

EE324 Part2 Report

20130185 김태겸

이번 Part2에서는 이때까지 구현했던 프록시들의 성능을 측정 할 것이다. 쓰레드, Libevent, buffered event, 총 세 가지의 프록시의 성능을 다음 보고서에 기록할 것이다.

- Threaded proxy: tags/PA2/Part3
- Libevent proxy: tag/PA3/Part2/libevent_proxy
- Buffered libevent proxy: tag/PA3/Extra

1. Performance evaluation

테스트 환경: 서로 다른 랩 머신(프록시: 143.248.141.40, 테스트 서버: 143.248.141.42)에서 ab를 각 프록시 당 세번씩 실행하여 특정 metric에 대한 평균을 구함. (이번 평가에서는 Time per request (mean, across all concurrent request, Request per second, Transfer rate, Time taken for tests, 총 네 개의 항목에 대해서 평가하도록 할 것이다.)

a) 1 concurrency, 1000 request

- Without proxy

Trial	Time/request	Request/second	Transfer rate	Total time
1	2.622 ms	381.41 #/sec	4158.63 KB/sec	2.622 seconds
2	2.596 ms	385.21 #/sec	4200.03 KB/sec	2.596 seconds
3	2.613 ms	382.73 #/sec	4173.00 KB/sec	2.613 seconds
Avg	2.610	383.12	4177.22	2.610

```
Concurrency Level:      1
Time taken for tests:   2.613 seconds
Complete requests:      1000
Failed requests:        0
Total transferred:      11165000 bytes
HTML transferred:       10814000 bytes
Requests per second:    382.73 [#/sec] (mean)
Time per request:       2.613 [ms] (mean)
Time per request:       2.613 [ms] (mean, across all concurrent requests)
Transfer rate:          4173.00 [Kbytes/sec] received
```

Figure 1 Image of third test result

- With threaded proxy

Trial	Time/request	Request/second	Transfer rate	Total time
1	2.199 ms	454.75 #/sec	4862.43 KB/sec	2.199 seconds
2	2.577 ms	388.09 #/sec	4149.64 KB/sec	2.577 seconds
3	1.932 ms	517.59 #/sec	5534.28 KB/sec	1.932 seconds
Avg	2.236	453.48	4848.78	2.236

```

Concurrency Level:      1
Time taken for tests:   1.932 seconds
Complete requests:      1000
Failed requests:        0
Total transferred:      10949000 bytes
HTML transferred:       10814000 bytes
Requests per second:    517.59 [#/sec] (mean)
Time per request:       1.932 [ms] (mean)
Time per request:       1.932 [ms] (mean, across all concurrent requests)
Transfer rate:          5534.28 [Kbytes/sec] received

```

- With libevent proxy

Trial	Time/request	Request/second	Transfer rate	Total time
1	1.449 ms	690.14 #/sec	7406.36 KB/sec	1.449 seconds
2	1.486 ms	673.04 #/sec	7222.64 KB/sec	1.486 seconds
3	1.820 ms	549.59 #/sec	5587.85 KB/sec	1.820 seconds
Avg	1.585	636.59	6738.95	1.585

```

Concurrency Level:      1
Time taken for tests:   1.486 seconds
Complete requests:      1000
Failed requests:        0
Total transferred:      10989000 bytes
HTML transferred:       10814000 bytes
Requests per second:    673.04 [#/sec] (mean)
Time per request:       1.486 [ms] (mean)
Time per request:       1.486 [ms] (mean, across all concurrent requests)
Transfer rate:          7222.64 [Kbytes/sec] received

```

- With buffered event proxy

Trial	Time/request	Request/second	Transfer rate	Total time
1	2.313 ms	432.34 #/sec	4639.62 KB/sec	2.313 seconds
2	2.125 ms	470.55 #/sec	5049.70 KB/sec	2.125 seconds
3	2.220 ms	454.46 #/sec	4876.98 KB/sec	2.200 seconds
Avg	2.219	452.45	4855.43	2.219

```

Concurrency Level:      1
Time taken for tests:   2.200 seconds
Complete requests:      1000
Failed requests:        0
Total transferred:      10989000 bytes
HTML transferred:       10814000 bytes
Requests per second:    454.46 [#/sec] (mean)
Time per request:       2.200 [ms] (mean)
Time per request:       2.200 [ms] (mean, across all concurrent requests)
Transfer rate:          4876.98 [Kbytes/sec] received

```

b) 100 concurrency, 10000 request

- Without proxy

Trial	Time/request	Request/second	Transfer rate	Total time
1	0.995 ms	1005.14 #/sec	10959.35 KB/sec	9.949 seconds
2	1.000 ms	990.69 #/sec	10899.90 KB/sec	10.003 seconds
3	1.797 ms	556.46 #/sec	6067.25 KB/sec	17.971 seconds
Avg	1.264	850.76	9308.83	12.641

```

Concurrency Level:      100
Time taken for tests:   17.971 seconds
Complete requests:      10000
Failed requests:        0
Total transferred:      111650000 bytes
HTML transferred:       108140000 bytes
Requests per second:    556.46 [#/sec] (mean)
Time per request:       179.708 [ms] (mean)
Time per request:       1.797 [ms] (mean, across all concurrent requests)
Transfer rate:          6067.25 [Kbytes/sec] received

```

- With threaded proxy

Trial	Time/request	Request/second	Transfer rate	Total time
1	0.969 ms	1031.80 #/sec	11033.74 KB/sec	9.692 seconds
2	0.963 ms	1038.44 #/sec	11103.37 KB/sec	9.630 seconds
3	0.963 ms	1037.91	11097.71 KB/sec	9.635 seconds
Avg	0.965	1036.05	11078.27	9.652

```

Concurrency Level:      100
Time taken for tests:   9.635 seconds
Complete requests:      10000
Failed requests:        0
Total transferred:      109490000 bytes
HTML transferred:       108140000 bytes
Requests per second:    1037.91 [#/sec] (mean)
Time per request:       96.348 [ms] (mean)
Time per request:       0.963 [ms] (mean, across all concurrent requests)
Transfer rate:          11097.71 [Kbytes/sec] received

```

- With libevent proxy

Trial	Time/request	Request/second	Transfer rate	Total time
1	0.976 ms	1024.59 #/sec	10996.45 KB/sec	9.760 seconds
2	0.967 ms	1034.55 #/sec	11102.26 KB/sec	9.666 seconds
3	0.967 ms	1034.57	11102.40 KB/sec	9.666 seconds
Avg	0.97	1031.24	11067.04	9.697

```

Concurrency Level:      100
Time taken for tests:   9.666 seconds
Complete requests:     10000
Failed requests:        0
Total transferred:     109890000 bytes
HTML transferred:      108140000 bytes
Requests per second:    1034.57 [#/sec] (mean)
Time per request:       96.659 [ms] (mean)
Time per request:       0.967 [ms] (mean, across all concurrent requests)
Transfer rate:          11102.40 [Kbytes/sec] received

```

- With buffered libevent proxy

Trial	Time/request	Request/second	Transfer rate	Total time
1	0.978 ms	1022.11 #/sec	10970.47 KB/sec	9.784 seconds
2	0.967ms	1042.13 #/sec	11183.57 KB/sec	9.596 seconds
3	0.960 ms	1042.04	11182.61 KB/sec	9.597 seconds
Avg	9.683	1035.43	11112.22	9.659

```

Concurrency Level:      100
Time taken for tests:   9.597 seconds
Complete requests:     10000
Failed requests:        0
Total transferred:     109890000 bytes
HTML transferred:      108140000 bytes
Requests per second:    1042.04 [#/sec] (mean)
Time per request:       95.965 [ms] (mean)
Time per request:       0.960 [ms] (mean, across all concurrent requests)
Transfer rate:          11182.61 [Kbytes/sec] received

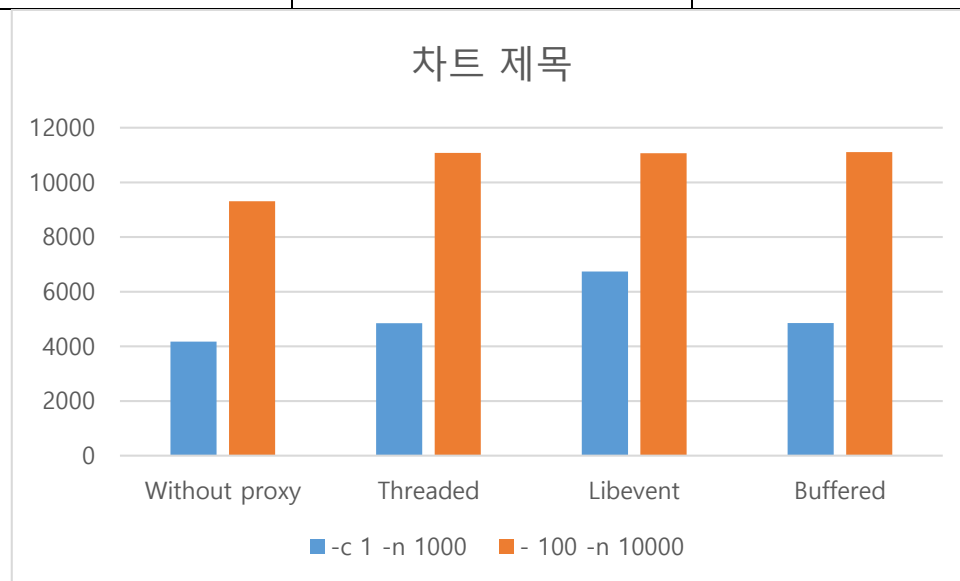
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2. Conculusion

평가한 항목들은 전부 연관이 있는 데이터 이므로 Transfer rate를 통해 비교하겠다.

프록시가 없을 때, 쓰레드를 이용했을 때, 그리고 libevent 와 buffered event를 이용했을 때의 결과는 다음과 같다.

	-c 1 -n 1000	- 100 -n 10000
Without proxy	4177.22	9308.83
Threaded	4848.78	11078.27
Libevent	6738.95	11067.04
Buffered	4855.43	11112.22



Concurrency가 없을 때 libevent가 가장 퍼포먼스가 뛰어났으며 concurrency가 있을 때는 buffered event가 더 뛰어났다. sequential하게 request를 줄 때 쓰레드의 경우 쓰레드를 생성하는데 드는 오버헤드가 크기 때문에 이러한 차이가 발생했다고 본다. 반면 concurrency가 커지면 쓰레드 생성에 의한 오버헤드가 상대적으로 적어지기 때문에 차이가 줄어든 것이라고 생각된다.