

Orange Pi Zero -- Ubuntu Core 使用文档

UbuntuCore OrangePi-Zero OrangePi商店

本文档介绍在 **Orange Pi Zero** 开发板上使用 **Ubuntu Core** 系统的方法，主要分为以下几部分：

- Ubuntu Core 系统的介绍
- 启动 Ubuntu Core 前的准备工作
- Ubuntu Core 首次启动的配置过程
- Ubuntu Core 系统的使用示例
- Ubuntu Core 系统驱动测试方法
- Orange Pi 商店

1. UbuntuCore 系统的介绍

Ubuntu Core 是基于 Ubuntu 的精简版系统，由 Canonical 在 2016 年发布，除了提供定期的可靠安全更新外，还为智能互联设备带来应用商店服务。Ubuntu Core 在工业网关、家庭网关、无线接入网络、数字标牌、机器人、自动贩卖机、无线通讯基站和无人机等领域得到了广泛应用。Ubuntu Core 完全采用安全、易于更新的开源 Linux 打包格式 Snap 构建。同时，Ubuntu Core 为快速打造物联网设备和嵌入式设备提供了一个安全的支持平台。

Ubuntu Core 的主要特性有：

- 安全性：自动可控更新，及时规避修复高危安全漏洞。
- 可靠性：采用事务性（可回滚）更新机制。
- 便利性：部署软件商店更加容易，可接入海量的应用程序。

2. 准备工作



图 2.1

- 网线、电源、串口线和 SD 卡

目前，Ubuntu Core 在 Orange Pi Zero 开发板上第一次启动时只能通过以太网口来配置系统。

- 下载 Ubuntu Core 镜像的压缩包

下载地址为：<http://www.orangepi.org/downloadresources/>

- 将下载好的镜像烧录到 SD 卡中

- 首先解压镜像

```
1. $ unrar -x OrangePi_zero_UbuntuCore_1604_V0_0_1.rar
```

- 然后将 Ubuntu Core 镜像烧录到 SD 卡中

```
1. $ umount /dev/sdx
2. $ sudo dd bs=4M if=orange-pi-zero.img of=/dev/sdx (sdx 根据实际情况指定)
```

- 最后还需要注册一个 Ubuntu One 的账号

- 注册地址为：<https://login.ubuntu.com/+login>。
- 选择图 2.2 中的 `I am a new Ubuntu One user`，根据提示注册即可。

One account to log in to everything on Ubuntu

Ubuntu One → log in

Please type your email:

Your email address

☐ I am a new Ubuntu One user

☒ I am a returning user and my password is:

Password

Log in

[Forgot your password?](#)

Ubuntu One is the single account you use to log in to all services and sites related to Ubuntu.

If you have an existing Ubuntu Single Sign On account, this is now called your Ubuntu One account. [Read More >](#)

图 2.2

- 注册完账号后需要将系统中(个人电脑)的 `ssh public key` 的内容(在Linux系统中的路径为：`~/.ssh/id_rsa.pub`) 导入到图 2.3 所示的 Ubuntu One 账号的 `SSH Keys` 一栏。

Personal details

Applications

SSH keys

Account activity

SSH keys

☐ orangepi

Type: ssh-rsa

Text: AAAAB3NzaC1yc2EAAAADAQABAAQAC16YfSGo8DwnShhXa...

图 2.3

- 如果系统中没有这些文件可以使用下面的命令生成：

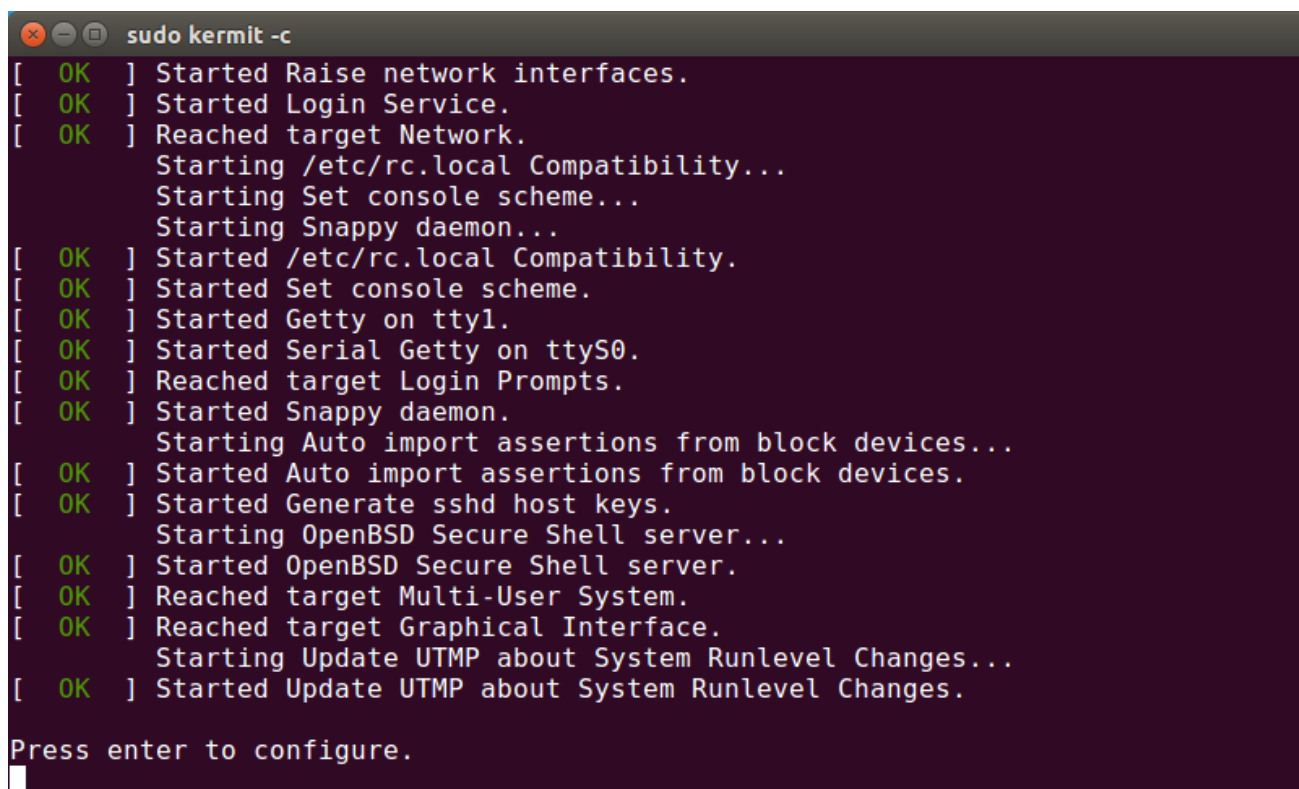
```
1. $ ssh-keygen -t rsa -C "orangepi"
```

- Ubuntu Core 默认没有提供本地的 `console` 登录，只有拥有这些 ssh key 的机器才有权限通过 ssh 远程登录 Ubuntu Core 系统。

3. Ubuntu Core 首次启动的配置过程

做完所有的准备工作后，我们就可以开始启动系统并进行相应的设置。

- 将烧录好镜像的 SD 卡插入 Orange Pi Zero 开发板，插入电源、网线以及连接串口，上电启动 Ubuntu Core，最终串口终端打印的信息会停留在图 3.1 所示的位置。



```
sudo kermi -c
[ OK ] Started Raise network interfaces.
[ OK ] Started Login Service.
[ OK ] Reached target Network.
       Starting /etc/rc.local Compatibility...
       Starting Set console scheme...
       Starting Snappy daemon...
[ OK ] Started /etc/rc.local Compatibility.
[ OK ] Started Set console scheme.
[ OK ] Started Getty on tty1.
[ OK ] Started Serial Getty on ttyS0.
[ OK ] Reached target Login Prompts.
[ OK ] Started Snappy daemon.
       Starting Auto import assertions from block devices...
[ OK ] Started Auto import assertions from block devices.
[ OK ] Started Generate sshd host keys.
       Starting OpenBSD Secure Shell server...
[ OK ] Started OpenBSD Secure Shell server.
[ OK ] Reached target Multi-User System.
[ OK ] Reached target Graphical Interface.
       Starting Update UTMP about System Runlevel Changes...
[ OK ] Started Update UTMP about System Runlevel Changes.

Press enter to configure.
█
```

图 3.1

- 按下 `Enter` 键进入图 3.2 所示的配置界面。

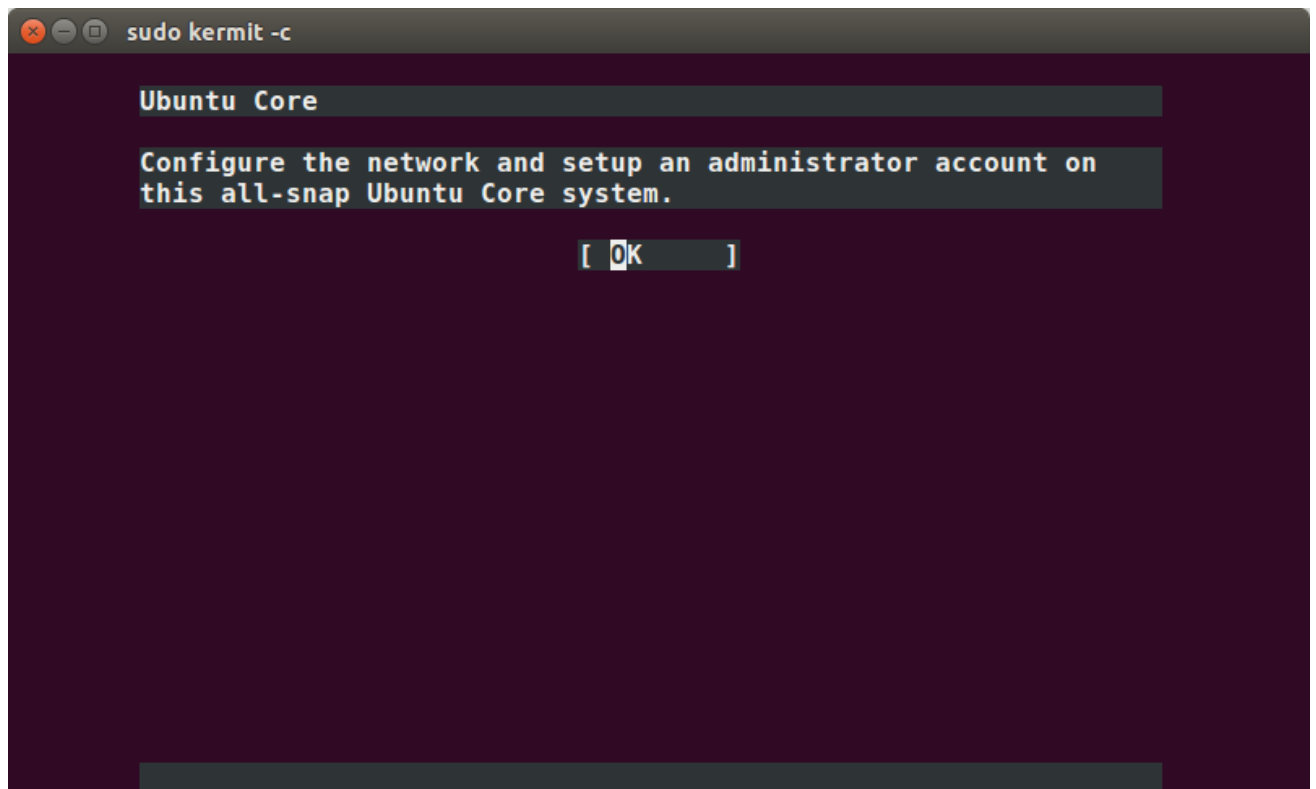


图 3.2

- 继续按下 `Enter` 键进入图 3.3 所示的网络设置界面，网络如果连接正常则会显示分配好的 IP 地址。

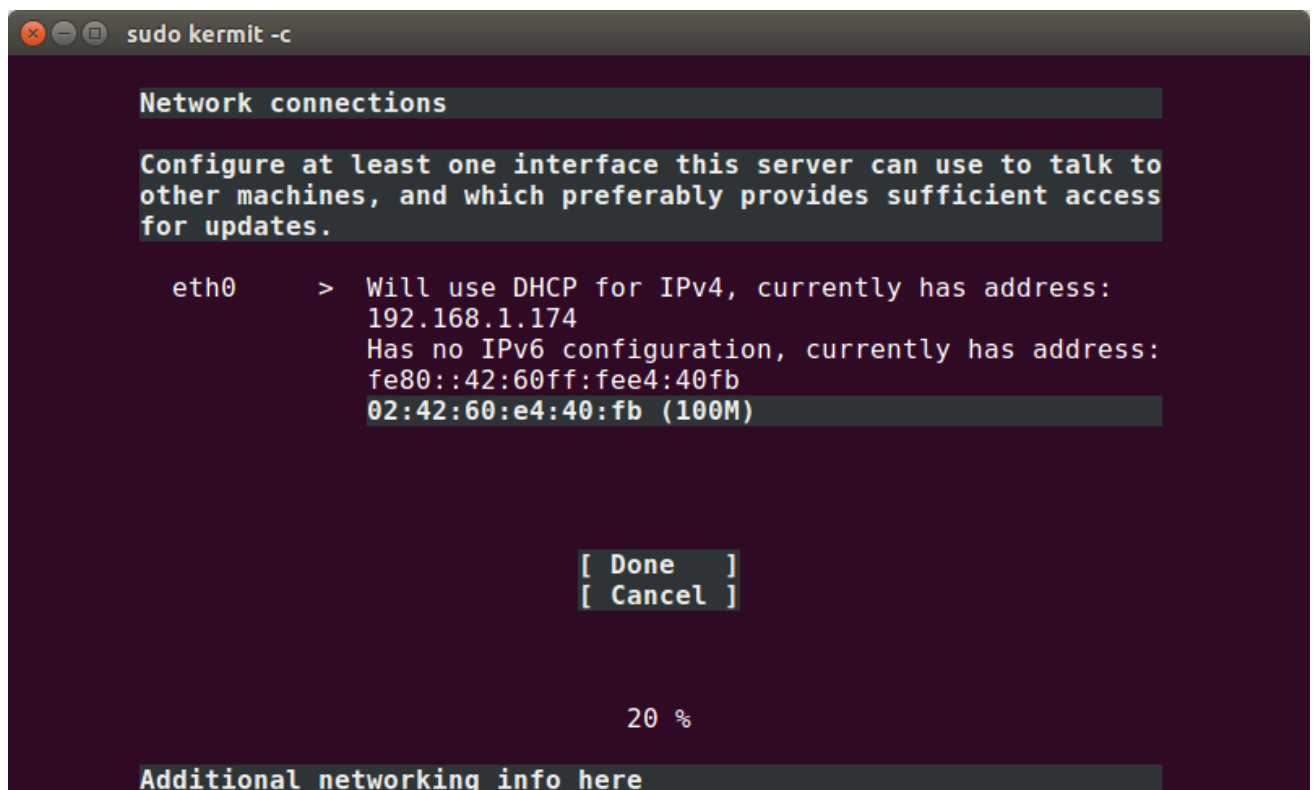


图 3.3

- 使用方向键将光标定位到图 3.3 中的 [Done] 选项，按下 `Enter` 键进入图 3.4 所示的 `Profile Setup` 配置界面。

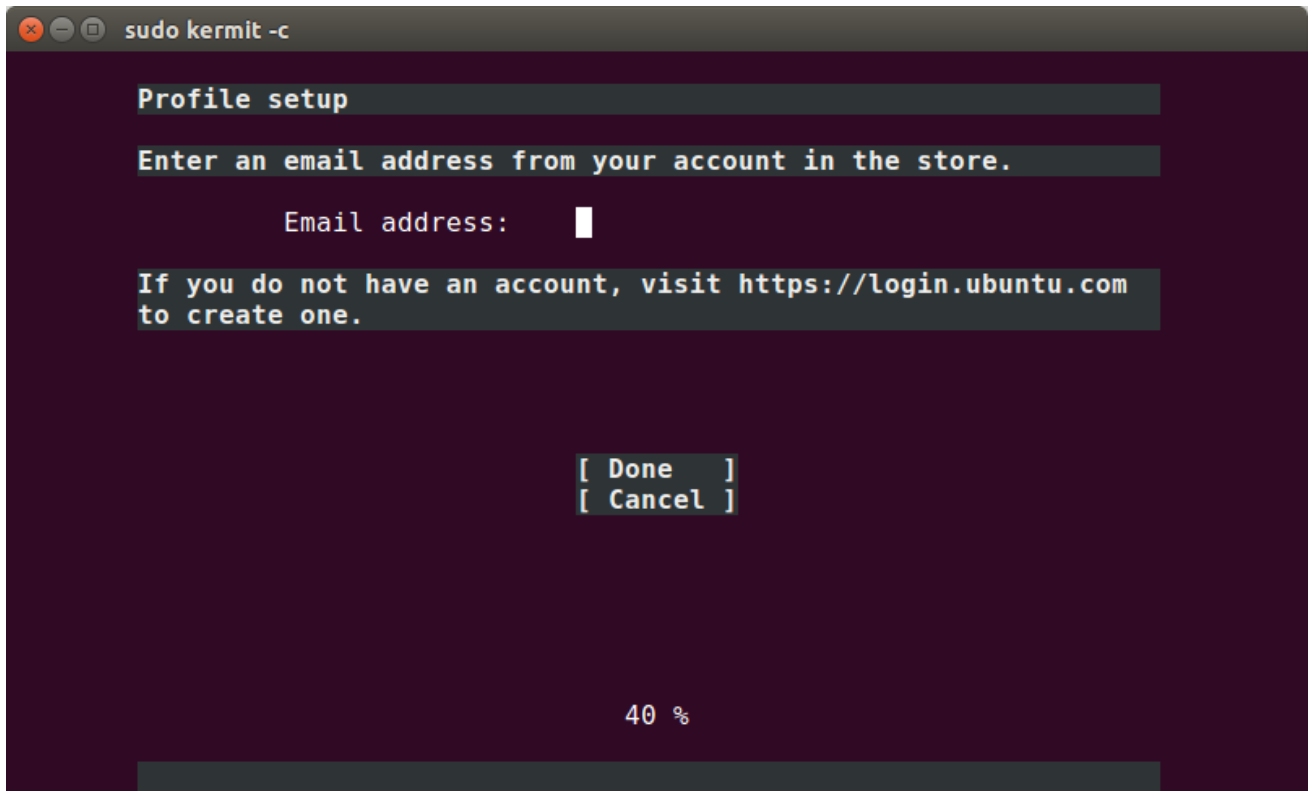
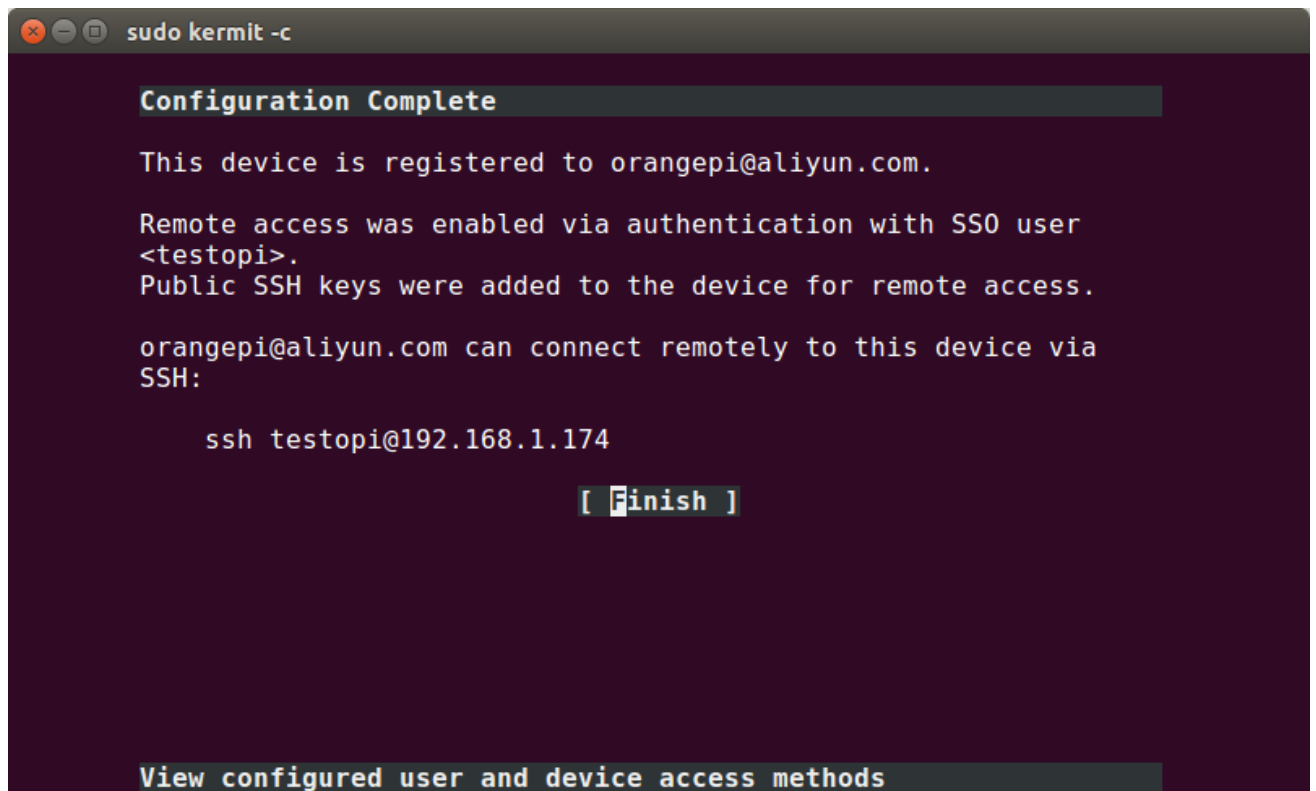


图 3.4

- 输入注册 Ubuntu One 账号时使用的邮箱地址，按下 `Enter` 键系统将会开始设置你的 ssh 登录，成功后会显示图 3.5 所示的界面，接下来就可以通过 ssh 来登陆 UbuntuCore 了。



The image shows a terminal window titled 'sudo kermi -c'. The text inside the terminal is as follows:

```
Configuration Complete

This device is registered to orangepi@aliyun.com.

Remote access was enabled via authentication with SSO user
<testopi>.
Public SSH keys were added to the device for remote access.

orangepi@aliyun.com can connect remotely to this device via
SSH:

ssh testopi@192.168.1.174

[ Finish ]

View configured user and device access methods
```

图 3.5

- 重新打开一个终端，使用图 3.5 中提示的 ssh 命令 `ssh testopi@192.168.1.174` 来登陆系统，成功登录后会显示图 3.6 所示的信息。


```
testopi@localhost: ~  
xunlong@xunlong:/home/xunlong  
$ ssh testopi@192.168.1.174  
The authenticity of host '192.168.1.174 (192.168.1.174)' can't be established.  
ECDSA key fingerprint is 59:1d:b0:1e:b8:46:c0:5e:6b:9a:5a:22:5a:25:3b:ab.  
Are you sure you want to continue connecting (yes/no)? yes  
Warning: Permanently added '192.168.1.174' (ECDSA) to the list of known hosts.  
Welcome to Ubuntu Core 16 (GNU/Linux 4.9-orangepi-zero armv7l)  
  
* Documentation:  https://help.ubuntu.com  
* Management:    https://landscape.canonical.com  
* Support:       https://ubuntu.com/advantage  
  
The programs included with the Ubuntu system are free software;  
the exact distribution terms for each program are described in the  
individual files in /usr/share/doc/*/copyright.  
  
Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by  
applicable law.  
  
Welcome to Snappy Ubuntu Core, a transactionally updated Ubuntu.  
  
* See https://ubuntu.com/snappy  
  
It's a brave new world here in Snappy Ubuntu Core! This machine  
does not use apt-get or deb packages. Please see 'snap --help'  
for app installation and transactional updates.  
testopi@localhost:~$
```

图 3.6

如果提示图 3.7 所示的错误，输入如下的命令删除以前的记录再重新登录即可。

```
1. ssh-keygen -f "/home/xunlong/.ssh/known_hosts" -R 192.168.1.174
```

```
xunlong@xunlong: ~
xunlong@xunlong:/home/xunlong
$ ssh testopi@192.168.1.174
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
@    WARNING: REMOTE HOST IDENTIFICATION HAS CHANGED!    @
@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@@
IT IS POSSIBLE THAT SOMEONE IS DOING SOMETHING NASTY!
Someone could be eavesdropping on you right now (man-in-the-middle attack)!
It is also possible that a host key has just been changed.
The fingerprint for the ECDSA key sent by the remote host is
59:1d:b0:1e:b8:46:c0:5e:6b:9a:5a:22:5a:25:3b:ab.
Please contact your system administrator.
Add correct host key in /home/xunlong/.ssh/known_hosts to get rid of this messag
e.
Offending ECDSA key in /home/xunlong/.ssh/known_hosts:1
  remove with: ssh-keygen -f "/home/xunlong/.ssh/known_hosts" -R 192.168.1.174
ECDSA host key for 192.168.1.174 has changed and you have requested strict check
ing.
Host key verification failed.
xunlong@xunlong:/home/xunlong
$
```

图 3.7

- 配置系统通过 console 登陆

Ubuntu Core 第一次开机的配置界面叫做 `console-conf`，它设置完成之后会退出，让 `getty` 运行起来并提供登录界面。如果不想使用 ssh，可以按照如下的设置通过 `console` 来登录系统。

- 通过 ssh 登录系统后可以通过如下命令设置账号的密码

```
1. $ sudo passwd ${USER}
```

- 然后回到连接串口的终端按一下 `enter` 键就可以让 `console-conf` 退出，并进入图 3.8 所示的 `console` 登录提示符。接下来我们就可以通过输入账号和密码来登录 Ubuntu Core。

```
sudo kermi -c
The host key fingerprints are:
RSA      SHA256:BDTuzoU4JABuKznGvyaftho/bukEngQIrmxK5mIgH8
DSA      SHA256:5M30HpzUWJ2uss4qMwL//f0PXUzJLp0aSxQpg6l8sbY
ECDSA    SHA256:pETlgAGTLsUnvPXJPSH0oG291+RxcdDDwwc89Zkde/o
ED25519  SHA256:TPBSaupQTHYEV3Gj0d7A1teWv4jR6fjeZMKdF0foQMY

To login:
ssh testopi@192.168.1.174

Personalize your account at https://login.ubuntu.com.

Ubuntu Core 16 on 192.168.1.174 (ttyS0)
localhost login: █
```

图 3.8

4. Ubuntu Core 系统使用示例

经过上面的一系列配置，接下来我们可以正式开始使用 Ubuntu Core。

- 安装运行你的第一个 Snaps —— Hello，输入如下的命令即可。

```
1. $ sudo snap install hello
2. $ hello
```

- 有关 Ubuntu Core 系统使用 and 开发可以参考 Ubuntu 官方提供的文档。
 - Snaps 和 snapcraft 文档：<https://snapcraft.io/docs/>
 - Ubuntu Core 文档：<https://docs.ubuntu.com/core/en/>

5. Ubuntu Core 系统驱动测试方法示例

使用 `Snappy wiringop-zero` 测试普通 GPIO 的功能

- 从 **Orange Pi** 商店安装 `wiringop-zero`（暂时还放在 edge 通道）

```
1. $ sudo snap install wiringop-zero --edge
```

- 连接 `wiringOP-zero` 和 `core` 的内存插件

```
1. $ snap connect wiringop-zero:physical-memory-control
   core:physical-memory-control
2. $ snap connect wiringop-zero:physical-memory-observe
   core:physical-memory-observe
```

- 测试普通 GPIO 的功能（和以前的系统没区别）

```
1. $ sudo wiringop-zero.gpio mode 2 out
2. $ sudo wiringop-zero.gpio write 8 0
3. $ sudo wiringop-zero.gpio write 8 1
4. $ sudo wiringop-zero.gpio read 8
```

测试放音和录音的功能

- 安装 alsa-utils

```
1. $ sudo snap install alsa-utils
```

- 相关命令的使用示例

```
1. $ sudo aplay -l
2. $ sudo alsamixer
3. $ sudo aplay test.wav
```

WIFI 和 AV 视频输出

由于相关的驱动暂时还不够完善，所以将这两个功能放在了 **edge** 通道的 `orange-pi-zero-kernel` 中，可以通过如下的方式使用

- 刷新 edge 通道的 `orange-pi-zero-kernel` 后重启系统即可使用 WIFI 和 AV 视频输出

```
1. $ sudo snap refresh orange-pi-zero-kernel --edge
2. $ reboot
```

- 其中 WIFI 的配置如图 5-1 所示，配置的账号和密码都是 `orange-pi`
在 `/etc/netplan/00-snapd-config.yaml` 中加入 WIFI 的配置后重启即可。



Reach millions of devices
with the Ubuntu store.

Add your snap to the Ubuntu store

Get published in minutes ›

Follow our easy step by step guide on getting set up with Ubuntu Core and publishing your first snap for the Ubuntu store.

- 通过右上角 `Account details` 设置 `Developer namespace`、`Country/Region` 等信息

Your account details

Full name

testopi

Your **Ubuntu One** account full name.

Ubuntu One email

orangepi@aliyun.com

Your **Ubuntu One** account primary email.

Snap account-id

T2X1unF5OMnkXsH3KxC6xHFmBjzKwuSo

Your snap account-id, used as a unique reference to this account. It is automatically generated as you interact with the Store and will never change.

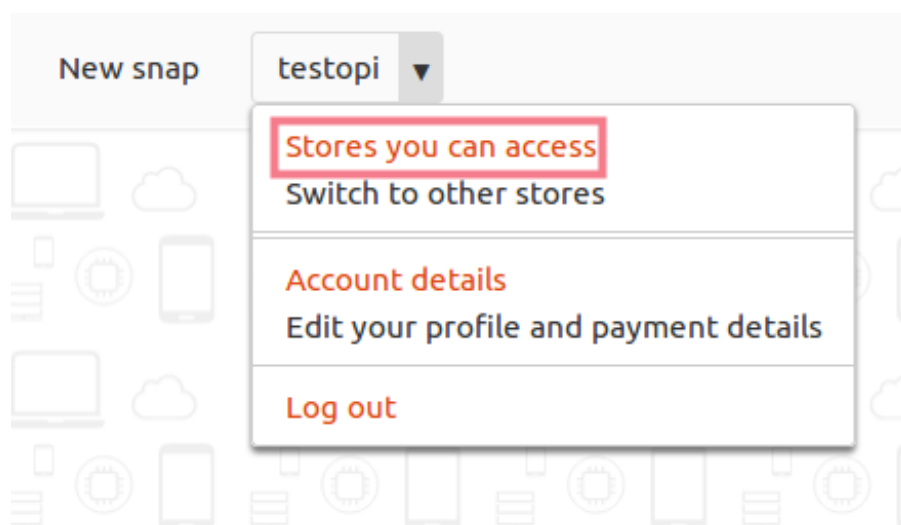
The namespace cannot be removed once set and cannot be changed while you have active packages.

Developer namespace*

testopi

Enter a value consisting of lower-case letters, numbers or hyphens. Hyphens can not occur at the start or end of the chosen value.

- 通过右上角 **Soters you can access** 进入可选商店的列表



Current store **Ubuntu (ubuntu)**

You can switch and upload snaps to these stores:

Public

LimeNET (LimeNET)

LimeSDR (LimeSDR)

Orange Pi (orange-pi)

Ubuntu Demo Store (demo)

You can review snaps in these stores:

No stores in this category.

You can manage and change settings in these stores:

No stores in this category.

- 选择 **Orange Pi** 商店后，左上角会显示 Orange Pi 的名字，这时候通过下图的页面默认会将 Sanps 上传到 Orange Pi 商店

Submit your application to the Orange Pi store

Not the store you want?

Your package*

No file selected, click to select a file.

This should be a snap for Ubuntu Core; upload will begin as soon as a valid file is selected.

Series

☒ 16

License*

The license(s) under which you will release your application. Multiple licenses can be selected to indicate alternative choices.

Support URL*

A URL users can go to for support for this application. Allows http(s); and mailto: schemes.

The form will be enabled for submission once a package has been uploaded.

- 在上传 snap app 之前还需要注册一个 Snaps 的名字，通过左上角的 [New snap](#) 即可进入注册页面。需要注意的是 Snaps 的名字都是**唯一的**。

Register a package name

Before you can add your package to the store, its name must be registered by submitting the form below.

If you have already registered the name of your package, [proceed directly to upload](#).

Snap name*

Enter a value consisting of lower-case letters, numbers or hyphens. Hyphens can not occur at the start or end of the chosen value.

☐

Is this package private?

Package privacy can be changed at any time after the initial upload.

Registrant comment

Enjoy it !