

Non-functional testing

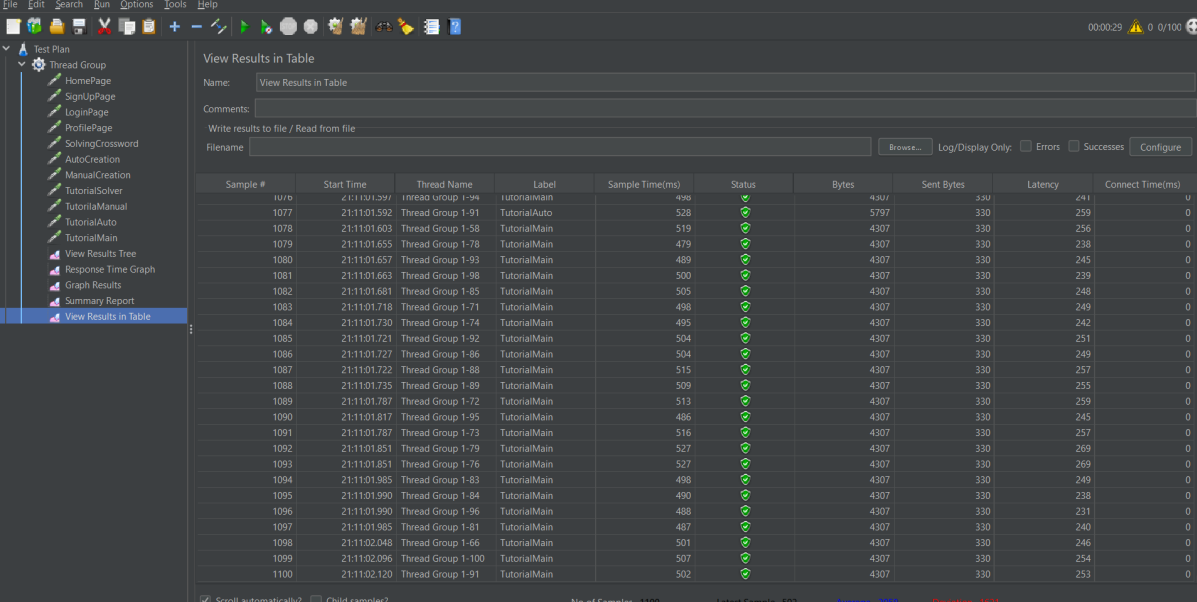
➤ Performance & Load testing

- 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

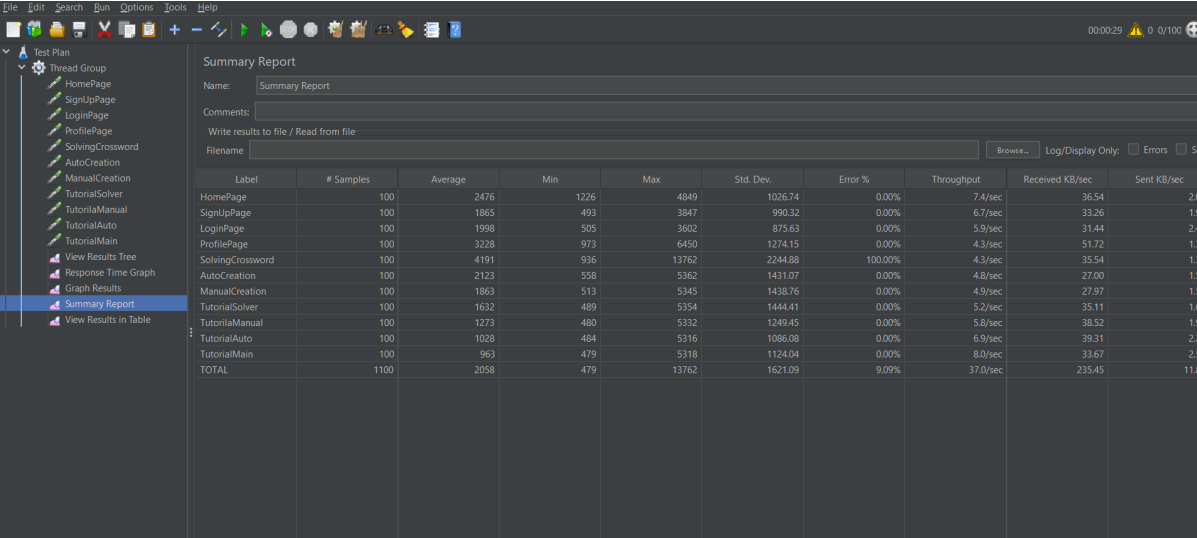
1. No. of users: 100

Ramp-up period (seconds) : 10



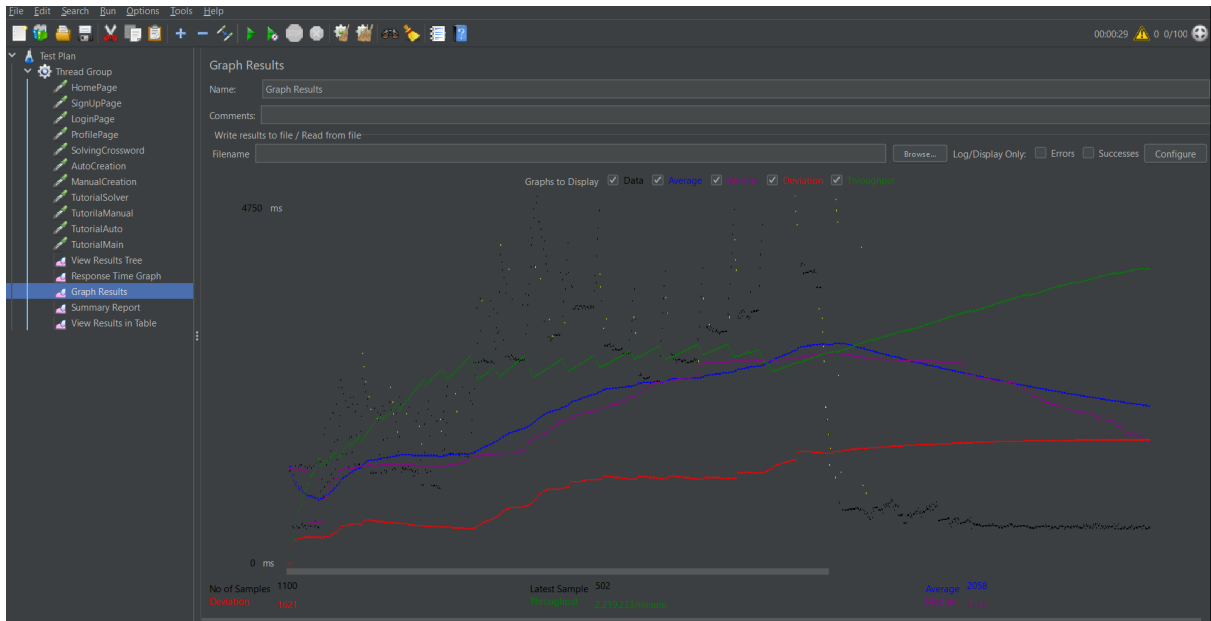
The screenshot shows the 'View Results in Table' window in Apache JMeter. The table displays individual test results for 1100 samples. The columns include Sample #, Start Time, Thread Name, Label, Sample Time (ms), Status, Bytes, Sent Bytes, Latency, and Connect Time (ms). The status column shows green checkmarks for all samples, indicating successful test runs. The bottom status bar shows 'No of Samples: 1100', 'Latest Sample: 502', 'Average: 3090', and 'Deviation: 1621'.

Sample #	Start Time	Thread Name	Label	Sample Time (ms)	Status	Bytes	Sent Bytes	Latency	Connect Time (ms)
1076	21:11:01.597	Thread Group 1-94	TutorialMain	498	✓	4307	330	241	0
1077	21:11:01.592	Thread Group 1-91	TutorialAuto	528	✓	5797	330	259	0
1078	21:11:01.603	Thread Group 1-58	TutorialMain	519	✓	4307	330	256	0
1079	21:11:01.655	Thread Group 1-78	TutorialMain	479	✓	4307	330	238	0
1080	21:11:01.657	Thread Group 1-93	TutorialMain	489	✓	4307	330	245	0
1081	21:11:01.663	Thread Group 1-98	TutorialMain	500	✓	4307	330	239	0
1082	21:11:01.681	Thread Group 1-85	TutorialMain	505	✓	4307	330	248	0
1083	21:11:01.718	Thread Group 1-71	TutorialMain	498	✓	4307	330	249	0
1084	21:11:01.730	Thread Group 1-74	TutorialMain	495	✓	4307	330	242	0
1085	21:11:01.721	Thread Group 1-92	TutorialMain	504	✓	4307	330	251	0
1086	21:11:01.727	Thread Group 1-86	TutorialMain	504	✓	4307	330	249	0
1087	21:11:01.722	Thread Group 1-88	TutorialMain	515	✓	4307	330	257	0
1088	21:11:01.735	Thread Group 1-89	TutorialMain	509	✓	4307	330	255	0
1089	21:11:01.787	Thread Group 1-72	TutorialMain	513	✓	4307	330	259	0
1090	21:11:01.817	Thread Group 1-95	TutorialMain	486	✓	4307	330	245	0
1091	21:11:01.787	Thread Group 1-73	TutorialMain	516	✓	4307	330	257	0
1092	21:11:01.851	Thread Group 1-79	TutorialMain	527	✓	4307	330	269	0
1093	21:11:01.851	Thread Group 1-76	TutorialMain	527	✓	4307	330	269	0
1094	21:11:01.985	Thread Group 1-83	TutorialMain	498	✓	4307	330	249	0
1095	21:11:01.990	Thread Group 1-84	TutorialMain	490	✓	4307	330	238	0
1096	21:11:01.990	Thread Group 1-96	TutorialMain	488	✓	4307	330	231	0
1097	21:11:01.985	Thread Group 1-81	TutorialMain	487	✓	4307	330	240	0
1098	21:11:02.048	Thread Group 1-66	TutorialMain	501	✓	4307	330	246	0
1099	21:11:02.096	Thread Group 1-100	TutorialMain	507	✓	4307	330	254	0
1100	21:11:02.120	Thread Group 1-91	TutorialMain	502	✓	4307	330	253	0



The screenshot shows the 'Summary Report' window in Apache JMeter. The table provides aggregated statistics for each test element. The columns include Label, # Samples, Average, Min, Max, Std. Dev., Error %, Throughput, Received KB/sec, and Sent KB/sec. The 'TOTAL' row summarizes the overall performance across all 1100 samples.

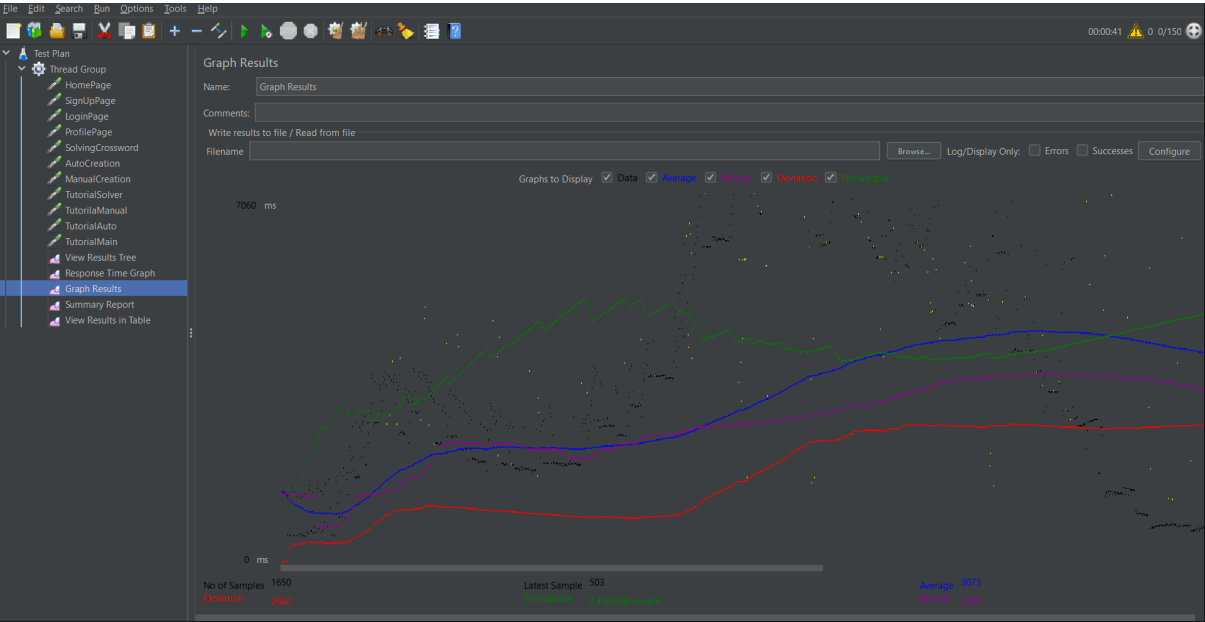
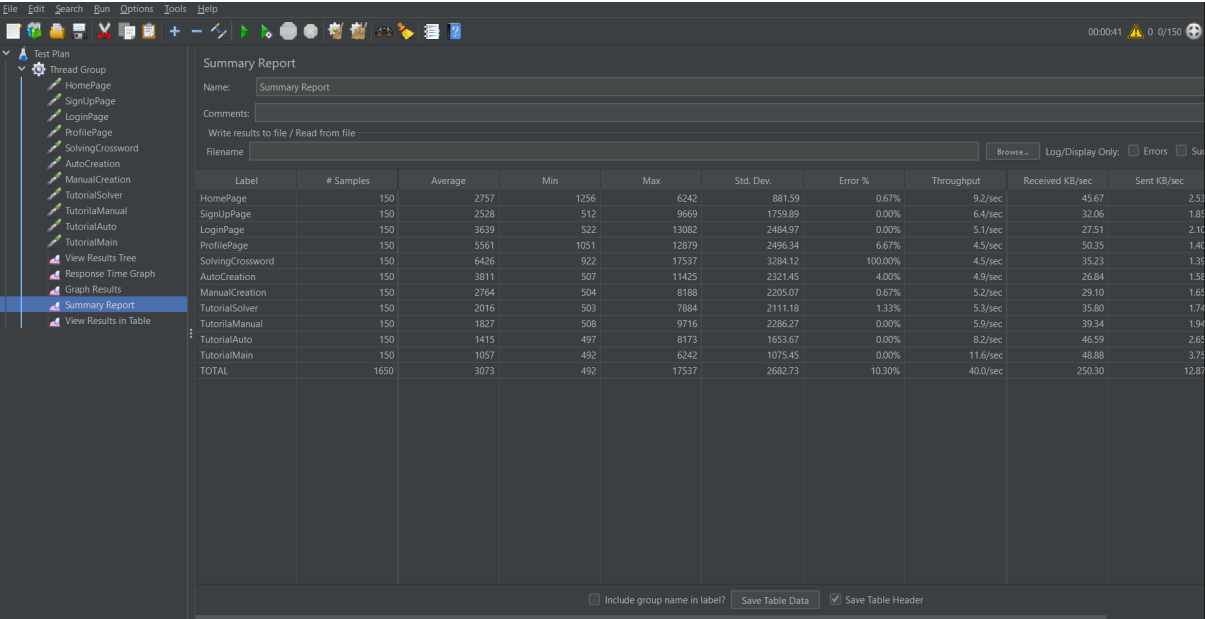
Label	# Samples	Average	Min	Max	Std. Dev.	Error %	Throughput	Received KB/sec	Sent KB/sec
HomePage	100	2476	1226	4849	1026.74	0.00%	7.4/sec	36.54	2.01
SignUpPage	100	1865	493	3847	990.32	0.00%	6.7/sec	33.26	1.92
LoginPage	100	1998	505	3602	875.63	0.00%	5.9/sec	31.44	2.40
ProfilePage	100	3228	973	6450	1274.15	0.00%	4.3/sec	51.72	1.36
SolvingCrossword	100	4191	936	13762	2244.88	100.00%	4.3/sec	35.54	1.33
AutoCreation	100	2123	558	5362	1431.07	0.00%	4.8/sec	27.00	1.53
ManualCreation	100	1863	513	5345	1438.76	0.00%	4.9/sec	27.97	1.58
TutorialSolver	100	1632	489	5354	1444.41	0.00%	5.2/sec	35.11	1.65
TutorialManual	100	1273	480	5332	1249.45	0.00%	5.8/sec	38.52	1.90
TutorialAuto	100	1028	484	5316	1086.08	0.00%	6.9/sec	39.31	2.24
TutorialMain	100	963	479	5318	1124.04	0.00%	8.0/sec	33.67	2.58
TOTAL	1100	2058	479	13762	1621.09	9.09%	37.0/sec	235.45	11.85



2. No. of users: 150
Ramp-up period(seconds) : 10

The screenshot shows the JMeter 'View Results in Table' window. The left sidebar lists the test plan components, with 'View Results in Table' selected. The main area displays a table of test results. The table has the following columns: Sample #, Start Time, Thread Name, Label, Sample Time(ms), Status, Bytes, Sent Bytes, Latency, and Connect Time(ms). The table contains 1650 rows of data, representing individual test samples. At the bottom of the table, the following statistics are displayed: No of Samples: 1650, Latest Sample: 503, Average: 2071, Deviation: 2682.

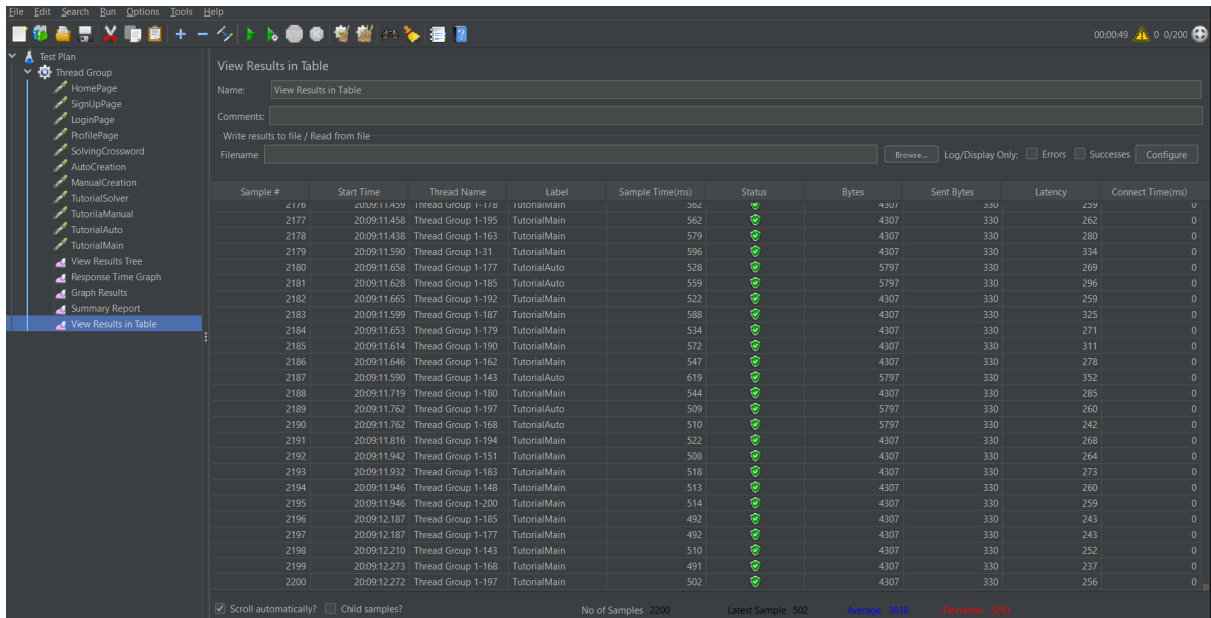
Sample #	Start Time	Thread Name	Label	Sample Time(ms)	Status	Bytes	Sent Bytes	Latency	Connect Time(ms)
1620	21:15:30.018	Thread Group 1-123	TutorialMain	342	✓	4307	330	217	0
1627	21:15:30.068	Thread Group 1-121	TutorialAuto	611	✓	5797	330	351	0
1628	21:15:30.068	Thread Group 1-90	TutorialMain	610	✓	4307	330	350	0
1629	21:15:30.068	Thread Group 1-147	TutorialAuto	606	✓	5797	330	350	0
1630	21:15:30.065	Thread Group 1-148	TutorialAuto	613	✓	5797	330	354	0
1631	21:15:30.065	Thread Group 1-133	TutorialMain	607	✓	4307	330	353	0
1632	21:15:30.201	Thread Group 1-134	TutorialMain	513	✓	4307	330	241	0
1633	21:15:30.200	Thread Group 1-146	TutorialMain	514	✓	4307	330	252	0
1634	21:15:30.201	Thread Group 1-138	TutorialMain	543	✓	4307	330	269	0
1635	21:15:30.300	Thread Group 1-128	TutorialMain	492	✓	4307	330	240	0
1636	21:15:30.301	Thread Group 1-144	TutorialMain	507	✓	4307	330	253	0
1637	21:15:30.358	Thread Group 1-149	TutorialAuto	497	✓	5797	330	242	0
1638	21:15:30.362	Thread Group 1-132	TutorialAuto	525	✓	5797	330	251	0
1639	21:15:30.410	Thread Group 1-150	TutorialMain	511	✓	4307	330	262	0
1640	21:15:30.418	Thread Group 1-135	TutorialMain	513	✓	4307	330	254	0
1641	21:15:30.442	Thread Group 1-129	TutorialMain	538	✓	4307	330	249	0
1642	21:15:30.443	Thread Group 1-145	TutorialMain	539	✓	4307	330	248	0
1643	21:15:30.442	Thread Group 1-142	TutorialMain	552	✓	4307	330	272	0
1644	21:15:30.442	Thread Group 1-137	TutorialMain	552	✓	4307	330	272	0
1645	21:15:30.542	Thread Group 1-141	TutorialMain	500	✓	4307	330	250	0
1646	21:15:30.713	Thread Group 1-147	TutorialMain	524	✓	4307	330	267	0
1647	21:15:30.713	Thread Group 1-148	TutorialMain	526	✓	4307	330	281	0
1648	21:15:30.713	Thread Group 1-121	TutorialMain	533	✓	4307	330	281	0
1649	21:15:30.855	Thread Group 1-149	TutorialMain	494	✓	4307	330	238	0
1650	21:15:30.887	Thread Group 1-132	TutorialMain	503	✓	4307	330	247	0



- **Medium traffic**

3. No. of users: 200

Ramp-up period(seconds) : 10



View Results in Table

Name: View Results in Table

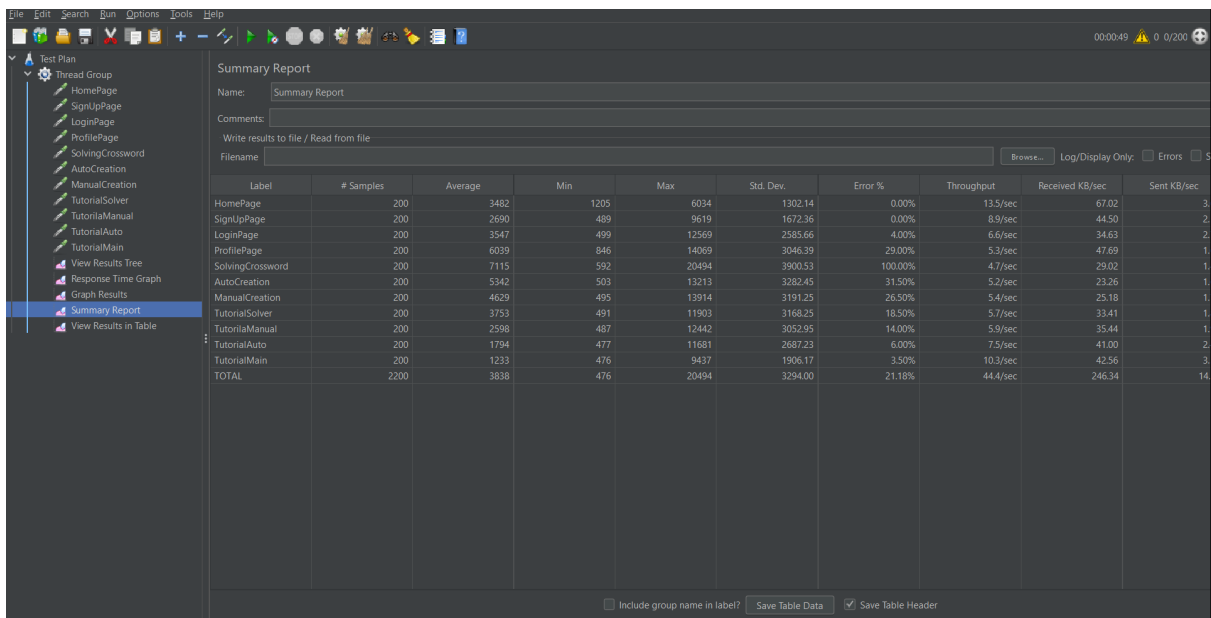
Comments:

Write results to file / Read from file

Filename: Log/Display Only: ☐ Errors ☐ Successes

Sample #	Start Time	Thread Name	Label	Sample Time(ms)	Status	Bytes	Sent Bytes	Latency	Connect Time(ms)
2176	2009111439	Thread Group 1-176	TutorialMain	362	✓	4307	330	262	0
2177	2009111438	Thread Group 1-195	TutorialMain	562	✓	4307	330	262	0
2178	2009111438	Thread Group 1-163	TutorialMain	579	✓	4307	330	280	0
2179	2009111590	Thread Group 1-31	TutorialMain	596	✓	4307	330	334	0
2180	2009111658	Thread Group 1-177	TutorialAuto	528	✓	5797	330	269	0
2181	2009111658	Thread Group 1-185	TutorialAuto	559	✓	5797	330	296	0
2182	2009111599	Thread Group 1-187	TutorialMain	522	✓	4307	330	259	0
2183	2009111599	Thread Group 1-187	TutorialMain	588	✓	4307	330	325	0
2184	2009111653	Thread Group 1-179	TutorialMain	534	✓	4307	330	271	0
2185	2009111614	Thread Group 1-190	TutorialMain	572	✓	4307	330	311	0
2186	2009111646	Thread Group 1-162	TutorialMain	547	✓	4307	330	278	0
2187	2009111590	Thread Group 1-143	TutorialAuto	619	✓	5797	330	352	0
2188	2009111719	Thread Group 1-180	TutorialMain	544	✓	4307	330	285	0
2189	2009111762	Thread Group 1-197	TutorialAuto	509	✓	5797	330	260	0
2190	2009111762	Thread Group 1-168	TutorialAuto	510	✓	5797	330	242	0
2191	2009111816	Thread Group 1-194	TutorialMain	522	✓	4307	330	268	0
2192	2009111942	Thread Group 1-151	TutorialMain	508	✓	4307	330	264	0
2193	2009111932	Thread Group 1-183	TutorialMain	518	✓	4307	330	273	0
2194	2009111946	Thread Group 1-148	TutorialMain	513	✓	4307	330	260	0
2195	2009111946	Thread Group 1-200	TutorialMain	514	✓	4307	330	259	0
2196	200912187	Thread Group 1-185	TutorialMain	492	✓	4307	330	243	0
2197	200912187	Thread Group 1-177	TutorialMain	492	✓	4307	330	243	0
2198	200912210	Thread Group 1-143	TutorialMain	510	✓	4307	330	252	0
2199	200912273	Thread Group 1-168	TutorialMain	491	✓	4307	330	237	0
2200	200912272	Thread Group 1-197	TutorialMain	502	✓	4307	330	256	0

☒ Scroll automatically? ☐ Child samples? No of Samples: 2200 Latest Sample: 302 Average: 3898 Deviation: 3294



Summary Report

Name: Summary Report

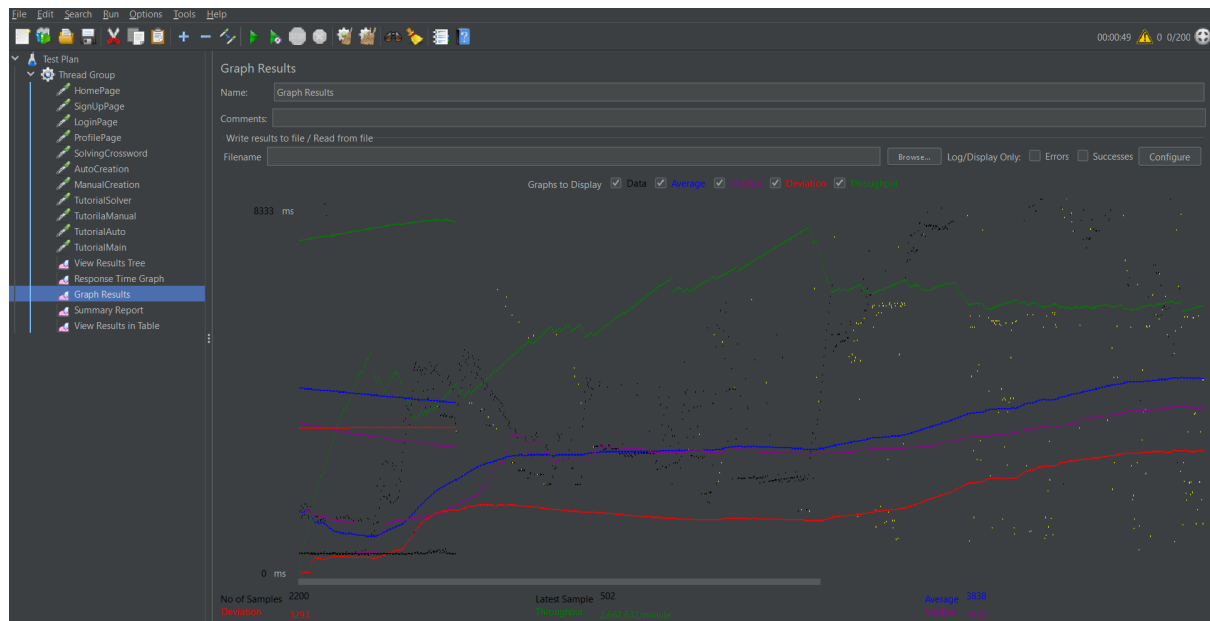
Comments:

Write results to file / Read from file

Filename: Log/Display Only: ☐ Errors ☐ Successes

Label	# Samples	Average	Min	Max	Std. Dev.	Error %	Throughput	Received KB/sec	Sent KB/sec
HomePage	200	3482	1205	6034	1302.14	0.00%	13.5/sec	67.02	3.
SignUpPage	200	2690	489	9619	1672.36	0.00%	8.9/sec	44.50	2.
LoginPage	200	3547	499	12569	2585.66	4.00%	6.6/sec	34.63	2.
ProfilePage	200	6039	846	14069	3046.39	29.00%	5.3/sec	47.69	1.
SolvingCrossword	200	7115	592	20494	3900.53	100.00%	4.7/sec	29.02	1.
AutoCreation	200	5342	503	13213	3282.45	31.50%	5.2/sec	23.26	1.
ManualCreation	200	4629	495	13914	3191.25	26.50%	5.4/sec	25.18	1.
TutorialSolver	200	3753	491	11903	3168.25	18.50%	5.7/sec	33.41	1.
TutorialManual	200	2598	487	12442	3052.95	14.00%	5.9/sec	35.44	1.
TutorialAuto	200	1794	477	11681	2687.23	6.00%	7.5/sec	41.00	2.
TutorialMain	200	1233	476	9437	1906.17	3.50%	10.3/sec	42.56	3.
TOTAL	2200	3838	476	20494	3294.00	21.18%	44.4/sec	246.34	14.

☐ Include group name in label? ☒ Save Table Header



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

FileEditSearchRunOptionsToolsHelp

00:00:530/250

Test Plan

- Thread Group
 - HomePage
 - SignUpPage
 - LoginPage
 - ProfilePage
 - SolvingCrossword
 - AutoCreation
 - ManualCreation
 - TutorialSolver
 - TutorialManual
 - TutorialAuto
 - TutorialMain
 - View Results Tree
 - Response Time Graph
 - Graph Results
 - Summary Report
 - View Results in Table

View Results in Table

Name:View Results in Table

Comments:

Write results to file / Read from file

FilenameBrowse...Log/Display Only:ErrorsSuccessesConfigure

Sample #	Start Time	Thread Name	Label	Sample Time(ms)	Status	Bytes	Sent Bytes	Latency	Connect Time(ms)
2726	2022:04:812	Thread Group 1-425	TutorialMain	332		4307	330	251	0
2727	2022:04:830	Thread Group 1-226	TutorialAuto	531		5797	330	266	0
2728	2022:04:790	Thread Group 1-84	TutorialMain	562		4307	330	254	0
2729	2022:04:801	Thread Group 1-223	TutorialMain	550		4307	330	243	0
2730	2022:04:799	Thread Group 1-189	TutorialMain	552		4307	330	252	0
2731	2022:04:785	Thread Group 1-240	TutorialMain	566		4307	330	259	0
2732	2022:04:796	Thread Group 1-87	TutorialMain	555		4307	330	255	0
2733	2022:05:045	Thread Group 1-158	TutorialMain	562		4307	330	297	0
2734	2022:05:125	Thread Group 1-143	TutorialMain	501		4307	330	251	0
2735	2022:05:107	Thread Group 1-176	TutorialMain	522		4307	330	268	0
2736	2022:05:125	Thread Group 1-236	TutorialMain	513		4307	330	251	0
2737	2022:05:143	Thread Group 1-101	TutorialMain	496		4307	330	235	0
2738	2022:05:125	Thread Group 1-171	TutorialMain	519		4307	330	251	0
2739	2022:05:171	Thread Group 1-188	TutorialAuto	512		5797	330	253	0
2740	2022:05:178	Thread Group 1-222	TutorialMain	530		4307	330	260	0
2741	2022:05:448	Thread Group 1-226	TutorialMain	547		4307	330	260	0
2742	2022:05:683	Thread Group 1-188	TutorialMain	510		4307	330	255	0
2743	2021:42:268	Thread Group 1-184	ProfilePage	28018		12196	320	502	10
2744	2022:10:286	Thread Group 1-184	SolvingCrossword	530		8368	318	247	0
2745	2022:10:816	Thread Group 1-184	AutoCreation	498		5808	334	245	0
2746	2022:11:314	Thread Group 1-184	ManualCreation	495		5805	328	244	0
2747	2022:11:810	Thread Group 1-184	TutorialSolver	488		6956	334	240	0
2748	2022:12:298	Thread Group 1-184	TutorialManual	489		6787	334	241	0
2749	2022:12:787	Thread Group 1-184	TutorialAuto	489		5797	330	241	0
2750	2022:13:276	Thread Group 1-184	TutorialMain	508		4307	330	258	0

☒ Scroll automatically?☐ Child samples?No of Samples: 2750Latest Sample: 508Average: 3.99Deviation: 311.2

FileEditSearchRunOptionsToolsHelp

00:00:530/250

Test Plan

- Thread Group
 - HomePage
 - SignUpPage
 - LoginPage
 - ProfilePage
 - SolvingCrossword
 - AutoCreation
 - ManualCreation
 - TutorialSolver
 - TutorialManual
 - TutorialAuto
 - TutorialMain
 - View Results Tree
 - Response Time Graph
 - Graph Results
 - Summary Report
 - View Results in Table

Summary Report

Name:Summary Report

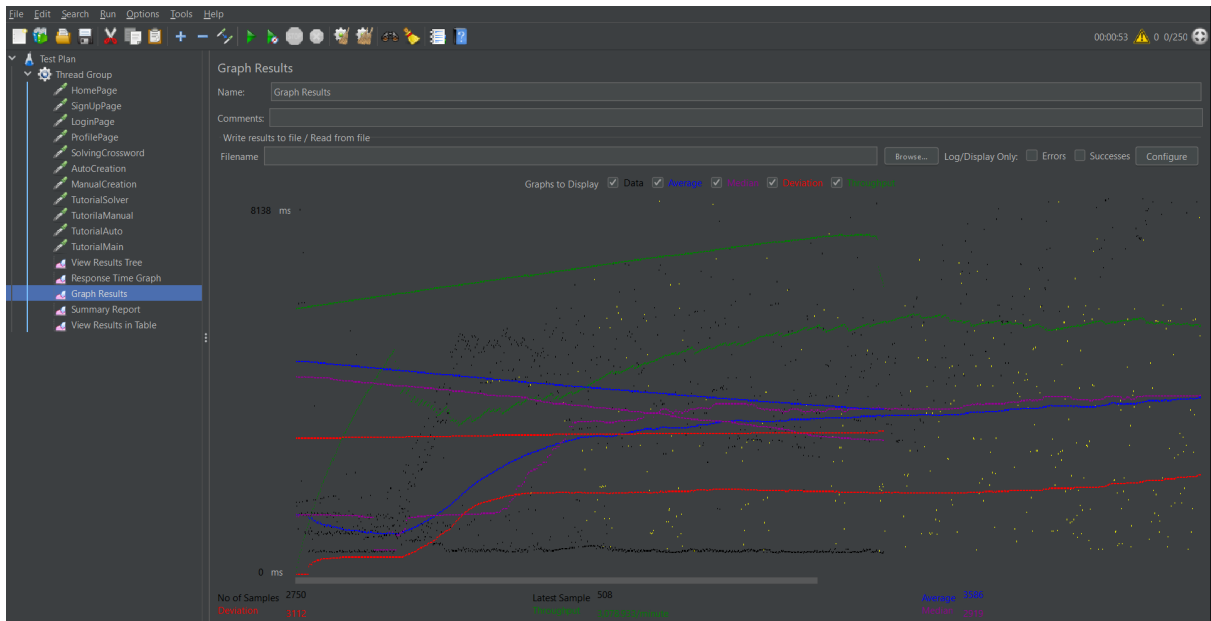
Comments:

Write results to file / Read from file

FilenameBrowse...Log/Display Only:ErrorsSuccessesConfigure

Label	# Samples	Average	Min	Max	Std. Dev.	Error %	Throughput	Received KB/sec	Sent KB/sec
HomePage	250	4036	1234	7632	1694.54	3.20%	17.5/sec	85.35	4
SignUpPage	250	3155	484	11961	1956.35	14.40%	12.3/sec	55.88	3
LoginPage	250	4146	504	12215	2563.62	22.80%	8.6/sec	39.52	3
ProfilePage	250	5553	774	28018	3452.64	39.60%	5.2/sec	41.76	1
SolvingCrossword	250	5437	530	24956	3709.80	100.00%	5.3/sec	25.89	1
AutoCreation	250	4811	494	13265	3229.70	53.60%	5.8/sec	21.58	1
ManualCreation	250	4447	495	12457	3297.34	42.00%	6.2/sec	25.38	1
TutorialSolver	250	3237	488	11785	3088.31	34.80%	6.7/sec	34.48	2
TutorialManual	250	2064	489	11598	2513.02	25.20%	8.0/sec	43.45	2
TutorialAuto	250	1491	489	11678	2133.18	12.80%	8.1/sec	41.95	2
TutorialMain	250	1068	481	9708	1585.96	4.80%	8.8/sec	35.93	2
TOTAL	2750	3586	481	28018	3112.77	32.11%	51.3/sec	254.40	16

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



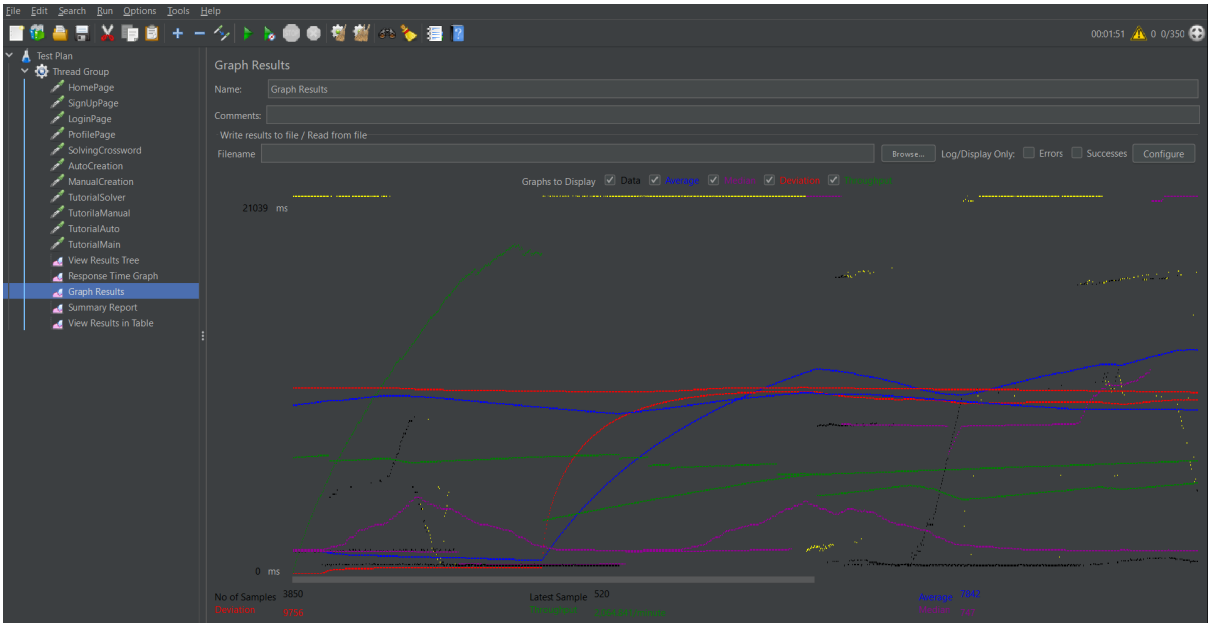
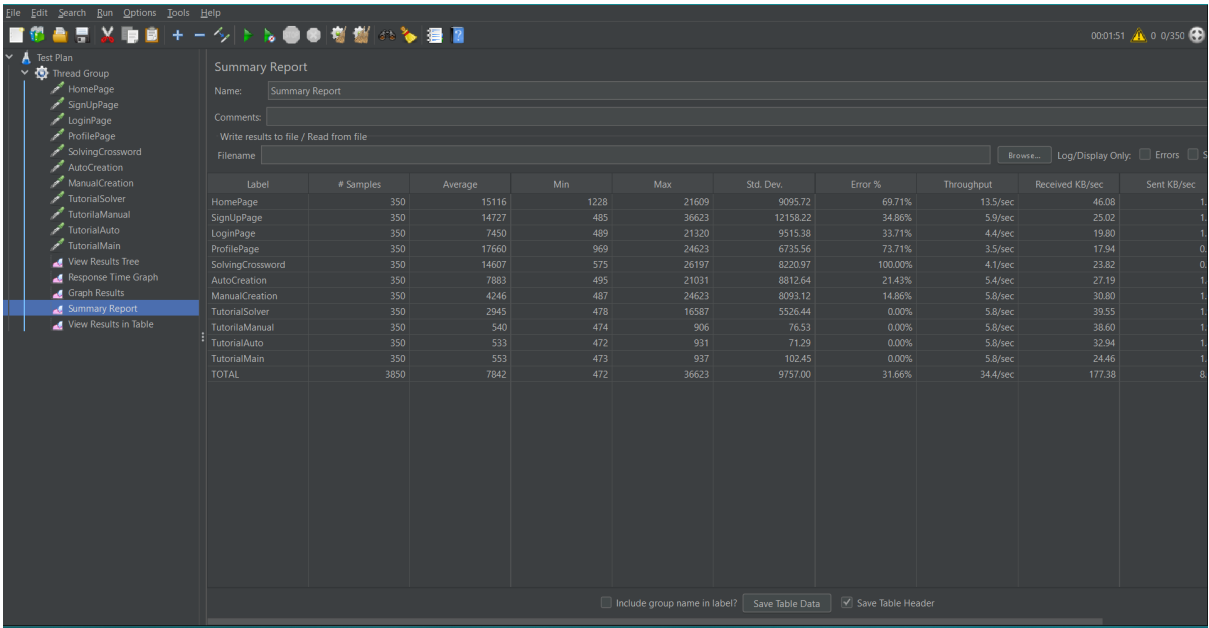
- **High traffic**

5. No. of users: 350

Ramp-up period(seconds) : 5

The screenshot shows the JMeter 'View Results in Table' window. The table displays test results for 'TutorialMain' across 3850 samples. The columns include Sample #, Start Time, Thread Name, Label, Sample Time(ms), Status, Bytes, Sent Bytes, Latency, and Connect Time(ms). The status column shows green checkmarks, indicating successful test results. The status bar at the bottom indicates 'No of Samples: 3850', 'Latest Sample: 520', 'Average: 2992', and 'Deviation: 9754'.

Sample #	Start Time	Thread Name	Label	Sample Time(ms)	Status	Bytes	Sent Bytes	Latency	Connect Time(ms)
3826	2028:34:009	Thread Group 1-145	TutorialMain	419	✓	4307	330	258	0
3827	2028:34:010	Thread Group 1-161	TutorialMain	498	✓	4307	330	251	0
3828	2028:34:007	Thread Group 1-241	TutorialMain	507	✓	4307	330	251	0
3829	2028:34:012	Thread Group 1-268	TutorialMain	502	✓	4307	330	257	0
3830	2028:34:004	Thread Group 1-250	TutorialMain	513	✓	4307	330	254	0
3831	2028:34:020	Thread Group 1-167	TutorialMain	505	✓	4307	330	258	0
3832	2028:34:020	Thread Group 1-157	TutorialMain	505	✓	4307	330	258	0
3833	2028:34:017	Thread Group 1-155	TutorialMain	514	✓	4307	330	251	0
3834	2028:34:020	Thread Group 1-142	TutorialMain	511	✓	4307	330	248	0
3835	2028:34:022	Thread Group 1-238	TutorialMain	509	✓	4307	330	256	0
3836	2028:34:040	Thread Group 1-162	TutorialMain	508	✓	4307	330	258	0
3837	2028:34:069	Thread Group 1-269	TutorialMain	493	✓	4307	330	247	0
3838	2028:34:078	Thread Group 1-258	TutorialMain	498	✓	4307	330	240	0
3839	2028:34:077	Thread Group 1-130	TutorialMain	506	✓	4307	330	247	0
3840	2028:34:125	Thread Group 1-160	TutorialMain	513	✓	4307	330	254	0
3841	2028:34:153	Thread Group 1-158	TutorialMain	487	✓	4307	330	247	0
3842	2028:34:141	Thread Group 1-259	TutorialMain	501	✓	4307	330	238	0
3843	2028:34:139	Thread Group 1-151	TutorialMain	509	✓	4307	330	254	0
3844	2028:34:139	Thread Group 1-136	TutorialMain	515	✓	4307	330	254	0
3845	2028:34:151	Thread Group 1-236	TutorialMain	510	✓	4307	330	249	0
3846	2028:34:140	Thread Group 1-120	TutorialMain	532	✓	4307	330	260	0
3847	2028:34:158	Thread Group 1-260	TutorialMain	543	✓	4307	330	274	0
3848	2028:34:334	Thread Group 1-138	TutorialMain	509	✓	4307	330	253	0
3849	2028:34:431	Thread Group 1-168	TutorialMain	508	✓	4307	330	241	0
3850	2028:34:431	Thread Group 1-159	TutorialMain	520	✓	4307	330	256	0



6. No of users: 450

Ramp-up period(Second): 5

View Results in Table

Name: View Results in Table

Comments:

Write results to file / Read from file

Filename: Log/Display Only: ☐ Errors ☐ Successes

Sample #	Start Time	Thread Name	Label	Sample Time(ms)	Status	Bytes	Sent Bytes	Latency	Connect Time(ms)
4927	2044.00.239	Thread Group 1-179	TutorialMain	586	✓	4307	330	299	0
4928	2044.00.239	Thread Group 1-172	TutorialMain	586	✓	4307	330	299	0
4929	2044.00.243	Thread Group 1-84	TutorialMain	582	✓	4307	330	299	0
4930	2044.00.246	Thread Group 1-187	TutorialMain	579	✓	4307	330	292	0
4931	2044.00.259	Thread Group 1-85	TutorialMain	574	✓	4307	330	293	0
4932	2044.00.270	Thread Group 1-102	TutorialMain	563	✓	4307	330	312	0
4933	2044.00.264	Thread Group 1-79	TutorialMain	573	✓	4307	330	319	0
4934	2044.00.264	Thread Group 1-93	TutorialMain	573	✓	4307	330	319	0
4935	2044.00.270	Thread Group 1-188	TutorialMain	567	✓	4307	330	313	0
4936	2044.00.273	Thread Group 1-190	TutorialMain	566	✓	4307	330	309	0
4937	2044.00.259	Thread Group 1-193	TutorialMain	599	✓	4307	330	324	0
4938	2044.00.255	Thread Group 1-112	TutorialAuto	603	✓	5797	330	328	0
4939	2044.00.273	Thread Group 1-86	TutorialMain	585	✓	4307	330	309	0
4940	2044.00.273	Thread Group 1-82	TutorialMain	606	✓	4307	330	333	0
4941	2044.00.270	Thread Group 1-192	TutorialMain	609	✓	4307	330	312	0
4942	2044.00.277	Thread Group 1-186	TutorialMain	602	✓	4307	330	305	0
4943	2044.00.277	Thread Group 1-182	TutorialMain	657	✓	4307	330	367	0
4944	2044.00.351	Thread Group 1-191	TutorialMain	583	✓	4307	330	293	0
4945	2044.00.471	Thread Group 1-115	TutorialMain	550	✓	4307	330	281	0
4946	2044.00.471	Thread Group 1-210	TutorialMain	550	✓	4307	330	281	0
4947	2044.00.471	Thread Group 1-107	TutorialMain	554	✓	4307	330	269	0
4948	2044.00.471	Thread Group 1-97	TutorialMain	556	✓	4307	330	289	0
4949	2044.00.811	Thread Group 1-119	TutorialMain	789	✓	4307	330	478	0
4950	2044.00.858	Thread Group 1-112	TutorialMain	742	✓	4307	330	431	0

☒ Scroll automatically? ☐ Child samples? No of Samples: 4950 Latest Sample: 742 Average: 107% Deviation: 9837

Summary Report

Name: Summary Report

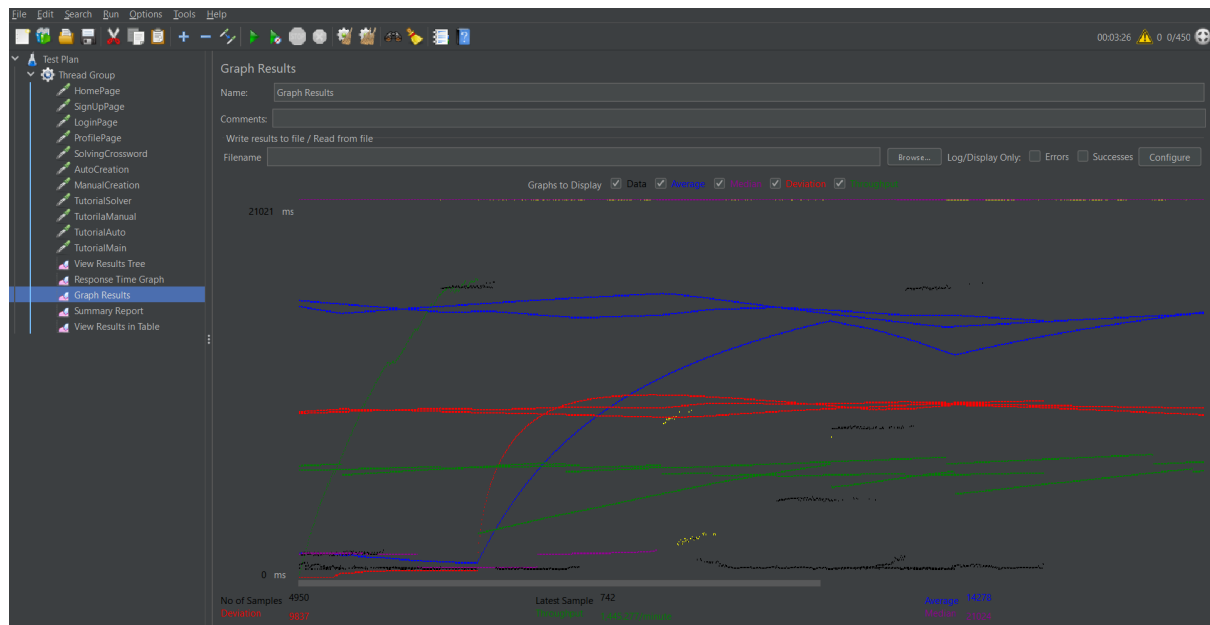
Comments:

Write results to file / Read from file

Filename: Log/Display Only: ☐ Errors ☐ Successes

Label	# Samples	Average	Min	Max	Std. Dev.	Error %	Throughput	Received KB/sec	Sent KB/sec
HomePage	450	17768	1309	21652	7386.04	83.11%	17.3/sec	53.72	1.
SignUpPage	450	16258	499	28597	9011.95	66.22%	8.5/sec	30.57	1.
LoginPage	450	14164	485	21318	9728.72	66.22%	6.1/sec	22.76	1.
ProfilePage	450	15899	1797	22187	4571.68	91.11%	4.8/sec	17.52	0.
SolvingCrossword	450	17912	660	21832	6664.81	100.00%	4.7/sec	18.85	0.
AutoCreation	450	17111	516	22001	8166.56	80.22%	4.2/sec	14.57	0.
ManualCreation	450	16437	528	22005	8713.59	76.44%	3.5/sec	12.53	0.
TutorialSolver	450	16990	513	36599	11565.05	63.78%	2.9/sec	12.77	0.
TutorialManual	450	13030	487	21386	9503.08	50.67%	2.6/sec	12.51	0.
TutorialAuto	450	4253	485	21668	6941.43	13.56%	2.6/sec	14.08	0.
TutorialMain	450	3232	476	36601	6989.64	6.22%	2.6/sec	10.93	0.
TOTAL	4950	14278	476	36601	9837.20	63.41%	24.1/sec	95.76	3.

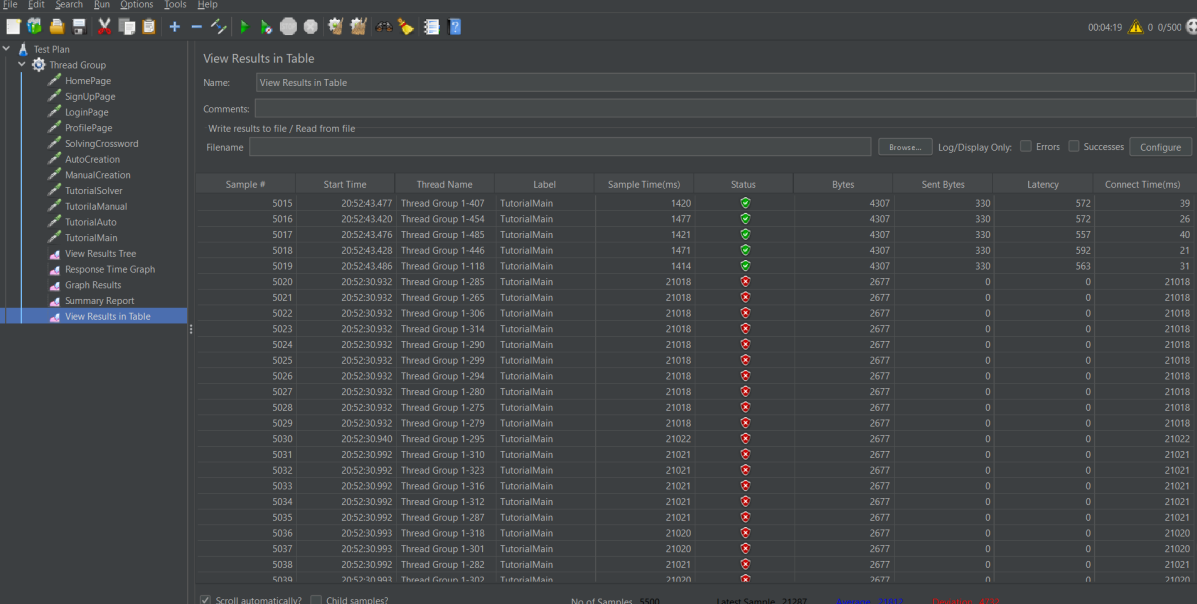
☐ Include group name in label? ☒ Save Table Header



➤ 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.

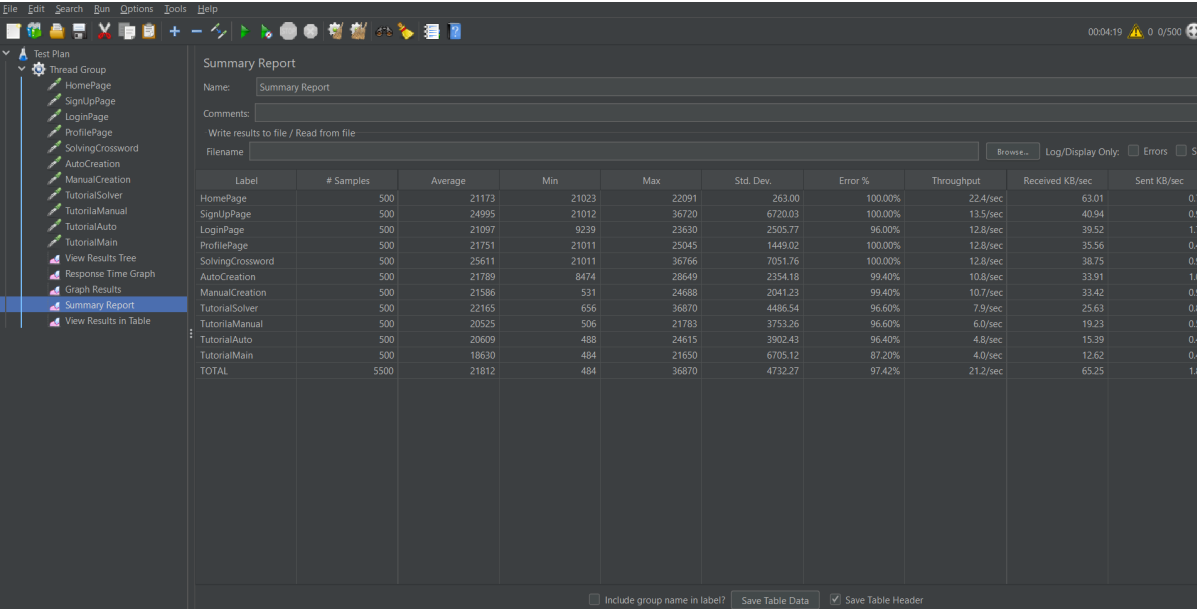
7. No. of users: 500 Ramp-up periods(seconds): 1



The screenshot shows the 'View Results in Table' window in JMeter. The table displays individual sample data for a test plan. The columns include Sample #, Start Time, Thread Name, Label, Sample Time(ms), Status, Bytes, Sent Bytes, Latency, and Connect Time(ms). The status column uses green checkmarks for successful samples and red X marks for failed samples. The test plan on the left includes various components like Thread Group, Home Page, Sign Up Page, Login Page, Profile Page, Solving Crossword, Auto Creation, Manual Creation, Tutorial Solver, Tutorial Manual, Tutorial Auto, Tutorial Main, View Results Tree, Response Time Graph, Graph Results, Summary Report, and View Results in Table.

Sample #	Start Time	Thread Name	Label	Sample Time(ms)	Status	Bytes	Sent Bytes	Latency	Connect Time(ms)
5015	2052:43.477	Thread Group 1-407	TutorialMain	1420	✓	4307	330	572	39
5016	2052:43.420	Thread Group 1-454	TutorialMain	1477	✓	4307	330	572	26
5017	2052:43.476	Thread Group 1-485	TutorialMain	1421	✓	4307	330	557	40
5018	2052:43.428	Thread Group 1-446	TutorialMain	1471	✓	4307	330	592	21
5019	2052:43.486	Thread Group 1-118	TutorialMain	1414	✓	4307	330	563	31
5020	2052:30.932	Thread Group 1-285	TutorialMain	21018	✗	2677	0	0	21018
5021	2052:30.932	Thread Group 1-265	TutorialMain	21018	✗	2677	0	0	21018
5022	2052:30.932	Thread Group 1-306	TutorialMain	21018	✗	2677	0	0	21018
5023	2052:30.932	Thread Group 1-314	TutorialMain	21018	✗	2677	0	0	21018
5024	2052:30.932	Thread Group 1-290	TutorialMain	21018	✗	2677	0	0	21018
5025	2052:30.932	Thread Group 1-299	TutorialMain	21018	✗	2677	0	0	21018
5026	2052:30.932	Thread Group 1-294	TutorialMain	21018	✗	2677	0	0	21018
5027	2052:30.932	Thread Group 1-280	TutorialMain	21018	✗	2677	0	0	21018
5028	2052:30.932	Thread Group 1-275	TutorialMain	21018	✗	2677	0	0	21018
5029	2052:30.932	Thread Group 1-279	TutorialMain	21018	✗	2677	0	0	21018
5030	2052:30.940	Thread Group 1-295	TutorialMain	21022	✗	2677	0	0	21022
5031	2052:30.992	Thread Group 1-310	TutorialMain	21021	✗	2677	0	0	21021
5032	2052:30.992	Thread Group 1-323	TutorialMain	21021	✗	2677	0	0	21021
5033	2052:30.992	Thread Group 1-316	TutorialMain	21021	✗	2677	0	0	21021
5034	2052:30.992	Thread Group 1-312	TutorialMain	21021	✗	2677	0	0	21021
5035	2052:30.992	Thread Group 1-287	TutorialMain	21021	✗	2677	0	0	21021
5036	2052:30.993	Thread Group 1-318	TutorialMain	21020	✗	2677	0	0	21020
5037	2052:30.993	Thread Group 1-301	TutorialMain	21020	✗	2677	0	0	21020
5038	2052:30.992	Thread Group 1-282	TutorialMain	21021	✗	2677	0	0	21021
5039	2052:30.993	Thread Group 1-303	TutorialMain	21020	✗	2677	0	0	21020

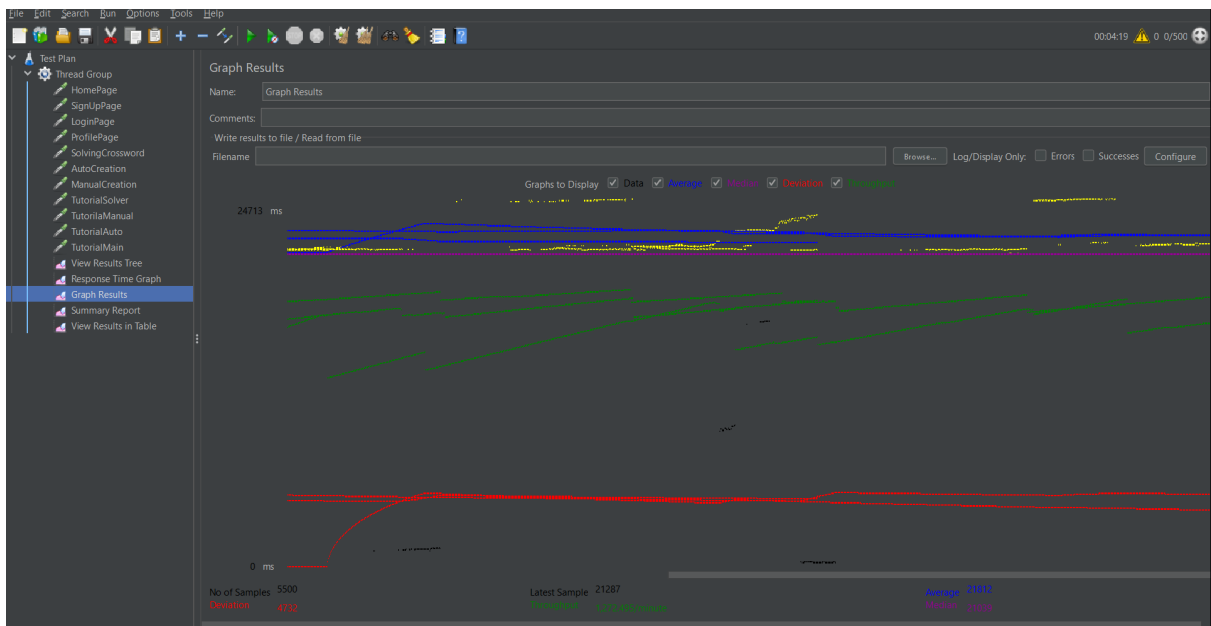
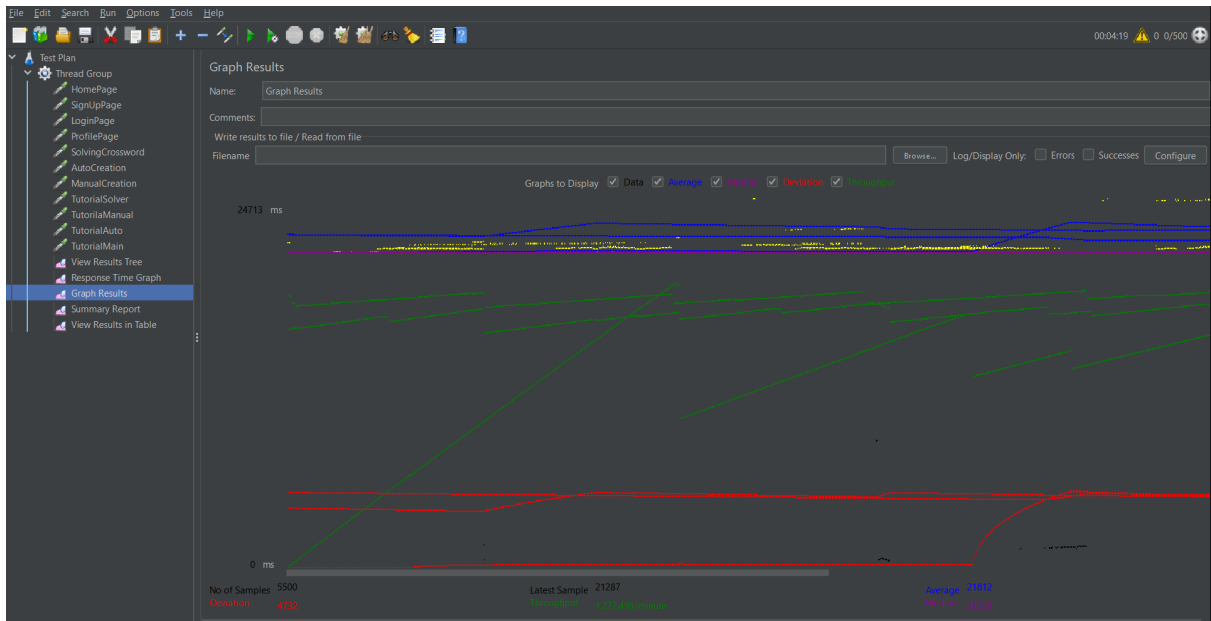
At the bottom of the window, it shows 'No of Samples: 5500', 'Latest Sample: 21287', 'Average: 10310', and 'Deviation: 4732'.



The screenshot shows the 'Summary Report' window in JMeter. It provides a summary of the test results for various labels. The table includes columns for Label, # Samples, Average, Min, Max, Std. Dev., Error %, Throughput, Received KB/sec, and Sent KB/sec. The 'TOTAL' row summarizes the overall test results.

Label	# Samples	Average	Min	Max	Std. Dev.	Error %	Throughput	Received KB/sec	Sent KB/sec
HomePage	500	21173	21023	22091	263.00	100.00%	22.4/sec	63.01	0.71
SignUpPage	500	24995	21012	36720	6720.03	100.00%	13.5/sec	40.94	0.94
LoginPage	500	21097	9239	23630	2505.77	96.00%	12.8/sec	39.52	1.72
ProfilePage	500	21751	21011	25045	1449.02	100.00%	12.8/sec	35.56	0.46
SolvingCrossword	500	25611	21011	36766	7051.76	100.00%	12.8/sec	38.75	0.97
AutoCreation	500	21789	8474	28649	2354.18	99.40%	10.8/sec	33.91	1.04
ManualCreation	500	21586	531	24688	2041.23	99.40%	10.7/sec	33.42	0.98
TutorialSolver	500	22165	656	36870	4486.54	96.60%	7.9/sec	25.63	0.86
TutorialManual	500	20525	506	21783	3753.26	96.60%	6.0/sec	19.23	0.55
TutorialAuto	500	20609	488	24615	3902.43	96.40%	4.8/sec	15.39	0.45
TutorialMain	500	18630	484	21650	6705.12	87.20%	4.0/sec	12.62	0.42
TOTAL	5500	21812	484	36870	4732.27	97.42%	21.2/sec	65.25	1.81

At the bottom of the window, there are checkboxes for 'Include group name in label?' and 'Save Table Header', and a 'Save Table Data' button.



➤ **Compatibility Testing**

- Compatibility testing is an essential part of software testing that evaluates the ability of a software application to function correctly in different environments.
- When tested on different Operating systems (window & Mac) it works normally.
- While in Mobile phone & in tablet, the website seems less responsive and some bugs like the in home page the side-bar is not opening.

➤ **Security Testing**

- It identifies system vulnerabilities and ensures that the system's data and resources are safe from attackers. It assures that the software system and application are free of threats or risks that could result in a loss.
- There is one threat that the database admin can see user details as the data is unencrypted.