

Ringkasan

Dalam tutorial ini, saya mempelajari mengenai *unit testing* dan *load testing*. *Unit testing* dilakukan dengan menggunakan JUnit & Mockito, testing dilakukan terhadap telah dibuat pada tutorial sebelumnya, seperti method `addStudent`, `deleteStudent` dan `updateStudent`. Sedangkan, untuk *load testing* digunakan JMeter sebagai alat melakukan *test* tersebut, sehingga saya dapat mengetahui bagaimana cara menggunakan JMeter.

Latihan Unit Testing

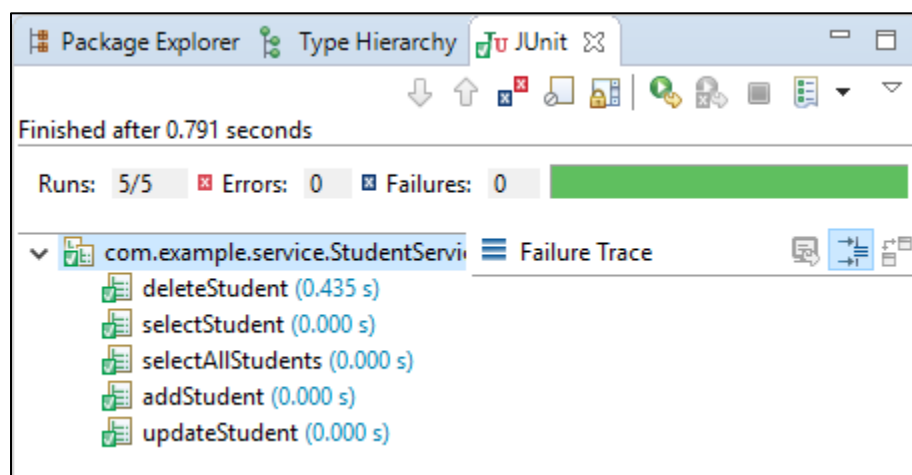
- **Unit testing `selectAllStudents`**

Method tersebut awalnya akan membuat 2 list Class `StudentModels`. Selanjutnya akan membuat method `studentMapper.selectAllStudents()` akan mengembalikan list Class `StudentModels`. Selanjutnya, akan dipanggil method `studentMapper.selectAllStudents()` kemudian hasilnya akan ditampung ke dalam sebuah variabel. Selanjutnya, dilakukan pengecekan variabel tadi apakah nilainya tidak kosong atau *not null*. Kemudian, dilakukan pengecekan kembali apakah variabel yang berupa lagi kosong atau tidak. Selanjutnya, ada pengecekan kembali apakah list tersebut memiliki ukuran yang sama atau tidak. Terakhir, dilakukan pengecekan apakah nilainya sesuai dengan list yang telah didefinisikan sebelumnya.

- **Unit testing `addStudent`**

Method tersebut awalnya akan membuat 2 object dari Class `StudentModel` dengan nilai attribute yang sama. Kemudian, dalam method tersebut akan membuat `studentService.addStudent(studentModel)` mengembalikan nilai “true”. Selanjutnya, akan dipanggil method `studentService.addStudent(studentModel)` dengan parameter salah satu object yang didefinisikan di awal tadi. Kemudian, hasilnya akan ditampung ke dalam sebuah variabel. Selanjutnya, dipanggil lagi method yang sama dengan parameter yang lainnya. Terakhir, hasil dari method tersebut akan dilakukan pengecekan dengan variabel tadi, apakah nilainya sama atau tidak.

Screenshot hasil testing pada latihan Unit Testing.



Gambar 1. Hasil Unit Testing

```
// Then
BDDMockito.then(studentMapper).should().addStudent(check);
assertThat(test, equalTo(true)); // Check if Same
}

@Test
public void deleteStudent() {
    // Given
    StudentModel studentModel = new StudentModel("1506737823", "Chanek", 3.5);
    StudentModel check = new StudentModel("1506737823", "Chanek", 3.5);
    BDDMockito.given(studentService.deleteStudent(studentModel)).willReturn(true);

    // When
    boolean test = studentService.deleteStudent(studentModel);

    // Then
    BDDMockito.then(studentMapper).should().deleteStudent(check);
    assertThat(test, equalTo(true)); // Check if Same
}

@Test
public void updateStudent() {
    // Given
    StudentModel studentModel = new StudentModel("1506737823", "Chanek", 3.5);
    StudentModel check = new StudentModel("1506737823", "Chanek", 3.5);
    BDDMockito.given(studentService.updateStudent(studentModel)).willReturn(true);

    // When
    boolean test = studentService.updateStudent(studentModel);

    // Then
    BDDMockito.then(studentMapper).should().updateStudent(check);
    assertThat(test, equalTo(true)); // Check if Same
}
}
```

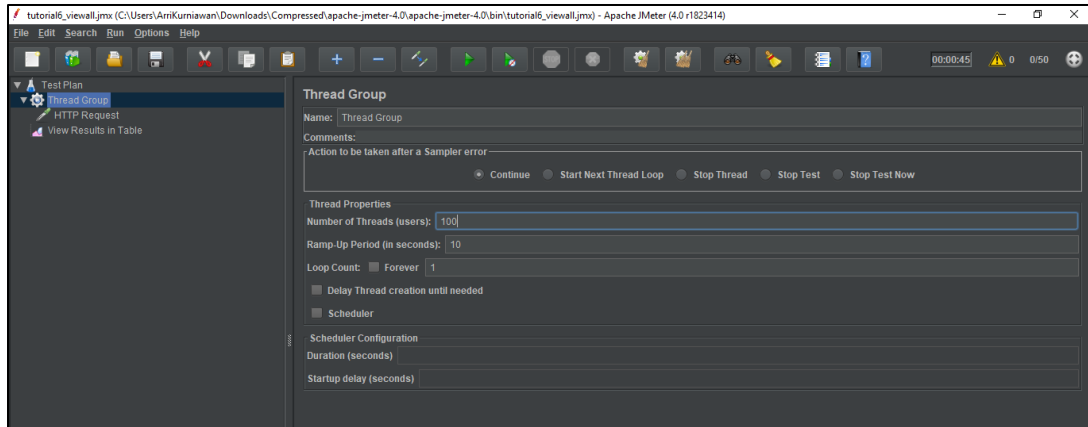
Gambar 2. Method Test Delete & Update

Latihan Load Testing

Optimasi dilakukan dengan menambahkan index pada table student. Index diberikan pada *column* name dan gpa. Index yang ditambahkan dapat dilihat pada **create_student_index.sql** yang ada pada folder project. Waktu yang dibutuhkan setelah dilakukan optimasi menjadi lebih cepat seperti terlihat pada Gambar 8 dan Gambar 11.

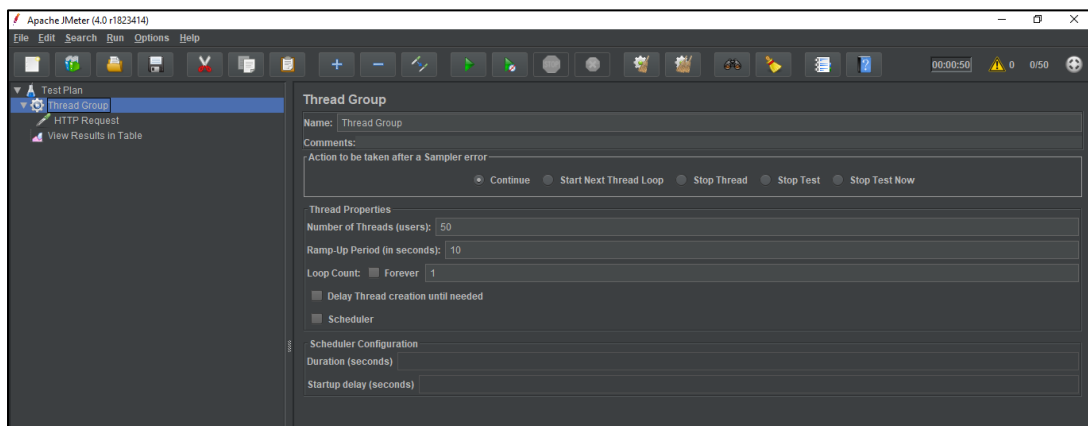
Screenshot hasil JMeter fitur soal latihan Load Testing nomor 1 sebelum dioptimasi

Gambar 3 merupakan pengaturan dari Thread Group yang dilakukan untuk melakukan *Load Testing* dengan menggunakan JMeter untuk method selectStudentBerhasil (data student ditemukan dengan npm yang dicari) dan selectStudentGagal (data student tidak ditemukan dengan npm yang dicari).

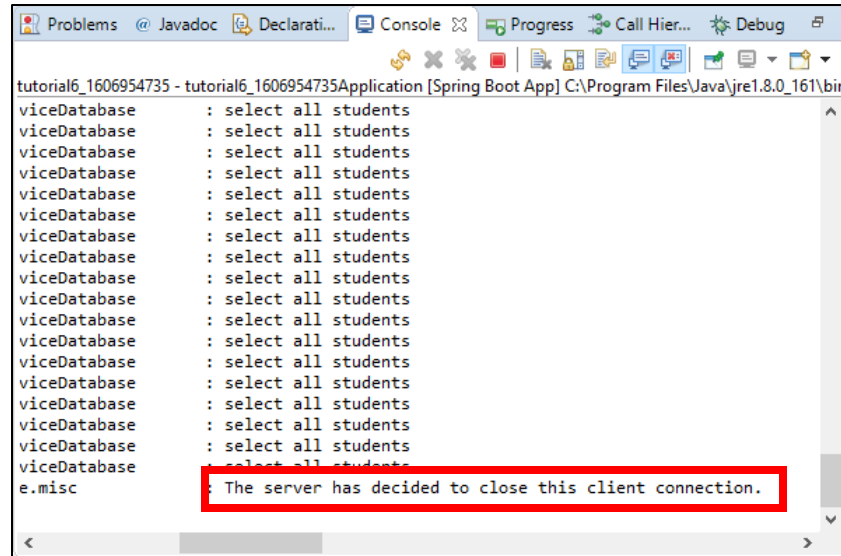


Gambar 3. Setting Thread Group Ke-1

Kemudian, dikarenakan keterbatasan hardware yang digunakan untuk Load Testing pada method selectAllStudents dengan menggunakan JMeter digunakan pengaturan Thread Group seperti Gambar 4. Dan jika tetap menggunakan pengaturan seperti Gambar 3, akan tampil error seperti Gambar 5 di console dan error di JMeter seperti Gambar 6.



Gambar 4. Setting Thread Group Ke-2



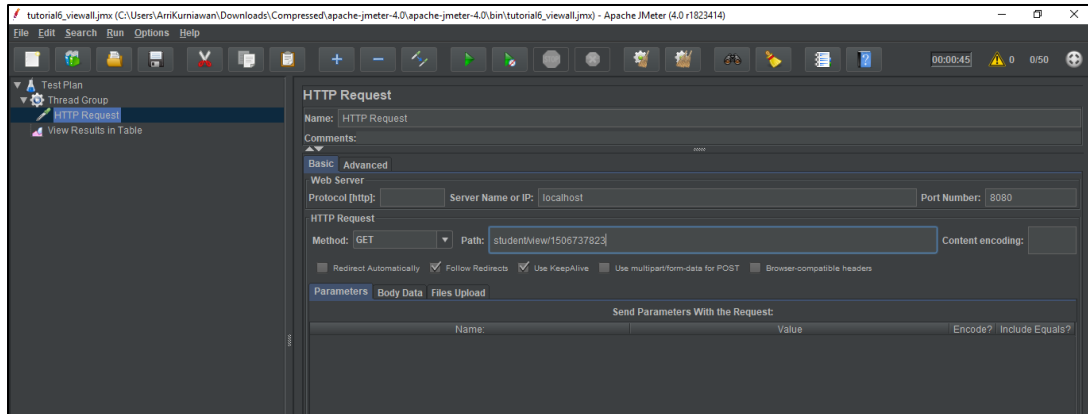
Gambar 5. Error run JMeter

The screenshot shows the Apache JMeter 4.0.1 interface. The 'View Results in Table' window is open, displaying a table of test results. The table has columns for Sample #, Start Time, Thread Name, Label, Sample Time (ms), Status, Bytes, Sent Bytes, Latency, and Connect Time (ms). The table contains 27 rows of data, all with a status of 'Success' (indicated by a green checkmark). The 'Sample Time (ms)' column shows values ranging from 754072 to 754958. The 'Bytes' column shows values ranging from 2675 to 754958. The 'Sent Bytes' column shows values ranging from 0 to 754958. The 'Latency' column shows values ranging from 0 to 82. The 'Connect Time (ms)' column shows values ranging from 0 to 1. The table is sorted by 'Sample Time (ms)' in ascending order. The 'Status' column shows a green checkmark for all samples. The 'Bytes' column shows a value of 2675 for all samples. The 'Sent Bytes' column shows a value of 0 for all samples. The 'Latency' column shows a value of 0 for all samples. The 'Connect Time (ms)' column shows a value of 0 for all samples. The table is titled 'View Results in Table' and has a 'Name' field set to 'View Results in Table'. The 'Comments' field is empty. The 'Write results to file / Read from file' section is empty. The 'Log/Display Only' section has checkboxes for 'Errors', 'Successes', and 'Configure'. The 'Errors' checkbox is checked. The 'Successes' checkbox is unchecked. The 'Configure' checkbox is unchecked. The 'No of Samples' is 100. The 'Latest Sample' is 756255. The 'Average' is 756120. The 'Deviation' is 2895.

Sample #	Start Time	Thread Name	Label	Sample Time (ms)	Status	Bytes	Sent Bytes	Latency	Connect Time (ms)
1	16:30:08.649	Thread Group 1...	HTTP Request	757596	Success	2675	0	0	1
2	16:30:12.172	Thread Group 1...	HTTP Request	754072	Success	2675	0	0	1
3	16:30:13.670	Thread Group 1...	HTTP Request	752566	Success	2675	0	0	1
4	16:30:07.840	Thread Group 1...	HTTP Request	758396	Success	2675	0	0	1
5	16:30:08.452	Thread Group 1...	HTTP Request	757795	Success	2675	0	0	1
6	16:30:09.046	Thread Group 1...	HTTP Request	757193	Success	2675	0	0	1
7	16:30:11.157	Thread Group 1...	HTTP Request	755092	Success	2675	0	0	1
8	16:30:12.673	Thread Group 1...	HTTP Request	753569	Success	2675	0	0	1
9	16:30:10.746	Thread Group 1...	HTTP Request	755494	Success	2675	0	0	2
10	16:30:14.579	Thread Group 1...	HTTP Request	751954	Success	2675	0	0	1
11	16:30:06.840	Thread Group 1...	HTTP Request	759394	Success	2675	0	0	1
12	16:30:12.472	Thread Group 1...	HTTP Request	753775	Success	2675	0	0	1
13	16:30:11.357	Thread Group 1...	HTTP Request	754882	Success	2675	0	0	1
14	16:30:05.235	Thread Group 1...	HTTP Request	761009	Success	2675	0	0	82
15	16:30:09.247	Thread Group 1...	HTTP Request	757019	Success	2675	0	0	1
16	16:30:10.948	Thread Group 1...	HTTP Request	755322	Success	2675	0	0	1
17	16:30:12.972	Thread Group 1...	HTTP Request	753303	Success	2675	0	0	1
18	16:30:07.740	Thread Group 1...	HTTP Request	758540	Success	2675	0	0	1
19	16:30:09.148	Thread Group 1...	HTTP Request	757134	Success	2675	0	0	1
20	16:30:13.069	Thread Group 1...	HTTP Request	753219	Success	2675	0	0	1
21	16:30:08.737	Thread Group 1...	HTTP Request	757554	Success	2675	0	0	2
22	16:30:10.847	Thread Group 1...	HTTP Request	755448	Success	2675	0	0	1
23	16:30:05.437	Thread Group 1...	HTTP Request	760859	Success	2675	0	0	1
24	16:30:11.556	Thread Group 1...	HTTP Request	754742	Success	2675	0	0	1
25	16:30:09.846	Thread Group 1...	HTTP Request	756453	Success	2675	0	0	1
26	16:30:12.873	Thread Group 1...	HTTP Request	753429	Success	2675	0	0	1
27	16:30:10.046	Thread Group 1...	HTTP Request	756958	Success	2675	0	0	1

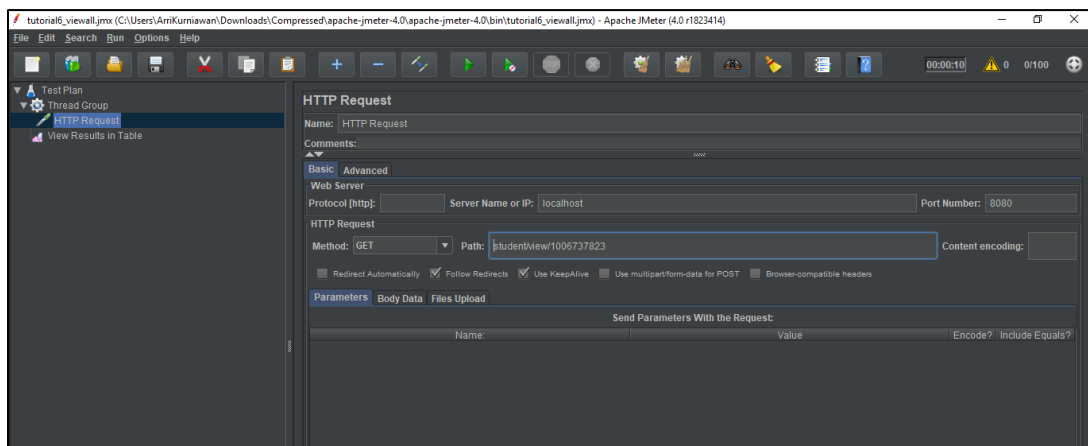
Gambar 6. Error jmeter_selectAllStudents dengan Pengaturan Gambar 1

Untuk pengaturan dari HTTP Request jmeter_selectStudentBerhasil dapat dilihat pada Gambar 7.



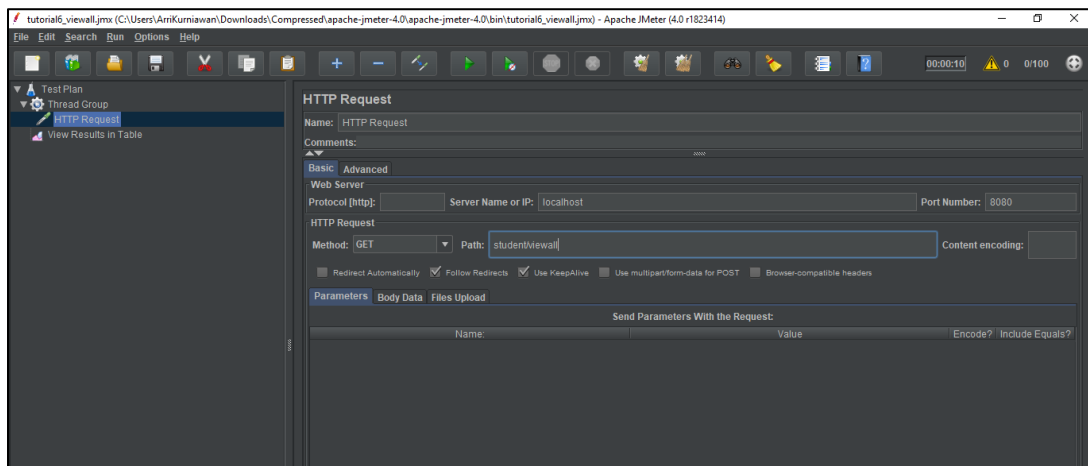
Gambar 7. Setting HTTP Request jmeter_selectStudentBerhasil

Untuk pengaturan dari HTTP Request jmeter_selectStudentGagal dapat dilihat pada Gambar 8.



Gambar 8. Setting HTTP Request jmeter_selectStudentGagal

Untuk pengaturan dari HTTP Request jmeter_selectAllStudent dapat dilihat pada Gambar 9.

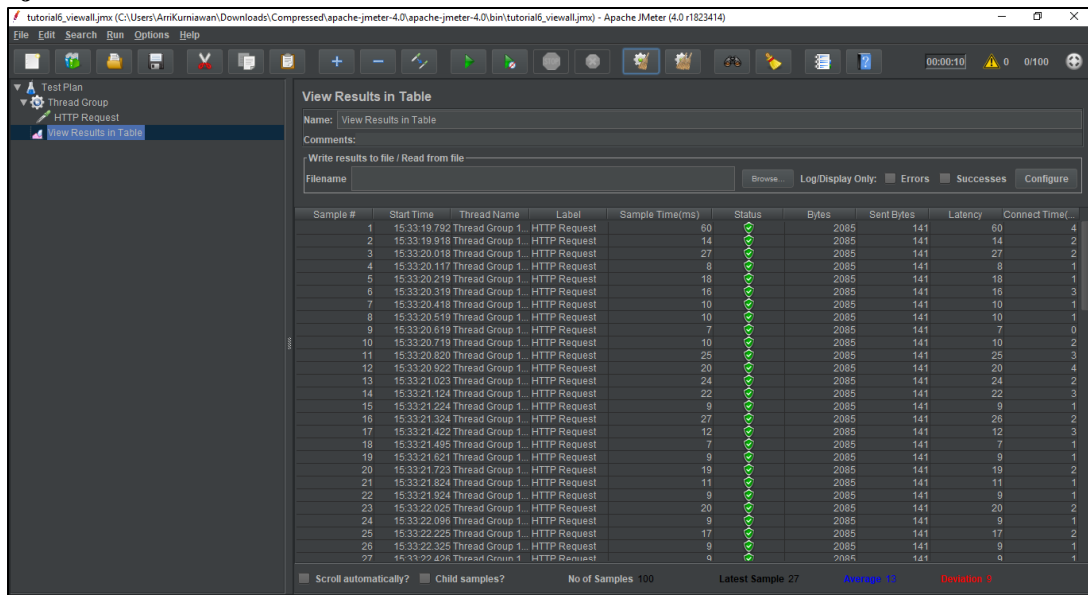


Gambar 9. Setting HTTP Request jmeter_selectAllStudent

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APAP – Genap 2017/2018
Tutorial 6

- **jmeter_selectStudentBerhasil**

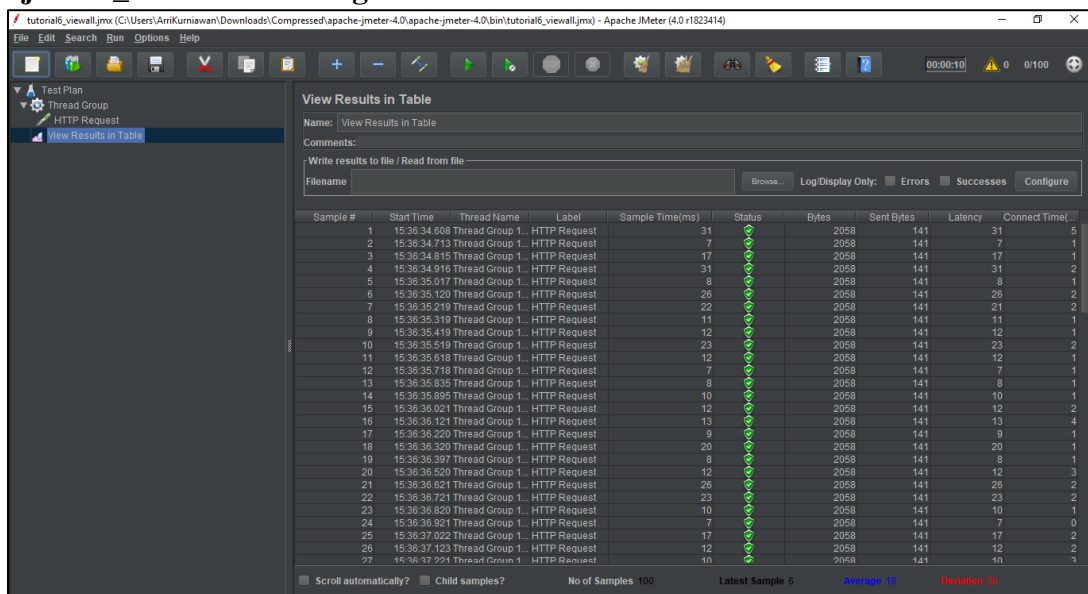


The screenshot shows the Apache JMeter 4.0.1 interface with the 'View Results in Table' window open. The table displays 27 samples, all with a status of 'Success' (green checkmark). The columns include Sample #, Start Time, Thread Name, Label, Sample Time (ms), Status, Bytes, Sent Bytes, Latency, and Connected Time. The summary at the bottom indicates 100 samples, with an average of 13 and a deviation of 9.

Sample #	Start Time	Thread Name	Label	Sample Time(ms)	Status	Bytes	Sent Bytes	Latency	Connected Time
1	15.33.19.792	Thread Group 1...	HTTP Request	60	Success	2085	141	60	4
2	15.33.19.918	Thread Group 1...	HTTP Request	14	Success	2085	141	14	2
3	15.33.20.018	Thread Group 1...	HTTP Request	27	Success	2085	141	27	2
4	15.33.20.117	Thread Group 1...	HTTP Request	9	Success	2085	141	9	1
5	15.33.20.219	Thread Group 1...	HTTP Request	18	Success	2085	141	18	1
6	15.33.20.319	Thread Group 1...	HTTP Request	16	Success	2085	141	16	3
7	15.33.20.418	Thread Group 1...	HTTP Request	10	Success	2085	141	10	1
8	15.33.20.519	Thread Group 1...	HTTP Request	10	Success	2085	141	10	1
9	15.33.20.619	Thread Group 1...	HTTP Request	7	Success	2085	141	7	0
10	15.33.20.719	Thread Group 1...	HTTP Request	10	Success	2085	141	10	2
11	15.33.20.820	Thread Group 1...	HTTP Request	25	Success	2085	141	25	3
12	15.33.20.922	Thread Group 1...	HTTP Request	20	Success	2085	141	20	4
13	15.33.21.023	Thread Group 1...	HTTP Request	24	Success	2085	141	24	2
14	15.33.21.124	Thread Group 1...	HTTP Request	22	Success	2085	141	22	3
15	15.33.21.224	Thread Group 1...	HTTP Request	9	Success	2085	141	9	1
16	15.33.21.324	Thread Group 1...	HTTP Request	27	Success	2085	141	26	2
17	15.33.21.422	Thread Group 1...	HTTP Request	12	Success	2085	141	12	3
18	15.33.21.495	Thread Group 1...	HTTP Request	7	Success	2085	141	7	1
19	15.33.21.521	Thread Group 1...	HTTP Request	9	Success	2085	141	9	1
20	15.33.21.723	Thread Group 1...	HTTP Request	19	Success	2085	141	19	2
21	15.33.21.824	Thread Group 1...	HTTP Request	11	Success	2085	141	11	1
22	15.33.21.924	Thread Group 1...	HTTP Request	9	Success	2085	141	9	1
23	15.33.22.025	Thread Group 1...	HTTP Request	20	Success	2085	141	20	2
24	15.33.22.096	Thread Group 1...	HTTP Request	9	Success	2085	141	9	1
25	15.33.22.225	Thread Group 1...	HTTP Request	17	Success	2085	141	17	2
26	15.33.22.325	Thread Group 1...	HTTP Request	9	Success	2085	141	9	1
27	15.33.22.426	Thread Group 1...	HTTP Request	9	Success	2085	141	9	1

Gambar 10. Hasil jmeter_selectStudentBerhasil

- **jmeter_selectStudentGagal**

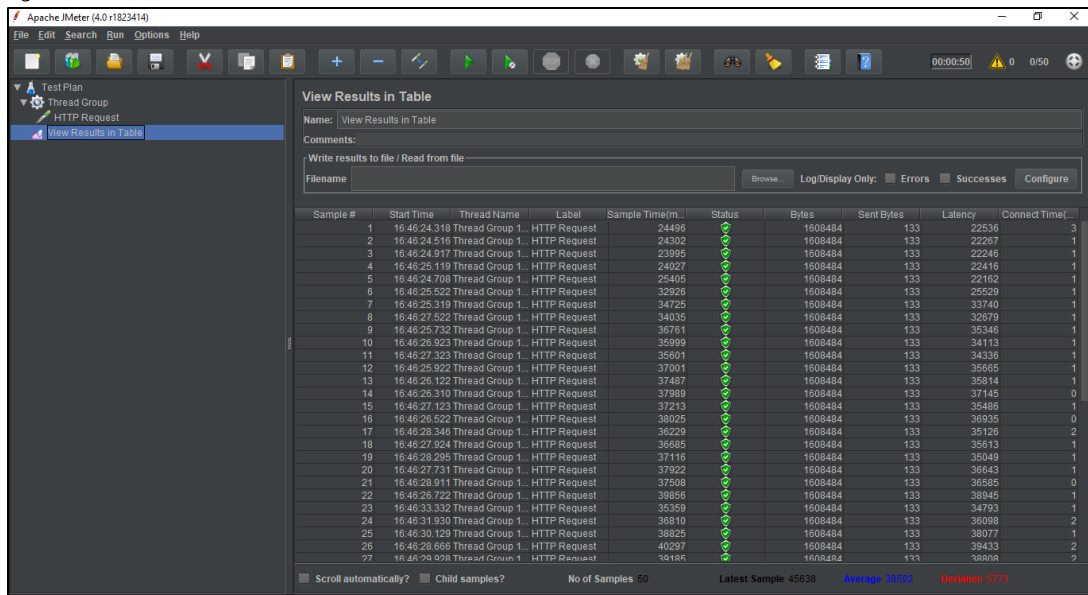


The screenshot shows the Apache JMeter 4.0.1 interface with the 'View Results in Table' window open. The table displays 27 samples, all with a status of 'Failure' (red X). The columns include Sample #, Start Time, Thread Name, Label, Sample Time (ms), Status, Bytes, Sent Bytes, Latency, and Connected Time. The summary at the bottom indicates 100 samples, with an average of 10 and a deviation of 28.

Sample #	Start Time	Thread Name	Label	Sample Time(ms)	Status	Bytes	Sent Bytes	Latency	Connected Time
1	15.36.34.608	Thread Group 1...	HTTP Request	31	Failure	2058	141	31	5
2	15.36.34.713	Thread Group 1...	HTTP Request	7	Failure	2058	141	7	1
3	15.36.34.815	Thread Group 1...	HTTP Request	17	Failure	2058	141	17	1
4	15.36.34.916	Thread Group 1...	HTTP Request	31	Failure	2058	141	31	2
5	15.36.35.017	Thread Group 1...	HTTP Request	8	Failure	2058	141	8	1
6	15.36.35.120	Thread Group 1...	HTTP Request	26	Failure	2058	141	26	2
7	15.36.35.219	Thread Group 1...	HTTP Request	22	Failure	2058	141	21	2
8	15.36.35.319	Thread Group 1...	HTTP Request	11	Failure	2058	141	11	1
9	15.36.35.419	Thread Group 1...	HTTP Request	12	Failure	2058	141	12	1
10	15.36.35.519	Thread Group 1...	HTTP Request	23	Failure	2058	141	23	2
11	15.36.35.618	Thread Group 1...	HTTP Request	12	Failure	2058	141	12	1
12	15.36.35.718	Thread Group 1...	HTTP Request	7	Failure	2058	141	7	1
13	15.36.35.835	Thread Group 1...	HTTP Request	8	Failure	2058	141	8	1
14	15.36.35.895	Thread Group 1...	HTTP Request	10	Failure	2058	141	10	1
15	15.36.36.021	Thread Group 1...	HTTP Request	12	Failure	2058	141	12	2
16	15.36.36.121	Thread Group 1...	HTTP Request	13	Failure	2058	141	13	4
17	15.36.36.220	Thread Group 1...	HTTP Request	9	Failure	2058	141	9	1
18	15.36.36.320	Thread Group 1...	HTTP Request	20	Failure	2058	141	20	1
19	15.36.36.397	Thread Group 1...	HTTP Request	8	Failure	2058	141	8	1
20	15.36.36.520	Thread Group 1...	HTTP Request	12	Failure	2058	141	12	3
21	15.36.36.621	Thread Group 1...	HTTP Request	26	Failure	2058	141	26	2
22	15.36.36.721	Thread Group 1...	HTTP Request	23	Failure	2058	141	23	2
23	15.36.36.820	Thread Group 1...	HTTP Request	10	Failure	2058	141	10	1
24	15.36.36.921	Thread Group 1...	HTTP Request	7	Failure	2058	141	7	0
25	15.36.37.022	Thread Group 1...	HTTP Request	17	Failure	2058	141	17	2
26	15.36.37.123	Thread Group 1...	HTTP Request	12	Failure	2058	141	12	2
27	15.36.37.221	Thread Group 1...	HTTP Request	10	Failure	2058	141	10	1

Gambar 11. Hasil jmeter_selectStudentGagal

- **jmeter_selectAllStudents**



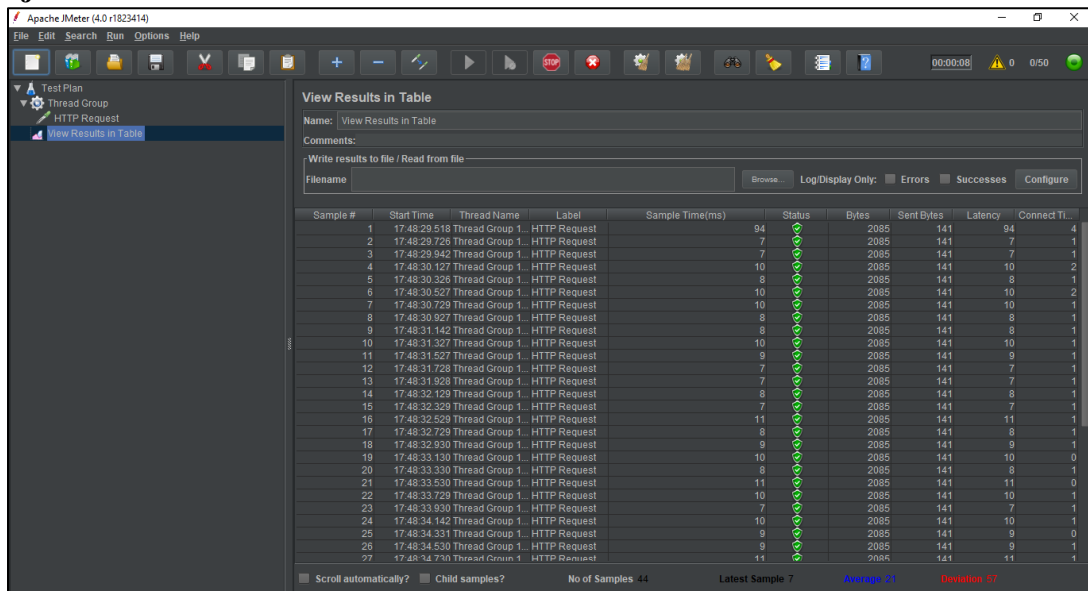
The screenshot displays the Apache JMeter 4.0 interface with the 'View Results in Table' option selected. The table shows 27 samples, all with a status of 'Success' (green checkmark). The columns include Sample #, Start Time, Thread Name, Label, Sample Time (ms), Status, Bytes, Sent Bytes, Latency, and Connect Time (ms). The 'No of Samples' is 50, and the 'Latest Sample' is 45038. Summary statistics at the bottom show an 'Average' of 30502 and a 'Deviation' of 5773.

Sample #	Start Time	Thread Name	Label	Sample Time (ms)	Status	Bytes	Sent Bytes	Latency	Connect Time (ms)
1	16.46.24.318	Thread Group 1...	HTTP Request	24496	Success	1608484	133	22536	3
2	16.46.24.516	Thread Group 1...	HTTP Request	24302	Success	1608484	133	22267	1
3	16.46.24.917	Thread Group 1...	HTTP Request	23995	Success	1608484	133	22246	1
4	16.46.25.119	Thread Group 1...	HTTP Request	24027	Success	1608484	133	22416	1
5	16.46.24.708	Thread Group 1...	HTTP Request	25405	Success	1608484	133	22162	1
6	16.46.25.522	Thread Group 1...	HTTP Request	32926	Success	1608484	133	25529	1
7	16.46.25.319	Thread Group 1...	HTTP Request	34725	Success	1608484	133	33740	1
8	16.46.27.522	Thread Group 1...	HTTP Request	34035	Success	1608484	133	32679	1
9	16.46.25.732	Thread Group 1...	HTTP Request	36761	Success	1608484	133	35346	1
10	16.46.26.923	Thread Group 1...	HTTP Request	35999	Success	1608484	133	34113	1
11	16.46.27.323	Thread Group 1...	HTTP Request	35601	Success	1608484	133	34336	1
12	16.46.25.922	Thread Group 1...	HTTP Request	37001	Success	1608484	133	35665	1
13	16.46.26.122	Thread Group 1...	HTTP Request	37487	Success	1608484	133	35914	1
14	16.46.26.310	Thread Group 1...	HTTP Request	37989	Success	1608484	133	37145	0
15	16.46.27.123	Thread Group 1...	HTTP Request	37213	Success	1608484	133	35486	1
16	16.46.26.522	Thread Group 1...	HTTP Request	38025	Success	1608484	133	36935	0
17	16.46.28.346	Thread Group 1...	HTTP Request	36229	Success	1608484	133	35126	2
18	16.46.27.924	Thread Group 1...	HTTP Request	36865	Success	1608484	133	35913	1
19	16.46.28.295	Thread Group 1...	HTTP Request	37116	Success	1608484	133	35049	1
20	16.46.27.731	Thread Group 1...	HTTP Request	37922	Success	1608484	133	36843	1
21	16.46.28.911	Thread Group 1...	HTTP Request	37508	Success	1608484	133	36585	0
22	16.46.26.722	Thread Group 1...	HTTP Request	39856	Success	1608484	133	38945	1
23	16.46.33.332	Thread Group 1...	HTTP Request	35369	Success	1608484	133	34793	1
24	16.46.31.930	Thread Group 1...	HTTP Request	36810	Success	1608484	133	36098	2
25	16.46.30.129	Thread Group 1...	HTTP Request	38825	Success	1608484	133	38077	1
26	16.46.28.666	Thread Group 1...	HTTP Request	40297	Success	1608484	133	39433	2
27	16.46.26.628	Thread Group 1...	HTTP Request	50165	Success	1608484	133	38886	2

Gambar 12. Hasil jmeter_selectAllStudents

Screenshot hasil JMeter fitur soal latihan Load Testing nomor 2 setelah dioptimasi

- **jmeter_selectStudentBerhasil**



The screenshot displays the Apache JMeter 4.0 interface with the 'View Results in Table' option selected. The table shows 27 samples, all with a status of 'Success' (green checkmark). The columns include Sample #, Start Time, Thread Name, Label, Sample Time (ms), Status, Bytes, Sent Bytes, Latency, and Connect Time (ms). The 'No of Samples' is 44, and the 'Latest Sample' is 7. Summary statistics at the bottom show an 'Average' of 21 and a 'Deviation' of 57.

Sample #	Start Time	Thread Name	Label	Sample Time (ms)	Status	Bytes	Sent Bytes	Latency	Connect Time (ms)
1	17.48.29.518	Thread Group 1...	HTTP Request	94	Success	2085	141	94	4
2	17.48.29.726	Thread Group 1...	HTTP Request	7	Success	2085	141	7	1
3	17.48.29.942	Thread Group 1...	HTTP Request	7	Success	2085	141	7	1
4	17.48.30.127	Thread Group 1...	HTTP Request	10	Success	2085	141	10	2
5	17.48.30.325	Thread Group 1...	HTTP Request	8	Success	2085	141	8	1
6	17.48.30.527	Thread Group 1...	HTTP Request	10	Success	2085	141	10	2
7	17.48.30.729	Thread Group 1...	HTTP Request	10	Success	2085	141	10	1
8	17.48.30.927	Thread Group 1...	HTTP Request	8	Success	2085	141	8	1
9	17.48.31.142	Thread Group 1...	HTTP Request	8	Success	2085	141	8	1
10	17.48.31.327	Thread Group 1...	HTTP Request	10	Success	2085	141	10	1
11	17.48.31.527	Thread Group 1...	HTTP Request	9	Success	2085	141	9	1
12	17.48.31.728	Thread Group 1...	HTTP Request	7	Success	2085	141	7	1
13	17.48.31.928	Thread Group 1...	HTTP Request	7	Success	2085	141	7	1
14	17.48.32.129	Thread Group 1...	HTTP Request	8	Success	2085	141	8	1
15	17.48.32.329	Thread Group 1...	HTTP Request	7	Success	2085	141	7	1
16	17.48.32.529	Thread Group 1...	HTTP Request	11	Success	2085	141	11	1
17	17.48.32.729	Thread Group 1...	HTTP Request	8	Success	2085	141	8	1
18	17.48.32.930	Thread Group 1...	HTTP Request	9	Success	2085	141	9	1
19	17.48.33.130	Thread Group 1...	HTTP Request	10	Success	2085	141	10	0
20	17.48.33.330	Thread Group 1...	HTTP Request	8	Success	2085	141	8	1
21	17.48.33.530	Thread Group 1...	HTTP Request	11	Success	2085	141	11	0
22	17.48.33.729	Thread Group 1...	HTTP Request	10	Success	2085	141	10	1
23	17.48.33.930	Thread Group 1...	HTTP Request	7	Success	2085	141	7	1
24	17.48.34.142	Thread Group 1...	HTTP Request	10	Success	2085	141	10	1
25	17.48.34.331	Thread Group 1...	HTTP Request	9	Success	2085	141	9	0
26	17.48.34.530	Thread Group 1...	HTTP Request	9	Success	2085	141	9	1
27	17.48.34.730	Thread Group 1...	HTTP Request	11	Success	2085	141	11	1

Gambar 13. Hasil jmeter_selectStudentBerhasil Optimasi

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APAP – Genap 2017/2018
Tutorial 6

- **jmeter_selectStudentGagal**

Sample #	Start Time	Thread Name	Label	Sample Time(ms)	Status	Bytes	Sent Bytes	Latency	Connect TL
1	17:49:12.473	Thread Group 1...	HTTP Request	29	Success	2085	141	29	1
2	17:49:12.579	Thread Group 1...	HTTP Request	9	Success	2085	141	9	1
3	17:49:12.680	Thread Group 1...	HTTP Request	7	Success	2085	141	7	0
4	17:49:12.793	Thread Group 1...	HTTP Request	14	Success	2085	141	14	1
5	17:49:12.880	Thread Group 1...	HTTP Request	10	Success	2085	141	10	1
6	17:49:12.980	Thread Group 1...	HTTP Request	9	Success	2085	141	9	1
7	17:49:13.081	Thread Group 1...	HTTP Request	8	Success	2085	141	8	1
8	17:49:13.181	Thread Group 1...	HTTP Request	7	Success	2085	141	7	0
9	17:49:13.281	Thread Group 1...	HTTP Request	10	Success	2085	141	10	0
10	17:49:13.381	Thread Group 1...	HTTP Request	6	Success	2085	141	6	0
11	17:49:13.493	Thread Group 1...	HTTP Request	7	Success	2085	141	7	1
12	17:49:13.581	Thread Group 1...	HTTP Request	8	Success	2085	141	8	1
13	17:49:13.681	Thread Group 1...	HTTP Request	9	Success	2085	141	9	1
14	17:49:13.781	Thread Group 1...	HTTP Request	9	Success	2085	141	9	1
15	17:49:13.881	Thread Group 1...	HTTP Request	7	Success	2085	141	7	1
16	17:49:13.981	Thread Group 1...	HTTP Request	8	Success	2085	141	8	1
17	17:49:14.093	Thread Group 1...	HTTP Request	7	Success	2085	141	7	1
18	17:49:14.183	Thread Group 1...	HTTP Request	8	Success	2085	141	8	1
19	17:49:14.282	Thread Group 1...	HTTP Request	9	Success	2085	141	9	1
20	17:49:14.384	Thread Group 1...	HTTP Request	7	Success	2085	141	7	1
21	17:49:14.483	Thread Group 1...	HTTP Request	7	Success	2085	141	7	1
22	17:49:14.584	Thread Group 1...	HTTP Request	7	Success	2085	141	7	0
23	17:49:14.683	Thread Group 1...	HTTP Request	7	Success	2085	141	7	0
24	17:49:14.784	Thread Group 1...	HTTP Request	8	Success	2085	141	8	0
25	17:49:14.884	Thread Group 1...	HTTP Request	7	Success	2085	141	7	0
26	17:49:14.983	Thread Group 1...	HTTP Request	8	Success	2085	141	8	1
27	17:49:15.085	Thread Group 1...	HTTP Request	6	Success	2085	141	6	1

Gambar 14. Hasil jmeter_selectStudentGagal Optimasi

- **jmeter_selectAllStudents**

Sample #	Start Time	Thread Name	Label	Sample Time(ms)	Status	Bytes	Sent Bytes	Latency	Connect TL
1	17:45:32.141	Thread Group 1...	HTTP Request	3590	Success	1608484	133	3252	3
2	17:45:32.350	Thread Group 1...	HTTP Request	4348	Success	1608484	133	3802	0
3	17:45:32.550	Thread Group 1...	HTTP Request	8947	Success	1608484	133	5729	1
4	17:45:32.750	Thread Group 1...	HTTP Request	13181	Success	1608484	133	12118	1
5	17:45:32.950	Thread Group 1...	HTTP Request	21050	Success	1608484	133	14594	1
6	17:45:33.158	Thread Group 1...	HTTP Request	21393	Success	1608484	133	20483	1
7	17:45:33.350	Thread Group 1...	HTTP Request	23127	Success	1608484	133	22005	1
8	17:45:33.551	Thread Group 1...	HTTP Request	24362	Success	1608484	133	22077	1
9	17:45:33.750	Thread Group 1...	HTTP Request	27628	Success	1608484	133	25833	1
10	17:45:33.952	Thread Group 1...	HTTP Request	27603	Success	1608484	133	26433	0
11	17:45:34.149	Thread Group 1...	HTTP Request	28433	Success	1608484	133	27815	1
12	17:45:34.152	Thread Group 1...	HTTP Request	28775	Success	1608484	133	27260	1
13	17:45:34.552	Thread Group 1...	HTTP Request	29656	Success	1608484	133	28797	1
14	17:45:34.752	Thread Group 1...	HTTP Request	34915	Success	1608484	133	29236	1
15	17:45:35.151	Thread Group 1...	HTTP Request	35147	Success	1608484	133	34402	1
16	17:45:35.352	Thread Group 1...	HTTP Request	34863	Success	1608484	133	28956	0
17	17:45:35.752	Thread Group 1...	HTTP Request	35322	Success	1608484	133	34584	1
18	17:45:34.959	Thread Group 1...	HTTP Request	36487	Success	1608484	133	35760	1
19	17:45:35.553	Thread Group 1...	HTTP Request	36594	Success	1608484	133	35838	1
20	17:45:36.153	Thread Group 1...	HTTP Request	36225	Success	1608484	133	35407	1
21	17:45:35.992	Thread Group 1...	HTTP Request	36887	Success	1608484	133	36024	1
22	17:45:37.155	Thread Group 1...	HTTP Request	35498	Success	1608484	133	35037	1
23	17:45:36.353	Thread Group 1...	HTTP Request	37251	Success	1608484	133	36479	1
24	17:45:36.554	Thread Group 1...	HTTP Request	37339	Success	1608484	133	36562	1
25	17:45:36.959	Thread Group 1...	HTTP Request	37110	Success	1608484	133	36603	1
26	17:45:36.755	Thread Group 1...	HTTP Request	37358	Success	1608484	133	36854	1
27	17:45:37.555	Thread Group 1...	HTTP Request	46239	Success	1608484	133	46797	1

Gambar 15. Hasil jmeter_selectAllStudents Optimasi