

Laporan Tugas 10



Pemrograman Jaringan B

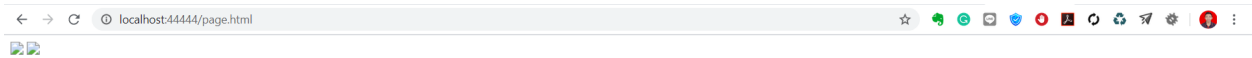
Oleh :
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Fakultas Teknologi Elektro dan Informatika Cerdas
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Surabaya
2020**

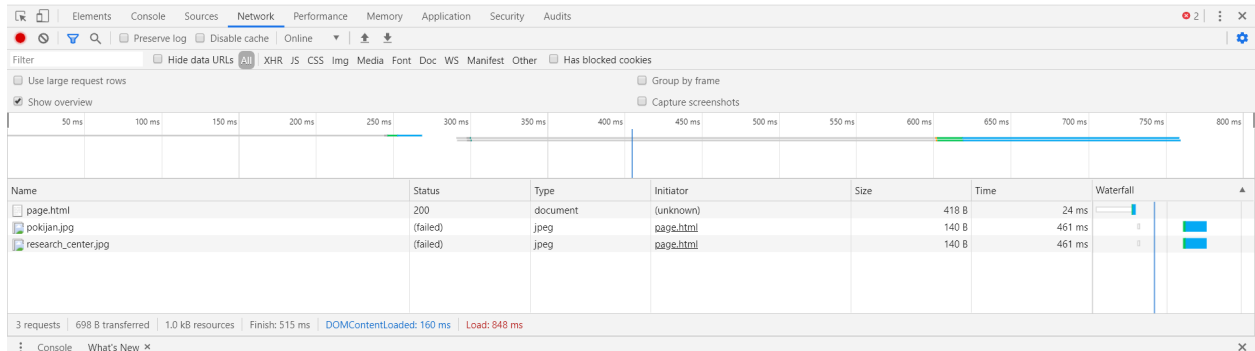
1. List Tugas 10

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

Tampilan pada page <http://localhost:44444/page.html>



Testing



Kedua foto tidak berhasil diloat oleh server.

Dan di bawah ini dapat dilihat bahwa setiap request akan dilayani oleh backend yang bergantian

```

rwnaim@WJDDANNAIM-LAPTOP:/mnt/d/1 Rana/2020/1 Kuliah/Progjar/Tugas/Tugas 10$ python3 lb.py
WARNING:root:Load Balancer berjalan pada port 44444
WARNING:root:Koneksi dari ('127.0.0.1', 61521)
WARNING:root:Koneksi dari ('127.0.0.1', 61521) akan di teruskan ke ('127.0.0.1', 9002)
WARNING:root:Koneksi dari ('127.0.0.1', 61592)
WARNING:root:Koneksi dari ('127.0.0.1', 61592) akan di teruskan ke ('127.0.0.1', 9003)
WARNING:root:Koneksi dari ('127.0.0.1', 61602)
WARNING:root:Koneksi dari ('127.0.0.1', 61602) akan di teruskan ke ('127.0.0.1', 9004)
WARNING:root:Koneksi dari ('127.0.0.1', 61604)
WARNING:root:Koneksi dari ('127.0.0.1', 61604) akan di teruskan ke ('127.0.0.1', 9005)
WARNING:root:Koneksi dari ('127.0.0.1', 61638)
WARNING:root:Koneksi dari ('127.0.0.1', 61638) akan di teruskan ke ('127.0.0.1', 9002)
WARNING:root:Koneksi dari ('127.0.0.1', 61646)
WARNING:root:Koneksi dari ('127.0.0.1', 61646) akan di teruskan ke ('127.0.0.1', 9003)
WARNING:root:Koneksi dari ('127.0.0.1', 61674)
WARNING:root:Koneksi dari ('127.0.0.1', 61674) akan di teruskan ke ('127.0.0.1', 9004)
WARNING:root:Koneksi dari ('127.0.0.1', 61678)
WARNING:root:Koneksi dari ('127.0.0.1', 61678) akan di teruskan ke ('127.0.0.1', 9005)
WARNING:root:Koneksi dari ('127.0.0.1', 61679)
WARNING:root:Koneksi dari ('127.0.0.1', 61679) akan di teruskan ke ('127.0.0.1', 9002)
WARNING:root:Koneksi dari ('127.0.0.1', 61682)
WARNING:root:Koneksi dari ('127.0.0.1', 61682) akan di teruskan ke ('127.0.0.1', 9003)
WARNING:root:Koneksi dari ('127.0.0.1', 61689)
WARNING:root:Koneksi dari ('127.0.0.1', 61689) akan di teruskan ke ('127.0.0.1', 9004)
WARNING:root:Koneksi dari ('127.0.0.1', 61691)
WARNING:root:Koneksi dari ('127.0.0.1', 61691) akan di teruskan ke ('127.0.0.1', 9005)

```

2. Parameter Test

Jumlah Request : 1000

Konkurensi : 1, 5, 10, 25, 50, 75, 100

3. Hasil Performance Test

a. Server Async dengan Load Balancer

No.	Concurrency Level	Time Taken For Rest (seconds)	Complete Request	Failed Request	Total Transferred	Request per second (#/sec)	Time per request (ms)	Transfer Rate
1	1	1.350	1000	0	122000	736.47	1.358	87.74
2	5	1.433	1000	0	122000	697.81	1.433	83.14
3	10	1.410	1000	0	122000	709.36	1.410	84.51
4	25	1.860	1000	0	122000	537.67	1.860	64.06
5	50	7.817	1000	0	122000	127.93	7.817	15.24
6	75	55.102	1000	0	122000	18.15	55.102	1.16

b. Server Thread dengan Load Balancer

No.	Concurrency Level	Time Taken For Rest (seconds)	Complete Request	Failed Request	Total Transferred	Request per second (#/sec)	Time per request (ms)	Transfer Rate
1	1	1.393	1000	0	122000	718.04	1.393	85.55
2	5	1.471	1000	0	122000	679.96	1.471	81.01
3	10	1.358	1000	0	122000	736.56	1.358	87.75
4	25	1.844	1000	0	122000	542.22	1.844	64.60
5	50	14.216	1000	0	122000	70.34	14.216	8.38
6	75	54.992	1000	0	122000	18.18	54.992	2.17

4. Kesimpulan

Dari hasil performance test diatas, menunjukkan bahwa server async memiliki waktu running yg lebih cepat daripada server thread. Lalu, dengan bantuan load balancer, server async memiliki proses yg lebih baik dibandingkan server thread dengan load balancer. Sehingga dapat disimpulkan bahkan, load balancer dapat meningkatkan perforfa yang lebih baik.

5. Dokumentasi

a. Async Server

• Concurrency 1

```
Server Software:      myserver/1.0
Server Hostname:      127.0.0.1
Server Port:          44444

Document Path:        /
Document Length:      4 bytes

Concurrency Level:     1
Time taken for tests:  1.358 seconds
Complete requests:    1000
Failed requests:       0
Non-2xx responses:    1000
Total transferred:    122000 bytes
HTML transferred:     4000 bytes
Requests per second:  736.47 [#/sec] (mean)
Time per request:     1.358 [ms] (mean)
Time per request:     1.358 [ms] (mean, across all concurrent requests)
Transfer rate:        87.74 [Kbytes/sec] received

Connection Times (ms)
      min    mean[+/-sd] median   max
Connect:    0      0   0.1      0     4
Processing:  0      1   1.1      1    13
Waiting:    0      1   1.1      1    13
Total:       1      1   1.1      1    13

Percentage of the requests served within a certain time (ms)
 50%      1
 66%      1
 75%      1
 80%      2
 90%      3
 95%      4
 98%      5
 99%      6
100%     13 (longest request)
```

• Concurrency 5

```
Server Software:      myserver/1.0
Server Hostname:      127.0.0.1
Server Port:          44444

Document Path:        /
Document Length:      4 bytes

Concurrency Level:     5
Time taken for tests:  1.433 seconds
Complete requests:    1000
Failed requests:       0
Non-2xx responses:    1000
Total transferred:    122000 bytes
HTML transferred:     4000 bytes
Requests per second:  697.81 [#/sec] (mean)
Time per request:     7.165 [ms] (mean)
Time per request:     1.433 [ms] (mean, across all concurrent requests)
Transfer rate:        83.14 [Kbytes/sec] received

Connection Times (ms)
      min    mean[+/-sd] median   max
Connect:    0      0   0.1      0     4
Processing:  1      7   3.7      6    43
Waiting:    1      6   3.6      6    42
Total:       1      7   3.7      6    43

Percentage of the requests served within a certain time (ms)
 50%      6
 66%      8
 75%      8
 80%      9
 90%     11
 95%     13
 98%     16
 99%     19
100%     43 (longest request)
```

- Concurrency 10

```

Server Software:      myserver/1.0
Server Hostname:     127.0.0.1
Server Port:         44444

Document Path:       /
Document Length:     4 bytes

Concurrency Level:    10
Time taken for tests: 1.410 seconds
Complete requests:    1000
Failed requests:      0
Non-2xx responses:    1000
Total transferred:    122000 bytes
HTML transferred:     4000 bytes
Requests per second:  709.36 [#/sec] (mean)
Time per request:     14.097 [ms] (mean)
Time per request:     1.410 [ms] (mean, across all concurrent requests)
Transfer rate:        84.51 [Kbytes/sec] received

Connection Times (ms)
              min      mean[+/-sd] median   max
Connect:     0       4   64.1      0    1023
Processing:   2       9    3.2      9     26
Waiting:      2       8    3.2      8     26
Total:        2      13   64.3      9    1034

Percentage of the requests served within a certain time (ms)
 50%    9
 66%   10
 75%   10
 80%   11
 90%   13
 95%   15
 98%   18
 99%   22
100% 1034 (longest request)

```

- Concurrency 25

```

Server Software:      myserver/1.0
Server Hostname:     127.0.0.1
Server Port:         44444

Document Path:       /
Document Length:     4 bytes

Concurrency Level:    25
Time taken for tests: 1.860 seconds
Complete requests:    1000
Failed requests:      0
Non-2xx responses:    1000
Total transferred:    122000 bytes
HTML transferred:     4000 bytes
Requests per second:  537.67 [#/sec] (mean)
Time per request:     46.497 [ms] (mean)
Time per request:     1.860 [ms] (mean, across all concurrent requests)
Transfer rate:        64.06 [Kbytes/sec] received

Connection Times (ms)
              min      mean[+/-sd] median   max
Connect:     0      19 137.7      0   1011
Processing:   2      19  69.2     11    843
Waiting:      2      18  69.2     10    842
Total:        2      38 194.4     11   1851

Percentage of the requests served within a certain time (ms)
 50%    11
 66%    13
 75%    15
 80%    16
 90%    20
 95%    24
 98%    30
 99%   1231
100% 1851 (longest request)

```

- Concurrency 50

```
Server Software:      myserver/1.0
Server Hostname:      127.0.0.1
Server Port:          44444

Document Path:        /
Document Length:      4 bytes

Concurrency Level:    50
Time taken for tests:  7.817 seconds
Complete requests:    1000
Failed requests:       0
Non-2xx responses:    1000
Total transferred:    122000 bytes
HTML transferred:     4000 bytes
Requests per second:  127.93 [#/sec] (mean)
Time per request:      390.839 [ms] (mean)
Time per request:      7.817 [ms] (mean, across all concurrent requests)
Transfer rate:         15.24 [Kbytes/sec] received

Connection Times (ms)
      min    mean[+/-sd] median    max
Connect:    0    45 210.0      0   1024
Processing:  2    81 528.3      9   6789
Waiting:    2    80 528.4      8   6789
Total:       2   126 680.8      9   7813

Percentage of the requests served within a certain time (ms)
 50%    9
 66%   10
 75%   11
 80%   12
 90%   17
 95%   28
 98%  1862
 99%  4356
100%  7813 (longest request)
nain@nain-VirtualBox:~/progjar/progjar-b-its-2020/Tugas 10$
```

- Concurrency 75

```
Server Software:      myserver/1.0
Server Hostname:      127.0.0.1
Server Port:          44444

Document Path:        /
Document Length:      4 bytes

Concurrency Level:    75
Time taken for tests:  55.102 seconds
Complete requests:    1000
Failed requests:       0
Non-2xx responses:    1000
Total transferred:    122000 bytes
HTML transferred:     4000 bytes
Requests per second:  18.15 [#/sec] (mean)
Time per request:      4132.627 [ms] (mean)
Time per request:      55.102 [ms] (mean, across all concurrent requests)
Transfer rate:         2.16 [Kbytes/sec] received

Connection Times (ms)
      min    mean[+/-sd] median    max
Connect:    0    70 257.4      0   1016
Processing:  2   484 3469.0      9  54081
Waiting:    2   483 3469.1      8  54081
Total:       2   554 3605.3      9  55097

Percentage of the requests served within a certain time (ms)
 50%    9
 66%   11
 75%   12
 80%   14
 90%   18
 95%  1434
 98%  7739
 99% 14400
100% 55097 (longest request)
nain@nain-VirtualBox:~/progjar/progjar-b-its-2020/Tugas 10$
```

b. Thread Server

- Concurrency 1

```
Server Software:      myserver/1.0
Server Hostname:      127.0.0.1
Server Port:          44444

Document Path:        /
Document Length:      4 bytes

Concurrency Level:     1
Time taken for tests:  1.393 seconds
Complete requests:     1000
Failed requests:       0
Non-2xx responses:     1000
Total transferred:     122000 bytes
HTML transferred:     4000 bytes
Requests per second:   718.04 [#/sec] (mean)
Time per request:      1.393 [ms] (mean)
Time per request:      1.393 [ms] (mean, across all concurrent requests)
Transfer rate:         85.55 [Kbytes/sec] received

Connection Times (ms)
      min  mean[+/-sd] median   max
Connect:    0      0  0.3      0      8
Processing:  1      1  1.3      1     23
Waiting:    0      1  1.3      1     23
Total:      1      1  1.4      1     23

Percentage of the requests served within a certain time (ms)
 50%      1
 66%      1
 75%      1
 80%      2
 90%      3
 95%      4
 98%      5
 99%      7
100%     23 (longest request)
nain@nain-VirtualBox:~/progjar/progjar-b-its-2020/Tugas 10$
```

- Concurrency 5

```
Server Software:      myserver/1.0
Server Hostname:      127.0.0.1
Server Port:          44444

Document Path:        /
Document Length:      4 bytes

Concurrency Level:     5
Time taken for tests:  1.471 seconds
Complete requests:     1000
Failed requests:       0
Non-2xx responses:     1000
Total transferred:     122000 bytes
HTML transferred:     4000 bytes
Requests per second:   679.96 [#/sec] (mean)
Time per request:      7.353 [ms] (mean)
Time per request:      1.471 [ms] (mean, across all concurrent requests)
Transfer rate:         81.01 [Kbytes/sec] received

Connection Times (ms)
      min  mean[+/-sd] median   max
Connect:    0      0  0.3      0      9
Processing:  1      7  3.2      7     27
Waiting:    1      6  3.1      6     27
Total:      1      7  3.2      7     27

Percentage of the requests served within a certain time (ms)
 50%      7
 66%      8
 75%      9
 80%      9
 90%     11
 95%     14
 98%     16
 99%     18
100%     27 (longest request)
nain@nain-VirtualBox:~/progjar/progjar-b-its-2020/Tugas 10$
```


- Concurrency 10

```

Finished 1000 requests

Server Software:      myserver/1.0
Server Hostname:      127.0.0.1
Server Port:          44444

Document Path:        /
Document Length:      4 bytes

Concurrency Level:    10
Time taken for tests:  1.358 seconds
Complete requests:    1000
Failed requests:      0
Non-2xx responses:    1000
Total transferred:    122000 bytes
HTML transferred:     4000 bytes
Requests per second:  736.56 [#/sec] (mean)
Time per request:     13.577 [ms] (mean)
Time per request:     1.358 [ms] (mean, across all concurrent requests)
Transfer rate:        87.75 [Kbytes/sec] received

Connection Times (ms)
      min  mean[+/-sd] median  max
Connect:    0    4  63.5    0  1007
Processing:  2    9   7.8    8   216
Waiting:    1    8   7.7    7   215
Total:       2   13  67.3    8  1223

Percentage of the requests served within a certain time (ms)
 50%    8
 66%    9
 75%   11
 80%   11
 90%   14
 95%   18
 98%   25
 99%   26
100%  1223 (longest request)
nain@nain-VirtualBox: ~/progjar/progjar-b-its-2020/Tugas 10$

```

- Concurrency 25

```

Server Software:      myserver/1.0
Server Hostname:      127.0.0.1
Server Port:          44444

Document Path:        /
Document Length:      4 bytes

Concurrency Level:    25
Time taken for tests:  1.844 seconds
Complete requests:    1000
Failed requests:      0
Non-2xx responses:    1000
Total transferred:    122000 bytes
HTML transferred:     4000 bytes
Requests per second:  542.22 [#/sec] (mean)
Time per request:     46.107 [ms] (mean)
Time per request:     1.844 [ms] (mean, across all concurrent requests)
Transfer rate:        64.60 [Kbytes/sec] received

Connection Times (ms)
      min  mean[+/-sd] median  max
Connect:    0   19 137.1    0  1027
Processing:  1   16  67.4    8   835
Waiting:    1   15  67.4    7   835
Total:       1   35 194.8    8  1838

Percentage of the requests served within a certain time (ms)
 50%    8
 66%    9
 75%   10
 80%   11
 90%   15
 95%   19
 98%   32
 99%  1416
100%  1838 (longest request)
nain@nain-VirtualBox: ~/progjar/progjar-b-its-2020/Tugas 10$

```

- Concurrency 50

```

Server Software:      myserver/1.0
Server Hostname:      127.0.0.1
Server Port:          44444

Document Path:        /
Document Length:      4 bytes

Concurrency Level:     50
Time taken for tests:  14.216 seconds
Complete requests:     1000
Failed requests:       0
Non-2xx responses:    1000
Total transferred:     122000 bytes
HTML transferred:     4000 bytes
Requests per second:   70.34 [#/sec] (mean)
Time per request:      710.789 [ms] (mean)
Time per request:      14.216 [ms] (mean, across all concurrent requests)
Transfer rate:         8.38 [Kbytes/sec] received

Connection Times (ms)
      min    mean[+/-sd] median    max
Connect:    0   45 210.1      0   1025
Processing:  2  125 922.2      8  13186
Waiting:    2  125 922.2      7  13186
Total:       2  170 1060.2     8  14210

Percentage of the requests served within a certain time (ms)
 50%    8
 66%    9
 75%   10
 80%   11
 90%   15
 95%   23
 98%  2691
 99%  4325
100% 14210 (longest request)
nain@nain-VirtualBox:~/progjar/progjar-b-its-2020/Tugas 10$

```

- Concurrency 75

```

Server Software:      myserver/1.0
Server Hostname:      127.0.0.1
Server Port:          44444

Document Path:        /
Document Length:      4 bytes

Concurrency Level:     75
Time taken for tests:  54.992 seconds
Complete requests:     1000
Failed requests:       0
Non-2xx responses:    1000
Total transferred:     122000 bytes
HTML transferred:     4000 bytes
Requests per second:   18.18 [#/sec] (mean)
Time per request:      4124.430 [ms] (mean)
Time per request:      54.992 [ms] (mean, across all concurrent requests)
Transfer rate:         2.17 [Kbytes/sec] received

Connection Times (ms)
      min    mean[+/-sd] median    max
Connect:    0   71 260.3      0   1027
Processing:  3  704 4775.8     14  53956
Waiting:    2  702 4775.9     13  53956
Total:       3  774 4918.1     14  54983

Percentage of the requests served within a certain time (ms)
 50%   14
 66%   18
 75%   23
 80%   29
 90%   47
 95%  1871
 98%  7884
 99% 27336
100% 54983 (longest request)
nain@nain-VirtualBox:~/progjar/progjar-b-its-2020/Tugas 10$

```