

Izveštaj

- Student 3: Tadija Šebez

Specifikacija računara

Navedeni testovi su izvršeni na jednom računaru sledećih specifikacija:

- Procesor: 11th Gen Intel(R) Core(TM) i7-11800H @ 2.30GHz 2.30 GHz
- RAM: 16.0 GB (15.9 GB usable)
- SSD: 1TB
- GPU: NVIDIA GeForce RTX 3050 Ti

Test čestih scenarija korišćenja

Testovi su izvšeni uz pomoć JMeter alata. Svaki test je pokrenut više puta sa različitim brojem korisnika, različitim obimom podataka u bazi i različitim brojem pokrenutih simulatora.

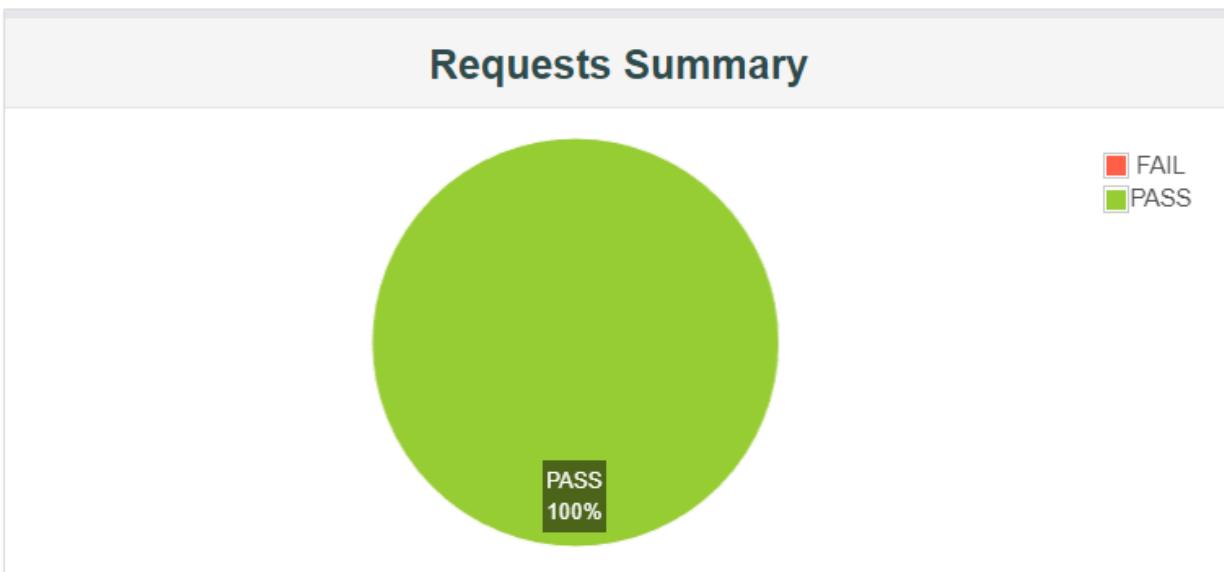
1 - Kreiranje baterije

Opis:

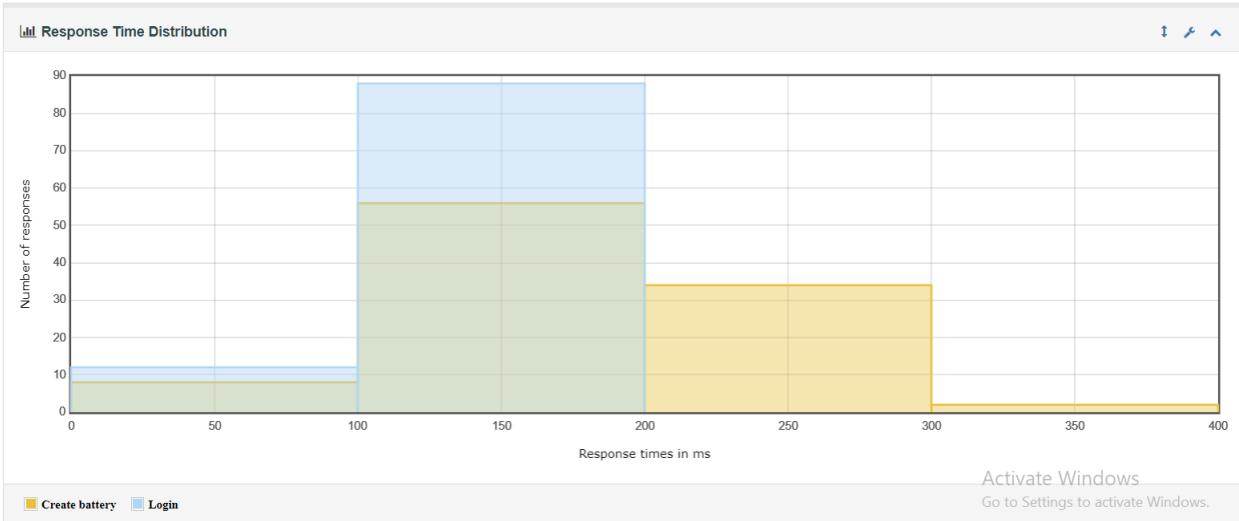
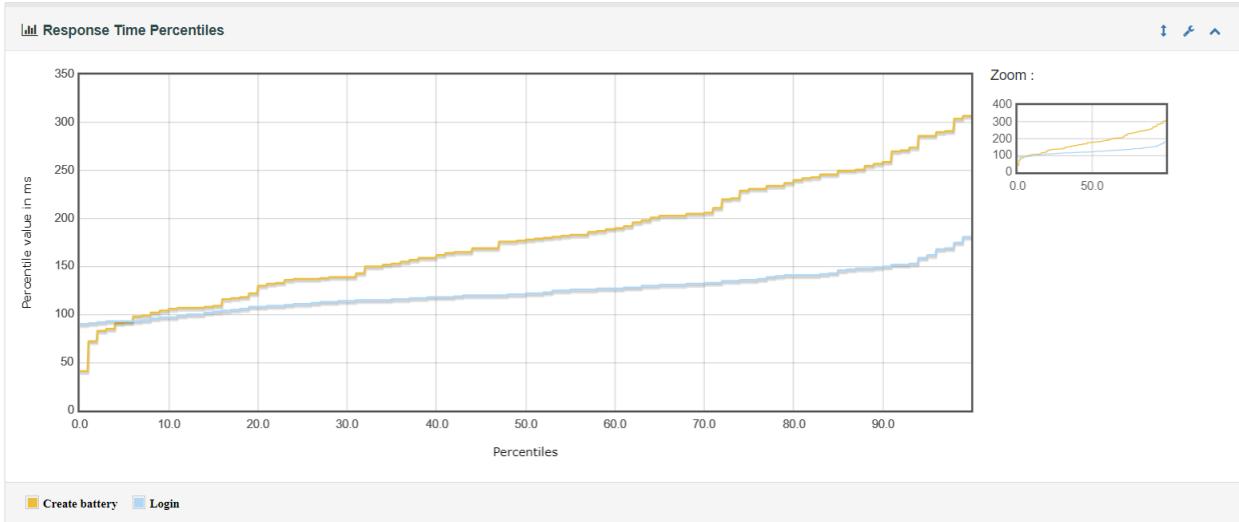
- Korisnik se prijavljuje na sistem i kreira bateriju.

Rezultati:

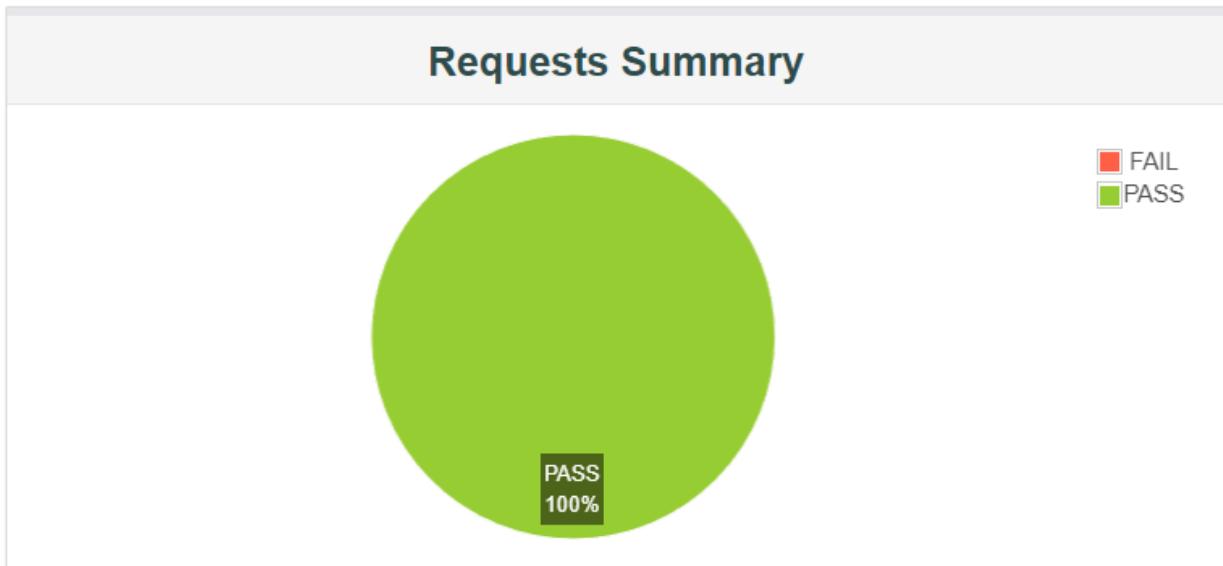
- 100 korisnika, 100 pokrenutih simulatora



Statistics														
Requests		Executions			Response Times (ms)						Throughput		Network (KB/sec)	
Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent	
Total	200	0	0.00%	151.75	41	307	136.50	239.70	258.90	303.87	161.94	127.70	5527.34	
Create battery	100	0	0.00%	179.47	41	307	177.50	258.80	286.00	306.97	91.83	70.57	6246.77	
Login	100	0	0.00%	124.02	90	181	121.50	149.90	161.85	180.94	92.25	74.59	21.71	

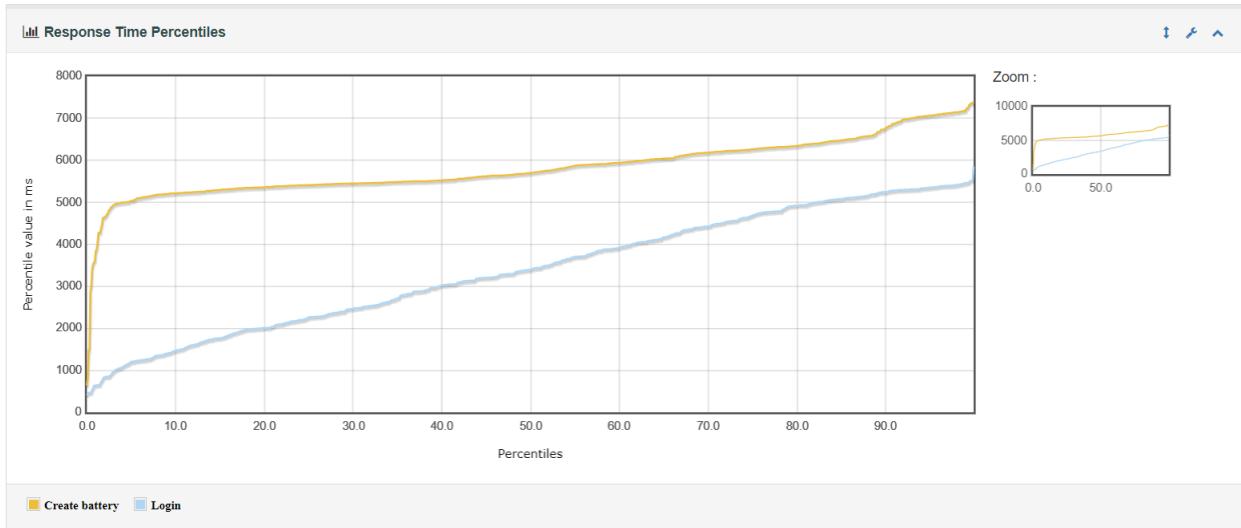


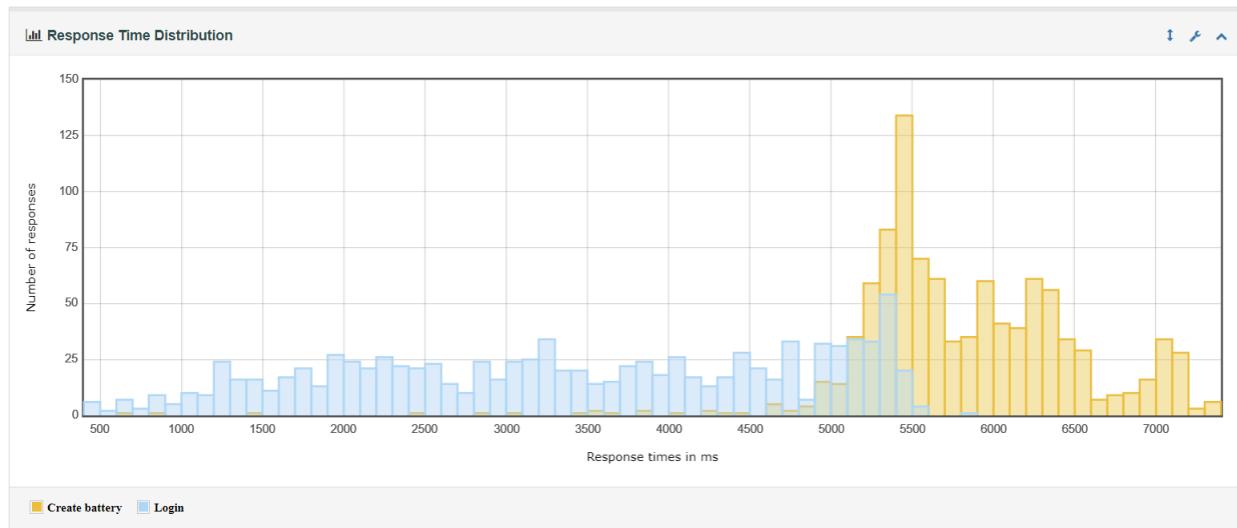
- 1000 korisnika, 100 pokrenutih simulatora



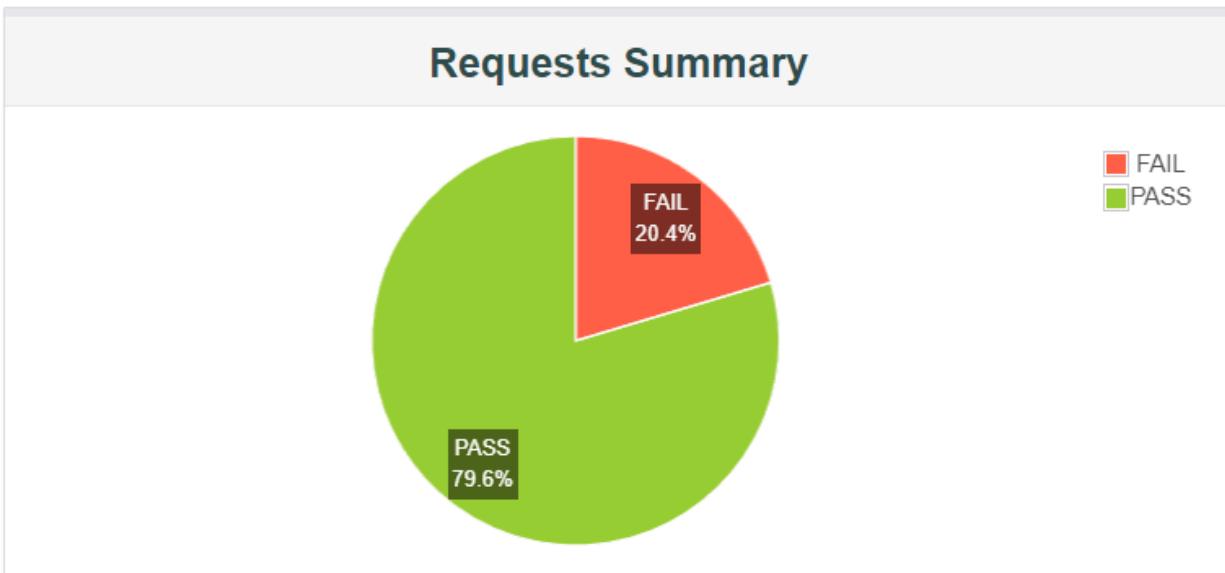
Statistics

Requests	Executions				Response Times (ms)							Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent	
Total	2000	0	0.00%	4613.71	406	7395	5224.00	6346.40	6772.90	7145.99	147.11	116.03	5021.11		
Create battery	1000	0	0.00%	5825.86	637	7395	5703.50	6771.80	7063.90	7182.00	76.26	58.63	5187.72		
Login	1000	0	0.00%	3401.56	406	5854	3400.00	5245.90	5349.00	5458.00	155.04	125.36	36.49		





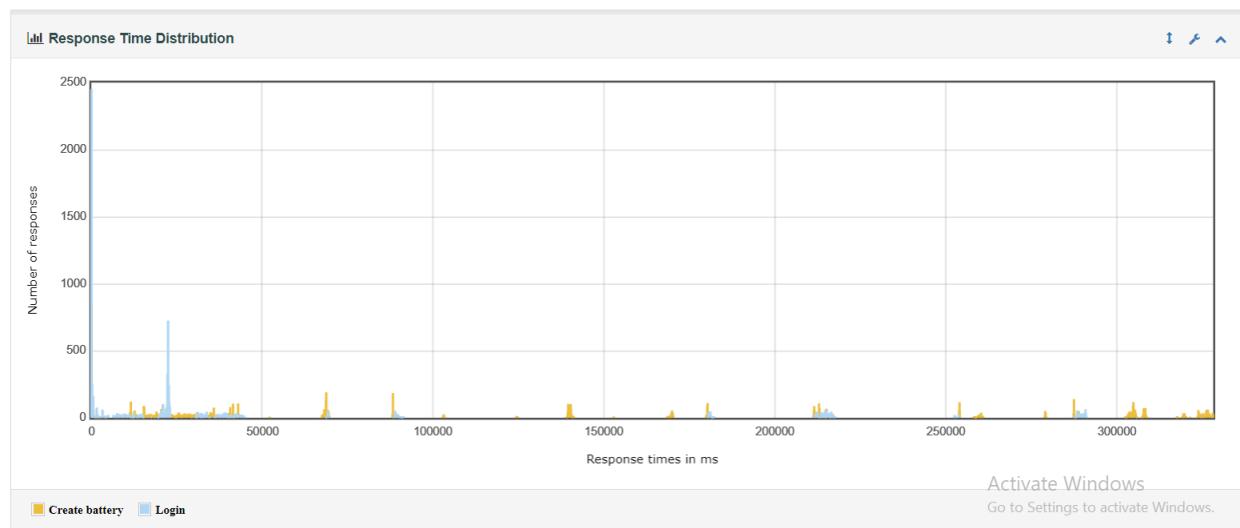
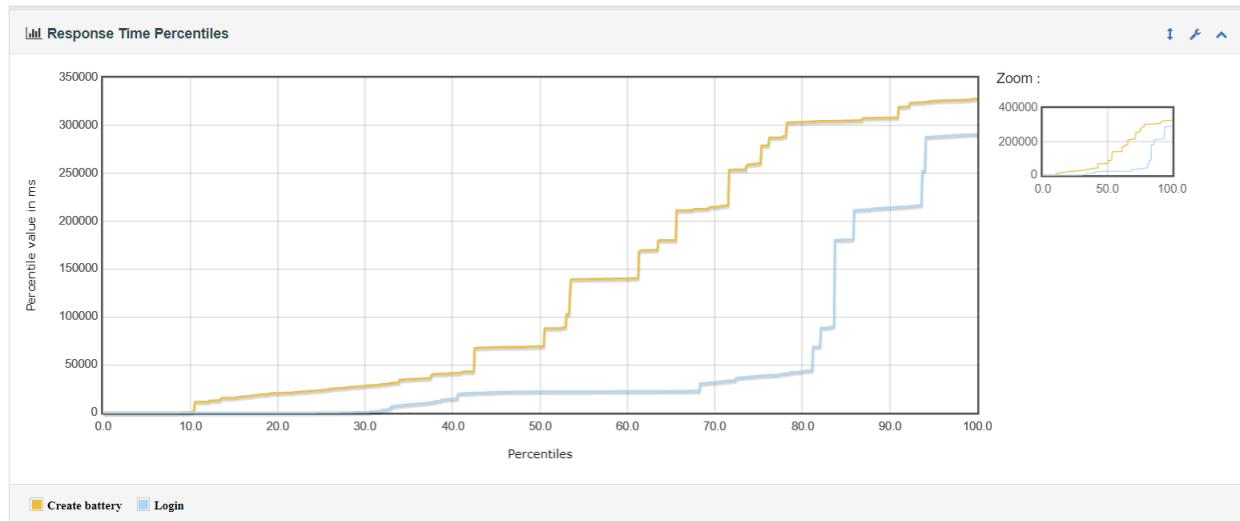
- 10000 korisnika, 100 pokrenutih simulatora



Statistics

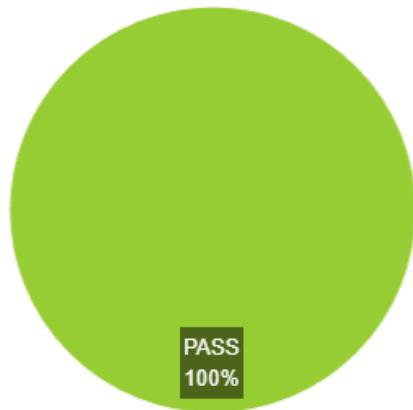
Requests	Executions				Response Times (ms)								Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent		
Total	20000	4080	20.40%	93551.66	0	328224	29606.00	303959.60	308404.00	326708.99	51.30	59.02	1568.44			
Create battery	10000	1030	10.30%	134234.32	0	328224	69395.00	308404.00	325827.15	327184.95	25.66	24.52	1565.01			
Login	10000	3050	30.50%	52868.99	0	291292	22270.00	214522.90	288587.65	290844.99	31.21	41.99	5.10			

Errors			
Type of error	Number of errors	% in errors	% in all samples
Non HTTP response code: org.apache.http.conn.HttpHostConnectException/Non HTTP response message: Connect to localhost:8080 [localhost/127.0.0.1, localhost/0:0:0:0:0:1] failed: Connection refused: connect	4076	99.90%	20.38%
Non HTTP response code: java.net.SocketException/Non HTTP response message: No buffer space available (maximum connections reached?): connect	4	0.10%	0.02%



- 100 korisnika, 1000 pokrenutih simulatora

Requests Summary

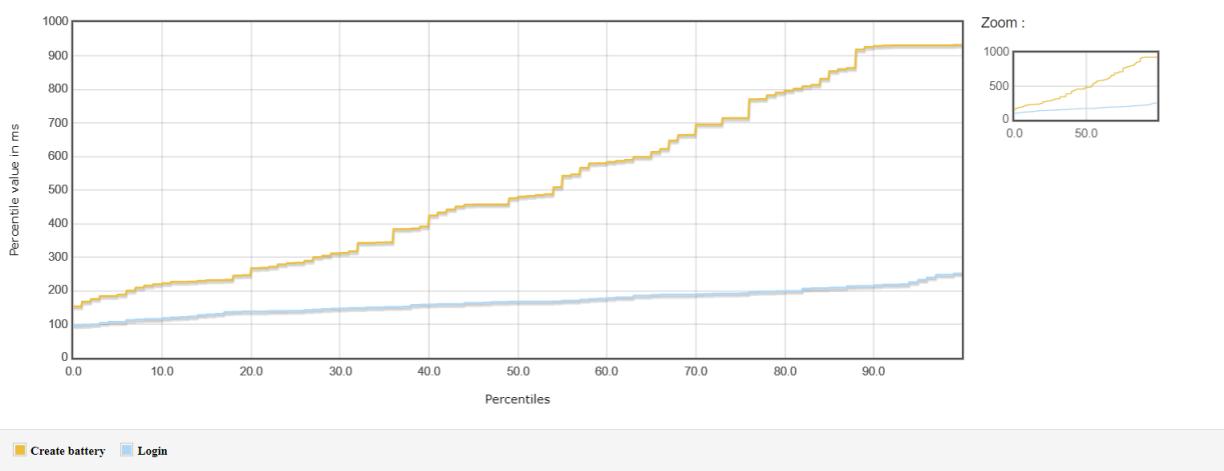


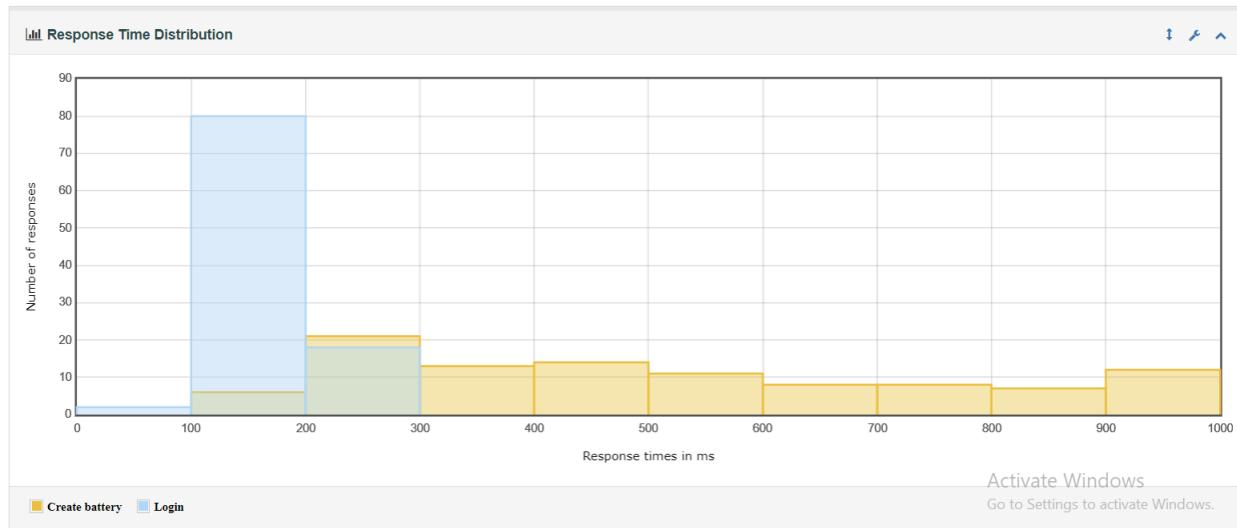
FAIL
PASS

Statistics

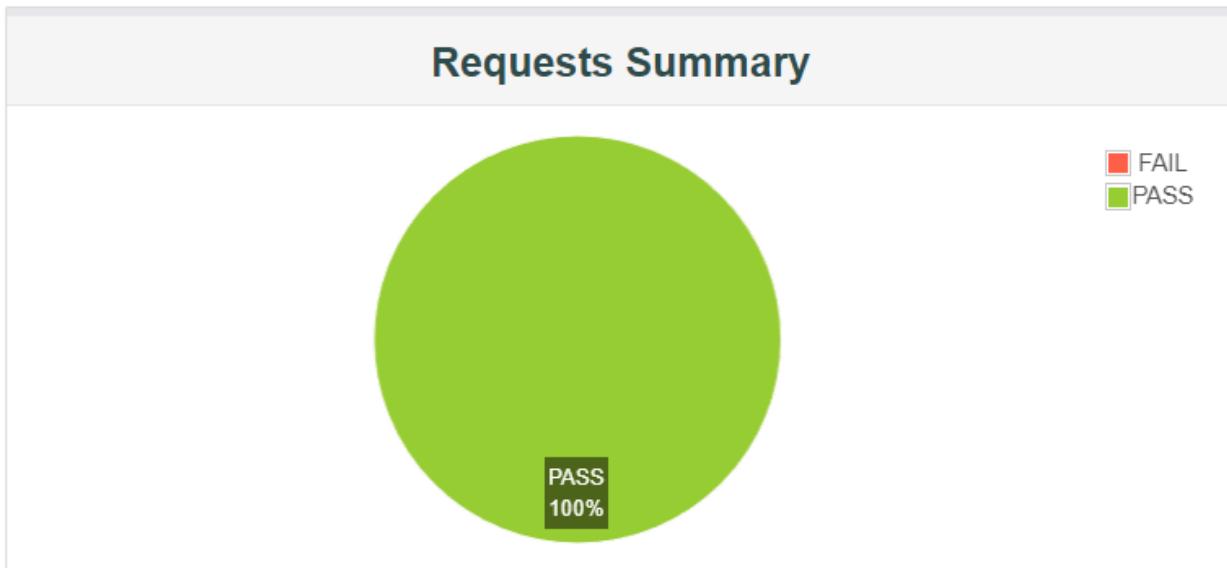
Requests	Executions				Response Times (ms)							Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent	
Total	200	0	0.00%	342.09	97	932	217.00	795.40	928.85	931.00	151.63	119.72	5175.26		
Create battery	100	0	0.00%	516.51	153	932	477.50	928.70	931.00	931.99	90.74	69.92	6172.98		
Login	100	0	0.00%	167.67	97	251	167.00	215.80	231.65	250.96	92.00	74.39	21.65		

Response Time Percentiles



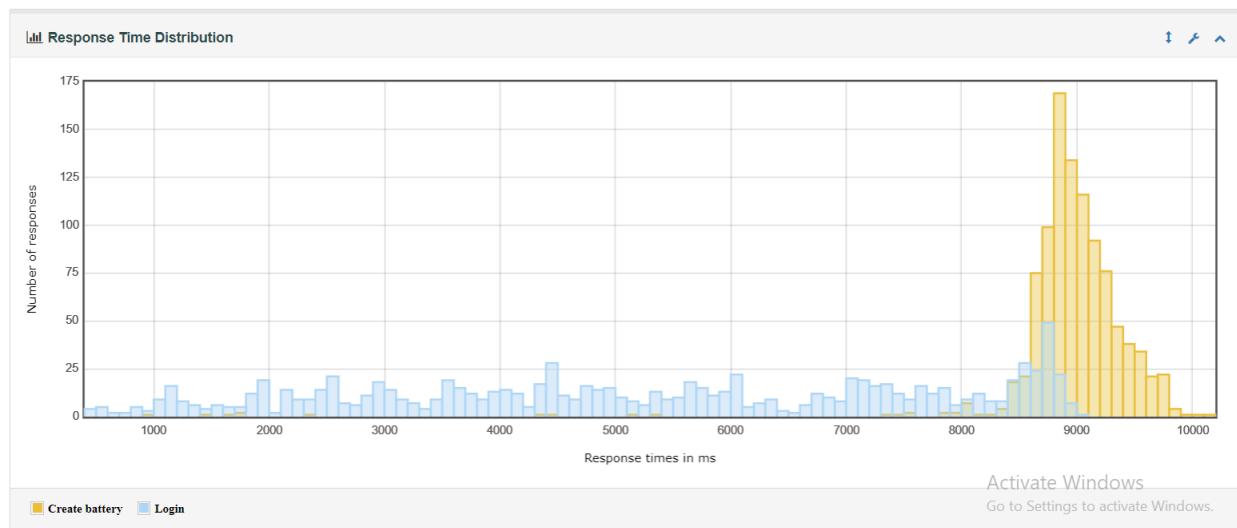
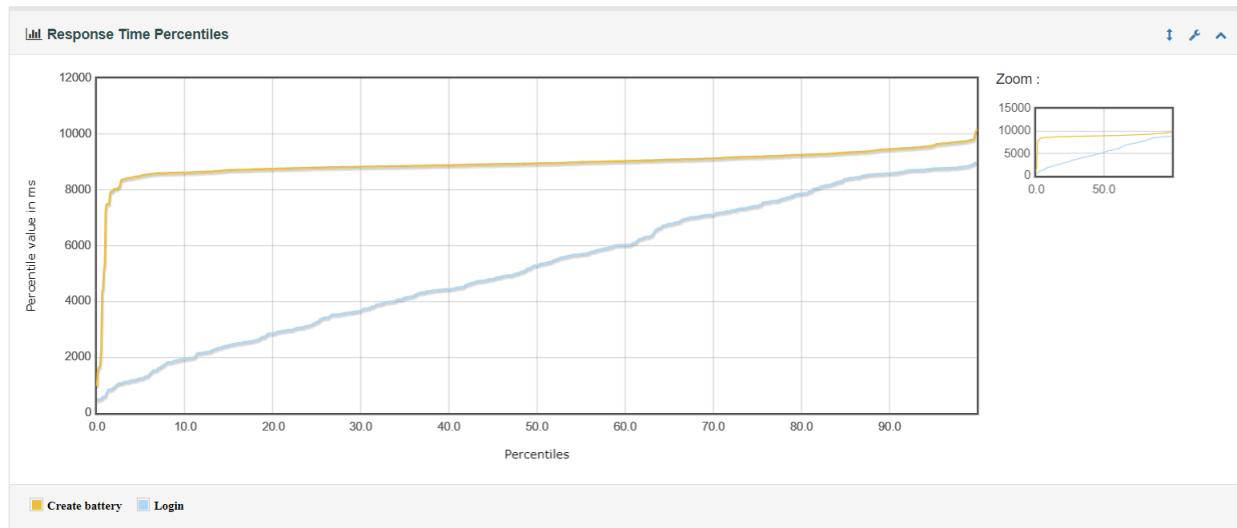


- 1000 korisnika, 1000 pokrenutih simulatora

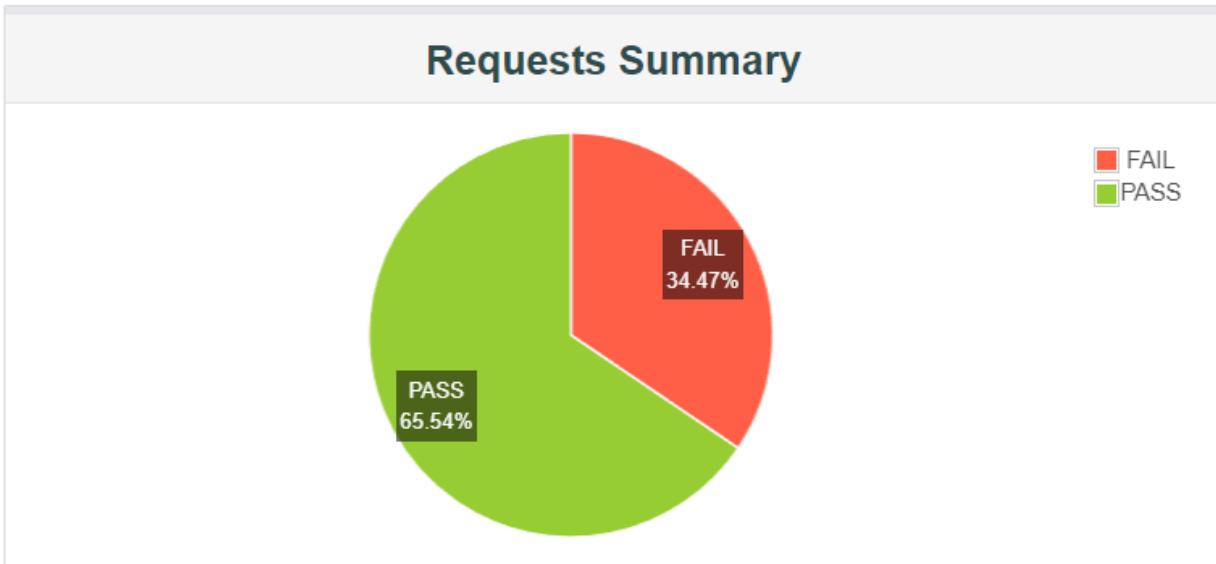


Statistics

Requests	Executions				Response Times (ms)								Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent		
Total	2000	0	0.00%	7117.10	471	10182	8619.50	9265.00	9462.00	9731.97	101.97	80.51	3480.34			
Create battery	1000	0	0.00%	8941.55	957	10182	8958.50	9462.00	9601.40	9773.93	52.49	40.44	3570.28			
Login	1000	0	0.00%	5292.64	471	9011	5313.50	8603.00	8773.95	8867.91	101.13	81.78	23.80			

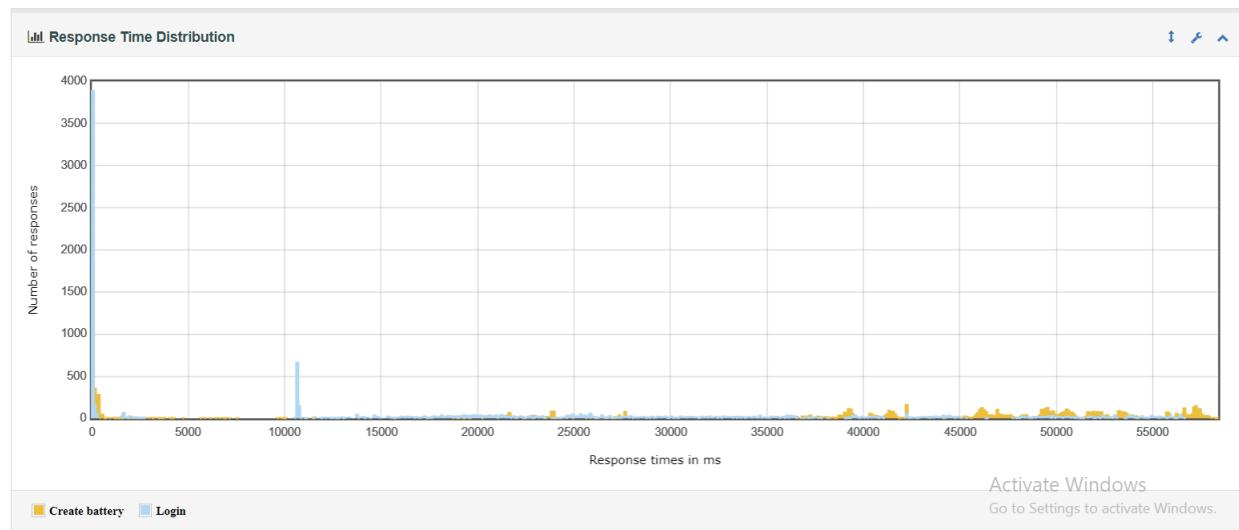
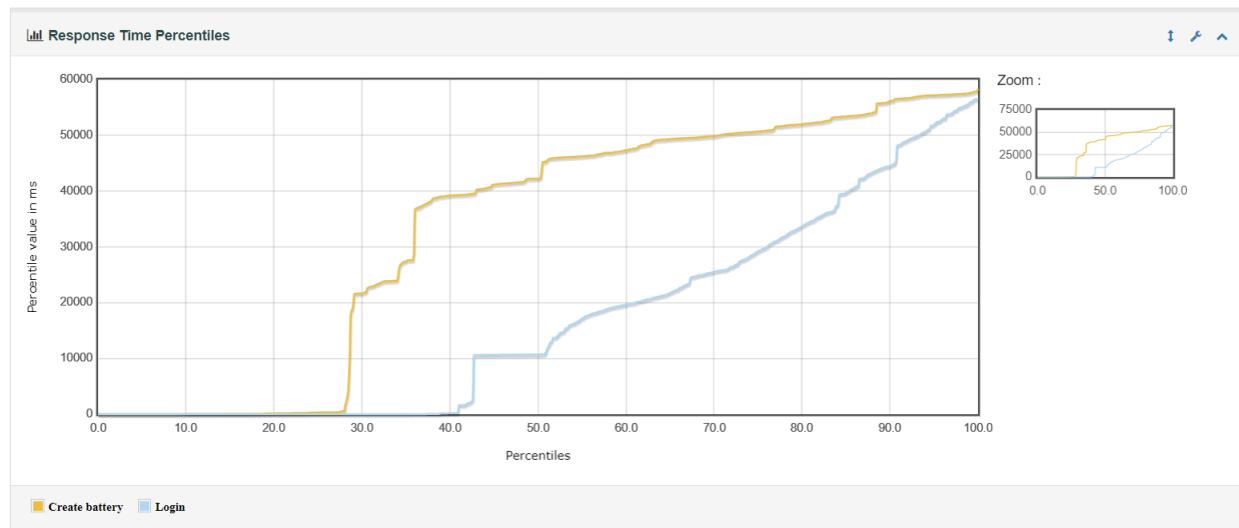


- 10000 korisnika, 1000 pokrenutih simulatora

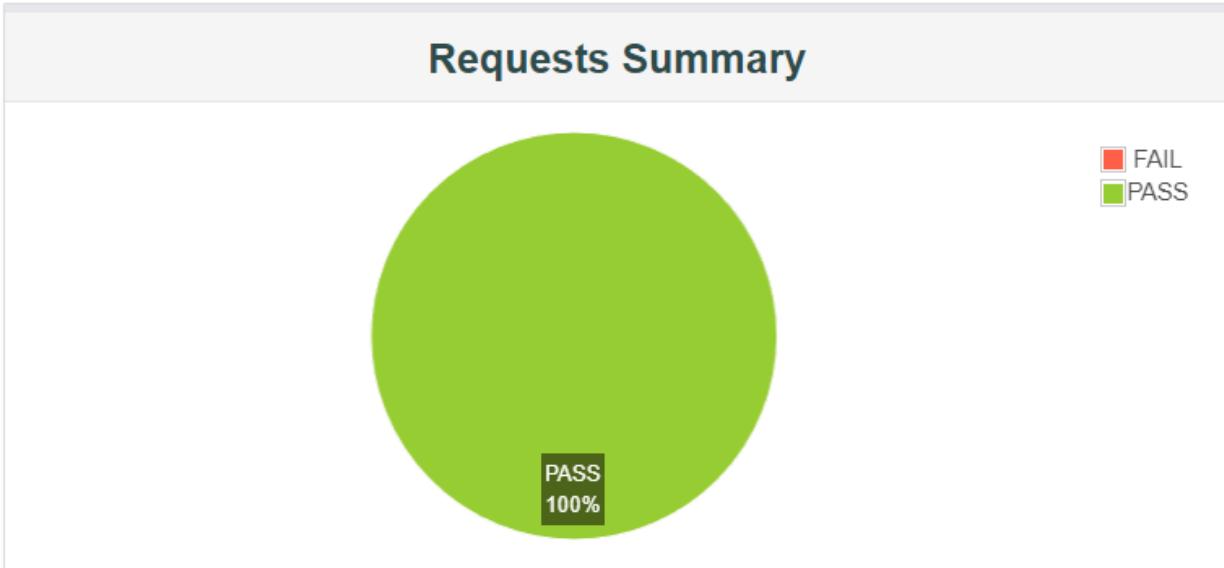


Statistics															
Requests	Executions				Response Times (ms)							Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent	
Total	20000	6893	34.47%	24909.14	0	58337	23847.00	53245.10	56411.25	57431.00	179.75	251.96	4413.18		
Create battery	10000	2799	27.99%	33102.27	0	58337	42247.00	56209.00	57200.00	57586.00	89.92	114.56	4402.94		
Login	10000	4094	40.94%	16716.02	0	56636	10716.00	44539.90	51890.85	55810.00	138.41	211.69	19.24		

Errors				
Type of error	Number of errors	% in errors	% in all samples	
Non HTTP response code: org.apache.http.conn.HttpHostConnectException/Non HTTP response message: Connect to localhost:8080 [localhost/127.0.0.1, localhost/0:0:0:0:0:1] failed: Connection refused: connect	6893	100.00%	34.47%	

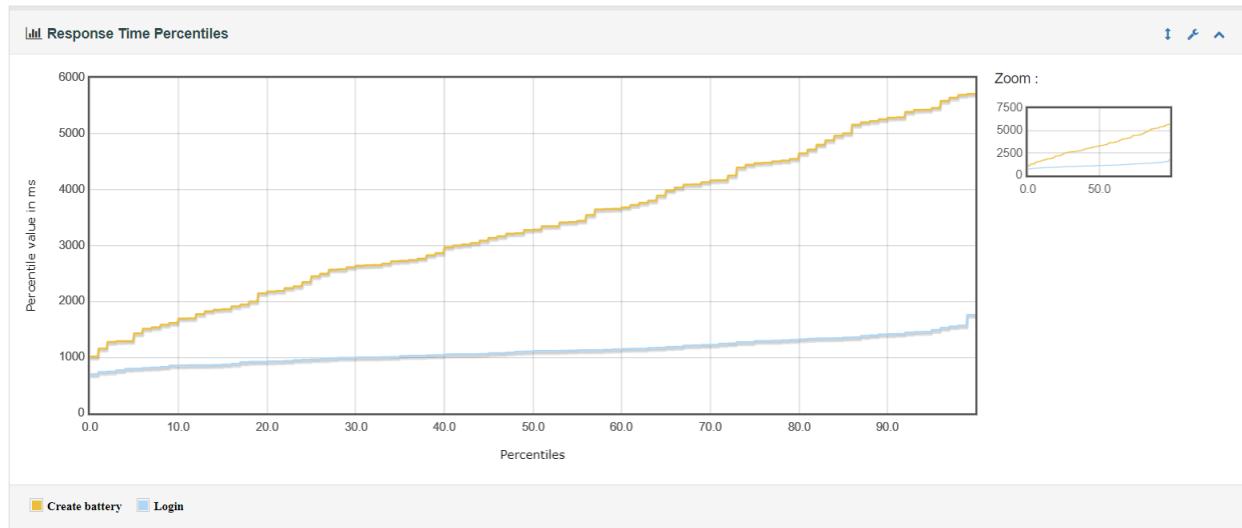


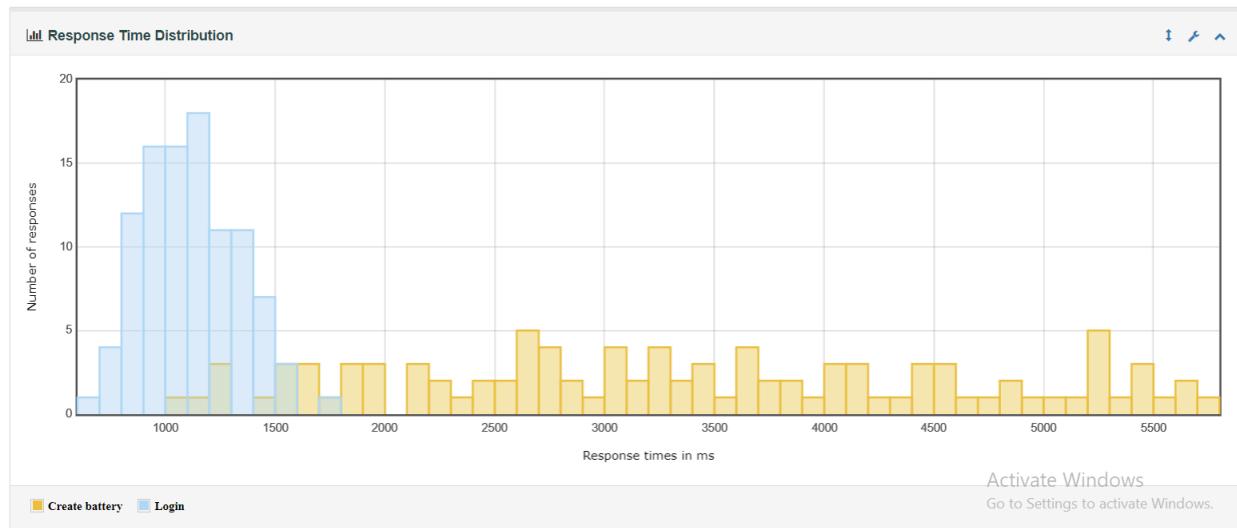
- 100 korisnika, 10000 pokrenutih simulatora



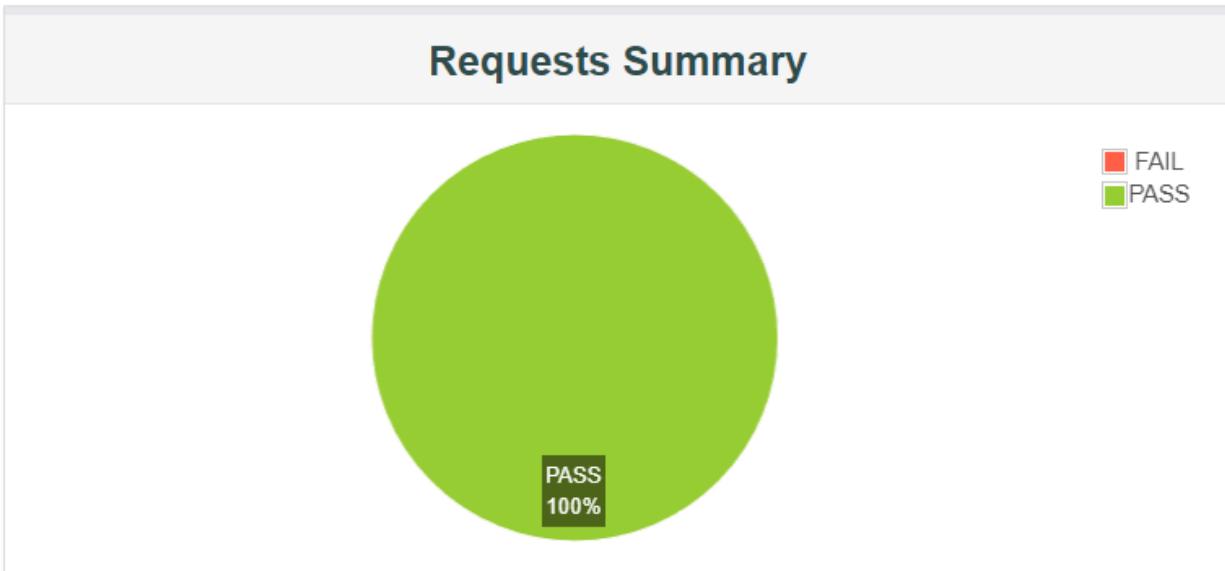
Statistics

Requests	Executions				Response Times (ms)							Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent	
Total	200	0	0.00%	2245.42	698	5714	1455.50	4640.00	5286.45	5694.51	26.12	20.65	891.39		
Create battery	100	0	0.00%	3374.72	1013	5714	3281.00	5284.90	5462.25	5713.81	15.09	11.65	1026.21		
Login	100	0	0.00%	1116.12	698	1760	1108.00	1415.60	1488.40	1758.09	47.82	38.67	11.26		



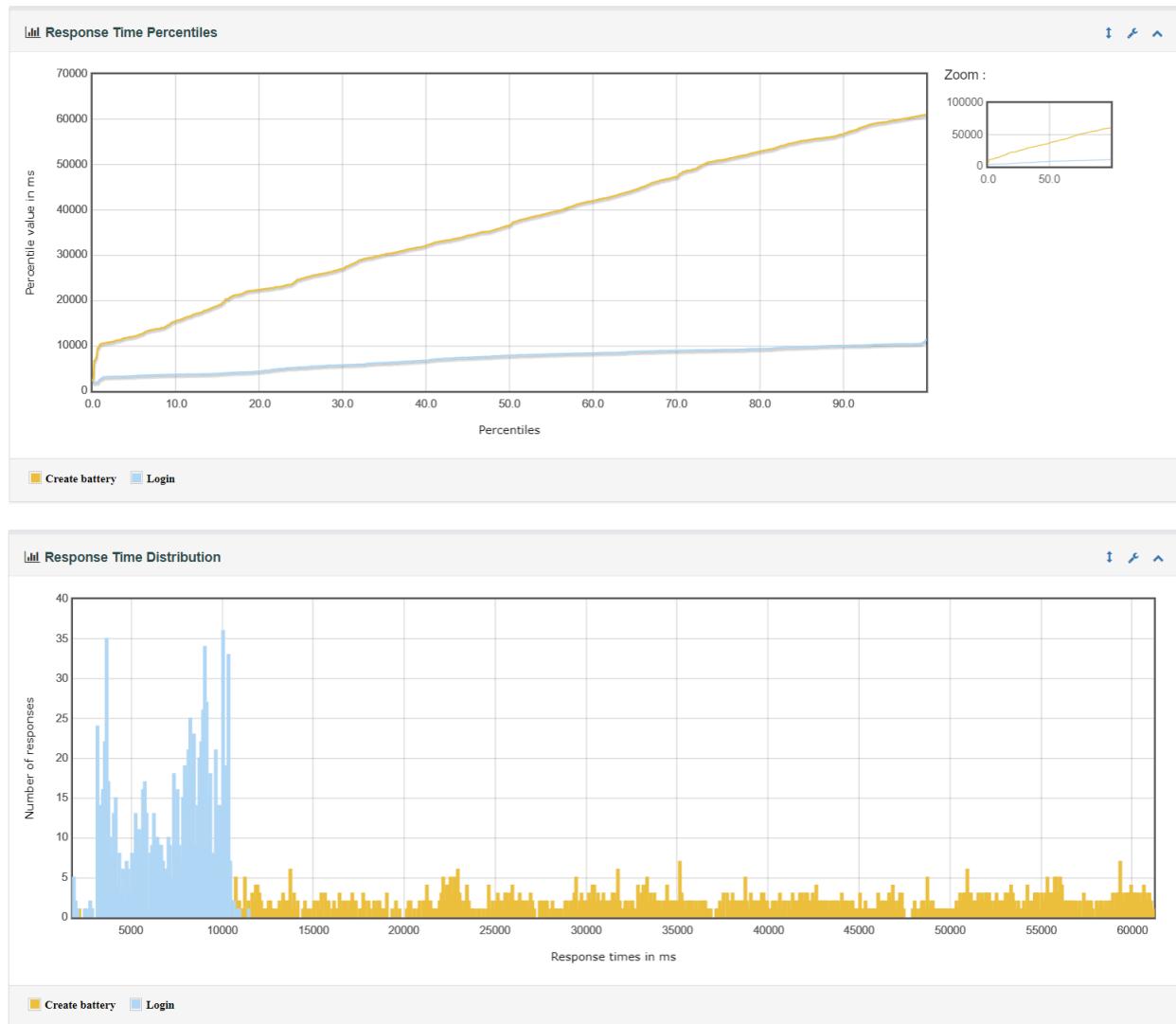


- 1000 korisnika, 10000 pokrenutih simulatora



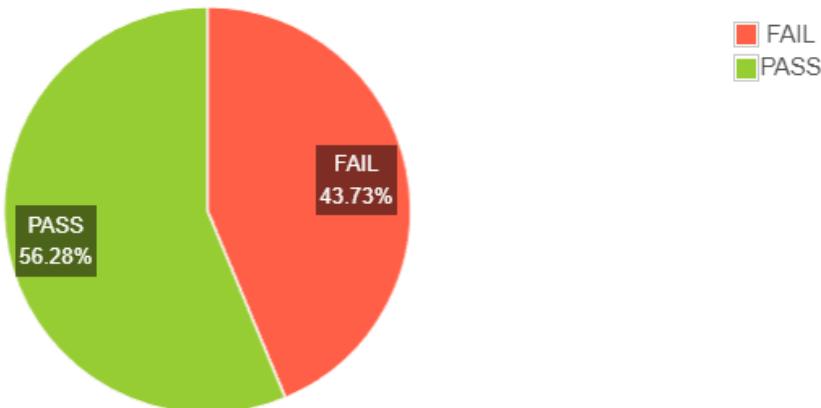
Statistics

Requests	Executions				Response Times (ms)							Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent	
Total	2000	0	0.00%	22047.06	1823	61105	10405.00	52971.40	56835.60	60416.67	27.07	21.40	923.98		
Create battery	1000	0	0.00%	36926.14	2140	61105	36685.00	56832.20	59427.20	60755.64	13.90	10.74	945.48		
Login	1000	0	0.00%	7167.98	1823	11478	7833.50	10027.80	10283.00	10415.90	78.30	63.31	18.43		



- 10000 korisnika, 10000 pokrenutih simulatora

Requests Summary

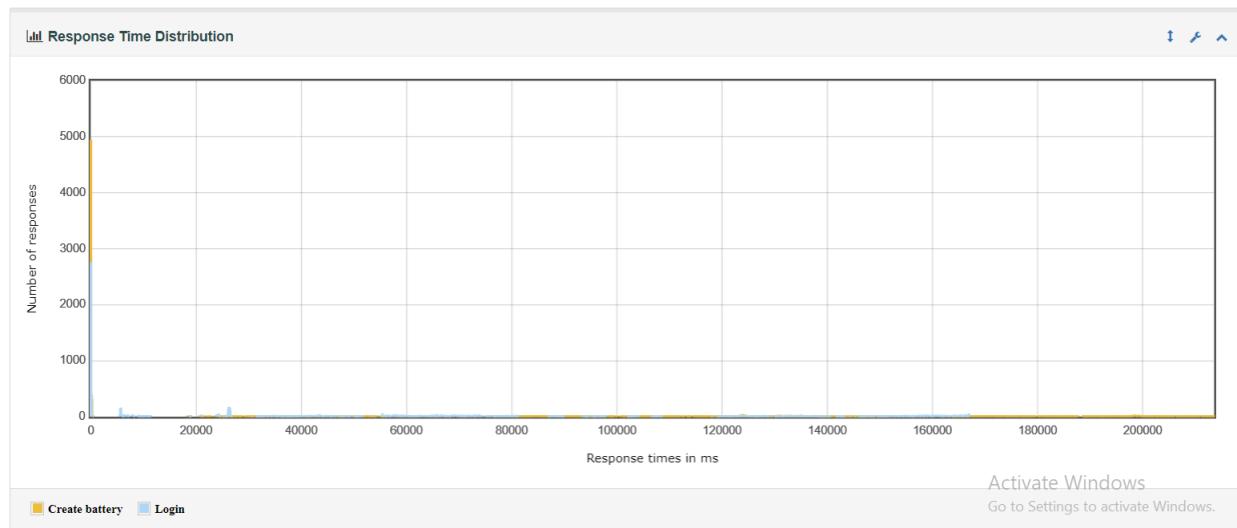
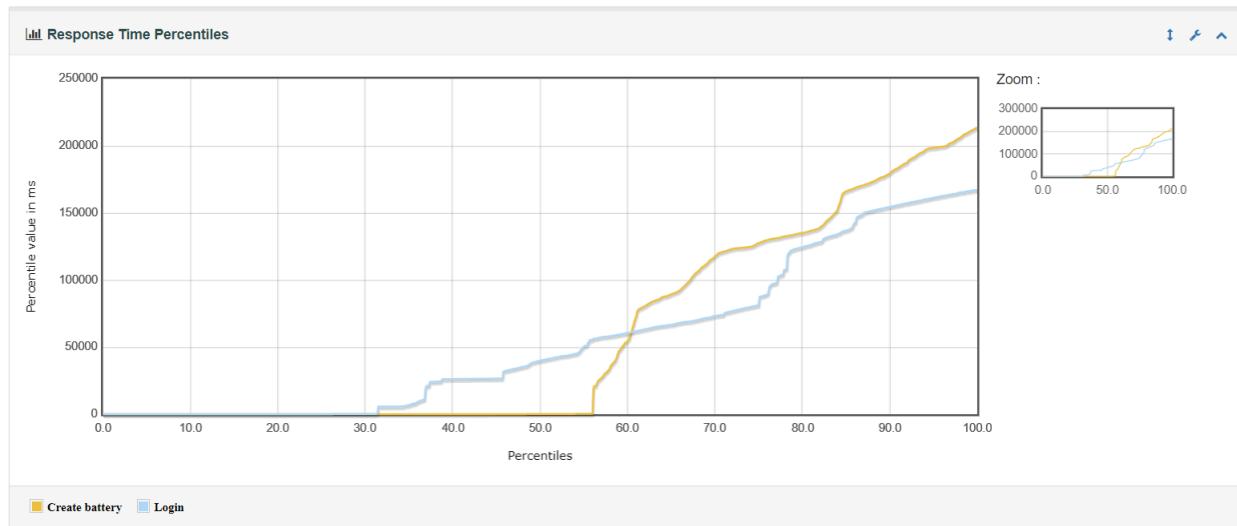


Statistics

Requests	Executions				Response Times (ms)								Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent		
Total	20000	8745	43.73%	56996.79	0	213533	26380.50	161924.20	179459.75	205812.62	59.85	87.34	899.17			
Create battery	10000	5605	56.05%	58896.04	0	213533	123.50	179457.50	198543.80	210101.64	29.94	48.60	894.90			
Login	10000	3140	31.40%	55097.55	0	167034	39889.00	154489.40	161309.85	166176.00	51.14	66.28	8.26			

Errors

Type of error	Number of errors	% in errors	% in all samples
Non HTTP response code: java.net.BindException/Non HTTP response message: Address already in use: connect	7071	80.86%	35.35%
Non HTTP response code: org.apache.http.conn.HttpHostConnectException/Non HTTP response message: Connect to localhost:8080 [localhost/127.0.0.1, localhost/0:0:0:0:0:1] failed: Connection refused: connect	1206	13.79%	6.03%
Non HTTP response code: java.net.SocketException/Non HTTP response message: No buffer space available (maximum connections reached?): connect	468	5.35%	2.34%



Zaključak:

- Server dobro podnosi opterećenje od 1000 korisnika, dok kod 10000 odbija oko 20-40% zahteva.
- Sa 1000 korisnika i 1000 pokrenutih simulatora vreme odziva je prihvatljivo i svi zahtevi su obrađeni. Kada je bar jedan od brojeva 100, vreme odziva dosta dobro.

2 - Kreiranje punjača električnih vozila

Opis:

- Korisnik se prijavljuje na sistem i kreira punjač za električna vozila.

Rezultati:

- Rezultati su isti kao kod kreiranja baterije

3 - Kreiranje sistema solarnih panela

Opis:

- Korisnik se prijavljuje na sistem i kreira sistem solarnih panela.

Rezultati:

- Rezultati su isti kao kod kreiranja baterije

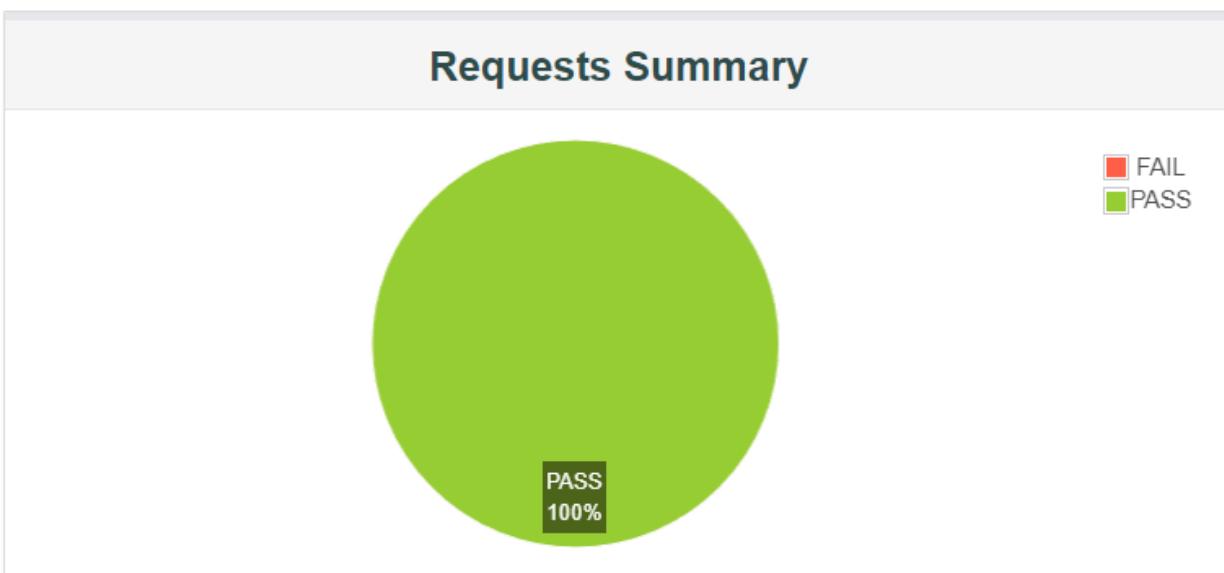
4 - Dobavljanje grafa stanja baterije

Opis:

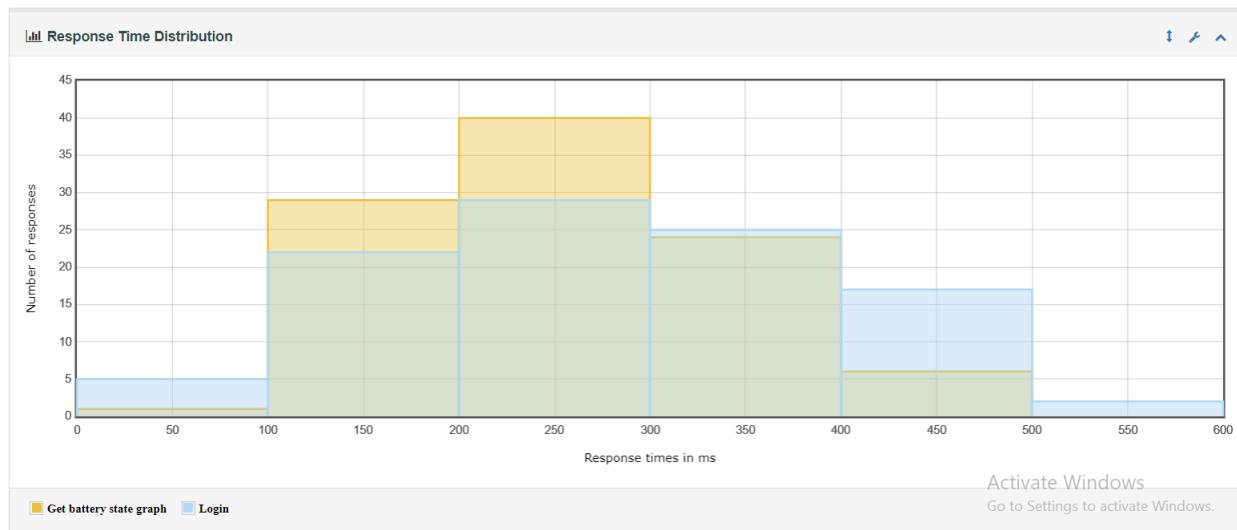
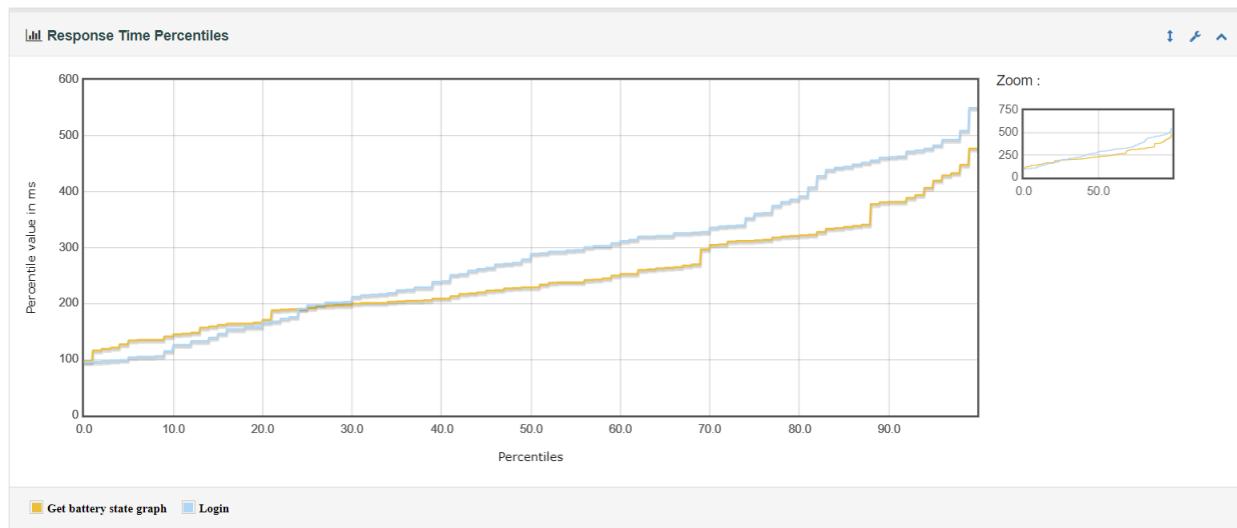
- Admin se prijavljuje na sistem i dobavlja graf stanja baterije.

Rezultati:

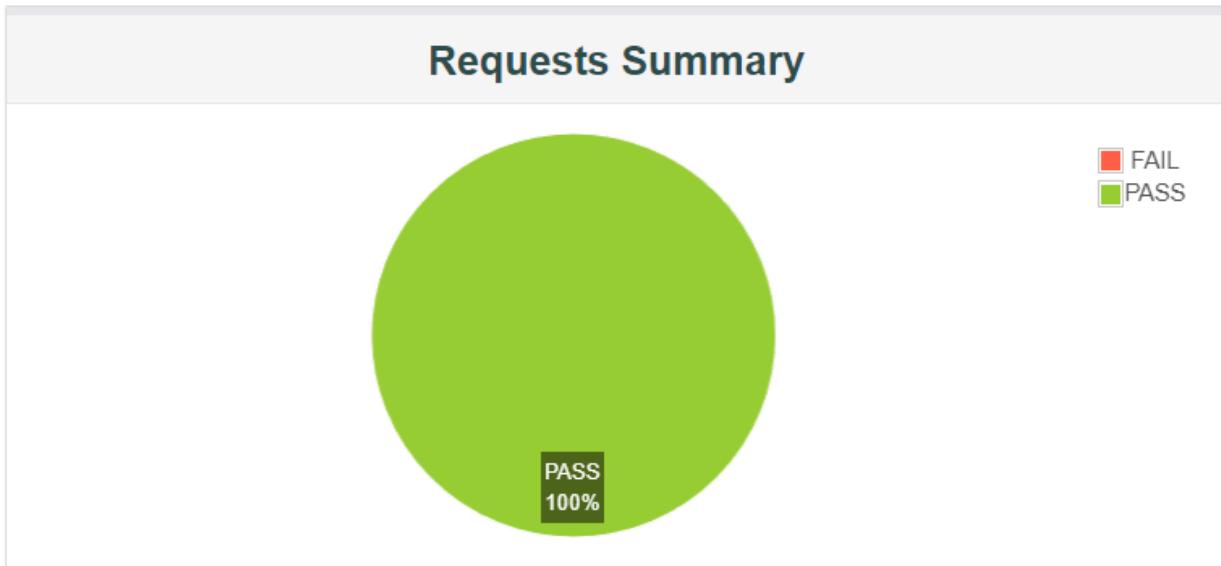
- 100 korisnika, 100 pokrenutih simulatora



Statistics															
Requests	Executions				Response Times (ms)							Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent	
Total	200	0	0.00%	264.60	95	550	247.50	432.60	462.95	508.84	138.79	290.12	59.89		
Get battery state graph	100	0	0.00%	247.43	97	477	229.00	381.90	419.35	476.71	78.55	264.88	49.30		
Login	100	0	0.00%	281.77	95	550	284.00	461.90	482.70	549.59	77.40	62.58	18.22		

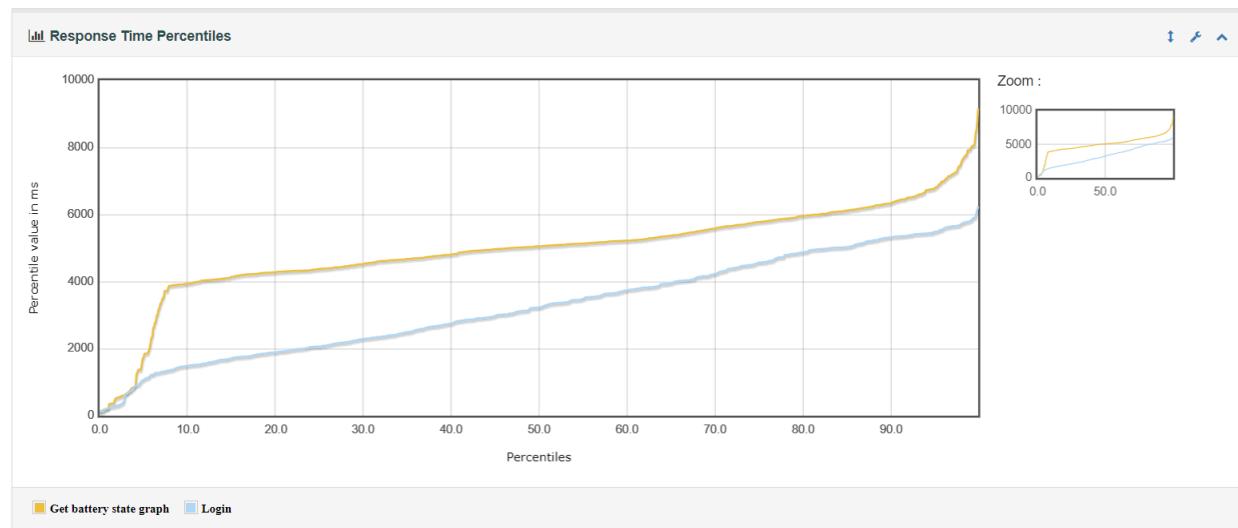


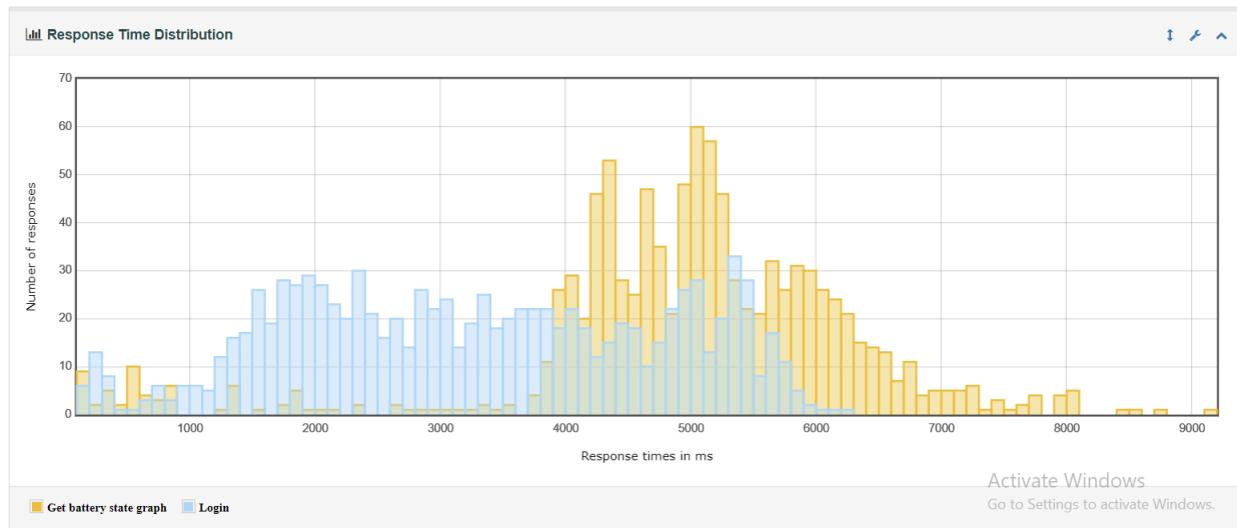
- 1000 korisnika, 100 pokrenutih simulatora



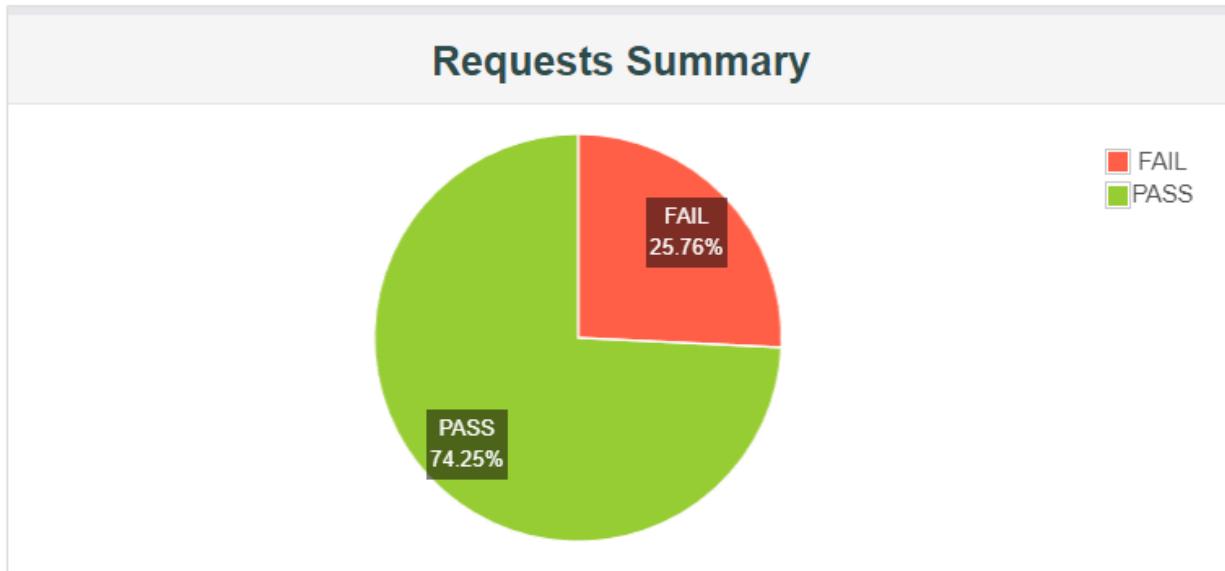
Statistics

Requests	Executions				Response Times (ms)							Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent	
Total	2000	0	0.00%	4118.39	117	9160	4430.00	5962.80	6345.15	7564.16	158.48	331.26	68.48		
Get battery state graph	1000	0	0.00%	4952.59	119	9160	5052.00	6344.30	6790.80	7931.95	80.08	270.01	50.36		
Login	1000	0	0.00%	3284.19	117	6236	3227.00	5325.40	5484.75	5806.89	133.35	107.83	31.38		





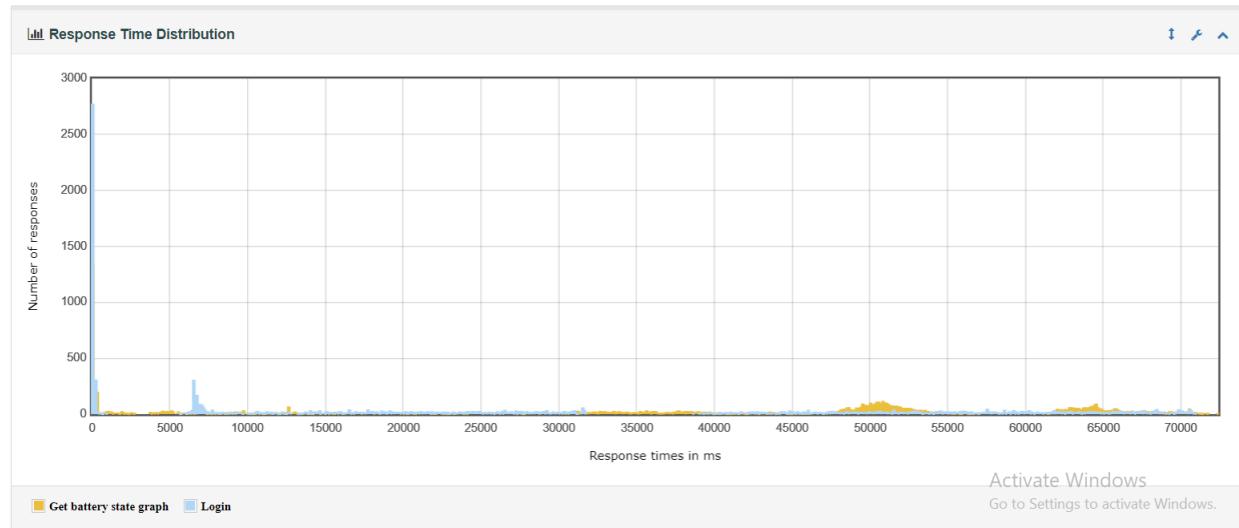
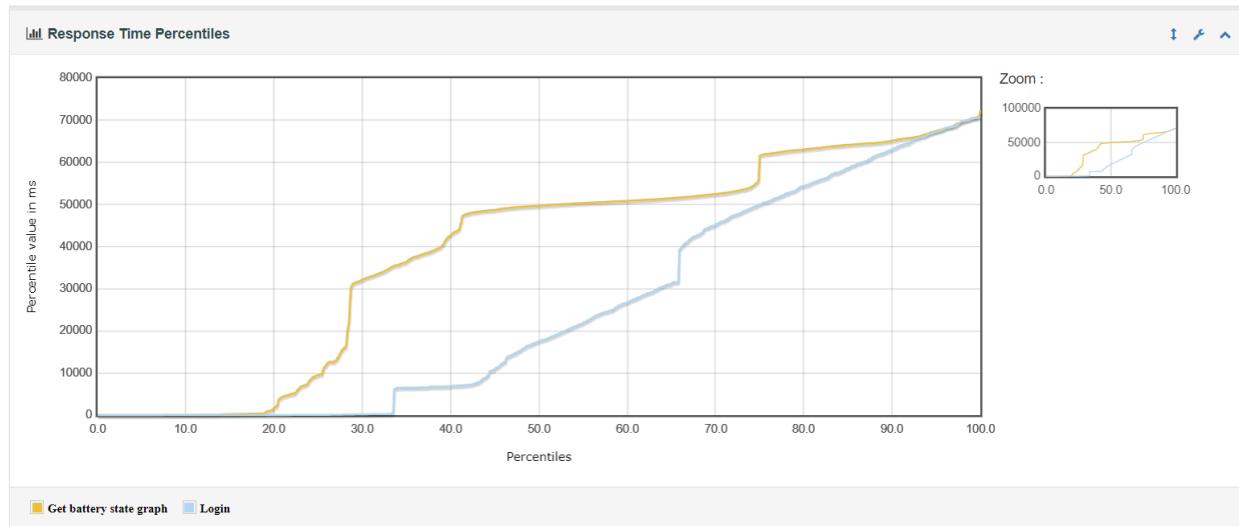
- 10000 korisnika, 100 pokrenutih simulatora



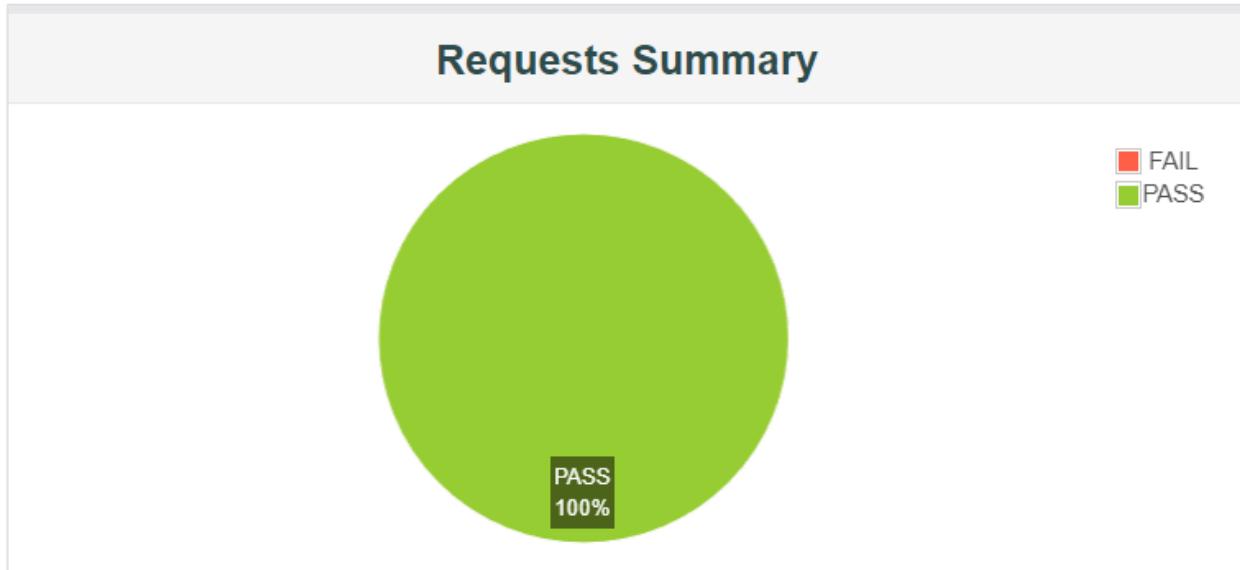
Statistics

Requests	Executions				Response Times (ms)							Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent	
Total	20000	5151	25.75%	31895.79	0	72339	35757.50	64639.00	67401.95	70378.99	151.16	344.47	48.97		
Get battery state graph	10000	1851	18.51%	38934.22	0	72339	49748.00	65165.90	67489.95	70470.96	75.69	241.94	37.10		
Login	10000	3300	33.00%	24857.36	0	70933	17605.50	63112.00	67299.95	70336.00	119.32	162.43	18.81		

Type of error	Number of errors	% in errors	% in all samples
Non HTTP response code: org.apache.http.conn.HttpHostConnectException/Non HTTP response message: Connect to localhost:8080 [localhost/127.0.0.1, localhost/0:0:0:0:0:1] failed: Connection refused: connect	3285	63.77%	16.43%
Non HTTP response code: java.net.BindException/Non HTTP response message: Address already in use: connect	1866	36.23%	9.33%

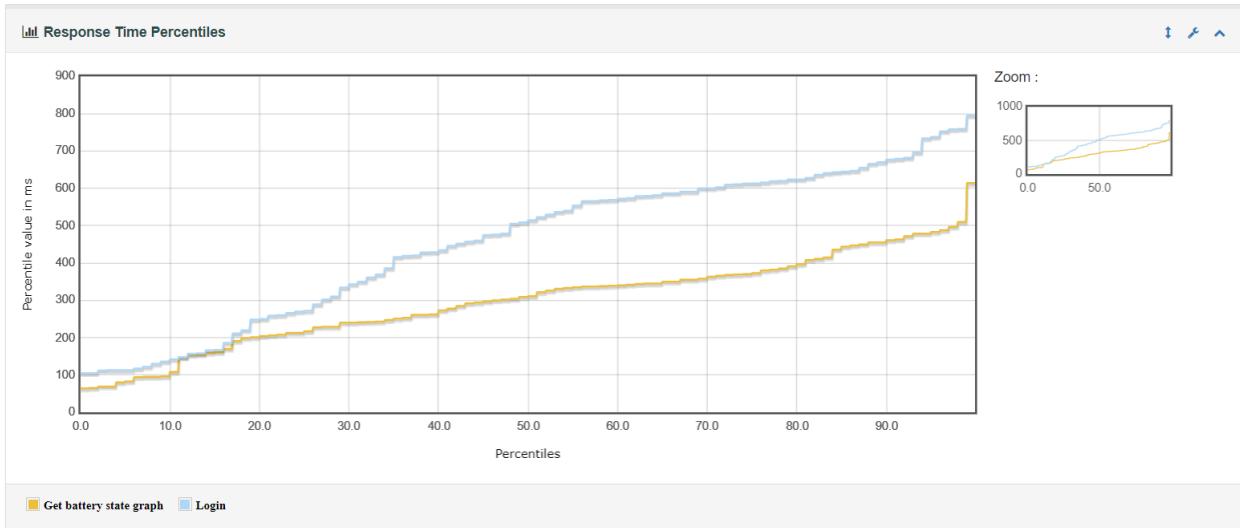


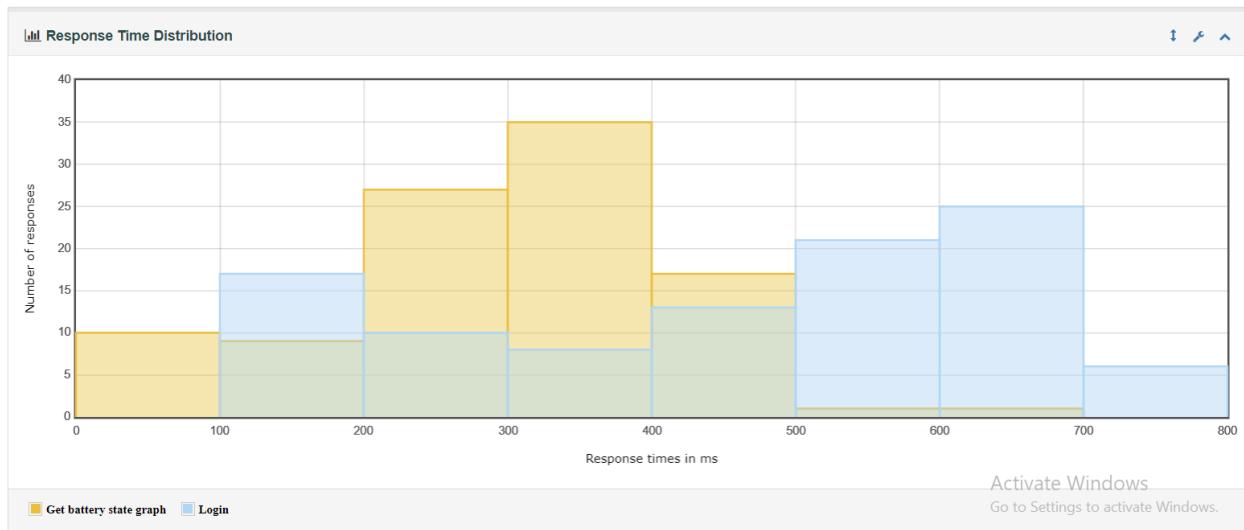
- 100 korisnika, 1000 pokrenutih simulatora



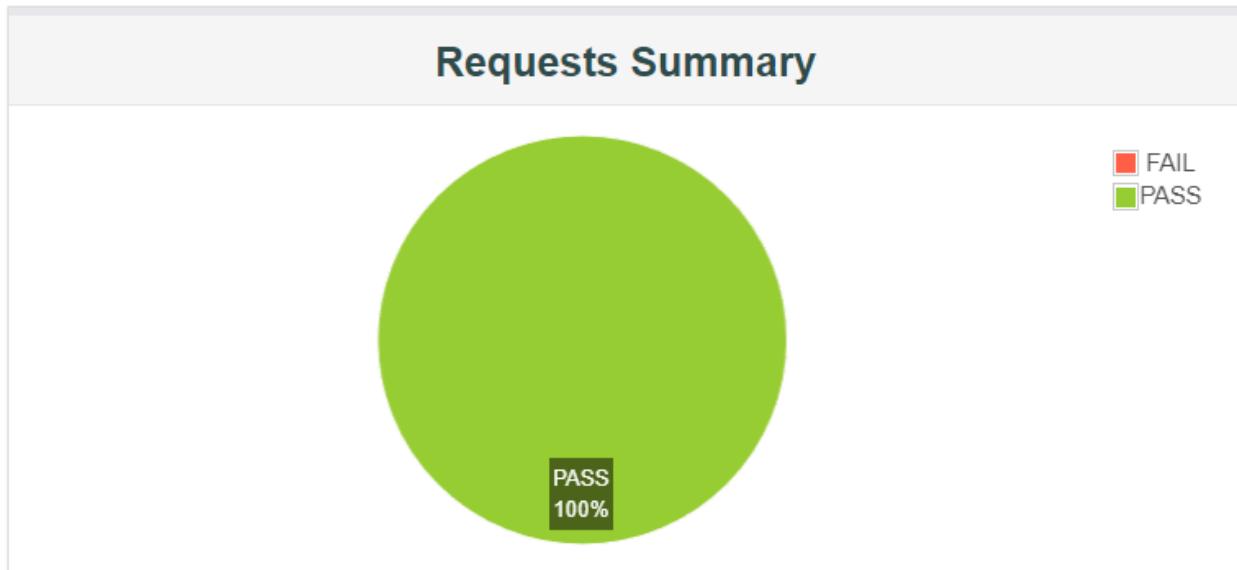
Statistics

Requests	Executions				Response Times (ms)							Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent	
Total	200	0	0.00%	377.21	64	795	355.00	624.00	676.65	758.99	109.59	229.07	47.36		
Get battery state graph	100	0	0.00%	298.81	64	614	310.00	460.40	482.80	612.96	58.17	196.16	36.59		
Login	100	0	0.00%	455.61	105	795	512.00	676.30	737.80	794.64	64.27	51.97	15.13		



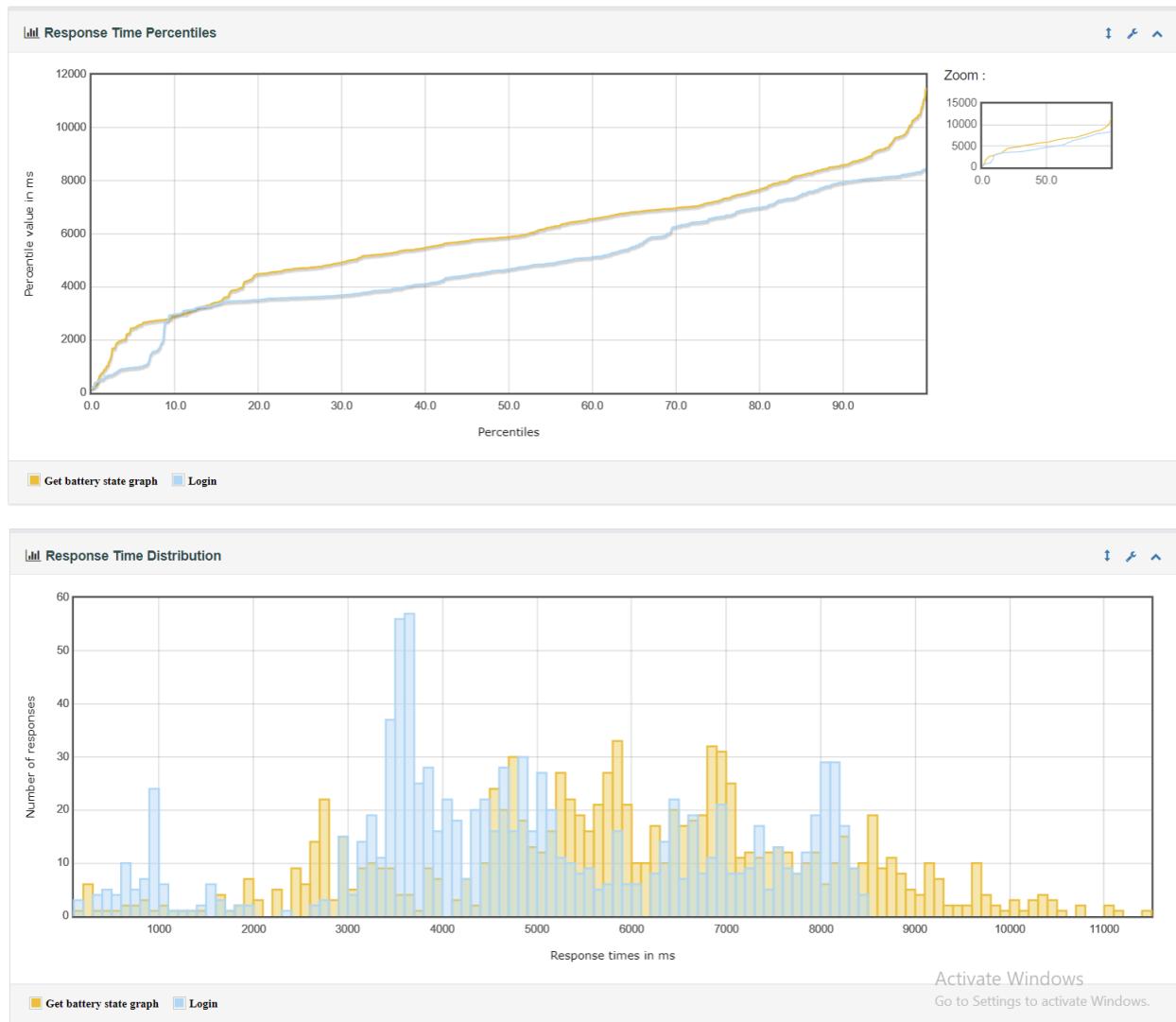


- 1000 korisnika, 1000 pokrenutih simulatora

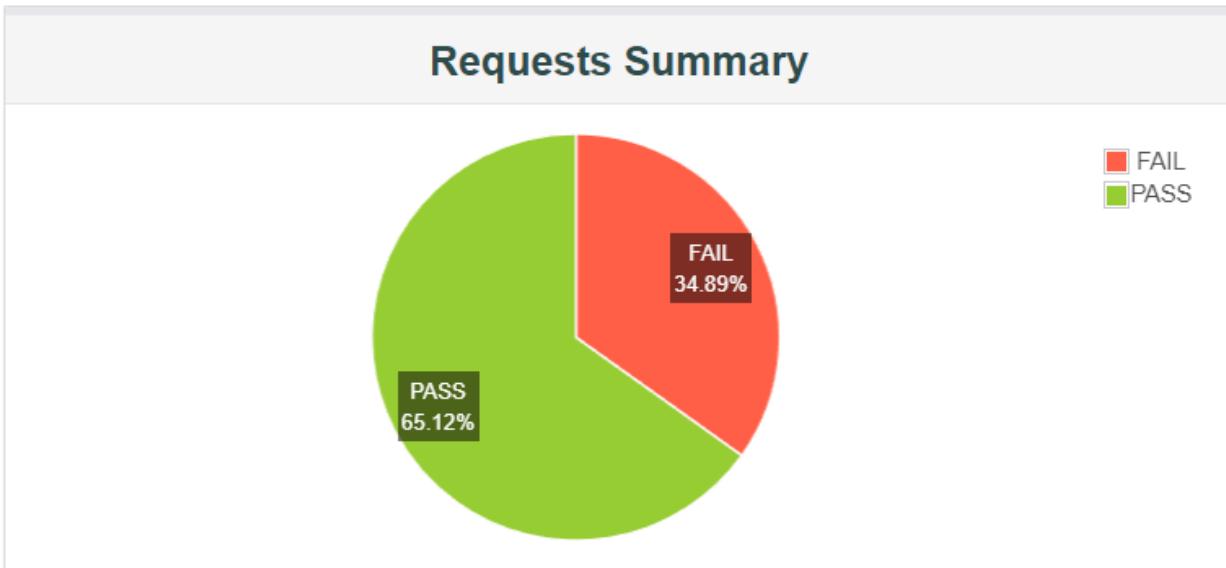


Statistics

Requests	Executions				Response Times (ms)									Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent			
Total	2000	0	0.00%	5412.88	149	11499	5347.00	8157.90	8590.90	10094.50	107.54	224.80	46.47				
Get battery state graph	1000	0	0.00%	5911.63	149	11499	5884.00	8590.80	9207.65	10478.00	54.34	183.24	34.17				
Login	1000	0	0.00%	4914.13	181	8444	4667.00	7948.50	8141.80	8328.96	77.21	62.43	18.17				



- 10000 korisnika, 1000 pokrenutih simulatora

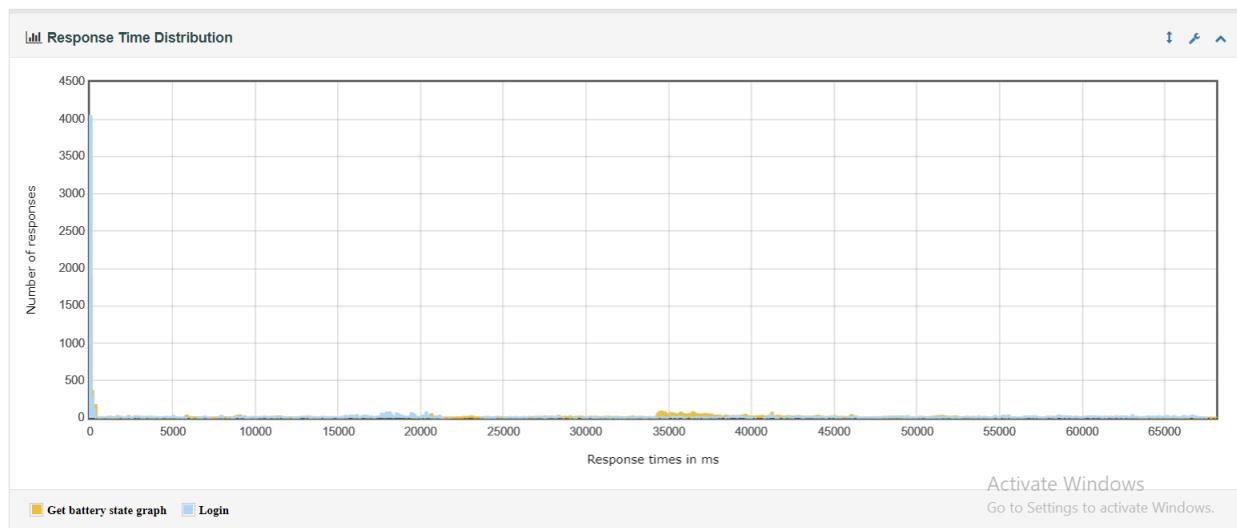
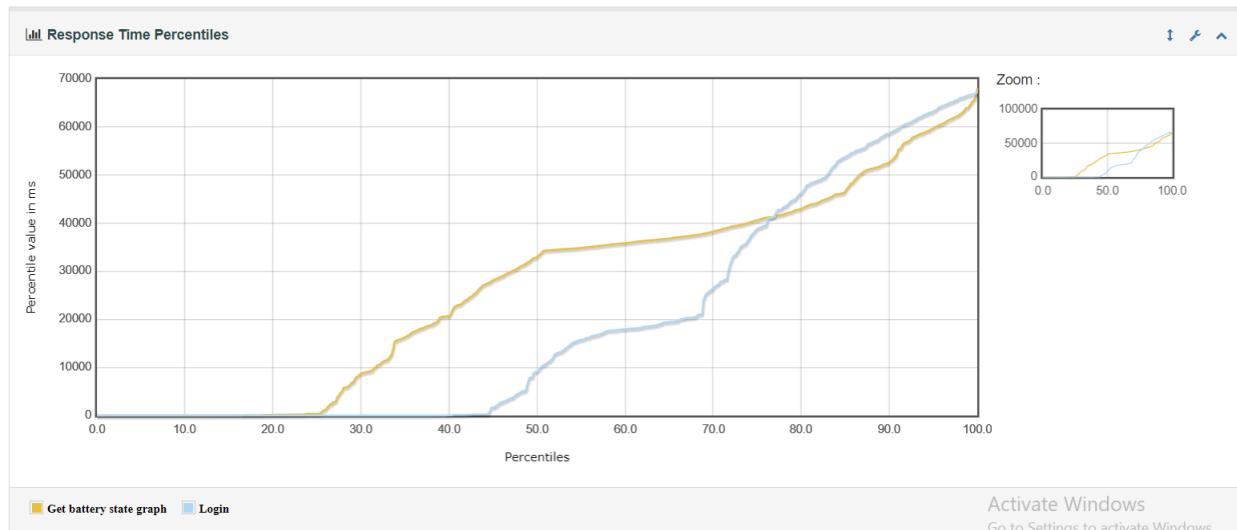


Statistics

Requests	Executions				Response Times (ms)									Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent			
Total	20000	6977	34.88%	22819.31	0	68088	18542.00	56829.50	61637.95	66157.00	153.51	365.20	43.82				
Get battery state graph	10000	2540	25.40%	26500.62	0	68088	33043.00	52746.10	59803.25	64106.73	76.86	243.49	33.82				
Login	10000	4437	44.37%	19138.00	0	67464	9246.00	58670.40	63225.00	66652.97	105.28	167.37	13.78				

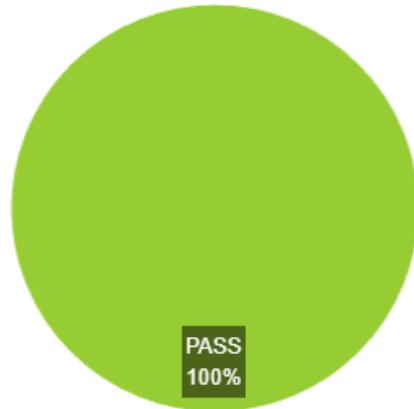
Errors

Type of error	Number of errors	% in errors	% in all samples
Non HTTP response code: org.apache.http.conn.HttpHostConnectException/Non HTTP response message: Connect to localhost:8080 [localhost/127.0.0.1, localhost/0:0:0:0:0:0:1] failed: Connection refused: connect	6977	100.00%	34.88%



- 100 korisnika, 10000 pokrenutih simulatora

Requests Summary

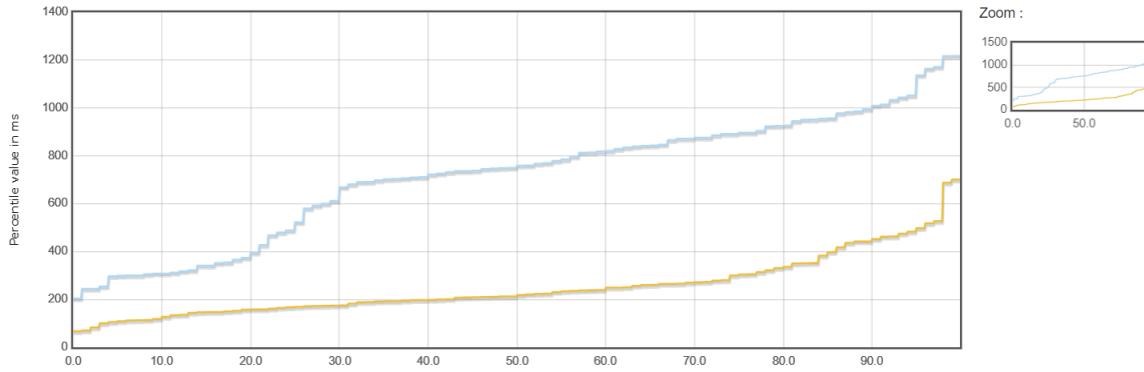


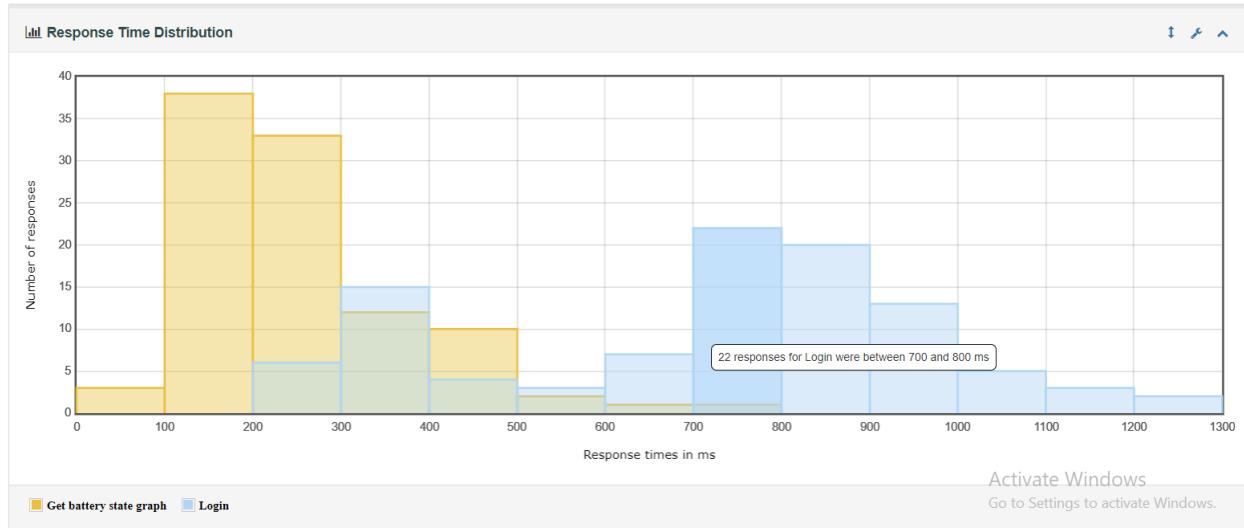
FAIL
PASS

Statistics

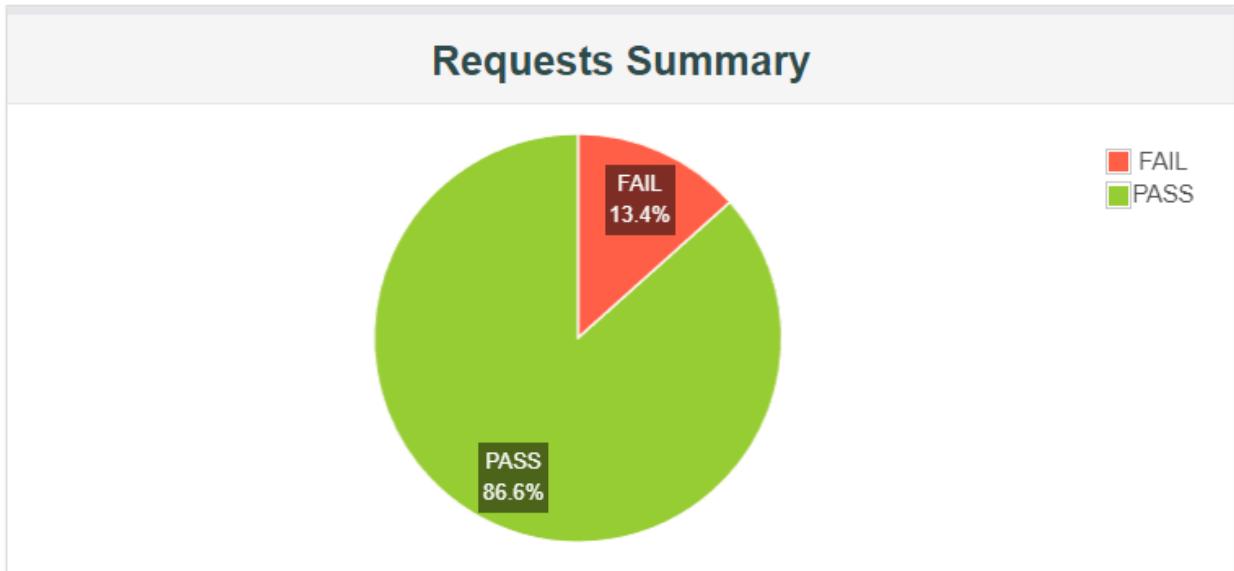
Requests	Executions				Response Times (ms)							Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent	
Total	200	0	0.00%	483.75	67	1218	352.00	926.80	1009.25	1216.55	102.25	70.05	44.21		
Get battery state graph	100	0	0.00%	251.12	67	701	215.00	451.00	497.25	700.87	57.11	32.07	35.95		
Login	100	0	0.00%	716.39	204	1218	754.50	1008.50	1132.75	1217.99	53.91	43.59	12.69		

Response Time Percentiles





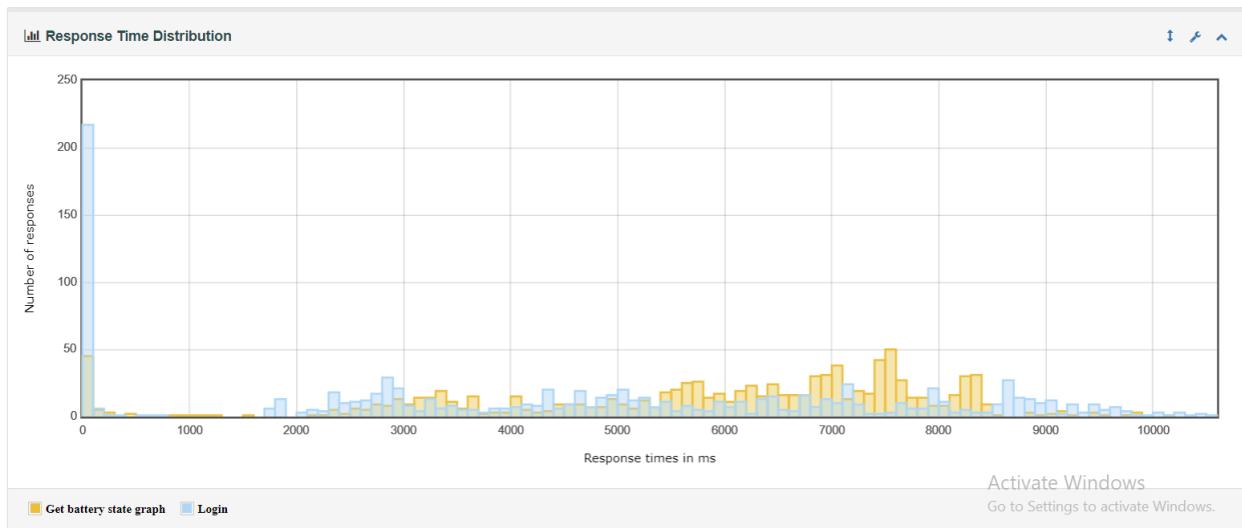
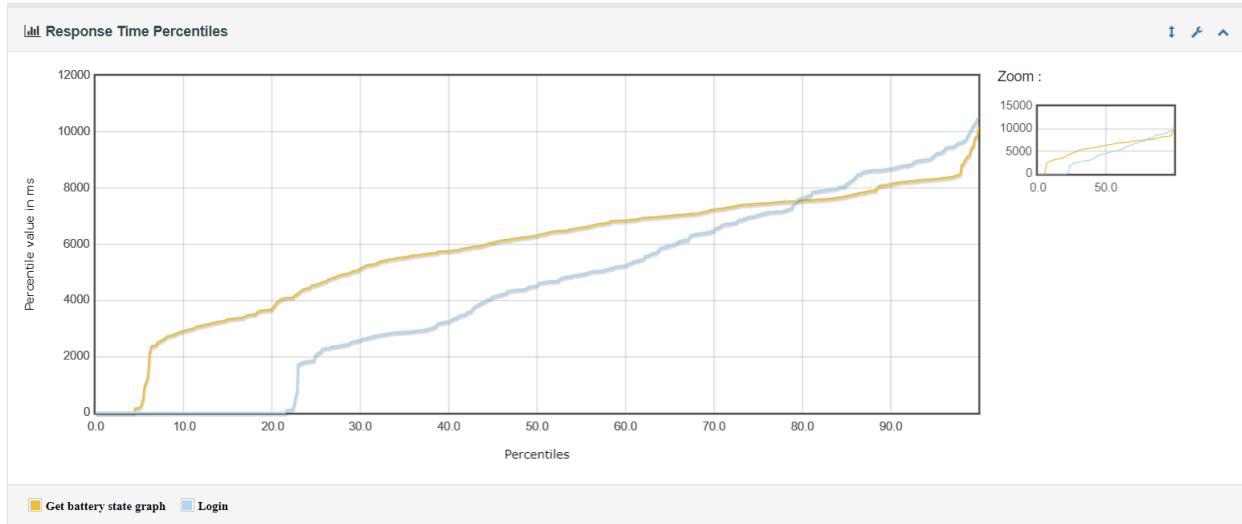
- 1000 korisnika, 10000 pokrenutih simulatora



Statistics

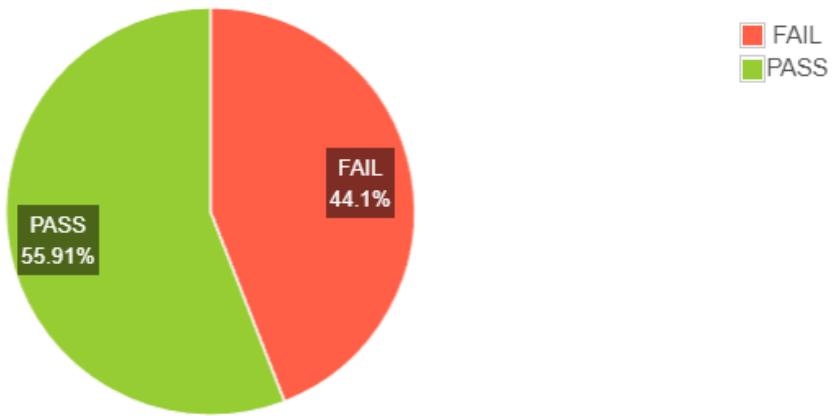
Requests	Executions				Response Times (ms)									Throughput		Network (KB/sec)	
	Label	#Samples	Fail	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent			
Total	2000	268	13.40%	5095.56	0	10522	5654.00	8306.90	8824.95	9755.52	133.20	123.40	50.38				
Get battery state graph	1000	44	4.40%	5789.61	0	10183	6330.00	8153.20	8328.00	9290.67	68.00	44.19	39.02				
Login	1000	224	22.40%	4401.51	0	10522	4580.00	8709.60	9200.00	10059.53	80.63	97.00	14.73				

Errors			
Type of error	Number of errors	% in errors	% in all samples
Non HTTP response code: org.apache.http.conn.HttpHostConnectException/Non HTTP response message: Connect to localhost:8080 [localhost/127.0.0.1, localhost/0:0:0:0:0:1] failed: Connection refused: connect	268	100.00%	13.40%



- 10000 korisnika, 10000 pokrenutih simulatora

Requests Summary

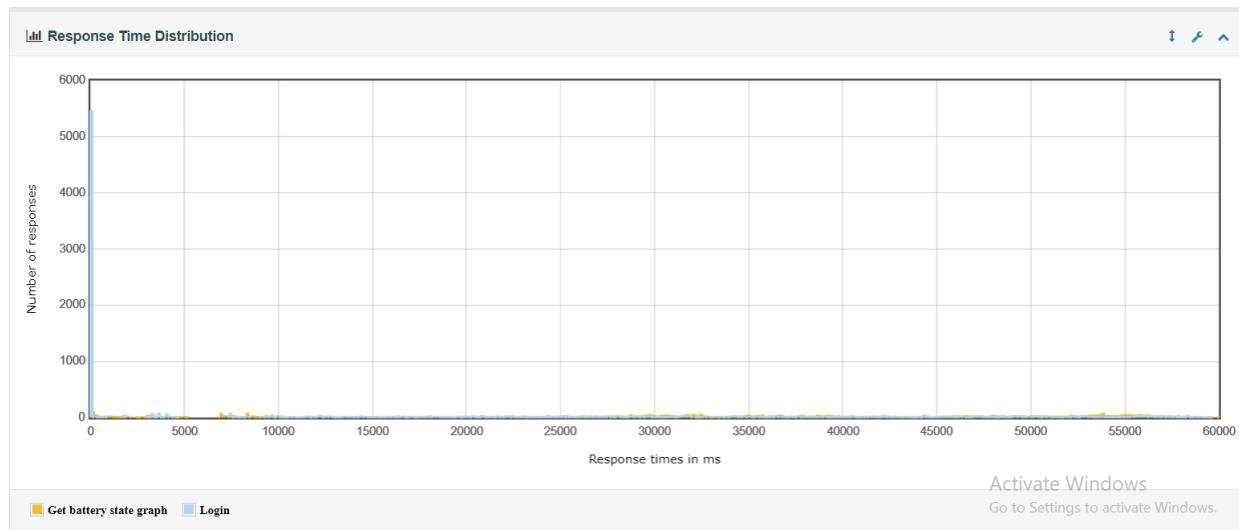
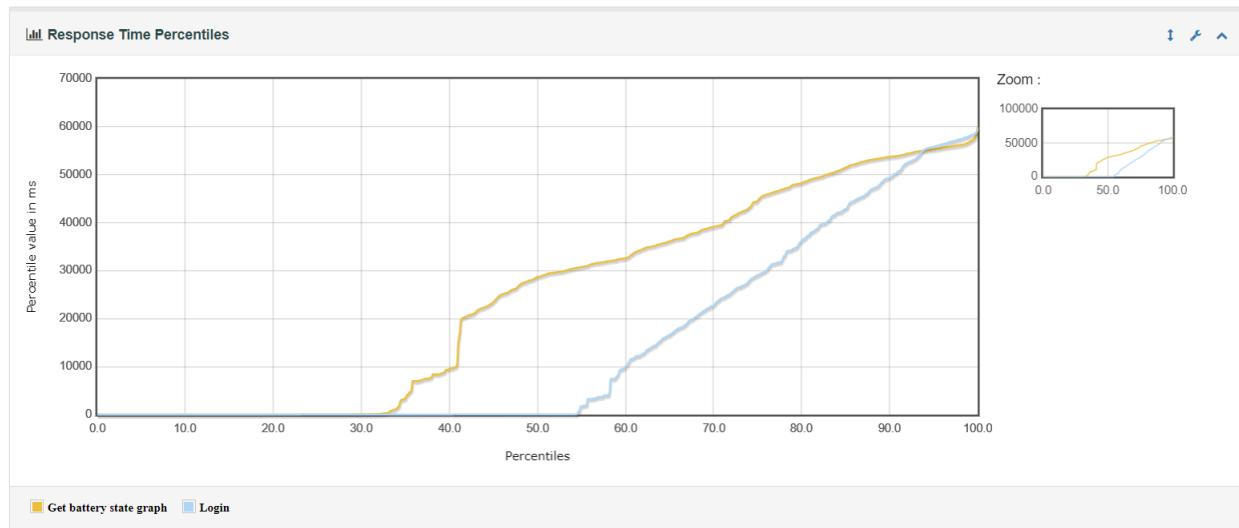


Statistics

Requests	Executions				Response Times (ms)									Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent			
Total	20000	8819	44.09%	19561.64	0	59922	9627.50	52955.50	55520.75	57586.85	213.02	306.34	52.56				
Get battery state graph	10000	3278	32.78%	24463.25	0	59922	28742.50	53763.90	55312.90	56735.93	106.89	124.14	41.53				
Login	10000	5541	55.41%	14660.03	0	59557	45.00	49430.00	55829.95	58053.82	136.04	233.28	14.28				

Errors

Type of error	Number of errors	% in errors	% in all samples
Non HTTP response code: org.apache.http.conn.HttpHostConnectException/Non HTTP response message: Connect to localhost:8080 [localhost/127.0.0.1, localhost/0:0:0:0:0:1] failed: Connection refused: connect	4585	51.99%	22.93%
Non HTTP response code: java.net.BindException/Non HTTP response message: Address already in use: connect	4221	47.86%	21.11%
500	13	0.15%	0.07%



Zaključak:

- Server dobro podnosi opterećenje od 1000 korisnika osim u slučaju sa 10000 simulatora, dok kod 10000 odbija nešto više zahteva nego kod kreiranja uređaja.
- Ovaj test dobavlja podatke iz influxdb baze i agregira podatke tako da je nešto zahtevniji od kreiranja uređaja koji samo zapisuje u PostgreSQL bazu.
- Sa 1000 korisnika i 1000 pokrenutih simulatora vreme odziva je prihvatljivo i svi zahtevi su obrađeni. Kada je bar jedan od brojeva 100, vreme odziva dosta dobro.

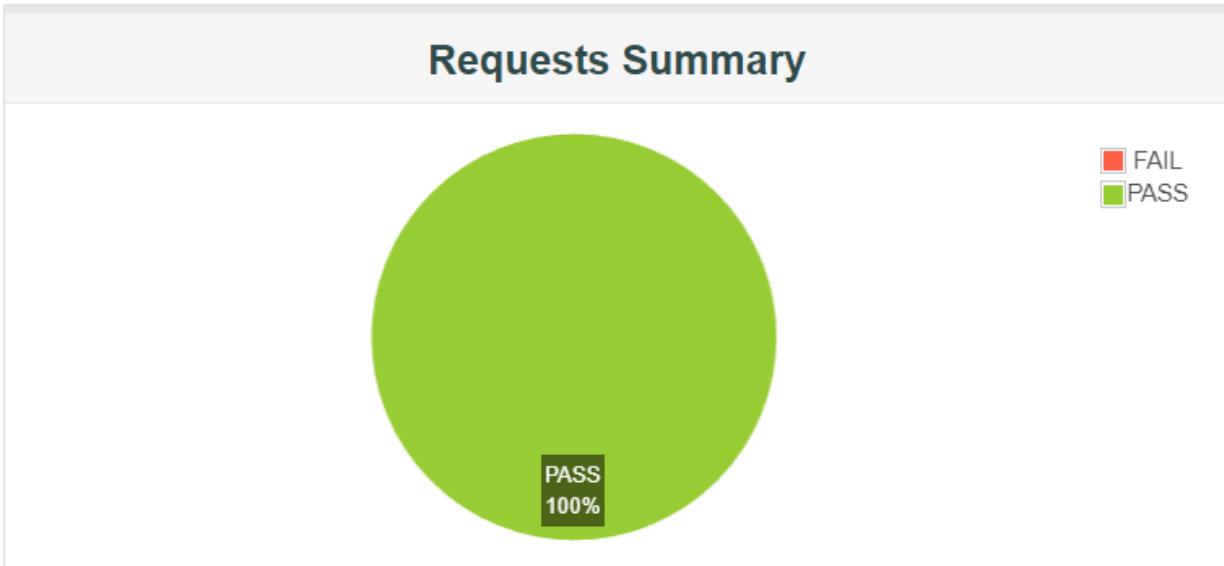
5 - Dobavljanje grafa potrošnje grada

Opis:

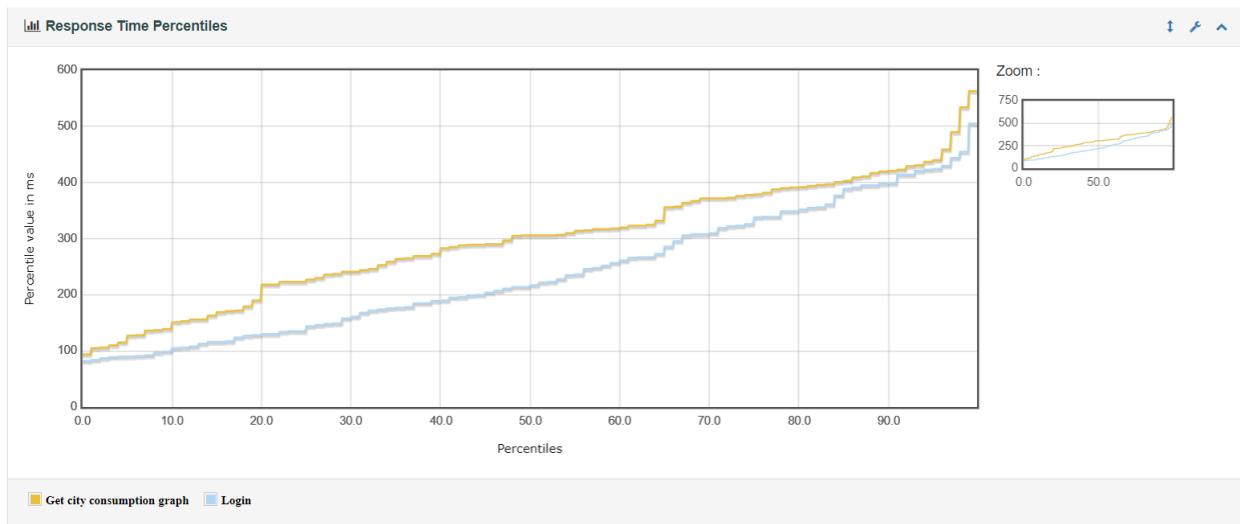
- Admin se prijavljuje na sistem i dobavlja graf potrošnje grada.

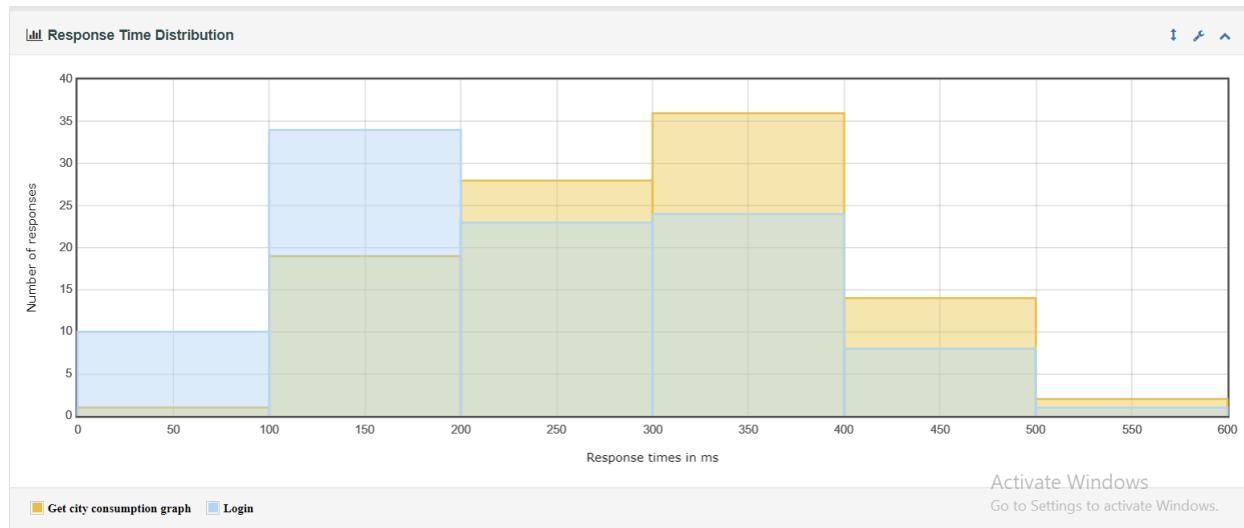
Rezultati:

- 100 korisnika, 100 pokrenutih simulatora

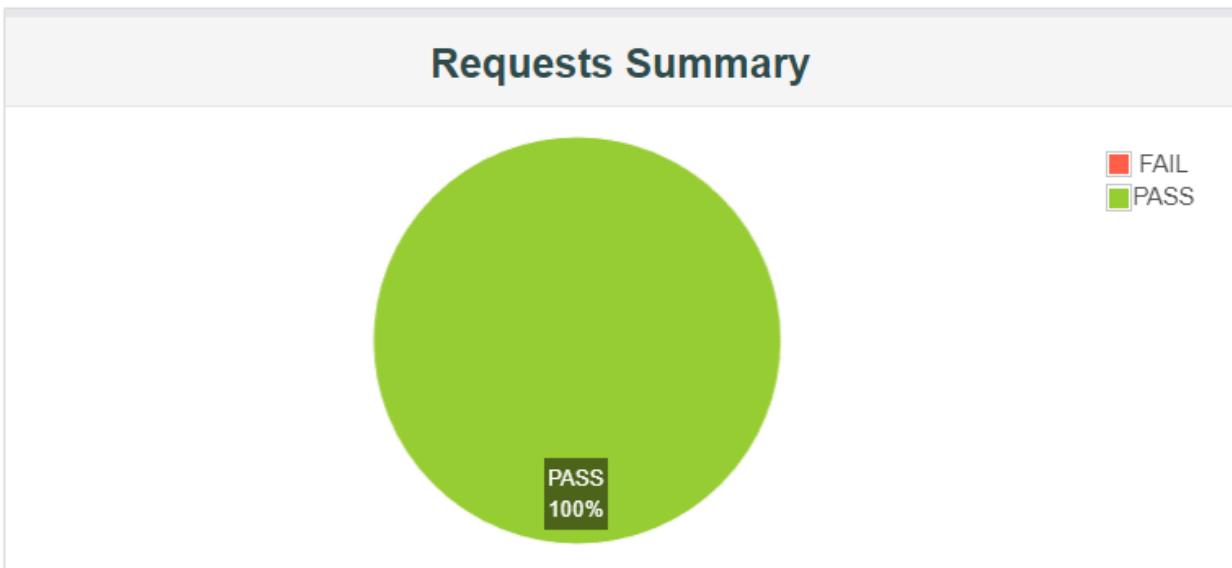


Statistics														
Requests		Executions				Response Times (ms)							Throughput	
Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent	
Total	200	0	0.00%	267.70	82	563	267.00	414.00	430.95	533.71	126.10	299.30	64.81	
Get city consumption graph	100	0	0.00%	296.61	94	563	306.00	420.90	439.85	562.71	66.93	263.61	53.04	
Login	100	0	0.00%	238.79	82	505	215.50	398.90	423.95	504.50	76.34	61.72	17.97	



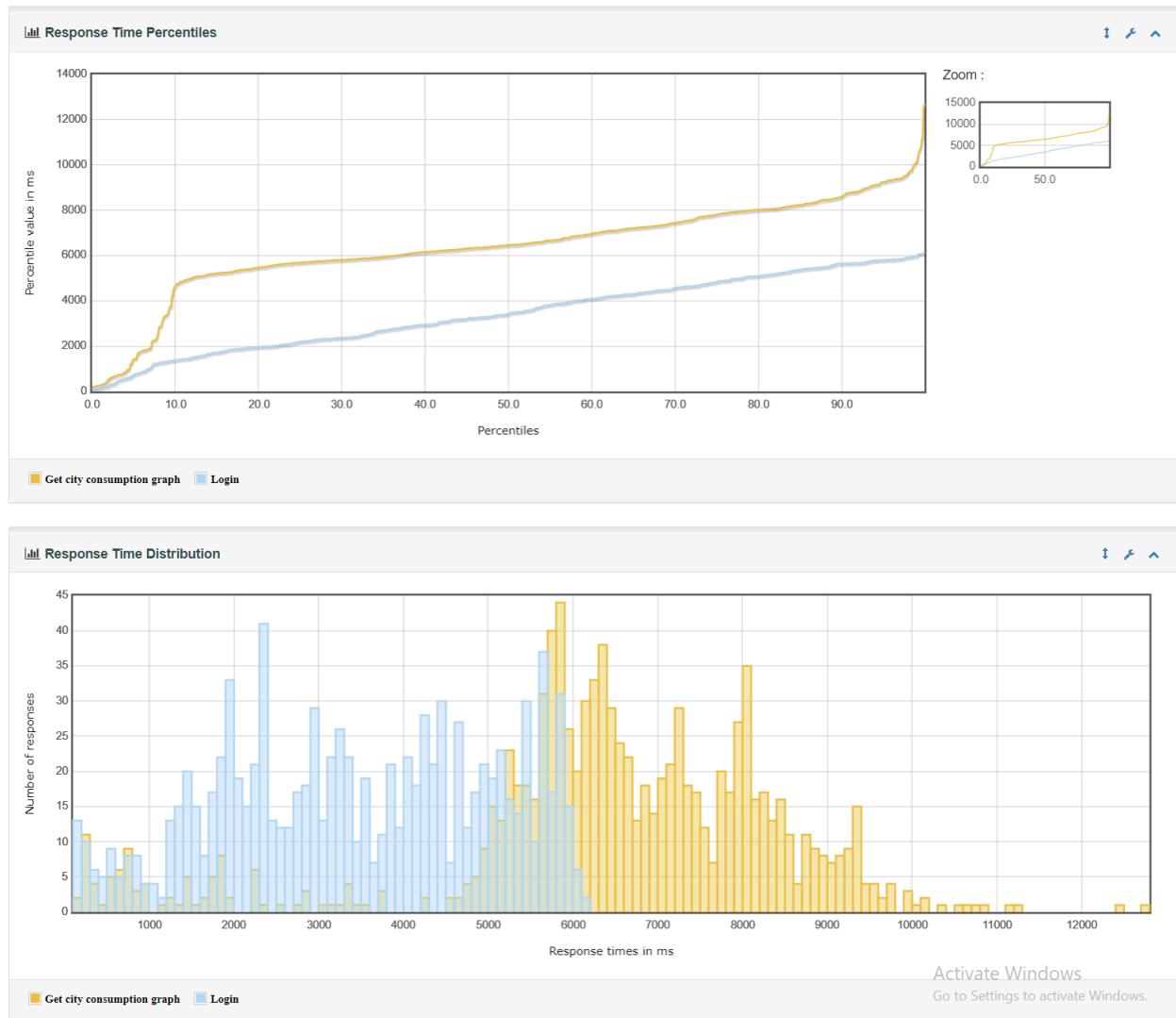


- 1000 korisnika, 100 pokrenutih simulatora

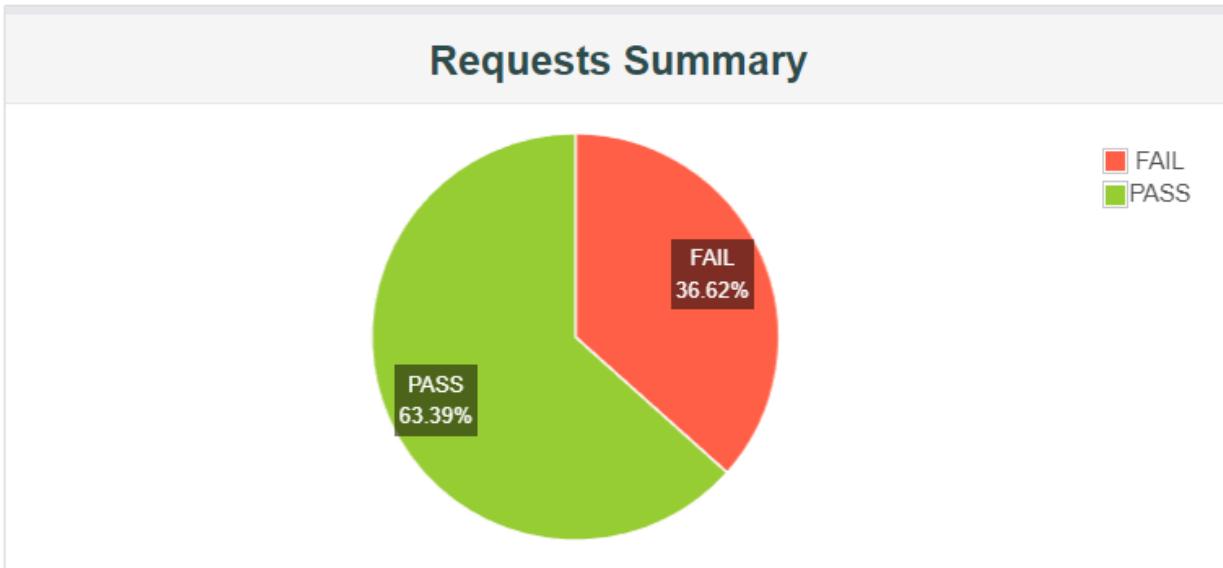


Statistics

Requests		Executions				Response Times (ms)							Throughput		Network (KB/sec)	
Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent			
Total	2000	0	0.00%	4930.05	127	12708	5268.50	8021.90	8602.70	9630.91	126.58	301.37	65.13			
Get city consumption graph	1000	0	0.00%	6398.61	180	12708	6463.00	8602.40	9242.90	10145.70	63.84	252.38	50.67			
Login	1000	0	0.00%	3461.49	127	6152	3436.50	5649.90	5804.95	5990.99	135.89	109.88	31.98			



- 10000 korisnika, 100 pokrenutih simulatora

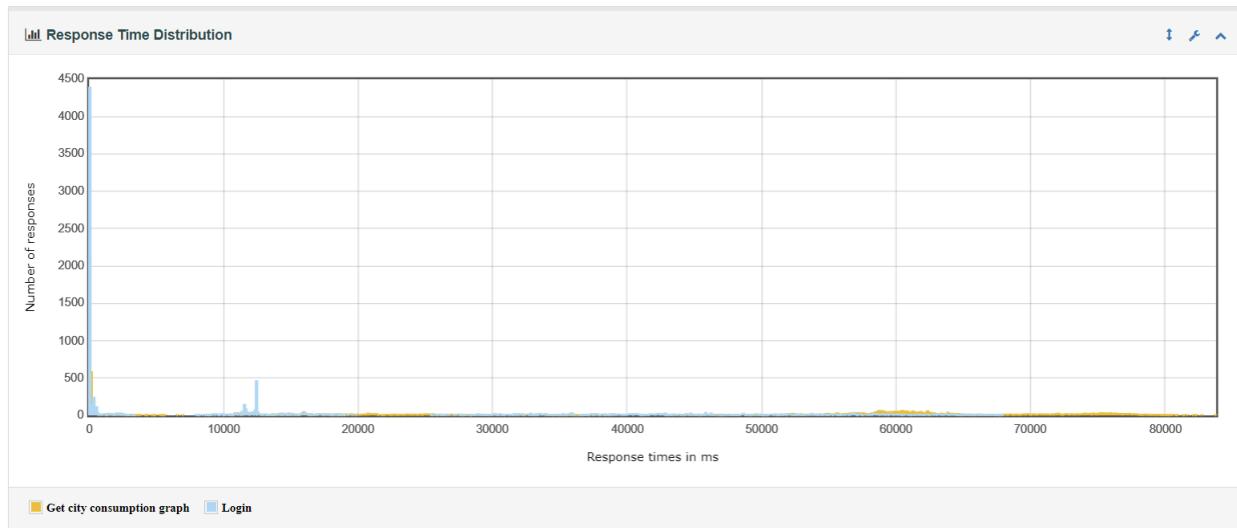
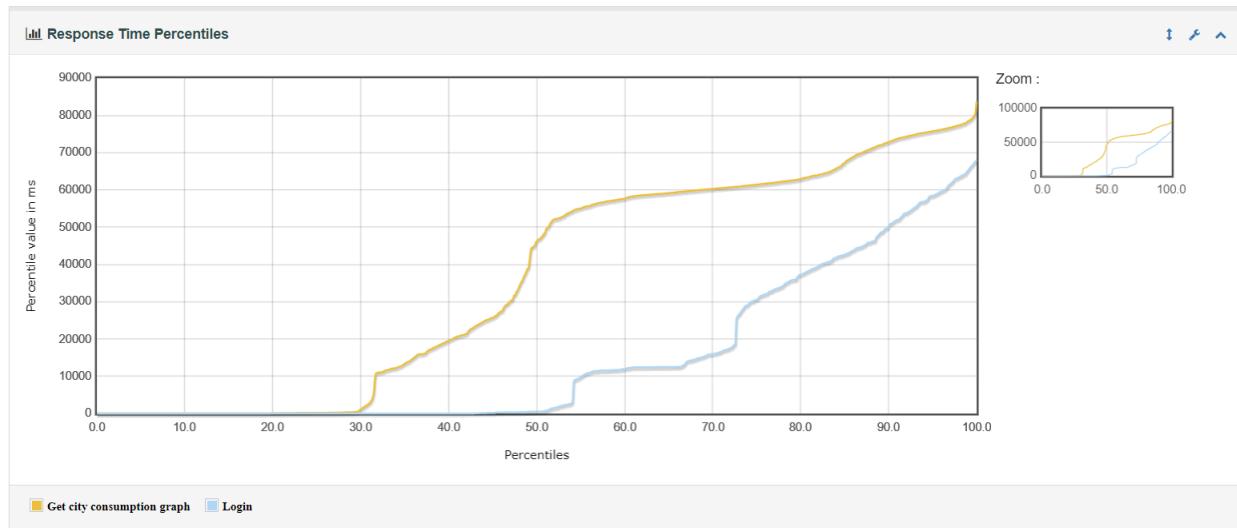


Statistics

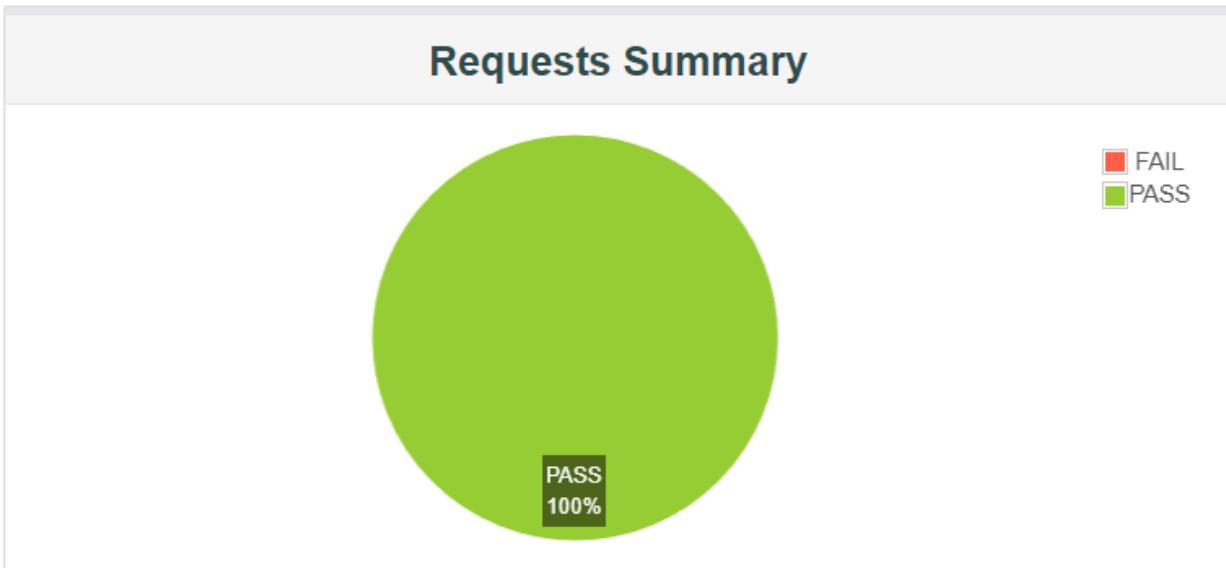
Requests	Executions			Response Times (ms)									Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent		
Total	20000	7323	36.62%	24688.18	0	77824	15071.00	59263.90	65555.35	71466.89	141.04	357.26	47.05			
Get city consumption graph	10000	3090	30.90%	27795.10	0	77824	31004.00	53586.80	59368.85	71066.96	70.58	247.90	37.52			
Login	10000	4233	42.33%	21581.25	0	72501	13411.00	63588.90	67867.80	71734.99	109.24	169.74	14.83			

Errors

Type of error	Number of errors	% in errors	% in all samples
Non HTTP response code: org.apache.http.conn.HttpHostConnectException/Non HTTP response message: Connect to localhost:8080 [localhost/127.0.0.1, localhost/0:0:0:0:0:0:1] failed: Connection refused: connect	7313	99.86%	36.56%
500	10	0.14%	0.05%

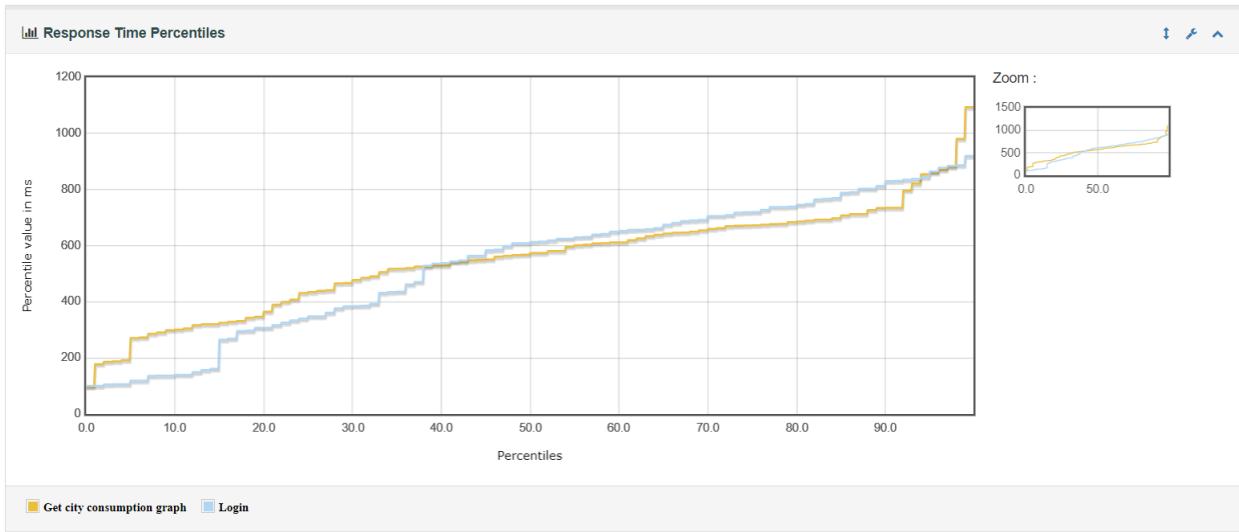


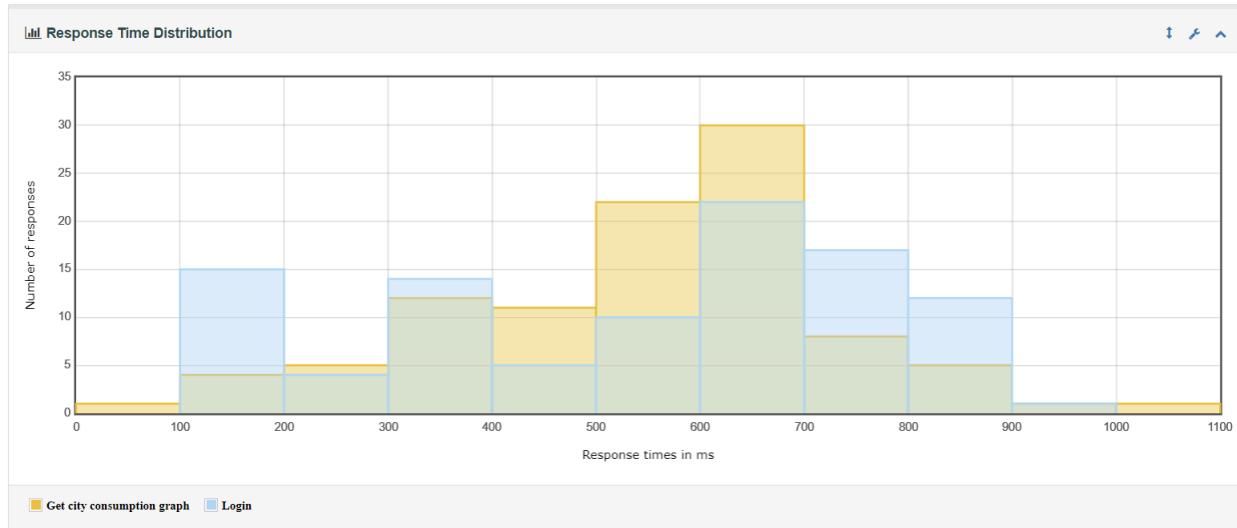
- 100 korisnika, 1000 pokrenutih simulatora



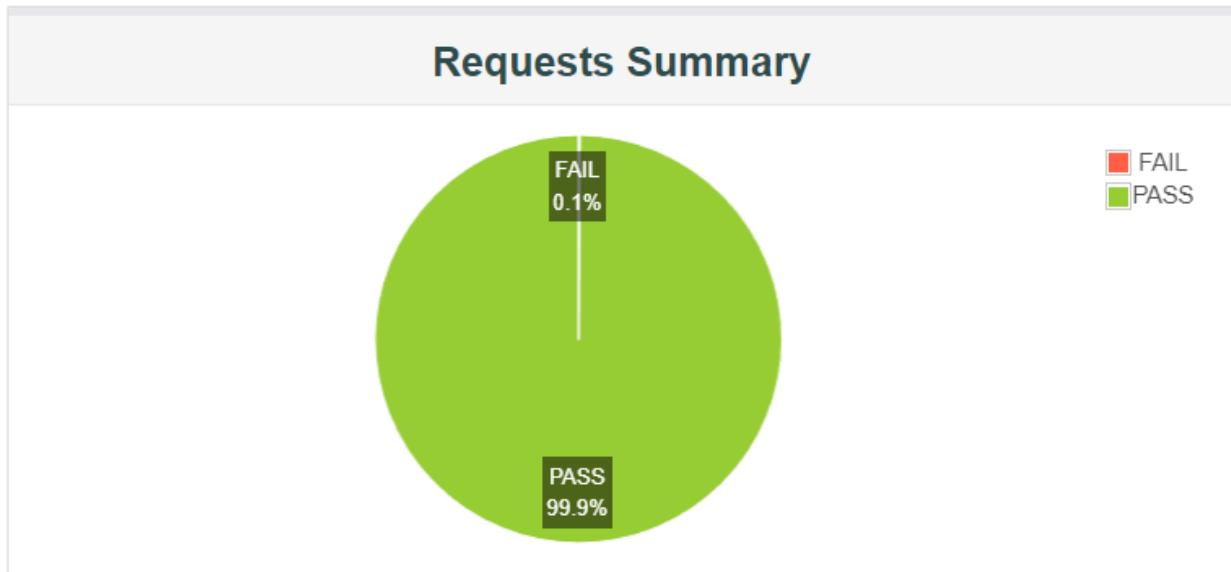
Statistics

Requests		Executions				Response Times (ms)							Throughput		Network (KB/sec)	
Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent			
Total	200	0	0.00%	543.55	97	1094	585.00	802.40	859.75	980.39	92.94	209.05	47.85			
Get city consumption graph	100	0	0.00%	550.80	97	1094	571.00	734.90	859.75	1092.87	48.73	179.84	38.71			
Login	100	0	0.00%	536.31	100	920	611.00	828.30	863.95	919.67	60.94	49.27	14.34			





- 1000 korisnika, 1000 pokrenutih simulatora



Statistics

Requests		Executions			Response Times (ms)									Throughput		Network (KB/sec)	
Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent				
Total	2000	2	0.10%	7676.90	152	18124	8438.00	12193.00	12978.00	14471.63	94.48	213.67	48.63				
Get city consumption graph	1000	2	0.20%	10613.18	152	18124	10826.50	12978.00	13635.65	15724.12	48.78	181.20	38.74				
Login	1000	0	0.00%	4740.62	613	9056	4618.00	8401.80	8676.95	8880.00	100.55	81.31	23.67				

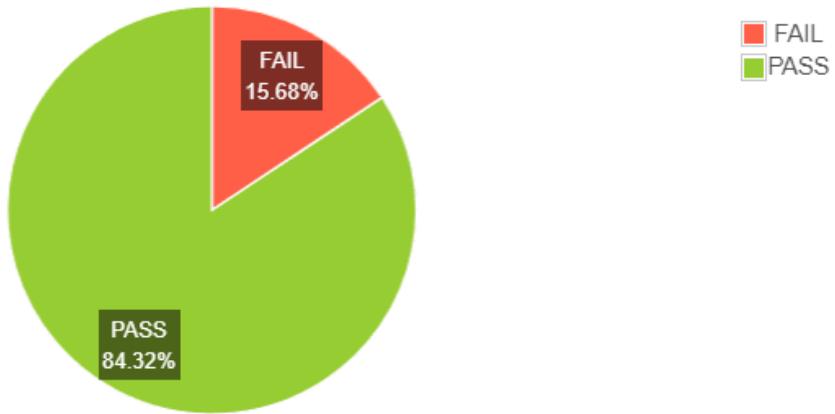
Errors

Type of error	Number of errors	% in errors	% in all samples
500	2	100.00%	0.10%



- 10000 korisnika, 1000 pokrenutih simulatora

Requests Summary

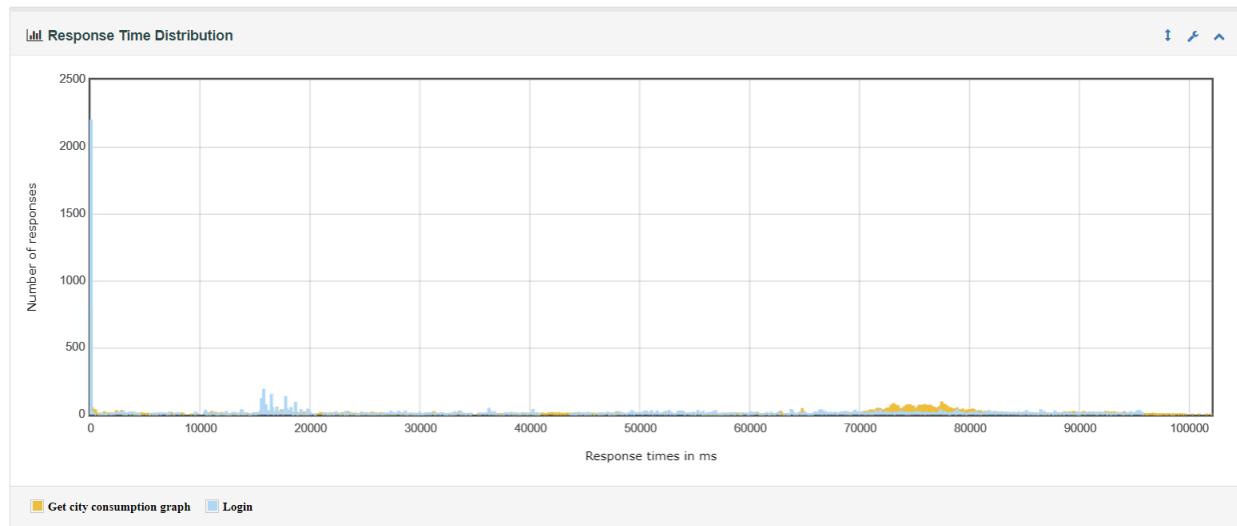
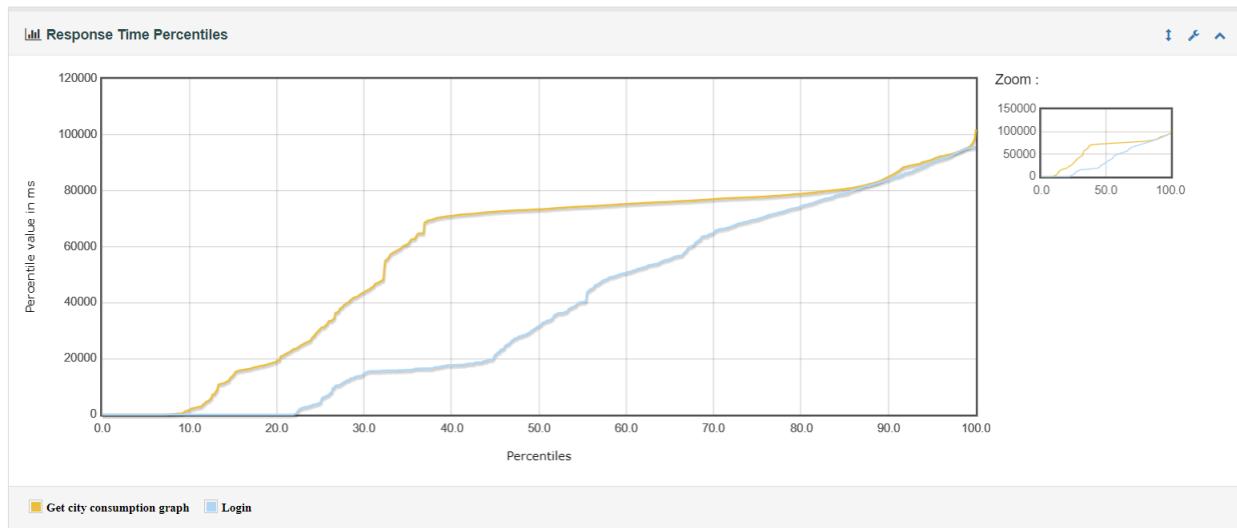


Statistics

Requests	Executions				Response Times (ms)							Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent	
Total	20000	3136	15.68%	47966.67	0	101986	57971.50	84451.00	90735.90	95231.95	101.46	244.20	44.86		
Get city consumption graph	10000	922	9.22%	57645.34	0	101986	73391.00	85057.70	91162.55	95333.99	50.78	183.59	35.60		
Login	10000	2214	22.14%	38288.01	0	95764	31728.50	84008.60	90217.95	95205.83	83.61	100.20	15.32		

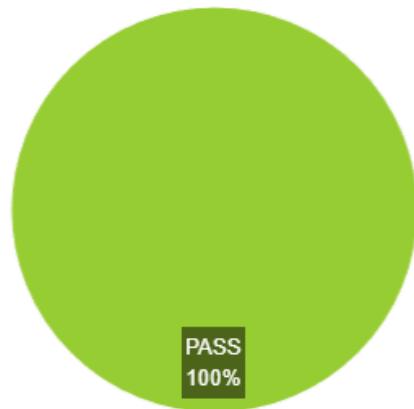
Errors

Type of error	Number of errors	% in errors	% in all samples
Non HTTP response code: org.apache.http.conn.HttpHostConnectException/Non HTTP response message: Connect to localhost:8080 [localhost/127.0.0.1, localhost/0:0:0:0:0:1] failed: Connection refused: connect	3131	99.84%	15.65%
500	5	0.16%	0.03%



- 100 korisnika, 10000 pokrenutih simulatora

Requests Summary

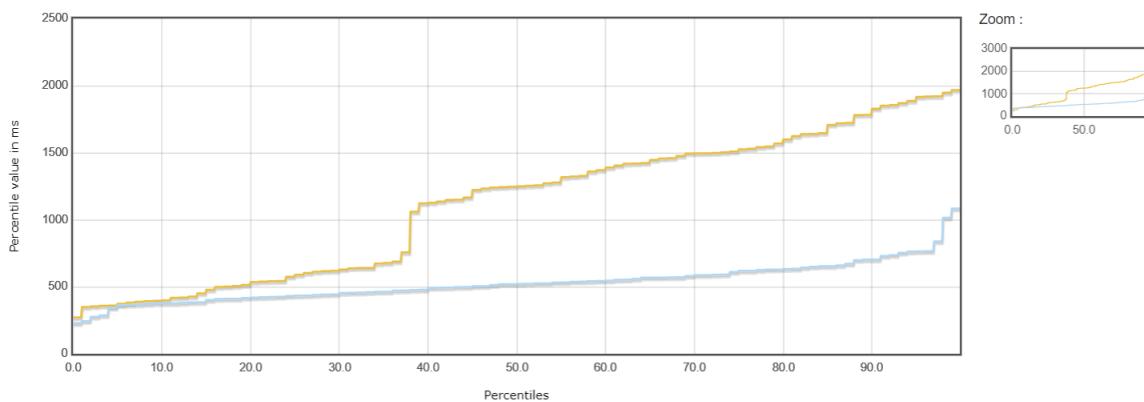


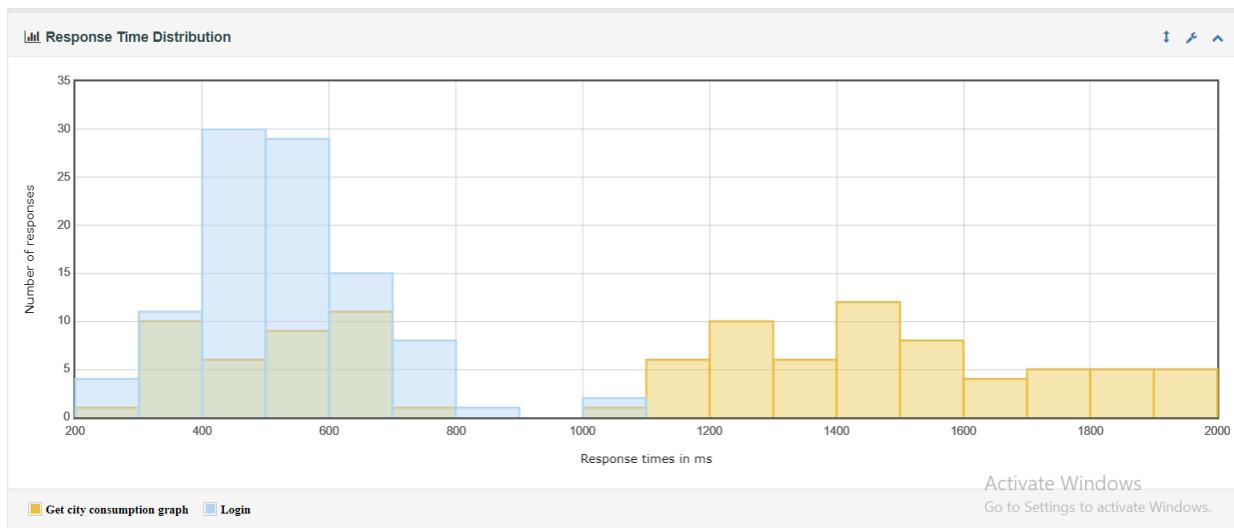
FAIL
PASS

Statistics

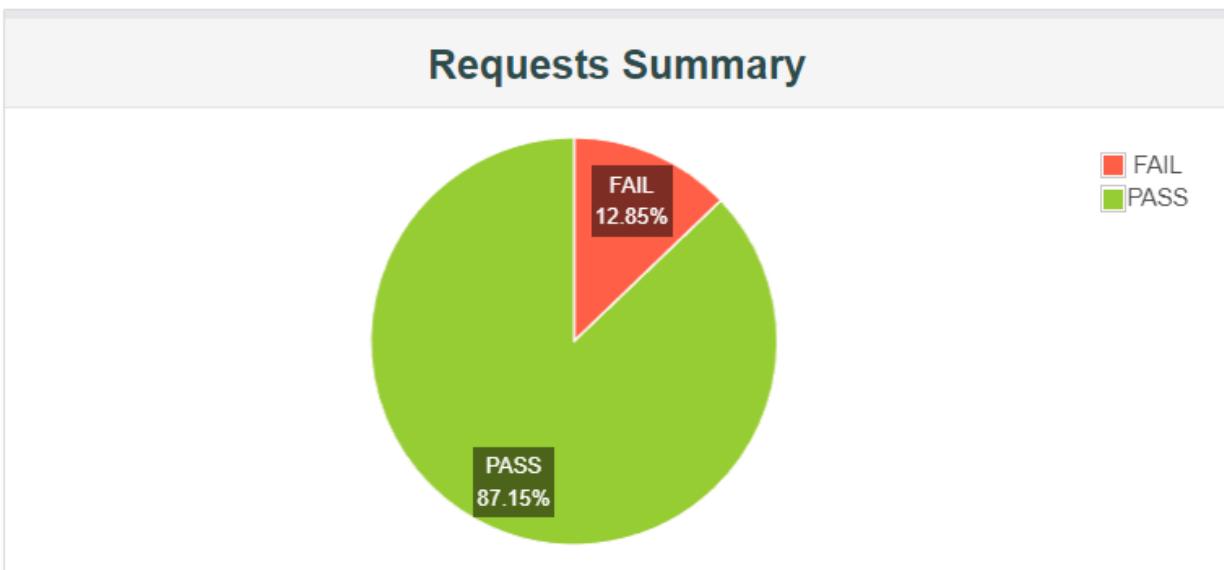
Requests	Executions				Response Times (ms)							Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent	
Total	200	0	0.00%	824.13	228	1967	597.00	1595.10	1825.70	1947.73	72.97	49.99	37.56		
Get city consumption graph	100	0	0.00%	1118.68	271	1967	1248.50	1823.40	1914.55	1966.81	47.92	26.91	38.05		
Login	100	0	0.00%	529.59	228	1084	520.50	703.00	763.90	1083.31	51.98	42.03	12.23		

Response Time Percentiles





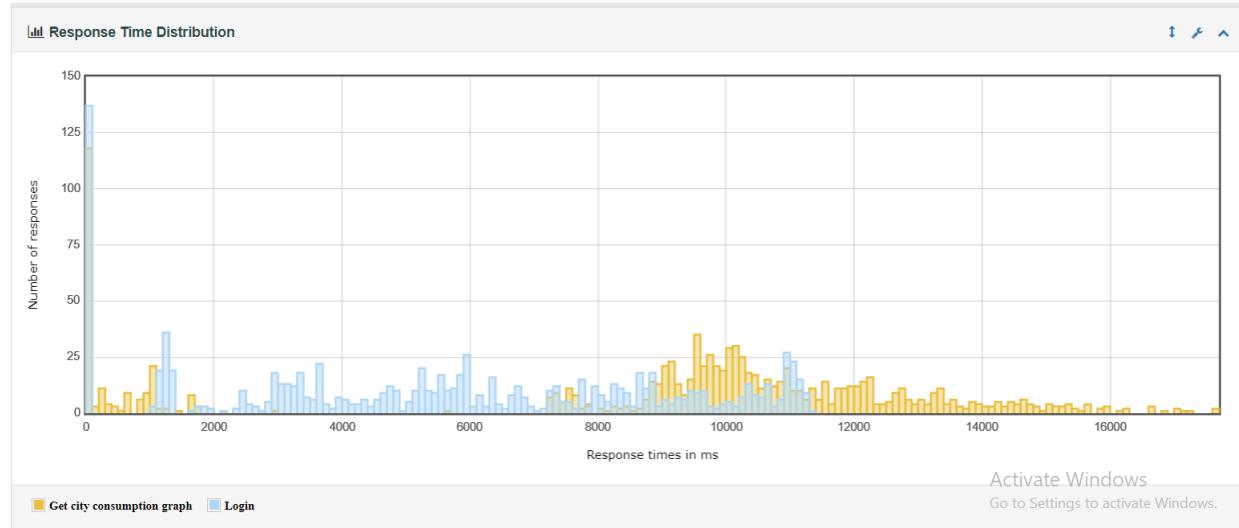
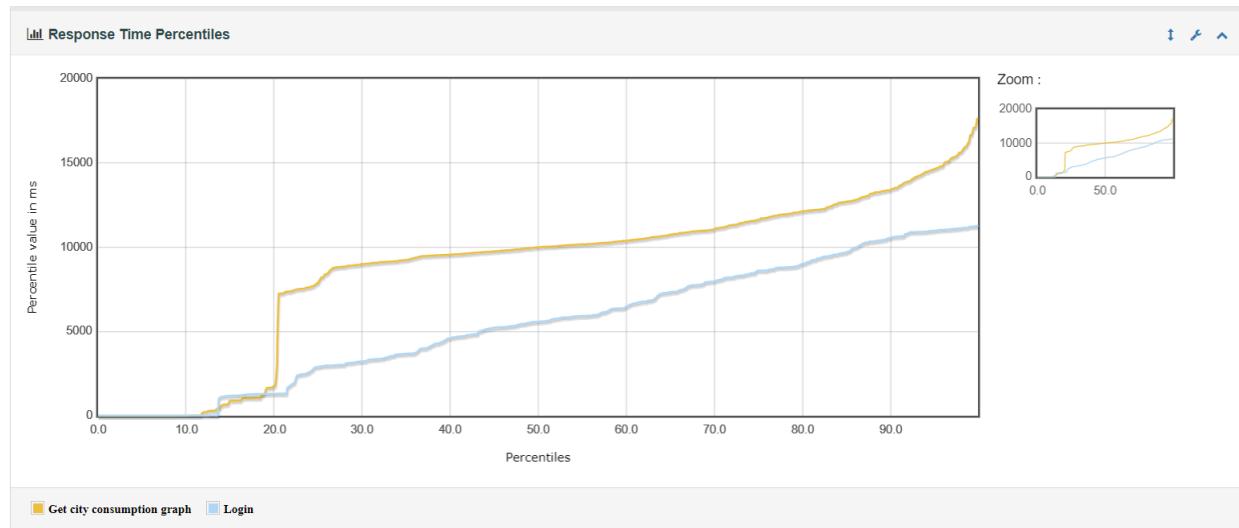
- 1000 korisnika, 10000 pokrenutih simulatora



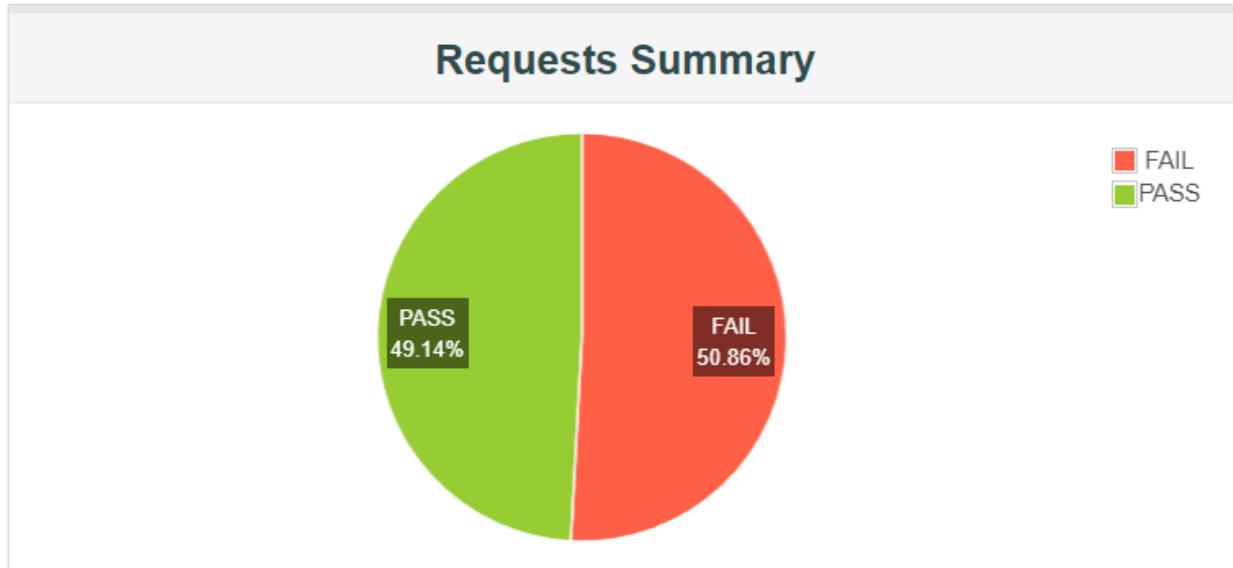
Statistics

Requests		Executions				Response Times (ms)							Throughput		Network (KB/sec)	
Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent			
Total	2000	257	12.85%	7135.83	0	17659	8445.00	12129.00	13421.75	15650.78	86.00	79.48	38.71			
Get city consumption graph	1000	120	12.00%	8786.20	0	17659	10003.00	13420.50	14659.95	16619.32	45.56	36.39	31.77			
Login	1000	137	13.70%	5485.45	0	11311	5588.50	10568.40	10981.80	11216.82	75.84	79.62	15.40			

Errors			
Type of error	Number of errors	% in errors	% in all samples
Non HTTP response code: org.apache.http.conn.HttpHostConnectException/Non HTTP response message: Connect to localhost:8080 [localhost/127.0.0.1, localhost/0:0:0:0:0:1] failed: Connection refused: connect	255	99.22%	12.75%
500	2	0.78%	0.10%



- 10000 korisnika, 10000 pokrenutih simulatora

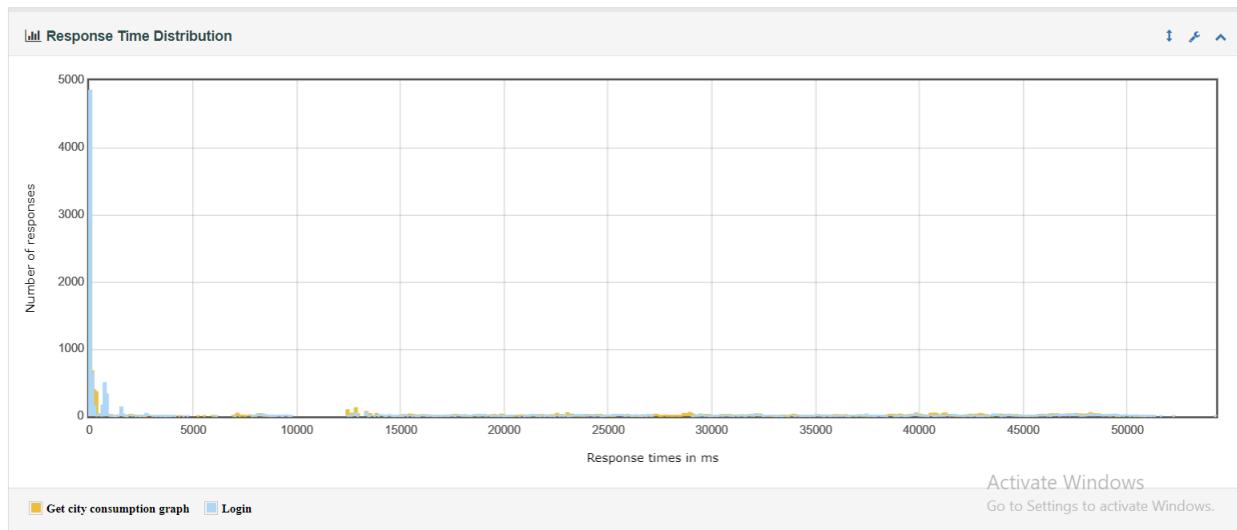
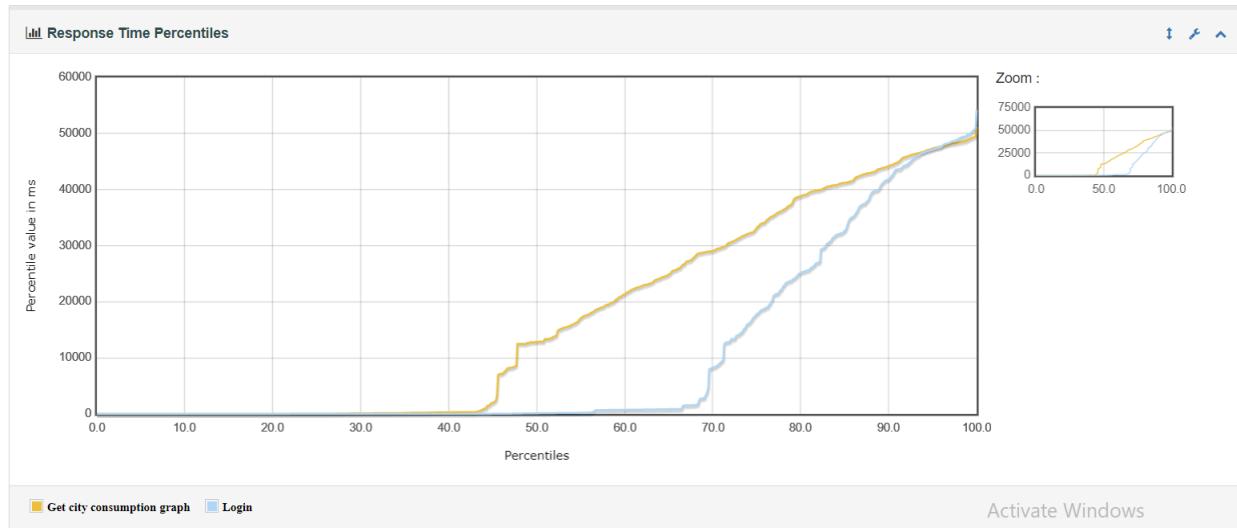


Statistics

Requests	Executions				Response Times (ms)							Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent	
Total	20000	10172	50.86%	19551.58	0	66182	409.00	58134.00	61833.95	64151.98	203.44	519.34	52.79		
Get city consumption graph	10000	4251	42.51%	24401.21	0	66182	21746.50	60373.40	62326.90	64085.95	102.06	339.01	43.17		
Login	10000	5921	59.21%	14701.95	0	65598	76.00	52072.60	60667.70	64244.97	123.12	219.61	11.82		

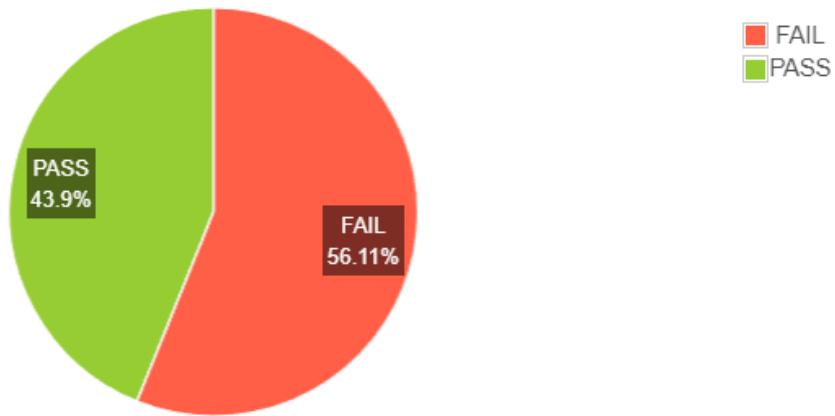
Errors

Type of error	Number of errors	% in errors	% in all samples
Non HTTP response code: org.apache.http.conn.HttpHostConnectException/Non HTTP response message: Connect to localhost:8080 [[localhost/127.0.0.1, localhost/0:0:0:0:0:1] failed: Connection refused: connect	5558	54.64%	27.79%
Non HTTP response code: java.net.BindException/Non HTTP response message: Address already in use: connect	4613	45.35%	23.07%
Non HTTP response code: java.net.SocketException/Non HTTP response message: No buffer space available (maximum connections reached?): connect	1	0.01%	0.01%



- **10000 korisnika, 100000 pokrenutih simulatora**

Requests Summary

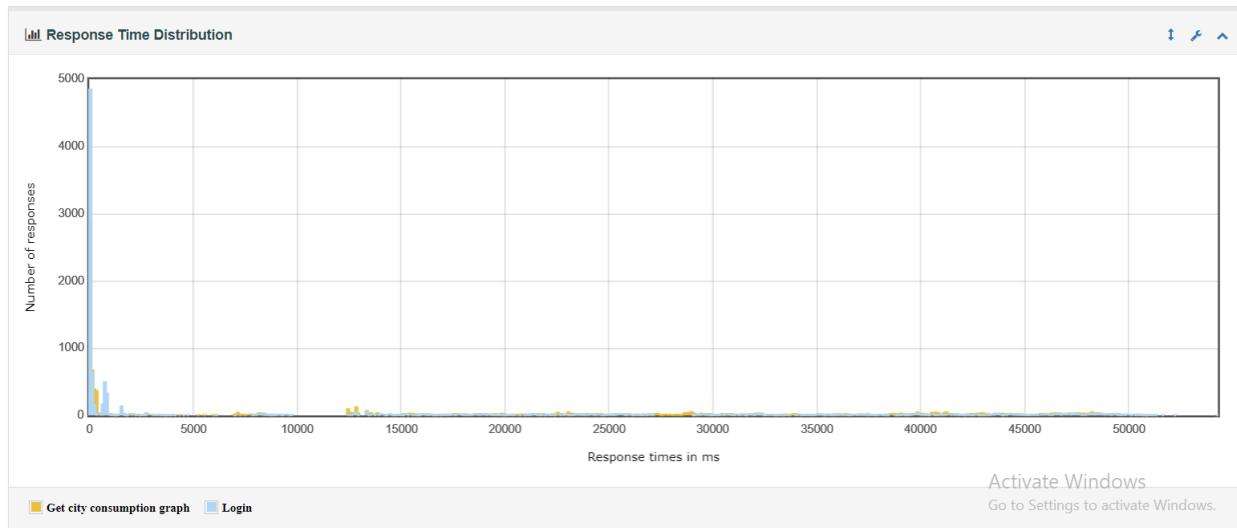
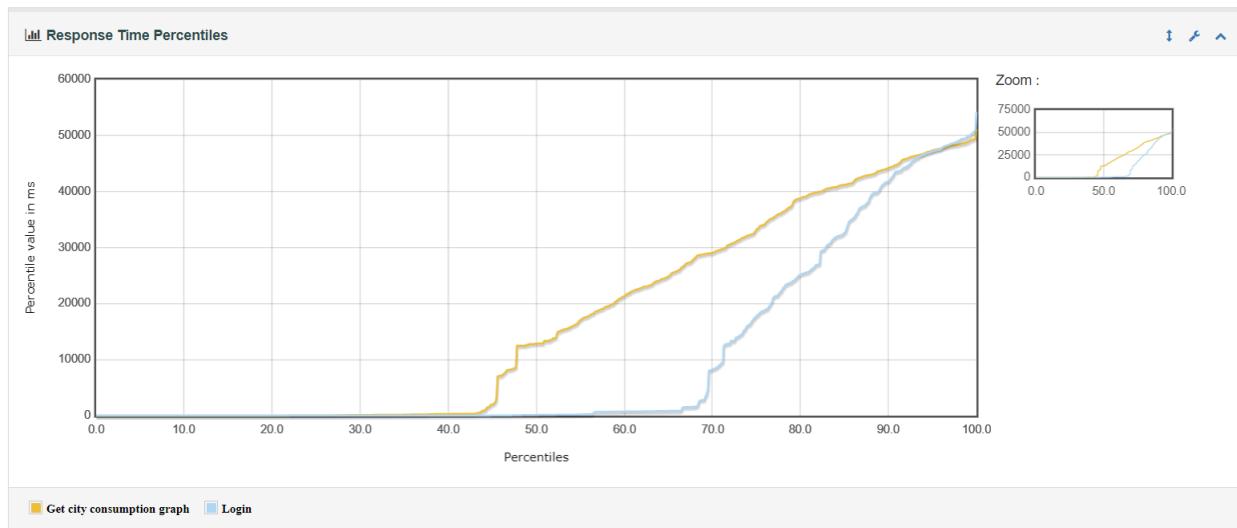


Statistics

Requests	Executions				Response Times (ms)							Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent	
Total	20000	11221	56.10%	13452.81	0	54240	475.50	43644.70	47264.00	49344.95	237.22	397.49	57.23		
Get city consumption graph	10000	4391	43.91%	16942.85	0	51131	12873.50	44212.00	47349.85	48835.00	119.43	166.27	48.72		
Login	10000	6830	68.30%	9962.77	0	54240	123.00	41858.40	47175.65	49876.99	143.70	281.51	10.72		

Errors

Type of error	Number of errors	% in errors	% in all samples
Non HTTP response code: org.apache.http.conn.HttpHostConnectException/Non HTTP response message: Connect to localhost:8080 [localhost/127.0.0.1, localhost/0:0:0:0:0:1] failed: Connection refused: connect	7746	69.03%	38.73%
Non HTTP response code: java.net.BindException/Non HTTP response message: Address already in use: connect	3475	30.97%	17.38%



Zaključak:

- Rezultati su malo lošiji nego kod prethodnog testa jer ima više podataka da se agregira.
- Pokrenut je i test sa 100000 simulatora i sistem se dobro pokazao. Nije se crashovao, uspeo je da obradi 44% zahteva sa odzivom od 13.5s.

6 - Dobavljanje grafa potrošnje punjača električnih vozila

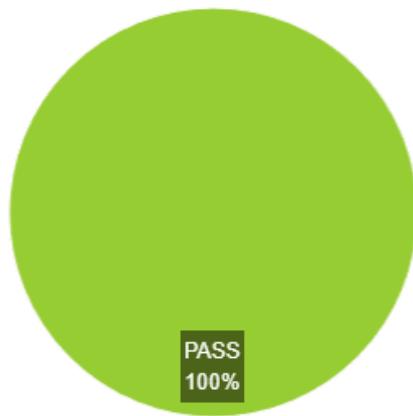
Opis:

- Korisnik se prijavljuje na sistem i dobavlja graf potrosnje punjača za električna vozila.

Rezultati:

- 100 korisnika, 100 pokrenutih simulatora

Requests Summary

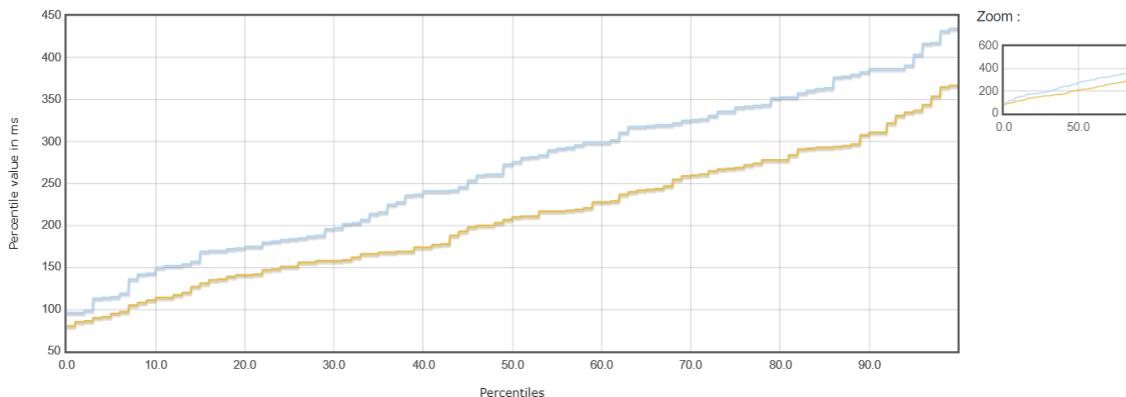


FAIL
PASS

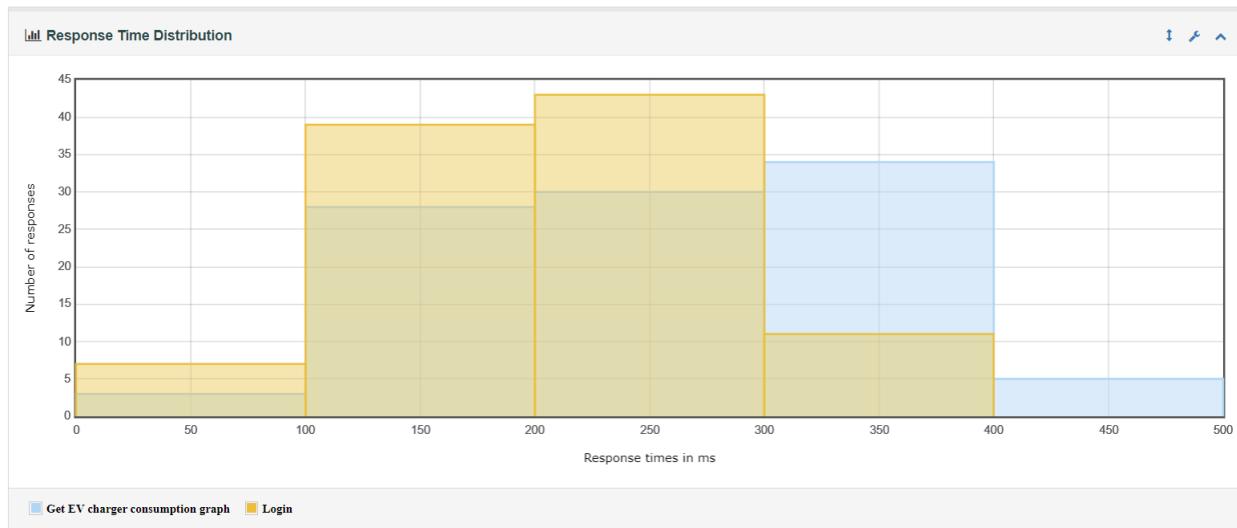
Statistics

Requests	Executions				Response Times (ms)							Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent	
Total	200	0	0.00%	236.72	80	435	232.50	357.60	386.80	431.86	140.35	294.40	60.86		
Get EV charger consumption graph	100	0	0.00%	264.50	96	435	274.50	386.60	403.35	434.97	75.08	254.25	47.44		
Login	100	0	0.00%	208.94	80	367	208.50	310.70	336.90	366.98	81.04	65.53	19.07		

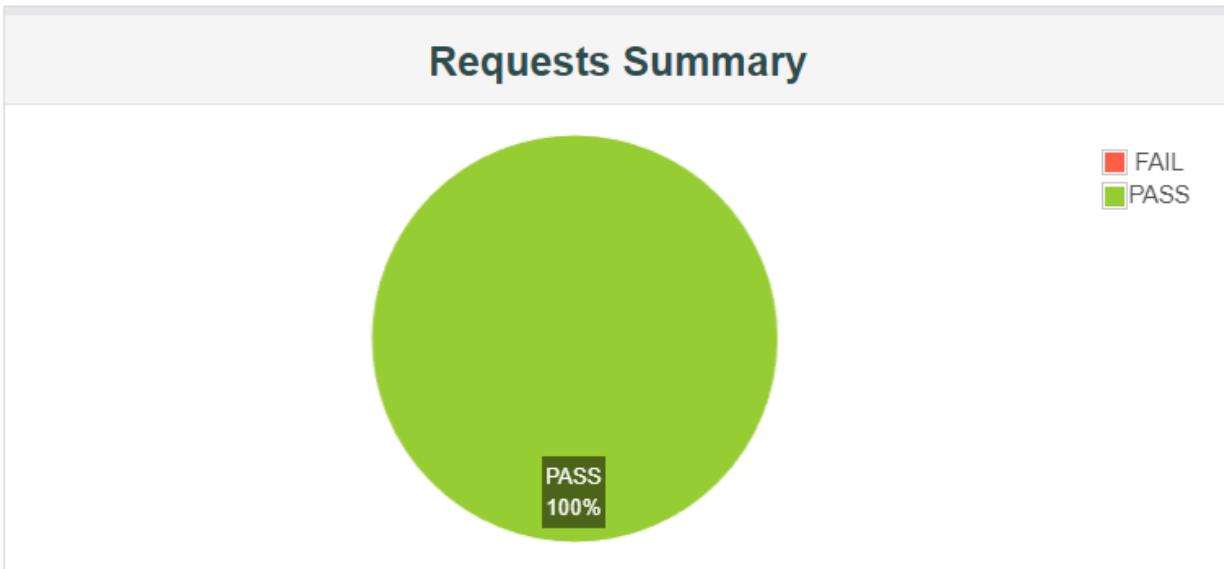
Response Time Percentiles



Get EV charger consumption graph Login

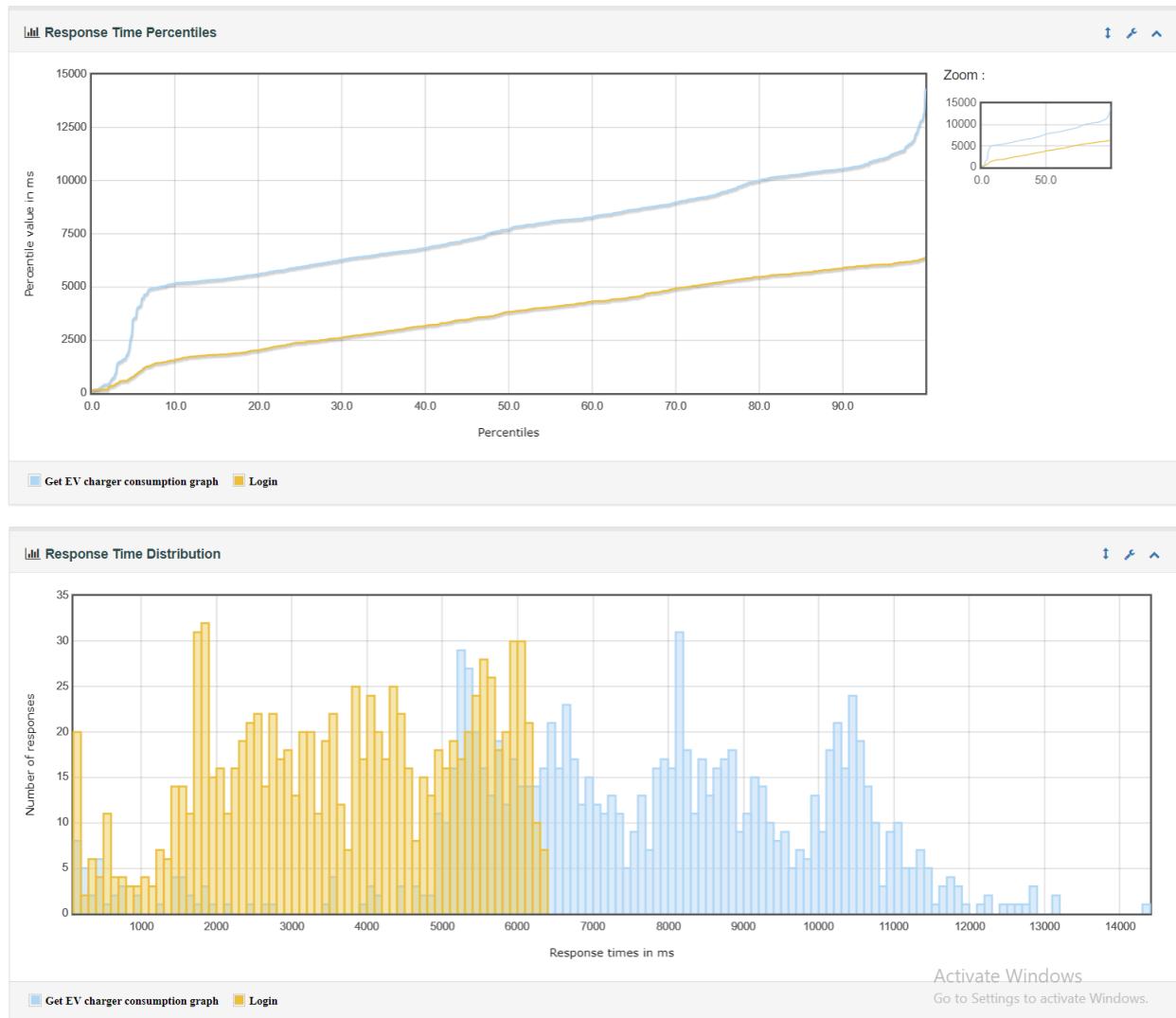


- 1000 korisnika, 100 pokrenutih simulatora



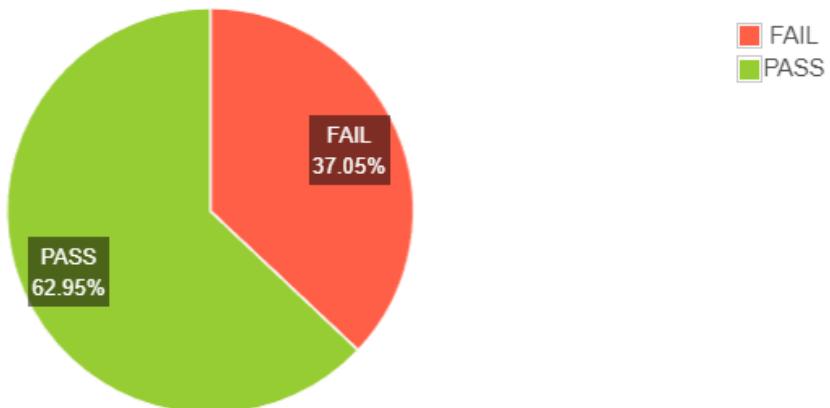
Statistics

Requests		Executions			Response Times (ms)							Throughput		Network (KB/sec)	
Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent		
Total	2000	0	0.00%	5633.77	129	14336	5529.00	10012.10	10553.00	11741.61	112.56	236.15	48.88		
Get EV charger consumption graph	1000	0	0.00%	7573.75	139	14336	7728.50	10553.00	11054.20	12421.52	56.80	192.41	35.96		
Login	1000	0	0.00%	3693.78	129	6381	3822.00	5882.30	6051.90	6244.86	136.00	109.97	32.01		



- 10000 korisnika, 100 pokrenutih simulatora

Requests Summary

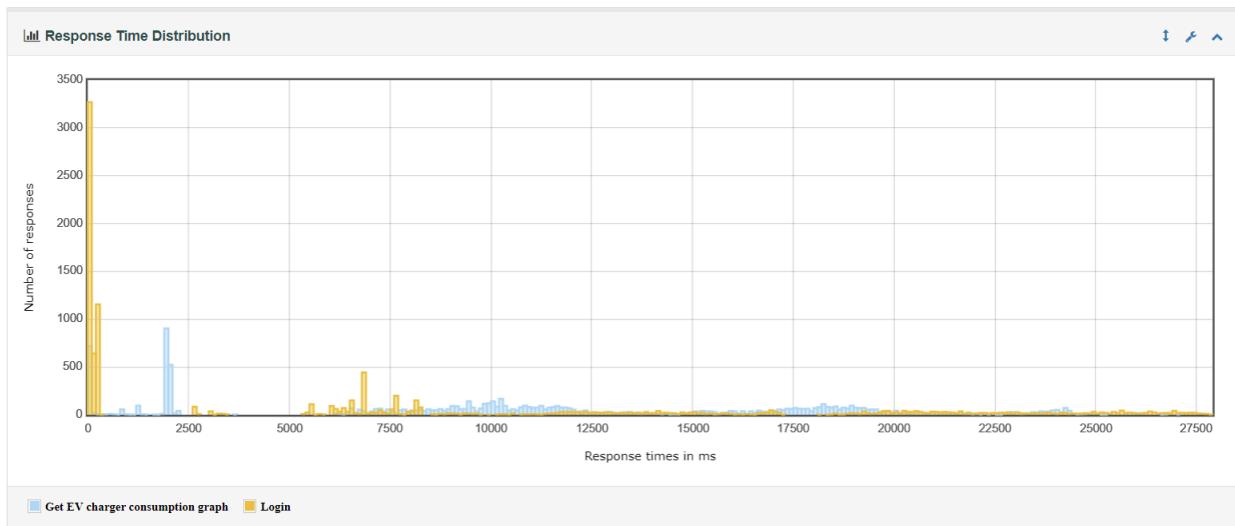
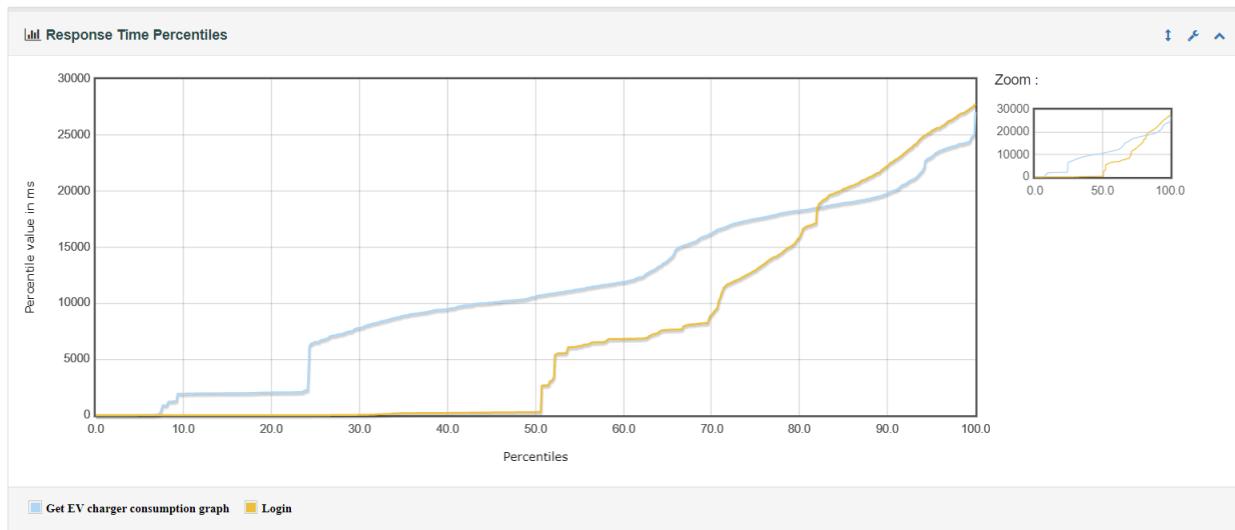


Statistics

Requests	Executions				Response Times (ms)								Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent		
Total	20000	7410	37.05%	9076.10	0	27813	8173.00	20994.00	23955.95	26770.00	385.08	526.17	107.53			
Get EV charger consumption graph	10000	2346	23.46%	11032.92	0	27064	10580.00	19825.90	23064.85	24347.00	216.23	223.26	95.64			
Login	10000	5064	50.64%	7119.27	0	27813	283.00	22259.80	25376.80	27151.98	221.79	377.10	25.77			

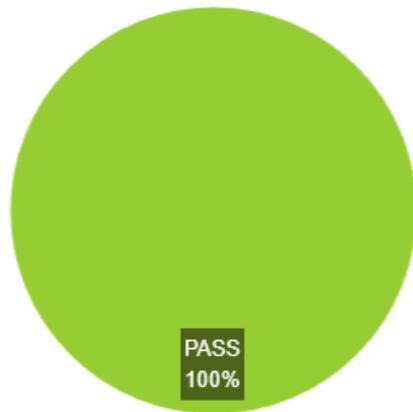
Errors

Type of error	Number of errors	% in errors	% in all samples
Non HTTP response code: org.apache.http.conn.HttpHostConnectException/Non HTTP response message: Connect to localhost:8080 [localhost/127.0.0.1, localhost/0:0:0:0:0:1] failed: Connection refused: connect	7409	99.99%	37.05%
Non HTTP response code: java.net.SocketException/Non HTTP response message: No buffer space available (maximum connections reached?): connect	1	0.01%	0.01%



- 100 korisnika, 1000 pokrenutih simulatora

Requests Summary

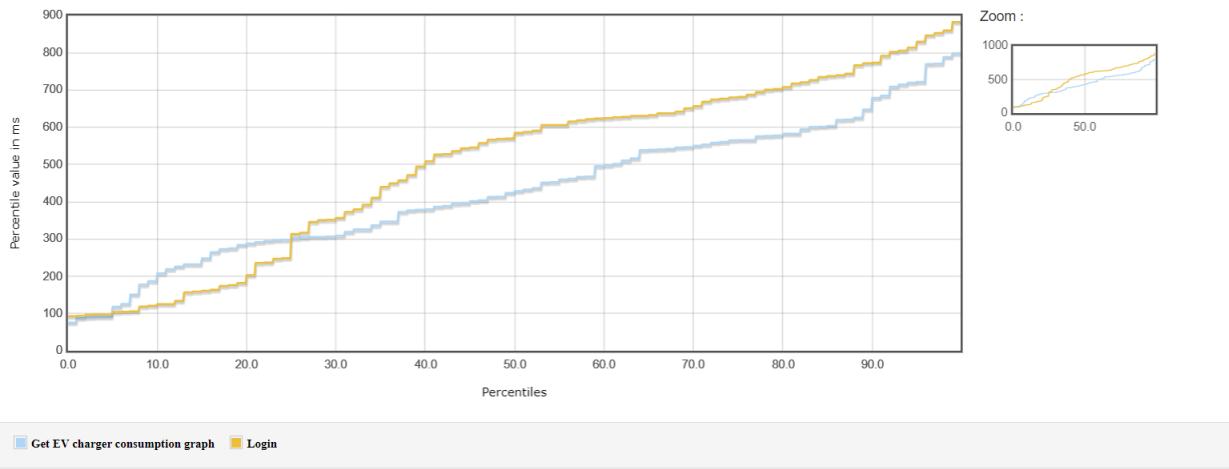


FAIL
PASS

Statistics

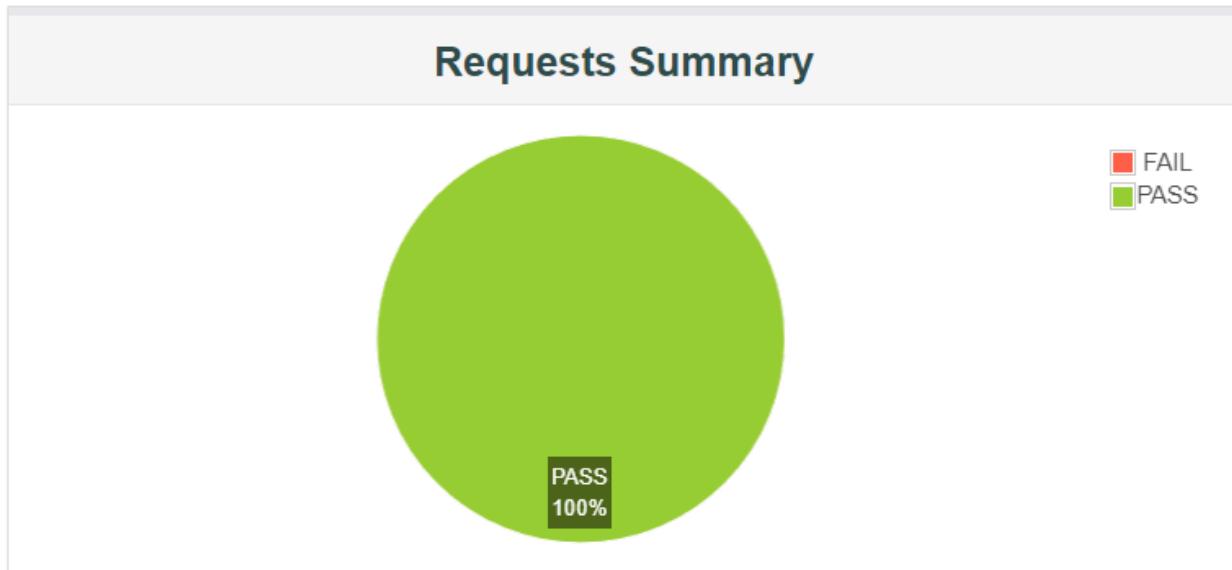
Requests	Executions				Response Times (ms)							Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent	
Total	200	0	0.00%	465.12	76	883	497.00	734.20	791.85	859.93	94.74	198.18	41.07		
Get EV charger consumption graph	100	0	0.00%	430.32	76	799	426.50	675.90	721.90	798.90	49.60	167.41	31.33		
Login	100	0	0.00%	499.92	93	883	577.50	773.80	829.20	882.77	60.75	49.12	14.30		

Response Time Percentiles

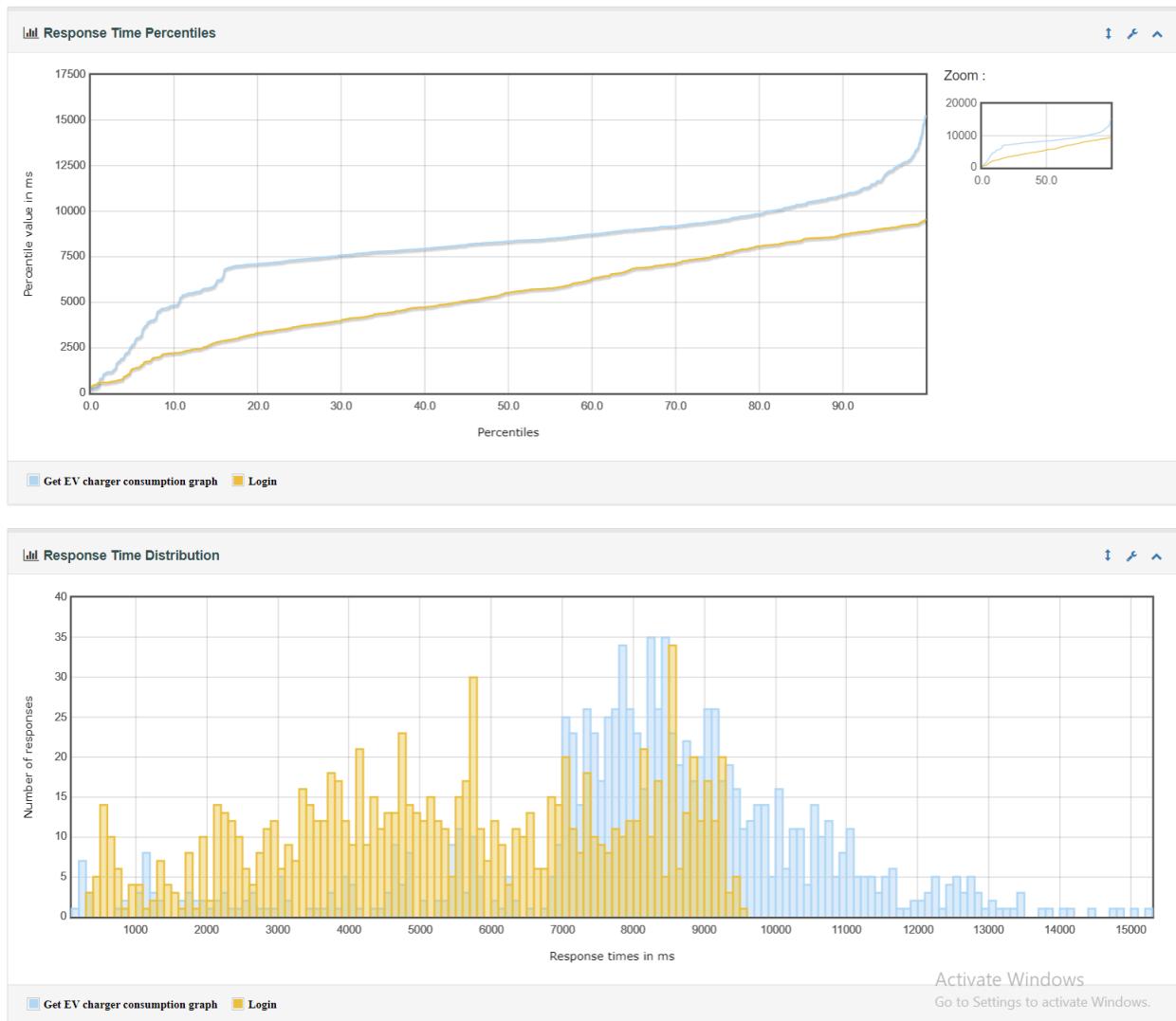




- 1000 korisnika, 1000 pokrenutih simulatora

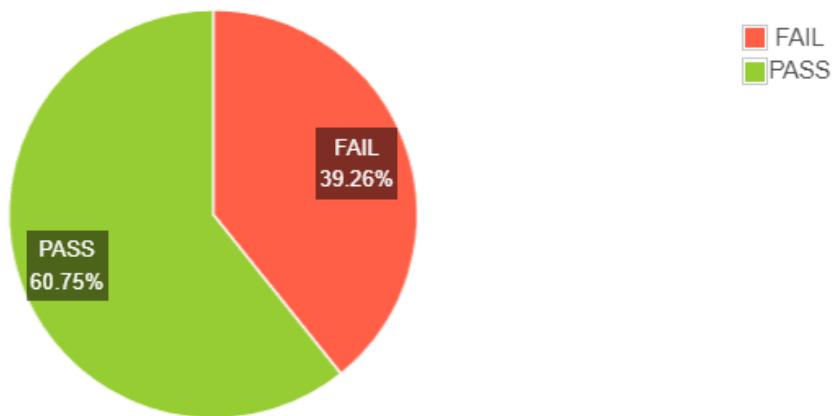


Statistics																
Requests		Executions				Response Times (ms)							Throughput		Network (KB/sec)	
Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent			
Total	2000	0	0.00%	6817.09	181	15282	7415.00	9860.80	10904.00	12823.00	95.65	200.08	41.52			
Get EV charger consumption graph	1000	0	0.00%	8160.50	181	15282	8349.50	10904.00	11983.45	13481.54	48.63	164.13	30.78			
Login	1000	0	0.00%	5473.68	331	9589	5526.50	8722.20	9055.55	9298.90	79.62	64.38	18.74			



- 10000 korisnika, 1000 pokrenutih simulatora

Requests Summary

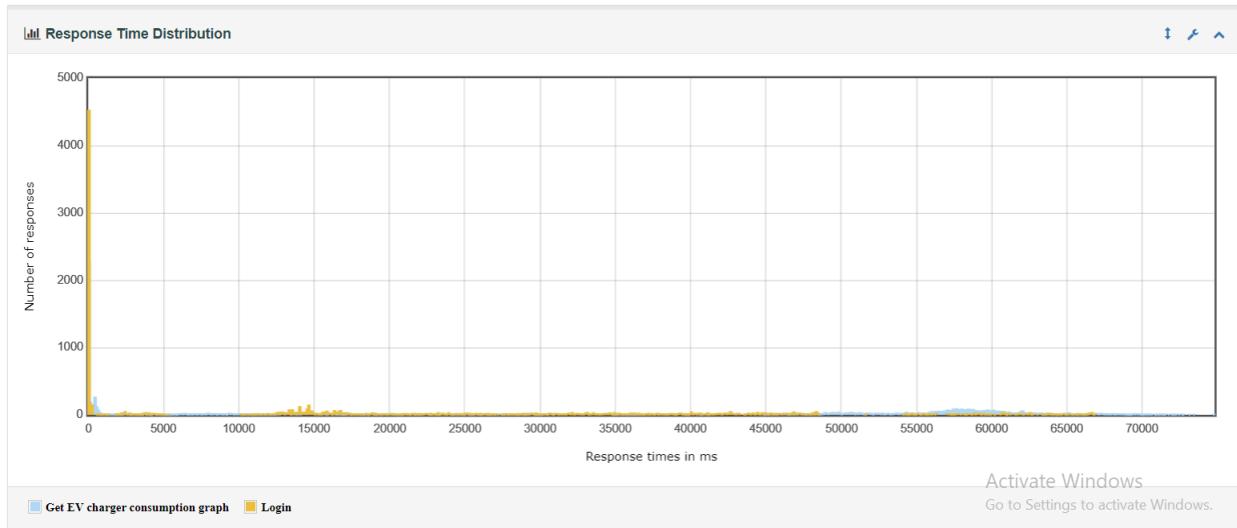
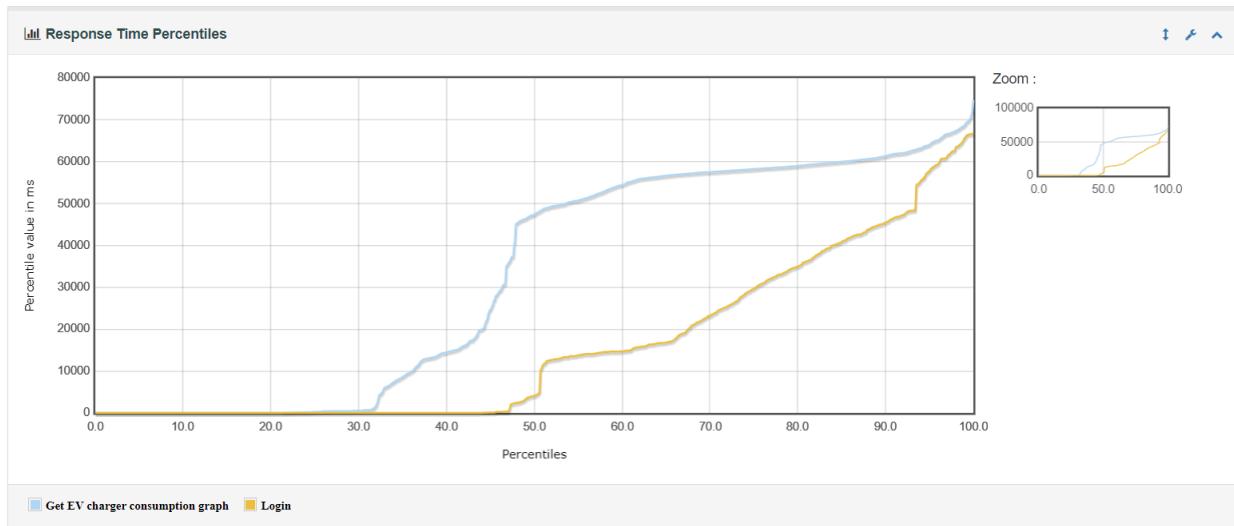


Statistics

Requests	Executions			Response Times (ms)									Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent		
Total	20000	7851	39.26%	24243.65	0	74726	14670.00	59791.00	62333.00	67333.85	149.31	355.38	39.90			
Get EV charger consumption graph	10000	3137	31.37%	32678.11	0	74726	47411.50	61367.80	64092.75	68718.97	74.78	233.44	30.67			
Login	10000	4714	47.14%	15809.18	0	66869	4104.50	45453.80	57743.45	65709.97	113.88	186.61	14.17			

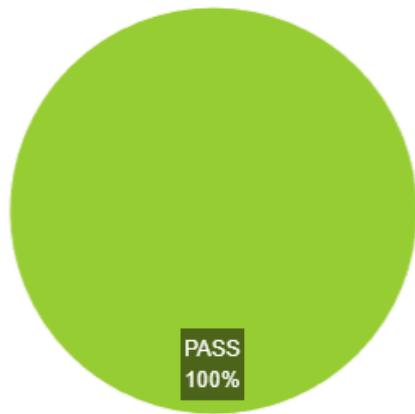
Errors

Type of error	Number of errors	% in errors	% in all samples
Non HTTP response code: org.apache.http.conn.HttpHostConnectException/Non HTTP response message: Connect to localhost:8080 [[localhost/127.0.0.1, localhost/0:0:0:0:0:1] failed: Connection refused: connect	7848	99.96%	39.24%
500	3	0.04%	0.01%



- 100 korisnika, 10000 pokrenutih simulatora

Requests Summary

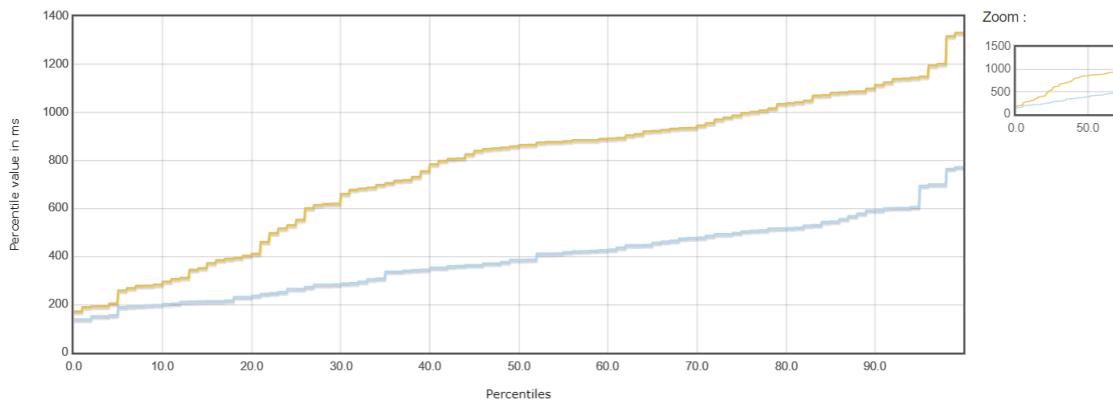


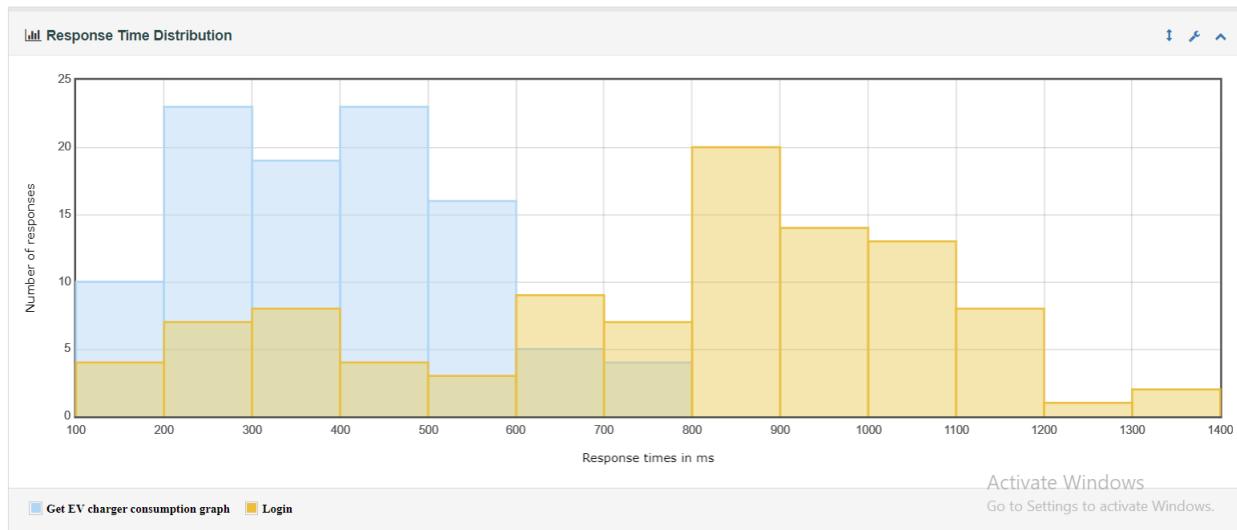
FAIL
PASS

Statistics

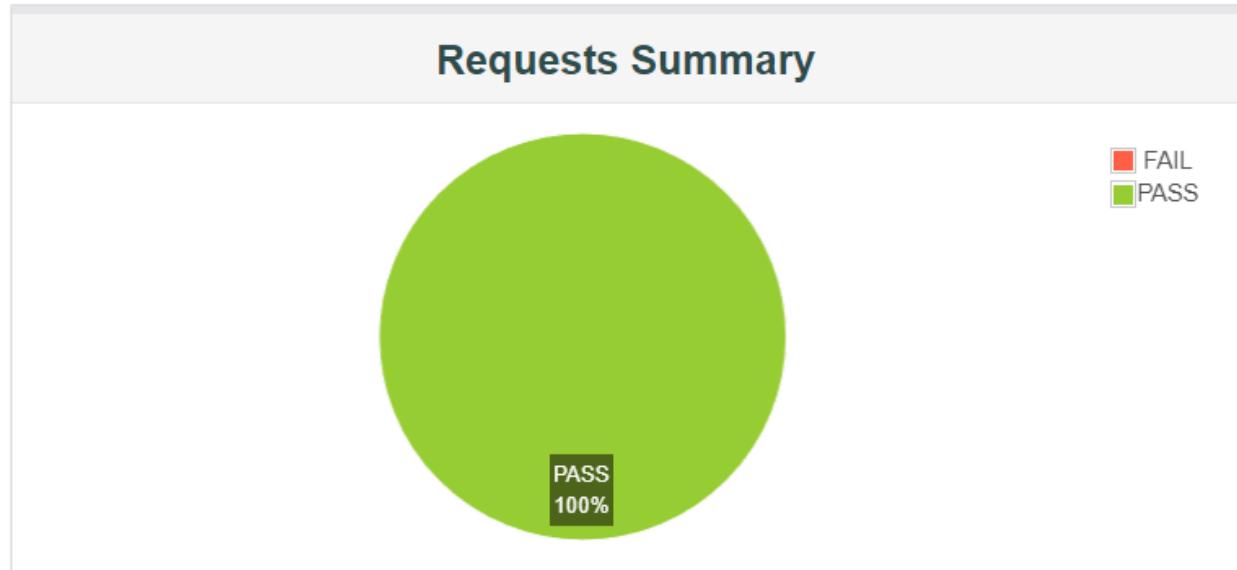
Requests	Executions				Response Times (ms)									Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent			
Total	200	0	0.00%	581.47	139	1332	509.00	1038.70	1114.25	1316.85	89.69	61.44	38.91				
Get EV charger consumption graph	100	0	0.00%	392.12	139	773	387.00	593.90	690.60	772.93	49.38	27.73	31.23				
Login	100	0	0.00%	770.82	171	1332	862.00	1113.50	1149.75	1331.86	53.30	43.10	12.55				

Response Time Percentiles



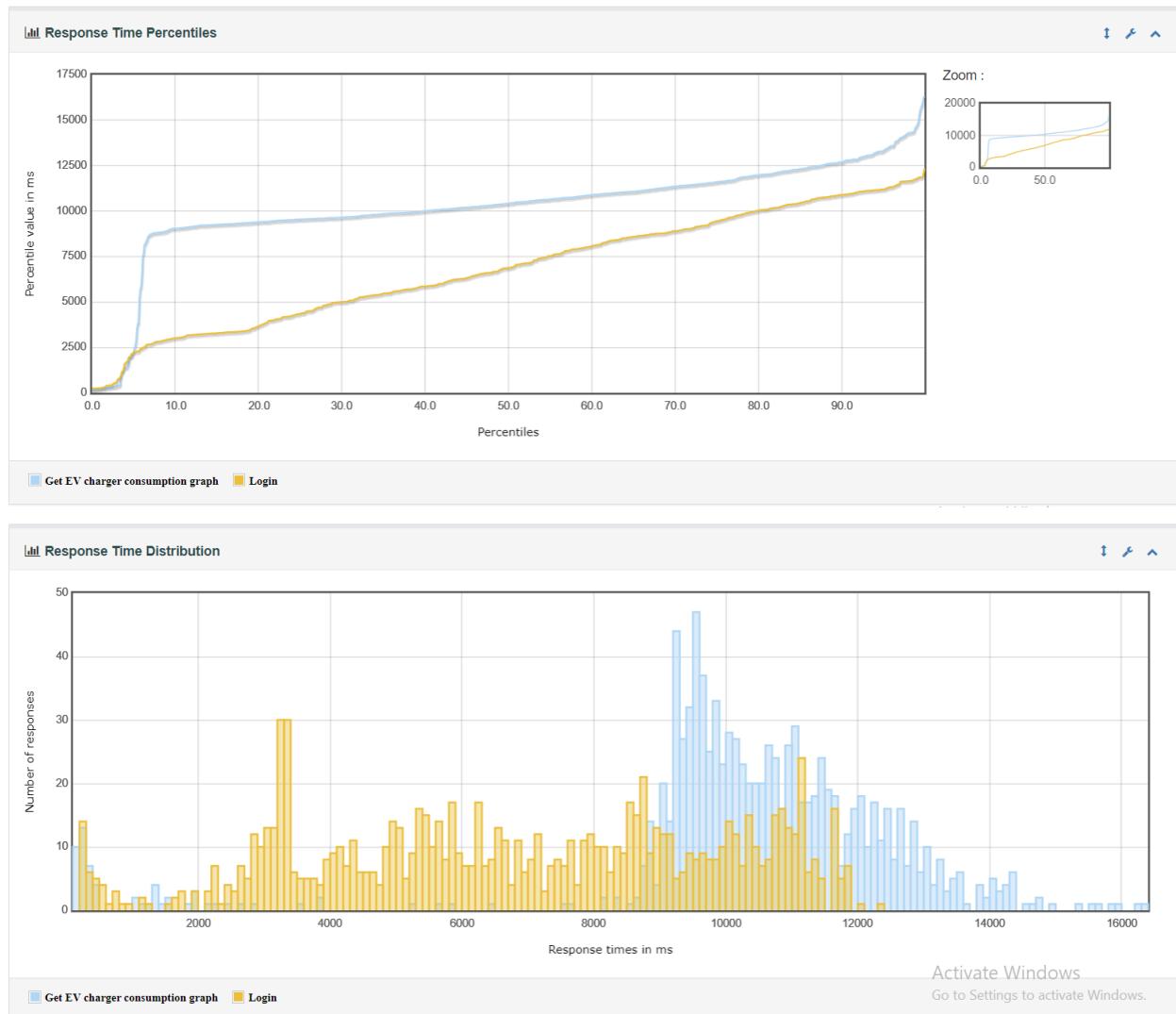


- 1000 korisnika, 10000 pokrenutih simulatora

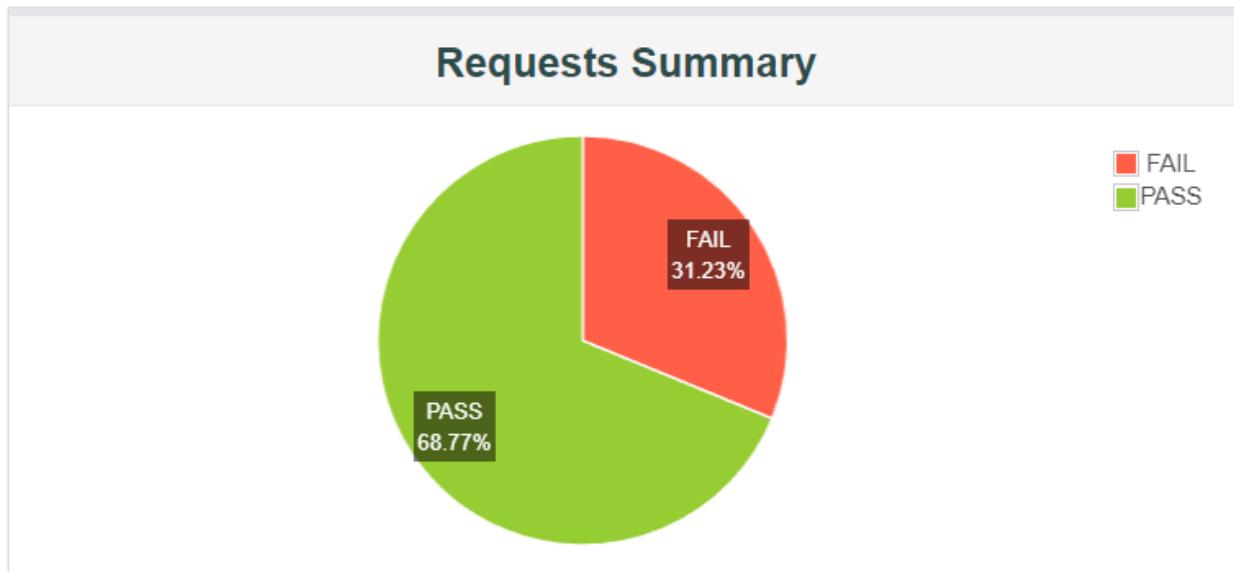


Statistics

Requests		Executions				Response Times (ms)							Throughput		Network (KB/sec)	
Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent			
Total	2000	0	0.00%	8540.64	130	16329	9525.00	11995.20	12699.60	14289.92	83.99	57.54	36.47			
Get EV charger consumption graph	1000	0	0.00%	10229.58	130	16329	10419.50	12699.20	13324.90	14717.00	42.43	23.82	26.86			
Login	1000	0	0.00%	6851.69	226	12332	6874.00	10885.80	11198.65	11770.97	69.76	56.41	16.42			



- 10000 korisnika, 10000 pokrenutih simulatora

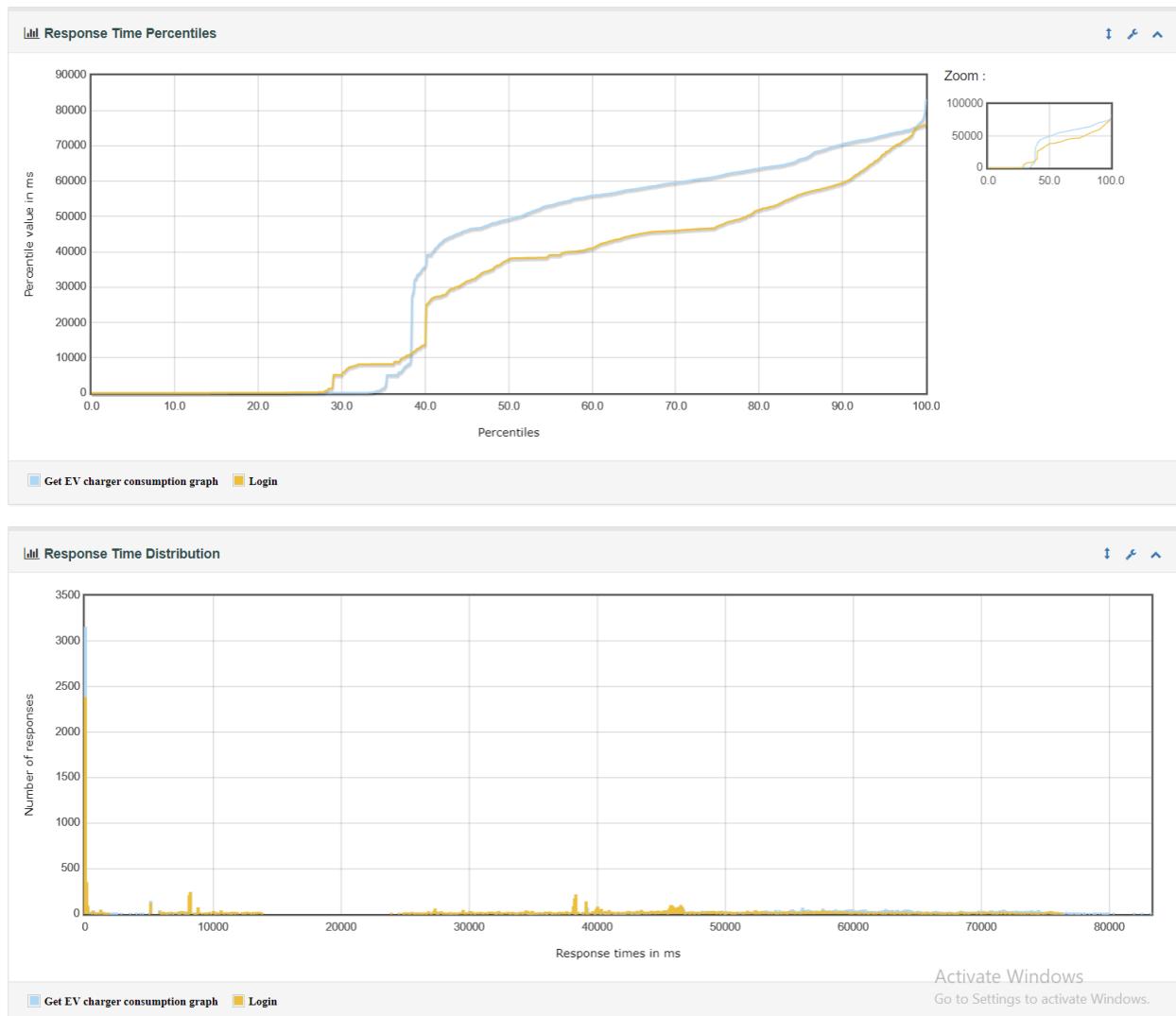


Statistics

Requests	Executions				Response Times (ms)							Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent	
Total	20000	6246	31.23%	33066.62	0	83256	40391.50	66589.70	71733.85	75414.97	121.47	144.24	35.39		
Get EV charger consumption graph	10000	3440	34.40%	36498.70	0	83256	49286.50	70548.90	73019.95	75884.87	60.97	69.80	25.20		
Login	10000	2806	28.06%	29634.53	0	76247	37952.50	59515.80	67768.95	75302.94	73.04	89.85	12.37		

Errors

Type of error	Number of errors	% in errors	% in all samples
Non HTTP response code: java.net.BindException/Non HTTP response message: Address already in use: connect	5777	92.49%	28.89%
Non HTTP response code: org.apache.http.conn.HttpHostConnectException/Non HTTP response message: Connect to localhost:8080 [localhost/127.0.0.1, localhost/0:0:0:0:0:1] failed: Connection refused: connect	425	6.80%	2.13%
500	44	0.70%	0.22%



Zaključak:

- Rezultati su slični kao kod dobavljanja drugih grafova za jedan uređaj.

7 - Dobavljanje grafa potrošnje nekretnine

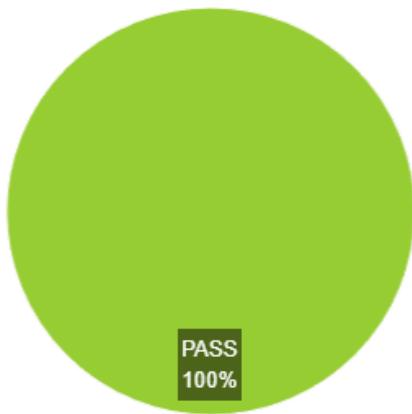
Opis:

- Korisnik se prijavljuje na sistem i dobavlja graf potrošnje nekretnine.

Rezultati:

- 100 korisnika, 100 pokrenutih simulatora

Requests Summary

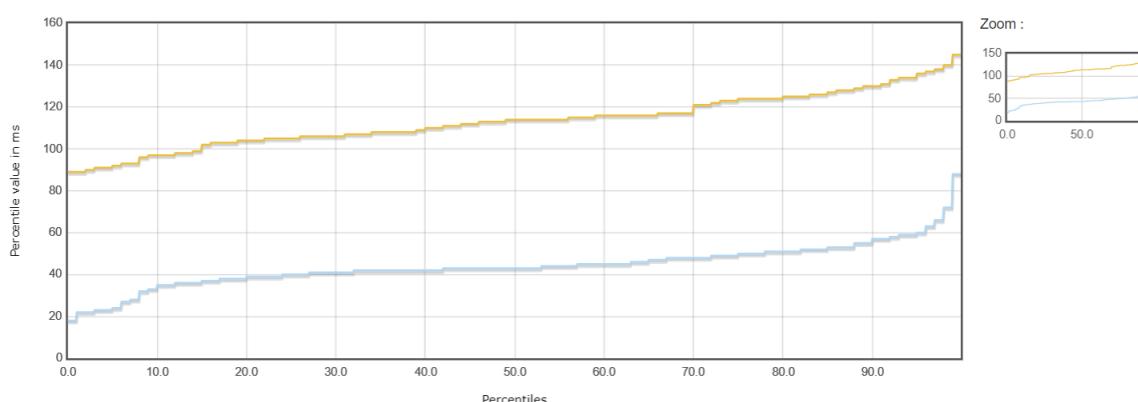


FAIL
PASS

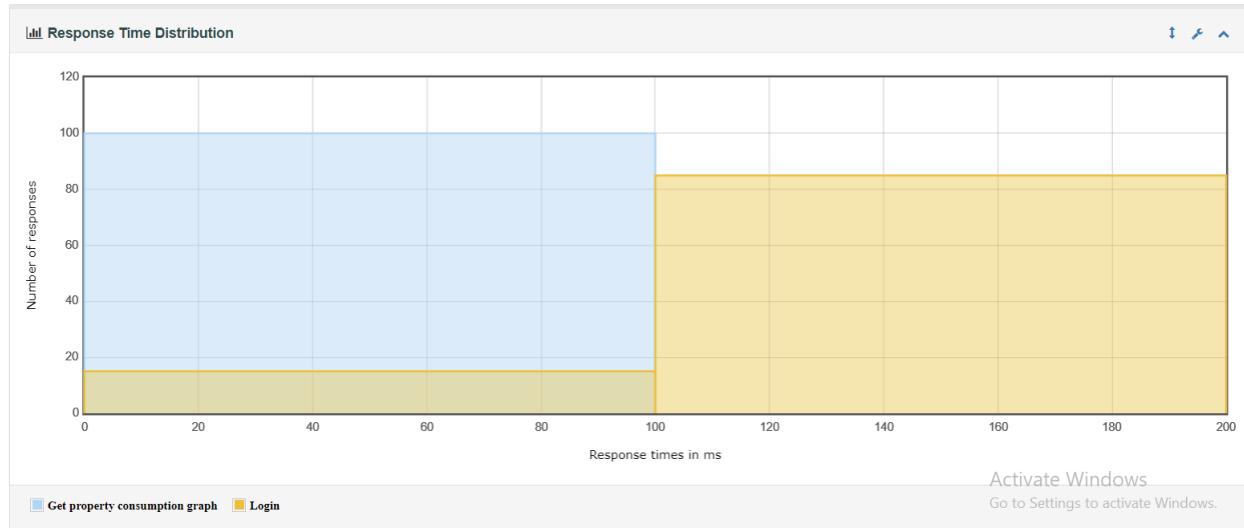
Statistics

Requests		Executions				Response Times (ms)							Throughput		Network (KB/sec)	
Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent			
Total	200	0	0.00%	78.84	18	145	88.50	124.90	130.00	139.98	181.00	381.16	78.83			
Get property consumption graph	100	0	0.00%	44.29	18	88	43.00	56.80	59.95	87.84	98.81	336.29	62.81			
Login	100	0	0.00%	113.38	89	145	114.00	130.00	135.90	144.95	92.00	74.39	21.65			

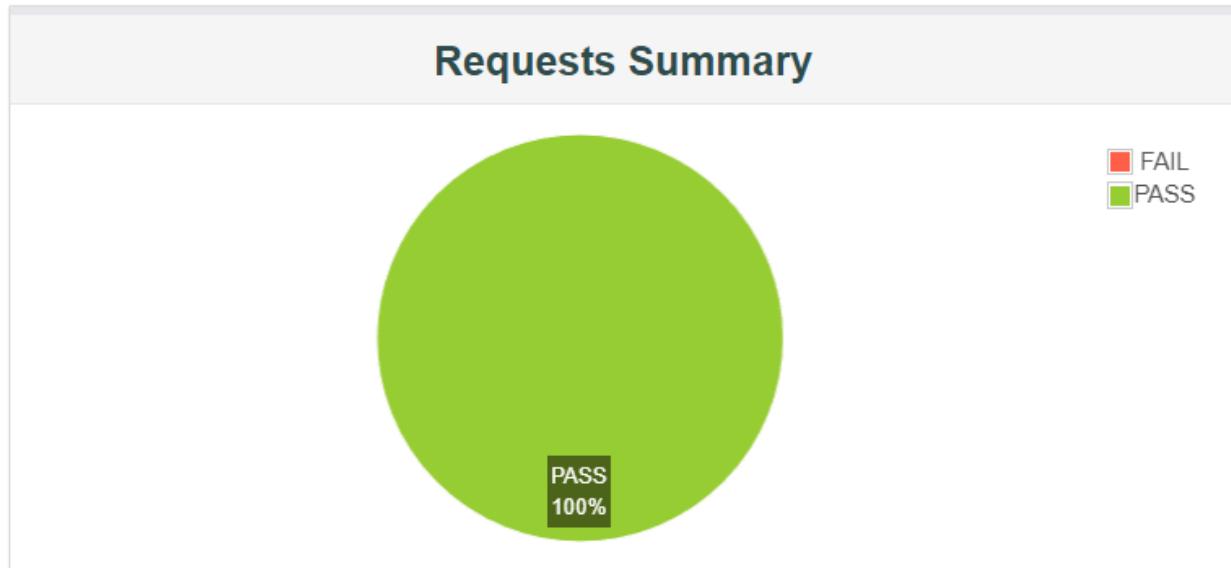
Response Time Percentiles



Get property consumption graph Login

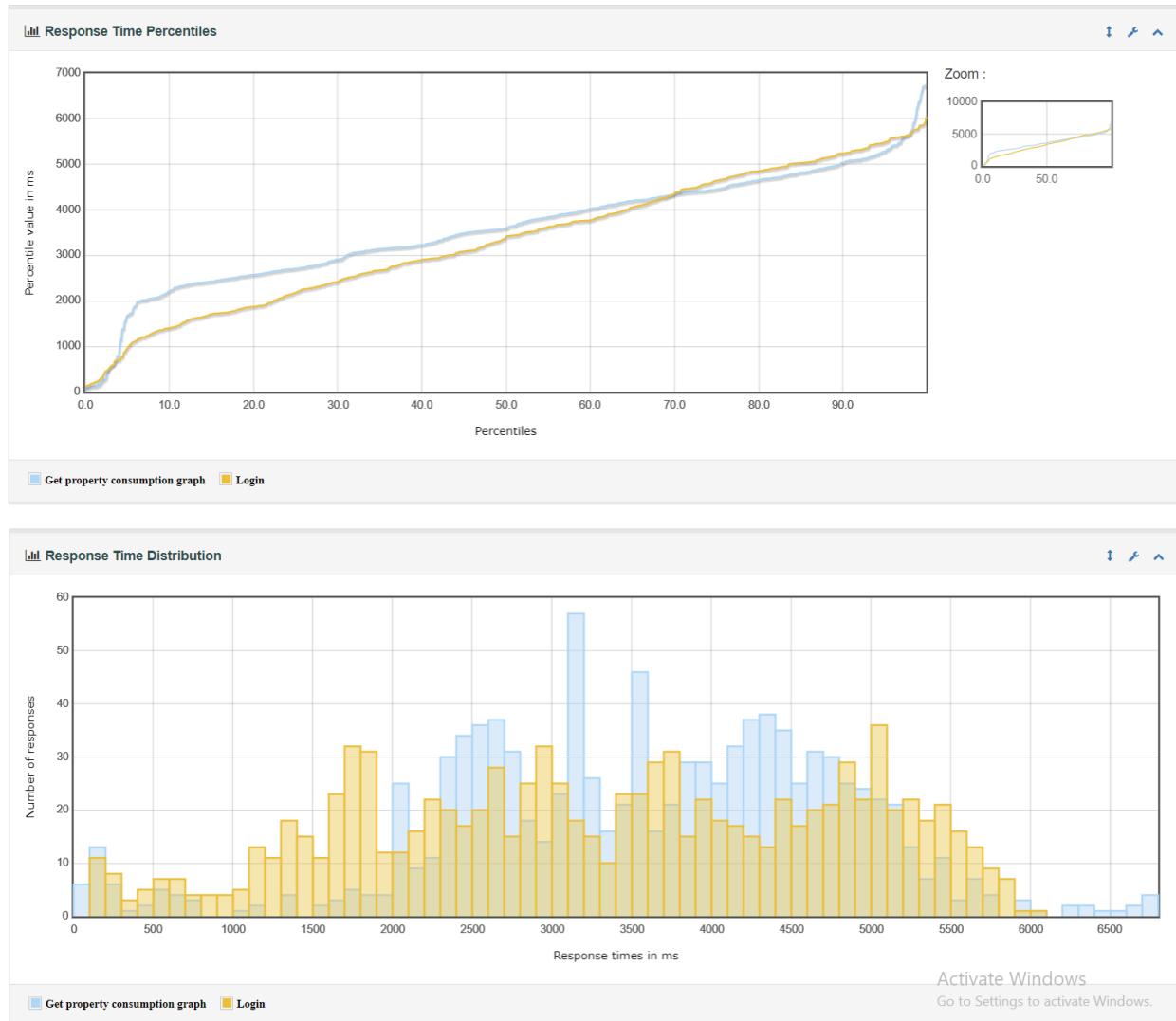


- 1000 korisnika, 100 pokrenutih simulatora



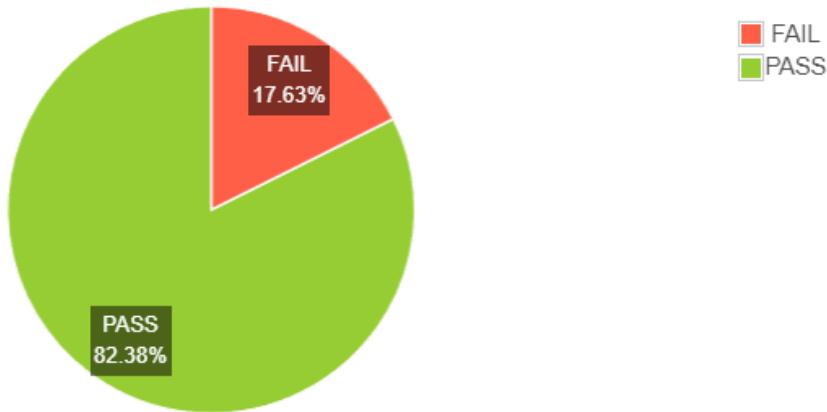
Statistics

Requests		Executions				Response Times (ms)							Throughput		Network (KB/sec)	
Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent			
Total	2000	0	0.00%	3452.37	64	6741	3528.50	5126.00	5429.00	5868.94	203.00	428.80	88.33			
Get property consumption graph	1000	0	0.00%	3576.04	64	6741	3601.00	5035.70	5286.60	6363.04	102.73	350.93	65.23			
Login	1000	0	0.00%	3328.70	109	6051	3418.00	5240.90	5490.15	5788.88	139.33	112.66	32.79			



- 10000 korisnika, 100 pokrenutih simulatora

Requests Summary

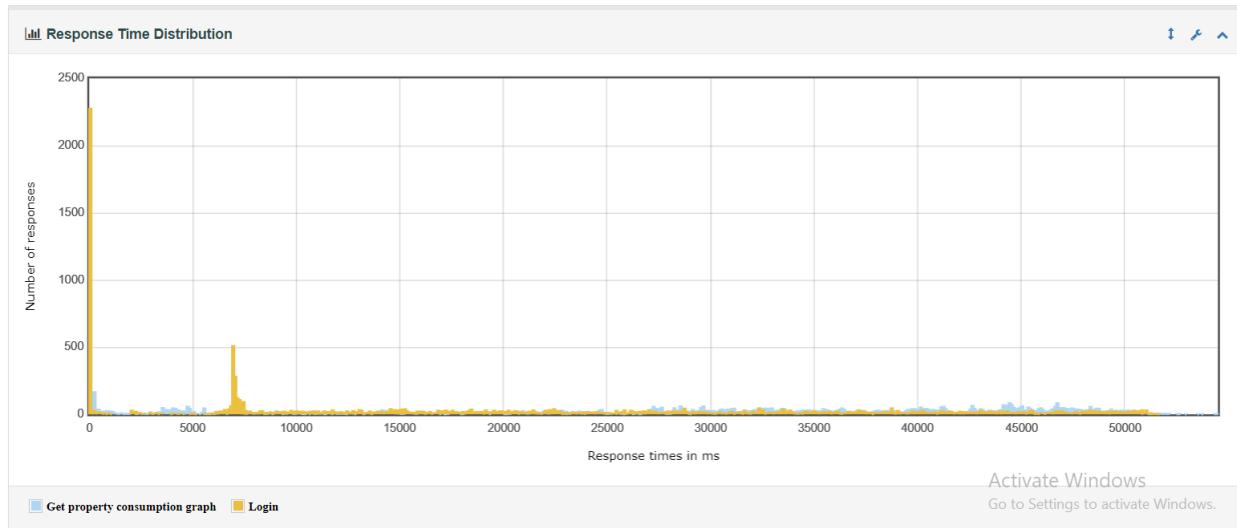
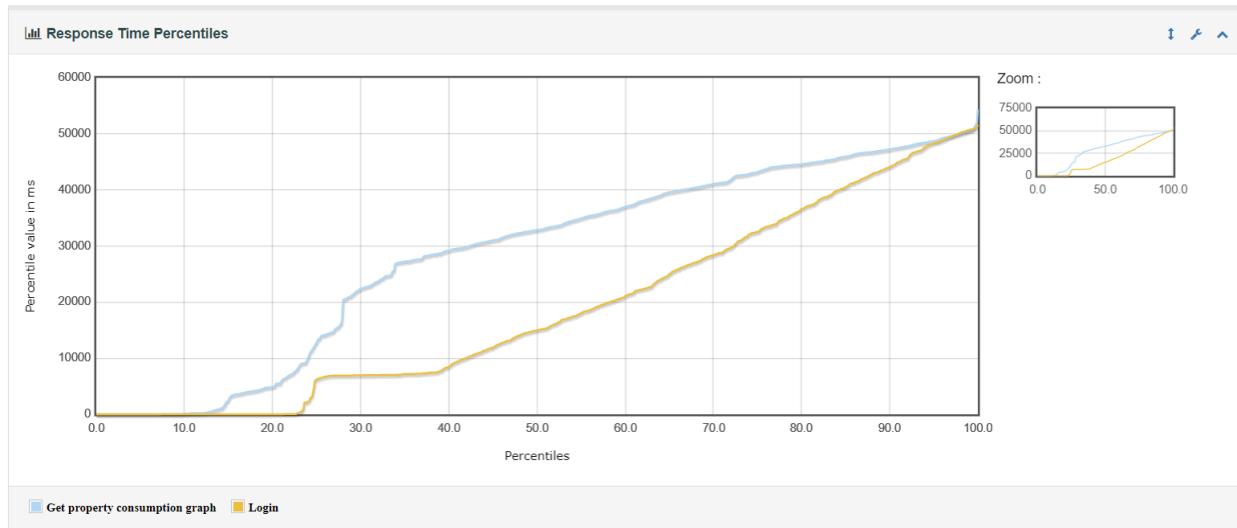


Statistics

Requests	Executions				Response Times (ms)							Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent	
Total	20000	3525	17.63%	23583.36	0	54404	26010.50	46693.90	48596.90	50631.96	217.24	492.77	78.38		
Get property consumption graph	10000	1233	12.33%	28473.76	0	54404	32875.50	47249.50	48744.90	50485.98	108.86	361.88	58.80		
Login	10000	2292	22.92%	18692.95	0	51644	14984.50	44127.90	48336.90	50708.95	153.80	186.43	27.90		

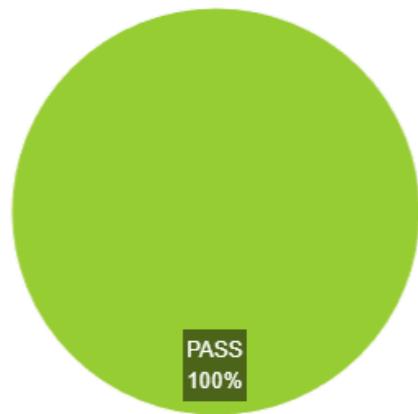
Errors

Type of error	Number of errors	% in errors	% in all samples
Non HTTP response code: org.apache.http.conn.HttpHostConnectException/Non HTTP response message: Connect to localhost:8080 [localhost/127.0.0.1, localhost/0:0:0:0:0:1] failed: Connection refused: connect	3525	100.00%	17.63%



- 100 korisnika, 1000 pokrenutih simulatora

Requests Summary

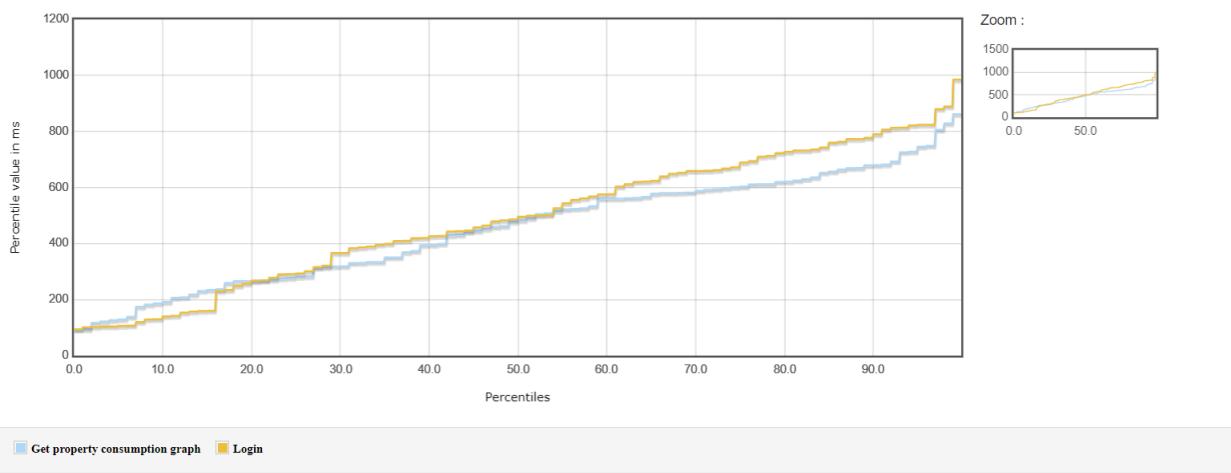


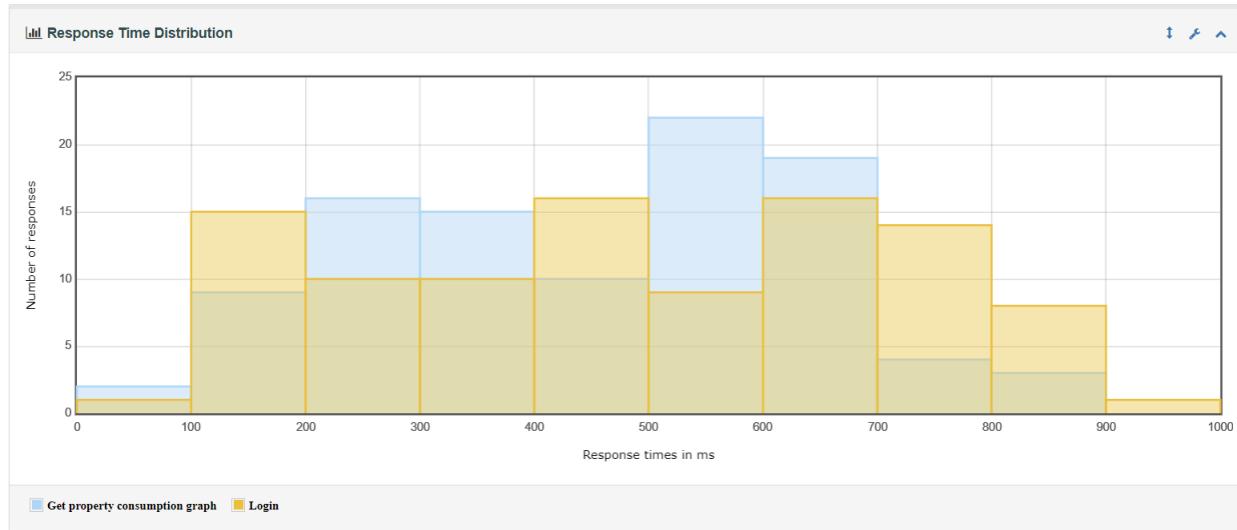
FAIL
PASS

Statistics

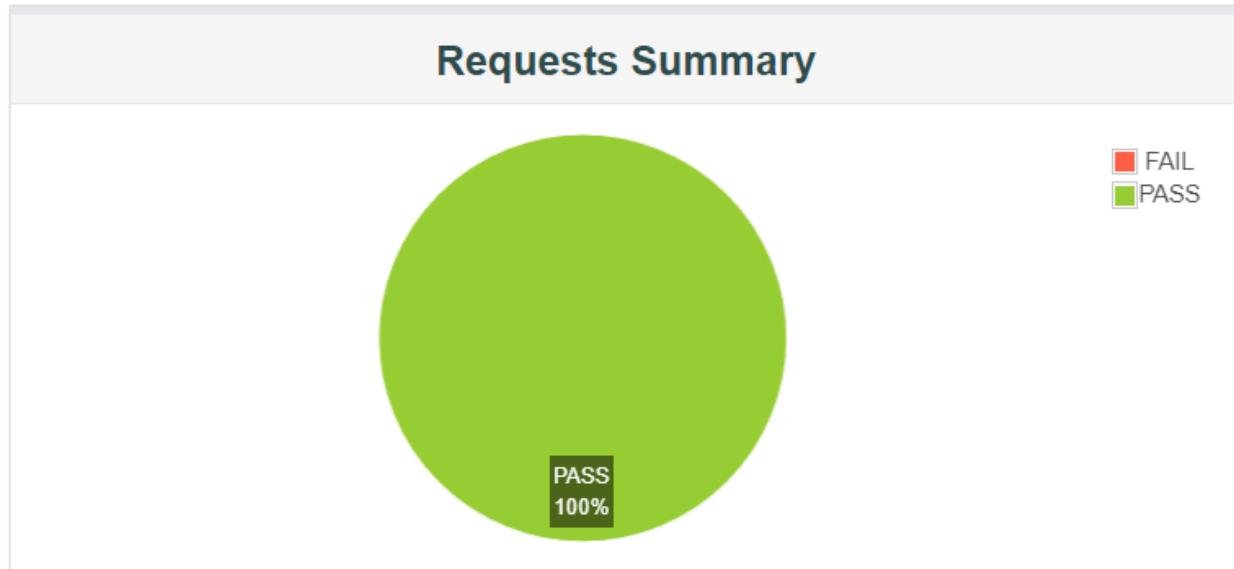
Requests		Executions				Response Times (ms)							Throughput		Network (KB/sec)	
Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent			
Total	200	0	0.00%	471.18	93	985	484.50	745.70	812.70	888.91	96.90	204.77	42.14			
Get property consumption graph	100	0	0.00%	453.34	93	862	480.50	679.90	745.10	861.67	50.76	173.50	32.20			
Login	100	0	0.00%	489.01	94	985	491.00	788.70	823.90	984.04	58.21	47.07	13.70			

Response Time Percentiles



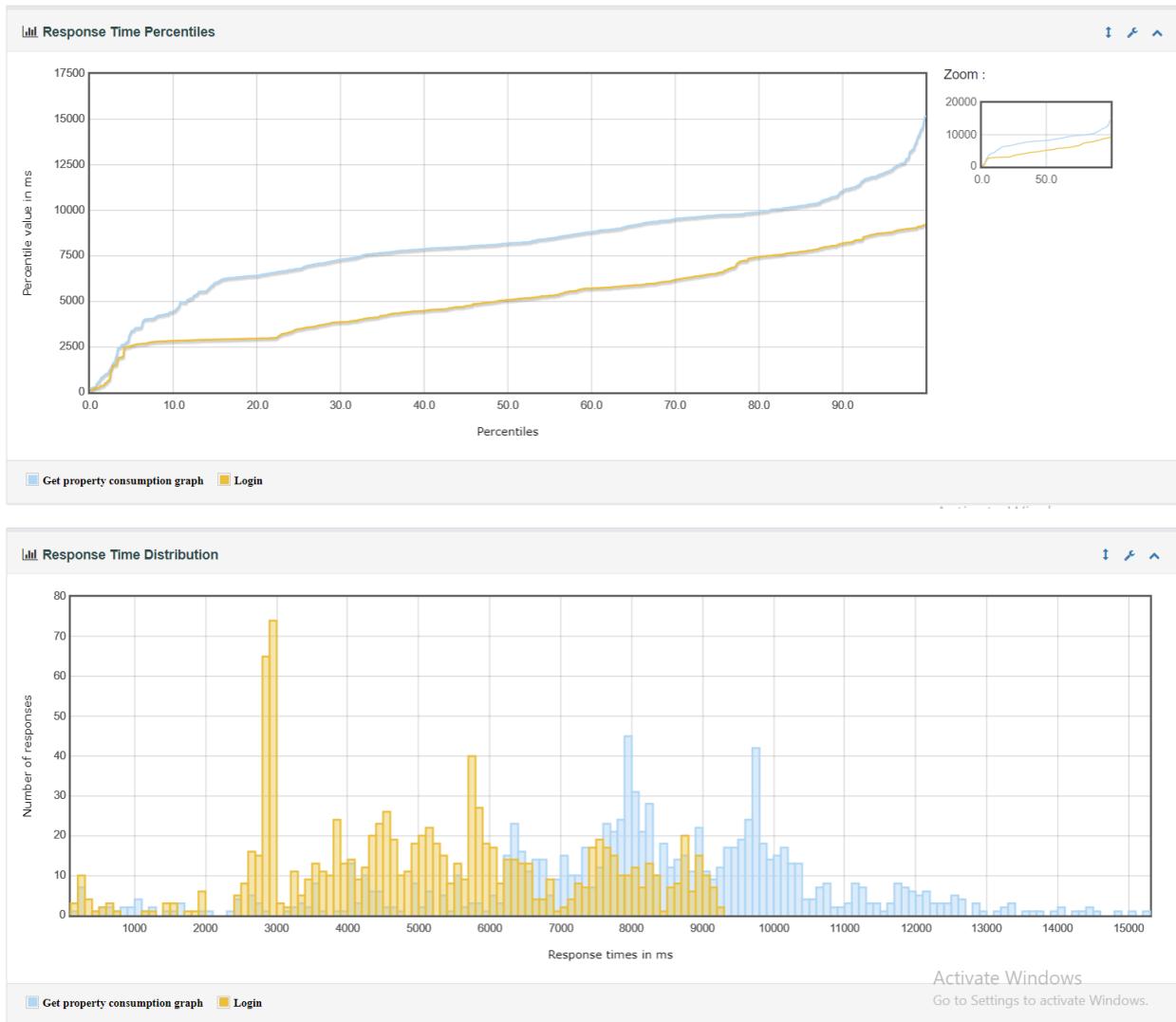


- 1000 korisnika, 1000 pokrenutih simulatora

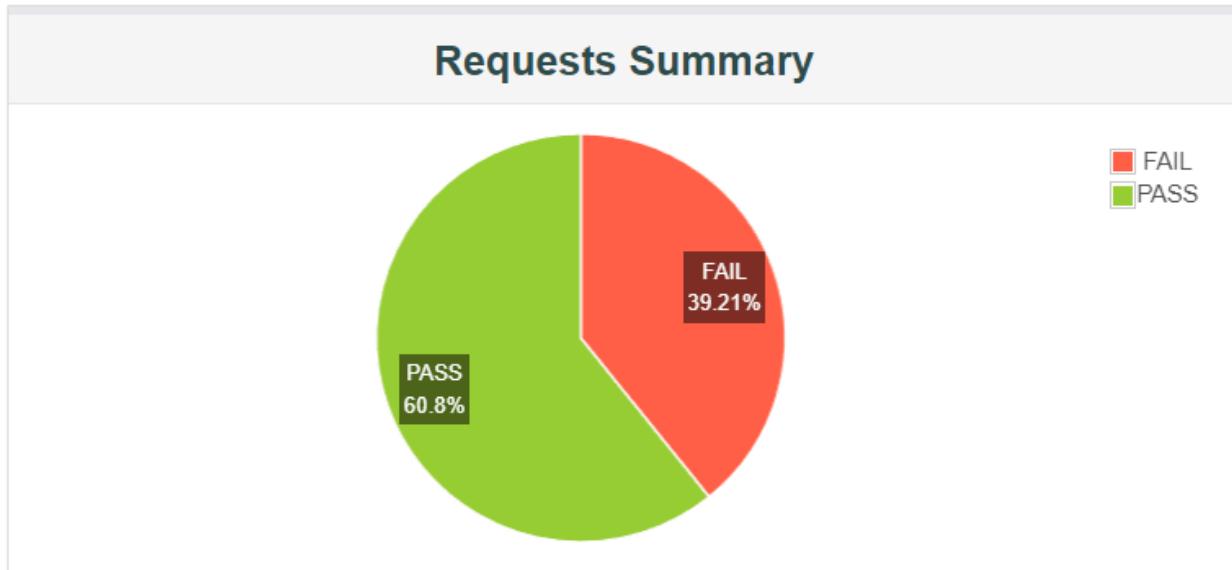


Statistics

Requests		Executions			Response Times (ms)							Throughput		Network (KB/sec)	
Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent		
Total	2000	0	0.00%	6637.88	128	15230	6727.00	9913.30	11081.95	13176.53	98.91	209.11	43.04		
Get property consumption graph	1000	0	0.00%	8108.46	177	15230	8196.00	11079.90	12078.45	14071.33	49.78	170.23	31.60		
Login	1000	0	0.00%	5167.30	128	9210	5088.00	8196.20	8756.00	9098.77	76.15	61.57	17.92		



- 10000 korisnika, 1000 pokrenutih simulatora

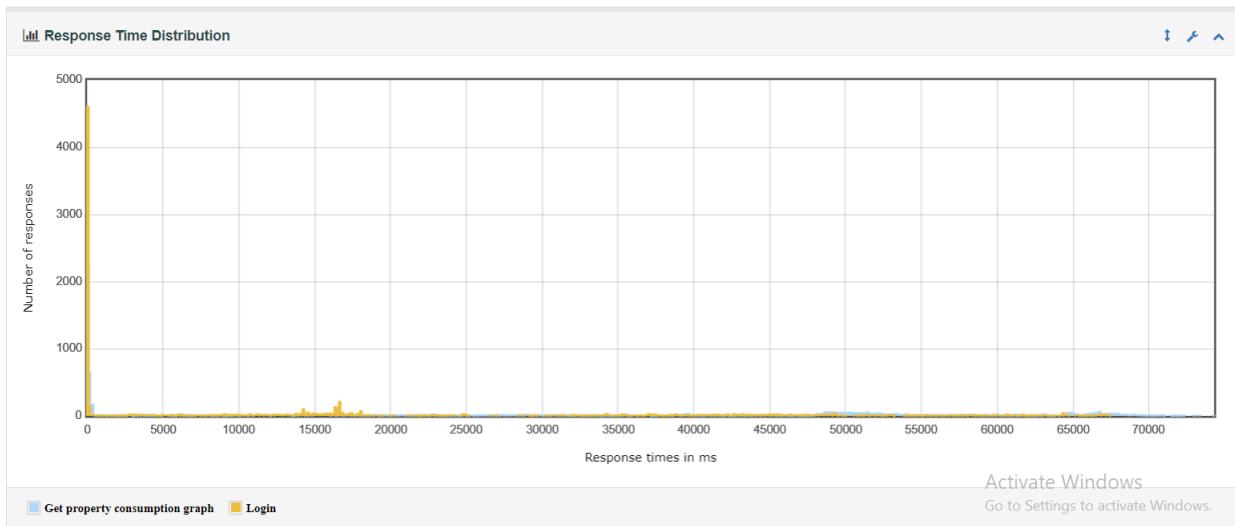
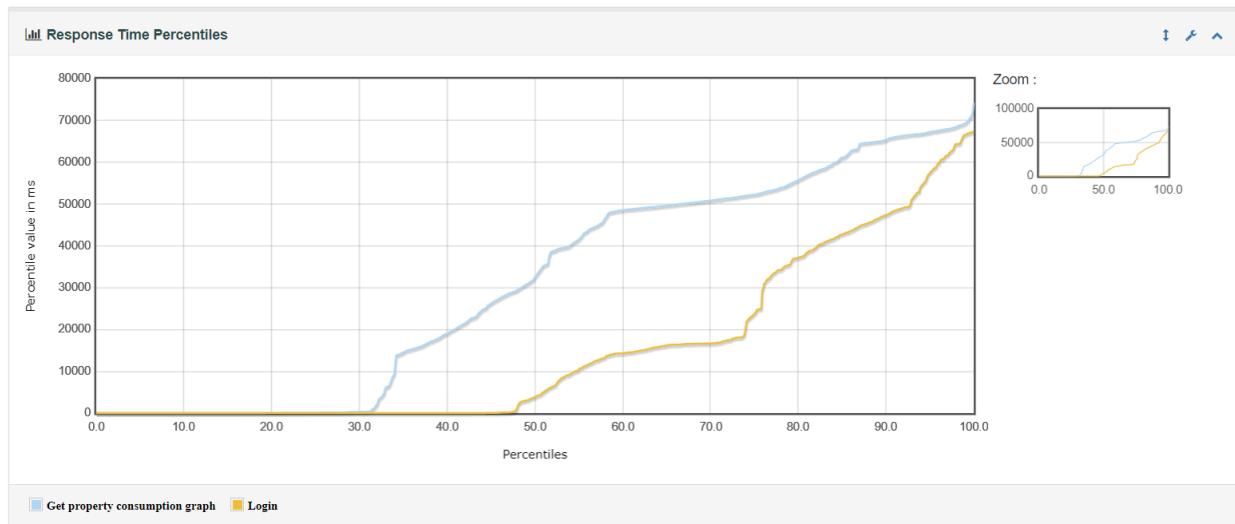


Statistics

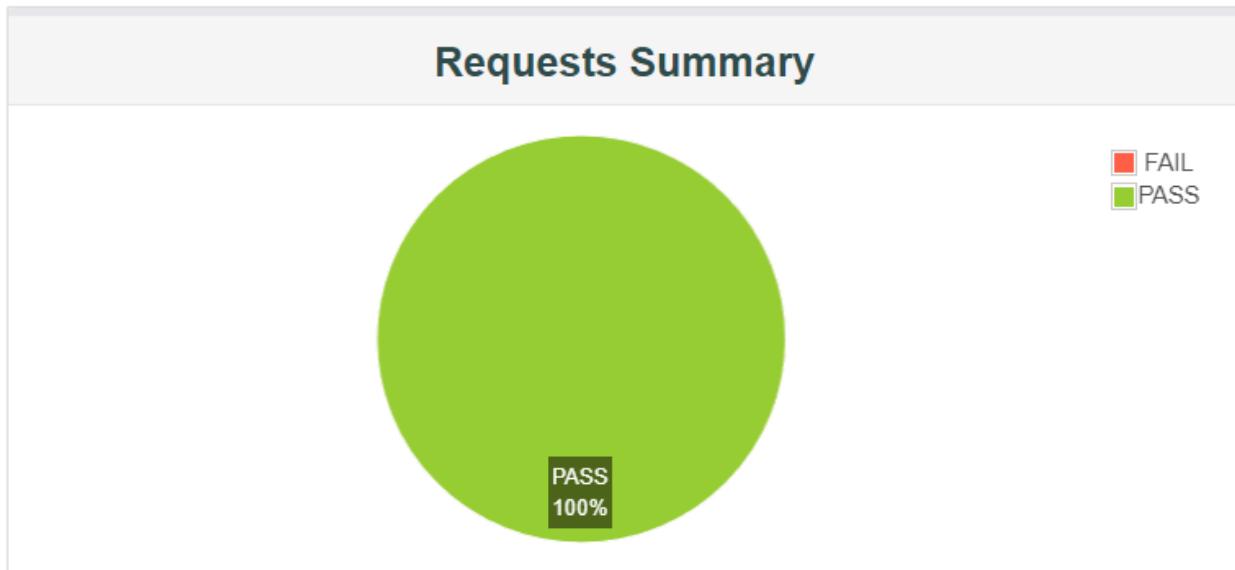
Requests	Executions				Response Times (ms)							Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent	
Total	20000	7841	39.20%	23056.45	0	74223	15625.00	59754.00	66156.65	68503.98	156.72	376.28	42.05		
Get property consumption graph	10000	3092	30.92%	30956.66	0	74223	32524.50	65396.10	67251.95	69314.96	78.58	248.08	32.45		
Login	10000	4749	47.49%	15156.24	0	67454	3836.50	47406.90	57489.50	66634.57	113.13	186.08	13.98		

Errors

Type of error	Number of errors	% in errors	% in all samples
Non HTTP response code: org.apache.http.conn.HttpHostConnectException/Non HTTP response message: Connect to localhost:8080 [localhost/127.0.0.1, localhost/0:0:0:0:0:1] failed: Connection refused: connect	7839	99.97%	39.20%
500	2	0.03%	0.01%

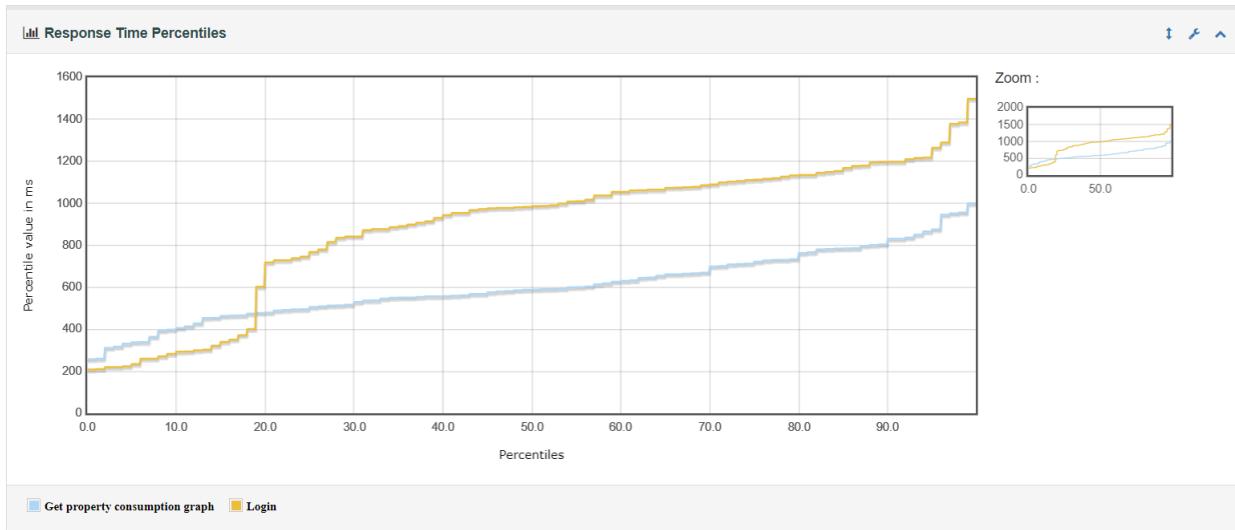


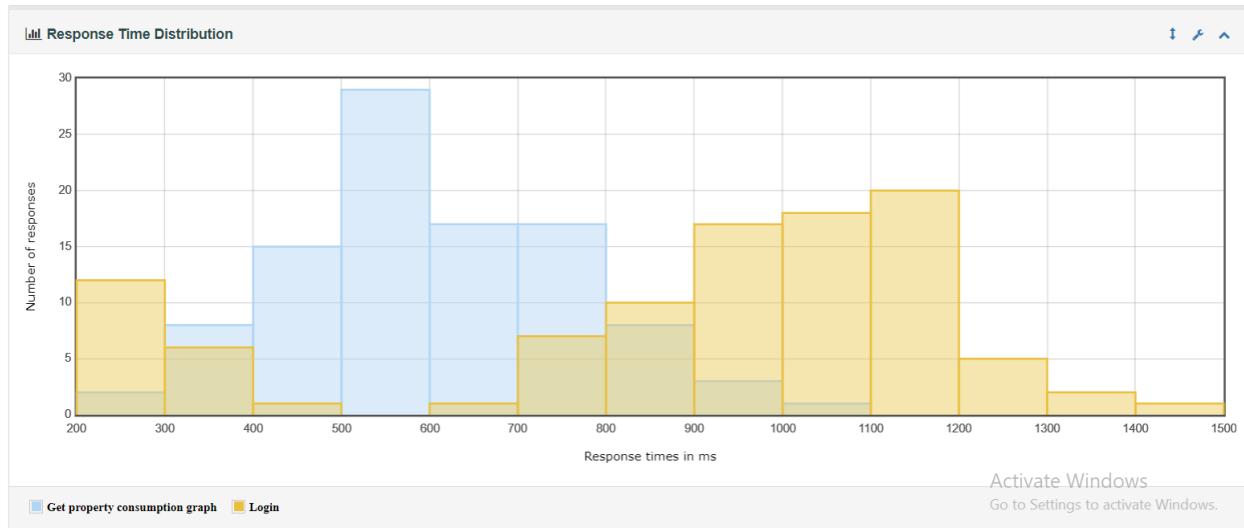
- 100 korisnika, 10000 pokrenutih simulatora



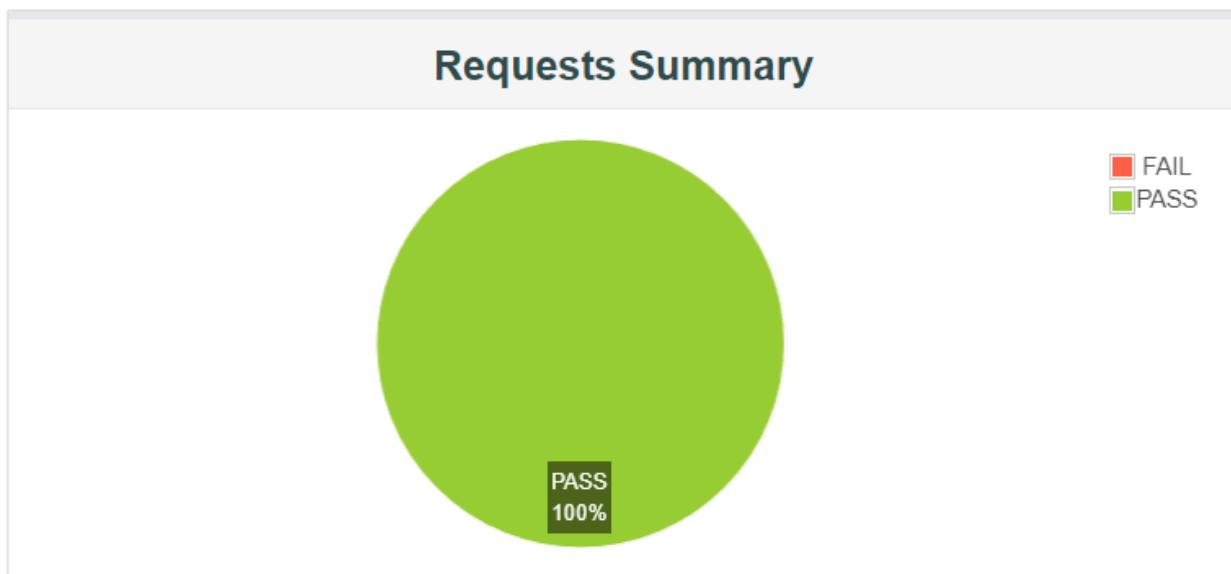
Statistics

Requests	Executions				Response Times (ms)							Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent	
Total	200	0	0.00%	746.29	208	1498	730.00	1134.80	1197.95	1384.93	79.94	168.42	34.78		
Get property consumption graph	100	0	0.00%	605.65	257	1000	588.50	828.30	875.50	999.56	43.65	148.63	27.71		
Login	100	0	0.00%	886.93	208	1498	985.00	1197.90	1262.65	1496.87	48.38	39.12	11.39		



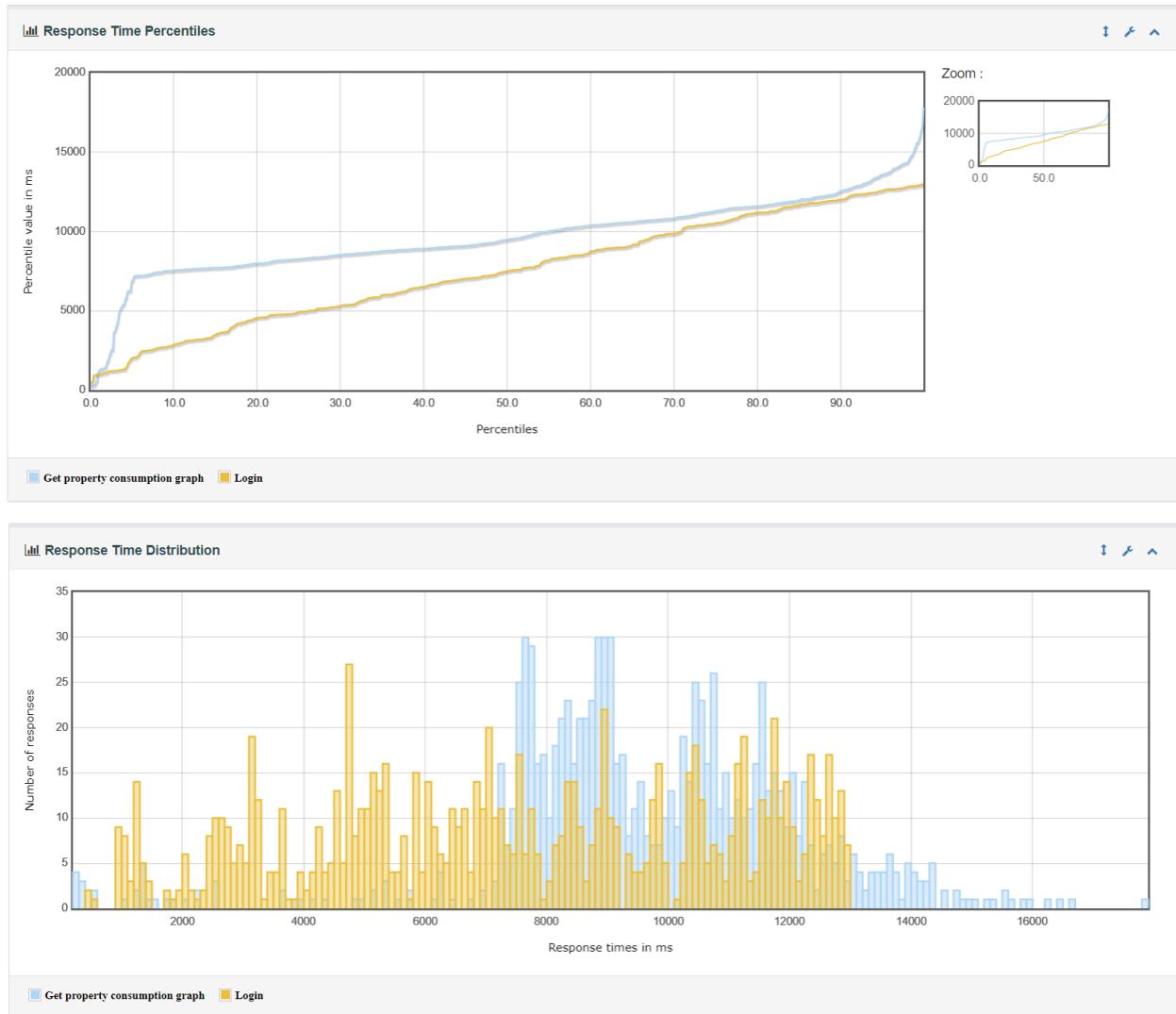


- 1000 korisnika, 10000 pokrenutih simulatora

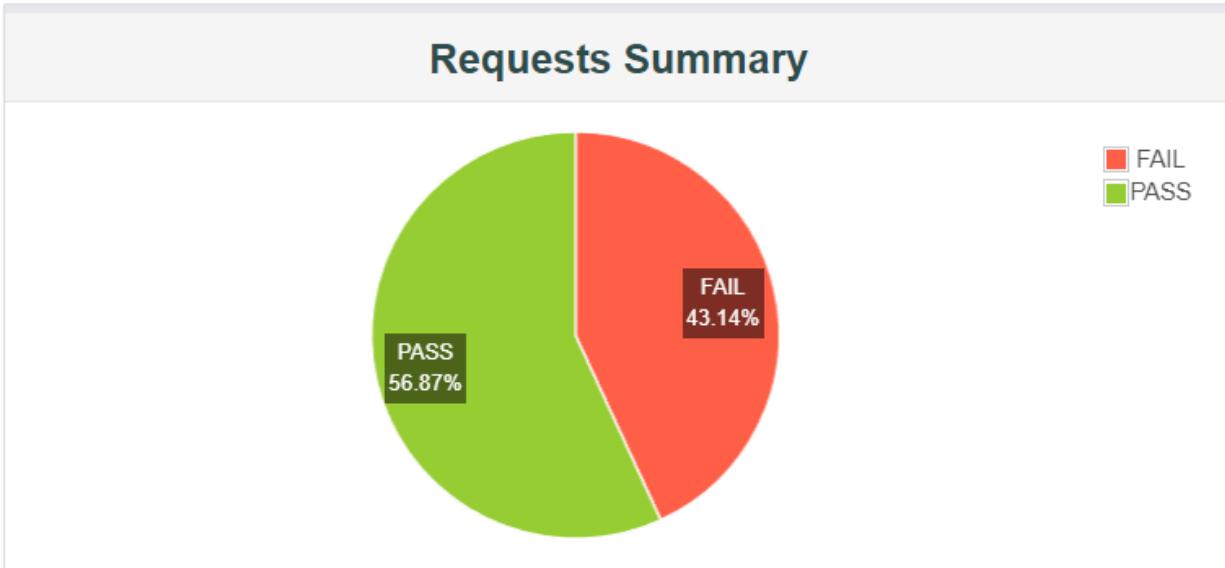


Statistics

Requests		Executions		Response Times (ms)							Throughput		Network (KB/sec)	
Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent	
Total	2000	0	0.00%	8606.52	248	17824	8880.00	12289.90	12844.30	14357.71	87.16	183.60	37.91	
Get property consumption graph	1000	0	0.00%	9672.47	248	17824	9493.50	12537.30	13589.20	15325.19	44.49	151.45	28.23	
Login	1000	0	0.00%	7540.57	459	12985	7511.00	12014.80	12563.15	12868.91	68.02	55.00	16.01	



- 10000 korisnika, 10000 pokrenutih simulatora

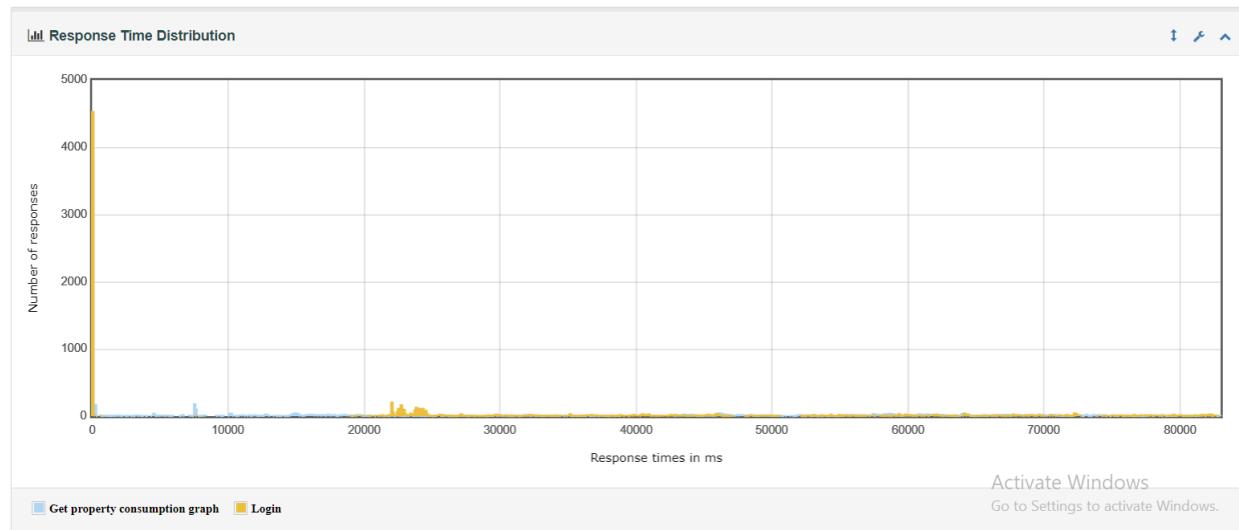
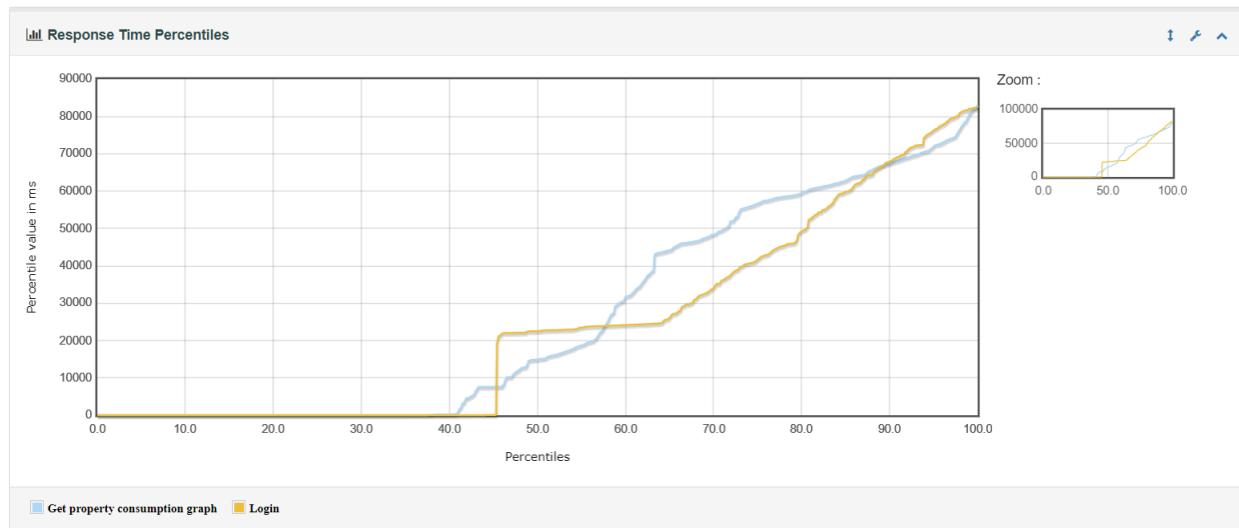


Statistics

Requests	Executions				Response Times (ms)							Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent	
Total	20000	8627	43.13%	25003.43	0	82937	18447.50	67720.90	73125.80	81586.00	148.09	339.24	35.12		
Get property consumption graph	10000	4093	40.93%	26215.88	0	82937	14957.00	67445.50	71936.90	80429.86	74.42	222.99	25.73		
Login	10000	4534	45.34%	23790.98	0	82719	22537.50	67938.20	76204.50	82048.92	85.24	135.12	10.97		

Errors

Type of error	Number of errors	% in errors	% in all samples
Non HTTP response code: org.apache.http.conn.HttpHostConnectException/Non HTTP response message: Connect to localhost:8080 [localhost/127.0.0.1, localhost/0:0:0:0:0:1] failed: Connection refused: connect	5702	66.09%	28.51%
Non HTTP response code: java.net.BindException/Non HTTP response message: Address already in use: connect	2922	33.87%	14.61%
500	3	0.03%	0.01%



Zaključak:

- Rezultati su malo bolji nego kod grafa potrošnje grada.

8 - Dobavljanje grafa proizvodnje sistema solarnih panela

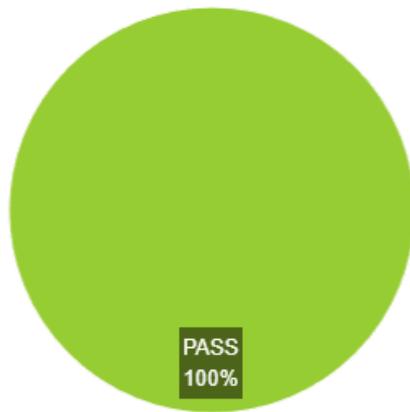
Opis:

- Korisnik se prijavljuje na sistem i dobavlja graf proizvodnje sistema solarnih panela.

Rezultati:

- 100 korisnika, 100 pokrenutih simulatora

Requests Summary

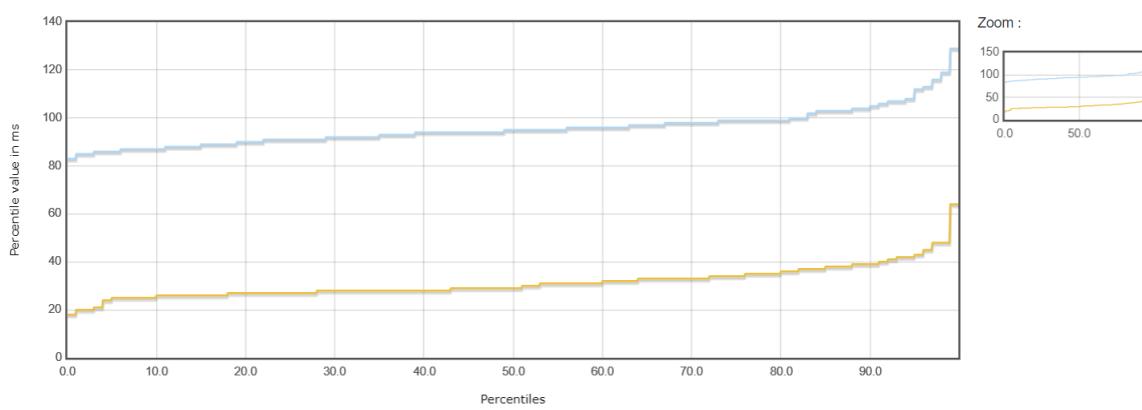


FAIL
PASS

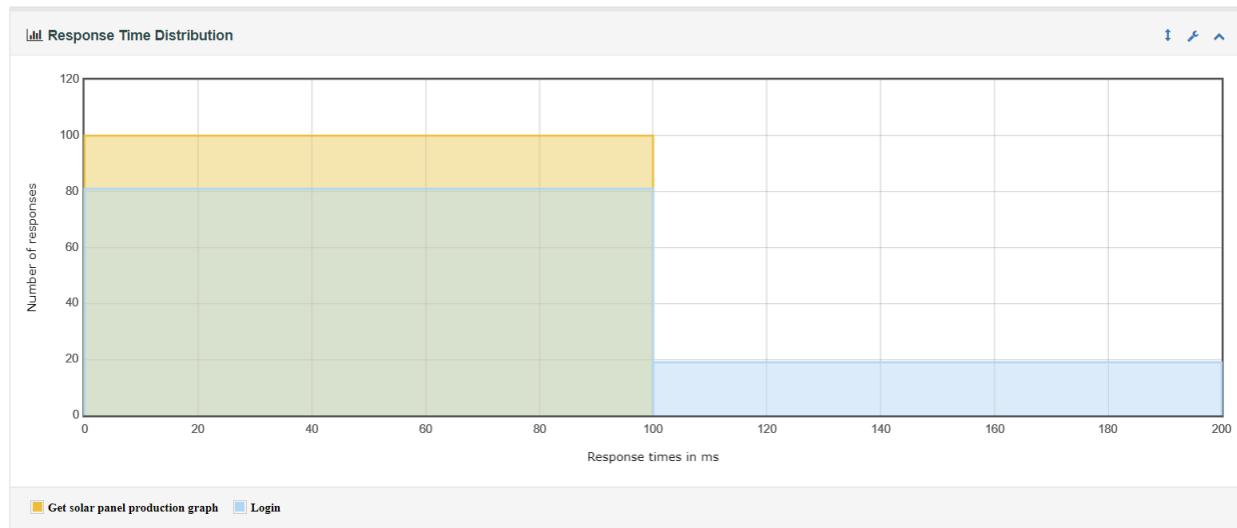
Statistics

Requests	Executions				Response Times (ms)							Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent	
Total	200	0	0.00%	63.52	18	129	73.50	99.00	104.95	118.97	183.15	392.40	79.59		
Get solar panel production graph	100	0	0.00%	31.30	18	64	29.00	39.00	42.95	63.84	99.60	346.26	63.13		
Login	100	0	0.00%	95.74	83	129	95.00	104.90	111.80	128.90	93.37	75.50	21.97		

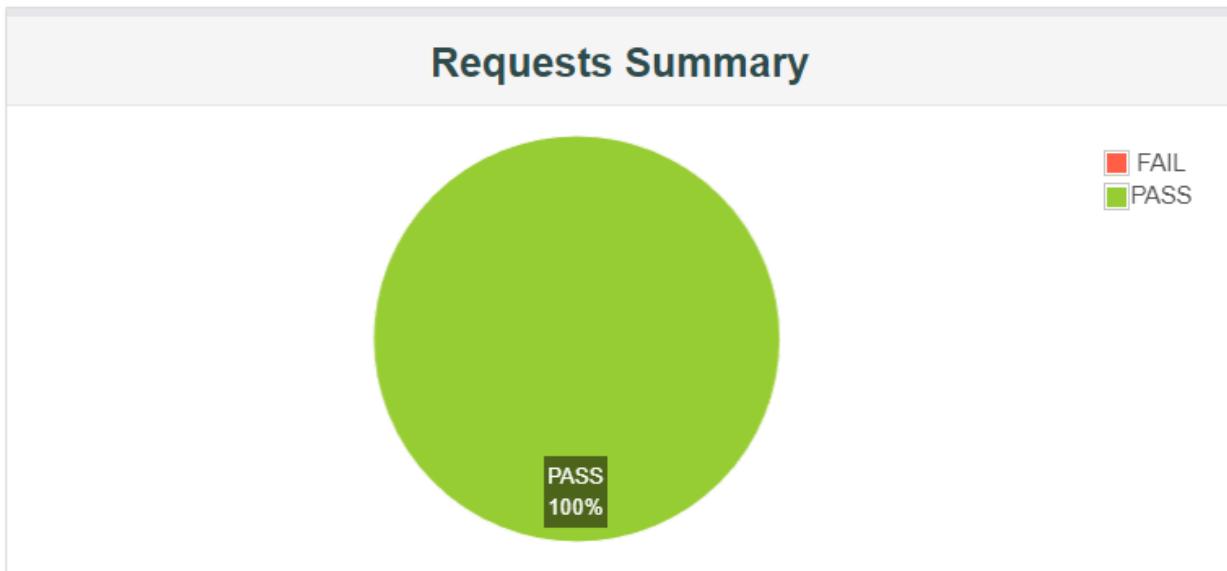
Response Time Percentiles



Get solar panel production graph Login

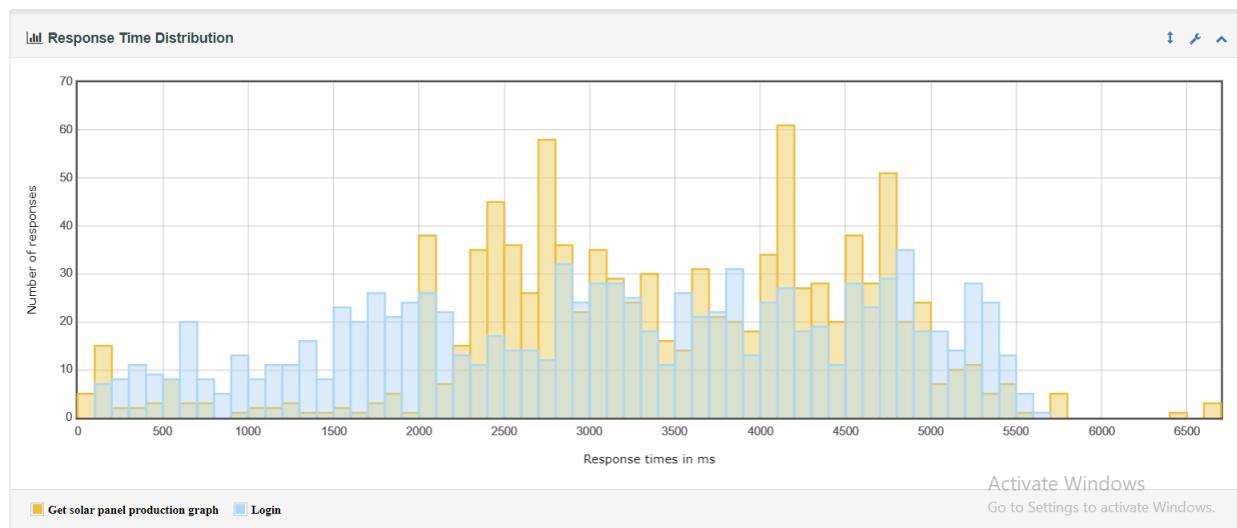
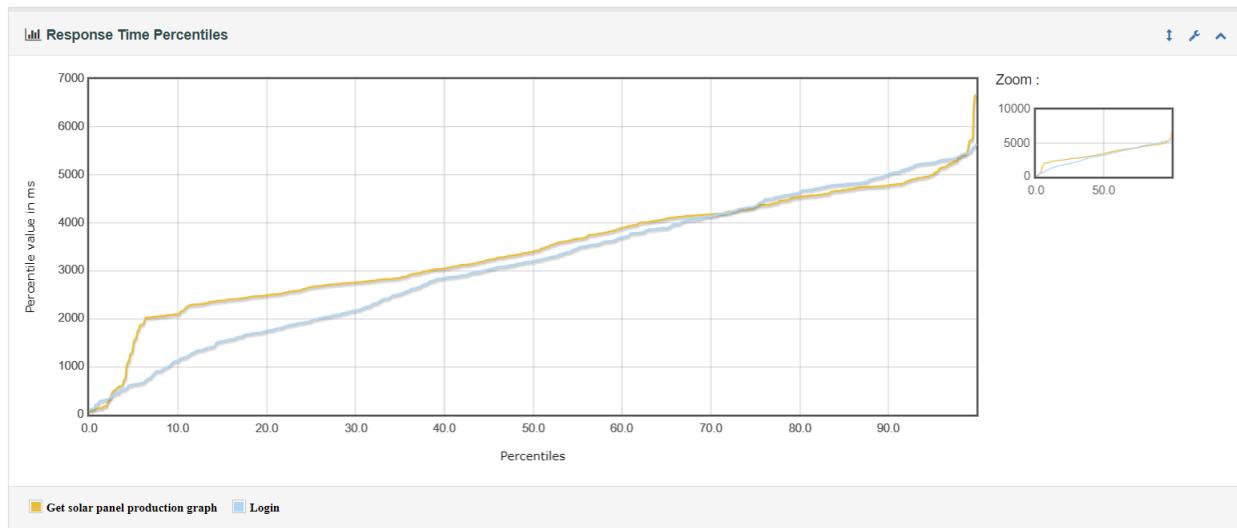


- 1000 korisnika, 100 pokrenutih simulatora



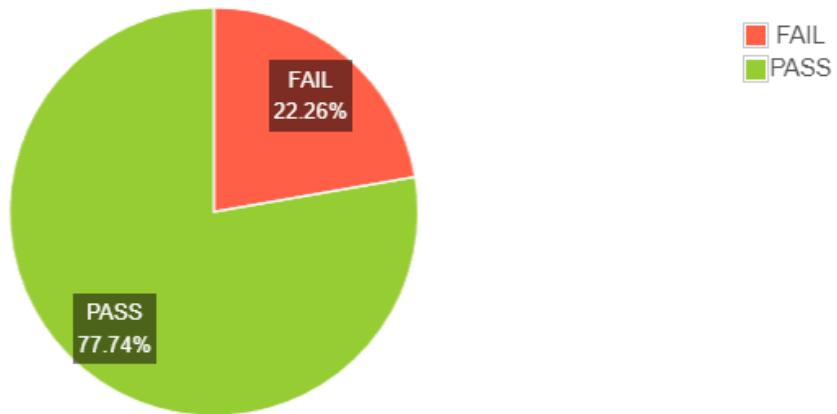
Statistics

Requests	Executions				Response Times (ms)							Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent	
Total	2000	0	0.00%	3286.29	67	6674	3314.50	4871.60	5217.75	5477.88	220.56	476.42	95.76		
Get solar panel production graph	1000	0	0.00%	3423.94	67	6674	3407.50	4785.50	5014.05	5590.04	111.76	392.44	70.74		
Login	1000	0	0.00%	3148.64	109	5653	3207.00	5017.80	5259.00	5464.87	147.93	119.61	34.82		



- 10000 korisnika, 100 pokrenutih simulatora

Requests Summary

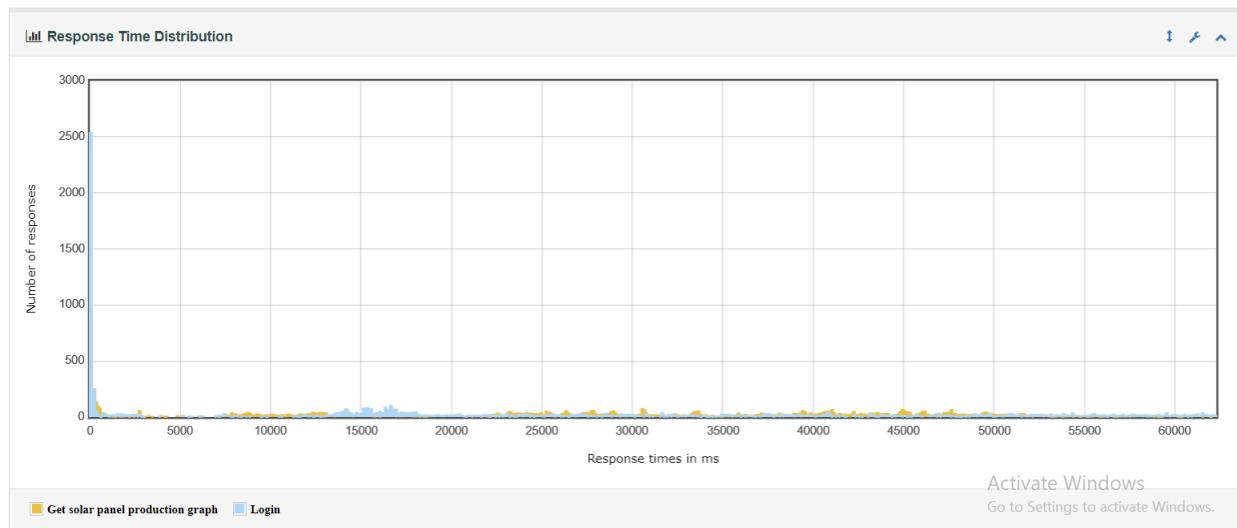
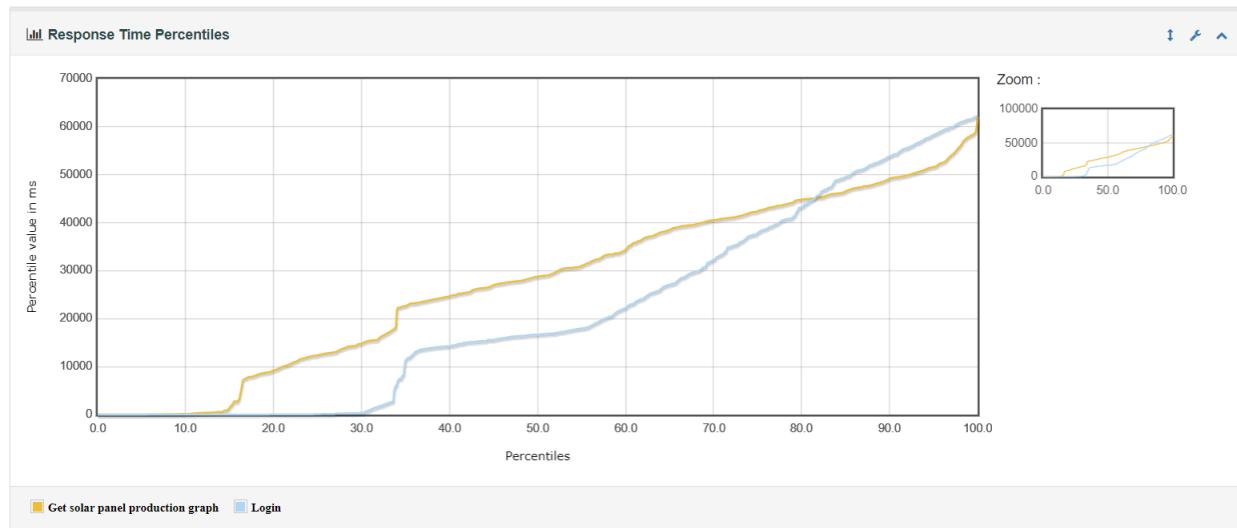


Statistics

Requests	Executions				Response Times (ms)									Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent			
Total	20000	4452	22.26%	24493.84	0	62266	24076.50	50839.90	55682.95	60992.00	182.86	433.16	62.37				
Get solar panel production graph	10000	1408	14.08%	27489.70	0	62059	28817.00	49246.90	51640.00	57916.97	91.67	311.05	47.53				
Login	10000	3044	30.44%	21497.98	0	62266	16695.00	53878.90	58300.85	61567.99	115.38	155.14	18.89				

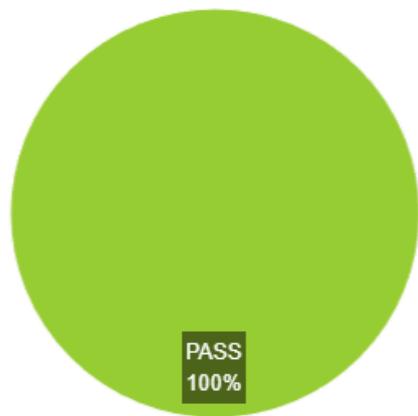
Errors

Type of error	Number of errors	% in errors	% in all samples
Non HTTP response code: org.apache.http.conn.HttpHostConnectException/Non HTTP response message: Connect to localhost:8080 [localhost/127.0.0.1, localhost/0:0:0:0:0:0:1] failed: Connection refused: connect	4452	100.00%	22.26%



- 100 korisnika, 1000 pokrenutih simulatora

Requests Summary

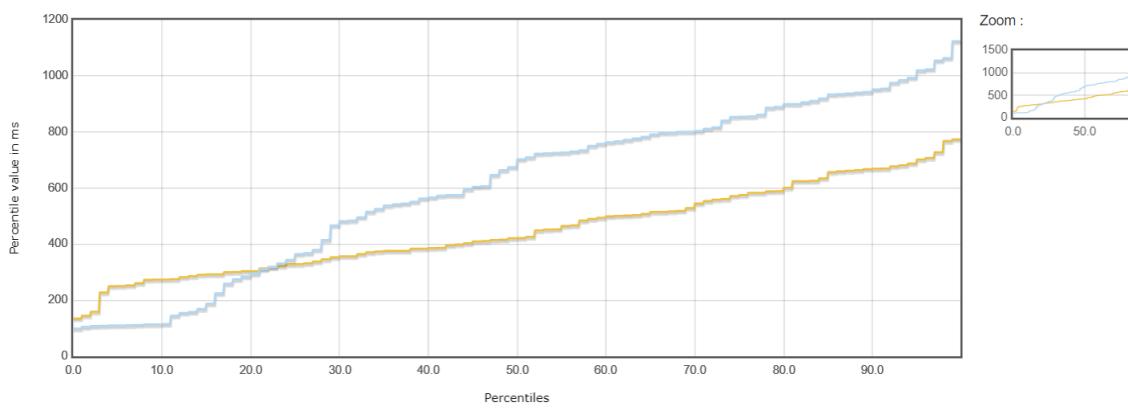


FAIL
PASS

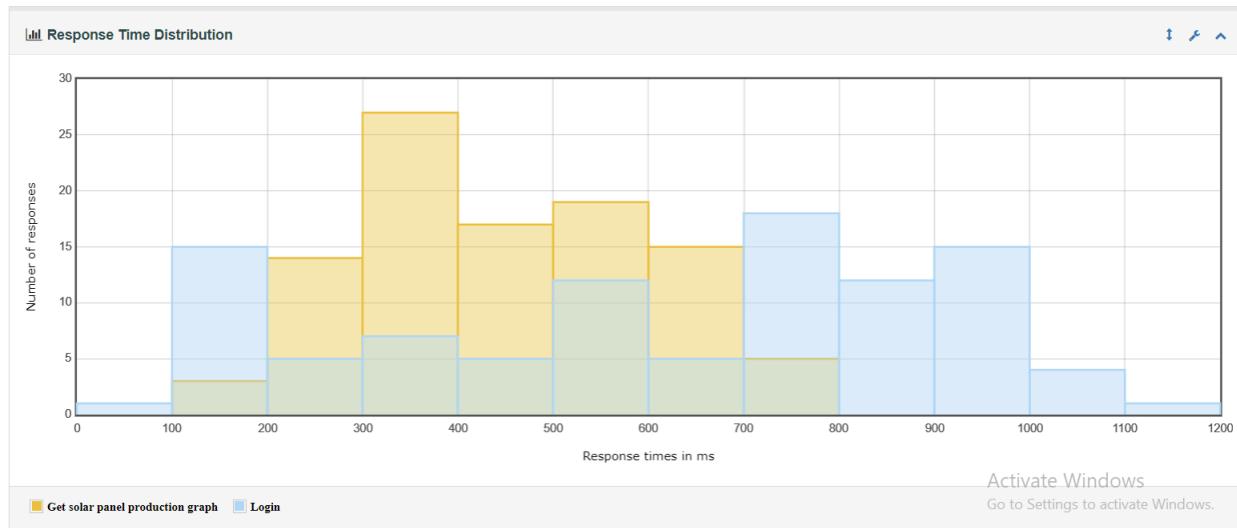
Statistics

Requests	Executions				Response Times (ms)							Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent	
Total	200	0	0.00%	530.34	99	1124	515.50	899.00	951.55	1063.91	94.21	64.54	40.95		
Get solar panel production graph	100	0	0.00%	450.84	135	774	421.50	668.90	701.30	773.94	49.43	27.76	31.34		
Login	100	0	0.00%	609.84	99	1124	689.00	951.10	1018.70	1123.40	55.13	44.58	12.97		

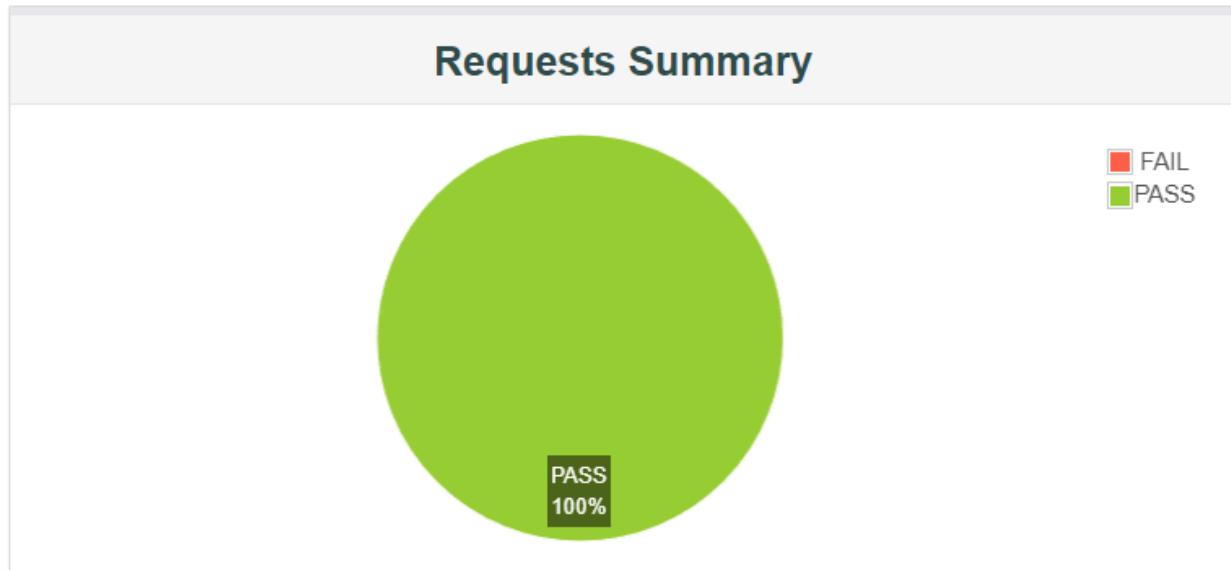
Response Time Percentiles



Get solar panel production graph Login

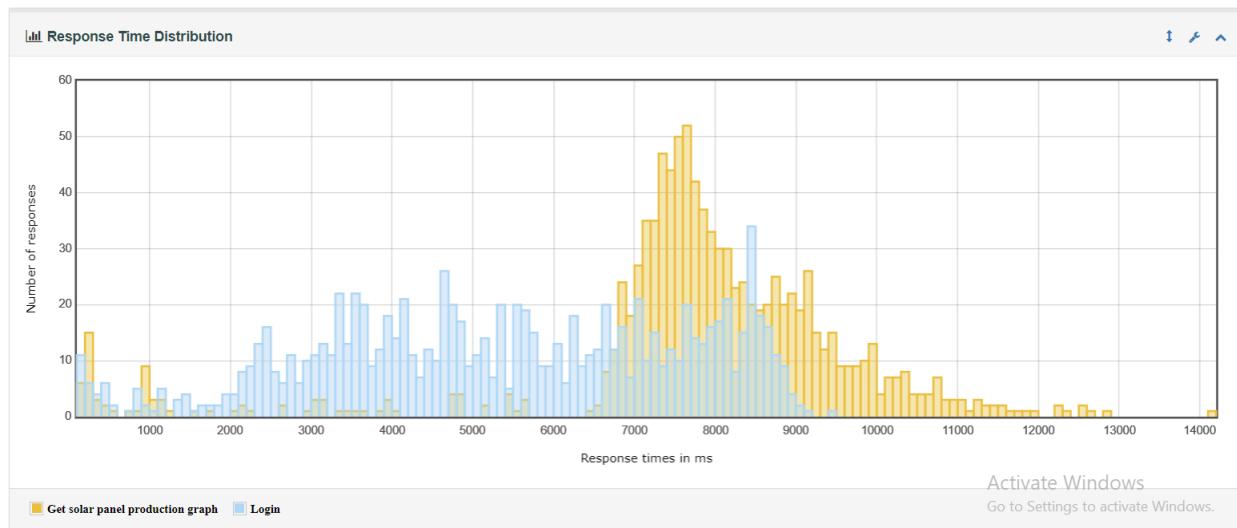
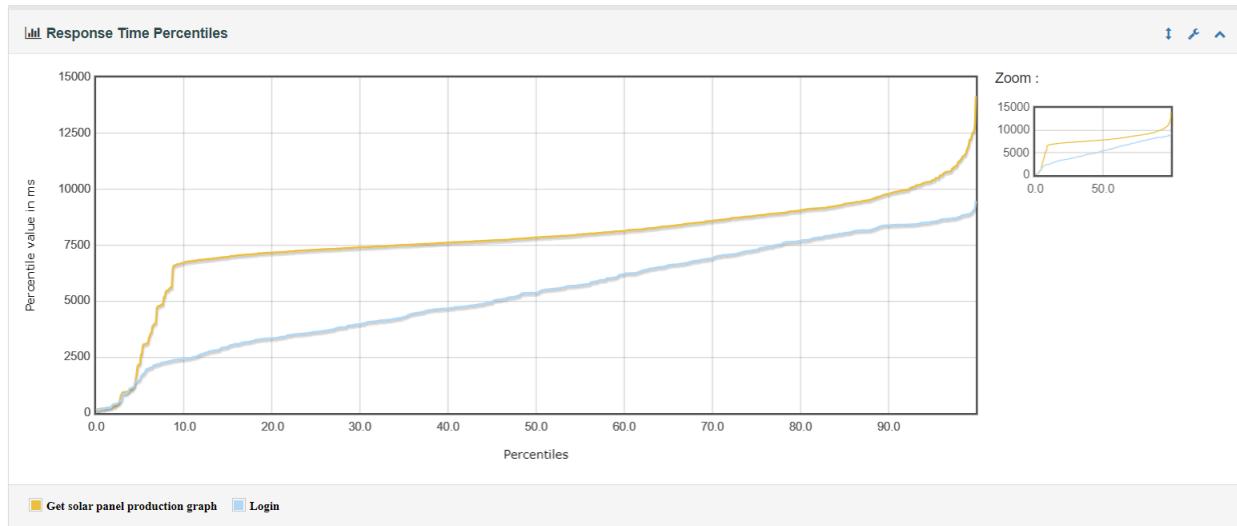


- 1000 korisnika, 1000 pokrenutih simulatora



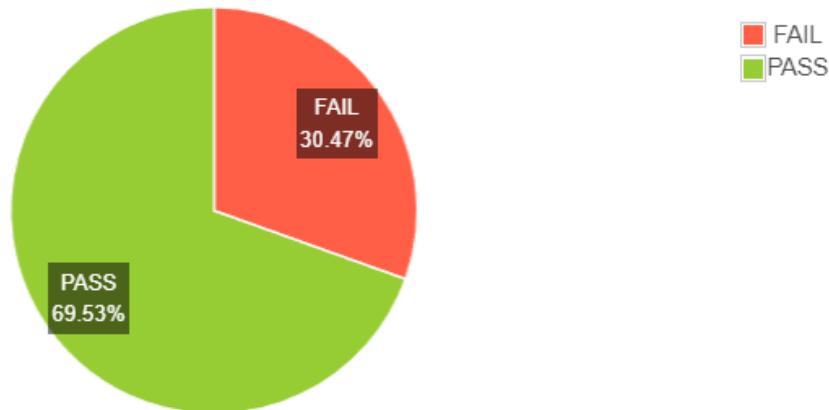
Statistics

Requests	Executions				Response Times (ms)									Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent			
Total	2000	0	0.00%	6557.08	130	14167	7301.50	9082.20	9797.40	11257.62	108.82	74.55	47.23				
Get solar panel production graph	1000	0	0.00%	7746.70	132	14167	7847.50	9796.80	10408.50	11861.30	54.81	30.78	34.68				
Login	1000	0	0.00%	5367.45	130	9477	5377.50	8392.90	8556.65	8881.98	90.72	73.36	21.35				



- 10000 korisnika, 1000 pokrenutih simulatora

Requests Summary

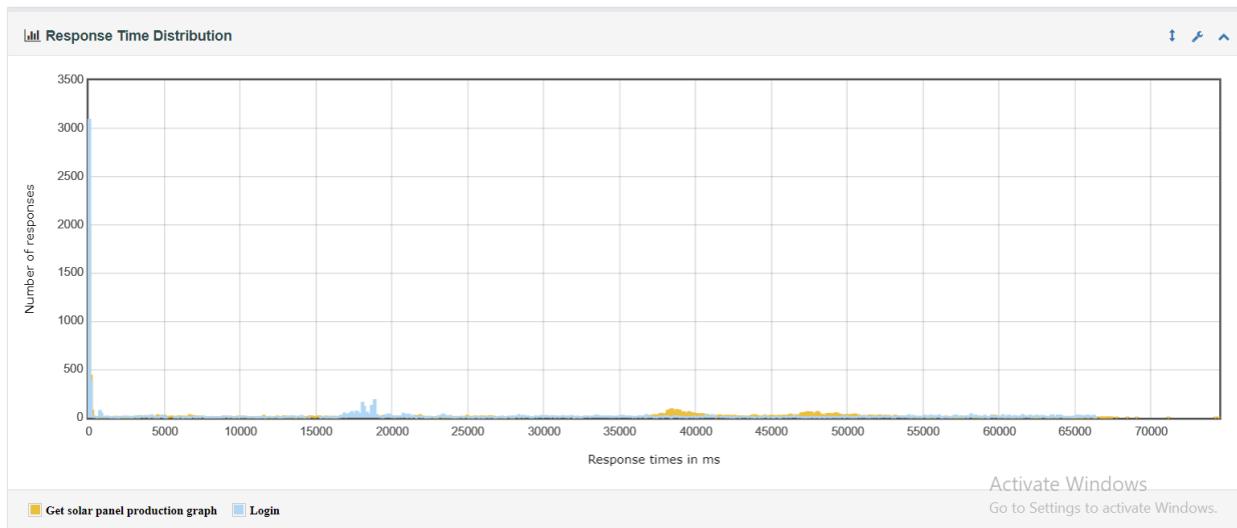
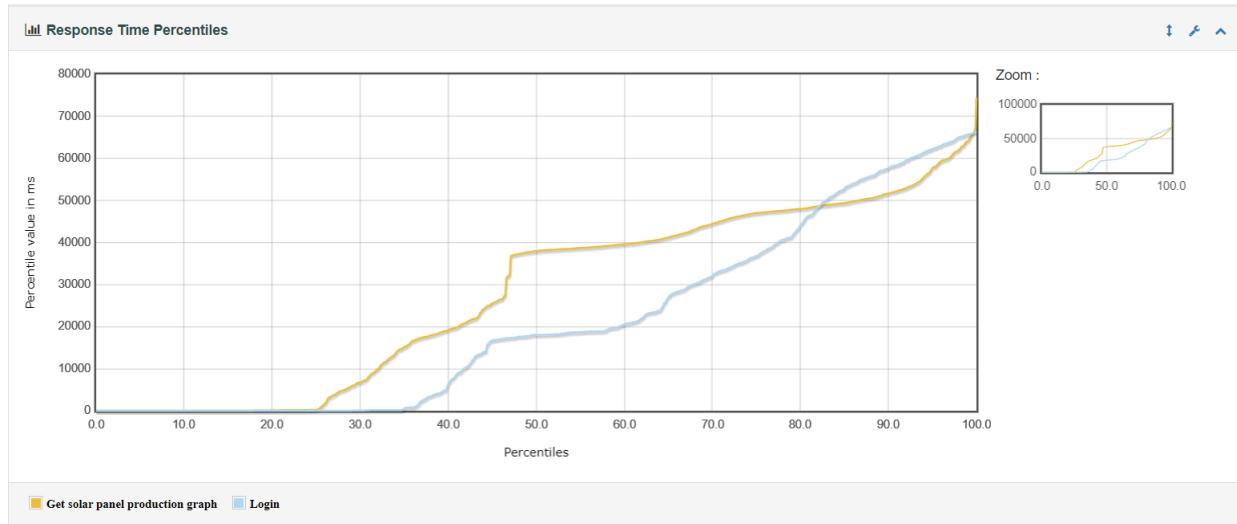


Statistics

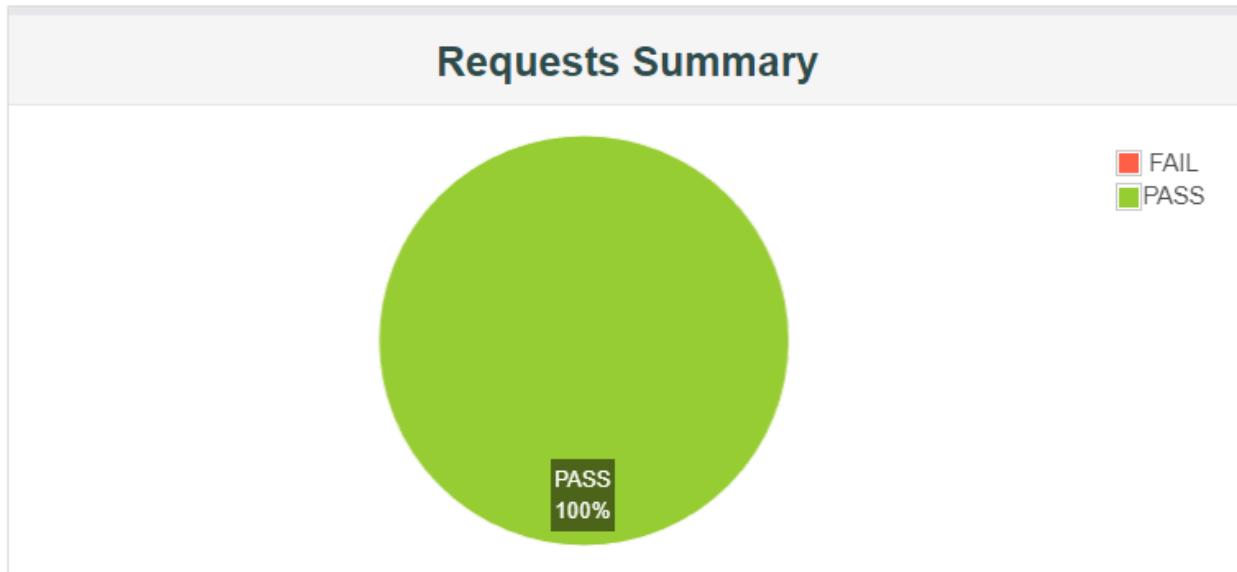
Requests	Executions				Response Times (ms)									Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent			
Total	20000	6094	30.47%	24536.89	0	74499	19808.50	54482.70	60453.45	65403.85	153.19	191.83	46.61				
Get solar panel production graph	10000	2497	24.97%	27822.13	0	74499	37981.00	51682.70	57740.40	64113.94	76.73	81.54	35.13				
Login	10000	3597	35.97%	21251.66	0	66363	18016.00	57751.70	62247.80	65707.00	108.93	157.07	16.42				

Errors

Type of error	Number of errors	% in errors	% in all samples
Non HTTP response code: org.apache.http.conn.HttpHostConnectException/Non HTTP response message: Connect to localhost:8080 [localhost/127.0.0.1, localhost/0:0:0:0:0:0:1] failed: Connection refused: connect	6093	99.98%	30.46%
500	1	0.02%	0.01%

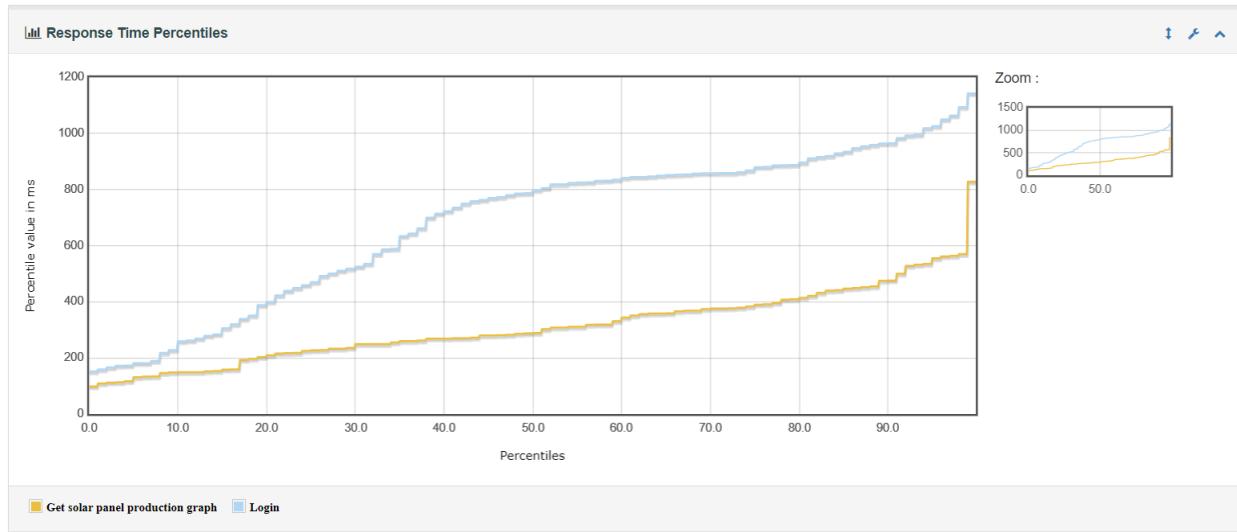


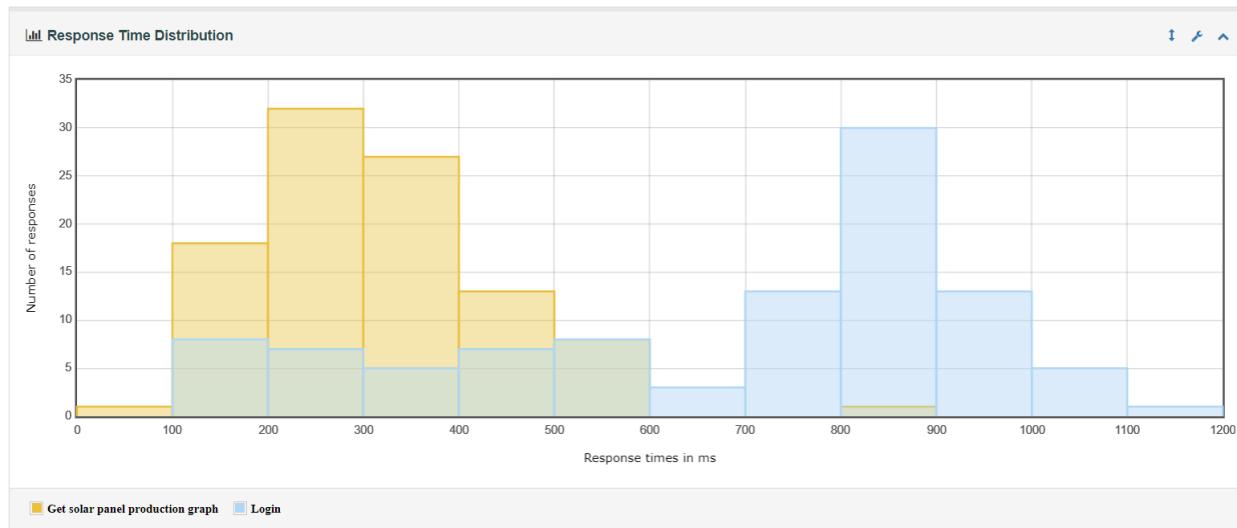
- 100 korisnika, 10000 pokrenutih simulatora



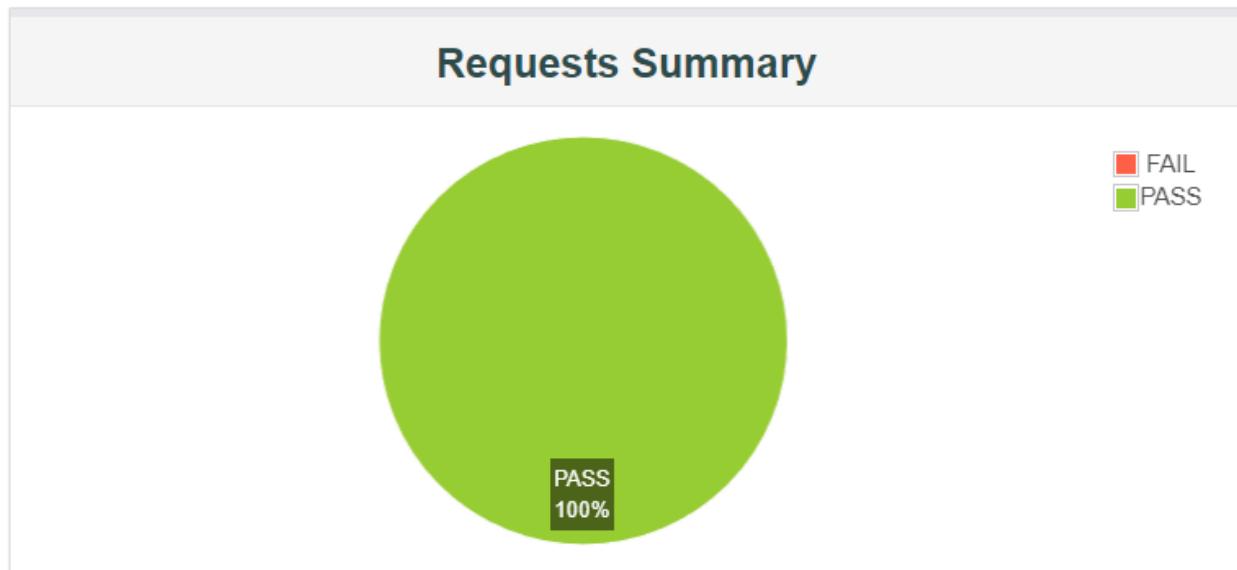
Statistics

Requests	Executions			Response Times (ms)							Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent
Total	200	0	0.00%	498.03	98	1143	408.50	895.20	964.95	1093.70	95.10	65.15	41.24	
Get solar panel production graph	100	0	0.00%	311.72	98	828	288.00	475.90	554.00	825.42	51.65	29.00	32.64	
Login	100	0	0.00%	684.35	152	1143	792.50	964.90	1025.65	1142.51	53.42	43.19	12.57	



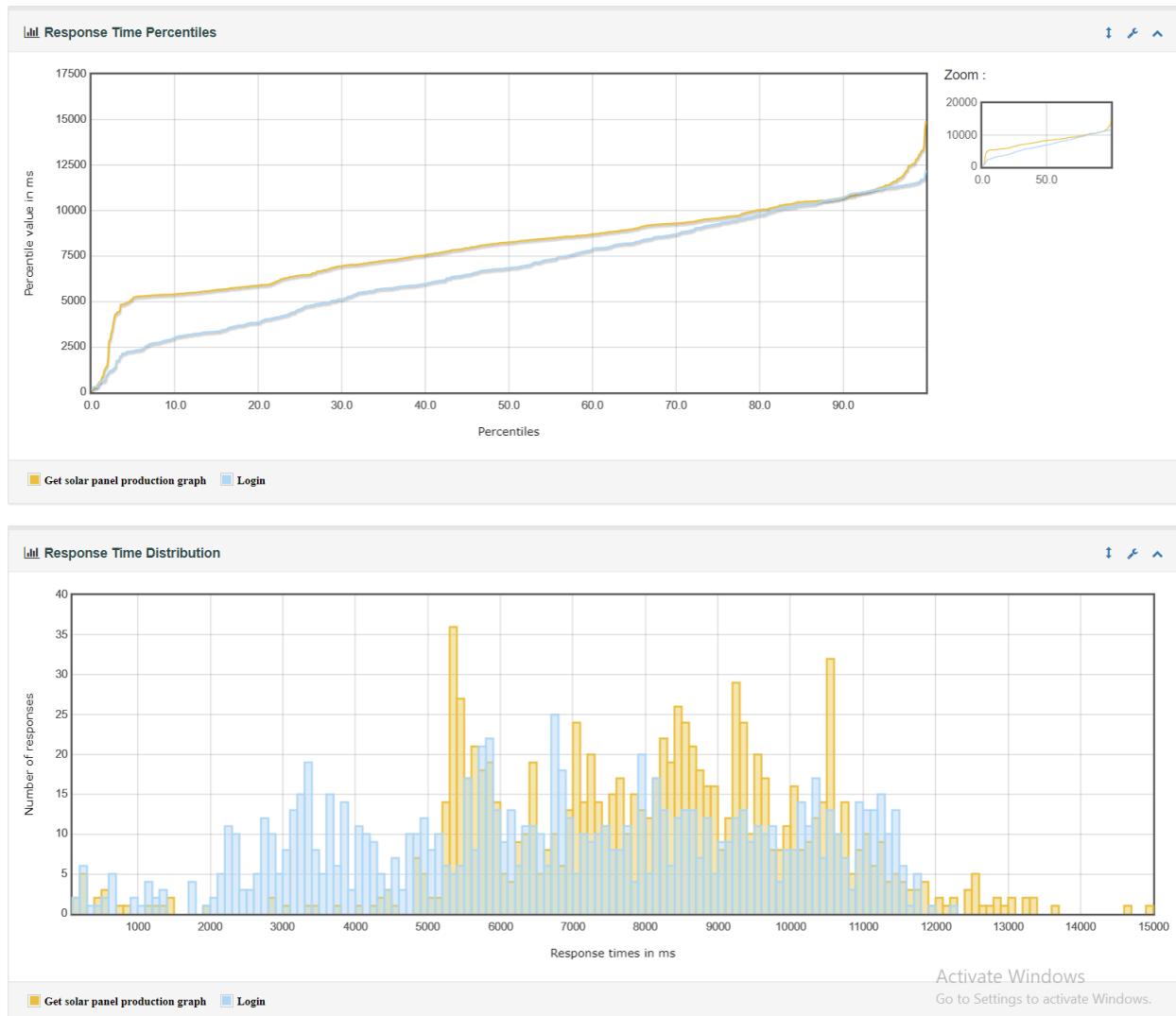


- 1000 korisnika, 10000 pokrenutih simulatora

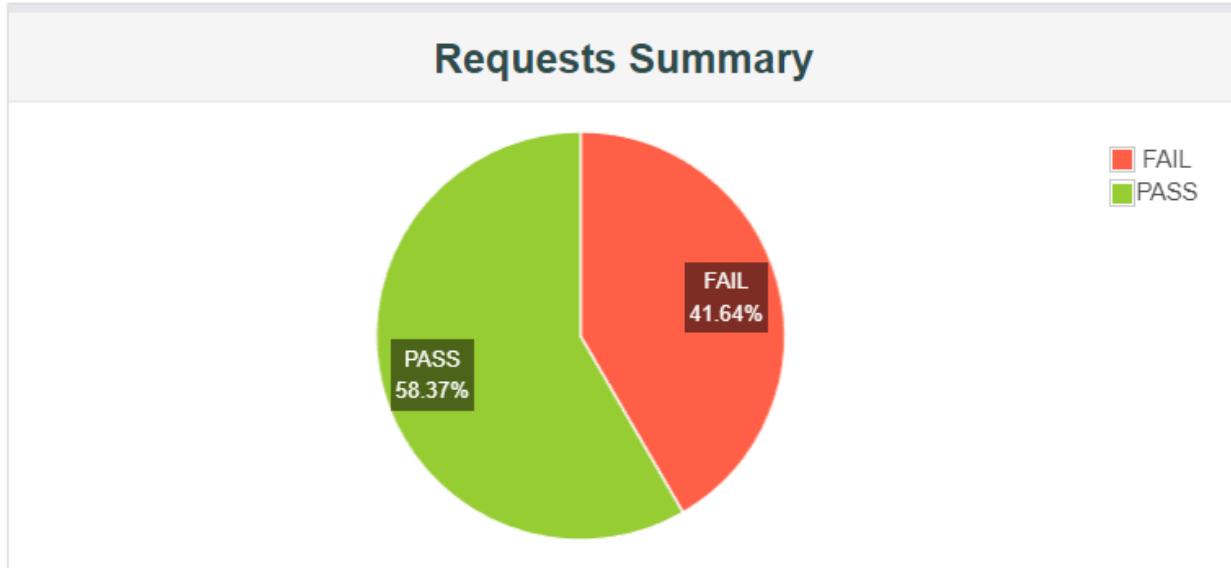


Statistics

Requests		Executions			Response Times (ms)							Throughput		Network (KB/sec)	
Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent		
Total	2000	0	0.00%	7451.36	105	14910	7682.50	10714.80	11275.30	12478.86	100.10	68.57	43.44		
Get solar panel production graph	1000	0	0.00%	8054.71	105	14910	8261.00	10714.80	11376.00	12962.27	50.52	28.37	31.96		
Login	1000	0	0.00%	6848.01	177	12226	6849.50	10723.80	11248.45	11576.62	67.69	54.73	15.93		

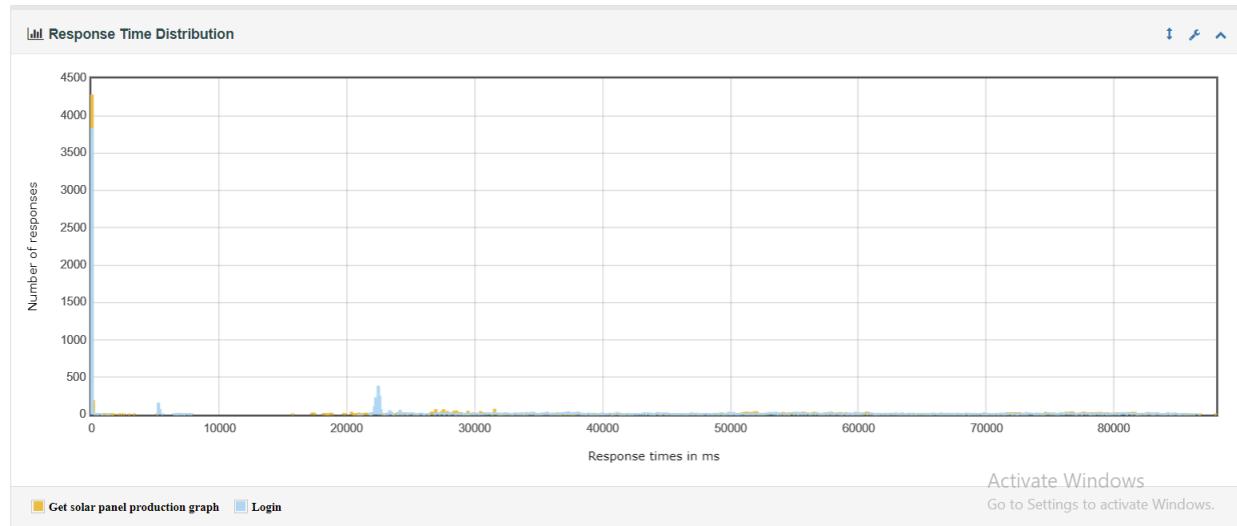
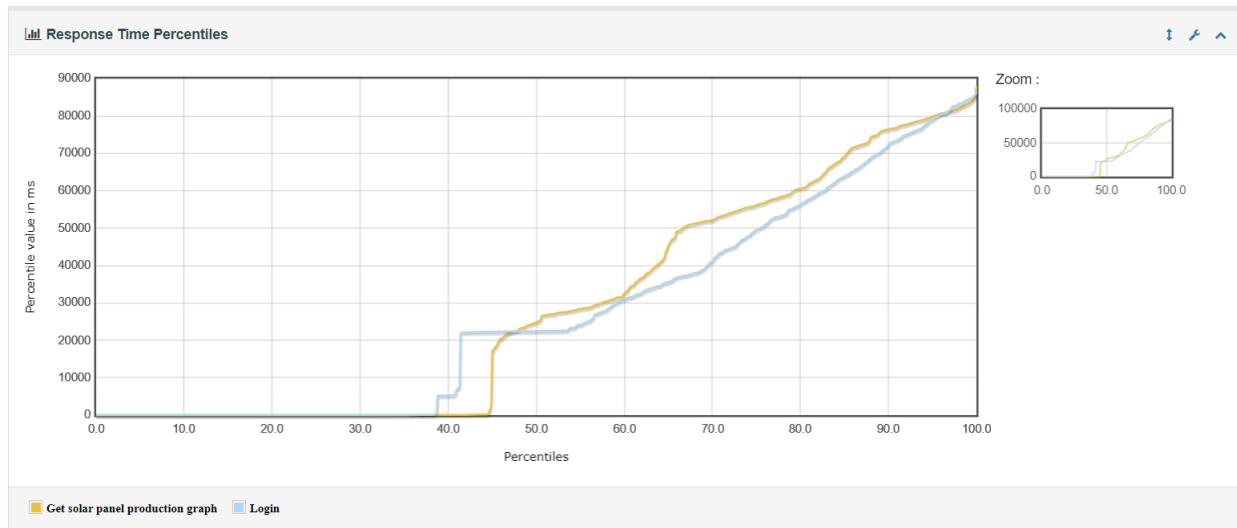


- 10000 korisnika, 10000 pokrenutih simulatora



Statistics															
Requests	Executions				Response Times (ms)							Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent	
Total	20000	8327	41.63%	28148.20	0	87980	22558.00	74678.90	79543.95	83816.98	149.53	207.28	35.74		
Get solar panel production graph	10000	4451	44.51%	28907.38	0	87980	24830.50	76490.80	79879.95	83198.69	74.86	100.52	24.99		
Login	10000	3876	38.76%	27389.02	0	86688	22484.00	72226.20	78997.95	84410.83	88.17	126.06	12.71		

Errors				
Type of error	Number of errors	% in errors	% in all samples	
Non HTTP response code: java.net.BindException/Non HTTP response message: Address already in use: connect	5690	68.33%	28.45%	
Non HTTP response code: org.apache.http.conn.HttpHostConnectException/Non HTTP response message: Connect to localhost:8080 [localhost/127.0.0.1, localhost/0:0:0:0:0:1] failed: Connection refused: connect	2479	29.77%	12.39%	
Non HTTP response code: java.net.SocketException/Non HTTP response message: No buffer space available (maximum connections reached?): connect	153	1.84%	0.77%	
500	5	0.06%	0.03%	



Zaključak:

- Rezultati su slični kao kod dobavljanja drugih grafova za jedan uređaj.

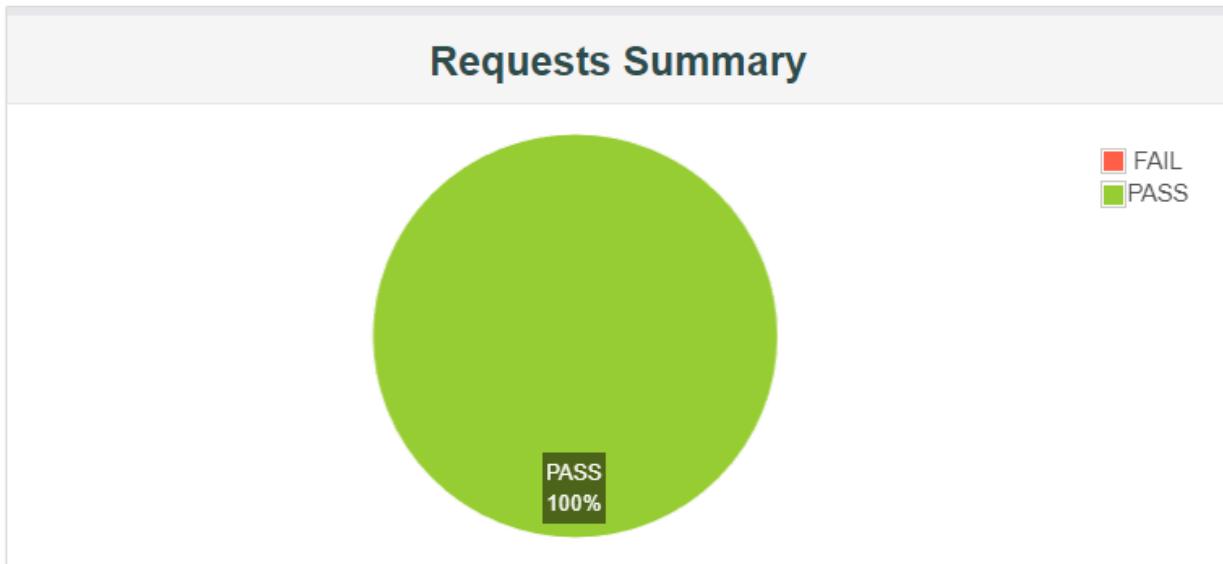
9 - Podešavanje procenta punjenja

Opis:

- Korisnik se prijavljuje na sistem i podešava do kog procenta punjač treba da puni vozila.

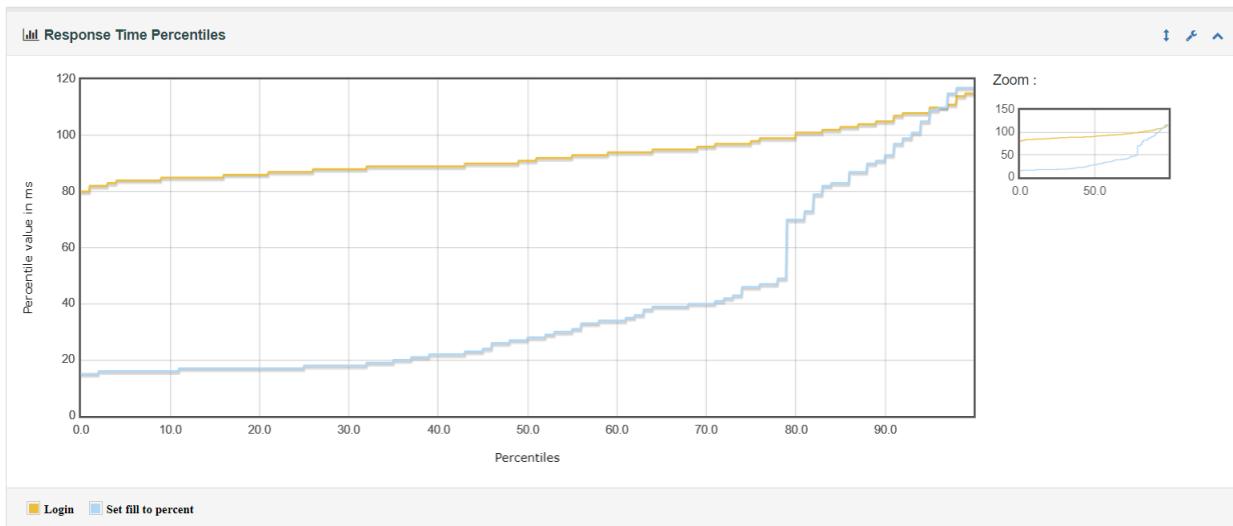
Rezultati:

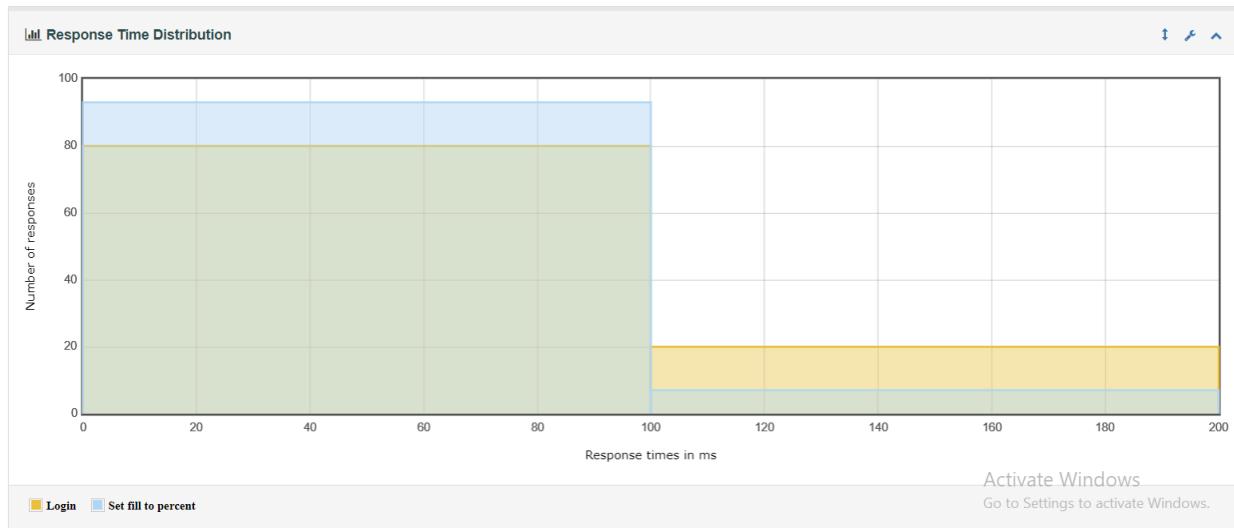
- 100 korisnika, 100 pokrenutih simulatora



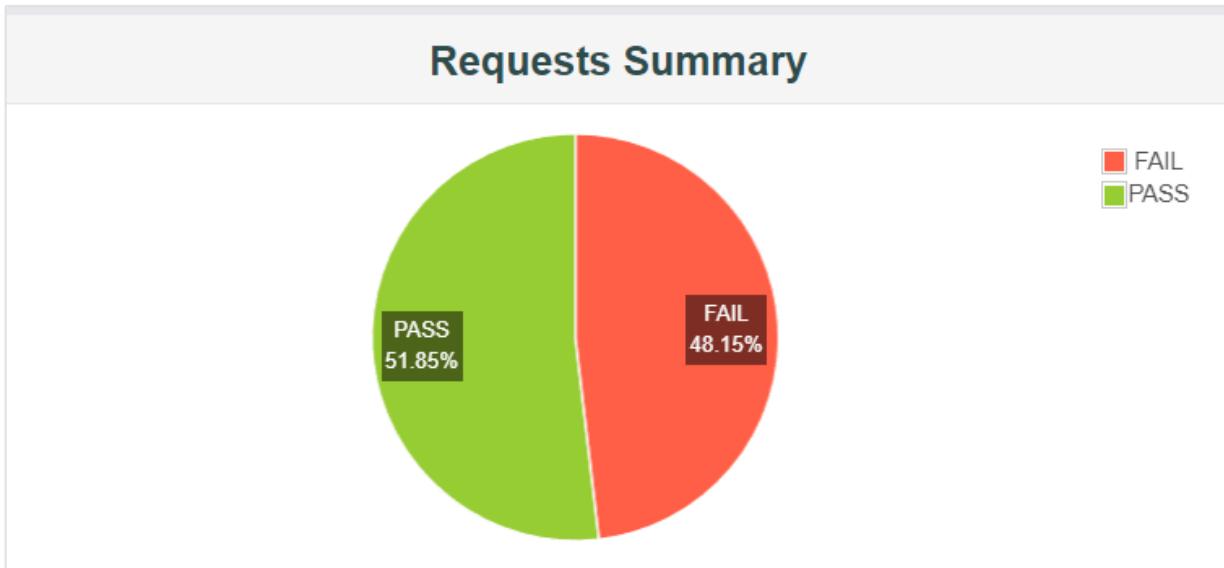
Statistics

Requests	Executions				Response Times (ms)									Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent			
Total	200	0	0.00%	66.53	15	117	85.00	103.00	108.95	116.98	175.59	167.19	91.74				
Login	100	0	0.00%	93.17	80	115	91.00	105.00	109.90	114.99	93.55	75.64	22.02				
Set fill to percent	100	0	0.00%	39.89	15	117	27.50	92.80	108.80	117.00	94.70	103.76	76.66				





- 1000 korisnika, 100 pokrenutih simulatora

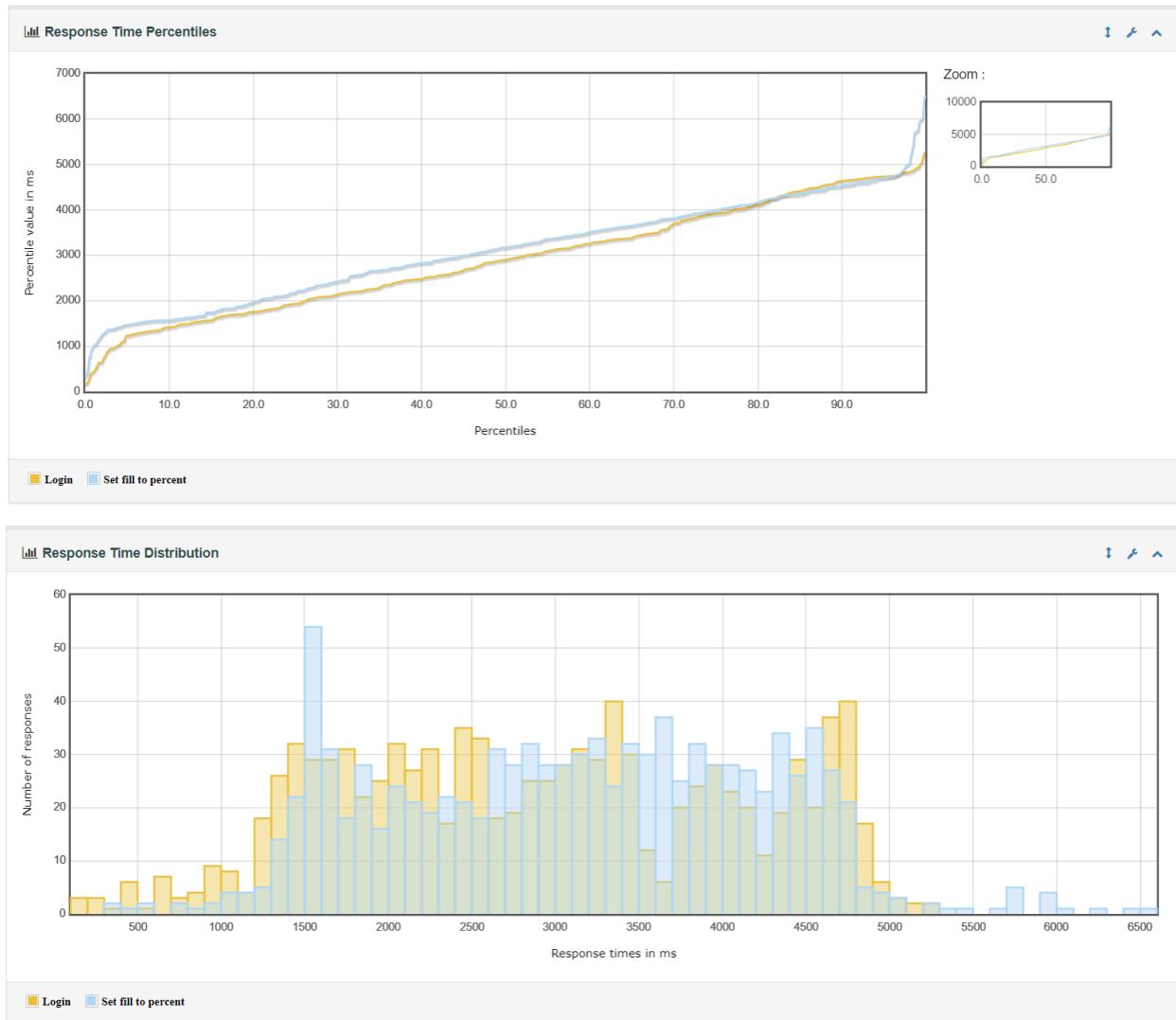


Statistics

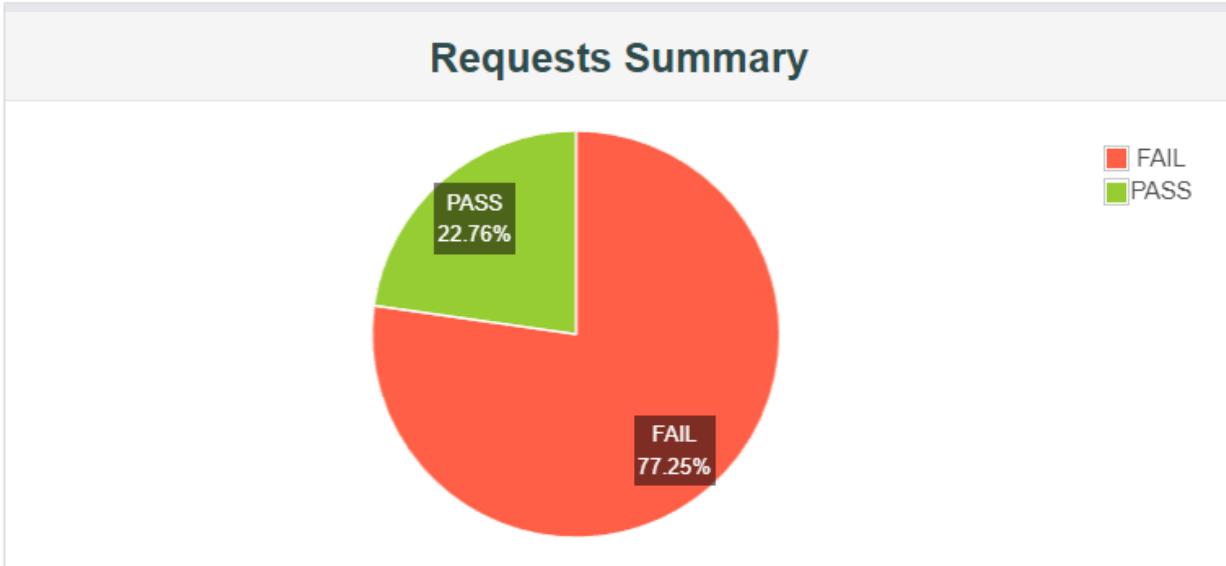
Requests	Executions				Response Times (ms)							Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent	
Total	2000	963	48.15%	48.15%	3018.47	156	6522	3038.50	4561.90	4724.95	5213.69	249.00	183.51	130.03	
Login	1000	0	0.00%	0.00%	2016.33	156	5270	2904.50	4636.80	4734.95	4930.00	146.07	118.11	34.38	
Set fill to percent	1000	963	96.30%	96.30%	3120.61	313	6522	3176.00	4525.90	4700.95	5750.80	126.98	84.49	102.74	

Errors

Type of error	Number of errors	% in errors	% in all samples
500	963	100.00%	48.15%



- 10000 korisnika, 100 pokrenutih simulatora

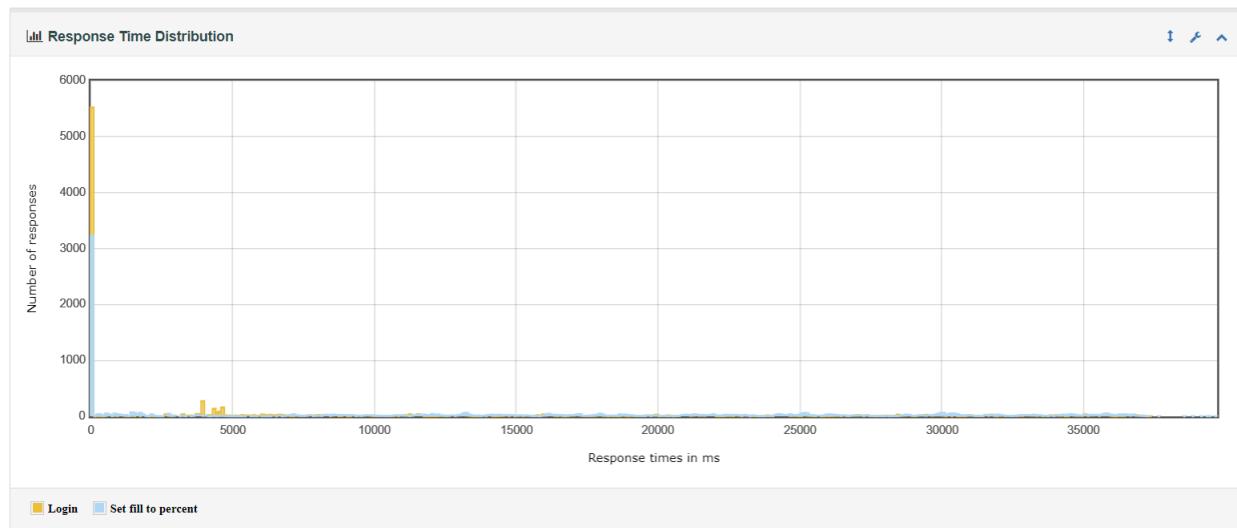
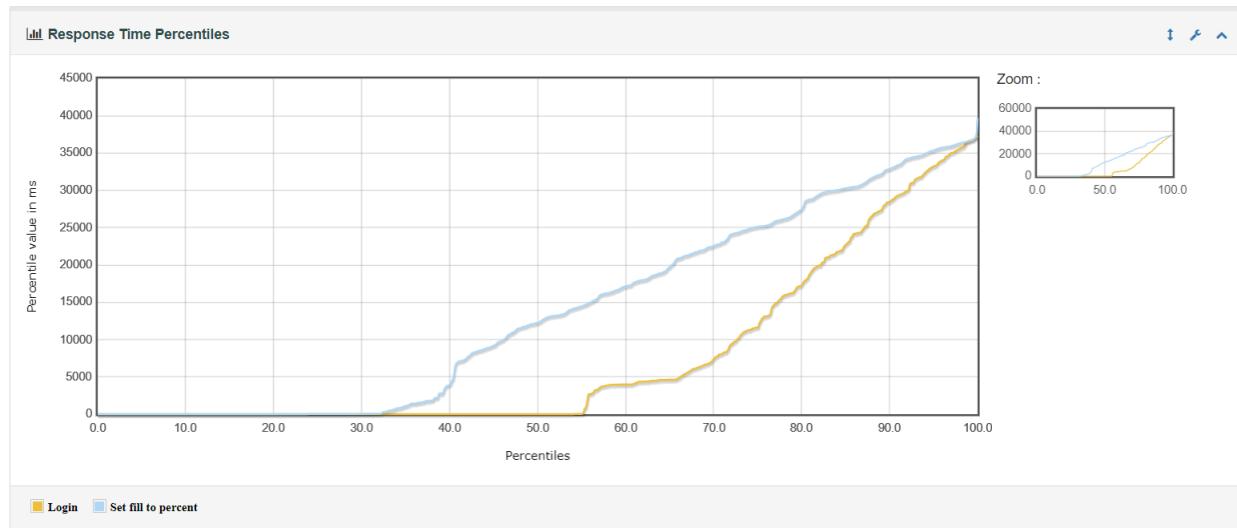


Statistics

Requests	Executions				Response Times (ms)									Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent			
Total	20000	15449	77.25%	10535.19	0	39689	3972.00	31081.70	34627.90	36593.95	383.66	585.73	118.43				
Login	10000	5523	55.23%	7503.76	0	37338	3.00	28459.80	33209.85	36539.98	220.96	393.53	23.28				
Set fill to percent	10000	9926	99.26%	13566.62	0	39689	12242.50	32905.40	35370.75	36640.99	192.48	244.89	98.55				

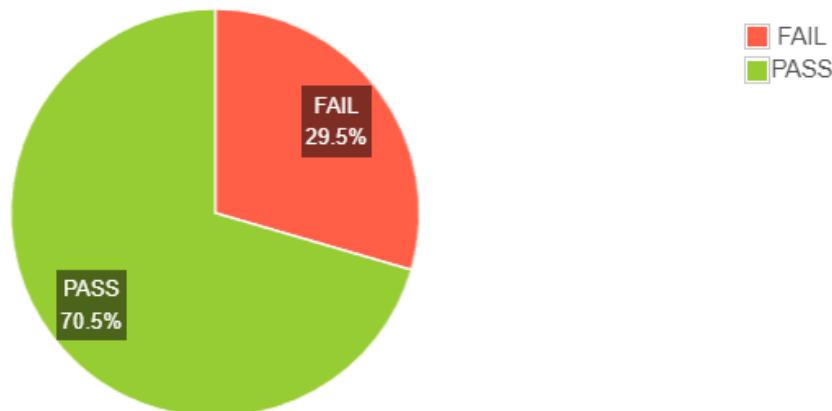
Errors

Type of error	Number of errors	% in errors	% in all samples
Non HTTP response code: org.apache.http.conn.HttpHostConnectException/Non HTTP response message: Connect to localhost:8080 [localhost/127.0.0.1, localhost/0:0:0:0:0:0:1] failed: Connection refused: connect	8753	56.66%	43.77%
500	6696	43.34%	33.48%



- 100 korisnika, 1000 pokrenutih simulatora

Requests Summary



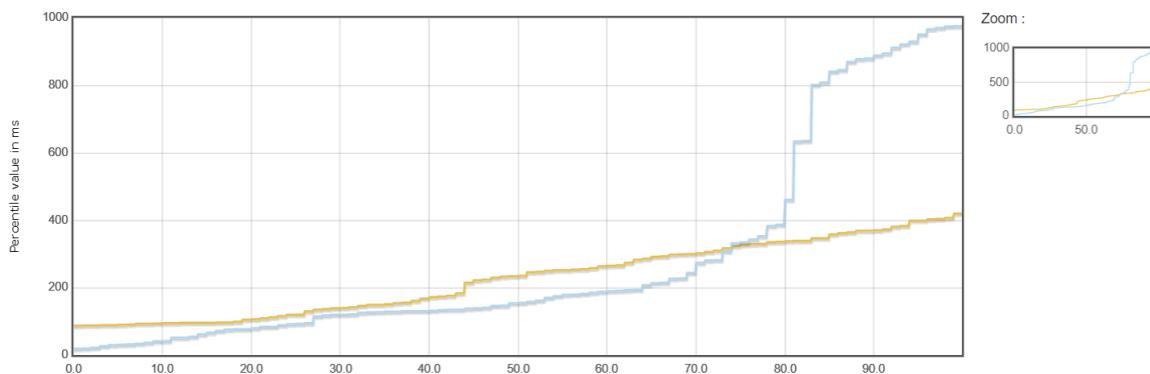
Statistics

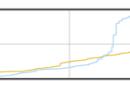
Requests	Executions				Response Times (ms)							Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent	
Total	200	59	29.50%	257.31	19	976	181.00	456.90	888.55	974.96	136.80	110.09	71.27		
Login	100	0	0.00%	227.32	87	420	234.50	369.90	399.00	419.87	76.51	61.87	18.01		
Set fill to percent	100	59	59.00%	287.30	19	976	154.50	888.10	949.95	975.99	72.83	58.34	58.75		

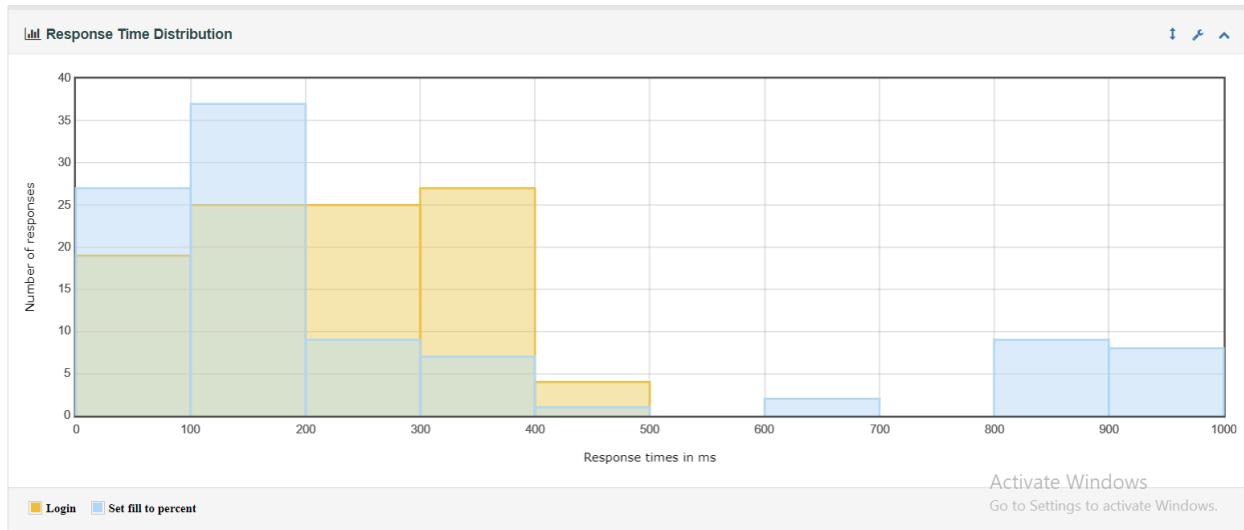
Errors

Type of error	Number of errors	% in errors	% in all samples
500	59	100.00%	29.50%

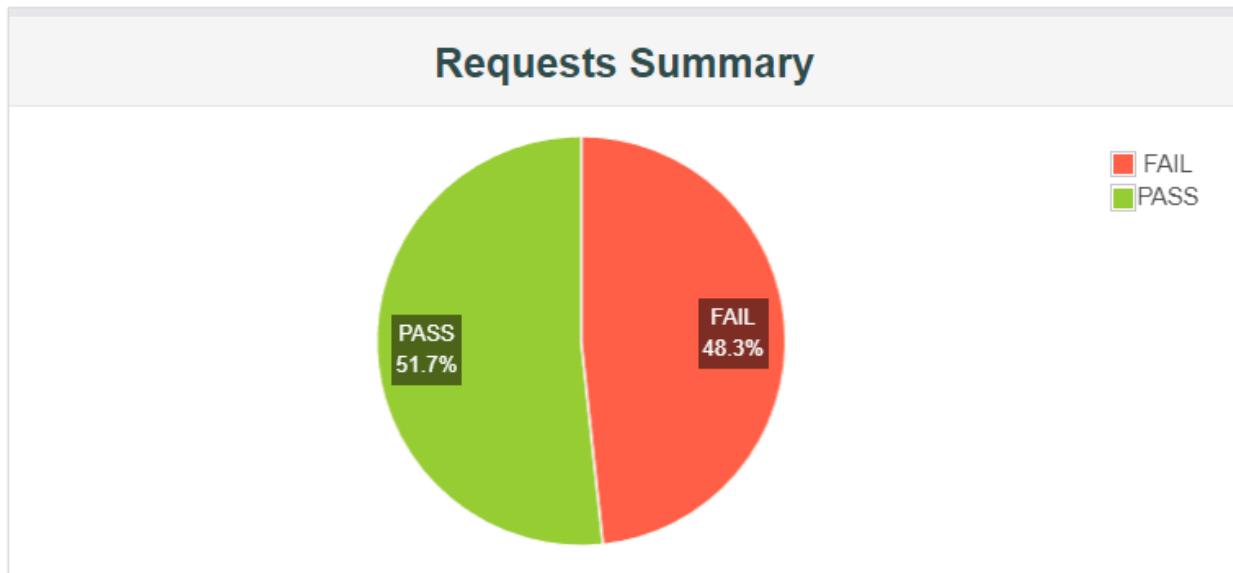
Response Time Percentiles



Zoom : 



- 1000 korisnika, 1000 pokrenutih simulatora

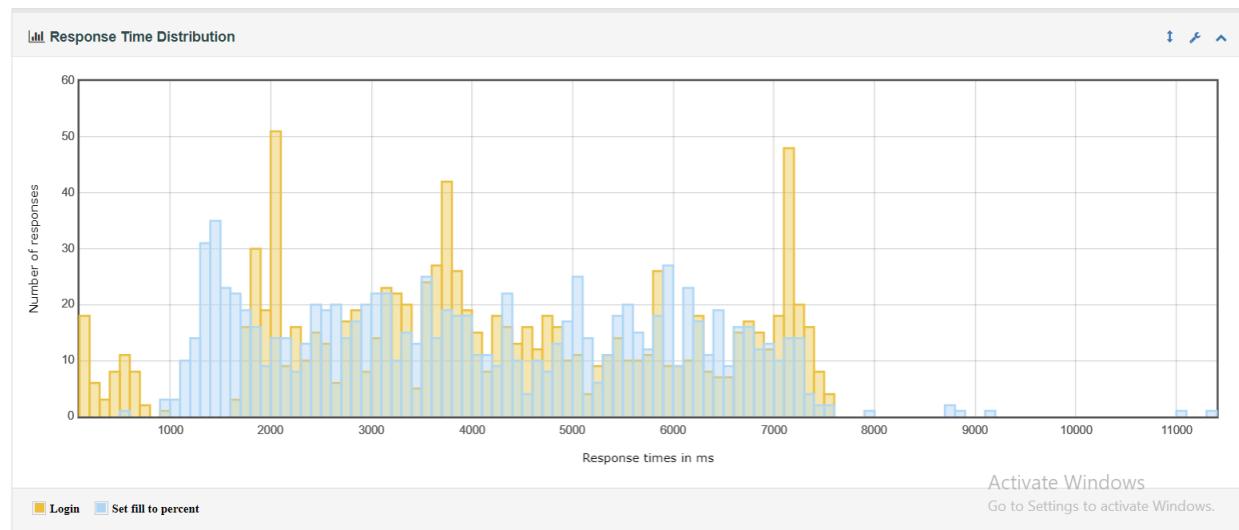
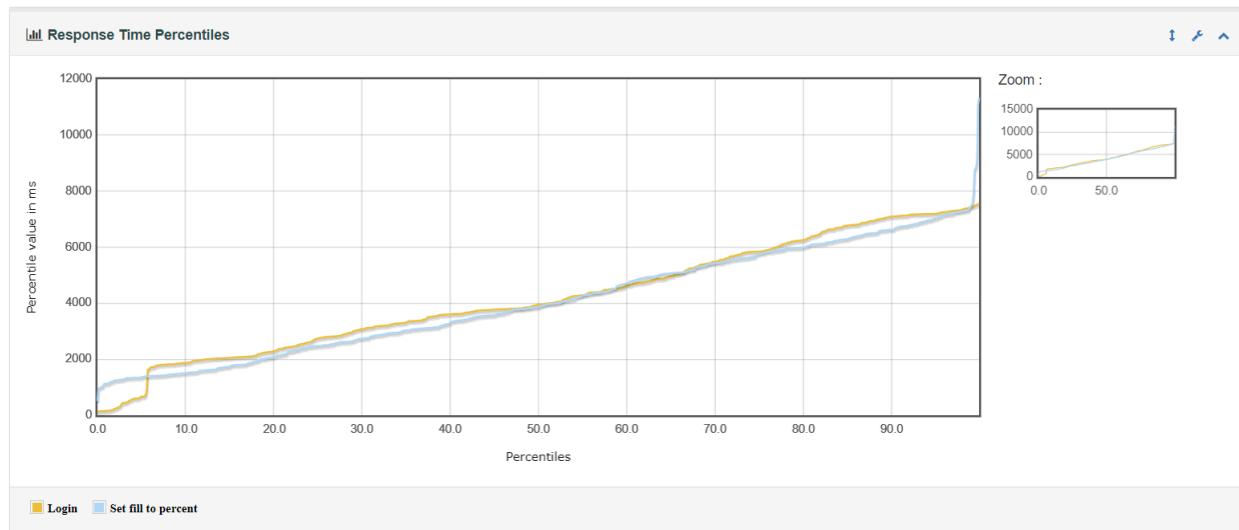


Statistics

Requests	Executions				Response Times (ms)							Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent	
Total	2000	966	48.30%	4137.18	124	11328	3921.50	6872.80	7177.95	7425.00	168.88	124.10	88.15		
Login	1000	0	0.00%	4201.90	124	7555	3955.50	7091.00	7195.90	7424.96	94.36	76.30	22.21		
Set fill to percent	1000	966	96.60%	4072.46	504	11328	3868.50	6632.70	7031.65	7485.39	85.37	56.44	69.03		

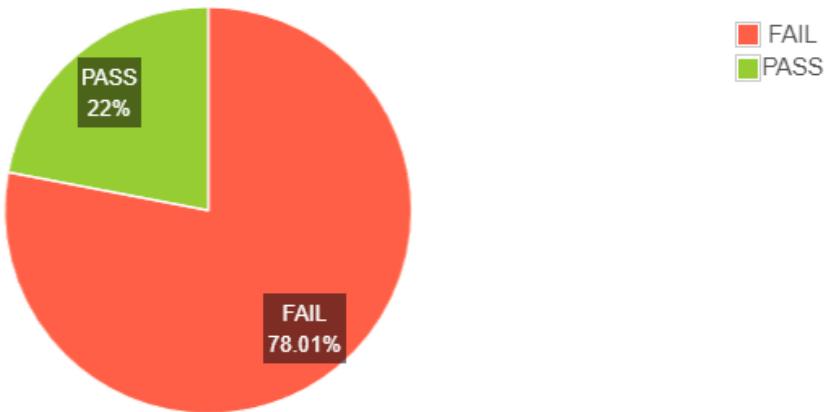
Errors

Type of error	Number of errors	% in errors	% in all samples
500	966	100.00%	48.30%



- 10000 korisnika, 1000 pokrenutih simulatora

Requests Summary

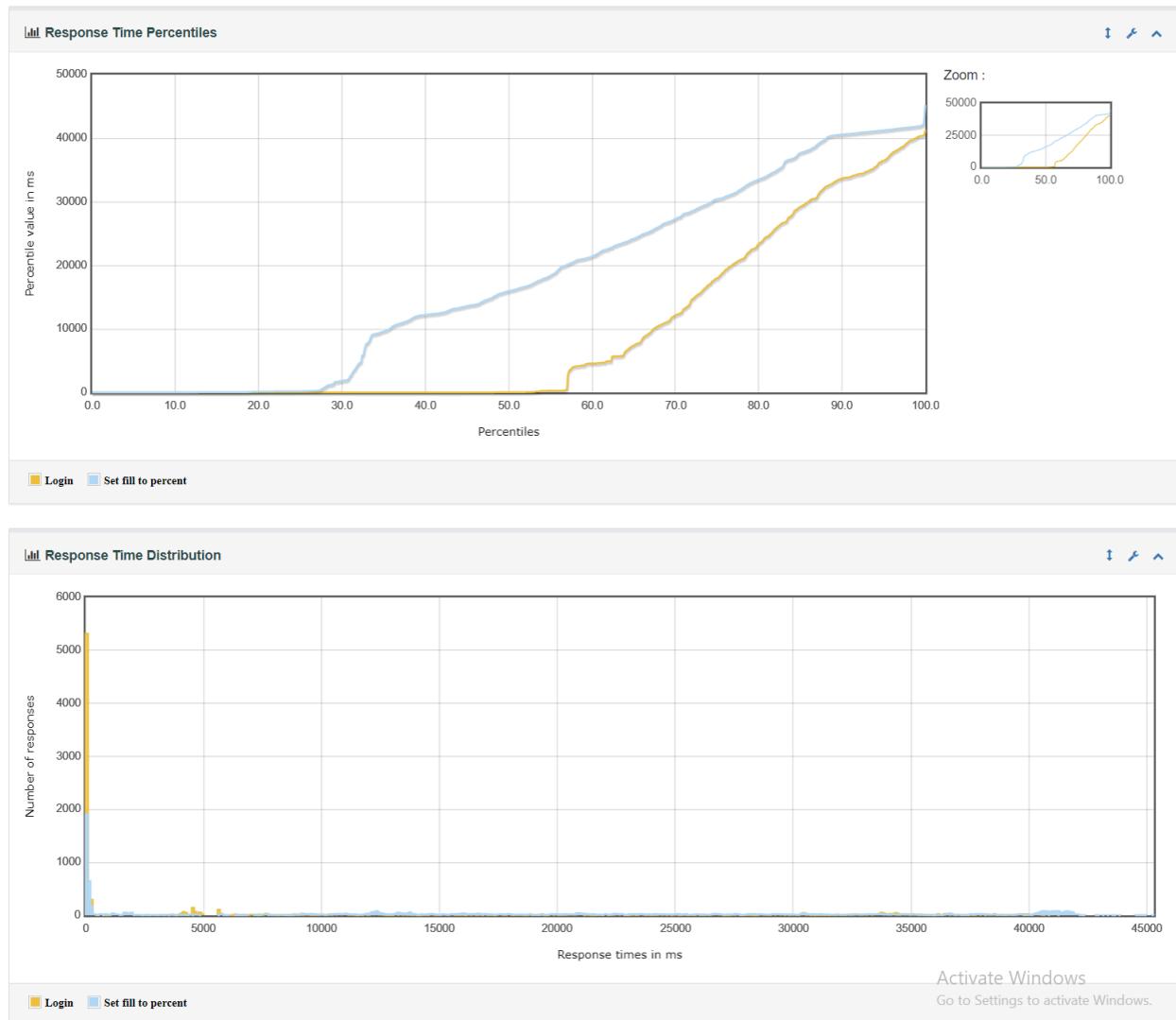


Statistics

Requests	Executions				Response Times (ms)							Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent	
Total	20000	15601	78.00%	13355.45	0	45217	8951.00	37026.00	40586.00	41681.98	328.35	490.12	105.61		
Login	10000	5666	56.66%	9248.97	0	41298	18.00	33669.90	36478.95	40122.00	191.39	345.70	19.52		
Set fill to percent	10000	9935	99.35%	17461.92	0	45217	15959.50	40578.40	41230.00	41841.98	164.70	194.20	89.15		

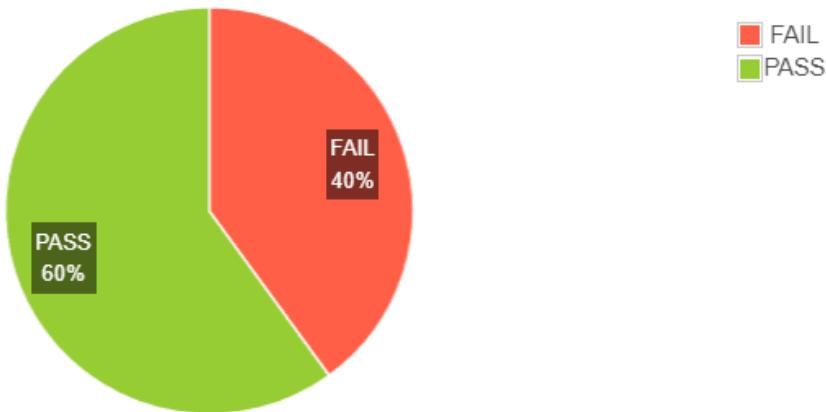
Errors

Type of error	Number of errors	% in errors	% in all samples
Non HTTP response code: org.apache.http.conn.HttpHostConnectException/Non HTTP response message: Connect to localhost:8080 [[localhost/127.0.0.1, localhost/0:0:0:0:0:0:1] failed: Connection refused: connect	8416	53.95%	42.08%
500	7185	46.05%	35.92%



- 100 korisnika, 10000 pokrenutih simulatora

Requests Summary



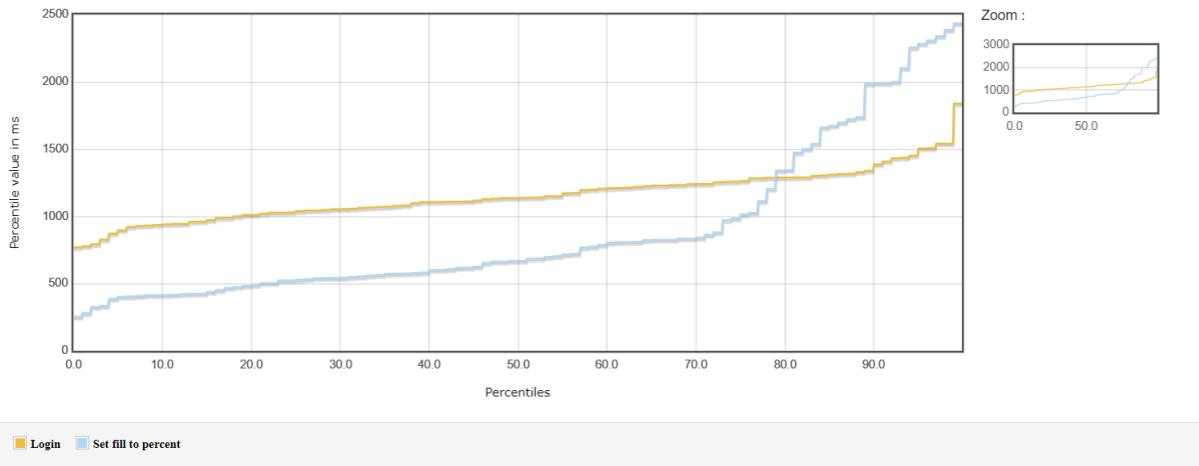
Statistics

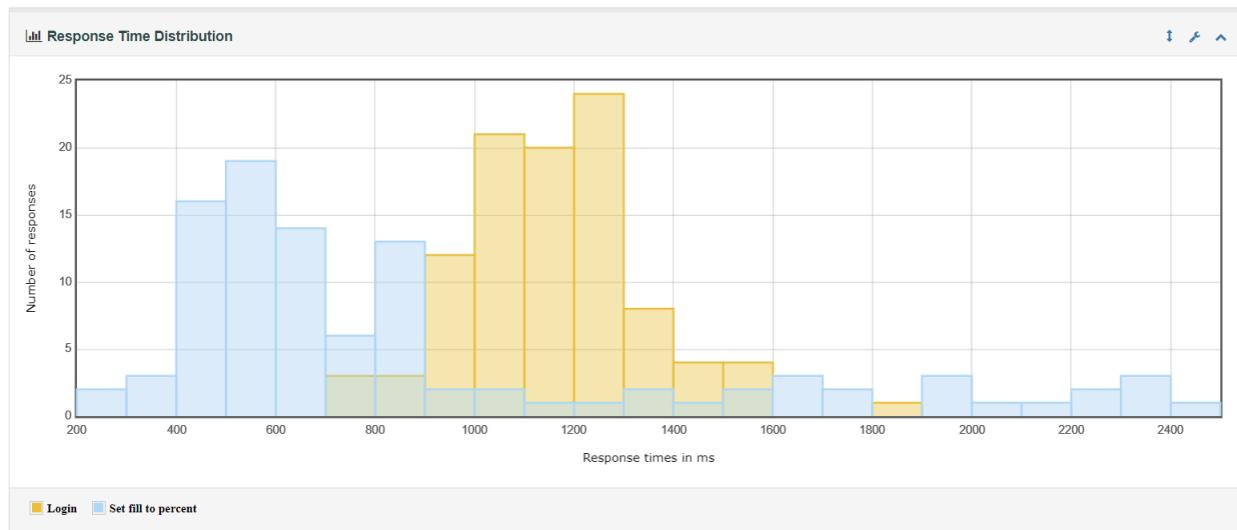
Requests	Executions				Response Times (ms)							Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent	
Total	200	80	40.00%	1023.04	253	2435	1027.00	1535.80	1989.75	2385.54	52.98	40.57	27.63		
Login	100	0	0.00%	1153.17	770	1839	1137.00	1381.30	1502.30	1836.02	44.82	36.24	10.55		
Set fill to percent	100	80	80.00%	892.90	253	2435	669.00	1989.50	2282.55	2434.51	36.55	26.42	29.52		

Errors

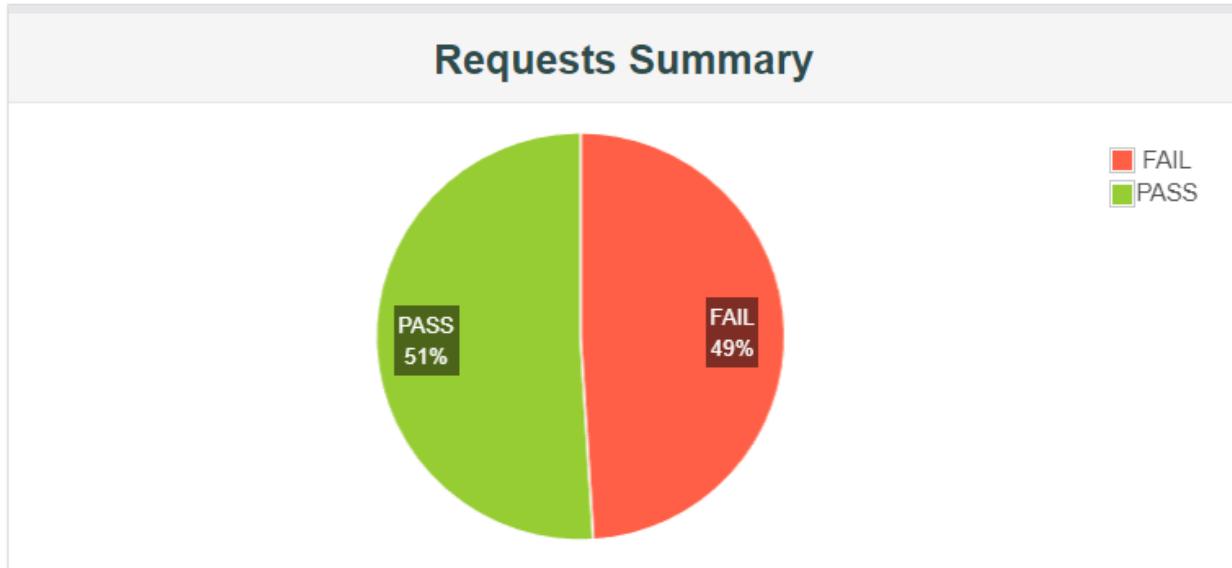
Type of error	Number of errors	% in errors	% in all samples
500	80	100.00%	40.00%

Response Time Percentiles





- 1000 korisnika, 10000 pokrenutih simulatora

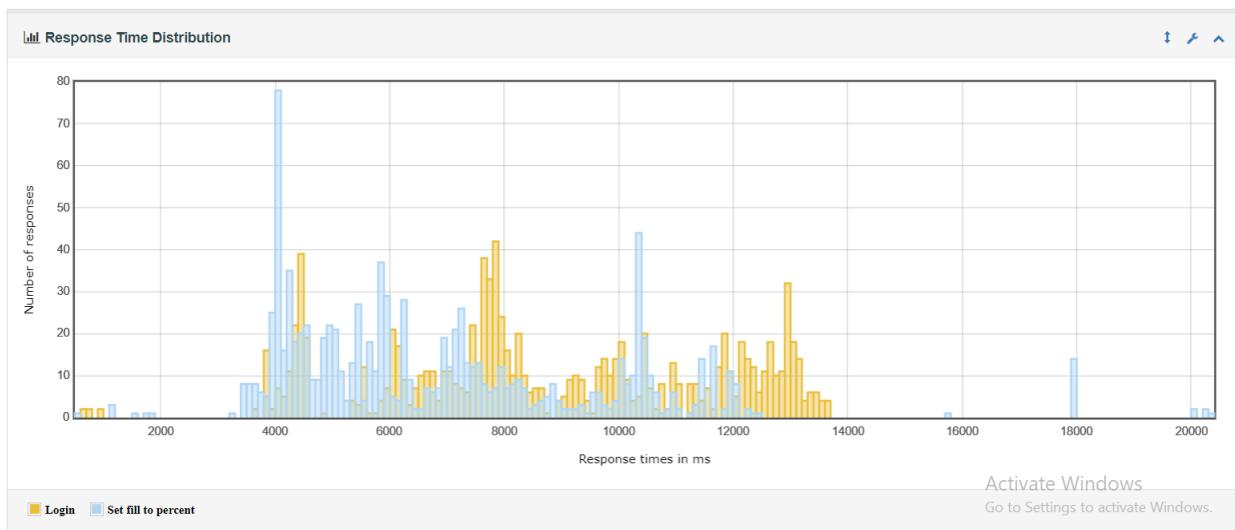
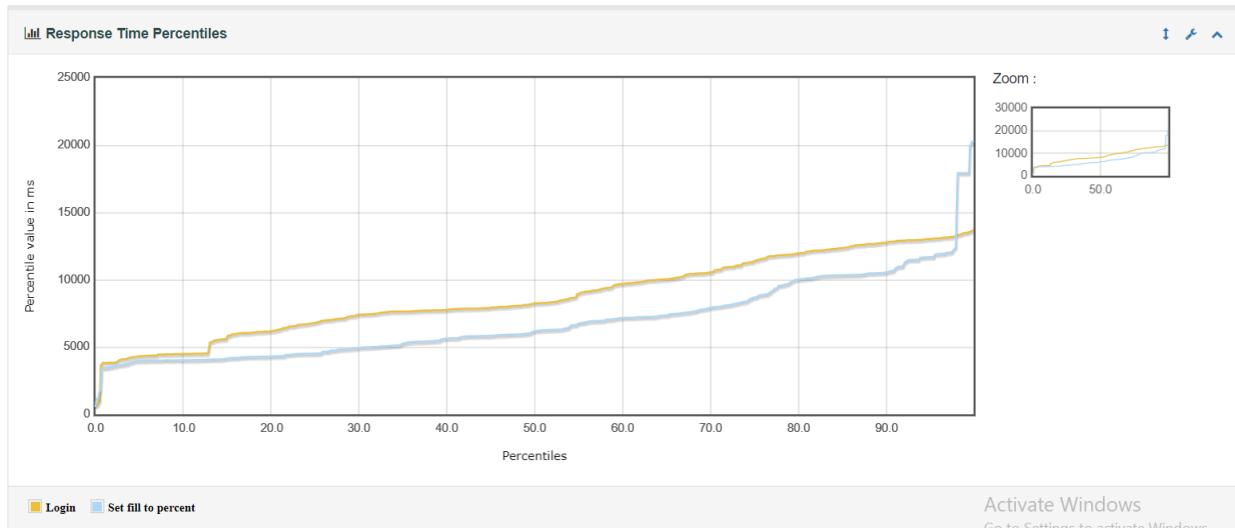


Statistics

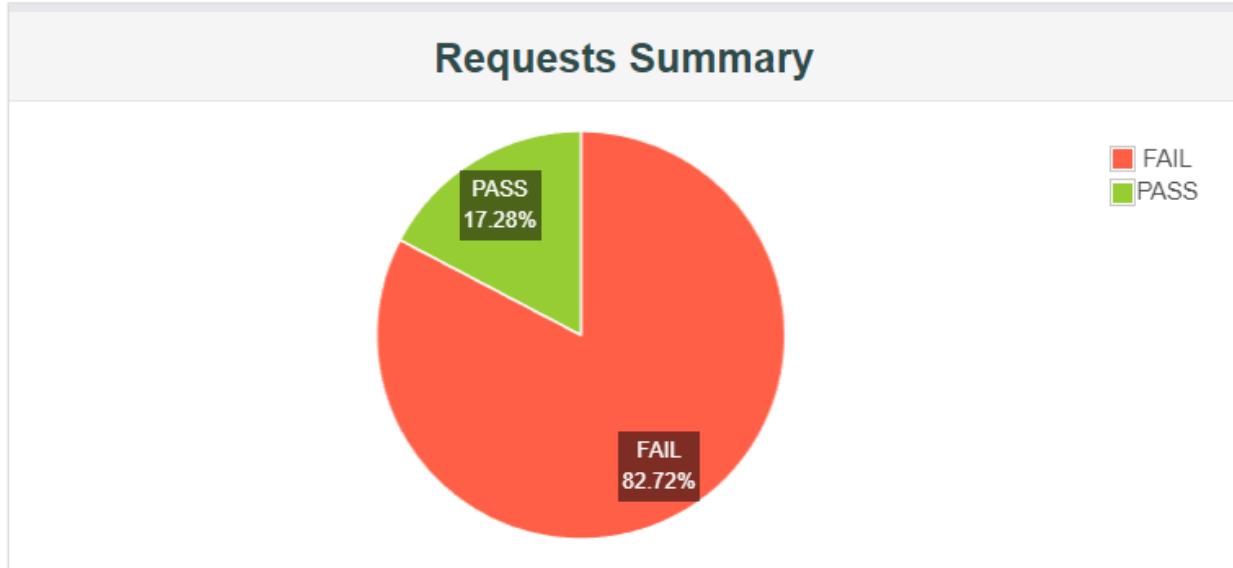
Requests	Executions				Response Times (ms)							Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent	
Total	2000	980	49.00%	7867.77	534	20318	7564.00	12183.90	12914.85	15750.95	89.03	65.27	46.45		
Login	1000	0	0.00%	8775.03	640	13667	8250.50	12786.90	13028.80	13475.99	52.72	42.63	12.41		
Set fill to percent	1000	980	98.00%	6960.52	534	20318	6200.50	10567.60	11694.90	17931.00	45.86	30.16	37.07		

Errors

Type of error	Number of errors	% in errors	% in all samples
500	980	100.00%	49.00%



- 10000 korisnika, 10000 pokrenutih simulatora

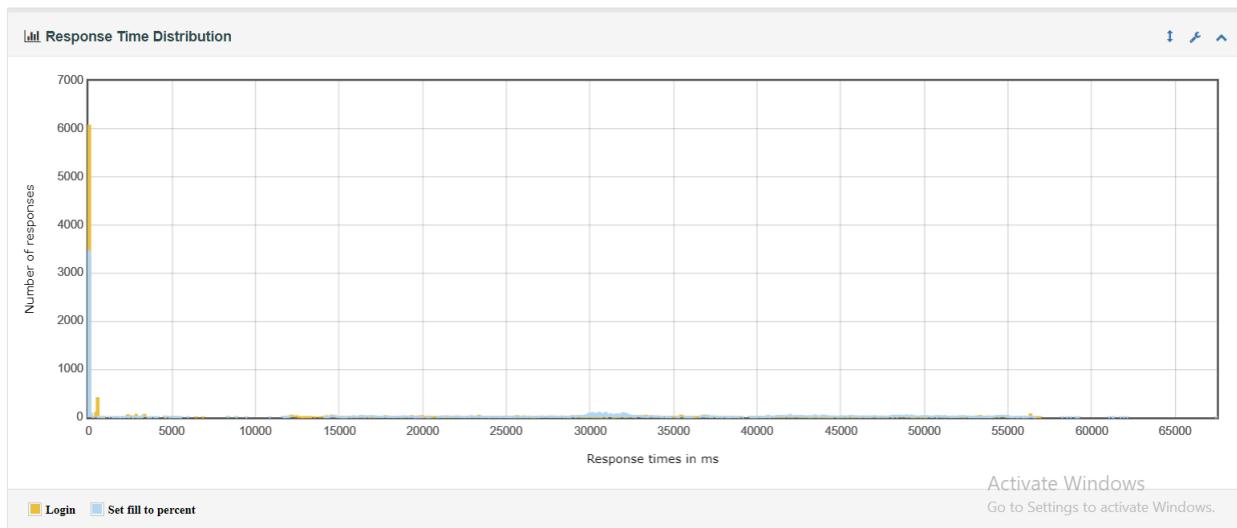
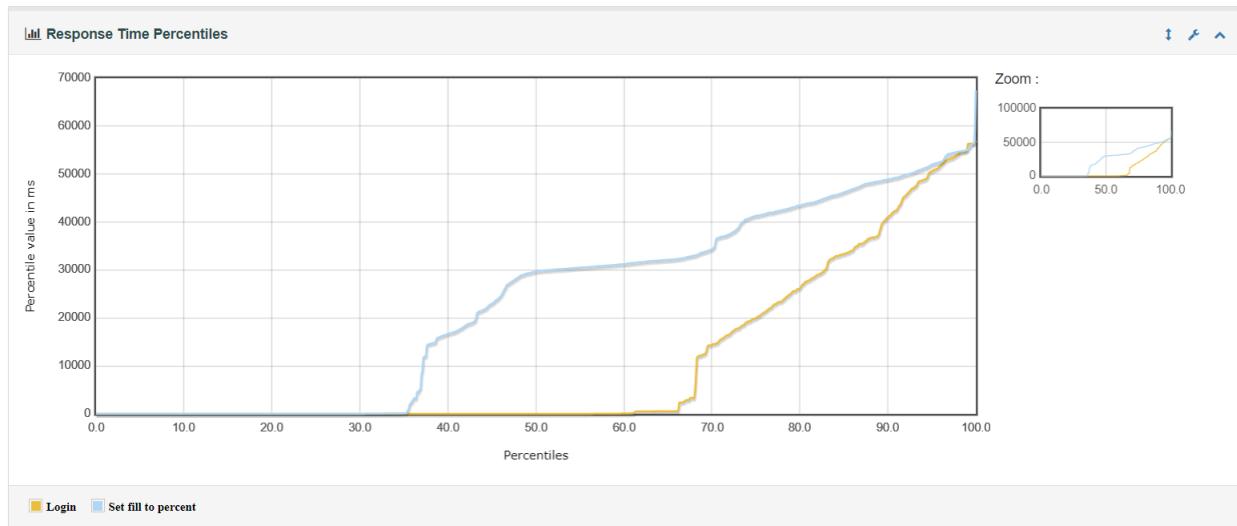


Statistics

Requests	Executions				Response Times (ms)							Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent	
Total	20000	16544	82.72%	16819.69	0	67469	537.00	47464.20	51298.00	55019.96	235.87	389.03	65.59		
Login	10000	6596	65.96%	10642.09	0	56944	3.00	41027.40	50624.95	55052.97	142.41	280.54	11.41		
Set fill to percent	10000	9948	99.48%	22997.30	0	67469	29730.00	48914.00	51940.00	55015.98	118.62	157.61	56.46		

Errors

Type of error	Number of errors	% in errors	% in all samples
Non HTTP response code: org.apache.http.conn.HttpHostConnectException/Non HTTP response message: Connect to localhost:8080 [localhost/127.0.0.1, localhost/0:0:0:0:0:0:1] failed: Connection refused: connect	10125	61.20%	50.63%
500	6419	38.80%	32.09%



Zaključak:

- Rezultati su loši, serverovo slanje MQTT poruke punjaču često timeout-uje jer je MQTT broker ne može da stigne da podrži sve te poruke.
- Test scenario održan preko frontend (1 korisnik) dobro radi i sa većim brojem simulatora.
- Performanse su dobre za 100 korisnika i 100 simulatora.
- Simulator punjača električnih vozila je dosta kompleksniji od simulatora baterije i sistema solarnih panela, a njegovo pojednostaljivanje bi umanjilo realnost njegovih podataka, tako da nisam uneo ove promene.

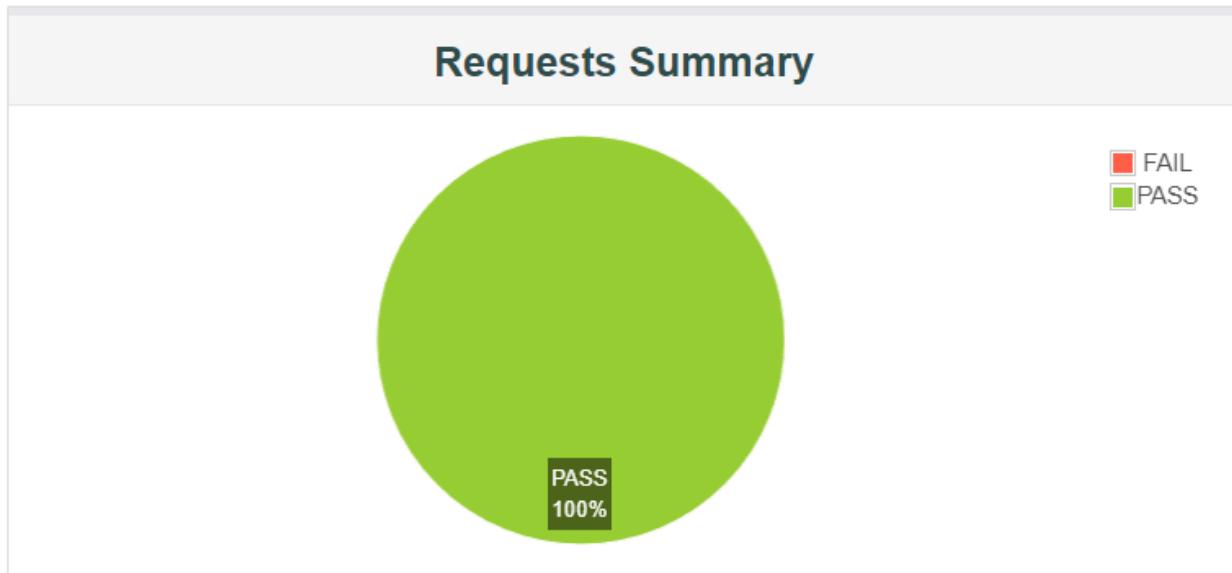
10 - Uključivanje i isključivanje sistema solarnih panela

Opis:

- Korisnik se prijavljuje na sistem i uključuje ili isključuje sistem solarnih panela.

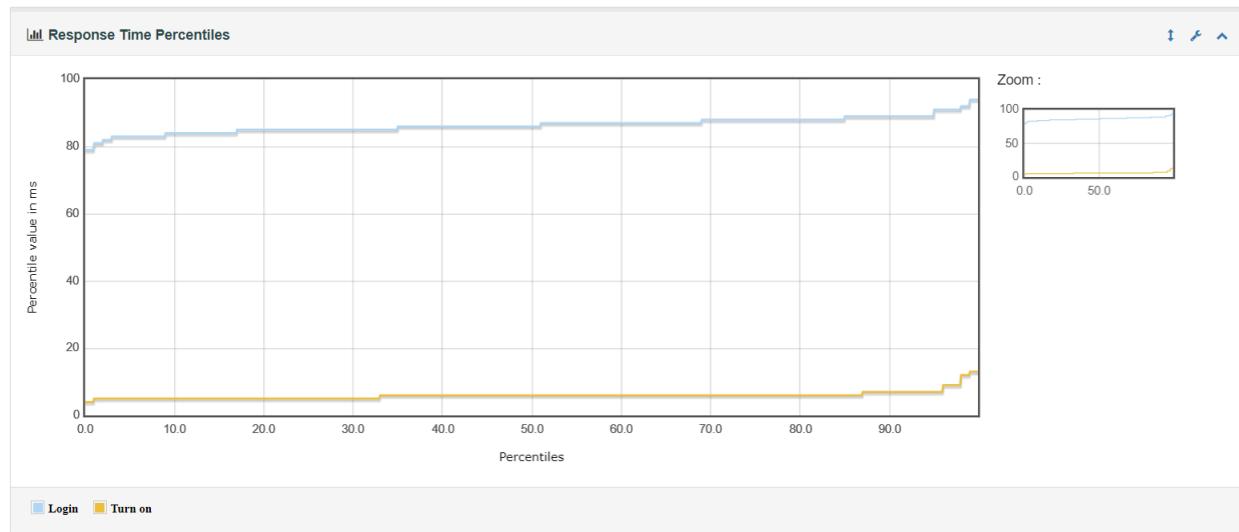
Rezultati:

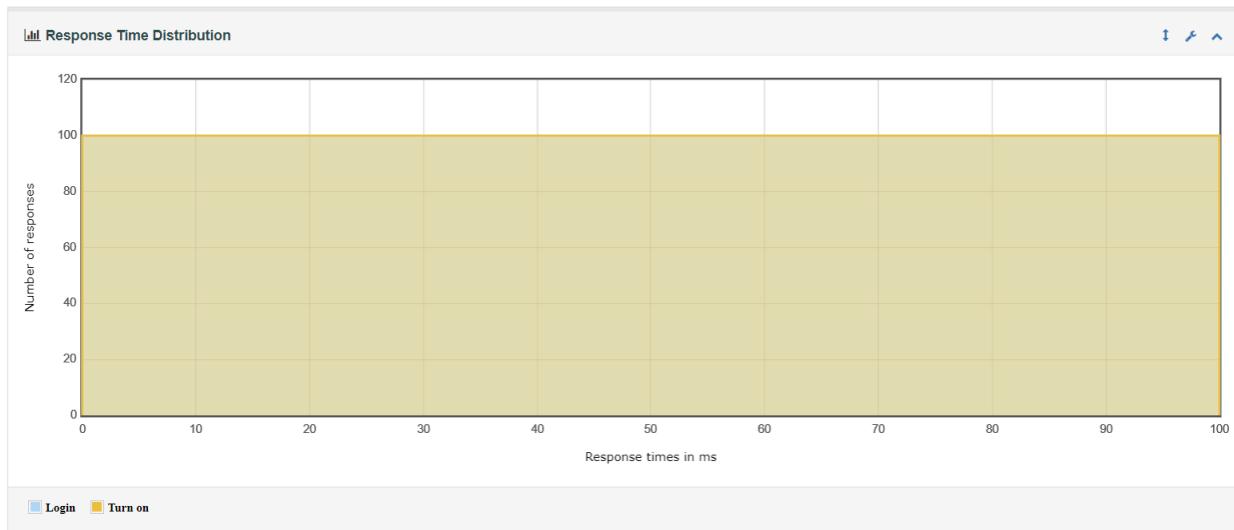
- 100 korisnika, 100 pokrenutih simulatora



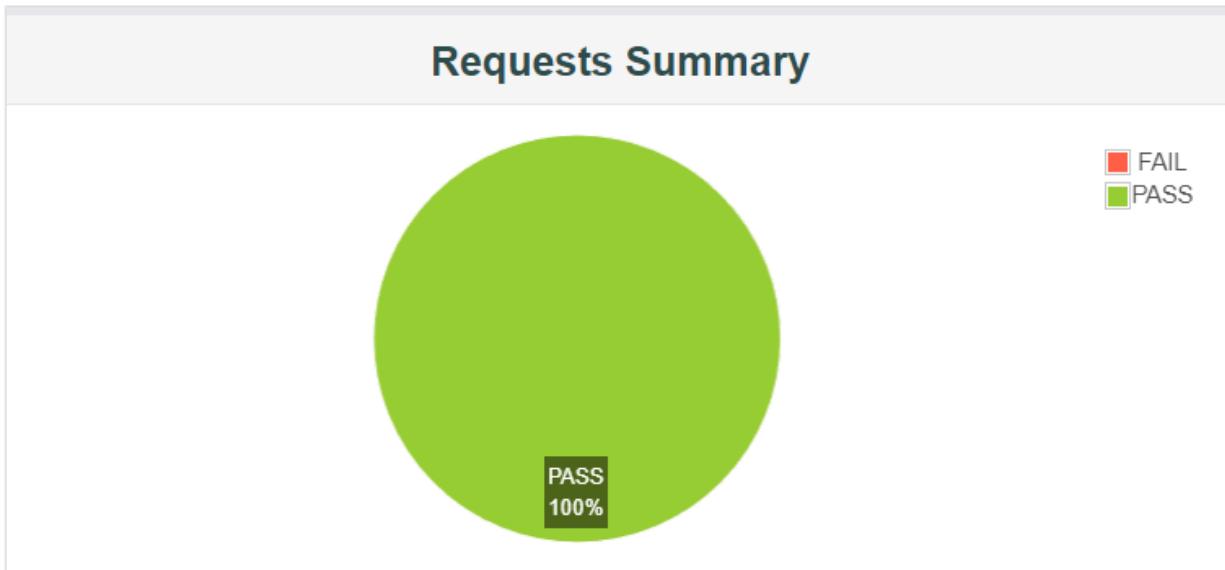
Statistics

Requests	Executions			Response Times (ms)							Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent
Total	200	0	0.00%	46.17	4	94	46.00	88.00	89.00	91.99	186.05	153.62	96.16	
Login	100	0	0.00%	86.41	79	94	86.00	89.00	90.90	93.98	93.55	75.64	22.02	
Turn on	100	0	0.00%	5.94	4	13	6.00	7.00	7.00	12.99	101.01	85.13	80.64	



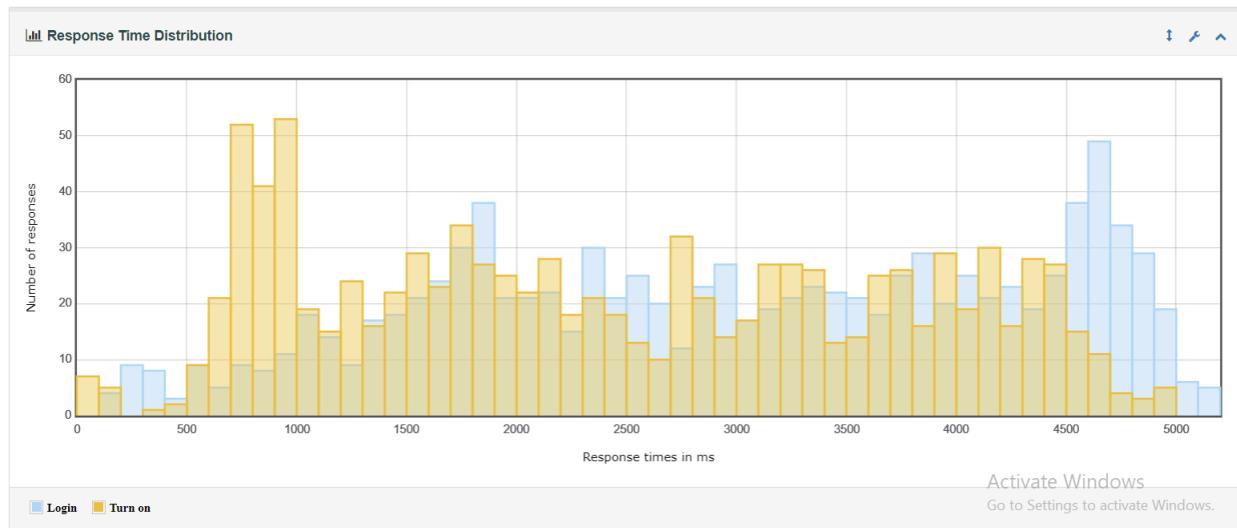
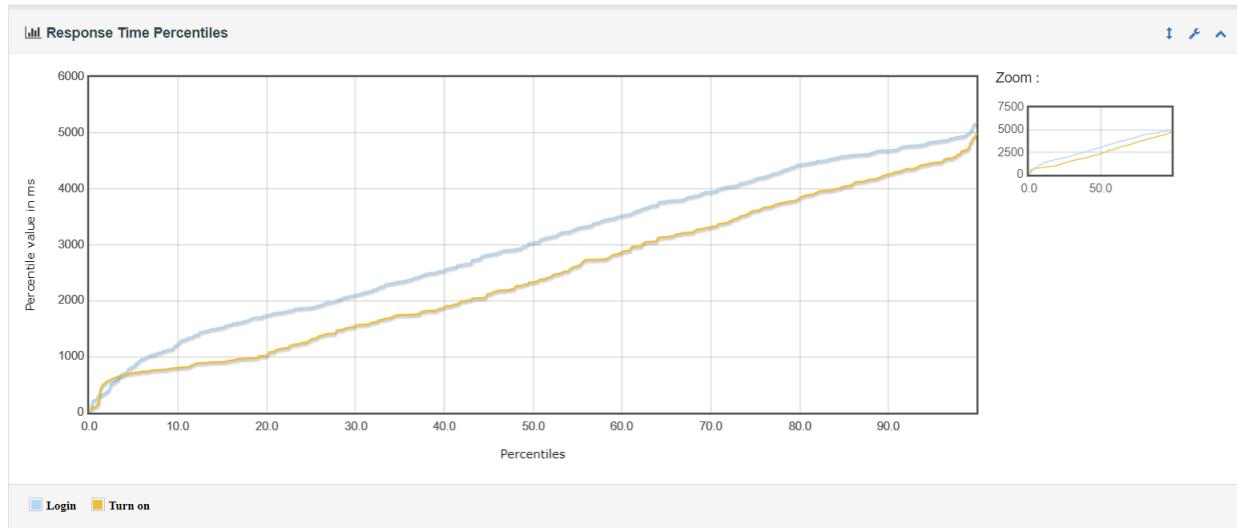


- 1000 korisnika, 100 pokrenutih simulatora

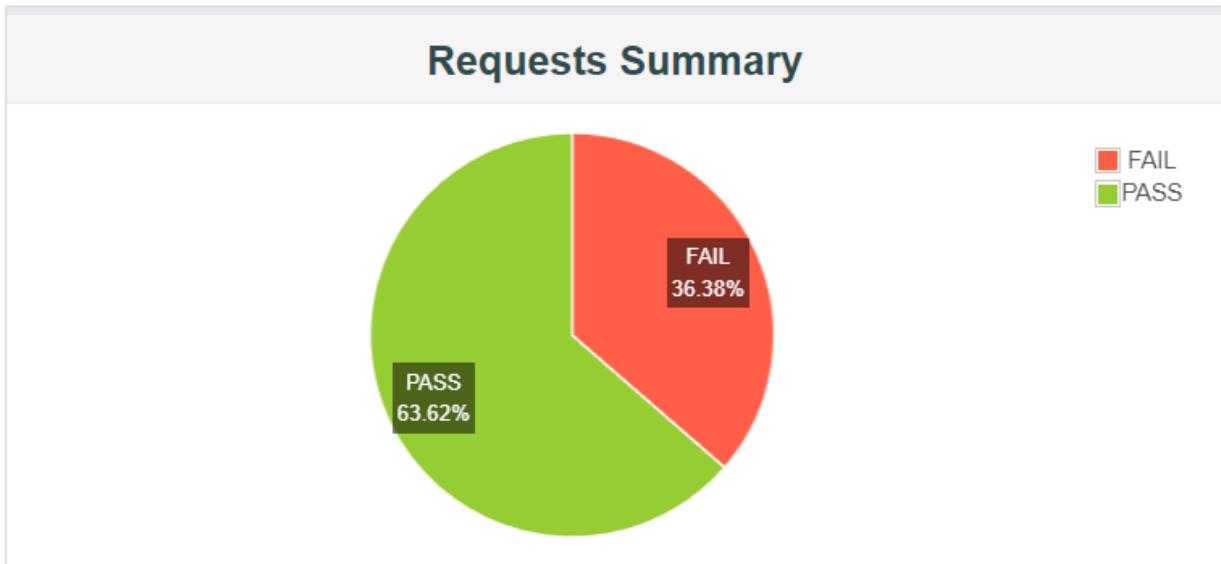


Statistics

Requests	Executions				Response Times (ms)								Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent		
Total	2000	0	0.00%	2727.07	43	5183	2735.00	4542.00	4712.50	4938.98	292.27		241.32	151.44		
Login	1000	0	0.00%	3000.03	104	5183	3049.50	4692.90	4843.85	5004.97	159.29		128.80	37.49		
Turn on	1000	0	0.00%	2454.11	43	4999	2336.00	4264.60	4466.90	4727.74	148.50		125.15	118.94		



- 10000 korisnika, 100 pokrenutih simulatora

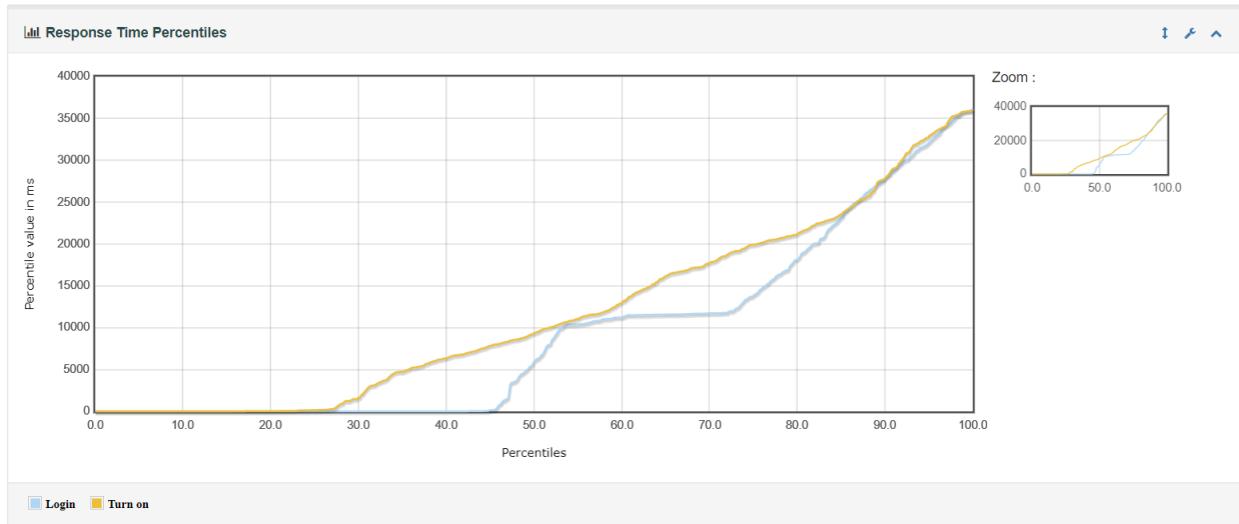


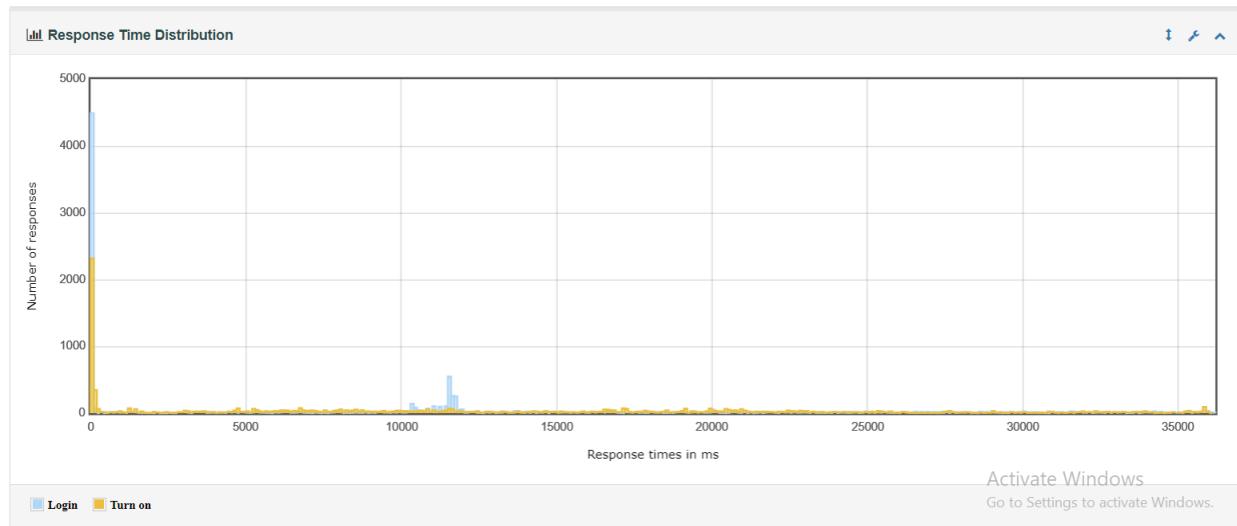
Statistics

Requests	Executions				Response Times (ms)							Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent	
Total	20000	7276	36.38%	10407.15	0	36186	8566.00	27815.90	32531.40	35802.99	358.69	524.31	122.50		
Login	10000	4566	45.66%	9226.26	0	36186	5937.00	27771.30	32119.00	35775.96	194.92	314.32	24.93		
Turn on	10000	2710	27.10%	11588.03	0	36024	9331.00	27851.30	32880.95	35806.00	180.26	236.31	100.07		

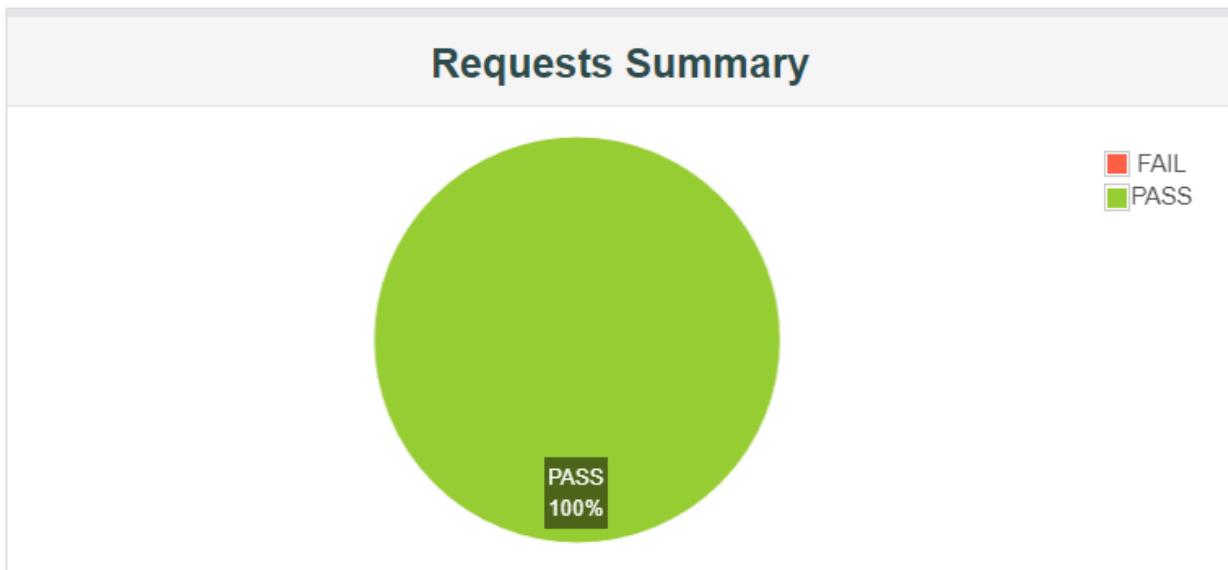
Errors

Type of error	Number of errors	% in errors	% in all samples
Non HTTP response code: org.apache.http.conn.HttpHostConnectException/Non HTTP response message: Connect to localhost:8080 [localhost/127.0.0.1, localhost/0:0:0:0:0:0:1] failed: Connection refused: connect	7276	100.00%	36.38%



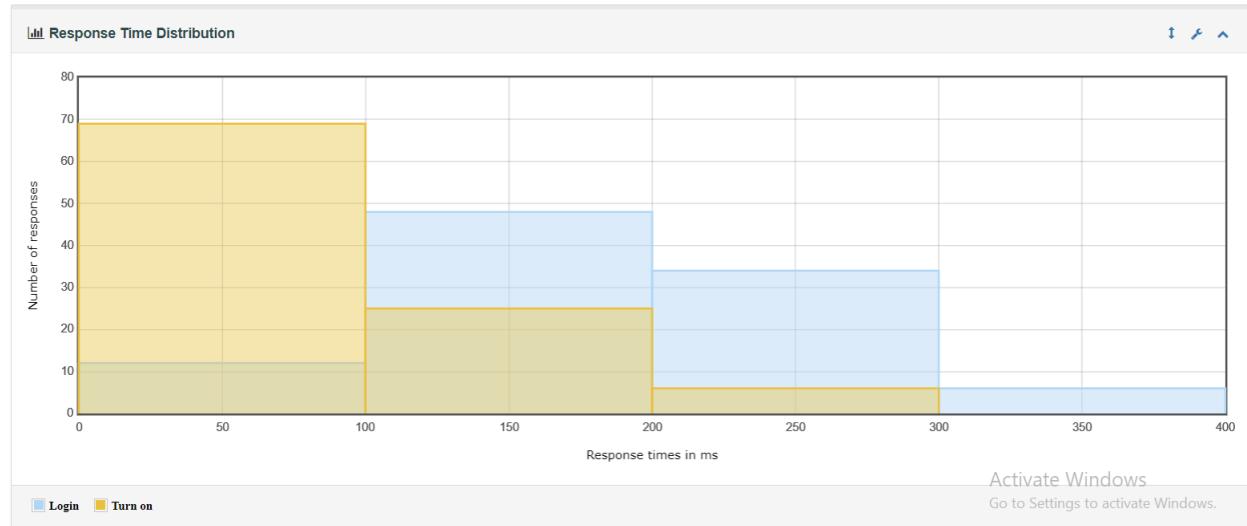
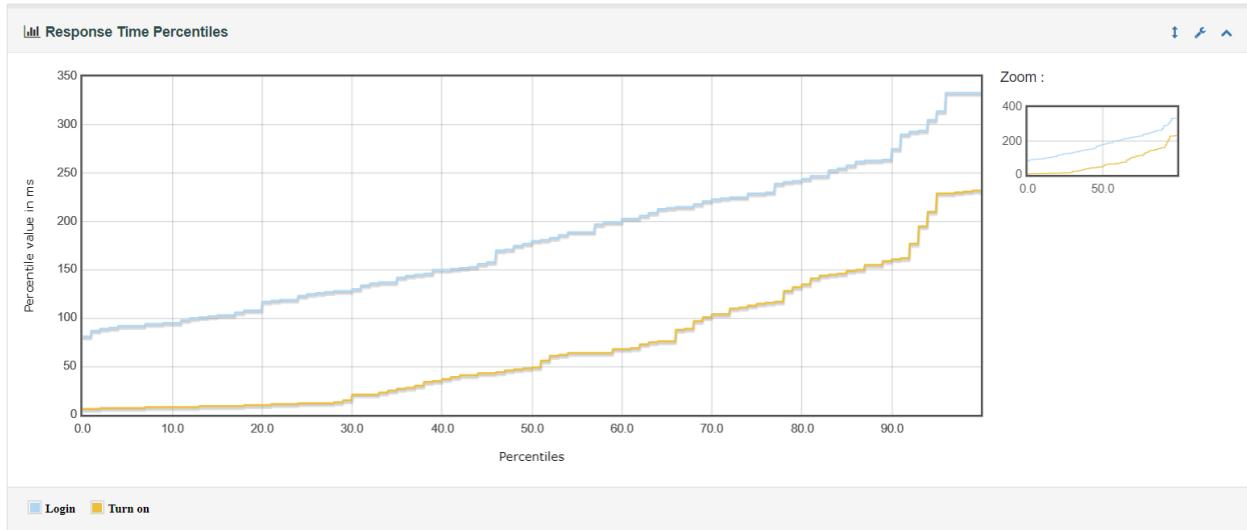


- 100 korisnika, 1000 pokrenutih simulatora



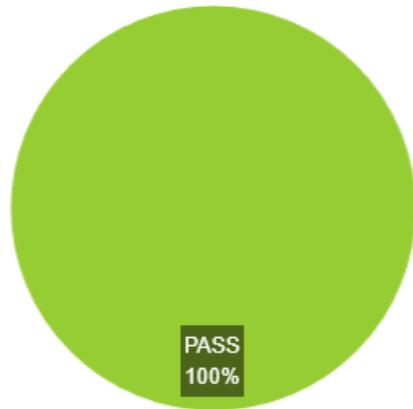
Statistics

Requests	Executions				Response Times (ms)							Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent	
Total	200	0	0.00%	126.17	6	333	118.50	243.80	274.45	333.00	198.02	162.44	102.75		
Login	100	0	0.00%	181.49	81	333	178.50	273.90	313.55	333.00	99.70	80.62	23.46		
Turn on	100	0	0.00%	70.86	6	232	48.50	160.80	228.05	231.99	133.87	111.38	107.41		



- 1000 korisnika, 1000 pokrenutih simulatora

Requests Summary

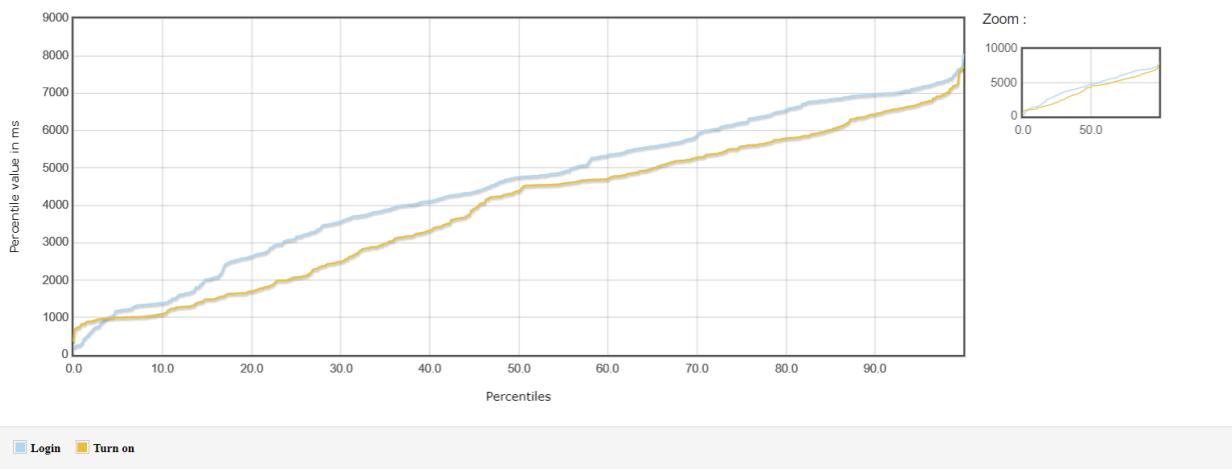


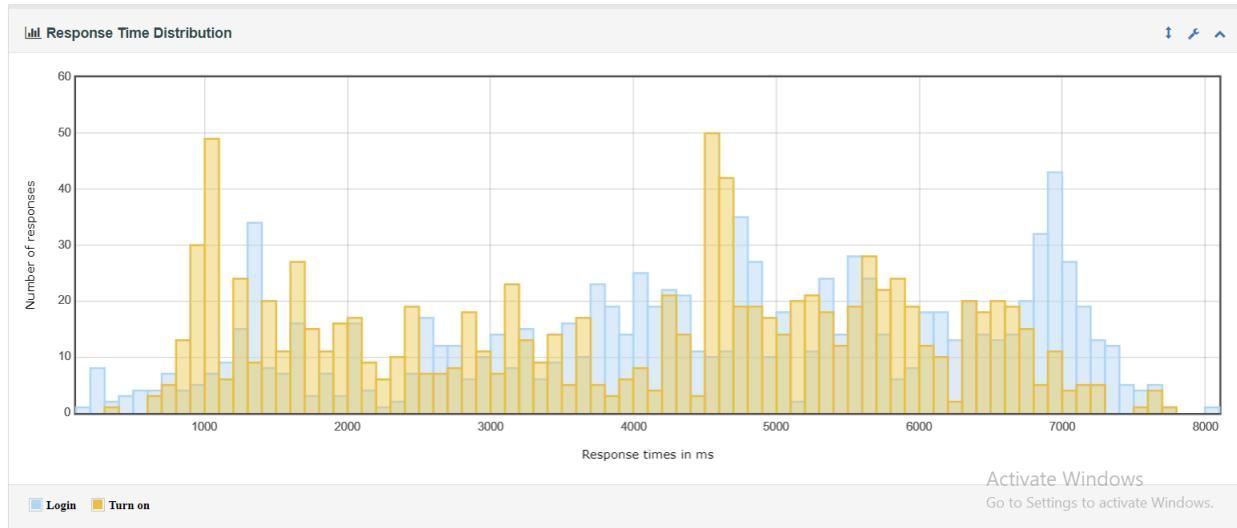
FAIL
PASS

Statistics

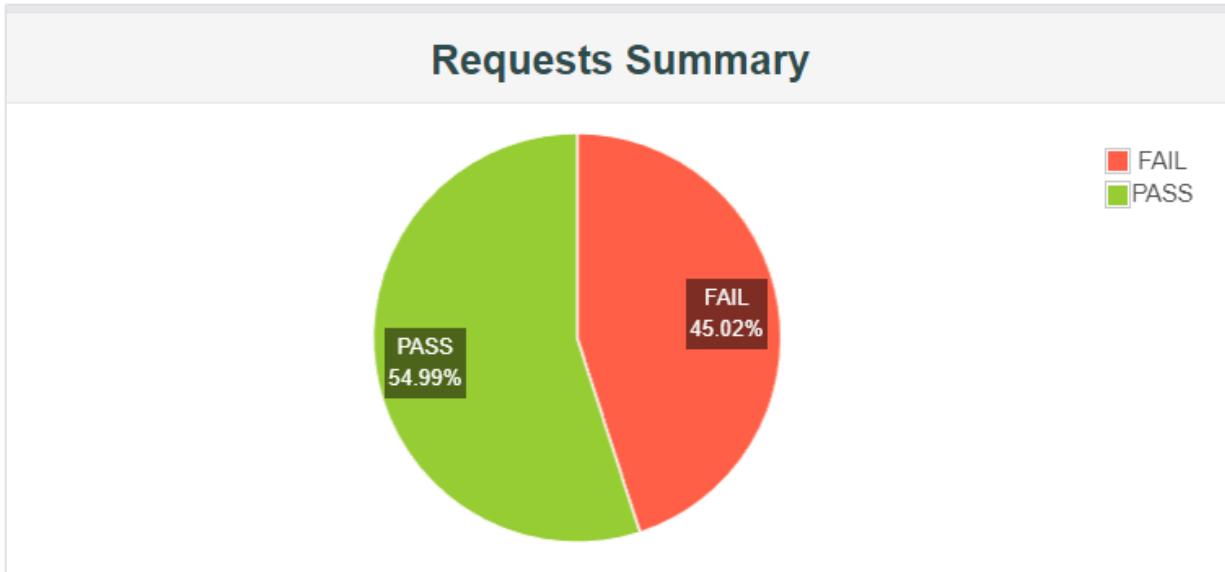
Requests	Executions				Response Times (ms)							Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent	
Total	2000	0	0.00%	4233.66	196	8057	4548.00	6796.90	7005.00	7402.98	184.04	150.97	95.28		
Login	1000	0	0.00%	4527.46	196	8057	4757.50	6974.40	7151.90	7513.97	98.20	79.41	23.11		
Turn on	1000	0	0.00%	3939.87	353	7730	4395.50	6434.80	6709.70	7202.98	93.71	77.97	74.98		

Response Time Percentiles





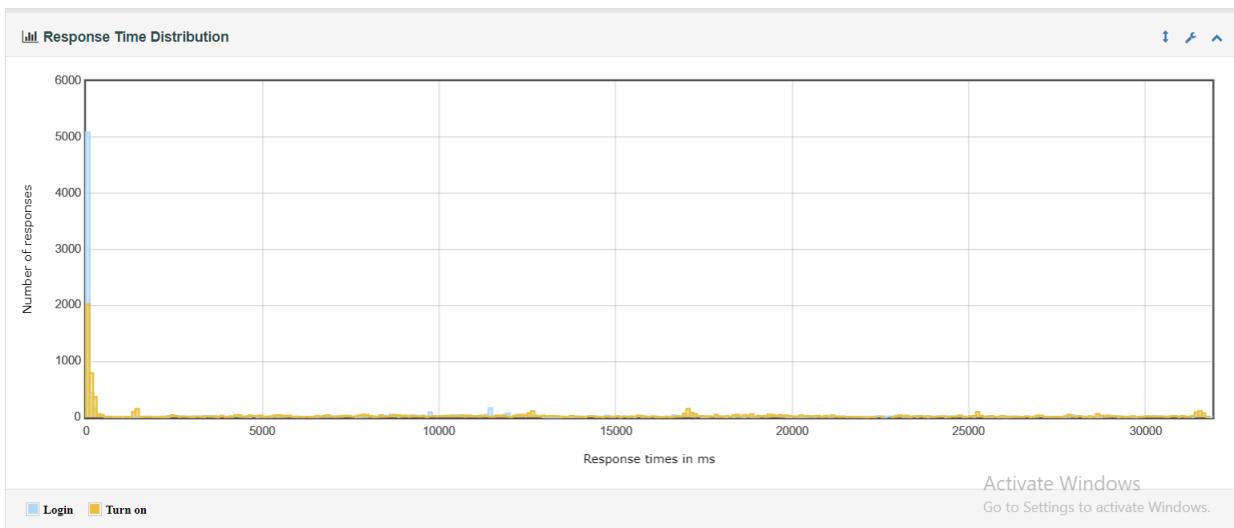
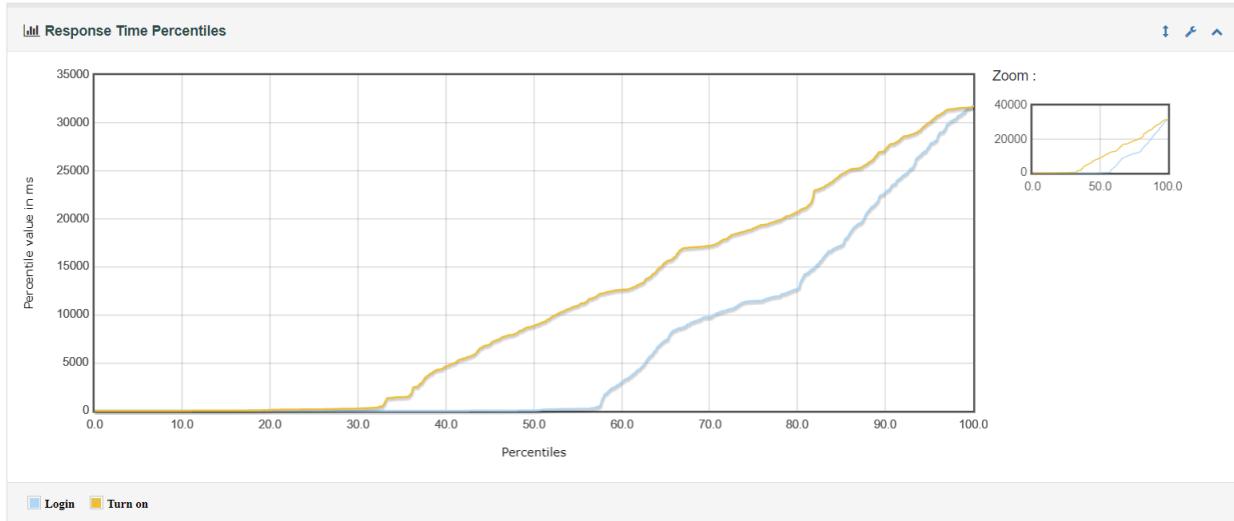
- 10000 korisnika, 1000 pokrenutih simulatora



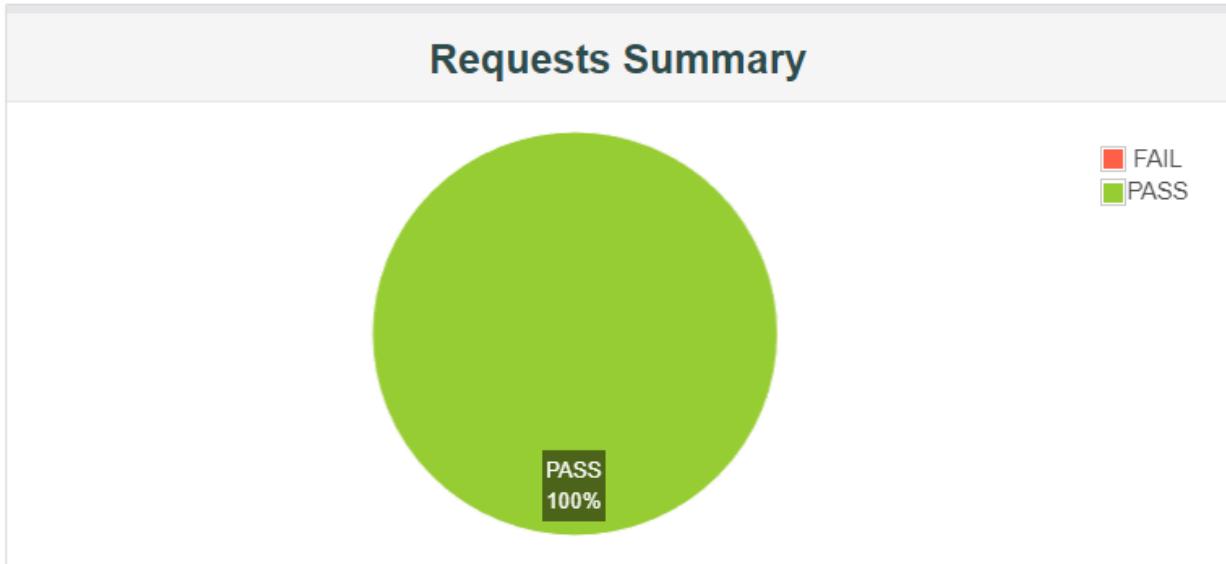
Statistics

Requests	Executions				Response Times (ms)									Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent			
Total	20000	9003	45.02%	45.02%	8627.88	0	31871	3977.00	25286.90	29061.95	31558.98	366.23	589.30	110.10			
Login	10000	5734	57.34%	57.34%	6429.32	0	31871	42.50	22809.30	27577.70	31151.00	197.62	359.32	19.84			
Turn on	10000	3269	32.69%	32.69%	10826.45	0	31779	8849.50	27215.40	30058.65	31592.99	183.95	257.52	92.13			

Errors			
Type of error	Number of errors	% in errors	% in all samples
Non HTTP response code: org.apache.http.conn.HttpHostConnectException/Non HTTP response message: Connect to localhost:8080 [localhost/127.0.0.1, localhost/0:0:0:0:0:1] failed: Connection refused: connect	9003	100.00%	45.02%

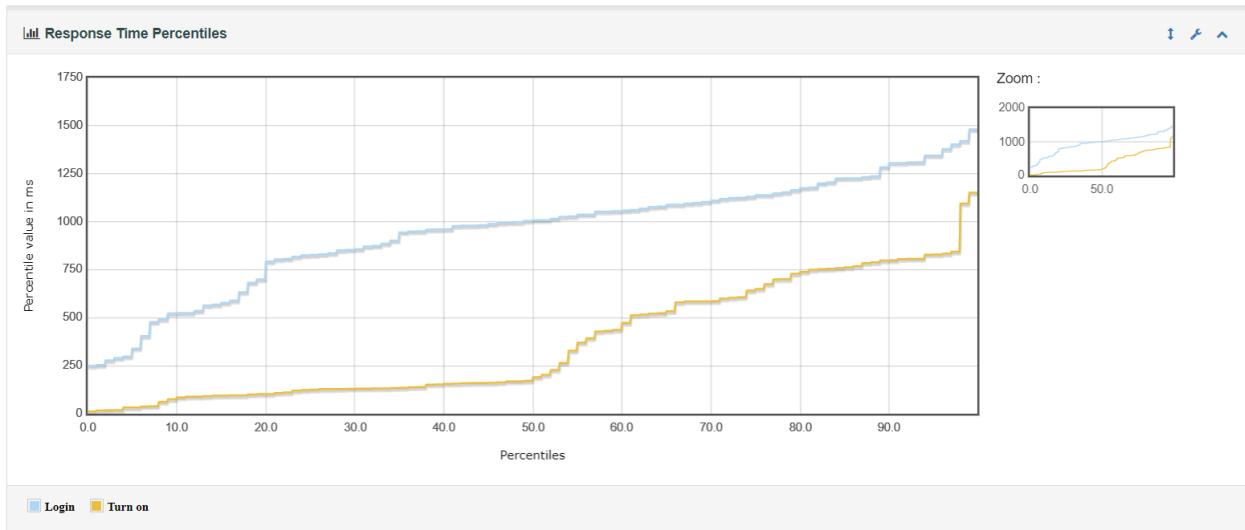


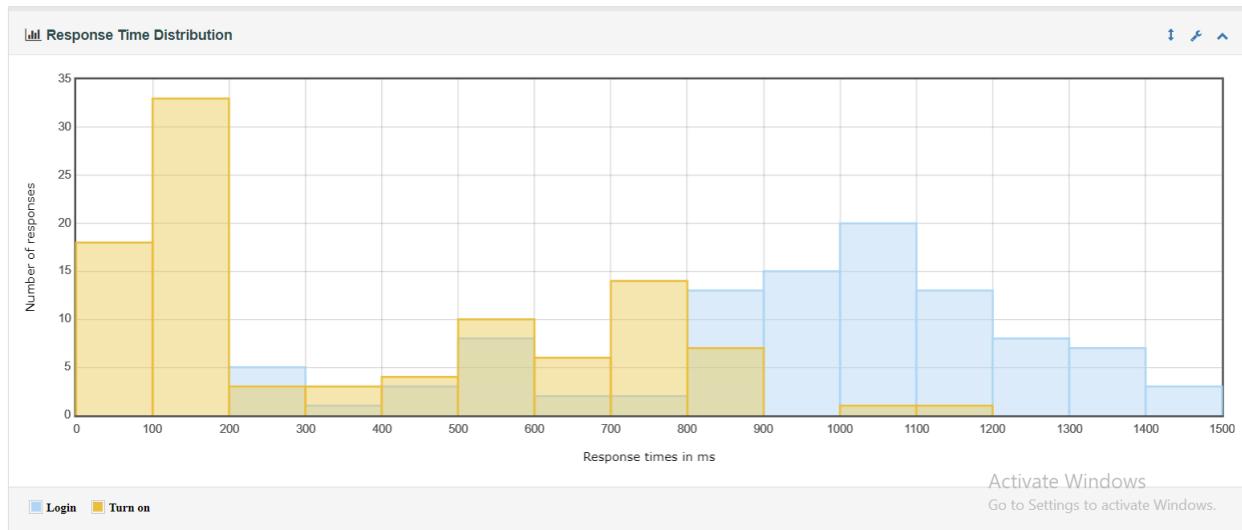
- 100 korisnika, 10000 pokrenutih simulatora



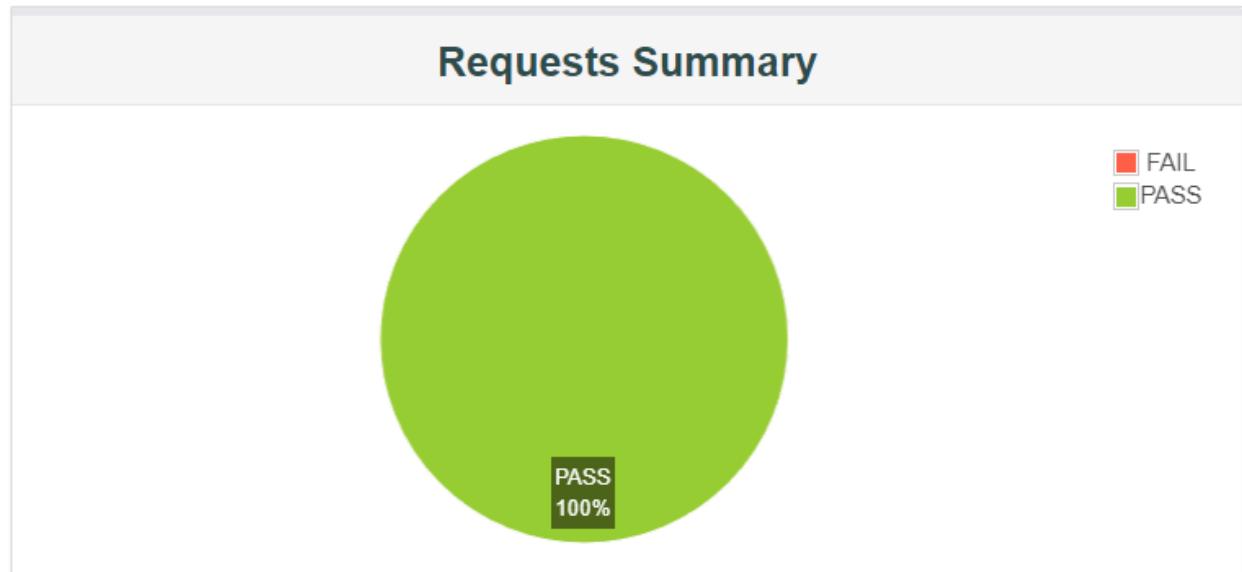
Statistics

Requests	Executions				Response Times (ms)							Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent	
Total	200	0	0.00%	660.91	12	1481	734.00	1174.00	1304.90	1420.82	97.47	79.95	50.56		
Login	100	0	0.00%	950.58	250	1481	1006.50	1303.80	1345.00	1480.40	49.02	39.64	11.54		
Turn on	100	0	0.00%	371.24	12	1151	180.50	798.90	829.95	1150.44	56.12	46.69	45.01		



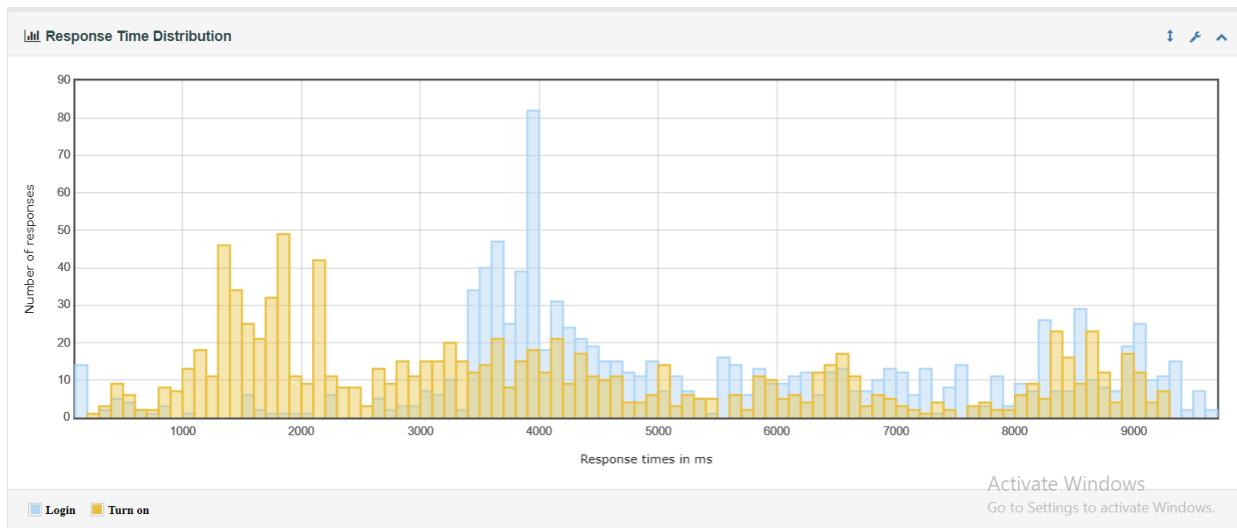
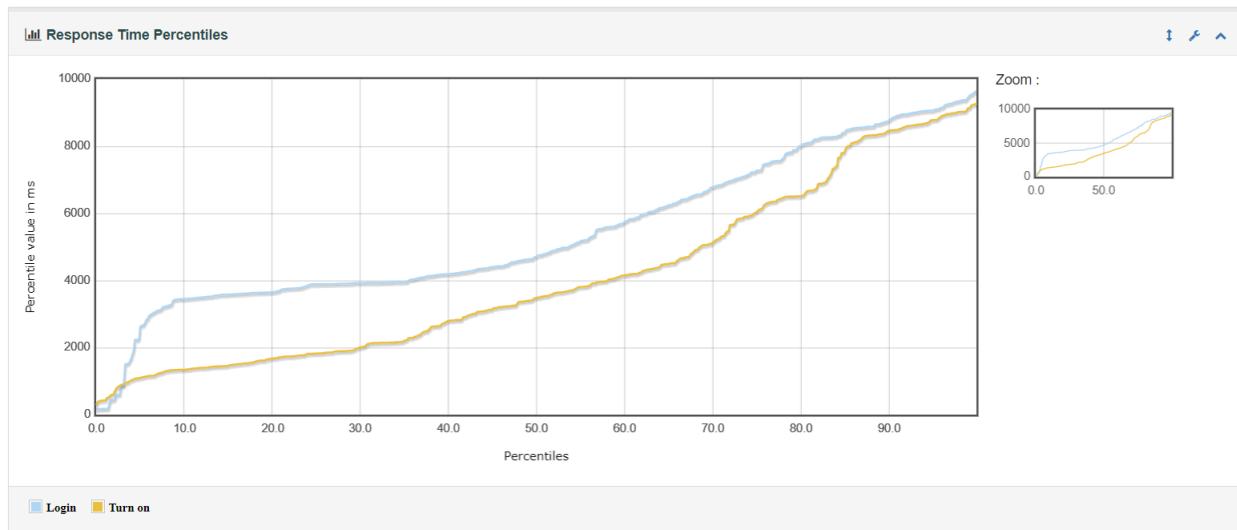


- 1000 korisnika, 10000 pokrenutih simulatora



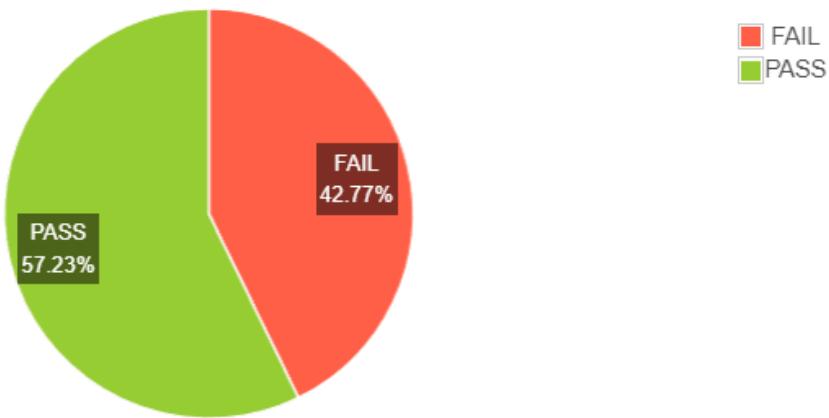
Statistics

Requests	Executions				Response Times (ms)							Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	80th pct	90th pct	95th pct	99th pct	Transactions/s	Received	Sent
Total	2000	0	0.00%	4737.98	161	9637	4183.50	8587.90	8987.00	9346.89	131.69	131.69	108.03	68.21	
Login	1000	0	0.00%	5420.17	161	9637	4724.00	8790.00	9067.95	9456.82	69.70	69.70	56.36	16.40	
Turn on	1000	0	0.00%	4055.79	279	9282	3490.00	8463.90	8782.70	9132.91	66.60	66.60	55.41	53.32	



- 10000 korisnika, 10000 pokrenutih simulatora

Requests Summary

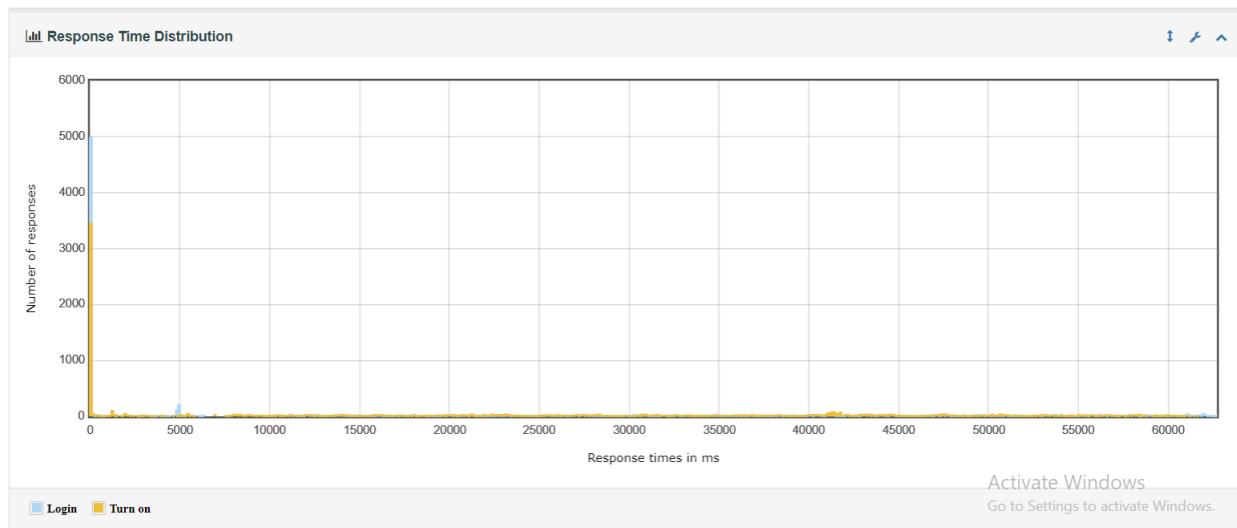
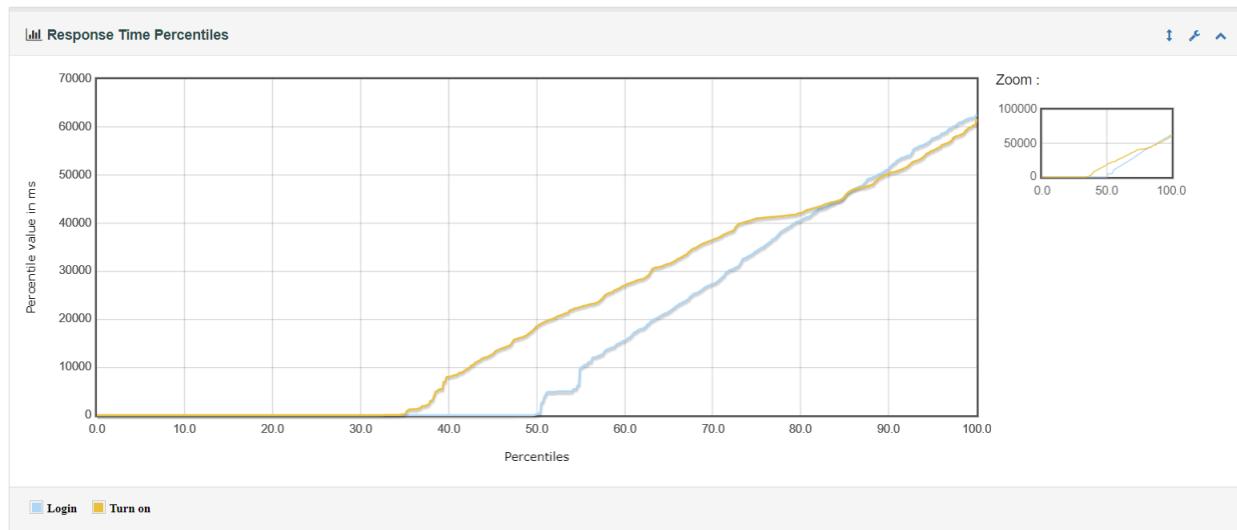


Statistics

Requests	Executions				Response Times (ms)									Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent			
Total	20000	8554	42.77%	18893.32	0	62698	11701.00	50669.00	56267.90	60999.97	235.17	362.84	72.05				
Login	10000	5048	50.48%	16791.54	0	62698	157.50	51422.90	57657.00	61728.99	129.05	215.64	15.04				
Turn on	10000	3506	35.06%	20995.11	0	61675	18515.00	50330.00	55083.30	59700.98	117.80	166.66	58.45				

Errors

Type of error	Number of errors	% in errors	% in all samples
Non HTTP response code: org.apache.http.conn.HttpHostConnectException/Non HTTP response message: Connect to localhost:8080 [localhost/127.0.0.1, localhost/0:0:0:0:0:0:1] failed: Connection refused: connect	6775	79.20%	33.88%
Non HTTP response code: java.net.BindException/Non HTTP response message: Address already in use: connect	1779	20.80%	8.89%



Zaključak:

- Rezultati su dosta dobri.
- Sa 10000 zahteva odbijeno je oko 40%.
- Sa 1000 zahteva i 10000 uredjaja svi zahtevi su obrađeni i odziv je ispod 5s.
- Simulator sistema solarnih panela je dosta jednostavniji odakle dolaze i bolje performanse.

Testovi performansi simulatora

Testovi su izvedeni tako što se pokrene server i određeni broj simulatora. Za svaku MQTT poruku koju simulator pošalje pamti se vreme slanja. Kada server obradi poruku pamti se vreme završetka obrade i meri se prosečna razlika ova dva vremena za svaki tip mqtt poruke.

Heartbeat

- 100 pokrenutih simulatora: 674ms
- 200 pokrenutih simulatora: 3440ms
- 300 pokrenutih simulatora: 7145ms

Baterija

- Slanje stanja baterije
 - 100 pokrenutih simulatora: 620ms
 - 200 pokrenutih simulatora: 4946ms
 - 300 pokrenutih simulatora: 9378ms

Sistem solarnih panela

- Slanje proizvedene energije
 - 100 pokrenutih simulatora: 1337ms
 - 200 pokrenutih simulatora: 5668ms
 - 300 pokrenutih simulatora: 7129ms

Punjač električnih vozila

- Počinjanje punjenja
 - 100 pokrenutih simulatora: 815ms
 - 200 pokrenutih simulatora: 1068ms
 - 300 pokrenutih simulatora: 1761ms
- Završavanje punjenja
 - 100 pokrenutih simulatora: 1791ms
 - 200 pokrenutih simulatora: 5155ms
 - 300 pokrenutih simulatora: 8525ms
- Slanje procenta do kog je auto napunjeno
 - 100 pokrenutih simulatora: 1704ms
 - 200 pokrenutih simulatora: 4630ms
 - 300 pokrenutih simulatora: 8489ms
- Potrošnja energije
 - 100 pokrenutih simulatora: 1757ms
 - 200 pokrenutih simulatora: 4863ms
 - 300 pokrenutih simulatora: 8505ms

Zaključak

Sistem je moguće koristiti sa dobrom performansama sa nekoliko stotina pokrenutih simulatora.

100000 pokrenutih simulatora

- Front end je i dalje moguće koristiti u potpunosti.

- Za akcije nad sistemom solarnih panela i punjačem električnih vozila server vraća odgovore za oko 3 sekunde, međutim vreme koje se čeka da simulator potvrdi izvršenje akcije je veoma dugo, oko 10-15 minuta za paljenje i gašenje solarnog panela.
- Sistem je prevazišao moja očekivanja za rad pod ovim ekstremnim opterećenjem.

Unapređenje delova sistema

- MQTT broker nije bio u stanju da podrži dovoljno velik broj poruka. Promenom `max_inflight_messages=10000` sistem je bio u stanju da pokrene veci broj simulatora.
- Kako bismo povećali broj korisnika koje server može da podrži u isto vreme promenili smo `server.tomcat.max-connection=10000` u `application.properties` serverske spring boot aplikacije.
- Najveći deo MQTT poruka su heartbeat poruke. Kako ne bismo zagušili sistem bitno je da ne radimo nepotreban posao dok obrađujemo ove poruke. U influxdb bazu čuvamo samo promene online/offline stanja. Kako bismo izbegli i korišćenje chron joba koji bi bio problem za veliki broj uređaja, uveli smo eventual consistency za online/offline stanje. Čuvanje promene iz online u offline je odloženo dok uređaj ponovo ne postane online ili korisnik ne zatraži graf stanja tog uređaja. Korisnik ima utisak da je stanje sistema uvek konzistentno.
- Smanjenjem informacija koje se logguju mogli bismo unaprediti performanse, ali kako su logovi ključni za monitoring sistema nismo ih menjali.
- Razmatrali smo da uvedemo keširanje podataka, ali pošto su uska grla u delovima sistema koji ne mogu da se keširaju ne bismo dobili značajno poboljšanje.