

# Installing Jetson environment

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Some users may need to use NVIDIA's own system component environment. After installing the system and successfully entering the system desktop, you can follow the tutorial below to install the component environment!

**Note: The solid-state drive that comes with the product has a factory image, which contains NVIDIA's official system and motherboard environment; if you do not have a requirement for a pure system, do not operate!**

The entire process requires the network, and some components may require scientific Internet access. If the user cannot complete the component installation, use our factory image

## 1. Hardware connection

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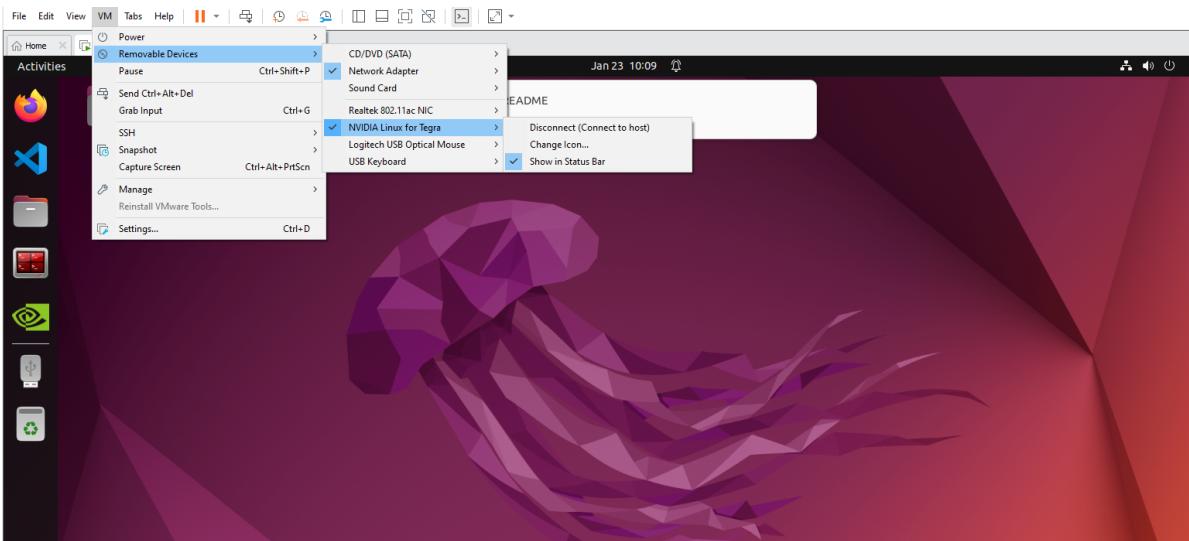
The Jetson Orin motherboard needs to be connected to a DC power adapter, DP data cable, network cable, and Type C data cable: Type C data cable connects to a computer or virtual machine



## 2. Software connection

The tutorial uses VMware Workstation 17 Pro to burn the system!

After starting the virtual machine, select in the menu bar: Virtual Machine → NVIDIA Linux for Tegra → Confirm the status of the connection with the virtual machine



## 3. Use SDK Manager

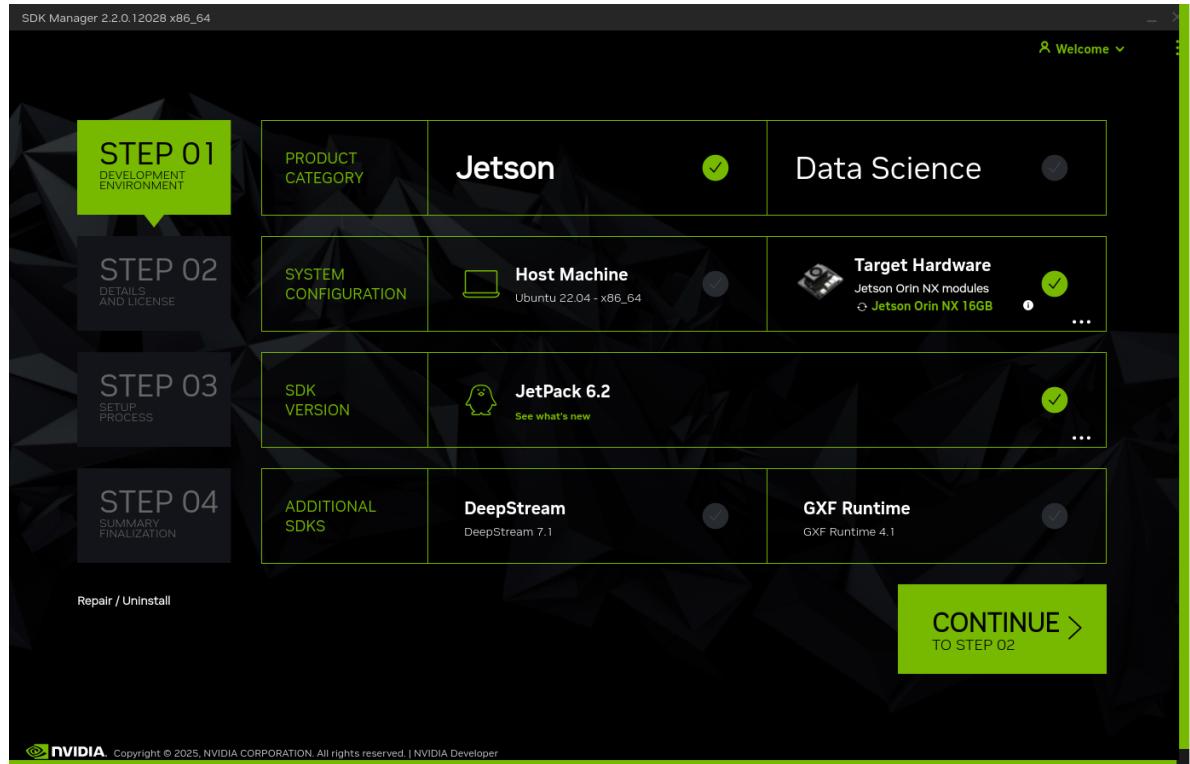
The Jetson Orin motherboard is in the normal system startup state, and the Type-C data cable is used to connect to the computer or virtual machine.

## 3.1. Motherboard selection

After opening `SDK Manager`, select according to your motherboard model.

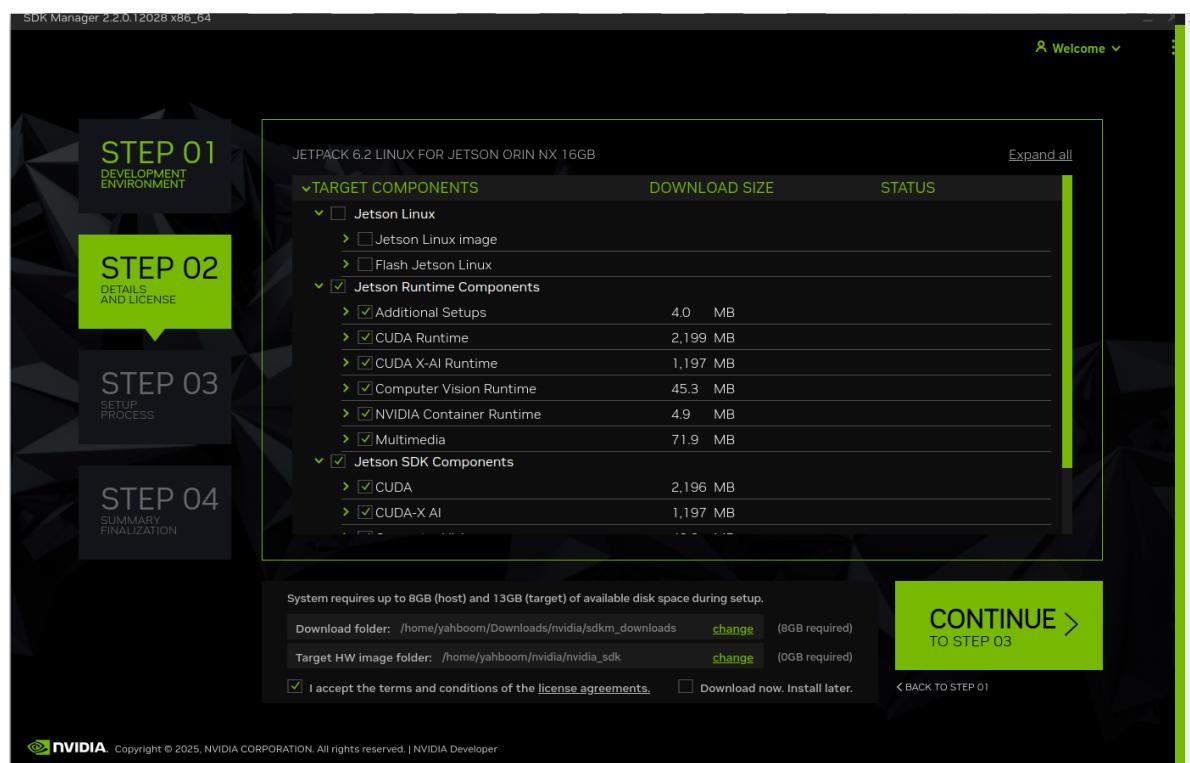
## 3.2, STEP1

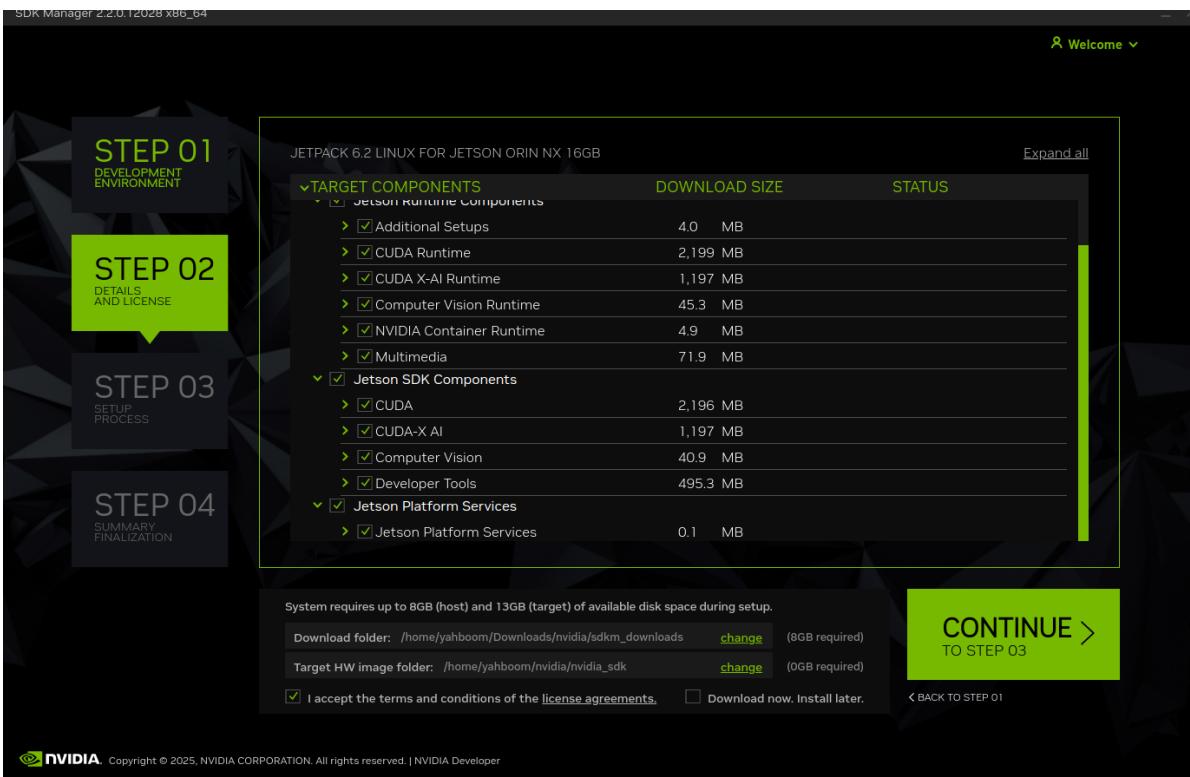
Check the options below, confirm that they are consistent, and click `CONTINUE`:



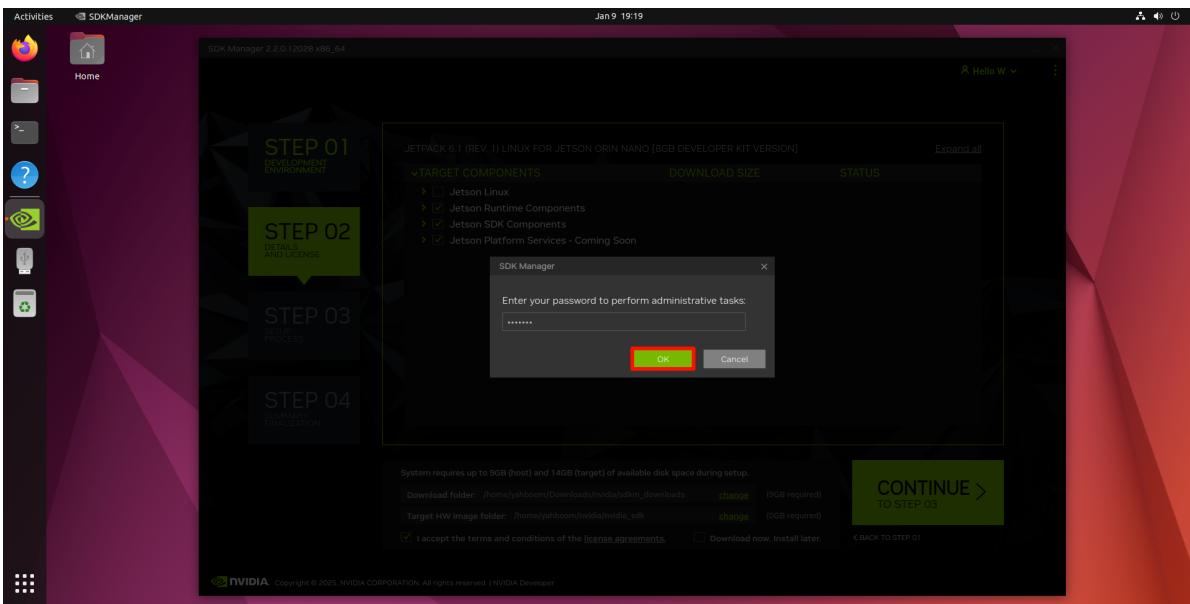
## 3.3, STEP2

Check all components except the Jetson Linux system:



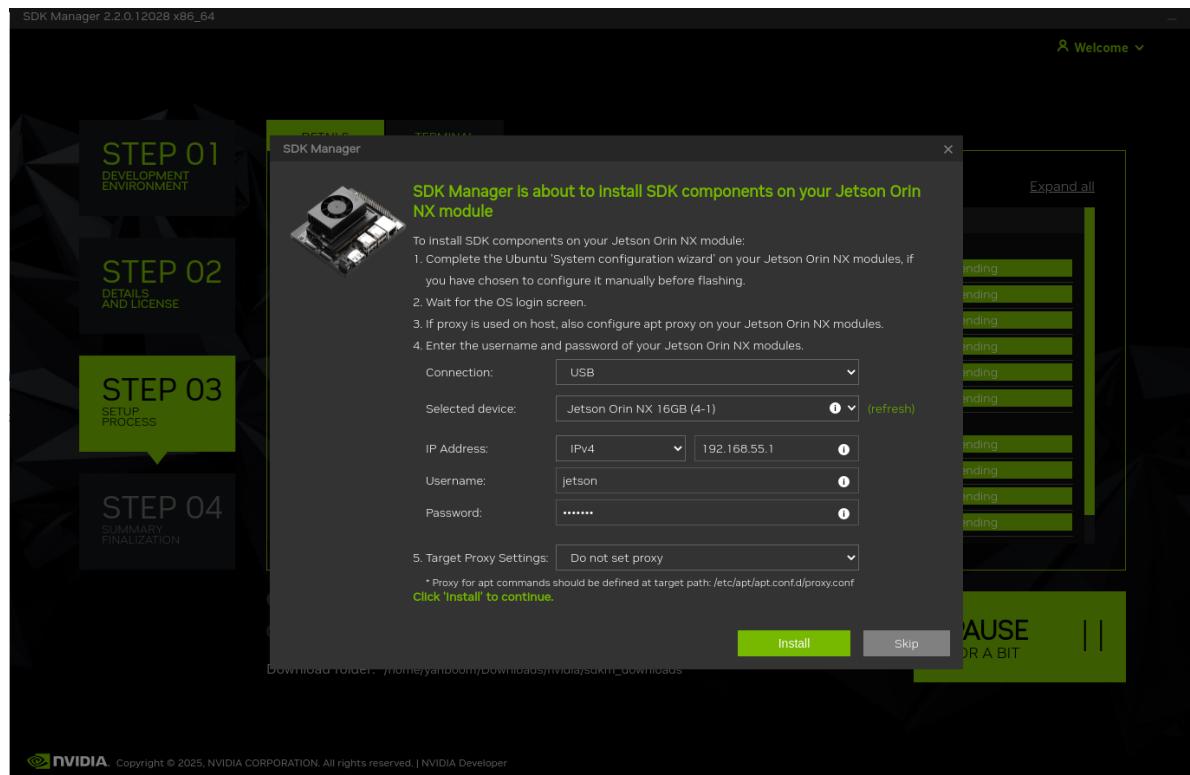


Enter the virtual machine password: yahboom



### 3.4, STEP3

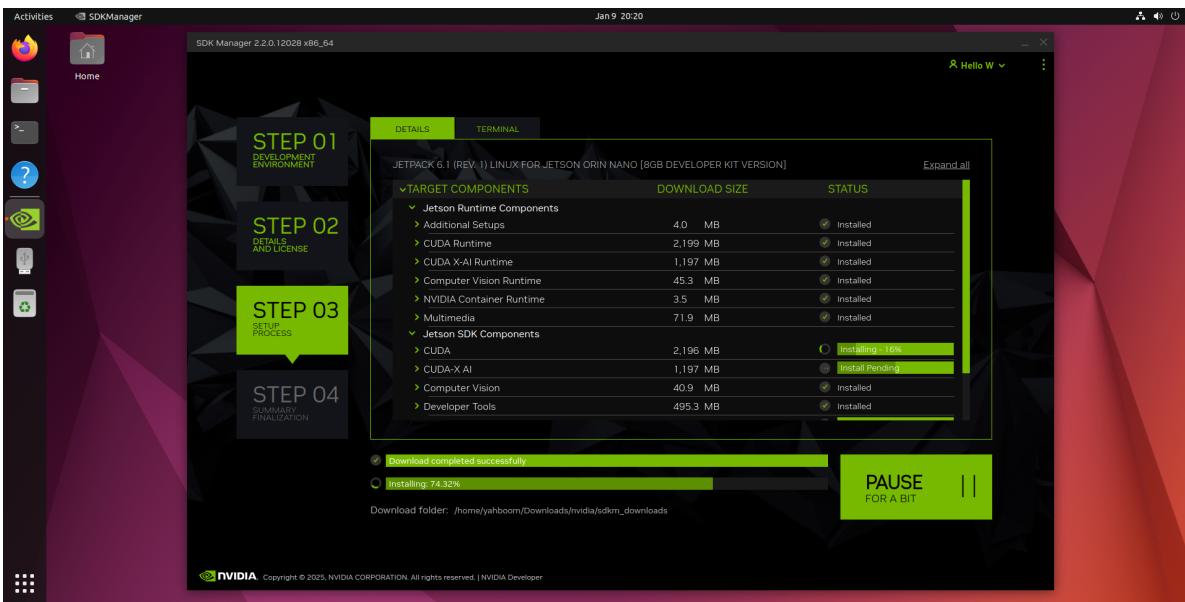
Enter the username and password of the motherboard system, and leave other options unchanged by default. After filling in, click `Install`:



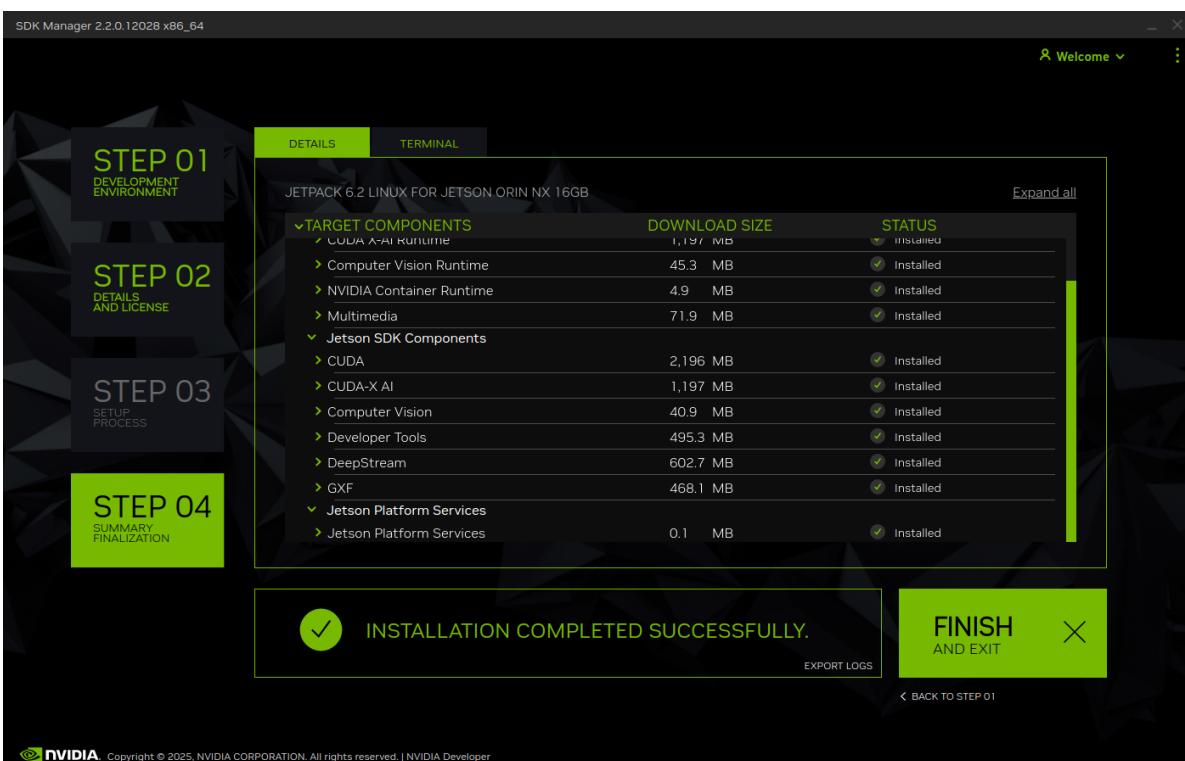
Wait for the system to download and install: The virtual machine has a network failure during the whole process, which can be ignored. The actual test did not affect the burning of the component environment



The entire installation process is relatively long, so you need to wait patiently. If the installation fails, you can restart the motherboard system and restart the SDK Manager installation:



### 3.5, STEP4



## 4. Environment verification

### Jtop tool

Use the following command to install Jtop:

```
sudo apt update && sudo apt upgrade  
sudo apt install python3-pip -y  
sudo pip3 install -U jetson-stats
```

```
Activities Terminal 1月 9 20:44 jetson@yahboom: ~
jetson@yahboom: $ sudo apt install python3-pip -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
gdal-data libaac0 libarmadillo0 libavpack2 libavcodec-dev libavformat-dev libblosc1 libcfitsio9
libcurl4 libcurl4-openssl-dev libdeflate-dev libdouble-conversions-dev libfreexi libfyba0 libgdal30
libgcm-dev libgcm3.0 libgeos-csv libgeos3.10.2 libgeotiffs libgl2ps1.4 libglew2.2 libgphoto2-dev
libhdf4-0-alt libhdf5-103-1 libheif1 libimbase-dev libjbig-dev libjpeg-dev libjpeg-turbo8-dev
libjpeg8-dev libkmlbase1 libkmldom1 libkmlengine1 liblept libminizip1 libmysqlclient21 libnetcdf19 libodbc2
libodbcinst2 libogdi4.1 libopencv-calib3d4.5d libopencv-contrib4.5d libopencv-dnn4.5d libopencv-features2d4.5d
libopencv-flann4.5d libopencv-highgui4.5d libopencv-imgcodecs4.5d libopencv-imgproc4.5d libopencv-m14.5d
libopencv-objectdetect4.5d libopencv-photo4.5d libopencv-shape4.5d libopencv-stitching4.5d libopencv-superres4.5d
libopencv-video4.5d libopencv-videoio4.5d libopencv-videostab4.5d libopencv-vl24.5d libopenexr-dev libpng-dev
libpq5 libproj22 libraw1394-dev librttopo1 libsocket++1 libspatialite7 libsuperlu5 libswresample-dev
libwscale-dev libsz2 libtbb-dev libtesseract4 libtiff-dev libtiffxx5 liburiparser1 libvtk9.1 libxerces-c3.2
mysql-common proj-data unixodbc-common
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
python3-setuptools python3-wheel
Suggested packages:
python3-setuptools-doc
The following NEW packages will be installed:
python3-pip python3-setuptools python3-wheel
0 upgraded, 3 newly installed, 0 to remove and 2 not upgraded.
Need to get 1,677 kB of archives.
After this operation, 8,968 kB of additional disk space will be used.
Get:1 http://ports.ubuntu.com/ubuntu-ports jammy-updates/main arm64 python3-setuptools all 59.6.0-1.2ubuntu0.22.04.2 [340 kB]
Get:2 http://ports.ubuntu.com/ubuntu-ports jammy-updates/universe arm64 python3-wheel all 0.37.1-2ubuntu0.22.04.1 [32.0 kB]
Get:3 http://ports.ubuntu.com/ubuntu-ports jammy-updates/universe arm64 python3-pip all 22.0.2+dfsg-1ubuntu0.5 [1,306 kB]
Fetched 1,677 kB in 3s (576 kB/s)
debconf: delaying package configuration, since apt-utils is not installed
Selecting previously unselected package python3-setuptools.
(Reading database ... 204856 files and directories currently installed.)
Preparing to unpack .../python3-setuptools_59.6.0-1.2ubuntu0.22.04.2_all.deb ...
Unpacking python3-setuptools (59.6.0-1.2ubuntu0.22.04.2) ...
Selecting previously unselected package python3-wheel.
Preparing to unpack .../python3-wheel_0.37.1-2ubuntu0.22.04.1_all.deb ...
Unpacking python3-wheel (0.37.1-2ubuntu0.22.04.1) ...
Selecting previously unselected package python3-pip.
```

```
Activities Terminal 1月 9 20:44 jetson@yahboom: ~
jetson@yahboom: $ sudo pip3 install -U jetson-stats
Collecting jetson-stats
  Downloading jetson-stats-4.3.0.tar.gz (118 kB)
    Preparing metadata (setup.py) ... done
Requirement already satisfied: distro in /usr/lib/python3/dist-packages (from jetson-stats) (1.7.0)
Collecting smbus2
  Downloading smbus2-0.5.0-py2.py3-none-any.whl (11 kB)
Building wheels for collected packages: jetson-stats
  Building wheel for jetson-stats (setup.py) ... done
    Created wheel for jetson-stats: filename=jetson_stats-4.3.0-py3-none-any.whl size=157743 sha256=11d87558ac919781b1a72ba7990fb63a826c3cd51c4741a41b0dc1a38074e
    Stored in directory: /root/.cache/pip/wheels/f9/f/76/01abe069d01c96a41ff2dff647bfafca9fb692669e3c565890
Successfully built jetson-stats
Installing collected packages: smbus2, jetson-stats
Successfully installed jetson-stats-4.3.0 smbus2-0.5.0
WARNING: Running pip as the 'root' user can result in broken permissions and conflicting behaviour with the system
package manager. It is recommended to use a virtual environment instead: https://pip.pypa.io/warnings/venv
jetson@yahboom: $
```

Note: After the installation is complete, you need to restart the system!

## Best performance mode

Enable MAX power mode

```
sudo nvpmodel -m 0
```

Enable Jetson clocks: CPU and GPU cores run at maximum frequency

```
sudo jetson_clocks
```

Use Jtop tool to view system information:

jtop

```
Activities Terminal Jan 20 18:18 MAXN SUPER NVIDIA Jetson Developer Zone
jetson@yahboom: $ sudo nvmodel -m 0
[sudo] password for jetson:
jetson@yahboom: $ sudo jetson_clocks
jetson@yahboom: $ jtop MAXN SUPER|CPU 11.6%|GPU 0.0%
Model: NVIDIA Jetson Orin NX Engineering Reference Developer Kit Super - Jetpack 6.2 [L4T 36.4.3]
1 [        4.0%] 2.0GHz 3 [        2.0%] 2.0GHz 5 [       11.1%] 2.0GHz 7 [        2.0%] 2.0GHz
2 [       2.0%] 2.0GHz 4 [       1.0%] 2.0GHz 6 [       6.0%] 2.0GHz 8 [       1.0%] 2.0GHz
Mem [|||||||] 1.6G/15.3G FAN [|||||||||] 42.7% 2469RPM
Swp [          ] 0k/7.6G Jetson Clocks: running
EMC [204MHz:::::::::::::3.2GHz] 3.2GHz 0% NV Power[0]: MAXN_SUPER
Uptime: 0 days 0:2:42
GPU [          ] 0.0% 1.2GHz
Dsk [#####] 20.2G/232G
PID USER GPU TYPE PRI S CPU% MEM [GPU MEM] Command
2806 jetson I G 20 S 12.1 76.0M 77.5M gnome-shell
2653 jetson I G 20 S 2.3 12.3M 42.6M Xorg
2757 jetson I G 20 S 4.7 15.0M 2.9M gnome-remote-de
2950 jetson I G 20 S 0.2 11.1M 1.5M xdg-desktop-por

[HW engines] [Sensor] [Temp] [Power] [Inst] [Avg]
APE: [OFF] PVA0a: [OFF] cpu 61.75C CPU GPU CV 3.0W 3.0W
DLA0c: [OFF] DLA1c: [OFF] cv0 57.84C SOC 3.0W 3.0W
NVENC: [OFF] NVDEC: [OFF] cv1 58.00C VDD_IN 9.9W 9.9W
NVJPG: [OFF] NVJPG1: [OFF] cv2 52.88C
SE: [OFF] VIC: [OFF] gpu 58.34C
soc0 57.94C
soc1 56.22C
soc2 55.81C
tj 61.75C

1ALL 2GPU 3CPU 4MEM 5ENG 6CTRL 7INFO Quit (c) 2024, RB
```

```
Activities Terminal Jan 20 18:20 MAXN SUPER NVIDIA Jetson Developer Zone
jetson@yahboom: $ sudo nvmodel -m 0
[sudo] password for jetson:
jetson@yahboom: $ sudo jetson_clocks
jetson@yahboom: $ jtop MAXN SUPER|CPU 3.1%|GPU 0.0%
jtop 4.3.1 - (c) 2024, Raffaello Bonghi [raffaello@rnext.it]
Website: https://rnext.it/jetson_stats

Platform Serial Number: [s]XX CLICK TO READ XXX
Machine: aarch64 Hardware
System: Linux Model: NVIDIA Jetson Orin NX Engineering Reference Developer
Distribution: Ubuntu 22.04 Jammy Jellyfish 699-level Part Number: 699-13767-0000-300 M.1
Release: 5.15.148-tegra P-Number: p3767-0000
Python: 3.10.12 Module: NVIDIA Jetson Orin NX (16GB ram)
                               Soc: tegra234
                               CUDA Arch BIN: 8.7
                               L4T: 36.4.3
                               Jetpack: 6.2
Libraries Hostname: yahboom
CUDA: 12.6.68 Interfaces
cuDNN: 9.3.0.75 eno1: 192.168.2.62
TensorRT: 10.3.0.30 l4tbr0: 192.168.55.1
VPI: 3.2.4 docker0: 172.17.0.1
Vulkan: 1.3.204
OpenCV: 4.8.0 with CUDA: NO

1ALL 2GPU 3CPU 4MEM 5ENG 6CTRL 7INFO Quit (c) 2024, RB
```