Network Health Assessment Project

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Project Overview
The Dakota State University Applied Research Lab (DSU-ARL) is working to better understand the ebbs and flows of data through the internet. To do this, DSU-ARL will be sending several purpose-built devices to various locations throughout the United States (US) to collect PCAP data generated using traceroute tools. A device will be placed in a location for at least 4 weeks to gather data. The collected PCAP data will be utilized to drive additional research efforts into understanding how data is routed through the Internet and their behavior and health over time.

DSU-ARL is actively seeking participants willing to aid in this research by hosting one of the purpose-built devices on their network. If you would be willing to aid in this research, or have questions or concerns, please contact the POCs, Alex and Jarod prior to October 6th, 2023.

Project Details
DSU-ARL will utilize multiple Raspberry Pi 3B+ devices deployed at various locations within the US, with a goal of collecting data from at least one location in all 50 states. The Raspberry Pi devices will be loaded with custom Python scripts used to issue traceroute commands to a list of predefined IP addresses. The traceroute data, and the PCAP data of the network traffic the traceroutes generate, will be collected. The collected data will be uploaded to a DSU-ARL owned and operated OwnCloud instance, hosted in a datacenter on DSU’s campus. Additionally, the Raspberry Pi devices will be configured to utilize outbound tunnels to CloudFlare, allowing DSU-ARL researchers to manage, monitor, and troubleshoot the devices without requiring modifications to the network security settings of those who agreed to host a device.

Data Collection Kit
1 - Hardshell carrying case
1 - Raspberry Pi 3B+, preconfigured with custom Python scripts
1 - Power adapter with 5ft cable
1 - 6ft ethernet cable
1 - Prepaid return shipping label

Network Information
<table>
<thead>
<tr>
<th>Ports / Protocols</th>
<th>Data Flow Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICMP</td>
<td>Outbound: &lt; 1 Mbps (average)</td>
</tr>
<tr>
<td>53 - TCP, UDP</td>
<td>Inbound: &lt; 1Mbps (average)</td>
</tr>
<tr>
<td>80 - TCP</td>
<td></td>
</tr>
<tr>
<td>443 - TCP</td>
<td></td>
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Expectations of Participants

- Identify a suitable location for the device within their network infrastructure.
- Plug in the device as soon as possible, once the device arrives, so it can begin collecting data.
- No network throttling/rate limiting of the device, as this can impact device performance.
- Leave device connected to the network for at least 2 weeks once data collection has commenced.
- Identify a Point of Contact for DSU-ARL personnel to communicate with for device issues, return shipping questions, and any problems that may arise.
- Aid DSU-ARL to troubleshoot any issues with the devices network connectivity.
- Report any network impacts caused by the device (no impacts are anticipated).
- Return the device to DSU-ARL using the provided packing materials and shipping label.