

OpenSSH Server 开发手册

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| 摘要

- OpenSSH Server在开发中可以被Qt Creator和Eclipse用来进行应用程序上传和远程调试，极大地提高了开发效率。同时它还可以远程复制和删除目标系统上的文件及登陆shell控制台操作目标机器。

Qt Creator远程调试中使用OpenSSH Server

- 在Qt Creator中远程调试中使用OpenSSH Server时，需要配置Buildroot，在Toolchain下，打开Build cross gdb for the host及其下面的Python support。

```
/home/arthur/Projects/buildroot_2024/.config - Buildroot 2024.02 Configuration
→ Toolchain

Toolchain
Arrow keys navigate the menu. <Enter> selects submenus ---> (or empty
submenus ----). Highlighted letters are hotkeys. Pressing <Y> selects a
feature, while <N> excludes a feature. Press <Esc><Esc> to exit, <?> for
Help, </> for Search. Legend: [*] feature is selected [ ] feature is
not selected
↑(-)
[ ] Enable Fortran support
[ ] Enable compiler OpenMP support
[ ] Enable graphite support
*** Host GDB Options ***
[*] Build cross gdb for the host
[ ] TUI support
[*] Python support
[ ] Simulator support
    GDB debugger Version (gdb 13.x) --->
*** Toolchain Generic Options ***
[ ] Copy gconv libraries
() Extra toolchain libraries to be copied to target
() Target Optimizations
↓(+)
```

<Select> <Exit> <Help> <Save> <Load>

| Qt Creator远程调试中使用OpenSSH Server

- 在Target packages → Networking applications 下打开openssh和rsync

The screenshot shows the Buildroot 2024.02 Configuration menu. The path is: /home/arthur/Projects/buildroot_2024/.config - Buildroot 2024.02 Configuration → Target packages → Networking applications. The Networking applications menu is open, showing a list of features. The 'openssh' feature is selected, and its sub-menu is shown, with 'client', 'server', 'key utilities', and 'use sandboxing' all selected. The 'rsync' feature is also selected. The bottom of the menu shows navigation options: <Select>, <Exit>, <Help>, <Save>, and <Load>.

```
/home/arthur/Projects/buildroot_2024/.config - Buildroot 2024.02 Configuration
→ Target packages → Networking applications
Networking applications
Arrow keys navigate the menu. <Enter> selects submenus ---> (or empty
submenus ----). Highlighted letters are hotkeys. Pressing <Y> selects a
feature, while <N> excludes a feature. Press <Esc><Esc> to exit, <?> for
Help, </> for Search. Legend: [*] feature is selected [ ] feature is
↑(-)
[ ] openntpd
[ ] openobex
[ ] openresolv
[*] openssh
[*] client
[*] server
[*] key utilities
[*] use sandboxing
[ ] openswan
[ ] openvpn
[*] rsync
[ ] parprouted
[ ] phidgetwebservice
↓(+)
```

<Select> <Exit> <Help> <Save> <Load>

| 配置OpenSSH Server

- 通过SSH远程登陆目标机器之前，需要事先配置OpenSSH Server。配置文件位于目标文件系统/etc/ssh/sshd_config，其配置如下

OpenSSH Server Configuration (/etc/ssh/sshd_config)	
PermitRootLogin	yes
PermitEmptyPasswords	yes
PasswordAuthentication	yes

上述配置存在“安全”问题，仅适用于在开发中“免密码输入”方便调试。接下来会将上述配置通过Post-Build脚本预先内置到目标根文件系统（rootfs）上，方便首次开机时，默认就能快速连接上目标机器。

Post-Build脚本中预置OpenSSH Server配置文件

- Buildroot通过Post-Build脚本在创建根文件系统（rootfs）之前提供一个机会让用户来修改文件系统内容。

```
/home/arthur/Projects/buildroot_2024/.config - Buildroot 2024.02 Configuration
→ System configuration

System configuration
Arrow keys navigate the menu. <Enter> selects submenus ---> (or empty submenus ----). Highlighted letters are hotkeys. Pressing <Y> selects a feature, while <N> excludes a feature. Press <Esc><Esc> to exit, <?> for Help, </> for Search. Legend: [*] feature is selected [ ] feature is

↑(-)
(/bin:/sbin:/usr/bin:/usr/sbin) Set the system's default PATH
[*] Purge unwanted locales
(C en_US) Locales to keep
() Generate locale data
[ ] Enable Native Language Support (NLS)
[ ] Install timezone info
() Path to the users tables
() Root filesystem overlay directories
() Custom scripts to run before commencing the build
(board/nuvoton/ma35d1/post-build.sh) Custom scripts to run before creat
() Custom scripts to run inside the fakeroot environment
(board/nuvoton/ma35d1/post-image.sh) Custom scripts to run after creati
() Extra arguments passed to custom scripts

<Select> < Exit > < Help > < Save > < Load >
```

| Post-Build脚本中预置OpenSSH Server配置文件

- 在Post-Build脚本中，添加下行

Post-Build Script (board/nuvoton/ma35d1/post-build.sh)

```
if grep -Eq "^BR2_PACKAGE_OPENSSH=y$" ${BR2_CONFIG}; then
    sed -i 's/^#PermitRootLogin.*/PermitRootLogin yes/'      ${TARGET_DIR}/etc/ssh/sshd_config
    sed -i 's/^#PermitEmptyPasswords.*/PermitEmptyPasswords yes/' ${TARGET_DIR}/etc/ssh/sshd_config
    sed -i 's/^#PasswordAuthentication.*/PasswordAuthentication yes/' ${TARGET_DIR}/etc/ssh/sshd_config
fi
```


| 通过SSH公匙验证登陆系统

- 前面提到的是基于用户名和密码的方式登陆认证，这种方式存在“安全”隐患，下面将会介绍基于SSH公匙的登陆验证。
- SSH公匙认证允许多个用户以同一个系统用户名（root）但不使用同一个密码的方式登陆系统。
- 注销某个用户的SSH认证不会影响到其它的SSH用户。
- 允许单个用户登陆进多个账户而不需要管理多个密码。

| 通过SSH公匙验证登陆系统

- 通过SSH公匙登陆操作步骤如下
 1. 在Ubuntu主机（编译机器）上生成RSA密匙
`$ ssh-keygen -t rsa`
 2. 使用SCP复制本地的公匙到远程从机
`$ scp ~/.ssh/id_rsa.pub root@192.168.1.102:`
 3. 登陆远程从机
`$ ssh root@192.168.1.102`
 4. 如果远程从机上不存在~/.ssh/authorized_keys文件，在命令行下创建
`# mkdir -p ~/.ssh`
`# touch ~/.ssh/authorized_keys`
 5. 在远程从机上，将公匙追加到文件~/.ssh/authorized_keys
`# cat ~/id_rsa.pub >> ~/.ssh/authorized_keys`
 6. 执行步骤1到5添加多个SSH公匙

| 通过SSH公匙验证登陆系统

- (接上) 通过SSH公匙登陆操作步骤

7. 在远程从机上，修改OpenSSH Server配置文件/etc/ssh/sshd_config

OpenSSH Server Configuration (/etc/ssh/sshd_config)	
PermitRootLogin	yes
PermitEmptyPasswords	no
PasswordAuthentication	no

8. 在远程从机上，重启OpenSSH Server

/etc/init.d/S50sshd restart

9. 在Ubuntu主机上，再次SSH登陆远程从机

\$ ssh root@192.168.1.102

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谢谢

謝謝

Děkuji

Bedankt

Thank you

Kiitos

Merci

Danke

Grazie

ありがとう

감사합니다

Dziękujemy

Obrigado

Спасибо

Gracias

Teşekkür ederim

Cảm ơn