LAPORAN TUGAS 10 PEMROGRAMAN JARINGAN

"Performance Test"



Oleh

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SOAL TUGAS 10

Dengan semakin populernya aplikasi/sistem informasi berbasis web, maka potensi diakses ribuan bahkan ratusan ribu user sangat besar. Apapun jenis model processingnya (threaded / asynchronous), pasti akan mempunyai batas kemampuan. Dalam hal ini yang bisa dilakukan adalah

- Scale up → meningkatkan kapasitas memory dan kemampuan cpu (menambah core), namun hal ini tidak murah
- Scale horizontal → melayani request dengan memanfaatkan resource komputasi dari mesin yang berbeda beda. Biaya tidak terlalu besar, karena dapat memanfaatkan komputer2 komoditi, atau bahkan laptop untuk bisa berpartisipasi dalam melayani request.

Pattern atau pola operasi yang digunakan pada umumnya adalah

- Load balancer → bertugas sebagai front end yang akan menerima request dari user, dan kemudian men-DISTRIBUSIKAN-nya ke BACKEND-server
- Backend server → bertugas menerima request dari load balancer, memprosesnya dan kemudian mengembalikannya ke load balancer untuk diteruskan ke client yang memintanya

Pada folder progjar6, terdapat file async_server.py seperti pada progjar5 yang bertindak sebagai server dengan asynchrnous processing. Ini yang akan dimanfaatkan sebagai BACKEND server. Lb.py merupakan load balancer yang bertugas mendistrubusikan request ke backend yang didefinisikan di class BackendList. Dalam lb.py, fungsi getserver pada class Backendlist akan membuat backend dipilih secara round robin atau bergantian secara fair.

- 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

PENJELASAN

- 1. Pull Update Terbaru
- 2. Menjalankan async_server.py dengan port 9002, 9003, 9004, 9005 dengan menggunkan WSL Dengan menggunakan perintah :

"python3 async_server.py 9002 & python3 async_server.py 9003 & python3 async_server.py 9004 & python3 async_server.py 9005 &"

```
isnaini@LAPTOP-KVRCR34L:/mnt/e/PROGJAR/PROGJAR_05111740000010/Tugas 10$ python3 async_server.py 9002 & python3 async_server.py 9003 & python3 async_server.py 9005 &

[1] 914

[2] 915

[3] 916

[4] 917

isnaini@LAPTOP-KVRCR34L:/mnt/e/PROGJAR/PROGJAR_05111740000010/Tugas 10$ WARNING:root:running on port 9002

WARNING:root:running on port 9004

WARNING:root:running on port 9003

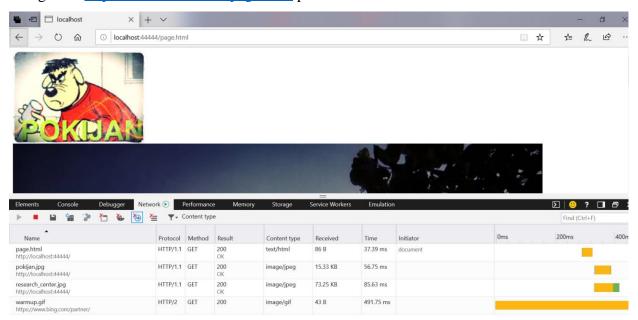
WARNING:root:running on port 9005
```

3. Menjalankan file lb.py dan menjalankan di port 44444 Dengan menggunakan perintah :

"python3 lb.py"

isnaini@LAPTOP-KVRCR34L: /mnt/e/PROGJAR/PROGJAR_05111740000010/Tugas 10

isnaini@LAPTOP-KVRCR34L:/mnt/e/PROGJAR/PROGJAR_05111740000010/Tugas 10\$ python3 lb.py WARNING:root:load balancer running on port 44444 4. Mengakses http://localhost:44444/page.html pada browser



5. Mengecek dan melihat proses di log program bahwa setiap request akan dilayani oleh backend secara bergantian.

```
🧿 isnaini@LAPTOP-KVRCR34L: /mnt/e/PROGJAR/PROGJAR 05111740000010/Tugas 10
snaini@LAPTOP-KVRCR34L:/mnt/e/PROGJAR/PROGJAR_05111740000010/Tugas 10$ python3 lb.py
WARNING:root:load balancer running on port 44444
WARNING:root:connection from ('127.0.0.1', 52060)
WARNING:root:koneksi dari ('127.0.0.1', 52060) diteruskan ke ('127.0.0.1', 9002)
WARNING:root:connection from ('127.0.0.1', 52072)
WARNING:root:koneksi dari ('127.0.0.1', 52072) diteruskan ke ('127.0.0.1', 9003)
WARNING:root:connection from ('127.0.0.1', 52071)
WARNING:root:koneksi dari ('127.0.0.1', 52071) diteruskan ke ('127.0.0.1', 9004)
WARNING:root:connection from ('127.0.0.1', 52075)
WARNING:root:koneksi dari ('127.0.0.1', 52075) diteruskan ke ('127.0.0.1', 9005)
WARNING:root:connection from ('127.0.0.1', 52081)
WARNING:root:koneksi dari ('127.0.0.1', 52081) diteruskan ke ('127.0.0.1', 9002)
WARNING:root:connection from ('127.0.0.1', 52082)
WARNING:root:koneksi dari ('127.0.0.1', 52082) diteruskan ke ('127.0.0.1', 9003)
WARNING:root:connection from ('127.0.0.1', 52085)
WARNING:root:koneksi dari ('127.0.0.1', 52085) diteruskan ke ('127.0.0.1', 9004)
WARNING:root:connection from ('127.0.0.1', 52091)
WARNING:root:koneksi dari ('127.0.0.1', 52091) diteruskan ke ('127.0.0.1', 9005)
WARNING:root:connection from ('127.0.0.1', 52092)
WARNING:root:koneksi dari ('127.0.0.1', 52092) diteruskan ke ('127.0.0.1', 9002)
WARNING:root:connection from ('127.0.0.1', 52095)
WARNING:root:koneksi dari ('127.0.0.1', 52095) diteruskan ke ('127.0.0.1', 9003)
WARNING:root:connection from ('127.0.0.1', 52099)
WARNING:root:koneksi dari ('127.0.0.1', 52099) diteruskan ke ('127.0.0.1', 9004)
WARNING:root:connection from ('127.0.0.1', 52100)
WARNING:root:koneksi dari ('127.0.0.1', 52100) diteruskan ke ('127.0.0.1', 9005)
WARNING:root:connection from ('127.0.0.1', 52103)
WARNING:root:koneksi dari ('127.0.0.1', 52103) diteruskan ke ('127.0.0.1', 9002)
WARNING:root:connection from ('127.0.0.1', 52129)
```

6. Melakukan performance test seperti tugas 9, dan membandingkan penggunaan antara load balancer dengan async_server dengan server_thread_http pada folder progjar Tugas5

Dengan parameter sebagai berikut :

Jumlah request : 1000

Konkurensi : 1,50, 100,500,1000

7. Membuat tabel hasil performance test

♣ Server Async (Port 45000)

No test	Concur rency level	Time taken for test	Complete request	Failed request	Total transfer red	Request per second	Time per request	Transfer rate
1	1	2.168	1000	0	122000	461.26	2.168	54.95
		seconds			bytes	[#/sec]	[ms]	[Kbytes/s
						(mean)		ec]
2	50	59.397	1000	0	122000	16.84	59.397	2.01
		seconds			bytes	[#/sec]	[ms]	[Kbytes/s
						(mean)		ec]
3	100	59.985	1000	0	122000	16.67	59.985	1.99
		seconds			bytes	[#/sec]	[ms]	[Kbytes/
						(mean)		sec]
4	500	60.406	1000	0	122000	16.55	60.406	1.97
		seconds			bytes	[#/sec]	[ms]	[Kbytes/
						(mean)		sec]
5	1000	62.970	1000	0	122000	15.88	62.970	1.89
		seconds			bytes	[#/sec]	[ms]	[Kbytes/
						(mean)		sec]

♣ Server Thread (Port 46000)

No test	Concur rency level	Time taken for test	Complete request	Failed request	Total transfer red	Request per second	Time per request	Transfer rate
1	1	483.745	1000	0	122000	2.07	483.745	0.25
		seconds			bytes	[#/sec]	[ms]	[Kbytes/s
						(mean)		ec]
2	50	422.244	1000	0	122000	2.37	422.244	0.28
		seconds			bytes	[#/sec]	[ms]	[Kbytes/s
						(mean)		ec]
3	100	492.146	1000	0	122000	2.03	492.146	0.24
		seconds			bytes	[#/sec]	[ms]	[Kbytes/
						(mean)		sec]
4	500	471.756	1000	0	122000	2.12	471.756	0.25
		seconds			bytes	[#/sec]	[ms]	[Kbytes/
						(mean)		sec]
5	1000	442.227	1000	0	122000	2.26	442.227	0.27
		seconds			bytes	[#/sec]	[ms]	[Kbytes/
						(mean)		sec]

♣ Sever Async dengan Load Balancer (Port 44444)

No test	Concur rency level	Time taken for test	Complete request	Failed request	Total transfer red	Request per second	Time per request	Transfer rate
1	1	1.579	1000	0	0	633.48	1.579	0.00
		seconds			bytes	[#/sec]	[ms]	[Kbytes/s
						(mean)		ec]
2	50	1.580	1000	0	0	632.86	1.580	0.00
		seconds			bytes	[#/sec]	[ms]	[Kbytes/s
						(mean)		ec]
3	100	1.614	1000	0	0	619.41	1.614	0.00
		seconds			bytes	[#/sec]	[ms]	[Kbytes/
						(mean)		sec]
4	500	2.285	1000	0	0	437.65	2.285	0.00
		seconds			bytes	[#/sec]	[ms]	[Kbytes/
						(mean)		sec]
5	1000	1.698	1000	0	0	558.81	1.698	0.00
		seconds			bytes	[#/sec]	[ms]	[Kbytes/
						(mean)		sec]

4 Kesimpulan

Dari ketiga table performance test diatas, dapat kita lihat bahwa asyncronus server yang menggunakan load balancer memproses lebih cepat jika dibandingkan dengan asyncronus server biasa dan multithread server yang menandakan bahwa performa asyncronus server lebih baik dibandingkan dengan asyncronus biasa dan multithread server. Load balancer bertugas untuk mendistribusikan request ke backend yag 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.

Hasil Performance Test

Asyncronus Server

(Port 45000)

```
45000
Server Port:
Document Path:
                        4 bytes
Document Length:
Concurrency Level:
                        1
Time taken for tests:
                        2.168 seconds
Complete requests:
                        1000
Failed requests:
                        1000
Non-2xx responses:
Total transferred:
                        122000 bytes
HTML transferred:
                        4000 bytes
Requests per second:
                        461.26 [#/sec] (mean)
                        2.168 [ms] (mean)
Time per request:
                        2.168 [ms] (mean, across all concurrent requests)
Time per request:
Transfer rate:
                        54.95 [Kbytes/sec] received
Connection Times (ms)
              min mean[+/-sd] median
                                        max
Connect:
                     0
                         0.4
                0
                                          2
                                          5
Processing:
                0
                     2
                         0.9
                                  1
                     2
                                  1
                                          5
Waiting:
                0
                         0.9
Total:
                0
                     2
                         1.0
                                  2
                                          6
WARNING: The median and mean for the processing time are not within a normal deviati
on
        These results are probably not that reliable.
WARNING: The median and mean for the waiting time are not within a normal deviation
        These results are probably not that reliable.
Percentage of the requests served within a certain time (ms)
  50%
           2
 66%
           2
 75%
           3
 80%
           3
 90%
           3
  95%
           4
           4
 98%
 99%
 100%
           6 (longest request)
```

```
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:
                       59.397 seconds
Complete requests:
                        1000
Failed requests:
Non-2xx responses:
                       1000
Total transferred:
                       122000 bytes
HTML transferred:
                       4000 bytes
Requests per second:
                       16.84 [#/sec] (mean)
                        2969.836 [ms] (mean)
Time per request:
                       59.397 [ms] (mean, across all concurrent requests)
Time per request:
Transfer rate:
                        2.01 [Kbytes/sec] received
Connection Times (ms)
             min mean[+/-sd] median
                                       max
Connect:
                   59 161.2
               0
                                 0
                                        507
Processing:
               8 2847 422.7
                               3039
                                       3550
Waiting:
               2 1913 738.4
                               2028
                                       3051
               8 2906 422.9
Total:
                              3042
                                       3551
Percentage of the requests served within a certain time (ms)
  50%
        3042
  66%
       3046
  75%
       3048
  80%
       3050
  90%
       3054
  95%
      3062
  98%
       3543
  99%
       3547
 100%
       3551 (longest request)
```

```
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:
                       59.985 seconds
Complete requests:
                     1000
Failed requests:
                       0
Non-2xx responses:
                      1000
Total transferred:
                       122000 bytes
HTML transferred:
                      4000 bytes
Requests per second: 16.67 [#/sec] (mean)
                     5998.512 [ms] (mean)
Time per request:
Time per request:
                       59.985 [ms] (mean, across all concurrent requests)
Transfer rate:
                       1.99 [Kbytes/sec] received
Connection Times (ms)
             min mean[+/-sd] median
                                      max
Connect:
              0
                   60 161.8
                                0
                                      518
Processing:
              18 5638 1101.8 6083
                                      6589
                               3049
Waiting:
              1 3127 1713.4
                                      6565
Total:
              18 5698 1101.2 6091
                                      7075
Percentage of the requests served within a certain time (ms)
  50%
       6091
  66%
       6101
  75%
       6105
  80%
      6109
  90%
       6121
  95%
       6578
  98%
       6582
 99%
       6588
       7075 (longest request)
 100%
```

```
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: 60.406 seconds
Complete requests:
                    1000
Failed requests:
                     0
Non-2xx responses:
                     1000
Total transferred:
                     122000 bytes
                    4000 bytes
HTML transferred:
Requests per second: 16.55 [#/sec] (mean)
                     30203.223 [ms] (mean)
Time per request:
                     60.406 [ms] (mean, across all concurrent requests)
Time per request:
Transfer rate:
                      1.97 [Kbytes/sec] received
Connection Times (ms)
             min mean[+/-sd] median
                                     max
Connect:
             0 60 162.3
                                     507
                                0
Processing:
            44 22294 9773.8 28962
                                    31416
Waiting:
             2 15128 8761.0 15205
                                     31386
Total:
             44 22354 9775.4 28970 31416
Percentage of the requests served within a certain time (ms)
 50% 28970
 66% 29474
 75% 29956
 80% 30419
 90% 30449
 95% 30919
 98% 31410
 99% 31412
 100% 31416 (longest request)
```

```
Server Software:
                        myserver/1.0
Server Hostname:
                         127.0.0.1
                        45000
Server Port:
Document Path:
Document Length:
                        4 bytes
Concurrency Level:
                       1000
Time taken for tests: 62.970 seconds
Complete requests: 1000
Failed requests:
                        0
Non-2xx responses:
                       1000
Total transferred:
                       122000 bytes
HTML transferred:
                        4000 bytes
Requests per second: 15.88 [#/sec] (mean)

Time per request: 62969.525 [ms] (mean)

Time per request: 62.970 [ms] (mean, across all concurrent requests)
Transfer rate:
                       1.89 [Kbytes/sec] received
Connection Times (ms)
              min mean[+/-sd] median
                                         max
Connect:
              0 63 165.4
                                 0
                                         514
              122 31332 18227.0 31514 62890
Processing:
              3 31216 18241.3 31460 62862
Waiting:
              123 31395 18227.4 31514 62890
Total:
Percentage of the requests served within a certain time (ms)
  50% 31514
  66% 41631
  75% 47211
  80% 50245
  90% 56827
  95% 59865
  98% 61881
  99% 62387
 100% 62890 (longest request)
```

Hasil Performance Test

Server Thread

(Port 46000)

```
Server Software:
                       myserver/1.0
Server Hostname:
                       127.0.0.1
Server Port:
                       46000
Document Path:
Document Length:
                       4 bytes
Concurrency Level:
Time taken for tests: 483.745 seconds
Complete requests:
                       1000
Failed requests:
                       0
Non-2xx responses:
                     1000
Total transferred:
                     122000 bytes
                      4000 bytes
HTML transferred:
Requests per second: 2.07 [#/sec] (mean)
Time per request:
                       483.745 [ms] (mean)
Time per request:
                     483.745 [ms] (mean, across all concurrent requests)
Transfer rate:
                       0.25 [Kbytes/sec] received
Connection Times (ms)
             min mean[+/-sd] median
                                      max
Connect:
               0
                    0
                        0.4
                                         1
              1 483 270.5
                               456
Processing:
                                      1830
Waiting:
              1 453 256.7
                               426
                                      1784
Total:
               1 484 270.5
                               456
                                      1830
Percentage of the requests served within a certain time (ms)
 50%
        456
 66%
        563
  75%
        641
 80%
        686
 90%
        839
 95%
        992
 98%
       1149
 99%
       1242
 100%
       1830 (longest request)
```

```
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:
                       422.244 seconds
Complete requests:
                       1000
Failed requests:
Non-2xx responses:
                      1000
Total transferred:
                      122000 bytes
HTML transferred:
                       4000 bytes
Requests per second:
                      2.37 [#/sec] (mean)
Time per request:
                      21112.202 [ms] (mean)
Time per request:
                       422.244 [ms] (mean, across all concurrent requests)
Transfer rate:
                       0.28 [Kbytes/sec] received
Connection Times (ms)
             min mean[+/-sd] median
                                       max
               0 418 332.4
Connect:
                               501
                                      1508
Processing:
            1291 20164 4829.3 20540
                                       30077
Waiting:
            322 11364 6136.5 11026
                                     29575
            1792 20583 4892.7 21039
Total:
                                       30578
Percentage of the requests served within a certain time (ms)
  50% 21039
  66% 22556
  75% 23560
  80% 25052
  90% 27074
  95% 28574
  98% 29579
  99% 30078
 100% 30578 (longest request)
```

```
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: 492.146 seconds
Complete requests:
                    1000
Failed requests:
Non-2xx responses:
                     1000
Total transferred:
                     122000 bytes
HTML transferred:
                     4000 bytes
Requests per second: 2.03 [#/sec] (mean)
                    49214.587 [ms] (mean)
Time per request:
                     492.146 [ms] (mean, across all concurrent requests)
Time per request:
Transfer rate:
                      0.24 [Kbytes/sec] received
Connection Times (ms)
             min mean[+/-sd] median max
Connect:
               0 489 397.6
                            501
                                     2008
Processing: 2017 47297 12710.5 50670 64705
Waiting:
               6 24997 14946.7 23074 64703
Total:
            2320 47786 12776.5 51146
                                       65206
Percentage of the requests served within a certain time (ms)
  50% 51146
 66% 56152
  75% 58180
 80% 58691
 90% 62185
 95% 63193
 98% 63703
 99% 64187
 100% 65206 (longest request)
```

```
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: 471.756 seconds
Complete requests:
                     1000
Failed requests:
                       0
Non-2xx responses:
                      1000
Total transferred:
                      122000 bytes
HTML transferred:
                      4000 bytes
Requests per second: 2.12 [#/sec] (mean)
Time per request:
                      235877.922 [ms] (mean)
Time per request:
                      471.756 [ms] (mean, across all concurrent requests)
                      0.25 [Kbytes/sec] received
Transfer rate:
Connection Times (ms)
             min mean[+/-sd] median
                                      max
               0 467 379.6 501
Connect:
                                     2010
Processing: 2960 191501 81776.3 218849 280950
Waiting:
            2 120585 727<mark>3</mark>1.9 120385 280438
            3463 191969 81735.8 219238 281451
Total:
Percentage of the requests served within a certain time (ms)
 50% 219238
 66% 251933
 75% 258411
 80% 264412
 90% 272915
 95% 274420
 98% 278429
 99% 280433
 100% 281451 (longest request)
```

```
Server Software:
                       myserver/1.0
                       127.0.0.1
Server Hostname:
Server Port:
                       46000
Document Path:
Document Length:
                       4 bytes
Concurrency Level: 1000
Time taken for tests: 442.227 seconds
Complete requests:
                       1000
Failed requests:
                      0
Non-2xx responses:
                       1000
Total transferred:
                       122000 bytes
HTML transferred:
                       4000 bytes
Requests per second: 2.26 [#/sec] (mean)
Time per request: 442226.757 [ms] (mean)
                     442.227 [ms] (mean, across all concurrent requests)
Time per request:
                       0.27 [Kbytes/sec] received
Transfer rate:
Connection Times (ms)
             min mean[+/-sd] median
                                       max
              0 439 363.3
Connect:
                                       2004
                             501
Processing: 1603 248750 129153.5 261377 439011
               5 248245 129276.5 260813 438981
Waiting:
Total:
             2104 249189 129053.5 261378 439011
Percentage of the requests served within a certain time (ms)
 50% 261378
 66% 331613
  75% 365737
  80% 382795
  90% 414427
  95% 427464
  98% 434986
 99% 437496
 100% 439011 (longest request)
```

Hasil Performance Test

Server Asyncronus Dengan Load Balancer

(Port 44444)

```
Server Software:
Server Hostname:
                          127.0.0.1
Server Port:
                         44444
Document Path:
Document Length:
                          0 bytes
Concurrency Level:
Time taken for tests: 1.579 seconds
Complete requests:
                         1000
Failed requests:
Total transferred:
                       0 bytes
HTML transferred:
                        0 bytes
Requests per second: 633.48 [#/sec] (mean)
Time per request: 1.579 [ms] (mean)
Time per request: 1.579 [ms] (mean, across all concurrent requests)
Transfer rate:
                         0.00 [Kbytes/sec] received
Connection Times (ms)
               min mean[+/-sd] median
                                           max
Connect:
               0 0 0.3
                                     0
                                             1
                   1 0.6
0 0.0
Processing:
               0
                                     1
                                             3
Waiting:
                 0
                                    0
                                             0
Total:
                 0
                      1
                           0.6
                                     1
                                             4
Percentage of the requests served within a certain time (ms)
  50%
            1
  66%
            2
            2
  75%
  80%
            2
  90%
            2
  95%
           3
  98%
           3
  99%
 100%
           4 (longest request)
```

```
Server Software:
Server Hostname:
                       127.0.0.1
Server Port:
                       44444
Document Path:
Document Length:
                       0 bytes
Concurrency Level:
                      50
Time taken for tests: 1.580 seconds
Complete requests:
                     1000
Failed requests:
                      0
Total transferred:
                      0 bytes
HTML transferred:
                      0 bytes
Requests per second:
                     632.86 [#/sec] (mean)
Time per request:
                      79.006 [ms] (mean)
Time per request:
                      1.580 [ms] (mean, across all concurrent requests)
Transfer rate:
                      0.00 [Kbytes/sec] received
Connection Times (ms)
             min mean[+/-sd] median
                                      max
Connect:
               0
                    0
                       0.4
                                0
                                1
                                        4
Processing:
              0 1
                        0.7
Waiting:
               0
                    0
                        0.0
                                0
                                        0
Total:
                                1
                                        4
               0
                    1
                       0.7
Percentage of the requests served within a certain time (ms)
  50%
  66%
          2
          2
  75%
          2
  80%
  90%
          2
  95%
          3
          3
  98%
 99%
 100%
          4 (longest request)
```

```
Server Software:
Server Hostname:
                      127.0.0.1
Server Port:
                      44444
Document Path:
Document Length:
                      0 bytes
Concurrency Level:
                      100
Time taken for tests: 1.614 seconds
Complete requests:
                     1000
Failed requests:
                      0
Total transferred:
                      0 bytes
HTML transferred:
                      0 bytes
Requests per second: 619.41 [#/sec] (mean)
                      161.444 [ms] (mean)
Time per request:
Time per request:
                      1.614 [ms] (mean, across all concurrent requests)
                      0.00 [Kbytes/sec] received
Transfer rate:
Connection Times (ms)
             min mean[+/-sd] median
Connect:
              0 0 0.4
                                        1
                                0
Processing:
              0
                       0.6
                                1
                                       5
                   1
Waiting:
                                       0
              0 0.0
                                0
Total:
               0
                   1
                       0.7
                                1
                                       7
Percentage of the requests served within a certain time (ms)
          1
 66%
          2
 75%
          2
 80%
          2
          2
 90%
 95%
          3
 98%
          3
 99%
          3
          7 (longest request)
 100%
```

```
Server Software:
Server Hostname:
                      127.0.0.1
                      44444
Server Port:
Document Path:
Document Length:
                      0 bytes
Concurrency Level:
                     500
Time taken for tests: 2.285 seconds
Complete requests:
                    1000
Failed requests:
                      0
Total transferred:
                     0 bytes
HTML transferred:
                      0 bytes
Requests per second: 437.65 [#/sec] (mean)
Time per request:
                   1142.466 [ms] (mean)
Time per request:
                      2.285 [ms] (mean, across all concurrent requests)
Transfer rate:
                      0.00 [Kbytes/sec] received
Connection Times (ms)
             min mean[+/-sd] median
                                      max
Connect:
               0
                    0
                       0.4
                                0
                                        1
                                2
                                       5
Processing:
               0
                    2
                       0.8
Waiting:
               0
                   0.0
                                0
                                       0
Total:
               0
                    2
                       0.8
                                2
                                        5
Percentage of the requests served within a certain time (ms)
  50%
          2
 66%
          2
  75%
          3
          3
 80%
 90%
          3
          3
 95%
 98%
          3
 99%
 100%
          5 (longest request)
```

```
Server Software:
Server Hostname:
                         127.0.0.1
Server Port:
                         44444
Document Path:
Document Length:
                         0 bytes
Concurrency Level: 1000
Time taken for tests: 1.698 seconds
                        1000
Complete requests:
Failed requests:
                        0
                       0 bytes
Total transferred:
HTML transferred:
                        0 bytes
Requests per second: 588.81 [#/sec] (mean)
Time per request: 1698.352 [ms] (mean)
Time per request: 1.698 [ms] (mean, across all concurrent requests)
Transfer rate:
                       0.00 [Kbytes/sec] received
Connection Times (ms)
              min mean[+/-sd] median
                                          max
Connect:
                0
                    0
                          0.4
                                   0
                                            1
                0 1
                                   1
                                            4
Processing:
                          0.7
Waiting:
                0 0
                          0.0
                                   0
                                            0
                                    1
Total:
                0
                          0.8
                                            4
Percentage of the requests served within a certain time (ms)
  50%
           1
           2
  66%
  75%
           2
           2
  80%
  90%
           3
  95%
           3
  98%
           3
  99%
           3
         4 (longest request)
 100%
```