Performance Test

In this section, performance testing has been done between DNS resolver in my_dig, Local DNS Resolver and Google DNS resolver.

Following were the observations:

1. Local DNS Resolver was the fastest.

2. Followed by Google DNS Resolver.

3. my_dig DNS resolver ended up being the slowest.

The local DNS resolver does a lot of caching which results in the average query time really low. When querying Google DNS resolver, even though Google is maintaining a cache, the query time is still higher since the resolver itself is located at a remote location. Our own implementation of DNS resolver has no cache at all, which results in hierarchal query from root to down for each DNS resolution, resulting in it taking the maximum time. There are some aliases which have one or more bad servers advertised for their DNS resolution and in those scenarios we wait for timeout before moving to next server. The same can be inferred from the graph below.

Results of Performance Test

Local DNS Resolver

[1.1981010437011719, 1.1977672576904297, 0.39288997650146484, 3.04560089111328, 3.50659942626953, 2.61686420440674, 4.405617713928223, 0.49757957458496094, 1.2009620666503906, 0.3972768783569336, 0.40030479431152344, 0.7998466491699219, 4.054673194885254, 0.8020639419555664, 7.611513137817383, 1.7073631286621094, 2.5995731353759766, 4.25766563415527, 0.5476951599121094, 0.3033161163330078, 0.5515098571777344, 1.2031316757202148, 1.946115493774414, 0.898432731628418, 0.5538702011108398]

Google DNS Resolver

[29.236769676208496, 19.244861602783203, 27.260184288024902, 135.35890579223633, 34.82942581176758, 42.47128963470459, 32.879066467285156, 40.069580078125, 27.583932876586914, 12.799596786499023, 24.851155281066895, 21.22952938079834, 29.255986213684082, 20.02575397491455, 28.829264640808105, 19.75579261779785, 130.89025020599365, 27.239990234375, 27.00960636138916, 13.976907730102539, 11.250805854797363, 13.1744384765625, 11.890006065368652, 24.612903594970703, 24.55916404724121]

MyDig DNS Resolver

[260.12122631073, 65.2714490890503, 281.56702518463135, 1029.3916463851929, 1213.332200050354, 898.6170530319214, 597.5688219070435, 3274.472284317017, 81.85899257659912, 54.89828586578369, 789.3917560577393, 155.85002899169922, 196.03688716888428, 575.6605386734009, 3085.423707962036, 1053.7707090377808, 2904.780387878418, 185.24212837219238, 219.0225124359131, 90.52398204803467, 1058.9928150177002, 1320.744228363037, 1038.4631872177124, 87.53046989440918, 98.89757633209229]

Cumulative Distribution Function (CDF) Graph

The graph shows that the cumulative frequency distribution for DNS resolution via Local DNS, Google DNS and My DNS(mydig). The graph shows that most of the DNS resolutions for Local DNS happens in few milliseconds due to DNS caching. The Google DNS is also fast and takes a little more time than Local DNS and all the resolutions happen within a range of 100-200 msec. When comparing this with mydig DNS resolver, we can see that it takes a huge amount of time as compared to other two. The main reason is that it does not have DNS caching and also as mentioned above some bad servers are advertised as DNS authoritative servers which lead to timeout value being added to the DNS resolution.