

1. 流程

1. 下载内核和补丁
rt补丁下载
载 <https://www.kernel.org/pub/linux/kernel/projects/rt/>
稳定版补丁下载
https://wiki.linuxfoundation.org/realtime/preempt_rt_versions
内核源码下载
<https://mirrors.edge.kernel.org/pub/linux/kernel/>

Note

对于某些内核版本找不到的场合，寻找相近的内核源码就可以，但是要注意到RT补丁与所下载的内核源码版本号需要严格对应。下载好后，将补丁包与解压后的内核源码文件夹放在同一级目录下。

2. 安装依赖

SHELL

```
sudo apt-get install libncurses5-dev libssl-dev  
build-essential openssl zlibc libelf-dev minizip  
libidn11-dev libidn11 bison flex dwarves  
libncurses-dev zstd -y
```

3. 开始安装
 - a. 解压内核源码
`tar -zxvf linux-xxxxxx.tar.gz`
 - b. 解压补丁
`gunzip patch-xxxx.patch.gz`

- c. 打补丁
cd linux-xxx
patch -p1 < ../patch-xxxx.patch
- d. 安装编译内核需要的模块
sudo apt-get install libncurses-dev
sudo apt-get install libssl-dev
- e. 配置内存
 - i. cp -v /boot/config-\$(uname -r) .config
 - ii. 这一步是根据当前系统内核的配置生成配置文件，我们一路enter即可
make localmodconfig
 - iii. 进入一个图形界面，有一些地方需要进行设置
make menuconfig
 - 1. 将内核设置为全抢占式的
General setup ->Preemption Model->Fully Preemptible Kernel(RT)
 - 2. 关闭内存溢出检测(找不到就忽略此步)
Kernel hacking —> Memory Debugging —> []Check for stack overflows
 - 3. 关闭Optimize very unlikely/likely branches(找不到就忽略此步)
General setup —> Optimize very unlikely/likely branches 子选项Stack Protector buffer overflow detection设置为None，因为编译器不支持更强的堆栈保护
 - 4. Device Drivers ->[] staging drivers(如果默认开启，按N键取消)(可选择跳过)
- f. 修改当前目录下配置文件./config
 - i. CONFIG_MODULE_SIG_KEY="certs/signing_key.pem"
 - ii. CONFIG_SYSTEM_TRUSTED_KEYS=""
 - iii. CONFIG_SYSTEM_BLACKLIST_HASH_LIST=""

iv. (CONFIG_SYSTEM_REVOCATION_KEYS=""

Example

一个ubuntu20.04可用的配置文件
[example](#)

g. 开始编译

i. (sudo make -j核心数

ii. (sudo make modules

iii. (sudo make bzImage

iv. (sudo make modules_install -j核心数

v. (sudo make install

vi. (sudo update-grub

vii. (sudo reboot

h. (在引导界面选择刚搞定的内核即可

2. 可能存在的问题

1. (现象: # BTF: .tmp_vmlinux.btf: pahole (pahole) is not available

2. (解决方法:

https://blog.csdn.net/weixin_38390808/article/details/109747503

3. 参考博客

4. 脚本

```
sudo apt-get install libncurses5-dev libssl-dev  
build-essential openssl zlibc libelf-dev minizip  
libidn11-dev libidn11 bison flex dwarves -y
```

```
wget
```

```
https://cdn.kernel.org/pub/linux/kernel/projects/rt/  
5.15/patch-5.15.49-rt47.patch.gz
```

```
wget
```

```
https://mirrors.edge.kernel.org/pub/linux/kernel/v5.  
x/linux-5.15.49.tar.gz
```

```
tar -zxvf linux-5.15.49.tar.gz  
gunzip patch-5.15.49-rt47.patch.gz
```

```
cd linux-5.15.49
```

```
patch -p1 < ../patch-5.15.49-rt47.patch
```

```
wget .config
```

```
sudo make -j
```

```
sudo make modules
```

```
sudo make bzImage
```

```
sudo make modules_install -j
```

```
sudo make install
```

```
sudo update-grub
```

```
sudo reboot
```

