

Linux Party

2023-09-23

FOCS Group


What is Linux

Linux kernel has just past its 32nd birthday.^{^1} In many devices including web servers, desktop computers and mobile devices, you can find Linux kernel.

Linux kernel is not easy to manage, so people create and add many components and release various distributions.

Today, we will help you to install a Linux distribution on your computer. You can choose Ubuntu, one of popular Linux distributions, or a Debian based distribution which is developed to be used for JI courses. Also you can choose other distributions.

Linux and Its Distributions

Beginner-friendly 新手友好型	Intermediate 中间等级	Hard mode 高难度模式
		
 Ubuntu Based on Debian 基于Debian	 Garuda Linux Based on Arch 基于Arch	 Arch [Independent] – DIY 独立开发-自行搭建
 Pop!_OS Based on Ubuntu 基于Ubuntu	 EndeavourOS Based on Arch 基于Arch	 Gentoo [Independent] – DIY 独立开发-自行搭建
 elementary OS Based on Ubuntu (LTS) 基于Ubuntu(LTS)	 Manjaro Based on Arch 基于Arch	 Slackware [Independent] 独立开发
 Mint Based on Ubuntu 基于Ubuntu	 MX Linux Based on Debian 基于Debian	 Linux From Scratch [Independent] – DIY 独立开发-自行搭建
 Zorin Based on Ubuntu 基于Ubuntu	 Fedora Based on Red Hat 基于红帽	 Qubes OS 基于Fedora-以安全为中心 Based on Fedora – Security
 Solus [Independent] 独立开发	 OpenSUSE [Independent] 独立开发	 NixOS [Independent] – DIY 独立开发-自行搭建

FOCS Debian

- Has similar interface to Windows 10
- Developed from base system to avoid redundant software as in the official Debian images
- Aims to lower the time spent by students on installing software during labs
- Has the following software pre-installed:



Ways to get a Linux system

- Use WSL
- Use virtual machine
- Install a dual boot system
- Only use Linux

Use WSL

If you use windows, it is the easiest way for you to have a Linux environment.

If you want windows do everything (having no choices on installation),

1. start Powershell in administer mode.
2. Type `wsl --install`.
3. Wait and then reboot.

<https://learn.microsoft.com/en-gb/windows/wsl/install>

If your windows version is old, please follow <https://learn.microsoft.com/en-gb/windows/wsl/install-manual>

Otherwise, check WSL Installation Guidance

WSL Installation Guidance

Created by TechJI and 2023 151 TA Team.

Modified by FOCS Group.



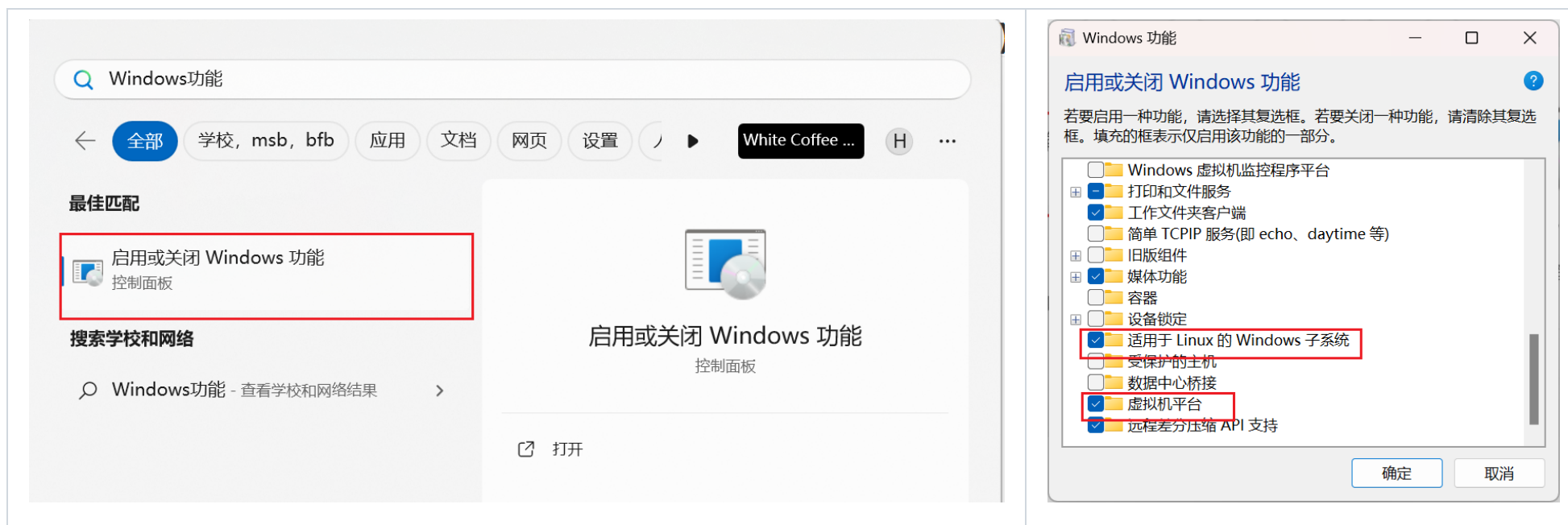
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Windows (using wsl)

Requirements

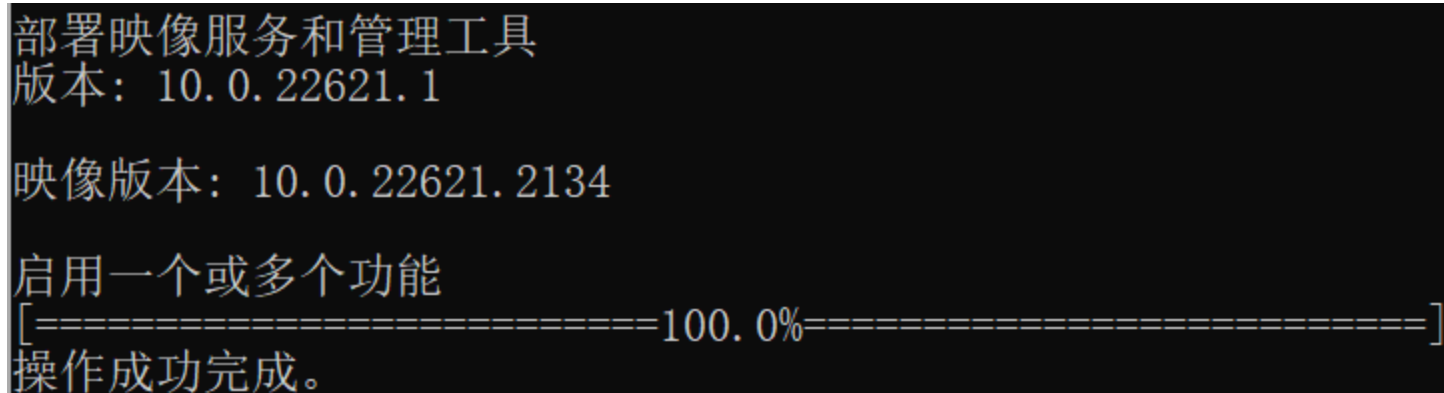
- Windows 10 1709 Fall Creators Update 64bit or later.
- Windows Subsystem for Linux feature is enabled.

Step 1 Enable Linux feature



Then run on `Powershell` with administrator.

```
dism.exe /online /enable-feature /featurename:Microsoft-Windows-Subsystem-Linux /all /norestart
```

A screenshot of a Windows PowerShell terminal window with a black background and white text. The text shows the output of the 'dism.exe' command: '部署映像服务和管理工具' (Deployment Image Service and Management Tools), '版本: 10.0.22621.1' (Version: 10.0.22621.1), '映像版本: 10.0.22621.2134' (Image Version: 10.0.22621.2134), '启用一个或多个功能' (Enabling one or more features), a progress bar at 100.0%, and '操作成功完成。' (Operation completed successfully.).

部署映像服务和管理工具
版本: 10.0.22621.1
映像版本: 10.0.22621.2134
启用一个或多个功能
[=====100.0%=====]
操作成功完成。

Reminder

When you use WSL2, Hyper-V is enabled, which is **NOT** compatible with other vm platforms like VMWare and VirtualBox.

Think twice before using it.

Step 2 Check whether your PC support WSL2

- In cmd run `systeminfo`
- Scroll down to Hyper-V section
- If there are 4 "Yes" OR "A hypervisor has been detected. Features required for Hyper-V will not be displayed." ("已检测到虚拟机监控程序。将不显示 Hyper-V 所需的功能。"), then your PC is OK
- Otherwise it's not OK, please use WSL1 or other vm platform

Step 3 Setup wsl2

```
wsl --set-default-version 2
```

```
system32 wsl --set-default-version 2  
有关与 WSL 2 的主要区别的信息, 请访问 https://aka.ms/wsl2  
操作成功完成。
```

Case 1: No error

- Just enjoy your WSL2

Case 2: Error with link <https://aka.ms/wsl2kernel> attached

- Go to <https://aka.ms/wsl2kernel> and download a patch
- start wsl2 again

Case 3: Error telling you Hyper-V is not enabled

- Go to Control Panel (控制面板) > Programs (程序) > Turn Windows features on or off (启用或关闭Windows功能)
- Find Hyper-V

Case 3.1: No Hyper-V Settings

- You should check whether your PC support WSL2. See above.

Case 3.2: All 4 settings in Hyper-V can be ticked

- Tick all settings
- Restart your PC
- Try to start wsl2 again

Case 3.3: Some of the settings can't be ticked

This might be an issue with your hardware. Please refer to section "How to Enable Hardware Virtualization in BIOS" in <https://www.makeuseof.com/windows-11-enable-hyper-v/> and try to enable hardware virtualization. (My laptop thinkpad has this issue)

Case 3.4 Otherwise

- Search online with error message on your screen (better go to stackoverflow/microsoft doc/github issues)
- Just use WSL1. It has no big issue.

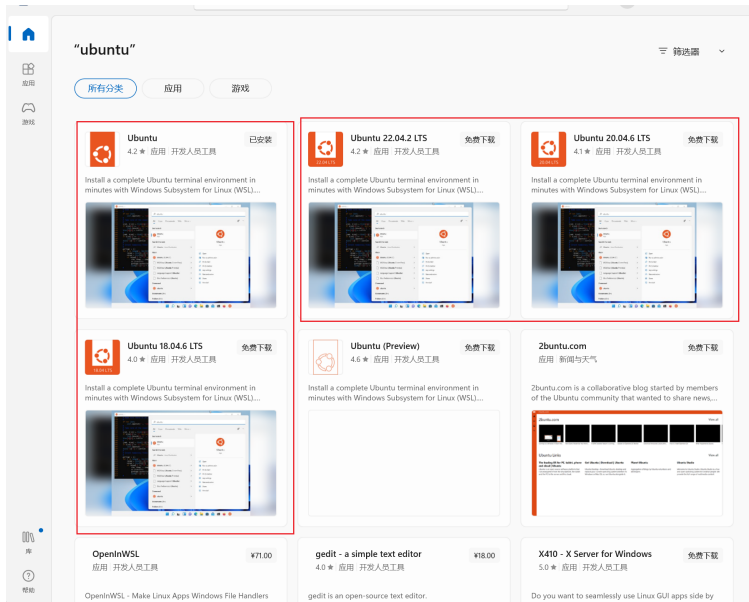
Step 4 Install Linux

- Ubuntu
- arch

You only need choose **one**.

Ubuntu

Go to Microsoft Store and search "Ubuntu"



Download one of them.

Open your terminal and choose `ubuntu`.

Setup your user name and password.

```
Installing, this may take a few minutes...
Please create a default UNIX user account. The username does not need to match your Windows username.
For more information visit: https://aka.ms/wslusers
Enter new UNIX username: Jaking
adduser: Please enter a username matching the regular expression configured
via the NAME_REGEX[_SYSTEM] configuration variable. Use the '--force-badname'
option to relax this check or reconfigure NAME_REGEX.
Enter new UNIX username: Jaking --force-badname
adduser: Please enter a username matching the regular expression configured
via the NAME_REGEX[_SYSTEM] configuration variable. Use the '--force-badname'
option to relax this check or reconfigure NAME_REGEX.
Enter new UNIX username: root
adduser: The user 'root' already exists.
Enter new UNIX username: XXXXXXXXXX
Enter new UNIX password:
Retype new UNIX password:
passwd: password updated successfully
Installation successful!
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.
```

run

```
$ sudo apt update  
$ sudo apt install build-essential  
$ gcc --version
```




```
hydraallen@Hydraallen ~$ gcc --version  
gcc (Ubuntu 11.4.0-1ubuntu1~22.04) 11.4.0  
Copyright (C) 2021 Free Software Foundation, Inc.  
This is free software; see the source for copying conditions. There is NO  
warranty; not even for MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.
```

Arch

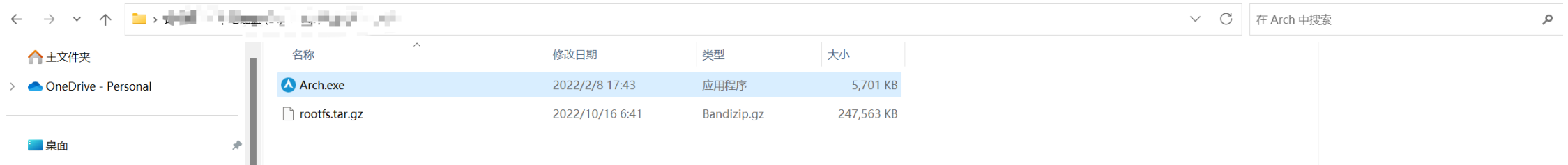
You may refer to the official website.

Here, we demonstrate the first method.

1. [Download](#) the installer zip.

▼ Assets 8		
 Arch.zip	242 MB	Oct 16, 2022
 ArchWSL-AppX_22.10.16.0_x64.appx	244 MB	Oct 16, 2022
 ArchWSL-AppX_22.10.16.0_x64.cer	828 Bytes	Oct 16, 2022
 ArchWSL_Online-AppX_22.10.16.0_x64.appx	2.31 MB	Oct 16, 2022
 ArchWSL_Online-AppX_22.10.16.0_x64.cer	828 Bytes	Oct 16, 2022
 Arch_Online.zip	2.15 MB	Oct 16, 2022
 Source code (zip)		Oct 16, 2022
 Source code (tar.gz)		Oct 16, 2022

2. Extract all files in zip file to the same directory. Please extract to a folder that you have write permission. For example, `C:\Program Files` cannot be used since the rootfs cannot be modified there.

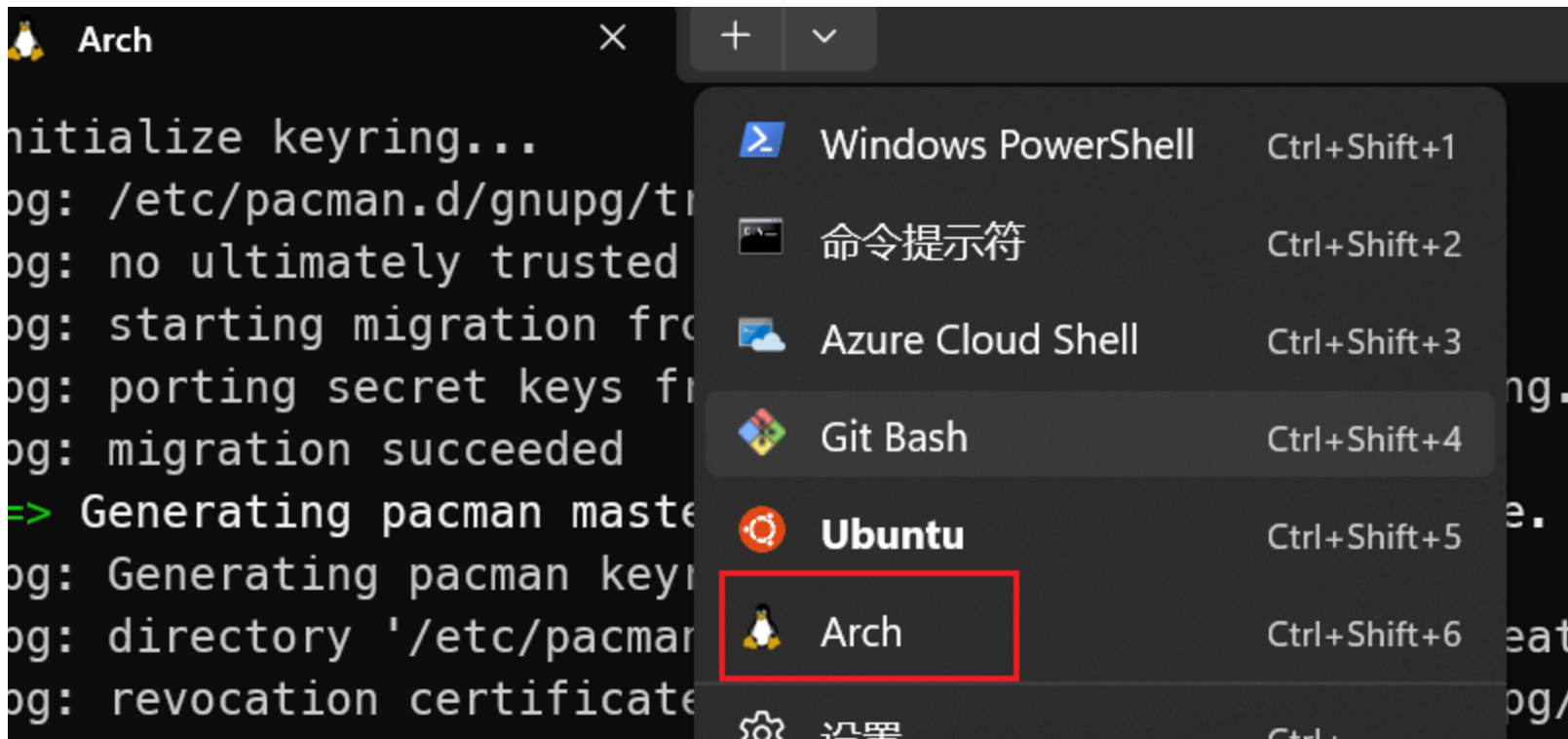


3. Run `Arch.exe` to extract the rootfs and register to WSL

```
D:\AppInstall\Arch\Arch.exe
Using: D:\AppInstall\Arch\rootfs.tar.gz
Installing...
Installation complete
Press enter to continue...
```

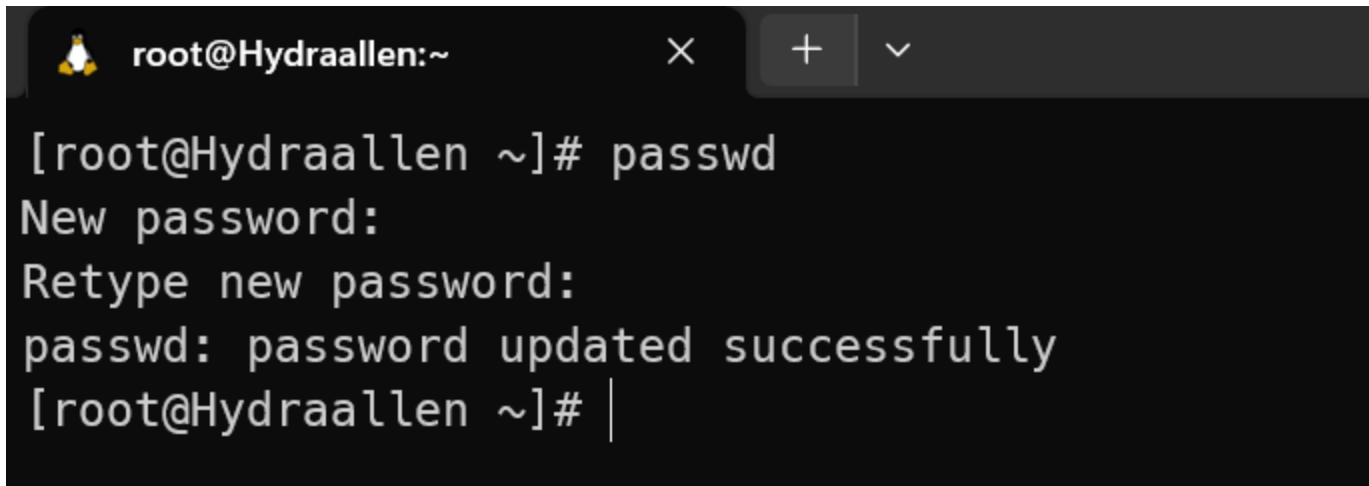
As a side note, the executable name is what is used as the WSL instance name. If you rename it, you can have multiple installs.

4. Open your terminal and choose `arch` .



5. Setting the root password

```
passwd
```

A terminal window with a dark background and light text. The window title bar shows a penguin icon, the text 'root@Hydraallen:~', and window control buttons (close, maximize, and a dropdown arrow). The terminal content shows the execution of the 'passwd' command, prompting for a new password and its retype, followed by a success message and the return to the shell prompt.

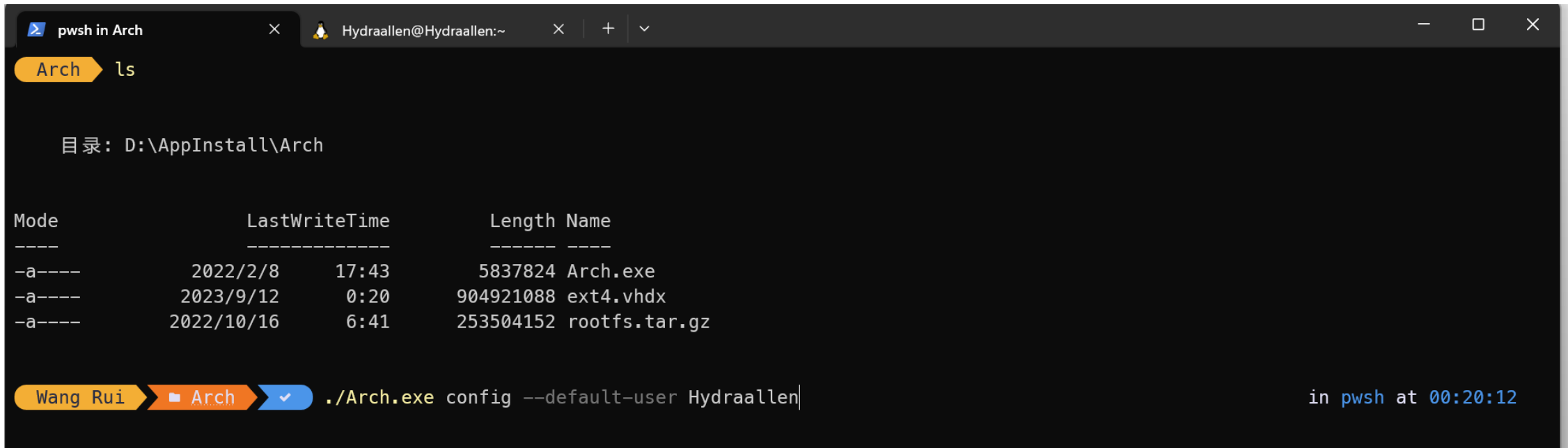
```
root@Hydraallen:~  
[root@Hydraallen ~]# passwd  
New password:  
Retype new password:  
passwd: password updated successfully  
[root@Hydraallen ~]# |
```

6. Set up the default user

```
$ echo "%wheel ALL=(ALL) ALL" > /etc/sudoers.d/wheel  
$ useradd -m -G wheel -s /bin/bash {username}  
$ passwd {username}
```

```
[root@Hydraallen ~]# useradd -m -G wheel -s /bin/bash Hydraallen --badname  
[root@Hydraallen ~]# passwd Hydraallen  
New password:  
Retype new password:  
passwd: password updated successfully  
[root@Hydraallen ~]# |
```

```
$ exit
$ Arch.exe config --default-user {username}
```



The screenshot shows a Windows PowerShell window with the title bar 'pwsh in Arch'. The window displays the output of the 'ls' command in the 'Arch' directory. The output shows a table of files with columns for Mode, LastWriteTime, Length, and Name. The files listed are Arch.exe, ext4.vhdx, and rootfs.tar.gz. The command prompt shows the user 'Wang Rui' in the 'Arch' directory, having just executed the command './Arch.exe config --default-user Hydraallen'.

```
Arch ls

目录: D:\AppInstall\Arch

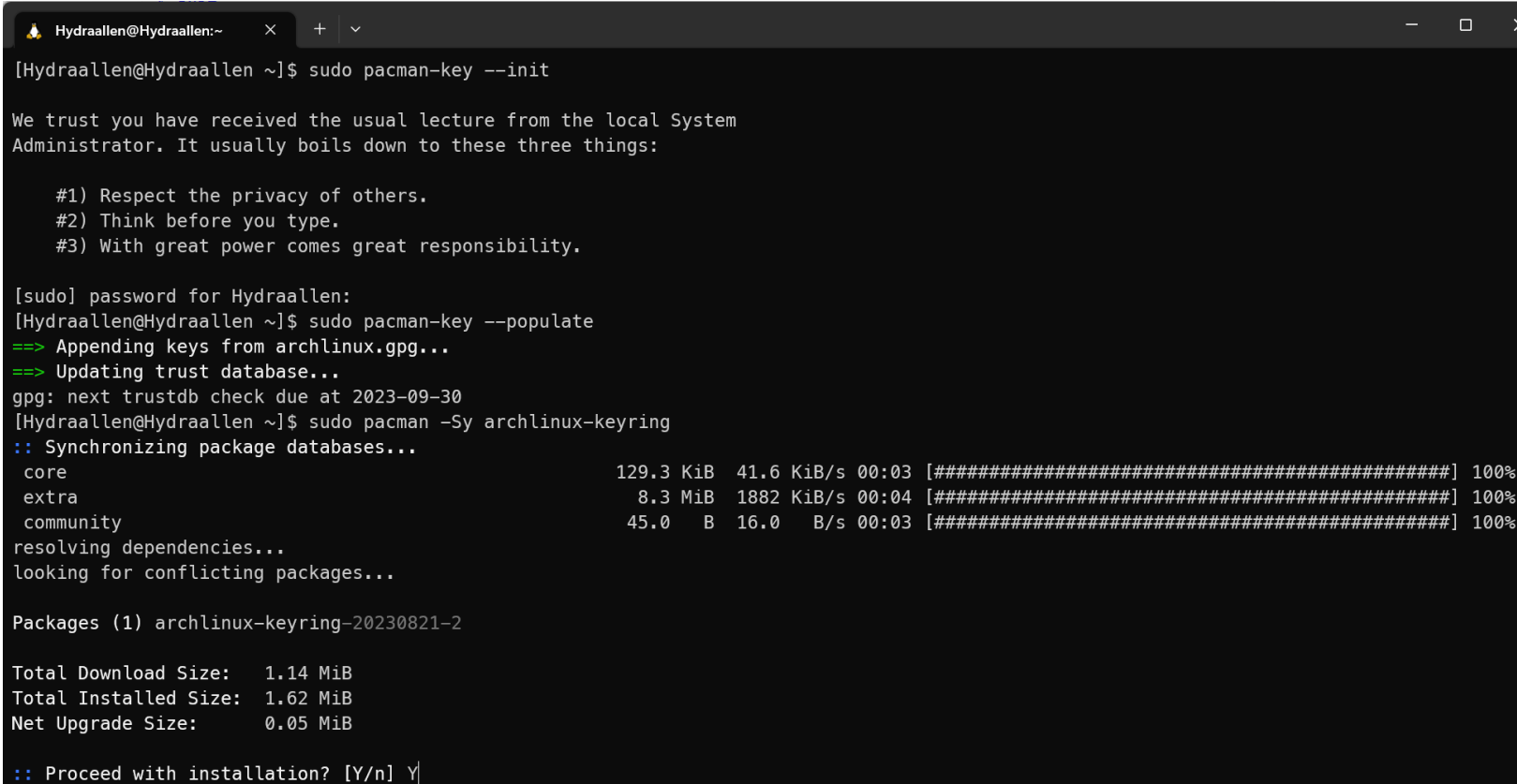
Mode                LastWriteTime         Length Name
----                -
-a-----         2022/2/8      17:43      5837824 Arch.exe
-a-----         2023/9/12       0:20     904921088 ext4.vhdx
-a-----         2022/10/16       6:41     253504152 rootfs.tar.gz

Wang Rui > Arch > ./Arch.exe config --default-user Hydraallen | in pwsh at 00:20:12
```

If the default user has not been changed ([issue #7](#)), please reboot the computer or alternatively, restart the LxssManager in an Admin command prompt. *Please refer to the official documentation.*

7. initialize the keyring

```
$ sudo pacman-key --init
$ sudo pacman-key --populate
$ sudo pacman -Sy archlinux-keyring
$ sudo pacman -Su
```



```
Hydraallen@Hydraallen:~  
[Hydraallen@Hydraallen ~]$ sudo pacman-key --init  
  
We trust you have received the usual lecture from the local System  
Administrator. It usually boils down to these three things:  
  
#1) Respect the privacy of others.  
#2) Think before you type.  
#3) With great power comes great responsibility.  
  
[sudo] password for Hydraallen:  
[Hydraallen@Hydraallen ~]$ sudo pacman-key --populate  
==> Appending keys from archlinux.gpg...  
==> Updating trust database...  
gpg: next trustdb check due at 2023-09-30  
[Hydraallen@Hydraallen ~]$ sudo pacman -Sy archlinux-keyring  
:: Synchronizing package databases...  
core 129.3 KiB 41.6 KiB/s 00:03 [#####] 100%  
extra 8.3 MiB 1882 KiB/s 00:04 [#####] 100%  
community 45.0 B 16.0 B/s 00:03 [#####] 100%  
resolving dependencies...  
looking for conflicting packages...  
  
Packages (1) archlinux-keyring-20230821-2  
  
Total Download Size: 1.14 MiB  
Total Installed Size: 1.62 MiB  
Net Upgrade Size: 0.05 MiB  
  
:: Proceed with installation? [Y/n] Y
```

8. Install gcc

```
$ sudo pacman -S gcc
```

```
[Hydraallen@Hydraallen ~]$ sudo pacman -S gcc  
resolving dependencies...  
looking for conflicting packages...
```

```
Packages (5) binutils-2.41-3  jansson-2.14-2  libisl-0.26-1  libmpc-1.3.1-1  gcc-13.2.1-3
```

```
Total Download Size:    55.42 MiB
```

```
Total Installed Size:  231.10 MiB
```

```
:: Proceed with installation? [Y/n] |
```

9. test gcc

```
$ gcc --version
```

```
[Hydraallen@Hydraallen ~]$ gcc --version
gcc (GCC) 13.2.1 20230801
Copyright (C) 2023 Free Software Foundation, Inc.
This is free software; see the source for copying conditions.  There is NO
warranty; not even for MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.

[Hydraallen@Hydraallen ~]$ |
```

Use virtual machine

You may choose VirtualBox or VMware.

<https://software.sjtu.edu.cn/List/VirtualBox/virtualbox>

1. Get the image (an `.iso` file) from the net.
2. Download and install the virtual machine software you want to use.
3. In the software, choose to create a virtual machine.
4. Choose the iso file you get.
5. Follow the instructions.

Install a dual boot system

Be careful! Your data may be lost. **Make a backup** before you do the following steps.

1. Have a free disk partition. Have a USB disk.
2. Get the image (an `.iso` file) from the net.
3. Use tools like [rufus](#) to burn the iso into your USB disk.
4. Search online how to enter bios or uefi(different laptops require different key.)
5. shutdown and then boot and enter bios or uefi.
6. Enable start from USB. Choose your USB disk to boot. Disable Secure Boot.
7. Boot and follow the setup steps.

When you choose the disk, be sure to check whether it is your **prepared free disk**.

Only use Linux

The same as dual boot system. The only difference is to choose to install on your current system disk.

*Your current system will **disappear**. All the data on your system disk will be **deleted**.*

Setup your system

If you use WSL, your system will be setup by windows. You do not need to do anything.

Follow the instructions on the screen.

Here are some remainders.

1. Choose English. Do not use Chinese. It may cause many issues.
2. When choose the disk, be ***careful*** if you are not using virtual machine. It is recommend to have one partition for `/` and one partition for `/home/{yourname}` because you may have serval times erasing the system and reinstalling the system.

Start to use

1. Start Terminal.
2. Type `apt update` (apt is the package manager for debian-based systems. Yes, ubuntu is a debian-based system.)
3. Install git, compiles and other tools you want to use by `apt install <name>` .

Well known tools you could use in Linux

- Chrome, Edge, 360 Browser ... -> Firefox
- Microsoft Office -> Libre office, WPS(not opensource)
- App store -> apt (and many UI store integrated with apt)
- Chinese Input tools -> Sogou Pinyin(not opensource), Rime