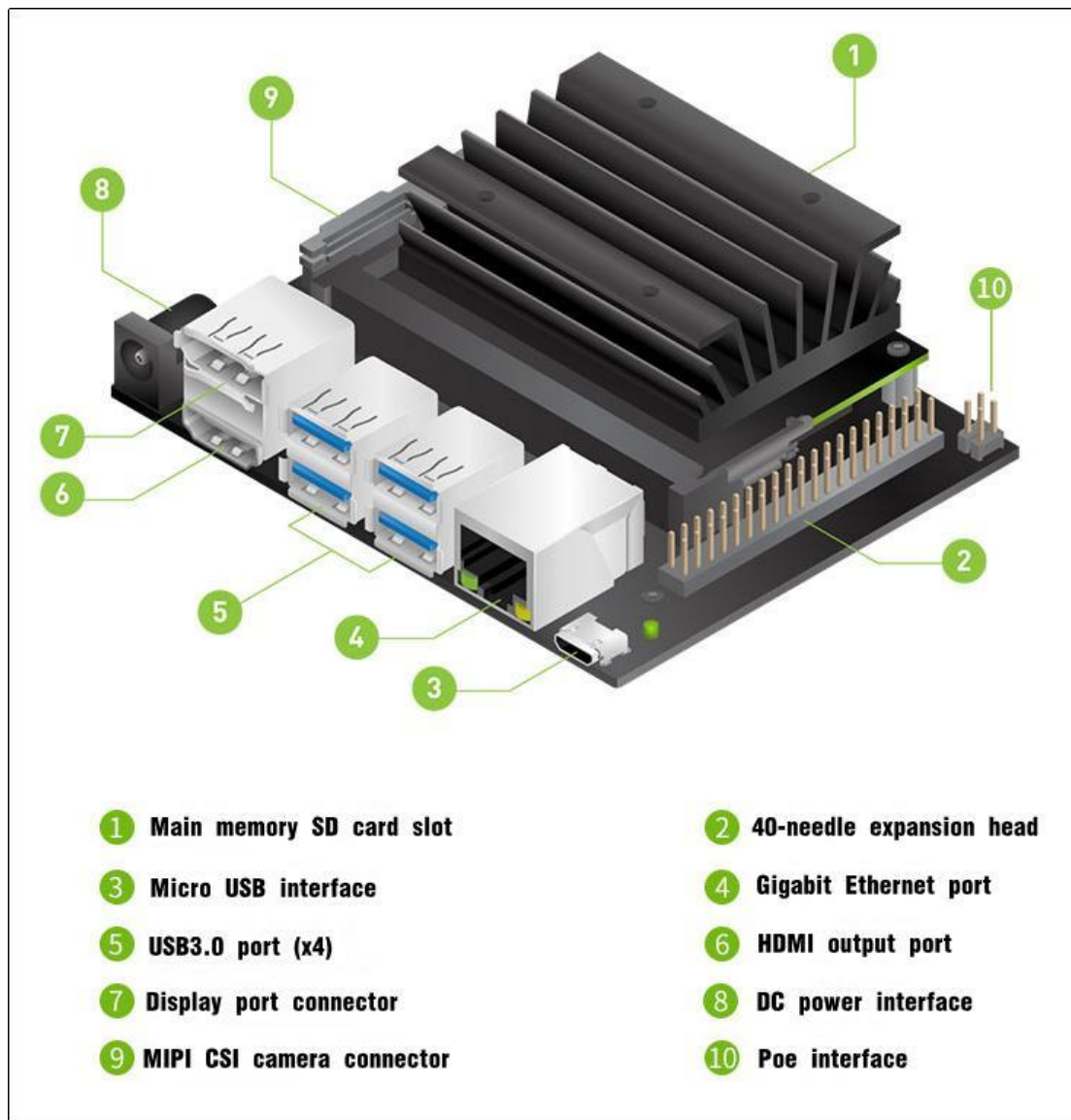


Part 1 Jetson Nano Introduction

1. Jetson Nano Introduction

Jetson Nano is launched in 2019 GTC convention. Small but powerful. Adopting quad-core 64-bit ARM CPU and a 128-core integrated NVIDIA GPU, Jetson Nano is capable of floating-point operations up to 472 GFLOPS.

Besides, Jetson Nano comes in high-efficiency and low-power package with a 5W/10W power mode and **5V DC input**. The modules of Jetson Nano are as follow.



Its performance and energy efficiency make it possible for Jetson Nano to run modern AI loads, run multiple neural network in parallel, and process the data from multiple HD sensors simultaneously. It is widely applicable in image sorting, object detection, image segmentation, speech processing, etc. It also supports some common AI frameworks, which enables the developers to integrate their favorite models and frameworks to the products.

2. Jetson Nano specification

No.	Component/ port	Function
1	GPU	NVIDIA Maxwell™ architecture. Equipped

		with 128 NVIDIA CUDA® cores
2	CPU	Quad-core ARM® Cortex®-A57 MPCore processor
3	RAM	4 GB 64-bit LPDDR4
4	Storage	Micro SD card slot. You need to purchase SD over 16G.
5	Video encoding	4K @ 30 (H.264/H.265)
6	Video encoding	4K @ 60 (H.264/H.265)
7	Camera	12 channels (3x4 or 4x2) MIPI CSI-2 DPHY 1.1 (1.5 Gbps)
8	Connection	gigabit Ethernet
9	Display	HDMI 2.0 or DP1.2 eDP 1.4 DSI (1 x2) 2
10	UPHY	1 x1/2/4 PCIE、1x USB 3.0、3x USB 2.0
11	I/O	1x SDIO/2x SPI/4x I2C/2x I2S/GPIO

No.	Model	Application	Architecture	NVIDIA Jetson Nano	Raspberry Pi 3+ Intel Neural Compute Stick2	Google Edge Tpu
1	ResNet-50 (224×224)	Sorting	Tensor flow	36 FPS	16 FPS	DNR
2	MobileNet-v2 (300×300)	Sorting	Tensor flow	64 FPS	30 FPS	130 FPS
3	SSD ResNet-18 (960×544)	Object detection	Tensor flow	5 FPS	DNR	DNR
4	SSD ResNet-18 (480×272)	Object detection	Tensor flow	16 FPS	DNR	DNR
5	SSD ResNet-18 (300×300)	Object detection	Tensor flow	18 FPS	DNR	DNR
6	SSD Mobilenet-V2 (960×544)	Object detection	Tensor flow	8 FPS	1.8 FPS	DNR
7	SSD ResNet-18 (480×272)	Object detection	Tensor flow	27 FPS	7 FPS	DNR
8	SSD ResNet-18 (300×300)	Object detection	Tensor flow	39 FPS	11 FPS	48 FPS
9	SSD Mobilenet-V2 (960×544)	Object detection	Tensor flow	8 FPS	1.8 FPS	DNR
10	SSD Mobilenet-V2 (480×272)	Object detection	Tensor flow	27 FPS	7 FPS	DNR
11	SSD Mobilenet-V2 (300×300)	Object detection	Tensor flow	39 FPS	11 FPS	48 FPS
12	Inception V4 (299×299)	Sorting	PyTorch	11 FPS	DNR	9 FPS

13	Tiny YOLO V3 (416×416)	Object detection	Darknet	25 FPS	DNR	DNR
14	OpenPose (256×256)	Posture estimation	Caffe	14 FPS	DNR	DNR
15	VGG-19 (224×224)	Sorting	MXNet	10 FPS	5 FPS	DNR
16	Super Resolution (481×321)	Image processing	PyTorch	15 FPS	DNR	DNR
17	Unet (1x512x512)	segmentation	Caffe	18 FPS	5 FPS	DNR

Part 2 Burn System Image

1. Preparation

Before burning the system image, you need to prepare the following stuffs:

- Card reader
- Memory card
- balenaEtcher-Portable (tool for burning the system image). The tool can be found in the same folder.

2. Extract the System Image

3. Burn System Image

1) After completing the above steps, insert the SD card into card reader and connect the card reader to your computer. Then, use the software “**balenaEtcher**” to burn the system image.

2) Click-on “**Flash from file**” and import the extracted image file.

3) Click-on “**Select target**” to select the SD card onto which the image is burned.

Note: the SD card will be formatted automatically during the process of image burning. If the SD card contains some important data, please remember to back up the data before burning the image.

4) Select the corresponding SD card, and then click-on “**Select(1)**”.

5) Click-on “**Flash!**” to start burning the system image. It takes a while for the burning process to be completed.

6) If the below window pops up, simply click-on “Cancel”.

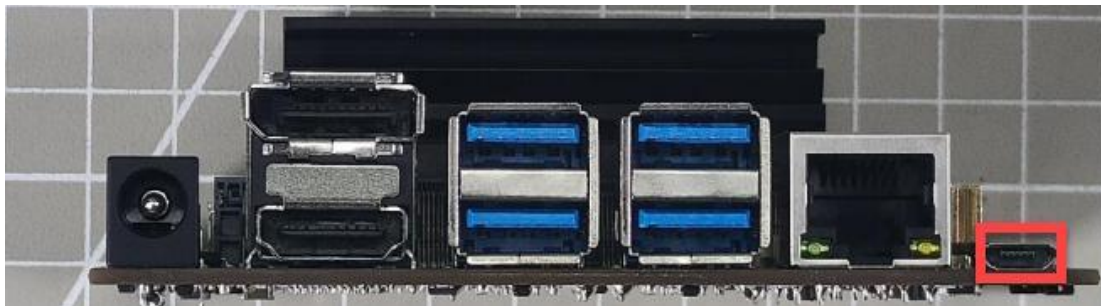
The system image is burned successfully once the interface shows “**Flash Complete!**”.

Part 3 Remote Desktop Connection

1. Control the Jetson Nano via USB cable(4th method)

1.1 Connect

1) Turn on the Jetson Nano and connect the USB cable (a regular Android micro connector cable will do) to the Jetson Nano at the red box in the picture below, and the other end to your computer.



1.2 View Device

- 1) Launch the Jetson Nano development board, right-click on the computer and select "Manage".
- 2) Click "Device Manager", find the red box, that is, the device is normally connected.

Remote NDIS Compatible Device

1.3 View Device IP

Networks and Internet->Advanced Network Settings->Hardware and connection properties

网络和 Internet > 高级网络设置 > 硬件和连接属性

连接性(IPv4/IPv6):	fec0:0:0:ffff::3%1 (未加密) 已连接到 未知网络, 无流量
名称:	이더넷 4
描述:	Remote NDIS Compatible Device
物理地址(MAC):	3a:fd:0f:c0:e8:4c
状态:	可操作
最大传输单元:	1500
链接速度(接收/传输):	425/425 (Mbps)
DHCP 已启用:	是
DHCP 服务器:	192.168.55.1

192.168.55.1

2. SSH remote connection

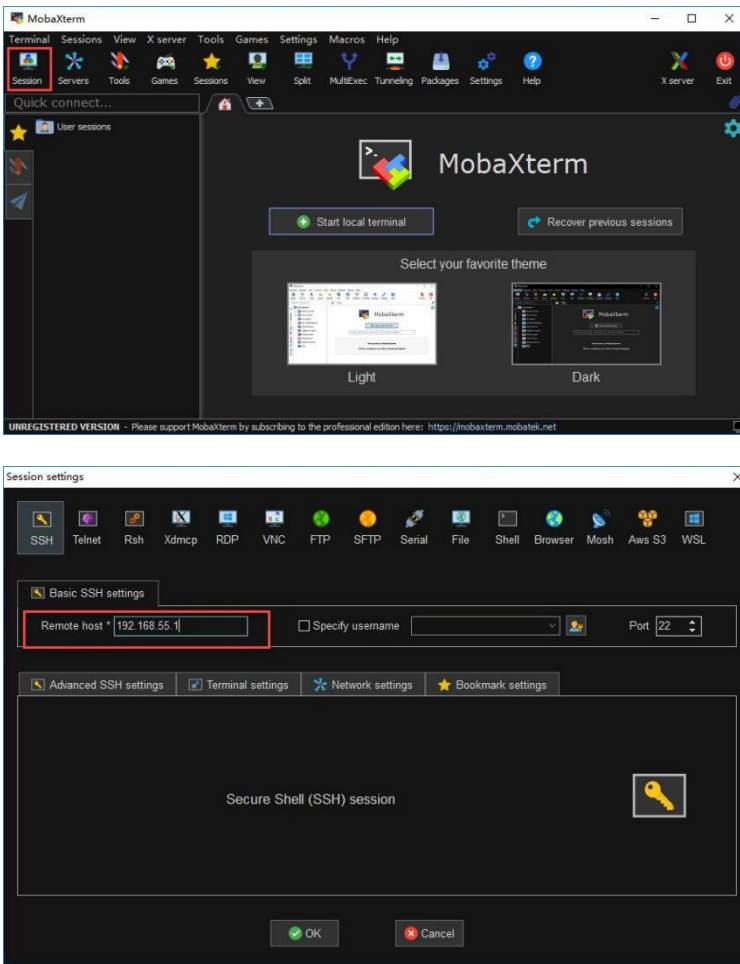
2.1 Preparation

◆The Jetson Nano is first connected to the network

◆MobaXterm tool (remote login tool, go to "1. Jetson Nano Part" to unzip and install it).

2.2 New Sessions and Connections

1) After installing it,open the MobaXterm.In the main interface, click "Session" in the upper right corner to create a new session, and in the session interface, enter the recorded IP address of Jetson Nano "**192.168.55.1**", and click the "OK" option.



2) The interface prompts you to enter the account name and password (the initial configuration of the machine set the account name: **jetauto**, password: **hiwonder**, the user in accordance with their own settings for the fixed), press "Enter" after typing is complete. It should be noted that entering the password is the same as in the Linux system, there will not be any visual display.

3.Remote connection through Nomachine

3.1 Installing Nomachine on your computer

3.2 Installing Nomachine on a Jetson Nano

1) Start the Jetson Nano development board, open a web browser and copy the URL:"<https://www.nomachine.com/download>" to go to the Nomachine download page.

2) Find "**NoMachine for ARM**" on the page and click on the ARM version download page.

3) Then, click "**NoMachine for ARM ARMv8 DEB**" to enter the download page.

- 4) Click "**Download**" to start downloading Nomachine.
- 5) In the download directory, drag and drop the file into the "**Home**" directory.
- 6) On the display Jetson Nano desktop, in the Home directory you can find "**nomachine_8.1.2_1_arm64.deb**".
- 7) In the "**Home**" directory, open "**Open in Terminal**" with the right mouse button.
- 8) Input the command "**sudo dpkg -i nomachine_8.1.2_1_arm64.deb**", where "**nomachine_8.1.2_1_arm64.deb**" is the default name of the file. Where "**nomachine_8.1.2_1_arm64.deb**" is the default name of the file. If the name is modified during the download, the command here should be changed to the name of the actual downloaded file.

3.3 Steps for connecting “Nomachine on your computer” to “Nomachine on a Jetson Nano”

- 1) After the installation is complete, open Nomachine and click "**Settings**" to enter the settings interface.
- 2) Click "Ports" to enter the port setting interface.
- 3) Check all the options under the "Ports".
- 4) Open NoMachine on your computer, enter the IP address "**192.168.55.1**" in the search field, and click Create a connection to this address.
- 5) Enter your username("**jetauto**") and password("**hiwonder**"), click the "Login" button, and you'll see the remotely opened Jetson Nano desktop.

Part 4 Basic Operation of Jetson Nano ✓

Part 5 Change Software Download Source(Skip)

Part 6 Modify WiFi(Skip)

Part 7 Network Connection(Skip)

Part 8 Common Linux Command ✓

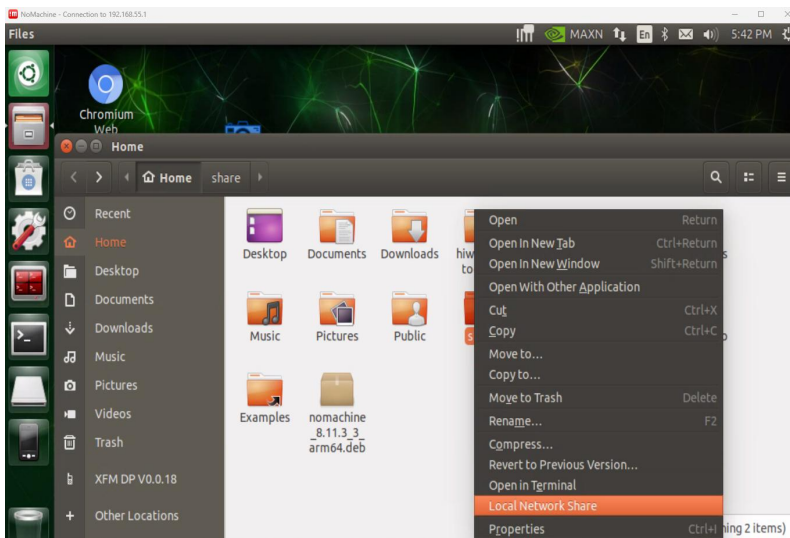
Part 9 Jetson Nano File Transmission ✓

1. Installing samba on ubuntu

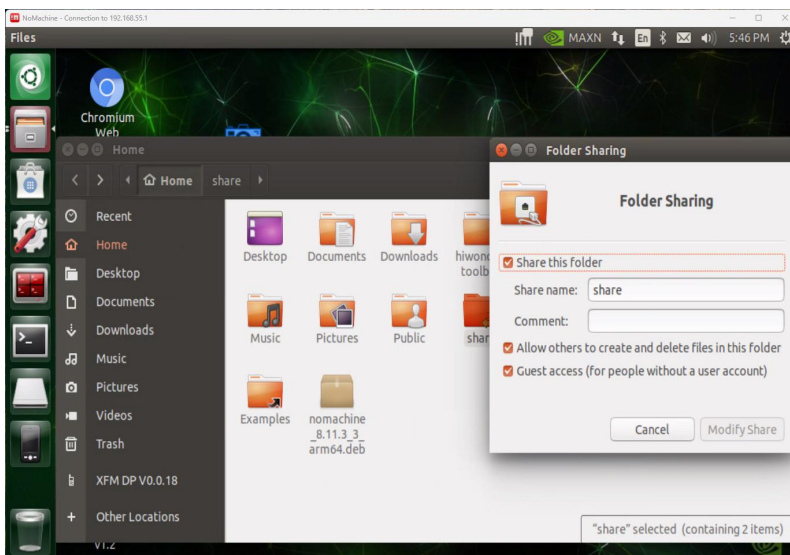
```
sudo apt-get install samba  
samba --version  
sudo smbpasswd -a jetauto
```


2. Setting up a shared directory under Ubuntu

1) Right-click on the directory you want to share -> Local Network Share

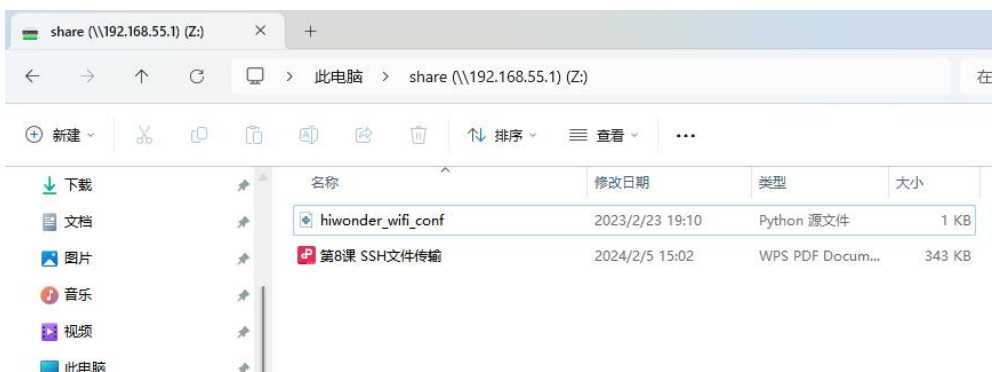


2) Check all items in the “Folder Sharing”

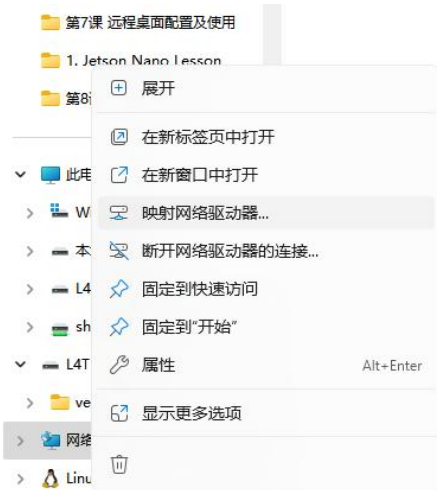


3. Mapping a shared directory on Windows

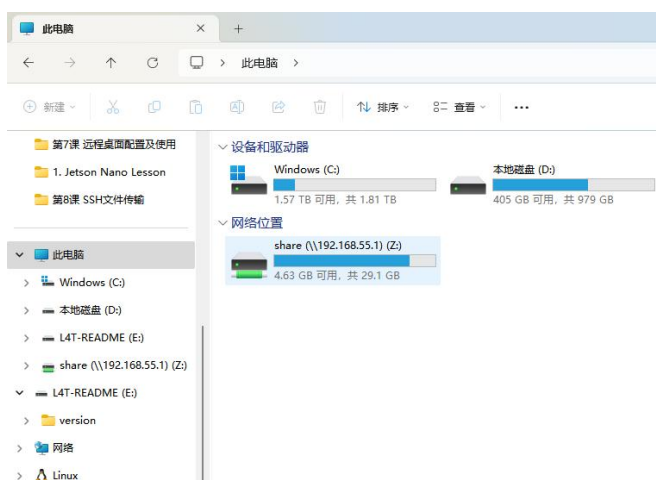
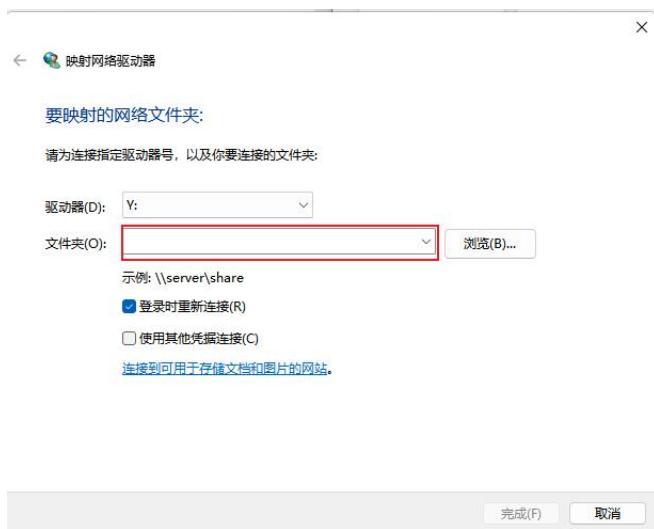
1) In windows, press "Win+R" and type "\\192.168.55.1\share" to enter the shared folder.



2) My Computer -> Right click on Network -> Map Network Drive



3) Type "\\192.168.55.1\share" in the red box.



Part 10 System Backup and Recover(Skip)