

Assignment 1 Part 1 – Host Discovery

For this assignment, you will create a tool using Python 3 and the sockets library capable of discovering hosts on a network. The tool will accomplish this through the use of UDP packets. When a host receives a UDP packet on a port that is not open, it should respond with an ICMP packet stating that the destination and port are unreachable. It does this through Types and Codes that are contained in the ICMP header. See the RFC for more detail:

<https://tools.ietf.org/html/rfc792>

This assignment will be divided into two parts. For the first part of this assignment, simply implement a UDP client that can send data to a host or network of hosts. Use Wireshark to confirm you are receiving replies from these hosts. You should test on your devices on your home network.

Run Wireshark on the system you are using to send UDP packets. Pick the appropriate interface. The name will vary based on your specific system. You filter packets in several ways. Here are two filters that may be useful:

- `ip.addr == ip.address.of.interest`
- `icmp`

The first filter will display packets that contain the IP address you specify as either the source or destination IP address. The second filter will display all packets of type icmp.

If you do not have other devices on your network, you can use the IP address for `scanme.nmap.org`. If you want to use its IP address instead of domain name, use the `ping` or `nslookup` tool to determine the actual IP address. The owners of `scanme.nmap.org` kindly ask that you do not abuse this service and over scan it (more than 100 scans a day).

For phase 1, you should have a tool (written in Python 3) that can scan an IP address or a full network using UDP packets. The user should be able to specify what they want to scan without modifying the source code. You should confirm that you are receiving ICMP packets in reply from these systems using wireshark. You must use the **socket library** for sending packets. I recommend using the **ipaddress** library for handling ip addresses / ip networks. Set a custom message for the UDP data as this will be useful later.

Deliverables

- Python 3 source code (with comments)
- Screenshot of wireshark displaying the icmp packets.