Measuring performance

In this part we analyse the performance of mydig resolver versus the Google Public DNS resolver and the local DNS resolver, which is the Stony Brook server in our case. The following text outlines the steps to measure performance. The code for this is attached in PART_C.ipynb.

- Finding the IP for local DNS server
  - The local DNS server ip address can be found under Network settings.
- Selecting top 25 websites
  - The top 25 websites are selected from https://www.alexa.com/
- Run the DNS resolver mydig for these websites 10 times and calculate average response time. Screenshot for the same is attached below.

|	0	1	2	3	4	5	6	7	8	9	mean
google.com	0.165979	0.136159	0.13854	0.138518	0.141722	0.139889	0.13729	0.148268	0.150208	0.149495	159.067512
facebook.com	0.137591	0.138287	0.128998	0.206546	0.121769	0.131617	0.127023	0.13081	0.129994	0.227713	162.838187
youtube.com	0.255042	0.174738	0.186192	0.144632	0.263349	0.206116	0.141469	0.14566	0.139451	0.139524	197.579067
tmall.com	0.261741	0.239812	0.239524	0.239683	0.238907	0.2403	0.226034	0.25174	0.239337	0.23989	265.866439
baidu.com	0.399404	0.51128	0.512276	0.511658	0.511377	0.511626	0.408678	0.511887	0.509988	0.472443	534.667809
qq.com	0.401226	0.453933	0.511761	0.512214	0.408463	0.509905	0.513614	0.509374	0.513057	0.406862	521.445084
360.cnsohu.com	1.652095	1.777037	0.509669	0.446669	0.495948	0.520248	0.471055	0.446359	0.474384	0.519864	804.466057
taobao.com	0.235738	0.267548	0.217261	0.26611	0.237074	0.230886	0.295886	0.29977	0.263005	0.250786	282.047122
jd.com	0.495171	0.518855	0.517211	0.454352	0.485543	0.523276	0.447211	0.380579	0.441252	0.467724	520.429165
amazon.com	0.35407	0.335884	0.298091	0.304117	0.267114	0.283032	0.299982	0.389185	0.277901	0.306145	342.707305
yahoo.com	0.200116	0.13786	0.166342	0.143814	0.1689	0.156643	0.144472	0.137968	0.136749	0.192169	174.353623
wikipedia.org	0.270567	0.186295	0.243989	0.279381	0.239395	0.195179	0.199812	0.19101	0.214413	0.185692	242.630637
weibo.com	0.379068	0.41858	0.413888	0.390789	0.418131	0.382062	0.384615	0.375701	0.438347	0.385653	438.551745
sina.com.cn	0.851728	0.681595	0.636467	0.729762	0.751605	0.623906	0.825814	0.724734	0.829138	0.640287	802.453942
zoom.us	0.28814	0.290541	0.275144	0.274793	0.268809	0.246327	0.295588	0.305565	0.28941	0.310113	312.887244
xinhuanet.com	1.120755	1.072638	1.093065	1.13393	1.063097	1.313513	1.148489	1.118888	1.235271	1.032304	1246.514521
live.com	0.154625	0.136492	0.139835	0.143535	0.134531	0.145527	0.163408	0.148605	0.148494	0.156487	161.869318
netflix.com	0.175687	0.198599	0.186516	0.156604	0.168129	0.164354	0.175841	0.193793	0.197205	0.177117	197.322996
reddit.com	0.156022	0.15813	0.173727	0.17599	0.137429	0.151504	0.171615	0.161161	0.139413	0.173902	175.878117
instagram.com	0.155687	0.172753	0.187642	0.162451	0.148242	0.135163	0.14401	0.136573	0.144802	0.145486	168.609018
microsoft.com	0.168307	0.163137	0.14338	0.148905	0.20882	0.15567	0.180064	0.13637	0.138538	0.187101	179.332139
office.com	0.156942	0.154979	0.185581	0.175683	0.185616	0.14357	0.150172	0.142748	0.157604	0.13593	174.770749
google.com.hk	0.585127	0.538667	0.594815	0.525715	0.609095	0.627831	0.620764	0.639503	0.507088	0.52674	635.287881
panda.tv	0.973793	0.830038	1.031379	0.834722	0.819127	0.830646	0.672869	0.822051	0.810471	0.897694	937.506895
zhanqi.tv	0.773479	0.905984	0.825862	0.925232	0.833083	0.958632	0.922764	0.876279	0.85025	0.830831	957.263577

The column **mean** represents the mean value of response time in **milliseconds** for each website in that row.

- Next, we continue the same experiments for 8.8.8.8 (Google's public DNS server) and 130.245.255.4 (Stony Brook DNS server). The overall dataframe is shown in the screenshot below.

	Mydig	LocalDNS	GoogleDNS
0	159.067512	13.673282	5.182004
1	162.838187	5.218291	4.833317
2	197.579067	5.046391	5.654907
3	265.866439	5.312586	4.988003
4	534.667809	5.009985	5.217409
5	521.445084	5.216217	5.016088
6	804.466057	5.033588	4.782319
7	282.047122	5.098605	4.756618
8	520.429165	5.027318	4.892397
9	342.707305	5.373216	4.815483
10	174.353623	5.030394	5.023098
11	242.630637	5.1296	5.280113
12	438.551745	5.059099	5.262184
13	802.453942	4.920316	5.08709
14	312.887244	5.04992	5.31249
15	1246.514521	5.205297	5.135202
16	161.869318	4.9968	5.15871
17	197.322996	4.9191	4.864383
18	175.878117	5.78959	4.909515
19	168.609018	5.288601	5.155516
20	179.332139	5.205297	5.007505
21	174.770749	5.121899	5.31919
22	635.287881	4.343009	5.211902
23	937.506895	5.088162	5.398679
24	957.263577	5.00319	5.179071

We can observe that Google DNS and Local DNS servers are faster than Mydig DNS resolver.

- Plotting CDF of response time values.
  - The following screenshot displays the CDF of response times of the 3 DNS resolvers.

DNS Resolution time (CDF)
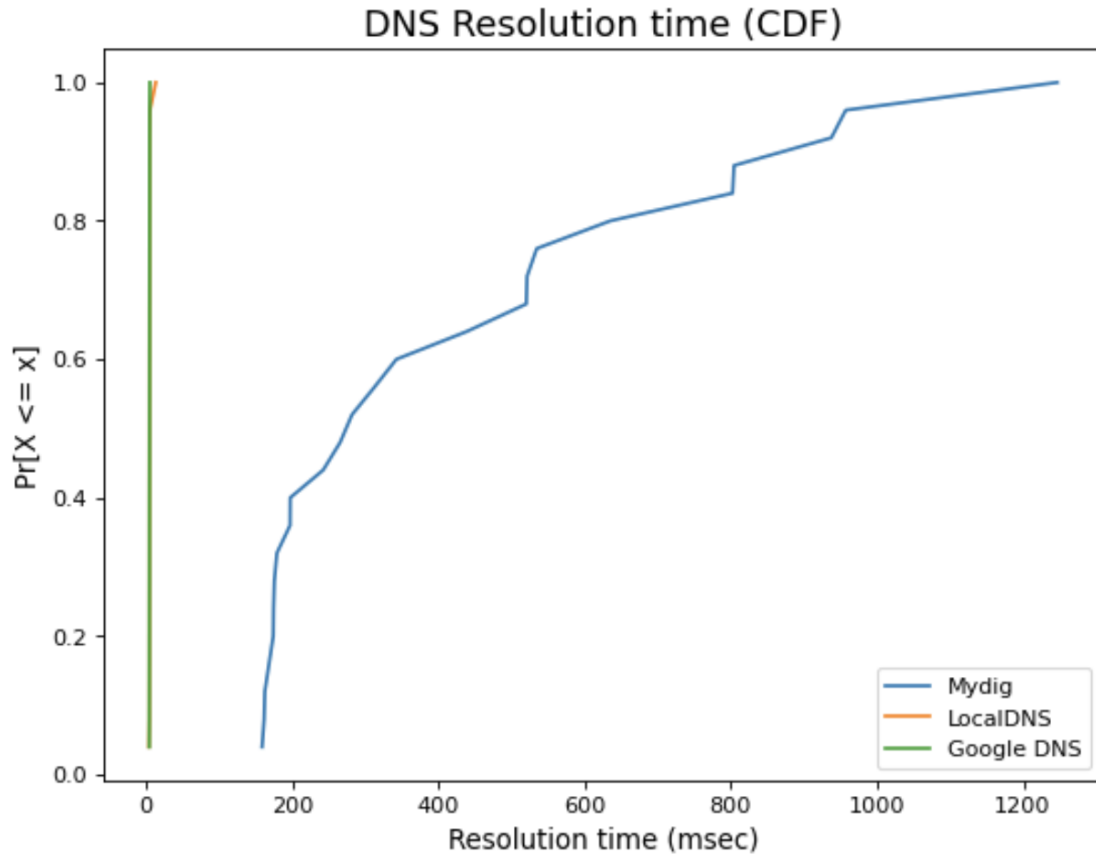
- Observations
  - The above graph shows the CDF of response times for three DNS servers. We can see that Mydig is the slowest as the cumulative time goes uptil 1200 ms.
  - Local DNS is only slightly slower than Google DNS.
  - Most requests to the Google DNS are completed within 4-5 milliseconds.