Network Packet Route Tracer for web request to find various intermediate routers in networks

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ABSTRACT

Network Packet Route Tracer is a smart .Net windows application which shows the geographical path of a network packet traversal to a destination IP address from the source. This paper involves developing a C# component to implement TraceRoute functionality to find the IP addresses of the intermediate routers.

The applications of this tool are mostly in network trouble shooting to identify the routing problems or firewalls that may be blocking access to the site. It can also be used in choosing the fastest mirror to download when there are multiple mirrors available for the same piece of data.

This paper involves combining the TraceRoute component, technology to locate geographically based on IP addresses from HostIP.Info/MaxMind, and Microsoft Virtual Earth API to plot the locations of various intermediate routers that fall in the route of a network packet as it traverses to the destination*.*

Key words :Network packet , routing tracer, path find for packet , location finder

I. INTRODUCTION

Network Packet Route Tracer [1] is a smart .Net windows application which shows the geographical path of a network packet traversal to a destination IP address from the source. This paper involves developing a C# component to implement TraceRoute functionality to find the IP addresses of the intermediate routers [2]. The applications of this tool are mostly in network trouble shooting to identify which website is hosted in which server and place and location of that server.

It involves combining the TraceRoute component, technology to locate geographically basedon IP addresses from HostIP.Info/MaxMind, and Microsoft Virtual Earth API to plot the locations of various intermediate routers that fall in the route of a network packet as it traverses to the destination.

The network path tracers currently available are good enough for the basic requirement to display the IP addresses of intermediate routers. But the information displayed by these systems can not be understood by lay man. There is no well built-in system to display the physical location of IP addresses of intermediate routers.

In the beginning of the internet , a tool called trace route was introduced in Unix. Trace route does exactly what its name suggests: it traces the route of IP packets while they travel from your PC to the remote destination. The tool essentially allows you to see exactly where the connectivity problem is, no matter how far it is from your computer. The last host to respond to trace route is the last host that is working properly. The first one that fails to respond is the faulty one.

In this application wrapped the same thing into a much more convenient package, overcoming the drawbacks of earlier applications. You can trace your network activity on the world map. The Route Tracer helps you to trace, identify and monitor your network activity on world map using the Microsoft Virtual Earth API [3]. You can trace any website or IP address on your map. The Network Packet Route Tracer provides clearly legible [4], well-formatted output by providing easy to understand numbers and well-explained results. Its user-friendly interface, it is much more convenient to use than Windows tracert.

Modules:

• TraceRoute Component: [5-6]This module deals with developing a class library which has classes that implement TraceRoute functionality.

• Location Service component: This module involves implementing a web service consuming class that communicates to HostIP.Info or MaxMind based on a switch and grabs the location data. [7]This component also has a xml parser that parses the xml output received.

• GUI for Route plot: This module involves creating custom plot display controls which uses Microsft Virtual Earth Application Program Interface. The Windows form will be created as a part of this module that consumes the created custom controls and draws the Route plot.

II. PROPOSED SYSTEM

We in our application wrapped the same thing into a much more convenient package, overcoming the drawbacks of earlier applications. You can trace your network activity on the world map. The Route Tracer helps you to trace, identify and monitor your network activity on world map using Microsoft Virtual Earth API. You can trace any website or IP address on your map. The Network Packet Route Tracer provides clearly legible, well-formatted output by providing easy to understand numbers and well-explained results. Its user-friendly interface, it is much more convenient to use than Windows tracert.

All of the functionality of the program that comes with Windows tracert.exe plus much more. You get information like: Time To Live of Returned Packets, Packet Data Size of returned packets, Round Trip Time of hop attempts. Average, Minimum, and Maximum Round Trip Times of entire Hops plus much more. It is a handy tool for figuring out where the network latency is coming from by show the exact path a packet has to take from the local machine to the target server. By looking at each step in the path, you can see where the packet is getting tied up and which routers are overloaded or antiquated. Route Tracer Wizard gives you all of this power and lets you put it right into your application. It is great for network monitoring applications, network diagnostics, latency checkups, and many more projects.

The proposed system once built has scope to run on any platform and not just on PCs but also on mobiles/smart phones using .Net compact framework.

Applications of the proposed system:

1. Can be applied as a tool for network troubleshooting to identify the firewall / intermediate router problems.

2. Can be used for custom advertising /webpage localization.

III. ARCHITECTURE DESIGN

Each of the modules is described briefly below with respective architectures.

1. Trace route Component:

This module deals with developing a class library which has classes that implement Trace Route

functionality. Trace route functionality works by causing each router along a network path to return an ICMP (Internet Control Message Protocol) error message. An IP packet dispatched from the host contains a *time-to-live* (TTL) value which specifies how long it can go on its search for a destination before being discarded. Each time a packet passes through a router, its TTL value is decremented by one; when it reaches zero, the packet is dropped, and an ICMP *Time-To-Live Exceeded* error message is returned to the sender.

A trace can also end with one of several error indications indicating why the trace cannot proceed.

• *Host unreachable*. The router has no route to the target system.

• *Network unreachable*. Trying to setup IP, server name AND domain name, but failing to do so

• *Protocol unreachable.*

• *Source route failed*. You tried to use source routing, but the router is configured to block source-routed packets.

• *Fragmentation needed*. This indicates that the router is misconfigured.

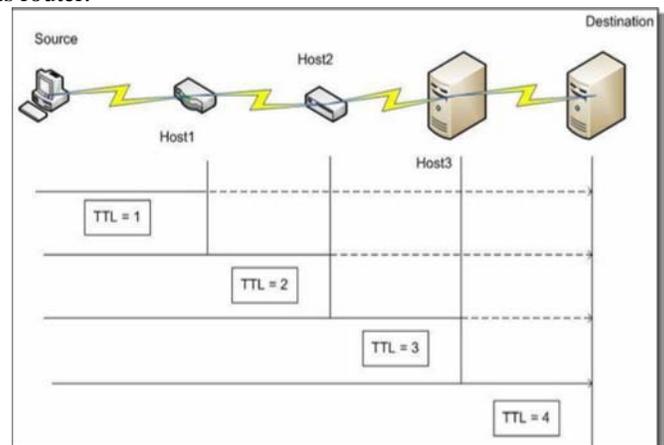• *Communication administratively prohibited.* The network administrator has blocked trace route at this router.

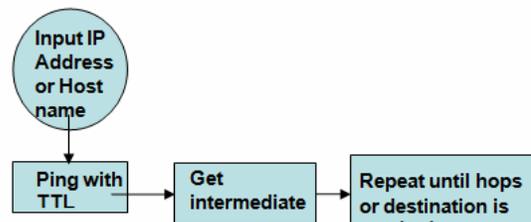*Figure: Tracing intermediate servers by decrementing TTL value*

Figure: Module diagram for trace route component

2. Location Service Component

This module involves implementing a web service consuming class that communicates to *'HostIP.Info'* or *'MaxMind'* based on a switch and grabs the location data. This component also has an xml parser that parses the xml output received. All the latitudes, location etc.., these values are dumped in database through this excel files which are provided by these
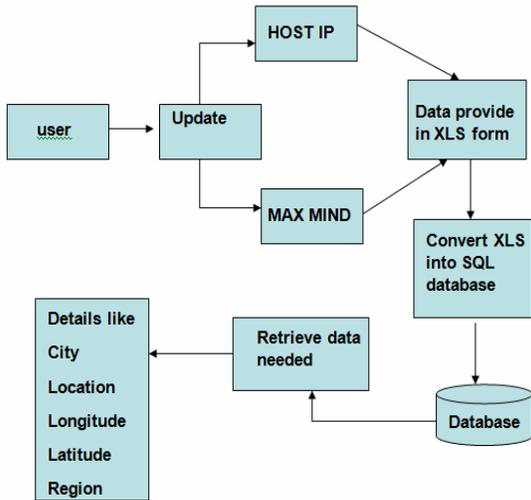

Figure: Module Diagram for Location Service Component

3 GUI for Route Plot

This module involves creating custom plot display controls which uses Microsoft Virtual Earth Application Program Interface. In this module we create a user interface through which user can interact with our application for this we need to first embed Microsoft virtual map API in our application and we need to create few user controls and drag them on to our application.
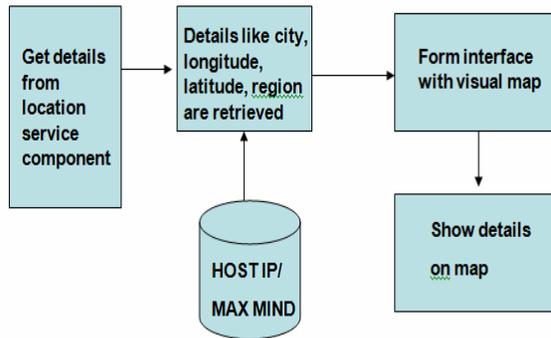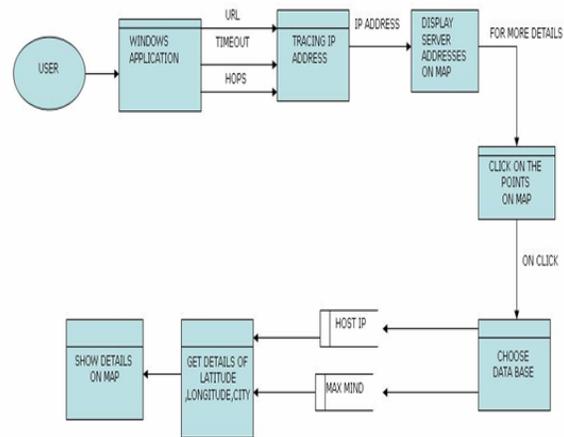

Figure: Module Diagram for GUI Map Component

Data Flow of Network Packet Route Tracer

Initially the user opens the application and gives URL, timeout and hops as input and runs the application. The application gets the related information from the database and displays the respective IP addresses, location, region, latitude, longitude on the visual map. To know more details about the server, when we click on the labels the map shows the detailed information in many views.

IV. CONCLUSION

Network Packet Route Tracer is very useful to any type of user. In today's world internet has become the best communication channel. In such a fast revolving circuit of networks the authenticated details of the source has a significant role in the authenticity of the data itself. Every other person today exchanges information through Mails. But mails are such media where a person can mask his true identity and pass the information. In such situations where its gets important to find out the identity of the person, Network Packet Route Tracer comes into picture. The project emphasizes on tracing the path of the source of any website or e-mail and locating the server's location on the virtual map. The map is a very impressive interface in depicting the information. The pin point view of the sender's server location is shown on the map. The entire intermediate route followed by the mail is traced and the path is drawn on the map. Any common user can also easily use this software to locate the source's server of his mail. In a network since the request first accesses the nearest server, locating the server is good enough to trace the client.

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