

# Izveštaj

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## Specifikacija računara

Navedeni testovi su izvršeni na jednom računaru sledećih specifikacija:

- i5-9400F @ 2.9GHZ clocked to 4.2GHZ
- 16GB RAM
- HDD

## Test čestih scenarija korišćenja

Testovi su izvrseni uz pomoć JMeter alata. Svaki test je pokrenut više puta sa različitim brojem korisnika, različitim obimom podataka u bazi i različitim brojem pokrenutih simulatora. Loop count je postavljen na 1-100 u zavisnosti od količine podataka, kako bi se dobili bolji rezultati.

### 1 - Login

Opis:

- Korisnik se prijavljuje na sistem

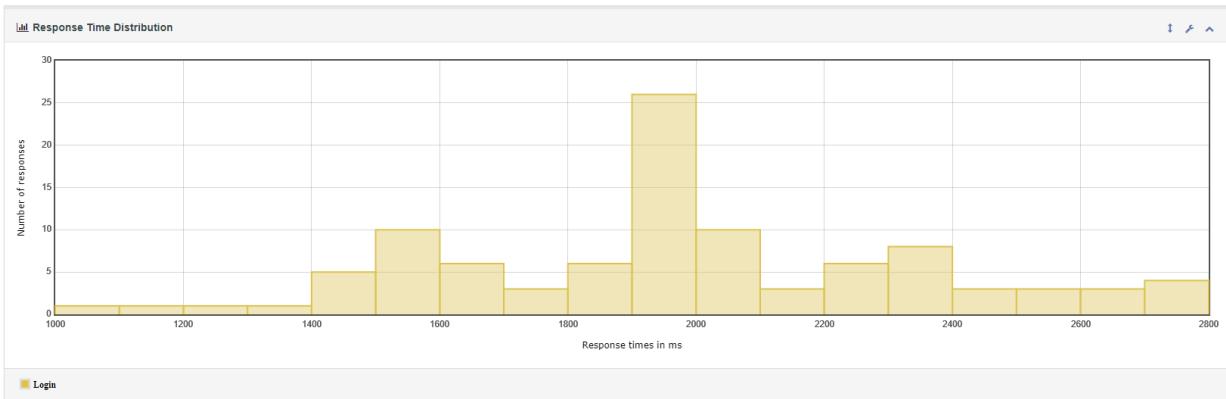
Rezultati:

1. 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	100	0	0.00%	1976.33	1088	2764	1966.50	2501.60	2696.35	2763.80	35.83	28.97	8.54					
Login	100	0	0.00%	1976.33	1088	2764	1966.50	2501.60	2696.35	2763.80	35.83	28.97	8.54					

Errors				
Type of error	Number of errors	% in errors	% in all samples	



## 2. 100 korisnika, 1000 pokrenutih simulatora

**APDEX (Application Performance Index)**

Apdex	T (Toleration threshold)	F (Frustration threshold)	Label
0.305	500 ms	1 sec 500 ms	Total
0.305	500 ms	1 sec 500 ms	Login

**Requests Summary**

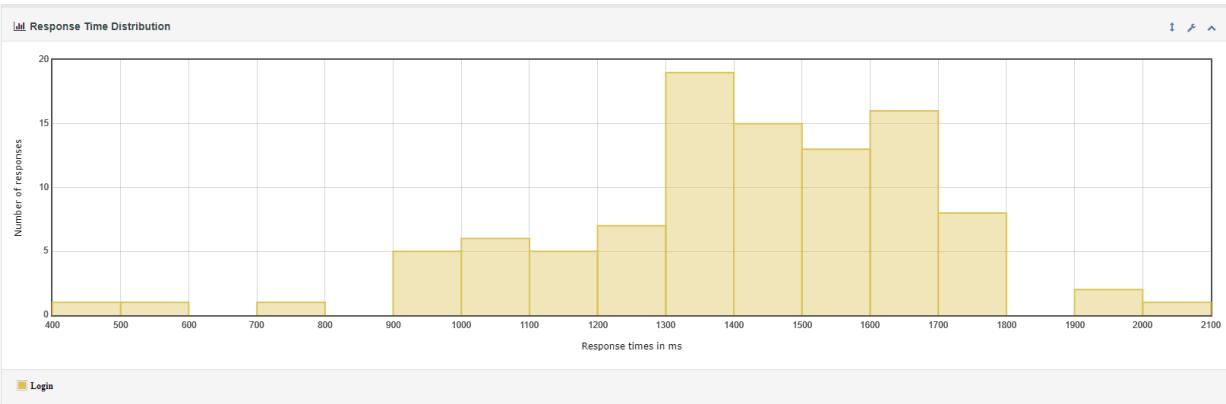
PASS 100%

**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	100	0	0.00%	1414.72	499	2066	1432.00	1716.20	1760.65	2065.29	43.92	35.51	10.46			
Login	100	0	0.00%	1414.72	499	2066	1432.00	1716.20	1760.65	2065.29	43.92	35.51	10.46			

**Errors**

Type of error	Number of errors	% in errors	% in all samples



## 3. 100 korisnika, 500 pokrenutih simulatora

**APDEX (Application Performance Index)**

Apdex	T (Toleration threshold)	F (Frustration threshold)	Label
0.290	500 ms	1 sec 500 ms	Total
0.290	500 ms	1 sec 500 ms	Login

**Requests Summary**

PASS 100%

**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	100	0	0.00%	1343.24	683	2054	1392.50	1803.90	1889.50	2053.10	40.54	32.78	9.66				
Login	100	0	0.00%	1343.24	683	2054	1392.50	1803.90	1889.50	2053.10	40.54	32.78	9.66				

**Errors**

Type of error	Number of errors	% in errors	% in all samples
None	100	100%	100%

**Initial Response Time Distribution**

Number of responses

Response times in ms

Legend: Login

#### 4. 1000 korisnika, 100 pokrenutih simulatora

**APDEX (Application Performance Index)**

Apdex	T (Toleration threshold)	F (Frustration threshold)	Label
0.028	500 ms	1 sec 500 ms	Total
0.028	500 ms	1 sec 500 ms	Login

**Requests Summary**

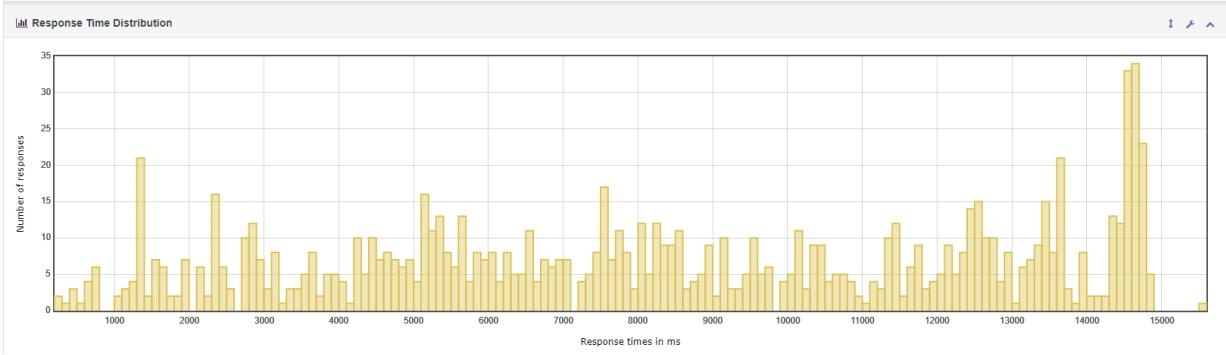
PASS 100%

**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	1000	0	0.00%	8502.63	230	15587	8320.00	14457.50	14652.00	14773.00	56.50	45.69	13.46				
Login	1000	0	0.00%	8502.63	230	15587	8320.00	14457.50	14652.00	14773.00	56.50	45.69	13.46				

**Errors**

Type of error	Number of errors	% in errors	% in all samples
None	1000	100%	100%



## 5. 1000 korisnika, 1000 pokrenutih simulatora

**APDEX (Application Performance Index)**

Apdex	T (Toleration threshold)	F (Frustration threshold)	Label
0.013	500 ms	1 sec 500 ms	Total
0.013	500 ms	1 sec 500 ms	Login

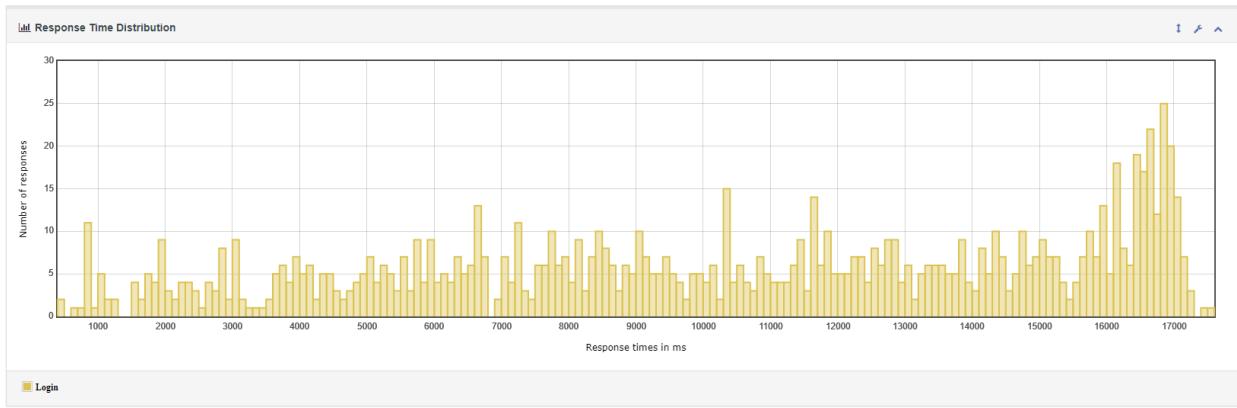
**Requests Summary**

**Statistics**

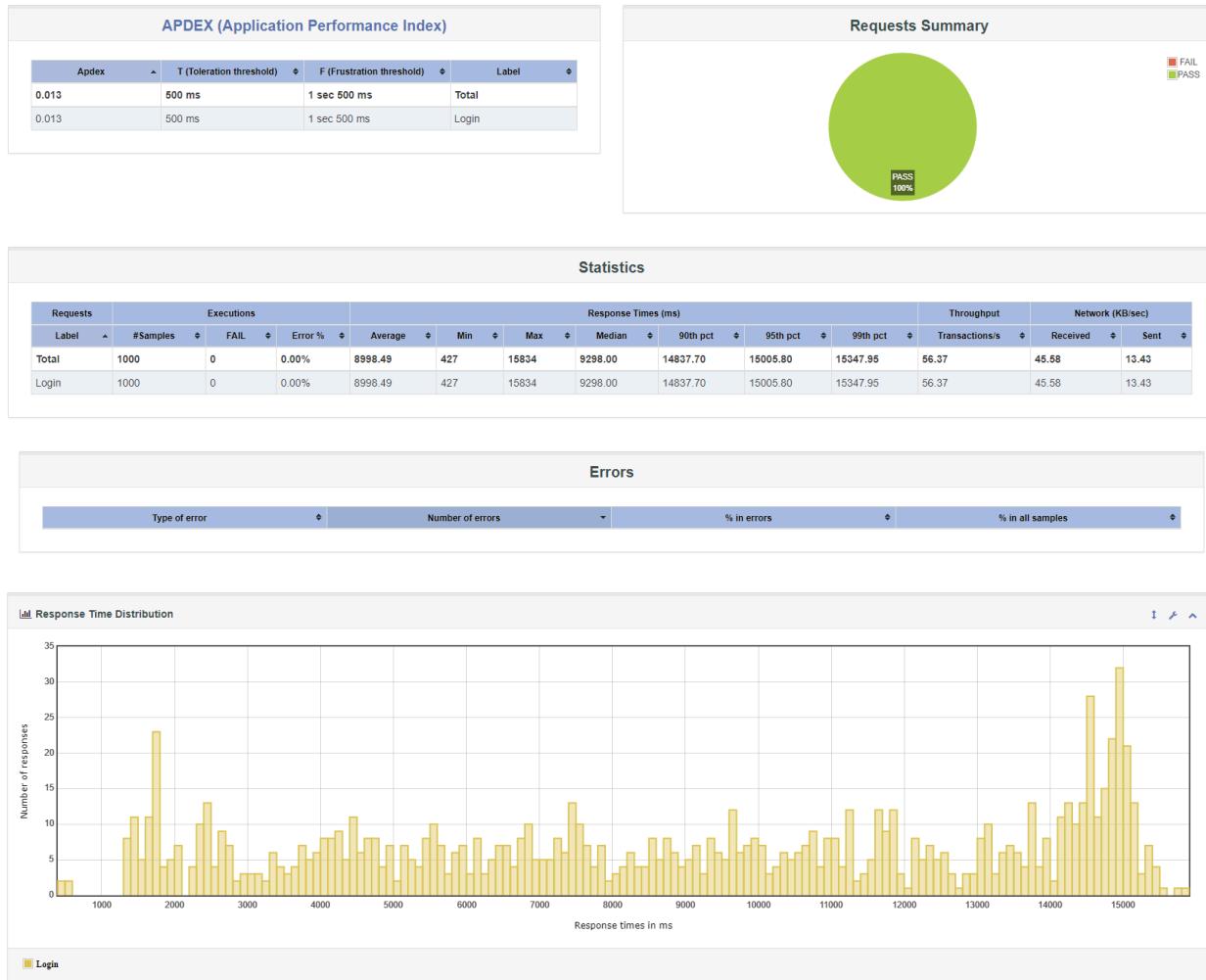
Requests	Executions				Response Times (ms)								Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent		
Total	1000	0	0.00%	10480.24	478	17596	10897.50	16643.50	16890.95	17130.95	53.43	43.20	12.73			
Login	1000	0	0.00%	10480.24	476	17596	10897.50	16643.50	16890.95	17130.95	53.43	43.20	12.73			

**Errors**

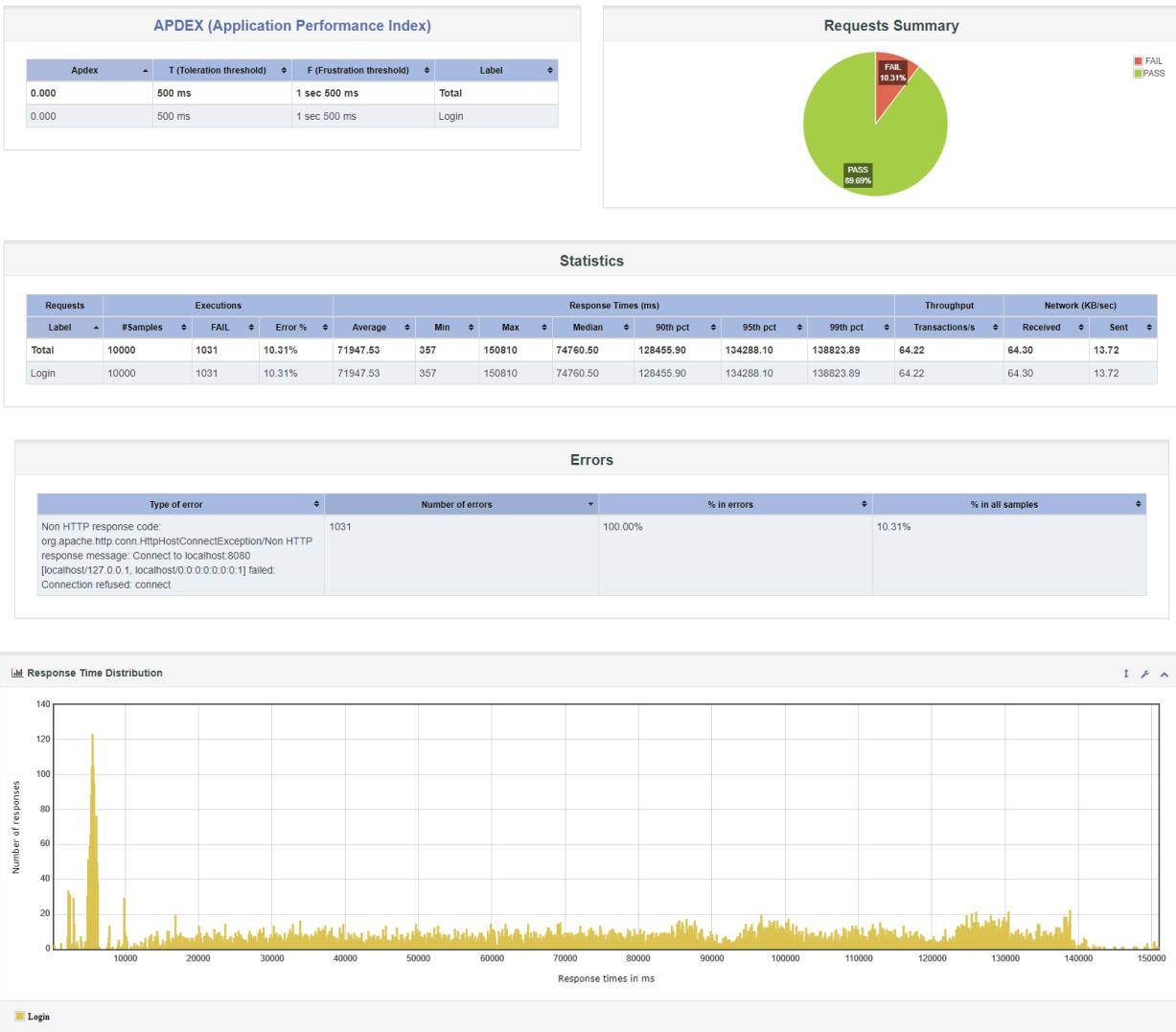
Type of error	Number of errors	% in errors	% in all samples



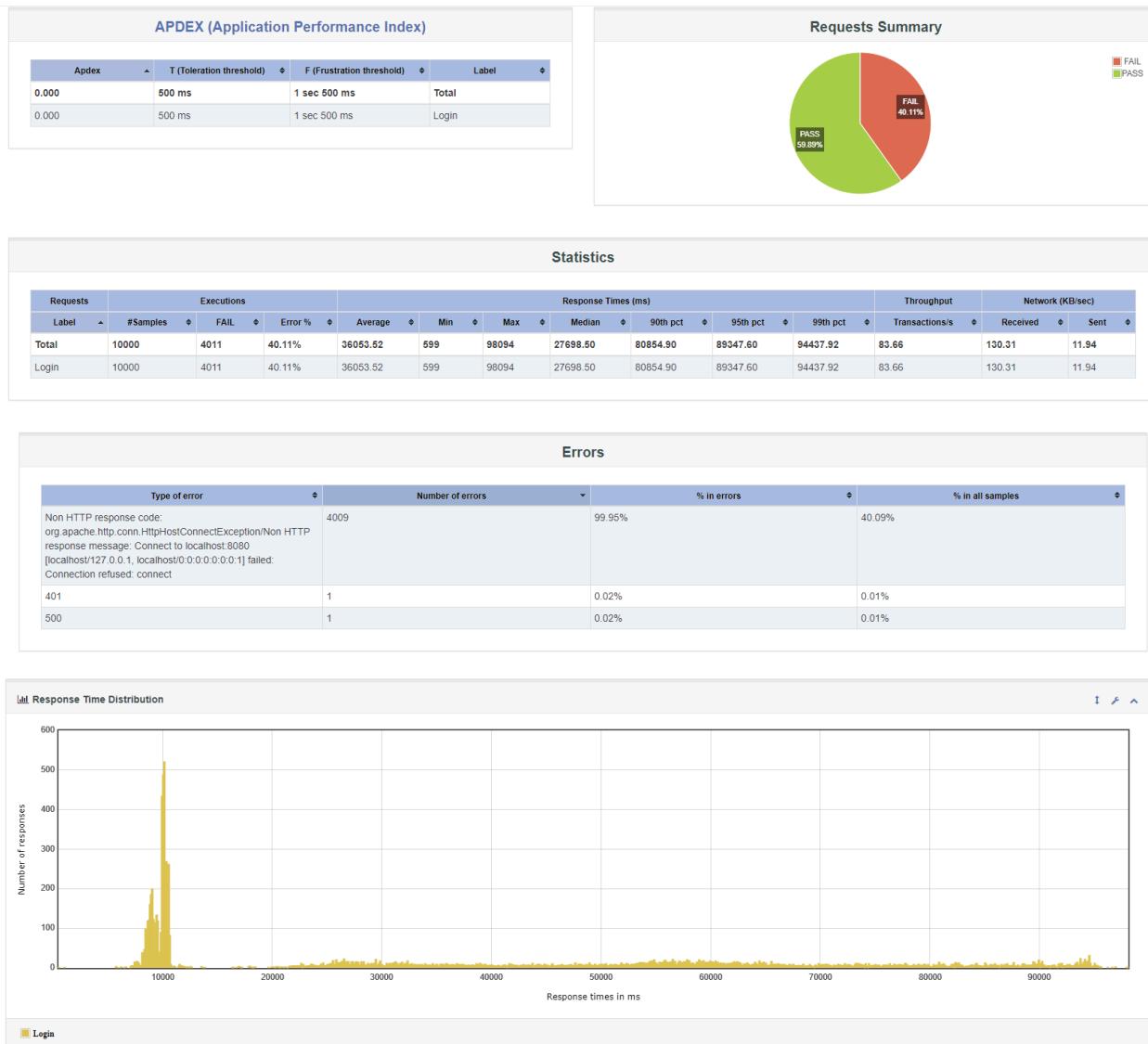
## 6. 1000 korisnika, 500 pokrenutih simulatora



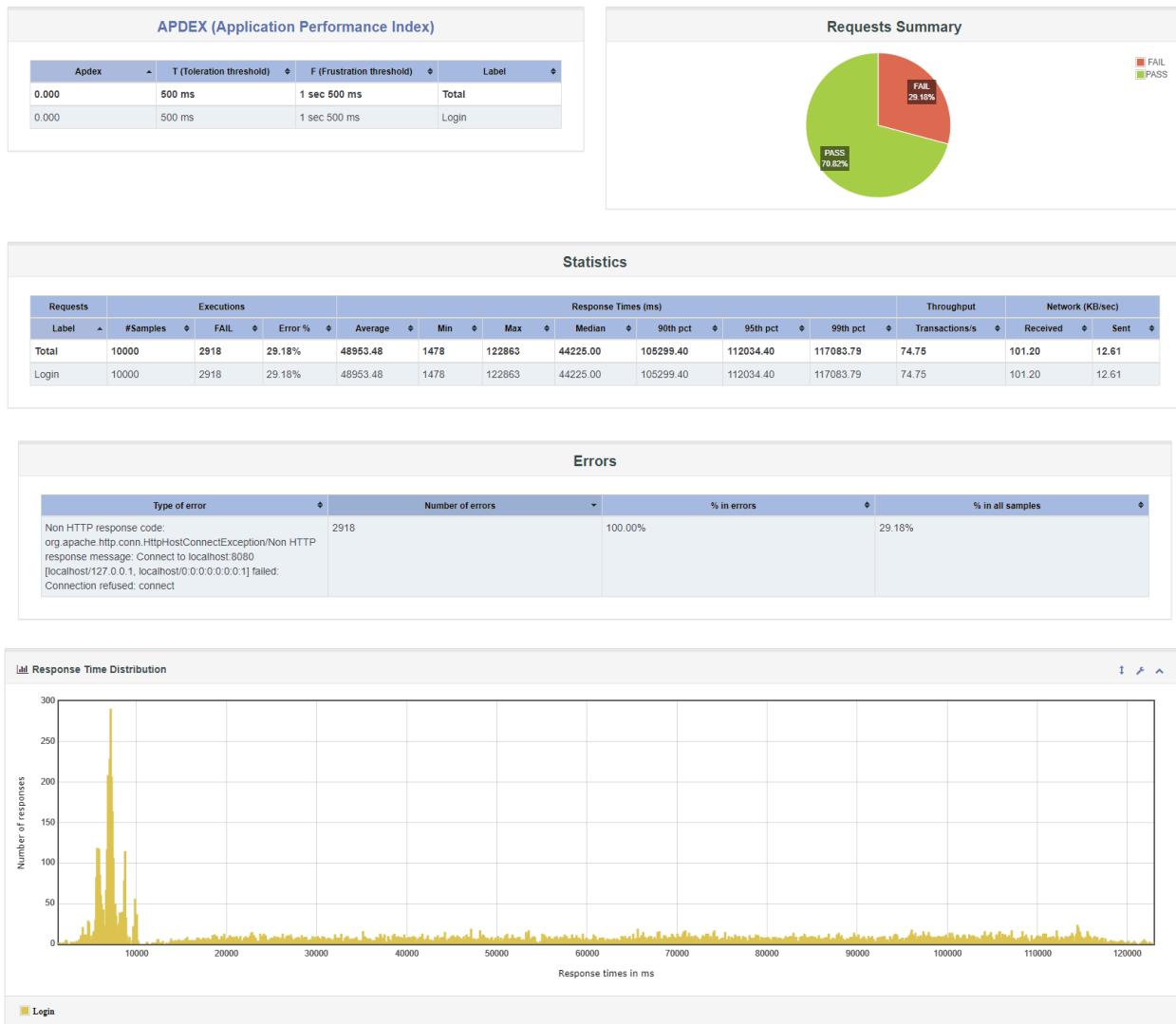
## 7. 10000 korisnika, 100 pokrenutih simulatora



## 8. 10000 korisnika, 1000 pokrenutih simulatora



## 9. 10000 korisnika, 500 pokrenutih simulatora



## 1 - Zakljucak

Mozemo primetiti da je neophodno do 100 milisekundi za svaki zahtev za login. Kako raste broj zahteva koje saljemo, vise vremena treba serveru da kreira nove threadove i obradi nase zahteve za login

## 2 - Create Sensor

Opis:

- Korisnik se prijavljuje na sistem i kreira senzor ambijentalnih uslova

Rezultati:

- 100 korisnika, 100 pokrenutih simulatora

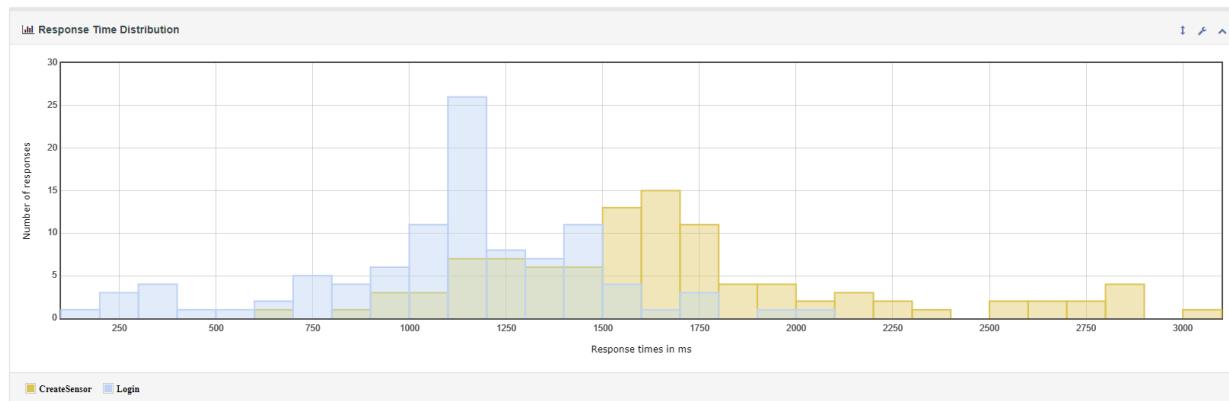


**Statistics**

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%	1397.96	195	3002	1368.50	2001.20	2559.15	2892.97	58.69	46.79	1582.61				
CreateSensor	100	0	0.00%	1683.50	651	3002	1631.00	2556.30	2815.85	3000.91	31.32	24.62	1681.71				
Login	100	0	0.00%	1112.42	195	2002	1145.50	1504.70	1731.40	2001.14	36.47	29.49	8.69				

**Errors**

Type of error	Number of errors	% in errors	% in all samples
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## 2. 1000 korisnika, 100 pokrenutih simulatora

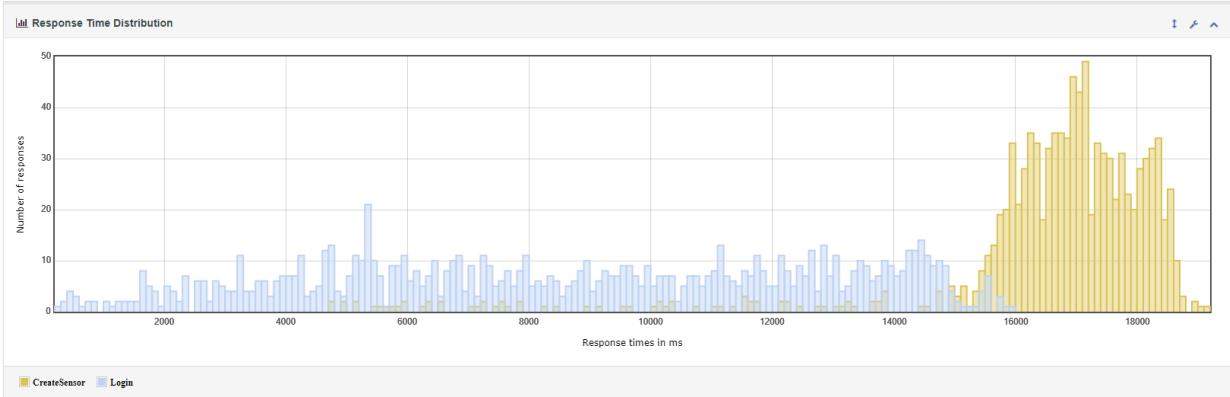


**Statistics**

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%	12631.56	243	19151	14446.50	17905.80	18269.00	18585.94	62.37	49.75	1681.86				
CreateSensor	1000	0	0.00%	16528.99	4707	19151	16968.50	18269.00	18429.55	18666.97	31.55	24.83	1694.02				
Login	1000	0	0.00%	8734.13	243	15946	8839.50	14247.90	14638.80	15532.91	57.74	46.69	13.76				

**Errors**

Type of error	Number of errors	% in errors	% in all samples
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### 3. 500 korisnika, 100 pokrenutih simulatora

APDEX (Application Performance Index)

Apdex	T (Toleration threshold)	F (Frustration threshold)	Label
0.008	500 ms	1 sec 500 ms	Total
0.000	500 ms	1 sec 500 ms	CreateSensor
0.016	500 ms	1 sec 500 ms	Login

Requests Summary

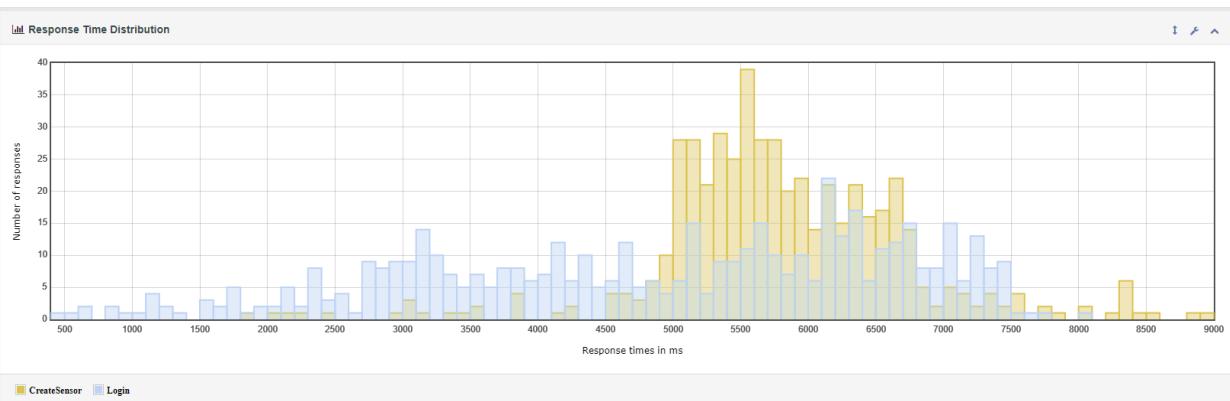
PASS 100%

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	1000	0	0.00%	5354.72	443	8912	5588.50	6937.60	7295.55	8315.38	76.89	61.39	2073.60				
CreateSensor	500	0	0.00%	5792.95	1861	8912	5717.00	6741.90	7359.10	8326.92	40.39	31.83	2168.84				
Login	500	0	0.00%	4916.48	443	8081	5190.00	7031.00	7268.60	7498.86	59.04	47.74	14.07				

Errors

Type of error	Number of errors	% in errors	% in all samples
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### 4. 100 korisnika, 500 pokrenutih simulatora

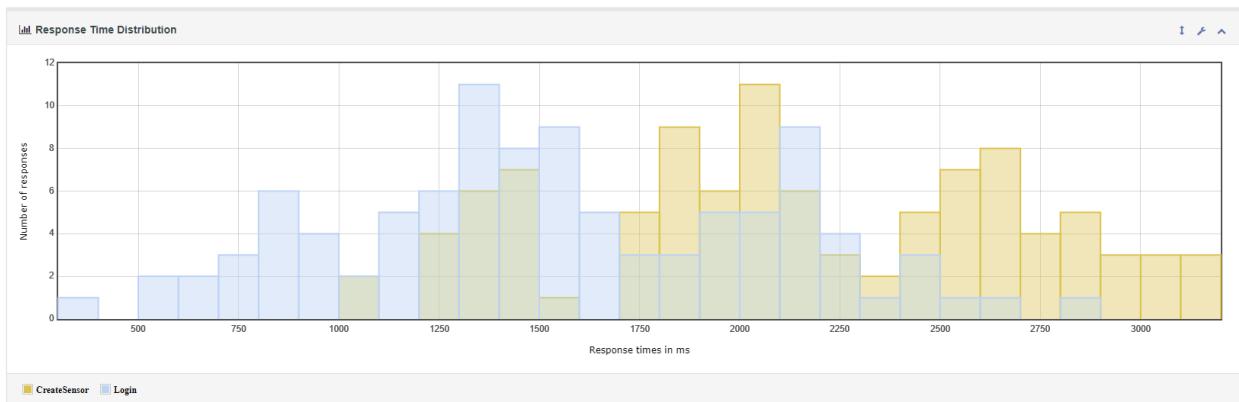


**Statistics**

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%	1845.68	330	3146	1855.50	2687.00	2896.80	3123.97	46.13	36.78	1243.82				
CreateSensor	100	0	0.00%	2147.23	1007	3146	2098.00	2896.60	3047.10	3145.78	30.78	24.20	1652.62				
Login	100	0	0.00%	1544.14	330	2848	1490.00	2249.50	2472.20	2846.44	30.05	24.30	7.16				

**Errors**

Type of error	Number of errors	% in errors	% in all samples
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## 5. 500 korisnika, 500 pokrenutih simulatora

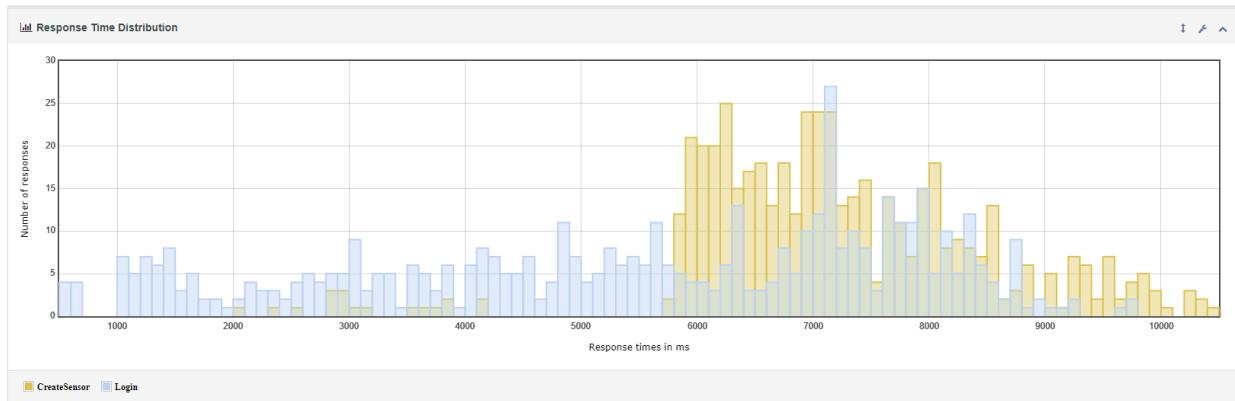


**Statistics**

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	1000	0	0.00%	6333.19	563	10482	6795.50	8444.70	9114.10	9952.46	63.03	50.27	1699.76				
CreateSensor	500	0	0.00%	7173.97	2074	10482	7070.50	8886.80	9513.85	10283.89	32.75	25.76	1758.88				
Login	500	0	0.00%	5492.41	563	9784	5794.50	8185.80	8507.70	9220.94	50.20	40.59	11.96				

**Errors**

Type of error	Number of errors	% in errors	% in all samples
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## 6. 1000 korisnika, 500 pokrenutih simulatora

APDEX (Application Performance Index)			
Apdex	T (Toleration threshold)	F (Frustration threshold)	Label
0.002	500 ms	1 sec 500 ms	Total
0.000	500 ms	1 sec 500 ms	CreateSensor
0.003	500 ms	1 sec 500 ms	Login

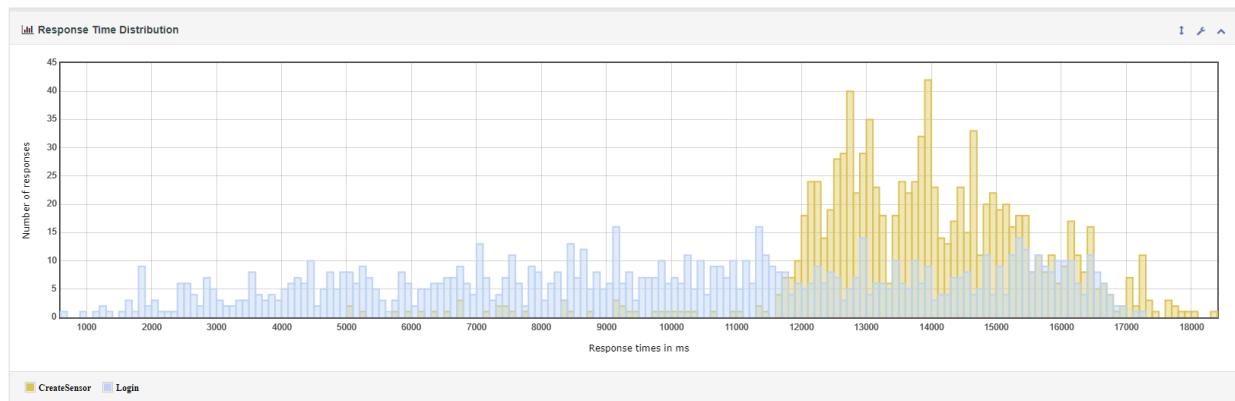
  

Requests Summary												
										FAIL	PASS	
										PASS		100%

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%	11905.45	697	18317	12931.00	15870.40	16409.95	17255.96	66.98	53.48	1806.44				
CreateSensor	1000	0	0.00%	13815.28	5023	18317	13840.00	16120.90	16517.80	17497.77	34.31	27.04	1842.39				
Login	1000	0	0.00%	9995.62	697	17213	10220.00	15623.50	16159.95	16729.59	54.81	44.32	13.06				

Errors				
Type of error	Number of errors	% in errors	% in all samples	



## 7. 100 korisnika, 1000 pokrenutih simulatora

**APDEX (Application Performance Index)**

Apdex	T (Toleration threshold)	F (Frustration threshold)	Label
0.182	500 ms	1 sec 500 ms	Total
0.125	500 ms	1 sec 500 ms	CreateSensor
0.240	500 ms	1 sec 500 ms	Login

**Requests Summary**

PASS 100%

**Statistics**

Requests	Executions				Response Times (ms)									Throughput		Network (KB/sec)	
	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent				
Total	200	0	0.00%	1785.80	690	3147	1669.00	2796.80	2865.90	3108.15	47.90	38.24	1291.77				
CreateSensor	100	0	0.00%	1972.57	690	3024	1892.50	2861.90	2966.15	3023.98	32.95	25.97	1769.13				
Login	100	0	0.00%	1599.03	717	3147	1557.50	2381.60	2549.10	3146.62	28.72	23.22	6.64				

**Errors**

Type of error	Number of errors	% in errors	% in all samples
CreateSensor	0	0.00%	0.00%
Login	0	0.00%	0.00%

**Response Time Distribution**

Number of responses

Response times in ms

Legend: CreateSensor (Yellow), Login (Light Blue)

## 8. 500 korisnika, 1000 pokrenutih simulatora

**APDEX (Application Performance Index)**

Apdex	T (Toleration threshold)	F (Frustration threshold)	Label
0.011	500 ms	1 sec 500 ms	Total
0.000	500 ms	1 sec 500 ms	CreateSensor
0.022	500 ms	1 sec 500 ms	Login

**Requests Summary**

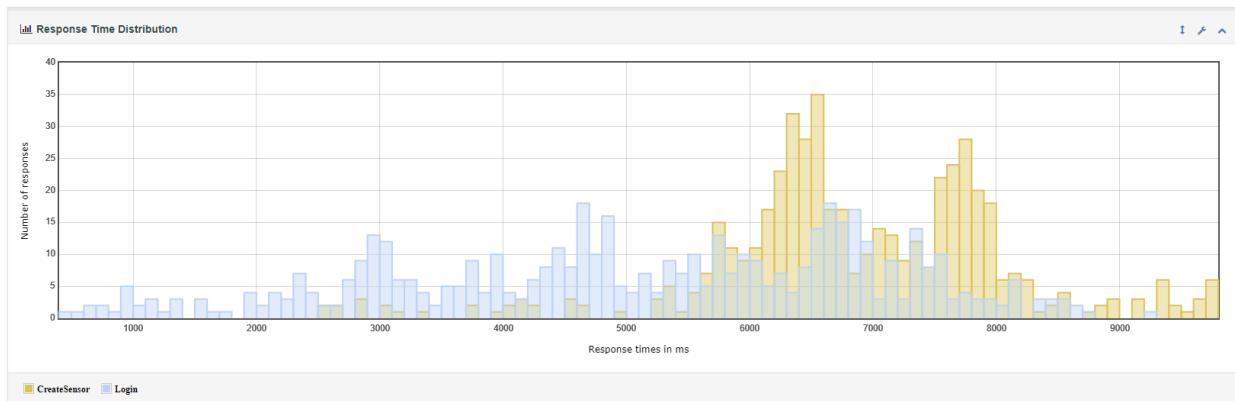
PASS 100%

**Statistics**

Requests	Executions				Response Times (ms)									Throughput		Network (KB/sec)	
	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent				
Total	1000	0	0.00%	5989.01	419	9781	6401.00	7865.30	8260.50	9525.47	64.93	51.84	1751.08				
CreateSensor	500	0	0.00%	6849.38	2506	9781	6730.50	8025.20	8894.85	9770.29	33.72	26.57	1810.71				
Login	500	0	0.00%	5128.63	419	9285	5307.00	7444.50	7871.80	8568.97	49.12	39.71	11.70				

**Errors**

Type of error	Number of errors	% in errors	% in all samples
CreateSensor	0	0.00%	0.00%
Login	0	0.00%	0.00%



## 9. 1000 korisnika, 1000 pokrenutih simulatora

**APDEX (Application Performance Index)**

Apdex	T (Toleration threshold)	F (Frustration threshold)	Label
0.003	500 ms	1 sec 500 ms	Total
0.000	500 ms	1 sec 500 ms	CreateSensor
0.006	500 ms	1 sec 500 ms	Login

**Requests Summary**

PASS 100%

FAIL

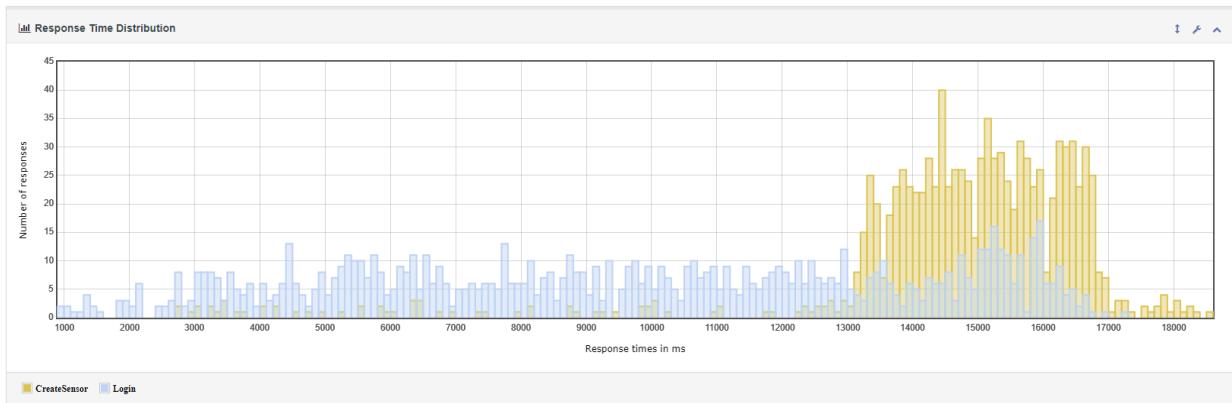
PASS

**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%	12156.42	912	18502	13892.00	16285.10	16611.00	17275.86	65.50	52.29	1766.40						
CreateSensor	1000	0	0.00%	14626.71	2729	18502	15039.00	16574.80	16756.95	17894.00	33.78	26.62	1813.97						
Login	1000	0	0.00%	9686.13	912	17262	9754.00	15395.10	15915.90	16498.91	55.95	45.24	13.33						

**Errors**

Type of error	Number of errors	% in errors	% in all samples
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## 2 - Zaključak

Kod kreiranja senzora, nakon sto prodje svaki login zahtev, kreiranje uredjaja traje jako kratko. Međutim, posto login zahtevi oduzimaju puno vremena, na vecem broju zahteva je neophodno dosta duze vreme kako bi se svi uredjaji kreirali

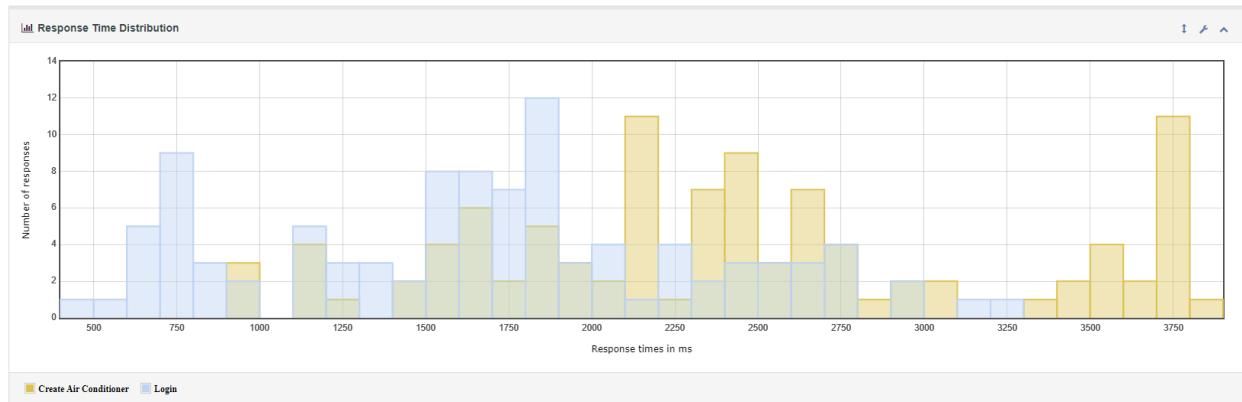
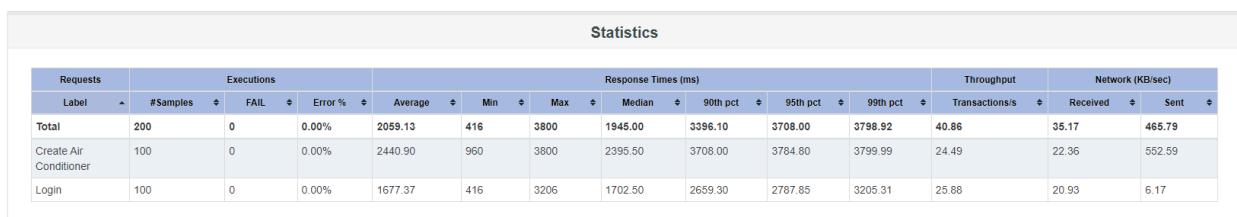
## 3 - Create Air Conditioner

Opis:

- Korisnik se prijavljuje na sistem i kreira klima uredjaj

Rezultati:

1. 100 korisnika, 100 pokrenutih simulatora



2. 500 korisnika, 100 pokrenutih simulatora

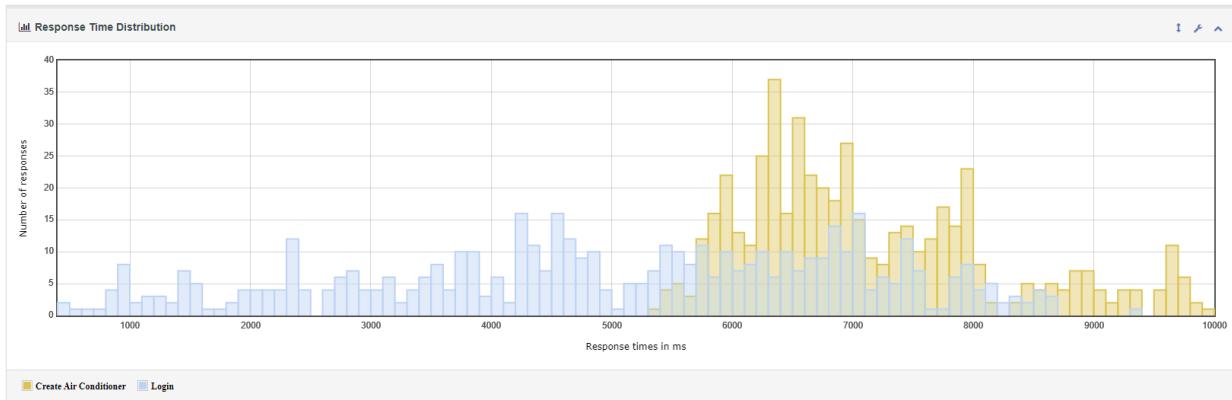


**Statistics**

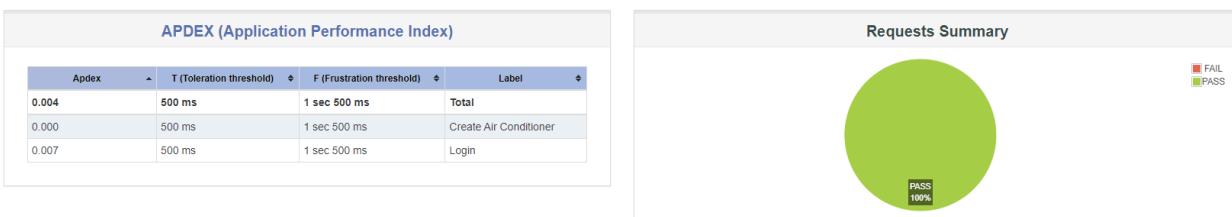
Requests		Executions				Response Times (ms)									Throughput		Network (KB/sec)	
Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent					
Total	1000	0	0.00%	6054.49	432	9992	6397.50	8056.20	8829.80	9699.00	63.71	54.90	726.30					
Create Air Conditioner	500	0	0.00%	7118.35	5373	9992	6857.00	8824.20	9378.60	9707.00	32.82	30.03	740.55					
Login	500	0	0.00%	4990.63	432	9307	5134.00	7476.80	7995.65	8584.91	49.25	39.82	11.73					

**Errors**

Type of error	Number of errors	% in errors	% in all samples
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### 3. 1000 korisnika, 100 pokrenutih simulatora

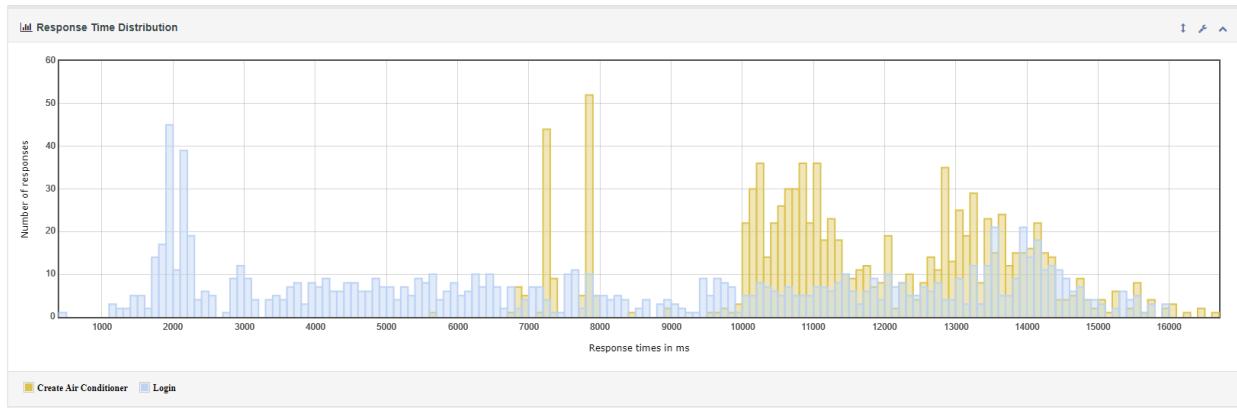


**Statistics**

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%	9864.72	472	16682	10827.50	14163.80	14627.35	15678.25	70.13	60.50	799.50					
Create Air Conditioner	1000	0	0.00%	11582.67	5623	16682	11370.00	14171.70	14698.85	15761.98	37.93	34.77	855.84					
Login	1000	0	0.00%	8146.76	472	15999	7817.00	14138.80	14546.80	15539.99	52.82	42.71	12.59					

**Errors**

Type of error	Number of errors	% in errors	% in all samples
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#### 4. 100 korisnika, 500 pokrenutih simulatora

APDEX (Application Performance Index)

Apdex	T (Toleration threshold)	F (Frustration threshold)	Label	Total
0.147	500 ms	1 sec 500 ms		
0.095	500 ms	1 sec 500 ms	Create Air Conditioner	
0.200	500 ms	1 sec 500 ms	Login	

Requests Summary

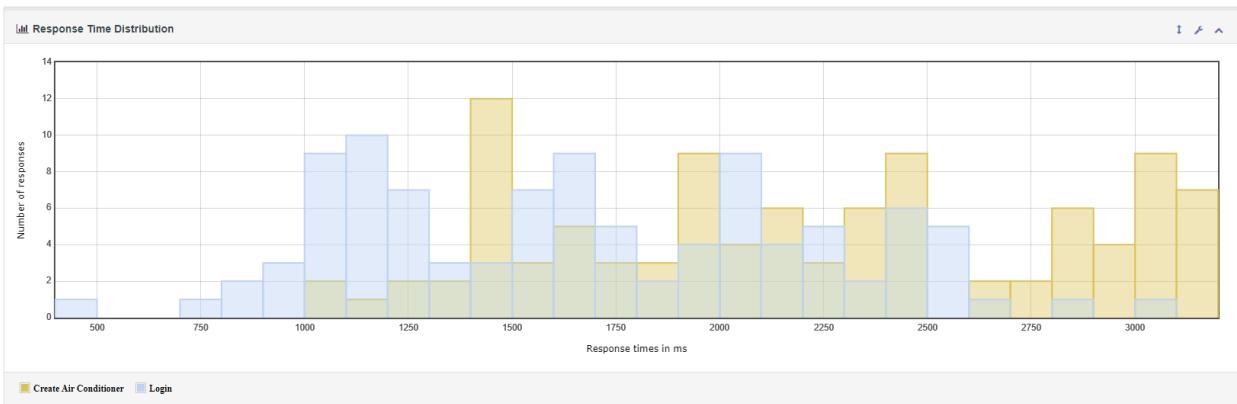
PASS 100%

Statistics

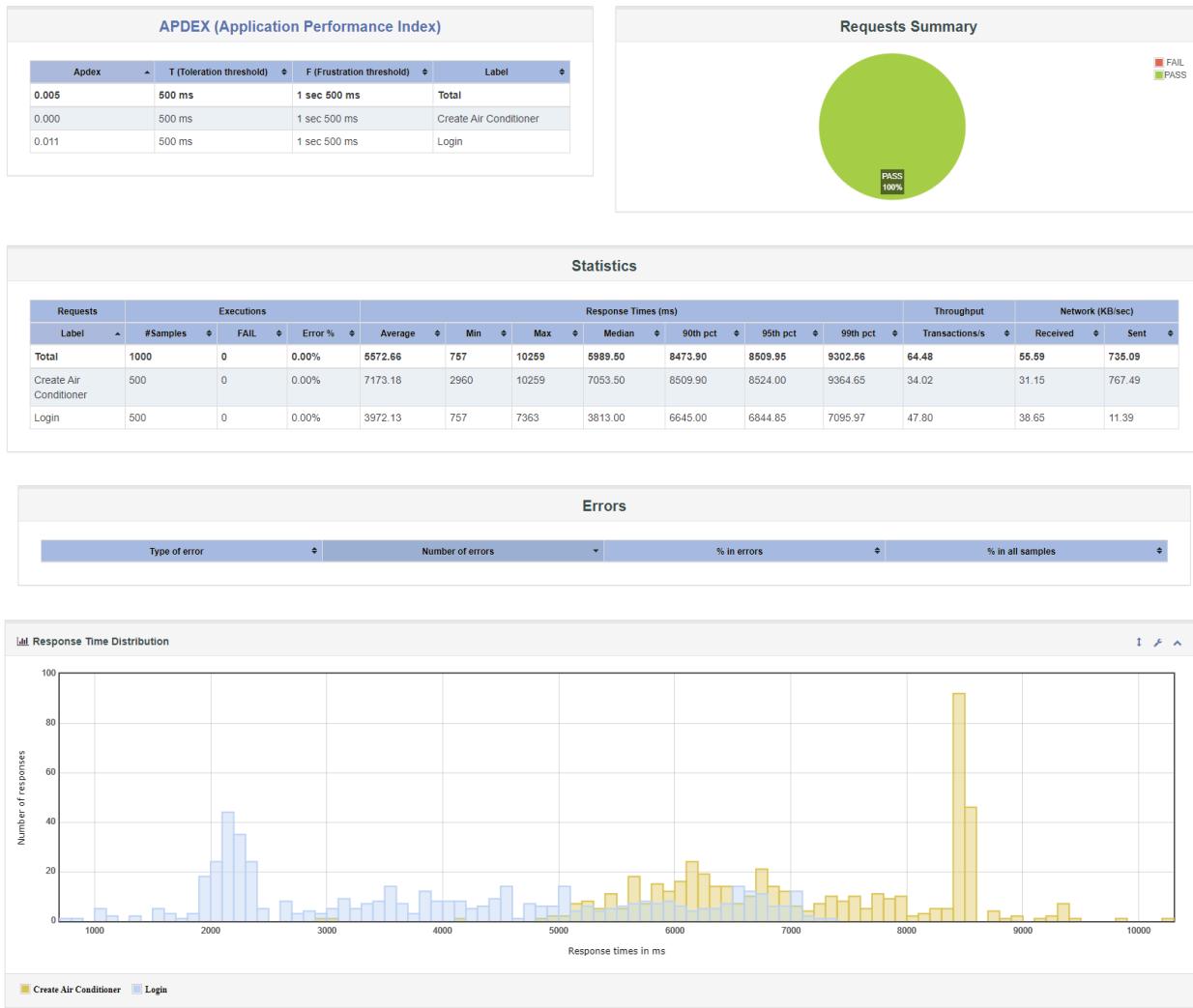
Requests	Executions				Response Times (ms)						Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent
Total	200	0	0.00%	1940.89	405	3184	1952.00	2956.10	3048.80	3156.89	44.30	38.13	505.05	
Create Air Conditioner	100	0	0.00%	2198.20	1004	3184	2144.50	3045.40	3154.25	3183.73	30.28	27.65	683.36	
Login	100	0	0.00%	1683.57	405	3079	1627.00	2456.20	2575.20	3076.69	28.53	23.07	6.80	

Errors

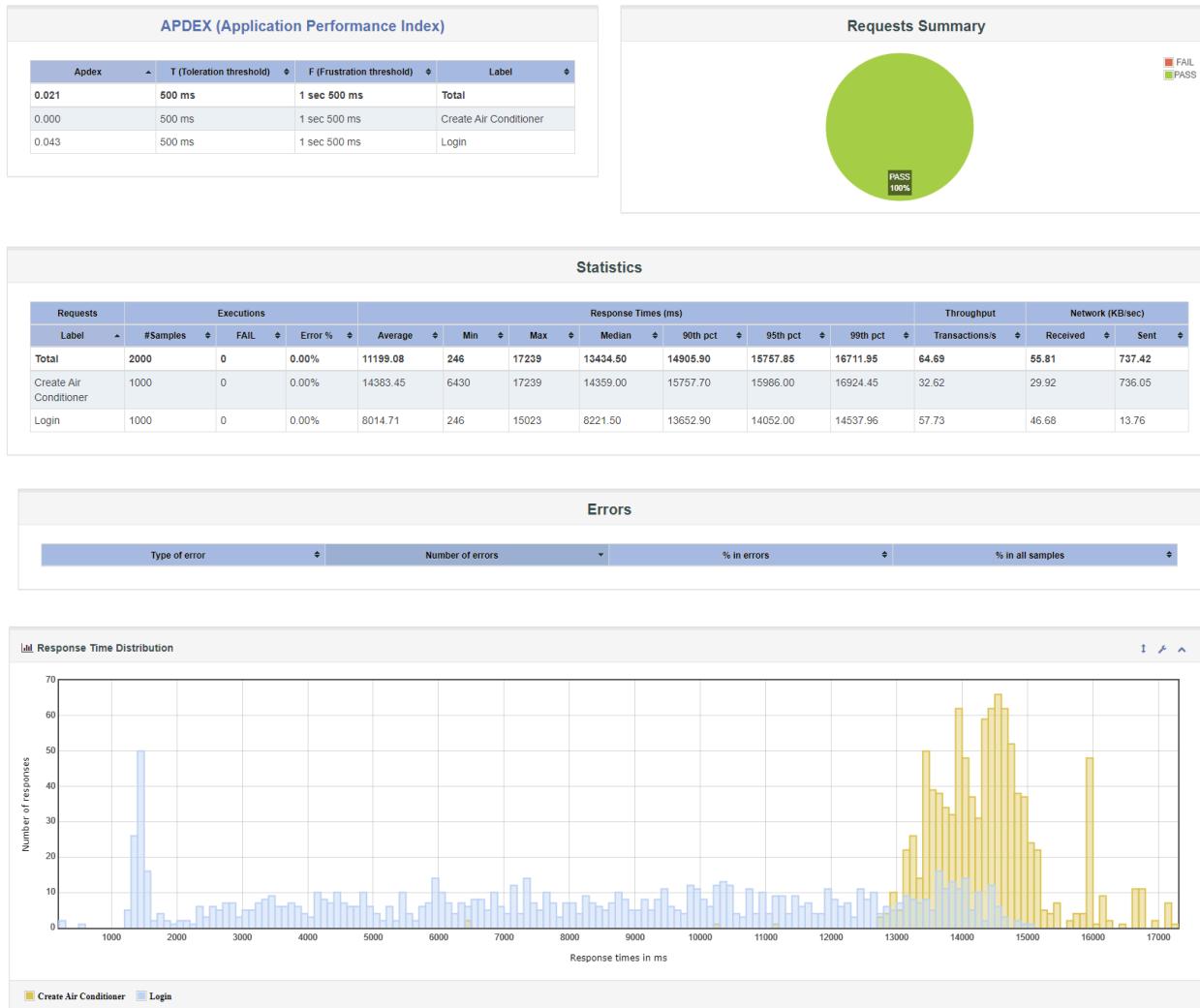
Type of error	Number of errors	% in errors	% in all samples



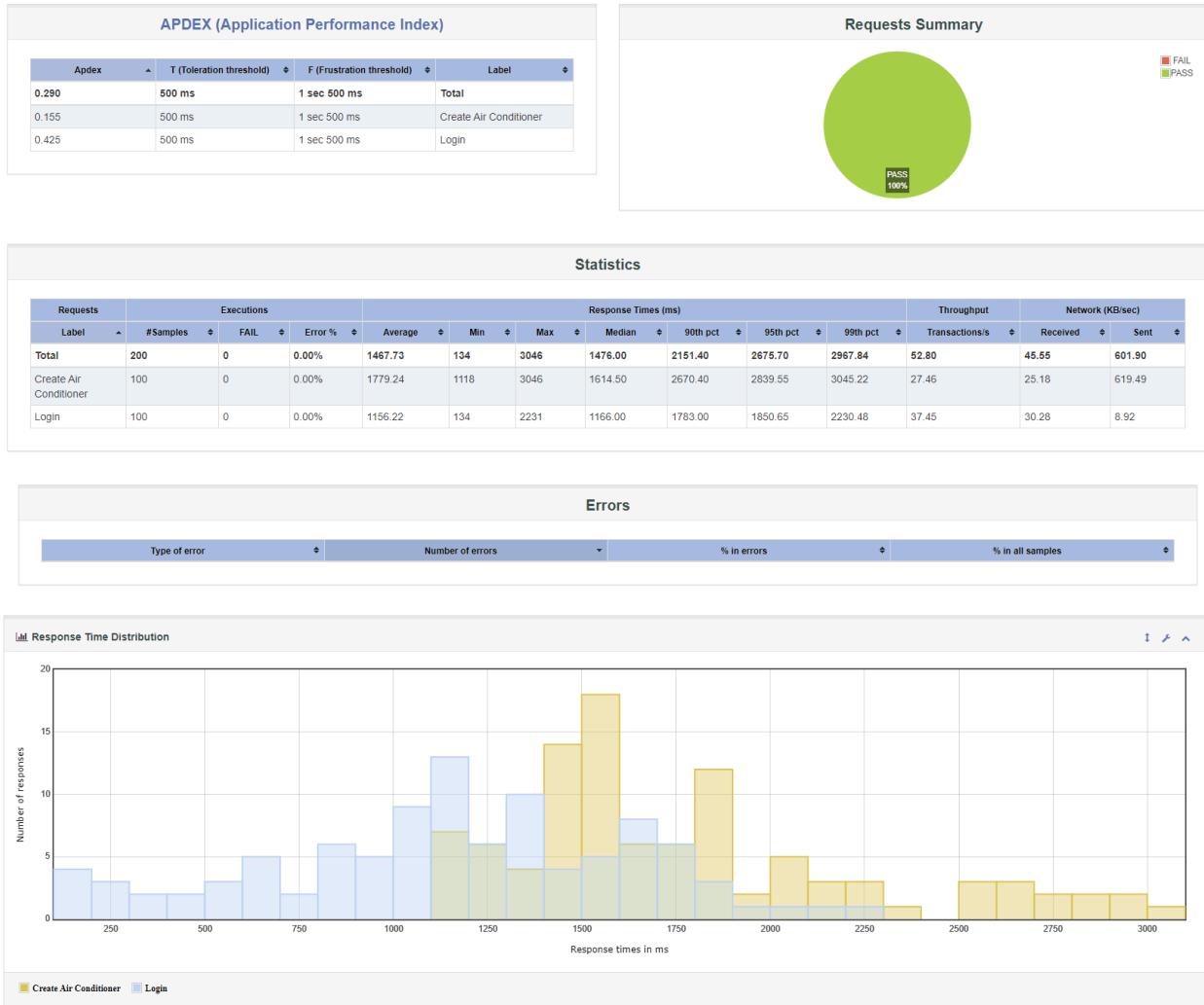
#### 5. 500 korisnika, 500 pokrenutih simulatora



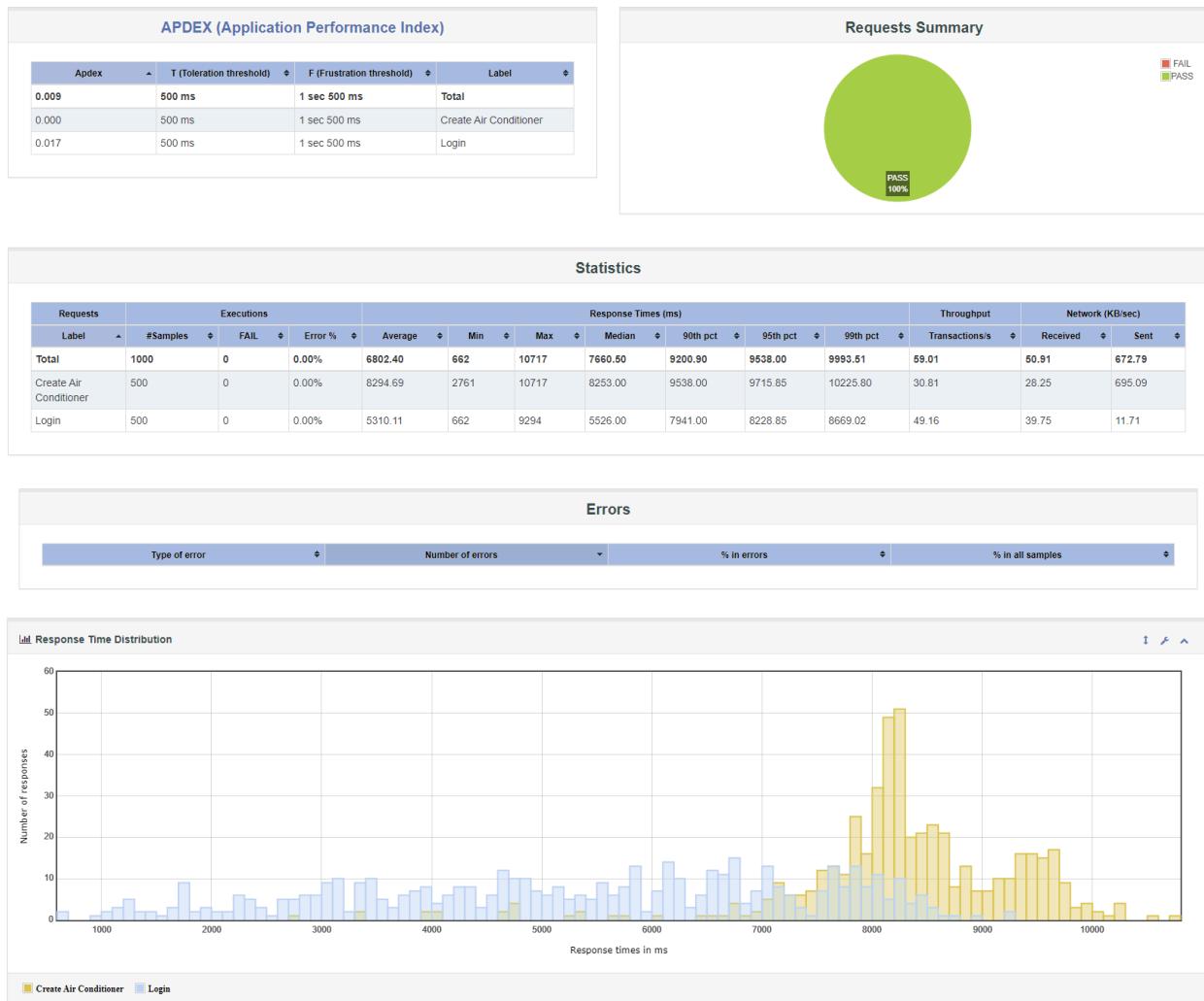
## 6. 1000 korisnika, 500 pokrenutih simulatora



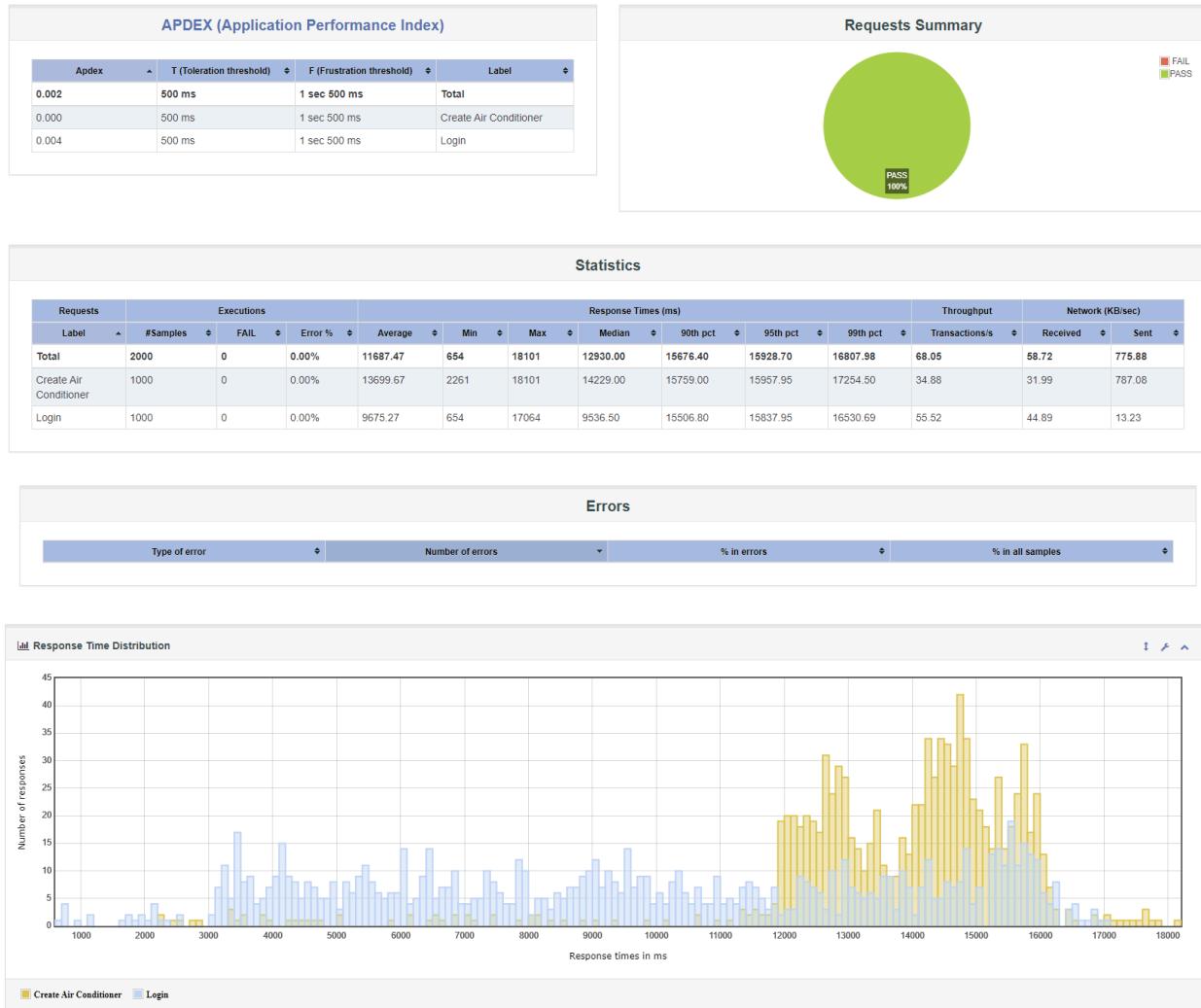
## 7. 100 korisnika, 1000 pokrenutih simulatora



## 8. 500 korisnika, 1000 pokrenutih simulatora



## 9. 1000 korisnika, 1000 pokrenutih simulatora



### 3 - Zakljucak

Kreiranje klima uredjaja traje za nijansu duze od kreiranja senzora temperature i vlastnosti vazduha. To je zato sto klima uredjaj ima jedan dodatan modul - zakazivanje, pa mu je neophodno vise vremena prilikom kreiranja

### 4 - Create Washing Machine

Opis:

- Korisnik se prijavljuje na sistem i kreira klima uredjaj

Rezultati:

1. 100 korisnika, 100 pokrenutih simulatora

**APDEX (Application Performance Index)**

Apdex	T (Toleration threshold)	F (Frustration threshold)	Label
0.475	500 ms	1 sec 500 ms	Total
0.410	500 ms	1 sec 500 ms	Create Washing Machine
0.540	500 ms	1 sec 500 ms	Login

**Requests Summary**

PASS 100%

**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%	1076.24	159	2375	1011.50	1875.20	2132.45	2367.94	71.94	61.37	3715.65			
Create Washing Machine	100	0	0.00%	1181.96	364	2375	1000.00	2131.90	2350.10	2374.93	38.64	34.68	3982.10			
Login	100	0	0.00%	970.52	159	1916	1027.50	1559.00	1760.30	1915.60	41.41	33.48	9.87			

**Errors**

Type of error	Number of errors	% in errors	% in all samples
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**Response Time Distribution**

Number of responses

Response times in ms

Legend: Create Washing Machine (Yellow), Login (Light Blue)

## 2. 500 korisnika, 100 pokrenutih simulatora

**APDEX (Application Performance Index)**

Apdex	T (Toleration threshold)	F (Frustration threshold)	Label
0.028	500 ms	1 sec 500 ms	Total
0.001	500 ms	1 sec 500 ms	Create Washing Machine
0.055	500 ms	1 sec 500 ms	Login

**Requests Summary**

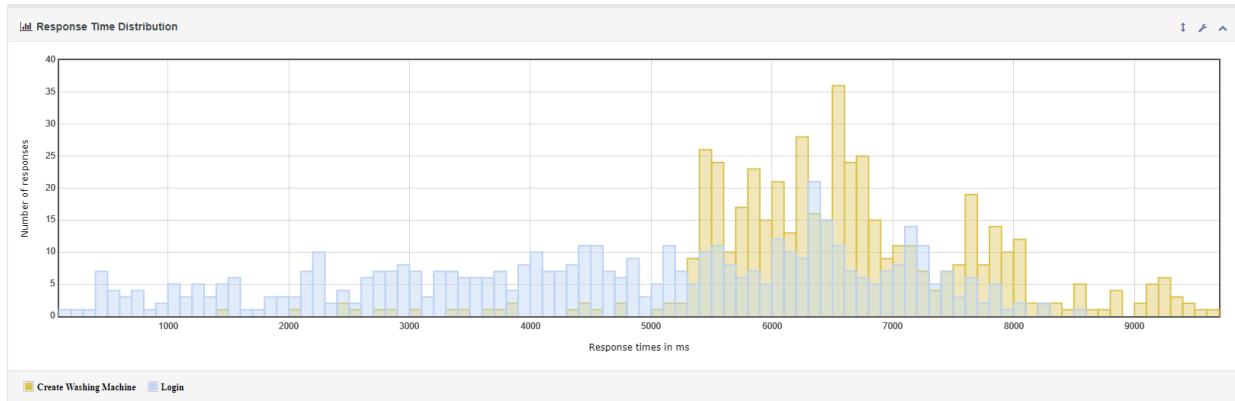
PASS 100%

**Statistics**

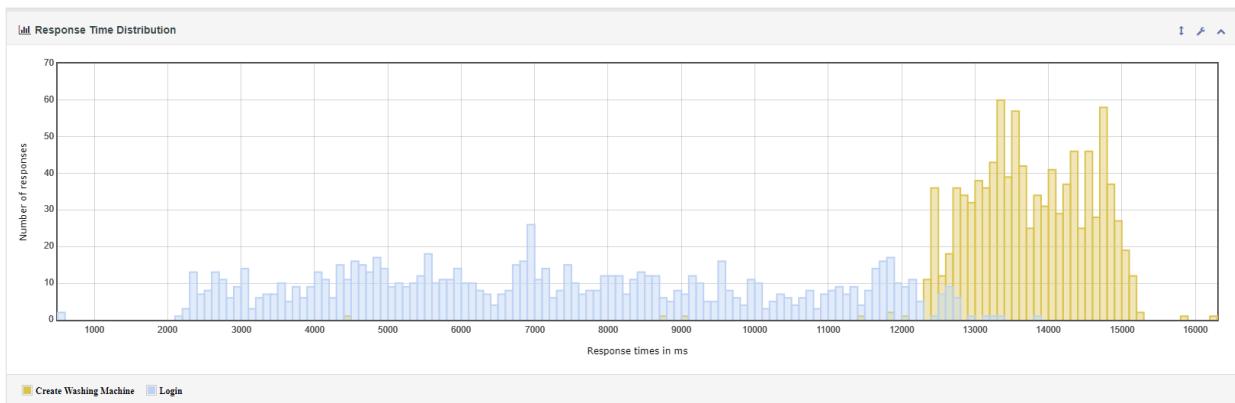
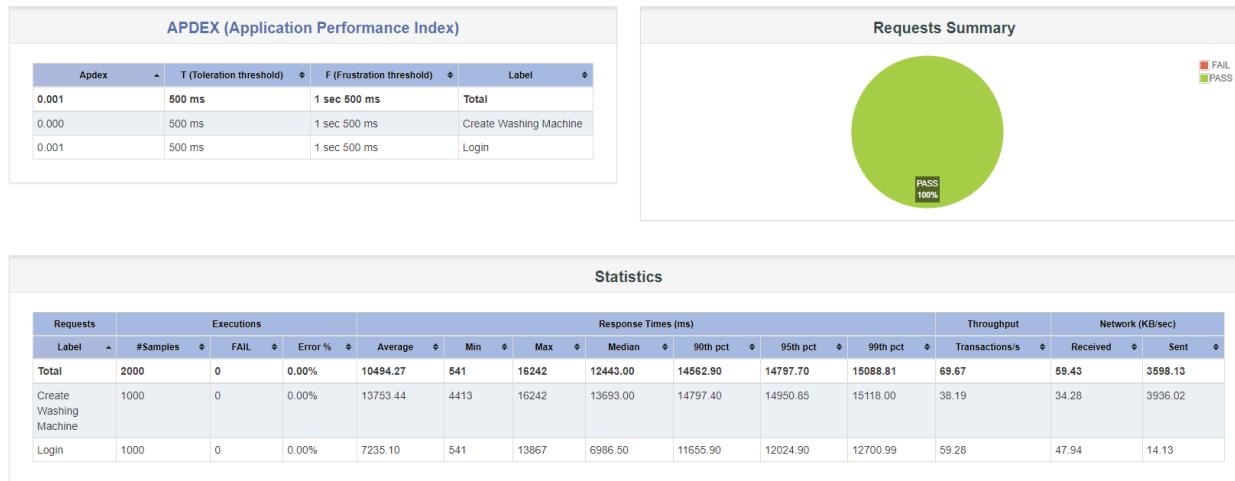
Requests	Executions				Response Times (ms)								Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent		
Total	1000	0	0.00%	5630.90	136	9621	6054.00	7670.00	8028.75	9247.89	68.09	58.08	3516.54			
Create Washing Machine	500	0	0.00%	6572.81	1401	9621	6536.00	8005.90	8785.55	9379.96	34.41	30.88	3546.10			
Login	500	0	0.00%	4689.00	136	8597	4865.50	7170.60	7489.35	8000.64	54.05	43.71	12.88			

**Errors**

Type of error	Number of errors	% in errors	% in all samples
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### 3. 1000 korisnika, 100 pokrenutih simulatora



### 4. 100 korisnika, 500 pokrenutih simulatora

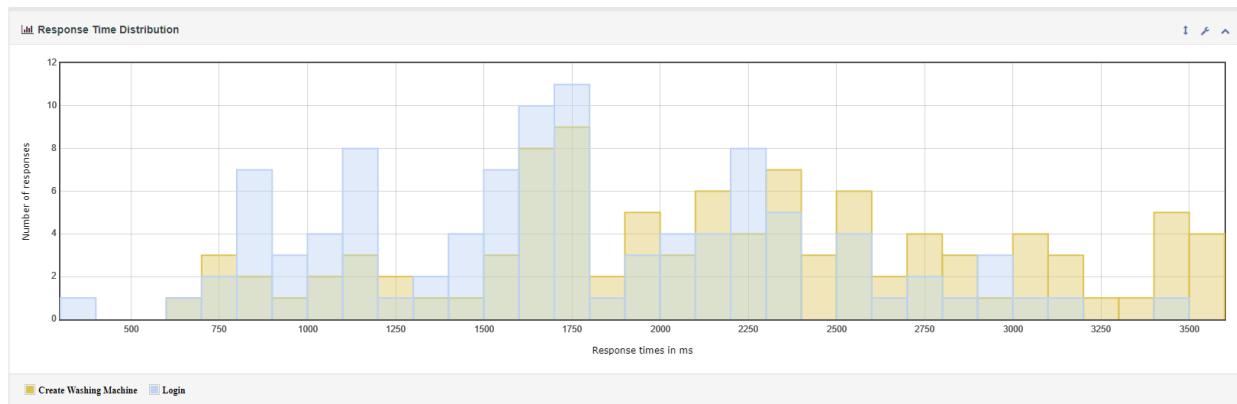


**Statistics**

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%	1964.70	326	3594	1884.50	3004.80	3402.55	3514.88	43.87	37.34	2265.67						
Create Washing Machine	100	0	0.00%	2179.98	699	3594	2159.50	3326.20	3491.10	3593.21	27.04	24.16	2786.74						
Login	100	0	0.00%	1749.42	326	3424	1696.50	2640.80	2974.05	3421.37	25.93	20.97	6.18						

**Errors**

Type of error	Number of errors	% in errors	% in all samples
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## 5. 500 korisnika, 500 pokrenutih simulatora

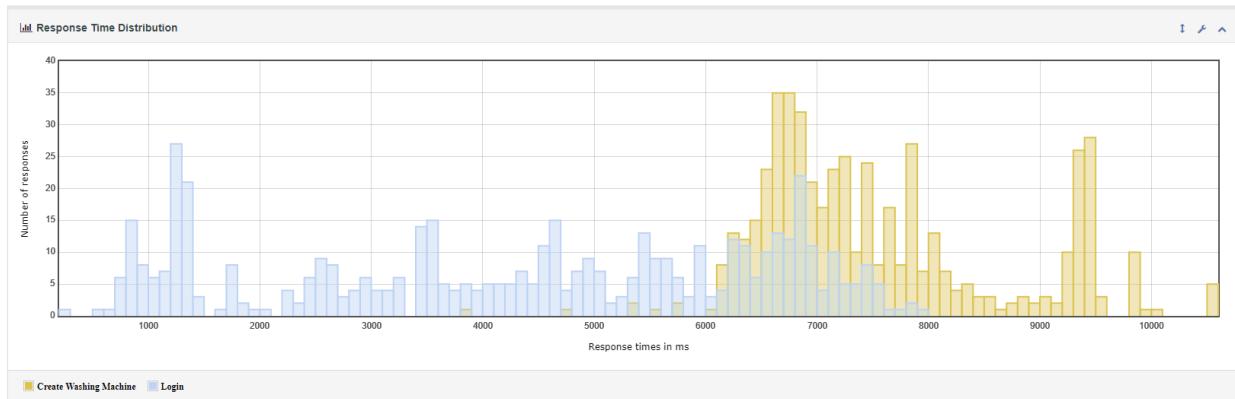


**Statistics**

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	1000	0	0.00%	5935.44	287	10546	6638.50	8522.30	9344.85	9872.97	62.84	53.57	3245.68						
Create Washing Machine	500	0	0.00%	7541.68	3809	10546	7223.50	9344.70	9456.00	10501.15	32.74	29.35	3374.33						
Login	500	0	0.00%	4329.20	297	7921	4599.50	6917.00	7252.75	7610.44	49.30	39.86	11.75						

**Errors**

Type of error	Number of errors	% in errors	% in all samples
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## 6. 1000 korisnika, 500 pokrenutih simulatora

**APDEX (Application Performance Index)**

Apdex	T (Toleration threshold)	F (Frustration threshold)	Label
0.005	500 ms	1 sec 500 ms	Total
0.000	500 ms	1 sec 500 ms	Create Washing Machine
0.011	500 ms	1 sec 500 ms	Login

**Requests Summary**

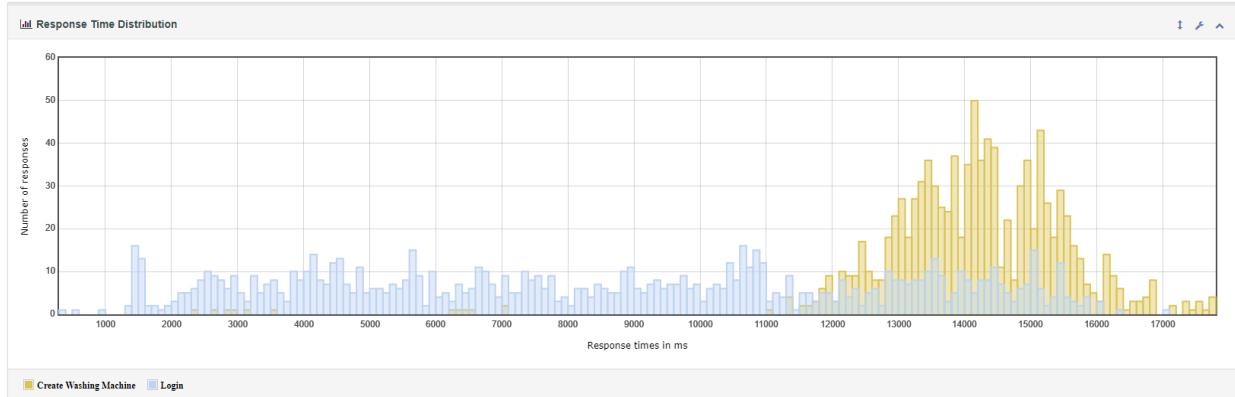
A donut chart with a single green segment labeled 'PASS 100%'.

**Statistics**

Label	#Samples	Executions		Response Times (ms)									Throughput		Network (KB/sec)	
		FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent			
Total	2000	0	0.00%	11327.27	385	17773	13163.00	15328.00	15701.90	16876.75	67.11	57.25	3466.30			
Create Washing Machine	1000	0	0.00%	14114.13	2304	17773	14178.00	15654.20	16185.65	17353.86	34.03	30.54	3506.78			
Login	1000	0	0.00%	8540.42	385	17002	8597.00	14345.80	15055.65	15778.23	53.25	43.06	12.69			

**Errors**

Type of error	Number of errors	% in errors	% in all samples
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## 7. 100 korisnika, 1000 pokrenutih simulatora

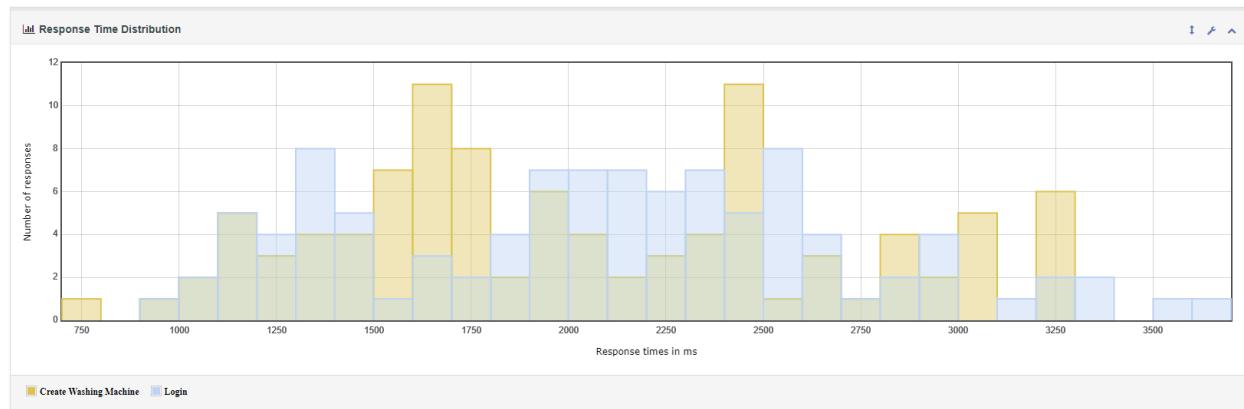


**Statistics**

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%	2065.36	743	3600	2024.00	2962.70	3234.50	3565.22	41.60	35.48	2148.39					
Create Washing Machine	100	0	0.00%	2035.22	743	3247	1948.00	3010.50	3234.50	3247.00	29.30	26.30	3019.52					
Login	100	0	0.00%	2095.50	968	3600	2125.00	2944.60	3276.45	3599.67	24.61	19.90	5.86					

**Errors**

Type of error	Number of errors	% in errors	% in all samples
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## 8. 500 korisnika, 1000 pokrenutih simulatora

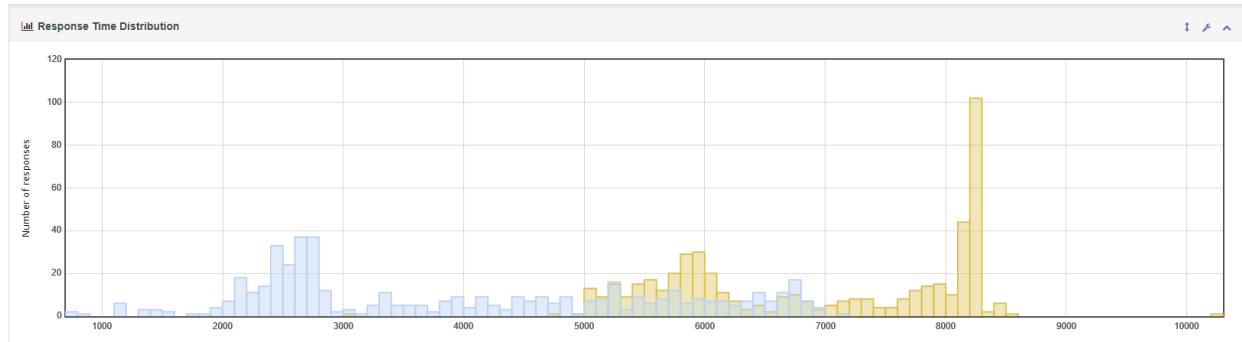


**Statistics**

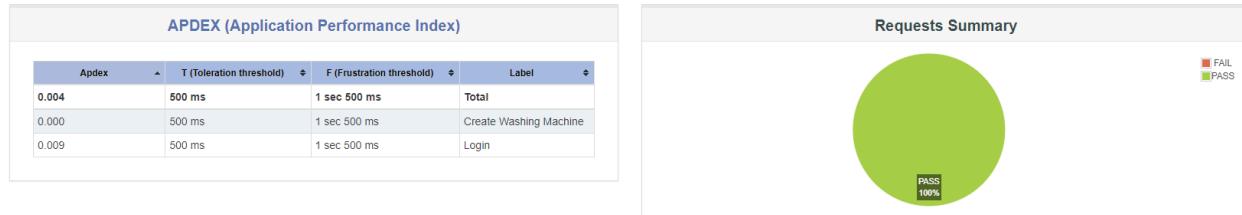
Requests	Executions					Response Times (ms)									Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent				
Total	1000	0	0.00%	5459.86	725	10224	5746.00	8215.90	8239.00	8373.07	64.29	54.84	3320.34					
Create Washing Machine	500	0	0.00%	5926.74	3068	10224	7024.50	8239.00	8260.85	8470.00	33.85	30.38	3488.27					
Login	500	0	0.00%	3992.97	725	7102	6367.50	6478.10	6728.65	6911.64	46.34	37.47	11.04					

**Errors**

Type of error	Number of errors	% in errors	% in all samples
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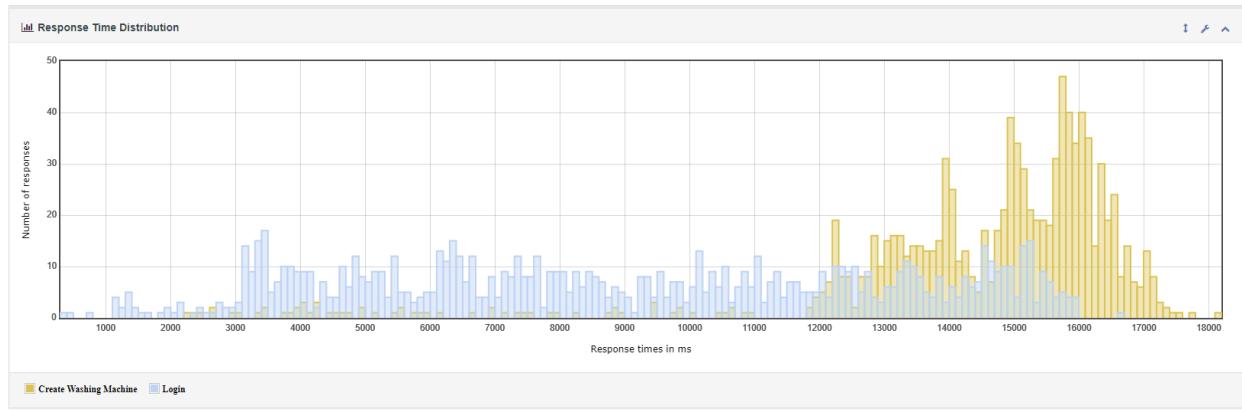


## 9. 1000 korisnika, 1000 pokrenutih simulatora



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%	11720.53	310	18191	13263.00	16051.00	16432.85	17072.93	66.63	56.84	3441.34			
Create Washing Machine	1000	0	0.00%	14403.71	2261	18191	15056.50	16429.90	16766.90	17194.85	33.66	30.21	3469.24			
Login	1000	0	0.00%	9037.36	310	16691	8810.50	14698.70	15238.95	15777.98	55.49	44.87	13.22			

Errors			
Type of error	Number of errors	% in errors	% in all samples



## 4 - Zakljucak

Kreiranje ves masine traje priblizno isto kao i kreiranje klima uredjaja. To je zato sto su im moduli gotovo isti

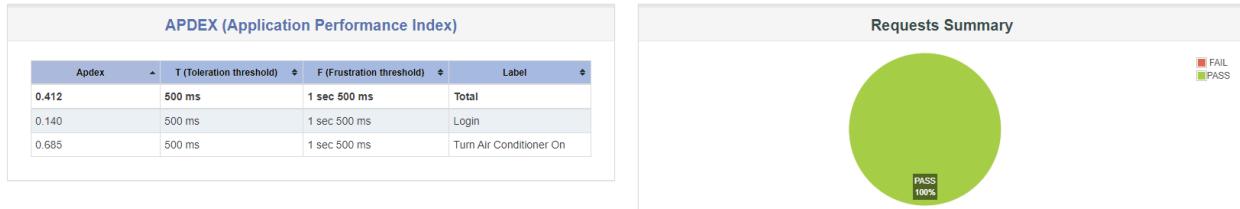
## 5 - Turn Air Conditioner On

Opis:

- Korisnik se prijavljuje na sistem i ukljucuje klima uredjaj

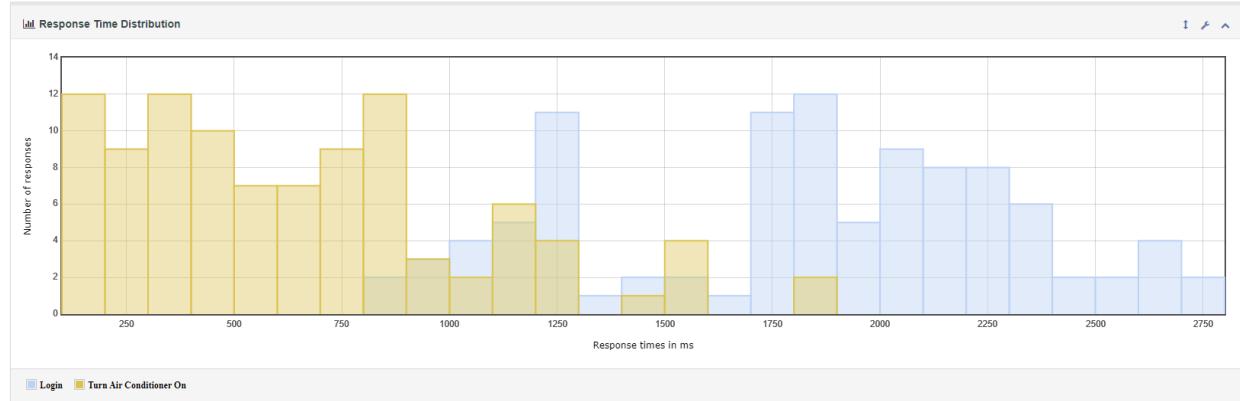
Rezultati:

- 100 korisnika, 100 pokrenutih simulatora

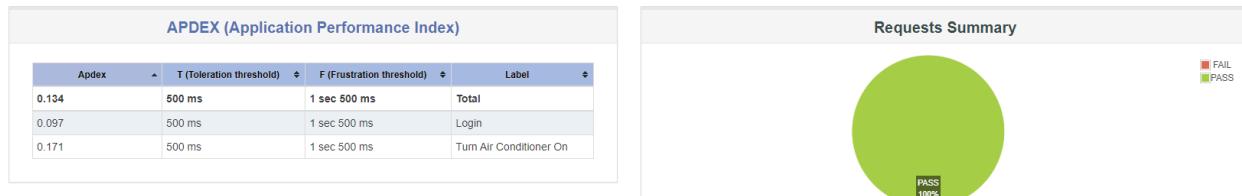


Statistics															
Requests	Executions				Response Times (ms)							Throughput		Network (KB/sec)	
	Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent	
Total		200	0	0.00%	1244.52	107	2793	1178.00	2252.70	2433.80	2760.20	58.17	60.33	29.93	
Login		100	0	0.00%	1824.71	865	2793	1859.50	2431.60	2649.60	2792.68	30.33	24.53	7.23	
Turn Air Conditioner On		100	0	0.00%	664.33	107	1880	594.00	1210.30	1563.95	1879.89	45.54	41.98	36.00	

Errors			
Type of error	Number of errors	% in errors	% in all samples

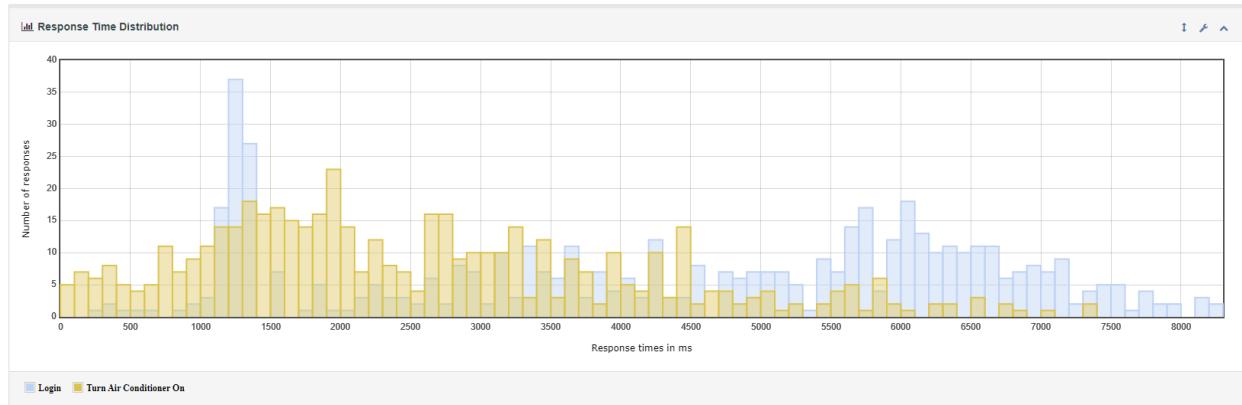


2. 500 korisnika, 100 pokrenutih simulatora

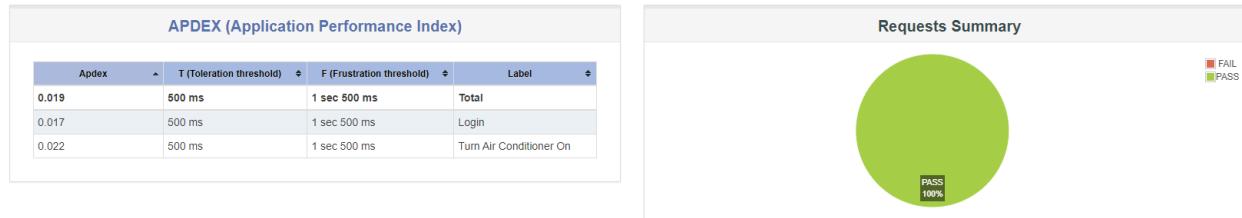


**Statistics**

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	1000	0	0.00%	3472.80	43	8291	3169.50	6481.00	6996.25	7798.99	96.08	83.13	49.26						
Login	500	0	0.00%	4382.17	279	8291	4774.00	6951.00	7367.10	8136.37	48.47	39.20	11.55						
Turn Air Conditioner On	500	0	0.00%	2563.42	43	7382	2257.50	4736.00	5689.40	6743.96	55.00	50.70	43.29						



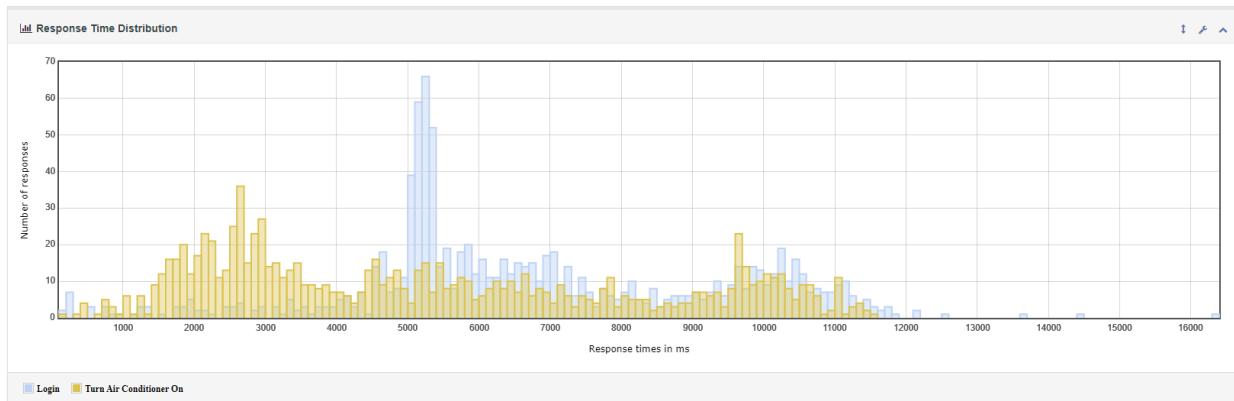
### 3. 1000 korisnika, 100 pokrenutih simulatora



**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%	6048.48	186	16383	5588.00	10238.90	10722.90	11466.56	103.91	89.91	53.27						
Login	1000	0	0.00%	6804.10	198	16383	6259.00	10417.80	10990.90	11709.69	55.67	45.01	13.26						
Turn Air Conditioner On	1000	0	0.00%	5292.87	186	11598	4708.50	9987.60	10497.45	11225.15	52.53	48.43	41.35						





#### 4. 100 korisnika, 500 pokrenutih simulatora

**APDEX (Application Performance Index)**

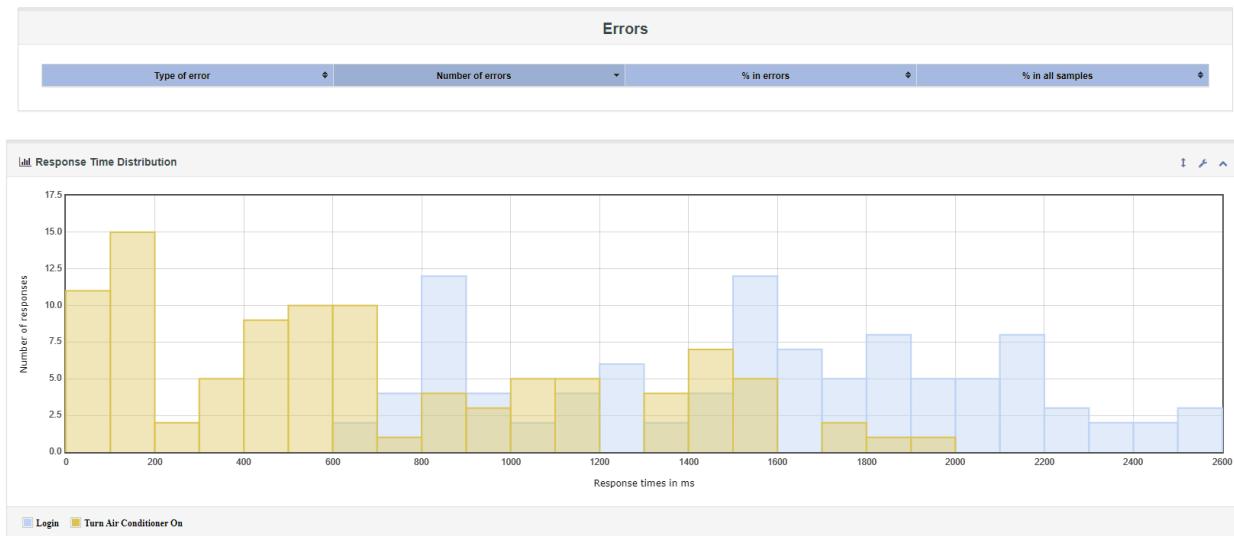
Apdex	T (Toleration threshold)	F (Frustration threshold)	Label
0.435	500 ms	1 sec 500 ms	Total
0.205	500 ms	1 sec 500 ms	Login
0.665	500 ms	1 sec 500 ms	Turn Air Conditioner On

**Requests Summary**

PASS 100%

**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%	1128.39	33	2519	1110.50	2036.60	2207.50	2503.96	62.31	53.91	31.97						
Login	100	0	0.00%	1554.56	655	2519	1595.50	2207.00	2401.80	2518.85	31.68	25.61	7.55						
Turn Air Conditioner On	100	0	0.00%	702.22	33	1968	585.00	1494.30	1575.70	1966.56	41.63	38.38	32.80						



#### 5. 500 korisnika, 500 pokrenutih simulatora

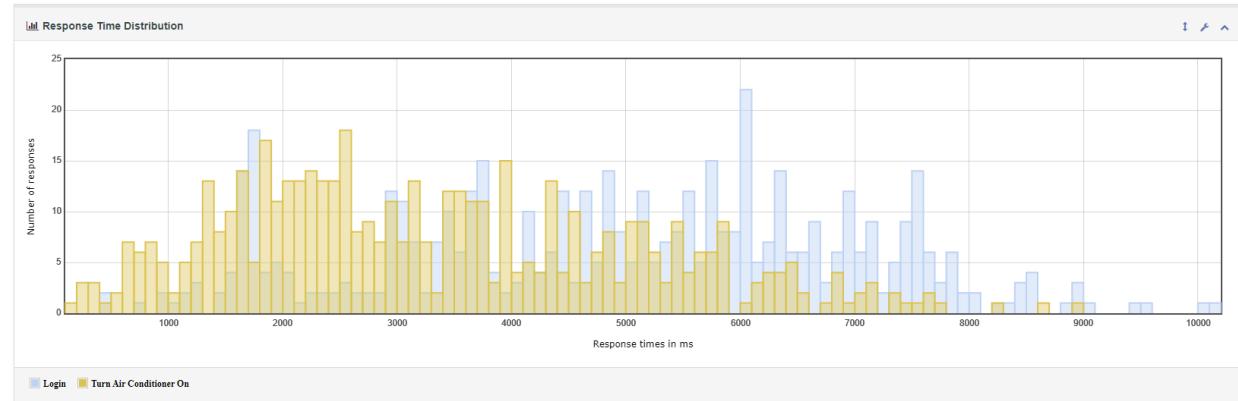


**Statistics**

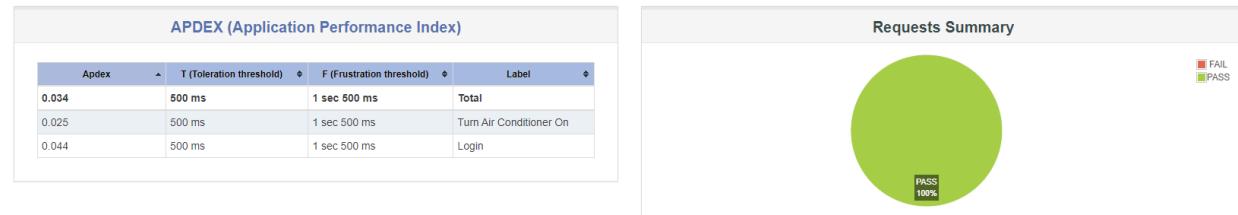
Requests		Executions				Response Times (ms)								Throughput		Network (KB/sec)		
Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent					
Total	1000	0	0.00%	4147.90	193	10180	3958.00	6984.60	7550.35	8858.68	90.51	78.36	46.44					
Login	500	0	0.00%	4960.31	401	10180	5129.00	7506.70	7877.75	8999.96	46.69	37.76	11.13					
Turn Air Conditioner On	500	0	0.00%	3335.49	193	8938	3082.00	5785.90	6439.75	7674.84	47.09	43.46	37.10					

**Errors**

Type of error	Number of errors	% in errors	% in all samples
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## 6. 1000 korisnika, 500 pokrenutih simulatora

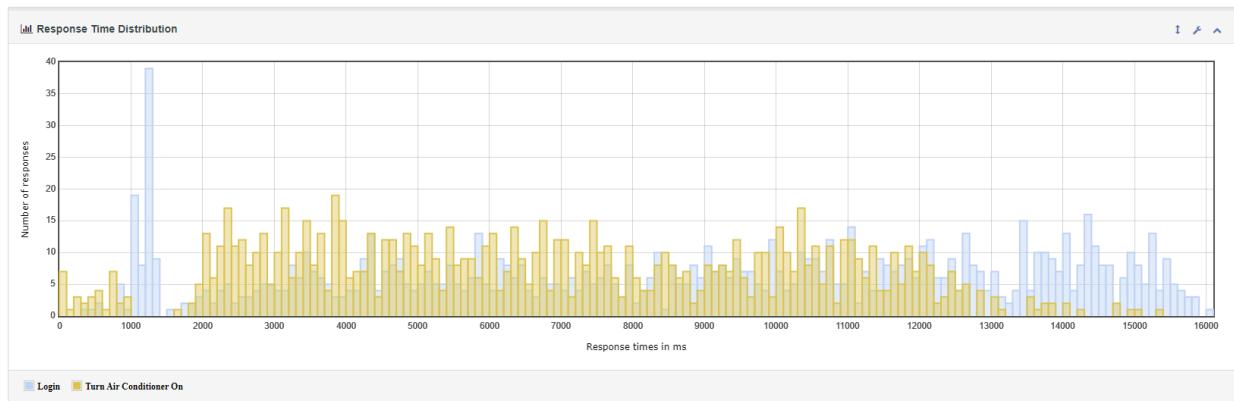


**Statistics**

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%	7762.73	24	16007	7586.00	13472.40	14470.75	15443.95	102.37	88.62	52.45					
Login	1000	0	0.00%	8701.75	383	16007	9154.00	14399.90	15058.75	15621.90	55.91	45.21	13.32					
Turn Air Conditioner On	1000	0	0.00%	6823.72	24	15360	6617.00	11560.70	12148.95	13862.09	52.25	48.22	41.09					

**Errors**

Type of error	Number of errors	% in errors	% in all samples
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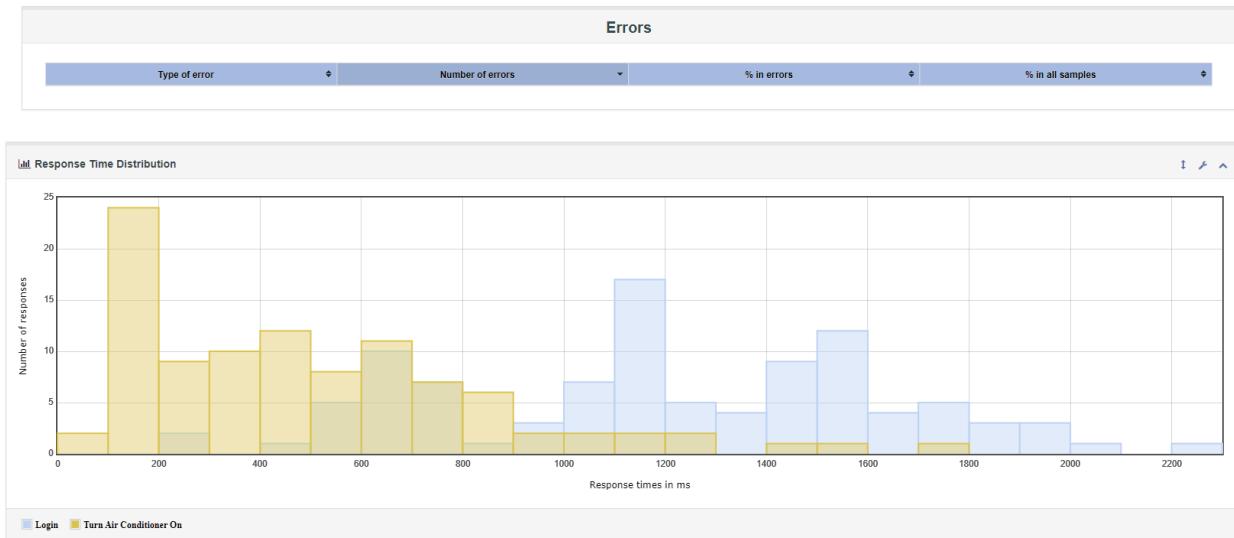


## 7. 100 korisnika, 1000 pokrenutih simulatora

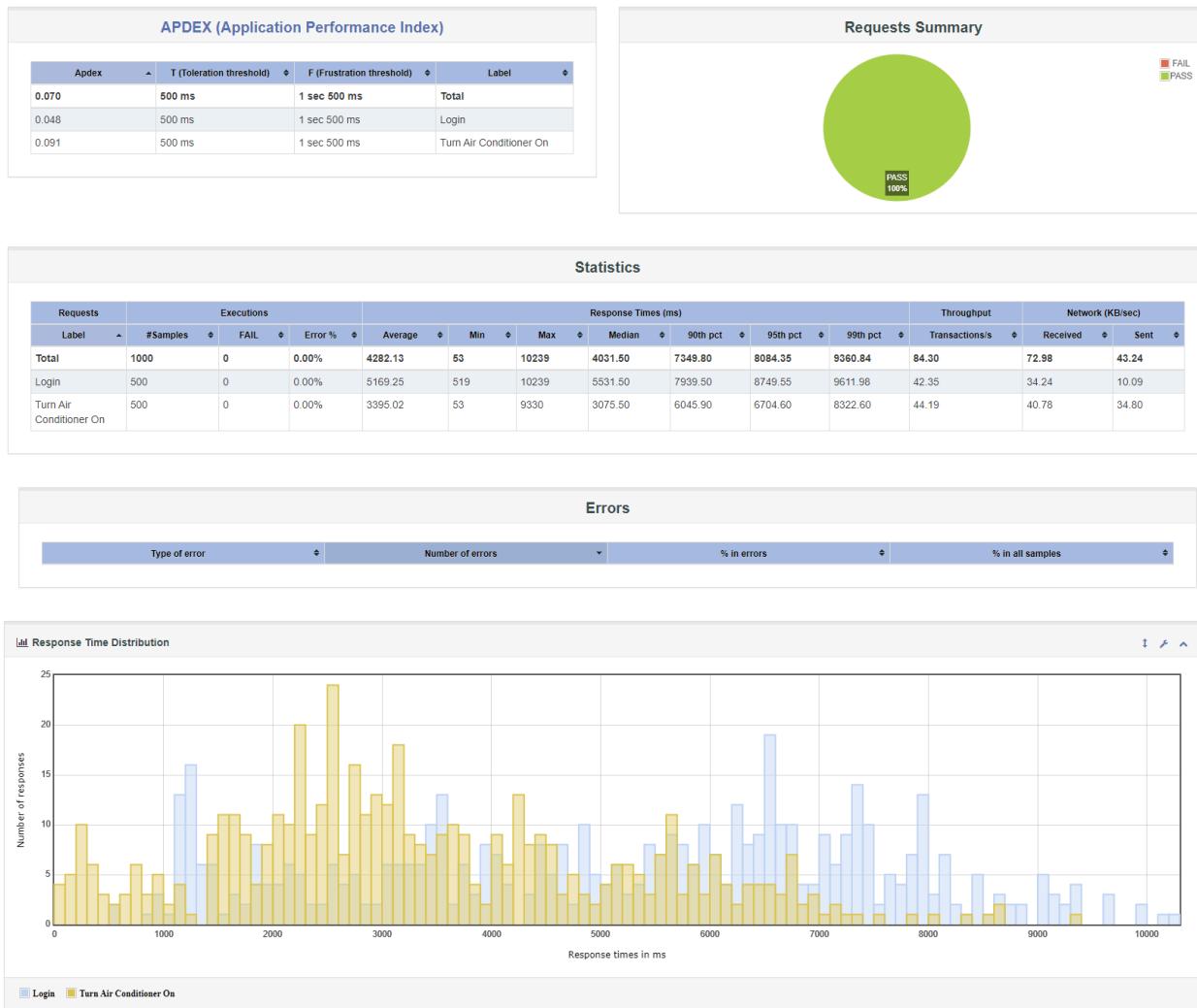
APDEX (Application Performance Index)				Requests Summary			
Apdex	T (Toleration threshold)	F (Frustration threshold)	Label				
0.573	500 ms	1 sec 500 ms	Total				
0.370	500 ms	1 sec 500 ms	Login				
0.775	500 ms	1 sec 500 ms	Turn Air Conditioner On				

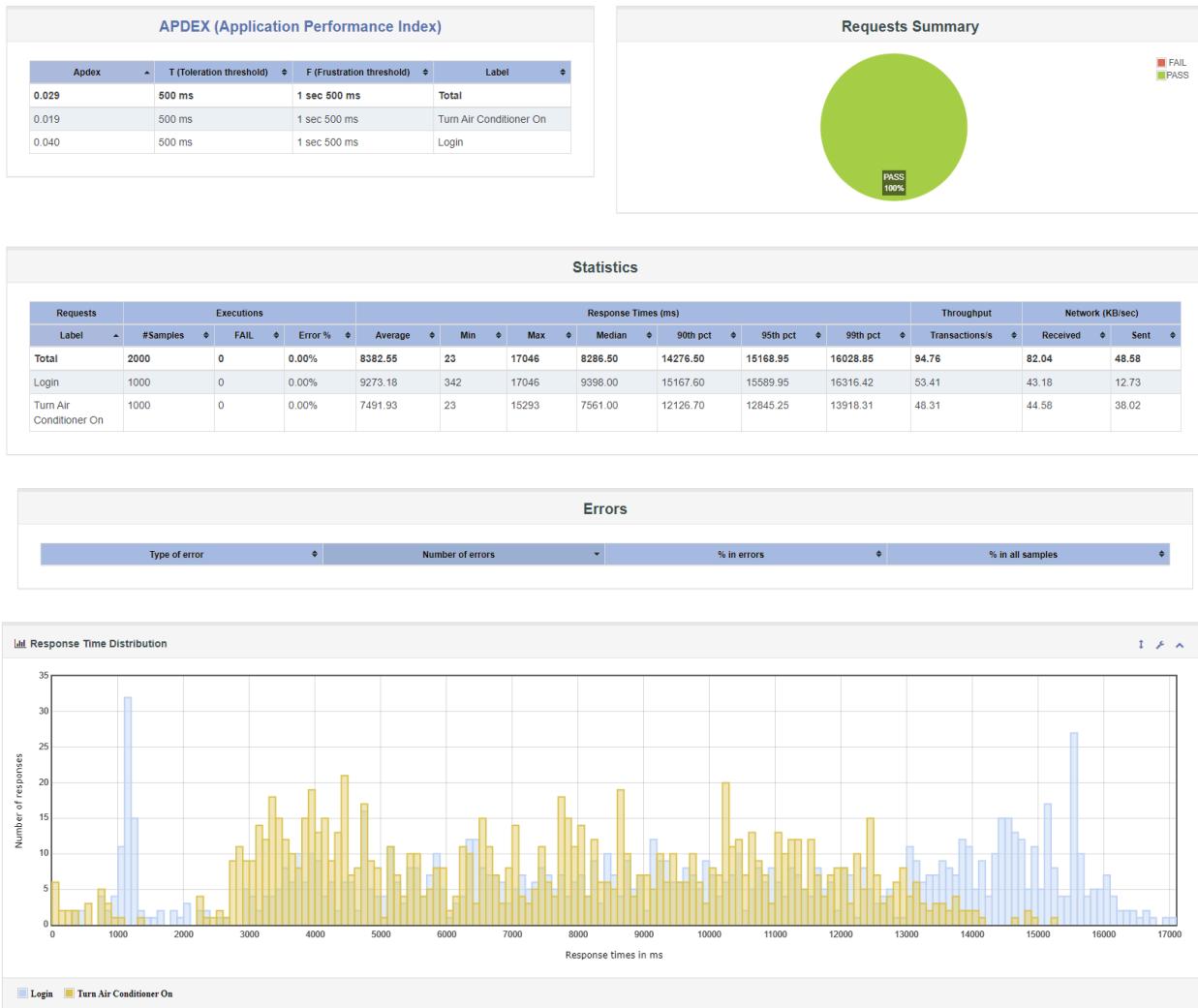
Statistics																	
Requests		Executions				Response Times (ms)							Throughput		Network (KB/sec)		
Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent				
Total	200	0	0.00%	853.88	63	2286	741.50	1583.60	1763.55	2071.00	74.27	64.29	38.13				
Login	100	0	0.00%	1204.25	226	2286	1176.50	1763.00	1911.10	2283.86	38.85	31.41	9.26				
Turn Air Conditioner On	100	0	0.00%	503.51	63	1755	455.00	912.80	1212.10	1753.06	40.95	37.79	32.29				



## 8. 500 korisnika, 1000 pokrenutih simulatora



## 9. 1000 korisnika, 1000 pokrenutih simulatora



## 5 - Zakljucak

Ukljucivanje klima uredjaja se izvrsava za veoma kratko vreme. Medutim zbog ogranicenog broja fizickih threadova i radne memorije, ukljucivanje vise klima uredjaja odjednom traje dosta dugo.

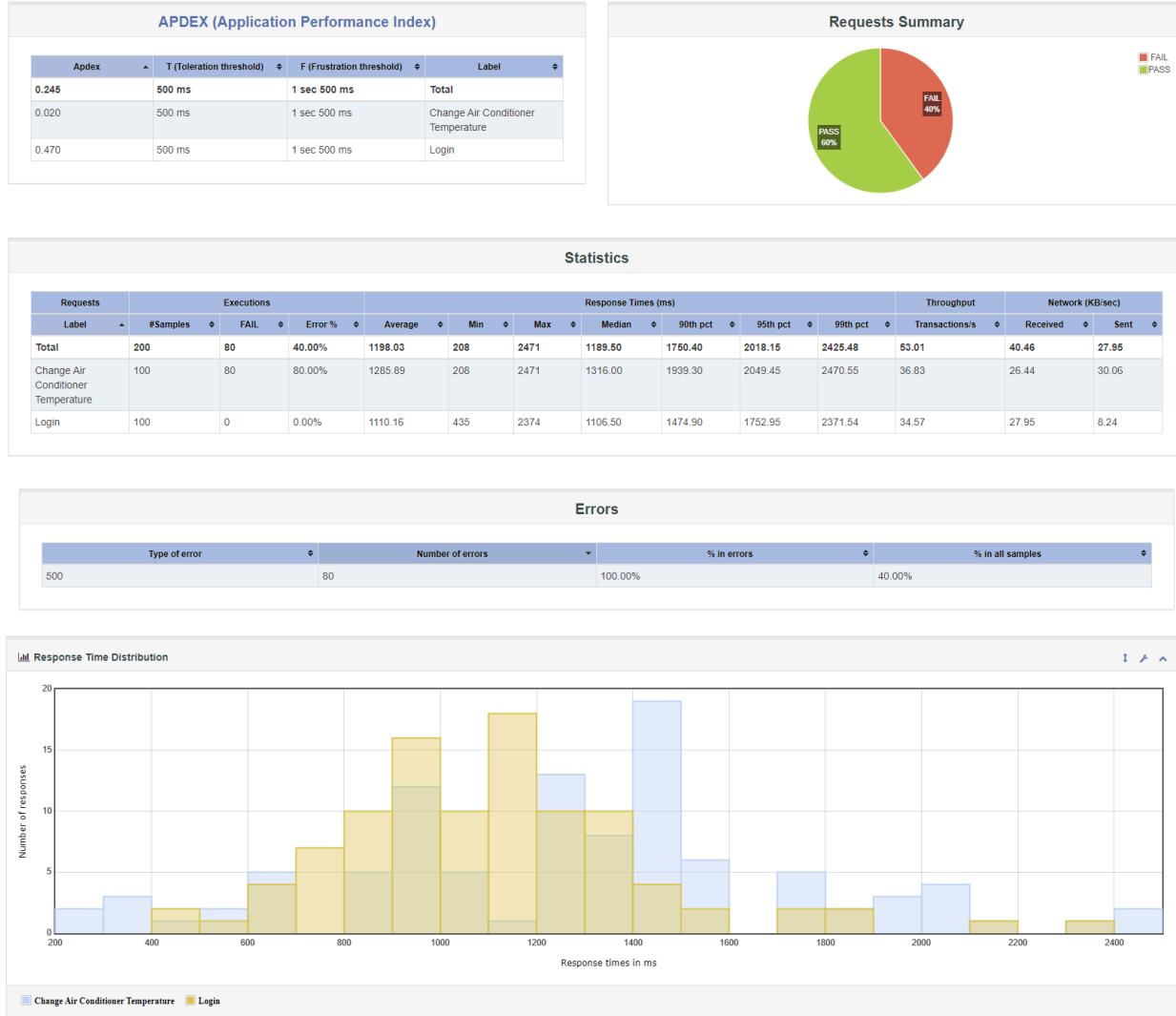
## 6 - Change Air Conditioner Temperature

Opis:

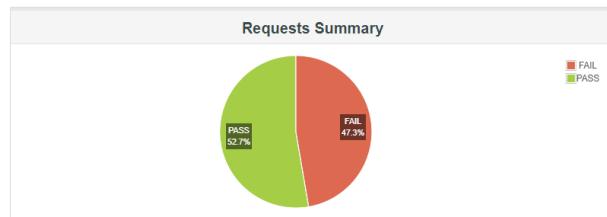
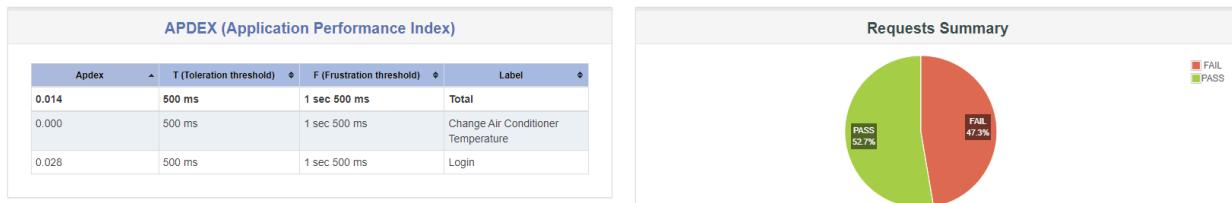
- Korisnik se prijavljuje na sistem i menja temperaturu klima uredjaja

Rezultati:

- 100 korisnika, 100 pokrenutih simulatora



## 2. 500 korisnika, 100 pokrenutih simulatora

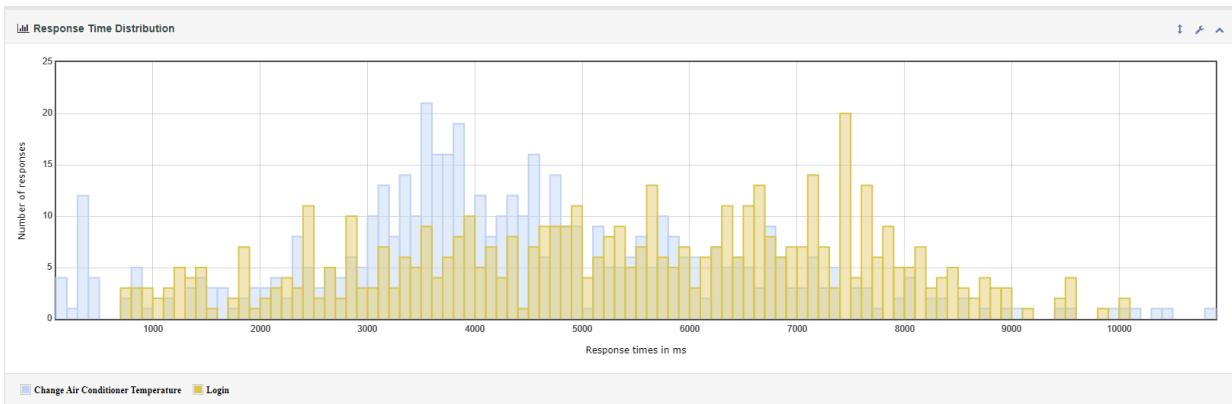


**Statistics**

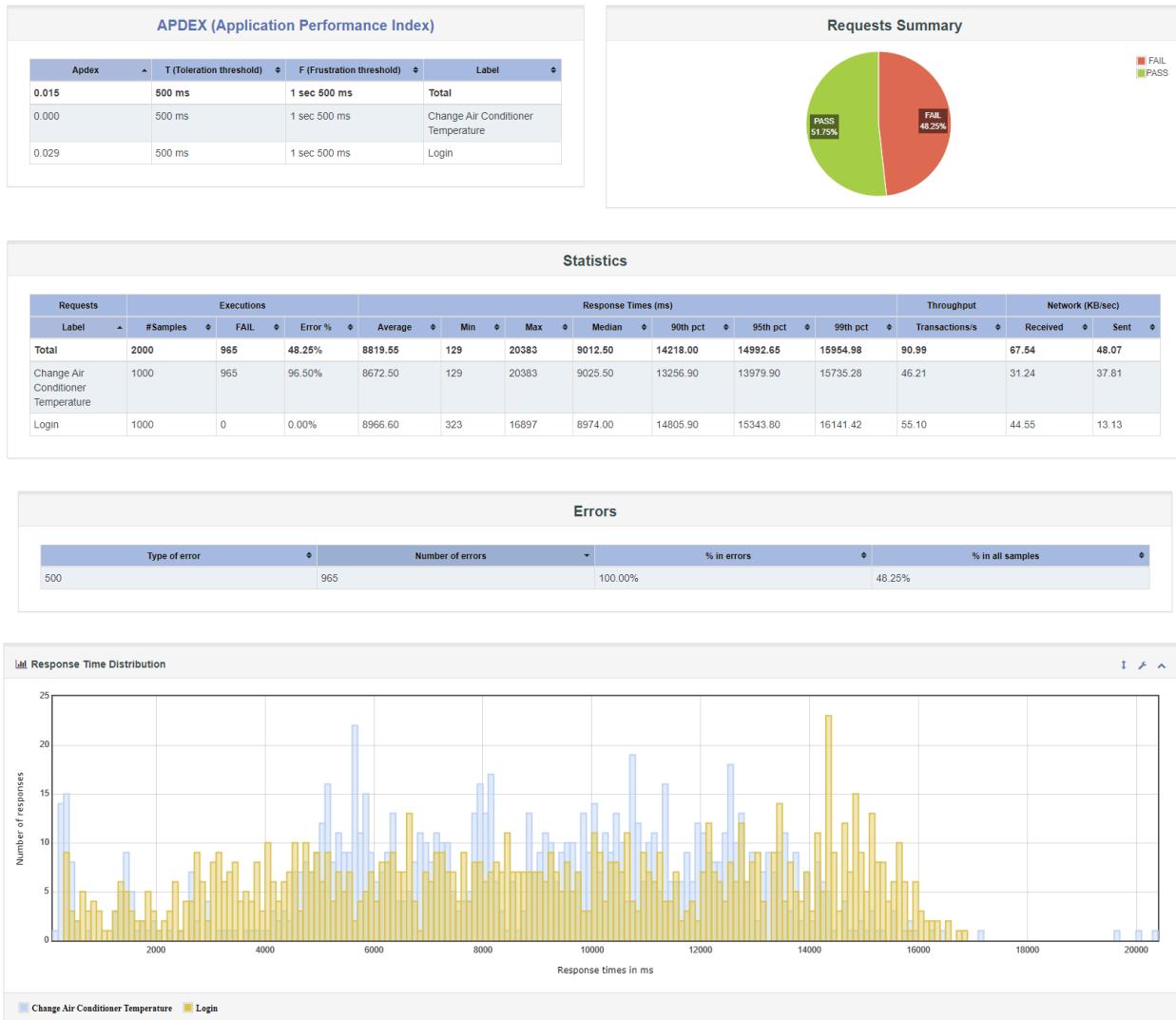
Requests		Executions				Response Times (ms)									Throughput		Network (KB/sec)	
Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent					
Total	1000	473	47.30%	4874.07	110	10891	4749.00	7663.10	8292.95	9582.81	80.39	59.87	42.44					
Change Air Conditioner Temperature	500	473	94.60%	4382.81	110	10891	4133.00	6910.90	7654.10	10030.64	42.65	29.03	34.87					
Login	500	0	0.00%	5365.32	701	10059	5533.50	7982.20	8506.40	9563.68	45.36	36.67	10.81					

**Errors**

Type of error	Number of errors	% in errors	% in all samples
500	473	100.00%	47.30%



### 3. 1000 korisnika, 100 pokrenutih simulatora



## 6 - Zakljucak

Preko 50% zahteva pada (mqtt zahtevi), to je usled previse mqtt poruka koje se salju u istom trenutku. To bi trebalo popraviti

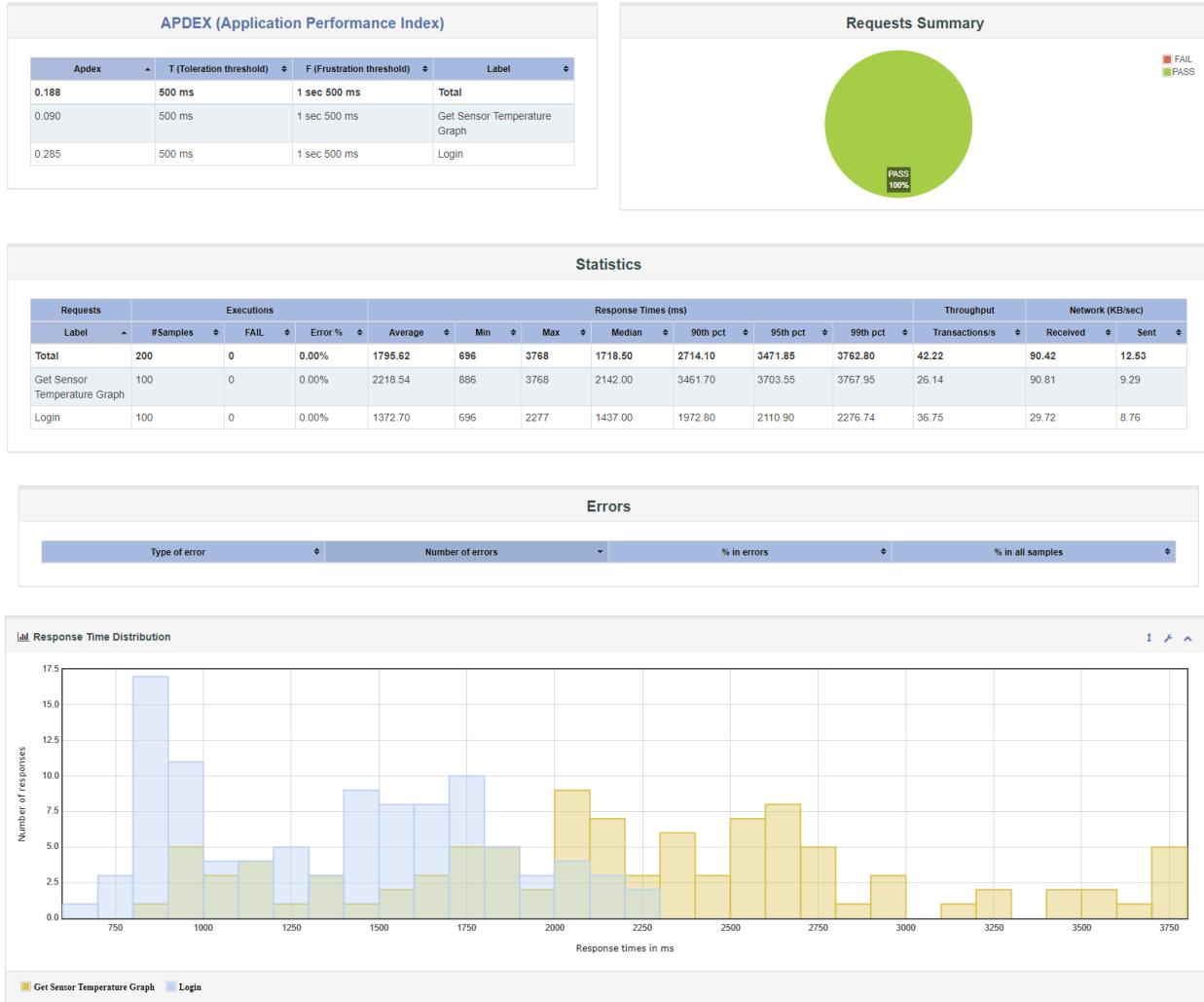
## 7 - Get Temperature Graph

Opis:

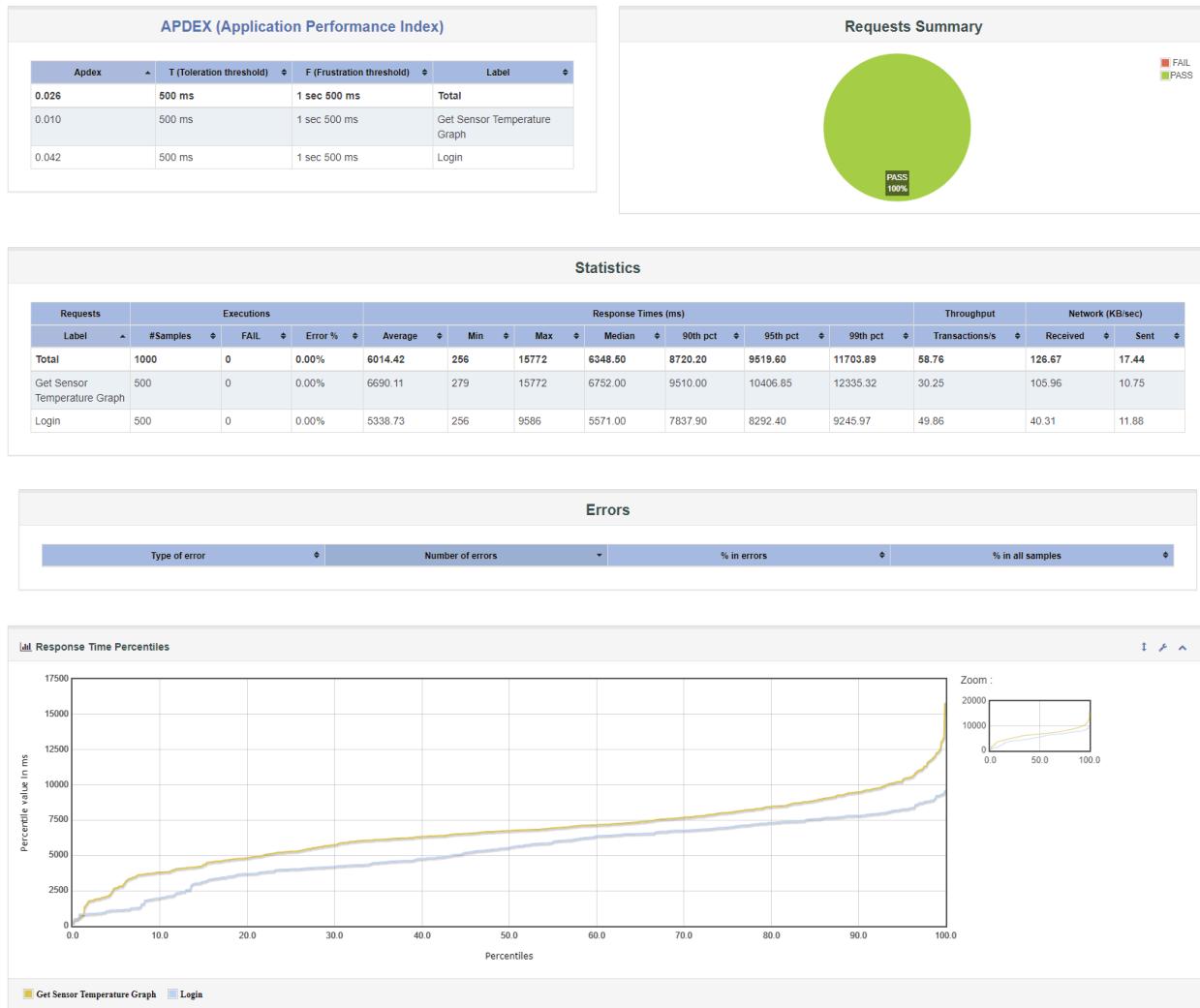
- Korisnik se prijavljuje na sistem i trazi graf za temperaturu senzora

Rezultati:

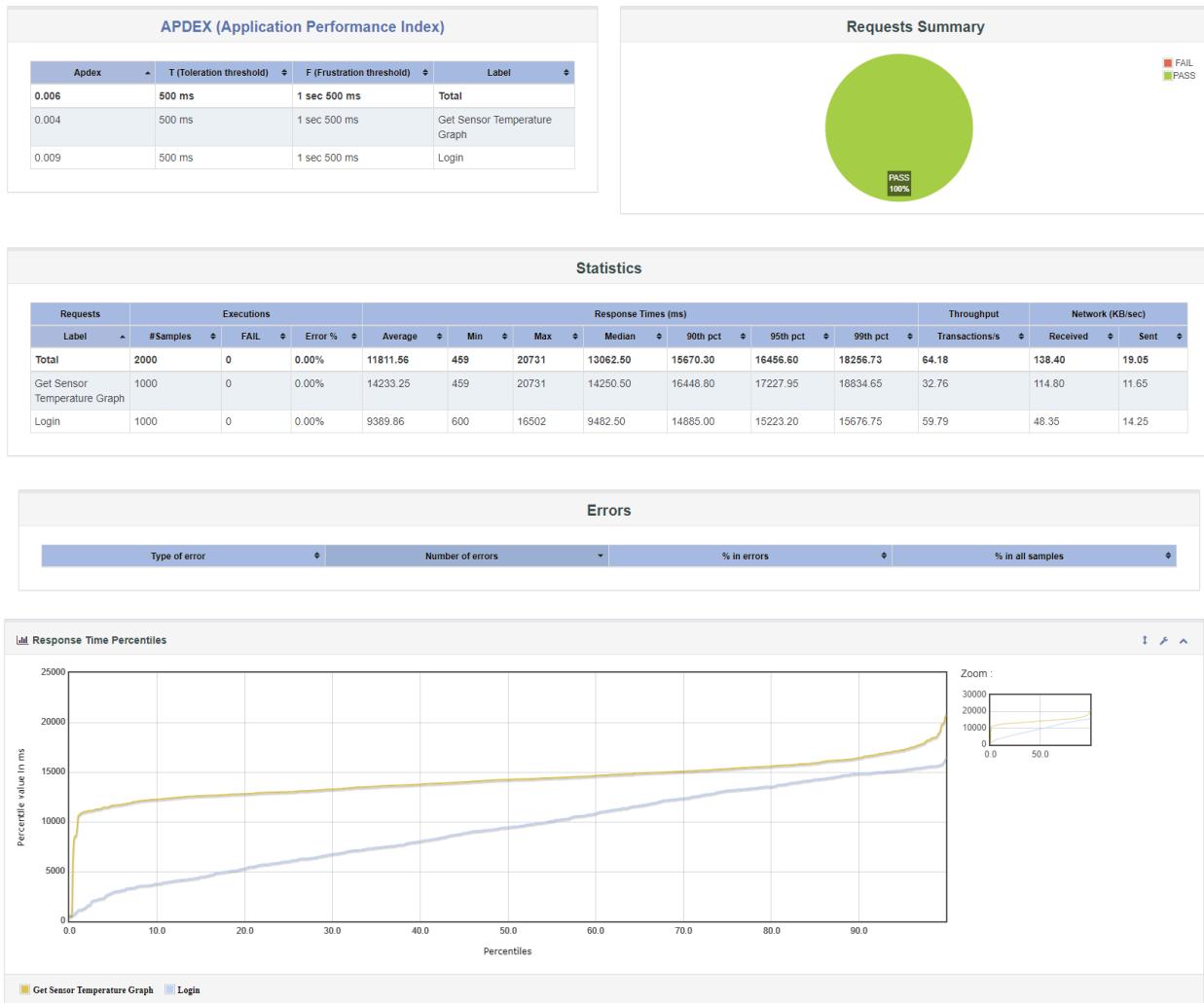
- 100 korisnika, 100 pokrenutih simulatora



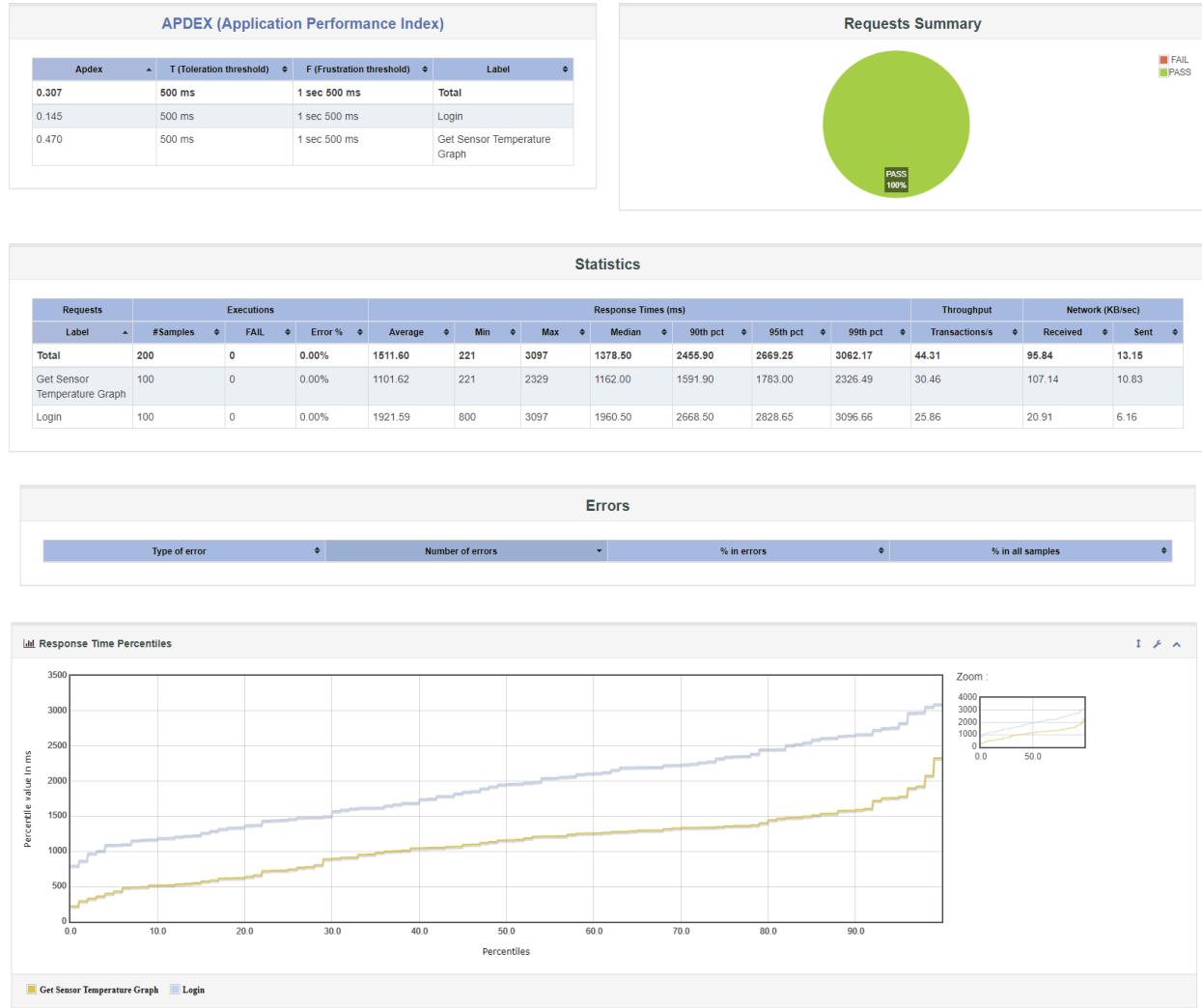
## 2. 500 korisnika, 100 pokrenutih simulatora



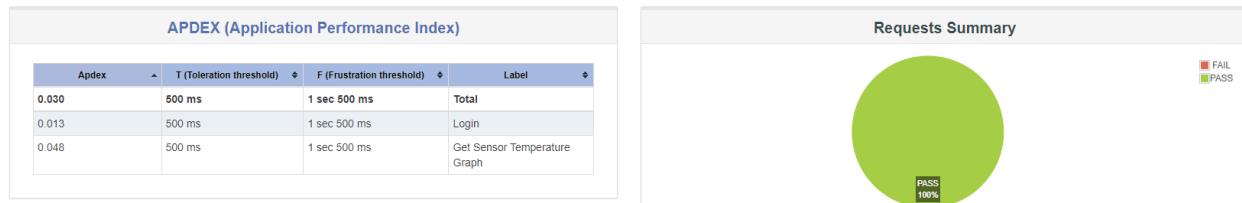
### 3. 1000 korisnika, 100 pokrenutih simulatora



#### 4. 100 korisnika, 500 pokrenutih simulatora



## 5. 500 korisnika, 500 pokrenutih simulatora

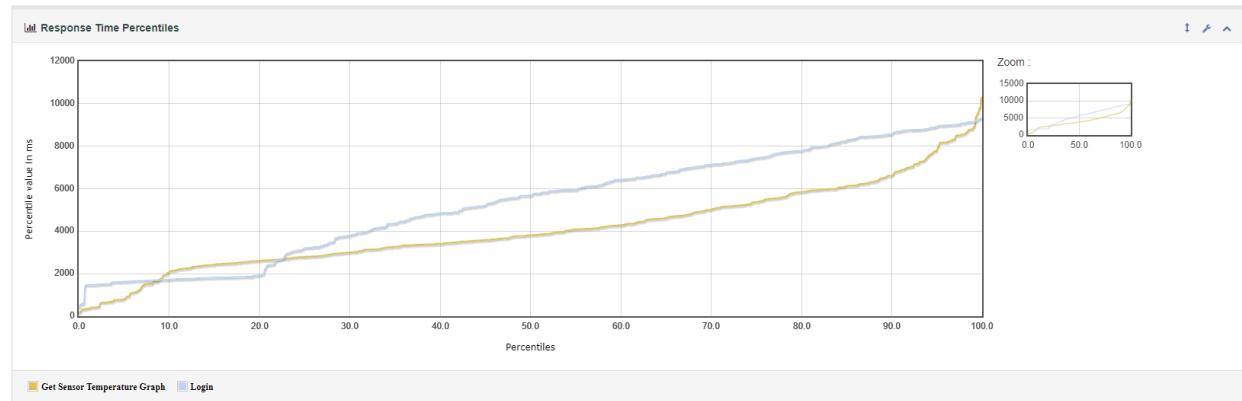


**Statistics**

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	1000	0	0.00%	4733.84	165	10268	4666.50	8187.60	8753.80	9145.88	64.12	138.69	19.04					
Get Sensor Temperature Graph	500	0	0.00%	4121.19	165	10268	3614.00	6645.30	7974.55	8930.83	33.02	116.15	11.74					
Login	500	0	0.00%	5346.50	424	9333	5685.00	8621.30	8953.80	9150.95	42.12	34.06	10.04					

**Errors**

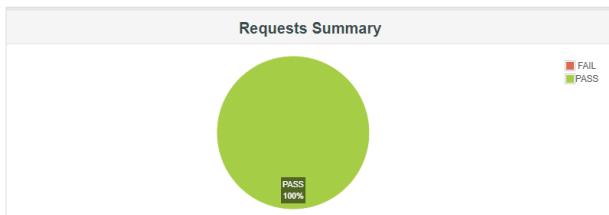
Type of error	Number of errors	% in errors	% in all samples
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## 6. 1000 korisnika, 500 pokrenutih simulatora

**APDEX (Application Performance Index)**

Apdex	T (Toleration threshold)	F (Frustration threshold)	Label
0.023	500 ms	1 sec 500 ms	Total
0.021	500 ms	1 sec 500 ms	Get Sensor Temperature Graph
0.025	500 ms	1 sec 500 ms	Login

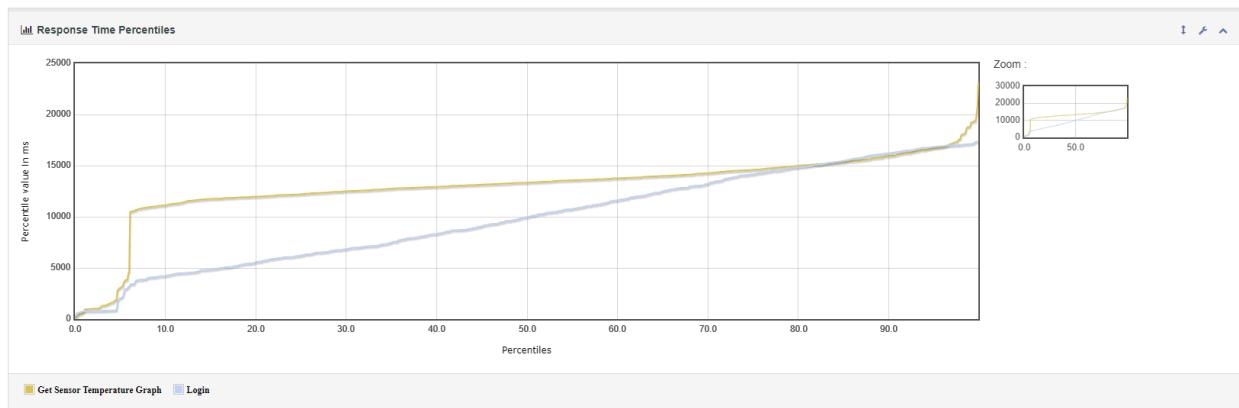


**Statistics**

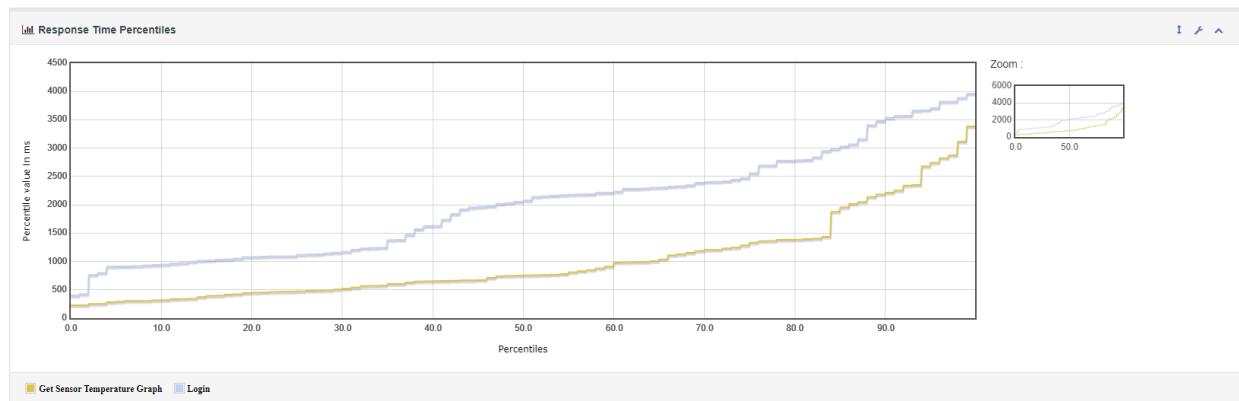
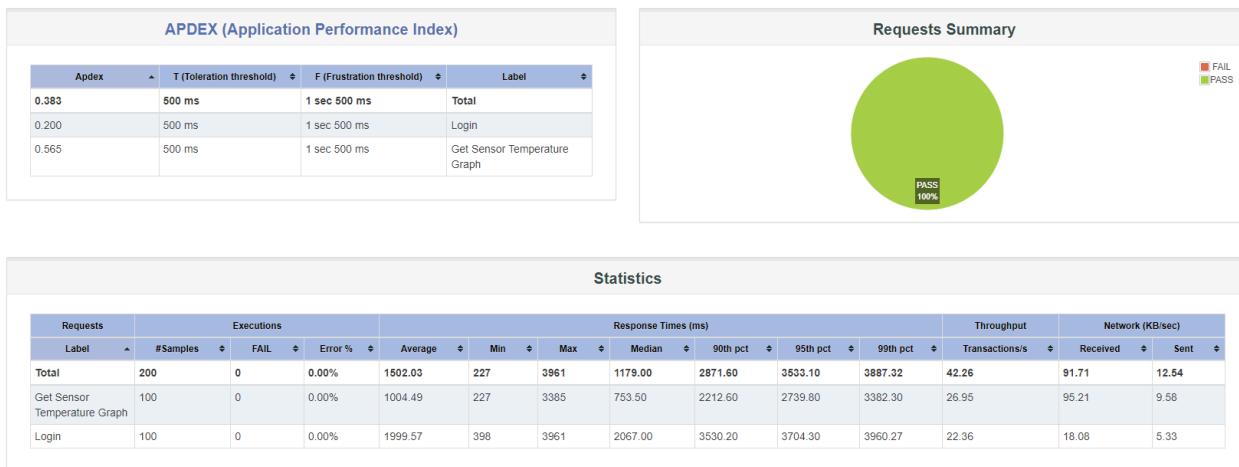
Requests		Executions				Response Times (ms)								Throughput		Network (KB/sec)		
Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent					
Total	2000	0	0.00%	11470.32	139	23116	12698.50	16098.70	16771.65	17974.33	61.95	134.45	18.39					
Get Sensor Temperature Graph	1000	0	0.00%	12968.52	139	23116	13341.50	15932.40	16721.65	18848.36	31.32	110.63	11.13					
Login	1000	0	0.00%	9972.13	352	17404	9986.50	16227.30	16839.70	17116.84	52.92	42.79	12.61					

**Errors**

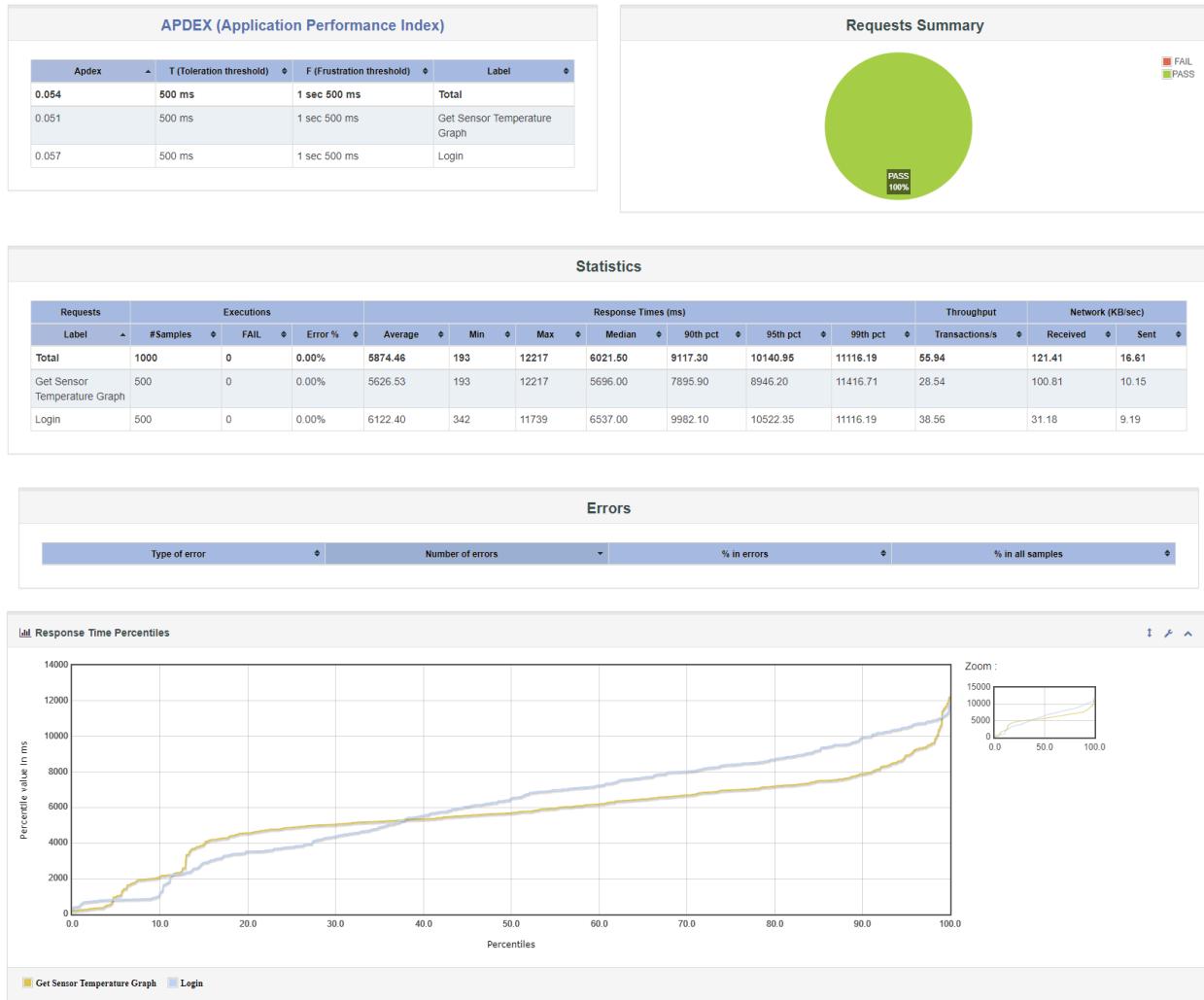
Type of error	Number of errors	% in errors	% in all samples
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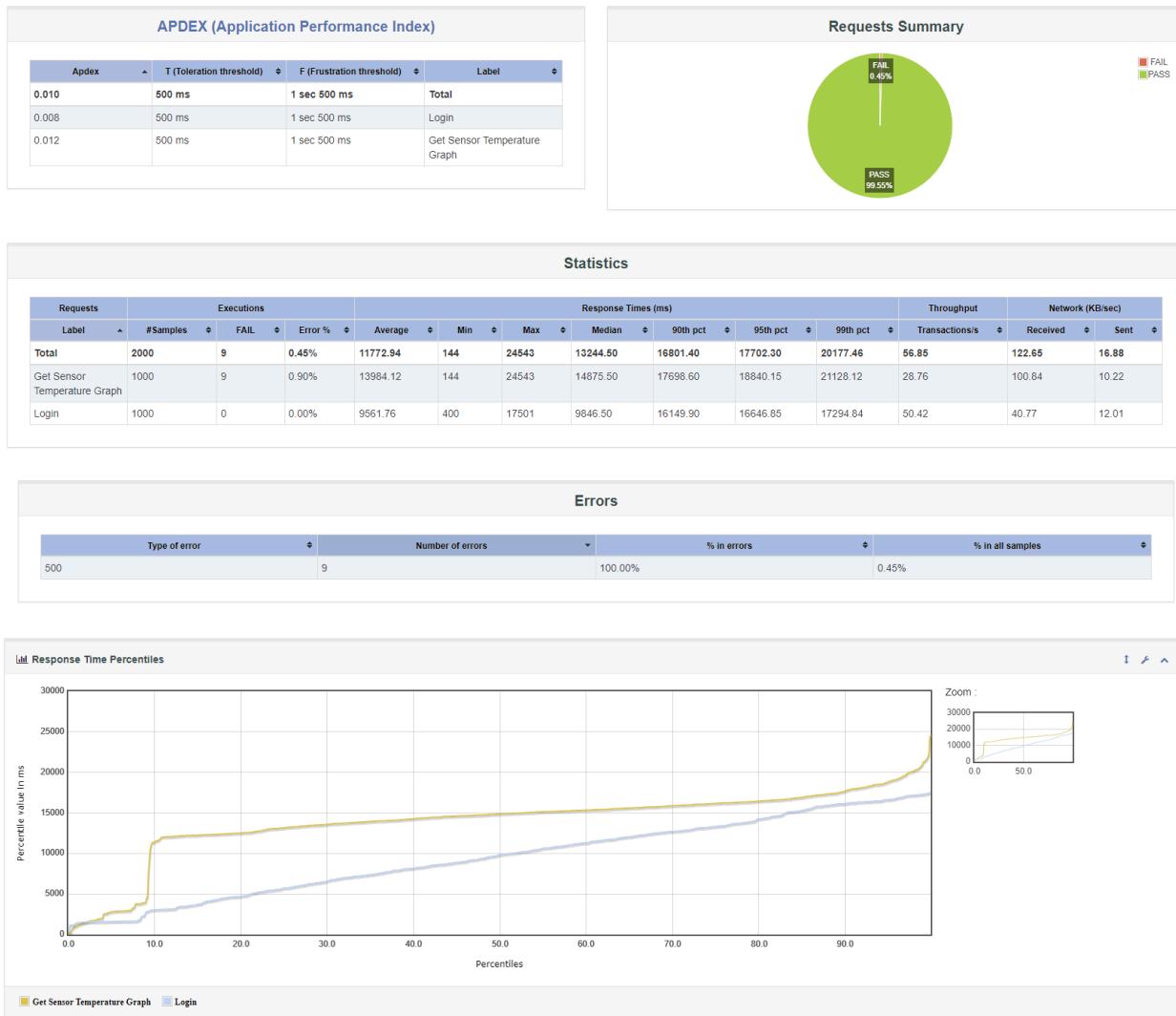
## 7. 100 korisnika, 1000 pokrenutih simulatora



## 8. 500 korisnika, 1000 pokrenutih simulatora



## 9. 1000 korisnika, 1000 pokrenutih simulatora



## 7 - Zakljucak

Vreme agregiranja podataka iz Influx baze se linearno povecava kako raste broj simulatora, ali i broj zahteva ka bazi

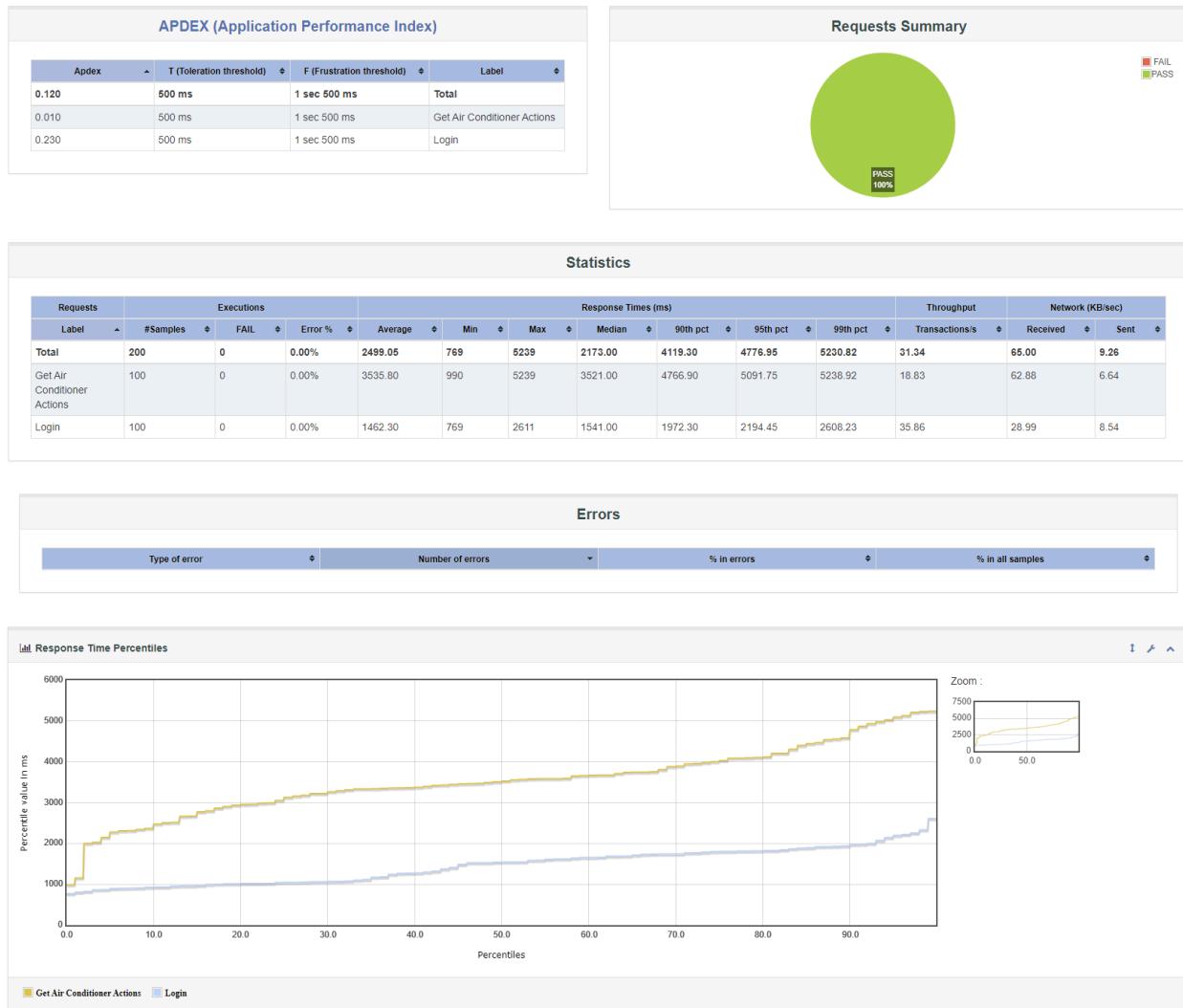
## 8 - Get Air Conditioner Actions

Opis:

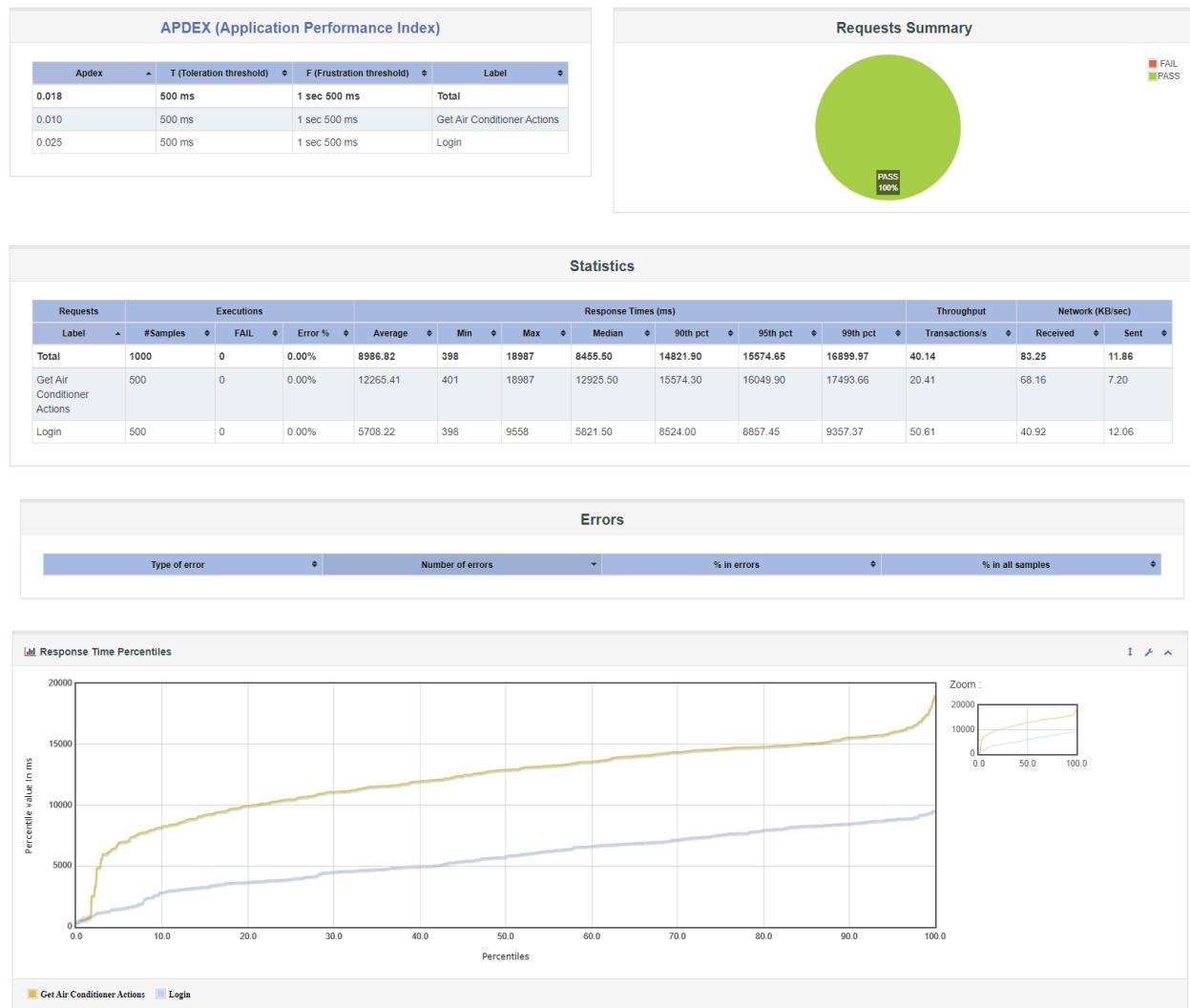
- Korisnik se prijavljuje na sistem i trazi tabelu akcija za klima uredjaj

Rezultati:

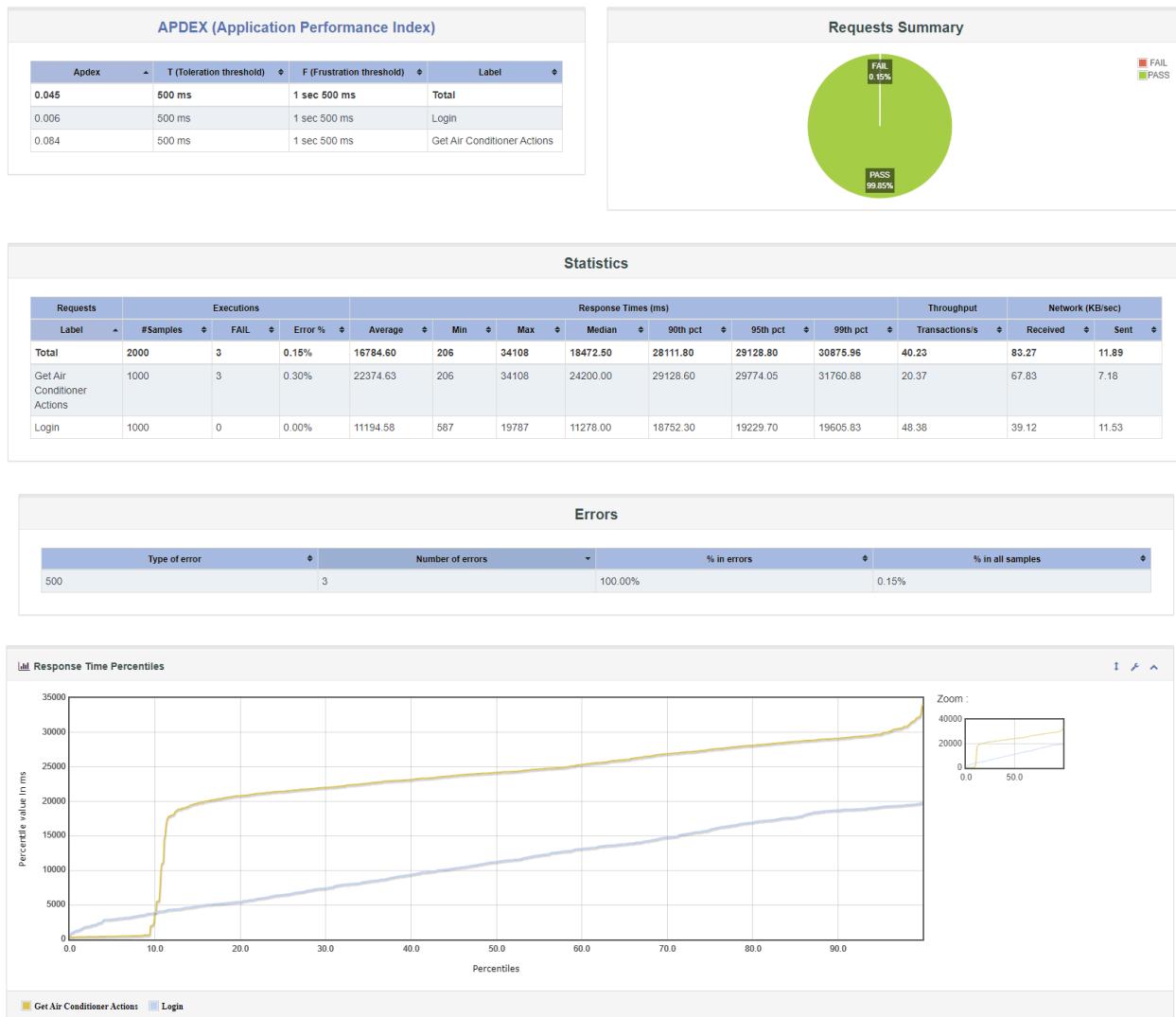
- 100 korisnika, 100 pokrenutih simulatora



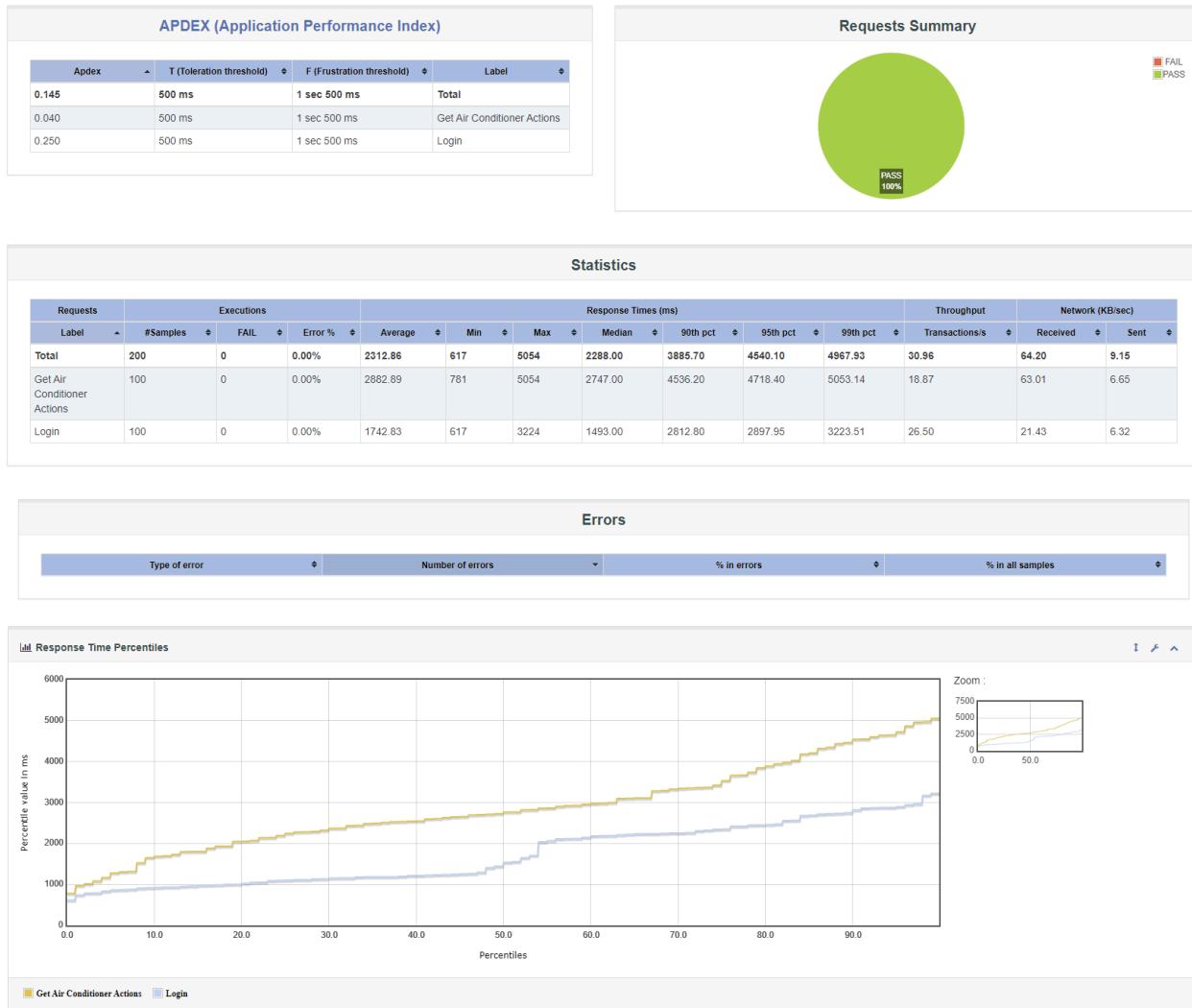
## 2. 500 korisnika, 100 pokrenutih simulatora



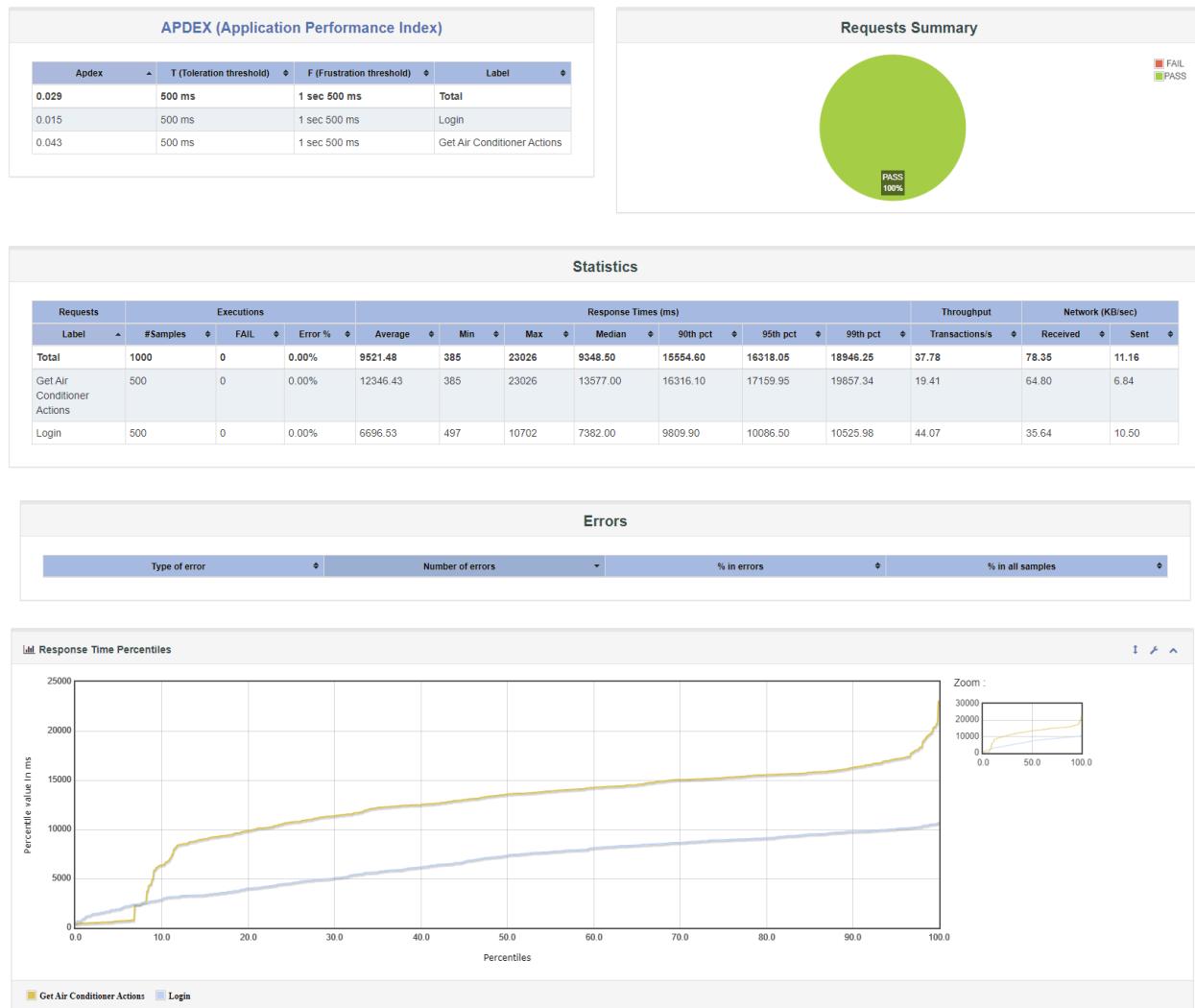
### 3. 1000 korisnika, 100 pokrenutih simulatora



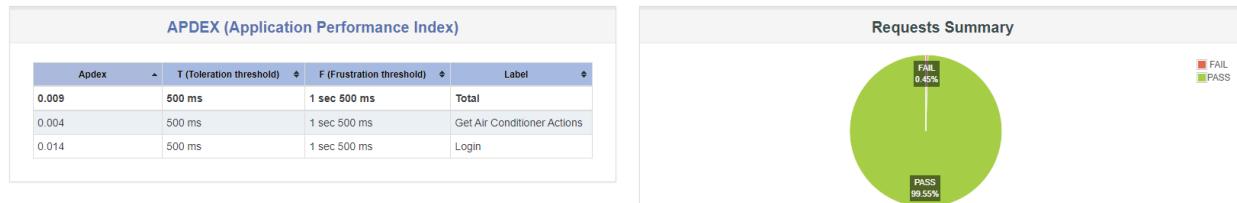
#### 4. 100 korisnika, 500 pokrenutih simulatora



## 5. 500 korisnika, 500 pokrenutih simulatora



## 6. 1000 korisnika, 500 pokrenutih simulatora

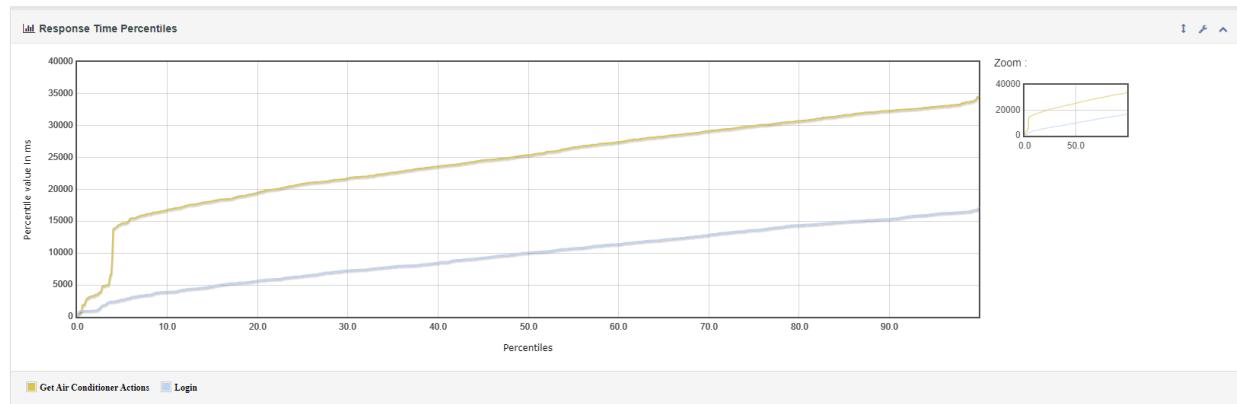


**Statistics**

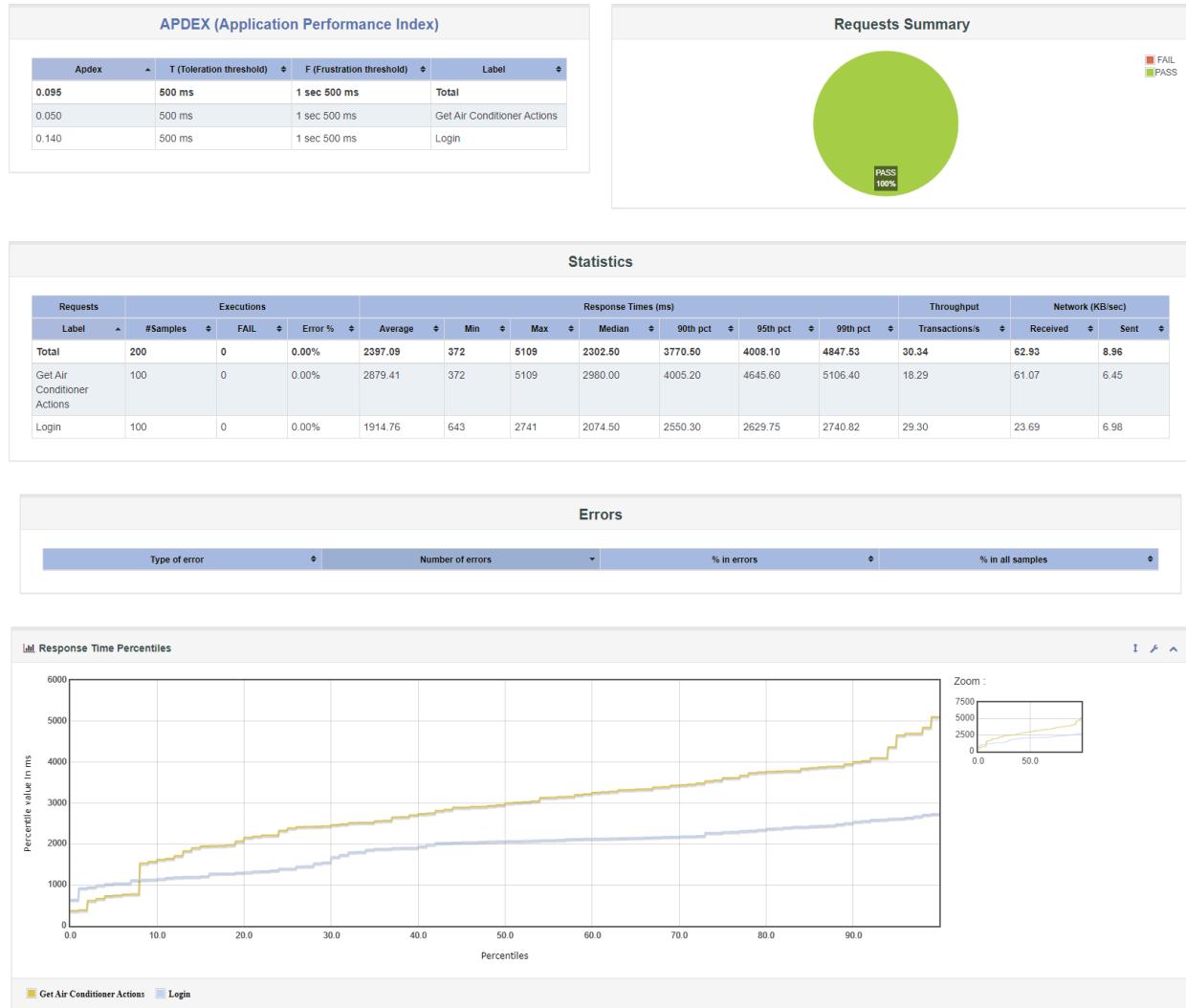
Requests		Executions				Response Times (ms)									Throughput		Network (KB/sec)		
Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent						
Total	2000	9	0.45%	17259.35	337	34687	15906.00	30745.90	32349.85	33545.33	39.27	80.97	11.60						
Get Air Conditioner Actions	1000	9	0.90%	24644.69	448	34687	25398.00	32349.70	32969.65	33793.33	19.77	65.52	6.97						
Login	1000	0	0.00%	9874.02	337	17218	10138.50	15369.60	16138.85	16593.91	54.33	43.93	12.95						

**Errors**

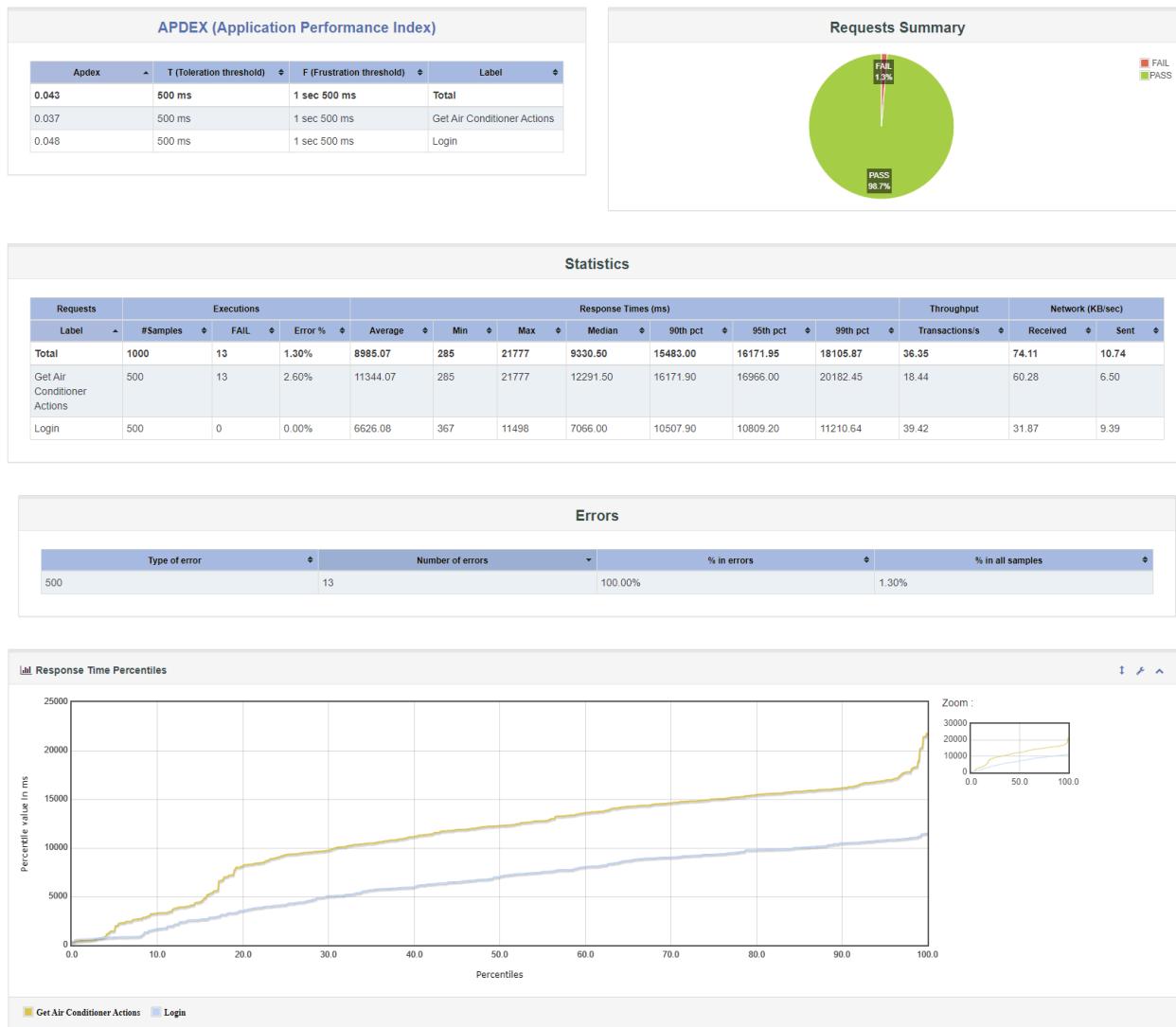
Type of error	Number of errors	% in errors	% in all samples
500	9	100.00%	0.45%



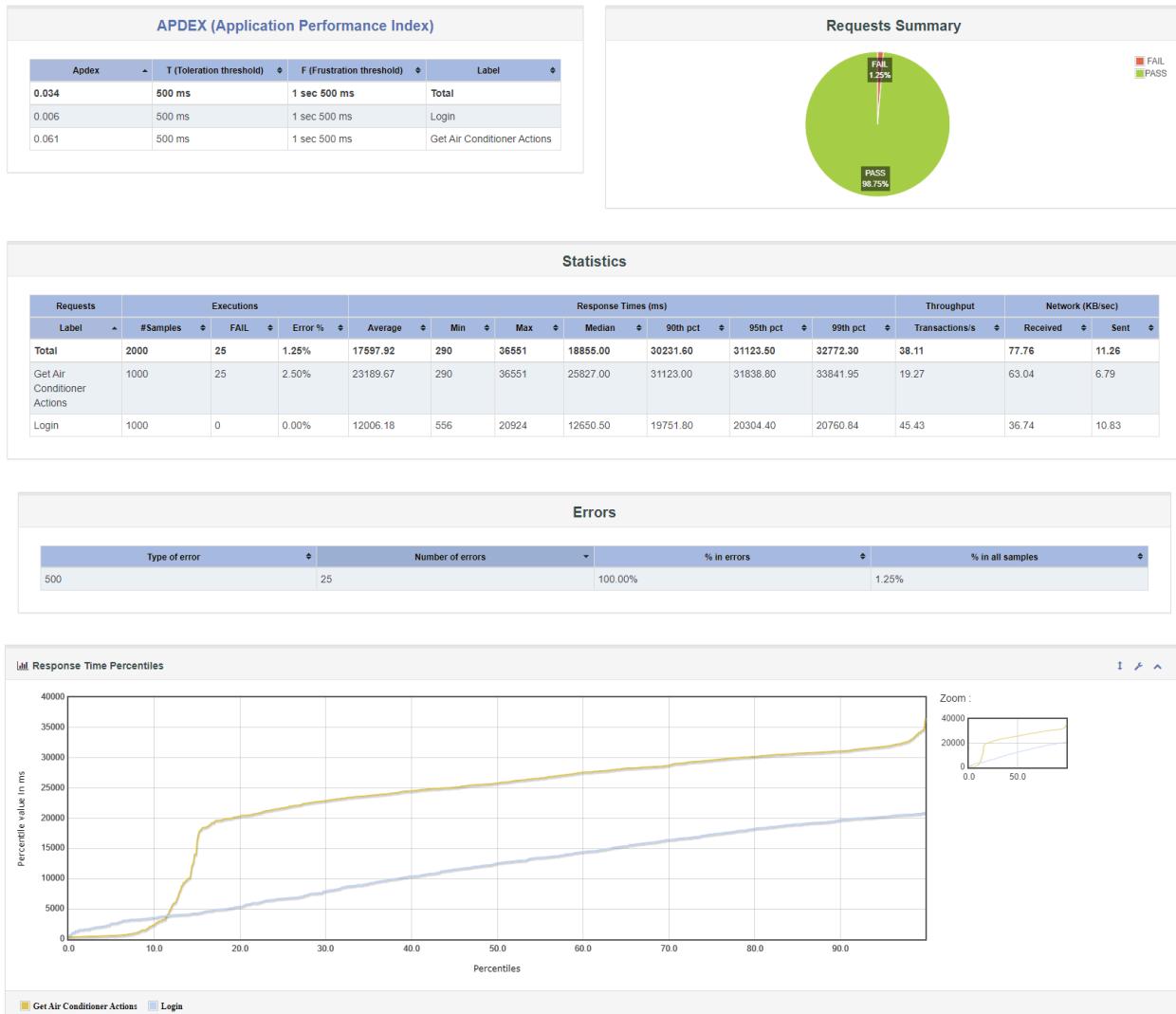
## 7. 100 korisnika, 1000 pokrenutih simulatora



## 8. 500 korisnika, 1000 pokrenutih simulatora



## 9. 1000 korisnika, 1000 pokrenutih simulatora



## 8 - Zakljucak

Vreme agregiranja podataka iz Influx baze se linearno povecava kako raste broj simulatora, ali i broj zahteva ka bazi

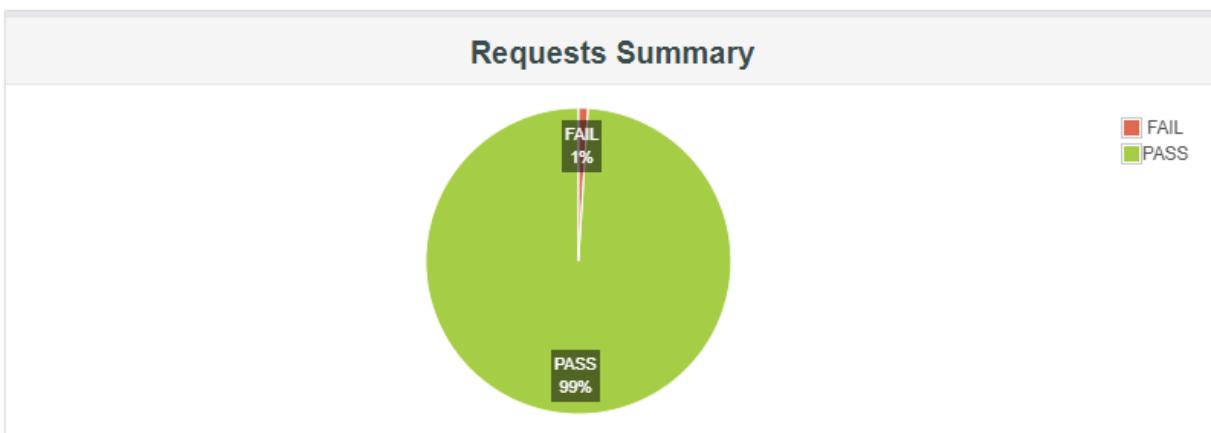
## 9 - Register user

Opis:

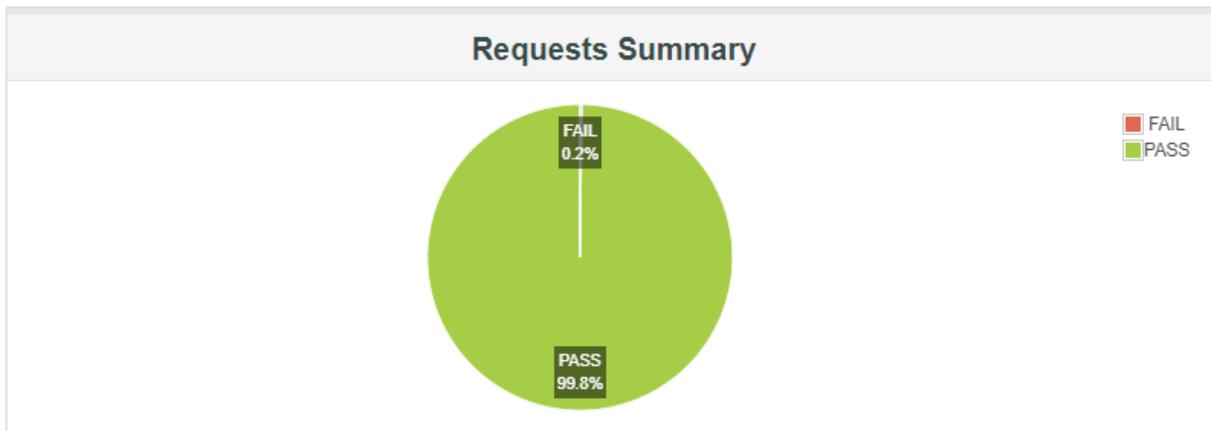
- Korisnik se registruje na sistem

Rezultati:

- 100 korisnika, 100 pokrenutih simulatora

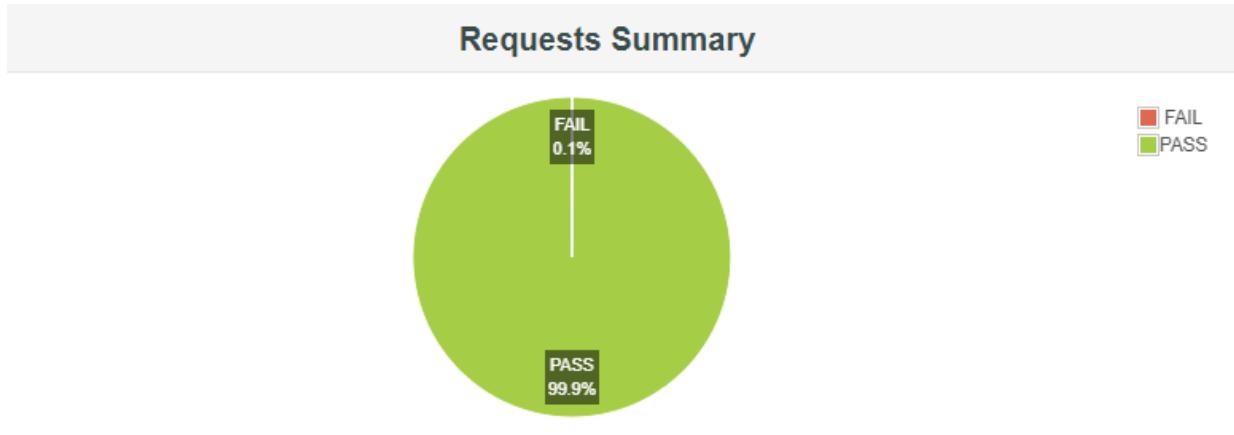


## 2. 500 korisnika, 100 pokrenutih simulatora





### 3. 1000 korisnika, 100 pokrenutih simulatora



## 9 - Zakljucak

Na register ne utice znatno broj simulacionih threadova. Svaki request traje oko 100 milisekundi kada krene da se izvrsava i to raste sa brojem requestova

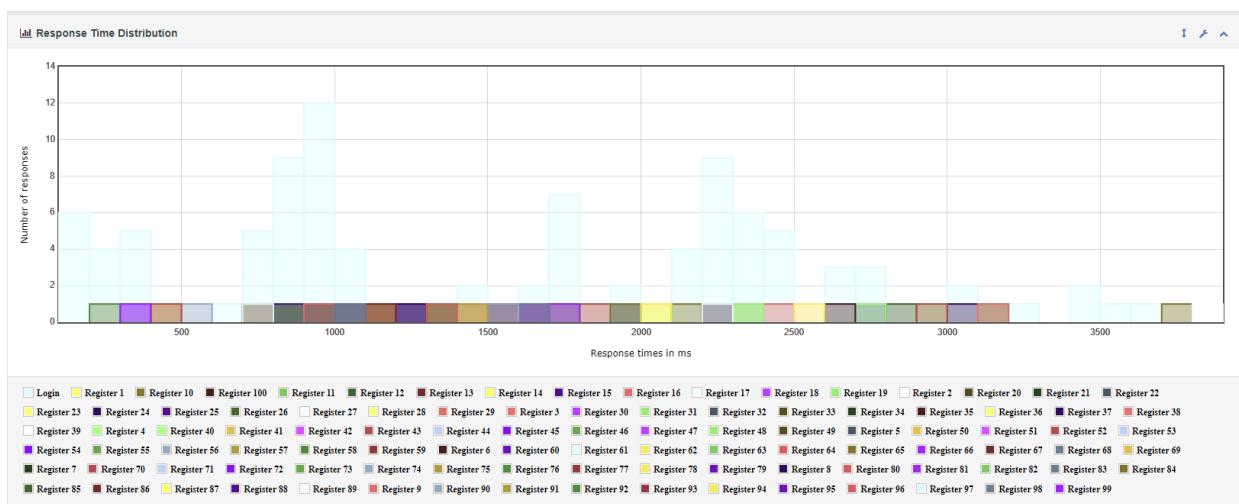
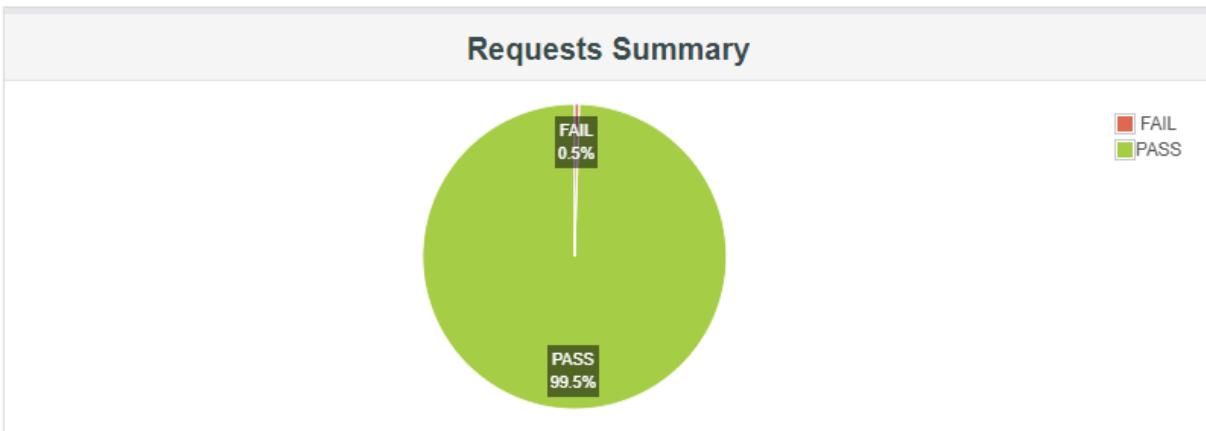
## 10 - Register user

Opis:

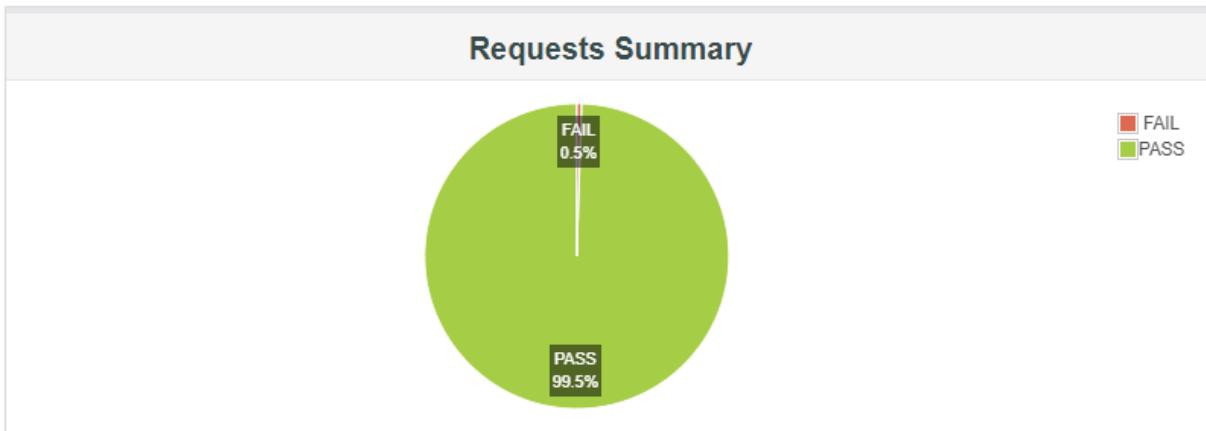
- Korisnik se registruje na sistem

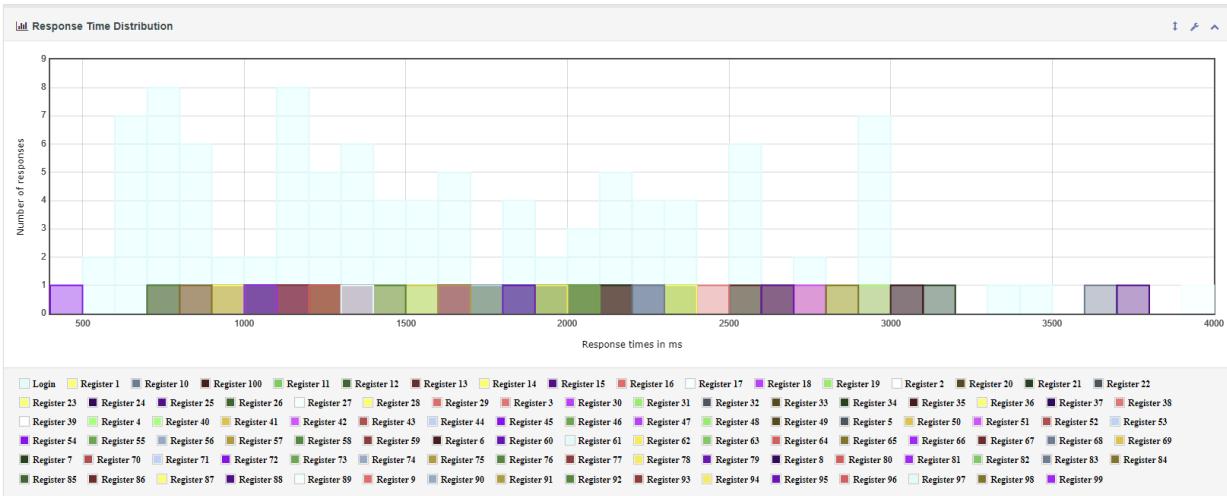
Rezultati:

- 100 korisnika, 100 pokrenutih simulatora

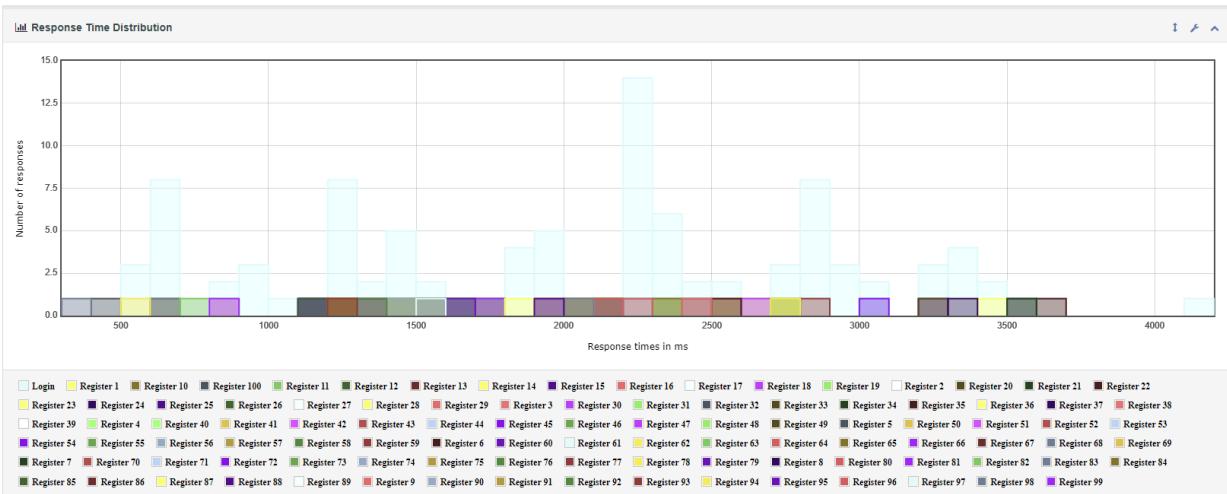
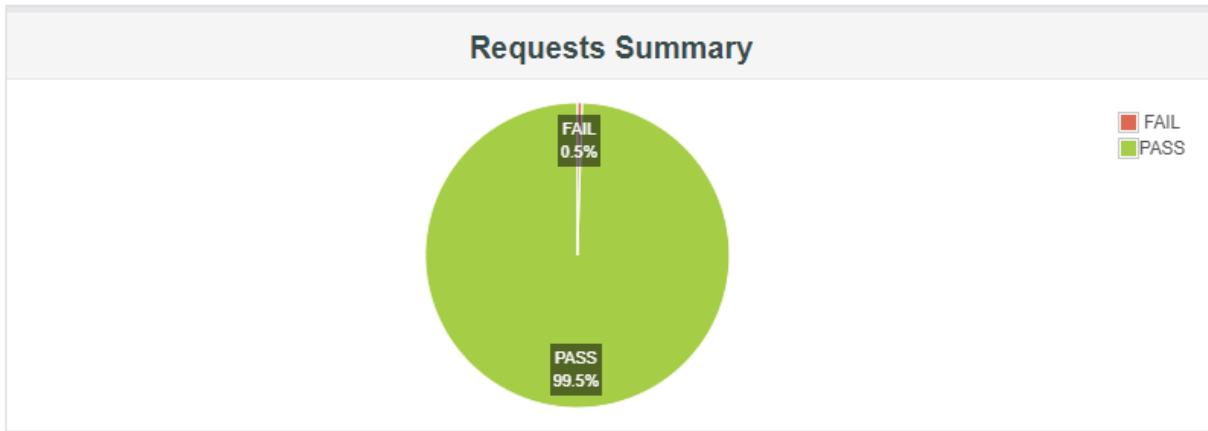


## 2. 100 korisnika, 500 pokrenutih simulatora





### 3. 100 korisnika, 1000 pokrenutih simulatora



## 10 - Zakljucak

Isto kao kod registracije normalnog korisnika, ne utice broj konektovanih simulatora na brzinu izvrsavanja. Svaki request se obradjuje do 100 milisekundi.

# 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.

### 1. Ambijentalni senzori

- 10 pokrenutih ambijentalnih senzora - vreme promene vrednosti je oko 5 sekundi
- 100 pokrenutih ambijentalnih senzora - vreme promene vrednosti je oko 9 sekundi
- 200 pokrenutih ambijentalnih senzora - vreme promene vrednosti je oko 12 sekundi
- za 500 pokrenutih ambijentalnih senzora - vreme promene vrednosti je oko 40 sekundi

### 2. Klima uredjaj

#### 1. On/Off

- 10 pokrenutih klima uredjaja - vreme promene vrednosti je oko 5 sekundi
- 100 pokrenutih klima uredjaja - vreme promene vrednosti je oko 8 sekundi
- 200 pokrenutih klima uredjaja - vreme promene vrednosti je oko 13 sekundi
- 500 pokrenutih klima uredjaja - vreme promene vrednosti je oko 38 sekundi

#### 2. Temperature and Mode change

- 10 pokrenutih klima uredjaja - vreme promene vrednosti je oko 5 sekundi
- 100 pokrenutih klima uredjaja - vreme promene vrednosti je oko 9 sekundi
- 200 pokrenutih klima uredjaja - vreme promene vrednosti je oko 13 sekundi
- 500 pokrenutih klima uredjaja - vreme promene vrednosti je oko 40 sekundi

#### 3. Add Schedule

- 10 pokrenutih klima uredjaja - vreme promene vrednosti je oko 5 sekundi
- 100 pokrenutih klima uredjaja - vreme promene vrednosti je oko 10 sekundi
- 200 pokrenutih klima uredjaja - vreme promene vrednosti je oko 15 sekundi
- 500 pokrenutih klima uredjaja - vreme promene vrednosti je oko 44 sekunde

### 3. Ves masina

#### 1. On/Off

- 10 pokrenutih ves masina - vreme promene vrednosti je oko 5 sekundi
- 100 pokrenutih ves masina - vreme promene vrednosti je oko 8 sekundi
- 200 pokrenutih ves masina - vreme promene vrednosti je oko 12 sekundi
- 500 pokrenutih ves masina - vreme promene vrednosti je oko 39 sekundi

#### 2. Mode change

- 10 pokrenutih ves masina - vreme promene vrednosti je oko 5 sekundi
- 100 pokrenutih ves masina - vreme promene vrednosti je oko 9 sekundi
- 200 pokrenutih ves masina - vreme promene vrednosti je oko 14 sekundi

500 pokrenutih ves masina - vreme promene vrednosti je oko 40 sekundi

### 3. Schedule add

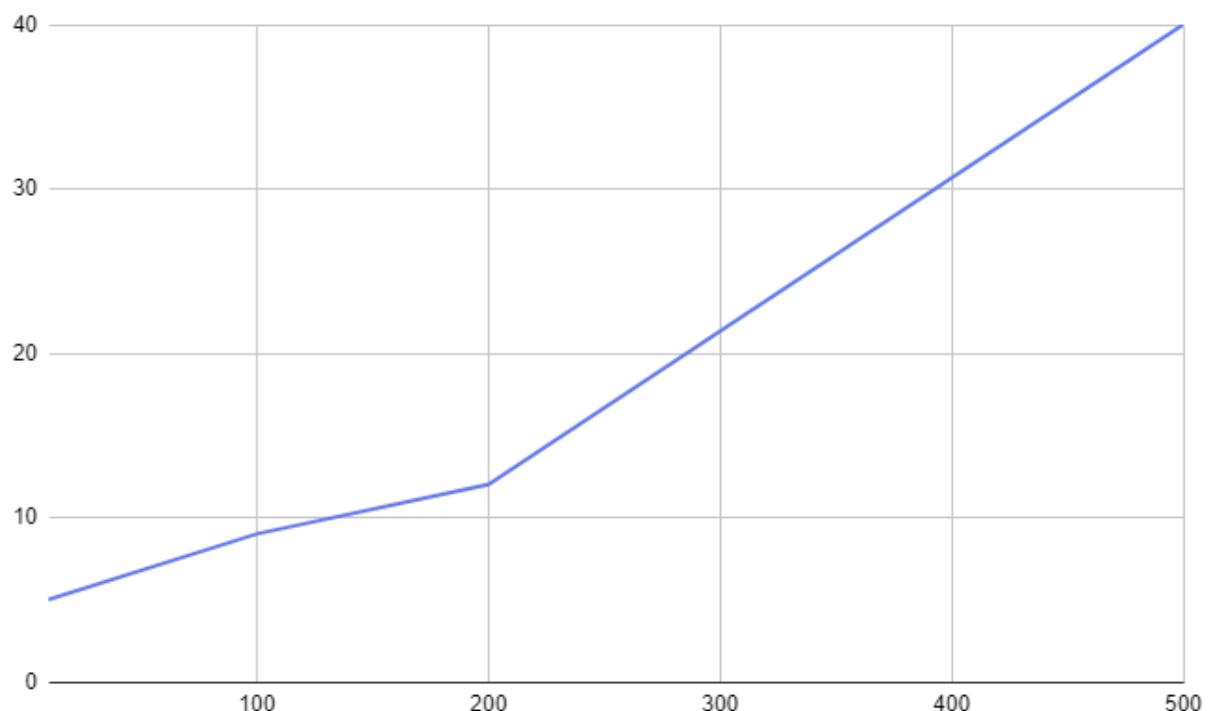
10 pokrenutih ves masina - vreme promene vrednosti je oko 5 sekundi

100 pokrenutih ves masina - vreme promene vrednosti je oko 10 sekundi

200 pokrenutih ves masina - vreme promene vrednosti je oko 14 sekundi

500 pokrenutih ves masina - vreme promene vrednosti je oko 43 sekundi

Sto vise simulatora pokrenemo, to vise cekamo na promenu jednog specificnog uredjaja. Ovaj odziv na vecem broju pokrenutih simulatora dosta zavisi i od kolicine logovanja koje imamo na serverskoj strani. Grafovi su slicni, rastu eksponencijalno sa povecanjem broja simuliranih uredjaja, i izgledaju ovako



Veci odziv bude na zahtevnijim operacijama kao sto su promena moda ili temperature i zakazivanje kod klime ili ves masine. Takodje, sistem se za nijansu bolje ponasa kada ima vise uredjaja tipa ves masina nego uredjaja tipa ambijentalni senzor. To je zato sto ambijentalni senzor javlja svoje vrednosti svakih 5 sekundi, dok ves masina (ako je iskljucena) to ne radi.

## Unapređenje delova sistema

- Neophodno je povecati broj publisha u odredjenom trenutku na MQTT broker - trenutno je defaultnih 10
- Neophodno je skloniti logovanje i pokrenuti testove ponovo

## 1 - Povecanje broja poruka u odredjenom trenutku na MQTT brokeru

Povecali smo broj mogucih poruka u odredjenom trenutku na MQTT broker. Sada cu ponovo pokrenuti testove za promenu temperature klime

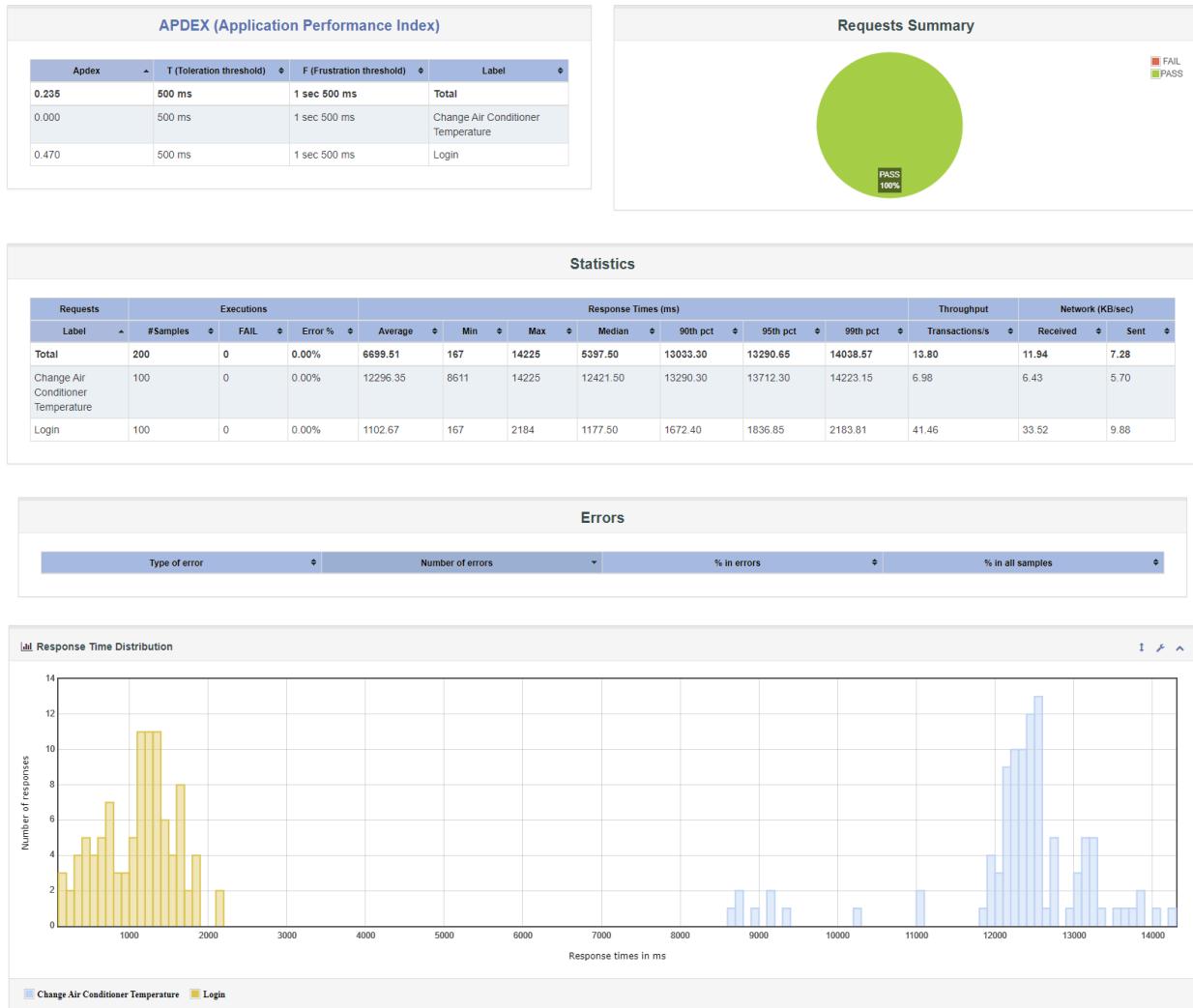
### 6 - Change Air Conditioner Temperature

Opis:

- Korisnik se prijavljuje na sistem i menja temperaturu klima uredjaja

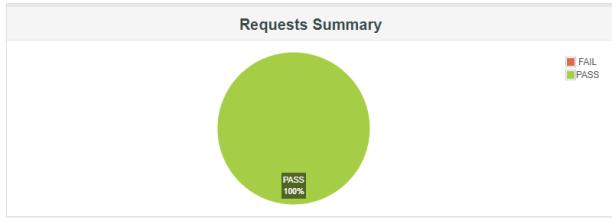
Rezultati:

- 100 korisnika, 100 pokrenutih simulatora



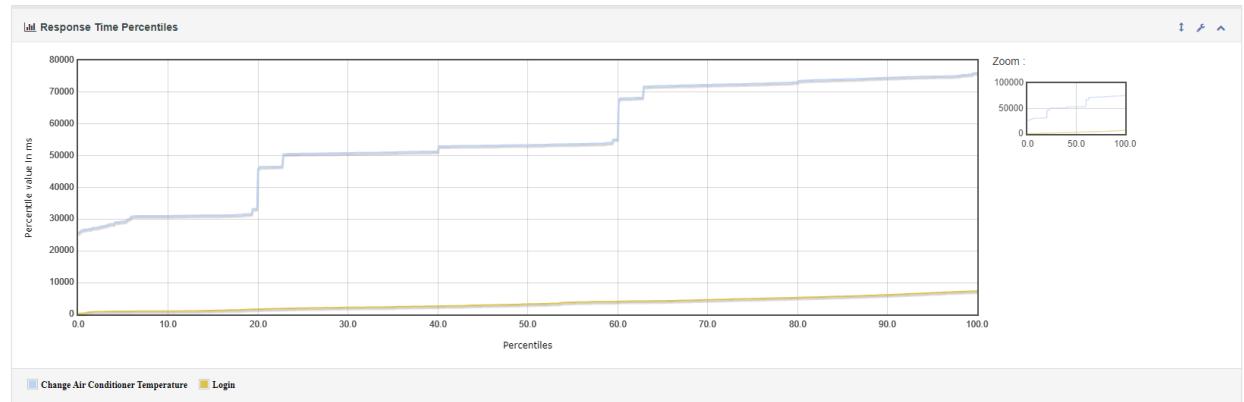
2. 500 korisnika, 100 pokrenutih simulatora

APDEX (Application Performance Index)			
Apdex	T (Toleration threshold)	F (Frustration threshold)	Label
0.050	500 ms	1 sec 500 ms	Total
0.000	500 ms	1 sec 500 ms	Change Air Conditioner Temperature
0.099	500 ms	1 sec 500 ms	Login

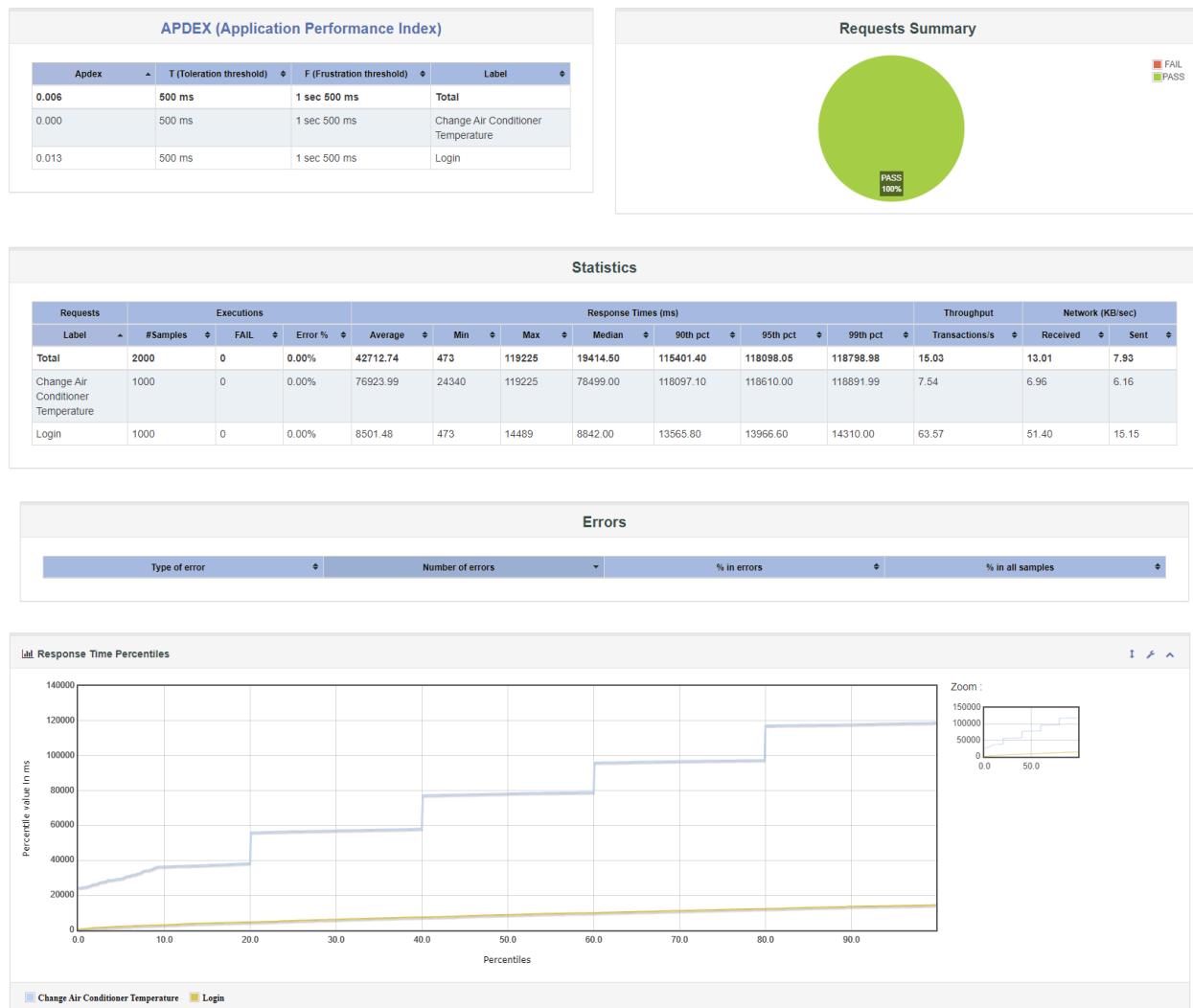


Statistics																
Requests		Executions					Response Times (ms)								Throughput	Network (KB/sec)
Label	#Samples	FAIL	Error %	Average	Min	Max	Median	90th pct	95th pct	99th pct	Transactions/s	Received	Sent			
Total	1000	0	0.00%	29789.51	280	76091	16531.50	73539.80	74583.95	75323.02	11.70	10.13	6.18			
Change Air Conditioner Temperature	500	0	0.00%	56102.39	25702	76091	53391.00	74583.90	74971.80	75650.85	5.88	5.42	4.81			
Login	500	0	0.00%	3476.63	280	7361	3258.50	6175.90	6790.40	7291.44	53.40	43.18	12.72			

Errors			
Type of error	Number of errors	% in errors	% in all samples



### 3. 1000 korisnika, 100 pokrenutih simulatora



Flat vrednosti na grafu je kada broj poruka na MQTT brokeru dostigne veoma veliki nivo, pa je neophodno vreme da se sve one obrade. Uz to, usput stizu i poruke sa simulatora pa postaje sve sporije i sporije

## 2 - Sklanjanje loggera sa backend dela aplikacije i sa simulatora

Sklanjanjem loggera bismo dobili dosta bolje performanse, medjutim radi odrzivosti sistema, necemo sklanjati logger