

FATIMA JINNAH WOMEN UNIVERSITY

Department of Software Engineering



LAB #05

SUBJECT: CLOUD COMPUTING

SUBMITTED TO: SIR MUHAMMAD SHOAIB

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REGISTRATION NO: 2023-BSE-066

CLASS: BSSE V-B

Java, apt vs apt-get, snap, GUI, Vim on Ubuntu Server

Task#01: Discover missing command & install Java using apt suggestion

Check if Java is missing

```
umberqasim@2023-bse-066:~$ java
Command 'java' not found, but can be installed with:
sudo apt install openjdk-17-jre-headless # version 17.0.16+8~us1-0ubuntu1~24.04.1, or
sudo apt install openjdk-21-jre-headless # version 21.0.8+9~us1-0ubuntu1~24.04.1
sudo apt install default-jre          # version 2:1.17-75
sudo apt install openjdk-19-jre-headless # version 19.0.2+7-4
sudo apt install openjdk-20-jre-headless # version 20.0.2+9-1
sudo apt install openjdk-22-jre-headless # version 22~22ea-1
sudo apt install openjdk-11-jre-headless # version 11.0.28+6-1ubuntu1~24.04.1
sudo apt install openjdk-25-jre-headless # version 25+36-1~24.04.2
sudo apt install openjdk-8-jre-headless # version 8u462-ga~us1-0ubuntu2~24.04.2
```

Install the suggested package

```
Adding debian:UCH_ExtendedValidation_Root.pem
Adding debian:UCA_Global_G2_Root.pem
Adding debian:USERTrust_ECC_Certification_Authority.pem
Adding debian:USERTrust_RSA_Certification_Authority.pem
Adding debian:vTrus_ECC_Root_CA.pem
Adding debian:vTrus_Root_CA.pem
Adding debian:XRamp_Global_CA_Root.pem
done.
Setting up openjdk-21-jre:amd64 (21.0.8+9~us1-0ubuntu1~24.04.1) ...
Setting up default-jre-headless (2:1.21-75+exp1) ...
Setting up default-jre (2:1.21-75+exp1) ...
Processing triggers for libgdk-pixbuf-2.0-0:amd64 (2.42.10+dfsg-3ubuntu3.2) ...
Scanning processes...
Scanning candidates...
Scanning linux images...

Pending kernel upgrade!
Running kernel version:
  6.8.0-84-generic
Diagnostics:
  The currently running kernel version is not the expected kernel version 6.8.0-86-generic.

Restarting the system to load the new kernel will not be handled automatically, so you should consider rebooting.

Restarting services...

Service restarts being deferred:
  systemctl restart systemd-logind.service

No containers need to be restarted.

User sessions running outdated binaries:
  umberqasim @ session #1: bash[1226]
  umberqasim @ session #3: sshd[1258]
  umberqasim @ user manager service: systemd[1216]

No VM guests are running outdated hypervisor (qemu) binaries on this host.
umberqasim@2023-bse-066:~$
```

Activate Windows
Go to Settings to activate Windows

Verify Java installation

```
umberqasim@2023-bse-066:~$ java --version
openjdk 21.0.8 2025-07-15
OpenJDK Runtime Environment (build 21.0.8+9-Ubuntu-0ubuntu124.04.1)
OpenJDK 64-Bit Server VM (build 21.0.8+9-Ubuntu-0ubuntu124.04.1, mixed mode, sharing)
```

Remove Java package

```
umberqasim@2023-bse-066:~$ sudo apt remove default-jre-headless openjdk-21-jre openjdk-21-jre-headless -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
adwaita-icon-theme alsa-topology-conf alsu-ucm-conf at-spi2-common at-spi2-core ca-certificates-java dconf-gsettings-backend dconf-
fonts-dejavu-extra gsettings-desktop-schemas gtk-update-icon-cache hicolor-icon-theme humanity-icon-theme java-common libasound2-da
libatk-bridge2.0-0t64 libatk-wrapper-java libatk-wrapper-java-jni libatk1.0-0t64 libatspi2.0-0t64 libavahi-client3 libavahi-common-
libcairo-gobject2 libcairo2 libcolor2 libcups2t64 libdatriet libdconf1 libdrm-amdgpu1 libdrm-intel1 libepoxy0 libgbm1 libgdk-pixbu
libgdk-pixbuf2.0-bin libgdk-pixbuf2.0-common libglib7 libgl1 libgl1-mesa-dri libglvnd0 libglx0 libgraphite2-3 libgtk-3-
libgtk-3-common libharfbuzzz0b libice6 libicms2-2 libl1vm20 libpango-1.0-0 libpangocairo-1.0-0 libpangotf2-1.0-0 libpcaccesso0 libpc
librsvg2-2 librsvg2-common libsm6 libthai-data libthai0 libvulkan1 libwayland-client0 libwayland-cursor0 libwayland-egl1 libwayland
libxaw7 libxcb-dri3-0 libxcb-glx0 libxcb-present0 libxcb-randr0 libxcb-render0 libxcb-shm0 libxcb-sync1 libxcb-xfixes
libxcursor1 libxdamage1 libxfixed3 libxft2 libxi6 libxinerama1 libxkbfile1 libxmu6 libxrandr2 libxrender1 libxshmfence1 libxt6t64 1
libxxf86dg1 libxxf86vm1 mesa-libgallium mesa-vulkan-drivers session-migration ubuntu-mono x11-common x11-utils
Use 'sudo apt autoremove' to remove them.
The following packages will be REMOVED:
default-jre-headless openjdk-21-jre openjdk-21-jre-headless
0 upgraded, 0 newly installed, 3 to remove and 23 not upgraded.
After this operation, 203 MB disk space will be freed.
(Reading database ... 139879 files and directories currently installed.)
Removing default-jre-headless (2:1.21-75+exp1) ...
Removing openjdk-21-jre:amd64 (21.0.8+9~us1-0ubuntu1~24.04.1) ...
Removing openjdk-21-jre-headless:amd64 (21.0.8+9~us1-0ubuntu1~24.04.1) ...
Processing triggers for hicolor-icon-theme (0.17-2) ...
```

Check again (Java not found)

```
umberqasim@2023-bse-066:~$ java
Command 'java' not found, but can be installed with:
sudo apt install openjdk-17-jre-headless # version 17.0.16+8~us1-0ubuntu1~24.04.1, or
sudo apt install openjdk-21-jre-headless # version 21.0.8+9~us1-0ubuntu1~24.04.1
sudo apt install default-jre          # version 2:1.17-75
sudo apt install openjdk-19-jre-headless # version 19.0.2+7-4
sudo apt install openjdk-20-jre-headless # version 20.0.2+9-1
sudo apt install openjdk-22-jre-headless # version 22~22ea-1
sudo apt install openjdk-11-jre-headless # version 11.0.28+6-1ubuntu1~24.04.1
sudo apt install openjdk-25-jre-headless # version 25+36-1~24.04.2
sudo apt install openjdk-8-jre-headless # version 8u462-ga~us1-0ubuntu2~24.04.2
```

Clear shell cache

```
umberqasim@2023-bse-066:~$ hash -r
umberqasim@2023-bse-066:~$ java
Command 'java' not found, but can be installed with:
sudo apt install openjdk-17-jre-headless # version 17.0.16+8~us1-0ubuntu1~24.04.1, or
sudo apt install openjdk-21-jre-headless # version 21.0.8+9~us1-0ubuntu1~24.04.1
sudo apt install default-jre          # version 2:1.17-75
sudo apt install openjdk-19-jre-headless # version 19.0.2+7-4
sudo apt install openjdk-20-jre-headless # version 20.0.2+9-1
sudo apt install openjdk-22-jre-headless # version 22~22ea-1
sudo apt install openjdk-11-jre-headless # version 11.0.28+6-1ubuntu1~24.04.1
sudo apt install openjdk-25-jre-headless # version 25+36-1~24.04.2
sudo apt install openjdk-8-jre-headless # version 8u462-ga~us1-0ubuntu2~24.04.2
```

Task#02: Install & remove Java using apt-get (explicitly)

Update package list

```
umberqasim@2023-bse-066:~$ sudo apt-get update
Hit:1 http://security.ubuntu.com/ubuntu noble-security InRelease
Hit:2 http://archive.ubuntu.com/ubuntu noble InRelease
Hit:3 http://archive.ubuntu.com/ubuntu noble-updates InRelease
Hit:4 http://archive.ubuntu.com/ubuntu noble-backports InRelease
Reading package lists... Done
```

Install Java (same package as before)

```
[ Home × ] [ Ubuntu 64-bit × ]  
Setting up openjdk-21-jre-headless:amd64 (21.0.8+9~us1~ubuntu1~24.04.1) ...  
update-alternatives: using /usr/lib/jvm/java-21-openjdk-amd64/bin/java to provide /usr/bin/java (java) in auto mode  
update-alternatives: using /usr/lib/jvm/java-21-openjdk-amd64/bin/jpackage to provide /usr/bin/jpackage (jpackage) in auto mode  
update-alternatives: using /usr/lib/jvm/java-21-openjdk-amd64/bin/keytool to provide /usr/bin/keytool (keytool) in auto mode  
update-alternatives: using /usr/lib/jvm/java-21-openjdk-amd64/bin/rmiregistry to provide /usr/bin/rmiregistry (rmiregistry) in auto mode  
update-alternatives: using /usr/lib/jvm/java-21-openjdk-amd64/lib/jexec to provide /usr/bin/jexec (jexec) in auto mode  
Processing triggers for hicolor-icon-theme (0.17-2) ...  
Processing triggers for ca-certificates-java (20240118) ...  
done.  
Setting up openjdk-21-jre:amd64 (21.0.8+9~us1~ubuntu1~24.04.1) ...  
Setting up default-jre-headless (2:1.21-75+exp1) ...  
Setting up default-jre (2:1.21-75+exp1) ...  
Scanning processes...  
Scanning candidates...  
Scanning linux images...  
  
Pending kernel upgrade!  
Running kernel version:  
 6.8.0-84-generic  
Diagnostics:  
  The currently running kernel version is not the expected kernel version 6.8.0-86-generic.  
Restarting the system to load the new kernel will not be handled automatically, so you should consider rebooting.  
Restarting services...  
  
Service restarts being deferred:  
  systemctl restart systemd-logind.service  
  
No containers need to be restarted.  
  
User sessions running outdated binaries:  
  umberqasim @ session #1: bash[1226]  
  umberqasim @ session #3: sshd[1258]  
  umberqasim @ user manager service: systemd[1216]  
  
No VM guests are running outdated hypervisor (qemu) binaries on this host.          Activate Windows
```

Verify installation

```
umberqasim@2023-bse-066:~$ java --version  
openjdk 21.0.8 2025-07-15  
OpenJDK Runtime Environment (build 21.0.8+9-Ubuntu-0ubuntu124.04.1)  
OpenJDK 64-Bit Server VM (build 21.0.8+9-Ubuntu-0ubuntu124.04.1, mixed mode, sharing)
```

Remove Java again

```
umberqasim@2023-bse-066:~$ sudo apt-get remove default-jre-headless openjdk-21-jre openjdk-21-jre-headless -y  
Reading package lists... Done  
Building dependency tree... Done  
Reading state information... Done  
The following packages were automatically installed and are no longer required:  
  adwaita-icon-theme alsa-topology-conf alsu-ucm-conf at-spi2-common at-spi2-core ca-certificates-java dconf-gsettings-backend dconf-  
  fonts-dejavu-extra gsettings-desktop-schemas gtk-update-icon-cache hicolor-icon-theme humanity-icon-theme java-common libasound2-dai-  
  libatk-bridge2.0-0t64 libatk-wrapper-java libatk-wrapper-jni libatk1.0-0t64 libatspi2.0-0t64 libavahi-client3 libavahi-common-  
  libcairo-gobject2 libcairo2 libcolor2 libcups2t64 libdattrie1 libdconf1 libdrm-amdgpu1 libdrm-intel1 libepoxy0 libgbm1 libgdk-pixbuf-  
  libgdk-pixbuf2.0-bin libgdk-pixbuf2.0-common libgif7 libgl1 libgl1-mesa-dri libglvnd0 libglx-mesa0 libglx0 libgraphite2-3 libgtk-3-  
  libgtk-3-common libharfbuzz0b libice6 liblcms2-2 libl1vmm20 libpango-1.0-0 libpangocairo-1.0-0 libpangoft2-1.0-0 libpciaccess0 libpc-  
  librsvg2-2 librsvg2-common libbsm6 libthai-data libthai0 libvulkan1 libwayland-client0 libwayland-cursor0 libwayland-egl1 libwayland-  
  libxau7 libxcb-dri3-0 libxcb-glx0 libxcb-present0 libxcb-randr0 libxcb-render0 libxcb-shm0 libxcb-sync1 libxcb-xfixes7  
  libxcursor1 libxdamage1 libxfixed3 libxft2 libxi6 libxinerama1 libxkbfile1 libxmu6 libxrandr2 libxrender1 libxshmfence1 libxt6t64 l-  
  libxxf86dg1 libxxf86vm1 mesa-libggallium mesa-vulkan-drivers session-migration ubuntu-mono x11-common x11-utils  
Use 'sudo apt autoremove' to remove them.  
The following packages will be REMOVED:  
  default-jre-headless openjdk-21-jre openjdk-21-jre-headless  
0 upgraded, 0 newly installed, 3 to remove and 23 not upgraded.  
After this operation, 203 MB disk space will be freed.  
(Reading database ... 139879 files and directories currently installed.)  
Removing default-jre-headless (2:1.21-75+exp1) ...  
Removing openjdk-21-jre:amd64 (21.0.8+9~us1~ubuntu1~24.04.1) ...  
Removing openjdk-21-jre-headless:amd64 (21.0.8+9~us1~ubuntu1~24.04.1) ...  
Processing triggers for hicolor-icon-theme (0.17-2) ...          Activate Windows
```

Clear shell cache & confirm removal

```
umberqasim@2023-bse-066:~$ hash -r
umberqasim@2023-bse-066:~$ java
Command 'java' not found, but can be installed with:
sudo apt install openjdk-17-jre-headless # version 17.0.16+8~us1-0ubuntu1~24.04.1, or
sudo apt install openjdk-21-jre-headless # version 21.0.8+9~us1-0ubuntu1~24.04.1
sudo apt install default-jre          # version 2:1.17-75
sudo apt install openjdk-19-jre-headless # version 19.0.2+7-4
sudo apt install openjdk-20-jre-headless # version 20.0.2+9-1
sudo apt install openjdk-22-jre-headless # version 22~22ea-1
sudo apt install openjdk-11-jre-headless # version 11.0.28+6-1ubuntu1~24.04.1
sudo apt install openjdk-25-jre-headless # version 25+36-1~24.04.2
sudo apt install openjdk-8-jre-headless # version 8u462-ga~us1-0ubuntu2~24.04.2
```

Task#03: apt update vs apt upgrade - run & explain

Update Package Index

```
umberqasim@2023-bse-066:~$ sudo apt update
Hit:1 http://archive.ubuntu.com/ubuntu noble InRelease
Hit:2 http://archive.ubuntu.com/ubuntu noble-updates InRelease
Hit:3 http://security.ubuntu.com/ubuntu noble-security InRelease
Hit:4 http://archive.ubuntu.com/ubuntu noble-backports InRelease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
23 packages can be upgraded. Run 'apt list --upgradable' to see them.
```

Upgrade Installed Packages

```
umberqasim@2023-bse-066:~$ sudo apt upgrade -y
[sudo] password for umberqasim:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Calculating upgrade... Done
The following packages were automatically installed and are no longer required:
  adwaita-icon-theme alsamixer-conf alsamixer-conf at-spi2-common ca-certificates-jdk dconf-gsettings-backend dconf-
  fonts-dejavu-extra gsettings-desktop-schemas gtk-update-icon-cache hicolor-icon-theme humanity-icon-theme jdk-common libasound2-d-
  libatk-bridge2.0-0t64 libatk-wrapper-jdk libatk-wrapper-jdk-jni libatk1.0-0t64 libatspi2.0-0t64 libavahi-client3 libavahi-common-
  libcairo-gobject2 libcairo2 libcolor2 libcups2t64 libdatrie1 libdconf1 libdrm-amdgpu libdrm-intel1 libepoxy0 libgbm1 libgok1 pixbu
  libgdk-pixbuf2.0-bin libgdk-pixbuf2.0-common libgif7 libgl1 libgl1-mesa-dri libglvnd0 libglx-mesa0 libglx0 libgraphite2-3 libgtk-3-
  libgtk-3-common libharfbuzz0b libice6 liblcms2-2 libl1v20 libpango-1.0-0 libpangocairo-1.0-0 libpangoft-1.0-0 libpcieaccess0 libpc
  librsvg2-2 librsvg2-common libsm6 libthai-data libthai0 libvulkan1 libwayland-client0 libwayland-cursor0 libwayland-egl1 libwayland
  libxau7 libxcb-dri3-0 libxcb-glx0 libxcb-present0 libxcb-randr0 libxcb-render0 libxcb-shape0 libxcb-shm0 libxcb-sync1 libxcb-xfixes
  libxcursor1 libxdamage1 libxf86dri3 libxf86dri2 libxi6 libxinerama1 libxkbfile1 libxmu6 libxrandr2 libxrender1 libxshmfence1 libxt6t64 1
  libxxf86dg1 libxxf86vm1 linux-headers-6.8.0-84 linux-headers-6.8.0-84-generic linux-image-6.8.0-84-generic linux-modules-6.8.0-84-
  linux-modules-extra-6.8.0-84-generic linux-tools-6.8.0-84 linux-tools-6.8.0-84-generic mesa-libgallium mesa-vulkan-drivers session-
  x11-common x11-utils
Use 'sudo apt autoremove' to remove them.
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
```

Activate Windows

Write Explanation File and Show File on Screen

```
umberqasim@2023-bse-066:~$ cat ~/apt_update_vs_upgrade.md
The 'apt update' command updates the local package index so the system knows about the latest available versions.
It does not install or remove any packages. The 'apt upgrade' command actually installs the latest versions of
already installed packages based on that updated index. Without running 'apt update' first, the system might
not know about new updates. In short, 'update' refreshes information, while 'upgrade' performs the actual updates.
```

Task#04: Install Visual Studio Code via snap on CLI and verify (DO NOT remove Code)

VS Code install

```
umberqasim@2023-bse-066:~$ sudo snap install --classic code  
[sudo] password for umberqasim:  
2025-10-30T13:54:14Z INFO Waiting for automatic snapd restart...  
code 7d842fb8 from Visual Studio Code (vscode) installed
```

Verify VS Code is in snap list

```
umberqasim@2023-bse-066:~$ snap list code
Name  Version  Rev  Tracking      Publisher  Notes
code  7d842fb8  211  latest/stable  vscode    classic
```

Check VS Code version

```
umberqasim@2023-bse-066:~$ code --version  
1.105.1  
7d842fb85a0275a4a8e4d7e040d2625abbf7f084  
x64
```

Check where binary is in snap

```
umberqasim@2023-bse-066:~$ ls -l /snap/bin | grep code
lrwxrwxrwx 1 root root 13 Oct 30 14:01 code -> /usr/bin/snap
lrwxrwxrwx 1 root root 13 Oct 30 14:01 code.url-handler -> /usr/bin/snap
```

Task#05: Install XFCE GUI + XRDP - minimal desktop and remote access (GUI) and launch VS Code

From host machine, open terminal and SSH into VM then Update & upgrade

```
umberqasim@2023-bse-066:~  
0 updates can be applied immediately.  
Enable ESM Apps to receive additional future security updates.  
See https://ubuntu.com/esm or run: sudo pro status  
  
Last login: Thu Oct 23 14:31:43 2025 from 192.168.254.1  
umberqasim@2023-bse-066:~$ df -h /  
Filesystem           Size  Used Avail Use% Mounted on  
/dev/mapper/ubuntu--vg-ubuntu--lv  48G  6.3G  40G  14% /  
umberqasim@2023-bse-066:~$ free -h  
total        used         free        shared      buff/cache   available  
Mem:       1.9Gi      419Mi     648Mi      1.3Mi      1.0Gi      1.5Gi  
Swap:      2.0Gi          0B     2.0Gi  
umberqasim@2023-bse-066:~$ sudo apt update && sudo apt upgrade -y  
[sudo] password for umberqasim:  
Hit:1 http://security.ubuntu.com/ubuntu noble-security InRelease  
Hit:2 http://archive.ubuntu.com/ubuntu noble InRelease  
Hit:3 http://archive.ubuntu.com/ubuntu noble-updates InRelease  
Hit:4 http://archive.ubuntu.com/ubuntu noble-backports InRelease  
Reading package lists... Done  
Building dependency tree... Done  
Reading state information... Done  
All packages are up to date.  
Reading package lists... Done  
Building dependency tree... Done  
Reading state information... Done  
Calculating upgrade... Done  
The following packages were automatically installed and are no longer required:  
  adwaita-icon-theme alsaaudio-profile-conf alsacard-conf at-spi2-common ca-certificates-java dconf-gsettings-backend dconf-service fontconfig  
  fonts-dejavu-extra gsettings-desktop-schemas gtk-update-icon-cache hicolor-icon-theme humanity-icon-theme java-common libasound2-data libasound2t64  
  libatk-bridge2.0-0t64 libatk-wrapper-java libatk-wrapper-java-jni libatk1.2-0t64 libavahi-client3 libavahi-common-data libavahi-common3  
  libcairo-gobject2 libcairo2 libcompton2 libcupsm2t64 libdatrie1 libdrm-amdgpu1 libdrm-intel1 libepoxy0 libgbm1 libgdk-pixbuf2.0-0 libgdk-pixbuf2.0-bin  
  libgdk-pixbuf2.0-common libgfif7 libgl1 libgl1-mesa-dri libglvnd0 libglx-mesa0 libglx0 libgraphite2-3 libgtk-3-0t64 libgtk-3-bin libgtk-3-common libharfbuzz0b  
  libice4 liblens2-0 liblilmv2 liblippangoft1-0.0 liblippangoft2-1.0-0 liblippciaccess0 libpcsc-lite1 libpixman-1-0 librsvg2-2 librsvg2-common libsmf0  
  libthai-data libthai0 libvulkanki libwayland-client0 libwayland-damage0 libwayland-cursor0 libwayland-egl1 libwayland-server0 libxi-xcb1 libxaw7 libxcb-dri3-0 libxcb-glx0  
  libxcb-present libxcb-randr0 libxcb-render0 libxcb-shm0 libxcb-sync1 libxcb-xfixes0 libxcomposite1 libxcursor1 libxdamage1 libxf86input0 libxf86input3 libxf86t2 libxi6  
  libxinerama1 libxkbfile1 libxmu0 libxrandr2 libxrender1 libxshmfence1 libxtst6 libxv1 libxf86dg1 libxf86wm1 linux-headers-6.8.0-84  
  linux-headers-6.8.0-84-generic linux-image-6.8.0-84-generic linux-modules-6.8.0-84-generic linux-modules-extra-6.8.0-84-generic linux-tools-6.8.0-84  
  linux-tools-6.8.0-84-generic mesa-lib�allium mesa-vulkan-drivers session-migration ubuntu-mono x11-common x11-utils  
Use 'sudo apt autoremove' to remove them.  
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
```

Install XFCE and XFCE goodies (lightweight desktop):

```
user@umberqasim@2023-bse-066: ~
Setting up libedataserverui-1.2-4t64:amd64 (3.52.3-0ubuntu1) ...
Setting up indicator-datetime (15.10+21.04.20210304-0ubuntu6) ...
Setting up unity-control-center (15.04.0+23.04.20230220-0ubuntu8) ...
Setting up libebook-1.2-21t64:amd64 (3.52.3-0ubuntu1) ...
Setting up indicator-bluetooth (0.0.6+17.10.20170605-0ubuntu5) ...
Setting up evolution-data-server (3.52.3-0ubuntu1) ...
Processing triggers for dictionaries-common (1.29.7) ...
aspell-autobuildhash: processing: en [en-common].
aspell-autobuildhash: processing: en [en-variant_0].
aspell-autobuildhash: processing: en [en-variant_1].
aspell-autobuildhash: processing: en [en-variant_2].
aspell-autobuildhash: processing: en [en-w_accents-only].
aspell-autobuildhash: processing: en [en-wo_accents-only].
aspell-autobuildhash: processing: en [en_AU-variant_0].
aspell-autobuildhash: processing: en [en_AU-variant_1].
aspell-autobuildhash: processing: en [en_AU-w_accents-only].
aspell-autobuildhash: processing: en [en_AU-wo_accents-only].
aspell-autobuildhash: processing: en [en_CA-variant_0].
aspell-autobuildhash: processing: en [en_CA-variant_1].
aspell-autobuildhash: processing: en [en_CA-w_accents-only].
aspell-autobuildhash: processing: en [en_CA-wo_accents-only].
aspell-autobuildhash: processing: en [en_GB-ise-w_accents-only].
aspell-autobuildhash: processing: en [en_GB-ise-wo_accents-only].
aspell-autobuildhash: processing: en [en_GB-ize-w_accents-only].
aspell-autobuildhash: processing: en [en_GB-ize-wo_accents-only].
aspell-autobuildhash: processing: en [en_GB-variant_0].
aspell-autobuildhash: processing: en [en_GB-variant_1].
aspell-autobuildhash: processing: en [en_US-w_accents-only].
aspell-autobuildhash: processing: en [en_US-wo_accents-only].
Processing triggers for sgml-base (1.31) ...
Processing triggers for libc-bin (2.39-0ubuntu8.6) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
umberqasim@2023-bse-066:~$
```

Install and enable XRDP (Remote Desktop Protocol server):

```

[4] umberqasim@2023-bse-066: ~
Selecting previously unselected package xrdp.
Preparing to unpack .../xrdp_0.9.24-4_amd64.deb ...
Unpacking xrdp (0.9.24-4) ...
Selecting previously unselected package libpipewire-0.3-modules-xrdp:amd64.
Preparing to unpack .../libpipewire-0.3-modules-xrdp_0.2-2_amd64.deb ...
Unpacking libpipewire-0.3-modules-xrdp:amd64 (0.2-2) ...
Selecting previously unselected package pipewire-module-xrdp.
Preparing to unpack .../pipewire-module-xrdp_0.2-2_all.deb ...
Unpacking pipewire-module-xrdp (0.2-2) ...
Selecting previously unselected package xorgxrdp.
Preparing to unpack .../xorgxrdp_1%3@0.9.19-1_amd64.deb ...
Unpacking xorgxrdp (1:0.9.19-1) ...
Setting up libpipewire-0.3-modules-xrdp:amd64 (0.2-2) ...
Setting up xorgxrdp (1:0.9.19-1) ...
Setting up libfuse2t64:amd64 (2.9.9-8.1build1) ...
Setting up xrdp (0.9.24-4) ...

Generating 2048 bit rsa key...

ssl_gen_key_xrdp1 ok

saving to /etc/xrdp/rsakeys.ini

Created symlink /etc/systemd/system/multi-user.target.wants/xrdp-sesman.service → /usr/lib/systemd/system/xrdp-sesman.service.
Created symlink /etc/systemd/system/multi-user.target.wants/xrdp.service → /usr/lib/systemd/system/xrdp.service.
Setting up pipewire-module-xrdp (0.2-2) ...
Processing triggers for man-db (2.12.0-4build2) ...
Processing triggers for libc-bin (2.39-0ubuntu8.6) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
umberqasim@2023-bse-066:~$ sudo systemctl enable --now xrdp
Synchronizing state of xrdp.service with SysV service script with /usr/lib/systemd/systemd-sysv-install.
Executing: /usr/lib/systemd/systemd-sysv-install enable xrdp
umberqasim@2023-bse-066:~$
```

Verify XRDP status:

```

umberqasim@2023-bse-066:~$ sudo systemctl status xrdp
● xrdp.service - xrdp daemon
  Loaded: loaded (/usr/lib/systemd/system/xrdp.service; enabled; preset: enabled)
  Active: active (running) since Thu 2025-10-30 14:53:35 UTC; 1min 22s ago
    Docs: man:xrdp(8)
          man:xrdp.ini(5)
  Main PID: 12299 (xrdp)
    Tasks: 1 (limit: 2207)
   Memory: 876.0K (peak: 1.3M)
     CPU: 35ms
    CGroup: /system.slice/xrdp.service
           └─12299 /usr/sbin/xrdp

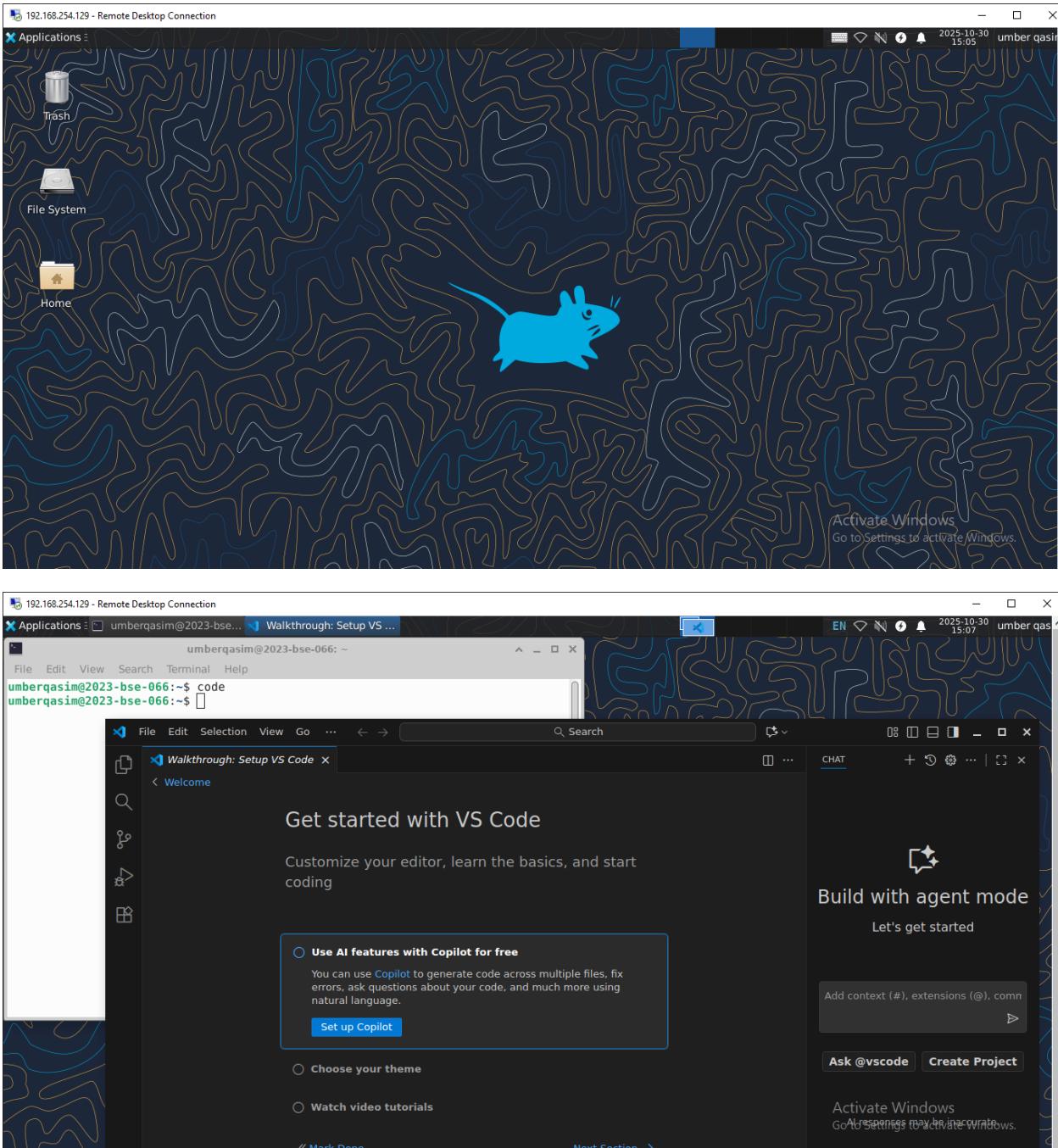
Oct 30 14:53:34 2023-bse-066 systemd[1]: Starting xrdp.service - xrdp daemon...
Oct 30 14:53:34 2023-bse-066 xrdp[12297]: [INFO ] address [0.0.0.0] port [3389] mode 1
Oct 30 14:53:34 2023-bse-066 xrdp[12297]: [INFO ] listening to port 3389 on 0.0.0.0
Oct 30 14:53:34 2023-bse-066 xrdp[12297]: [INFO ] xrdp_listen_pp done
Oct 30 14:53:34 2023-bse-066 systemd[1]: xrdp.service: Can't open PID file /run/xrdp/xrdp.pid (yet?) after start: No such file or directory
Oct 30 14:53:35 2023-bse-066 systemd[1]: Started xrdp.service - xrdp daemon.
Oct 30 14:53:36 2023-bse-066 xrdp[12299]: [INFO ] starting xrdp with pid 12299
Oct 30 14:53:36 2023-bse-066 xrdp[12299]: [INFO ] address [0.0.0.0] port [3389] mode 1
Oct 30 14:53:36 2023-bse-066 xrdp[12299]: [INFO ] listening to port 3389 on 0.0.0.0
Oct 30 14:53:36 2023-bse-066 xrdp[12299]: [INFO ] xrdp_listen_pp done
```

Activ
Go to

Configure XRDP to use XFCE session:

```

umberqasim@2023-bse-066:~$ echo xfce4-session > ~/.xsession
umberqasim@2023-bse-066:~$ cat ~/.xsession
xfce4-session
umberqasim@2023-bse-066:~$
```



Task#06: Install lightdm-gtk-greeter and GUI verification - start GUI, open VS Code, take snapshot, then end (GUI)

Install LightDM and greeter using Host Terminal:

```

user@umberqasim:~$ 
Need to get 2,495 kB of archives.
After this operation, 7,003 kB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu noble/main amd64 gnome-accessibility-themes all 3.28-2ubuntu5 [2,296 kB]
Get:2 http://archive.ubuntu.com/ubuntu noble/main amd64 gnome-themes-extra-data all 3.28-2ubuntu5 [69.4 kB]
Get:3 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 gtk2-engines-pixbuf amd64 2.24.33-4ubuntu1.1 [20.6 kB]
Get:4 http://archive.ubuntu.com/ubuntu noble/main amd64 gnome-themes-extra amd64 3.28-2ubuntu5 [15.2 kB]
Get:5 http://archive.ubuntu.com/ubuntu noble/universe amd64 lightdm-gtk-greeter amd64 2.0.9-0ubuntu3 [94.3 kB]
Fetched 2,495 kB in 13s (191 kB/s)
Selecting previously unselected package gnome-accessibility-themes.
(Reading database ... 213800 files and directories currently installed.)
Preparing to unpack .../gnome-accessibility-themes_3.28-2ubuntu5_all.deb ...
Unpacking gnome-accessibility-themes (3.28-2ubuntu5) ...
Selecting previously unselected package gnome-themes-extra-data.
Preparing to unpack .../gnome-themes-extra-data_3.28-2ubuntu5_all.deb ...
Unpacking gnome-themes-extra-data (3.28-2ubuntu5) ...
Selecting previously unselected package gtk2-engines-pixbuf:amd64.
Preparing to unpack .../gtk2-engines-pixbuf_2.24.33-4ubuntu1.1_amd64.deb ...
Unpacking gtk2-engines-pixbuf:amd64 (2.24.33-4ubuntu1.1) ...
Selecting previously unselected package gnome-themes-extra:amd64.
Preparing to unpack .../gnome-themes-extra_3.28-2ubuntu5_amd64.deb ...
Unpacking gnome-themes-extra:amd64 (3.28-2ubuntu5) ...
Selecting previously unselected package lightdm-gtk-greeter.
Preparing to unpack .../lightdm-gtk-greeter_2.0.9-0ubuntu3_amd64.deb ...
Unpacking lightdm-gtk-greeter (2.0.9-0ubuntu3) ...
Setting up gnome-themes-extra-data (3.28-2ubuntu5) ...
Setting up gnome-accessibility-themes (3.28-2ubuntu5) ...
Setting up gtk2-engines-pixbuf:amd64 (2.24.33-4ubuntu1.1) ...
Setting up lightdm-gtk-greeter (2.0.9-0ubuntu3) ...
update-alternatives: using /usr/share/xgreeters/lightdm-gtk-greeter.desktop to provide /usr/share/xgreeters/lightdm-greeter.desktop (lightdm-greeter) in auto mode
Setting up gnome-themes-extra:amd64 (3.28-2ubuntu5) ...
Processing triggers for hicolor-icon-theme (0.17-2) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.

Activate Windows
Go to Settings to activate Windows.

```

Create LightDM config to use XFCE:

```

user@umberqasim:~$ 
umberqasim@2023-bse-066:~$ sudo mkdir -p /etc/lightdm/lightdm.conf.d
umberqasim@2023-bse-066:~$ echo -e "[Seat:*]\ngreeter-session=lightdm-gtk-greeter\nuser-session=xfce\nautologin-user-timeout=0" | sudo tee /etc/lightdm/lightdm.conf.d/99-xfce.conf
[Seat:*]\ngreeter-session=lightdm-gtk-greeter\nuser-session=xfce\nautologin-user-timeout=0" | sudo tee /etc/lightdm/lightdm.conf.d/99-xfce.conf
umberqasim@2023-bse-066:~$ echo -e "[Seat:*]\ngreeter-session=lightdm-gtk-greeter\nuser-session=xfce\nautologin-user-timeout=0" | sudo tee /etc/lightdm/lightdm.conf.d/99-xfce.conf
[Seat:*]
greeter-session=lightdm-gtk-greeter
user-session=xfce
autologin-user-timeout=0
m/lightdm.conf.d/99-xfce.conf
umberqasim@2023-bse-066:~$ 

```

Clean up problematic session files and permissions:

```

umberqasim@2023-bse-066:~$ sudo rm -f /var/lib/lightdm/.Xauthority
umberqasim@2023-bse-066:~$ sudo rm -f ~/.Xauthority
umberqasim@2023-bse-066:~$ sudo rm -rf ~/.cache/sessions
umberqasim@2023-bse-066:~$ sudo chown -R $USER:$USER /home/$USER

```

Restart LightDM:

```

umberqasim@2023-bse-066:~$ sudo systemctl restart lightdm

```

Enable GUI login at boot

```
umberqasim@2023-bse-066:~$ sudo systemctl enable lightdm
Synchronizing state of lightdm.service with SysV service script with /usr/lib/systemd/systemd-sysv-install.
Executing: /usr/lib/systemd/systemd-sysv-install enable lightdm
The unit files have no installation config (WantedBy=, RequiredBy=, UpheldBy=,
Also=, or Alias= settings in the [Install] section, and DefaultInstance= for
template units). This means they are not meant to be enabled or disabled using systemctl.

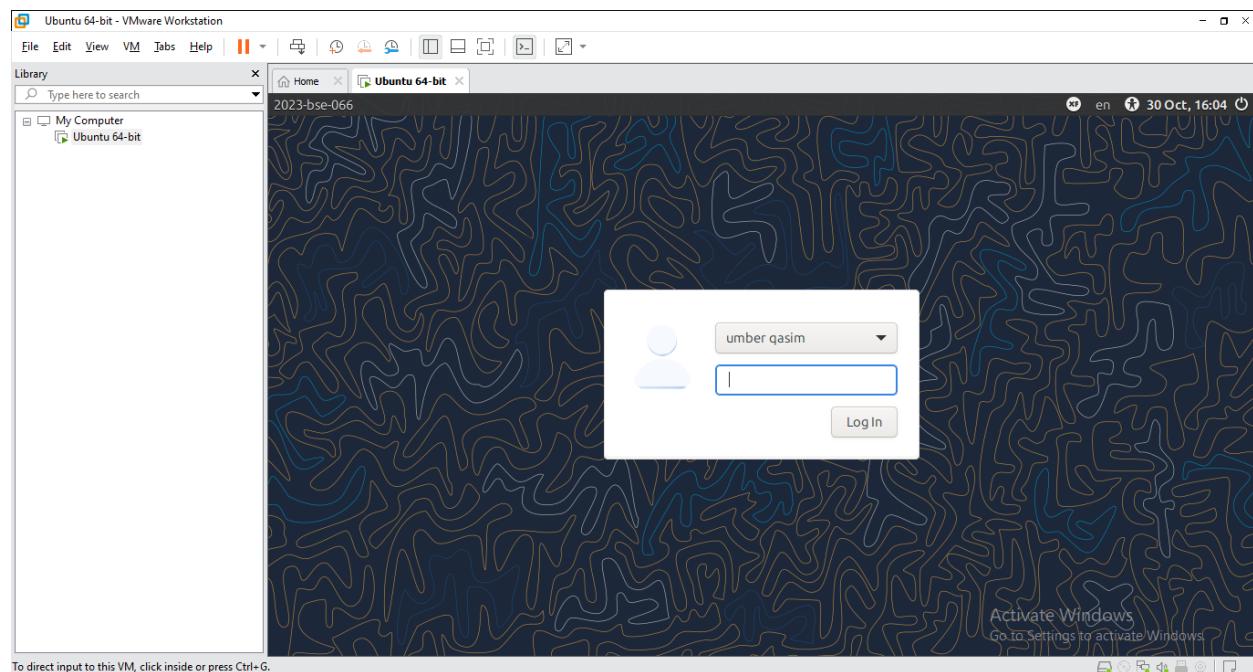
Possible reasons for having these kinds of units are:
• A unit may be statically enabled by being symlinked from another unit's
.wants/, .requires/, or .upholds/ directory.
• A unit's purpose may be to act as a helper for some other unit which has
a requirement dependency on it.
• A unit may be started when needed via activation (socket, path, timer,
D-Bus, udev, scripted systemctl call, ...).
• In case of template units, the unit is meant to be enabled with some
instance name specified.
umberqasim@2023-bse-066:~$ sudo systemctl set-default graphical.target
Created symlink /etc/systemd/system/default.target → /usr/lib/systemd/system/graphical.target.
umberqasim@2023-bse-066:~$
```

Reboot and observe GUI login

```
umberqasim@2023-bse-066:~$ sudo reboot

Broadcast message from root@2023-bse-066 on pts/1 (Thu 2025-10-30 15:36:10 UTC):
The system will reboot now!

umberqasim@2023-bse-066:~$ client_loop: send disconnect: Connection reset
```



Disable GUI Login (Boot to CLI)

```
C:\Users\HP>ssh umberqasim@192.168.254.129
umberqasim@192.168.254.129's password:
Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.8.0-87-generic x86_64)

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

System information as of Thu Oct 30 04:11:21 PM UTC 2025

      System load:  0.11           Processes:          262
      Usage of /:   15.2% of 47.93GB  Users logged in:     0
      Memory usage: 23%            IPv4 address for ens33: 192.168.254.129
      Swap usage:   0%

Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

6 additional security updates can be applied with ESM Apps.
Learn more about enabling ESM Apps service at https://ubuntu.com/esm

Last login: Thu Oct 30 14:25:37 2025 from 192.168.254.1
umberqasim@2023-bse-066:~$ sudo systemctl set-default multi-user.target
[sudo] password for umberqasim:
Removed "/etc/systemd/system/default.target".
Created symlink /etc/systemd/system/default.target → /usr/lib/systemd/system/multi-user.target.
umberqasim@2023-bse-066:~$ sudo systemctl disable lightdm
Synchronizing state of lightdm.service with SysV service script with /usr/lib/systemd/systemd-sysv-install.
Executing: /usr/lib/systemd/systemd-sysv-install disable lightdm
Removed "/etc/systemd/system/display-manager.service".
```

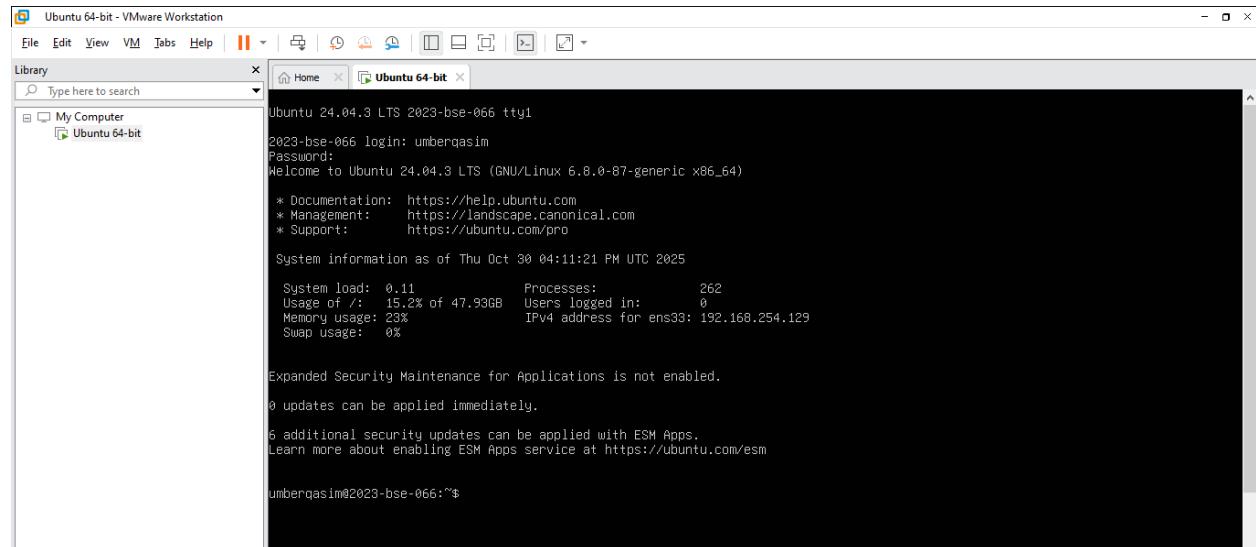
Reboot again to check CLI-only boot

```
umberqasim@2023-bse-066:~$ sudo reboot

Broadcast message from root@2023-bse-066 on pts/1 (Thu 2025-10-30 16:12:58 UTC):
The system will reboot now!

umberqasim@2023-bse-066:~$ client_loop: send disconnect: Connection reset

C:\Users\HP>
```



Start/Stop GUI manually (no reboot)

```
C:\Users\HP>ssh umberqasim@192.168.254.129
umberqasim@192.168.254.129's password:
Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.8.0-87-generic x86_64)

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

System information as of Thu Oct 30 04:31:03 PM UTC 2025

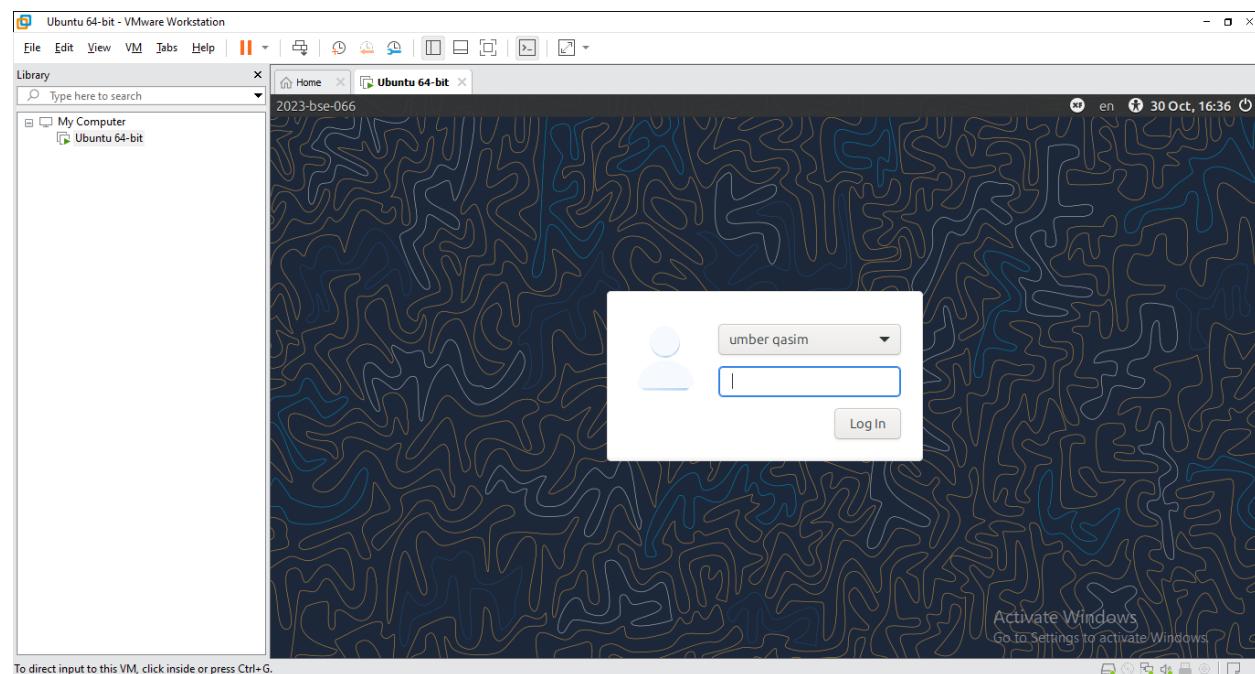
System load:  0.06          Processes:            225
Usage of /:   15.2% of 47.93GB  Users logged in:    1
Memory usage: 15%           IPv4 address for ens33: 192.168.254.129
Swap usage:   0%

Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

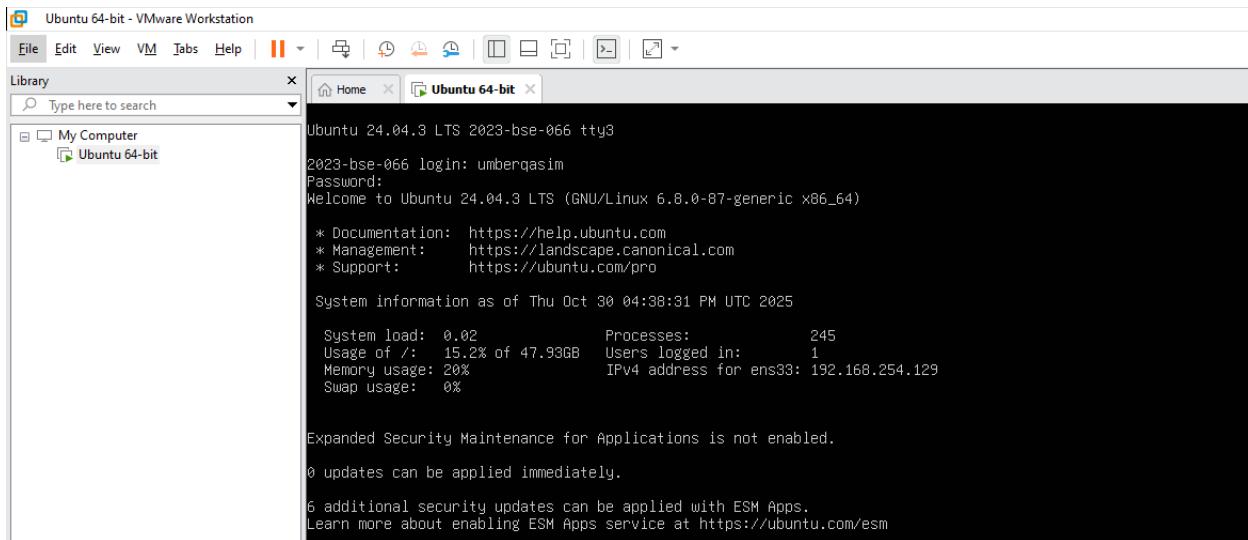
6 additional security updates can be applied with ESM Apps.
Learn more about enabling ESM Apps service at https://ubuntu.com/esm

Last login: Thu Oct 30 16:11:23 2025 from 192.168.254.1
umberqasim@2023-bse-066:~$ sudo systemctl start lightdm
[sudo] password for umberqasim:
```



Stop GUI manually:

Press *Ctrl + Alt + F2* to return to CLI terminal.



```
Ubuntu 24.04.3 LTS 2023-bse-066 tty3
2023-bse-066 login: umberqasim
Password:
Welcome to Ubuntu 24.04.3 LTS (GNU/Linux 6.8.0-87-generic x86_64)

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

System information as of Thu Oct 30 04:38:31 PM UTC 2025

System load: 0.02      Processes: 245
Usage of /: 15.2% of 47.99GB  Users logged in: 1
Memory usage: 20%          IPv4 address for ens33: 192.168.254.129
Swap usage: 0%

Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

6 additional security updates can be applied with ESM Apps.
Learn more about enabling ESM Apps service at https://ubuntu.com/esm
```

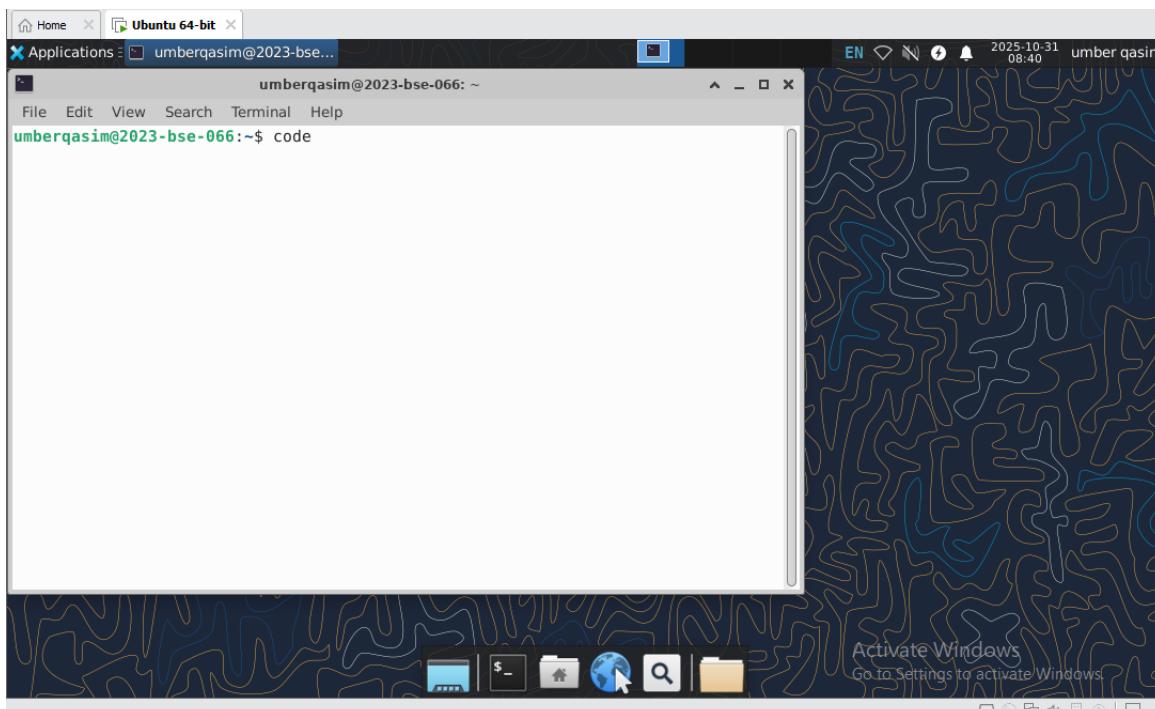
Then press *Ctrl + Alt* to return to desktop environment.

```
umberqasim@2023-bse-066:~$ sudo systemctl stop lightdm
```

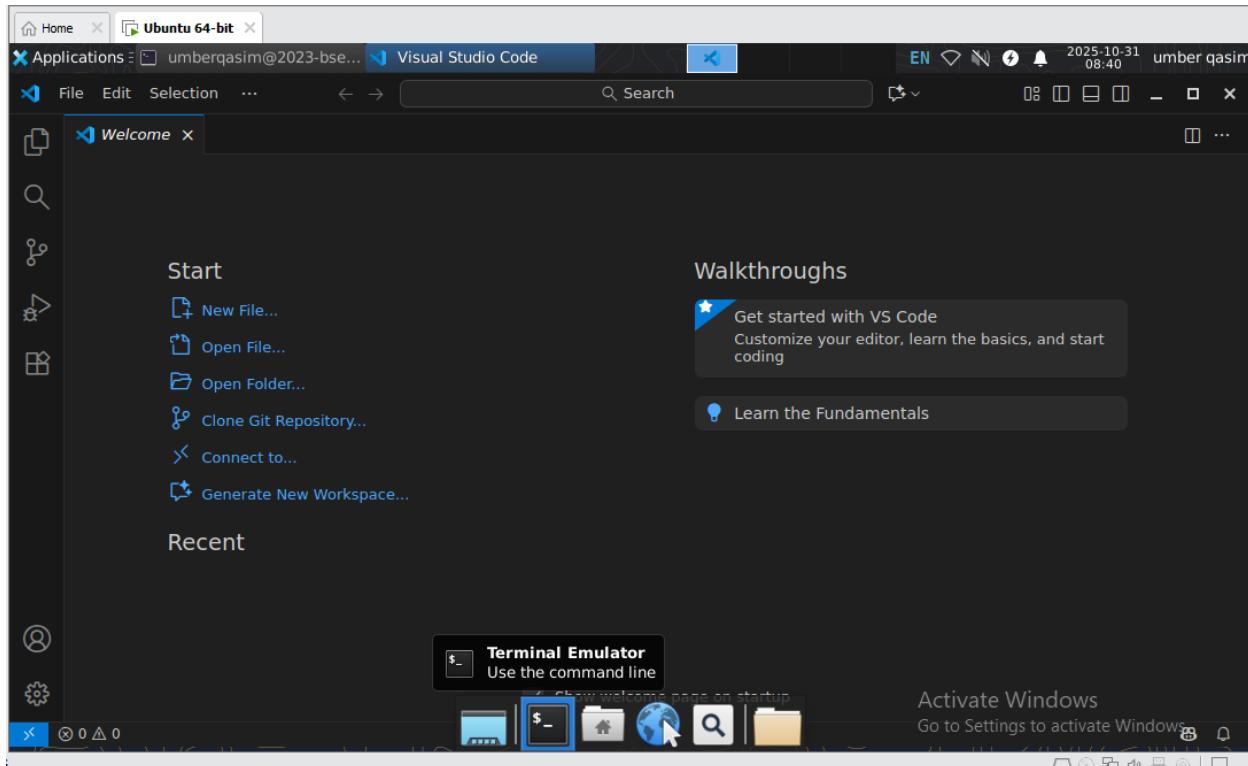
Start the GUI (if the system is currently set to CLI or the GUI is not running):

```
umberqasim@2023-bse-066:~$ sudo systemctl start lightdm
[sudo] password for umberqasim:
```

From a GUI terminal inside the desktop, run:



VS Code running in the GUI:



Task#07: Install Google Chrome by adding its apt source & key (Chrome)

Try installing Chrome

```
umberqasim@2023-bse-066:~$ sudo apt install google-chrome-stable -y
[sudo] password for umberqasim:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
E: Unable to locate package google-chrome-stable
```

Check /etc/apt directory

```
umberqasim@2023-bse-066:~$ ls -la /etc/apt
total 48
drwxr-xr-x  9 root root  4096 Sep 30 02:55 .
drwxr-xr-x 142 root root 12288 Oct 30 15:04 ..
drwxr-xr-x  2 root root  4096 Oct 30 13:30 apt.conf.d
drwxr-xr-x  2 root root  4096 Mar 31 2024 auth.conf.d
drwxr-xr-x  2 root root  4096 Mar 31 2024 keyrings
drwxr-xr-x  2 root root  4096 Aug  5 17:14 preferences.d
drwxr-xr-x  2 root root  4096 Aug  5 17:14 preferences.d.save
-rw-r--r--  1 root root    70 Sep 30 03:06 sources.list
drwxr-xr-x  2 root root  4096 Sep 30 03:06 sources.list.d
drwxr-xr-x  2 root root  4096 Aug  5 17:01 trusted.gpg.d
```

View main sources.list file

```
umberqasim@2023-bse-066:~$ cat /etc/apt/sources.list  
# Ubuntu sources have moved to /etc/apt/sources.list.d/ubuntu.sources
```

List /etc/apt/sources.list.d/

```
umberqasim@2023-bse-066:~$ ls -la /etc/apt/sources.list.d/  
total 16  
drwxr-xr-x 2 root root 4096 Sep 30 03:06 .  
drwxr-xr-x 9 root root 4096 Sep 30 02:55 ..  
-rw-r--r-- 1 root root 383 Sep 30 02:55 ubuntu.sources  
-rw-r--r-- 1 root root 2552 Aug 5 17:02 ubuntu.sources.curtin.orig
```

Check if ubuntu.sources file exists

```
umberqasim@2023-bse-066:~$ cat /etc/apt/sources.list.d/ubuntu.sources  
Types: deb  
URIs: http://archive.ubuntu.com/ubuntu/  
Suites: noble noble-updates noble-backports  
Components: main restricted universe multiverse  
Signed-By: /usr/share/keyrings/ubuntu-archive-keyring.gpg  
  
Types: deb  
URIs: http://security.ubuntu.com/ubuntu/  
Suites: noble-security  
Components: main restricted universe multiverse  
Signed-By: /usr/share/keyrings/ubuntu-archive-keyring.gpg
```

METHOD A — Add Chrome repo manually

Edit the *ubuntu.sources* file (create if not there)

```
cat. umberqasim@2023-bse-066: ~  
GNU nano 7.2  
Types: deb  
URIs: http://archive.ubuntu.com/ubuntu/  
Suites: noble noble-updates noble-backports  
Components: main restricted universe multiverse  
Signed-By: /usr/share/keyrings/ubuntu-archive-keyring.gpg  
  
Types: deb  
URIs: http://security.ubuntu.com/ubuntu/  
Suites: noble-security  
Components: main restricted universe multiverse  
Signed-By: /usr/share/keyrings/ubuntu-archive-keyring.gpg  
Types: deb  
URIs: http://dl.google.com/linux/chrome/deb/  
Suites: stable  
Components: main  
Architectures: amd64  
Signed-By: /etc/apt/keyrings/google.gpg
```

Add Google's signing key and add key:

```
umberqasim@2023-bse-066:~$ sudo mkdir -p /etc/apt/keyrings  
umberqasim@2023-bse-066:~$ curl -fsSL https://dl.google.com/linux/linux_signing_key.pub | sudo gpg --dearmor -o /etc/apt/keyrings/google.gpg
```

Update apt and install Chrome

```
umberqasim@2023-bse-066:~$ sudo apt update
Hit:1 http://archive.ubuntu.com/ubuntu noble InRelease
Get:2 http://archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
Get:3 http://dl.google.com/linux/chrome/deb stable InRelease [1,825 B]
Get:4 http://archive.ubuntu.com/ubuntu noble-backports InRelease [126 kB]
Get:5 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 Packages [1,573 kB]
Get:6 http://dl.google.com/linux/chrome/deb stable/main amd64 Packages [1,210 B]
Get:7 http://archive.ubuntu.com/ubuntu noble-updates/main Translation-en [297 kB]
Get:8 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 Components [175 kB]
Get:9 http://archive.ubuntu.com/ubuntu noble-updates/main amd64 c-n-f Metadata [15.4 kB]
Get:10 http://archive.ubuntu.com/ubuntu noble-updates/restricted amd64 Packages [2,226 kB]
Get:11 http://archive.ubuntu.com/ubuntu noble-updates/restricted Translation-en [505 kB]
Get:12 http://archive.ubuntu.com/ubuntu noble-updates/restricted amd64 Components [212 kB]
Get:13 http://archive.ubuntu.com/ubuntu noble-updates/universe amd64 Packages [1,498 kB]
Get:14 http://archive.ubuntu.com/ubuntu noble-updates/universe amd64 Components [378 kB]
Get:15 http://archive.ubuntu.com/ubuntu noble-updates/universe amd64 c-n-f Metadata [31.4 kB]
Get:16 http://archive.ubuntu.com/ubuntu noble-updates/multiverse amd64 Components [940 B]
Get:17 http://archive.ubuntu.com/ubuntu noble-backports/main amd64 Components [7,140 B]
Get:18 http://archive.ubuntu.com/ubuntu noble-backports/restricted amd64 Components [216 B]
Get:19 http://archive.ubuntu.com/ubuntu noble-backports/universe amd64 Components [11.0 kB]
Get:20 http://archive.ubuntu.com/ubuntu noble-backports/multiverse amd64 Components [212 B]
Fetched 6,974 kB in 4s (1,766 kB/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
2 packages can be upgraded. Run 'apt list --upgradable' to see them.
```

```
umberqasim@2023-bse-066:~
The following NEW packages will be installed:
  fonts-liberation fonts-liberation-sans-narrow google-chrome-stable
0 upgraded, 3 newly installed, 0 to remove and 2 not upgraded.
Need to get 119 MB of archives.
After this operation, 395 MB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu noble/main amd64 fonts-liberation all 1:2.1.5-3 [1,603 kB]
Get:2 http://dl.google.com/linux/chrome/deb stable/main amd64 google-chrome-stable amd64 142.0.7444.59-1 [118 MB]
Get:3 http://archive.ubuntu.com/ubuntu noble/main amd64 fonts-liberation-sans-narrow all 1:1.07.6-4 [197 kB]
Fetched 119 MB in 30s (3,977 kB/s)
Selecting previously unselected package fonts-liberation.
(Reading database ... 179869 files and directories currently installed.)
Preparing to unpack .../fonts-liberation_1%3a2.1.5-3_all.deb ...
Unpacking fonts-liberation (1:2.1.5-3) ...
Selecting previously unselected package google-chrome-stable.
Preparing to unpack .../google-chrome-stable_142.0.7444.59-1_amd64.deb ...
Unpacking google-chrome-stable (142.0.7444.59-1) ...
Selecting previously unselected package fonts-liberation-sans-narrow.
Preparing to unpack .../fonts-liberation-sans-narrow_1%3a1.07.6-4_all.deb ...
Unpacking fonts-liberation-sans-narrow (1:1.07.6-4) ...
Setting up fonts-liberation (1:2.1.5-3) ...
Setting up fonts-liberation-sans-narrow (1:1.07.6-4) ...
Setting up google-chrome-stable (142.0.7444.59-1) ...
update-alternatives: using /usr/bin/google-chrome-stable to provide /usr/bin/x-www-browser (x-www-browser) in auto mode
update-alternatives: using /usr/bin/google-chrome-stable to provide /usr/bin/gnome-www-browser (gnome-www-browser) in auto mode
update-alternatives: using /usr/bin/google-chrome-stable to provide /usr/bin/google-chrome (google-chrome) in auto mode
Processing triggers for gnome-menus (3.36.0-1.1ubuntu3) ...
Processing triggers for man-db (2.12.0-4build2) ...
Processing triggers for fontconfig (2.15.0-1.1ubuntu2) ...
Processing triggers for bamfdaemon (0.5.6+22.04.20220217-0ubuntu5) ...
Rebuilding /usr/share/applications/bamf-2.index...
Processing triggers for desktop-file-utils (0.27-2build1) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
```

METHOD B (Preferred clean method)

Remove old setup

```
umberqasim@2023-bse-066:~$ sudo apt remove google-chrome-stable -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  ca-certificates-java fonts-dejavu-extra java-common libatk-wrapper-java libatk-wrapper-java-jni libgif7
Use 'sudo apt autoremove' to remove them.
The following packages will be REMOVED:
  google-chrome-stable
0 upgraded, 0 newly installed, 1 to remove and 2 not upgraded.
After this operation, 390 MB disk space will be freed.
(Reading database ... 180179 files and directories currently installed.)
Removing google-chrome-stable (142.0.7444.59-1) ...
Processing triggers for desktop-file-utils (0.27-2build1) ...
Processing triggers for gnome-menus (3.36.0-1.1ubuntu3) ...
Processing triggers for man-db (2.12.0-4build2) ...
Processing triggers for bamfdaemon (0.5.6+22.04.20220217-0ubuntu5) ...
Rebuilding /usr/share/applications/bamf-2.index...
```

```
c:~$ umberqasim@2023-bse-066: ~
      GNU nano 7.2                                     /etc/apt/sources.list.d/ubuntu.sources *
Types: deb
URIs: http://archive.ubuntu.com/ubuntu/
Suites: noble noble-updates noble-backports
Components: main restricted universe multiverse
Signed-By: /usr/share/keyrings/ubuntu-archive-keyring.gpg

Types: deb
URIs: http://security.ubuntu.com/ubuntu/
Suites: noble-security
Components: main restricted universe multiverse
Signed-By: /usr/share/keyrings/ubuntu-archive-keyring.gpg
```

Remove old key:

```
umberqasim@2023-bse-066:~$ umberqasim@2023-bse-066:~$ sudo rm -f /etc/apt/keyrings/google.gpg
```

Add dedicated Chrome list file

```
umberqasim@2023-bse-066:~$ echo "deb [arch=amd64 signed-by=/etc/apt/keyrings/google.gpg] http://dl.google.com/linux/chrome/deb/ stable" | sudo tee /etc/apt/sources.list.d/google-chrome.list > /dev/null
```

```
umberqasim@2023-bse-066:~$ ls -la /etc/apt/sources.list.d/
total 20
drwxr-xr-x 2 root root 4096 Oct 31 13:17 .
drwxr-xr-x 9 root root 4096 Sep 30 02:55 ..
-rw-r--r-- 1 root root 107 Oct 31 13:18 google-chrome.list
-rw-r--r-- 1 root root 383 Oct 31 13:17 ubuntu.sources
-rw-r--r-- 1 root root 2552 Aug 5 17:02 ubuntu.sources.curtin.orig
```

Re-add signing key again

```
umberqasim@2023-bse-066:~$ sudo mkdir -p /etc/apt/keyrings
umberqasim@2023-bse-066:~$ curl -fsSL https://dl.google.com/linux/linux_signing_key.pub | sudo gpg --dearmor -o /etc/apt/keyrings/google.gpg
```

Update and install again

```
umberqasim@2023-bse-066:~$ sudo apt update
Hit:1 http://dl.google.com/linux/chrome/deb stable InRelease
Get:2 http://security.ubuntu.com/ubuntu noble-security InRelease [126 kB]
Hit:3 http://archive.ubuntu.com/ubuntu noble InRelease
Hit:4 http://archive.ubuntu.com/ubuntu noble-updates InRelease
Hit:5 http://archive.ubuntu.com/ubuntu noble-backports InRelease
Get:6 http://security.ubuntu.com/ubuntu noble-security/main amd64 Packages [1,270 kB]
Get:7 http://security.ubuntu.com/ubuntu noble-security/main Translation-en [211 kB]
Get:8 http://security.ubuntu.com/ubuntu noble-security/main amd64 Components [21.5 kB]
Get:9 http://security.ubuntu.com/ubuntu noble-security/main amd64 c-n-f Metadata [9,008 B]
Get:10 http://security.ubuntu.com/ubuntu noble-security/restricted amd64 Packages [2,080 kB]
Get:11 http://security.ubuntu.com/ubuntu noble-security/restricted Translation-en [470 kB]
Get:12 http://security.ubuntu.com/ubuntu noble-security/restricted amd64 Components [212 B]
Get:13 http://security.ubuntu.com/ubuntu noble-security/restricted amd64 c-n-f Metadata [500 B]
Get:14 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Packages [906 kB]
Get:15 http://security.ubuntu.com/ubuntu noble-security/universe Translation-en [203 kB]
Get:16 http://security.ubuntu.com/ubuntu noble-security/universe amd64 Components [52.3 kB]
Get:17 http://security.ubuntu.com/ubuntu noble-security/universe amd64 c-n-f Metadata [19.4 kB]
Get:18 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 Packages [27.4 kB]
Get:19 http://security.ubuntu.com/ubuntu noble-security/multiverse Translation-en [5,708 B]
Get:20 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 Components [208 B]
Get:21 http://security.ubuntu.com/ubuntu noble-security/multiverse amd64 c-n-f Metadata [384 B]
Fetched 5,402 kB in 4s (1,223 kB/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
2 packages can be upgraded. Run 'apt list --upgradable' to see them.
```

```
umberqasim@2023-bse-066:~$ sudo apt install google-chrome-stable -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  ca-certificates-java fonts-dejavu-extra java-common libatk-wrapper-java libatk-wrapper-java-jni libgif7
Use 'sudo apt autoremove' to remove them.
The following NEW packages will be installed:
  google-chrome-stable
0 upgraded, 1 newly installed, 0 to remove and 2 not upgraded.
Need to get 118 MB of archives.
After this operation, 390 kB of additional disk space will be used.
Get:1 http://dl.google.com/linux/chrome/deb stable/main amd64 google-chrome-stable amd64 142.0.7444.59-1 [118 MB]
Fetched 118 MB in 32s (3,718 kB/s)
Selecting previously unselected package google-chrome-stable.
(Reading database ... 179898 files and directories currently installed.)
Preparing to unpack .../google-chrome-stable_142.0.7444.59-1_amd64.deb ...
Unpacking google-chrome-stable (142.0.7444.59-1) ...
Setting up google-chrome-stable (142.0.7444.59-1) ...
update-alternatives: using /usr/bin/google-chrome-stable to provide /usr/bin/x-www-browser (x-www-browser) in auto mode
update-alternatives: using /usr/bin/google-chrome-stable to provide /usr/bin/gnome-www-browser (gnome-www-browser) in auto mode
update-alternatives: using /usr/bin/google-chrome-stable to provide /usr/bin/google-chrome (google-chrome) in auto mode
Processing triggers for gnome-menus (3.36.0-1.1ubuntu3) ...
Processing triggers for man-db (2.12.0-4build2) ...
Processing triggers for bamfdaemon (0.5.6+22.04.20220217-0ubuntu5) ...
Rebuilding /usr/share/applications/bamf-2.index...
Processing triggers for desktop-file-utils (0.27-2build1) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
```

Task#08: Install applications via PPA (Audacity & OBS) and launch

Part 1 — Audacity

Add the Audacity PPA

```
Home X Ubuntu 64-bit X

Expanded Security Maintenance for Applications is not enabled.

0 updates can be applied immediately.

6 additional security updates can be applied with ESM Apps.
Learn more about enabling ESM Apps service at https://ubuntu.com/esm

umberqasim@2023-bse-066:~$ sudo add-apt-repository ppa:ubuntuhandbook1/audacity -y
[sudo] password for umberqasim:
Repository: 'Types: deb
URIs: https://ppa.launchpadcontent.net/ubuntuhandbook1/audacity/ubuntu/
Suites: noble
Components: main
'

Description:
Unofficial build of Audacity audio editor

For help, please use Audacity forum: http://forum.audacityteam.org/

If the packages here are helpful, you may buy me a coffee:

      https://ko-fi.com/ubuntuhandbook1
More info: https://launchpad.net/~ubuntuhandbook1/+archive/ubuntu/audacity
Adding repository.
Hit:1 http://archive.ubuntu.com/ubuntu noble InRelease
Hit:2 http://security.ubuntu.com/ubuntu noble-security InRelease
Hit:3 http://dl.google.com/linux/chrome/deb stable InRelease
Hit:4 http://archive.ubuntu.com/ubuntu noble-updates InRelease
Hit:5 http://archive.ubuntu.com/ubuntu noble-backports InRelease
Get:6 https://ppa.launchpadcontent.net/ubuntuhandbook1/audacity/ubuntu noble InRelease [18.1 kB]
Get:7 https://ppa.launchpadcontent.net/ubuntuhandbook1/audacity/ubuntu noble/main amd64 Packages [1,064 B]
Get:8 https://ppa.launchpadcontent.net/ubuntuhandbook1/audacity/ubuntu noble/main Translation-en [492 B]
Fetched 19.6 kB in 3s (5,906 B/s)
Reading package lists... Done
Activate Win
```

Update package list

```
umberqasim@2023-bse-066:~$ sudo apt update
Hit:1 http://archive.ubuntu.com/ubuntu noble InRelease
Hit:2 http://archive.ubuntu.com/ubuntu noble-updates InRelease
Hit:3 http://security.ubuntu.com/ubuntu noble-security InRelease
Hit:4 http://dl.google.com/linux/chrome/deb stable InRelease
Hit:5 http://archive.ubuntu.com/ubuntu noble-backports InRelease
Hit:6 https://ppa.launchpadcontent.net/ubuntuhandbook1/audacity/ubuntu noble InRelease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
2 packages can be upgraded. Run 'apt list --upgradable' to see them.
umberqasim@2023-bse-066:~$
```

Install Audacity

```

Home × Ubuntu 64-bit ×
Setting up libqt5dbus5:amd64 (5.15.13+dfsg-1ubuntu1) ...
Setting up libqt5network5:amd64 (5.15.13+dfsg-1ubuntu1) ...
Setting up libqt5gui5:amd64 (5.15.13+dfsg-1ubuntu1) ...
Setting up libqt5qml5:amd64 (5.15.13+dfsg-1ubuntu0.1) ...
Setting up libqt5svg5:amd64 (5.15.13-1) ...
Setting up libqt5quick5:amd64 (5.15.13+dfsg-1ubuntu0.1) ...
Setting up libqt5waylandclient5:amd64 (5.15.13-1) ...
Setting up libqt5waylandcompositor5:amd64 (5.15.13-1) ...
Setting up qt5-gtk-platformtheme:amd64 (5.15.13+dfsg-1ubuntu1) ...
Setting up libqt5waylandclient5:amd64 (5.15.13-1) ...
Setting up libqt5quick5:amd64 (5.15.13+dfsg-1ubuntu0.1) ...
Setting up libqt5waylandcompositor5:amd64 (5.15.13-1) ...
Setting up qtwayland5:amd64 (5.15.13-1) ...
Processing triggers for man-db (2.12.0-4build2) ...
Processing triggers for shared-mime-info (2.4-4) ...
Processing triggers for bamfdaemon (0.5.6+22.04.20220217-0ubuntu5) ...
Rebuilding /usr/share/applications/bamf-2.index...
Processing triggers for desktop-file-utils (0.27-2build1) ...
Processing triggers for hicolor-icon-theme (0.17-2) ...
Processing triggers for gnome-menus (3.36.0-1.1ubuntu3) ...
Processing triggers for libc-bin (2.39-0ubuntu8.6) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.

umbergasim@2023-bse-066:~$
```

Activate Windows
Go to Settings to activate Windows.

Verify or launch Audacity



Part 2 — OBS Studio

Add the OBS Studio PPA

```
umberqasim@2023-bse-066:~$ sudo add-apt-repository ppa:obsproject/obs-studio -y
Repository: 'Types: deb
URIs: https://ppa.launchpadcontent.net/obsproject/obs-studio/ubuntu/
Suites: noble
Components: main
'

Description:
Latest stable release of OBS Studio
More info: https://launchpad.net/~obsproject/+archive/ubuntu/obs-studio
Adding repository.
Hit:1 http://security.ubuntu.com/ubuntu noble-security InRelease
Hit:2 http://dl.google.com/linux/chrome/deb stable InRelease
Hit:3 http://archive.ubuntu.com/ubuntu noble InRelease
Hit:4 http://archive.ubuntu.com/ubuntu noble-updates InRelease
Hit:5 http://archive.ubuntu.com/ubuntu noble-backports InRelease
Get:6 https://ppa.launchpadcontent.net/obsproject/obs-studio/ubuntu noble InRelease [17.8 kB]
Hit:7 https://ppa.launchpadcontent.net/ubuntuhandbook1/audacity/ubuntu noble InRelease
Get:8 https://ppa.launchpadcontent.net/obsproject/obs-studio/ubuntu noble/main amd64 Packages [1,172 B]
Get:9 https://ppa.launchpadcontent.net/obsproject/obs-studio/ubuntu noble/main Translation-en [160 B]
Fetched 19.1 kB in 3s (6,169 B/s)
Reading package lists... Done
umberqasim@2023-bse-066:~$
```

Activ
Go to

Update package list

```
umberqasim@2023-bse-066:~$ sudo apt update
Hit:1 http://dl.google.com/linux/chrome/deb stable InRelease
Hit:2 http://archive.ubuntu.com/ubuntu noble InRelease
Hit:3 http://security.ubuntu.com/ubuntu noble-security InRelease
Hit:4 http://archive.ubuntu.com/ubuntu noble-updates InRelease
Hit:5 http://archive.ubuntu.com/ubuntu noble-backports InRelease
Hit:6 https://ppa.launchpadcontent.net/obsproject/obs-studio/ubuntu noble InRelease
Hit:7 https://ppa.launchpadcontent.net/ubuntuhandbook1/audacity/ubuntu noble InRelease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
2 packages can be upgraded. Run 'apt list --upgradable' to see them.
```

Install OBS Studio

```

Setting up libqt6quick6:amd64 (6.4.2+dfsg-4build3) ...
Setting up libmbedtls14t64:amd64 (2.28.8-1) ...
Setting up libqt6wlshellintegration6:amd64 (6.4.2-5build3) ...
Setting up libqt6waylandcompositor6:amd64 (6.4.2-5build3) ...
Setting up libqt6waylandeglcompositorhwintegration6:amd64 (6.4.2-5build3) ...
Setting up libpocketsphinx3:amd64 (0.8.0+real15prealpha1-15ubuntu5) ...
Setting up qt6-wayland:amd64 (6.4.2-5build3) ...
Setting up libavfilter9:amd64 (7:6.1.1-3ubuntu5) ...
Setting up libavdevice60:amd64 (7:6.1.1-3ubuntu5) ...
Setting up obs-studio (32.0.2-0obsproject1~noble) ...
Processing triggers for bamfdaemon (0.5.6+22.04.20220217-0ubuntu5) ...
Rebuilding /usr/share/applications/bamf-2.index...
Processing triggers for desktop-file-utils (0.27-2build1) ...
Processing triggers for hicolor-icon-theme (0.17-2) ...
Processing triggers for gnome-menus (3.36.0-1.1ubuntu3) ...
Processing triggers for libc-bin (2.39-0ubuntu0.6) ...
Processing triggers for man-db (2.12.0-4build2) ...
Scanning processes...
Scanning candidates...
Scanning linux images...

Running kernel seems to be up-to-date.

Restarting services...
systemctl restart cups-browsed.service fwupd.service

Service restarts being deferred:
systemctl restart NetworkManager.service

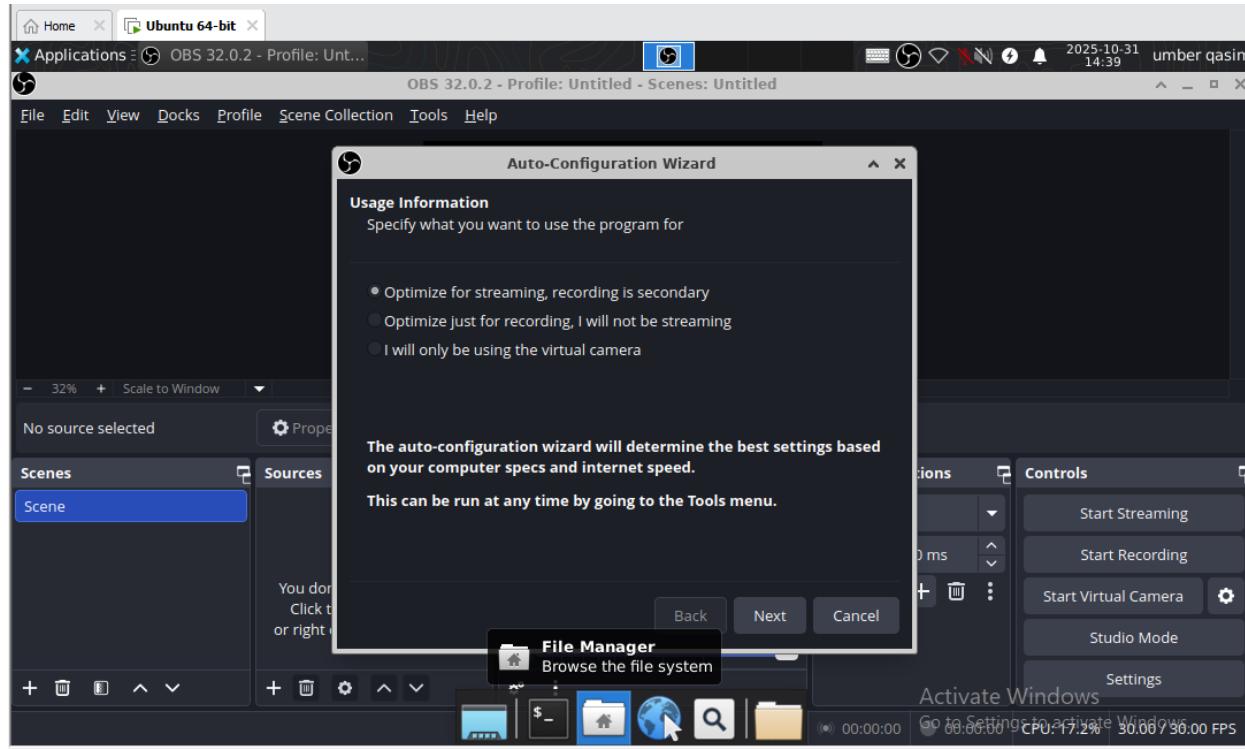
No containers need to be restarted.

User sessions running outdated binaries:
umberqasim @ user manager service: systemd[1264]

No VM guests are running outdated hypervisor (qemu) binaries on this host.
umberqasim@2023-bse-066:~$
```

Activate Windows
Go to Settings to activate Windows

Verify or launch OBS



Task#09: Create a Kubernetes sample YAML using vim

Check if vim is installed

```
umberqasim@2023-bse-066:~  
VIM - Vi IMproved  
version 9.1.697  
by Bram Moolenaar et al.  
Modified by team+vim@tracker.debian.org  
Vim is open source and freely distributable  
  
Sponsor Vim development!  
type :help sponsor<Enter> for information  
type :q<Enter> to exit  
type :help<Enter> or <F1> for on-line help  
type :help version9<Enter> for version info  
  
-- REPLACE --  
Activate Windows  
Go to Settings to activate Windows.  
0,1 All
```

Make Lab5 directory

```
umberqasim@2023-bse-066:~$ mkdir -p ~/Lab5  
umberqasim@2023-bse-066:~$ cd ~/Lab5  
umberqasim@2023-bse-066:~/Lab5$ pwd  
/home/umberqasim/Lab5
```

Create YAML file with vim

```
umberqasim@2023-bse-066:~/Lab5  
apiVersion: v1  
kind: Pod  
metadata:  
  name: nginx-pod  
spec:  
  containers:  
    - name: nginx  
      image: nginx:1.19  
      ports:  
        - containerPort: 80  
  restartPolicy: Always
```

Confirm file is saved

```
umberqasim@2023-bse-066:~/Lab5$ umberqasim@2023-bse-066:~/Lab5$ ls -la  
total 12  
drwxrwxr-x  2 umberqasim umberqasim 4096 Oct 31 15:13 .  
drwxr-x--- 23 umberqasim umberqasim 4096 Oct 31 15:13 ..  
-rw-rw-r--  1 umberqasim umberqasim  285 Oct 31 15:13 k8s-sample.yaml
```

Task#10: Edit the Kubernetes YAML - add annotation, verify, then discard temporary change

Add annotation under metadata

```
umberqasim@2023-bse-066:~/Lab5$ cat k8s-sample.yaml
apiVersion: v1
kind: Pod
metadata:
  name: nginx-pod
  annotations:
    lab: lesson11
spec:
  containers:
    - name: nginx
      image: nginx:1.19
      ports:
        - containerPort: 80
  restartPolicy: Always
```

Practice a temporary edit (discarding change)

```
umberqasim@2023-bse-066: ~/Lab5
apiVersion: v1
kind: Pod
metadata:
  name: nginx-pod
  annotations:
    lab: lesson11
spec:
  containers:
    - name: nginx
      image: nginx:1.19
      ports:
        - containerPort: 80
  restartPolicy: Always
# temp: do-not-keep
```

Verify the temp line is gone

```
umberqasim@2023-bse-066:~/Lab5$ cat k8s-sample.yaml
apiVersion: v1
kind: Pod
metadata:
  name: nginx-pod
  annotations:
    lab: lesson11
spec:
  containers:
    - name: nginx
      image: nginx:1.19
      ports:
        - containerPort: 80
  restartPolicy: Always
```

Task#11: Vim editing practice - delete, undo, numeric deletes, navigation

Open file in vim and delete the line containing image: nginx:1.19 with a single command. Then Immediately undo the deletion and capture:

```
umberqasim@2023-bse-066:~/Lab5$ cat k8s-sample.yaml
apiVersion: v1
kind: Pod
metadata:
  name: nginx-pod
  annotations:
    lab: lesson11
spec:
  containers:
    - name: nginx
      image: nginx:1.19
      ports:
        - containerPort: 80
  restartPolicy: Always
```

Open file in vim and delete the three lines containing from image onwards using d3d command. Then Immediately undo the deletion and capture:

```
umberqasim@2023-bse-066:~/Lab5$ cat k8s-sample.yaml
apiVersion: v1
kind: Pod
metadata:
  name: nginx-pod
  annotations:
    lab: lesson11
spec:
  containers:
    - name: nginx
      image: nginx:1.19
      ports:
        - containerPort: 80
  restartPolicy: Always
```

Jump to the first line:

```
ca. umberqasim@2023-bse-066: ~/Lab5
apiVersion: v1
```

Navigation using different commands like going to the start and end of line from top to bottom of file:

```
umberqasim@2023-bse-066:~/Lab5$ cat k8s-sample.yaml
apiVersion: v1
kind: Pod
metadata:
  name: nginx-pod
  annotations:
    lab: lesson11
spec:
  containers:
    - name: nginx
      image: nginx:1.19
      ports:
        - containerPort: 80
  restartPolicy: Always
```

Task#12: Vim search, add matches, substitute, undo

Search for “nginx”

```
ca: umberqasim@2023-bse-066: ~/Lab5
apiVersion: v1
kind: Pod
metadata:
  name: nginx-pod
  annotations:
    lab: lesson11
spec:
  containers:
    - name: nginx
      image: nginx:1.19
      ports:
        - containerPort: 80
  restartPolicy: Always
```

Move between matches

```
ca: umberqasim@2023-bse-066: ~/Lab5
apiVersion: v1
kind: Pod
metadata:
  name: nginx-pod
  annotations:
    lab: lesson11
spec:
  containers:
    - name: nginx
      image: nginx:1.19
      ports:
        - containerPort: 80
  restartPolicy: Always
```

Add two more “nginx” words somewhere

```
ca: umberqasim@2023-bse-066: ~/Lab5
apiVersion: v1
kind: Pod
metadata:
  name: nginx-pod
  annotations:
    lab: lesson11
spec:
  containers:
    - name: nginx
      image: nginx:1.19
      ports:
        - containerPort: 80
  restartPolicy: Always
# nginx
# nginx
```

Repeat same process so Each press of n will jump to the next “nginx”

```
ouser@2023-bse-066: ~/Lab5
apiVersion: v1
kind: Pod
metadata:
  name: nginx-pod
  annotations:
    lab: lesson11
spec:
  containers:
    - name: nginx
      image: nginx:1.19
      ports:
        - containerPort: 80
    restartPolicy: Always
# nginx
# nginx
```

Substitute all “nginx” → “webapp”

```
ouser@2023-bse-066: ~/Lab5
apiVersion: v1
kind: Pod
metadata:
  name: webapp-pod
  annotations:
    lab: lesson11
spec:
  containers:
    - name: webapp
      image: webapp:1.19
      ports:
        - containerPort: 80
    restartPolicy: Always
# webapp
# webapp
```

Undo the substitution

```
ouser@2023-bse-066: ~/Lab5
apiVersion: v1
kind: Pod
metadata:
  name: nginx-pod
  annotations:
    lab: lesson11
spec:
  containers:
    - name: nginx
      image: nginx:1.19
      ports:
        - containerPort: 80
    restartPolicy: Always
# nginx
# nginx
```

Exam Evaluation Question:

1. Make sure system is updated
2. Install dependencies
3. Add Docker's official GPG key
4. Add Docker repository and refresh
5. Install Docker Desktop package
6. Verify it started and running

```
umberqasim@2023-bse-066:~$ systemctl --user start docker-desktop
umberqasim@2023-bse-066:~$ docker --version
Docker version 28.5.1, build e180ab8
umberqasim@2023-bse-066:~$ systemctl --user status docker-desktop
● docker-desktop.service - Docker Desktop
   Loaded: loaded (/usr/lib/systemd/user/docker-desktop.service; disabled; preset: enabled)
     Active: active (running) since Fri 2025-10-31 18:26:42 UTC; 11h ago
       Main PID: 3498 (com.docker.backend)
          Tasks: 69 (limit: 2207)
        Memory: 147.5M (peak: 157.3M)
         CPU: 8min 991ms
      CGroup: /user.slice/user-1000.slice/user@1000.service/app.slice/docker-desktop.service
              ├─3498 /opt/docker-desktop/bin/com.docker.backend
              ├─3506 /opt/docker-desktop/bin/com.docker.backend.services
              ├─3528 "/opt/docker-desktop/Docker Desktop" --name=error-dialog --socket=/home/umberqasim/.docker/desktop/error.reporter
              ├─3531 "/opt/docker-desktop/Docker Desktop" --type=zygote --no-zygote-sandbox
              ├─3532 "/opt/docker-desktop/Docker Desktop" --type=zygote
              ├─3534 "/opt/docker-desktop/Docker Desktop" --type=zygote
              ├─3572 "/opt/docker-desktop/Docker Desktop" --type=zygote --no-zygote-sandbox

Oct 31 18:26:43 2023-bse-066 com.docker.backend[3498]: [18:26:43.8265247012] [main]
Oct 31 18:26:43 2023-bse-066 com.docker.backend[3498]: [18:26:43.8273928962] [main.report]
Oct 31 18:26:43 2023-bse-066 com.docker.backend[3498]: [18:26:43.8281311422] [main.report]
Oct 31 18:26:43 2023-bse-066 com.docker.backend[3498]: [18:26:43.8291470122] [main.ipc]
Oct 31 18:27:43 2023-bse-066 com.docker.backend[3498]: [18:27:43.5529987512] [main.modules]
Oct 31 18:27:43 2023-bse-066 com.docker.backend[3498]: [18:27:43.5762290872] [main.modules]
Oct 31 18:27:43 2023-bse-066 com.docker.backend[3498]: [18:27:43.8126153072] [main.updater]
Oct 31 18:27:43 2023-bse-066 com.docker.backend[3498]: [18:27:43.8127216452] [main.updater]
Nov 01 05:51:52 2023-bse-066 com.docker.backend[3498]: [05:51:52.1123777462] [main.marlin]
Nov 01 05:52:52 2023-bse-066 com.docker.backend[3498]: [05:52:52.1383752742] [main.marlin]

lines 1-26/26 (END)
```

Docker Desktop service successfully started and is running in Ubuntu, indicating that Docker has been installed and configured properly.