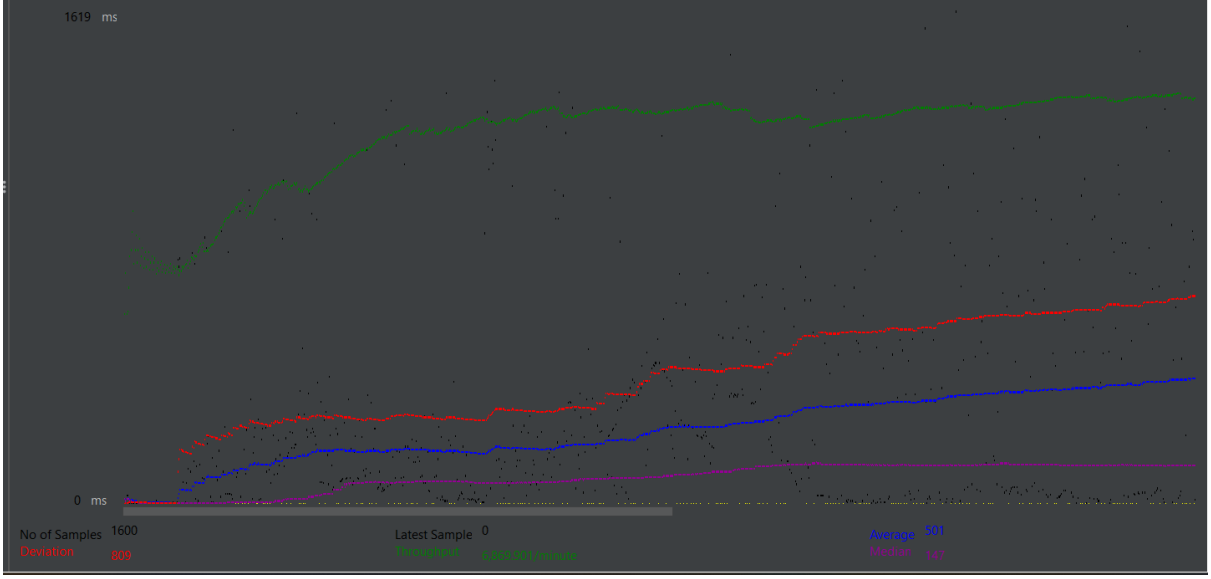
Name: Graph Results

Comments:

Write results to file / Read from file

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

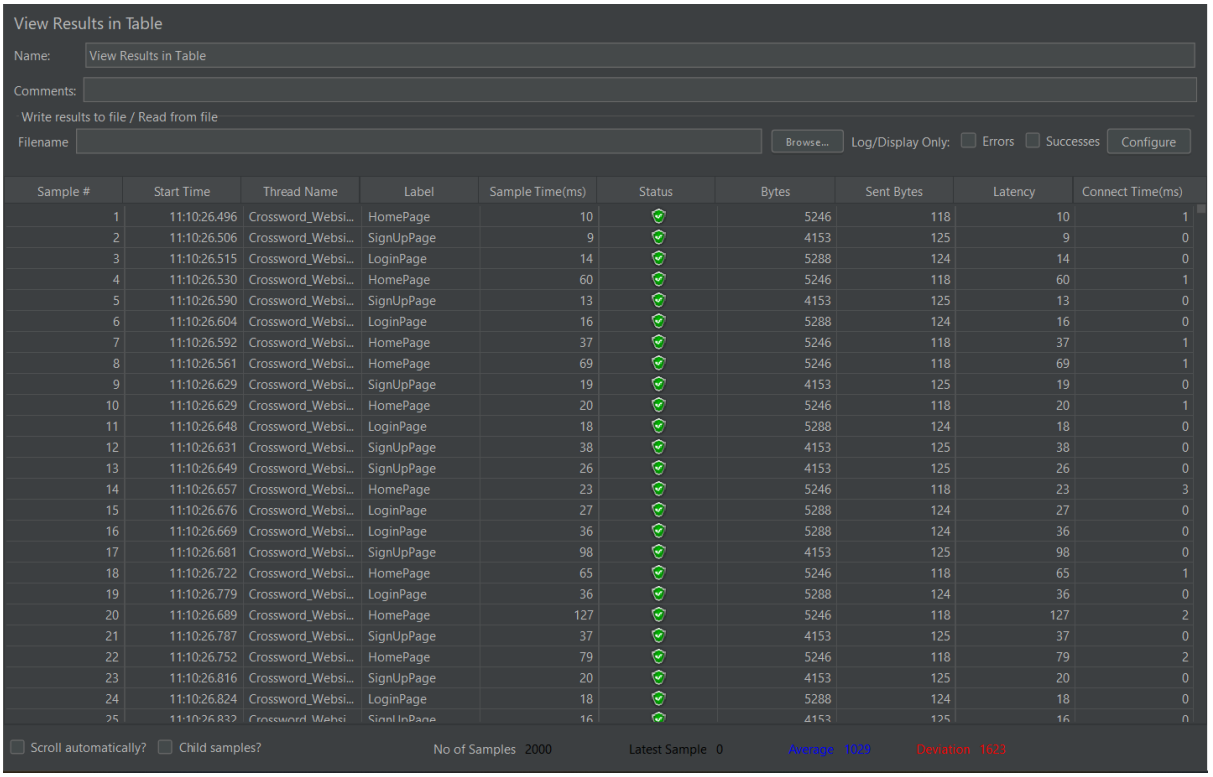
Graphs to Display Data Average Median Deviation Throughput



No of Samples 1600 Latest Sample 0 Average 501

Deviation 809 Throughput 6.869.901/minute Median 147

4. No. of users: 250
   Ramp-up period(seconds) : 8



View Results in Table

Name: View Results in Table

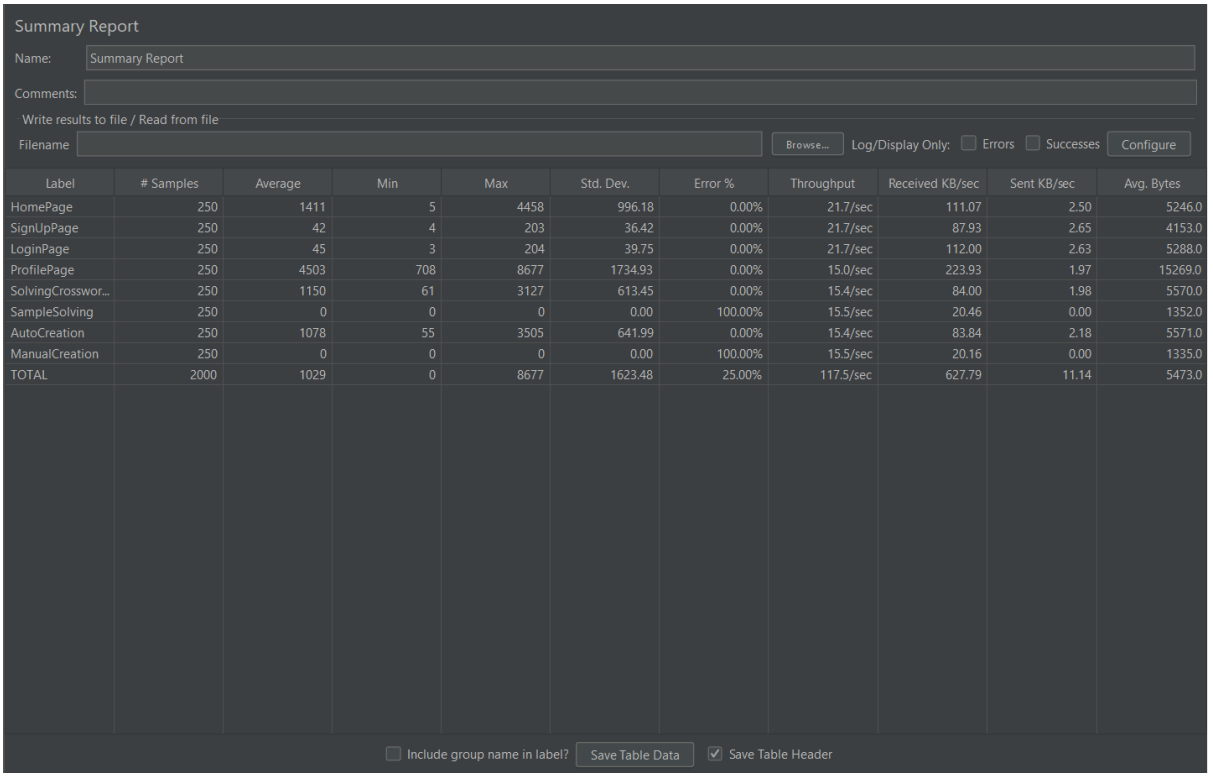
Comments:

Write results to file / Read from file

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

Sample #	Start Time	Thread Name	Label	Sample Time(ms)	Status	Bytes	Sent Bytes	Latency	Connect Time(ms)
1	11:10:26.496	Crossword_Websi...	HomePage	10		5246	118	10	1
2	11:10:26.506	Crossword_Websi...	SignUpPage	9		4153	125	9	0
3	11:10:26.515	Crossword_Websi...	LoginPage	14		5288	124	14	0
4	11:10:26.530	Crossword_Websi...	HomePage	60		5246	118	60	1
5	11:10:26.590	Crossword_Websi...	SignUpPage	13		4153	125	13	0
6	11:10:26.604	Crossword_Websi...	LoginPage	16		5288	124	16	0
7	11:10:26.592	Crossword_Websi...	HomePage	37		5246	118	37	1
8	11:10:26.561	Crossword_Websi...	HomePage	69		5246	118	69	1
9	11:10:26.629	Crossword_Websi...	SignUpPage	19		4153	125	19	0
10	11:10:26.629	Crossword_Websi...	HomePage	20		5246	118	20	1
11	11:10:26.648	Crossword_Websi...	LoginPage	18		5288	124	18	0
12	11:10:26.631	Crossword_Websi...	SignUpPage	38		4153	125	38	0
13	11:10:26.649	Crossword_Websi...	SignUpPage	26		4153	125	26	0
14	11:10:26.657	Crossword_Websi...	HomePage	23		5246	118	23	3
15	11:10:26.676	Crossword_Websi...	LoginPage	27		5288	124	27	0
16	11:10:26.669	Crossword_Websi...	LoginPage	36		5288	124	36	0
17	11:10:26.681	Crossword_Websi...	SignUpPage	98		4153	125	98	0
18	11:10:26.722	Crossword_Websi...	HomePage	65		5246	118	65	1
19	11:10:26.779	Crossword_Websi...	LoginPage	36		5288	124	36	0
20	11:10:26.689	Crossword_Websi...	HomePage	127		5246	118	127	2
21	11:10:26.787	Crossword_Websi...	SignUpPage	37		4153	125	37	0
22	11:10:26.752	Crossword_Websi...	HomePage	79		5246	118	79	2
23	11:10:26.816	Crossword_Websi...	SignUpPage	20		4153	125	20	0
24	11:10:26.824	Crossword_Websi...	LoginPage	18		5288	124	18	0
25	11:10:26.832	Crossword_Websi...	SignUpPage	16		4153	125	16	0

Scroll automatically? Child samples? No of Samples 2000 Latest Sample 0 Average 1029 Deviation 1623



Summary Report

Name: Summary Report

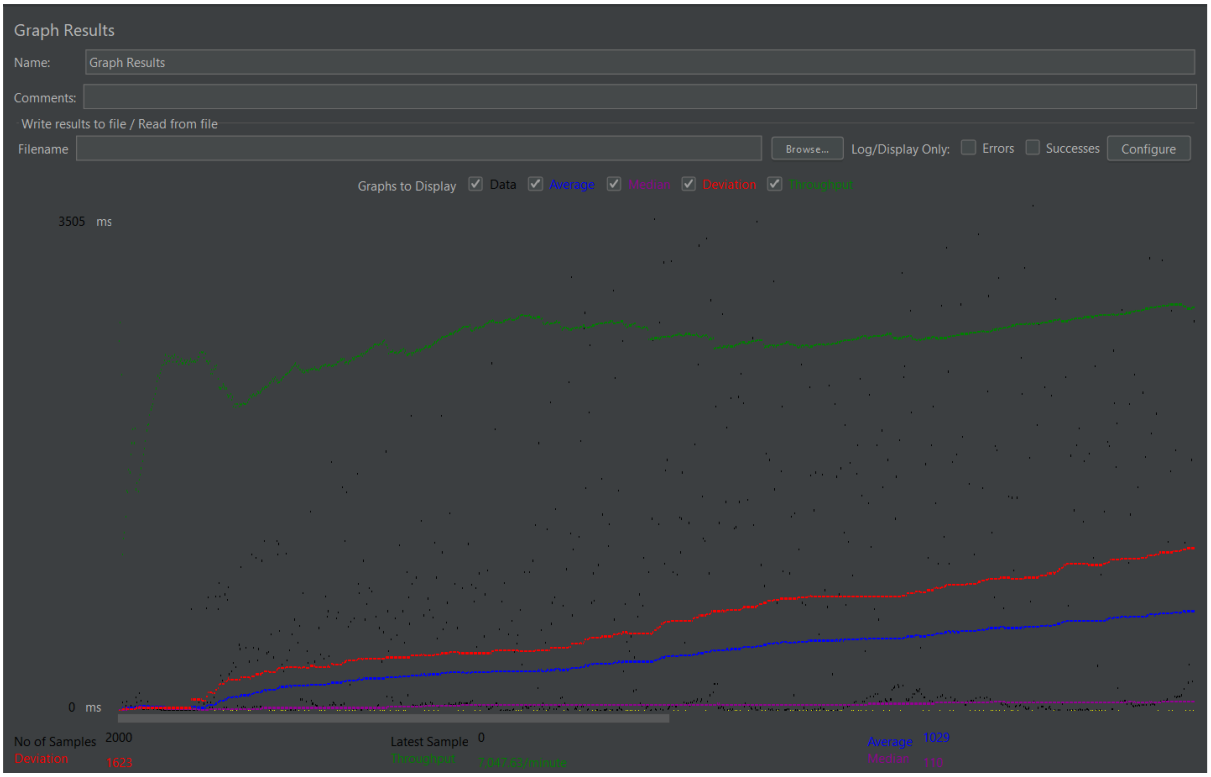
Comments:

Write results to file / Read from file

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

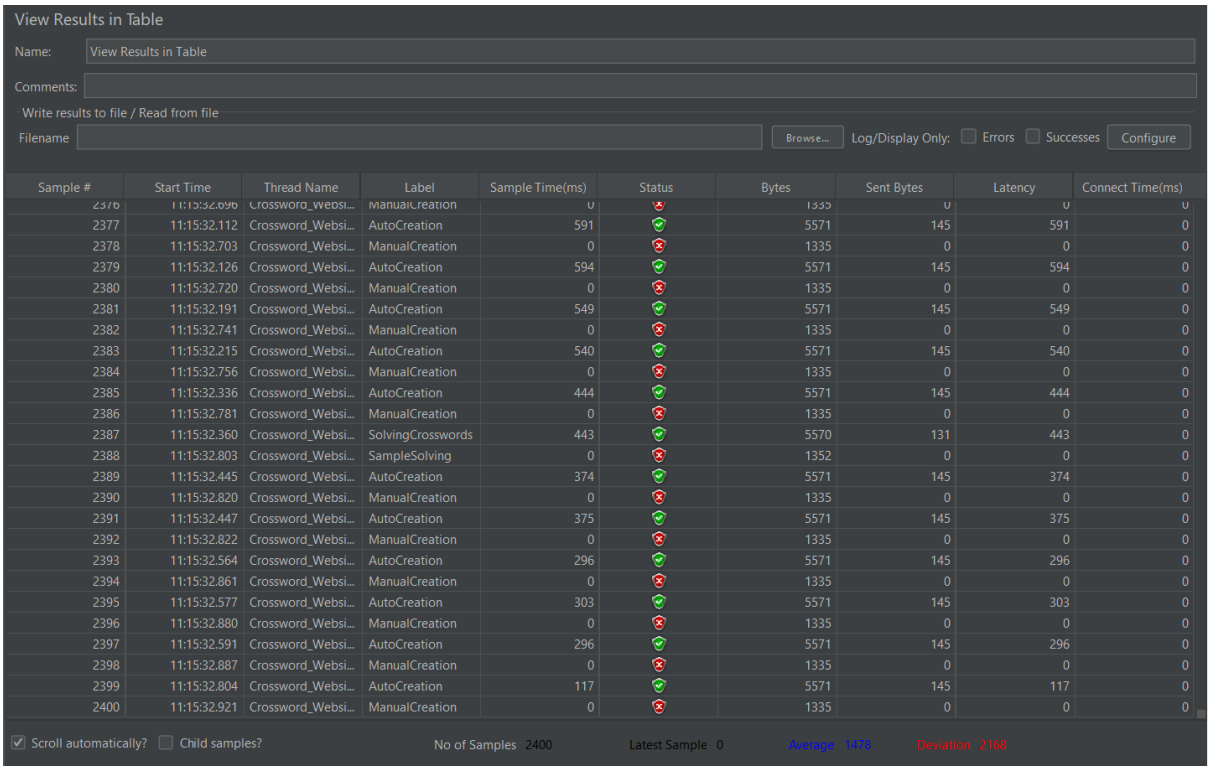
Label	# Samples	Average	Min	Max	Std. Dev.	Error %	Throughput	Received KB/sec	Sent KB/sec	Avg. Bytes
HomePage	250	1411	5	4458	996.18	0.00%	21.7/sec	111.07	2.50	5246.0
SignUpPage	250	42	4	203	36.42	0.00%	21.7/sec	87.93	2.65	4153.0
LoginPage	250	45	3	204	39.75	0.00%	21.7/sec	112.00	2.63	5288.0
ProfilePage	250	4503	708	8677	1734.93	0.00%	15.0/sec	223.93	1.97	15269.0
SolvingCrosswor...	250	1150	61	3127	613.45	0.00%	15.4/sec	84.00	1.98	5570.0
SampleSolving	250	0	0	0	0.00	100.00%	15.5/sec	20.46	0.00	1352.0
AutoCreation	250	1078	55	3505	641.99	0.00%	15.4/sec	83.84	2.18	5571.0
ManualCreation	250	0	0	0	0.00	100.00%	15.5/sec	20.16	0.00	1335.0
TOTAL	2000	1029	0	8677	1623.48	25.00%	117.5/sec	627.79	11.14	5473.0

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



- **High traffic**

5. No. of users: 300
   Ramp-up period(seconds) : 5



Sample #	Start Time	Thread Name	Label	Sample Time(ms)	Status	Bytes	Sent Bytes	Latency	Connect Time(ms)
2376	11:15:32.696	Crossword_Websi...	ManualCreation	0		1335	0	0	0
2377	11:15:32.112	Crossword_Websi...	AutoCreation	591		5571	145	591	0
2378	11:15:32.703	Crossword_Websi...	ManualCreation	0		1335	0	0	0
2379	11:15:32.126	Crossword_Websi...	AutoCreation	594		5571	145	594	0
2380	11:15:32.720	Crossword_Websi...	ManualCreation	0		1335	0	0	0
2381	11:15:32.191	Crossword_Websi...	AutoCreation	549		5571	145	549	0
2382	11:15:32.741	Crossword_Websi...	ManualCreation	0		1335	0	0	0
2383	11:15:32.215	Crossword_Websi...	AutoCreation	540		5571	145	540	0
2384	11:15:32.756	Crossword_Websi...	ManualCreation	0		1335	0	0	0
2385	11:15:32.336	Crossword_Websi...	AutoCreation	444		5571	145	444	0
2386	11:15:32.781	Crossword_Websi...	ManualCreation	0		1335	0	0	0
2387	11:15:32.360	Crossword_Websi...	SolvingCrosswords	443		5570	131	443	0
2388	11:15:32.803	Crossword_Websi...	SampleSolving	0		1352	0	0	0
2389	11:15:32.445	Crossword_Websi...	AutoCreation	374		5571	145	374	0
2390	11:15:32.820	Crossword_Websi...	ManualCreation	0		1335	0	0	0
2391	11:15:32.447	Crossword_Websi...	AutoCreation	375		5571	145	375	0
2392	11:15:32.822	Crossword_Websi...	ManualCreation	0		1335	0	0	0
2393	11:15:32.564	Crossword_Websi...	AutoCreation	296		5571	145	296	0
2394	11:15:32.861	Crossword_Websi...	ManualCreation	0		1335	0	0	0
2395	11:15:32.577	Crossword_Websi...	AutoCreation	303		5571	145	303	0
2396	11:15:32.880	Crossword_Websi...	ManualCreation	0		1335	0	0	0
2397	11:15:32.591	Crossword_Websi...	AutoCreation	296		5571	145	296	0
2398	11:15:32.887	Crossword_Websi...	ManualCreation	0		1335	0	0	0
2399	11:15:32.804	Crossword_Websi...	AutoCreation	117		5571	145	117	0
2400	11:15:32.921	Crossword_Websi...	ManualCreation	0		1335	0	0	0

Summary Report

Name: Summary Report

Comments:

Write results to file / Read from file

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

Label	# Samples	Average	Min	Max	Std. Dev.	Error %	Throughput	Received KB/sec	Sent KB/sec	Avg. Bytes
HomePage	300	2218	6	6161	1334.59	0.00%	32.7/sec	167.47	3.77	5246.0
SignUpPage	300	97	3	487	83.73	0.00%	32.7/sec	132.57	3.99	4153.0
LoginPage	300	102	4	330	86.80	0.00%	32.7/sec	168.76	3.96	5288.0
ProfilePage	300	6227	961	10800	1747.88	0.00%	16.6/sec	248.23	2.18	15269.0
SolvingCrosswor...	300	1701	199	5184	876.12	0.00%	17.2/sec	93.79	2.21	5570.0
SampleSolving	300	0	0	0	0.00	100.00%	17.7/sec	23.39	0.00	1352.0
AutoCreation	300	1477	117	5317	816.21	0.00%	17.6/sec	95.73	2.49	5571.0
ManualCreation	300	0	0	0	0.00	100.00%	18.0/sec	23.41	0.00	1335.0
TOTAL	2400	1478	0	10800	2168.30	25.00%	128.9/sec	688.86	12.22	5473.0

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

Graph Results

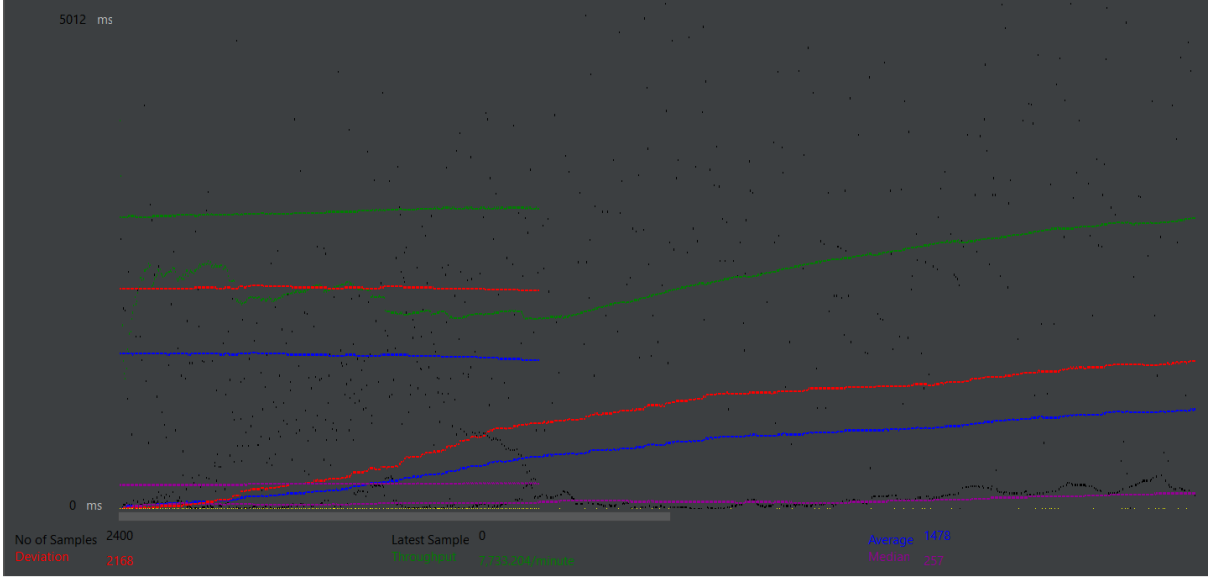
Name: Graph Results

Comments:

Write results to file / Read from file

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

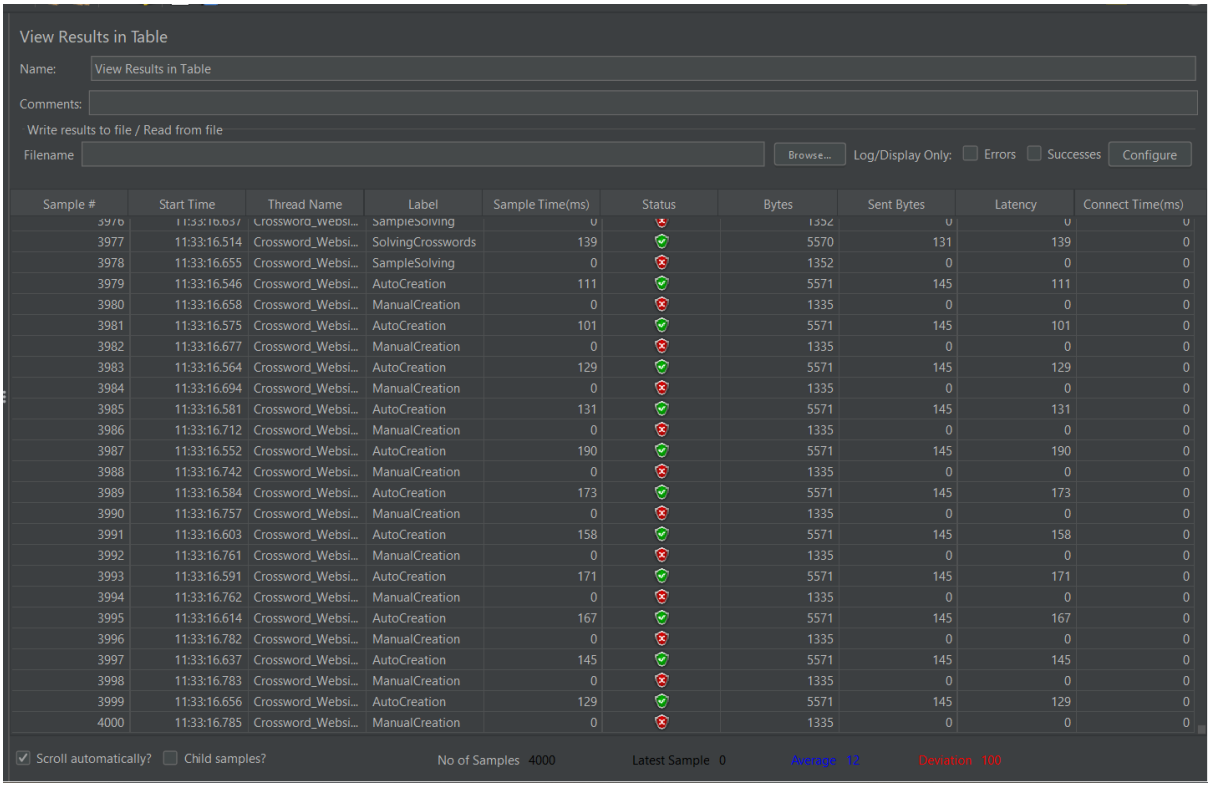
Graphs to Display Data Average Median Deviation Throughput



➢ **Stress testing**

- Stress tests help you understand the upper limits of a system's capacity using a load beyond the expected maximum.
- In other words, stress tests help you determine how a system would behave under an extreme load. The goal is more to determine a maximum limit than to identify bottlenecks.
- In order to do stress testing, we have used the Apache JMeter tool.

6. No. of users: 500
   Ramp-up periods(seconds): 1



View Results in Table

Name: View Results in Table

Comments:

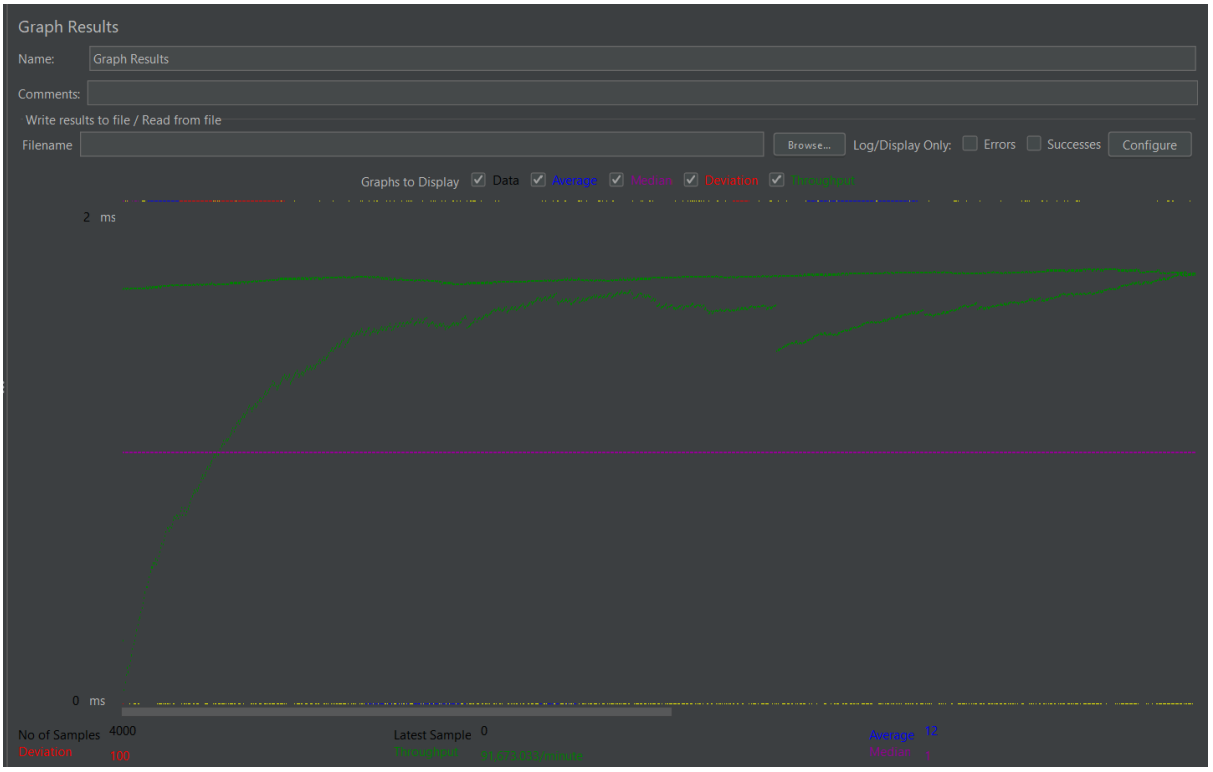
Write results to file / Read from file

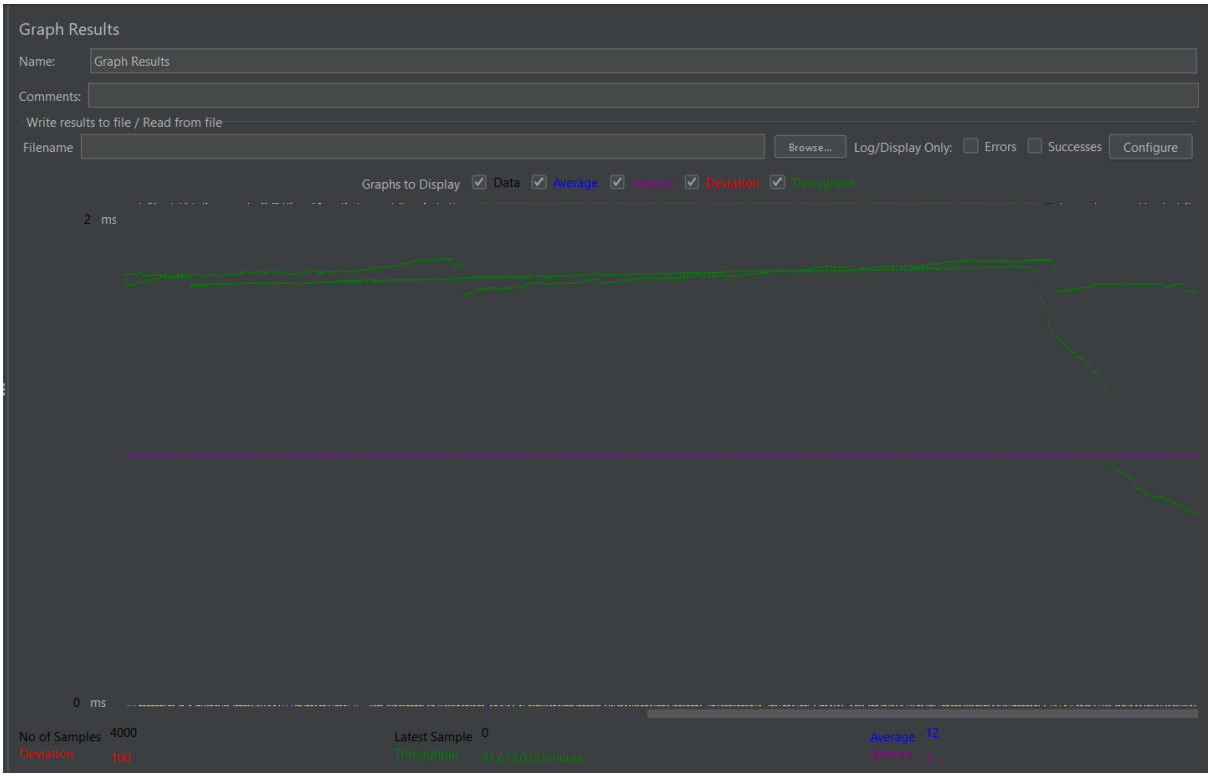
Filename | Browse... | Log/Display Only: Errors Successes | Configure

Sample #	Start Time	Thread Name	Label	Sample Time(ms)	Status	Bytes	Sent Bytes	Latency	Connect Time(ms)
3977	11:33:16.514	Crossword_Websi...	SolvingCrosswords	139		5570	131	139	0
3978	11:33:16.655	Crossword_Websi...	SampleSolving	0		1352	0	0	0
3979	11:33:16.546	Crossword_Websi...	AutoCreation	111		5571	145	111	0
3980	11:33:16.658	Crossword_Websi...	ManualCreation	0		1335	0	0	0
3981	11:33:16.575	Crossword_Websi...	AutoCreation	101		5571	145	101	0
3982	11:33:16.677	Crossword_Websi...	ManualCreation	0		1335	0	0	0
3983	11:33:16.564	Crossword_Websi...	AutoCreation	129		5571	145	129	0
3984	11:33:16.694	Crossword_Websi...	ManualCreation	0		1335	0	0	0
3985	11:33:16.581	Crossword_Websi...	AutoCreation	131		5571	145	131	0
3986	11:33:16.712	Crossword_Websi...	ManualCreation	0		1335	0	0	0
3987	11:33:16.552	Crossword_Websi...	AutoCreation	190		5571	145	190	0
3988	11:33:16.742	Crossword_Websi...	ManualCreation	0		1335	0	0	0
3989	11:33:16.584	Crossword_Websi...	AutoCreation	173		5571	145	173	0
3990	11:33:16.757	Crossword_Websi...	ManualCreation	0		1335	0	0	0
3991	11:33:16.603	Crossword_Websi...	AutoCreation	158		5571	145	158	0
3992	11:33:16.761	Crossword_Websi...	ManualCreation	0		1335	0	0	0
3993	11:33:16.591	Crossword_Websi...	AutoCreation	171		5571	145	171	0
3994	11:33:16.762	Crossword_Websi...	ManualCreation	0		1335	0	0	0
3995	11:33:16.614	Crossword_Websi...	AutoCreation	167		5571	145	167	0
3996	11:33:16.782	Crossword_Websi...	ManualCreation	0		1335	0	0	0
3997	11:33:16.637	Crossword_Websi...	AutoCreation	145		5571	145	145	0
3998	11:33:16.783	Crossword_Websi...	ManualCreation	0		1335	0	0	0
3999	11:33:16.656	Crossword_Websi...	AutoCreation	129		5571	145	129	0
4000	11:33:16.785	Crossword_Websi...	ManualCreation	0		1335	0	0	0

Scroll automatically? Child samples? No of Samples 4000 Latest Sample 0 Average 12 Deviation 100

Label	# Samples	Average	Min	Max	Std. Dev.	Error %	Throughput	Received KB/sec	Sent KB/sec	Avg. Bytes
HomePage	500	32	0	1419	196.84	97.60%	352.4/sec	914.50	0.97	2657.6
SignUpPage	500	5	0	644	43.87	97.00%	339.4/sec	875.38	1.24	2640.8
LoginPage	500	3	0	369	20.10	96.80%	321.1/sec	840.52	1.24	2680.2
ProfilePage	500	30	0	1767	159.33	96.60%	215.2/sec	635.83	0.96	3024.9
SolvingCrosswor...	500	17	0	1150	109.54	95.60%	203.4/sec	541.31	1.15	2724.9
SampleSolving	500	0	0	0	0.00	100.00%	204.1/sec	269.45	0.00	1352.0
AutoCreation	500	9	0	540	44.31	95.20%	194.3/sec	519.18	1.32	2736.9
ManualCreation	500	0	0	0	0.00	100.00%	194.6/sec	253.74	0.00	1335.0
TOTAL	4000	12	0	1767	100.99	97.35%	1527.9/sec	3572.10	5.19	2394.1


Graph Results
Name:
Graph Results
Comments:
Write results to file / Read from file
Filename
Browse...
Log/Display Only:
Errors
Successes
Configure
Graphs to Display
Data
Average
Median
Deviation
Throughput
2 ms
0 ms
No of Samples 4000
Latest Sample 0
Average 12
Deviation 100
Median 1


Graph Results
Name:
Graph Results
Comments:
Write results to file / Read from file
Filename
Browse...
Log/Display Only:
Errors
Successes
Configure
Graphs to Display
Data
Average
Median
Deviation
Throughput
2 ms
0 ms
No of Samples 4000
Latest Sample 0
Average 12
Deviation 100
Median 1