

Performance Test LoadBalancer– Tugas 10

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Pemrograman Jaringan C

A. Parameter test

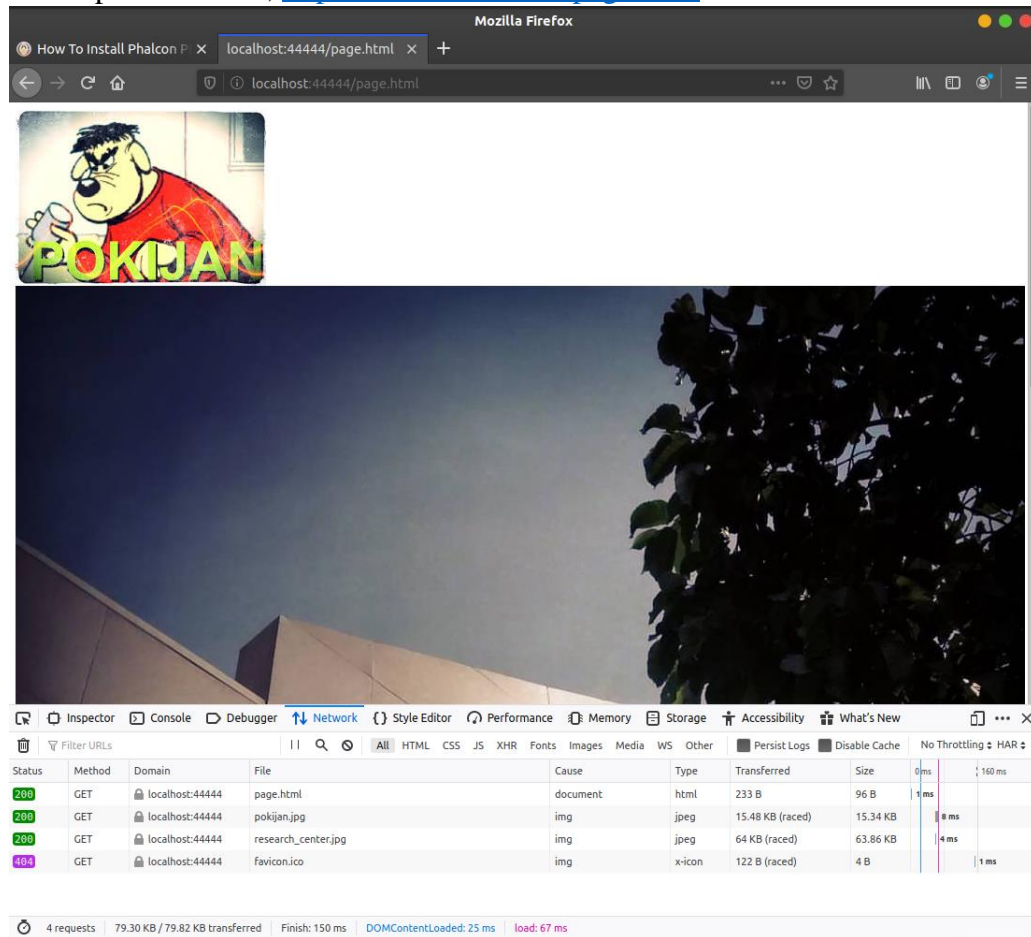
1. Jalankan async_server.py pada port 9002, 9003, 9004, 9005

```
pootreth@yemimasutanto: /media/pootreth/rahasianegara/KULIAH/Semester 6/Progjar C /PROGJAR_05111740000049/tugas10$ WARNING:root:running on port 9002
WARNING:root:running on port 9003
WARNING:root:running on port 9004
WARNING:root:running on port 9005
```

2. Jalankan file lb.py, dengan port 44444

```
pootreth@yemimasutanto: /media/pootreth/rahasianegara/KULIAH/Semester 6/Progjar C/PROGJAR_...
File Edit View Search Terminal Help
pootreth@yemimasutanto: /media/pootreth/rahasianegara/KULIAH/Semester 6/Progjar C /PROGJAR_05111740000049/tugas10$ python lb.py
WARNING:root:load balancer running on port 44444
```

3. Akses pada browser, <http://localhost:44444/page.html>



The screenshot shows a Mozilla Firefox browser window with the address bar displaying `localhost:44444/page.html`. The webpage content includes a cartoon character in a red shirt and the word "POKIJAN" in large green letters, followed by a landscape image of a building and trees. The Network tab is open, showing a list of requests:

Status	Method	Domain	File	Cause	Type	Transferred	Size	Time
200	GET	localhost:44444	page.html	document	html	233 B	96 B	1 ms
200	GET	localhost:44444	pokijan.jpg	img	jpeg	15.48 KB (raced)	15.34 KB	8 ms
200	GET	localhost:44444	research_center.jpg	img	jpeg	64 KB (raced)	63.86 KB	4 ms
404	GET	localhost:44444	favicon.ico	img	x-icon	122 B (raced)	4 B	1 ms

At the bottom, the status bar shows: 4 requests, 79.30 KB / 79.82 KB transferred, Finish: 150 ms, DOMContentLoaded: 25 ms, load: 67 ms.

- Lihatlah di log program, bahwa setiap request akan dilayani oleh backend yang bergantian

```
pootreth@yemimasutanto: /media/pootreth/rahasianegara/KULIAH/Semester 6/Progjar C/PROGJAR_...
File Edit View Search Terminal Help
pootreth@yemimasutanto: /media/pootreth/rahasianegara/KULIAH/Semester 6/Progjar C
/PROGJAR_05111740000049/tugas10$ python lb.py
WARNING:root:load balancer running on port 44444
WARNING:root:connection from ('127.0.0.1', 40932)
WARNING:root:koneksi dari ('127.0.0.1', 40932) diteruskan ke ('127.0.0.1', 9002)
WARNING:root:connection from ('127.0.0.1', 40936)
WARNING:root:koneksi dari ('127.0.0.1', 40936) diteruskan ke ('127.0.0.1', 9003)
WARNING:root:connection from ('127.0.0.1', 40940)
WARNING:root:koneksi dari ('127.0.0.1', 40940) diteruskan ke ('127.0.0.1', 9004)
WARNING:root:connection from ('127.0.0.1', 40944)
WARNING:root:koneksi dari ('127.0.0.1', 40944) diteruskan ke ('127.0.0.1', 9005)
□
```

- Lakukan performance test seperti pada tugas 9, bandingkan penggunaan load balancer dengan async_server dengan server_thread_http pada folder progjar5
Jumlah request : 1000
Concurrency: 1,10,25,50,75,100

B. Hasil Performance Test

1. Server Async ('127.0.0.1:45000')

No Test	Concurrency level	Time taken for test (s)	Complete request	Failed request	Total transferred (bytes)	Request per second (#/sec)	Time per request (ms)	Transfer rate (Kbytes/sec)
1	1	0.044	1000	0	122000	2729.56	0.366	325.2
2	10	0.333	1000	0	122000	3002.3	0.333	357.7
3	25	0.332	1000	0	122000	3015.25	0.332	359.24
4	50	0.331	1000	0	122000	3019.13	0.331	359.7
5	75	0.337	1000	0	122000	2969.5	0.337	353.79
6	100	0.335	1000	0	122000	2983.24	0.335	355.43

2. Server Thread ('127.0.0.1:46000')

No Test	Concurrency level	Time taken for test (s)	Complete request	Failed request	Total transferred (bytes)	Request per second (#/sec)	Time per request (ms)	Transfer rate (Kbytes/sec)
1	1	0.624	1000	0	122000	1603.09	0.624	190.99
2	10	0.605	1000	0	122000	1652.19	0.605	196.84
3	25	0.599	1000	0	122000	1668.92	0.599	198.84
4	50	0.62	1000	0	122000	1613.63	0.62	192.25
5	75	0.618	1000	0	122000	1619.23	0.618	192.92
6	100	0.616	1000	0	122000	1624.22	0.616	193.51

3. Server Async dengan Load Balancer ('127.0.0.1:44444')

No Test	Concurrency level	Time taken for test (s)	Complete request	Failed request	Total transferred (bytes)	Request per second (#/sec)	Time per request (ms)	Transfer rate (Kbytes/sec)
1	1	0.685	1000	0	122000	1459.88	0.685	173.93
2	10	0.343	1000	0	122000	2918.05	0.343	347.66
3	25	0.352	1000	0	122000	2837.68	0.352	338.08
4	50	1.204	1000	0	122000	830.76	1.204	98.98
5	75	0.413	1000	0	122000	2420.43	0.413	288.37
6	100	0.412	1000	0	122000	2429.94	0.412	289.51

C. Analisis dan Kesimpulan

Setelah pengujian performa, dari ketiga tabel performance test tersebut dapat kita lihat bahwa asynchronous server yang menggunakan load balancer memproses **lebih cepat** dibandingkan asynchronous server biasa dan multithread server yang menandakan bahwa performa asynchronous server yang menggunakan load balancer **lebih baik** dibandingkan asynchronous 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. Lampiran

(Server Async dengan Load Balancer)

```

{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:  0.685 seconds
{Complete requests:    1000
{Failed requests:      0
{Non-2xx responses:    1000
{Total transferred:    122000 bytes
{HTML transferred:     4000 bytes
{Requests per second:  1459.88 [#/sec] (mean)
{Time per request:     0.685 [ms] (mean)
{Time per request:     0.685 [ms] (mean, across all concurrent requests)
{Transfer rate:        173.93 [Kbytes/sec] received
{

```

```
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:  0.343 seconds
Complete requests:     1000
Failed requests:       0
Non-2xx responses:     1000
Total transferred:     122000 bytes
HTML transferred:      4000 bytes
Requests per second:   2918.05 [#/sec] (mean)
Time per request:      3.427 [ms] (mean)
Time per request:      0.343 [ms] (mean, across all concurrent requests)
Transfer rate:         347.66 [Kbytes/sec] received
```

```
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:  0.352 seconds
Complete requests:     1000
Failed requests:       0
Non-2xx responses:     1000
Total transferred:     122000 bytes
HTML transferred:      4000 bytes
Requests per second:   2837.68 [#/sec] (mean)
Time per request:      8.810 [ms] (mean)
Time per request:      0.352 [ms] (mean, across all concurrent requests)
Transfer rate:         338.08 [Kbytes/sec] received
```

```
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:  1.204 seconds
Complete requests:     1000
Failed requests:       0
Non-2xx responses:     1000
Total transferred:     122000 bytes
HTML transferred:      4000 bytes
Requests per second:   830.76 [#/sec] (mean)
Time per request:      60.186 [ms] (mean)
Time per request:      1.204 [ms] (mean, across all concurrent requests)
Transfer rate:         98.98 [Kbytes/sec] received
```

```
pootreth@yemimasutanto: /media/pootreth/rahasianegara/KULIAH/Semester 6/Progjar C/progjar-b-i...
File Edit View Search Terminal Help
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:  0.413 seconds
Complete requests:     1000
Failed requests:       0
Non-2xx responses:     1000
Total transferred:     122000 bytes
HTML transferred:     4000 bytes
Requests per second:   2420.43 [#/sec] (mean)
Time per request:      30.986 [ms] (mean)
Time per request:      0.413 [ms] (mean, across all concurrent requests)
Transfer rate:         288.37 [Kbytes/sec] received

pootreth@yemimasutanto: /media/pootreth/rahasianegara/KULIAH/Semester 6/Progjar C/progjar-b-i...
File Edit View Search Terminal Help
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:  0.412 seconds
Complete requests:     1000
Failed requests:       0
Non-2xx responses:     1000
Total transferred:     122000 bytes
HTML transferred:     4000 bytes
Requests per second:   2429.94 [#/sec] (mean)
Time per request:      41.153 [ms] (mean)
Time per request:      0.412 [ms] (mean, across all concurrent requests)
Transfer rate:         289.51 [Kbytes/sec] received
```