Restrict SSH User Access to Certain Directory Using Chrooted Jail

In order to lock SSH users in a certain directory, we can use chroot mechanism.

change root (chroot) in Unix-like systems such as Linux, is a means of separating specific user operations from the rest of the Linux system; changes the apparent root directory for the current running user process and its child process with new root directory called a chrooted jail.

In this tutorial, we'll show you how to restrict a SSH user access to a given directory in Linux. Note that we'll run the all the commands as root, use the sudo command if you are logged into server as a normal user.

Step 1: Create SSH Chroot Jail

1. Start by creating the chroot jail using the mkdir command below:

mkdir -p /home/test

2. Next, identify required files, according to the **sshd_config** man page, the ChrootDirectory option specifies the pathname of the directory to chroot to after authentication. The directory must contain the necessary files and directories to support a user's session.

For an interactive session, this requires at least a shell, commonly sh, and basic /dev nodes such as null, zero, stdin, stdout, stderr, and tty devices:

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

<pre>[root@tecmint ~]#</pre>	ls -l /dev/{nu	<pre>ll,zero,stdin,stdout,stderr,random,tty}</pre>
crw-rw-rw- 1 root	root 1, 3 Mar	3 15:51 /dev/null
crw-rw-rw- 1 root	root 1, 8 Mar	3 15:51 /dev/random
lrwxrwxrwx 1 root	root 15 Mar	3 15:50 /dev/stderr -> /proc/self/fd/2
lrwxrwxrwx 1 root	root 15 Mar	3 15:50 /dev/stdin -> /proc/self/fd/0
lrwxrwxrwx 1 root	root 15 Mar	3 15:50 /dev/stdout -> /proc/self/fd/1
crw-rw-rw- 1 root	tty 5,0 Mar	3 15:51 /dev/tty
crw-rw-rw- 1 root	root 1, 5 Mar	3 15:51 /dev/zero
<pre>[root@tecmint ~]#</pre>		

3. Now, create the /dev files as follows using the **mknod command**. In the command below, the -m flag is used to specify the file permissions bits, c means character file and the two numbers are major and minor numbers that the files point to.

```
# mkdir -p /home/test/dev/
# cd /home/test/dev/
# mknod -m 666 null c 1 3
```

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mknod -m 666 tty c 5 0
mknod -m 666 zero c 1 5
mknod -m 666 random c 1 8

[root@tecmint	~]# mkdir -p /home/test/dev/	
[root@tecmint	~]# cd /home/test/dev/	
[root@tecmint	dev]# mknod -m 666 null c 1 3	
[root@tecmint	dev]# mknod -m 666 tty c 5 0	
[root@tecmint	dev]# mknod -m 666 zero c 1 5	
[root@tecmint	dev]# mknod -m 666 random c 1 8	
[root@tecmint	dev]#	
	—	

4. Afterwards, set the appropriate permission on the chroot jail. Note that the chroot jail and its subdirectories and subfiles must be owned by **root** user, and not writable by any normal user or group:

```
# chown root:root /home/test
# chmod 0755 /home/test
# ls -ld /home/test
```

```
[root@tecmint dev]# chown root:root /home/test
[root@tecmint dev]# chmod 0755 /home/test
[root@tecmint dev]# ls -ld /home/test
drwxr-xr-x 3 root root 4096 Mar 3 20:16 /home/test
[root@tecmint dev]#
```

Step 2: Setup Interactive Shell for SSH Chroot Jail

5. First, create the bin directory and then copy the /bin/bash files into the bin directory as follows:

mkdir -p /home/test/bin
cp -v /bin/bash /home/test/bin/

```
[root@tecmint dev]# mkdir -p /home/test/bin
[root@tecmint dev]# cp -v /bin/bash /home/test/bin/
`/bin/bash' -> `/home/test/bin/bash'
[root@tecmint dev]#
```

6. Now, identify bash required shared libs, as below and copy them into the lib directory:

```
# ldd /bin/bash
# mkdir -p /home/test/lib64
```

cp -v /lib64/{libtinfo.so.5,libdl.so.2,libc.so.6,ld-linux-x86-64.so.2}
/home/test/lib64/

[root@tecmint dev]# ldd /bin/bash
linux-vdso.so.1 => (0x00007fff225f5000)
libtinfo.so.5 => /lib64/libtinfo.so.5 (0x00007fb77c5de000)
libdl.so.2 => /lib64/libdl.so.2 (0x00007fb77c3da000)
libc.so.6 => /lib64/libc.so.6 (0x00007fb77c045000)
/lib64/ld-linux-x86-64.so.2 (0x00007fb77c812000)
[root@tecmint dev]# mkdir -p /home/test/lib64
<pre>[root@tecmint dev]# cp -v /lib64/{libtinfo.so.5,libdl.so.2,libc.so.6,ld-linux-x86-64.so.2} /home/test/lib64/</pre>
//lib64/libtinfo.so.5' -> `/home/test/lib64/libtinfo.so.5'
`/lib64/libdl.so.2' -> `/home/test/lib64/libdl.so.2'
`/lib64/libc.so.6' -> `/home/test/lib64/libc.so.6'
<pre>`/lib64/ld-linux-x86-64.so.2' -> `/home/test/lib64/ld-linux-x86-64.so.2'</pre>
[root@tecmint dev]#
[root@tecmint dev]#

Step 3: Create and Configure SSH User

7. Now, create the SSH user with the useradd command and set a secure password for the user:

useradd tuxi
passwd tuxi

8. Create the chroot jail general configurations directory, /home/test/etc and copy the updated account files (/etc/passwd and /etc/group) into this directory as follows:

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



Note: Each time you add more SSH users to the system, you will need to copy the updated account files into the /home/test/etc directory.

