Kelompok F09

LAPORAN GRIMOIRE

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M3

Nomer 8

Karena diminta untuk menuliskan grimoire, buatlah analisis hasil testing dengan 200 request dan 10 request/second masing-masing algoritma Load Balancer dengan ketentuan sebagai berikut:

- Nama Algoritma Load Balancer
- Report hasil testing pada Apache Benchmark
- Grafik request per second untuk masing masing algoritma.
- Analisis

A. Nama algoritma dan report

- Round Robin

```
Benchmarking granz.channel.f09.com (be patient)
Completed 100 requests
Completed 200 requests
Finished 200 requests


Server Software:        nginx/1.14.2
Server Hostname:        granz.channel.f09.com
Server Port:            80

Document Path:          /
Document Length:        624 bytes

Concurrency Level:      10
Time taken for tests:   0.422 seconds
Complete requests:      200
Failed requests:        133
   (Connect: 0, Receive: 0, Length: 133, Exceptions: 0)
Total transferred:      152333 bytes
HTML transferred:       124933 bytes
Requests per second:    473.43 [#/sec] (mean)
Time per request:       21.123 [ms] (mean)
Time per request:       2.112 [ms] (mean, across all concurrent requests)
Transfer rate:          352.14 [Kbytes/sec] received

Connection Times (ms)
            min  mean[+/-sd] median   max
Connect:      1    5   1.4      5       9
Processing:   2   16   2.1     16      21
Waiting:      2   16   2.1     16      21
Total:        3   21   2.7     21      26

Percentage of the requests served within a certain time (ms)
  50%     21
  66%     22
  75%     22
  80%     23
  90%     24
  95%     25
  98%     26
  99%     26
 100%     26 (longest request)
```

Request per second : 473.43 [#/sec]

- Least-Connection

```
Benchmarking granz.channel.f09.com (be patient)
Completed 100 requests
Completed 200 requests
Finished 200 requests


Server Software:        nginx/1.14.2
Server Hostname:        granz.channel.f09.com
Server Port:            80

Document Path:          /
Document Length:        625 bytes

Concurrency Level:      10
Time taken for tests:   0.422 seconds
Complete requests:      200
Failed requests:        60
   (Connect: 0, Receive: 0, Length: 60, Exceptions: 0)
Total transferred:      152340 bytes
HTML transferred:       124940 bytes
Requests per second:    473.98 [#/sec] (mean)
Time per request:       21.098 [ms] (mean)
Time per request:       2.110 [ms] (mean, across all concurrent requests)
Transfer rate:          352.57 [Kbytes/sec] received

Connection Times (ms)
            min  mean[+/-sd] median   max
Connect:      1    5   1.4      5       9
Processing:   2   16   2.1     16      22
Waiting:      2   16   2.1     16      22
Total:        3   21   2.3     20      27

Percentage of the requests served within a certain time (ms)
  50%     20
  66%     22
  75%     22
  80%     23
  90%     23
  95%     25
  98%     26
  99%     26
 100%     27 (longest request)
```

Request per second : 473.98 [#/sec]

- IP Hash

```
Benchmarking granz.channel.f09.com (be patient)
Completed 100 requests
Completed 200 requests
Finished 200 requests


Server Software:        nginx/1.14.2
Server Hostname:        granz.channel.f09.com
Server Port:            80

Document Path:          /
Document Length:        625 bytes

Concurrency Level:      10
Time taken for tests:   0.421 seconds
Complete requests:      200
Failed requests:        0
Total transferred:      152400 bytes
HTML transferred:       125000 bytes
Requests per second:    474.63 [#/sec] (mean)
Time per request:       21.069 [ms] (mean)
Time per request:       2.107 [ms] (mean, across all concurrent requests)
Transfer rate:          353.19 [Kbytes/sec] received

Connection Times (ms)
              min  mean[+/-sd] median   max
Connect:        1    5   1.6      5       9
Processing:     2   16   2.3     16      23
Waiting:        2   16   2.3     15      23
Total:          3   21   2.8     20      28

Percentage of the requests served within a certain time (ms)
  50%     20
  66%     21
  75%     22
  80%     22
  90%     24
  95%     27
  98%     28
  99%     28
 100%     28 (longest request)
```

Request per second : 474.63 [#/sec]

- Generic Hash

```
Benchmarking granz.channel.f09.com (be patient)
Completed 100 requests
Completed 200 requests
Finished 200 requests


Server Software:        nginx/1.14.2
Server Hostname:        granz.channel.f09.com
Server Port:            80

Document Path:          /
Document Length:        625 bytes

Concurrency Level:      10
Time taken for tests:   0.406 seconds
Complete requests:      200
Failed requests:        0
Total transferred:      152400 bytes
HTML transferred:       125000 bytes
Requests per second:    493.21 [#/sec] (mean)
Time per request:       20.275 [ms] (mean)
Time per request:       2.028 [ms] (mean, across all concurrent requests)
Transfer rate:          367.02 [Kbytes/sec] received

Connection Times (ms)
              min  mean[+/-sd] median   max
Connect:        0    5   1.5      5       9
Processing:     2   15   1.9     15      19
Waiting:        0   15   2.0     15      19
Total:          3   20   2.3     20      25

Percentage of the requests served within a certain time (ms)
  50%     20
  66%     21
  75%     21
  80%     21
  90%     22
  95%     23
  98%     24
  99%     25
 100%     25 (longest request)
```
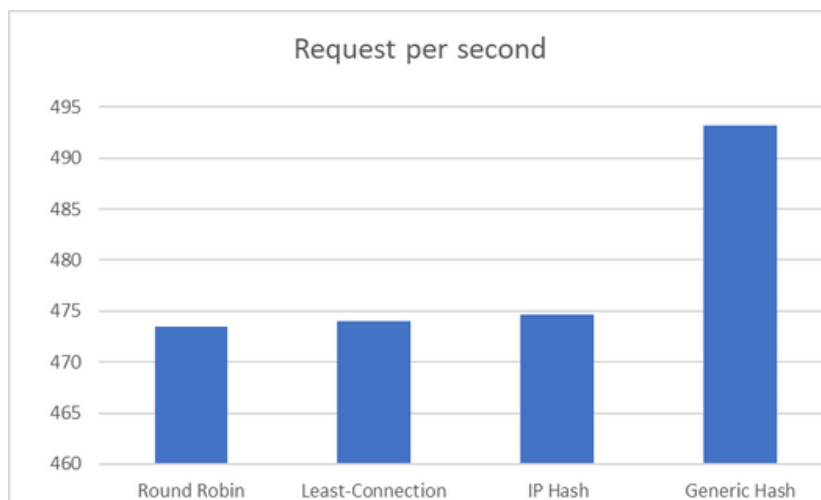
Request per second : 493.21 [#/sec]

B. Grafik

Request per second

C. Analisis

Dari hasil testing 200 request yang dilakukan, terlihat bahwa 3 algoritma; Round robin, Least-connection, dan IP Hash memiliki request per second yang tidak berbeda jauh dengan interval 1.20 request per second dan rata-rata 474.01. Sedangkan untuk generic hash memiliki interval 19.20 dengan rata-rata ketiga algoritma lain

Lalu algoritma dengan request per second terendah adalah round robin dengan 473.43 request per second. Sedangkan request per second tertinggi adalah generic hash dengan 493.21 request per second

Nomer 9

Dengan menggunakan algoritma Round Robin, lakukan testing dengan menggunakan 3 worker, 2 worker, dan 1 worker sebanyak 100 request dengan 10 request/second, kemudian tambahkan grafiknya pada grimoire.

A. Report

- 1 Worker

```
This is ApacheBench, Version 2.3 <$Revision: 1843412 $>
Copyright 1996 Adam Twiss, Zeus Technology Ltd, http://www.zeustech.net/
Licensed to The Apache Software Foundation, http://www.apache.org/

Benchmarking granz.channel.f09.com (be patient).....done


Server Software:        nginx/1.14.2
Server Hostname:        granz.channel.f09.com
Server Port:            80

Document Path:          /
Document Length:        625 bytes

Concurrency Level:      10
Time taken for tests:   0.242 seconds
Complete requests:      100
Failed requests:        0
Total transferred:      76200 bytes
HTML transferred:       62500 bytes
Requests per second:    412.61 [#/sec] (mean)
Time per request:       24.236 [ms] (mean)
Time per request:       2.424 [ms] (mean, across all concurrent requests)
Transfer rate:          307.04 [Kbytes/sec] received

Connection Times (ms)
              min  mean[+/-sd] median   max
Connect:        0    5   2.3      5      17
Processing:     3   19   6.0     17      33
Waiting:        3   19   6.0     17      33
Total:          3   24   6.5     22      37

Percentage of the requests served within a certain time (ms)
  50%     22
  66%     23
  75%     28
  80%     32
  90%     36
  95%     36
  98%     37
  99%     37
 100%     37 (longest request)
```

Request per second : 412.61 [#/sec]

- 2 Worker

```
This is ApacheBench, Version 2.3 <$Revision: 1843412 $>
Copyright 1996 Adam Twiss, Zeus Technology Ltd, http://www.zeustech.net/
Licensed to The Apache Software Foundation, http://www.apache.org/

Benchmarking granz.channel.f09.com (be patient).....done


Server Software:        nginx/1.14.2
Server Hostname:        granz.channel.f09.com
Server Port:            80

Document Path:          /
Document Length:        624 bytes

Concurrency Level:      10
Time taken for tests:   0.204 seconds
Complete requests:      100
Failed requests:        0
Total transferred:      76100 bytes
HTML transferred:       62400 bytes
Requests per second:    490.91 [#/sec] (mean)
Time per request:       20.370 [ms] (mean)
Time per request:       2.037 [ms] (mean, across all concurrent requests)
Transfer rate:          364.83 [Kbytes/sec] received

Connection Times (ms)
              min  mean[+/-sd] median   max
Connect:        0    5   1.7      4       9
Processing:     3   15   2.1     15      21
Waiting:        0   15   2.3     15      21
Total:          3   20   2.9     20      25

Percentage of the requests served within a certain time (ms)
  50%     20
  66%     20
  75%     21
  80%     22
  90%     23
  95%     25
  98%     25
  99%     25
 100%     25 (longest request)
```

Request per second : 490.91 [#/sec]

- 3 Worker

```
This is ApacheBench, Version 2.3 <$Revision: 1843412 $>
Copyright 1996 Adam Twiss, Zeus Technology Ltd, http://www.zeustech.net/
Licensed to The Apache Software Foundation, http://www.apache.org/

Benchmarking granz.channel.f09.com (be patient).....done


Server Software:        nginx/1.14.2
Server Hostname:        granz.channel.f09.com
Server Port:            80

Document Path:          /
Document Length:        625 bytes

Concurrency Level:      10
Time taken for tests:   0.233 seconds
Complete requests:      100
Failed requests:        0
Total transferred:      76200 bytes
HTML transferred:       62500 bytes
Requests per second:    428.77 [#/sec] (mean)
Time per request:       23.322 [ms] (mean)
Time per request:       2.332 [ms] (mean, across all concurrent requests)
Transfer rate:          319.07 [Kbytes/sec] received

Connection Times (ms)
              min  mean[+/-sd] median   max
Connect:        1    5   1.9      5      11
Processing:     3   17   3.4     17      24
Waiting:        2   17   3.4     17      24
Total:          4   23   3.4     23      28

Percentage of the requests served within a certain time (ms)
  50%     23
  66%     24
  75%     25
  80%     26
  90%     27
  95%     27
  98%     28
  99%     28
 100%     28 (longest request)
```

Request per second : 428.77 [#/sec]

B. Grafik

Nomer 15, 16, 17

Riegel Channel memiliki beberapa endpoint yang harus ditesting sebanyak 100 request dengan 10 request/second. Tambahkan response dan hasil testing pada grimoire.

A. POST /auth/register

```
root@Sein:~# bash no15.sh
This is ApacheBench, Version 2.3 <$Revision: 1843412 $>
Copyright 1996 Adam Twiss, Zeus Technology Ltd, http://www.zeustech.net/
Licensed to The Apache Software Foundation, http://www.apache.org/

Benchmarking 10.56.4.1 (be patient).....done


Server Software:        nginx/1.14.2
Server Hostname:        10.56.4.1
Server Port:            8001

Document Path:          /api/auth/register
Document Length:        53 bytes

Concurrency Level:      10
Time taken for tests:   0.992 seconds
Complete requests:      100
Failed requests:        38
   (Connect: 0, Receive: 0, Length: 38, Exceptions: 0)
Non-2xx responses:      100
Total transferred:      286051 bytes
Total body sent:        21400
HTML transferred:       254808 bytes
Requests per second:    100.81 [#/sec] (mean)
Time per request:       99.193 [ms] (mean)
Time per request:       9.919 [ms] (mean, across all concurrent requests)
Transfer rate:          281.62 [Kbytes/sec] received
                        21.07 kb/s sent
                        302.69 kb/s total

Connection Times (ms)
              min  mean[+/-sd] median   max
Connect:        0    0   0.1      0       1
Processing:    21   95  22.4    104     150
Waiting:       20   89  27.6    102     150
Total:         22   96  22.3    104     150

Percentage of the requests served within a certain time (ms)
  50%    104
  66%    106
  75%    110
  80%    113
  90%    121
  95%    126
  98%    133
  99%    150
 100%    150 (longest request)
```

B. POST /auth/login

```
ttp://10.56.4.1:8001/api/auth/loginplication/json' -p login.json -g login.data ht
This is ApacheBench, Version 2.3 <$Revision: 1843412 $>
Copyright 1996 Adam Twiss, Zeus Technology Ltd, http://www.zeustech.net/
Licensed to The Apache Software Foundation, http://www.apache.org/

Benchmarking 10.56.4.1 (be patient).....done


Server Software:        nginx/1.14.2
Server Hostname:        10.56.4.1
Server Port:            8001

Document Path:          /api/auth/login
Document Length:        335 bytes

Concurrency Level:      10
Time taken for tests:   8.375 seconds
Complete requests:      100
Failed requests:        40
   (Connect: 0, Receive: 0, Length: 40, Exceptions: 0)
Non-2xx responses:      40
Total transferred:      315668 bytes
Total body sent:        21100
HTML transferred:       284860 bytes
Requests per second:    11.94 [#/sec] (mean)
Time per request:       837.454 [ms] (mean)
Time per request:       83.745 [ms] (mean, across all concurrent requests)
Transfer rate:          36.81 [Kbytes/sec] received
                        2.46 kb/s sent
                        39.27 kb/s total

Connection Times (ms)
             min  mean[+/-sd] median   max
Connect:       0    1   2.2      0       16
Processing:  106  819 540.2   1209     1726
Waiting:      73  802 560.5   1209     1726
Total:       106  820 540.1   1210     1726

Percentage of the requests served within a certain time (ms)
  50%    1210
  66%    1266
  75%    1280
  80%    1286
  90%    1358
  95%    1405
  98%    1638
  99%    1726
 100%    1726 (longest request)
root@Sein:~#
```

C. GET /me

```
token" http://10.56.4.2:8002/api/me; ab -n 100 -c 10 -H "Authorization: Bearer $t
This is ApacheBench, Version 2.3 <$Revision: 1843412 $>
Copyright 1996 Adam Twiss, Zeus Technology Ltd, http://www.zeustech.net/
Licensed to The Apache Software Foundation, http://www.apache.org/

Benchmarking 10.56.4.2 (be patient).....done


Server Software:        nginx/1.14.2
Server Hostname:        10.56.4.2
Server Port:            8002

Document Path:          /api/me
Document Length:        6619 bytes

Concurrency Level:      10
Time taken for tests:   2.789 seconds
Complete requests:      100
Failed requests:        0
Non-2xx responses:      100
Total transferred:      696500 bytes
HTML transferred:       661900 bytes
Requests per second:    35.85 [#/sec] (mean)
Time per request:       278.935 [ms] (mean)
Time per request:       27.893 [ms] (mean, across all concurrent requests)
Transfer rate:          243.85 [Kbytes/sec] received

Connection Times (ms)
              min  mean[+/-sd] median   max
Connect:        0    0   0.7      0       7
Processing:    66  267  64.3    266     460
Waiting:       50  255  64.7    258     459
Total:         67  268  64.0    266     460

Percentage of the requests served within a certain time (ms)
  50%    266
  66%    281
  75%    299
  80%    316
  90%    355
  95%    370
  98%    387
  99%    460
 100%    460 (longest request)
```

Nomer 19

Untuk meningkatkan performa dari Worker, coba implementasikan PHP-FPM pada Frieren, Flamme, dan Fern. Untuk testing kinerja naikkan
- pm.max_children
- pm.start_servers
- pm.min_spare_servers
- pm.max_spare_servers

sebanyak tiga percobaan dan lakukan testing sebanyak 100 request dengan 10 request/second kemudian berikan hasil analisisnya pada Grimoire.

Screenshot

```
data http://riegel.canyon.f09.com/api/auth/register-p register.json -g register.d
This is ApacheBench, Version 2.3 <$Revision: 1843412 $>
Copyright 1996 Adam Twiss, Zeus Technology Ltd, http://www.zeustech.net/
Licensed to The Apache Software Foundation, http://www.apache.org/

Benchmarking riegel.canyon.f09.com (be patient).....done


Server Software:        nginx/1.14.2
Server Hostname:        riegel.canyon.f09.com
Server Port:            80

Document Path:          /api/auth/register
Document Length:        53 bytes

Concurrency Level:      10
Time taken for tests:   4.160 seconds
Complete requests:      100
Failed requests:        0
Non-2xx responses:      100
Total transferred:      34500 bytes
Total body sent:        22100
HTML transferred:       5300 bytes
Requests per second:    24.04 [#/sec] (mean)
Time per request:       416.013 [ms] (mean)
Time per request:       41.601 [ms] (mean, across all concurrent requests)
Transfer rate:          8.10 [Kbytes/sec] received
                        5.19 kb/s sent
                        13.29 kb/s total

Connection Times (ms)
              min  mean[+/-sd] median   max
Connect:        0    0   0.5      0       2
Processing:    55  368 407.6    163    1682
Waiting:       54  368 407.7    162    1681
Total:         55  369 407.9    163    1684

Percentage of the requests served within a certain time (ms)
  50%    163
  66%    484
  75%    561
  80%    587
  90%   1131
  95%   1429
  98%   1553
  99%   1684
 100%   1684 (longest request)
root@Sein:~#
```

user = www-data
group = www-data
listen = /run/php/php8.0-fpm.sock
listen.owner = www-data
listen.group = www-data
php_admin_value[disable_functions] = exec,passthru,shell_exec,system
php_admin_flag[allow_url_fopen] = off

; Choose how the process manager will control the number of child processes.

pm = dynamic
pm.max_children = 5
pm.start_servers = 2
pm.min_spare_servers = 1
pm.max_spare_servers = 3

Nomer 20

Nampaknya hanya menggunakan PHP-FPM tidak cukup untuk meningkatkan performa dari worker maka implementasikan Least-Conn pada Eisen. Untuk testing kinerja dari worker tersebut dilakukan sebanyak 100 request dengan 10 request/second.

Screenshot

```
data http://riegel.canyon.f09.com/api/auth/register-p register.json -g register.d
This is ApacheBench, Version 2.3 <$Revision: 1843412 $>
Copyright 1996 Adam Twiss, Zeus Technology Ltd, http://www.zeustech.net/
Licensed to The Apache Software Foundation, http://www.apache.org/

Benchmarking riegel.canyon.f09.com (be patient).....done


Server Software:        nginx/1.14.2
Server Hostname:        riegel.canyon.f09.com
Server Port:            80

Document Path:          /api/auth/register
Document Length:        53 bytes

Concurrency Level:      10
Time taken for tests:   2.802 seconds
Complete requests:      100
Failed requests:        0
Non-2xx responses:      100
Total transferred:      34500 bytes
Total body sent:        22100
HTML transferred:       5300 bytes
Requests per second:    35.69 [#/sec] (mean)
Time per request:       280.214 [ms] (mean)
Time per request:       28.021 [ms] (mean, across all concurrent requests)
Transfer rate:          12.02 [Kbytes/sec] received
                        7.70 kb/s sent
                        19.73 kb/s total

Connection Times (ms)
              min  mean[+/-sd] median   max
Connect:        0    0   0.4      0       3
Processing:    41  269  75.3    260     561
Waiting:       38  268  75.4    259     561
Total:         42  269  75.3    260     561

Percentage of the requests served within a certain time (ms)
  50%    260
  66%    282
  75%    307
  80%    318
  90%    351
  95%    432
  98%    498
  99%    561
 100%    561 (longest request)
root@Sein:~#
```

Sama seperti nomor 19, hanya saja ini menggunakan least-con, sedangkan 19 menggunakan round robin