CA 3 – PROJECT
INT 301 - OPENSOURCE TECHNOLOGIES

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1. Introduction:

Network security has assumed an increasingly critical role in our fast-paced modern society, in which technology has become an inseparable component of our everyday lives. Because of the increasing sophistication and complexity of networks, it is very necessary to have a complete awareness of all of the devices that are linked to the network. Network scanning tools have evolved as a strong option that may assist in the accomplishment of this objective. These tools enable users to gather a large variety of information on each connected device, such as the operating systems, hostnames, and services that are installed on those devices.

This research will investigate the usage of open source software for network scanning, focusing on the programme's capacity to give in-depth insights about the topology, services, and hosts of a network. The study will go into the specifics of installing and configuring a network scanning tool, as well as illustrate how to make the most of it in order to do an efficient scan of a network. In addition to this, the report will include concrete instructions on how to list all of the connected hosts in a text file and how to determine the operating system that is used by each host.

The readers of this study will come away from it with a more in-depth comprehension of the essential function that network scanning serves to serve in the improvement of network security. In addition to this, they will learn the knowledge and abilities necessary to make efficient use of open source software in order to scan networks, identify devices, and extract essential information. This research, in its whole, offers a complete guide to network scanning via the use of open source software. The insights included within this paper may be utilised by individuals as well as organisations in order to defend their networks against possible threats.

1.1 Objective of the project

Use of any open source software to scan your network and discover everything connected to it, retrieve variety of information about what's connected, what services each host is operating, scan the hostname, list all the hosts in a text file, identify a host's operating system (OS).

1.2 Description of the project

You will be able to do a full analysis of your network and get a detailed report on all of the devices that are presently connected to it if you use software that is available under an open source licence for network scanning. The programme was developed to gather a broad variety of data points, such as the exact services that are being operated by each device, the hostname that is linked with each device, and the operating system (OS) that is powering it. After you have

scanned your network, the programme will be able to provide a comprehensive list of all the devices that are presently connected to it. This list can then be saved as a text file and analysed at a later time. You will be able to acquire useful insights on the topology of your network and discover any possible security threats that may be present if you make use of this open source software.

1.3 Scope of the project

It is possible for a project to have a highly comprehensive scope when it makes use of open source software for network scanning and device identification. The scope of such a project is determined by the particular objectives and prerequisites of the undertaking. The following are some potential areas on which to concentrate:

Security of the network: The major objective of the project could be to determine whether or not the network has any vulnerabilities or potential security issues. This might entail scanning for open ports or unprotected services, identifying old software versions or firmware, or detecting any unauthorised devices that have joined to the network. Alternatively, it could involve finding any outdated software versions or firmware.

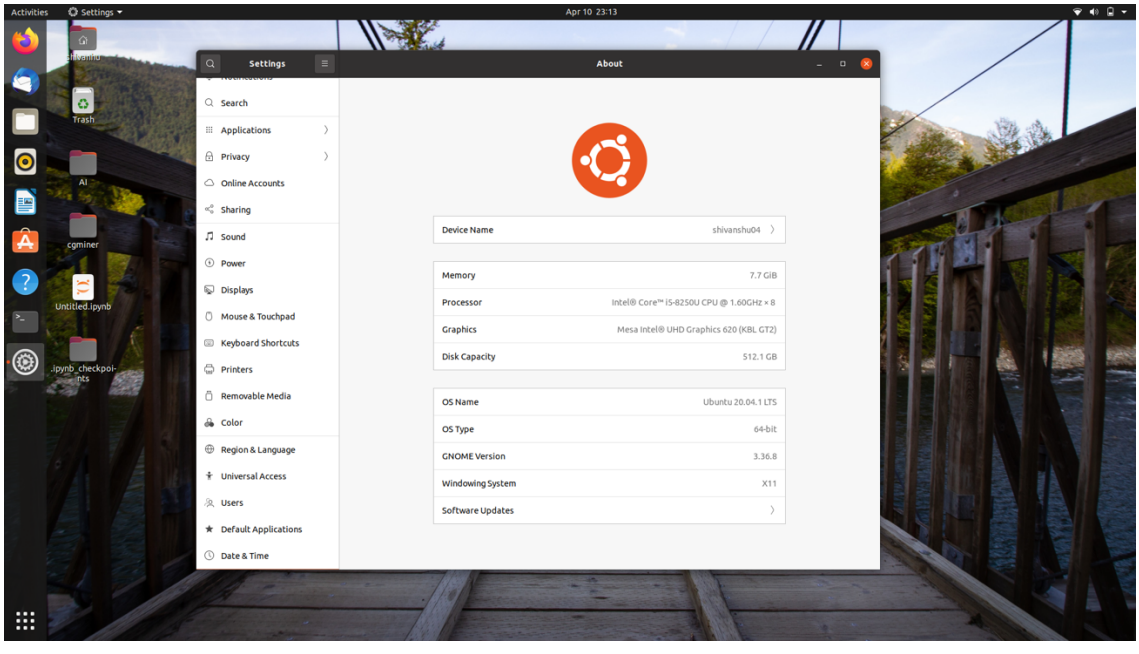
Management of the network's inventory: The project may also be used to compile an exhaustive inventory of all devices that are connected to the network. This inventory would include the devices' makes and models, as well as the software versions and physical locations of each item. The management of hardware and software assets, the identification of devices that are no longer in use, and the planning of future network improvements might all benefit from this information.

Network troubleshooting and optimisation: The project might be used to discover bottlenecks or other performance problems inside the network, such as devices that are consuming an excessive amount of bandwidth or services that are operating inefficiently. One example of a performance issue is a device that is using an excessive amount of bandwidth. This information may be put to use to enhance both the performance of the network and the system as a whole.

Compliance and regulation: The goal of the project might be to ensure that the network complies with a set of compliance standards or fulfils the requirements of the regulatory agency. For instance, if the network has devices that deal with sensitive data, the project might be used to guarantee that all security standards are followed and that the devices are correctly set to guard against data breaches. This would be useful in situations where the network already contains devices that deal with sensitive data.

In general, the aims and needs of the organisation or the person who is performing the network scan will determine the extent to which the project will be carried out. The findings of the scan may give useful insights into the current condition of the network and may also assist in identifying sections of the system that might want improvement as well as possible vulnerabilities.

2. System Description



Device Name: shivanshuo4
Memory: 1 TCB (exact memory capacity not specified)
Processor: Intel Core i5-8250U CPU @ 1.8 GHz (4 cores, 8 threads)
Graphics: Mesa Intel UHD Graphics 620 (KBL CT2)
Disk Capacity: 512.1 GB
OS Name: Ubuntu 20.04.1 LTS OS
Type: 64-bit GNOME Version: 3.36.8

This information gives an overview of the main hardware components and software specifications of your device.

3. Analysis Report

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Starting Nmap 7.92SVN ( https://nmap.org ) at 2023-04-10 22:46 IST
Nmap scan report for shivanshu04 (192.168.193.81)
Host is up (0.000036s latency).
Not shown: 997 closed tcp ports (reset)
PORT    STATE SERVICE     VERSION
80/tcp  open  http        Apache httpd 2.4.41 ((Ubuntu))
139/tcp open  netbios-ssn Samba smbd 4.6.2
445/tcp open  netbios-ssn Samba smbd 4.6.2
Device type: general purpose
Running: Linux 2.6.X
OS CPE: cpe:/o:linux:linux_kernel:2.6.32
OS details: Linux 2.6.32
Network Distance: 0 hops

OS and Service detection performed. Please report any incorrect results at
https://nmap.org/submit/ .
Nmap done: 1 IP address (1 host up) scanned in 13.42 seconds
```

Explanation:

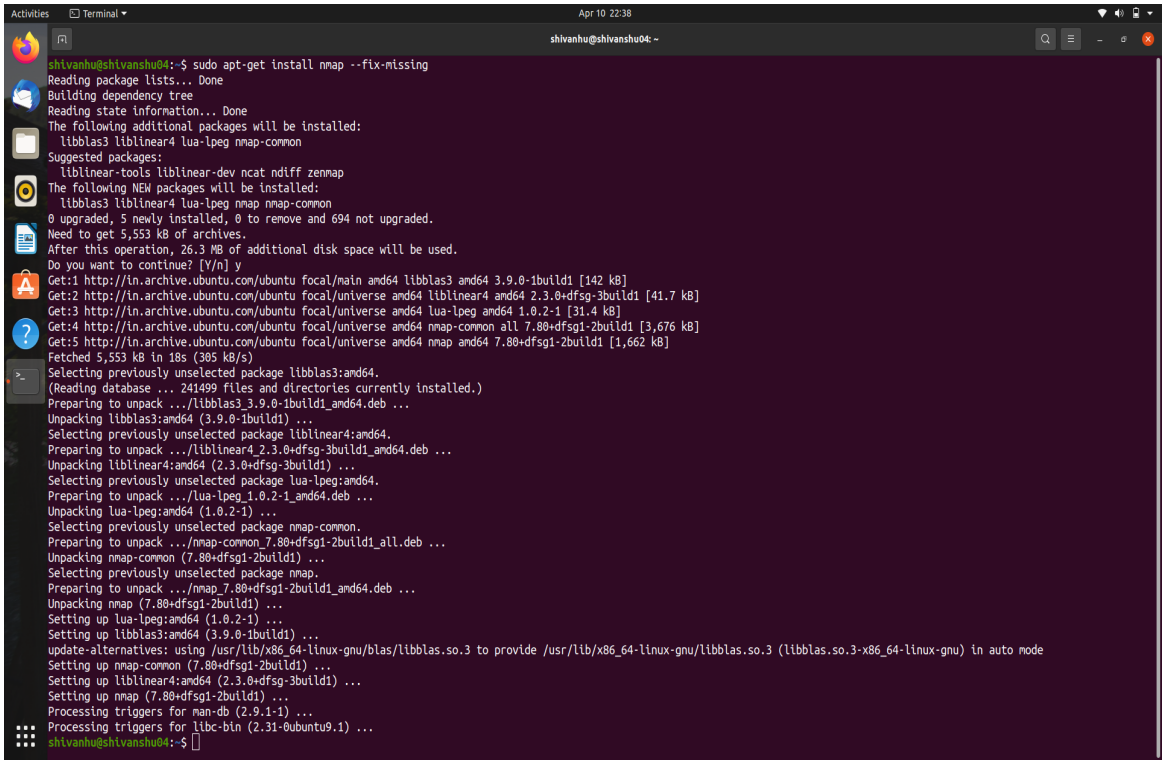
- The Nmap scan report shows that a device with the hostname "shivanshu04" and IP address "192.168.193.81" is up and responsive.
- It also shows that there are three open ports on this device, which are TCP ports 80 (used for HTTP), 139 and 445 (used for NetBIOS over TCP/IP protocol).
- Nmap has also detected that this device is running Apache httpd 2.4.41 on port 80, and Samba smbd 4.6.2 on ports 139 and 445.
- Furthermore, Nmap has identified the device as a general purpose device running Linux 2.6.X, with an operating system Common Platform Enumeration (OS CPE) of cpe:/o:linux:linux_kernel:2.6.32.
- Overall, this scan has provided valuable information about the connected device, including its IP address, open ports, running services and operating system.

3.1 System snapshots and full analysis report

There are several open source software tools that can be used to scan a network and discover everything connected to it. One such tool is Nmap (Network Mapper), which is a free and open source utility for network exploration, administration, and security auditing.

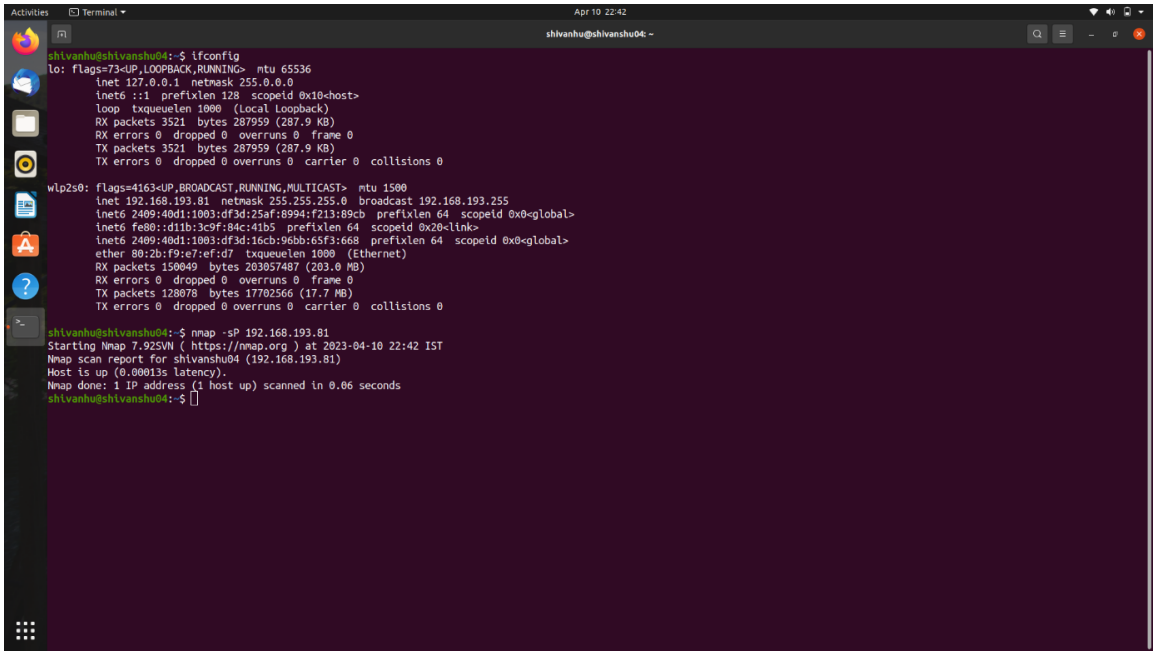
Here are the steps to use Nmap to scan your network and retrieve information about what's connected:

1. Install Nmap: If you're using a Linux-based operating system, you can install Nmap using your distribution's package manager. For example, on Ubuntu, you can use the command sudo apt-get install nmap. If you're using Windows, you can download Nmap from the official website at https://nmap.org/download.html



2. ifconfig is a command-line utility in Linux and Unix operating systems that is used to display information about network interfaces, such as their IP addresses, netmasks, and hardware addresses (MAC addresses).

   To use ifconfig, open a terminal window and type the command followed by the name of the network interface you want to display information about. If you don't specify an interface name, ifconfig will display information for all.



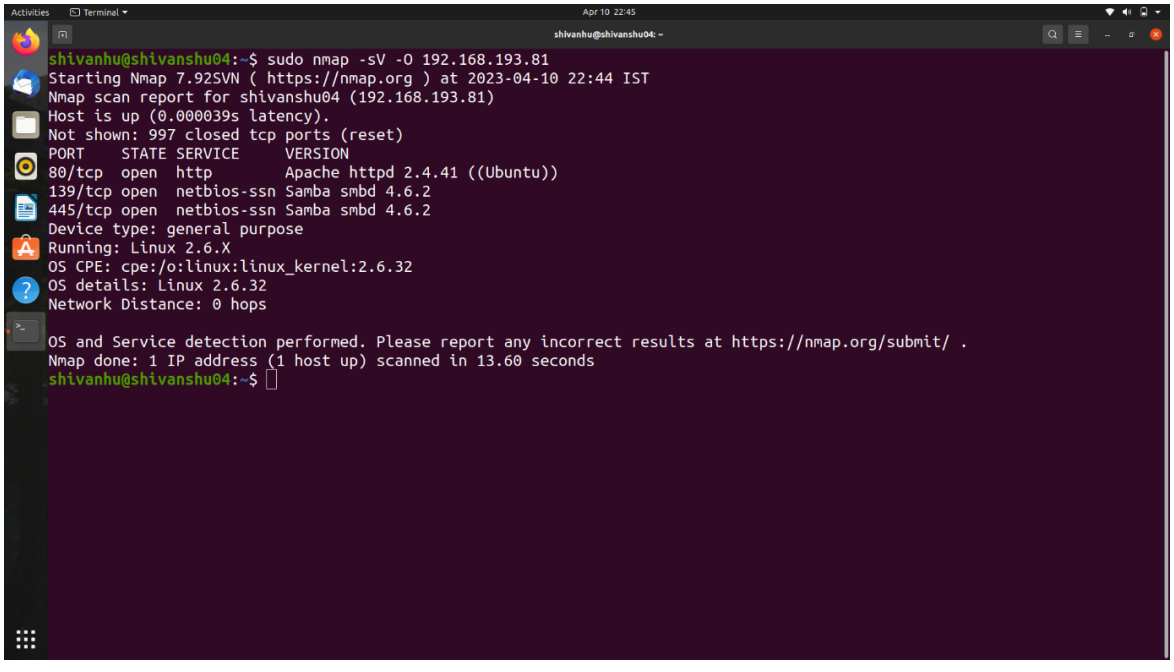
Our IP address is: 192.168.193.81

Scan the network: Once you have Nmap installed, you can use it to scan your network by running the following command in a terminal or command prompt:
nmap -sP 192.168.193.81

Replace 192.168.193.81 with the IP address range of your network. This will scan all the hosts in the range and report which ones are up.

3. Retrieve hostnames and OS information: Once you know which hosts are up, you can use Nmap to retrieve more information about each one. For example, to scan for hostnames and identify the operating system of each host, you can run the following command:
nmap -sV -O 192.168.193.81

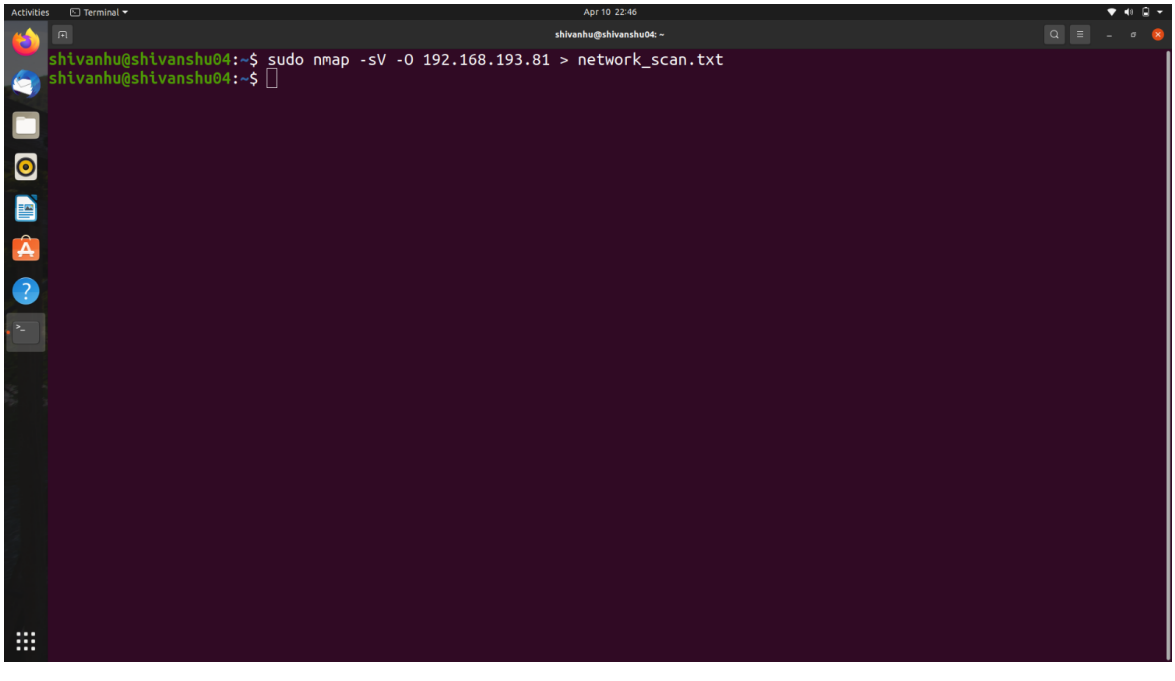
This will not only retrieve the hostname and OS information, but it will also scan for the services each host is operating and report any open ports.



4. Save the output to a text file: To save the output to a text file, you can redirect the output of the command to a file using the > symbol. For example:

nmap -sV -O 192.168.1.0/24 > network_scan.txt

This will save the output to a file named network_scan.txt in the current directory.



4. Reference

- https://phoenixnap.com/kb/how-to-install-nmap-ubuntu
- https://www.herzing.edu/blog/what-network-security-and-why-it-important
- https://nmap.org/
- https://nmap.org/book/man.html
- https://nmap.org/download.html
- https://www.comparitech.com/net-admin/find-network-devices/
- https://www.dummies.com/article/technology/computers/operating-systems/windows/windows-10/see-devices-connected-windows-10-computer-230424/
- https://www.ghacks.net/2007/01/29/find-out-which-devices-have-been-connected-to-your-pc/
- https://itsfoss.com/list-usb-devices-linux/
- https://sourcedigit.com/22048-how-to-list-connected-usb-devices-in-linux-ubuntu/