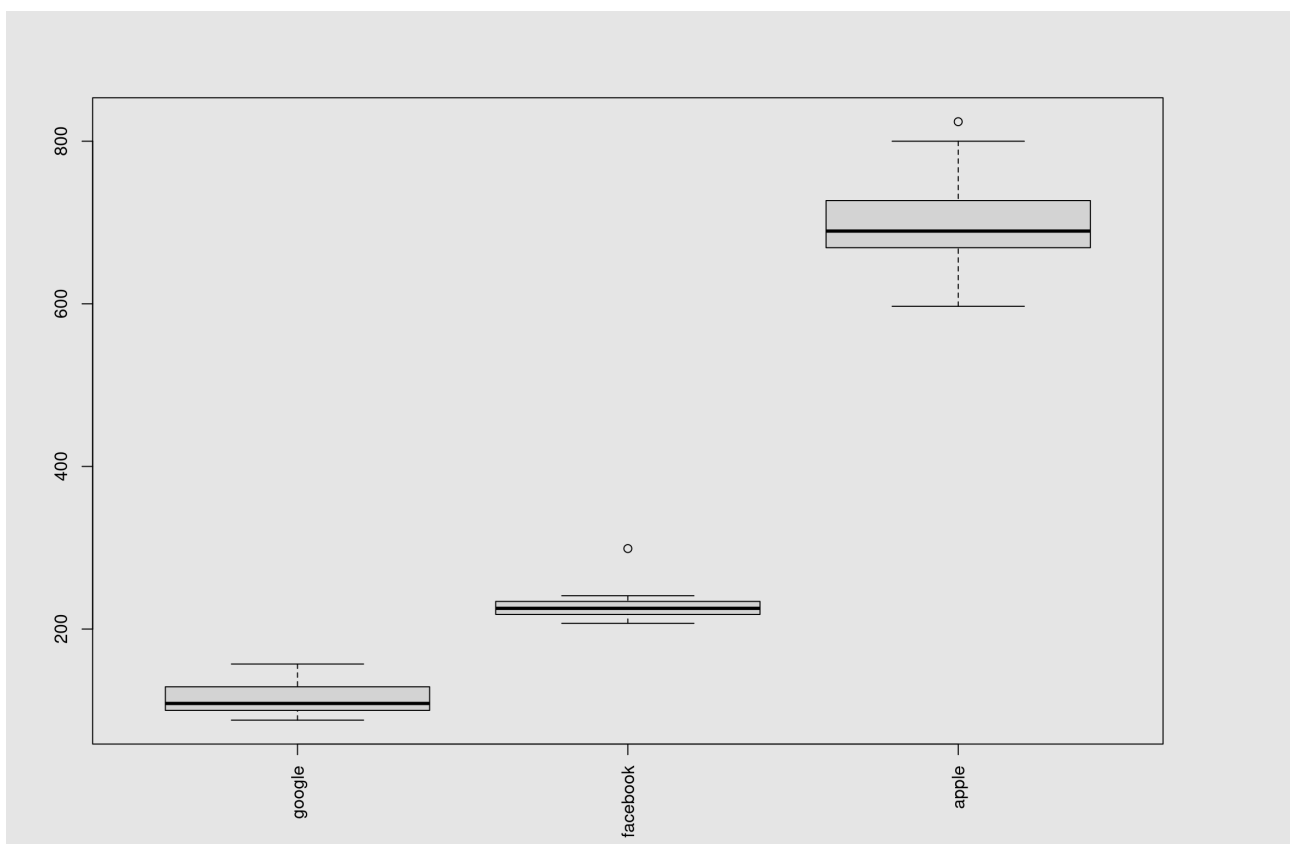


Comparison between custom DNS resolver with Local and Google Public DNS resolver

Box Plot #1 (My DNS resolver)

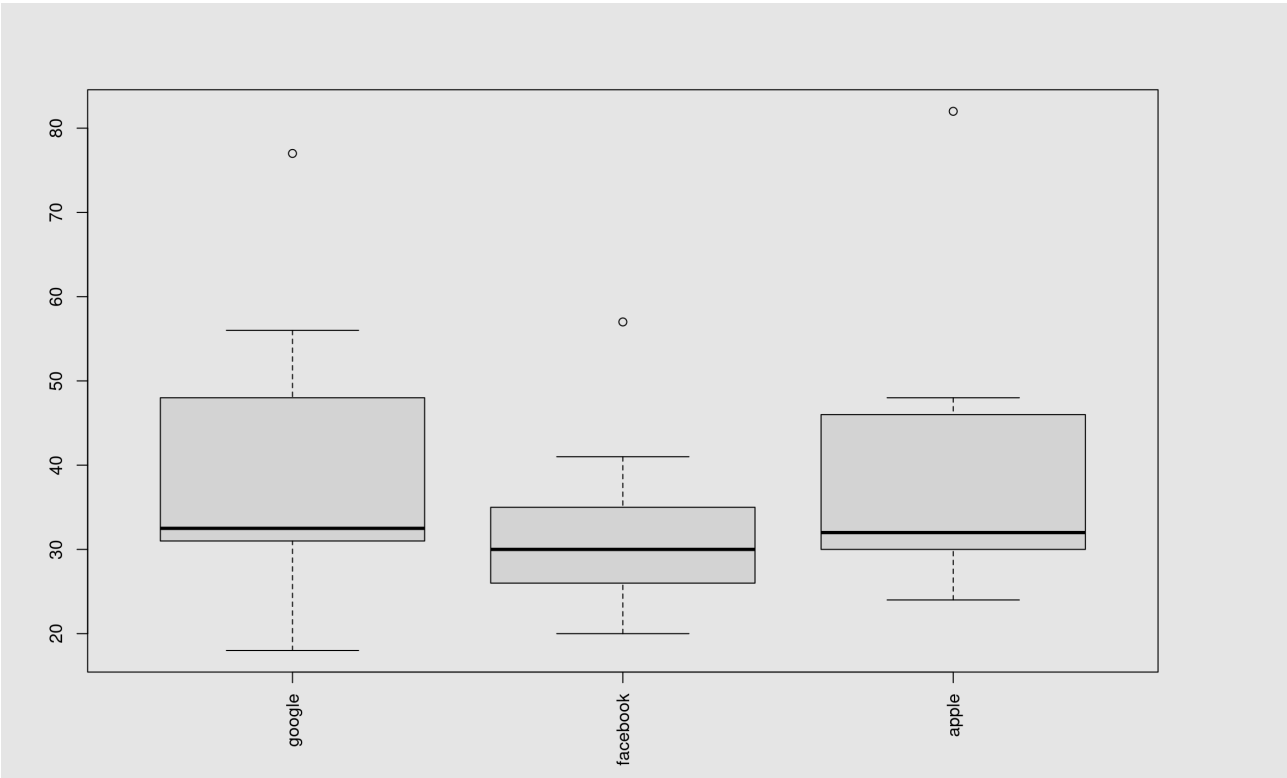


X = website Y=time (ms)

Data #1

	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	Trial 6	Trial 7	Trial 8	Trial 9	Trial 10	Mean	Q1	Q3
google	95	106	129	157	102	111	121	88	100	147	115.6	100.5	127.0
Facebook	234	241	220	233	216	218	299	207	231	220	231.9	218.50	233.75
apple	690	597	824	657	698	800	669	689	677	727	702.8	671.0	719.75

Box Plot #2 (Local DNS resolver)

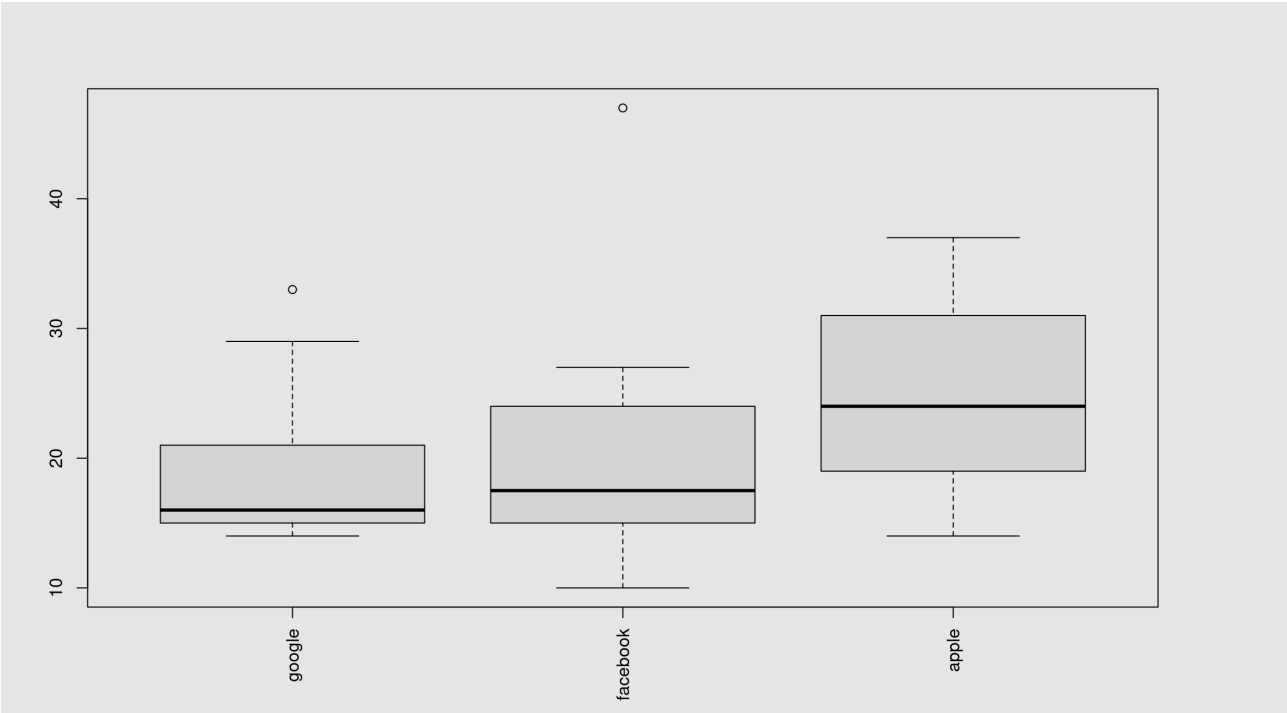


X = website Y=time (ms)

Data #2

	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	Trial 6	Trial 7	Trial 8	Trial 9	Trial 10	Mean	Q1	Q3
google	18	77	33	31	22	32	31	35	48	56	38.3	31.0	44.8
Facebook	35	41	31	23	20	57	26	26	29	35	32.3	26	35
apple	32	35	32	32	24	82	46	27	48	30	38.8	30.5	43.3

Box Plot #3 (Google Public DNS resolver)



X = website Y=time (ms)

Data #3

	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5	Trial 6	Trial 7	Trial 8	Trial 9	Trial 10	Mean	Q1	Q3
google	21	15	29	18	15	17	14	15	14	33	19.1	15.0	20.3
Facebook	17	18	15	16	15	47	27	24	21	10	21	15.3	23.3
apple	25	16	24	21	24	37	14	31	19	34	24.5	19.5	29.5

Analysis

Overall, you can see that my custom DNS resolver takes as little as three to as much as 30 times longer than the existing local dns or Google Public dns. There can be many reasons for such a big difference, but representatively, there are the following reasons.

The first reason is caching. In the case of local DNS or Google public DNS, previous request data is stored in the cache. This reduces the time elapsed during repetitive operations because it returns the results stored in the cache when the same data is requested again. In the case of my custom DNS resolver, it takes a relatively longer time because it has no implementation of caching functions, so it needs to search in the same way to the same requests.

The second reason is optimization. In the case of Google public DNS, a large number of requests are received in a short time, so it is optimized using various technologies such as Load balancing and parallel processing. The code that implements the technology also uses minimal resources. My custom DNS is relatively slow because it consists only of basic functions without special optimization tasks, and there are likely to be wasted resources in the process of implementing those functions.

Now let's compare Local DNS and google public DNS. At first glance, the data of two resolvers look similar, but if you look closely, you can see that Google public DNS resolver is slightly faster than local DNS. The reason is similar to the above, but there are some additional reasons.

First is Google's large-scale infrastructure. Google public DNS has a large global distributed infrastructure that can efficiently handle large numbers of queries. It is faster and more reliable than local DNS, where resources and network connectivity are limited.

Moreover, In the case of Google, it frequently updates the latest information on domain and IP addresses, so it can respond relatively faster than local DNS. However, in the case of the above data, since it was measured based on the most frequently used website Top3, the time difference depending on the status of update would not have had a significant impact here.