

LAPORAN TUGAS 9

PEMROGRAMAN JARINGAN

“Performance Test”



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SOAL TUGAS 9

Dalam folder progjar 5 terdapat file **server_async_http.py** . program tersebut adalah contoh server dengan menggunakan asynchronous processing model dengan memanfaatkan library asyncore yang ada pada python.

** terdapat perbaikan pada program

CATATAN: (http.py)

- Input dari socket adalah berupa bytes, agar bisa diproses secara string, maka harus dijalankan fungsi decode terlebih dahulu
- Data file yang dilayani oleh http, akan selalu dikirim dalam bentuk bytes dan binary
- Dalam mengirim balik lewat socket, maka data yang akan dikirim harus dikonversi terlebih dahulu menjadi bytes

Catatan mengenai string encoding di python

- <https://learning-python.com/strings30.html>
- <https://medium.com/better-programming/strings-unicode-and-bytes-in-python-3-everything-you-always-wanted-to-know-27dc02ff2686>
- <https://portingguide.readthedocs.io/en/latest/strings.html>

Library http tetap menggunakan yang sudah ada. Clonelah program terbaru dan jalankan.

1. Pull update terakhir
2. Jalankan kedua model tersebut
 - a. Server_async_http.py di port 45000
 - b. Server_thread_http.py di port 46000
3. Ujicobalah dengan apache benchmark untuk 1000 request dan konkurensi yang bervariasi
4. Buatlah tabel untuk melaporkan hasilnya

PENJELASAN

Performance test sederhana, hanya bisa dilakukan di linux/unix based sebagai berikut :

1. Menggunakan apachebenchark , dengan command ab
2. Testlah server anda dengan : ab -n <jumlahrequest> -c <concurency> port ip
3. Dengan parameter sbb:

Jumlah Request : 1000

Konkurensi : 1,50, 100,500,1000

Concurency melambangkan user yang mengakses secara bersamaan, concurency berbeda dengan paralel, concurency adalah bagaimana satu resource dibagi ke sekian banyak request yang meminta layanan

Hasil Performance Test

1. Server Async

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

2. Server Thread

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

Kesimpulan

Setelah membandingkan hasil performance test antara server async dengan server thread, maka diperoleh kesimpulan bahwa server async memproses lebih cepat dibandingkan dengan server thread.

✚ Berikut ini adalah hasil untuk performance test pada **Server Async** adalah sebagai berikut :

1. `ab -n 1000 -c 1 -r http://127.0.0.1:45000/`

```
Server Port:          45000

Document Path:        /
Document Length:      4 bytes

Concurrency Level:    1
Time taken for tests:  2.168 seconds
Complete requests:    1000
Failed requests:      0
Non-2xx responses:    1000
Total transferred:    122000 bytes
HTML transferred:     4000 bytes
Requests per second:  461.26 [#/sec] (mean)
Time per request:     2.168 [ms] (mean)
Time per request:     2.168 [ms] (mean, across all concurrent requests)
Transfer rate:        54.95 [Kbytes/sec] received

Connection Times (ms)
              min  mean[+/-sd] median   max
Connect:     0    0   0.4      0     2
Processing:   0    2   0.9      1     5
Waiting:     0    2   0.9      1     5
Total:       0    2   1.0      2     6
WARNING: The median and mean for the processing time are not within a normal deviation
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
 98%    4
 99%    5
100%    6 (longest request)
```

2. `ab -n 1000 -c 50 -r http://127.0.0.1:45000/`

```
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:        0
Non-2xx responses:     1000
Total transferred:     122000 bytes
HTML transferred:      4000 bytes
Requests per second:   16.84 [#/sec] (mean)
Time per request:      2969.836 [ms] (mean)
Time per request:      59.397 [ms] (mean, across all concurrent requests)
Transfer rate:         2.01 [Kbytes/sec] received

Connection Times (ms)
              min  mean[+/-sd] median   max
Connect:        0    59 161.2      0     507
Processing:      8  2847 422.7    3039   3550
Waiting:         2  1913 738.4    2028   3051
Total:          8  2906 422.9    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)
```

3. `ab -n 1000 -c 100 -r http://127.0.0.1:45000/`

```
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)
Time per request:      5998.512 [ms] (mean)
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
Waiting:        1 3127 1713.4    3049   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
100%    7075 (longest request)
```


4. `ab -n 1000 -c 500 -r http://127.0.0.1:45000/`

```
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
HTML transferred:      4000 bytes
Requests per second:   16.55 [#/sec] (mean)
Time per request:      30203.223 [ms] (mean)
Time per request:      60.406 [ms] (mean, across all concurrent requests)
Transfer rate:         1.97 [Kbytes/sec] received

Connection Times (ms)
              min    mean[+/-sd] median    max
Connect:        0     60 162.3      0     507
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)
```

5. `ab -n 1000 -c 1000 -r http://127.0.0.1:45000/`

```
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:  62.970 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
Processing:    122 31332 18227.0  31514  62890
Waiting:        3  31216 18241.3  31460  62862
Total:         123 31395 18227.4  31514  62890

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)
```

✚ Berikut ini adalah hasil untuk performance test pada **Server Thread** adalah sebagai berikut :

1. `ab -n 1000 -c 1 -r http://127.0.0.1:46000/`

```
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:  483.745 seconds
Complete requests:     1000
Failed requests:        0
Non-2xx responses:     1000
Total transferred:     122000 bytes
HTML transferred:      4000 bytes
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      0      1
Processing:      1 483 270.5    456   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)
```

2. `ab -n 1000 -c 50 -r http://127.0.0.1:46000/`

```
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:       0
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
Connect:    0   418 332.4    501   1508
Processing: 1291 20164 4829.3  20540  30077
Waiting:    322 11364 6136.5  11026  29575
Total:      1792 20583 4892.7  21039  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)
```

3. `ab -n 1000 -c 100 -r http://127.0.0.1:46000/`

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: 0
Non-2xx responses: 1000
Total transferred: 122000 bytes
HTML transferred: 4000 bytes
Requests per second: 2.03 [#/sec] (mean)
Time per request: 49214.587 [ms] (mean)
Time per request: 492.146 [ms] (mean, across all concurrent requests)
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)

4. `ab -n 1000 -c 500 -r http://127.0.0.1:46000/`

```
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)
Transfer rate:         0.25 [Kbytes/sec] received

Connection Times (ms)
      min   mean[+/-sd] median   max
Connect:    0   467 379.6    501   2010
Processing: 2960 191501 81776.3 218849 280950
Waiting:    2  120585 72751.9 120385 280438
Total:      3463 191969 81735.8 219238 281451

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)
```

5. `ab -n 1000 -c 1000 -r http://127.0.0.1:46000/`

```
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:  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)
Time per request:      442.227 [ms] (mean, across all concurrent requests)
Transfer rate:         0.27 [Kbytes/sec] received

Connection Times (ms)
              min  mean[+/-sd] median   max
Connect:        0   439 363.3    501   2004
Processing:    1603 248750 129153.5 261377 439011
Waiting:         5  248245 129276.5 260813 438981
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)
```