FUNDAMENTALS OF INFORMATION SECURITY

Louie Venegas

What This Project Covers

Module 2, Asymmetric key encryption: encrypting and decrypting files with GPG in a Kali terminal.

Module 3, Stateful firewall: changing iptables policy to drop inbound traffic, then scanning with Nmap.

Module 4, BYOD security policy: a written device policy for a fictional corporation.

Module 5, Multifactor authentication: adding Google Authenticator to Linux logon.

Module 6, Vulnerability assessment: Nmap, NetCat, Wireshark, and Nessus against lab targets.

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MODULE 2

ASYMMETRIC KEY ENCRYPTION

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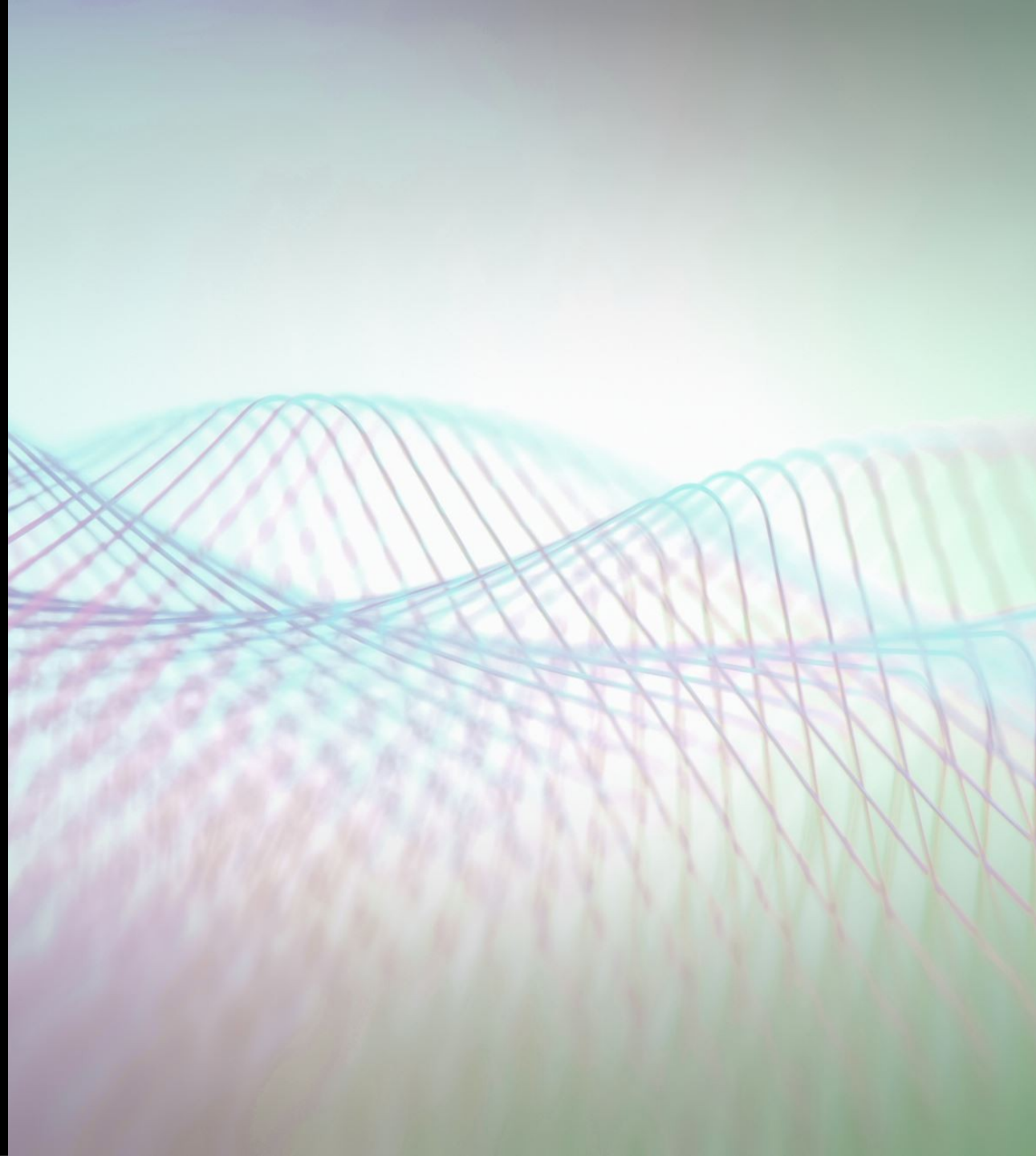

Asymmetric Key Encryption is used every time a https connection is established without most users even knowing it happens. It is also known as public key encryption. “is a type of cryptographic protocol that uses a public and private key to exchange encrypted data between two users or devices” (Ingles, 1997).

Another use for this type of technology is encrypting sensitive data before sending it to someone or storing it on a device. In the following two slides are screenshots of me using software called GPG also called GnuPg in a kali terminal. A brief explanation is provided to explain the contents of each.

THIS SCREEN SHOT IS AFTER THE INITIAL PROCESS OF ENCRYPTION.
THE ORIGINAL AND ENCRYPTED FILE ARE DISPLAYED IN THE DIRECTORY, AND BOTH ENCRYPTED AND PLAINTEXT FORM.

FILE DECRYPTION

INCLUDES THE ENCRYPTED FILE, THE DECRYPTING PROCESS AND LIST OF BOTH THE ENCRYPTED AND PLAINTEXT FILE.

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MODULE 3
STATEFUL FIREWALL

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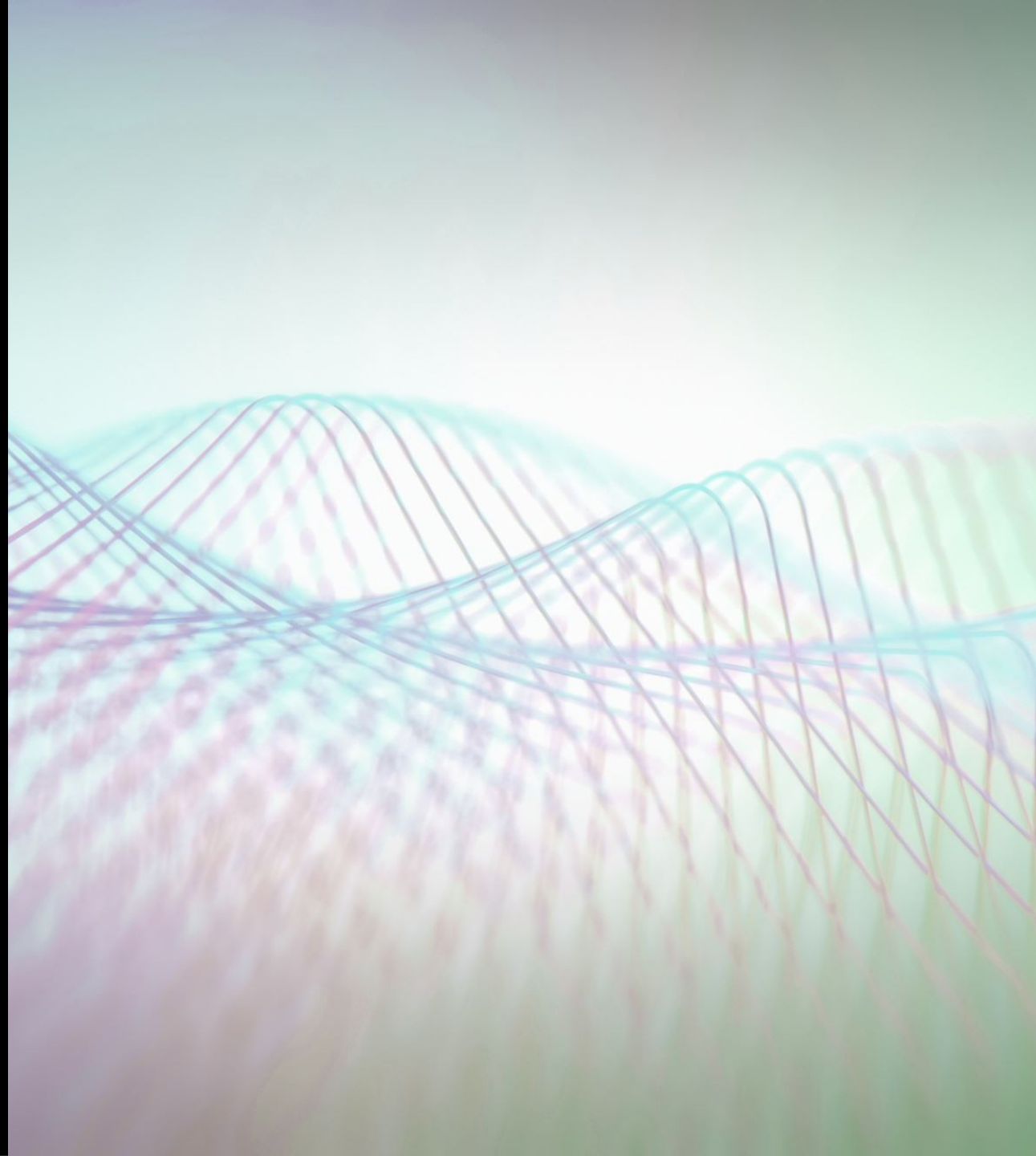


WHAT EFFECT DOES THE *SUDO IPTABLES --POLICY INPUT DROP* COMMAND HAVE ON THE ACCESS TO COMPUTING RESOURCES?

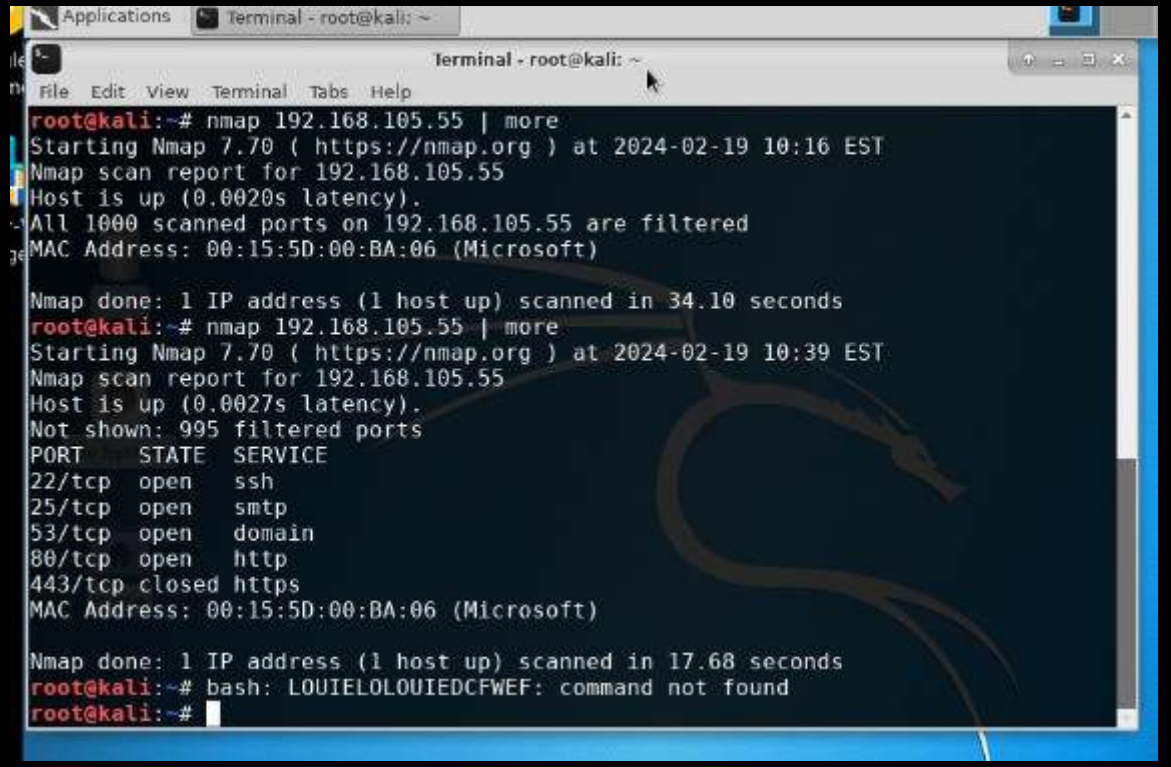
Answer

Sudo iptables –policy INPUT DROP

Essentially this command changes the iptables firewall policy on a Linux system. The result of this is that all incoming packets are dropped until or unless otherwise specified.

References

Working with iptables. (n.d.). Network World. https://www.networkworld.com/article/930788/working-with-iptables.html



NMAP SCAN

THIS IS A SCREEN SHOT OF A KALI TERMINAL RUNNING NMAP ON A LINUX SERVER

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MODULE 4

BRING YOUR OWN DEVICE (BYOD)

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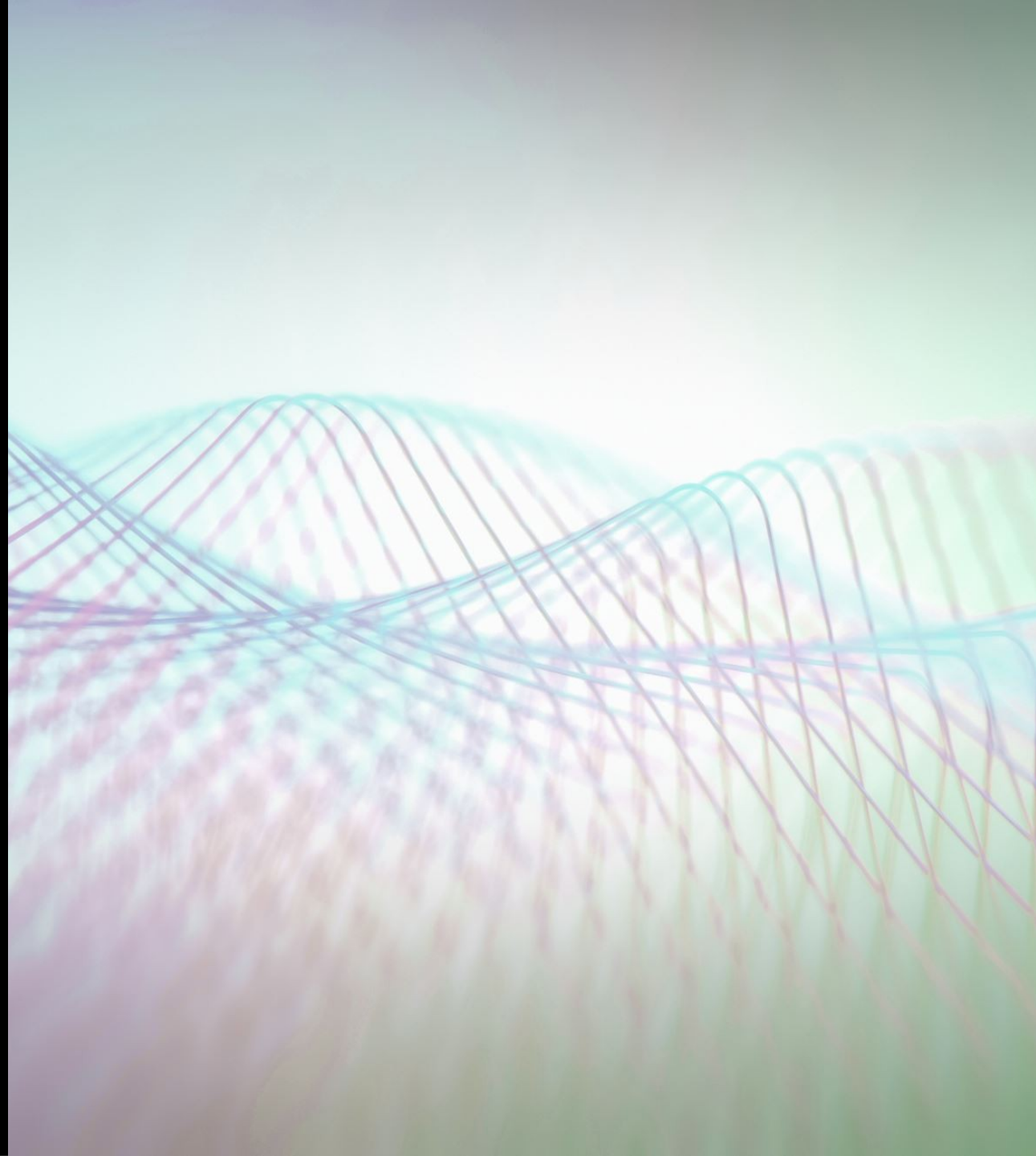

1. Overview:

ABC Fictional Corporation recognizes the productivity and flexibility of allowing employees to use personal devices for business purposes. Our BYOD security policy allows for employees to use personal devices such as smart phones, tablets, laptops and computers while addressing challenges like data security and device management. This policy's goal is to harness the economic, productivity and convenient benefits of allowing this while mitigating the risk involved.

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2. Purpose:

Confidentiality, integrity, and availability (CIA) of data is the main purpose of this policy. Having the BYOD security policy helps to identify devices that introduce unnecessary vulnerabilities to the organization's computing resources and data. Another purpose is to address how timely discovery of such vulnerabilities will reduce the attack vector on our organization's computing resources and data. This policy aims to establish a process for regular security assessments and updates to ensure potential vulnerabilities are identified and addressed promptly

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3. Scope

This policy will affect all personnel with reasons to use personal devices for work related reasons such as email and work related assignments. The devices that fall under this policy will be personal phones tablets and computers. If assigned technology related assignments but not issued a device to perform the duties on then it is assumed the personnel will be using personal devices. Assume all actions performed work related will be monitored but only to that extent. The exact type of devices will be outlined in the policy and the required security measures. Compliance and consequences will be outlined as well.

4. Policy

Security assessments prior to the acceptance to ABC Corporation's network. For a device to be compliant it must be password protected and up to date, maintain a firewall feature and anti virus software of some type. The operating system since so many exist is not restricted except that it is up to date with security patches and allows for updates automatically. Devices not in compliance will not be granted access to the network. The IT department will monitor for compliance as well as enforce it. All access to the network must be done through the designated applications and automatically logged out when no longer needed to prevent unauthorized access. Two step verification via company application will be required.

7. Definitions and Terms:

BYOD: (bring your own device) defined as any personal device used on our network,
mobile devices are but not limited to cell phone tablets and laptops.
CIA(Confidentiality, Integrity and Availability) in regards to data stored for and used by people associated with our organization.
HIPAA(Health Insurance Portability and Accountability Act)
PCI-DSS (Payment Card Industry Data Security Standard)

8. H

Date of change	Responsible	Summary of change
February 2024	L. Venegas	Adapted from the SANS BYOD policy template

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MODULE5

MULTIFACTOR AUTHENTICATION(MFA)

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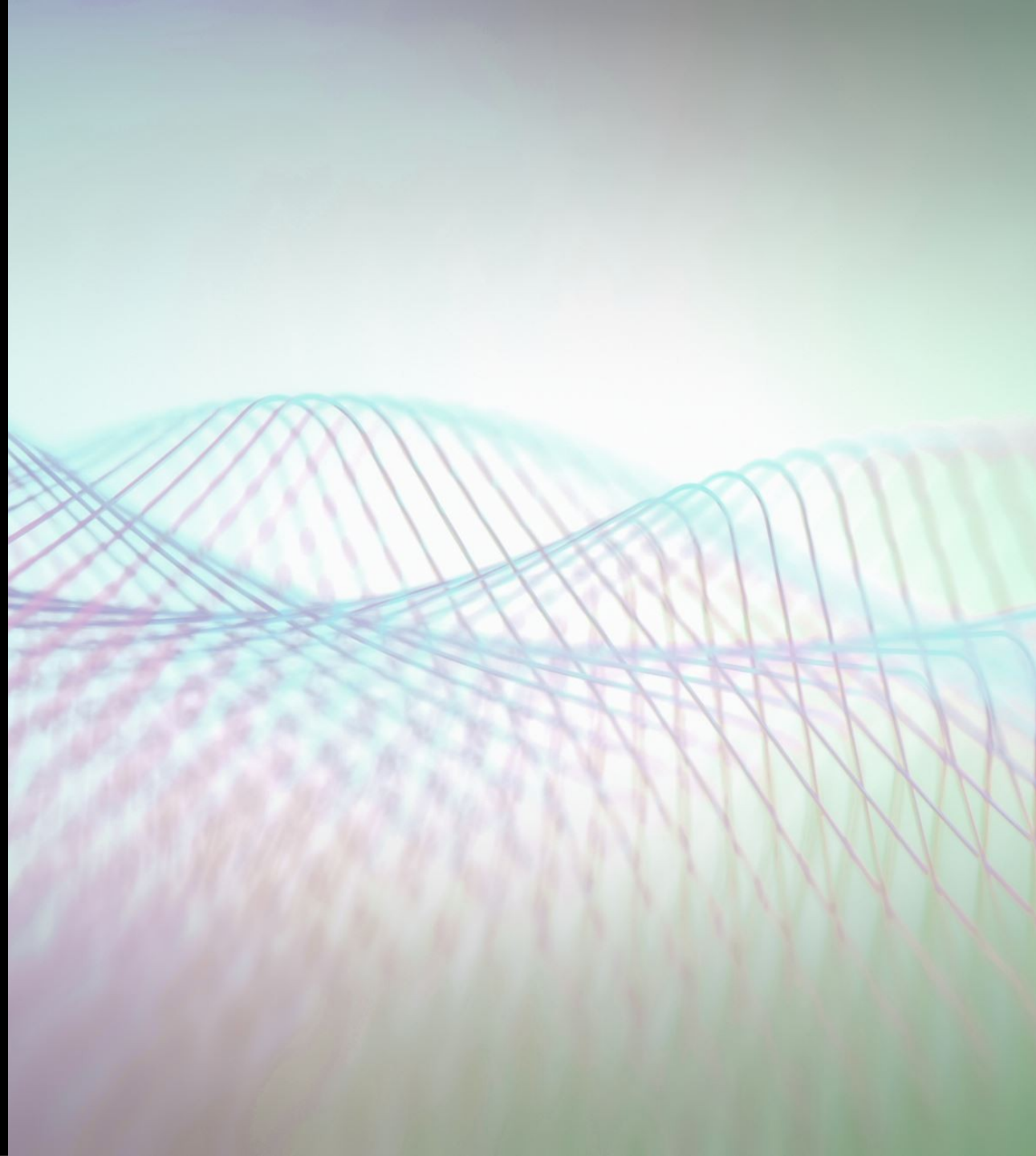
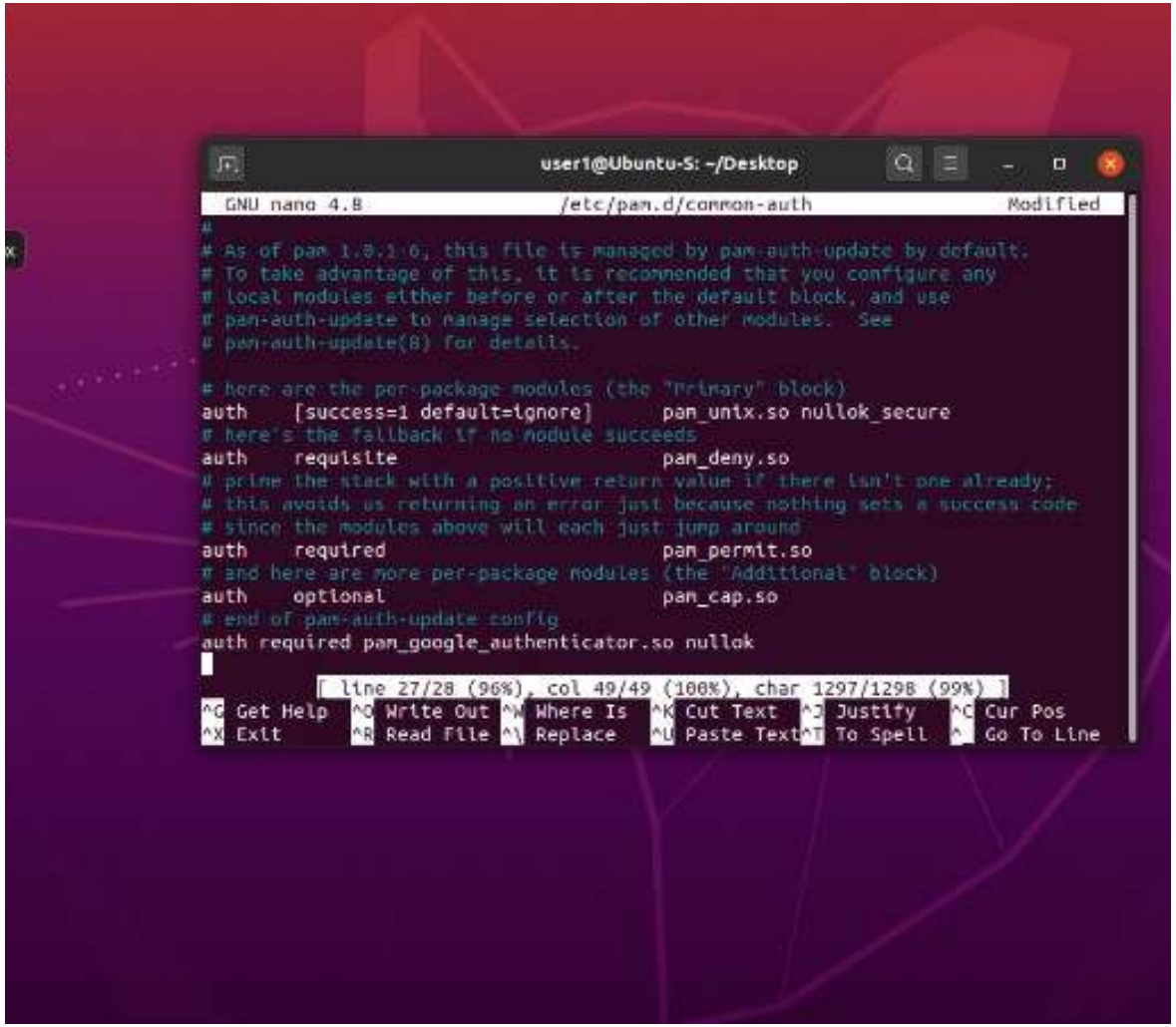


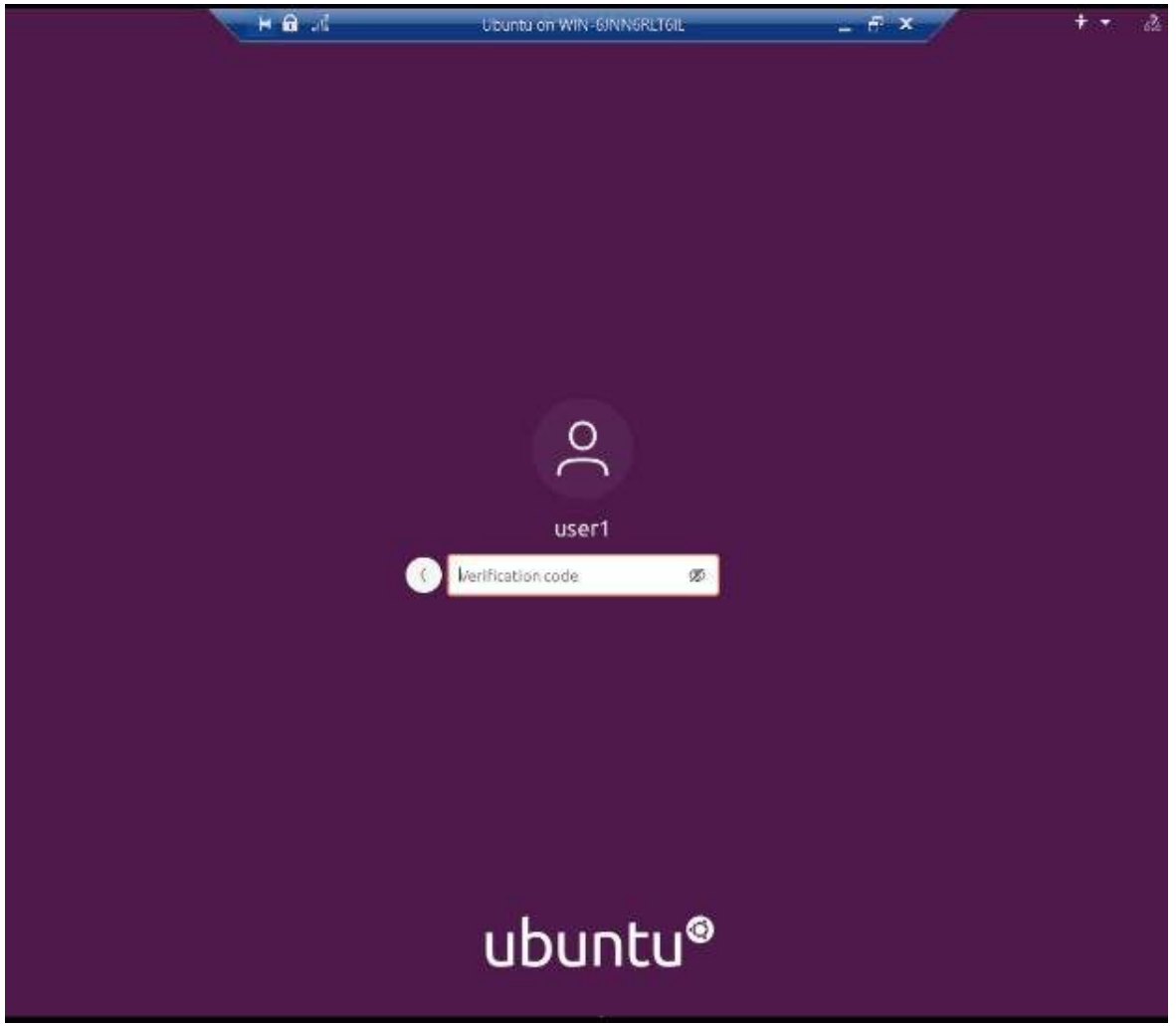
Common-auth Configuration File

The common-auth configuration file, with the entry enabling the Google Authenticator module.



MFA Logon Screen

The logon screen prompting for a verification code.



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MODULE 6

VULNERABILITY ASSESSMENT

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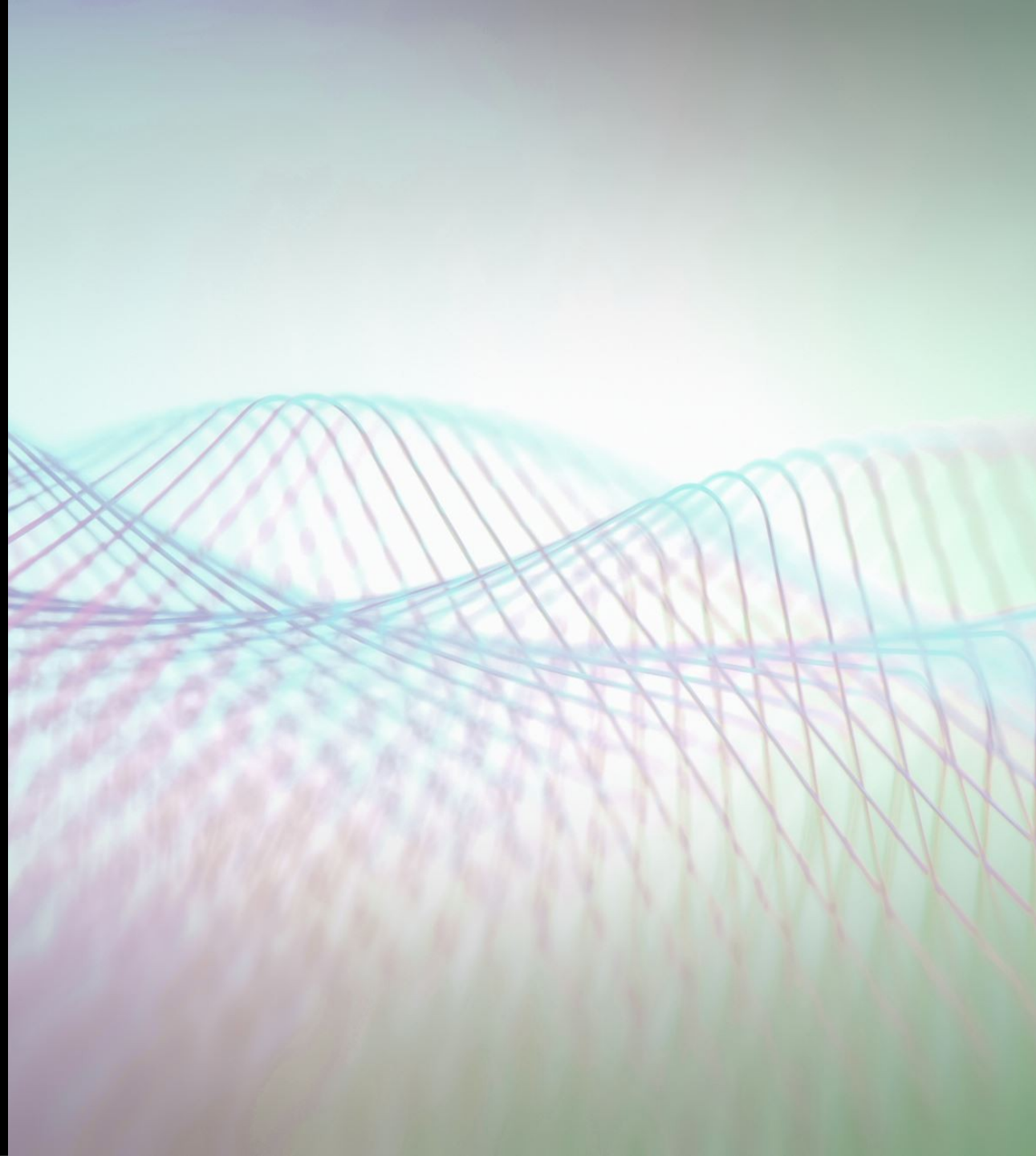
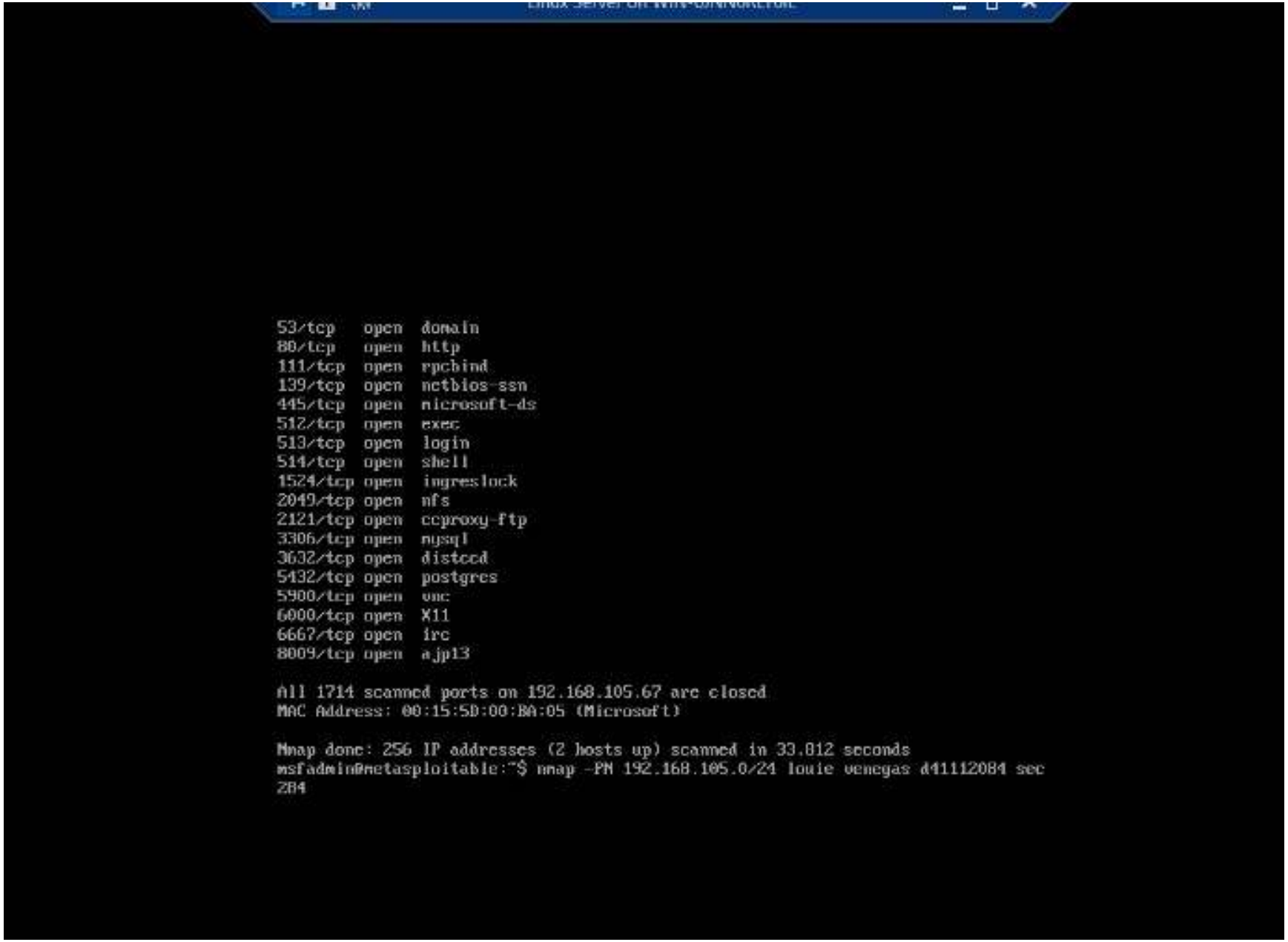
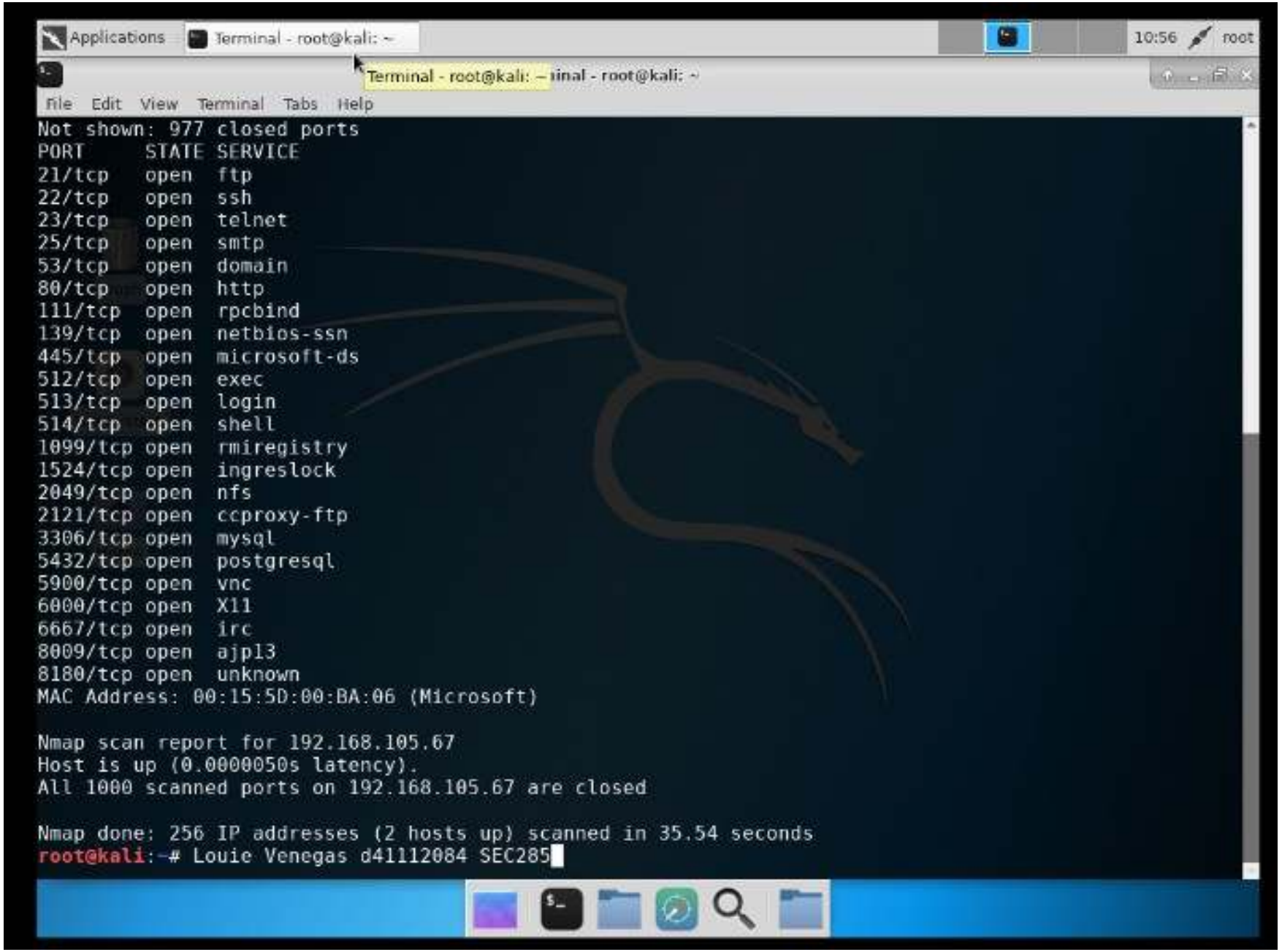
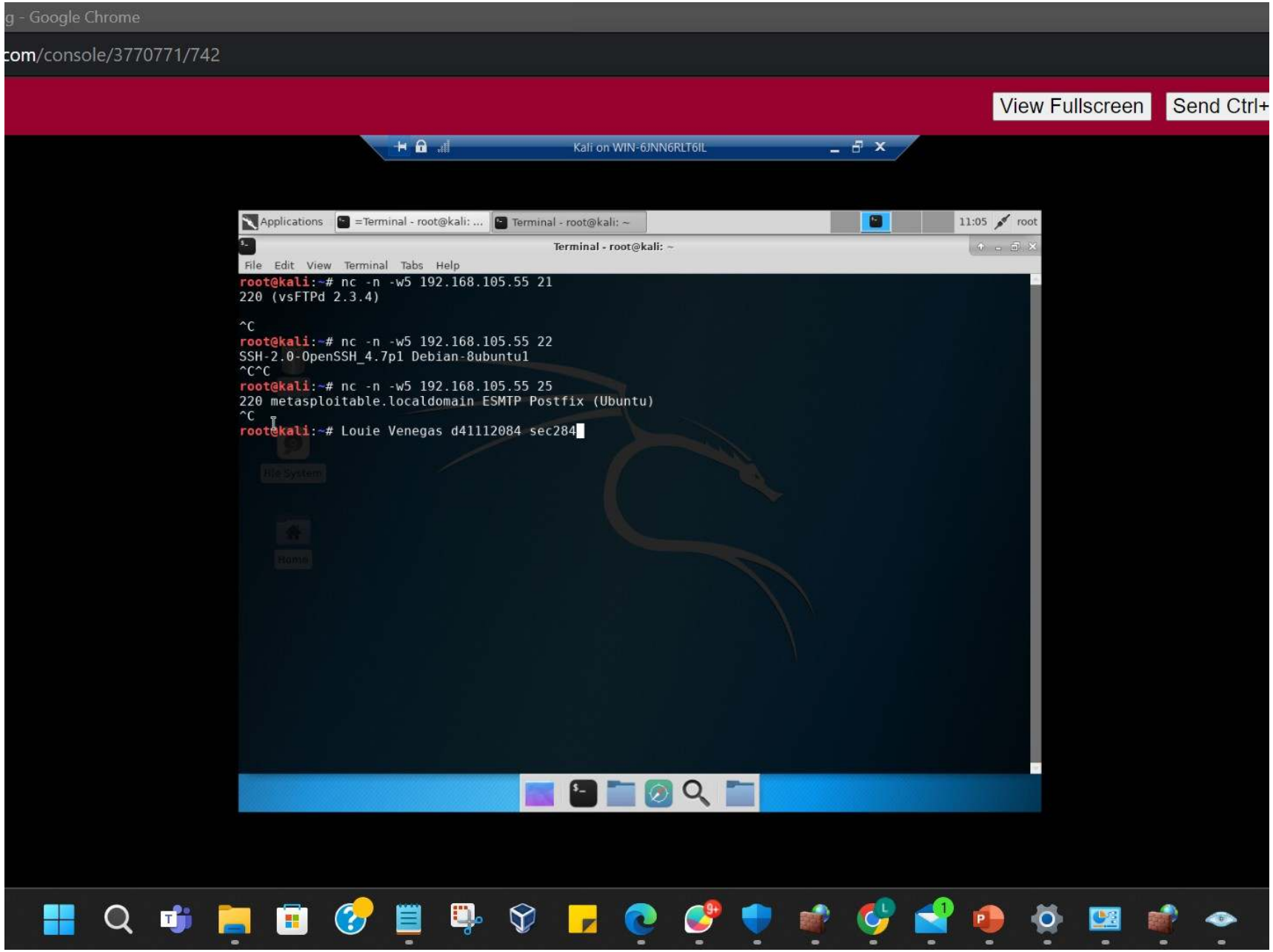
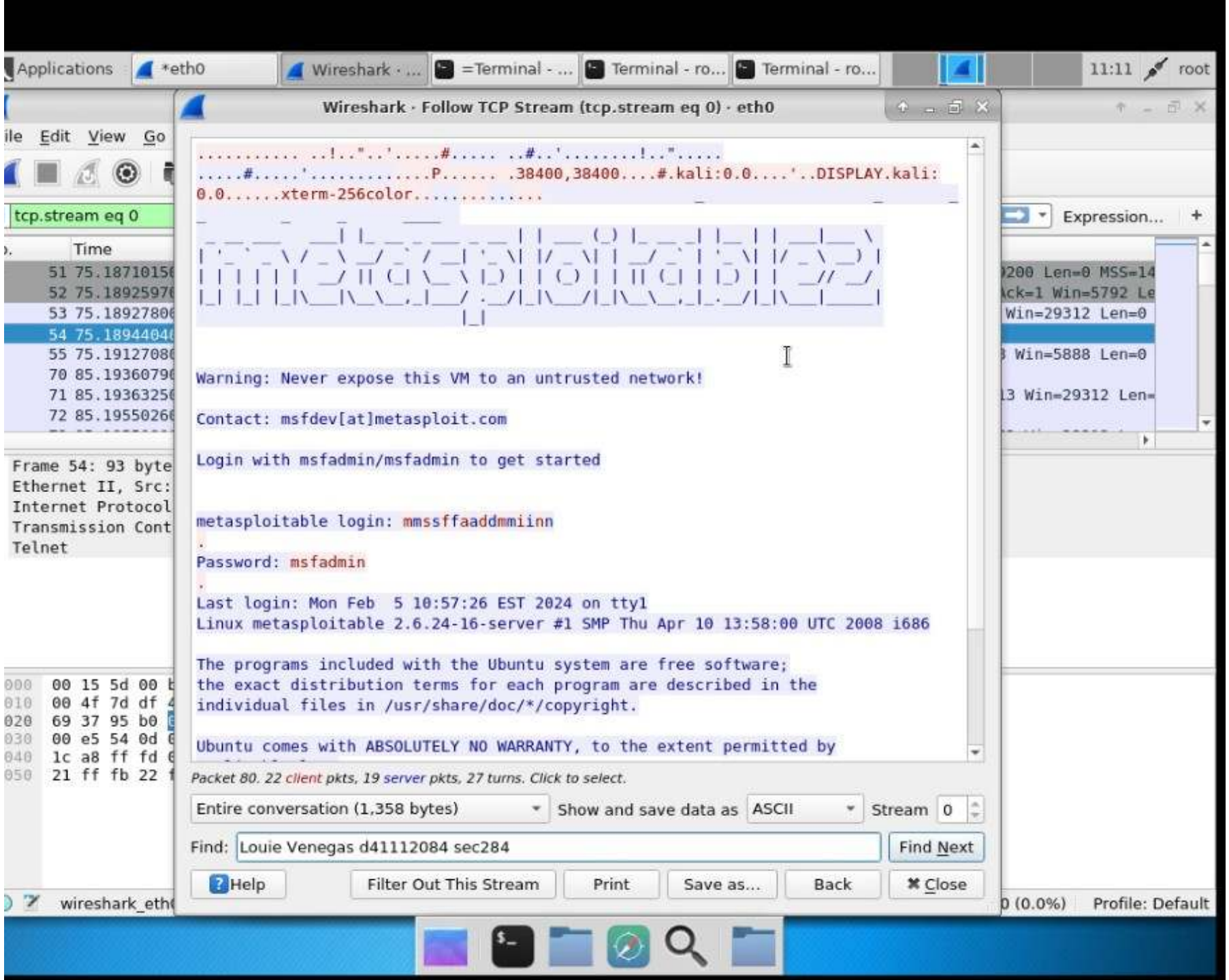
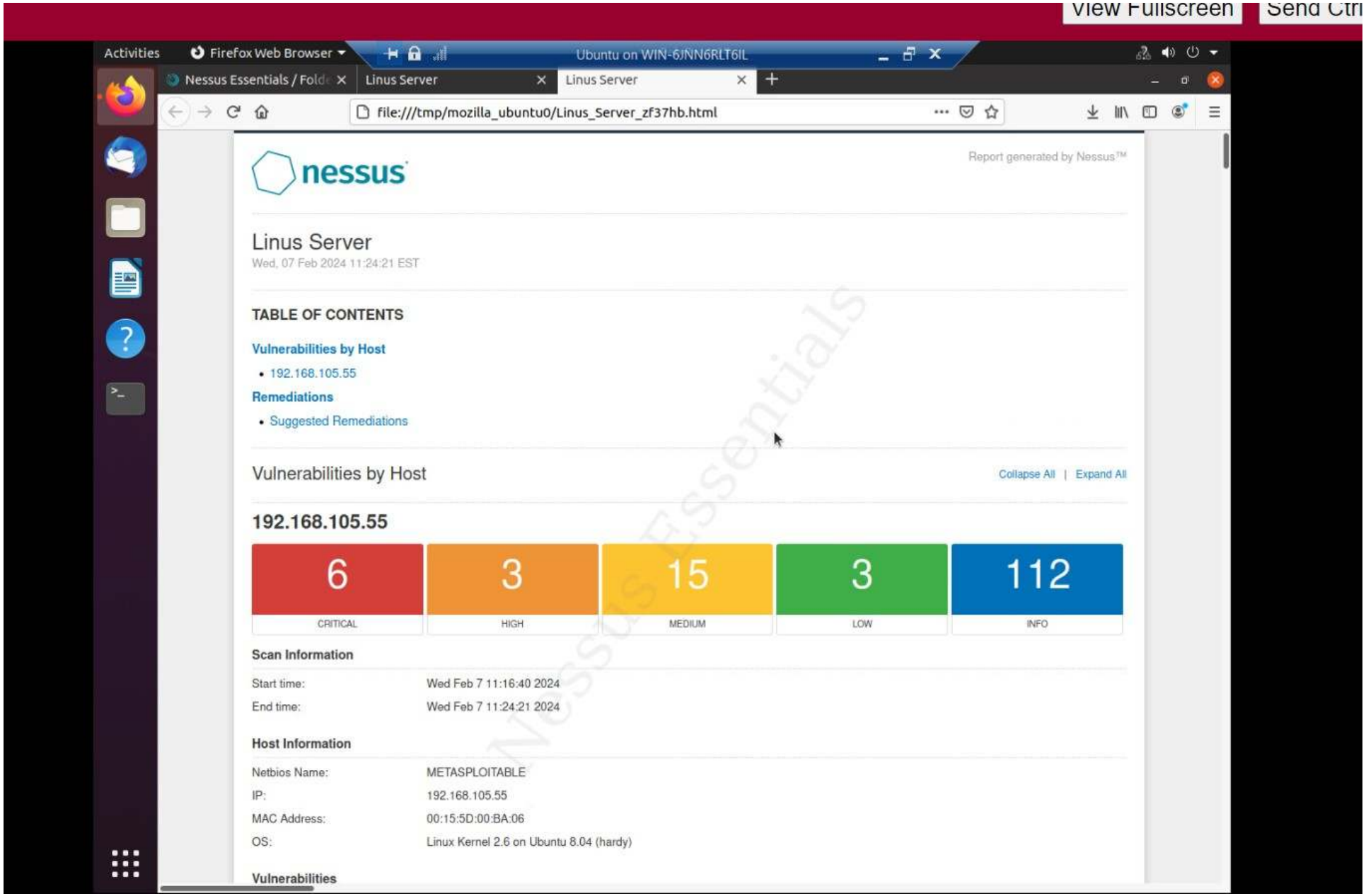



53/tcp open domain
80/tcp open http
111/tcp open rpcbind
139/tcp open netbios-ssn
445/tcp open microsoft-ds
512/tcp open exec
513/tcp open login
514/tcp open shell
1524/tcp open ingreslock
2049/tcp open nfs
2121/tcp open ccproxy-ftp
3306/tcp open mysql
3632/tcp open distccd
5432/tcp open postgres
5900/tcp open vnc
6000/tcp open X11
6667/tcp open irc
8009/tcp open ajp13
All 1714 scanned ports on 192.168.105.67 are closed
MAC Address: 00:15:5D:00:BA:05 (Microsoft)
Nmap done: 256 IP addresses (2 hosts up) scanned in 33.812 seconds
msfadmin@metasploitable:~$ nmap -PN 192.168.105.0/24 louie venegas d41112084 sec
284


Applications
Terminal - root@kali: ~
10:56
root
Terminal - root@kali: ~
File Edit View Terminal Tabs Help
Not shown: 977 closed ports
PORT STATE SERVICE
21/tcp open ftp
22/tcp open ssh
23/tcp open telnet
25/tcp open smtp
53/tcp open domain
80/tcp open http
111/tcp open rpcbind
139/tcp open netbios-ssn
445/tcp open microsoft-ds
512/tcp open exec
513/tcp open login
514/tcp open shell
1099/tcp open rmiregistry
1524/tcp open ingreslock
2049/tcp open nfs
2121/tcp open ccproxy-ftp
3306/tcp open mysql
5432/tcp open postgresql
5900/tcp open vnc
6000/tcp open X11
6667/tcp open irc
8009/tcp open ajp13
8180/tcp open unknown
MAC Address: 00:15:5D:00:BA:06 (Microsoft)
Nmap scan report for 192.168.105.67
Host is up (0.0000050s latency).
All 1000 scanned ports on 192.168.105.67 are closed
Nmap done: 256 IP addresses (2 hosts up) scanned in 35.54 seconds
root@kali:~# Louie Venegas d41112084 SEC285


g - Google Chrome
com/console/3770771/742
View Fullscreen
Send Ctrl+
Kali on WIN-6JNN6RLT6IL
Applications
=Terminal - root@kali: ...
Terminal - root@kali: ~
11:05
root
Terminal - root@kali: ~
File Edit View Terminal Tabs Help
root@kali:~# nc -n -w5 192.168.105.55 21
220 (vsFTPd 2.3.4)
^C
root@kali:~# nc -n -w5 192.168.105.55 22
SSH-2.0-OpenSSH_4.7p1 Debian-8ubuntu1
^C^C
root@kali:~# nc -n -w5 192.168.105.55 25
220 metasploitable.localdomain ESMTP Postfix (Ubuntu)
^C
root@kali:~# Louie Venegas d41112084 sec284


Applications
*eth0
Wireshark · ...
=Terminal - ...
Terminal - ro...
Terminal - ro...
11:11
root
Wireshark · Follow TCP Stream (tcp.stream eq 0) · eth0
tcp.stream eq 0
Expression...
Time
Warning: Never expose this VM to an untrusted network!
Contact: msfdev[at]metasploit.com
Login with msfadmin/msfadmin to get started
metasploitable login: mmssffaaddmmiinn
Password: msfadmin
Last login: Mon Feb 5 10:57:26 EST 2024 on tty1
Linux metasploitable 2.6.24-16-server #1 SMP Thu Apr 10 13:58:00 UTC 2008 i686
The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.
Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
Packet 80. 22 client pkts, 19 server pkts, 27 turns. Click to select.
Entire conversation (1,358 bytes)
Show and save data as
ASCII
Stream
0
Find:
Louie Venegas d41112084 sec284
Find Next
Help
Filter Out This Stream
Print
Save as...
Back
Close
Profile: Default


View Fullscreen
Send Ctrl
Activities
Firefox Web Browser
Ubuntu on WIN-6JNN6RLT6IL
Nessus Essentials / Folde
Linus Server
Linus Server
file:///tmp/mozilla_ubuntu0/Linus_Server_zf37hb.html
nessus
Report generated by Nessus™
Linus Server
Wed, 07 Feb 2024 11:24:21 EST
TABLE OF CONTENTS
Vulnerabilities by Host
192.168.105.55
Remediations
Suggested Remediations
Vulnerabilities by Host
Collapse All | Expand All
192.168.105.55
6
CRITICAL
3
HIGH
15
MEDIUM
3
LOW
112
INFO
Scan Information
Start time: Wed Feb 7 11:16:40 2024
End time: Wed Feb 7 11:24:21 2024
Host Information
Netbios Name: METASPLOITABLE
IP: 192.168.105.55
MAC Address: 00:15:5D:00:BA:06
OS: Linux Kernel 2.6 on Ubuntu 8.04 (hardy)
Vulnerabilities
Nessus Essentials

Ingles, S. (1997, October 17). *Asymmetric Encryption*. https://www.webopedia.com/definitions/asymmetric-encryption/. Retrieved February 15, 2024, from https://www.webopedia.com/definitions/asymmetric-encryption/