Geo Routing Based Algorithm Investigation to Track Website Quality Using Geo-Location

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Abstract— The study of the research is to collect the information like users browsing place, browser used, IP Address, latitude, longitude and operating system automatically when the time of client browsing. With the help of geocast, Geo-Location and the collected information, it will map the client browsed position in the Google Map. This is a web based research used to track all kind of website information in any specific platform. This system collects a large number of users' browsing information to analyze the website performance, load balancing, web traffic and finding errors for taking the essential improvements. This research is also to find the shortest path from the client browsing place to website hosted server. It will reach the specific routers to find the shortest path. Each and every router will have the router name and IP Address. It collects the router information by using tracert command and shows the geographic location in the Google Map. It shows the various kinds of information's like, Client captured IP Address, Routers location and IP Address, Total hits of the website right from the beginning, Country based website hits, Region based website hits, City based website hits, Browser based website hits and Platform based website hits. Each and every information, there is a graph for easy identification.

Keywords— Geo-location, IP Addresses and Domain Names, Internet Control Message Protocol, Transmission Control Protocol

I. INTRODUCTION

Website quality evaluation can be made based on creating site map for the WebPages for a single website which works properly. A website is taken for the analysis where we check every link under that website are checker and split it according to status code.[1]

Geo-location is the identification of the real-world geographic location of an object, such as radar, mobile phone or an internet connected computer terminal. Geo-location may refer to the practice of assessing the location, or to the actual assessed location. Geo-location is closely related to the use of positioning systems but can be distinguished from it by a greater emphasis on determining a meaningful location (e.g. IP address, latitude…) rather than just a set of geographic coordinates.

For either geo-locating or positioning, the locating engine often uses radio frequency (RF) location methods, for example Time Difference of Arrival (TDOA) for precision. TDOA systems often utilize mapping displays or other geographic information system. When a GPS signal is unavailable, geo-location applications can use information from cell towers to triangulate the approximate position, a method that is not as accurate as GPS but has greatly improved in recent years. This is in contrast to

earlier radiolocation technologies, for example Direction Finding where a line of bearing to a transmitter is achieved as part of the process.[2]

IP address location data can include information such as country, region, city, postal/zip code, latitude, longitude and time zone. Deeper data sets can determine other parameters such as domain name, connection speed, ISP, language, proxies, company name, US DMA/MSA, NAICS codes, and home/business.

The word geo-location is also used in other contexts to refer to the process of inferring the location of a tracked animal based, for instance, on the time history of sunlight brightness or the water temperature and depth measured by an instrument attached to the animal. Such instruments are commonly called archival tags.

In computing, Geo-location software is used to deduce the Geo-location (geographic location) of another party. For example, on the Internet, one Geo-location approach is to identify the subject party's IP address, and then determine what country (including down to the city and post or ZIP code level), organization, or user the IP address has been assigned to, and finally, determine that party's location. [3] Geographic routing (It is also called geo-routing or position-based routing algorithm) is a routing principle that relies on

geographic position information. It is mainly proposed for wireless networks and based on the idea that the source sends a message to the geographic location of the destination instead of using the network address. The idea of using position information for routing was first proposed in the [4]

1980s in the area of packet radio networks and interconnection networks. Geographic routing requires that each node can determine its own location and that the source is aware of the location of the destination. With this information a message can be routed to the destination without knowledge of the network topology or a prior route discovery.

II. PROBLEM DEFINITION

In this research we are tracing the website using traceroute command in the specified platform. Traceroute shows you the route over the network between two systems, listing all the intermediate routers a connection must pass through to get to its destination. It can help you in analyzing why the connections from your end to a server is poor, and can often help you to spot what exactly is the problem. It always shows you how your machine is connected to ISP and ISP to the rest of the network, collectively the connection between your end and server.

When we initiate Traceroute, it sends a sequence of Internet Control Message Protocol (ICMP) packets addressed to a destination host. It passes through a series of intermediate routers, which involves a TTL (Time-to-Live) value. TTL refers to how many routers your packet can go through before its expires. Routers will discard a packet when the TTL has reached zero, returning an ICMP error message Code 11 (ICMP Time Exceeded) to the sender.[5]

> traceroute [-m] [-q] [-w]
> -m : Specifies the maximum number of hops (max Time-To-Live value). The default is 30.
> -q : Sets the number of UDP packets per hop. The default is 3
> -w : Set the time (in seconds) to wait for a response to a probe. Default 5 seconds

A) IP-based Geo-location
IP-based Geo-location is mapping of an IP address or MAC address to the real-world geographic location of an Internet connected to a computing device or mobile device. Geo-location involves in mapping IP address to the country, region, city, latitude and longitude, ISP and domain name among other useful things.
Latitude and Longitude are basically the imaginary lines drawn over the maps that help to find out the accurate location of a place and its time zone. These two angles or geographical coordinates are measured in three units: degrees (°), minutes of arc (') and seconds of arc (").

Latitudes are the lines that run parallel to the equator and measure the north-south direction, whereas longitudes or meridians, the vertical lines running perpendicular to the latitudes measure the east-west direction. Although, there is no definite starting point for longitudes; however, the Prime Meridian or Greenwich is often considered as the 0° longitudinal line.

The Latitude and Longitude world map provides information not only about a country, but shows the accurate location of regions, districts, states, cities as well as areas. Internet maps showing latitude and longitude of world's different cities and countries also help in providing information about the time zone of a particular country. Determining the geographic location of an Internet host is valuable for a number of Internet applications. For example, it simplifies network management in large-scale systems, helps network diagnoses, and enables location based advertising service. While coarse grained Geo-location e.g., at the state or city level, is sufficient in a number of contexts, the need for a highly accurate and reliable Geo-location service has been identified as an important goal for the Internet. Such a system would not only improve the performance of existing applications, but would enable the development of novel ones.

While client assisted systems capable of providing highly accurate IP Geo-location inferences do exist, many applications such as location-based access restrictions and online advertising cannot rely on clients' support for Geo-location. Hence, a highly accurate client-independent Geo-location system stands to be an important goal for the Internet.

The key contribution of our paper lies in designing a novel client independent Geo-location methodology and in deploying a system capable of achieving highly accurate results. In particular determine that our system can Geo-location IP addresses with a median error distance of 690 meters in an academic environment. Comparing to recent results on the same dataset shows that we improve the median accuracy by 50 times relative to and by approximately 100 times relative to.

B) IP Addresses and Domain Names
Computers connected to the Internet must speak the "Internet language" called the "Internet Protocol" or simply "IP". Each computer is assigned a unique address somewhat similar to a street address or telephone number. Under the current system there are four numbers that range from 0 to 255 (Example: 206.156.18.122). Every computer, whether it functions as a web site, is being used by a web surfer, is a mail server, and/or is used for any other function, has an IP address so it can communicate across the Internet. Communication is accomplished by sending pieces of

information called "packets" that include the IP address of the destination computer. [6]

Up to this point, domain names have not yet been mentioned because they are not needed for the Internet to work! An optional feature of the Internet is to use domain names. With this system I can tell users to visit www.srkv.org rather than 192.241.220.47. If there are several computers in a network they can be grouped under a domain and could be given 'friendly' names for convenience such as: computer1.srkv.org, computer2.srkv.org, etc. This has the added convenience of keeping the same computer names even when the IP addresses change or if the computers move to a different physical location. Again, this naming is optional and is not always done. As a side note, the underlying IP addresses have no intrinsic value but the optional domain names can be worth thousands of dollars and have been the subject of many court cases.

The Domain Name System (often called DNS) is the system where the IP addresses are converted into names. When www.srkv.org is entered by a user into a browser a (somewhat hidden) process converts that name into 192.241.220.47. This allows the user to connect to the proper web site and usually involves a domain registration service that is funded by domain name fees[7].

C) IP Addresses Distribution

Every transfer of information over the Internet must include the capture of the IP address. Some examples of automatic logging are: visiting a web site, sending or receiving e-mail, using a chat room, or reading and posting to newsgroups. A common situation that causes IP addresses to be distributed to a third party is when visiting a web site and that site participates in banner ad networks where the ads are served from a third party site. This third party site retrieves the IP address when it sends the details. This information is used to measure the number of ad views and calculate click-through rates.[8]

Transferring IP addresses to a third party can also be accomplished by sending a web page via e-mail. When the user opens the attachment (if they are connected to the Internet) the e-mailed web page could make a request to a web site anywhere on the Internet (such as requesting an image file). This transfers the user's IP address to that web site along with the date and time that the user opened the message. An Internet cookie can also be placed on the user's system at that time. Several advertisers already engage in this practice. This method could also be used to defeat anonymous e-mail.[9]

III. METHODOLOGY

A) Geographically locating an IP Address

Since all internet IP addresses are unique and every owner and provider is officially registered, it should be possible to geographically locate any PC or server simply by its IP address. One Problem is that IP address ranges are administered by several hundred regional institutions, and it would not be very practical to query each of them directly. Fortunately some companies have specialized in collecting IP Address range information from all over the world. They are selling this information in the form of consolidated databases that are easily integrated into any web server for the purpose of a fast lookup of a country, region, city or ISP information. Accuracy of these databases is low, however, ranging from 80 to 97%, according to their own claims. As an example, our server, located in Berlin, Germany, is believed to reside in the city of Mianyang (China) by one of the most popular databases, which sheds some doubt on these claims. Large internet service providers, such as AOL, are complicating the matter even further because they authenticate all users on US servers and hand out IP addresses from their US address pool, no matter where a user dials in from.

B)Unicast Addressing Methodologies

The term unicast is contrasted with the term broadcast which means transmitting the same data to all possible destinations. Another multi-destination distribution method, multicasting, sends data only to interested destinations by using special address assignments.

If an IP Unicast packet passes through a switch that does not know the location of the associated MAC Address, the packet will be broadcast to all ports on the switch. This failure of Unicast to 'cast to a single device' is called a Unicast flood. Unicast messaging is used for all network processes in which a private or unique resource is requested.

Certain network applications which are mass-distributed are too costly to be conducted with unicast transmission since each network connection consumes computing resources on the sending host and requires its own separate network bandwidth for transmission. Such applications include streaming media of many forms. Internet radio stations using unicast connections may have high bandwidth costs.

These terms are also used by streaming content providers' services. Unicast-based media servers open and provide a stream for each unique user. Multicast-based servers can support a larger audience by serving content simultaneously to multiple users.

C) Geocast Addressing Methodologies

Geocast refers to the delivery of information to a group of destinations in a network identified by their geographical locations. It is a specialized form of multicast addressing used by some routing protocols for mobile ad hoc networks.

A geographic destination address is expressed in three ways: point, circle (with center point and radius), and polygon (a

list of points, e.g., P(1), P(2), …, P(n–1), P(n), P(1)). A geographic router (Geo Router) calculates its service area (geographic area it serves) as the union of the geographic areas covered by the networks attached to it. This service area is approximated by a single closed polygon. Geo Routers exchange service area polygons to build routing tables. The routers are organized in a hierarchy.[10]

1. Routing Components
Routing involves two basic activities: determining optimal routing paths and transporting information groups (typically called packets) through an internetwork. In the context of the routing process, the latter of these is referred to as packet switching. Although packet switching is relatively straightforward, path determination can be very complex.

2. Path Determination
Routing protocols use metrics to evaluate what path will be the best for a packet to travel. A metric is a standard of measurement, such as path bandwidth, that is used by routing algorithms to determine the optimal path to a destination. To aid the process of path determination, routing algorithms initialize and maintain routing tables, which contain route information. Route information varies depending on the routing algorithm used.
Routing algorithms fill routing tables with a variety of information. Destination or next hop associations tell a router that a particular destination can be reached optimally by sending the packet to a particular router representing the "next hop" on the way to the final destination. When a router receives an incoming packet, it checks the destination address and attempts to associate this address with a next hop.

Table- 1 Destination/Next Hop Associations

S.No	To Reach Network	Send to:
1	27	Node A
2	57	Node B
3	17	Node C
4	24	Node A
5	52	Node A
6	16	Node B
7	26	Node A

D) Routing Algorithms
Routing algorithms can be differentiated based on several key characteristics. First, the particular goals of the algorithm designer affect the operation of the resulting routing protocol. Second, various types of routing algorithms exist, and each algorithm has a different impact on network and router resources. Finally, routing algorithms use a variety of metrics that affect calculation of optimal routes. The following sections analyze these routing algorithm attributes.

E) Algorithm Types
Routing algorithms can be classified by type. Key differentiators include these:
- Static versus dynamic
- Single-path versus multipath
- Flat versus hierarchical
- Host-intelligent versus router-intelligent
- Intradomain versus interdomain

F) Link State Routing
In a link-state protocol, a router provides information about the topology of the network in its immediate vicinity and does not provide information about destinations it knows how to reach. This information consists of a list of the network segments, or links, to which it is attached, and the state of those links (functioning or not functioning). This information is then broadcasted throughout the network. Every router can build its own picture of the current state of all of the links in the network because of the information broadcast throughout the network. As every router sees the same information, all of these pictures should be the same. From this picture, each router computes its best path to all destinations, and populates its routing table with this information. Now we will see the link state algorithm known as Dijkstra's algorithm.
The notation and there meanings are as follows:
N Denotes set of all nodes in graph.
$l(i,j)$ is the link cost from node i to node j which are in N. If both nodes are not directly connected, then $l(i,j) = \infty$. The most general form of the algorithm doesn't require that $l(i,j) \neq l(j,i)$, but for simplicity we assumed that they are equal.
s is the node executing the algorithm to find the shortest path to all the other nodes.
M denotes the set of nodes incorporated so far by the algorithm to find the shortest path to all the other nodes in N.
$C(n)$ cost of the path from the source node s to destination node n.

G) Bellman - Ford algorithm
The Bellman - Ford algorithm is an algorithm that computes shortest paths from a single source vertex to all of the other vertices in a weighted digraph. It is slower than Dijkstra's algorithm for the same problem, but more versatile, as it is capable of handling graphs in which some of the edge weights are negative numbers. The algorithm is usually named after two of its developers, Richard Bellman and Lester Ford, Jr., who published it in 1958 and 1956, respectively; however, Edward F. Moore also published the same algorithm in 1957, and for this reason it is also sometimes called the Bellman – Ford - Moore algorithm.

Negative edge weights are found in various applications of graphs, hence the usefulness of this algorithm. If a graph contains a "negative cycle" (i.e. a cycle whose edges sum to a negative value) that is reachable from the source, then there is no cheapest path: any path can be made cheaper by one more walk around the negative cycle. In such a case, the Bellman–Ford algorithm can detect negative cycles and report their existence.

```
        function BellmanFord(list vertices, list edges,
vertex source)::weight[],predecessor[]
        // This implementation takes in a graph,
represented as
        // lists of vertices and edges, and fills two arrays
        // (weight and predecessor) with shortest-path
        // (less cost/weight/metric) information
        // Step 1: initialize graph
        for each vertex v in vertices:
            if v is source then weight[v] := 0
            else weight[v] := infinity
            predecessor[v] := null

        // Step 2: relax edges repeatedly
        for i from 1 to size(vertices)-1:
            for each edge (u, v) with weight w in edges:
                if weight[u] + w < weight[v]:
                    weight[v] := weight[u] + w
                    predecessor[v] := u
        // Step 3: check for negative-weight cycles
        for each edge (u, v) with weight w in edges:
            if weight[u] + w < weight[v]:
                error "Graph contains a negative-weight
cycle"
        return weight[], predecessor[]
```

IV.   IMPLEMENTATION AND RESULTS

A) Geolocation used in client machine
The first implementation is to track visitor's IP Address, most of the time, user visits a website in browser submits an HTTP GET request (an HTTP data package) based on Transmission Control Protocol (most of the time), browser passed the ball to DNS server and DNS server delivered the request to the designation - the web host server, during the process, the original HTTP request was possibly transferred through a number of routers / proxies and many other stuff, the request's header information might have been updated: Via (Standard HTTP request header) or X-Forwarded-For (non-standard header but widely used), could be the original ISP's information / IP Address or possibly one of the proxy's IP Address.

So, usually the server received the request and saw Via/X-Forwarded-For header information, it got to know visitor's IP address (NOT all the time, sometimes ISP's IP address), in ASP.NET, it is simply to CallRequest. UserHostAddress,

however, we can never simply trust this because of two major reasons:

Malicious application can forge HTTP request with modified X-Forwareded -To header (for example: X-Forwarded-To: dangerous code), if you are unlucky to trust it and have it inserted into Database, then SQL Injection hole will be utilized by Malicious application.
Not all the visitors are human-been, part of them could be search engine spiders, I must distinguish human visitors and spiders, otherwise for example, I will be happy to see a lot of "visitors" came from "Mountain View, CA".

Geolocation API, or Web-GL as it is sometimes referred to, is a W3C candidate recommendation for a method of informing a website of the user's geographical location associated with the hosting device, primarily referencing the latitude and longitude position. Common sources of location information include: Global Positioning System (GPS)

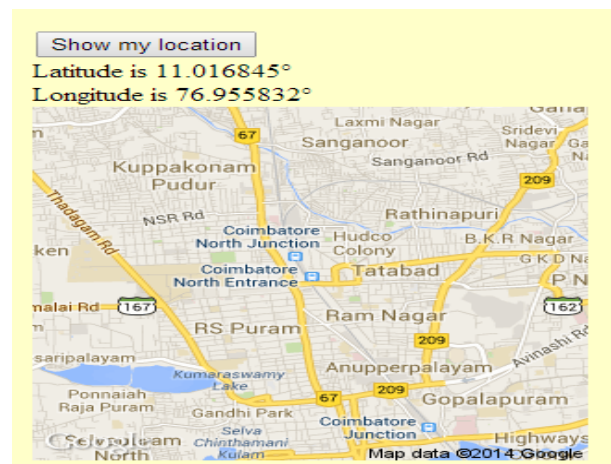Locations inferred from network signals such as an IP address, RFID, Wi-Fi and Bluetooth MAC addresses

Figure 1. Latitude and Longitude

A) Client IP Address Capturing
IP Geolocation Views & Maps (IPGV&M) makes it easy to create Views-based mapping solutions using the map renderer of your choice (Google, OpenLayers or Leaflet) with any location storage module of your choice, e.g. Get Locations, Geofield, Geolocation field or Location. This allows you to pick and mix and bring together modules that without IPGV&M are incompatible.

More importantly IPGV&M adds some features you won't find as conveniently packaged in everywhere. These include marker appearance differentiation based on field values or ranges, various centering options, super-imposing the current visitor's location, allowing multiple content types to be displayed on the same map, full screen option, marker tags and tool tips.

Finally IPGV&M provides a set of visitor location retrieval technologies, both IP and HTML5 based, so that you can track where past visits came from and where current visitors are located, superimposing their moving positions as markers on your maps. IPGV&M displays your maps via any of the three main Javascript mapping APIs. Just pick the one you like best for your solution.

Google API v3 (included, no further modules required)
        IPLocation Finder API
        In driving any of the above three map renderers IPGV&M accepts for location storage any of the following well-established methods.
        Latitude and longitude as simple text fields on your node or user content types
        Get Locations module
        Geofield module
        Geolocation Field module
        Location module
        Commerce module (3rd screenshot)

Table- 2. IP Address Capturing Information

IP Address	Country	City	Region	Country Code	Latitude	Longitude	Timezone
117.218.2 11.200	IND IA	COIMBA TORE	TA MIL NA DU	IN	11	76.96 7	+05 .30

B) Viewers IP Address Captured Information
This will capture the website users (browsers or viewers) information in various locations with different IP Addresses

C) Geolocation Views and Maps
        According to the various collected website users information, this will generate the Geo Map based on website users Latitude, Longitude and Internet Protocol Address using geocast and unicast algorithms with Google Application Programming Interface services.

Figure-3 IP Geo Map

D) Traceroute Implementation
        Traceroute is implemented to track the website server IP Address from the client users browsing machine. Traceroute is the program that shows you the route over

from the implementation of the website to till now. Internet Protocol Address is a unique identification to find the website user. This Information can easily view the individual IP address information such as ISP Name, Country name, City Name, Region Name, Country Code, Latitude, Longitude, Timezone, Browser Name, Browser Version, and Platform.

S.No.	IP Address	Country Name	City Name	Region Name	Country Code	Latitude	Longitude	Timezone	Browser Name	Browser Version	Platform
1	117.218.211.200	INDIA	COIMBATORE	TAMIL NADU	IN	11	76.9667	+05:30	Firefox	30.0	WinNT
2	178.255.154.2	CZECH REPUBLIC	PRAGUE	HLAVNI MESTO PRAHA	CZ	50.088	14.4208	+02:00	Unknown	0.0	Unknown
3	64.237.55.3	UNITED STATES	MATAWAN	NEW JERSEY	US	40.4127	-74.2525	-04:00	Unknown	0.0	Unknown
4	117.218.211.200	INDIA	COIMBATORE	TAMIL NADU	IN	11	76.9667	+05:30	Firefox	30.0	WinNT
5	173.248.147.18	UNITED STATES	DENVER	COLORADO	US	39.7392	-104.985	-06:00	Unknown	0.0	Unknown
6	204.152.200.42	UNITED STATES	LOS ANGELES	CALIFORNIA	US	34.0432	-118.251	-07:00	Unknown	0.0	Unknown
7	220.181.108.102	CHINA	BEIJING	BEIJING	CN	39.9075	116.397	+08:00	Mozilla	0.0	Unknown
8	123.125.71.12	CHINA	BEIJING	BEIJING	CN	39.9075	116.397	+08:00	Mozilla	0.0	Unknown
9	95.211.87.85	NETHERLANDS	AMSTERDAM	NOORD-HOLLAND	NL	52.374	4.88969	+02:00	Unknown	0.0	Unknown
10	124.125.38.224	INDIA	COIMBATORE	TAMIL NADU	IN	11	76.9667	+05:30	Firefox	30.0	WinNT
11	49.15.219.9	INDIA	MUMBAI	MAHARASHTRA	IN	19.0144	72.8479	+05:30	Firefox	10.0	WinXP
12	83.170.113.210	UNITED KINGDOM	LONDON	ENGLAND	GB	51.5085	-0.12574	+01:00	Unknown	0.0	Unknown
13	188.138.118.144	GERMANY	HURTH	NORDRHEIN-WESTFALEN	DE	50.8708	6.86761	+02:00	Unknown	0.0	Unknown
14	66.249.90.253	UNITED STATES	MOUNTAIN VIEW	CALIFORNIA	US	37.406	-122.079	-07:00	Unknown	0.0	Unknown
15	101.222.241.45	INDIA	MADURAI	TAMIL NADU	IN	9.93333	78.1167	+05:30	Chrome	34.0	WinNT
16	72.46.153.26	UNITED STATES	LAS VEGAS	NEVADA	US	36.0895	-115.138	-07:00	Unknown	0.0	Unknown
17	184.75.208.210	CANADA	TORONTO	ONTARIO	CA	43.7001	-79.4163	-04:00	Unknown	0.0	Unknown
18	178.255.154.2	CZECH REPUBLIC	PRAGUE	HLAVNI MESTO PRAHA	CZ	50.088	14.4208	+02:00	Unknown	0.0	Unknown
19	64.237.55.3	UNITED STATES	MATAWAN	NEW JERSEY	US	40.4127	-74.2525	-04:00	Unknown	0.0	Unknown
20	14.140.161.52	INDIA	DELHI	DELHI	IN	28.6667	77.2167	+05:30	Mozilla	0.0	Unknown

Figure. 2. IP Address Captured Information

the network between two systems, listing all the intermediate routers a connection must pass through to get to its destination. It can help you in analyzing why the connections from your end to a server is poor, and can often help you to spot what exactly is the problem. It always shows you how your machine is connected to ISP and ISP to the rest of the network, collectively the connection between your end and server.
        When we initiate Traceroute, it sends a sequence of Internet Control Message Protocol (ICMP) packets
        Traceroute [-m] [-q] [-w]
        -m : Specifies the maximum number of hops (max Time-To-Live value). The default is 30.
-q : Sets the number of UDP packets per hop. The default is   3
-w : Set the time (in seconds) to wait for a response to a probe. Default 5 seconds

Figure. 4. Traceroute Information

E) Traceroute Report and Geo Map

This will generate a report based on tracert command on which the routers are used for finding the shortest path from the client to reach the server. In that report, it finds the path to reach the srkv.org website hosted server and show the time delay in between routers to routers and its router Internet Protocol Address.

Regarding the traceroute report, It will generate the Internet Protocol Address of Routers and its location is positioned in Google Map using geocast algorithm and Google Application Programming Interface services.

Traceroute - www.srkv.org	IP-Address
Tracing route to srkv.org [192.241.220.47]	192.241.220.47
1 <1 ms <1 ms <1 ms 67.192.249.2	67.192.249.2
2 <1 ms <1 ms <1 ms core3-aggr10a.dfw1.rackspace.net [72.3.129.30]	72.3.129.30
3 <1 ms <1 ms <1 ms Po1.core3.CoreA.dfw1.rackspace.net [72.32.111.0]	72.32.111.0
4 <1 ms <1 ms <1 ms be31.dcpe1.dfw1.rackspace.net [74.205.108.112]	74.205.108.112
5 4 ms 2 ms 3 ms 10.25.1.117	10.25.1.117
6 2 ms 2 ms 2 ms dls-bb1-link.telia.net [62.115.33.77]	62.115.33.77
7 41 ms 41 ms 43 ms las-b21-link.telia.net [213.155.136.41]	213.155.136.41
8 54 ms 54 ms 54 ms sjo-bb1-link.telia.net [62.115.138.187]	62.115.138.187
9 55 ms 55 ms 55 ms digitalocean-ic-306499-sjo-bb1.c.telia.net [62.115.45.22]	62.115.45.22
10 63 ms 55 ms 55 ms 198.199.99.234	198.199.99.234
11 56 ms 56 ms 55 ms 192.241.220.47	192.241.220.47

Figure.5. Traceroute Report

V. CONCLUSION

This thesis proofs to locate IP addresses in the real world with extreme accuracy. Additionally, it demonstrates and applicable to IP addresses from academic institutions, a collection of residential addresses, as well as a larger mixed collection of addresses. The high accuracy of collecting information is a wide range of networking environments demonstrates its potential to dramatically improve the performance of existing location-dependent internet applications using algorithm.

Traceroute is a computer network diagnostic tool for displaying the route (path) and measuring transit delays

of packets across an Internet Protocol (IP) network. The history of the route is recorded as the round-trip times of the packets received from each successive host (remote node) in the route (path); the sum of the mean times in each hop indicates the total time spent to establish the connection. It is an infinite loop whose body creates a connection, prints out information about it, and then breaks out of the loop if a certain condition has been reached for tracing the website. Finally using this traceroute information, it will show the Geo-Location and view the positions of routers (hops) which are accessed for finding the website hosted server in Geo Map.

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