

StaticSpeed Vulnerability Report

As you start your final project, you are expected to perform the following tasks in BOTH Windows and Linux systems. We need to decide if StaticSpeeds systems should be integrated into NuttyUtility's extended network and infrastructure. In the end, your report must support your recommendation. This document is a template that NuttyUtility uses similar system reviews. Some specific information is provided in certain places after initial talks with NuttyUtility. Please follow the format of this template and answer all questions for each section. **You will need to provide either the text outputs from the command line and/or screenshots as evidence** in all sections of this template to show that you have completed the required steps of our company's template and make it easier for stakeholders to see where there might be issues.

Your report must include the findings of your CIS Benchmarks and Security control checks along with the results of OpenVAS and NMap scans. As a security professional, it is expected that you will relay your findings in terms of industry language (i.e., CVE-yyyy-yyyy, Mitre Technique ID Txxx where applicable). Based on NuttyUtility's security policies, are these systems ready? Your report will be used by stakeholders to decide on the integration.

The best way to find these vulnerabilities is by performing vulnerability scans using Nmap NSE Vuln scripts as shown in the course Nmap lesson and use the CIS benchmarks requested in the project.

Control checks and CIS benchmarks for Windows & Ubuntu

In this section, outline your answers from the requested checks. Please provide either the **command-line outputs in the form of text or screenshots** that show a CIS check and/or control check has been performed. You must also answer the questions based on your assessments.

Step 1: Asset identification, address update, dependencies, patches, and native protections at targeted Server/ Desktop Operating Systems

Task 1

As seen in your lessons, you must have CIS Benchmarks for Ubuntu 18.04 v2.01 and Windows 10 Ent v1.9.0 to perform these checks. Use the MITRE website for the database of common vulnerabilities and exposures (CVE) <https://cve.mitre.org> and Mitre ATT&CK framework for referencing attack techniques, tools, and procedures attack.mitre.org.

You must download the CIS Benchmark PDFs for Ubuntu 18.04 v2.01 and Windows 10 Ent v1.9.0. In these PDFs, there will be all the information related to the CIS Benchmarks requested in the following tasks which need to be included in your final report. In order to perform the vulnerability scans via Nmap NSE scripts as shown in Lesson 6 “Use Nmap for Vulnerability Discovery” Please review the lesson if needed and use, as suggested in the Lesson NSE scripts from Vulscan and Vulners GitHub repositories. Using these NSE scripts should be enough to discover the vulnerabilities present in your virtual machines (Both Ubuntu and Windows Machines). Both machines have vulnerable services and applications, a vulnerability may include as well, a deprecated or outdated/exposed service, it is also suggested to use the highest privilege (root/administrator) when applicable to perform an audit, there might be applications not found by network scan yet present at machines that are also reportable (Please review Lesson 2 “Software Inventory and Version Tracking”).

Once you discover the vulnerabilities please refer to Mitre cve.mitre.org for vulnerability classification and remediation, also Mitre ATT&CK framework attack.mitre.org (Lesson 2, “Identify Industry Frameworks for Vulnerability Reference Pt 1”) to get things such as technique ids, tools, and procedures. Once you have all this information, you will need to complete the report template. Your report Must also include the CIS Benchmarks requested in the next tasks please see template examples for the report format.

Task 2

Let's get started on our assessment. We need to find out if software updates and third-party packages settings are correct. Verify in both of your hosts the following checks.

Are software updates for the systems and third parties configured correctly in these systems?

What is your assessment of StaticSpeeds systems configuration for software updates and third-party packages? Please provide evidence to support your evaluation (command line output or screenshots for each as well)

Windows CIS 18.9.102.2

Ensure 'configure automatic updates' is set to 'Enabled.'

The configuration was disabled, which is not correct.

third-party updates must be disabled or with a value of 0

The screenshot shows the Local Group Policy Editor window. The left pane displays the navigation tree under 'Computer Configuration' / 'Administrative Templates' / 'Windows Components' / 'Windows Update'. The right pane shows a list of policy settings for 'Windows Update for Business'. One setting, 'Configure Automatic Updates', is highlighted and set to 'Enabled'. Other settings listed include 'Do not display 'Install Updates and Shut Down' option in Sh...', 'Do not adjust default option to 'Install Updates and Shut Do...', 'Enabling Windows Update Power Management to automati...', 'Turn off auto-restart for updates during active hours', 'Specify active hours range for auto-restarts', 'Allow updates to be downloaded automatically over metere...', 'Always automatically restart at the scheduled time', 'Specify deadline before auto-restart for update installation', 'Configure auto-restart reminder notifications for updates', 'Turn off auto-restart notifications for update installations', 'Configure auto-restart required notification for updates', 'Configure automatic updates', 'Specify intranet Microsoft update service location', 'Automatic Updates detection frequency', 'Do not allow update deferral policies to cause scans against ...', 'Remove access to use all Windows Update features', and 'Do not connect to any Windows Update Internet locations'. The status column indicates most settings are 'Not configu'.

I enabled the automatic updates as can be seen in the screenshot below.

This screenshot shows the same Local Group Policy Editor window as the previous one, but with a different focus. The left pane shows the navigation tree, and the right pane is now displaying the 'Configure Automatic Updates' dialog for the 'Windows Update for Business' policy. In this dialog, the 'Configure Automatic Updates' setting is explicitly listed and set to 'Enabled'. The rest of the settings in the list are identical to the previous screenshot, showing various options for managing updates like download times, restarts, and notifications.

Ubuntu CIS 1.2.1

Ensure package manager repositories are configured correctly.
It can be seen that the updates in ubuntu seem to be good.

```
ustudent@ubu-ustudent:/var/log/audit$ sudo apt-cache policy
[sudo] Passwort für ustudent:
Paketdateien:
  100 /var/lib/dpkg/status
    release a=now
  500 http://us.archive.ubuntu.com/ubuntu bionic/multiverse i386 Packages
    release v=18.04,o=Ubuntu,a=bionic,n=bionic,l=Ubuntu,c=multiverse,b=i386
    origin us.archive.ubuntu.com
  500 http://us.archive.ubuntu.com/ubuntu bionic/multiverse amd64 Packages
    release v=18.04,o=Ubuntu,a=bionic,n=bionic,l=Ubuntu,c=multiverse,b=amd64
    origin us.archive.ubuntu.com
  500 http://us.archive.ubuntu.com/ubuntu bionic/universe i386 Packages
    release v=18.04,o=Ubuntu,a=bionic,n=bionic,l=Ubuntu,c=universe,b=i386
    origin us.archive.ubuntu.com
  500 http://us.archive.ubuntu.com/ubuntu bionic/universe amd64 Packages
    release v=18.04,o=Ubuntu,a=bionic,n=bionic,l=Ubuntu,c=universe,b=amd64
    origin us.archive.ubuntu.com
  500 http://us.archive.ubuntu.com/ubuntu bionic/restricted i386 Packages
    release v=18.04,o=Ubuntu,a=bionic,n=bionic,l=Ubuntu,c=restricted,b=i386
    origin us.archive.ubuntu.com
  500 http://us.archive.ubuntu.com/ubuntu bionic/restricted amd64 Packages
    release v=18.04,o=Ubuntu,a=bionic,n=bionic,l=Ubuntu,c=restricted,b=amd64
    origin us.archive.ubuntu.com
  500 http://us.archive.ubuntu.com/ubuntu bionic/main i386 Packages
    release v=18.04,o=Ubuntu,a=bionic,n=bionic,l=Ubuntu,c=main,b=i386
    origin us.archive.ubuntu.com
  500 http://us.archive.ubuntu.com/ubuntu bionic/main amd64 Packages
    release v=18.04,o=Ubuntu,a=bionic,n=bionic,l=Ubuntu,c=main,b=amd64
    origin us.archive.ubuntu.com
Mit Pinning verwaltete Pakete:
ustudent@ubu-ustudent:/var/log/audit$ sudo apt-key list
/etc/apt/trusted.gpg.d/ubuntu-keyring-2012-archive.gpg
-----
pub   rsa4096 2012-05-11 [SC]
      790B C727 7767 219C 42C8  6F93 3B4F E6AC C0B2 1F32
uid            [ unbekannt ] Ubuntu Archive Automatic Signing Key (2012) <ftpmaster@ubuntu.com>
-----  

/etc/apt/trusted.gpg.d/ubuntu-keyring-2012-cdimage.gpg
-----
pub   rsa4096 2012-05-11 [SC]
      8439 38DF 228D 22F7 B374  2BC0 D94A A3F0 EFE2 1092
uid            [ unbekannt ] Ubuntu CD Image Automatic Signing Key (2012) <cdimage@ubuntu.com>
```

Task 3- Native Protections and Software Inventory

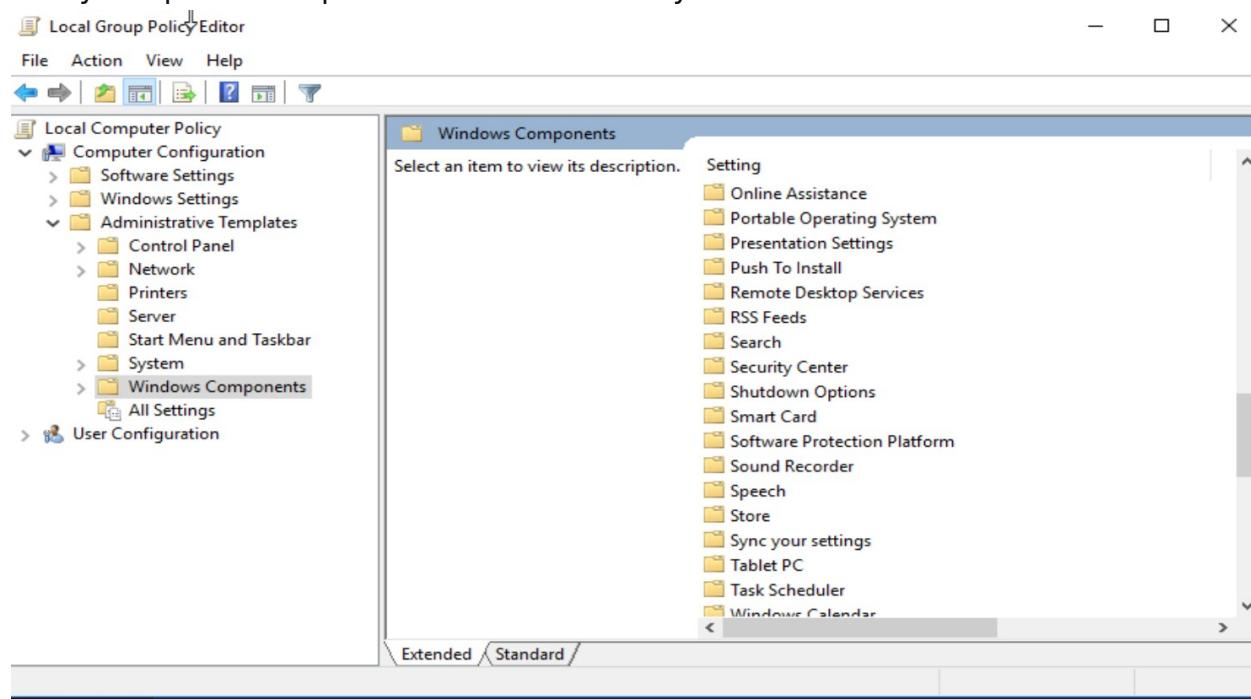
Next, verify that native protections for the operating systems are enough to protect systems from exploitation. (Hint: Think upgrades) We also need to know exactly what software is running on every machine. Also, please perform a software inventory on each computer and post your findings. The more you know about the systems you are defending, the better chance you will mitigate and harden them. Provide documentation as to what applications are installed on the Windows machine.

Windows CIS 18.3.4

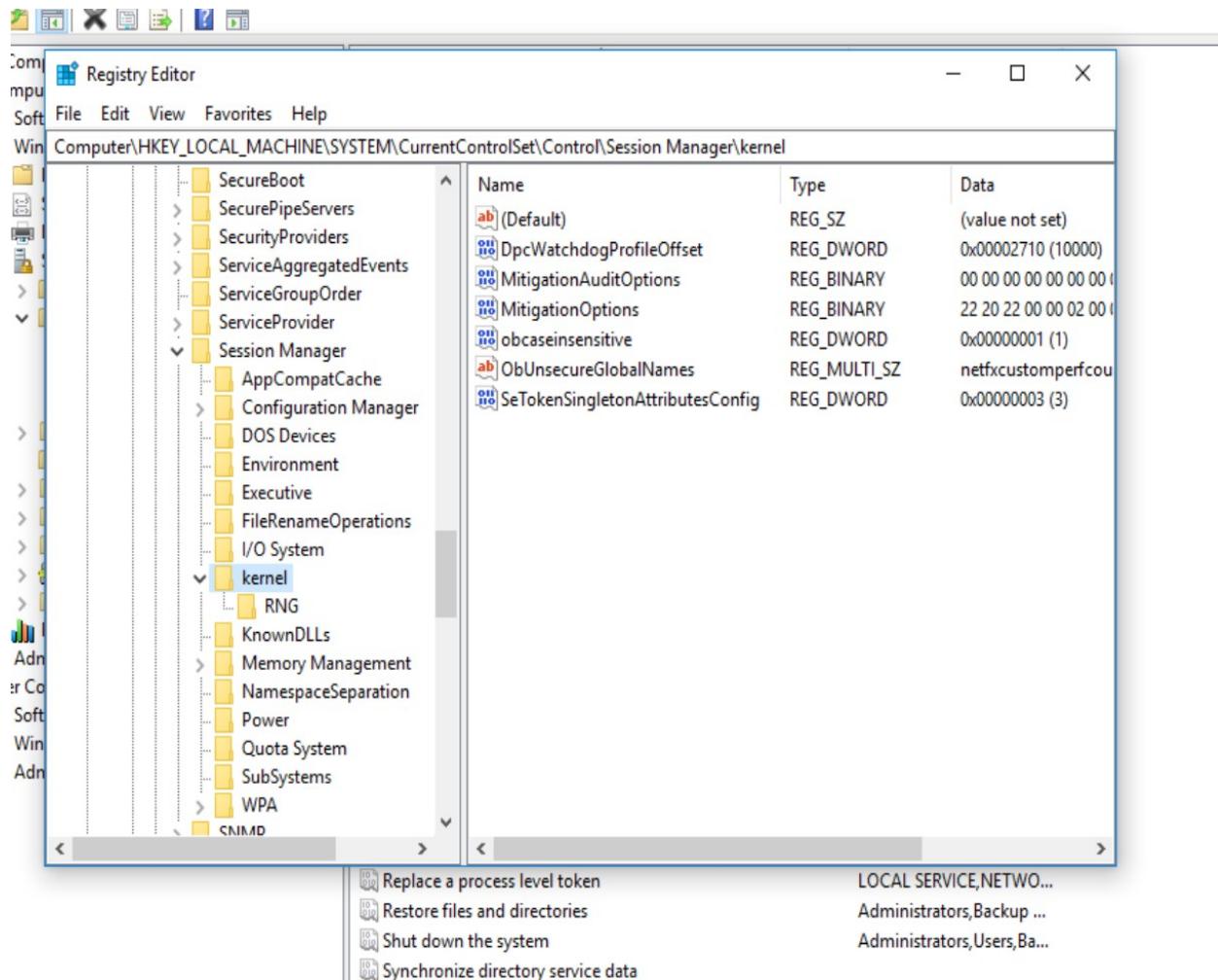
Ensure 'Enable Structured Exception Handling Overwrite Protection (SEHOP)' is set to 'Enabled.'

Is this system compliant?

It is not CIS compliant. The path from the CIS does not exist. An additional Group Policy template is required to add MS Security Guide.



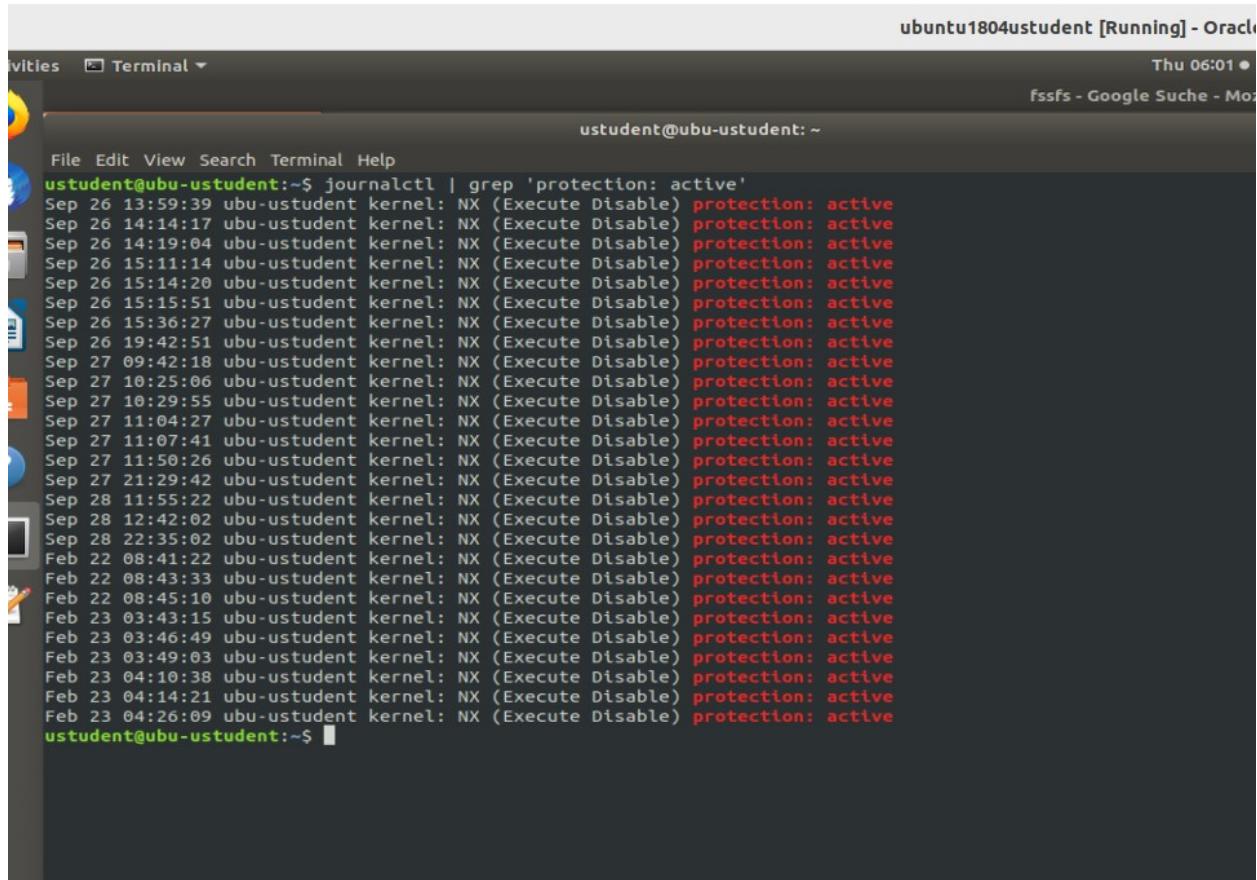
The registry entry DisableExceptionChainValidation is not available.



Ubuntu CIS 1.6.1, 1.6.2

1.6.1 Ensure XD/NX support is enabled

The system is CIS conform

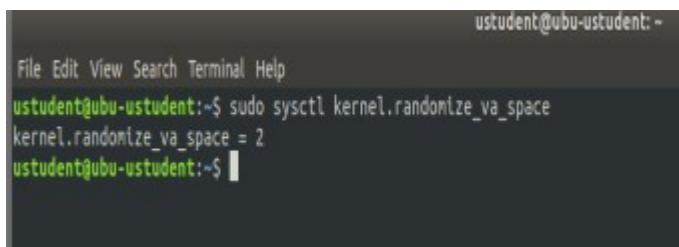


A screenshot of a Linux terminal window titled "ubuntu1804student [Running] - Oracle VM VirtualBox". The window shows a command-line interface with the user "ustudent@ubu-ustudent". The terminal displays the output of the command "journalctl | grep 'protection: active'". The output lists numerous kernel log entries from Sep 26 to Feb 23, each indicating that NX (Execute Disable) protection is active. The terminal window has a dark background with light-colored text.

```
ustudent@ubu-ustudent:~$ journalctl | grep 'protection: active'
Sep 26 13:59:39 ubu-ustudent kernel: NX (Execute Disable) protection: active
Sep 26 14:14:17 ubu-ustudent kernel: NX (Execute Disable) protection: active
Sep 26 14:19:04 ubu-ustudent kernel: NX (Execute Disable) protection: active
Sep 26 15:11:14 ubu-ustudent kernel: NX (Execute Disable) protection: active
Sep 26 15:14:20 ubu-ustudent kernel: NX (Execute Disable) protection: active
Sep 26 15:15:51 ubu-ustudent kernel: NX (Execute Disable) protection: active
Sep 26 15:36:27 ubu-ustudent kernel: NX (Execute Disable) protection: active
Sep 26 19:42:51 ubu-ustudent kernel: NX (Execute Disable) protection: active
Sep 27 09:42:18 ubu-ustudent kernel: NX (Execute Disable) protection: active
Sep 27 10:25:06 ubu-ustudent kernel: NX (Execute Disable) protection: active
Sep 27 10:29:55 ubu-ustudent kernel: NX (Execute Disable) protection: active
Sep 27 11:04:27 ubu-ustudent kernel: NX (Execute Disable) protection: active
Sep 27 11:07:41 ubu-ustudent kernel: NX (Execute Disable) protection: active
Sep 27 11:50:26 ubu-ustudent kernel: NX (Execute Disable) protection: active
Sep 27 21:29:42 ubu-ustudent kernel: NX (Execute Disable) protection: active
Sep 28 11:55:22 ubu-ustudent kernel: NX (Execute Disable) protection: active
Sep 28 12:42:02 ubu-ustudent kernel: NX (Execute Disable) protection: active
Sep 28 22:35:02 ubu-ustudent kernel: NX (Execute Disable) protection: active
Feb 22 08:41:22 ubu-ustudent kernel: NX (Execute Disable) protection: active
Feb 22 08:43:33 ubu-ustudent kernel: NX (Execute Disable) protection: active
Feb 22 08:45:10 ubu-ustudent kernel: NX (Execute Disable) protection: active
Feb 23 03:43:15 ubu-ustudent kernel: NX (Execute Disable) protection: active
Feb 23 03:46:49 ubu-ustudent kernel: NX (Execute Disable) protection: active
Feb 23 03:49:03 ubu-ustudent kernel: NX (Execute Disable) protection: active
Feb 23 04:10:38 ubu-ustudent kernel: NX (Execute Disable) protection: active
Feb 23 04:14:21 ubu-ustudent kernel: NX (Execute Disable) protection: active
Feb 23 04:26:09 ubu-ustudent kernel: NX (Execute Disable) protection: active
ustudent@ubu-ustudent:~$
```

1.6.2 Ensure address space layout randomization (ASLR) is enabled

The system is not CIS conform. It needs to set the `kernel.randomize_va_space=2` entry in the `/etc/sysctl.conf`



A screenshot of a Linux terminal window titled "ubuntu1804student [Running] - Oracle VM VirtualBox". The window shows a command-line interface with the user "ustudent@ubu-ustudent". The terminal displays the output of the command "sudo sysctl kernel.randomize_va_space". The output shows the value "kernel.randomize_va_space = 2" has been set. The terminal window has a dark background with light-colored text.

```
ustudent@ubu-ustudent:~$ sudo sysctl kernel.randomize_va_space
kernel.randomize_va_space = 2
ustudent@ubu-ustudent:~$
```

Please provide proof of checks via command output or screenshots. According to these checks, are native protections applied to these systems? What packages are installed in this ubuntu machine?

All the installed packages can be viewed in ubuntu with `apt list -installed`

Is TightVNC installed on this Ubuntu machine?

Yes, TightVNC is installed

```
ustudent@ubu-ustudent:~$ apt list --installed | grep vnc

WARNING: apt does not have a stable CLI interface. Use with caution in scripts.

libvncclient/bionic,now 0.9.11+dfsg-1ubuntu1 amd64 [installed]
remmina-plugin-vnc/bionic,now 1.2.0-rcgit.29+dfsg-1ubuntu1 amd64 [installed]
tightvncserver/bionic,now 1.3.10-8ubuntu4 amd64 [installed]
xtightvncviewer/bionic,now 1.3.10-8ubuntu4 amd64 [installed]
ustudent@ubu-ustudent:~$
```

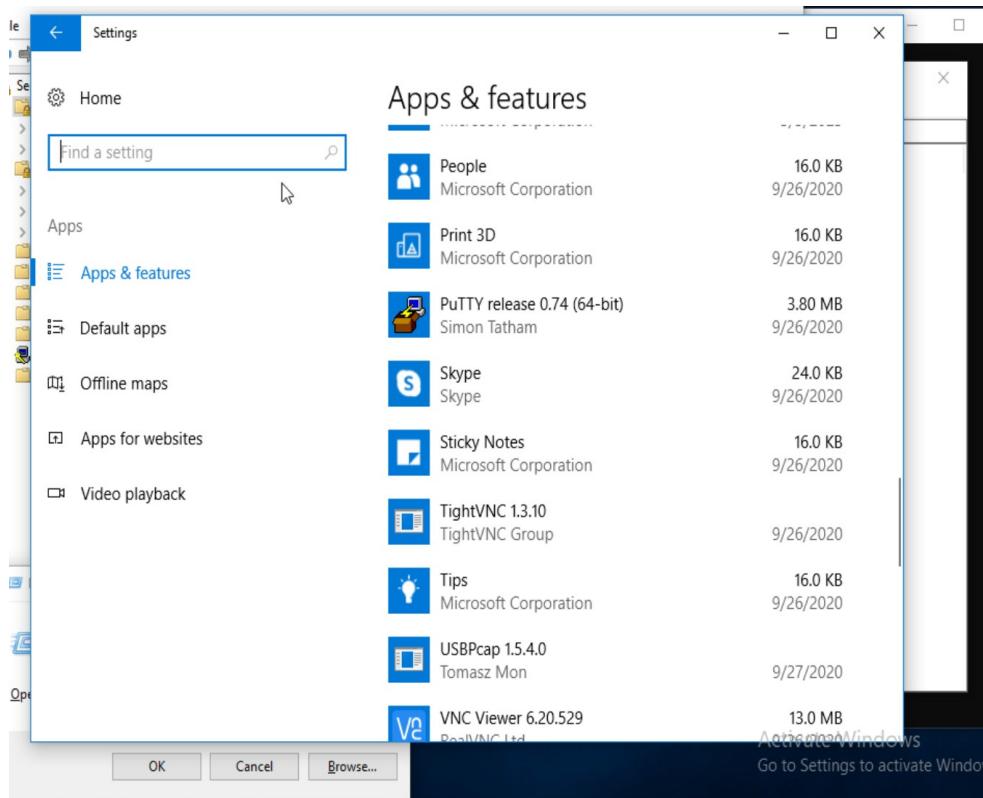
your answer.

Do these applications, both for Windows and Ubuntu, bring added risks to these systems? Please provide proof and reasoning for

Yes, every additional installed application increases the attack surface and thus increases the risk.

For example on ubuntu is an ftp server running which sends username/password in cleartext which can be intercepted by a man in the middle attack. This service should be deactivated. In general the number of services should be kept to a minimum.

The programs in windows can be checked by going to settings > Apps & features. It lists for example VNC Viewer, TightVNC, Putty



Task 4

Perform a network asset inventory using Nmap to identify VMs with open ports on both Windows and Linux

What is your assessment of the Asset Inventory and what recommendations do you have to mitigate any potential issues. Please provide evidence to support your findings.

Ubuntu

Ports should be disabled:

Port 12/tcp daytime service
Port 17/tcp qotd
Port 21/tcp ftp
Port 23/telnet

Ports that are fine:

Port 22/ssh
Port 37/tcp time
Port 80/tcp http
Port 139/tcp samba
Port 445/tcp samba

```
PORT      STATE SERVICE      VERSION
13/tcp    open  daytime
17/tcp    open  qotd?
| fingerprint-strings:
|   DNSStatusRequest:
|     You see, I consider that a man's brain originally is like a little empty
|     attic, and you have to stock it with such furniture as you choose. A fool
|     takes in all the lumber of every sort he comes across, so that the knowledge
|     which might be useful to him gets crowded out, or at best is jumbled up with
|     other things, so that he has difficulty in laying his hands upon it.
|     skilful workman is very careful indeed as to what he takes into his
|     brain-attic. He will have nothing but the tools which may help him in doing
|     work, but of these he has a large assortment, and all in the most perfect
|     order. It is a mistake to think that that little room has elastic walls and
|     distend to any extent. Depend upon it there comes a time when for every
|     addition of knowledge you forget something that you knew before. It is of
|     highest importance, therefore, not to have useless facts
| GenericLines:
|   The time is right to make new friends.
| Help:
|   You will overcome the attacks of jealous associates.
| Kerberos:
|   That secret you've been guarding, isn't.
| NULL:
|   Things past redress and now with me past care.
|   William Shakespeare, "Richard II"
| RTSPRequest:
|   You have a deep appreciation of the arts and music.
| SSLSessionReq:
|   You will pass away very quickly.
| TLS SessionReq:
|   You should go home.
21/tcp    open  ftp          vsftpd 2.0.8 or later
|_sslv2-drown:
22/tcp    open  ssh          OpenSSH 7.6p1 Ubuntu 4 (Ubuntu Linux; protocol 2.0)
23/tcp    open  telnet       Linux telnetd
37/tcp    open  time         (32 bits)
|_rfc868-time: 2023-03-03T14:56:17
80/tcp    open  http         Apache httpd 2.4.29 ((Ubuntu))
|_http-server-header: Apache/2.4.29 (Ubuntu)
```

```

Host script results:
| smb-vuln-cve-2017-7494:
|   VULNERABLE:
|     SAMBA Remote Code Execution from Writable Share
|       State: LIKELY VULNERABLE
|       IDs: CVE:CVE-2017-7494
|       Risk factor: HIGH CVSSv3: 7.5 (HIGH) (CVSS:3.0/AV:N/AC:H/PR:L/UI:N/S:U/C:H/I:H/A:H)
|         All versions of Samba from 3.5.0 onwards are vulnerable to a remote
|         code execution vulnerability, allowing a malicious client to upload a
|         shared library to a writable share, and then cause the server to load
|         and execute it.

|       Disclosure date: 2017-05-24
|       Check results:
|         Samba Version: 3.X - 4.X
|         Writable share found.
|           Name: \\10.0.2.5\data
|             File written to remote share, but unable to execute payload either due to unknown actual path, or the system
|             may be patched.
|               Extra information:
|                 All writable shares:
|                   Name: \\10.0.2.5\data
|                   References:
|                     https://www.samba.org/samba/security/CVE-2017-7494.html
|                     https://cve.mitre.org/cgi-bin/cvename.cgi?name=CVE-2017-7494
|_ smb-vuln-ms10-054: false
|_ smb-vuln-ms10-061: false
|_ smb-vuln-regsvc-dos:
|   VULNERABLE:
|     Service regsvc in Microsoft Windows systems vulnerable to denial of service
|     State: VULNERABLE
|     The service regsvc in Microsoft Windows 2000 systems is vulnerable to denial of service caused by a null
|     deference
|     pointer. This script will crash the service if it is vulnerable. This vulnerability was discovered by Ron
|     Bowes
|     while working on smb-enum-sessions.
|_ 

Service detection performed. Please report any incorrect results at https://nmap.org/submit/ .
Nmap done: 1 IP address (1 host up) scanned in 71.34 seconds

```

Windows ip

Should be disabled

7/tcp echo
 9/tcp discard
 13/tcp daytime
 17/tcp qotd
 19/tcp chargen

Are good:

135/tcp msrpc
 139/ microsoft ssn
 445/tcp microsoft ds
 3389/tcp ms wbt server
 80/tcp http

```
Starting Nmap 7.60 ( https://nmap.org ) at 2023-03-03 10:58 EST
Pre-scan script results:
| broadcast-avahi-dos:
|   Discovered hosts:
|     224.0.0.251
|   After NULL UDP avahi packet DoS (CVE-2011-1002).
|_  Hosts are all up (not vulnerable).
Stats: 0:03:03 elapsed; 0 hosts completed (1 up), 1 undergoing Service Scan
Service scan Timing: About 100.00% done; ETC: 11:01 (0:00:00 remaining)
Nmap scan report for 10.0.2.4
Host is up (0.00029s latency).
Not shown: 990 closed ports
PORT      STATE SERVICE      VERSION
7/tcp      open  echo
9/tcp      open  discard?
13/tcp     open  daytime      Microsoft Windows USA daytime
17/tcp     open  qotd         Windows qotd (English)
19/tcp     open  chargen
80/tcp     open  http         Microsoft IIS httpd 10.0
|_http-csrf: Couldn't find any CSRF vulnerabilities.
|_http-dombased-xss: Couldn't find any DOM based XSS.
|_http-server-header: Microsoft-IIS/10.0
|_http-stored-xss: Couldn't find any stored XSS vulnerabilities.
135/tcp    open  msrpc        Microsoft Windows RPC
139/tcp    open  netbios-ssn  Microsoft Windows netbios-ssn
445/tcp    open  microsoft-ds Microsoft Windows 7 - 10 microsoft-ds (workgroup: WORKGROUP)
3389/tcp   open  ms-wbt-server Microsoft Terminal Services
|_ssl-ccs-injection: No reply from server (TIMEOUT)
|_sslv2-drown:
Service Info: Host: WIN10-USTUDENT; OS: Windows; CPE: cpe:/o:microsoft:windows

Host script results:
|_samba-vuln-cve-2012-1182: NT_STATUS_ACCESS_DENIED
|_smb-vuln-ms10-054: false
|_smb-vuln-ms10-061: NT_STATUS_ACCESS_DENIED

Service detection performed. Please report any incorrect results at https://nmap.org/submit/ .
Nmap done: 1 IP address (1 host up) scanned in 309.96 seconds
```

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Step 2: Assess Access Management at Targeted Assets

Task 1

Check for current settings on Network Segmentation, VLANs, Domain Isolation, or IP Security Policies.

After completing your checks, what is your assessment of these settings? What recommendations do you have to improve the settings? Remember to provide evidence to back up your thoughts. Things to consider on both Ubuntu and Windows:

- Are there any VLANs?
- Are there any policies in place?
 - If there are any, are they applied?
- Is Anonymous access granted to any share?

VLAN hints:

Ubuntu: look under /etc/network/interfaces

Windows: Look under properties of network adapter or Cmdlet Get-NetAdapter|Format-List*, secpol.msc (please provide screenshots)

Vlans:

There are no vlans configured in ubuntu

```
ustudent@ubu-ustudent:~$ cat /etc/network/interfaces
# interfaces(5) file used by ifup(8) and ifdown(8)
auto lo
iface lo inet loopback
ustudent@ubu-ustudent:~$
```

There is no vlan configured in windows

```
Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . :
PS C:\Users\student> ipconfig

Windows IP Configuration

Ethernet adapter Ethernet:

Connection-specific DNS Suffix . : lan
Link-local IPv6 Address . . . . . : fe80::80b0:c285:f15:9129%10
IPv4 Address. . . . . : 10.0.2.4
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 10.0.2.1

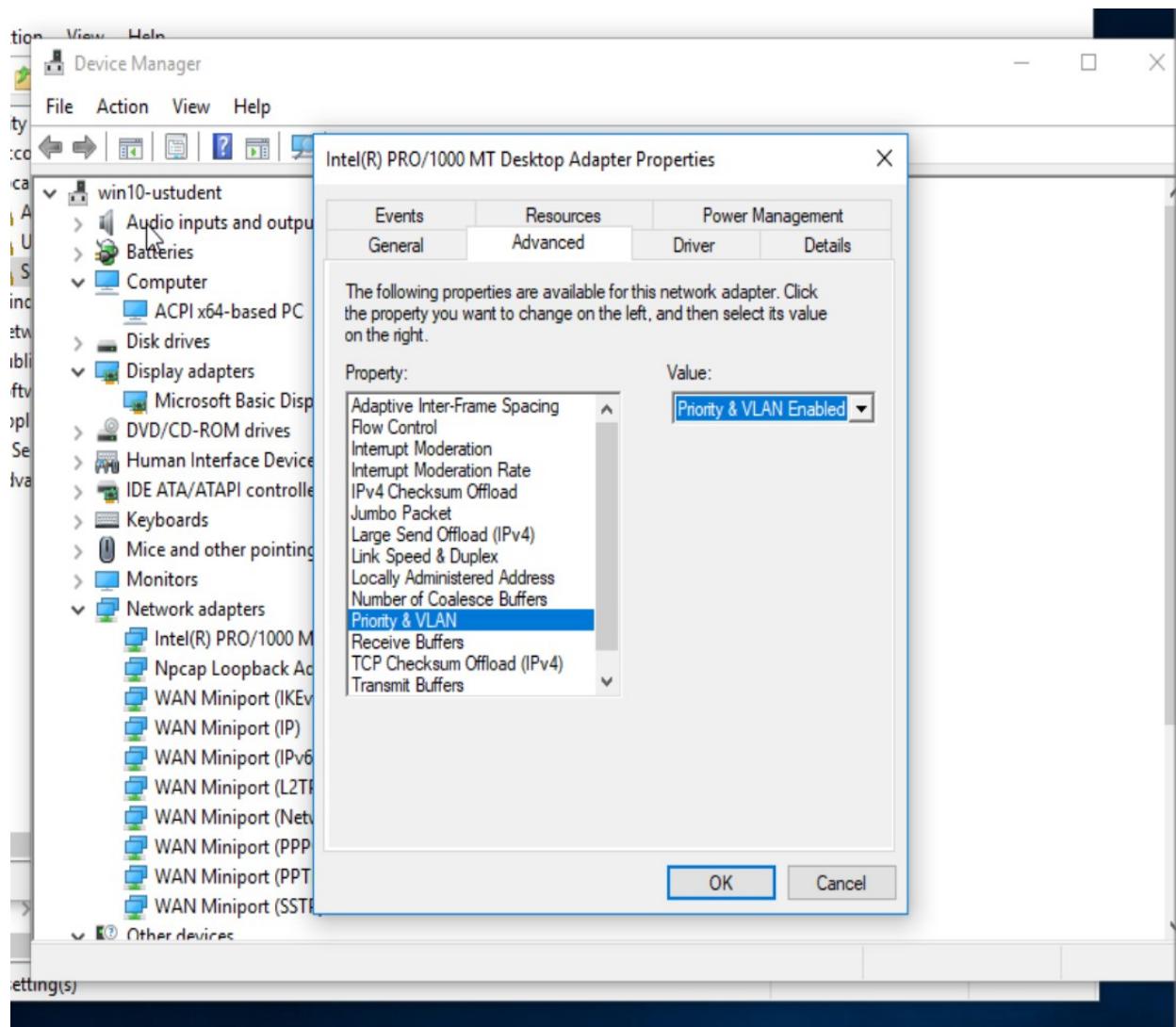
Ethernet adapter Npcap Loopback Adapter:

Connection-specific DNS Suffix . :
Link-local IPv6 Address . . . . . : fe80::5404:62b5:ceda:68c7%12
Autoconfiguration IPv4 Address. . . : 169.254.104.199
Subnet Mask . . . . . : 255.255.0.0
Default Gateway . . . . . :

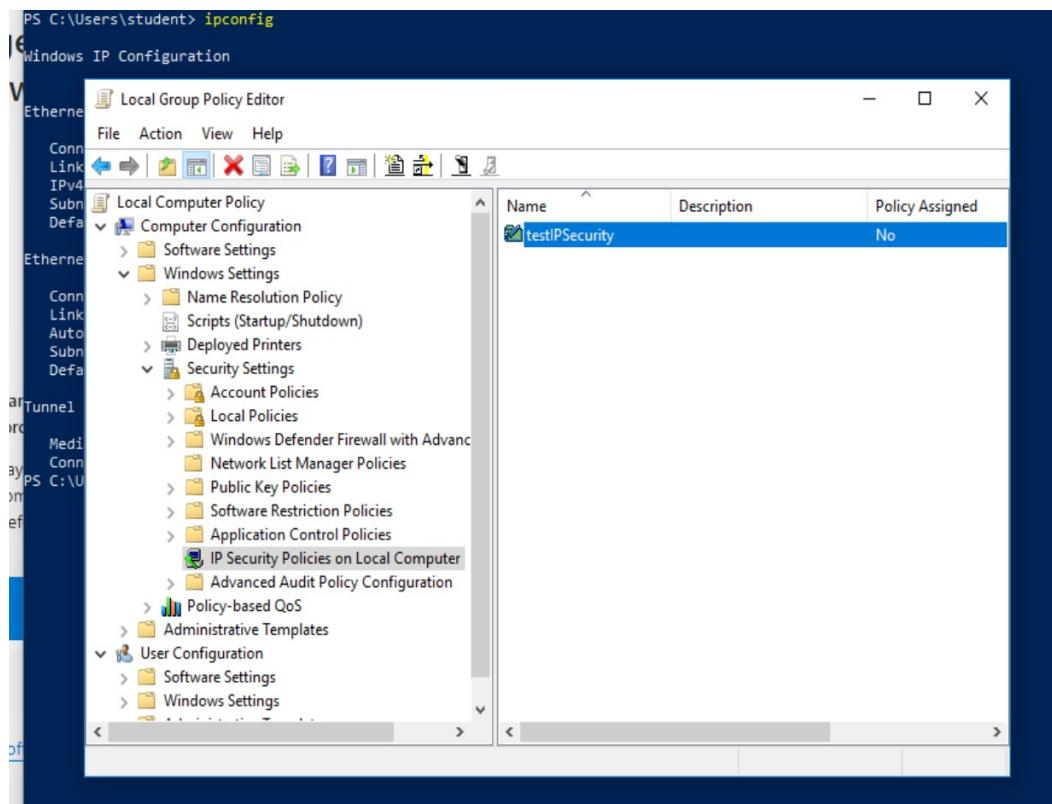
Tunnel adapter Teredo Tunneling Pseudo-Interface:

Media State . . . . . : Media disconnected
Connection-specific DNS Suffix . :
PS C:\Users\student> ■
```

The network adapter is able to handle vlan



On windows there is an IPSec in place, but not applied. See screenshot below.



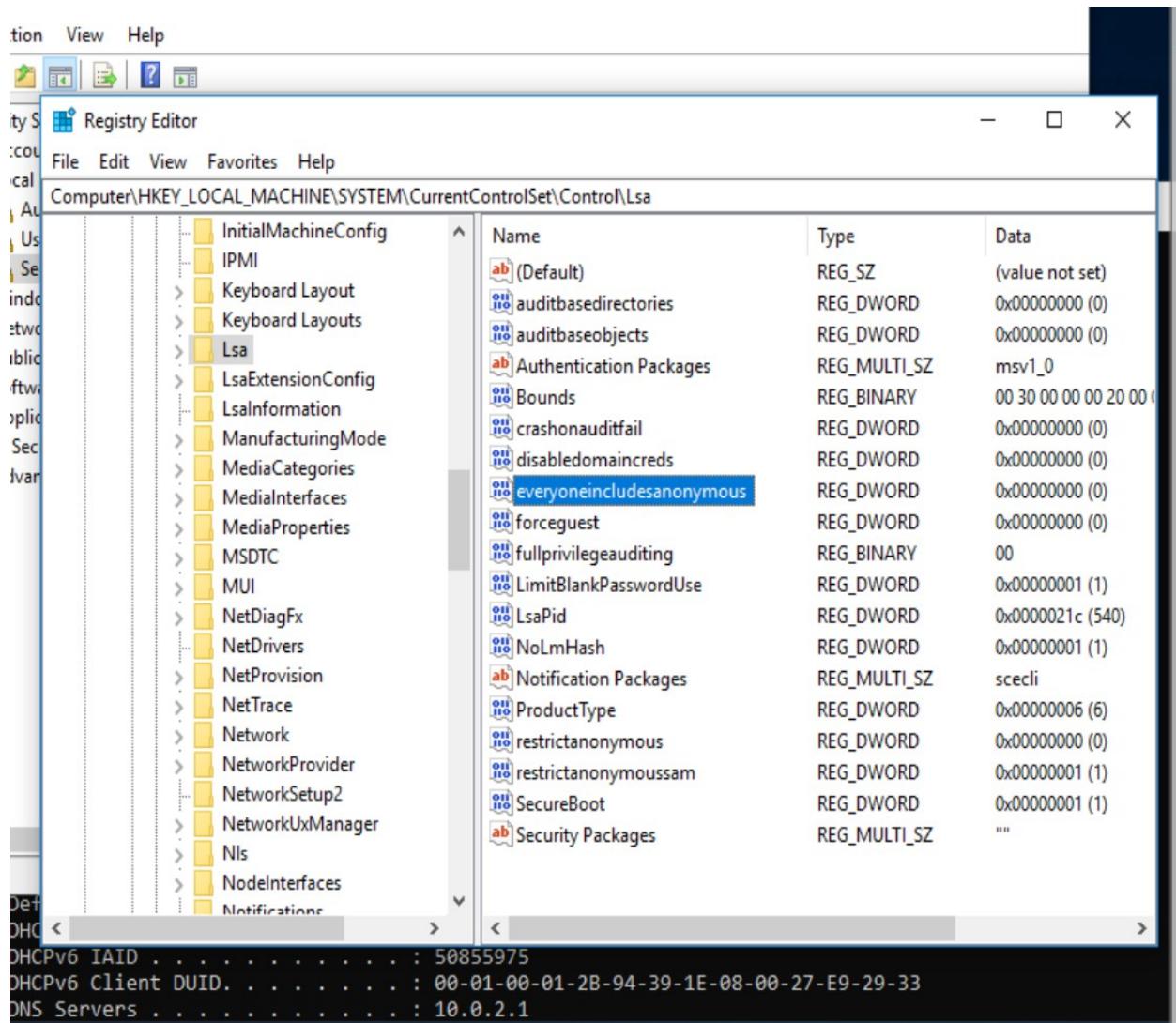
There are no policies configured in ubuntu

```
root@ubu-ustudent:~$ sudo apt install nmap
\#
\#ustudent@ubu-ustudent:~$ cat /etc/hosts.allow
# /etc/hosts.allow: list of hosts that are allowed to access the system.
# See the manual pages hosts_access(5) and hosts_options(5).
# Example:    ALL: LOCAL @some_netgroup
#             ALL: .foobar.edu EXCEPT terminalserver.foobar.edu
# If you're going to protect the portmapper use the name "rpcbind" for the
# daemon name. See rpcbind(8) and rpc.mountd(8) for further information.
# Example:    ALL: LOCAL @some_netgroup
#             ALL: .foobar.edu EXCEPT terminalserver.foobar.edu
# If you're going to protect the portmapper use the name "rpcbind" for the
# daemon name. See rpcbind(8) and rpc.mountd(8) for further information.
# The PARANOID wildcard matches any host whose name does not match its
# address.
# You may wish to enable this to ensure any programs that don't
# validate looked up hostnames still leave understandable logs. In past
# versions of Debian this has been the default.
# ALL: PARANOID

ustudent@ubu-ustudent:~$
```

File written to remote share, but unable to execute payload either due to unknown actual pa

Access by anonymous users is restricted



The network should be made more secure by adding vlans to separate the networks. There could be different vlans for different departments and especially for guest access.

Task 2

Investigate and assess the remote access services and protocols in place for StaticSpeed and determine their security level. After completing your investigation, including your assessment of how StaticSpeed is doing with remote access. Please

have evidence to support your findings. Remember to consider IPv4 and IPv6. Also, include which Remote Service protocols are running on these systems (both Ubuntu and Windows)? What would you recommend to make improvements to this system? Are there protocols that should not be enabled?. Are there networking features that should be disabled or hardened?

One hardening possiblitiy for ssh would be to permit root access only when an internal ip adress is used, denying access from the outside.

Services that are not used or more unsecure, like ftp should be disabled. In general it would be good to disable ipv6 as it is not necessarily used and then only ipv4 needs to be secured. This saves a lot of effort and reduces the attack surface.

The ftp service should be completely shut down as it is a unsecured protocol.

```
ustudent@ubu-ustudent:~$ netstat -ntlp | grep LISTEN
(Es konnten nicht alle Prozesse identifiziert werden; Informationen über
nicht-eigene Prozesse werden nicht angezeigt; Root kann sie anzeigen.)
tcp      0      0 0.0.0.0:37          0.0.0.0:*          LISTEN      -
tcp      0      0 0.0.0.0:139         0.0.0.0:*          LISTEN      -
tcp      0      0 0.0.0.0:13          0.0.0.0:*          LISTEN      -
tcp      0      0 0.0.0.0:17          0.0.0.0:*          LISTEN      -
tcp      0      0 0.0.0.0:21          0.0.0.0:*          LISTEN      -
tcp      0      0 127.0.0.53:53        0.0.0.0:*          LISTEN      -
tcp      0      0 0.0.0.0:22          0.0.0.0:*          LISTEN      -
tcp      0      0 0.0.0.0:23          0.0.0.0:*          LISTEN      -
tcp      0      0 127.0.0.1:631         0.0.0.0:*          LISTEN      -
tcp      0      0 0.0.0.0:445         0.0.0.0:*          LISTEN      -
tcp6     0      0 ::1:139            ::*:              LISTEN      -
tcp6     0      0 ::1:80             ::*:              LISTEN      -
tcp6     0      0 ::1:22             ::*:              LISTEN      -
tcp6     0      0 ::1:631            ::*:              LISTEN      -
tcp6     0      0 ::1:445            ::*:              LISTEN      -
ustudent@ubu-ustudent:~$ netstat -ntlp | grep LISTEN | wc
```

Windows ipv4

Should be disabled

7/tcp echo

9/tcp discard

13/tcp daytime

17/tcp qotd

19/tcp chargen

```
PS C:\Users\student> netstat /a | Select-String -Pattern 'LISTEN'
```

TCP	Local Address	Remote Address	Status
TCP	0.0.0.0:7	win10-ustudent:0	LISTENING
TCP	0.0.0.0:9	win10-ustudent:0	LISTENING
TCP	0.0.0.0:13	win10-ustudent:0	LISTENING
TCP	0.0.0.0:17	win10-ustudent:0	LISTENING
TCP	0.0.0.0:19	win10-ustudent:0	LISTENING
TCP	0.0.0.0:80	win10-ustudent:0	LISTENING
TCP	0.0.0.0:135	win10-ustudent:0	LISTENING
TCP	0.0.0.0:445	win10-ustudent:0	LISTENING
TCP	0.0.0.0:3389	win10-ustudent:0	LISTENING
TCP	0.0.0.0:5985	win10-ustudent:0	LISTENING
TCP	0.0.0.0:47001	win10-ustudent:0	LISTENING
TCP	0.0.0.0:49664	win10-ustudent:0	LISTENING
TCP	0.0.0.0:49665	win10-ustudent:0	LISTENING
TCP	0.0.0.0:49666	win10-ustudent:0	LISTENING
TCP	0.0.0.0:49669	win10-ustudent:0	LISTENING
TCP	0.0.0.0:49670	win10-ustudent:0	LISTENING
TCP	0.0.0.0:49671	win10-ustudent:0	LISTENING
TCP	0.0.0.0:49672	win10-ustudent:0	LISTENING
TCP	10.0.2.4:139	win10-ustudent:0	LISTENING
TCP	10.0.2.4:5040	win10-ustudent:0	LISTENING
TCP	169.254.104.199:139	win10-ustudent:0	LISTENING
TCP	169.254.104.199:5040	win10-ustudent:0	LISTENING
TCP	[::]:7	win10-ustudent:0	LISTENING
TCP	[::]:9	win10-ustudent:0	LISTENING
TCP	[::]:13	win10-ustudent:0	LISTENING
TCP	[::]:17	win10-ustudent:0	LISTENING
TCP	[::]:19	win10-ustudent:0	LISTENING
TCP	[::]:80	win10-ustudent:0	LISTENING
TCP	[::]:135	win10-ustudent:0	LISTENING
TCP	[::]:445	win10-ustudent:0	LISTENING
TCP	[::]:3389	win10-ustudent:0	LISTENING
TCP	[::]:5985	win10-ustudent:0	LISTENING
TCP	[::]:47001	win10-ustudent:0	LISTENING
TCP	[::]:49664	win10-ustudent:0	LISTENING
TCP	[::]:49665	win10-ustudent:0	LISTENING
TCP	[::]:49666	win10-ustudent:0	LISTENING
TCP	[::]:49669	win10-ustudent:0	LISTENING
TCP	[::]:49670	win10-ustudent:0	LISTENING
TCP	[::]:49671	win10-ustudent:0	LISTENING
TCP	[::]:49672	win10-ustudent:0	LISTENING

Task 3

NuttyUtility only needs remote access ports for administrators on workstations. What is your assessment of the firewalls in StaticSpeed's systems? Please include evidence to support your thoughts. We need to know if the firewalls are configured correctly?

Also, what ports would you suggest to have open and running and why?

In ubuntu the firewall is inactive

```
ustudent@ubu-ustudent:~$ sudo ufw status  
Status: Inaktiv  
ustudent@ubu-ustudent:~$
```

I would suggest that port 22/tcp is open for the ssh service that admins can remotely log into the workstation. Additionally, I would permit access only with an internal ip address.

```
Domain Profile Settings:
-----
State                                ON
Firewall Policy                      BlockInbound,AllowOutbound
LocalFirewallRules                   N/A (GPO-store only)
LocalConSecRules                     N/A (GPO-store only)
InboundUserNotification              Enable
RemoteManagement                     Disable
UnicastResponseToMulticast          Enable

Logging:
LogAllowedConnections                Disable
LogDroppedConnections                Disable
FileName                            %systemroot%\system32\LogFiles\Firewall\pfirewall.log
MaxFileSize                         4096
```

Private Profile Settings:

```
-----
State                                OFF
Firewall Policy                      BlockInbound,AllowOutbound
LocalFirewallRules                   N/A (GPO-store only)
LocalConSecRules                     N/A (GPO-store only)
InboundUserNotification              Disable
RemoteManagement                     Disable
UnicastResponseToMulticast          Enable

Logging:
LogAllowedConnections                Disable
LogDroppedConnections                Disable
FileName                            %systemroot%\system32\LogFiles\Firewall\pfirewall.log
MaxFileSize                         4096
```

Task 4

Next, conduct a Principles of Least Privilege assessment of StaticSpeed's system.

We need to know:

- Which users have high privileges?
- Do important PII folders have the correct permissions and ownership?
- Are the default settings correct, and are there any excessive permissions?
- On our initial scan, we found "data" shared folders that need further investigation.
- Are there "guest" accounts enabled? Are they allowed to use Sudo commands? Are they allowed to log in to ALL workstations?.

Based on your findings, what should be done to secure these accounts and permissions better? Please provide proof of your results and provide reasoning for your answer.

In ubutu the folder permissions are not set correctly as everyone has read, write and execute permission to the data folder for example.

```
ustudent@ubu-ustudent:~/Documents$ ll
insgesamt 12
drwxr-xr-x  3 uststudent uststudent 4096 Sep 26  2020 .
drwxr-xr-x 19 uststudent uststudent 4096 Mär  5 05:24 ../
drwxrwxrwx  2 uststudent uststudent 4096 Mär  3 09:56 data/
ustudent@ubu-ustudent:~/Documents$
```

On ubuntu there are guest accounts

```
ustudent@ubu-ustudent:~$ sudo cat /etc/group | grep guest
guest:x:1001:
ustudent@ubu-ustudent:~$

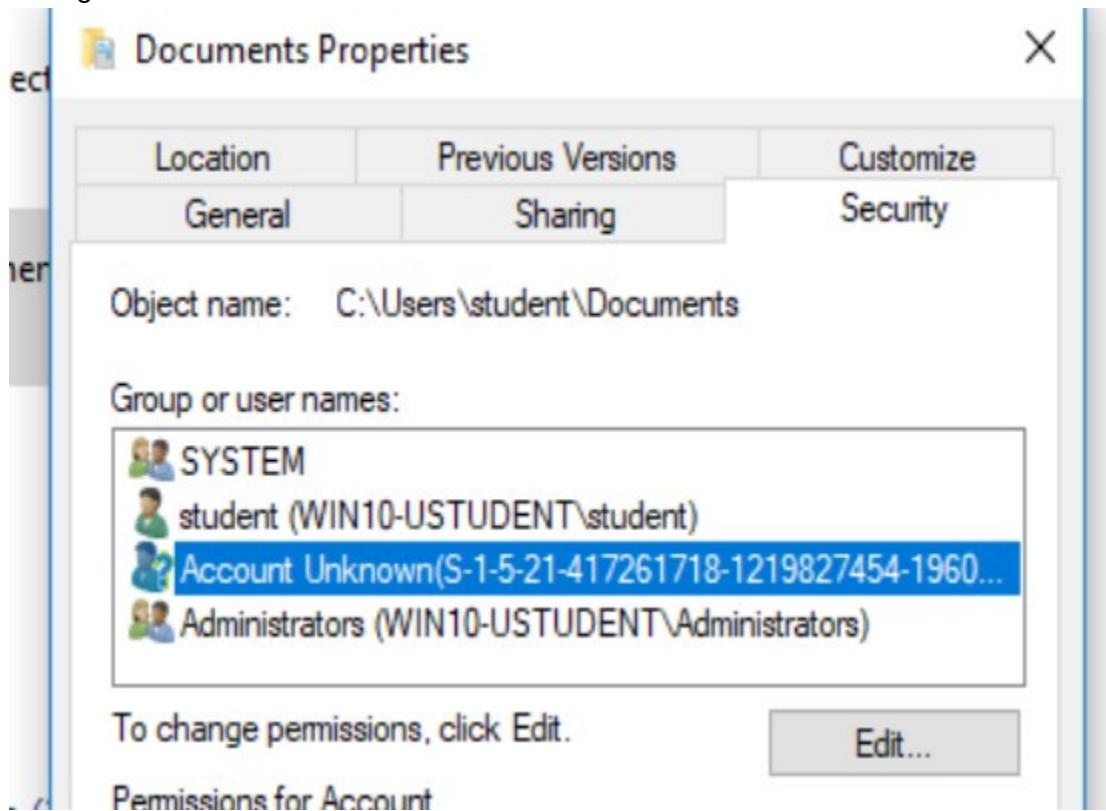
ustudent@ubu-ustudent:/home$ ls
guest  user3  user4  user5  uststudent
ustudent@ubu-ustudent:/home$
```

On ubuntu everyone is allowed to use sudo.

```
ustudent@ubu-ustudent:~$ sudo cat /etc/sudoers
#
# This file MUST be edited with the 'visudo' command as root.
#
# Please consider adding local content in /etc/sudoers.d/ instead of
# directly modifying this file.
#
# See the man page for details on how to write a sudoers file.
#
Defaults        env_reset
Defaults        mail_badpass
Defaults        secure_path="/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/usr/games:/usr/local/games"
#
# Host alias specification
#
# User alias specification
#
# Cmnd alias specification
#
# User privilege specification
root    ALL=(ALL:ALL) ALL
#
# Members of the admin group may gain root privileges
%admin  ALL=(ALL) ALL
#
# Allow members of group sudo to execute any command
%sudo   ALL=(ALL:ALL) ALL
#
# See sudoers(5) for more information on "#include" directives:
#
#include /etc/sudoers.d
ustudent@ubu-ustudent:~$
```

On windows

There are guest accounts



The screenshot shows the Windows Local Users and Groups snap-in. The left pane displays a tree view with 'Local Users and Groups (Local)' expanded, showing 'Users' and 'Groups'. The right pane lists user accounts in a table format:

Name	Full Name	Description
Administrator		Built-in account for administering...
DefaultAcco...		A user account managed by the s...
Guest		Built-in account for guest access t...
student		
user2		
user3	user3	
user4	user4	
WDAGUtility...		A user account managed and use...

An 'Actions' sidebar on the right shows 'Users' selected.

The permissions are not set correctly as authenticaed users are allowed to modify the content of the folder.

The screenshot shows the 'Advanced Security Settings for Local Disk (C:)' dialog box. The 'Permissions' tab is selected, showing the following permission entries:

Type	Principal	Access	Inherited from	Applies to
Allow	Administrators (WIN10-USTU...)	Full control	None	This folder, subfolders and files
Allow	SYSTEM	Full control	None	This folder, subfolders and files
Allow	Users (WIN10-USTUDENT\Use...)	Read & execute	None	This folder, subfolders and files
Allow	Authenticated Users	Modify	None	Subfolders and files only
Allow	Authenticated Users	Create folders / append data	None	This folder only

At the bottom, there are buttons for 'Change permissions' and 'View', and standard 'OK', 'Cancel', and 'Apply' buttons.

Step 3: Log Monitoring Setup for Detection at Targeted Assets

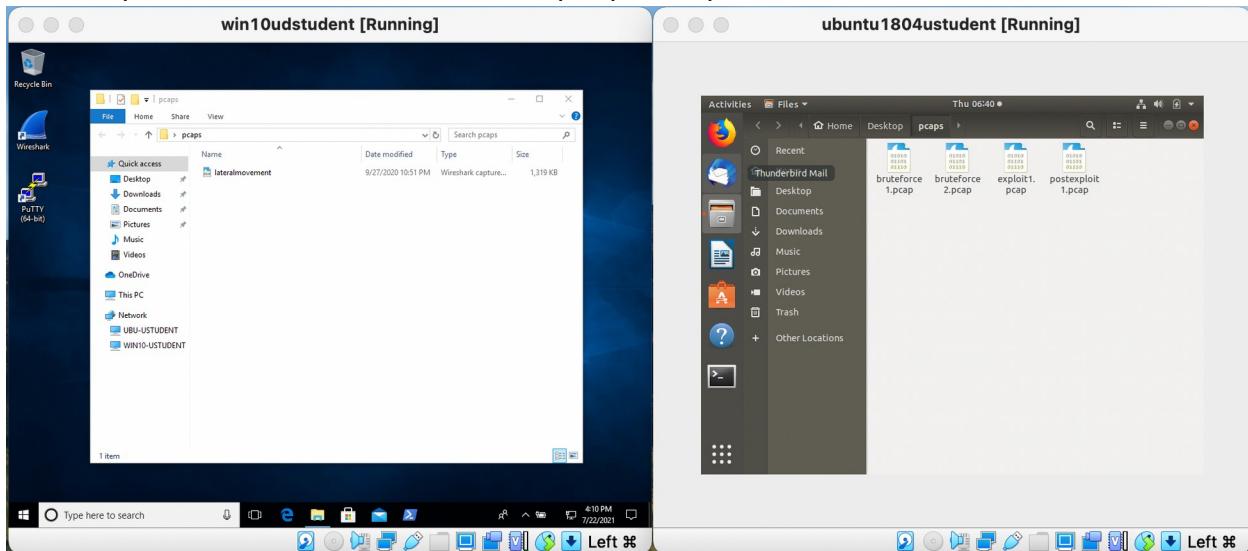
StaticSpeed has provided access to a monitoring device that has recorded some traffic marked as malicious. Please investigate and assess this further using Wireshark or tcpdump and the provided capture files (pcaps). It is also required of you to verify that appropriate logging is in place at your machines.

Complete your assessment of this traffic. Then, add your suggestions on any issues and improvements by following the steps below. Remember to provide evidence to support your work and recommendations.

Task 1

In this audit, use the pcaps named bruteforce2.pcap and lateralmovement.pcap, along with the other pcaps that may provide more insight into StaticSpeed's network. We recommend focusing on bruteforce2.pcap.

The snapshot below shows the list of pcap files present in both machines.



Use the pcap file to assess and determine the following:

- What type of attack was recorded?
- What is the source IP of the attack?
- What protocol was targeted?
- What password was used successfully?
- Which user was compromised?

Based on your findings from above, what is your assessment of what happened? Please provide evidence to back up your results.

There was a bruteforce attack from the host 10.0.2.7. This can be seen that request with different username/password combinations are recorded.

The telnet protocol was targeted.

The successful credentials are: ustudent/1234 as seen in the last screenshot.

No.	Time	Source	Destination	Protocol	Length	Info
3148	75.336938	10.0.2.7	10.0.2.5	TCP	66	32920 → 23 [ACK] Seq=37 Ack=78 Win=64256 Len=0 Tsvl=1857764048 Tscr=3538440427
3226	75.437742	10.0.2.7	10.0.2.5	TCP	66	32920 → 23 [ACK] Seq=42 Ack=83 Win=64256 Len=0 Tsvl=1857764149 Tscr=3538440508
3269	75.478596	10.0.2.7	10.0.2.5	TCP	66	32920 → 23 [ACK] Seq=42 Ack=93 Win=64256 Len=0 Tsvl=1857764189 Tscr=3538440528
3467	75.640468	10.0.2.7	10.0.2.5	TCP	66	32920 → 23 [ACK] Seq=48 Ack=95 Win=64256 Len=0 Tsvl=1857764352 Tscr=3538440715
3570	75.753561	10.0.2.7	10.0.2.5	TCP	66	32920 → 23 [ACK] Seq=49 Ack=96 Win=64256 Len=0 Tsvl=1857764465 Tscr=3538440844
3566	75.752726	10.0.2.7	10.0.2.5	TCP	66	32920 → 23 [FIN, ACK] Seq=48 Ack=95 Win=64256 Len=0 Tsvl=1857764464 Tscr=3538440715
2615	74.735629	10.0.2.7	10.0.2.5	TCP	74	32920 → 23 [SYN] Seq=0 Win=64240 Len=0 MSS=1468 SACK_PERM=1 Tsvl=1857763446 Tscr=0 WS=128
Ubuntu-Software	75.001448	10.0.2.5	10.0.2.7	TELNET	78	Telnet Data ...
	75.001466	10.0.2.7	10.0.2.5	TELNET	69	Telnet Data ...
2723	74.888451	10.0.2.5	10.0.2.7	TELNET	69	Telnet Data ...
2728	74.888530	10.0.2.7	10.0.2.5	TELNET	78	Telnet Data ...
2737	74.893453	10.0.2.5	10.0.2.7	TELNET	81	Telnet Data ...
2861	75.091404	10.0.2.7	10.0.2.5	TELNET	69	Telnet Data ...
2865	75.092111	10.0.2.5	10.0.2.7	TELNET	69	Telnet Data ...
2869	75.092938	10.0.2.7	10.0.2.5	TELNET	78	Telnet Data ...
2876	75.094210	10.0.2.5	10.0.2.7	TELNET	69	Telnet Data ...
2881	75.095139	10.0.2.5	10.0.2.7	TELNET	104	Telnet Data ...
2951	75.195623	10.0.2.7	10.0.2.5	TELNET	69	Telnet Data ...
3097	75.296371	10.0.2.7	10.0.2.5	TELNET	67	Telnet Data ...
3099	75.296542	10.0.2.5	10.0.2.7	TELNET	67	Telnet Data ...
3127	75.316394	10.0.2.7	10.0.2.5	TELNET	67	Telnet Data ...
3128	75.316453	10.0.2.5	10.0.2.7	TELNET	67	Telnet Data ...
3146	75.336533	10.0.2.7	10.0.2.5	TELNET	67	Telnet Data ...
3147	75.336612	10.0.2.5	10.0.2.7	TELNET	67	Telnet Data ...
3170	75.356594	10.0.2.7	10.0.2.5	TELNET	67	Telnet Data ...
3171	75.356724	10.0.2.5	10.0.2.7	TELNET	67	Telnet Data ...
3184	75.376869	10.0.2.7	10.0.2.5	TELNET	67	Telnet Data ...
3187	75.376975	10.0.2.5	10.0.2.7	TELNET	67	Telnet Data ...
3201	75.397276	10.0.2.7	10.0.2.5	TELNET	67	Telnet Data ...
3204	75.397573	10.0.2.5	10.0.2.7	TELNET	67	Telnet Data ...
3215	75.417381	10.0.2.7	10.0.2.5	TELNET	66	Telnet Data ...
3217	75.417941	10.0.2.5	10.0.2.7	TELNET	66	Telnet Data ...

Frame 2881: 104 bytes on wire (832 bits), 104 bytes captured (832 bits)
Ethernet II, Src: PcsCompu_1a:99:62 (08:00:27:1a:99:62), Dst: PcsCompu_4f:2f:6a (08:00:27:4f:2f:6a)
Internet Protocol Version 4, Src: 10.0.2.5, Dst: 10.0.2.7
Transmission Control Protocol, Src Port: 23, Dst Port: 32920, Seq: 37, Ack: 31, Len: 38

▼ Telnet
 Data: Ubuntu 18.04 LTS\r\n Data: ubu-ustudent login:

..... .#..!".."..... .#..!'.....!....!....!....Ubuntu 18.04 LTS
ubu-ustudent login: uussttuuddeenntt

>Password: 12345678

.

..... .#..!".."..... .#..!'.....!....!....!....Ubuntu 18.04 LTS
ubu-ustudent login: uussttuuddeenntt

.

Password: password1

.

```
.... .#..!".."..... .#..'.....!.....!...Ubuntu 18.04 LTS
ubu-ustudent login: ...uussttuuddeenntt
.
Password: 1234
.
Last login: Sun Sep 27 23:06:49 EDT 2020 from 10.0.2.7 on pts/11
```

Bruteforce attacks can be prevented by using timeouts that slow down the attack. Furthermore, the quality of the password should be extended. It should be longer and have small and big letters as well as special characters.

Task 2

We suspect that an internal user may have compromised another machine inside StaticSpeed's network and pivoted to one of the devices you are auditing. Please use `lateralmovement.pcap` and determine the following:

- What was the source IP of the "initial" attack?
- Did the attacker try to access your machine from a compromised device - MITRE ATT&CK Technique T1021?
- What service and port were targeted?
- Was the attacker able to access a sensitive file at the machine you are auditing? Mitre ATT&ACK Technique - T1570

Please provide a narrative of what happened based on your findings. Justify your report based on the answers.

The source ip of the initial attack is 10.0.2.7.

It seems the attacker also attacked the machine 10.0.2.6.

ip.addr == 10.0.2.6 and ip.addr == 10.0.2.7						
No.	Time	Source	Destination	Protocol	Length	Info
5	42.930762	10.0.2.7	10.0.2.6	SMB	136	Tree Connect AndX Request, Path: \\10.0.2.6\IPC\$
36	42.930980	10.0.2.6	10.0.2.7	SMB	116	Tree Connect AndX Response
37	42.932764	10.0.2.7	10.0.2.6	SMB Pi...	144	PeekNamedPipe Request, FID: 0x0000
38	42.932879	10.0.2.6	10.0.2.7	SMB	105	Trans Response, Error: STATUS_INSUFF_SERVER_RESOURCES
39	42.933998	10.0.2.7	10.0.2.6	TCP	74	39289 → 135 [SYN] Seq=0 Win=64240 Len=0 MSS=1460
40	42.934200	10.0.2.6	10.0.2.7	TCP	74	135 → 39289 [SYN, ACK] Seq=0 Ack=1 Win=8192 Len=0
41	42.934372	10.0.2.7	10.0.2.6	TCP	66	39289 → 135 [ACK] Seq=1 Ack=1 Win=64256 Len=0 TS=1
42	42.934508	10.0.2.7	10.0.2.6	DCERPC	138	Bind: call_id: 0, Fragment: Single, 1 context item
43	42.934667	10.0.2.6	10.0.2.7	DCERPC	126	Bind_ack: call_id: 0, Fragment: Single, max_xmit
44	42.934830	10.0.2.7	10.0.2.6	TCP	66	39289 → 135 [ACK] Seq=73 Ack=61 Win=64256 Len=0
45	42.934830	10.0.2.7	10.0.2.6	TCP	66	39289 → 135 [FIN, ACK] Seq=73 Ack=61 Win=64256 Len=0
46	42.934936	10.0.2.6	10.0.2.7	TCP	66	135 → 39289 [ACK] Seq=61 Ack=74 Win=66560 Len=0
47	42.934936	10.0.2.6	10.0.2.7	TCP	66	135 → 39289 [FIN, ACK] Seq=61 Ack=74 Win=66560 Len=0
48	42.935098	10.0.2.7	10.0.2.6	TCP	66	39289 → 135 [ACK] Seq=74 Ack=62 Win=64256 Len=0
49	42.936943	10.0.2.7	10.0.2.6	SMB	149	Trans2 Request, SESSION_SETUP
50	42.937107	10.0.2.6	10.0.2.7	SMB	105	Trans2 Response, SESSION_SETUP, Error: STATUS_NO_SUCH_FILE_OR_DIRECTORY
51	42.937476	10.0.2.7	10.0.2.6	TCP	66	34515 → 445 [FIN, ACK] Seq=982 Ack=769 Win=64128 Len=0
52	42.937633	10.0.2.6	10.0.2.7	TCP	66	445 → 34515 [ACK] Seq=769 Ack=983 Win=65536 Len=0
53	42.937703	10.0.2.6	10.0.2.7	TCP	60	445 → 34515 [RST, ACK] Seq=769 Ack=983 Win=0 Len=0
54	42.939306	10.0.2.7	10.0.2.6	TCP	74	46311 → 445 [SYN] Seq=0 Win=64240 Len=0 MSS=1460
55	42.939412	10.0.2.6	10.0.2.7	TCP	74	445 → 46311 [SYN, ACK] Seq=0 Ack=1 Win=6102 Len=0

The attacker tried to access my machine 10.0.2.4 from a compromised machine with ip 10.0.2.6.

ip.addr == 10.0.2.6 and ip.addr == 10.0.2.4						
No.	Time	Source	Destination	Protocol	Length	Info
1221	111.110195	10.0.2.4	10.0.2.6	LLMNR	160	Standard query response 0x05ed ANY win10-ustudent
1229	111.113549	10.0.2.4	10.0.2.6	LLMNR	160	Standard query response 0x6cf ANY win10-ustudent
2032	411.157355	10.0.2.4	10.0.2.6	LLMNR	160	Standard query response 0xe400 ANY win10-ustudent
2040	411.161533	10.0.2.4	10.0.2.6	LLMNR	160	Standard query response 0x56ca ANY win10-ustudent
2351	681.667224	10.0.2.6	10.0.2.4	TCP	66	49165 → 445 [SYN] Seq=0 Win=8192 Len=0 MSS=1460
2352	681.667409	10.0.2.4	10.0.2.6	TCP	66	445 → 49165 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0
2353	681.667937	10.0.2.6	10.0.2.4	TCP	60	49165 → 445 [ACK] Seq=1 Ack=1 Win=65536 Len=0
2357	681.728690	10.0.2.6	10.0.2.4	SMB	116	Negotiate Protocol Request
2358	681.741316	10.0.2.4	10.0.2.6	SMB2	506	Negotiate Protocol Response
2364	681.810326	10.0.2.6	10.0.2.4	SMB2	224	Session Setup Request, NTLMSSP_NEGOTIATE
2365	681.819642	10.0.2.4	10.0.2.6	SMB2	390	Session Setup Response, Error: STATUS_MORE_PROCESSOR_LEVELS
2371	681.922490	10.0.2.6	10.0.2.4	SMB2	482	Session Setup Request, NTLMSSP_AUTH, User: .\Administrator
2372	681.930481	10.0.2.4	10.0.2.6	SMB2	130	Session Setup Response, Error: STATUS_LOGON_FAILURE
2378	681.989060	10.0.2.6	10.0.2.4	SMB2	160	Tree Connect Request Tree: \\10.0.2.4\IPC\$
2379	681.989361	10.0.2.4	10.0.2.6	TCP	54	445 → 49165 [RST, ACK] Seq=865 Ack=767 Win=0 Len=0
2413	711.209439	10.0.2.4	10.0.2.6	LLMNR	160	Standard query response 0x6450 ANY win10-ustudent
2421	711.212670	10.0.2.4	10.0.2.6	LLMNR	160	Standard query response 0x33d3 ANY win10-ustudent
2531	753.374783	10.0.2.6	10.0.2.4	TCP	66	49166 → 445 [SYN] Seq=0 Win=8192 Len=0 MSS=1460
2532	753.374849	10.0.2.4	10.0.2.6	TCP	66	445 → 49166 [SYN, ACK] Seq=0 Ack=1 Win=65535 Len=0
2533	753.375187	10.0.2.6	10.0.2.4	TCP	60	49166 → 445 [ACK] Seq=1 Ack=1 Win=65536 Len=0
2537	753.465651	10.0.2.4	10.0.2.4	SMB	116	Negotiate Protocol Request

The smb2 protocol on port 445 of 10.0.2.4 is the target.

The attacker 10.0.2.7 was able to read sensitive information. He got access to the payroll_xxxxx.xls file.

9037450	10.0.2.4	10.0.2.7	SMB2	102 Close Response
900420	10.0.2.7	10.0.2.4	SMB2	242 Create Request File: payroll_20200927000951_1871.xls
900572	10.0.2.4	10.0.2.7	SMB2	210 Create Response File: payroll_20200927000951_1871.xls
901674	10.0.2.7	10.0.2.4	SMB2	163 GetInfo Request FILE_INFO/SMB2_FILE_ALL_INFO File: payroll_20...
901770	10.0.2.4	10.0.2.7	SMB2	234 GetInfo Response
906007	10.0.2.7	10.0.2.4	SMB2	163 GetInfo Request FILE_INFO/SMB2_FILE_ALL_INFO File: payroll_20...
906116	10.0.2.4	10.0.2.7	SMB2	234 GetInfo Response
906833	10.0.2.7	10.0.2.4	SMB2	171 Read Request Len:262128 Off:0 File: payroll_20200927000951_18...
909831	10.0.2.4	10.0.2.7	TCP	24874 445 → 39160 [ACK] Seq=10230 Ack=8243 Win=524800 Len=24820 [TC...
910240	10.0.2.7	10.0.2.4	TCP	60 39160 → 445 [ACK] Seq=8243 Ack=30670 Win=51968 Len=0
910266	10.0.2.4	10.0.2.7	SMB2	32150 Read Response
910369	10.0.2.7	10.0.2.4	TCP	60 39160 → 445 [ACK] Seq=8243 Ack=35050 Win=62592 Len=0
910662	10.0.2.7	10.0.2.4	TCP	60 39160 → 445 [ACK] Seq=8243 Ack=67146 Win=64128 Len=0
910734	10.0.2.7	10.0.2.4	SMB2	171 Read Request Len:205296 Off:56832 File: payroll_2020092700095...
910779	10.0.2.4	10.0.2.7	SMB2	130 Read Response, Error: STATUS_END_OF_FILE
911688	10.0.2.7	10.0.2.4	SMB2	171 Read Request Len:262128 Off:56832 File: payroll_2020092700095...
911739	10.0.2.4	10.0.2.7	SMB2	130 Read Response, Error: STATUS_END_OF_FILE
912261	10.0.2.7	10.0.2.4	SMB2	146 Close Request File: payroll_20200927000951_1871.xls
912338	10.0.2.4	10.0.2.7	SMB2	182 Close Response
956568	10.0.2.7	10.0.2.4	TCP	60 39160 → 445 [ACK] Seq=8569 Ack=67426 Win=67072 Len=0

Task 3

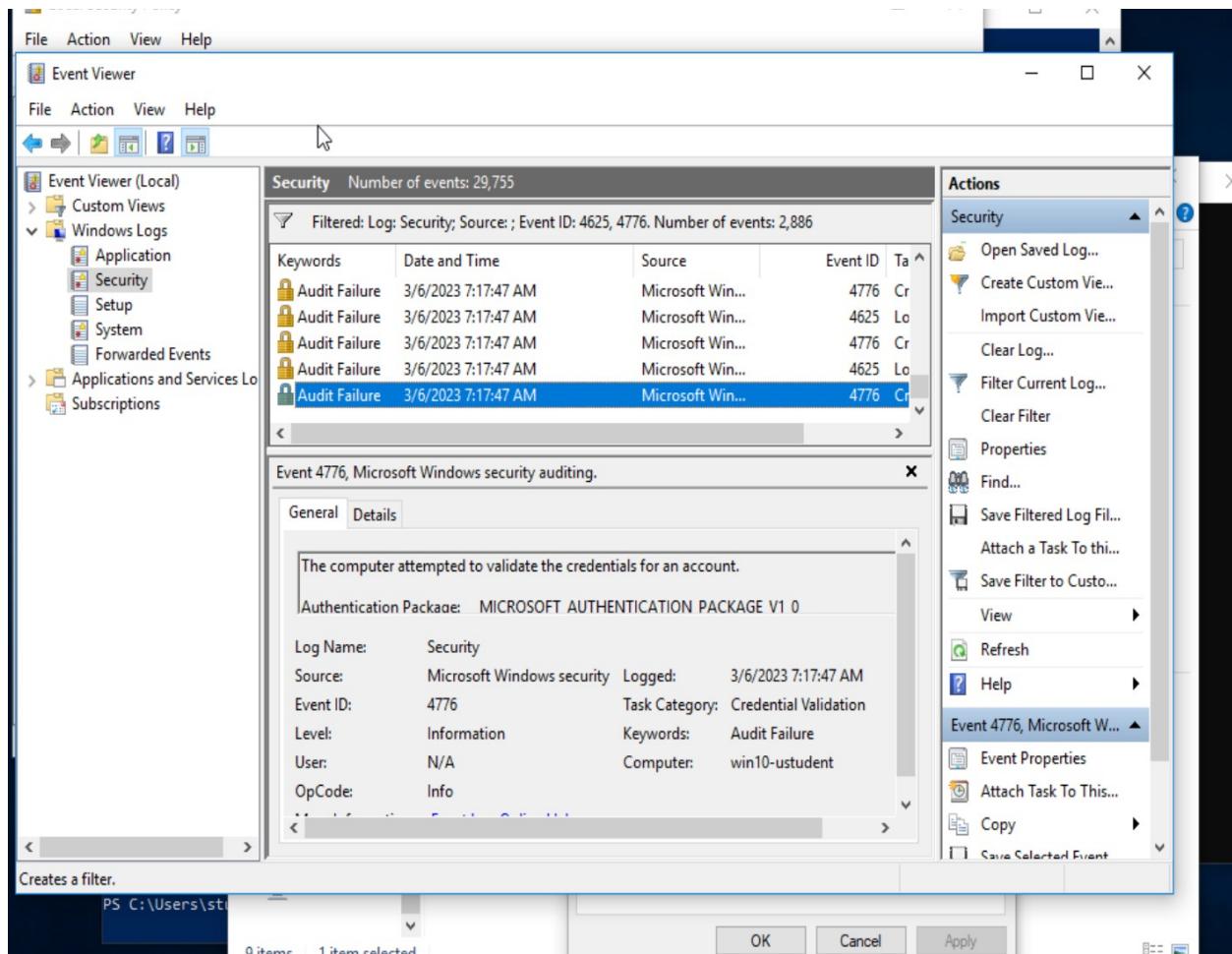
Look at logs on the StaticSpeed Windows machine.

Using the logs, determine the following:

- Are there any issues with Windows Share? Please provide screenshots of your findings.
- Look at the audit logs setup at your Linux machine and find the audit.log file. What was the name of the attacker's account? Please provide screenshots.

Based on what you found above, provide your assessment on whether these events are enough to start an investigation? Please explain your answer based on what you saw in the logs.

I don't see anything suspicious in the windows event viewer.



The name of the attacker is nobody

terminal=? res=success'
type=SERVICE_STOP msg=audit(1601323095.471:1327): pid=1 uid=0 auid=4294967295 ses=4294967295 msg='unit=NetworkManager-dispatcher comm="systemd" exe="/lib/systemd/systemd" hostname=? addr=?
terminal=? res=success'
type=CRED_DISP msg=audit(1601323210.745:1328): pid=4130 uid=0 auid=4294967295 ses=4294967295 msg='op=PAM:setcred acct="nobody" exe="/usr/sbin/smbd" hostname=10.0.2.15 addr=10.0.2.15 terminal=sml
646127919 res=success'
type=USER_END msg=audit(1601323210.761:1329): pid=4130 uid=0 auid=4294967295 ses=4294967295 msg='op=PAM:session_close acct="nobody" exe="/usr/sbin/smbd" hostname=10.0.2.15 addr=10.0.2.15
terminal=smb/646127919 res=success'
type=CRED_DISP msg=audit(1601323210.905:1330): pid=4128 uid=0 auid=4294967295 ses=4294967295 msg='op=PAM:setcred acct="nobody" exe="/usr/sbin/smbd" hostname=10.0.2.15 addr=10.0.2.15 terminal=sml
1550062165 res=success'
type=USER_END msg=audit(1601323210.909:1331): pid=4128 uid=0 auid=4294967295 ses=4294967295 msg='op=PAM:session_close acct="nobody" exe="/usr/sbin/smbd" hostname=10.0.2.15 addr=10.0.2.15
terminal=smb/1550062165 res=success'
type=CRED_DISP msg=audit(1601323210.957:1332): pid=4126 uid=0 auid=4294967295 ses=4294967295 msg='op=PAM:setcred acct="nobody" exe="/usr/sbin/smbd" hostname=10.0.2.15 addr=10.0.2.15 terminal=sml
1584089085 res=success'
type=USER_END msg=audit(1601323210.973:1333): pid=4126 uid=0 auid=4294967295 ses=4294967295 msg='op=PAM:session_close acct="nobody" exe="/usr/sbin/smbd" hostname=10.0.2.15 addr=10.0.2.15
terminal=smb/1584089085 res=success'
type=CRED_DISP msg=audit(1601323211.529:1334): pid=4132 uid=0 auid=4294967295 ses=4294967295 msg='op=PAM:setcred acct="nobody" exe="/usr/sbin/smbd" hostname=10.0.2.15 addr=10.0.2.15 terminal=sml
441871692 res=success'
type=USER_END msg=audit(1601323211.529:1335): pid=4132 uid=0 auid=4294967295 ses=4294967295 msg='op=PAM:session_close acct="nobody" exe="/usr/sbin/smbd" hostname=10.0.2.15 addr=10.0.2.15
terminal=smb/441871692 res=success'
type=CRED_DISP msg=audit(1601323211.685:1336): pid=4133 uid=0 auid=4294967295 ses=4294967295 msg='op=PAM:setcred acct="nobody" exe="/usr/sbin/smbd" hostname=10.0.2.15 addr=10.0.2.15 terminal=sml
172534554 res=success'
type=USER_END msg=audit(1601323211.689:1337): pid=4133 uid=0 auid=4294967295 ses=4294967295 msg='op=PAM:session_close acct="nobody" exe="/usr/sbin/smbd" hostname=10.0.2.15 addr=10.0.2.15
terminal=smb/172534554 res=success'
type=CRED_DISP msg=audit(1601323211.741:1338): pid=4134 uid=0 auid=4294967295 ses=4294967295 msg='op=PAM:setcred acct="nobody" exe="/usr/sbin/smbd" hostname=10.0.2.15 addr=10.0.2.15 terminal=sml
4234296512 res=success'
type=USER_END msg=audit(1601323211.741:1339): pid=4134 uid=0 auid=4294967295 ses=4294967295 msg='op=PAM:session_close acct="nobody" exe="/usr/sbin/smbd" hostname=10.0.2.15 addr=10.0.2.15
terminal=smb/4234296512 res=success'
type=CRED_DISP msg=audit(1601323212.025:1340): pid=4131 uid=0 auid=4294967295 ses=4294967295 msg='op=PAM:setcred acct="nobody" exe="/usr/sbin/smbd" hostname=10.0.2.15 addr=10.0.2.15 terminal=sml
3470035333 res=success'
type=USER_END msg=audit(1601323212.029:1341): pid=4131 uid=0 auid=4294967295 ses=4294967295 msg='op=PAM:session_close acct="nobody" exe="/usr/sbin/smbd" hostname=10.0.2.15 addr=10.0.2.15
terminal=smb/3470035333 res=success'
type=CRED_DISP msg=audit(1601323212.361:1342): pid=4138 uid=0 auid=4294967295 ses=4294967295 msg='op=PAM:setcred acct="nobody" exe="/usr/sbin/smbd" hostname=10.0.2.15 addr=10.0.2.15 terminal=sml
620233130 res=success'
type=USER_END msg=audit(1601323212.365:1343): pid=4138 uid=0 auid=4294967295 ses=4294967295 msg='op=PAM:session_close acct="nobody" exe="/usr/sbin/smbd" hostname=10.0.2.15 addr=10.0.2.15
terminal=smb/620233130 res=success'
type=CRED_DISP msg=audit(1601323212.645:1344): pid=4140 uid=0 auid=4294967295 ses=4294967295 msg='op=PAM:setcred acct="nobody" exe="/usr/sbin/smbd" hostname=10.0.2.15 addr=10.0.2.15 terminal=sml
2219810588 res=success'
type=USER_END msg=audit(1601323212.653:1345): pid=4140 uid=0 auid=4294967295 ses=4294967295 msg='op=PAM:session_close acct="nobody" exe="/usr/sbin/smbd" hostname=10.0.2.15 addr=10.0.2.15
terminal=smb/2219810588 res=success'
type=CRED_DISP msg=audit(1601323212.805:1346): pid=4141 uid=0 auid=4294967295 ses=4294967295 msg='op=PAM:setcred acct="nobody" exe="/usr/sbin/smbd" hostname=10.0.2.15 addr=10.0.2.15 terminal=sml
3347844555 res=success'
type=USER_END msg=audit(1601323212.809:1347): pid=4141 uid=0 auid=4294967295 ses=4294967295 msg='op=PAM:session_close acct="nobody" exe="/usr/sbin/smbd" hostname=10.0.2.15 addr=10.0.2.15
terminal=smb/3347844555 res=success'
type=CRED_DISP msg=audit(1601323213.309:1348): pid=4142 uid=0 auid=4294967295 ses=4294967295 msg='op=PAM:setcred acct="nobody" exe="/usr/sbin/smbd" hostname=10.0.2.15 addr=10.0.2.15 terminal=sml
613014350 res=success'
type=USER_END msg=audit(1601323213.333:1349): pid=4142 uid=0 auid=4294967295 ses=4294967295 msg='op=PAM:session_close acct="nobody" exe="/usr/sbin/smbd" hostname=10.0.2.15 addr=10.0.2.15
terminal=smb/613014350 res=success'
type=CRED_DISP msg=audit(1601323213.797:1350): pid=4146 uid=0 auid=4294967295 ses=4294967295 msg='op=PAM:setcred acct="nobody" exe="/usr/sbin/smbd" hostname=10.0.2.15 addr=10.0.2.15 terminal=sml
2696905599 res=success'

```
type=CRED_DISP msg=audit(1678117030.580:8502): pid=24145 uid=0 auid=4294967295 ses=4294967295 msg='op=PAM:setcred acct="<no body" exe="/usr/sbin/smbd" hostname=10.0.2.5 addr=10.0.2.5 terminal=smb/2100764339 res=success'
type=CRED_DISP msg=audit(1678117030.636:8503): pid=24147 uid=0 auid=4294967295 ses=4294967295 msg='op=PAM:setcred acct="<no body" exe="/usr/sbin/smbd" hostname=10.0.2.5 addr=10.0.2.5 terminal=smb/177625783 res=success'
type=USER_END msg=audit(1678117030.636:8504): pid=24147 uid=0 auid=4294967295 ses=4294967295 msg='op=PAM:session_close acct="<no body" exe="/usr/sbin/smbd" hostname=10.0.2.5 addr=10.0.2.5 terminal=smb/177625783 res=success'
type=CRED_DISP msg=audit(1678117030.648:8505): pid=24150 uid=0 auid=4294967295 ses=4294967295 msg='op=PAM:setcred acct="<no body" exe="/usr/sbin/smbd" hostname=10.0.2.5 addr=10.0.2.5 terminal=smb/1827508913 res=success'
type=CRED_DISP msg=audit(1678117030.648:8506): pid=24141 uid=0 auid=4294967295 ses=4294967295 msg='op=PAM:setcred acct="<no body" exe="/usr/sbin/smbd" hostname=10.0.2.5 addr=10.0.2.5 terminal=smb/3555756682 res=success'
type=USER_END msg=audit(1678117030.648:8507): pid=24150 uid=0 auid=4294967295 ses=4294967295 msg='op=PAM:session_close acct="<no body" exe="/usr/sbin/smbd" hostname=10.0.2.5 addr=10.0.2.5 terminal=smb/1827508913 res=success'
type=CRED_DISP msg=audit(1678117030.656:8508): pid=24146 uid=0 auid=4294967295 ses=4294967295 msg='op=PAM:setcred acct="<no body" exe="/usr/sbin/smbd" hostname=10.0.2.5 addr=10.0.2.5 terminal=smb/2951444130 res=success'
type=CRED_DISP msg=audit(1678117030.656:8509): pid=24144 uid=0 auid=4294967295 ses=4294967295 msg='op=PAM:setcred acct="<no body" exe="/usr/sbin/smbd" hostname=10.0.2.5 addr=10.0.2.5 terminal=smb/1732923482 res=success'
type=CRED_DISP msg=audit(1678117030.656:8512): pid=24142 uid=0 auid=4294967295 ses=4294967295 msg='op=PAM:setcred acct="<no body" exe="/usr/sbin/smbd" hostname=10.0.2.5 addr=10.0.2.5 terminal=smb/1323539750 res=success'
type=USER_END msg=audit(1678117030.660:8513): pid=24142 uid=0 auid=4294967295 ses=4294967295 msg='op=PAM:session_close acct="<no body" exe="/usr/sbin/smbd" hostname=10.0.2.5 addr=10.0.2.5 terminal=smb/1323539750 res=success'
type=CRED_DISP msg=audit(1678117030.660:8514): pid=24140 uid=0 auid=4294967295 ses=4294967295 msg='op=PAM:setcred acct="<no body" exe="/usr/sbin/smbd" hostname=10.0.2.5 addr=10.0.2.5 terminal=smb/39532581 res=success'
type=CRED_DISP msg=audit(1678117030.660:8515): pid=24149 uid=0 auid=4294967295 ses=4294967295 msg='op=PAM:setcred acct="<no body" exe="/usr/sbin/smbd" hostname=10.0.2.5 addr=10.0.2.5 terminal=smb/1621176710</pre>
```

Task 4

NuttyUtility has a centralized log infrastructure using a SIEM product. You need to verify the machines you are checking from StaticSpeed have the settings enabled to use this.

Analyze StaticSpeed systems and determine if these machines are currently shipping jobs to a centralized location and set up correctly for our SIEM.

Hint: Perform **Ubuntu CIS 4.2.1.3** and verify if remote Syslog is configured for sending logs.

In **Windows**, verify in the event viewer if there are any remote subscriptions related to Windows Event Forwarder.

Based on your answers, suggest a course of action to ensure StaticSpeed meets our needs to use a SIEM.

Ubuntu:

Ubuntu CIS 4.2.1.3 is satisfied.

```
ustudent@uba-ustudent:/etc$ cat rsyslog.conf
# /etc/rsyslog.conf      Configuration file for rsyslog.
#
#           For more information see
#           /usr/share/doc/rsyslog-doc/html/rsyslog_conf.html
#
# Default logging rules can be found in /etc/rsyslog.d/50-default.conf

#####
#### MODULES ####
#####

module(load="imuxsock") # provides support for local system logging
#module(load="immark")  # provides --MARK-- message capability

# provides UDP syslog reception
#module(load="imudp")
#input(type="imudp" port="514")

# provides TCP syslog reception
#module(load="imtcp")
#input(type="imtcp" port="514")

# provides kernel logging support and enable non-kernel klog messages
module(load="imklog" permitnonkernelfacility="on")

#####
### GLOBAL DIRECTIVES ####
#####

#
# Use traditional timestamp format.
# To enable high precision timestamps, comment out the following line.
#
$ActionFileDefaultTemplate RSYSLOG_TraditionalFileFormat

# Filter duplicated messages
$RepeatedMsgReduction on

#
# Set the default permissions for all log files.
#
$fileOwner syslog
$fileGroup adm
$fileCreateMode 0640
$dirCreateMode 0755
$umask 0022
$privDropToUser syslog
$privDropToGroup syslog

#
# Where to place spool and state files
#
$workDirectory /var/spool/rsyslog
```

```

Datei Bearbeiten Ansicht Suchen Terminal Hilfe
#      *.=notice;*.=warn      /dev/tty8
ustudent@uba-ustudent:/etc/rsyslog.d$ cat *
# Log kernel generated UFW log messages to file
:msg,contains,"[UFW" /var/log/ufw.log

# Uncomment the following to stop logging anything that matches the last rule.
# Doing this will stop logging kernel generated UFW log messages to the file
# normally containing kern.* messages (eg, /var/log/kern.log)
#& stop
# Default rules for rsyslog.
#
#               For more information see rsyslog.conf(5) and /etc/rsyslog.conf

#
# First some standard log files.  Log by facility.
#
auth,authpriv.*          /var/log/auth.log
*.*;auth,authpriv.none    -/var/log/syslog
#cron.*                  /var/log/cron.log
#daemon.*                /var/log/daemon.log
kern.*                   /var/log/kern.log
#lpr.*                   /var/log/lpr.log
mail.*                   -/var/log/mail.log
#user.*                  -/var/log/user.log

#
# Logging for the mail system.  Split it up so that
# it is easy to write scripts to parse these files.
#
#mail.info              -/var/log/mail.info
#mail.warn              -/var/log/mail.warn
mail.err                 /var/log/mail.err

#
# Some "catch-all" log files.
#
#*=debug;\*
#      auth,authpriv.none;\*
#      news.none;mail.none    -/var/log/debug
#*=info;*.=notice;*.=warn;\*
#      auth,authpriv.none;\*
#      cron,daemon.none;\*
#      mail,news.none        -/var/log/messages

#
# Emergencies are sent to everybody logged in.
#
*.emerg                 :omusrmsg:*

#
# I like to have messages displayed on the console, but only on a virtual
# console I usually leave idle.
#
#daemon,mail.*;\*
#      news.=crit;news.=err;news.=notice;\*
#      *.=debug;*.=info;\*
#      *.=notice;*.=warn      /dev/tty8
ustudent@uba-ustudent:/etc/rsyslog.d$ 

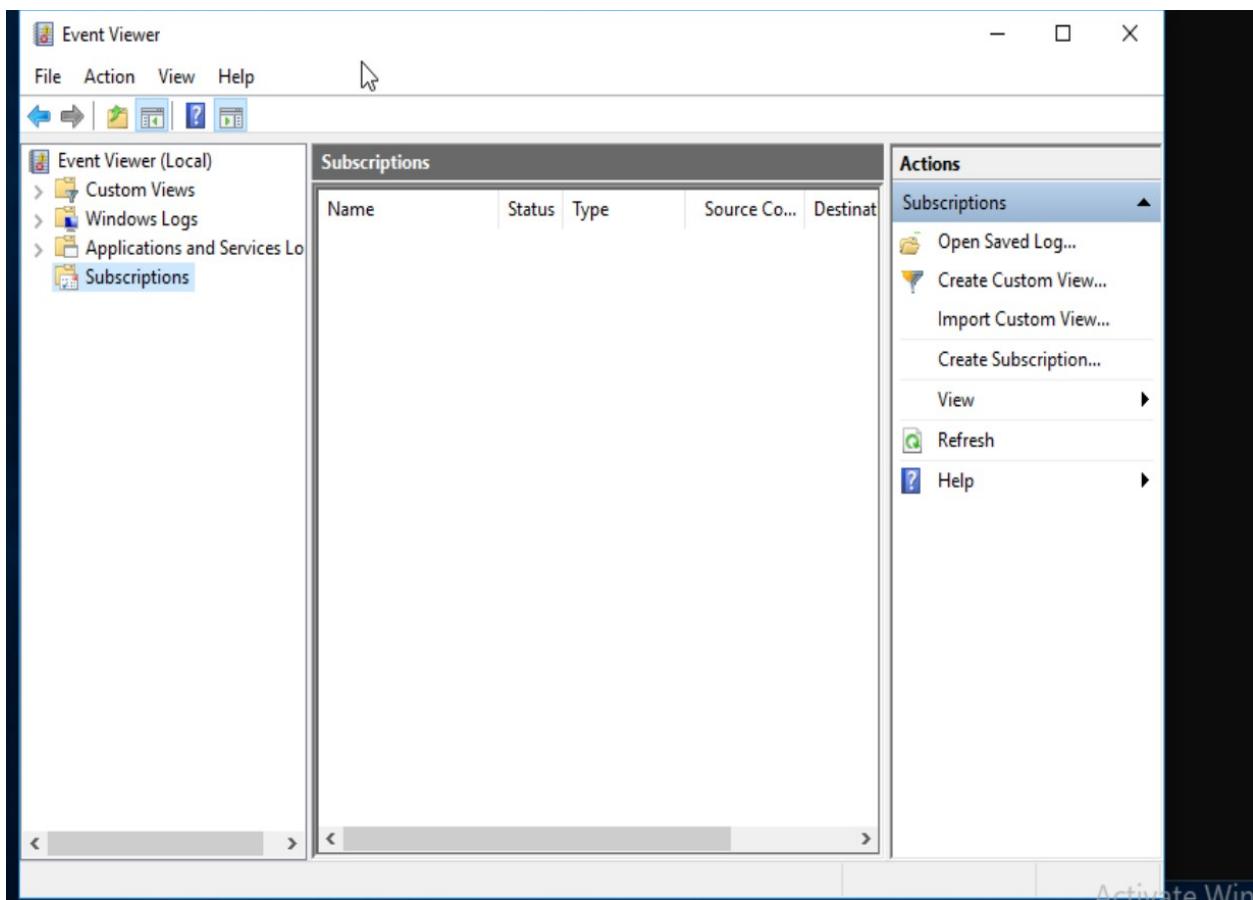
```

But Ubuntu CIS 4.2.1.5 which checks if rsyslog is configured to send logs to a remote host is not fulfilled. There is no target ip address where to send the logs to.

```
ustudent@uba-ustudent:/etc$ cat /etc/rsyslog.conf /etc/rsyslog.d/*.conf | grep target  
ustudent@uba-ustudent:/etc$
```

Windows:

I can't see any subscription in Windows. So it's not correctly set up.



In summary the system is not prepared for using a SIEM. The sending of the logs needs to be configured to be able to use it with a SIM.

Step 4: Assess Authentication Management at Targeted Assets

Task 1

Evaluate the authentication management situation of StaticSpeed's systems. In our initial look at StaticSpeed, we discovered what is called a "FLAT" network. This means there are no either Active Directory servers or OpenLDAP servers for Linux. We need these to provide us with tools to administer the network and enforce access control models. Specifically, when it comes to separate departments, supervisors, end-users, administrators, contractors, visitors, etc.

We also suspected that anyone that accesses this network could pretty much access everything. Determine if the current authentication scheme at StaticSpeed is unacceptable.

Make sure to include the following:

- Ensure only administrators can remotely access windows machines and verify if root access is permitted at the Linux host.
- Check for users with excessive permissions
- Is root remote login allowed?
- Are there users that should not have remote access via ssh in Linux?
- Remote Desktop Access should only be granted to administrators in Windows, are there other accounts that should not be given access?

Knowing that your company only wants administrators to log remotely, provide a summary of the current situation for StaticSpeed. Then, suggest what accounts should be allowed to log remotely and why. Include your recommendations on whether StaticSpeeds authentication is acceptable and how you would improve it if it is not. Don't forget to include evidence to back up your recommendations.

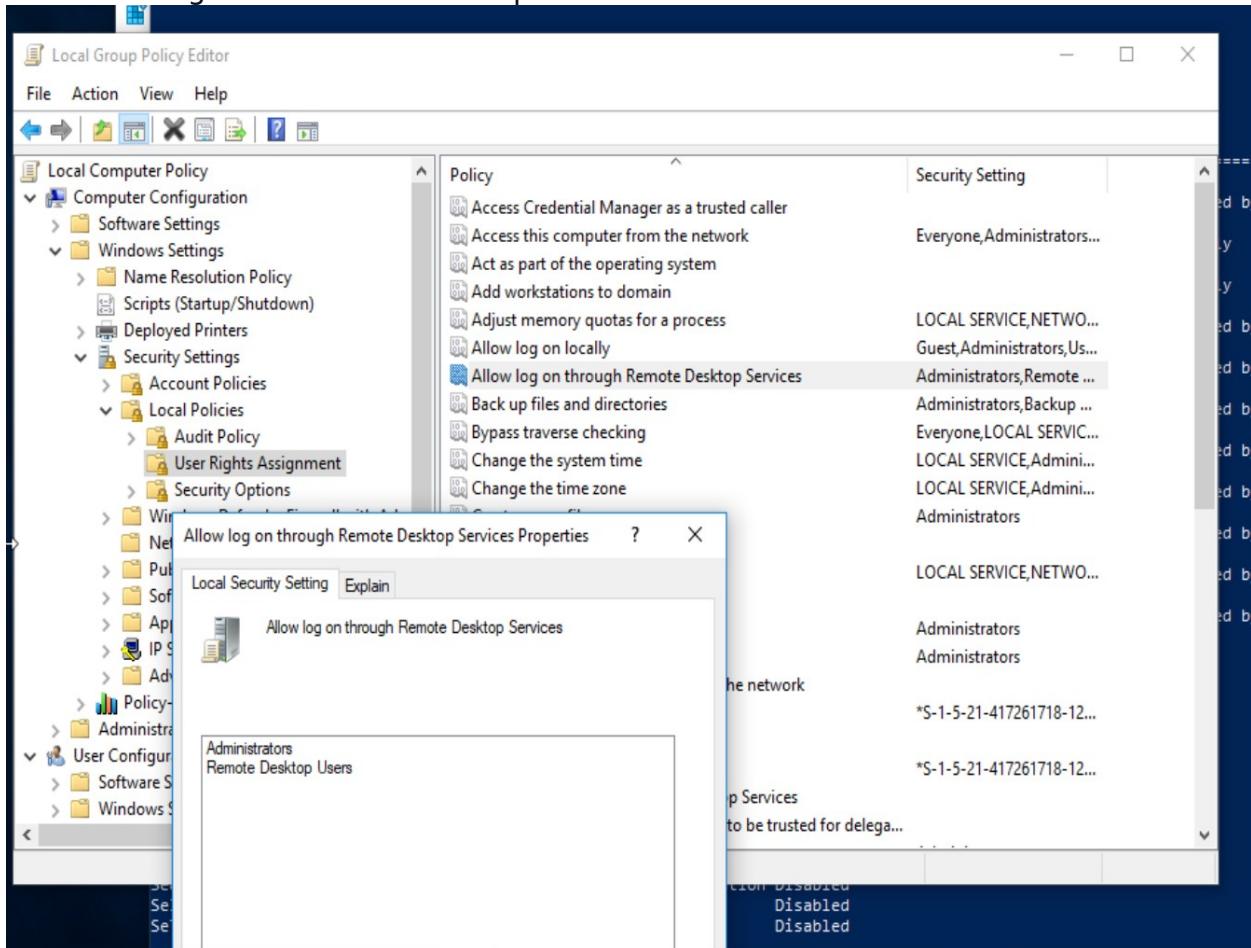
In ubuntu all users have excessive permissions as discussed earlier. That's because all are allowed to switch to the superuser(sudo).

In ubuntu ssh root login is disabled by default as a security feature. I don't see a `PermitRootLogin yes` in the configuration file. Thus root login is not allowed.

There should be not root access in linux from the outside. It should be restricted to local ip addresses for root login. Normal users can login. To improve security all users can be denied the access. The only exception is root if they are in the local network.

```
ustudent@ubu-ustudent:~$ cat /etc/ssh/sshd_config | grep Permit
#PermitRootLogin prohibit-password
#PermitEmptyPasswords no
# the setting of "PermitRootLogin without-password".
#PermitTTY yes
#PermitUserEnvironment no
#PermitTunnel no
#      PermitTTY no
ustudent@ubu-ustudent:~$
```

In Windows Admins as well as normal users can remotely login. To only allow admins to login the remote desktop users should be removed.



Task 2

NuttyUtility follows CIS Benchmarks. Therefore, we need to audit the password policies of StaticSpeed to see if they comply.

Audit the StaticSpeeds systems to verify that they comply with **CIS 5.3.1 Ubuntu** or **Windows 10 CIS benchmarks 1.1.5?** Please provide screenshots of current settings in both systems.

After you perform the checks, please provide an overview of your findings with the specific settings that should be in place and any other changes that should be made. Remember to justify your answer.

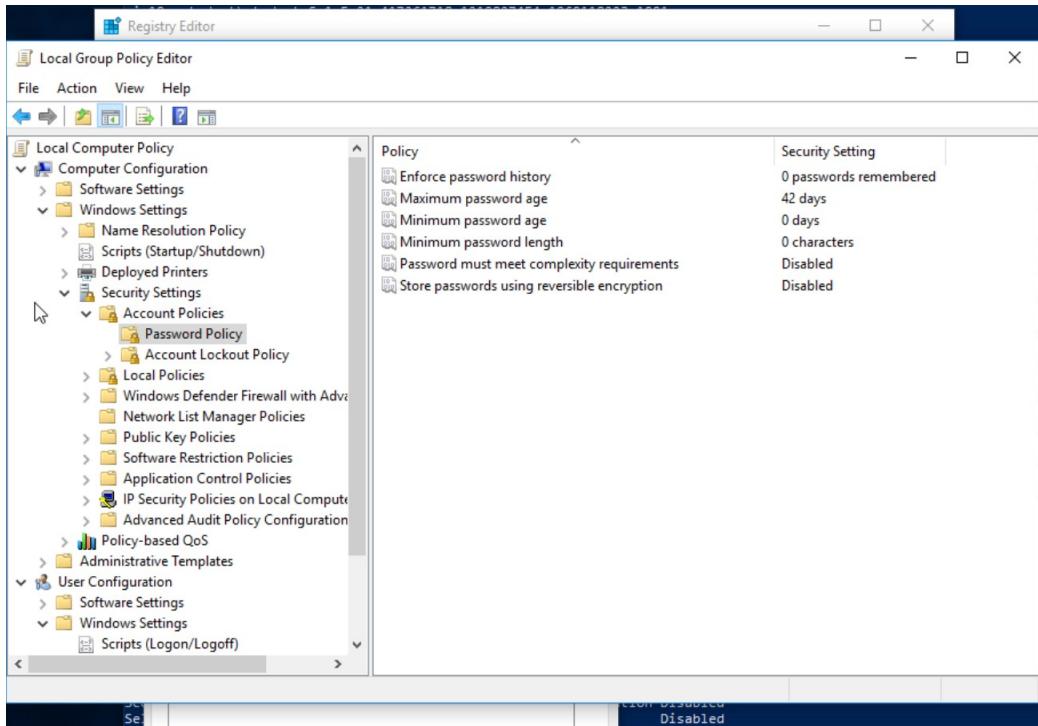
CIS 5.3.1 Ubuntu -Ensure password creation requirements are configured

The CIS is not fulfilled as can be seen in the screenshot below. The password should be set to minlen = 14 and minclass = 4 or dccredit = -1 uccredit = -1 ocredit = -1

```
ustudent@ubu-ustudent:/etc$ cat /etc/security/pwquality.conf
# Configuration for systemwide password quality limits
# Defaults:
#
# Number of characters in the new password that must not be present in the
# old password.
# difok = 1
#
# Minimum acceptable size for the new password (plus one if
# credits are not disabled which is the default). (See pam_cracklib manual.)
# Cannot be set to lower value than 6.
# minlen = 8
#
# The maximum credit for having digits in the new password. If less than 0
# it is the minimum number of digits in the new password.
# dccredit = 0
#
# The maximum credit for having uppercase characters in the new password.
# If less than 0 it is the minimum number of uppercase characters in the new
# password.
# uccredit = 0
#
# The maximum credit for having lowercase characters in the new password.
# If less than 0 it is the minimum number of lowercase characters in the new
# password.
# lcredit = 0
#
# The maximum credit for having other characters in the new password.
# If less than 0 it is the minimum number of other characters in the new
# password.
# ocredit = 0
#
# The minimum number of required classes of characters for the new
# password (digits, uppercase, lowercase, others).
# minclass = 0
#
# The maximum number of allowed consecutive same characters in the new password.
# The check is disabled if the value is 0.
# maxrepeat = 0
#
# The maximum number of allowed consecutive characters of the same class in the
# new password.
# The check is disabled if the value is 0.
# maxclassrepeat = 0
#
# Whether to check for the words from the passwd entry GECOS string of the user.
# The check is enabled if the value is not 0.
# gecoscheck = 0
#
# Whether to check for the words from the cracklib dictionary.
# The check is enabled if the value is not 0.
# dictcheck = 1
```

Windows 10 CIS benchmarks 1.1.5 - Ensure 'Password must meet complexity requirements' is set to 'Enabled'

The setting is disabled. It should be enabled to ensure that passwords are secure.



Task 3

NuttyUtility uses a strong encryption ciphers policy (FIPS 140-2). Verify that your target assets comply with this policy. Check that these systems are compliant?. Please provide proof of the checks and give specifics on what to do next to get these systems compliant.

Ubuntu 18.04 CIS 5.2.13 -Ensure only strong Ciphers are used

This CIS is fulfilled by the linux machine

```
fips: disabled (not available)
livepatch: disabled
ustudent@ubu-ustudent:/etc$ sshd -T | grep ciphers
Could not load host key: /etc/ssh/ssh_host_rsa_key
Could not load host key: /etc/ssh/ssh_host_ecdsa_key
Could not load host key: /etc/ssh/ssh_host_ed25519_key
ciphers chacha20-poly1305@openssh.com,aes128-ctr,aes192-ctr,aes256-ctr,aes128-gcm@openssh.com,aes256-gcm@openssh.com
ustudent@ubu-ustudent:/etc$
```

FIPS 140-2 is not installed in ubuntu.

```

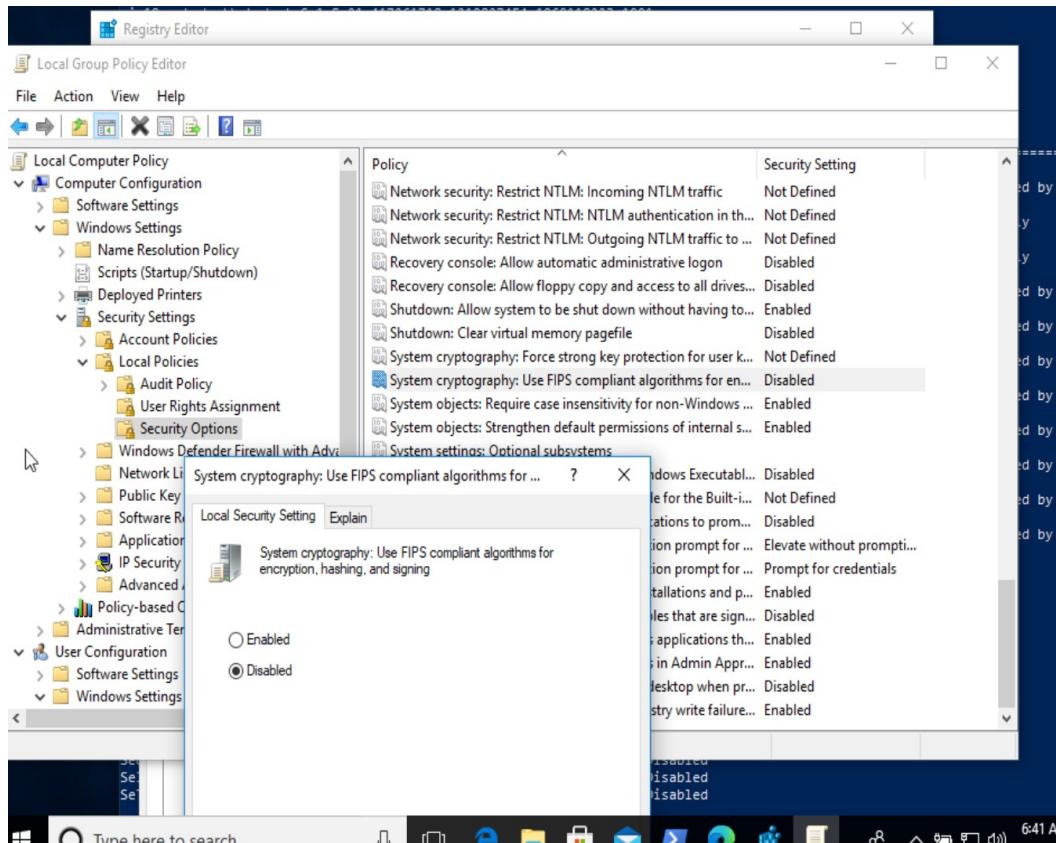
Datei Bearbeiten Ansicht Suchen Terminal Hilfe
eustudent@ubu-ustudent:~$ dpkg -l | grep fips
ustudent@ubu-ustudent:~$ cat /proc/sys/crypto/fips_enabled
scat: /proc/sys/crypto/fips_enabled: Datei oder Verzeichnis nicht gefunden
:ustudent@ubu-ustudent:~$
```

This link describes how to enable FIPS 140-2:
<https://ubuntu.com/security/certifications/docs/fips-faq>

```

# dictpath =
ustudent@ubu-ustudent:/etc$ ^C
ustudent@ubu-ustudent:/etc$ sudo ua status
[sudo] Passwort für ustUDENT:
esm: disabled (not available)
fips: disabled (not available)
livepatch: disabled
ustudent@ubu-ustudent:/etc$
```

FIPS is disable in windows. It should be set to enabled



Task 4

Conduct aggressive testing for password strength. Use a Nmap NSE Script to test how easy it would be to access StaticSpeed's FTP Server and SMB Shares if an attacker probed them. We have already requested and obtained permission to perform these audits.

Please use an NSE Script to test Mitre ATT&CK T1110 in your Ubuntu virtual machine. Also, use an NSE Script to test the security mode of your SMB shares at your Windows virtual machine. What are your findings? Please provide screenshots. Remember to give an explanation of the security state of these services based on your results.

The ftp server in ubuntu seems to be at least at basic security as the bruteforce attack didn't return any valid credentials:

```
ustudent@ubu-ustudent:~$ sudo nmap --script=ftp-brute -p 21 10.0.2.5

Starting Nmap 7.60 ( https://nmap.org ) at 2023-03-06 09:56 EST
Stats: 0:00:13 elapsed; 0 hosts completed (1 up), 1 undergoing Script Scan
NSE Timing: About 0.00% done
Stats: 0:00:13 elapsed; 0 hosts completed (1 up), 1 undergoing Script Scan
NSE Timing: About 0.00% done
Stats: 0:00:42 elapsed; 0 hosts completed (1 up), 1 undergoing Script Scan
NSE Timing: About 0.00% done
Stats: 0:03:21 elapsed; 0 hosts completed (1 up), 1 undergoing Script Scan
NSE Timing: About 0.00% done
Stats: 0:03:22 elapsed; 0 hosts completed (1 up), 1 undergoing Script Scan
NSE Timing: About 0.00% done
Stats: 0:05:19 elapsed; 0 hosts completed (1 up), 1 undergoing Script Scan
NSE Timing: About 0.00% done
Stats: 0:05:19 elapsed; 0 hosts completed (1 up), 1 undergoing Script Scan
NSE Timing: About 0.00% done
Stats: 0:08:31 elapsed; 0 hosts completed (1 up), 1 undergoing Script Scan
NSE Timing: About 0.00% done
Nmap scan report for ubu-ustudent (10.0.2.5)
Host is up (0.000028s latency).

PORT      STATE SERVICE
21/tcp    open  ftp
|_ ftp-brute:
|| Accounts: No valid accounts found
||_ Statistics: Performed 7263 guesses in 601 seconds, average tps: 11.8

Nmap done: 1 IP address (1 host up) scanned in 601.56 seconds
ustudent@ubu-ustudent:~$
```

No valid credentials found for smb. Thus it seems at least to be not easily attacked.

```
Nmap done. 1 IP address (1 host up) scanned in 559.70 seconds
ustudent@ubu-ustudent:~$ sudo nmap -sU -sS --script=smb-brute.nse -p 445 10.0.2.4
[sudo] Passwort für ustudent:

Starting Nmap 7.60 ( https://nmap.org ) at 2023-03-06 10:16 EST
Nmap scan report for 10.0.2.4
Host is up (0.00042s latency).

PORT      STATE    SERVICE
445/tcp    open     microsoft-ds
445/udp    closed   microsoft-ds
MAC Address: 08:00:27:E9:29:33 (Oracle VirtualBox virtual NIC)

Host script results:
| smb-brute:
|_ No accounts found

Nmap done: 1 IP address (1 host up) scanned in 75.74 seconds
ustudent@ubu-ustudent:~$
```

Step 5: Final Report

After performing the project's tasks, you must produce a report that will include an overview of your findings using the best practices industry format. You are expected to include ALL high, medium, low vulnerabilities, and informational findings (Things that are not necessarily scored but are relevant). Make sure to use and include the scanner switches and vulnerability scripts as they may provide conclusions that are not found in the default scanner settings.

The format expected for both virtual machine results is below. Please divide by Operating System
- Linux Ubuntu 18.04
- Windows 10

Windows 10 ENT

Ex

Host	High	Medium	Low	Log
10.0.2.4	2	5	1	0

IP Address: 10.0.2.4

Service	Port	Sensitive Level
Auto Update		High
Discard Service	9 tcp	High
SEHOP Password Complexity	TCP	Medium
Password Quality		Medium
chargen	19 tcp	Medium
echo	7 tcp	Medium
qotd	17 tcp	Medium
Daytime	13 tcp	Low
xxx	xx TCP	Log

Expected detail format for vulnerabilities found

The scan shows multiple open ports:

```
Starting Nmap 7.60 ( https://nmap.org ) at 2023-03-03 10:58 EST
Pre-scan script results:
| broadcast-avahi-dos:
|   Discovered hosts:
|     224.0.0.251
| After NULL UDP avahi packet DoS (CVE-2011-1002).
|_ Hosts are all up (not vulnerable).

Stats: 0:03:03 elapsed; 0 hosts completed (1 up), 1 undergoing Service Scan
Service scan Timing: About 100.00% done; ETC: 11:01 (0:00:00 remaining)
Nmap scan report for 10.0.2.4
Host is up (0.00029s latency).
Not shown: 990 closed ports
PORT      STATE SERVICE      VERSION
7/tcp      open  echo
9/tcp      open  discard?
13/tcp     open  daytime      Microsoft Windows USA daytime
17/tcp     open  qotd         Windows qotd (English)
19/tcp     open  chargen
80/tcp     open  http         Microsoft IIS httpd 10.0
|_http-csrf: Couldn't find any CSRF vulnerabilities.
|_http-dombased-xss: Couldn't find any DOM based XSS.
|_http-server-header: Microsoft-IIS/10.0
|_http-stored-xss: Couldn't find any stored XSS vulnerabilities.
135/tcp    open  msrpc        Microsoft Windows RPC
139/tcp    open  netbios-ssn  Microsoft Windows netbios-ssn
445/tcp    open  microsoft-ds Microsoft Windows 7 - 10 microsoft-ds (workgroup: WORKGROUP)
3389/tcp   open  ms-wbt-server Microsoft Terminal Services
|_ssl-ccs-injection: No reply from server (TIMEOUT)
|_sslv2-drown:
Service Info: Host: WIN10-USTUDENT; OS: Windows; CPE: cpe:/o:microsoft:windows

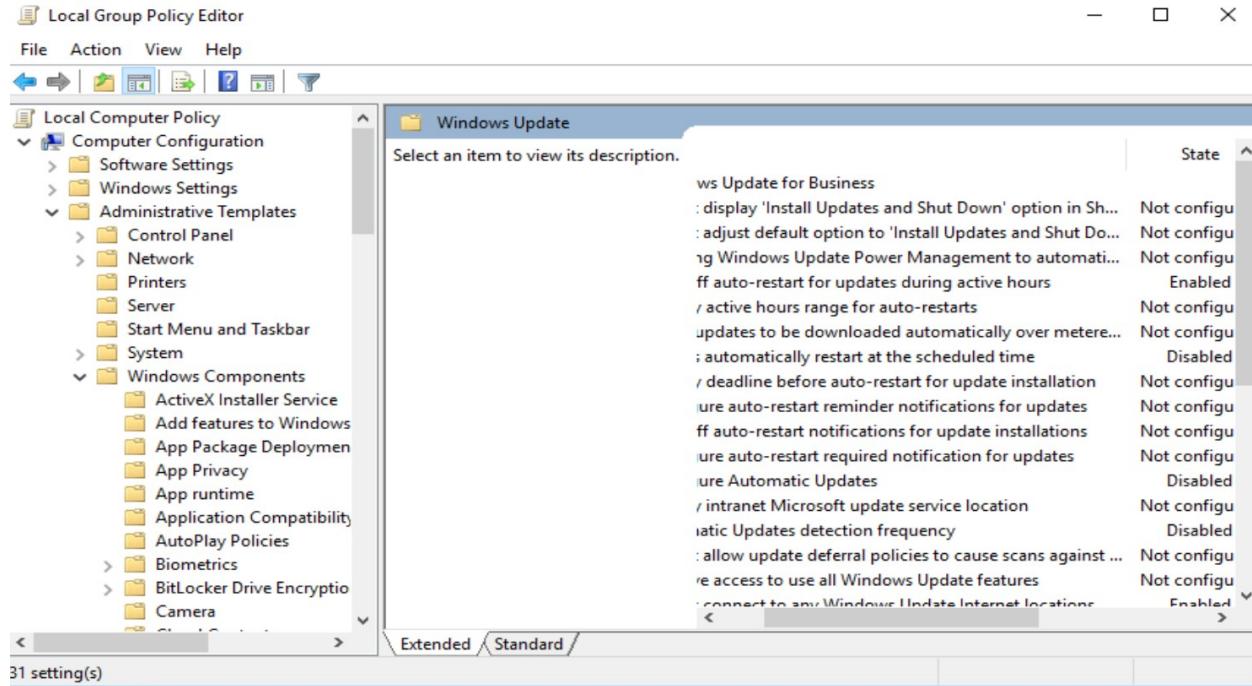
Host script results:
|_samba-vuln-cve-2012-1182: NT_STATUS_ACCESS_DENIED
|_smb-vuln-ms10-054: false
|_smb-vuln-ms10-061: NT_STATUS_ACCESS_DENIED

Service detection performed. Please report any incorrect results at https://nmap.org/submit/ .
Nmap done: 1 IP address (1 host up) scanned in 309.96 seconds
```

High - Windows Auto Update is disabled

Issue

Windows is not getting the latest security patches, which makes the system vulnerable



Impact

Attackers can exploit the knowledge about known security problems.

Mitigation

Windows Auto Update should be enabled

Reference

Windows CIS 18.9.102.2

High - CVE-1999-0636 - Discard Service Running

Issue

The discard service is running

Impact

Using a weakness in discard service users can elevate privileges. The attack is described in Das MITRE ATT&CK Projekt deklariert die Angriffstechnik als T1068.

Mitigation

Disable the discard service

Reference

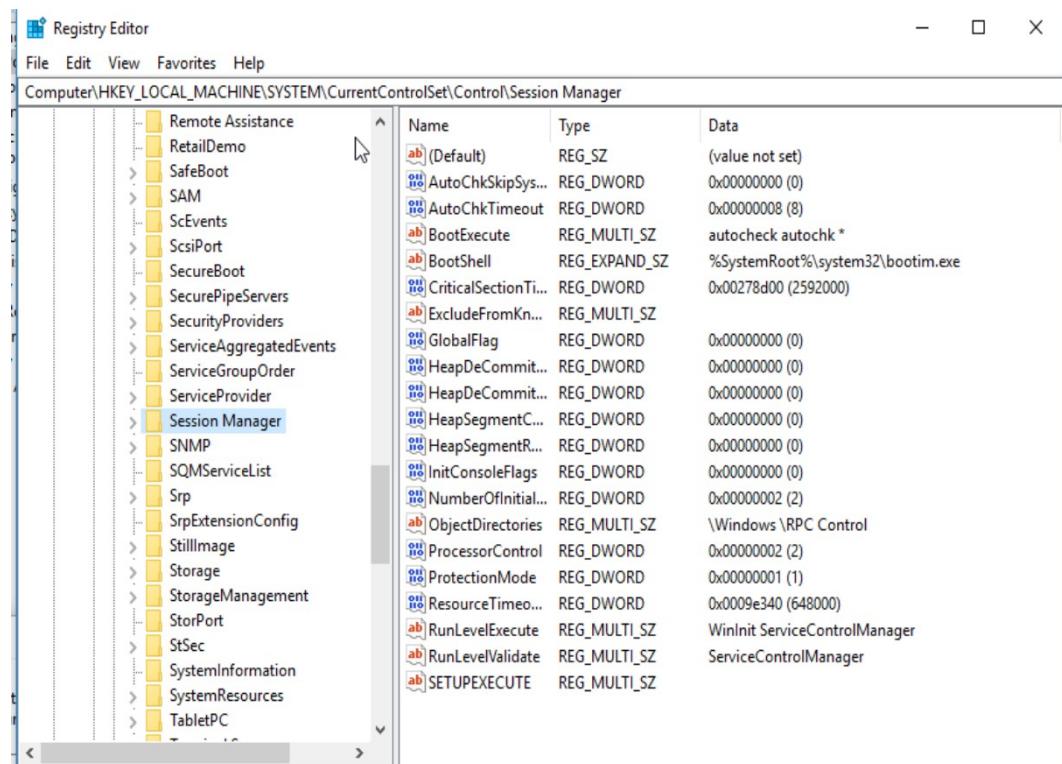
<https://www.cvedetails.com/cve/CVE-1999-0636/>

<https://vuldb.com/de/?id.14400>

Medium - Enable Structured Exception Handling Overwrite Protection (SEHOP) is disabled

Issue

At a high-level, the SEH overwrite technique uses a software vulnerability to execute arbitrary code by abusing the 32-bit exception dispatching facilities provided by Windows.



Impact

This feature is designed to block exploits that use the Structured Exception Handler (SEH) overwrite technique.

Mitigation

Set it to enabled. Just follow CIS 18.3.4

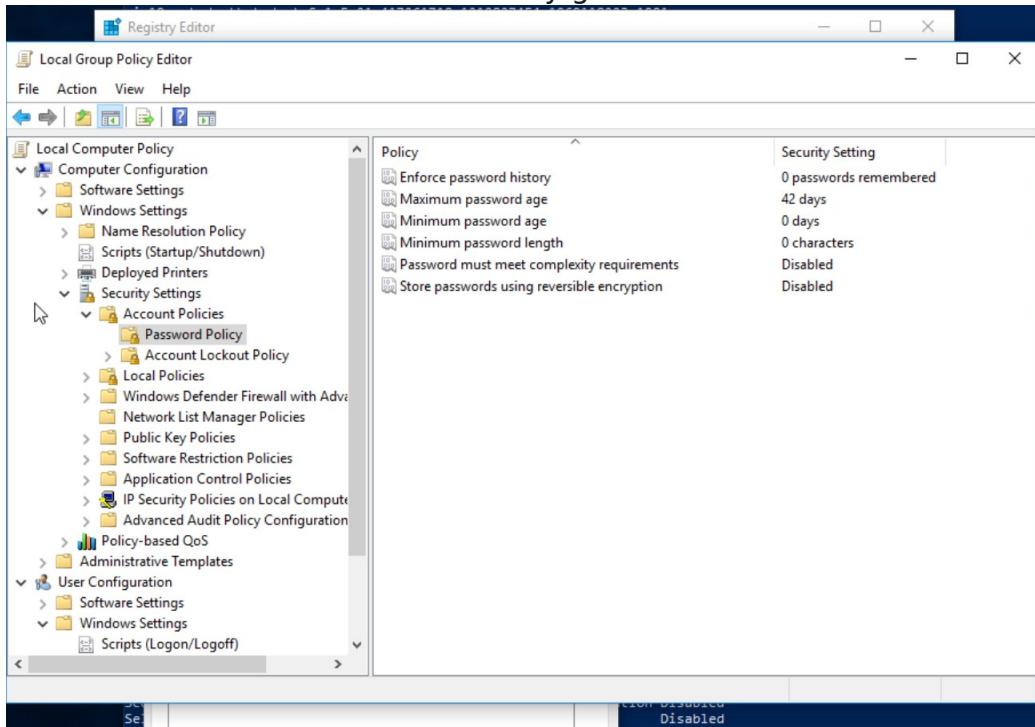
Reference

Windows CIS 18.3.4.

Medium - Ensure 'Password must meet complexity requirements' is set to 'Enabled'

Issue

There is no check that passwords contain a minimum complexity. If a weak password is chosen the attacker has an easy game.



Impact

An attacker can easily brute-force the password.

Mitigation

Follow the instructions of Windows 10 CIS benchmarks 1.1.5 and set the flag to enabled.

Reference

Windows 10 CIS benchmarks 1.1.5

Medium - CVE-1999-0103 - Chargen Service can be exploited

Issue

The chargen service can be used for denial of service attacks.

Impact

The attacker can flood the server and make it unavailable. It furthermore can be used as an intermediate server for causing the attack.

Mitigation

The chargen service should be disabled

Reference

<https://www.cvedetails.com/cve/CVE-1999-0103/>

<https://www.incibe-cert.es/en/blog/chargen-cyberattacks-based-chargen-protocol>

Medium - CVE-1999-0103 - Echo Service can be exploited

Issue

The echo service can be used for denial of service attacks.

Impact

The attacker can flood the server and make it unavailable. It furthermore can be used as an intermediate server for causing the attack.

Mitigation

The echo service should be disabled

Reference

<https://www.cvedetails.com/cve/CVE-1999-0103/>

<https://www.incibe-cert.es/en/blog/chargen-cyberattacks-based-chargen-protocol>

Medium- CVE-1999-0103 - QOTD Service Running

Issue

The qotd service is running.

Impact

The qotd service can be used to flood the server with a bomb or packet storm.

Mitigation

Disable the service

Reference

<https://www.cvedetails.com/cve/CVE-1999-0103/>

Low- CVE-1999-0638 - Daytime Service Running

Issue

The daytime service is running.

Impact

The daytime service is an unsecured and obsolete protocol and it should be disabled.

Mitigation

Should be disabled

Reference

<https://nvd.nist.gov/vuln/detail/CVE-1999-0638>

Ubuntu 18.04

Ex

Host	High	Medium	Low	Log
10.0.2.5	3	3	2	1

IP Address: 10.0.2.5

Service	Port	Sensitive Level
ftp	21 tcp	High
ssh	22 tcp	High
telnet	23 tcp	High
http	80 tcp	Medium
http	80 tcp	Medium
qotd	17/tcp	Medium
Daytime	13/tcp	Low
ASLR		Low

Scan Results of Ubuntu:

```
Nmap scan report for ubu-ustudent (10.0.2.5)
Host is up (0.0003s latency).
Not shown: 991 closed ports
PORT      STATE SERVICE      VERSION
13/tcp    open  daytime
17/tcp    open  qotd?
| fingerprint-strings:
|   DNSstatusRequest:
|     You see, I consider that a man's brain originally is like a little empty
|     attic, and you have to stock it with such furniture as you choose. A fool
|     takes in all the lumber of every sort he comes across, so that the knowledge
|     which might be useful to him gets crowded out, or at best is jumbled up with
|     other things, so that he has difficulty in laying his hands upon it.
|     skilful workman is very careful indeed as to what he takes into his
|     brath-attic. He will have nothing but the tools which may help him in doing
|     work, but of these he has a large assortment, and all in the most perfect
|     order. It is a mistake to think that that little room has elastic walls and
|     distend to any extent. Depend upon it there comes a time when for every
|     addition of knowledge you forget something that you knew before. It is of
|     highest importance, therefore, not to have useless facts
| GenericLines:
|   The time is right to make new friends.
| Help:
|   You will overcome the attacks of jealous associates.
| Kerberos:
|   That secret you've been guarding, isn't.
| NULL:
|   Things past redress and now with me past care.
|   William Shakespeare, "Ritchard II"
| RTSPRequest:
|   You have a deep appreciation of the arts and music.
| SSLSessionReq:
|   You will pass away very quickly.
| TLSSessionReq:
|   You should go home.
21/tcp  open  ftp          vsftpd 2.0.8 or later
|_sslv2-down:
22/tcp  open  ssh          OpenSSH 7.6p1 Ubuntu 4 (Ubuntu Linux; protocol 2.0)
23/tcp  open  telnet       Linux telnetd
37/tcp  open  time         (32 bits)
|_fc868-time: 2023-03-03T14:56:17
80/tcp  open  http         Apache httpd 2.4.29 ((Ubuntu))
|_http-csrf: Couldn't find any CSRF vulnerabilities.
|_http-dombased-xss: Couldn't find any DOM based XSS.
|_http-server-header: Apache/2.4.29 (Ubuntu)
|_http-stored-xss: Couldn't find any stored XSS vulnerabilities.
139/tcp open  netbios-ssn  Samba smbd 3.X - 4.X (workgroup: WORKGROUP)
445/tcp open  netbios-ssn  Samba smbd 3.X - 4.X (workgroup: WORKGROUP)
```

```

SF:zC0LlRe\x20d\x20lLlLlL\x20empty\x20lLlLc,\x20dnu\x20you\x20ndve\x20LlL\x20
SF:stock\x20lt\x20with\x20such\x20furniture\x20as\x20you\x20choose).\x20\x
SF:20A\x20fool\ntakes\x20n\x20all\x20th\x20umber\x20of\x20every\x20sort
SF:\x20he\x20comes\x20across,\x20so\x20that\x20the\x20knowledge\which\x20
SF:might\x20be\x20useful\x20to\x20him\x20gets\x20crowded\x20out,\x20or\x20
SF:at\x20best\x20is\x20jumbled\x20up\x20with\na\x20lot\x20of\x20other\x20t
SF:hings,\x20so\x20that\x20he\x20has\x20difficulty\x20in\x20laying\x20his\
SF:x20hands\x20upon\x20it).\nNow\x20the\x20skillful\x20workman\x20is\x20ver
SF:y\x20careful\x20indeed\x20as\x20to\x20what\x20he\x20takes\x20into\x20hi
SF:s\nbrain-attic.\x20He\x20will\x20have\x20nothing\x20but\x20the\x20
SF:tools\x20which\x20may\x20help\x20him\x20in\x20doing\this\x20work,\x20bu
SF:t\x20of\x20these\x20he\x20has\x20a\x20large\x20assortment,\x20and\x20al
SF:l\x20in\x20the\x20most\x20perfect\norder.\x20\x20It\x20is\x20a\x20mist
SF:ake\x20to\x20thinx\x20that\x20hat\x20that\x20little\x20room\x20has\x20elastic\
SF:x20walls\x20and\ncan\x20distend\x20to\x20any\x20extent).\x20\x20Depend\
SF:x20upon\x20it\x20there\x20comes\x20a\x20time\x20when\x20for\x20every\na
SF:dition\x20of\x20knowledge\x20you\x20forget\x20something\x20that\x20you
SF:\x20knew\x20before.\x20\x20It\x20is\x20of\nthe\x20highest\x20importanc
SF:e,\x20therefore,\x20not\x20to\x20have\x20useless\x20facts")\r(Help,35,
SF:You\x20will\x20overcome\x20the\x20attacks\x20of\x20jealous\x20associate
SF:s.\n")\r(SSLSessionReq,21,"You\x20will\x20pass\x20away\x20very\x20quic
SF:kly.\n")\r(TLSSessionReq,14,"You\x20should\x20go\x20home.\n")\r(Kerbe
SF:ros,29,"That\x20secret\x20you've\x20been\x20guarding,\x20isn't.\n");
Service Info: Host: Welcome; OSs: Unix, Linux; CPE: cpe:/o:linux:linux_kernel

```

host script results:

```

| smb-vuln-cve-2017-7494:
| VULNERABLE:
|   SAMBA Remote Code Execution from Writable Share
|     State: LIKELY VULNERABLE
|     IDs: CVE-CVE-2017-7494
|     Risk factor: HIGH CVSSv3: 7.5 (HIGH) (CVSS:3.0/AV:N/AC:H/PR:L/UI:N/S:U/C:H/I:H/A:H)
|       All versions of Samba from 3.5.0 onwards are vulnerable to a remote
|       code execution vulnerability, allowing a malicious client to upload a
|       shared library to a writable share, and then cause the server to load
|       and execute it.
|
|     Disclosure date: 2017-05-24
|     Check results:
|       Samba Version: 3.X - 4.X
|       Writable share found.
|       Name: \\10.0.2.5\data
|       File written to remote share, but unable to execute payload either due to unknown actual path, or the system may be patched.
|     Extra information:
|       All writable shares:
|         Name: \\10.0.2.5\data
|     References:
|       https://www.samba.org/samba/security/CVE-2017-7494.html
|       https://cve.mitre.org/cgi-bin/cvename.cgi?name=CVE-2017-7494
|_smb-vuln-ms10-054: false
|_smb-vuln-ms10-061: false
| smb-vuln-regsvc-dos:
| VULNERABLE:
|   Service regsvc in Microsoft Windows systems vulnerable to denial of service
|     State: VULNERABLE
|     The service regsvc in Microsoft Windows 2000 systems is vulnerable to denial of service caused by a null deference
|     pointer. This script will crash the service if it is vulnerable. This vulnerability was discovered by Ron Bowes
|     while working on smb-enum-sessions.
|_

```

Service detection performed. Please report any incorrect results at <https://nmap.org/submit/> .
 Nmap done: 1 IP address (1 host up) scanned in 71.34 seconds

High - ftp - CVE-2011-2523

Issue

vsFTPD contains a backdoor which opens a shell on port 6200/tcp.

```
21/tcp open  ftp
| ftp-vsftpd-backdoor:
|   VULNERABLE:
|     vsFTPD version 2.3.4 backdoor
|       State: VULNERABLE (Exploitable)
|       IDs: OSVDB:73573 CVE:CVE-2011-2523
|         vsFTPD version 2.3.4 backdoor, this was reported on 2011-07-04.
|       Disclosure date: 2011-07-03
|       Exploit results:
|         Shell command: id
|         Results: uid=0(root) gid=0(root) Gruppen=0(root)
|       References:
|         http://osvdb.org/73573
|         http://scarybeastsecurity.blogspot.com/2011/07/alert-vsftpd-download-backdoored.html
|         https://cve.mitre.org/cgi-bin/cvename.cgi?name=CVE-2011-2523
|         https://github.com/rapid7/metasploit-framework/blob/master/modules/exploits/unix/ftp/vsftpd_234_back
|         rb
|         |_ sslv2-drown:
```

Impact

The attacker can open a shell and then is able to takeover full control

Mitigation

In general ftp should be disabled due to this and other problems. It should be replaced by a more secure service.

Reference

<https://nvd.nist.gov/vuln/detail/CVE-2011-2523>

High - ssh - CVE-2021-41617

Issue

ssh runs in an old version OpenSSH 7.6

Impact

sshd in OpenSSH 6.2 through 8.x before 8.8, when certain non-default configurations are used, allows privilege escalation because supplemental groups are not initialized as expected. Helper programs for AuthorizedKeysCommand and AuthorizedPrincipalsCommand may run with privileges associated with group memberships of the sshd process, if the configuration specifies running the command as a different user.

Mitigation

Update to the newest version of OpenSSH

Reference

<https://nvd.nist.gov/vuln/detail/CVE-2021-41617>

High - Telnet Unencrypted Cleartext Login

Issue

The host is running a Telnet service that allows cleartext logins over unencrypted connections

```
23/tcp open telnet
```

Impact

Attackers can uncover login names and passwords by sniffing traffic to the Telnet service.

Mitigation

Replace Telnet with remote access protocols that support encryption such as SSH.

Reference

<https://attack.mitre.org/techniques/T1021/>

Med - http - CVE-2018-17189

Issue

In Apache HTTP server versions 2.4.37 and prior, by sending request bodies in a slow loris way to plain resources, the h2 stream for that request unnecessarily occupied a server thread cleaning up that incoming data.

```
87/tcp open time      (32 bits)
30/tcp open http      Apache httpd 2.4.29 ((Ubuntu))
139/tcp open netbios-ssn Samba smbd 3.X - 4.X (workgroup: WORKGR
45/tcp open netbios-ssn Samba smbd 3.X - 4.X (workgroup: WORKGR
```

Impact

The server resources are lowered

Mitigation

The version of apache should be upgraded

Reference

<https://www.cvedetails.com/cve/CVE-2018-17189/>

Med - http - CVE-2018-1312

Issue

In Apache httpd 2.2.0 to 2.4.29, when generating an HTTP Digest authentication challenge, the nonce sent to prevent reply attacks was not correctly generated using a pseudo-random seed.

Impact

In a cluster of servers using a common Digest authentication configuration, HTTP requests could be replayed across servers by an attacker without detection.

Mitigation

upgrade the version of apache

Reference

<https://www.cvedetails.com/cve/CVE-2018-1312/>

Med- CVE-1999-0103 - QOTD Service Running

Issue

The qotd service is running.

Impact

The qotd service can be used to flood the server with a bomb or packet storm.

Mitigation

Disable the service

Reference

<https://www.cvedetails.com/cve/CVE-1999-0103/>

Low- CVE-1999-0638 - Daytime Service Running

Issue

The daytime service is running.

Impact

The daytime service is an unsecured and obsolete protocol and it should be disabled.

Mitigation

Should be disabled

Reference

<https://nvd.nist.gov/vuln/detail/CVE-1999-0638>

Low Ensure address space layout randomization (ASLR) is enabled

Issue

An attacker can examine the layout of a program and thus can use memory exploits

Impact

In a cluster of servers using a common Digest authentication configuration, HTTP requests could be replayed across servers by an attacker without detection.

Mitigation

Follow the steps of CIS 1.6.2 and activate ASLR. Randomly placing virtual memory regions will make it difficult to write memory page exploits as the memory placement will be consistently shifting

Reference

Ubuntu CIS 1.6.2

Step 6: Final Assessment and Recommendations Based on Your Scans and Checks

In this section, provide a final recommendation, supported by the information above, on whether NuttyUtility should extend its network and integrate the StaticSpeed system into its current infrastructure.

Include the following in your assessment:

- Would integrating this network into the extended network of our company bring new risks and exposures?
- If it would be a risk to NuttyUtility, what recommendations would you make to mitigate these risks before implementing the integration, and why?
- Please provide reasoning based on the proof obtained throughout your assessment.
- Remember, the Stakeholders need to decide as to whether or not to complete this integration now.

The final recommendation is not to include the StaticSpeed System

The table above shows that there are multiple vulnerabilities with a high criticality are found. In general it can be seen that the current system does not fulfill the security standards that are needed to include it.

There were only a few CIS checked that failed the audit. Thus, it is recommend to go through the whole list of CIS and for each disabled one check if that's really what we want.

The next steps would be to fix all the issues mention in this report. Afterwards a new scan should be made to check if there are other findings that are not already mentioned yet due to the high number of issues.