Laporan Tugas 10 Pemrograman Jaringan

Dosen:

Royyana Muslim I, S.Kom., M.Kom., Ph.D



Disusun oleh: Salsha Armenia Amosea 05111740000142

Pemrograman Jaringan – B

Informatika Institut Teknologi Sepuluh Nopember **Tahun Ajaran 2019/2020**

A. Soal

- 1. Pull update terbaru
- 2. Jalankan async_server.py pada port 9002, 9003, 9004, 9005 (lihat pada BackendList)
- 3. Jalankan file lb.py, jalankan di port 44444
- 4. Jalankan browser, akseslah http://localhost:44444/page.html
- 5. Lihatlah di log program, bahwa setiap request akan dilayani oleh backend yang bergantian
- 6. Lakukan performance test seperti pada tugas 9, bandingkan penggunaan load balancer dengan async_server dengan server_thread_http pada folder progjar5
- 7. Buatlah tabel hasilnya

B. Jawaban

- 1. Jalankan file async_server.py pada port 9002, 9003, 9004, 9005
- 2. Jalankan file lb.py pada port 44444
- 3. Mengakses http://localhost:44444/page.html pada web browser
- 4. Lihat log dari lb.py
- 5. Hasil performance test
 - a. Port 45000 Server_async_http.py

Jumlah request: 1000

| No test | Concurrency level | Time taken for test [seconds] | Complete request | Failed request | Total transferred [bytes] | Request per second [#/sec] | Time per request [ms] | Transfer rate [Kbytes/ sec] |
|---------|-------------------|----------------------------------|------------------|----------------|------------------------------|----------------------------------|-----------------------------|--------------------------------------|
| 1 | 1 | 7.528 | 1000 | 0 | 122000 | 132.84 | 7.528 | 74.16 |
| 2 | 5 | 0.731 | 1000 | 0 | 122000 | 1368.26 | 3.654 | 163.02 |
| 3 | 10 | 72.321 | 1000 | 0 | 122000 | 13.83 | 723.208 | 1.65 |
| 4 | 50 | 63.810 | 1000 | 0 | 122000 | 15.67 | 3190.521 | 1.87 |
| 5 | 100 | 64.813 | 1000 | 0 | 122000 | 15.43 | 6481.274 | 1.84 |
| 6 | 250 | 65.999 | 1000 | 0 | 122000 | 15.15 | 16499.863 | 1.81 |
| 7 | 500 | 66.286 | 1000 | 0 | 122000 | 14.96 | 33413.018 | 1.78 |
| 8 | 1000 | 70.832 | 1000 | 0 | 122000 | 14.12 | 70832.143 | 1.68 |

b. Port 46000 Server_thread_http.py

Jumlah request: 1000

| | | Julilali | request. | 1000 | | | | |
|---------|-------------------|----------------------------------|------------------|----------------|------------------------------|----------------------------------|-----------------------------|--------------------------------------|
| No test | Concurrency level | Time taken for test [seconds] | Complete request | Failed request | Total transferred [bytes] | Request per second [#/sec] | Time per request [ms] | Transfer rate [Kbytes/ sec] |
| 1 | 1 | 147.975 | 1000 | 0 | 122000 | 6.76 | 147.975 | 0.81 |
| 2 | 5 | 260.660 | 1000 | 0 | 122000 | 3.84 | 1303.299 | 0.46 |
| 3 | 10 | 250.351 | 1000 | 0 | 122000 | 3.99 | 2503.509 | 0.48 |
| 4 | 50 | 263.431 | 1000 | 0 | 122000 | 3.80 | 13171.547 | 0.45 |
| 5 | 100 | 391.736 | 1000 | 0 | 122000 | 2.55 | 39173.610 | 0.30 |
| 6 | 250 | 253.066 | 1000 | 0 | 122000 | 3.95 | 63266.570 | 0.47 |
| 7 | 500 | 250.360 | 1000 | 0 | 122000 | 3.99 | 125179.848 | 0.48 |
| 8 | 1000 | 259.717 | 1000 | 0 | 122000 | 3.85 | 259716.878 | 0.46 |

6. Kesimpulan

Dari percobaan yang telah saya lakukan, perbedaan waktu antara server async yang menggunakan load balancer dan server thread sangat signifikan. Jadi bisa disimpulkan bahwa server async (asynchronous) dengan load balancer jauh lebih cepat bila dibandingkan dengan server thread (multithread).

7. Screenshot

- a. Server Asynchronus
 - 1. Concurrency 1

```
Completed 600 requests
Completed 700 requests
Completed 800 requests
Completed 900 requests
Completed 1000 requests
Finished 1000 requests
Server Software:
                          myserver/1.0
Server Hostname:
                           localhost
Server Port:
                           44444
Document Path:
                           4 bytes
Document Length:
Concurrency Level:
Time taken for tests:
Complete requests:
                          0.654 seconds
                          1000
Failed requests:
Non-2xx responses:
                          1000
                          122000 bytes
Total transferred:
HTML transferred:
                          4000 bytes
                          1528.46 [#/sec] (mean)
0.654 [ms] (mean)
0.654 [ms] (mean, across all concurrent requests)
Requests per second:
Time per request:
Time per request:
Transfer rate:
                          182.10 [Kbytes/sec] received
Connection Times (ms)
              min mean[+/-sd] median
                                           max
                 0 0 0.0 0
0 1 0.5 1
0 1 0.5 0
0 1 0.5 1
Connect:
Processing:
Waiting:
Total:
WARNING: The median and mean for the waiting time are not within a normal devi
        These results are probably not that reliable.
Percentage of the requests served within a certain time (ms)
  75%
  80%
            9 (longest request)
 100%
```

```
Completed 400 requests
Completed 500 requests
Completed 600 requests
Completed 700 requests
Completed 800 requests
Completed 900 requests
Completed 1000 requests
Finished 1000 requests
Server Software:
Server Hostname:
                                 myserver/1.0
                                 localhost
Server Port:
Document Path:
Document Length:
Concurrency Level:
Time taken for tests:
Complete requests:
                                 1000
Failed requests:
Non-2xx responses: 1000
Total transferred: 12206
HTML transferred: 4000
                                 122000 bytes
                                4000 bytes
Requests per second: 2827.31 [#/sec] (mean)
Time per request: 1.768 [ms] (mean)
Time per request: 0.354 [ms] (mean, across all concurrent requests)
Transfer rate:
                                 336.85 [Kbytes/sec] received
Connection Times (ms)
                  min mean[+/-sd] median
Connect:
Processing:
Waiting:
Total:
                                  1.5
Percentage of the requests served within a certain time (ms)
   75%
   80%
   95%
              11 (longest request)
 100%
```

```
Completed 400 requests
Completed 500 requests
Completed 600 requests
Completed 700 requests
Completed 800 requests
Completed 900 requests
Completed 1000 requests
Finished 1000 requests
Server Software:
Server Hostname:
                                myserver/1.0
                                localhost
Server Port:
Document Path:
Document Length:
Concurrency Level:
Time taken for tests:
Complete requests:
                                10
                                1000
Failed requests:
Non-2xx responses:
Total transferred:
HTML transferred:
                                1000
                                122000 bytes
                                4000 bytes
Requests per second: 3422.36 [#/sec] (mean)
Time per request: 2.922 [ms] (mean)
Time per request: 0.292 [ms] (mean, across all concurrent requests)
Transfer rate:
                                407.74 [Kbytes/sec] received
Connection Times (ms)
                  min mean[+/-sd] median
Connect:
Processing:
Waiting:
Total:
                                  1.2
Percentage of the requests served within a certain time (ms)
  66%
   75%
   80%
   95%
             10 (longest request)
 100%
```

```
Completed 400 requests
Completed 500 requests
Completed 600 requests
Completed 700 requests
Completed 800 requests
Completed 900 requests
Completed 1000 requests
Finished 1000 requests
Server Software:
Server Hostname:
                                myserver/1.0
                                localhost
Server Port:
Document Path:
Document Length:
Concurrency Level:
Time taken for tests:
Complete requests:
                                1000
Failed requests:
Non-2xx responses:
Total transferred:
HTML transferred:
                               1000
                                122000 bytes
                               4000 bytés
Requests per second: 890.21 [#/sec] (mean)
Time per request: 28.083 [ms] (mean)
Time per request: 1.123 [ms] (mean, across all concurrent requests)
Transfer rate:
                                106.06 [Kbytes/sec] received
Connection Times (ms)
                  min mean[+/-sd] median
                          0 0.0 0
3 31.7 2
Connect:
Processing:
                            3 31.7
3 31.7
Waiting:
                                                     1004
Total:
                                                     1004
Percentage of the requests served within a certain time (ms)
   66%
   75%
   80%
   95%
           1004 (longest request)
 100%
```

```
Completed 400 requests
Completed 500 requests
Completed 600 requests
Completed 700 requests
Completed 800 requests
Completed 900 requests
Completed 1000 requests
Finished 1000 requests
Server Software:
Server Hostname:
                               myserver/1.0
                               localhost
Server Port:
Document Path:
Document Length:
Concurrency Level:
Time taken for tests:
Complete requests:
                               1000
Failed requests:
Non-2xx responses:
Total transferred:
HTML transferred:
                               1000
                               122000 bytes
                               4000 bytés
                              2803.65 [#/sec] (mean)
17.834 [ms] (mean)
0.357 [ms] (mean, across all concurrent requests)
334.03 [Kbytes/sec] received
Requests per second:
Time per request:
Time per request:
Transfer rate:
Connection Times (ms)
                 min mean[+/-sd] median
Connect:
Processing:
Waiting:
Total:
Percentage of the requests served within a certain time (ms)
  66%
  75%
  80%
 100%
             19 (longest request)
```

```
6. Concurrency
                                                                                                                   100
      Completed 600 requests
Completed 700 requests
Completed 800 requests
       Completed 900 requests
Completed 1000 requests
       Finished 1000 requests
      Server Software:
Server Hostname:
                                                localhost
       Server Port:
       Document Path:
       Document Length:
                                                4 bytes
      Concurrency Level: 100
Time taken for tests: 0.268 seconds
       Complete requests:
Failed requests:
                                               1000
      Failed requests:

Non-2xx responses:
1000

Total transferred:
122000 bytes

HTML transferred:
4000 bytes

Requests per second:
3737.16 [#/sec] (mean)

Time per request:
26.758 [ms] (mean)

Time per request:
0.268 [ms] (mean, across all concurrent requests)

Transfer rate:
445.25 [Kbytes/sec] received
       Connection Times (ms)
      Connection Times (ms)

min mean[+/-sd] median max

Connect: 0 0 0.1 0 1

Processing: 0 2 0.8 2 7

Waiting: 0 2 0.8 1 7

Total: 0 2 0.8 2 7
       WARNING: The median and mean for the waiting time are not within a normal devi
                    These results are probably not that reliable.
       Percentage of the requests served within a certain time (ms)
          75%
          80%
          90%
                          4
          98%
                         7 (longest request)
        100%
```

```
Completed 400 requests
Completed 500 requests
Completed 600 requests
Completed 700 requests
Completed 800 requests
Completed 900 requests
Completed 1000 requests
Finished 1000 requests
Server Software:
Server Hostname:
                              myserver/1.0
                               localhost
Server Port:
Document Path:
Document Length:
Concurrency Level:
Time taken for tests:
Complete requests:
                               1000
Failed requests:
Non-2xx responses:
Total transferred:
HTML transferred:
                              1000
                               122000 bytes
                              4000 bytés
                              2940.73 [#/sec] (mean)
85.013 [ms] (mean)
0.340 [ms] (mean, across all concurrent requests)
Requests per second:
Time per request:
Time per request:
Transfer rate:
                              350.36 [Kbytes/sec] received
Connection Times (ms)
                 min mean[+/-sd] median
Connect:
Processing:
Waiting:
                                2.0
Total:
Percentage of the requests served within a certain time (ms)
  75%
  80%
  95%
             17 (longest request)
 100%
```

```
Completed 400 requests
Completed 500 requests
Completed 600 requests
Completed 700 requests
Completed 800 requests
Completed 900 requests
Completed 1000 requests
Finished 1000 requests
Server Software:
Server Hostname:
                                 myserver/1.0
                                 localhost
Server Port:
Document Path:
Document Length:
Concurrency Level:
Time taken for tests:
Complete requests:
                                 500
                                 1000
Failed requests:
Non-2xx responses:
Total transferred:
HTML transferred:
                                1000
                                 122000 bytes
                                4000 bytes
                                3161.55 [#/sec] (mean)
158.150 [ms] (mean)
0.316 [ms] (mean, across all concurrent requests)
376.67 [Kbytes/sec] received
Requests per second:
Time per request:
Time per request:
Transfer rate:
Connection Times (ms)
                  min mean[+/-sd] median
Connect:
Processing:
Waiting:
Total:
                                  1.6
Percentage of the requests served within a certain time (ms)
   75%
   80%
   95%
              13 (longest request)
 100%
```

```
Completed 400 requests
Completed 500 requests
Completed 600 requests
Completed 700 requests
Completed 700 requests
Completed 800 requests
Completed 1000 requests
Finished 1000 requests
Server Software:
Server Hostname:
Server Port:
                                     myserver/1.0
                                      localhost
Document Path:
Document Length:
Concurrency Level: 1000
Time taken for tests: 0.334 seconds
Complete requests: 1000
- iled requests: 0
Non-2xx responses: 1000
Total transferred: 122000 bytes
HTML transferred: 4000 bytes
Requests per second: 2990.72 [#/sec] (mean)
Time per request: 334.368 [ms] (mean)
Time per request: 0.334 [ms] (mean, across all concurrent requests)
Transfer rate: 356.32 [Kbytes/sec] received
Connection Times (ms)
min mean[+/-sd] median
Connect: 0 1
                        0 1 3.1 0
0 5 10.3 2
Processing:
Waiting:
Total:
                                      8.8
                        0 6 12.4
Percentage of the requests served within a certain time (ms)
   66%
   75%
   80%
   95%
                65 (longest request)
  100%
```

b. Server Thread

```
Completed 400 requests
Completed 500 requests
Completed 600 requests
Completed 700 requests
Completed 800 requests
Completed 900 requests
Completed 1000 requests
Finished 1000 requests
Server Software:
Server Hostname:
                                         myserver/1.0
                                          localhost
Server Port:
                                          44444
Document Path:
                                          4 bytes
Document Length:
Concurrency Level:
Time taken for tests:
Complete requests:
                                         1000
Failed requests:
Non-2xx responses:
                                         1000
                                     1000
122000 bytes
Total transferred:
Total transferred: 122000 bytes
HTML transferred: 4000 bytes
Requests per second: 1329.38 [#/sec] (mean)
Time per request: 0.752 [ms] (mean)
Time per request: 0.752 [ms] (mean, across all concurrent requests)
Transfer rate: 158.38 [Kbytes/sec] received
Connection Times (ms)
                      min mean[+/-sd] median
0 0 0.0 0
0 1 1.0 1
0 1 1.0 0
                                                                      max
Connect:
Processing:
Waiting:
                                            1.0
Total:
Percentage of the requests served within a certain time (ms)
   75%
   80%
   90%
   99%
                 12 (longest request)
  100%
```

```
Completed 400 requests
Completed 500 requests
Completed 600 requests
Completed 700 requests
Completed 800 requests
Completed 900 requests
Completed 1000 requests
Finished 1000 requests
Server Software:
Server Hostname:
                                   myserver/1.0
                                    localhost
Server Port:
Document Path:
Document Length:
Concurrency Level:
Time taken for tests:
Complete requests:
                                    1.342 seconds
                                   1000
Failed requests:
Non-2xx responses: 1000
Total transferred: 122000 bytes
HTML transferred: 4000 bytes
Requests per second: 745.26 [#/sec] (mean)
Time per request: 6.709 [ms] (mean)
Time per request: 1.342 [ms] (mean, across all concurrent requests)
Transfer rate: 88.79 [Kbytes/sec] received
Connection Times (ms)
                    min mean[+/-sd] median
                             2 45.8 0
3 4.3 2
3 4.3 2
Connect:
                                                          1024
Processing:
Waiting:
Total:
Percentage of the requests served within a certain time (ms)
   66%
   75%
   80%
   95%
            1036 (longest request)
  100%
```

```
Completed 400 requests
Completed 500 requests
Completed 600 requests
Completed 700 requests
Completed 800 requests
Completed 900 requests
Completed 1000 requests
Finished 1000 requests
Server Software:
Server Hostname:
                                   myserver/1.0
                                    localhost
Server Port:
Document Path:
Document Length:
Concurrency Level:
Time taken for tests:
Complete requests:
                                    10
                                   1.858 seconds
                                    1000
Failed requests:
Non-2xx responses: 1000
Total transferred: 122000 byte
HTML transferred: 4000 bytes
                                   122000 bytes
Requests per second: 538.13 [#/sec] (mean)
Time per request: 18.583 [ms] (mean)
Time per request: 1.858 [ms] (mean, across all concurrent requests)
Transfer rate: 64.11 [Kbytes/sec] received
Connection Times (ms)
                    min mean[+/-sd] median
                       0 8 90.8 0
0 5 33.4 2
0 5 33.4 2
0 13 116.4 2
Connect:
Processing:
Waiting:
                                                           834
Total:
Percentage of the requests served within a certain time (ms)
   66%
   75%
   80%
   95%
           1852 (longest request)
 100%
```

```
Completed 400 requests
Completed 500 requests
Completed 600 requests
Completed 700 requests
Completed 800 requests
Completed 900 requests
Completed 1000 requests
Finished 1000 requests
Server Software:
Server Hostname:
                                    myserver/1.0
                                    localhost
Server Port:
Document Path:
Document Length:
Concurrency Level:
Time taken for tests:
Complete requests:
                                    1000
Failed requests:
Non-2xx responses:
Total transferred:
HTML transferred:
                                   1000
                                    122000 bytes
Total transferred: 122000 bytes

HTML transferred: 4000 bytes

Requests per second: 69.49 [#/sec] (mean)

Time per request: 359.773 [ms] (mean)

Time per request: 14.391 [ms] (mean, across all concurrent requests)

Transfer rate: 8.28 [Kbytes/sec] received
Connection Times (ms)
                    min mean[+/-sd] median
Connect:
                      0 23 151.0 0
0 57 689.7 2
0 57 689 7
Processing:
Waiting:
                              57 689.7
                                                          13379
                       0 81 778.3 2 14382
Total:
Percentage of the requests served within a certain time (ms)
   66%
   75%
   80%
   95%
            1844
 100% 14382 (longest request)
```

```
Completed 400 requests
Completed 500 requests
Completed 600 requests
Completed 700 requests
Completed 800 requests
Completed 900 requests
Completed 1000 requests
Finished 1000 requests
Server Software:
Server Hostname:
                                myserver/1.0
                                 localhost
Server Port:
Document Path:
Document Length:
Concurrency Level:
Time taken for tests:
Complete requests:
                                 1000
Failed requests:
Non-2xx responses:
Total transferred:
HTML transferred:
                                1000
                                 122000 bytes
                                4000 bytés
                                1049.06 [#/sec] (mean)
47.662 [ms] (mean)
0.953 [ms] (mean, across all concurrent requests)
Requests per second:
Time per request:
Time per request:
Transfer rate:
                                124.99 [Kbytes/sec] received
Connection Times (ms)
                  min mean[+/-sd] median
Connect:
Processing:
Waiting:
                                  1.6
Total:
                                  1.6
Percentage of the requests served within a certain time (ms)
   75%
   80%
   95%
              12 (longest request)
 100%
```

```
Completed 400 requests
Completed 500 requests
Completed 600 requests
Completed 700 requests
Completed 800 requests
Completed 900 requests
Completed 1000 requests
Finished 1000 requests
Server Software:
Server Hostname:
                              myserver/1.0
                               localhost
Server Port:
Document Path:
Document Length:
Concurrency Level:
Time taken for tests:
Complete requests:
                              0.856 seconds
                               1000
Failed requests:
Non-2xx responses:
Total transferred:
HTML transferred:
                              1000
                               122000 bytes
                              4000 bytés
                              1167.98 [#/sec] (mean)
85.618 [ms] (mean)
0.856 [ms] (mean, across all concurrent requests)
Requests per second:
Time per request:
Time per request:
Transfer rate:
                              139.15 [Kbytes/sec] received
Connection Times (ms)
                 min mean[+/-sd] median
Connect:
Processing:
Waiting:
Total:
Percentage of the requests served within a certain time (ms)
  75%
  80%
             11 (longest request)
 100%
```

```
Completed 400 requests
Completed 500 requests
Completed 600 requests
Completed 700 requests
Completed 800 requests
Completed 900 requests
Completed 1000 requests
Finished 1000 requests
Server Software:
Server Hostname:
                                   myserver/1.0
                                   localhost
Server Port:
Document Path:
Document Length:
Concurrency Level:
Time taken for tests:
Complete requests:
                                   1000
Failed requests:
Non-2xx responses:
Total transferred:
HTML transferred:
                                   1000
                                   122000 bytes
                                  122000 bytes
4000 bytes
1062.97 [#/sec] (mean)
235.190 [ms] (mean)
0.941 [ms] (mean, across all concurrent requests)
126.64 [Kbytes/sec] received
Requests per second:
Time per request:
Time per request:
Transfer rate:
Connection Times (ms)
                    min mean[+/-sd] median
Connect:
Processing:
Waiting:
Total:
                                                            219
Percentage of the requests served within a certain time (ms)
   75%
   80%
   95%
             219 (longest request)
 100%
```

```
Completed 400 requests
Completed 500 requests
Completed 600 requests
Completed 700 requests
Completed 800 requests
Completed 900 requests
Completed 1000 requests
Finished 1000 requests
Server Software:
Server Hostname:
                                        myserver/1.0
                                        localhost
Server Port:
Document Path:
Document Length:
Concurrency Level:
Time taken for tests:
Complete requests:
                                         1000
Failed requests:
Failed requests: 0

Non-2xx responses: 1000

Total transferred: 122000 bytes

HTML transferred: 4000 bytes

Requests per second: 23.39 [#/sec] (mean)

Time per request: 21380.785 [ms] (mean)

Time per request: 42.762 [ms] (mean, across all concurrent requests)

Transfer rate: 2.79 [Kbytes/sec] received
Connection Times (ms)
                      min mean[+/-sd] median
Connect:
                        0 13 114.9 0 1018
1 102 1798.3 2 42749
0 102 1798.3 2 42749
1 115 1812.2 2 42749
Processing:
Waiting:
Total:
Percentage of the requests served within a certain time (ms)
   66%
   75%
   80%
   95%
  100% 42749 (longest request)
```

```
Completed 400 requests
Completed 500 requests
Completed 600 requests
Completed 700 requests
Completed 800 requests
Completed 900 requests
Completed 1000 requests
Finished 1000 requests
                      myserver/1.0
Server Software:
Server Hostname:
                           localhost
Server Port:
Document Path:
Document Length:
                            4 bytes
Concurrency Level:
Time taken for tests:
                           1000
                            0.855 seconds
Complete requests:
                            1000
Failed requests:
                        1000
Non-2xx responses:
Total transferred:
HTML transferred:
                            122000 bytes
                           4000 bytes
                         1169.34 [#/sec] (mean)
855.183 [ms] (mean)
0.855 [ms] (mean, across all concurrent requests)
139.32 [Kbytes/sec] received
Requests per second:
Time per request:
Time per request:
Transfer rate:
Connection Times (ms)
               min mean[+/-sd] median
Connect:
Processing:
Waiting:
Total:
Percentage of the requests served within a certain time (ms)
  75%
  80%
  98%
           46 (longest request)
 100%
```