

代理服务器——Chaos-Proxy 实验测试

注：在下列实验中，相同一级标号（e.g: 2.1, 2.2）为对比测试

1. 测试服务器（Server）每秒传输速率上限。

参数：Speed: 30000000000 bit/s（不做限制） Latency: 0 ms (不做限制)

wsq@wsq-vm:~\$ ab -n 100 -c 1 http://localhost:2334/blank/500000

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Benchmarking localhost (be patient).....done

Server Software: TornadoServer/5.1.1

Server Hostname: localhost

Server Port: 2334

Document Path: /blank/500000

Document Length: 500000 bytes

Concurrency Level: 1

Time taken for tests: 2.069 seconds

Complete requests: 100

Failed requests: 0

Total transferred: 50032400 bytes

HTML transferred: 50000000 bytes

Requests per second: 48.32 [# /sec] (mean)

Time per request: 20.693 [ms] (mean)

Time per request: 20.693 [ms] (mean, across all concurrent requests)

Transfer rate: 23611.27 [Kbytes/sec] received --》 Server 每秒传输速率上限

Connection Times (ms)

	min	mean[+/-sd]	median	max
Connect:	0	0 0.1	0	1
Processing:	15	20 6.6	17	38
Waiting:	13	18 6.0	15	35
Total:	15	21 6.6	17	39

Percentage of the requests served within a certain time (ms)

50%	17
66%	20
75%	25
80%	28
90%	32
95%	34
98%	37
99%	39
100%	39 (longest request)

2.1 测试 Latency 参数:

参数: **Speed: 30000000000** (不做限制) **Latency: 0 ms** (不做限制)

wsq@wsq-vm:~\$ ab -n 100 -c 1 http://localhost:2334/blank/5000

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Benchmarking localhost (be patient).....done

Server Software: TornadoServer/5.1.1
Server Hostname: localhost
Server Port: 2334

Document Path: /blank/5000
Document Length: 5000 bytes

Concurrency Level: 1
Time taken for tests: 1.227 seconds
Complete requests: 100
Failed requests: 0
Total transferred: 532200 bytes
HTML transferred: 500000 bytes
Requests per second: 81.49 [#/sec] (mean)
Time per request: 12.272 [ms] (mean)
Time per request: 12.272 [ms] (mean, across all concurrent requests)
Transfer rate: 423.52 [Kbytes/sec] received

Connection Times (ms)

	min	mean[+/-sd]	median	max
Connect:	0	0 0.2	0	2
Processing:	8	12 3.7	10	19
Waiting:	7	11 3.5	10	18
Total:	8	12 3.8	10	19

Percentage of the requests served within a certain time (ms)

50%	10
66%	13
75%	16
80%	17
90%	18
95%	19
98%	19
99%	19
100%	19 (longest request)

2.2 测试 Latency 参数:

参数: **Speed: 30000000000** (不做限制) **Latency: 2000 ms**

wsq@wsq-vm:~\$ ab -n 100 -c 1 http://localhost:2334/blank/5000

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Benchmarking localhost (be patient).....done

Server Software: TornadoServer/5.1.1
Server Hostname: localhost
Server Port: 2334

Document Path: /blank/5000
Document Length: 5000 bytes

Concurrency Level: 1
Time taken for tests: 202.369 seconds
Complete requests: 100
Failed requests: 0
Total transferred: 532200 bytes
HTML transferred: 500000 bytes
Requests per second: 0.49 [#/sec] (mean)
Time per request: 2023.694 [ms] (mean)
Time per request: 2023.694 [ms] (mean, across all concurrent requests)
Transfer rate: 2.57 [Kbytes/sec] received

Connection Times (ms)

	min	mean[+/-sd]	median	max
Connect:	0	0 0.1	0	1
Processing:	2012 2023	4.2	2024	2040
Waiting:	2012 2022	4.1	2023	2039
Total:	2012 2023	4.2	2024	2040

Percentage of the requests served within a certain time (ms)

50%	2024
66%	2025
75%	2026
80%	2026
90%	2028
95%	2030
98%	2033
99%	2040
100%	2040 (longest request)

3.1 测试 Speed 参数（对单用户是否达到速率限制）：

参数：Speed: 5000 Latency: 0 ms (不做限制)

```
wsq@wsq-vm:~$ ab -n 100 -c 1 http://localhost:2334/blank/5000
```

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Benchmarking localhost (be patient).....done

Server Software: TornadoServer/5.1.1

Server Hostname: localhost

Server Port: 2334

Document Path: /blank/5000

Document Length: 5000 bytes

Concurrency Level: 1

Time taken for tests: 102.372 seconds

Complete requests: 100

Failed requests: 0

Total transferred: 532200 bytes

HTML transferred: 500000 bytes

Requests per second: 0.98 [#/sec] (mean)

Time per request: 1023.716 [ms] (mean)

Time per request: 1023.716 [ms] (mean, across all concurrent requests)

Transfer rate: 5.08 [Kbytes/sec] received

Connection Times (ms)

	min	mean[+/-sd]	median	max
Connect:	0	0 0.1	0	0
Processing:	1011 1023	4.9	1024	1043
Waiting:	8 20	5.3	20	39
Total:	1011 1023	4.9	1024	1043

Percentage of the requests served within a certain time (ms)

50%	1024
66%	1025
75%	1026
80%	1026
90%	1028
95%	1029
98%	1035
99%	1043
100%	1043 (longest request)

3.2 测试 Speed 参数（对**多用户**是否达到速率限制）： 此处采用并发性 100

参数： **Speed: 30000000000**（不做限制） **Latency: 0 ms** (不做限制)

wsq@wsq-vm:~\$ ab -n 100 -c 100 http://localhost:2334/blank/5000

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Benchmarking localhost (be patient).....done

Server Software: TornadoServer/5.1.1
Server Hostname: localhost
Server Port: 2334

Document Path: /blank/5000
Document Length: 5000 bytes

Concurrency Level: 100

Time taken for tests: 1.037 seconds

Complete requests: 100

Failed requests: 0

Total transferred: 532200 bytes

HTML transferred: 500000 bytes

Requests per second: 96.44 [#/sec] (mean)

Time per request: 1036.932 [ms] (mean)

Time per request: 10.369 [ms] (mean, across all concurrent requests)

Transfer rate: 501.22 [Kbytes/sec] received

Connection Times (ms)

	min	mean[+/-sd]	median	max
Connect:	0	7 2.4	7	22
Processing:	33	549 258.4	462	1003
Waiting:	11	538 257.0	457	1001
Total:	34	556 258.5	468	1011

Percentage of the requests served within a certain time (ms)

50%	468
66%	681
75%	783
80%	797
90%	930
95%	1006
98%	1011
99%	1011
100%	1011 (longest request)

3.3 测试 Speed 参数（对多用户是否达到速率限制）： 此处采用并发性 100

参数： **Speed: 5000** **Latency: 0 ms** (不做限制)

wsq@wsq-vm:~\$ ab -n 100 -c 100 http://localhost:2334/blank/5000

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Server Software: TornadoServer/5.1.1

Server Hostname: localhost

Server Port: 2334

Document Path: /blank/5000

Document Length: 5000 bytes

Concurrency Level: 100

Time taken for tests: 100.281 seconds

Complete requests: 100

Failed requests: 0

Total transferred: 532200 bytes

HTML transferred: 500000 bytes

Requests per second: 1.00 [#/sec] (mean)

Time per request: 100281.427 [ms] (mean)

Time per request: 1002.814 [ms] (mean, across all concurrent requests)

Transfer rate: 5.18 [Kbytes/sec] received → 此处表明在多用户同时请求的情况下服务器总的传输速率通过代理服务器得到限制

Connection Times (ms)

	min	mean[+/-sd]	median	max
Connect:	0	8 1.9	8	11
Processing:	1039 50644 29083.8	51148	100254	
Waiting:	11 492 204.4	429	813	
Total:	1039 50653 29083.9	51156	100261	

→ 表明我们代理服务器并发性策略有效, 在 **speed** 限制为 **5000 bit/s** 时, **Time per request: 100281.427 [ms] (mean)**, 而请求 **waiting** 时间最多只需要 **813 ms**, 每秒的流量被平均的分给每个并发的 **request**.

Percentage of the requests served within a certain time (ms)

50%	51156
66%	67192
75%	76220
80%	81232
90%	91252
95%	96255
98%	99261
99%	100261
100%	100261 (longest request)

4.1 测试代理服务器性能

参数: **Speed: 30000000000** (不做限制) **Latency: 2000 ms**

wsq@wsq-vm:~\$ ab -n 100 -c 1 http://localhost:2334/blank/5000

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Benchmarking localhost (be patient).....done

Server Software: TornadoServer/5.1.1
Server Hostname: localhost
Server Port: 2334

Document Path: /blank/5000
Document Length: 5000 bytes

Concurrency Level: 1
Time taken for tests: 202.369 seconds
Complete requests: 100
Failed requests: 0
Total transferred: 532200 bytes
HTML transferred: 500000 bytes
Requests per second: 0.49 [#/sec] (mean)
Time per request: 2023.694 [ms] (mean)
Time per request: 2023.694 [ms] (mean, across all concurrent requests)
Transfer rate: 2.57 [Kbytes/sec] received

Connection Times (ms)

	min	mean[+/-sd]	median	max
Connect:	0	0 0.1	0	1
Processing:	2012 2023	4.2	2024	2040
Waiting:	2012 2022	4.1	2023	2039
Total:	2012 2023	4.2	2024	2040

Percentage of the requests served within a certain time (ms)

50%	2024
66%	2025
75%	2026
80%	2026
90%	2028
95%	2030
98%	2033
99%	2040
100%	2040 (longest request)

4.2 测试代理服务器性能

参数: **Speed: 30000000000** (不做限制) **Latency: 2000 ms**

wsq@wsq-vm:~\$ ab -n 800 -c 800 http://localhost:2334/blank/5000

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Benchmarking localhost (be patient)

Server Software: TornadoServer/5.1.1

Server Hostname: localhost

Server Port: 2334

Document Path: /blank/5000

Document Length: 5000 bytes

Concurrency Level: 800

Time taken for tests: 12.449 seconds

Complete requests: 800

Failed requests: 0

Total transferred: 4257600 bytes

HTML transferred: 4000000 bytes

Requests per second: 64.26 [#/sec] (mean)

Time per request: 12448.513 [ms] (mean)

Time per request: 15.561 [ms] (mean, across all concurrent requests)

Transfer rate: 334.00 [Kbytes/sec] received

→ 我们可以看出, 在同样的单个请求大小 (5000bit), 延迟 2000ms 情况下, 4.1 测试 100 个请求在没有并发性的情况下代理服务器一次只能处理一个请求, 此模拟同步 I/O。而我们的代理服务器使用高效的异步实现+ Python Tornado 框架, 因此拥有很高的并发性能。在 4.2 中测试 800 个同步请求, 平均每个请求只花费 **15.561 ms** 的时间, 相比 4.1 中平均每个请求 **2023.694 ms** 有巨大的提升,

Connection Times (ms)

	min	mean[+/-sd]	median	max
Connect:	0	903 932.0	1021	3051
Processing:	2152	5237 1470.2	5305	7550
Waiting:	2023	5227 1472.3	5300	7537
Total:	2152	6140 2135.5	6325	10319

Percentage of the requests served within a certain time (ms)

50%	6325
66%	6744
75%	7557
80%	7934
90%	9626
95%	10022
98%	10223
99%	10294
100%	10319 (longest request)