EDI: First Lab Report

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Abstract

Assignment 1: The goal of this work was to determine the average daily peak time of a server, using an active monitoring technique (traceroute).

1 Monitoring of a Server's Peak Time

1.1 Methodology and experimental setup

1.1.1 Hypotheses that were formulated

When a server is experiencing too many requests, the following things are expected to happen:

- H1) Latency Surges: Because the server has to deal with a higher amount of packets per unit time, queueing is expected to happen, and the round trip time of packets sent to the server is expected to increase.
- H2) Number of hops increases: At peak time, congestion may take place on the normally optimal routes, and thus alternative routes, which may include more hops, will be sought by the packets, increasing the average number of hops to reach the server.

1.1.2 Experimental Setup

A script that performs traceroute on a target IP at regular intervals (every 5 minutes) was executed on a vantage point for just over a week. Subsequently, the collected data was processed offline.

The vantage point in question was a virtual machine on GCP (Google Cloud Platform), located on a server in the US. The target website was: www.google.it. Assuming that www.google.it is mostly visited by users in Italy, the timestamps were interpreted as times in CEST, aka: GMT+2, which happens to be the Italian local time in April.

As a side-note, peak time traditionally occurs from late evening to early night, more precisely from 6 PM to 11 PM. [1]

The assumption that I made, in accordance with H1[1.1.1], was that latency (RTT) would've been proportional to the amount of traffic on the server.

1.2 Experimental results

After letting the script run for more than 183 hours (almost 8 days), collecting measurements at regular intervals of 5 minutes, I was left with 2204 readings; 4 of which were discarded as outliers.

The remaining 2200 measurements were processed and arranged in a table of this format:

timestamp	hops	reached	latency_ms	hour
2022-04-17 16:09:56	15	True	0.919000	16

Table 1: Table 1

The records were grouped by hour of the day, the mean and standard error were computed, resulting in this final table:

hour	latency_ms	latency_ms_std_err	hops	hops_std_err
0	0.885481	0.332606	12.326316	1.124600
1	0.911547	0.274709	12.784946	1.405343
2	0.923648	0.284790	12.562500	1.709494
3	0.883117	0.318890	12.436170	1.492335
4	0.951461	0.249570	12.702128	1.457865
5	0.915111	0.314960	12.252632	1.406432
6	0.955569	0.283697	12.138298	1.603766
7	0.914733	0.285439	12.357895	1.529259
8	0.876304	0.241643	12.463158	1.137471
9	0.909583	0.303091	12.361702	1.605441
10	0.870383	0.259852	12.241758	1.628501
11	0.877788	0.285976	12.559524	1.491754
12	0.882918	0.348783	12.592593	1.376388
13	0.897655	0.310639	12.180723	1.562866
14	0.888898	0.280578	12.469880	1.417120
15	0.827652	0.270974	12.271605	1.449244
16	0.872984	0.279684	12.728261	1.597410
17	0.846570	0.306079	12.505376	1.449315
18	0.823714	0.301251	12.437500	1.159060
19	0.870302	0.276282	12.800000	1.242852
20	0.864380	0.286903	12.677419	1.286732
21	0.892767	0.337298	12.505263	1.521993
22	0.860239	0.356526	12.468085	1.300968
23	0.933872	0.347573	12.606383	1.254824

Table 2: Table 2

Two bar charts were obtained from said table.

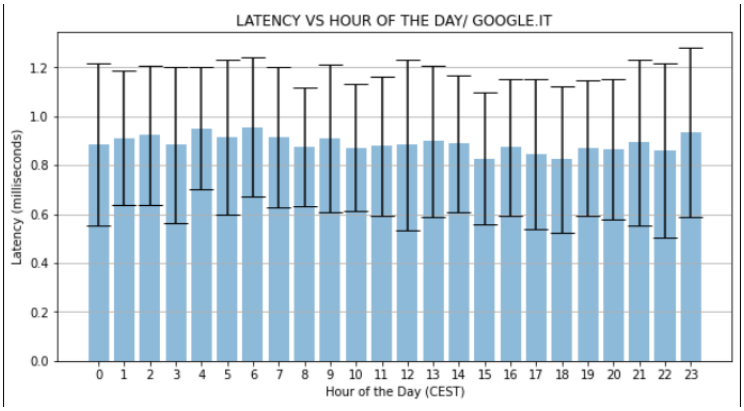

Figure 1: Latency Graph

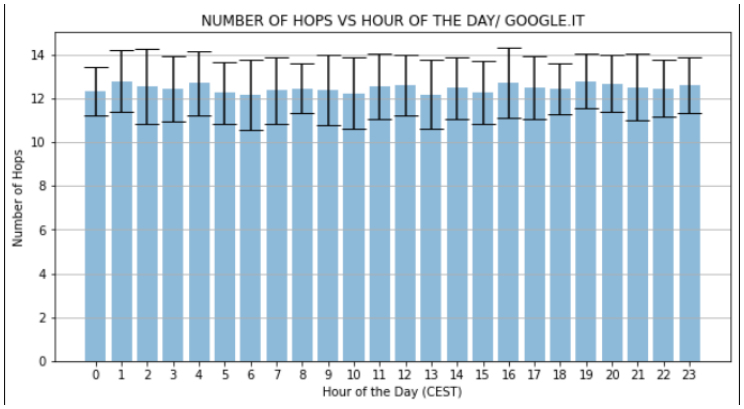

Figure 2: Hops Graph

2 Insert the title of your second lab

2.1 Methodology and experimental setup

2.2 Experimental results

3 Conclusion

4 References

1. https://www.highspeedinternet.com/resources/why-does-my-internet-slow-down-at-night