

PERFORMANCE TEST



PEMROGRAMAN JARINGAN - B

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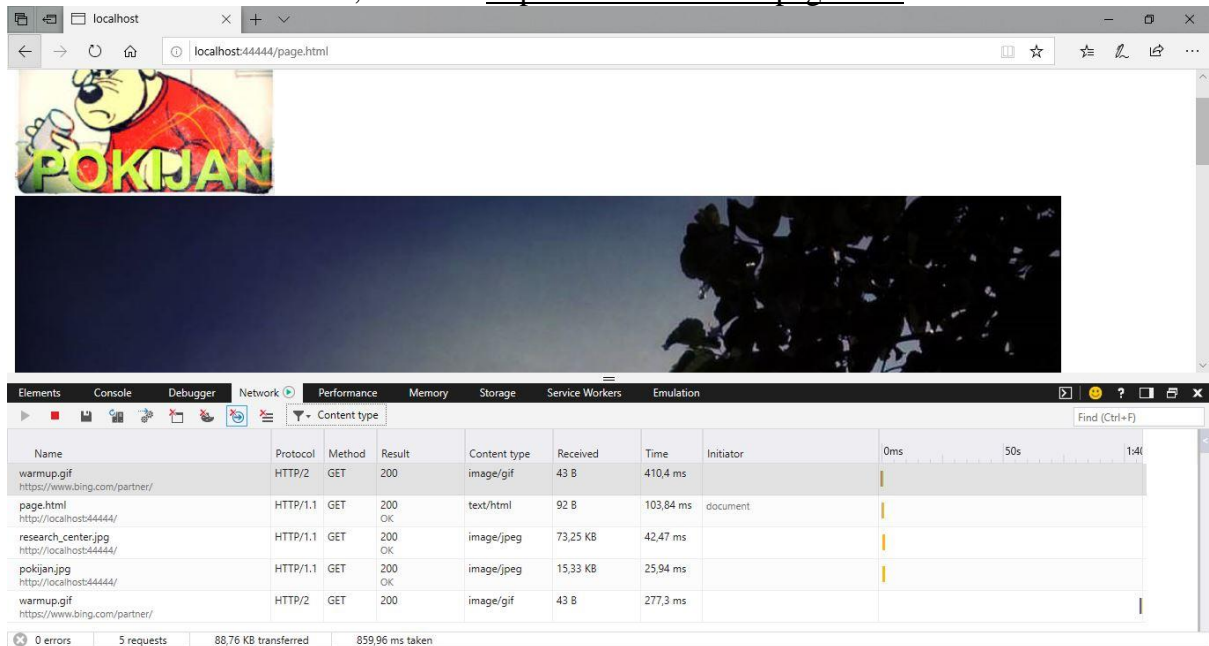
2020

A. Langkah-langkah

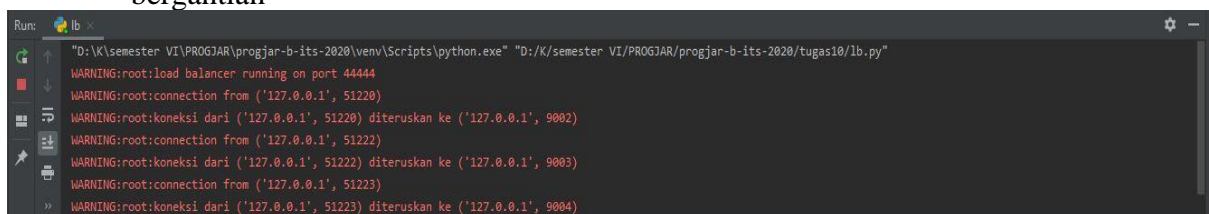
1. Pull update terbaru
2. Jalankan `async_server.py` pada port 9002, 9003, 9004, 9005 (lihat pada BackendList)

```
karinasoraya@DESKTOP-240H91J: /mnt/d/K/semester VI/PROGJAR/progjar-b-its-2020/tugas10$ WARNING:root:running on port 9002
WARNING:root:running on port 9003
WARNING:root:running on port 9004
```

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



Dari screenshot diatas dapat kita lihat bahwa setiap request 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`
Jumlah Request : 1000
Konkurensi : 1,50,100,250,500,1000
7. Buatlah tabel hasilnya

B. Hasil Performace Test

1. Server Async

No test	Concurrency level	Time taken for test	Complete request	Failed request	Total transferred	Request per second	Time per request	Transfer rate
1	1	1.192 seconds	1000	0	122000 bytes	839.14 [#/sec]	1.192 [ms]	99.98 [Kbytes/sec]
2	50	58.461 seconds	1000	0	122000 bytes	17.11 [#/sec]	58.461 [ms]	2.04 [Kbytes/sec]
3	100	57.493 seconds	1000	0	122000 bytes	17.39 [#/sec]	57.493 [ms]	2.07 [Kbytes/sec]
4	250	58.013 seconds	1000	0	122000 bytes	17.24 [#/sec]	58.013 [ms]	2.05 [Kbytes/sec]
5	500	59.020 seconds	1000	0	122000 bytes	16.94 [#/sec]	59.020 [ms]	2.02 [Kbytes/sec]
6	1000	62.574 seconds	1000	0	122000 bytes	15.98 [#/sec]	62.574 [ms]	1.90 [Kbytes/sec]

2. Server Thread

No test	Concurrency level	Time taken for test	Complete request	Failed request	Total transferred	Request per second	Time per request	Transfer rate
1	1	462.873 seconds	1000	0	122000 bytes	2.16 [#/sec]	462.873 [ms]	0.26 [Kbytes/sec]
2	50	260.294 seconds	1000	0	122000 bytes	3.84 [#/sec]	260.294 [ms]	0.46 [Kbytes/sec]
3	100	266.165 seconds	1000	0	122000 bytes	3.76 [#/sec]	266.165 [ms]	0.45 [Kbytes/sec]
4	250	271.513 seconds	1000	0	122000 bytes	3.68 [#/sec]	271.513 [ms]	0.44 [Kbytes/sec]
5	500	271.825 seconds	1000	0	122000 bytes	3.68 [#/sec]	271.825 [ms]	0.44 [Kbytes/sec]
6	1000	262.716 seconds	1000	0	122000 bytes	3.81 [#/sec]	262.716 [ms]	0.45 [Kbytes/sec]

3. Server Async Dengan Load Balancer

No test	Concurren cy level	Time taken for test	Complete request	Failed request	Total transferred	Request per second	Time per request	Transf er rate
1	1	1.824 seconds	1000	0	122000 bytes	548.39 [#/sec]	1.824 [ms]	65.34 [Kbytes /sec]
2	50	52.137 seconds	1000	0	122000 bytes	19.18 [#/sec]	52.137 [ms]	2.29 [Kbytes /sec]
3	100	52.977 seconds	1000	0	122000 bytes	18.88 [#/sec]	52.977 [ms]	2.25 [Kbytes /sec]
4	250	52.506 seconds	1000	0	122000 bytes	19.05 [#/sec]	52.506 [ms]	2.27 [Kbytes /sec]
5	500	55.271 seconds	1000	0	122000 bytes	18.09 [#/sec]	55.271 [ms]	2.16 [Kbytes /sec]
6	1000	60.039 seconds	1000	0	122000 bytes	16.66 [#/sec]	60.039 [ms]	1.98 [Kbytes /sec]

C. Kesimpulan

Dari ketiga tabel performance test tersebut dapat kita lihat bahwa asynchronus server yang menggunakan load balancer memproses lebih cepat dibandingkan asynchronus server biasa dan multithread server yang menandakan bahwa performa asynchronus server yang menggunakan load balancer lebih baik dibandingkan asynchronus server biasa dan multithread server. Load balancer disini bertugas untuk mendistribusikan request ke backend yang didefinisikan di class BackendList. Di dalam load balancer terdapat fungsi getserver pada class Backendlist yang akan membuat backend dipilih secara round robin atau bergantian secara fair sehingga setiap request akan dilayani oleh backend yang bergantian.

D. Capture Performance Test

1. Server Async Concurrency 1

```

Server Software:      myserver/1.0
Server Hostname:      127.0.0.1
Server Port:          45000

Document Path:        /
Document Length:      4 bytes

Concurrency Level:    1
Time taken for tests:  1.192 seconds
Complete requests:    1000
Failed requests:      0
Non-2xx responses:    1000
Total transferred:    122000 bytes
HTML transferred:     4000 bytes
Requests per second:  839.14 [#/sec] (mean)
Time per request:      1.192 [ms] (mean)
Time per request:      1.192 [ms] (mean, across all concurrent requests)
Transfer rate:         99.98 [Kbytes/sec] received

Connection Times (ms)
      min  mean[+/-sd] median   max
Connect:    0      0  0.8      0      4
Processing:  0      1  2.2      0     44
Waiting:    0      1  2.2      0     44
Total:       0      1  2.3      0     44

Percentage of the requests served within a certain time (ms)
 50%      0
 66%      0
 75%      4
 80%      4
 90%      4
 95%      4
 98%      4
 99%      4
100%     44 (longest request)

```

2. Server Async Concurrency 50

```

Server Software:      myserver/1.0
Server Hostname:      127.0.0.1
Server Port:          45000

Document Path:        /
Document Length:      4 bytes

Concurrency Level:    50
Time taken for tests:  58.461 seconds
Complete requests:    1000
Failed requests:      0
Non-2xx responses:    1000
Total transferred:    122000 bytes
HTML transferred:     4000 bytes
Requests per second:  17.11 [#/sec] (mean)
Time per request:      2923.054 [ms] (mean)
Time per request:      58.461 [ms] (mean, across all concurrent requests)
Transfer rate:         2.04 [Kbytes/sec] received

Connection Times (ms)
      min  mean[+/-sd] median   max
Connect:    0    58 160.8      0    508
Processing:  4 2803 428.1   3043 3061
Waiting:    0 1591 803.4   1528 3051
Total:       4 2861 423.1   3044 3552

Percentage of the requests served within a certain time (ms)
 50%    3044
 66%    3047
 75%    3049
 80%    3051
 90%    3055
 95%    3058
 98%    3061
 99%    3547
100%   3552 (longest request)

```

3. Server Async Concurrency 100

```

Server Software:      myserver/1.0
Server Hostname:     127.0.0.1
Server Port:         45000

Document Path:       /
Document Length:     4 bytes

Concurrency Level:    100
Time taken for tests: 57.493 seconds
Complete requests:    1000
Failed requests:      0
Non-2xx responses:    1000
Total transferred:    122000 bytes
HTML transferred:     4000 bytes
Requests per second:  17.39 [#/sec] (mean)
Time per request:     5749.350 [ms] (mean)
Time per request:     57.493 [ms] (mean, across all concurrent requests)
Transfer rate:        2.07 [Kbytes/sec] received

Connection Times (ms)
      min  mean[+/-sd] median   max
Connect:    0    57 159.4      0    506
Processing: 12 5406 1088.3   5595  6584
Waiting:    4 3032 1673.8   3045  6060
Total:      12 5463 1091.8   5597  6584

Percentage of the requests served within a certain time (ms)
 50%    5597
 66%    5647
 75%    6094
 80%    6097
 90%    6099
 95%    6101
 98%    6104
 99%    6105
100%    6584 (longest request)

```

4. Server Async Concurrency 250

```

Server Software:      myserver/1.0
Server Hostname:     127.0.0.1
Server Port:         45000

Document Path:       /
Document Length:     4 bytes

Concurrency Level:    250
Time taken for tests: 58.013 seconds
Complete requests:    1000
Failed requests:      0
Non-2xx responses:    1000
Total transferred:    122000 bytes
HTML transferred:     4000 bytes
Requests per second:  17.24 [#/sec] (mean)
Time per request:     14503.150 [ms] (mean)
Time per request:     58.013 [ms] (mean, across all concurrent requests)
Transfer rate:        2.05 [Kbytes/sec] received

Connection Times (ms)
      min  mean[+/-sd] median   max
Connect:    0    58 160.2      0    508
Processing: 48 12539 3802.3  14233 15729
Waiting:    0  7614 4280.7   7632 15708
Total:      48 12597 3803.0  14237 15729

Percentage of the requests served within a certain time (ms)
 50%   14237
 66%   14253
 75%   14736
 80%   14740
 90%   15223
 95%   15240
 98%   15725
 99%   15727
100%   15729 (longest request)

```

5. Server Async Concurrency 500

```

Server Software:      myserver/1.0
Server Hostname:      127.0.0.1
Server Port:          45000

Document Path:        /
Document Length:      4 bytes

Concurrency Level:    500
Time taken for tests:  59.020 seconds
Complete requests:    1000
Failed requests:      0
Non-2xx responses:    1000
Total transferred:    122000 bytes
HTML transferred:     4000 bytes
Requests per second:  16.94 [#/sec] (mean)
Time per request:     29510.021 [ms] (mean)
Time per request:     59.020 [ms] (mean, across all concurrent requests)
Transfer rate:        2.02 [Kbytes/sec] received

Connection Times (ms)
              min  mean[+/-sd] median   max
Connect:      0   59 161.4      0     508
Processing:   88 21673 9517.0  27489  31458
Waiting:      0 14981 8622.3  14763  31431
Total:        88 21732 9519.3  27490  31458

Percentage of the requests served within a certain time (ms)
 50%  27490
 66%  28487
 75%  29472
 80%  29953
 90%  30458
 95%  30950
 98%  31450
 99%  31453
100%  31458 (longest request)

```

6. Server Async Concurrency 1000

```

Server Software:      myserver/1.0
Server Hostname:      127.0.0.1
Server Port:          45000

Document Path:        /
Document Length:      4 bytes

Concurrency Level:    1000
Time taken for tests:  62.574 seconds
Complete requests:    1000
Failed requests:      0
Non-2xx responses:    1000
Total transferred:    122000 bytes
HTML transferred:     4000 bytes
Requests per second:  15.98 [#/sec] (mean)
Time per request:     62573.843 [ms] (mean)
Time per request:     62.574 [ms] (mean, across all concurrent requests)
Transfer rate:        1.90 [Kbytes/sec] received

Connection Times (ms)
              min  mean[+/-sd] median   max
Connect:      0   62 165.3      0     508
Processing:  156 31410 18032.3  31092  62466
Waiting:      0 31272 18061.4  31020  62430
Total:       156 31473 18031.9  31592  62466

Percentage of the requests served within a certain time (ms)
 50%  31592
 66%  41212
 75%  47280
 80%  50311
 90%  56393
 95%  59936
 98%  61454
 99%  62434
100%  62466 (longest request)

```

7. Server Thread Concurrency 1

```

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:  462.873 seconds
Complete requests:    1000
Failed requests:       0
Non-2xx responses:    1000
Total transferred:    122000 bytes
HTML transferred:     4000 bytes
Requests per second:  2.16 [#/sec] (mean)
Time per request:     462.873 [ms] (mean)
Time per request:     462.873 [ms] (mean, across all concurrent requests)
Transfer rate:        0.26 [Kbytes/sec] received

Connection Times (ms)
      min    mean[+/-sd] median    max
Connect:    0       0   0.4      0      1
Processing:  2    463 254.5    474   1374
Waiting:    1    438 245.3    448   1303
Total:      2    463 254.5    474   1374

Percentage of the requests served within a certain time (ms)
 50%    474
 66%    576
 75%    638
 80%    680
 90%    790
 95%    891
 98%    999
 99%   1084
100%   1374 (longest request)

```

8. Server Thread Concurrency 50

```

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:  260.294 seconds
Complete requests:    1000
Failed requests:       0
Non-2xx responses:    1000
Total transferred:    122000 bytes
HTML transferred:     4000 bytes
Requests per second:  3.84 [#/sec] (mean)
Time per request:     13014.693 [ms] (mean)
Time per request:     260.294 [ms] (mean, across all concurrent requests)
Transfer rate:        0.46 [Kbytes/sec] received

Connection Times (ms)
      min    mean[+/-sd] median    max
Connect:    0    260 252.6    500   1001
Processing: 376 12451 1610.8  12537  14042
Waiting:    2  6825 3620.3   7015  14041
Total:      875 12711 1600.9  13032  14541

Percentage of the requests served within a certain time (ms)
 50%   13032
 66%   13037
 75%   13534
 80%   13537
 90%   13541
 95%   14038
 98%   14042
 99%   14539
100%   14541 (longest request)

```

9. Server Thread Concurrency 100


```

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:  266.165 seconds
Complete requests:    1000
Failed requests:       0
Non-2xx responses:    1000
Total transferred:    122000 bytes
HTML transferred:     4000 bytes
Requests per second:  3.76 [#/sec] (mean)
Time per request:     26616.548 [ms] (mean)
Time per request:     266.165 [ms] (mean, across all concurrent requests)
Transfer rate:        0.45 [Kbytes/sec] received

Connection Times (ms)
      min  mean[+/-sd] median   max
Connect:    0   265 253.4    501   1013
Processing: 554 25084 4594.7  26064  31108
Waiting:    2  13558 7598.5  13529  30102
Total:      901 25350 4588.2  26071  31609

Percentage of the requests served within a certain time (ms)
 50%  26071
 66%  26574
 75%  27077
 80%  27572
 90%  28080
 95%  30093
 98%  30605
 99%  31107
100%  31609 (longest request)

```

10. Server Thread Concurrency 250

```

Server Software:      myserver/1.0
Server Hostname:      127.0.0.1
Server Port:          46000

Document Path:        /
Document Length:      4 bytes

Concurrency Level:    250
Time taken for tests:  271.513 seconds
Complete requests:    1000
Failed requests:       0
Non-2xx responses:    1000
Total transferred:    122000 bytes
HTML transferred:     4000 bytes
Requests per second:  3.68 [#/sec] (mean)
Time per request:     67878.346 [ms] (mean)
Time per request:     271.513 [ms] (mean, across all concurrent requests)
Transfer rate:        0.44 [Kbytes/sec] received

Connection Times (ms)
      min  mean[+/-sd] median   max
Connect:    0   270 255.0    501   1002
Processing: 928 59659 17200.7  64684  73207
Waiting:    1  33885 19564.9  34084  72702
Total:     1019 59930 17192.0  64693  73208

Percentage of the requests served within a certain time (ms)
 50%  64693
 66%  69205
 75%  71109
 80%  71698
 90%  72202
 95%  72701
 98%  73203
 99%  73204
100%  73208 (longest request)

```

11. Server Thread Concurrency 500

```

Server Software:      myserver/1.0
Server Hostname:      127.0.0.1
Server Port:          46000

Document Path:        /
Document Length:      4 bytes

Concurrency Level:    500
Time taken for tests:  271.825 seconds
Complete requests:    1000
Failed requests:      0
Non-2xx responses:    1000
Total transferred:    122000 bytes
HTML transferred:     4000 bytes
Requests per second:  3.68 [#/sec] (mean)
Time per request:     135912.603 [ms] (mean)
Time per request:     271.825 [ms] (mean, across all concurrent requests)
Transfer rate:        0.44 [Kbytes/sec] received

Connection Times (ms)
      min      mean[+/-sd] median   max
Connect:    0      271 258.8      501   1002
Processing: 604    104105 42115.4 128848 143879
Waiting:    1     69613 39468.0  70184 143874
Total:      854    104377 42096.3 129345 143880

Percentage of the requests served within a certain time (ms)
 50%    129345
 66%    131850
 75%    134356
 80%    136366
 90%    140365
 95%    142369
 98%    143368
 99%    143871
100%    143880 (longest request)

```

12. Server Thread Concurrency 1000

```

Server Software:      myserver/1.0
Server Hostname:      127.0.0.1
Server Port:          46000

Document Path:        /
Document Length:      4 bytes

Concurrency Level:    1000
Time taken for tests:  262.716 seconds
Complete requests:    1000
Failed requests:      0
Non-2xx responses:    1000
Total transferred:    122000 bytes
HTML transferred:     4000 bytes
Requests per second:  3.81 [#/sec] (mean)
Time per request:     262716.463 [ms] (mean)
Time per request:     262.716 [ms] (mean, across all concurrent requests)
Transfer rate:        0.45 [Kbytes/sec] received

Connection Times (ms)
      min      mean[+/-sd] median   max
Connect:    0      262 253.5      501   1001
Processing: 962    134557 75128.2 136383 261674
Waiting:    2     134256 75161.2 135852 261660
Total:     1071    134819 75114.9 136385 261674

Percentage of the requests served within a certain time (ms)
 50%    136385
 66%    177473
 75%    200024
 80%    212551
 90%    237614
 95%    250143
 98%    257663
 99%    260169
100%    261674 (longest request)

```

13. Server Async + Load Balancer 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:  1.824 seconds
Complete requests:    1000
Failed requests:      0
Non-2xx responses:    1000
Total transferred:    122000 bytes
HTML transferred:     4000 bytes
Requests per second:  548.39 [#/sec] (mean)
Time per request:     1.824 [ms] (mean)
Time per request:     1.824 [ms] (mean, across all concurrent requests)
Transfer rate:        65.34 [Kbytes/sec] received

Connection Times (ms)
              min  mean[+/-sd] median  max
Connect:      0    0   2.3      0    68
Processing:   0    1   2.0      0    16
Waiting:      0    1   1.9      0    16
Total:        0    2   3.0      0    72

Percentage of the requests served within a certain time (ms)
 50%    0
 66%    4
 75%    4
 80%    4
 90%    4
 95%    4
 98%    4
 99%    4
100%   72 (longest request)

```

14. Server Thread + Load Balancer 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:  52.137 seconds
Complete requests:    1000
Failed requests:      0
Non-2xx responses:    1000
Total transferred:    122000 bytes
HTML transferred:     4000 bytes
Requests per second:  19.18 [#/sec] (mean)
Time per request:     2606.845 [ms] (mean)
Time per request:     52.137 [ms] (mean, across all concurrent requests)
Transfer rate:        2.29 [Kbytes/sec] received

Connection Times (ms)
              min  mean[+/-sd] median  max
Connect:      0   52 152.6      0   508
Processing:  12 2495 414.2   2556 3066
Waiting:      0 1672 668.1   1543 2560
Total:       12 2547 415.9   2557 3069

Percentage of the requests served within a certain time (ms)
 50%   2557
 66%   2561
 75%   2563
 80%   2565
 90%   3054
 95%   3057
 98%   3061
 99%   3065
100%  3069 (longest request)

```

15. Server Thread + Load Balancer 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:  52.977 seconds
Complete requests:    1000
Failed requests:       0
Non-2xx responses:    1000
Total transferred:    122000 bytes
HTML transferred:     4000 bytes
Requests per second:  18.88 [#/sec] (mean)
Time per request:     5297.695 [ms] (mean)
Time per request:     52.977 [ms] (mean, across all concurrent requests)
Transfer rate:        2.25 [Kbytes/sec] received

Connection Times (ms)
      min    mean[+/-sd] median    max
Connect:    0   53 153.0      1     502
Processing: 19 4980 1010.7    5099   6087
Waiting:    2  2840 1546.3    3043   5584
Total:      19 5032 1015.9    5100   6088

Percentage of the requests served within a certain time (ms)
 50%    5100
 66%    5585
 75%    5592
 80%    5597
 90%    5600
 95%    5601
 98%    5605
 99%    6084
100%    6088 (longest request)

```

16. Server Thread + Load Balancer Concurrency 250

```

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

Document Path:        /
Document Length:      4 bytes

Concurrency Level:    250
Time taken for tests:  52.506 seconds
Complete requests:    1000
Failed requests:       0
Non-2xx responses:    1000
Total transferred:    122000 bytes
HTML transferred:     4000 bytes
Requests per second:  19.05 [#/sec] (mean)
Time per request:     13126.600 [ms] (mean)
Time per request:     52.506 [ms] (mean, across all concurrent requests)
Transfer rate:        2.27 [Kbytes/sec] received

Connection Times (ms)
      min    mean[+/-sd] median    max
Connect:    0   52 152.3      1     503
Processing: 29 11262 3537.3   12747  14714
Waiting:    1  6955 3876.6    7101  14689
Total:      29 11314 3539.4   12748  15202

Percentage of the requests served within a certain time (ms)
 50%    12748
 66%    12756
 75%    12788
 80%    13250
 90%    14209
 95%    14600
 98%    14707
 99%    14712
100%    15202 (longest request)

```

17. Server Thread + Load Balancer Concurrency 500

```

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

Document Path:        /
Document Length:      4 bytes

Concurrency Level:    500
Time taken for tests:  55.271 seconds
Complete requests:    1000
Failed requests:       0
Non-2xx responses:    1000
Total transferred:    122000 bytes
HTML transferred:     4000 bytes
Requests per second:  18.09 [#/sec] (mean)
Time per request:      27635.440 [ms] (mean)
Time per request:      55.271 [ms] (mean, across all concurrent requests)
Transfer rate:         2.16 [Kbytes/sec] received

Connection Times (ms)
              min    mean[+/-sd] median    max
Connect:        0     55 156.5      0     508
Processing:    92 20132 8985.6   25169  30022
Waiting:        0 14009 8068.2   13897  30003
Total:         92 20187 8989.0   25172  30022

Percentage of the requests served within a certain time (ms)
 50%  25172
 66%  26588
 75%  27554
 80%  28054
 90%  29027
 95%  29518
 98%  30015
 99%  30022
100%  30022 (longest request)

```

18. Server Thread + Load Balancer Concurrency 1000

```

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

Document Path:        /
Document Length:      4 bytes

Concurrency Level:    1000
Time taken for tests:  60.039 seconds
Complete requests:    1000
Failed requests:       0
Non-2xx responses:    1000
Total transferred:    122000 bytes
HTML transferred:     4000 bytes
Requests per second:  16.66 [#/sec] (mean)
Time per request:      60039.097 [ms] (mean)
Time per request:      60.039 [ms] (mean, across all concurrent requests)
Transfer rate:         1.98 [Kbytes/sec] received

Connection Times (ms)
              min    mean[+/-sd] median    max
Connect:        0     60 162.6      0     508
Processing:   104 30005 17339.2   30054  59971
Waiting:        4 29897 17352.1   30006  59947
Total:        108 30065 17339.3   30054  59971

Percentage of the requests served within a certain time (ms)
 50%  30054
 66%  39696
 75%  45271
 80%  47808
 90%  54393
 95%  56928
 98%  58959
 99%  59951
100%  59971 (longest request)

```