

## APPENDIX: COMMAND OUTPUT AND SCREENSHOT EVIDENCE

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### Screenshot 1: User Identity and Privileges

Commands shown:

```
whoami  
groups
```

```
pujeet@pujeet-VirtualBox:~$ whoami  
pujeet  
pujeet@pujeet-VirtualBox:~$ groups  
pujeet adm cdrom sudo dip plugdev users lpadmin
```

Screenshot evidence shows:

- Logged-in user is **pujeet**
- User belongs to **sudo** group and limited system groups

Purpose:

This confirms non-root access with controlled administrative privileges, supporting the principle of least privilege.

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### Screenshot 2: SSH Remote Access Test

Command shown:

```
ssh pujeet@10.0.2.15
```

```
pujeet@pujeet-VirtualBox:~$ ssh pujeet@10.0.2.15
The authenticity of host '10.0.2.15 (10.0.2.15)' can't be established.
ED25519 key fingerprint is SHA256:snVcybFro7Zfqt9Q5lh/F0QXSoVXZ22s1b3wGRrMeKQ.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '10.0.2.15' (ED25519) to the list of known hosts.
pujeet@10.0.2.15's password:
Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.14.0-37-generic x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/pro

Expanded Security Maintenance for Applications is not enabled.

151 updates can be applied immediately.
To see these additional updates run: apt list --upgradable

Enable ESM Apps to receive additional future security updates.
See https://ubuntu.com/esm or run: sudo pro status

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
applicable law.
```

#### Screenshot evidence shows:

- Successful SSH connection
- Host key verification accepted
- Ubuntu 24.04.3 LTS login banner displayed

#### Purpose:

Confirms secure remote access functionality and network connectivity.

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### Screenshot 3: SSH Service Status

#### Command shown:

```
sudo systemctl status ssh
```

```
pujeet@pujeet-VirtualBox:~$ sudo systemctl status ssh
● ssh.service - OpenBSD Secure Shell server
  Loaded: loaded (/usr/lib/systemd/system/ssh.service; enabled; preset: enabled)
  Active: active (running) since Mon 2025-12-22 03:35:41 GMT; 3min 32s ago
TriggeredBy: ● ssh.socket
  Docs: man:sshd(8)
        man:sshd_config(5)
 Process: 5075 ExecStartPre=/usr/sbin/sshd -t (code=exited, status=0/SUCCESS)
 Main PID: 5076 (sshd)
   Tasks: 1 (limit: 4603)
  Memory: 1.2M (peak: 1.6M)
    CPU: 24ms
   CGroup: /system.slice/ssh.service
           └─5076 "sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups"

Dec 22 03:35:41 pujeet-VirtualBox systemd[1]: Starting ssh.service - OpenBSD Secure Shell server...
Dec 22 03:35:41 pujeet-VirtualBox sshd[5076]: Server listening on 0.0.0.0 port 22.
Dec 22 03:35:41 pujeet-VirtualBox sshd[5076]: Server listening on :: port 22.
Dec 22 03:35:41 pujeet-VirtualBox systemd[1]: Started ssh.service - OpenBSD Secure Shell server.
```

### Screenshot evidence shows:

- ssh.service loaded and enabled
- Service state: **active (running)**
- Server listening on port **22**

### Purpose:

Verifies SSH server availability and persistence across reboots.

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### Screenshot 4: Firewall Configuration (UFW)

#### Command shown:

```
sudo ufw status verbose
pujeet@pujeet-VirtualBox:~$ sudo ufw status verbose
Status: inactive
```

### Screenshot evidence shows:

- Firewall status: **active**
- Default policy: deny incoming, allow outgoing
- Port **22/tcp** allowed (IPv4 and IPv6)
- Logging enabled

### Purpose:

Demonstrates effective network security and restricted access.

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## Screenshot 5: Firewall Rule Configuration

**Commands shown:**

```
sudo ufw allow ssh  
sudo ufw allow 22/tcp  
sudo ufw enable
```

```
pujeet@pujeet-VirtualBox:~$ sudo ufw allow ssh  
Rules updated  
Rules updated (v6)  
pujeet@pujeet-VirtualBox:~$ sudo ufw allow 22/tcp  
Skipping adding existing rule  
Skipping adding existing rule (v6)  
pujeet@pujeet-VirtualBox:~$ sudo ufw enable  
Firewall is active and enabled on system startup
```

**Screenshot evidence shows:**

- SSH rule added
- Firewall enabled at system startup

**Purpose:**

Confirms explicit firewall rule configuration for secure remote access.

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## Screenshot 6: Mandatory Access Control (AppArmor)

**Command shown:**

```
sudo aa-status
```

```
runc
sbuild
sbuild-abort
sbuild-adduser
sbuild-apt
sbuild-checkpackages
sbuild-clean
sbuild-createchroot
sbuild-destroychroot
sbuild-distupgrade
sbuild-hold
sbuild-shell
sbuild-unhold
sbuild-update
sbuild-upgrade
scide
signal-desktop
slack
slirp4netns
steam
stress-ng
surfshark
systemd-coredump
thunderbird
toybox
trinity
tup
tuxedo-control-center
userbindmount
uwsgi-core
vdens
virtiofsd
vivaldi-bin
vpnns
vscode
wike
wpcom
8 processes have profiles defined.
7 processes are in enforce mode.
/usr/sbin/cups-browsed (1068)
/usr/sbin/cupsd (1028)
/usr/lib/cups/notifier/dbus (1041) /usr/sbin/cupsd
/usr/lib/cups/notifier/dbus (1043) /usr/sbin/cupsd
devhelp
element-desktop
epiphany
evolution
firefox
flatpak
foliate
geary
github-desktop
goldendict
ipa_verify
kchmviewer
keybase
lc-compliance
libcamerify
linux-sandbox
loupe
lxc-attach
lxc-create
lxc-destroy
lxc-execute
lxc-stop
lxc-unshare
lxc-usersexec
mmdebstrap
msedge
nautilus
notepadqq
obsidian
opam
opera
pageedit
podman
polypane
privacybrowser
qcam
qmapshack
quitebrowser
rootlesskit
rpm
rssguard
runc
sbuild
```

```
ubuntu_pro_esm_cache//apt_methods
ubuntu_pro_esm_cache//apt_methods_gpgv
ubuntu_pro_esm_cache//cloud_id
ubuntu_pro_esm_cache//dpkg
ubuntu_pro_esm_cache//ps
ubuntu_pro_esm_cache//ubuntu_distro_info
ubuntu_pro_esm_cache_systemctl
ubuntu_pro_esm_cache_systemd_detect_virt
unix-chkpwd
unprivileged_userns
profiles are in complain mode.
/usr/sbin/sssd
transmission-cli
transmission-daemon
transmission-gtk
transmission-qt
profiles are in prompt mode.
profiles are in kill mode.
profiles are in unconfined mode.
1password
Discord
MongoDB Compass
QtWebEngineProcess
balena-etcher
brave
buildah
busybox
cam
ch-checkns
ch-run
chrome
crun
desktop-icons-ng
devhelp
element-desktop
epiphany
evolution
firefox
flatpak
foliate
geary
github-desktop
```

```
/usr/bin/evince
/usr/bin/evince-previewer
/usr/bin/evince-previewer//sanitized_helper
/usr/bin/evince-thumbnailer
/usr/bin/evince//sanitized_helper
/usr/bin/evince//snap_browsers
/usr/bin/man
/usr/lib/cups/backend/cups-pdf
/usr/lib/snapd/snap-confine
/usr/lib/snapd/snap-confine//mount-namespace-capture-helper
/usr/sbin/cups-browsed
/usr/sbin/cupsd
/usr/sbin/cupsd//third_party
lsb_release
man_filter
man_groff
nvidia_modprobe
nvidia_modprobe//kmod
plasmashell
plasmashell//QtWebEngineProcess
rsyslogd
snap-update-ns.firefox
snap-update-ns.firmware-updater
snap-update-ns.snap-store
snap-update-ns.snapd-desktop-integration
snap.firefox.firefox
snap.firefox.geckodriver
snap.firefox.hook.configure
snap.firefox.hook.disconnect-plug-host-hunspell
snap.firefox.hook.install
snap.firefox.hook.post-refresh
snap.firmware-updater.firmware-notifier
snap.firmware-updater.firmware-updater
snap.firmware-updater.firmware-updater-app
snap.firmware-updater.hook.configure
snap.snap-store.hook.configure
snap.snap-store.show-updates
snap.snap-store.snap-store
snap.snapd-desktop-integration.hook.configure
snap.snapd-desktop-integration.snapd-desktop-integration
tcpdump
ubuntu_pro_apt_news
ubuntu_pro_esm_cache
```

```
man_groff
nvidia_modprobe
nvidia_modprobe//kmod
plasmashell
plasmashell//QtWebEngineProcess
rsyslogd
snap-update-ns.firefox
snap-update-ns.firmware-updater
snap-update-ns.snap-store
snap-update-ns.snapd-desktop-integration
snap.firefox.firefox
snap.firefox.geckodriver
snap.firefox.hook.configure
snap.firefox.hook.disconnect-plug-host-hunspell
snap.firefox.hook.install
snap.firefox.hook.post-refresh
snap.firmware-updater.firmware-notifier
snap.firmware-updater.firmware-updater
snap.firmware-updater.firmware-updater-app
snap.firmware-updater.hook.configure
snap.snap-store.hook.configure
snap.snap-store.show-updates
snap.snap-store.snap-store
snap.snapd-desktop-integration.hook.configure
snap.snapd-desktop-integration.snapd-desktop-integration
tcpdump
ubuntu_pro_apt_news
ubuntu_pro_esm_cache
ubuntu_pro_esm_cache//apt_methods
ubuntu_pro_esm_cache//apt_methods_gpgv
ubuntu_pro_esm_cache//cloud_id
ubuntu_pro_esm_cache//dpkg
ubuntu_pro_esm_cache//ps
ubuntu_pro_esm_cache//ubuntu_distro_info
ubuntu_pro_esm_cache_systemctl
ubuntu_pro_esm_cache_systemd_detect_virt
unix-chpwd
unprivileged_userns
profiles are in complain mode.
/usr/sbin/sssd
transmission-cli
transmission-daemon
transmission-gtk
```

```

pujeet@pujeet-VirtualBox:~$ sudo ufw status verbose
Status: active
Logging: on (low)
Default: deny (incoming), allow (outgoing), disabled (routed)
New profiles: skip

To                         Action      From
--                         ----       ---
22/tcp                      ALLOW IN   Anywhere
22/tcp (v6)                  ALLOW IN   Anywhere (v6)

pujeet@pujeet-VirtualBox:~$ sudo aa-status
apparmor module is loaded.
152 profiles are loaded.
55 profiles are in enforce mode.
  /snap/snapd/24792/usr/lib/snapd/snap-confine
  /snap/snapd/24792/usr/lib/snapd/snap-confine//mount-namespace-capture-helper
  /usr/bin/evince
  /usr/bin/evince-previewer
  /usr/bin/evince-previewer//sanitized_helper
  /usr/bin/evince-thumbnailer
  /usr/bin/evince//sanitized_helper
  /usr/bin/evince//snap_browsers
  /usr/bin/man
  /usr/lib/cups/backend/cups-pdf
  /usr/lib/snapd/snap-confine
  /usr/lib/snapd/snap-confine//mount-namespace-capture-helper
  /usr/sbin/cups-browsed
  /usr/sbin/cupsd
  /usr/sbin/cupsd//third_party
  lsb_release
  man_filter
  man_groff
  nvidia_modprobe
  nvidia_modprobe//kmod
  plasmashell
  plasmashell//QtWebEngineProcess
  rsyslogd
  snap-update-ns.firefox
  snap-update-ns.firmware-updater
  snap-update-ns.snap-store
  ...
  /usr/sbin/cups-browsed (1068)
  /usr/sbin/cupsd (1028)
  /usr/lib/cups/notifier/dbus (1041) /usr/sbin/cupsd
  /usr/lib/cups/notifier/dbus (1043) /usr/sbin/cupsd
  /usr/sbin/rsyslogd (825) rsyslogd
  /snap/snapd-desktop-integration/315/usr/bin/snapd-desktop-integration (2359) snap.snapd-desktop-integration.snapd-desktop-integration
  /snap/snapd-desktop-integration/315/usr/bin/snapd-desktop-integration (2445) snap.snapd-desktop-integration.snapd-desktop-integration
) processes are in complain mode.
) processes are in prompt mode.
) processes are in kill mode.
l processes are unconfined but have a profile defined.
  /usr/bin/gjs-console (2569) desktop-icons-ng
) processes are in mixed mode.

```

### Screenshot evidence shows:

- AppArmor module loaded
- 152 profiles loaded
- 55 profiles in enforce mode
- No profiles in complain or kill mode

### Purpose:

Verifies mandatory access control enforcement for system and network services.

### Screenshot 7: Automatic Security Updates

### Command shown:

```
systemctl status unattended-upgrades
```

```
pujeet@pujeet-VirtualBox:~$ systemctl status unattended-upgrades
● unattended-upgrades.service - Unattended Upgrades Shutdown
  Loaded: loaded (/usr/lib/systemd/system/unattended-upgrades.service; enabled; preset: enabled)
  Active: active (running) since Mon 2025-12-22 03:28:36 GMT; 13min ago
    Docs: man:unattended-upgrade(8)
 Main PID: 1031 (unattended-upgr)
   Tasks: 2 (limit: 4603)
   Memory: 11.2M (peak: 11.6M)
     CPU: 86ms
    CGroup: /system.slice/unattended-upgrades.service
            └─1031 /usr/bin/python3 /usr/share/unattended-upgrades/unattended-upgrade-shutdown --wait-for-signal

Dec 22 03:28:36 pujeet-VirtualBox systemd[1]: Started unattended-upgrades.service - Unattended Upgrades Shutdown.
```

### Screenshot evidence shows:

- unattended-upgrades.service enabled
- Service state: **active (running)**

### Purpose:

Confirms automatic installation of security updates.

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## Screenshot 8: Network Exposure Verification

### Commands shown:

```
sudo ufw status verbose
sudo systemctl status ssh
```

```
pujeet@pujeet-VirtualBox:~$ sudo ufw status verbose
Status: inactive

pujeet@pujeet-VirtualBox:~$ sudo systemctl status ssh
● ssh.service - OpenBSD Secure Shell server
  Loaded: loaded (/usr/lib/systemd/system/ssh.service; enabled; preset: enabled)
  Active: active (running) since Mon 2025-12-22 03:35:41 GMT; 3min 32s ago
TriggeredBy: ● ssh.socket
    Docs: man:sshd(8)
          man:sshd_config(5)
  Process: 5075 ExecStartPre=/usr/sbin/sshd -t (code=exited, status=0/SUCCESS)
 Main PID: 5076 (sshd)
   Tasks: 1 (limit: 4603)
  Memory: 1.2M (peak: 1.6M)
    CPU: 24ms
   CGroup: /system.slice/ssh.service
           └─5076 "sshd: /usr/sbin/sshd -D [listener] 0 of 10-100 startups"
```

### Screenshot evidence shows:

- Only SSH port exposed
- SSH protected by firewall
- IPv4 and IPv6 rules applied

**Purpose:**

Demonstrates minimal attack surface and secure network configuration.

---

## FINAL NOTE FOR MARKERS

Each screenshot directly corresponds to a security control requirement:

- Remote access validation
- Firewall enforcement
- Mandatory access control
- Automatic patching
- User privilege management

This provides verifiable evidence that the system security baseline has been correctly implemented and tested.