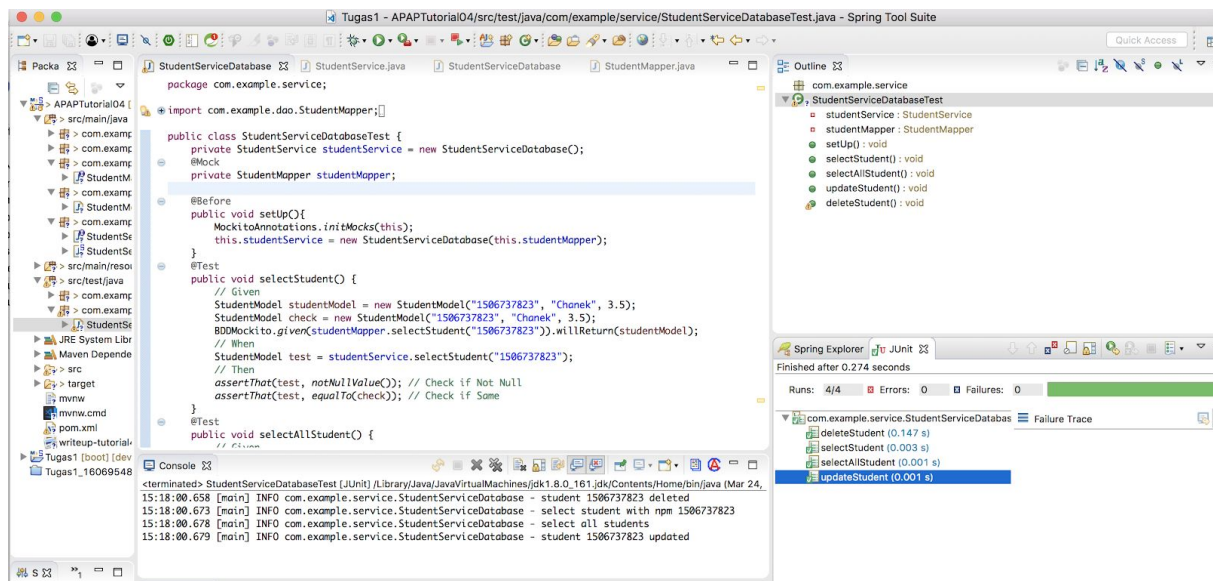


Unit Testing dan Load Testing Web App Sederhana

Latihan Unit Testing



Latihan Load Testing

- SelectStudent Berhasil

The screenshot shows the Apache JMeter interface with the 'View Results in Table' window open. The table displays the results of 32 HTTP requests. The columns are: Sample #, Start Time, Thread Name, Label, Sample Time(ms), Status, Bytes, Sent Bytes, Latency, and Connect Time(ms). The status for all requests is 'Success'.

Sample #	Start Time	Thread Name	Label	Sample Time(ms)	Status	Bytes	Sent Bytes	Latency	Connect Time(ms)
1	16:10:27.938	Thread Group ...	HTTP Request	24	Success	1630	141	24	6
2	16:10:28.039	Thread Group ...	HTTP Request	6	Success	1630	141	6	1
3	16:10:28.141	Thread Group ...	HTTP Request	6	Success	1630	141	6	1
4	16:10:28.245	Thread Group ...	HTTP Request	5	Success	1630	141	5	0
5	16:10:28.246	Thread Group ...	HTTP Request	8	Success	1630	141	7	1
6	16:10:28.446	Thread Group ...	HTTP Request	7	Success	1630	141	7	1
7	16:10:28.546	Thread Group ...	HTTP Request	4	Success	1630	141	4	0
8	16:10:28.646	Thread Group ...	HTTP Request	6	Success	1630	141	6	1
9	16:10:28.750	Thread Group ...	HTTP Request	8	Success	1630	141	8	1
10	16:10:28.851	Thread Group ...	HTTP Request	5	Success	1630	141	5	1
11	16:10:28.947	Thread Group ...	HTTP Request	10	Success	1630	141	10	2
12	16:10:29.052	Thread Group ...	HTTP Request	7	Success	1630	141	7	1
13	16:10:29.151	Thread Group ...	HTTP Request	8	Success	1630	141	8	1
14	16:10:29.249	Thread Group ...	HTTP Request	10	Success	1630	141	9	0
15	16:10:29.353	Thread Group ...	HTTP Request	4	Success	1630	141	4	0
16	16:10:29.449	Thread Group ...	HTTP Request	8	Success	1630	141	8	1
17	16:10:29.552	Thread Group ...	HTTP Request	8	Success	1630	141	8	1
18	16:10:29.649	Thread Group ...	HTTP Request	7	Success	1630	141	7	1
19	16:10:29.752	Thread Group ...	HTTP Request	6	Success	1630	141	6	0
20	16:10:29.854	Thread Group ...	HTTP Request	7	Success	1630	141	7	1
21	16:10:29.950	Thread Group ...	HTTP Request	15	Success	1630	141	15	2
22	16:10:30.053	Thread Group ...	HTTP Request	5	Success	1630	141	5	1
23	16:10:30.156	Thread Group ...	HTTP Request	5	Success	1630	141	5	0
24	16:10:30.250	Thread Group ...	HTTP Request	8	Success	1630	141	8	1
25	16:10:30.353	Thread Group ...	HTTP Request	6	Success	1630	141	6	1
26	16:10:30.454	Thread Group ...	HTTP Request	27	Success	1630	141	27	1
27	16:10:30.560	Thread Group ...	HTTP Request	11	Success	1630	141	11	1
28	16:10:30.658	Thread Group ...	HTTP Request	8	Success	1630	141	8	1
29	16:10:30.756	Thread Group ...	HTTP Request	9	Success	1630	141	9	1
30	16:10:30.861	Thread Group ...	HTTP Request	6	Success	1630	141	6	1
31	16:10:30.959	Thread Group ...	HTTP Request	8	Success	1630	141	8	1
32	16:10:31.061	Thread Group ...	HTTP Request	8	Success	1630	141	8	1

Sample time awal 24ms hingga 8ms, dengan avarage 11ms

- SelectStudent Gagal

View Results in Table

Name: View Results in Table

Comments:

Write results to file / Read from file

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

Sample #	Start Time	Thread Name	Label	Sample Time(ms)	Status	Bytes	Sent Bytes	Latency	Connect Time(ms)
1	16-14:10.685	Thread Group ...	HTTP Request	36	✓	1591	138	35	5
2	16-14:10.787	Thread Group ...	HTTP Request	5	✓	1591	138	5	0
3	16-14:10.890	Thread Group ...	HTTP Request	7	✓	1591	138	7	2
4	16-14:10.989	Thread Group ...	HTTP Request	7	✓	1591	138	7	1
5	16-14:11.091	Thread Group ...	HTTP Request	6	✓	1591	138	6	1
6	16-14:11.190	Thread Group ...	HTTP Request	7	✓	1591	138	7	1
7	16-14:11.293	Thread Group ...	HTTP Request	15	✓	1591	138	15	5
8	16-14:11.390	Thread Group ...	HTTP Request	6	✓	1591	138	6	0
9	16-14:11.489	Thread Group ...	HTTP Request	6	✓	1591	138	6	1
10	16-14:11.589	Thread Group ...	HTTP Request	7	✓	1591	138	7	1
11	16-14:11.687	Thread Group ...	HTTP Request	4	✓	1591	138	4	1
12	16-14:11.789	Thread Group ...	HTTP Request	5	✓	1591	138	5	1
13	16-14:11.889	Thread Group ...	HTTP Request	8	✓	1591	138	8	1
14	16-14:11.986	Thread Group ...	HTTP Request	9	✓	1591	138	9	1
15	16-14:12.092	Thread Group ...	HTTP Request	10	✓	1591	138	10	0
16	16-14:12.188	Thread Group ...	HTTP Request	6	✓	1591	138	6	0
17	16-14:12.289	Thread Group ...	HTTP Request	6	✓	1591	138	6	0
18	16-14:12.388	Thread Group ...	HTTP Request	6	✓	1591	138	6	1
19	16-14:12.494	Thread Group ...	HTTP Request	7	✓	1591	138	7	1
20	16-14:12.592	Thread Group ...	HTTP Request	7	✓	1591	138	7	1
21	16-14:12.693	Thread Group ...	HTTP Request	8	✓	1591	138	8	1
22	16-14:12.796	Thread Group ...	HTTP Request	8	✓	1591	138	8	2
23	16-14:12.894	Thread Group ...	HTTP Request	7	✓	1591	138	7	1
24	16-14:12.993	Thread Group ...	HTTP Request	7	✓	1591	138	7	1
25	16-14:13.096	Thread Group ...	HTTP Request	7	✓	1591	138	7	1
26	16-14:13.192	Thread Group ...	HTTP Request	6	✓	1591	138	6	1
27	16-14:13.293	Thread Group ...	HTTP Request	5	✓	1591	138	5	1
28	16-14:13.394	Thread Group ...	HTTP Request	8	✓	1591	138	8	1
29	16-14:13.493	Thread Group ...	HTTP Request	8	✓	1591	138	8	1
30	16-14:13.593	Thread Group ...	HTTP Request	7	✓	1591	138	7	1
31	16-14:13.693	Thread Group ...	HTTP Request	7	✓	1591	138	7	1
32	16-14:13.794	Thread Group ...	HTTP Request	6	✓	1591	138	6	1

☐ Scroll automatically?
 ☐ Child samples?
 No of Samples 100
 Latest Sample 5
 Average 6
 Deviation 3

Sample time awal 36ms hingga 6ms dengan avarage 6ms

- SelectAllStudent

Load testing pada fitur ini tidak berhasil dijalankan sampai selesai.

View Results in Table

Name: View Results in Table

Comments:

Write results to file / Read from file

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

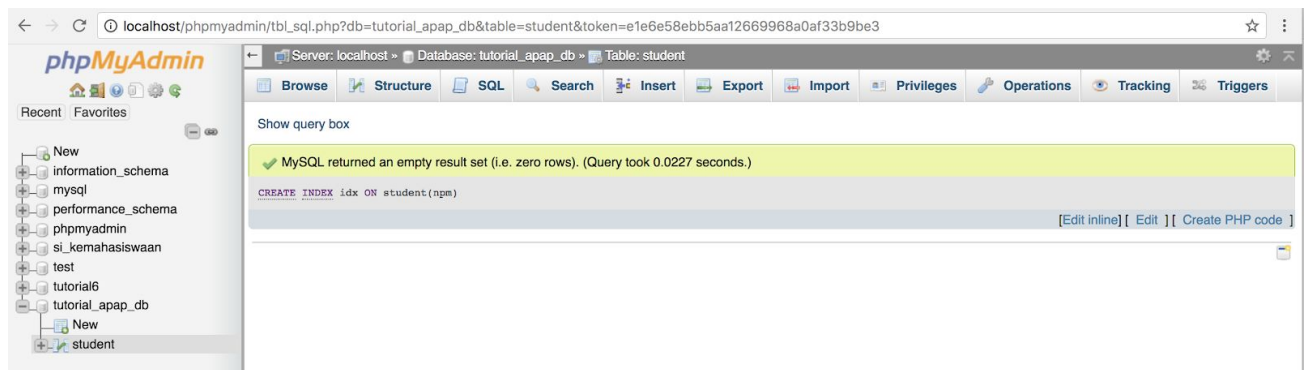
Sample #	Start Time	Thread Name	Label	Sample Time(ms)	Status	Bytes	Sent Bytes	Latency	Connect Time(ms)
1	17-21:19.275	Thread Group ...	HTTP Request	15862	✓	1979618	133	13560	37
2	17-21:19.258	Thread Group ...	HTTP Request	16184	✓	1979618	133	15847	57
3	17-21:19.383	Thread Group ...	HTTP Request	27259	✓	1979618	133	22201	1
4	17-21:19.581	Thread Group ...	HTTP Request	59538	✓	1979618	133	40615	1

☐ Scroll automatically?
 ☐ Child samples?
 No of Samples 4
 Latest Sample 59538
 Average 20719
 Deviation 17821

Setelah Melakukan optimasi berupa:

1. Indexing pada table student

```
CREATE INDEX idx ON students(npm)
```



2. Mengganti servlet container menjadi Undertow yaitu dengan cara menambahkan dependency undertow pada file pom.xml

```
<dependency>
  <groupId>org.springframework.boot</groupId>
  <artifactId>spring-boot-starter-undertow</artifactId>
</dependency>
```

Maka hasil yang didapatkan adalah seperti di bawah ini.

SelectStudent Berhasil

Sample #	Start Time	Thread Name	Label	Sample Time(ms)	Status	Bytes	Sent Bytes	Latency	Connect Time(ms)
1	18:29:49.816	Thread Group ...	HTTP Request	13	Success	1657	141	13	2
2	18:29:49.919	Thread Group ...	HTTP Request	6	Success	1657	141	6	1
3	18:29:50.022	Thread Group ...	HTTP Request	9	Success	1657	141	9	0
4	18:29:50.121	Thread Group ...	HTTP Request	10	Success	1657	141	10	1
5	18:29:50.222	Thread Group ...	HTTP Request	9	Success	1657	141	9	0
6	18:29:50.318	Thread Group ...	HTTP Request	7	Success	1657	141	7	1
7	18:29:50.420	Thread Group ...	HTTP Request	10	Success	1657	141	10	1
8	18:29:50.520	Thread Group ...	HTTP Request	9	Success	1657	141	9	1
9	18:29:50.619	Thread Group ...	HTTP Request	7	Success	1657	141	6	0
10	18:29:50.720	Thread Group ...	HTTP Request	11	Success	1657	141	11	1
11	18:29:50.817	Thread Group ...	HTTP Request	8	Success	1657	141	8	1
12	18:29:50.919	Thread Group ...	HTTP Request	7	Success	1657	141	7	3
13	18:29:51.018	Thread Group ...	HTTP Request	7	Success	1657	141	7	1
14	18:29:51.120	Thread Group ...	HTTP Request	9	Success	1657	141	9	1
15	18:29:51.222	Thread Group ...	HTTP Request	9	Success	1657	141	9	1
16	18:29:51.323	Thread Group ...	HTTP Request	12	Success	1657	141	12	1
17	18:29:51.422	Thread Group ...	HTTP Request	10	Success	1657	141	10	1
18	18:29:51.523	Thread Group ...	HTTP Request	7	Success	1657	141	7	0
19	18:29:51.623	Thread Group ...	HTTP Request	10	Success	1657	141	10	1
20	18:29:51.718	Thread Group ...	HTTP Request	8	Success	1657	141	7	1
21	18:29:51.821	Thread Group ...	HTTP Request	9	Success	1657	141	9	0
22	18:29:51.923	Thread Group ...	HTTP Request	10	Success	1657	141	9	1
23	18:29:52.024	Thread Group ...	HTTP Request	9	Success	1657	141	9	1
24	18:29:52.122	Thread Group ...	HTTP Request	9	Success	1657	141	9	0
25	18:29:52.221	Thread Group ...	HTTP Request	10	Success	1657	141	10	0
26	18:29:52.323	Thread Group ...	HTTP Request	9	Success	1657	141	9	1
27	18:29:52.424	Thread Group ...	HTTP Request	9	Success	1657	141	9	1
28	18:29:52.528	Thread Group ...	HTTP Request	6	Success	1657	141	6	0
29	18:29:52.628	Thread Group ...	HTTP Request	9	Success	1657	141	9	1

Sample time awal 13ms hingga 6ms dengan avarage 8ms

- SelectStudent Gagal

Sample #	Start Time	Thread Name	Label	Sample Time(ms)	Status	Bytes	Sent Bytes	Latency	Connect Time(ms)
1	18:37:59.309	Thread Group ...	HTTP Request	35	Success	1618	138	34	2
2	18:37:59.410	Thread Group ...	HTTP Request	12	Success	1618	138	12	2
3	18:37:59.511	Thread Group ...	HTTP Request	4	Success	1618	138	4	0
4	18:37:59.612	Thread Group ...	HTTP Request	5	Success	1618	138	5	1
5	18:37:59.714	Thread Group ...	HTTP Request	7	Success	1618	138	7	1
6	18:37:59.812	Thread Group ...	HTTP Request	5	Success	1618	138	5	0
7	18:37:59.912	Thread Group ...	HTTP Request	5	Success	1618	138	5	1
8	18:38:00.015	Thread Group ...	HTTP Request	8	Success	1618	138	8	1
9	18:38:00.115	Thread Group ...	HTTP Request	6	Success	1618	138	6	5
10	18:38:00.214	Thread Group ...	HTTP Request	6	Success	1618	138	6	0
11	18:38:00.315	Thread Group ...	HTTP Request	6	Success	1618	138	6	0
12	18:38:00.414	Thread Group ...	HTTP Request	5	Success	1618	138	5	1
13	18:38:00.512	Thread Group ...	HTTP Request	6	Success	1618	138	6	0
14	18:38:00.615	Thread Group ...	HTTP Request	5	Success	1618	138	5	0
15	18:38:00.711	Thread Group ...	HTTP Request	9	Success	1618	138	9	1
16	18:38:00.815	Thread Group ...	HTTP Request	5	Success	1618	138	5	1
17	18:38:00.915	Thread Group ...	HTTP Request	7	Success	1618	138	7	0
18	18:38:01.015	Thread Group ...	HTTP Request	10	Success	1618	138	10	1
19	18:38:01.113	Thread Group ...	HTTP Request	6	Success	1618	138	6	0
20	18:38:01.215	Thread Group ...	HTTP Request	10	Success	1618	138	10	1
21	18:38:01.314	Thread Group ...	HTTP Request	7	Success	1618	138	7	1
22	18:38:01.411	Thread Group ...	HTTP Request	5	Success	1618	138	5	1
23	18:38:01.515	Thread Group ...	HTTP Request	9	Success	1618	138	9	1
24	18:38:01.615	Thread Group ...	HTTP Request	9	Success	1618	138	9	1
25	18:38:01.715	Thread Group ...	HTTP Request	7	Success	1618	138	7	1
26	18:38:01.814	Thread Group ...	HTTP Request	7	Success	1618	138	7	0
27	18:38:01.914	Thread Group ...	HTTP Request	4	Success	1618	138	4	0
28	18:38:02.015	Thread Group ...	HTTP Request	6	Success	1618	138	6	0
29	18:38:02.115	Thread Group ...	HTTP Request	10	Success	1618	138	10	1

Sample time awal 35ms hingga 6ms dengan avarage 3ms

- SelectAllStudent

Setelah melakukan optimisasi, load testing pada fitur ini dapat dilakukan hingga selesai.

Sample #	Start Time	Thread Name	Label	Sample Time(ms)	Status	Bytes	Sent Bytes	Latency	Connect Time(ms)
1	18:40:13.481	Thread Group ...	HTTP Request	2992	Success	1978677	133	2676	1
2	18:40:13.585	Thread Group ...	HTTP Request	3793	Success	1978677	133	3470	0
3	18:40:13.683	Thread Group ...	HTTP Request	6770	Success	1978677	133	6260	0
4	18:40:13.884	Thread Group ...	HTTP Request	9854	Success	1978677	133	9514	0
5	18:40:13.785	Thread Group ...	HTTP Request	9960	Success	1978677	133	9664	1
6	18:40:14.487	Thread Group ...	HTTP Request	9698	Success	1978677	133	9592	0
7	18:40:13.985	Thread Group ...	HTTP Request	10528	Success	1978677	133	9879	1
8	18:40:14.387	Thread Group ...	HTTP Request	12609	Success	1978677	133	10257	0
9	18:40:14.586	Thread Group ...	HTTP Request	12579	Success	1978677	133	12150	0
10	18:40:14.184	Thread Group ...	HTTP Request	13335	Success	1978677	133	12868	1
11	18:40:14.888	Thread Group ...	HTTP Request	12785	Success	1978677	133	12720	0
12	18:40:14.087	Thread Group ...	HTTP Request	13611	Success	1978677	133	12984	0
13	18:40:14.787	Thread Group ...	HTTP Request	13024	Success	1978677	133	12243	0
14	18:40:14.286	Thread Group ...	HTTP Request	13570	Success	1978677	133	13071	0
15	18:40:14.988	Thread Group ...	HTTP Request	12899	Success	1978677	133	12539	1
16	18:40:15.687	Thread Group ...	HTTP Request	12252	Success	1978677	133	11684	0
17	18:40:14.686	Thread Group ...	HTTP Request	13297	Success	1978677	133	12820	1
18	18:40:16.184	Thread Group ...	HTTP Request	12175	Success	1978677	133	11721	1
19	18:40:16.289	Thread Group ...	HTTP Request	12229	Success	1978677	133	11760	0
20	18:40:15.588	Thread Group ...	HTTP Request	12946	Success	1978677	133	12423	0
21	18:40:16.086	Thread Group ...	HTTP Request	12786	Success	1978677	133	11990	0
22	18:40:15.083	Thread Group ...	HTTP Request	13878	Success	1978677	133	13365	1
23	18:40:15.386	Thread Group ...	HTTP Request	13581	Success	1978677	133	13080	1
24	18:40:16.684	Thread Group ...	HTTP Request	12680	Success	1978677	133	11729	0
25	18:40:15.887	Thread Group ...	HTTP Request	13487	Success	1978677	133	12673	0
26	18:40:15.284	Thread Group ...	HTTP Request	14102	Success	1978677	133	13497	1
27	18:40:16.588	Thread Group ...	HTTP Request	12923	Success	1978677	133	12229	1
28	18:40:15.187	Thread Group ...	HTTP Request	15836	Success	1978677	133	13854	1
29	18:40:16.488	Thread Group ...	HTTP Request	14598	Success	1978677	133	12565	1

Sample time awal 2992ms hingga 14598ms dengan avarage 22831ms

Kesimpulan :

Setelah melakukan optimasi maka meningkatkan kinerja aplikasi Spring Boot, Manfaatnya lebih kecil untuk aplikasi yang lebih kecil, tetapi untuk aplikasi yang lebih besar maka akan memberikan dampak yaitu dapat berjalan dengan lebih cepat.