

Laporan Tugas 10 Pemrograman Jaringan



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A. Step

1. Membuat bash runserver dengan isi seperti dibawah dan menjalankannya
python3 async_server.py 9002 & python3 async_server.py 9003 & python3 async_server.py 9004 & python3 async_server.py 9005

2. Menjalankan load balancer (lb.py) dan menjalankan localhost:44444/page.html

```
C:\Users\asus-pc\Documents\Progjar\progjar-b-its-2020\Tugas 10>python3 lb.py  
WARNING:root:load balancer running on port 44444
```

← → ↻ ⓘ localhost:44444/page.html



3. Hasil log setelah menjalankan localhost:44444/page.html

```
C:\Users\asus-pc\Documents\Progjar\progjar-b-its-2020\Tugas 10>python3 lb.py  
WARNING:root:load balancer running on port 44444  
WARNING:root:connection from ('127.0.0.1', 58129)  
WARNING:root:koneksi dari ('127.0.0.1', 58129) diteruskan ke ('127.0.0.1', 9002)  
WARNING:root:connection from ('127.0.0.1', 58130)  
WARNING:root:koneksi dari ('127.0.0.1', 58130) diteruskan ke ('127.0.0.1', 9003)  
WARNING:root:connection from ('127.0.0.1', 58133)  
WARNING:root:koneksi dari ('127.0.0.1', 58133) diteruskan ke ('127.0.0.1', 9004)  
WARNING:root:connection from ('127.0.0.1', 58136)  
WARNING:root:koneksi dari ('127.0.0.1', 58136) diteruskan ke ('127.0.0.1', 9005)
```

B. Parameter Test

Jumlah Request: 1000

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

C. Perbandingan Hasil Uji Coba Test

Berikut hasil tabel uji coba test menggunakan asynchronous server + load balancer dan multithread server berdasarkan dokumentasi/lampiran (C).

1. Multithread Server

No.	Concurrency Level	Time Taken For Rest [seconds]	Complete Request	Failed Request	Total Transferred	Request per second [#/sec]	Time per request [ms] (mean)	Transfer Rate [kybtes/second]
1	1	815.36	1000	0	122000	1.23	815.36	0.15
2	5	330.15	1000	0	122000	3.03	1650.774	0.36
3	10	316.253	1000	0	122000	3.16	3162.526	0.38
4	25	299.139	1000	0	122000	3.34	7478.475	0.4
5	50	347.415	1000	0	122000	2.88	17370.728	0.34
6	100	687.016	1000	0	122000	1.46	68701.589	0.17

2. Asynchronous Server + Load Balancer

No.	Concurrency Level	Time Taken For Rest [seconds]	Complete Request	Failed Request	Total Transferred	Request per second [#/sec]	Time per request [ms] (mean)	Transfer Rate [kybtes/second]
1	1	3.813	1000	0	122000	262.24	3.813	31.24
2	5	2.274	1000	0	122000	439.83	11.368	52.4
3	10	0.234	1000	0	122000	4267.78	2.343	508.47
4	25	0.233	1000	0	122000	4294.08	5.822	511.6
5	50	0.231	1000	0	122000	4330.64	11.546	515.95
6	100	0.231	1000	0	122000	4322.12	23.137	514.94

D. Kesimpulan

Dari hasil uji coba tes antara multithread dan asynchronous + load balancer, dapat dilihat bahwa asynchronous + load balancer memiliki peforma yang lebih baik dari multi thread karena asynchronous + load balancer memiliki waktu running lebih kecil dan transfer rate yang lebih tinggi daripada mulitthread server

E. Dokumentasi/Lampiran

1. Multithread Server

- Concurrency 1

```
cyber12drago@DESKTOP-OSA8IDU:~$ ab -n 1000 -c 1 http://127.0.0.1:46000/
This is ApacheBench, Version 2.3 <$Revision: 1807734 $>
Copyright 1996 Adam Twiss, Zeus Technology Ltd, http://www.zeustech.net/
Licensed to The Apache Software Foundation, http://www.apache.org/

Benchmarking 127.0.0.1 (be patient)
Completed 100 requests
Completed 200 requests
Completed 300 requests
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:      myserver/1.0
Server Hostname:      127.0.0.1
Server Port:          46000

Document Path:        /
Document Length:      4 bytes

Concurrency Level:    1
Time taken for tests:  815.536 seconds
Complete requests:    1000
Failed requests:      0
Non-2xx responses:    1000
Total transferred:    122000 bytes
HTML transferred:     4000 bytes
Requests per second:  1.23 [#/sec] (mean)
Time per request:     815.536 [ms] (mean)
Time per request:     815.536 [ms] (mean, across all concurrent requests)
Transfer rate:        0.15 [Kbytes/sec] received
```

- Concurrency 5

```
cyber12drago@DESKTOP-OSA8IDU:~$ ab -n 1000 -c 5 http://127.0.0.1:46000/
This is ApacheBench, Version 2.3 <$Revision: 1807734 $>
Copyright 1996 Adam Twiss, Zeus Technology Ltd, http://www.zeustech.net/
Licensed to The Apache Software Foundation, http://www.apache.org/

Benchmarking 127.0.0.1 (be patient)
Completed 100 requests
Completed 200 requests
Completed 300 requests
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:      myserver/1.0
Server Hostname:      127.0.0.1
Server Port:          46000

Document Path:        /
Document Length:      4 bytes

Concurrency Level:    5
Time taken for tests:  330.155 seconds
Complete requests:    1000
Failed requests:      0
Non-2xx responses:    1000
Total transferred:    122000 bytes
HTML transferred:     4000 bytes
Requests per second:  3.03 [#/sec] (mean)
Time per request:     1650.774 [ms] (mean)
Time per request:     330.155 [ms] (mean, across all concurrent requests)
Transfer rate:        0.36 [Kbytes/sec] received
```

- Concurrency 10

```
cyber12drago@DESKTOP-OSA8IDU:~$ ab -n 1000 -c 10 http://127.0.0.1:46000/
This is ApacheBench, Version 2.3 <$Revision: 1807734 $>
Copyright 1996 Adam Twiss, Zeus Technology Ltd, http://www.zeustech.net/
Licensed to The Apache Software Foundation, http://www.apache.org/

Benchmarking 127.0.0.1 (be patient)
Completed 100 requests
Completed 200 requests
Completed 300 requests
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:      myserver/1.0
Server Hostname:      127.0.0.1
Server Port:          46000

Document Path:        /
Document Length:      4 bytes

Concurrency Level:    10
Time taken for tests:  316.253 seconds
Complete requests:    1000
Failed requests:       0
Non-2xx responses:    1000
Total transferred:    122000 bytes
HTML transferred:     4000 bytes
Requests per second:  3.16 [#/sec] (mean)
Time per request:     3162.526 [ms] (mean)
Time per request:     316.253 [ms] (mean, across all concurrent requests)
Transfer rate:        0.38 [Kbytes/sec] received
```

- Concurrency 25

```
cyber12drago@DESKTOP-OSA8IDU:~$ ab -n 1000 -c 25 http://127.0.0.1:46000/
This is ApacheBench, Version 2.3 <$Revision: 1807734 $>
Copyright 1996 Adam Twiss, Zeus Technology Ltd, http://www.zeustech.net/
Licensed to The Apache Software Foundation, http://www.apache.org/

Benchmarking 127.0.0.1 (be patient)
Completed 100 requests
Completed 200 requests
Completed 300 requests
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:      myserver/1.0
Server Hostname:      127.0.0.1
Server Port:          46000

Document Path:        /
Document Length:      4 bytes

Concurrency Level:    25
Time taken for tests:  299.139 seconds
Complete requests:    1000
Failed requests:       0
Non-2xx responses:    1000
Total transferred:    122000 bytes
HTML transferred:     4000 bytes
Requests per second:  3.34 [#/sec] (mean)
Time per request:     7478.475 [ms] (mean)
Time per request:     299.139 [ms] (mean, across all concurrent requests)
Transfer rate:        0.40 [Kbytes/sec] received
```

- Concurrency 50

```
cyber12drago@DESKTOP-OSA8IDU:~$ ab -n 1000 -c 50 http://127.0.0.1:46000/
This is ApacheBench, Version 2.3 <$Revision: 1807734 $>
Copyright 1996 Adam Twiss, Zeus Technology Ltd, http://www.zeustech.net/
Licensed to The Apache Software Foundation, http://www.apache.org/

Benchmarking 127.0.0.1 (be patient)
Completed 100 requests
Completed 200 requests
Completed 300 requests
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:      myserver/1.0
Server Hostname:      127.0.0.1
Server Port:          46000

Document Path:        /
Document Length:      4 bytes

Concurrency Level:    50
Time taken for tests:  347.415 seconds
Complete requests:    1000
Failed requests:       0
Non-2xx responses:    1000
Total transferred:    122000 bytes
HTML transferred:     4000 bytes
Requests per second:  2.88 [#/sec] (mean)
Time per request:     17370.728 [ms] (mean)
Time per request:     347.415 [ms] (mean, across all concurrent requests)
Transfer rate:        0.34 [Kbytes/sec] received
```

- Concurrency 100

```
cyber12drago@DESKTOP-OSA8IDU:~$ ab -n 1000 -c 100 http://127.0.0.1:46000/
This is ApacheBench, Version 2.3 <$Revision: 1807734 $>
Copyright 1996 Adam Twiss, Zeus Technology Ltd, http://www.zeustech.net/
Licensed to The Apache Software Foundation, http://www.apache.org/

Benchmarking 127.0.0.1 (be patient)
Completed 100 requests
Completed 200 requests
Completed 300 requests
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:      myserver/1.0
Server Hostname:      127.0.0.1
Server Port:          46000

Document Path:        /
Document Length:      4 bytes

Concurrency Level:    100
Time taken for tests:  687.016 seconds
Complete requests:    1000
Failed requests:       0
Non-2xx responses:    1000
Total transferred:    122000 bytes
HTML transferred:     4000 bytes
Requests per second:  1.46 [#/sec] (mean)
Time per request:     68701.589 [ms] (mean)
Time per request:     687.016 [ms] (mean, across all concurrent requests)
Transfer rate:        0.17 [Kbytes/sec] received
```


2. Asynchronous Server + Load Balancer

- Concurrency 1

```
cyber12drago@DESKTOP-OSA8IDU:~$ ab -n 1000 -c 1 http://127.0.0.1:4444/
This is ApacheBench, Version 2.3 <$Revision: 1807734 $>
Copyright 1996 Adam Twiss, Zeus Technology Ltd, http://www.zeustech.net/
Licensed to The Apache Software Foundation, http://www.apache.org/

Benchmarking 127.0.0.1 (be patient)
Completed 100 requests
Completed 200 requests
Completed 300 requests
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:      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:  3.813 seconds
Complete requests:     1000
Failed requests:        0
Non-2xx responses:     1000
Total transferred:     122000 bytes
HTML transferred:     4000 bytes
Requests per second:   262.24 [#/sec] (mean)
Time per request:      3.813 [ms] (mean)
Time per request:      3.813 [ms] (mean, across all concurrent requests)
Transfer rate:         31.24 [Kbytes/sec] received
```

- Concurrency 5

```
cyber12drago@DESKTOP-OSA8IDU:~$ ab -n 1000 -c 5 http://127.0.0.1:4444/
This is ApacheBench, Version 2.3 <$Revision: 1807734 $>
Copyright 1996 Adam Twiss, Zeus Technology Ltd, http://www.zeustech.net/
Licensed to The Apache Software Foundation, http://www.apache.org/

Benchmarking 127.0.0.1 (be patient)
Completed 100 requests
Completed 200 requests
Completed 300 requests
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:      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:  2.274 seconds
Complete requests:     1000
Failed requests:        0
Non-2xx responses:     1000
Total transferred:     122000 bytes
HTML transferred:     4000 bytes
Requests per second:   439.83 [#/sec] (mean)
Time per request:      11.368 [ms] (mean)
Time per request:      2.274 [ms] (mean, across all concurrent requests)
Transfer rate:         52.40 [Kbytes/sec] received
```

- 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:  0.234 seconds
Complete requests:     1000
Failed requests:       0
Non-2xx responses:    1000
Total transferred:    122000 bytes
HTML transferred:     4000 bytes
Requests per second:   4267.78 [#/sec] (mean)
Time per request:      2.343 [ms] (mean)
Time per request:      0.234 [ms] (mean, across all concurrent requests)
Transfer rate:         508.47 [Kbytes/sec] received
```

Connection Times (ms)

	min	mean[+/-sd]	median	max
Connect:	0	0 0.0	0	0
Processing:	2	2 0.3	2	5
Waiting:	1	2 0.3	2	4
Total:	2	2 0.3	2	5

Percentage of the requests served within a certain time (ms)

50%	2
66%	2
75%	2
80%	2
90%	3
95%	3
98%	3
99%	4
100%	5 (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:  0.233 seconds
Complete requests:     1000
Failed requests:       0
Non-2xx responses:    1000
Total transferred:    122000 bytes
HTML transferred:     4000 bytes
Requests per second:   4294.08 [#/sec] (mean)
Time per request:      5.822 [ms] (mean)
Time per request:      0.233 [ms] (mean, across all concurrent requests)
Transfer rate:         511.60 [Kbytes/sec] received
```

Connection Times (ms)

	min	mean[+/-sd]	median	max
Connect:	0	0 0.1	0	1
Processing:	1	6 1.9	5	18
Waiting:	1	5 1.8	5	18
Total:	2	6 1.9	5	18

Percentage of the requests served within a certain time (ms)

50%	5
66%	6
75%	6
80%	6
90%	6
95%	7
98%	16
99%	18
100%	18 (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:  0.231 seconds
Complete requests:     1000
Failed requests:       0
Non-2xx responses:     1000
Total transferred:     122000 bytes
HTML transferred:     4000 bytes
Requests per second:   4330.64 [#/sec] (mean)
Time per request:      11.546 [ms] (mean)
Time per request:      0.231 [ms] (mean, across all concurrent requests)
Transfer rate:         515.95 [Kbytes/sec] received

Connection Times (ms)
      min    mean[+/-sd] median    max
Connect:    0      0   0.2      0      1
Processing:  1     11   1.9     11     15
Waiting:    1     11   1.9     11     15
Total:       2     11   1.7     11     15

Percentage of the requests served within a certain time (ms)
 50%    11
 66%    12
 75%    12
 80%    12
 90%    14
 95%    15
 98%    15
 99%    15
100%    15 (longest request)
```

- Concurrency 100

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

Document Path:        /
Document Length:      4 bytes

Concurrency Level:     100
Time taken for tests:  0.231 seconds
Complete requests:     1000
Failed requests:       0
Non-2xx responses:     1000
Total transferred:     122000 bytes
HTML transferred:     4000 bytes
Requests per second:   4322.12 [#/sec] (mean)
Time per request:      23.137 [ms] (mean)
Time per request:      0.231 [ms] (mean, across all concurrent requests)
Transfer rate:         514.94 [Kbytes/sec] received

Connection Times (ms)
      min    mean[+/-sd] median    max
Connect:    0      0   0.5      0      3
Processing:  2     12   2.5     12     22
Waiting:    1     12   2.5     12     22
Total:       4     12   2.4     12     23

Percentage of the requests served within a certain time (ms)
 50%    12
 66%    12
 75%    13
 80%    13
 90%    14
 95%    19
 98%    21
 99%    22
100%    23 (longest request)
```

