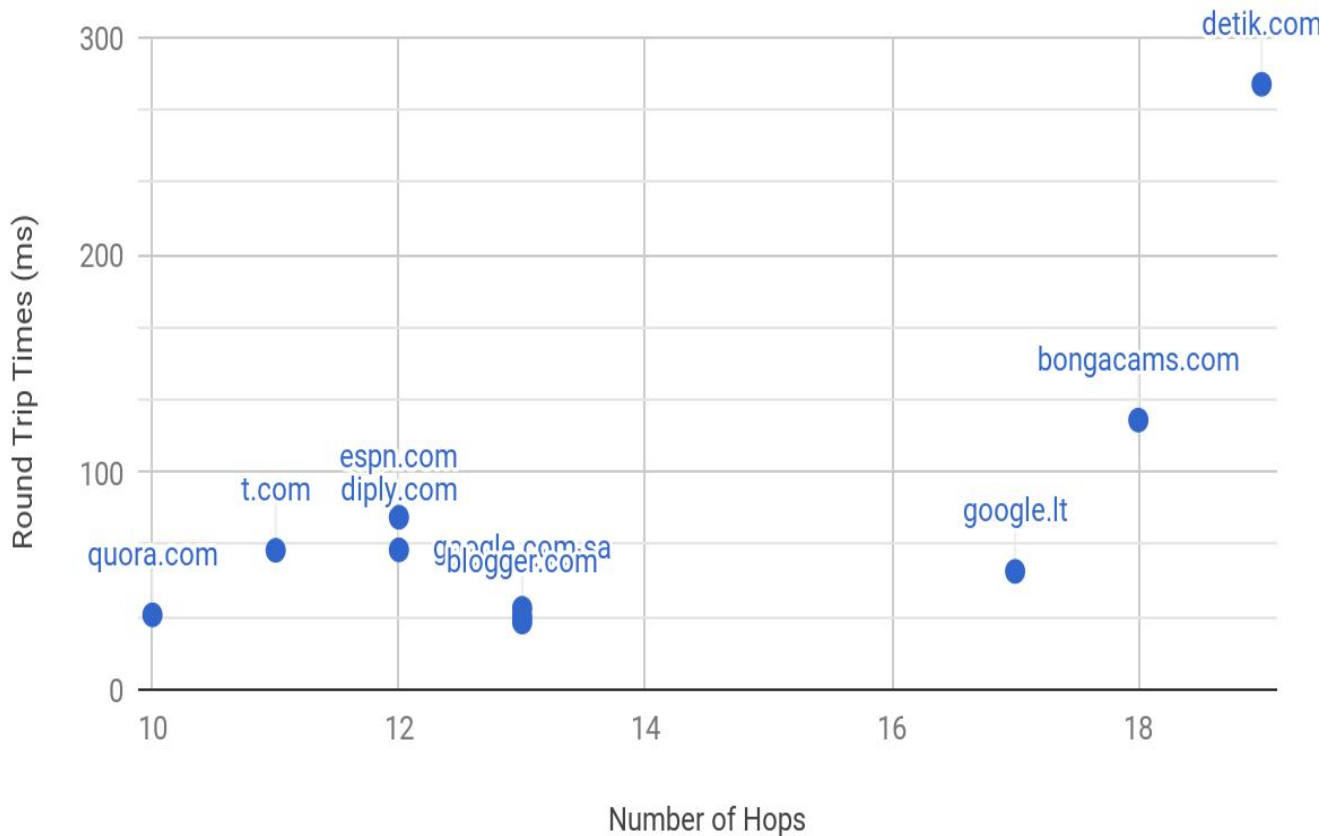


Probe Results:

Hostname	Number of Hops	Round Trip Time (ms)	Bytes Resent
google.com	13	33.6	28
google.com.sa	13	37.4	28
detik.com	19	27.8	512
blogger.com	13	31.1	28
diply.com	12	64.3	512
bongacams.com	18	124.0	512
espn.com	12	79.3	28
quora.com	10	34.4	512
google.lt	17	54.4	28
t.com	11	64.1	28

Round Trip Time vs Number of Hops



Report:

First thing I noticed from this experiment is while most sites follow RFC and only include 28 bytes of the original packet in ICMP error message (20 of which is the IP header the original message was encapsulated in) some sites, as shown in the table, maximize the bytes returned in the error message sending instead 512 bytes. Of my original list I found many sites blocked both my pings and my project's probe, so I picked random websites from the list until I had ten working sites. After some research I have noticed that many websites tend to block ICMP messages sent for traceroute and ping functions because many DDOS and DOS attacks actually use ICMP echo messages. Additionally I noticed some websites will silently drop packets sent to ports not in use or reserved for other functions, that is why I chose port 33434 which most sites reserve for traceroute if that functionality is allowed. To ensure the returned packets were the ones I sent I check to ensure the port the packet was sent to is 33434 and I ensure the original size of the packet sent was 1480 bytes. If both these conditions are met then the error message I am receiving is regarding a traceroute packet or ping packet that was padded and sent from my host, this kind of traffic will only be my project. Other ways of doing

this (excluding the way mentioned in the instructions.) would be to compare the checksum of the returned UDP portion to the original, the values on this portion of the packet should have remained unchanged and so the checksum should be identical. Additionally you can honestly look at the few bytes in the UDP payload that are returned, the first bit of the text should be included which has my email, this also can be used to identify packets.

From this experiment I conclude that there is a clear correlation between hops taken and round trip time, however there are plenty of outliers to this. Some servers had a longer round trip time with less hops than others, this could be a result of queueing times or propagation delays since the distance between routers isn't constant for all paths. These exceptions however are not a consistent appearance and the number of hops a path takes is a good proxy metric on how long the round trip time will take.