

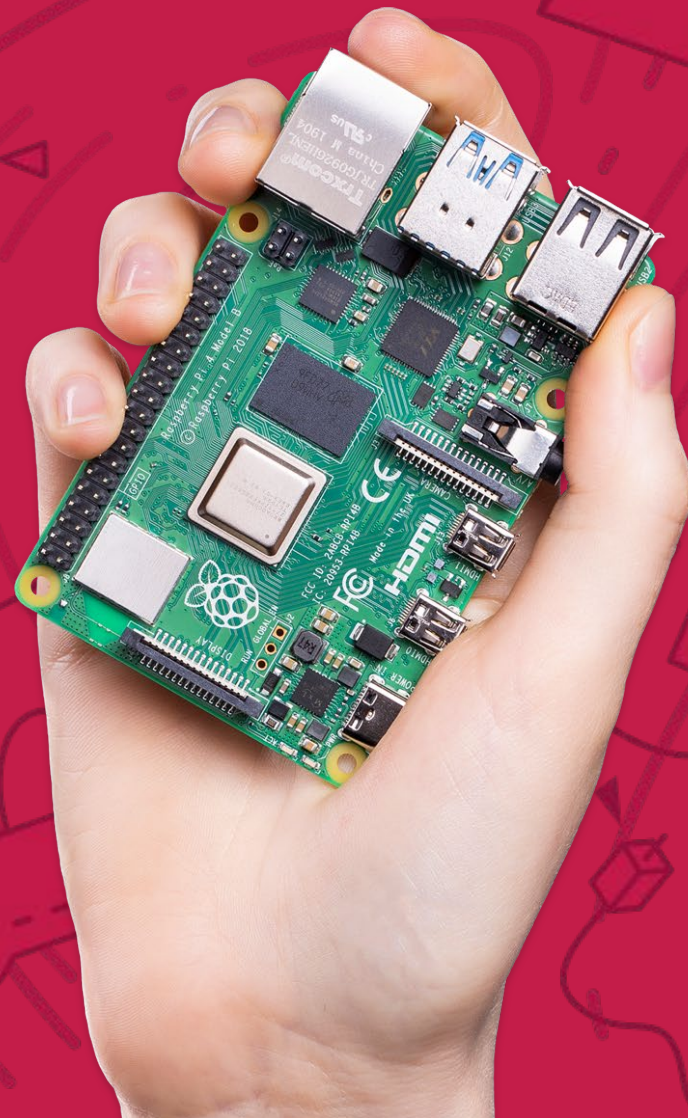


ISTSMART



# Raspberry Pi 4

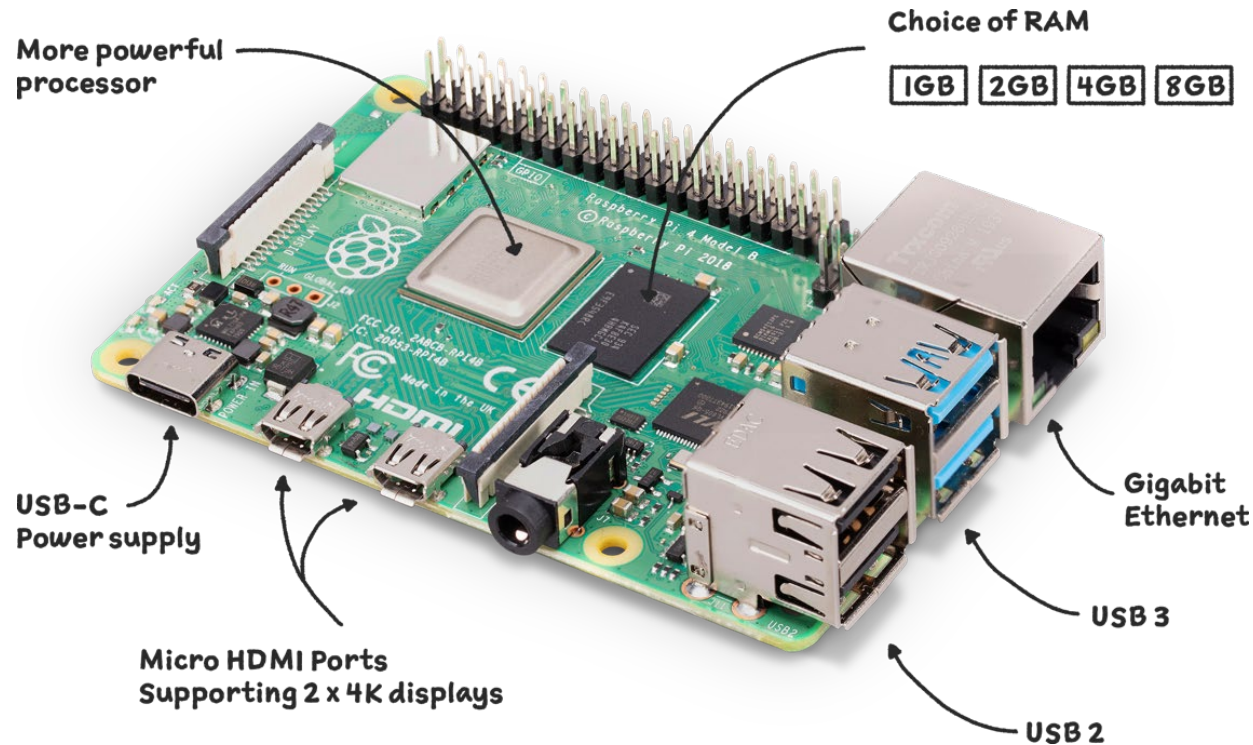
计算机与信息安全学院21级小学期暨  
第二届“智慧机器，以芯起航”  
树莓派培训 6月28日 9:00-12:00



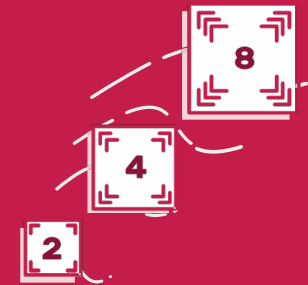
Your tiny, dual-display, desktop computer  
...and robot brains, smart home hub, media centre, networked AI core, factory controller, and much more

# Raspberry Pi 4

## Faster, more powerful

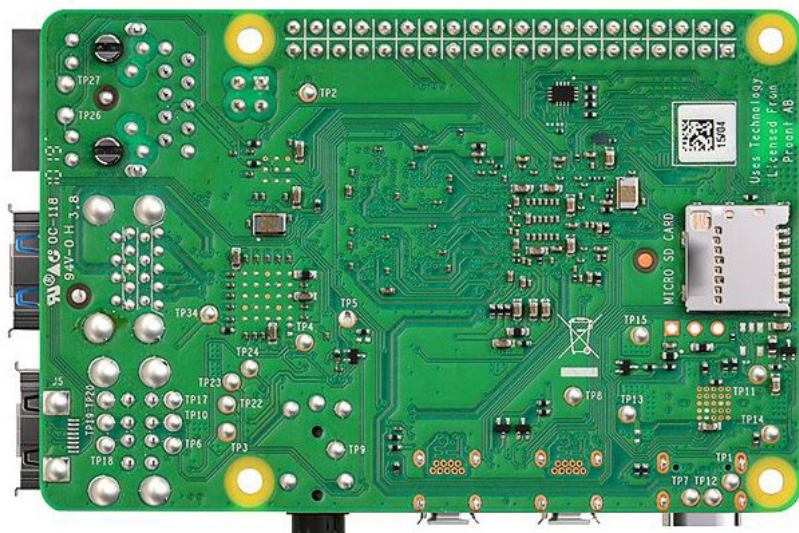


Raspberry Pi 4 comes with Gigabit Ethernet, along with onboard wireless networking and Bluetooth.



We're making different variants of the Raspberry Pi 4 available, depending on how much RAM you need – 1GB, 2GB, 4GB, or 8GB.





树莓派 40Pin 引脚对照表

wiringPi 编码	BCM 编码	功能名	物理引脚 BOARD编码		功能名	BCM 编码	wiringPi 编码
		3.3V	1	2	5V		
8	2	SDA.1	3	4	5V		
9	3	SCL.1	5	6	GND		
7	4	GPIO.7	7	8	TXD	14	15
		GND	9	10	RXD	15	16
0	17	GPIO.0	11	12	GPIO.1	18	1
2	27	GPIO.2	13	14	GND		
3	22	GPIO.3	15	16	GPIO.4	23	4
		3.3V	17	18	GPIO.5	24	5
12	10	MOSI	19	20	GND		
13	9	MISO	21	22	GPIO.6	25	6
14	11	SCLK	23	24	CE0	8	10
		GND	25	26	CE1	7	11
30	0	SDA.0	27	28	SCL.0	1	31
21	5	GPIO.21	29	30	GND		
22	6	GPIO.22	31	32	GPIO.26	12	26
23	13	GPIO.23	33	34	GND		
24	19	GPIO.24	35	36	GPIO.27	16	27
25	26	GPIO.25	37	38	GPIO.28	20	28
		GND	39	40	GPIO.29	21	29

NXEZ.COM

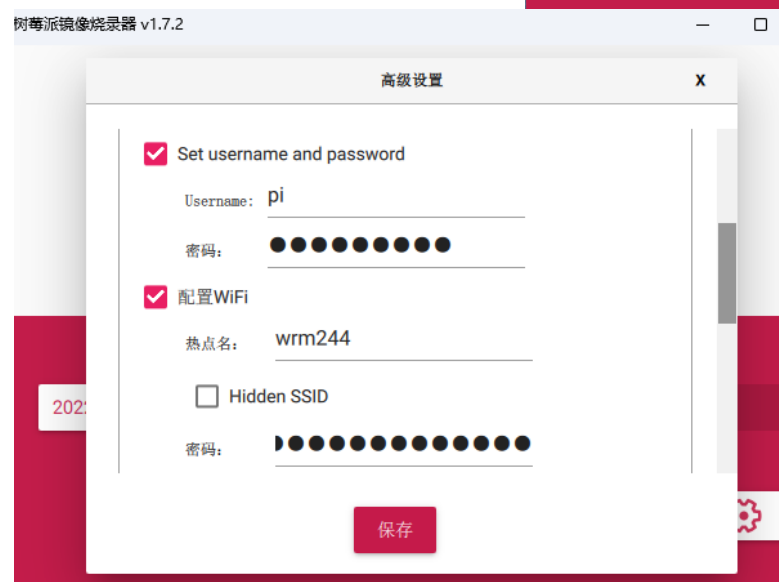
表格由树莓派实验室绘制 <http://shumeipai.nxez.com>

# An update to Raspberry Pi OS Bullseye

7th Apr 2022 <https://www.raspberrypi.com/news/raspberry-pi-bullseye-update-april-2022>

One of the things which we spend a lot of time thinking about here at Raspberry Pi is security.....

.....So with this latest release, the default “pi” user is being removed, and instead you will create a user the first time you boot a newly-flashed Raspberry Pi OS image.

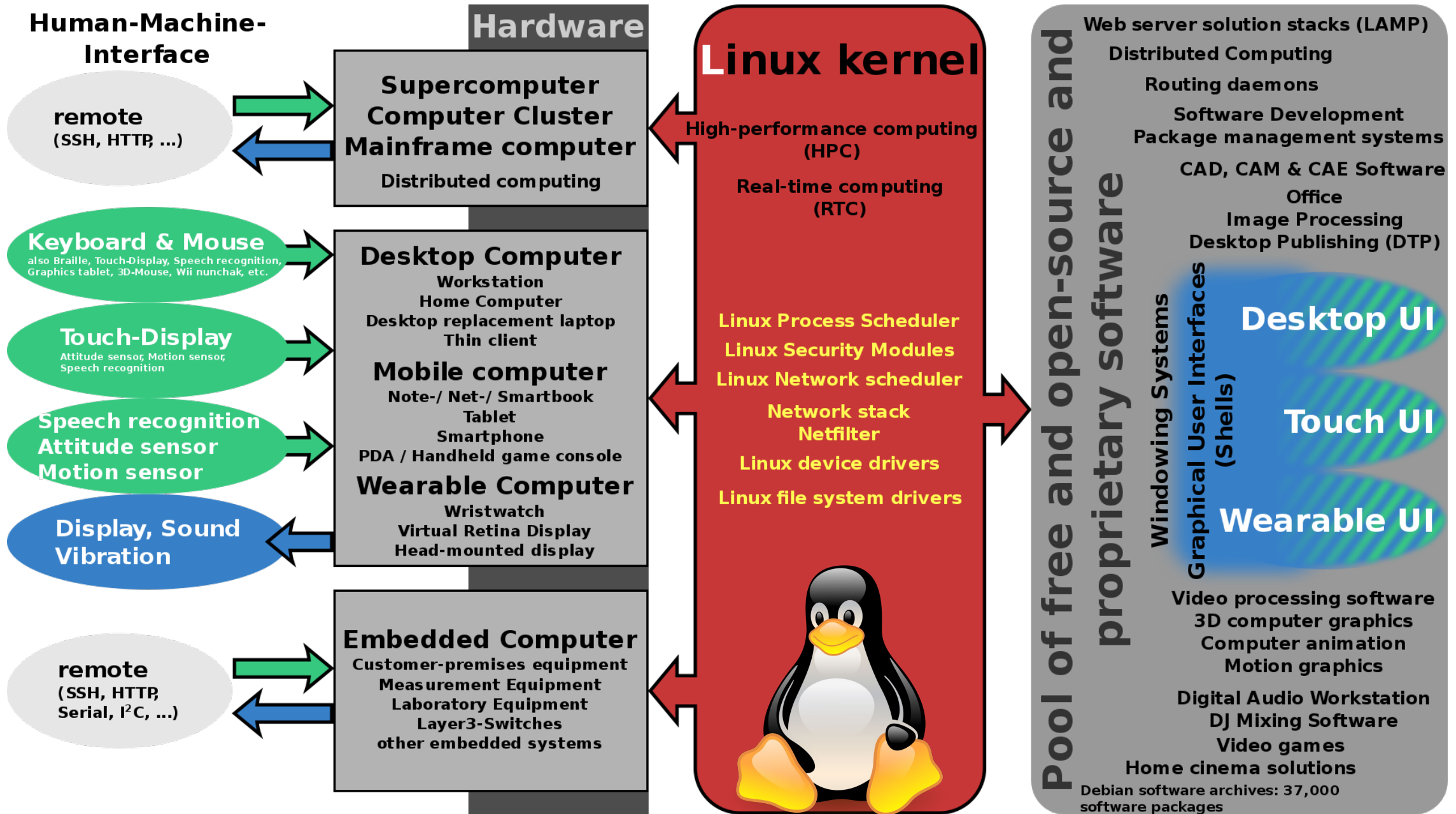


# Raspberry OS 🍓 系统刷入演示环节



Your tiny, dual-display, desktop computer  
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Desktop widgets

2D Application  
possibly adaptations to Wayland/Mir

Media Application  
possibly adaptations to Wayland/Mir

3D Application  
possibly adaptations to Wayland/Mir

Widgets for  
Unity and Plasma

Desktop Shells:

- GNOME Shell
- Cinnamon
- Plasma 2
- Cairo-Dock
- Enlight. DR19

User Interface Toolkits (in the form of libraries):

**GTK**  
Pango ATK  
Clutter  
**Cairo (Xr)**  
libwayland / COGL

**Qt**  
libwayland-client

**EFL**  
libwayland-client

**SDL**  
libwayland-client

**GNUstep  
wxWidgets  
FLTK**  
...  
libwayland-client  
libX/libXCB

Ubuntu

Unity

Android

Display server:

weston, clayton, mutter, KWin  
**libwayland-server**  
**Wayland Compositor**  
libinput

System libraries:

**glibc  
µClibc**

**GLib**  
GObject  
Glib  
GModule  
GThread  
GIO

System daemons:

**systemd**  
(contains udev)

**D-Bus-Daemon**

**udisks**

**avahi-daemon**

**packagekitd**

**PulseAudio-d**

**unetwork**  
NetworkManager

Alternative display servers:

**libxserver**  
**X-Server**  
X.Org  
Xfree86  
X-Win32  
X11.app

window manager  
metacity  
mutter  
KWin  
Compiz

**libmir-serv**  
**mir**  
mir

window manager  
Compiz

**SF**  
SurfaceFlinger

window manager  
AWh

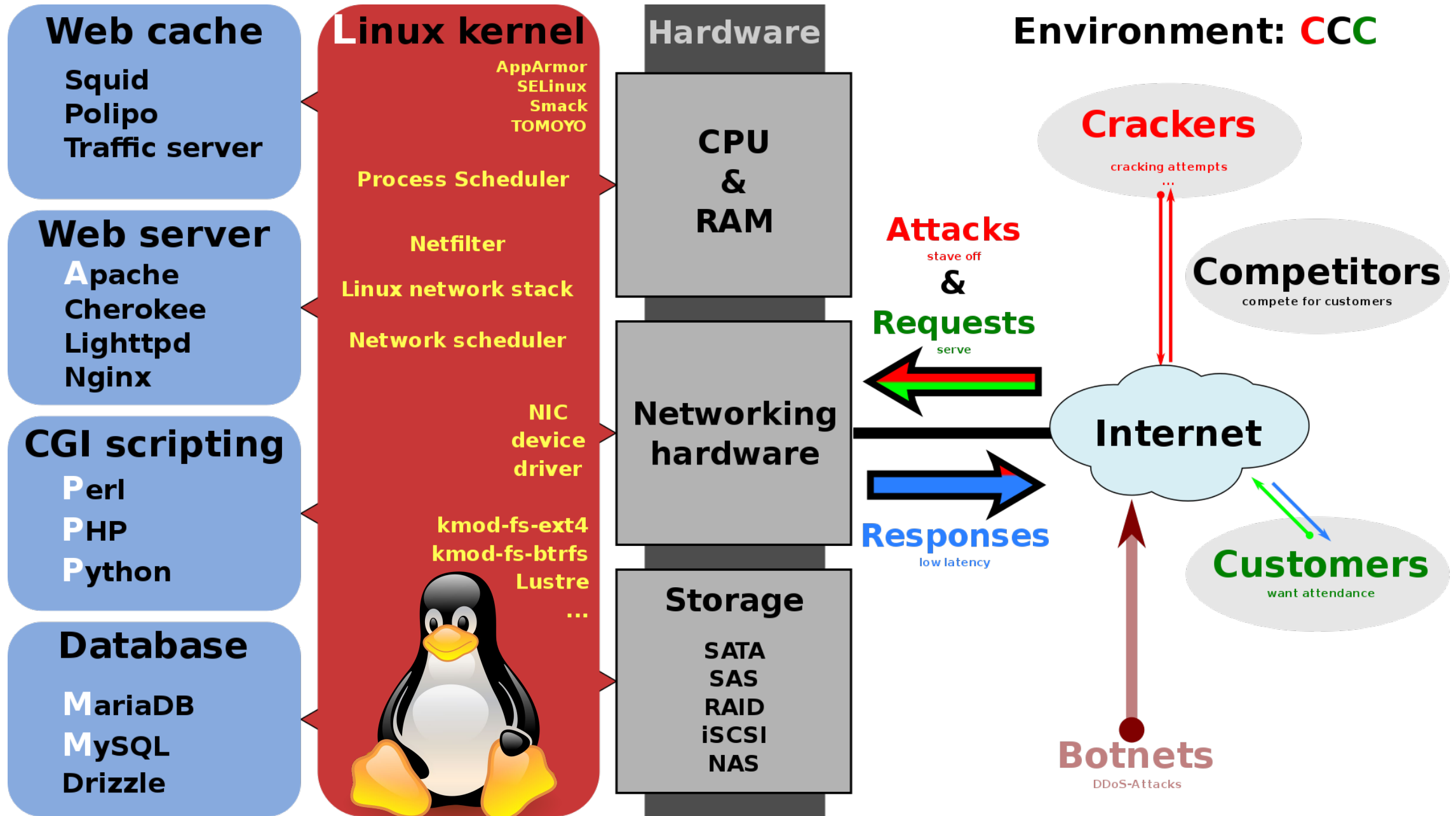
**Linux kernel, device drivers & other modules**  
evdev kms (Kernel Mode Setting) drm (Direct Rendering Manager) ? kdbus ? kmod-fs-ext4 netfilter SELinux TOMOYO Smack AppArmor  
radeon nouveau lima etna\_viv freedreno tegra-re ALSA: emu20k1, ctxfi, hda... kmod-ltq-atm-vr9 ath9k

**libhybris libbionic**

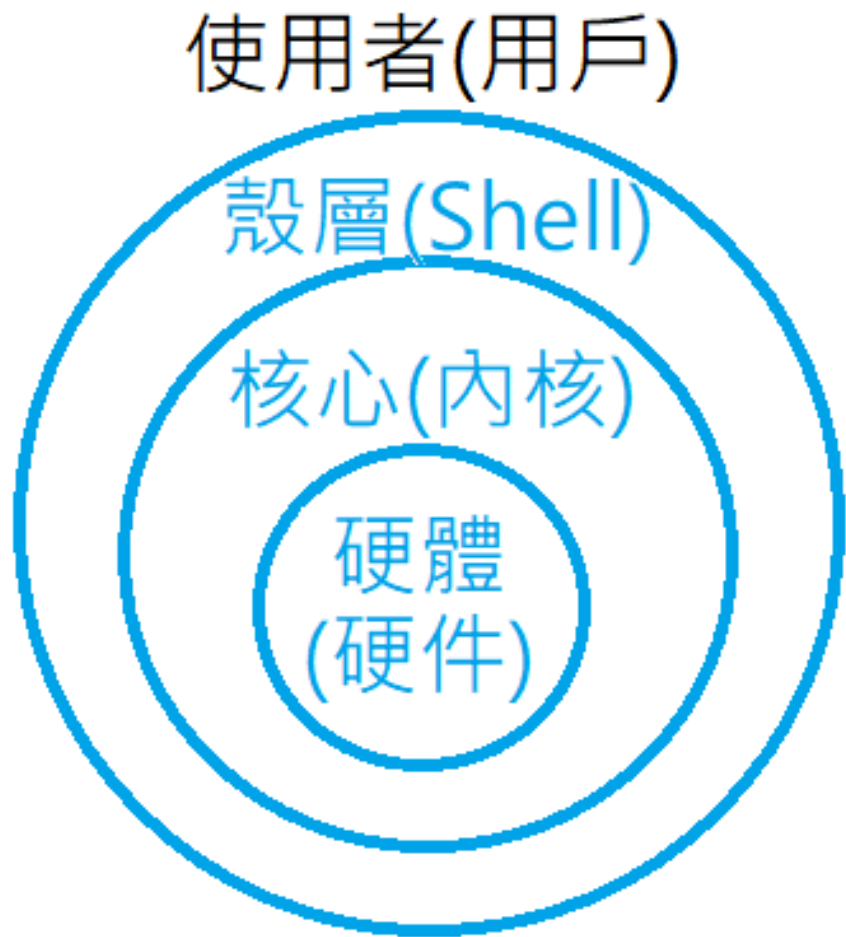
binder ashmem pmem wakelocks logger ...

**Linux kernel (Android-forked)**

Keyboard & Mouse CPU & GPU Hardware UMTS/CDMA/LTE Ethernet  
Touch-Screen cache coherent L2-Caches GPS-receiver 802.11-(abc)  
BrailleDisplay main memory G-sensor Bluetooth







命令	作用	选项
ls	显示文件和目录列表(list)	-a (all) 隐藏文件、特殊目录.和... -l (long) -t (time)
pwd	显示当前工作目录 (print working directory)	
touch 或者 >	创建空文件	
mkdir	创建目录	-p 父目录不存在情况下先生成父目录 (parents)
rm	删除文件 (remove)	-r 同时删除该目录下的所有文件 (recursive) -f 强制删除文件或目录 (force)
cat	显示文本文件内容 (catenate)	cat
ifconfig、 ip adds	查看linux系统的ip地址	



*Package, dependency and environment management for any language—Python, R, Ruby, Lua, Scala, Java, JavaScript, C/C++, Fortran, and more.*



OpenCV的全称是Open Source Computer Vision Library，是一个跨平台的计算机视觉库。OpenCV是由英特尔公司发起并参与开发，以BSD许可证授权发行，可以在商业和研究领域中免费使用。OpenCV可用于开发实时的图像处理、计算机视觉以及模式识别程序。

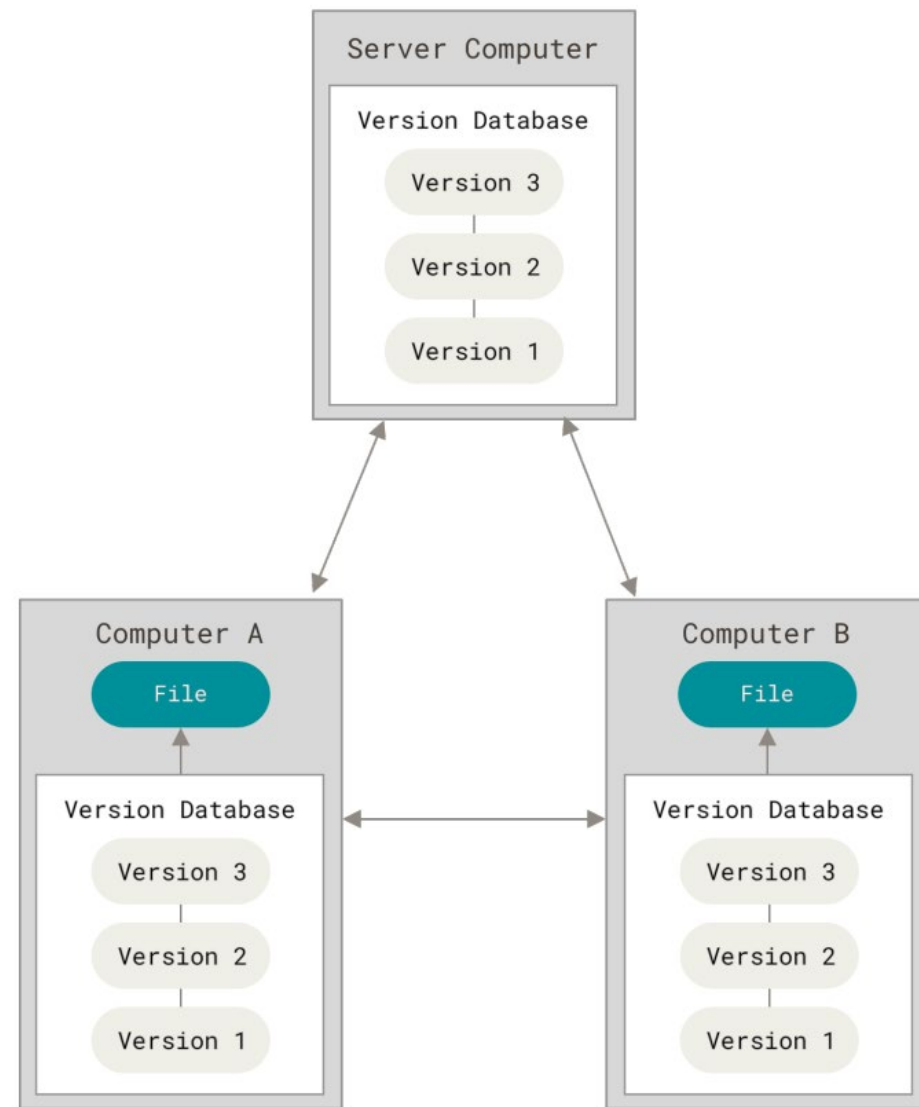
```
pip3 install opencv-contrib-python -i https://pypi.tuna.tsinghua.edu.cn/simple
```

```
import cv2  
print(cv2.__version__)
```

opencv-python: 只包含opencv库的主要模块. 一般不推荐安装。  
opencv-contrib-python: 包含主要模块和contrib模块, 功能基本完整, 推荐安装。



Git is a **free and open source** distributed version control system designed to handle everything from small to very large projects with speed and efficiency.



分布式版本控制系统(Distributed Version Control System)



**git config --global user.name "RiverMountain"**  
**git config --global user.email "wrm244@outlook.com"**

**git clone [<options>] [--] <repo> [<dir>]**

**git init**

**git add**

**git status**

**git commit -m " "**

**git log/reflog**

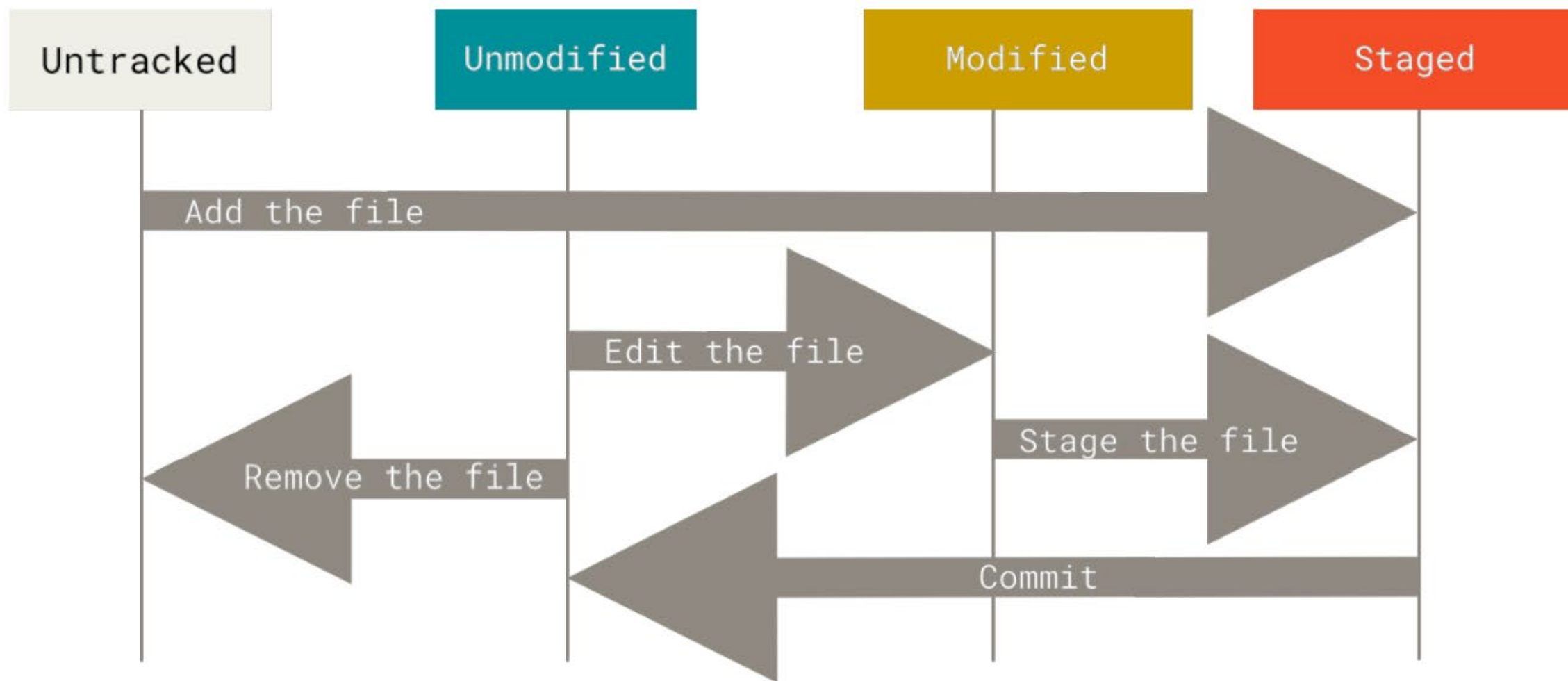
**git rm --cache**

**git reset [--soft | --mixed | --hard] [HEAD]**

**git remote add <name> <url>**

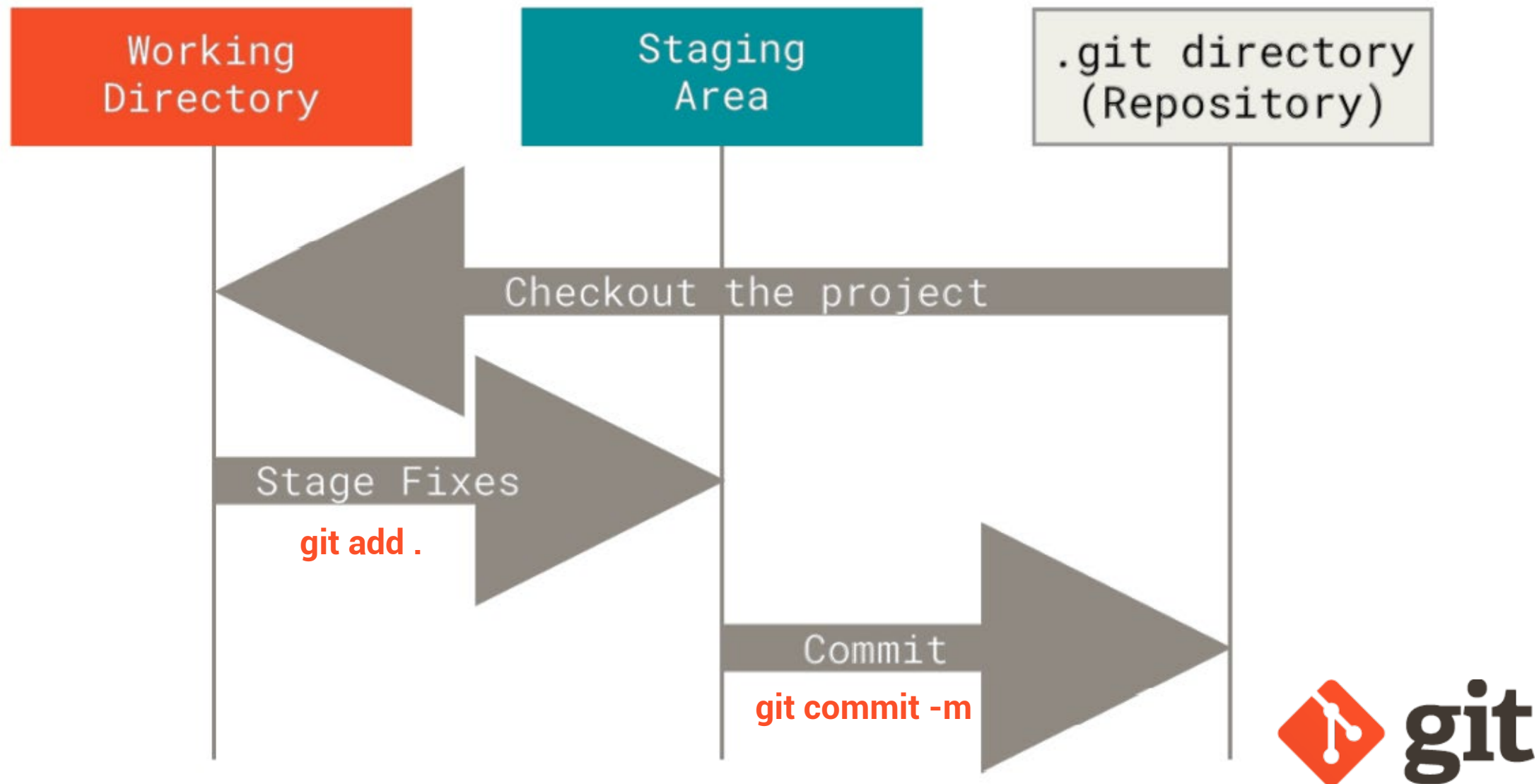
**git push [<options>] [<repository> [<refspec>...]]**



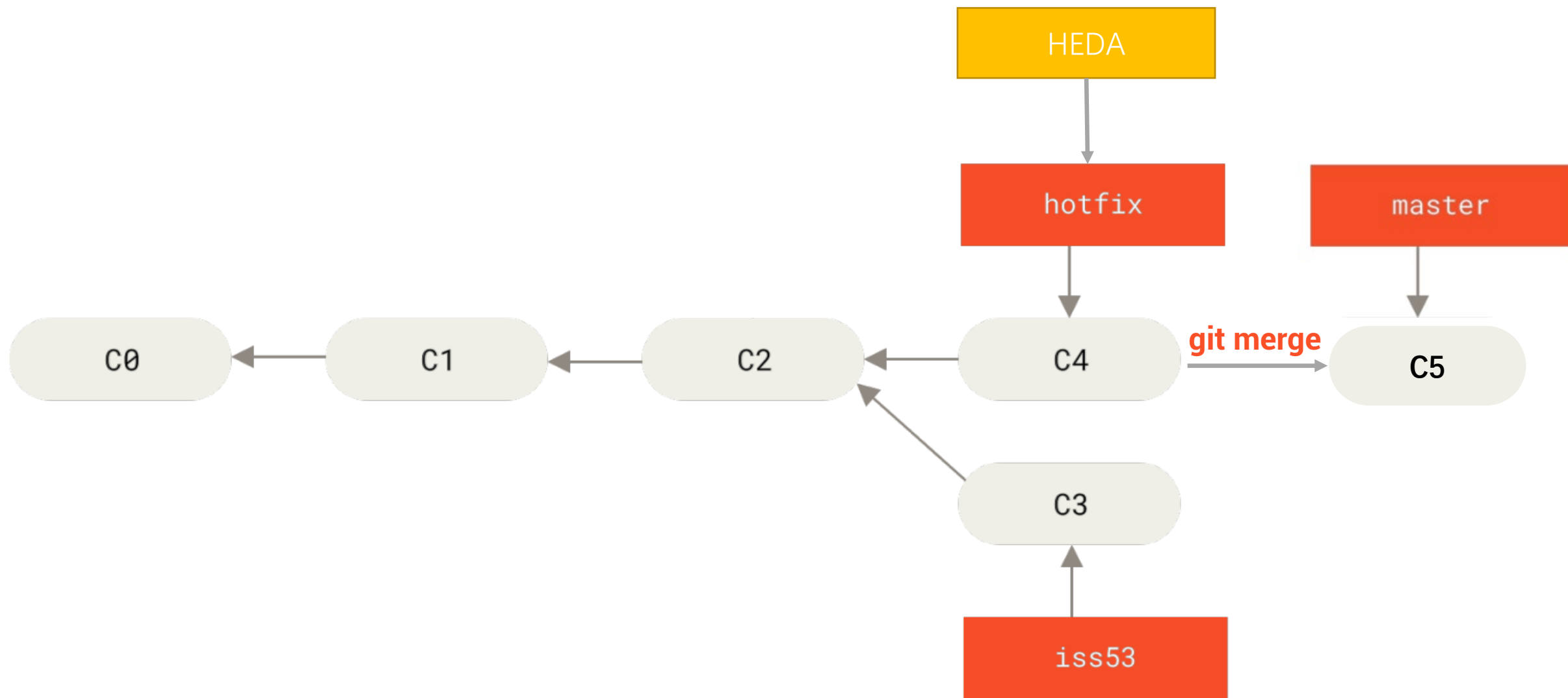


图表 8. 文件的状态变化周期





图表 6. 工作目录、暂存区域以及 Git 仓库。



图表 21. 基于 master 分支的紧急问题分支 hotfix branch



**git config --global user.name "RiverMountain"**  
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**git remote add <name> <url>**

**git push [<options>] [<repository> [<refspec>...]]**



机器人代码: [https://github.com/ist4102/human\\_code.git](https://github.com/ist4102/human_code.git)

# 实验任务

当的队伍在树莓派刷完系统后以 VNC 连接 Raspberry OS 桌面的同时在 Shell 用 Python 打印出 opencv 的版本号及 print 函数打印出一行你的队名截图保存以队名命名附件发送到 wrm244@outlook.com 作为验收任务。

**截止时间：第一批上课：2022年7月3日 21:00**  
**第二批上课：2022年7月5日 21:00**

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