Linux ?? Chroot

????

- **LXC Debian 12**

??SSH chroot

□□ chroot jail

```
mkdir -p /home/user
```

□□□□ `/dev` □□

```
ls -l /dev/{null,zero,stdin,stdout,stderr,random,tty}
```

□□ LXC□□□□□□ `dev` □□□□□

```
mkdir -p /home/user/dev/

touch /home/user/dev/{null,zero,random,tty}

chmod 666 /home/user/dev/{null,zero,random,tty}
```

□□□□□□□ `mknod`□□□□

```
mkdir -p /home/user/dev/□□
cd /home/user/dev/
mknod -m 666 null c 1 3
mknod -m 666 tty c 5 0
mknod -m 666 zero c 1 5
mknod -m 666 random c 1 8
```

chroot jail □□□□□ root□□

```
chown root:root /home/user
chmod 0755 /home/user
ls -ld /home/user
```

```
root@test:~# chown root:root /home/user
root@test:~# chmod 0755 /home/user
root@test:~# ls -ld /home/user
drwxr-xr-x 3 root root 4096 Oct 11 05:24 /home/user
```

??SSH chroot Shell

□□ `bin` □□□□□□ `/bin/bash` □□□□□□□□□□□□□□□□ `/bin/sh` □□□□□□ `/bin/sh` □□□□ `/etc/passwd` □ **Shell**

```
mkdir -p /home/user/bin
cp -v /bin/bash /home/user/bin/
```

```
root@test:~# mkdir -p /home/user/bin
root@test:~# cp -v /bin/bash /home/user/bin/
'/bin/bash' -> '/home/user/bin/bash'
```

□□ **bash**□□□ `lib` □□□□□□□ `lib` □□□□

```
ldd /bin/bash
mkdir -p /home/user/lib/x86_64-linux-gnu
mkdir -p /home/user/lib64

cp -v /lib/x86_64-linux-gnu/libtinfo.so.6 /home/user/lib/x86_64-linux-gnu/
cp -v /lib/x86_64-linux-gnu/libc.so.6 /home/user/lib/x86_64-linux-gnu/
cp -v /lib64/ld-linux-x86-64.so.2 /home/user/lib64/
```

```
root@test:~# ldd /bin/bash
        linux-vdso.so.1 (0x00007ffd43f4f000)
        libtinfo.so.6 => /lib/x86_64-linux-gnu/libtinfo.so.6 (0x00007fc543171000)
        libc.so.6 => /lib/x86_64-linux-gnu/libc.so.6 (0x00007fc542f90000)
        /lib64/ld-linux-x86-64.so.2 (0x00007fc5432e9000)
```

```
root@test:~# cp -v /lib/x86_64-linux-gnu/libtinfo.so.6 /home/user/lib/x86_64-linux-gnu/
'/lib/x86_64-linux-gnu/libtinfo.so.6' -> '/home/user/lib/x86_64-linux-gnu/libtinfo.so.6'
root@test:~# cp -v /lib/x86_64-linux-gnu/libc.so.6 /home/user/lib/x86_64-linux-gnu/
'/lib/x86_64-linux-gnu/libc.so.6' -> '/home/user/lib/x86_64-linux-gnu/libc.so.6'
root@test:~# cp -v /lib64/ld-linux-x86-64.so.2 /home/user/lib64/
'/lib64/ld-linux-x86-64.so.2' -> '/home/user/lib64/ld-linux-x86-64.so.2'
```

??SSH???

```
useradd user
passwd user
```

□□ `etc` □□□□□□ `/etc/passwd`□`/etc/group`□□□

```
mkdir /home/user/etc
cp -vf /etc/{passwd,group} /home/user/etc/
```

□□□□ **SSH chroot**□□□□ `/etc/passwd`□`/etc/group`□□□□□ `/home/user/etc` □

??SSHD

□□ `/etc/ssh/sshd_config`□□□□□ **ChrootDirectory**□□□ **sftp**□□

```
#Subsystem      sftp    /usr/lib/openssh/sftp-server
Subsystem sftp internal-sftp

Match User user
ChrootDirectory /home/user
```

```
 systemctl restart sshd
```

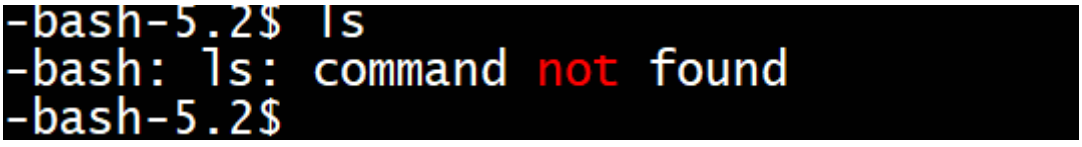
□□□□

```
root@ssh:~# ssh user@192.168.100.1
user@192.168.100.1's password:
-bash-5.2$
```

?? SSH ???????????

```
mkdir -p /home/user/home/user1
chown -R user:user /home/user/home/user1
chmod -R 0700 /home/user/home/user1
```

□□□□□□ **bash**□ **chroot**□□□□□□□□□□□□□□□□□ **bash lib**□□□□□□□□□□□□□ **chroot**□



□□ `/bin/ls`□□□ `ls`□□□ `lib`□□□□□□□ `lib`□□□□

```
root@test:~#  ldd /bin/ls
        linux-vdso.so.1 (0x00007ffd98188000)
        libselinux.so.1 => /lib/x86_64-linux-gnu/libselinux.so.1 (0x00007f41fda83000)
        libc.so.6 => /lib/x86_64-linux-gnu/libc.so.6 (0x00007f41fd8a2000)
        libpcre2-8.so.0 => /lib/x86_64-linux-gnu/libpcre2-8.so.0 (0x00007f41fd808000)
        /lib64/ld-linux-x86-64.so.2 (0x00007f41fdadc000)
root@test:~# cp -v /lib/x86_64-linux-gnu/libselinux.so.1 /home/user/lib/x86_64-linux-gnu/
'/lib/x86_64-linux-gnu/libselinux.so.1' -> '/home/user/lib/x86_64-linux-gnu/libselinux.so.1'
root@test:~# cp -v /lib/x86_64-linux-gnu/libc.so.6 /home/user/lib/x86_64-linux-gnu/
'/lib/x86_64-linux-gnu/libc.so.6' -> '/home/user/lib/x86_64-linux-gnu/libc.so.6'
root@test:~# cp -v /lib/x86_64-linux-gnu/libpcre2-8.so.0 /home/user/lib/x86_64-linux-gnu/
'/lib/x86_64-linux-gnu/libpcre2-8.so.0' -> '/home/user/lib/x86_64-linux-gnu/libpcre2-8.so.0'
root@test:~# cp -v /lib64/ld-linux-x86-64.so.2 /home/user/lib64/
'/lib64/ld-linux-x86-64.so.2' -> '/home/user/lib64/ld-linux-x86-64.so.2'
root@test:~# cp -v /bin/ls /home/user/bin/
'/bin/ls' -> '/home/user/bin/ls'
```

複製後可使用 `ls` 指令，其餘指令依此步驟安裝

```
-bash-5.2$ ls
bin  dev  etc  home  lib  lib64
```

SFTP測試

```
sftp> ls
bin    dev    etc    home   lib    lib64
sftp> cd /home/
sftp> ls
user1
sftp> cd user1/
sftp> ls
sftp> mkdir 123
sftp> ls
123
```

SFTP是基於 **SSH** 的檔案傳輸協定，只要該使用者對檔案有「寫入權限」且對目錄有「寫入 **+** 執行權限」，就可以操作檔案

所以 **Shell**未安裝 **rm,mkdir**等不能使用，但 **sftp**可以

Revision #2
Created 11 October 2025 12:49:24 by Jason
Updated 11 October 2025 15:42:31 by Jason