



南昌大学实验报告

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实验类型：☒ 验证 ☐ 综合 ☐ 设计 ☐ 创新 实验日期：__2021.12.1__ 实验成绩：__

一、 实验项目名称

Linux 系统的防火墙管理及网络文件系统的安装与配置

二、 实验目的

1. 了解 Linux 系统的防火墙类型及设计策略。
2. 熟悉 Linux 系统防火墙的管理。
3. 掌握 NFS 的配置与使用。

三、 实验要求

要求使用 Xshell 进行登录，具体操作如下：

1. 查看防火墙服务 firewalld 的状态及所有信息。

The screenshot shows an Xshell terminal window with a CentOS 7 environment. The terminal displays the output of the 'firewall-cmd --state' command, which returns 'running'. Below this, the 'firewall-cmd --help' command is executed, showing various options and their descriptions. The terminal window has a title bar that reads 'centOs7 - root@localhost:~ - Xshell 6'. The terminal output is as follows:

```
icmp-blocks:
rich rules:

[root@localhost ~]# firewall-cmd --state
running
[root@localhost ~]# firewall
firewall-cmd          firewalld          firewall-offline-cmd
[root@localhost ~]# firewall-cmd --help

Usage: firewall-cmd [OPTIONS...]

General Options
  -h, --help          Prints a short help text and exists
  -V, --version        Print the version string of firewalld
  -q, --quiet          Do not print status messages

Status Options
  --state              Return and print firewalld state
  --reload              Reload firewall and keep state information
  --complete-reload    Reload firewall and lose state information
  --runtime-to-permanent Create permanent from runtime configuration
  --check-config        Check permanent configuration for errors

Log Denied Options
```

```
*****@192.168.2.136:22
话, 点击左侧的箭头按钮。
8003119100丁俊

1 centOs7
[root@localhost ~]# firewall -cmd -V
-bash: firewall: 未找到命令
[root@localhost ~]# firewall-cmd -V
0.6.3
[root@localhost ~]#
```

```
[root@localhost ~]# systemctl status firewalld
● firewalld.service - firewalld - dynamic firewall daemon
   Loaded: loaded (/usr/lib/systemd/system/firewalld.service; enabled; vendor preset: enabled)
   Active: active (running) since 2021-12-01 15:05:29 CST; 20min ago
     Docs: man:firewalld(1)
   Main PID: 633 (firewalld)
    CGroup: /system.slice/firewalld.service
            └─633 /usr/bin/python2 -Es /usr/sbin/firewalld --nofork --nopid

12月 01 15:05:28 localhost.localdomain systemd[1]: Starting firewalld - dynamic firewall daemon...
12月 01 15:05:29 localhost.localdomain systemd[1]: Started firewalld - dynamic firewall daemon.
[root@localhost ~]#
```

2. 查询默认使用区域。

```
ssh://root:*****@192.168.2.136:22
会话管理器
所有会话
Allyun
centOs7
HuaWei
Last

--panic-off          Disable panic mode
--query-panic        Query whether panic mode is enabled

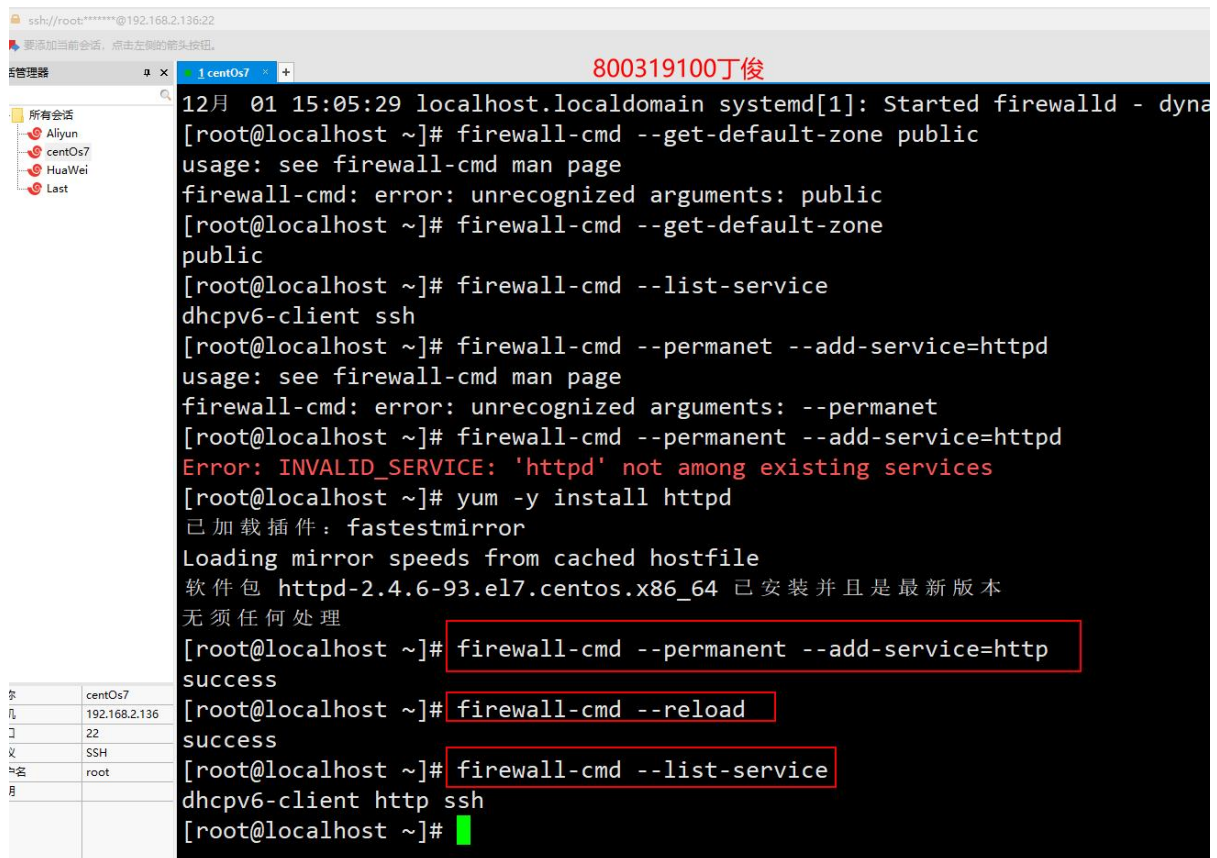
[root@localhost ~]# firewall-cmd --zone
usage: see firewall-cmd man page
firewall-cmd: error: argument --zone: expected one argument
[root@localhost ~]# firewall-cmd --zone=public --list-ports

[root@localhost ~]# systemctl status firewalld
● firewalld.service - firewalld - dynamic firewall daemon
   Loaded: loaded (/usr/lib/systemd/system/firewalld.service; enabled; vendor preset: enabled)
   Active: active (running) since 2021-12-01 15:05:29 CST; 20min ago
     Docs: man:firewalld(1)
   Main PID: 633 (firewalld)
    CGroup: /system.slice/firewalld.service
            └─633 /usr/bin/python2 -Es /usr/sbin/firewalld --nofork --nopid

12月 01 15:05:28 localhost.localdomain systemd[1]: Starting firewalld - dynamic firewall daemon...
12月 01 15:05:29 localhost.localdomain systemd[1]: Started firewalld - dynamic firewall daemon.
[root@localhost ~]# firewall-cmd --get-default-zone public
usage: see firewall-cmd man page
firewall-cmd: error: unrecognized arguments: public
[root@localhost ~]# firewall-cmd --get-default-zone
public
[root@localhost ~]
```

名称	centOs7
主机	192.168.2.136
端口	22
协议	SSH
用户名	root
说明	

3. 任意选择一个服务，并让防火墙服务 firewalld 设置通过，需要验证。



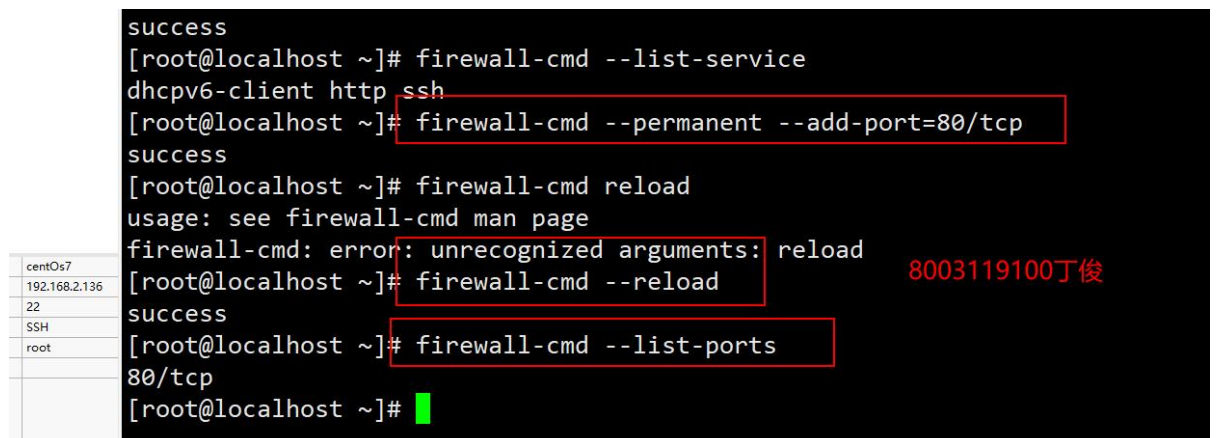
The screenshot shows a terminal window with the following commands and output:

```
12月 01 15:05:29 localhost.localdomain systemd[1]: Started firewalld - dynamic firewall manager
[root@localhost ~]# firewall-cmd --get-default-zone public
usage: see firewall-cmd man page
firewall-cmd: error: unrecognized arguments: public
[root@localhost ~]# firewall-cmd --get-default-zone public
public
[root@localhost ~]# firewall-cmd --list-service
dhcpv6-client ssh
[root@localhost ~]# firewall-cmd --permanet --add-service=httpd
usage: see firewall-cmd man page
firewall-cmd: error: unrecognized arguments: --permanet
[root@localhost ~]# firewall-cmd --permanent --add-service=httpd
Error: INVALID_SERVICE: 'httpd' not among existing services
[root@localhost ~]# yum -y install httpd
已加载插件：fastestmirror
Loading mirror speeds from cached hostfile
软件包 httpd-2.4.6-93.el7.centos.x86_64 已安装并且是最新版本
无须任何处理
[root@localhost ~]# firewall-cmd --permanent --add-service=http
success
[root@localhost ~]# firewall-cmd --reload
success
[root@localhost ~]# firewall-cmd --list-service
dhcpv6-client http ssh
[root@localhost ~]#
```

On the left side of the terminal, there is a sidebar with a list of sessions:

名称	会话
centOs7	192.168.2.136
22	SSH
root	root

4. 任意选择服务端口，并让防火墙服务 firewalld 设置通过，需要验证。



The screenshot shows a terminal window with the following commands and output:

```
success
[root@localhost ~]# firewall-cmd --list-service
dhcpv6-client http ssh
[root@localhost ~]# firewall-cmd --permanent --add-port=80/tcp
success
[root@localhost ~]# firewall-cmd reload
usage: see firewall-cmd man page
firewall-cmd: error: unrecognized arguments: reload
[root@localhost ~]# firewall-cmd --reload
success
[root@localhost ~]# firewall-cmd --list-ports
80/tcp
[root@localhost ~]#
```

On the left side of the terminal, there is a sidebar with a list of sessions:

名称	会话
centOs7	192.168.2.136
22	SSH
root	root

5. 安装 NFS，对共享目录进行权限分配，并对配置文件进行设置。

这里将 192.168.2.136 当作服务器、192.168.2.141 当作客户端。

```
CentOS Linux 7 (Core)
Kernel 3.10.0-1127.el7.x86_64 on an x86_64

localhost login: root
Password:
Last login: Wed Dec 1 14:58:12 from 192.168.2.1
[root@localhost ~]# ifconfig
ens33: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.2.141 netmask 255.255.255.0 broadcast 192.168.2.255
    inet6 fe80::536d:81ec:5803:c4de prefixlen 64 scopeid 0x20<link>
    ether 08:0c:29:fa:0b:74 txqueuelen 1000 (Ethernet)
    RX packets 52 bytes 5569 (5.4 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 50 bytes 5786 (5.6 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
    loop txqueuelen 1000 (Local Loopback)
    RX packets 68 bytes 5912 (5.7 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 68 bytes 5912 (5.7 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

[root@localhost ~]# rpm -qa nfs-utils
nfs-utils-1.3.0-0.66.el7.x86_64
[root@localhost ~]#
```

安装 NFS 服务。

Yum -y install rpcbind nfs-utils

Systemctl start rpcbind

Systemctl start nfs

```
[root@localhost ~]# rpm -q nfs-utils portmap
未安装软件包 nfs-utils
未安装软件包 portmap
[root@localhost ~]# yum -y install nfs-utils
已加载插件：fastestmirror
Determining fastest mirrors
dingjun | 3.6 kB
没有可用软件包 nfs-utils。
错误：无须任何处理
[root@localhost ~]# yum search nfs-utils
已加载插件：fastestmirror
Loading mirror speeds from cached hostfile
警告：没有匹配 nfs-utils 的软件包
No matches found
[root@localhost ~]# yum -y install nfs-utils
已加载插件：fastestmirror
Loading mirror speeds from cached hostfile
正在解决依赖关系
--> 正在检查事务
--> 软件包 nfs-utils.x86_64.1.1.3.0-0.66.el7 将被 安装
--> 正在处理依赖关系 libtirpc >= 0.2.4-0.7, 它被软件包 1:nfs-utils-1.3.0-0.66.el7.x86_64 需要
```


创建共享目录，修改权限。

```
ssh://root*****@192.168.2.136:22
要添加当前会话，点击左侧的箭头按钮。
管理器
所有会话
Aliyun
centOs7
HuaWei
Last

[root@localhost home]# mkdir /home/share
mkdir: 无法创建目录"/home/share": 文件已存在
[root@localhost home]# ls
abc.txt  lamp  lamp1  share
[root@localhost home]# rm -rf share
[root@localhost home]# ls
abc.txt  lamp  lamp1
[root@localhost home]# mkdir -p /home/share
[root@localhost home]# chmod -R 777 /home/share
[root@localhost home]# vi /etc/exports
[root@localhost home]#
```

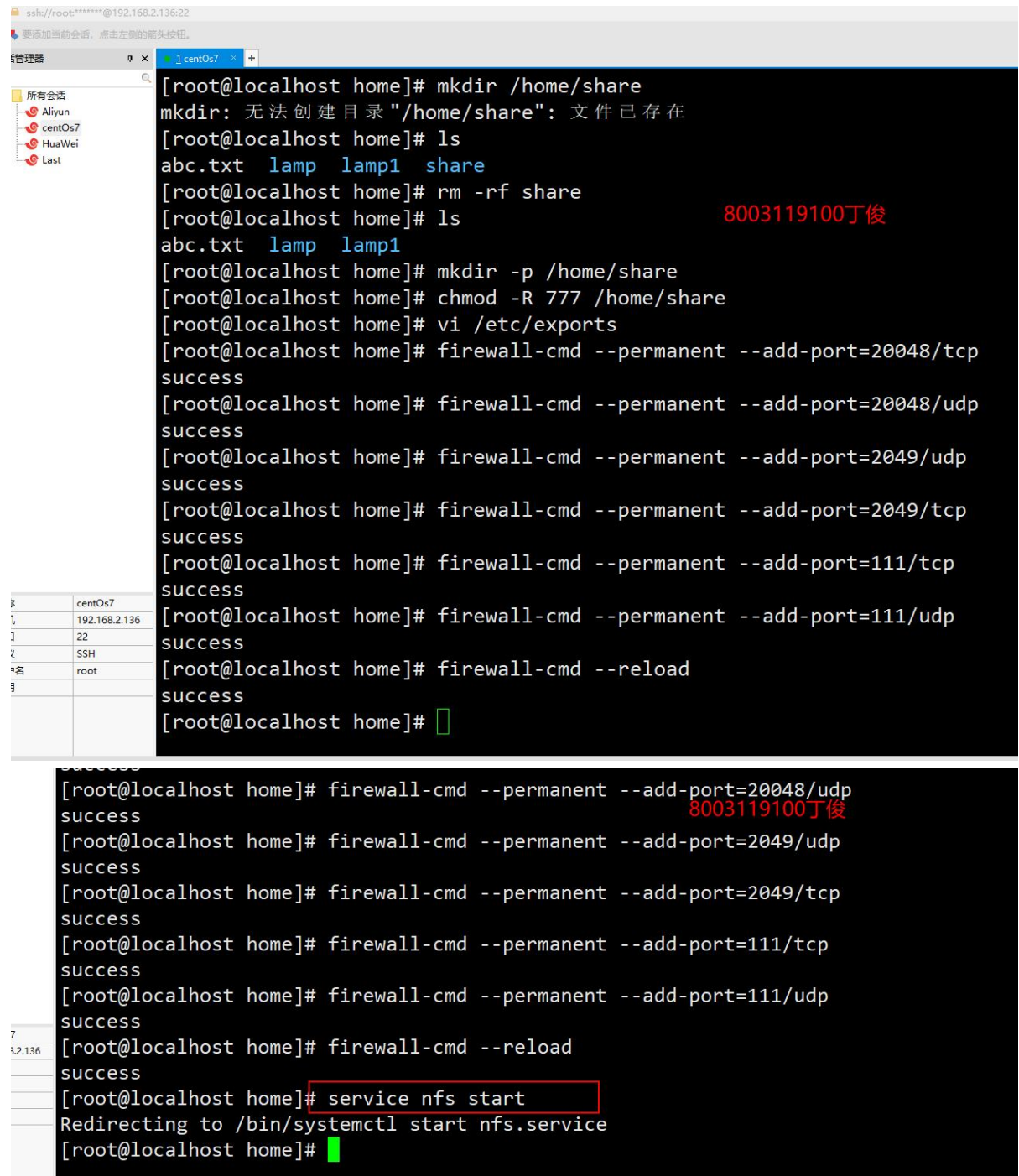
后面不能有空格，连在一起

```
/home/share 192.168.2.141(sync,rw)
/home/public *(sync,ro)
~
~
```

自动挂载/etc/fstab 文件 rw,soft,intr

```
##
## /etc/fstab
## Created by anaconda on Mon Dec 28 03:39:52 2020
##
## Accessible filesystems, by reference, are maintained under '/dev/disk'
## See man pages fstab(5), findfs(8), mount(8) and/or blkid(8) for more info
##
/dev/mapper/centos-root / xfs defaults 0 0
UUID=6c7f0be2-f32c-47e8-9547-403d40a198d5 /boot xfs defaults 0 0
/dev/mapper/centos-swap swap swap defaults 0 0
192.168.146.163:/share/global /share/test1 nfs rw,soft,intr 0 0
```

6. 开启服务，开放服务端口，显示共享目录状态。



```
[root@localhost home]# mkdir /home/share
mkdir: 无法创建目录 "/home/share": 文件已存在
[root@localhost home]# ls
abc.txt  lamp  lamp1  share
[root@localhost home]# rm -rf share
[root@localhost home]# ls
abc.txt  lamp  lamp1
[root@localhost home]# mkdir -p /home/share
[root@localhost home]# chmod -R 777 /home/share
[root@localhost home]# vi /etc/exports
[root@localhost home]# firewall-cmd --permanent --add-port=20048/tcp
success
[root@localhost home]# firewall-cmd --permanent --add-port=20048/udp
success
[root@localhost home]# firewall-cmd --permanent --add-port=2049/udp
success
[root@localhost home]# firewall-cmd --permanent --add-port=2049/tcp
success
[root@localhost home]# firewall-cmd --permanent --add-port=111/tcp
success
[root@localhost home]# firewall-cmd --permanent --add-port=111/udp
success
[root@localhost home]# firewall-cmd --reload
success
[root@localhost home]#
```

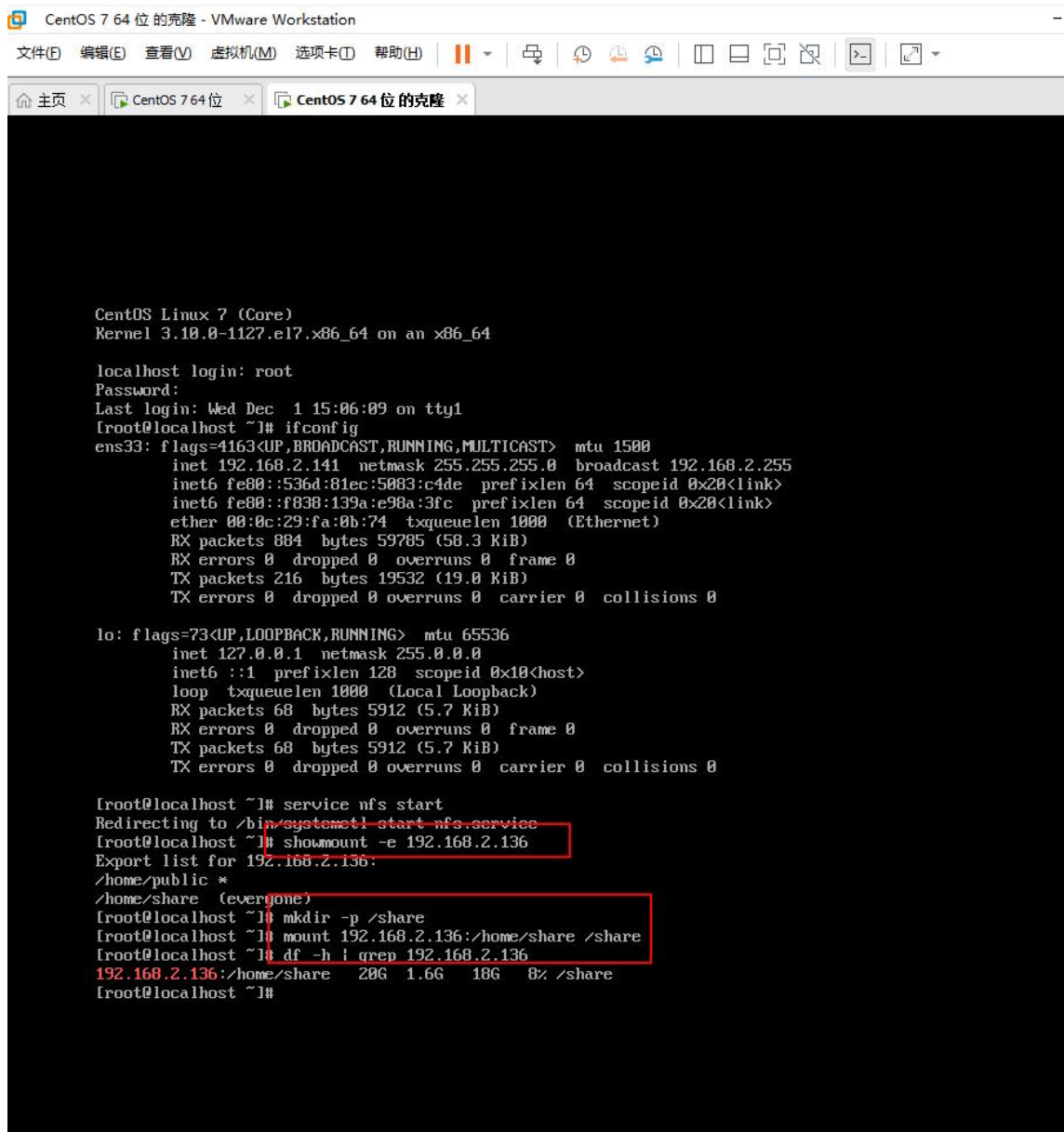
```
[root@localhost home]# firewall-cmd --permanent --add-port=20048/udp
success
[root@localhost home]# firewall-cmd --permanent --add-port=2049/udp
success
[root@localhost home]# firewall-cmd --permanent --add-port=2049/tcp
success
[root@localhost home]# firewall-cmd --permanent --add-port=111/tcp
success
[root@localhost home]# firewall-cmd --permanent --add-port=111/udp
success
[root@localhost home]# firewall-cmd --reload
success
[root@localhost home]# service nfs start
Redirecting to /bin/systemctl start nfs.service
[root@localhost home]#
```

```
****@192.168.2.136:22
话, 点击左侧的箭头按钮。
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1 centOs7
[root@localhost home]# ls -l share
总用量 0
[root@localhost home]# ls -ld share
drwxrwxrwx. 2 root root 6 12月  1 15:37 share
[root@localhost home]#
```

```
***@192.168.2.136:22
, 点击左侧的箭头按钮。
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1 centOs7
[root@localhost home]# ls -l share
总用量 0
[root@localhost home]# ls -ld share
drwxrwxrwx. 2 root root 6 12月  1 15:37 share
[root@localhost home]# cd share
[root@localhost share]# mkdir dingjun
[root@localhost share]# cd ../
[root@localhost home]# df -h share
文件系统          容量  已用  可用  已用% 挂载点
/dev/sda3          20G  1.6G   18G    8% /
```

7. 客户端挂载 NFS 服务器，并测试。

将 NFS 服务器（192.168.2.136）上的 /home/share 目录挂载到本地机 192.168.2.141 的 /share 目录下。



```
CentOS Linux 7 (Core)
Kernel 3.10.0-1127.el7.x86_64 on an x86_64

localhost login: root
Password:
Last login: Wed Dec 1 15:06:09 on tty1
root@localhost ~]# ifconfig
ens33: flags=4163<UP,BROADCAST,RUNNING,MULTICAST> mtu 1500
    inet 192.168.2.141 netmask 255.255.255.0 broadcast 192.168.2.255
    inet6 fe80::536d:81ec:5083:c4de prefixlen 64 scopeid 0x20<link>
    inet6 fe80::f838:139a:e98a:3fc prefixlen 64 scopeid 0x20<link>
    ether 00:0c:29:fa:0b:74 txqueuelen 1000 (Ethernet)
    RX packets 884 bytes 59785 (58.3 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 216 bytes 19532 (19.0 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING> mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
    loop txqueuelen 1000 (Local Loopback)
    RX packets 68 bytes 5912 (5.7 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 68 bytes 5912 (5.7 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

root@localhost ~]# service nfs start
Redirecting to /bin/systemctl start nfs.service
root@localhost ~]# showmount -e 192.168.2.136
Export list for 192.168.2.136:
/home/public *
/home/share (everyone)
root@localhost ~]# mkdir -p /share
root@localhost ~]# mount 192.168.2.136:/home/share /share
root@localhost ~]# df -h | grep 192.168.2.136
192.168.2.136:/home/share 20G 1.6G 18G 8% /share
root@localhost ~]#
```


服务端新建文件，看客户端是否可以同步文件。

```
[root@localhost home]# ls -l share
总用量 0
[root@localhost home]# ls -ld share
drwxrwxrwx. 2 root root 6 12月  1 15:37 share
[root@localhost home]# cd share
[root@localhost share]# mkdir dingjun
[root@localhost share]#
```

新建文件

```
Last login: Wed Dec  1 15:06:09 on tty1
[root@localhost ~]# ifconfig
ens33: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
    inet 192.168.2.141 netmask 255.255.255.0 broadcast 192.168.2.255
    inet6 fe80::5364:81ec:5983:c4de prefixlen 64 scopeid 0x20<link>
    inet6 fe80::f830:139a:e904:3fc prefixlen 64 scopeid 0x20<link>
    ether 08:0e:2d:fa:0b:74 txqueuelen 1000 (Ethernet)
    RX packets 894 bytes 59765 (58.3 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 216 bytes 19532 (19.0 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

lo: flags=73<UP,LOOPBACK,RUNNING>  mtu 65536
    inet 127.0.0.1 netmask 255.0.0.0
    inet6 ::1 prefixlen 128 scopeid 0x10<host>
    loop txqueuelen 1000 (Local Loopback)
    RX packets 60 bytes 5912 (5.7 KiB)
    RX errors 0 dropped 0 overruns 0 frame 0
    TX packets 60 bytes 5912 (5.7 KiB)
    TX errors 0 dropped 0 overruns 0 carrier 0 collisions 0

[root@localhost ~]# service nfs start
Redirecting to /bin/systemctl start nfs.service
[root@localhost ~]# showmount -e 192.168.2.136
Export list for 192.168.2.136:
/home/public *
/home/share (everyone)
[root@localhost ~]# mkdir -p /share
[root@localhost ~]# mount 192.168.2.136:/home/share /share
[root@localhost ~]# df -h | grep 192.168.2.136
192.168.2.136:/home/share 20G 1.6G 18G 8% /share
[root@localhost ~]# cd /home/share
-bash: cd: /home/share: No such file or directory
[root@localhost ~]# cd /share
[root@localhost share]# ls
dingjun
[root@localhost share]#
```

同步文件

```
/home/share (everyone)
[root@localhost ~]# mkdir -p /share
[root@localhost ~]# mount 192.168.2.136:/home/share /share
[root@localhost ~]# df -h | grep 192.168.2.136
192.168.2.136:/home/share 20G 1.6G 18G 8% /share
[root@localhost ~]# cd /home/share
-bash: cd: /home/share: No such file or directory
[root@localhost ~]# cd /share
[root@localhost share]# ls
dingjun
[root@localhost share]#
```

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四、主要仪器设备及耗材

计算机、VMware、CentOS 7、word

五、实验步骤

六、实验数据及处理结果

七、思考讨论题或体会或对改进实验的建议

八、参考资料

[1] 文东戈,赵艳芹.Linux 操作系统实用教程（第2版）[M].北京：清华大学出版社.2019,9.