# Group 6: Traceroute

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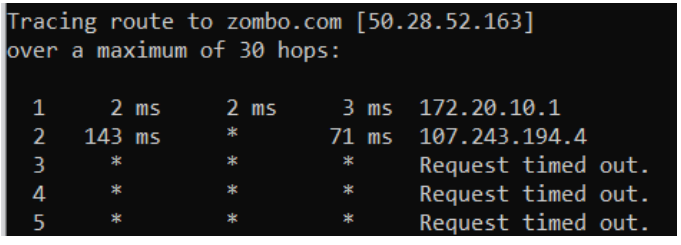
# Overview

Traceroute typically spews out a poorly-formatted table of opaque raw data. We rebuilt the `tracert` program, expanded its functionality, added a GUI, and added options that provide deeper insight into the paths of the packets.

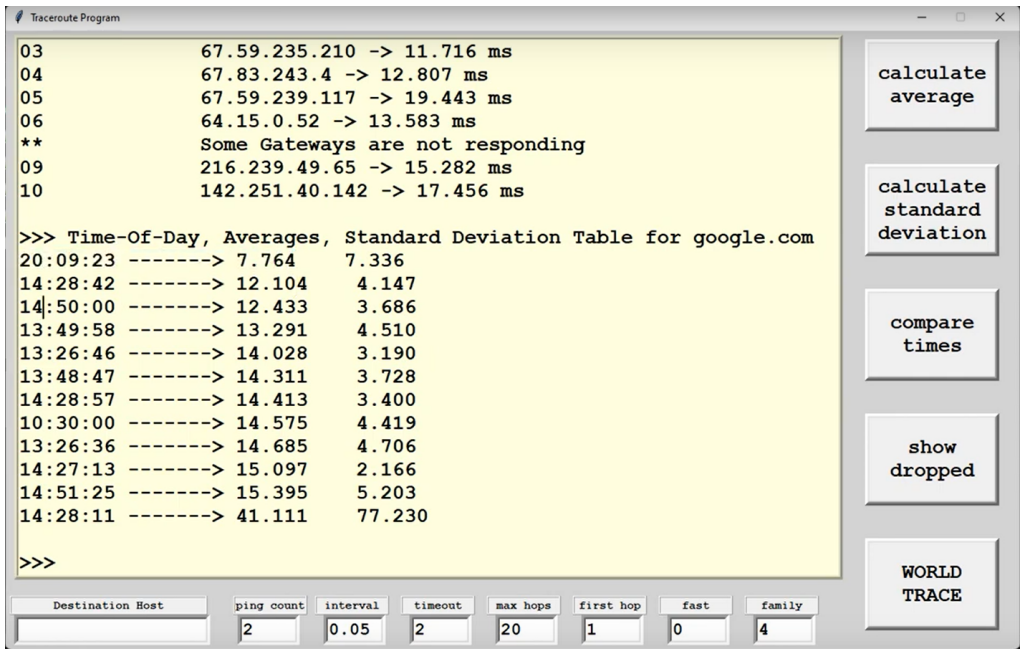


# Features

- RTT Analysis
- World Trace
- Long-term Comparisons
- Output Options

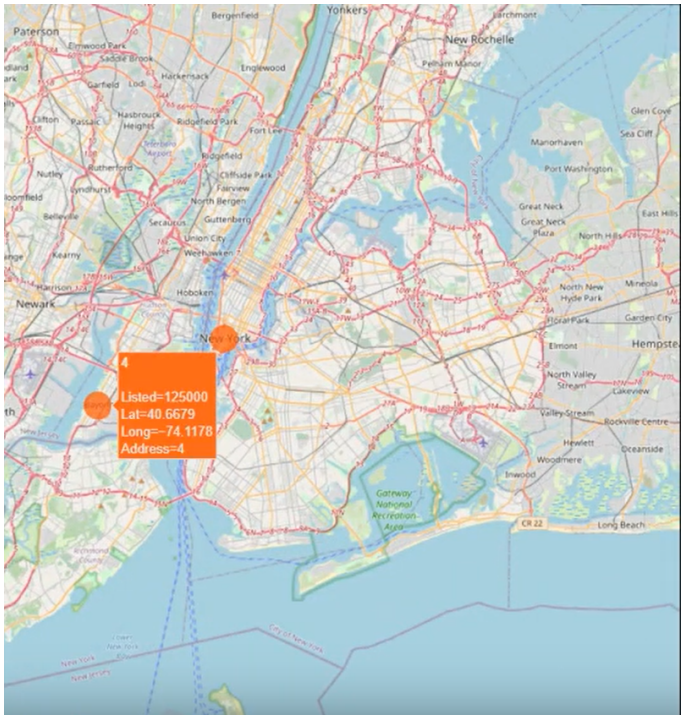
# RTT Analysis

A descriptive statistical summary of the roundtrip times for a particular trace is output at the press of a button. Additionally, the hop numbers on which packets were dropped are displayed.



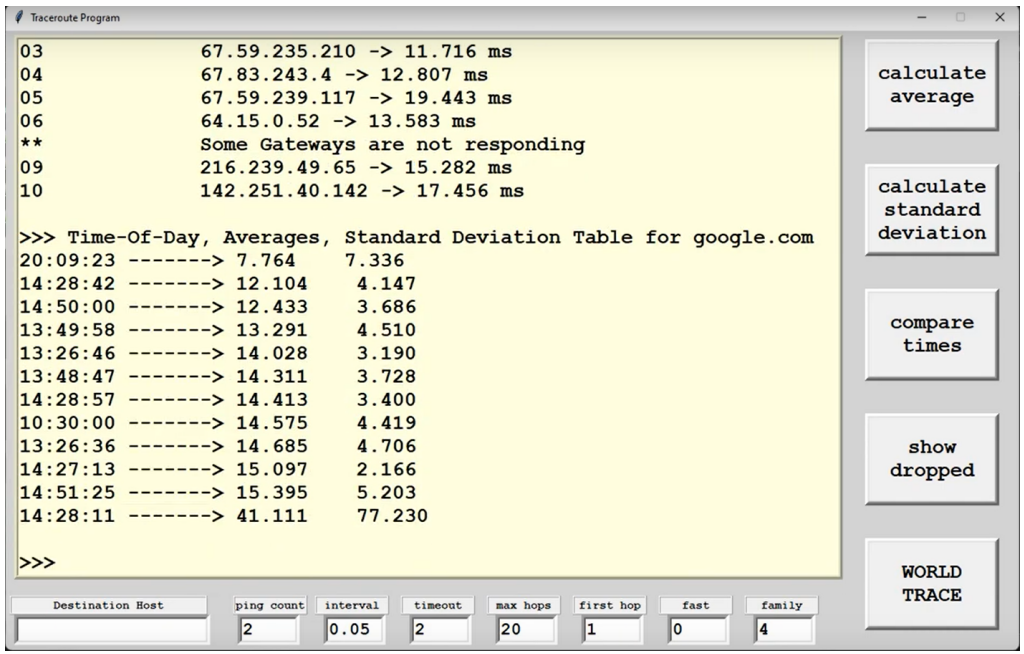
# World Trace

IPs visited during the trace are geolocated to form a map view of the path taken. As a result, users can look at the route from a geographical perspective as opposed to the usual numeric outlook.



# Long-term Comparisons

The updated traceroute program saves results for an IP each time a trace is performed. With subsequent runs over time, the user can get an overview of how the stats of the trace change over a longer period.



# Output Options

In case the user wishes to look deeper into the results of the traces, information about the runs is saved in a `.csv` file, allowing for deeper statistical analyses if desired. This is an improvement over the base `tracert` since the latter has no options to easily pipe results into other programs.

# Potential Directions Forward

`tracert` is already a minimal program, so core performance improvements are unlikely. However, any depth of statistic analysis could be implemented from here on - the mean and standard deviation are only starting points.
Additionally, more robust support for saving and analyzing old traces could be added.
Finally, the web app currently used to display the World Trace could be moved to be part of the GUI.

# Technologies Used

- `icmplib` - Python implementation of ICM protocol
- `tkinter` - GUI library
- `pandas` - quick statistical operations
- `requests` - used to convert IPs to locations

# Links

- GUI Traceroute Demo
- `mrinchanSIT/Traceroute` on Github