Saugat Tripathi
@02752994

WRITE UP

Objective of the project :
To understand the internet delays from the from the source route along the end to end path towards the destination. Understand which hosts have longest delay and give the reason for the stated delays.

Tools used:
I first tried tracing the path to the destination using traceroute. It seemed many router/ host blocked ICMP which is necessary to perform traceroute. This resulted in
*** in place of delays in the output of the program.

Since a web server does not block port 80, I used tcptraceroute and the results were more successful than using traceroute.

Command Used:

```
sudo tcptraceroute " domanin_name >> filename
```

Other than this command I have used python scripts to repeat the command 30 times for each host and call the commands over to 30 hosts stored in domain name.txt files for each domain where the results of the tcptraceroute was store.

Then another script ‘analyze.py’ was used to read the files of each hostname. The host was selected by using keyword ‘open’ which was only present in the last line of the host.
The line was then split and the values for the send to the get_average function which gives the average of the line for the host.
All the average for every host is stored in a dictionary and avg + 4 * standard deviation is stored in another dictionary. Numpy library is used to calculate the standard deviation from the list of delays by using numpy.std() function.
I stored the keys from the dictionary (hashmap) , sorted them in descending order, then took the first five values from both the list. Then the first five host are picked from both the lists.

Results:

The results seems to reflect that the website which are hosted in geographically far regions from Washington DC are having highest delay.
I believe this is due to propagation delay since propagation delay is L/B.

Ranking	Domain Name	Average
1	naver.com	352.757527778 ms
2	hongkiat.com	347.699561111 ms
3	sublime.com	322.204611111 ms
4	ctrip.com	318.601447222 ms
5	nationsonline.org	314.863916667 ms

Ranking	Domain Name	Average + 4 * Standard Deviation
1	cmu.edu	1668.2139903 ms
2	yahoo.in	862.932454489 ms
3	ctrip.com	860.020506776 ms
4	pustakalaya.org	806.55781931 ms
5	sublime.com	692.922629988 ms