

Linux NFS、Samba 网络服务实验

实验报告

一、实验目的

熟练掌握 Linux 操作系统的使用,掌握 Linux 系统的 NFS 和 Samba 服务的配置和管理。

二、实验内容

1. 查看系统的网络情况,确保能够在本地网络中联网通信(给出网络接口配置文件和测试结果),获知主机的 IP 地址和主机所在的子网信息。
2. 在本机提供 NFS 服务,请将本地的/home/设为共享目录供指定客户机使用,客户机具有读写权限。给出访问结果。
3. 假设本地网络中大部分客户端是 windows 系统,请建立 Samba 服务器使得客户端能够共享 Linux 服务器的资源,具体要求如下:
 - 1) 创建一个共享文件夹/home/public,使得所有用户都可以匿名访问(可读写)。
 - 2) 每个用户可以访问自己的主目录,且具有完全权限,采用用户验证的方式进行配置;
 - 3) 为用户 tux 和 tom 创建一个共享目录/home/share,可供这两个用户进行文件的共享(可读写);
 - 4) 测试:使用 smbclient 客户端程序和 windows 客户端分别登录 Samba 服务器,访问服务器中的共享资源。

注：以上所需用户组和用户以及文件夹需要自己创建，并具有适当的权限。实验报告中需要给出配置文件及相关的运行结果。

4. 根据以下要求配置 Apache 服务器：

- 1) 设置 Web 页面的主目录为 `/var/www/web`;
- 2) 设置 Apache 监听的端口号为 8080;
- 3) 建立一个名为 `temp` 的虚拟目录，其对应的物理路径是 `/var/www/temp`，并对该虚拟目录启用用户认证，只允许用户 `tux` 和 `lily` 访问。
- 4) 允许每个用户拥有自己的个人主页。制作你的个人主页，并给出你的个人主页显示结果。

三、题目分析及基本设计过程分析

1. 使用 `ifconfig` 命令查询主机所在子网的相关信息。网络接口的配置文件位于 `/etc/sysconfig/network` 以及 `/etc/sysconfig/network-scripts/ifcfg-xxx`。利用 `ping` 命令检测系统的网络通信状态。
2. 执行以下命令来查看是否已安装 NFS: `rpm -qa|grep nfs` 和 `rpm -qa|grep portmap`。编辑配置文件 `/etc/exports` 以启用 NFS 服务，使用 `rw/ro` 来管理读写权限，添加一行 `/home*(rw)`，然后重启服务。运行 `showmount -e` 来查看共享目录，使用 `mount` 命令将 NFS 服务器导出的目录挂载到本地，以验证 NFS 服务是否设置成功。

3. 使用 `rpm -qa|grep samba` 来检验是否安装 samba。安装后，创建题目要求的用户和目录，并修改 samba 的配置文件 `/etc/samba/smb.conf`。配置文件应添加如下内容：

```
[public]
path = /home/public
writable = yes
read only = no
guest ok = yes
create mode = 0777

[homes]
browseable = no
writable = yes
read only = no
create mode = 0700

[share]
path = /home/share
writable = yes
valid users = tux,tom
read only = no
create mode = 0700
```

这段配置实现了三个共享，分别是 public（访客可访问）、homes（用户访问自己的主目录）、share（tux 和 tom 的共享文件夹）。配置结束后利用 `smbclient` 查看共享情况，也可以通过 windows 访问。

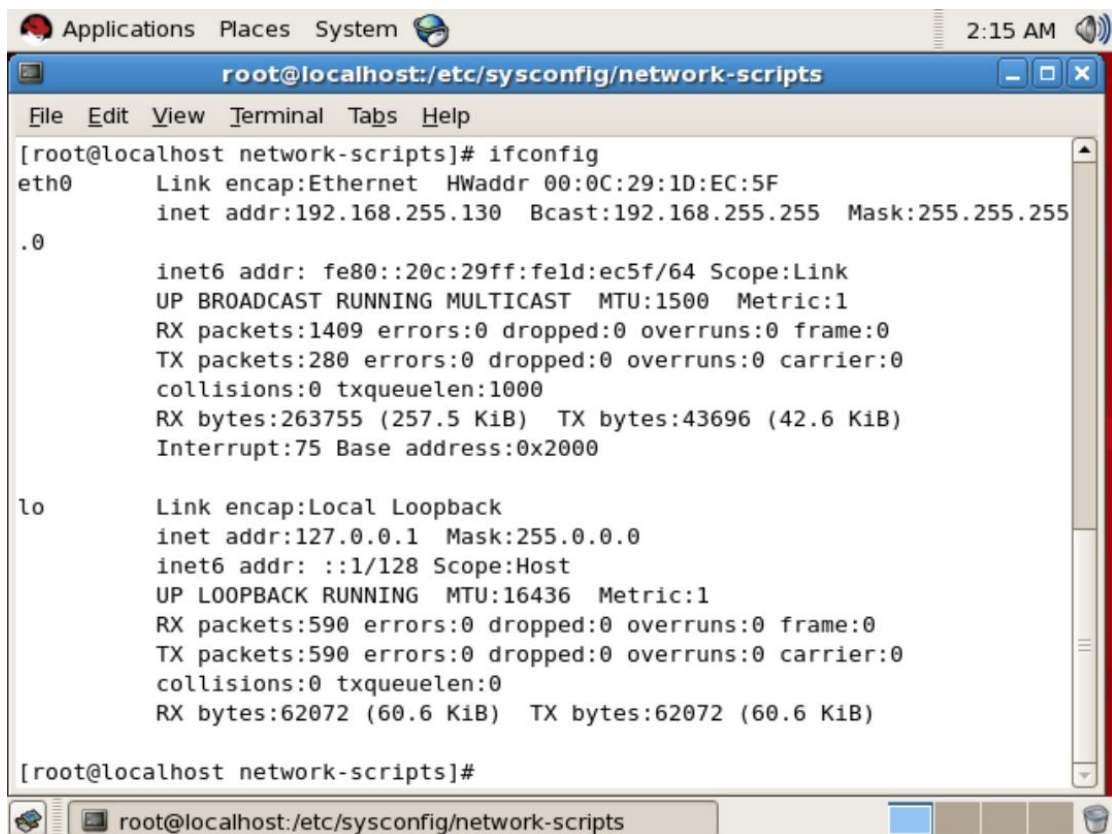
安装 apache 服务后，修改 `/etc/httpd/conf/httpd.conf` 以配置 Web 页面的主目录，虚拟目录 temp 和 apache 监听的端口号，并创建相关文件夹和 html 网页，使用 `htpasswd` 配置登录用户 tux。

四、运行截图和相关说明

1. 查看系统的网络接口配置文件：

```
root@localhost:/etc/sysconfig/network-scripts
File Edit View Terminal Tabs Help
[root@localhost sysconfig]# cat network
NETWORKING=yes
NETWORKING_IPV6=no
HOSTNAME=localhost.localdomain
[root@localhost sysconfig]# cd network-scripts/
[root@localhost network-scripts]# ls
ifcfg-eth0    ifdown-ppp    ifup-ipsec    ifup-sl
ifcfg-lo      ifdown-routes ifup-ipv6     ifup-tunnel
ifdown        ifdown-sit    ifup-ipv6     ifup-wireless
ifdown-bnep   ifdown-sl     ifup-isdn     init.ipv6-global
ifdown-eth    ifdown-tunnel ifup-plip     net.hotplug
ifdown-ipppp  ifup          ifup-plusb    network-functions
ifdown-ipsec  ifup-aliases ifup-post     network-functions-ipv6
ifdown-ipv6   ifup-bnep     ifup-ppp
ifdown-isdn   ifup-eth      ifup-routes
ifdown-post   ifup-ipppp    ifup-sit
[root@localhost network-scripts]# caat ifcfg-eth0
-bash: caat: command not found
[root@localhost network-scripts]# cat ifcfg-eth0
# Advanced Micro Devices [AMD] 79c970 [PCnet32 LANCE]
DEVICE=eth0
BOOTPROTO=dhcp
DHCPCLASS=
HWADDR=00:0C:29:1D:EC:5F
ONBOOT=yes
[root@localhost network-scripts]#
```

查看 ip 地址和主机所在的子网信息:



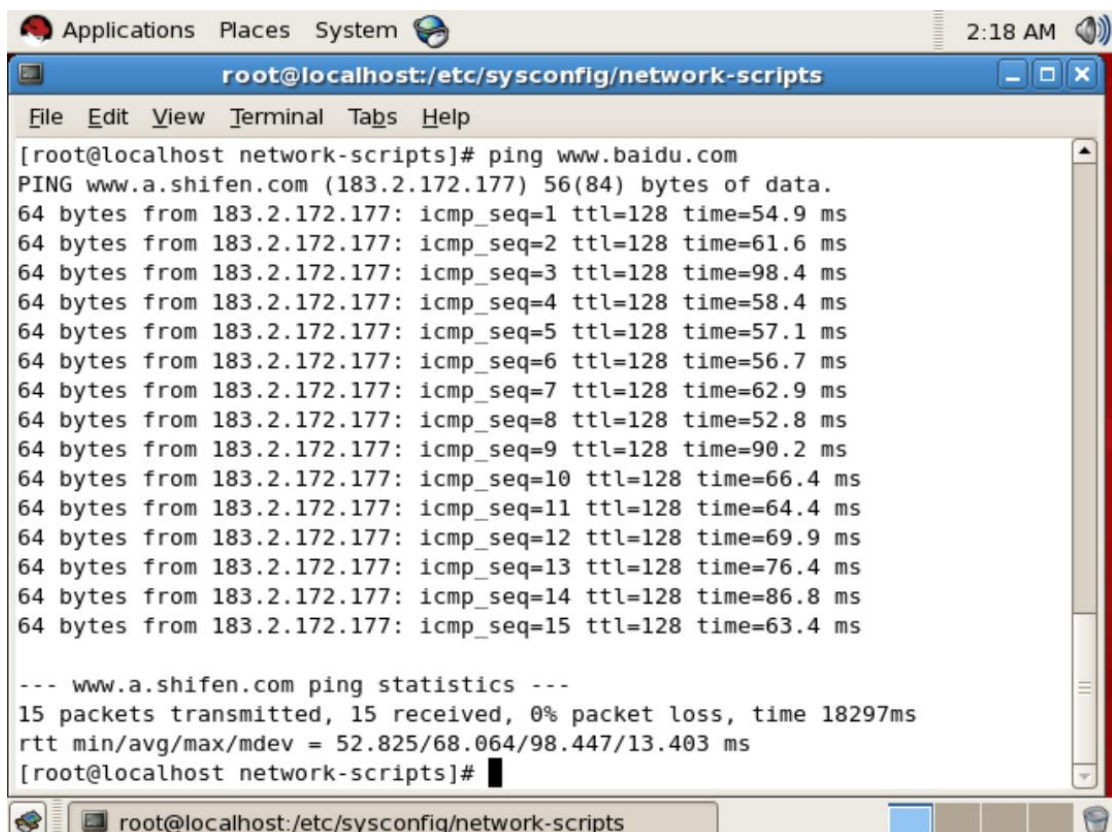
A terminal window titled 'root@localhost:/etc/sysconfig/network-scripts' with a menu bar (File, Edit, View, Terminal, Tabs, Help). The terminal shows the output of the 'ifconfig' command. It displays details for the 'eth0' interface (Ethernet, IP 192.168.255.130, MTU 1500) and the 'lo' interface (Loopback, IP 127.0.0.1, MTU 16436). The window has a status bar at the bottom showing the current directory.

```
[root@localhost network-scripts]# ifconfig
eth0      Link encap:Ethernet  HWaddr 00:0C:29:1D:EC:5F
          inet addr:192.168.255.130  Bcast:192.168.255.255  Mask:255.255.255
          .0
          inet6 addr: fe80::20c:29ff:fe1d:ec5f/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:1409 errors:0 dropped:0 overruns:0 frame:0
          TX packets:280 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:263755 (257.5 KiB)  TX bytes:43696 (42.6 KiB)
          Interrupt:75 Base address:0x2000

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:16436  Metric:1
          RX packets:590 errors:0 dropped:0 overruns:0 frame:0
          TX packets:590 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:62072 (60.6 KiB)  TX bytes:62072 (60.6 KiB)

[root@localhost network-scripts]#
```

测试联网通信:

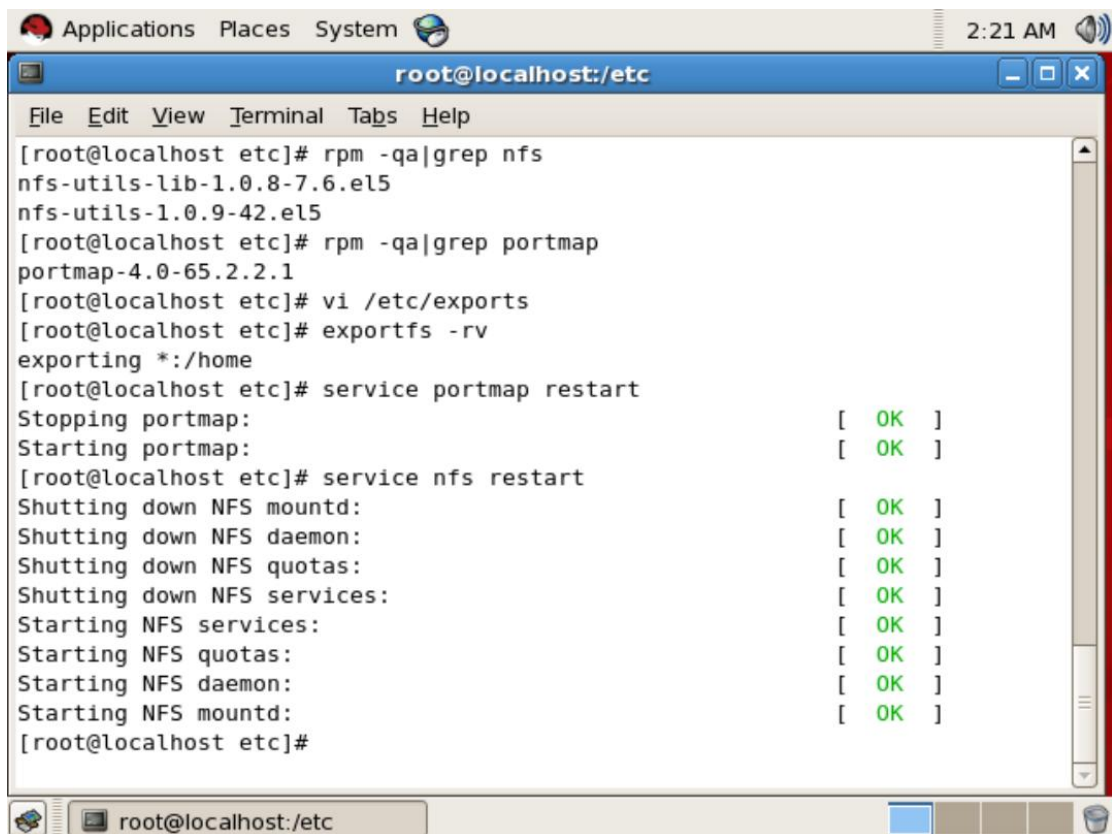


A terminal window titled 'root@localhost:/etc/sysconfig/network-scripts' with a menu bar (File, Edit, View, Terminal, Tabs, Help). The terminal shows the output of the 'ping www.baidu.com' command. It displays 15 successful ping attempts with response times ranging from 52.8 ms to 98.4 ms. The window has a status bar at the bottom showing the current directory.

```
[root@localhost network-scripts]# ping www.baidu.com
PING www.a.shifen.com (183.2.172.177) 56(84) bytes of data.
64 bytes from 183.2.172.177: icmp_seq=1 ttl=128 time=54.9 ms
64 bytes from 183.2.172.177: icmp_seq=2 ttl=128 time=61.6 ms
64 bytes from 183.2.172.177: icmp_seq=3 ttl=128 time=98.4 ms
64 bytes from 183.2.172.177: icmp_seq=4 ttl=128 time=58.4 ms
64 bytes from 183.2.172.177: icmp_seq=5 ttl=128 time=57.1 ms
64 bytes from 183.2.172.177: icmp_seq=6 ttl=128 time=56.7 ms
64 bytes from 183.2.172.177: icmp_seq=7 ttl=128 time=62.9 ms
64 bytes from 183.2.172.177: icmp_seq=8 ttl=128 time=52.8 ms
64 bytes from 183.2.172.177: icmp_seq=9 ttl=128 time=90.2 ms
64 bytes from 183.2.172.177: icmp_seq=10 ttl=128 time=66.4 ms
64 bytes from 183.2.172.177: icmp_seq=11 ttl=128 time=64.4 ms
64 bytes from 183.2.172.177: icmp_seq=12 ttl=128 time=69.9 ms
64 bytes from 183.2.172.177: icmp_seq=13 ttl=128 time=76.4 ms
64 bytes from 183.2.172.177: icmp_seq=14 ttl=128 time=86.8 ms
64 bytes from 183.2.172.177: icmp_seq=15 ttl=128 time=63.4 ms

--- www.a.shifen.com ping statistics ---
15 packets transmitted, 15 received, 0% packet loss, time 18297ms
rtt min/avg/max/mdev = 52.825/68.064/98.447/13.403 ms
[root@localhost network-scripts]#
```

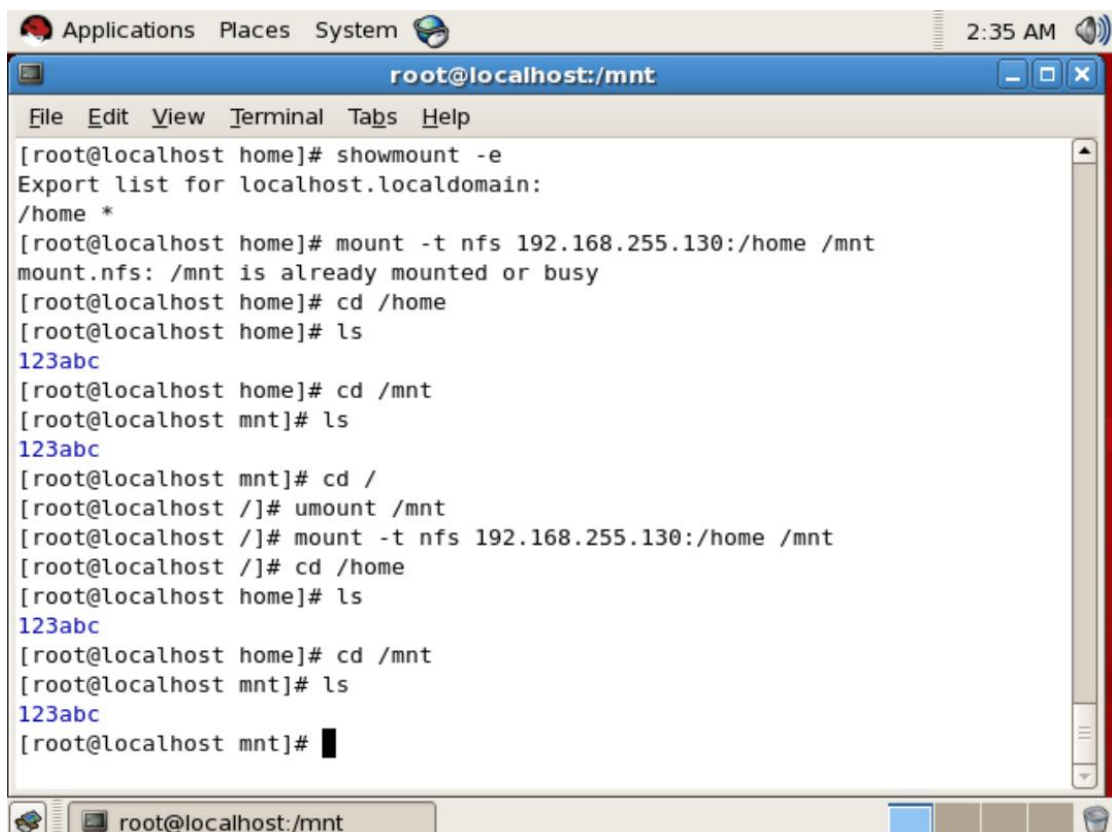
2. 配置 NFS 服务:



A terminal window titled 'root@localhost:/etc' with a menu bar (File, Edit, View, Terminal, Tabs, Help) and a status bar (root@localhost:/etc). The terminal shows the following commands and output:

```
[root@localhost etc]# rpm -qa|grep nfs
nfs-utils-lib-1.0.8-7.6.el5
nfs-utils-1.0.9-42.el5
[root@localhost etc]# rpm -qa|grep portmap
portmap-4.0-65.2.2.1
[root@localhost etc]# vi /etc/exports
[root@localhost etc]# exportfs -rv
exporting */home
[root@localhost etc]# service portmap restart
Stopping portmap: [ OK ]
Starting portmap: [ OK ]
[root@localhost etc]# service nfs restart
Shutting down NFS mountd: [ OK ]
Shutting down NFS daemon: [ OK ]
Shutting down NFS quotas: [ OK ]
Shutting down NFS services: [ OK ]
Starting NFS services: [ OK ]
Starting NFS quotas: [ OK ]
Starting NFS daemon: [ OK ]
Starting NFS mountd: [ OK ]
[root@localhost etc]#
```

验证 NFS 服务:



A terminal window titled 'root@localhost:/mnt' with a menu bar (File, Edit, View, Terminal, Tabs, Help) and a status bar (root@localhost:/mnt). The terminal shows the following commands and output:

```
[root@localhost home]# showmount -e
Export list for localhost.localdomain:
/home *
[root@localhost home]# mount -t nfs 192.168.255.130:/home /mnt
mount.nfs: /mnt is already mounted or busy
[root@localhost home]# cd /home
[root@localhost home]# ls
123abc
[root@localhost home]# cd /mnt
[root@localhost mnt]# ls
123abc
[root@localhost mnt]# cd /
[root@localhost /]# umount /mnt
[root@localhost /]# mount -t nfs 192.168.255.130:/home /mnt
[root@localhost /]# cd /home
[root@localhost home]# ls
123abc
[root@localhost home]# cd /mnt
[root@localhost mnt]# ls
123abc
[root@localhost mnt]#
```

3. 配置 samba:

Applications Places System 1:17 AM

root@localhost:/home

File Edit View Terminal Tabs Help

```
[123abc@localhost ~]$ su -
Password:
[root@localhost ~]# mkdir /home/public
[root@localhost ~]# mkdir /home/share
[root@localhost ~]# cd /home/
[root@localhost home]# ls
123abc lily public share tux
[root@localhost home]# touch /home/public/public-test
[root@localhost home]# touch /home/public/share-test
[root@localhost home]# vi /etc/samba/smb.conf
[root@localhost home]# sudo service smb restart
Shutting down SMB services: [FAILED]
Shutting down NMB services: [FAILED]
Starting SMB services: [ OK ]
Starting NMB services: [ OK ]
[root@localhost home]# sudo service smb restart
Shutting down SMB services: [ OK ]
Shutting down NMB services: [ OK ]
Starting SMB services: [ OK ]
Starting NMB services: [ OK ]
[root@localhost home]#
```

Applications Places System 1:42 AM

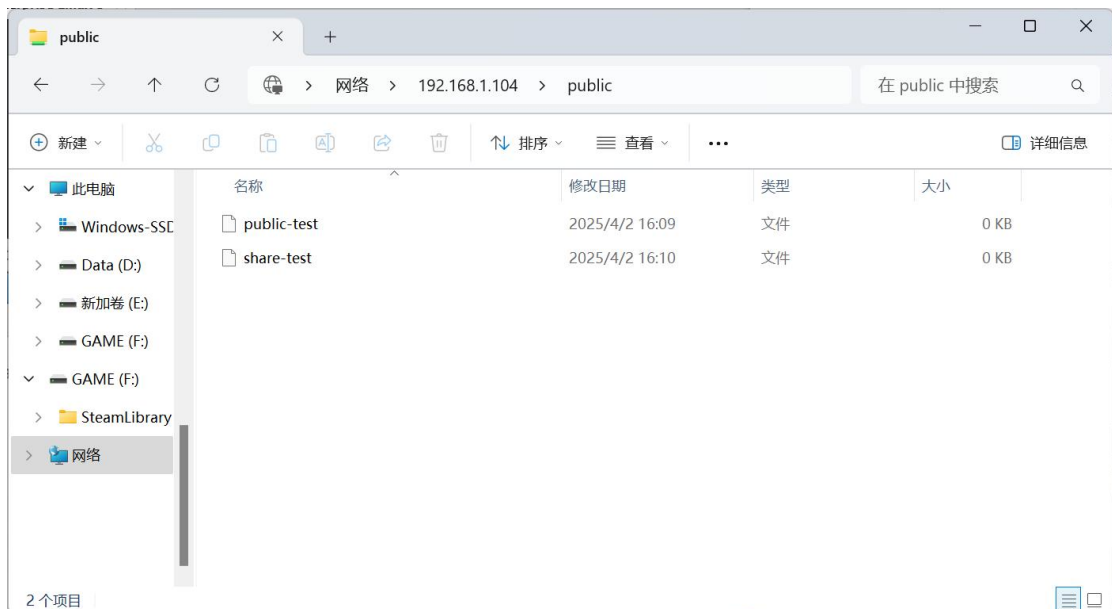
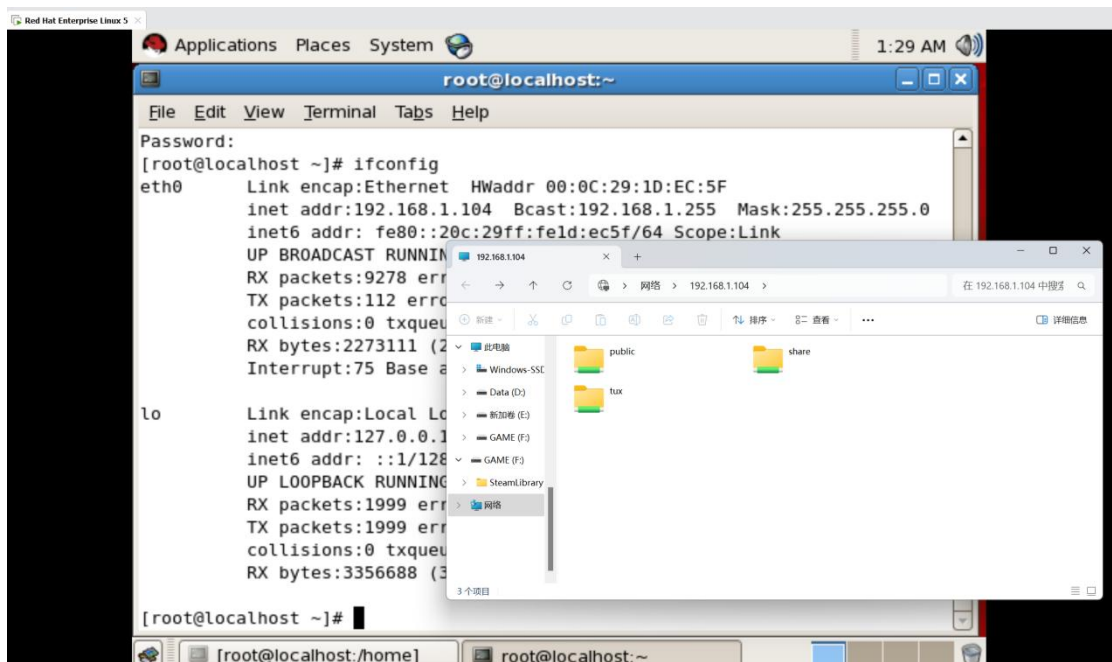
root@localhost:/

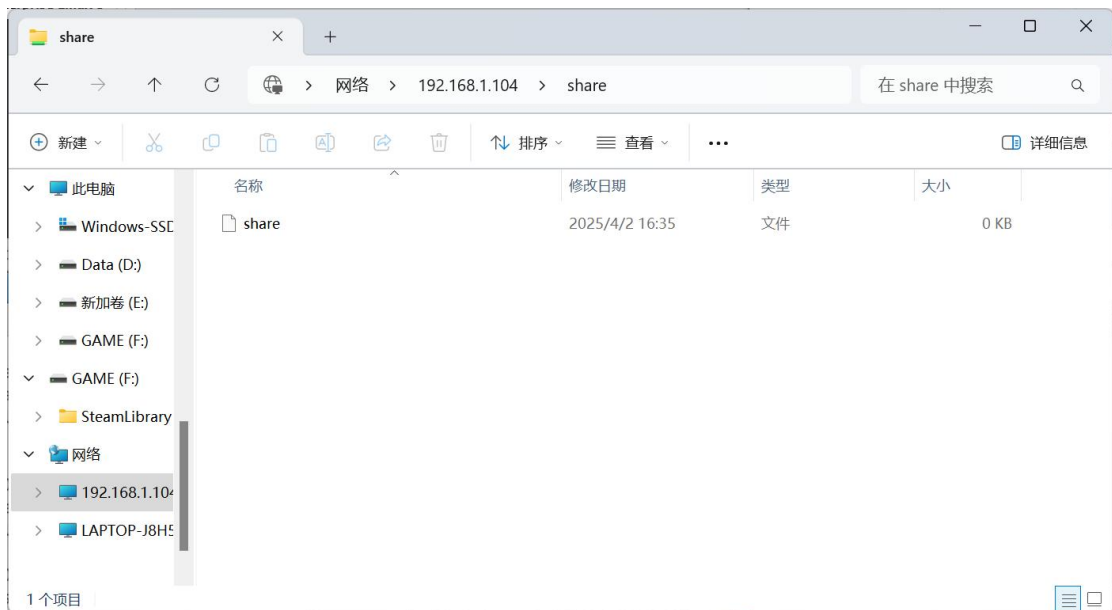
File Edit View Terminal Tabs Help

```
[global]
  workgroup =WORKGROUP
  netbios name =Filesever
  security =share
[public]
  path = /home/public
  writable = yes
  read only = no
  guest ok = yes
  create mode = 0777
[homes]
  browseable = no
  read only =no
  writable=yes
  create mode = 0700
[share]
  path = /home/share
  writable = yes
  read only = no
  valid users =tux,tom
  create mode = 0700
:
```

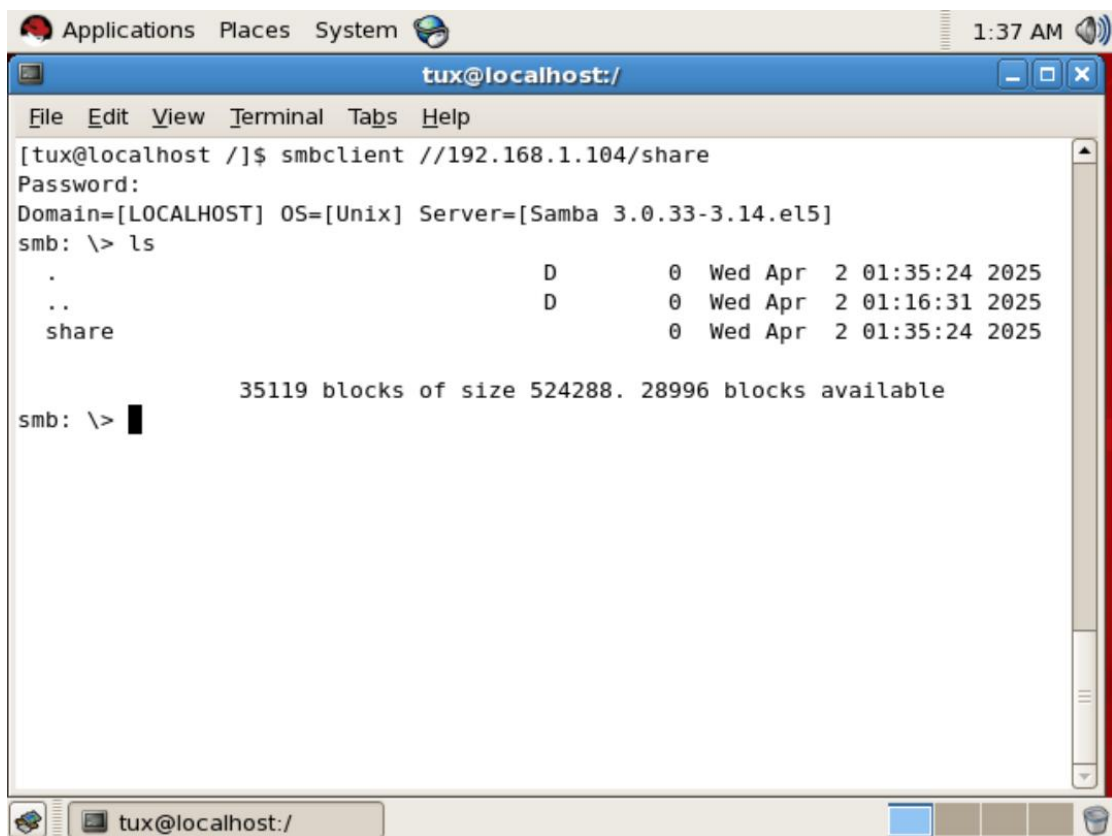
```
[root@localhost home]# smbpasswd -a tux
New SMB password:
Retype new SMB password:
Added user tux.
[root@localhost home]# smbpasswd -a tom
New SMB password:
Retype new SMB password:
Added user tom.
```

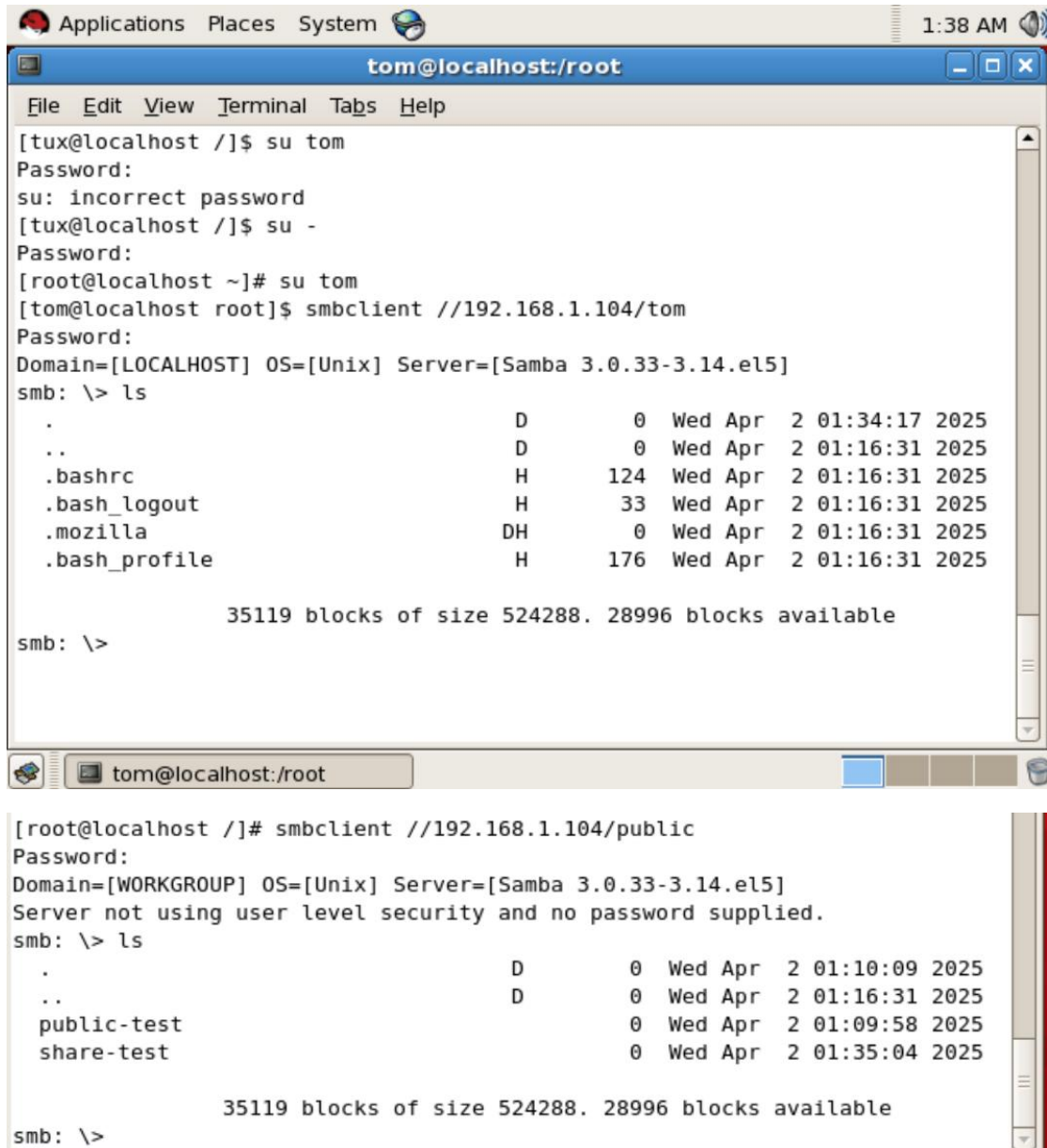
验证 samba 服务（windows 访问）：





验证 samba 服务（smbclient 访问）：





The screenshot shows a terminal window titled 'tom@localhost:/root'. The user 'tux' attempts to switch to 'tom' and then to root. After logging in as root, the user runs 'smbclient //192.168.1.104/tom'. The output shows a directory listing for the 'tom' share, including files like '.bashrc', '.bash_logout', '.mozilla', and '.bash_profile'. The user then runs 'smbclient //192.168.1.104/public', and the output shows a directory listing for the 'public' share, including files like 'public-test' and 'share-test'. The terminal window has a menu bar with 'File', 'Edit', 'View', 'Terminal', 'Tabs', and 'Help'. The status bar at the bottom shows 'tom@localhost:/root'.

```
[tux@localhost ~]$ su tom
Password:
su: incorrect password
[tux@localhost ~]$ su -
Password:
[root@localhost ~]# su tom
[tom@localhost root]$ smbclient //192.168.1.104/tom
Password:
Domain=[LOCALHOST] OS=[Unix] Server=[Samba 3.0.33-3.14.el5]
smb: \> ls
.                D            0  Wed Apr  2 01:34:17 2025
..               D            0  Wed Apr  2 01:16:31 2025
.bashrc          H          124  Wed Apr  2 01:16:31 2025
.bash_logout     H           33  Wed Apr  2 01:16:31 2025
.mozilla         DH           0  Wed Apr  2 01:16:31 2025
.bash_profile    H          176  Wed Apr  2 01:16:31 2025

35119 blocks of size 524288. 28996 blocks available
smb: \>

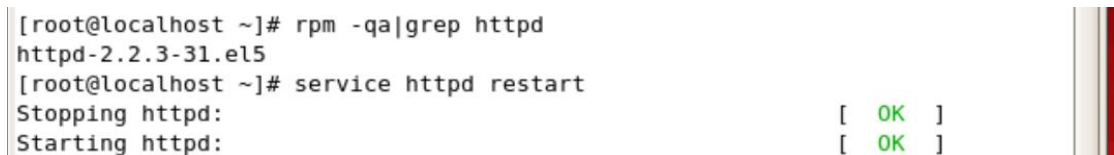
[root@localhost ~]# smbclient //192.168.1.104/public
Password:
Domain=[WORKGROUP] OS=[Unix] Server=[Samba 3.0.33-3.14.el5]
Server not using user level security and no password supplied.
smb: \> ls
.                D            0  Wed Apr  2 01:10:09 2025
..               D            0  Wed Apr  2 01:16:31 2025
public-test      0  Wed Apr  2 01:09:58 2025
share-test       0  Wed Apr  2 01:35:04 2025

35119 blocks of size 524288. 28996 blocks available
smb: \>
```

public 目录可以供输入任意用户名和密码的访客用户访问。

Public 目录下有 public-test 和 share-test 两个文件，share 目录下只有 share 一个文件

4. 安装 apache:



The screenshot shows a terminal window with the following commands and output: 'rpm -qa|grep httpd' returns 'httpd-2.2.3-31.el5'. Then 'service httpd restart' is run, showing 'Stopping httpd:' followed by '[OK]' and 'Starting httpd:' followed by '[OK]'. The terminal window has a menu bar with 'File', 'Edit', 'View', 'Terminal', 'Tabs', and 'Help'. The status bar at the bottom shows 'tom@localhost:/root'.

```
[root@localhost ~]# rpm -qa|grep httpd
httpd-2.2.3-31.el5
[root@localhost ~]# service httpd restart
Stopping httpd: [ OK ]
Starting httpd: [ OK ]
```

配置/etc/httpd/conf/httpd.conf:

```

# as error documents.  e.g. admin@your-domain.com
#
ServerAdmin root@localhost

#
# ServerName gives the name and port that the server uses to identify itself
#
# This can often be determined automatically, but we recommend you specify
#
# DocumentRoot: The directory out of which you will serve your
# documents. By default, all requests are taken from this directory, but
# symbolic links and aliases may be used to point to other locations.
#
DocumentRoot "/var/www/web"

#
# Each directory to which Apache has access can be configured with respect
#
#
<VirtualHost *:8080>
#   ServerAdmin webmaster@dummy-host.example.com
#   DocumentRoot /var/www/web
#   ServerName localhost
#   ErrorLog logs/dummy-host.example.com-error_log
#   CustomLog logs/dummy-host.example.com-access_log common
#   <Directory "/var/www/web">
#       Options Indexes FollowSymLinks
#       AllowOverride All
#       Require all granted
#   </Directory>
#   <Directory "/var/www/temp">
#       AuthType Basic
#       AuthName "Restricted Access"
#       AuthUserFile /etc/httpd/conf/.htpasswd
#       Require user tux lily
#   </Directory>
</VirtualHost>

```

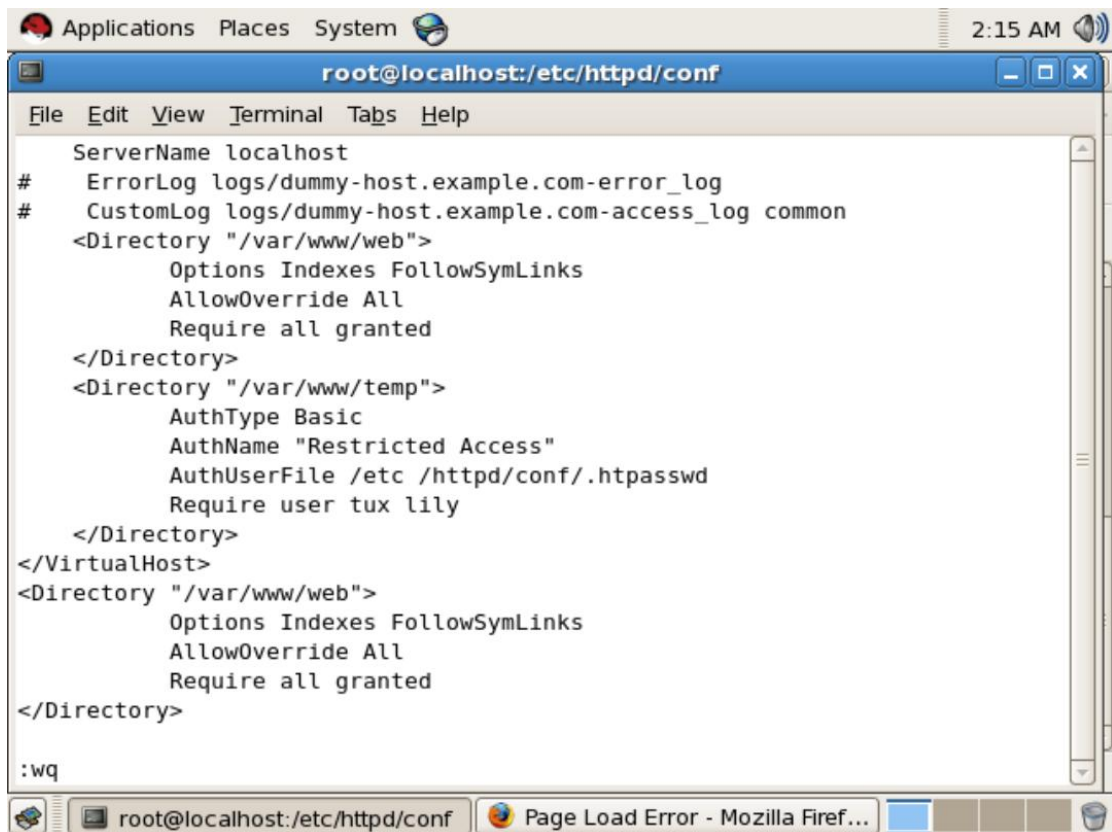
root@localhost:/etc/httpd/conf

配置端口：

```

# Change this to Listen on specific IP addresses as shown below to
# prevent Apache from glomming onto all bound IP addresses (0.0.0.0)
#
#Listen 12.34.56.78:80
Listen 8080
#
#
# Dynamic Shared Object (DSO) Support
#
# To be able to use the functionality of a module which was built as a DSO y

```

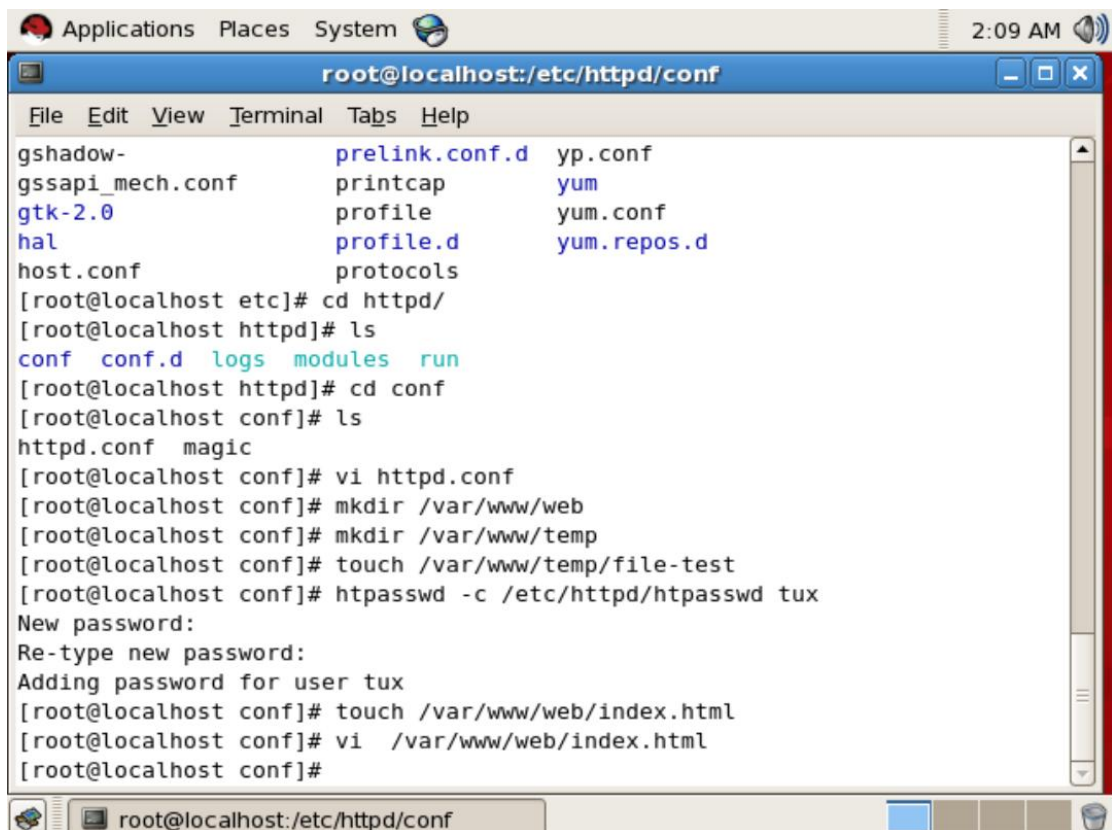


The screenshot shows a terminal window titled 'root@localhost:/etc/httpd/conf'. The terminal displays the configuration of the httpd.conf file. The configuration includes the following lines:

```
ServerName localhost
#   ErrorLog logs/dummy-host.example.com-error_log
#   CustomLog logs/dummy-host.example.com-access_log common
<Directory "/var/www/web">
    Options Indexes FollowSymLinks
    AllowOverride All
    Require all granted
</Directory>
<Directory "/var/www/temp">
    AuthType Basic
    AuthName "Restricted Access"
    AuthUserFile /etc/httpd/conf/.htpasswd
    Require user tux lily
</Directory>
</VirtualHost>
<Directory "/var/www/web">
    Options Indexes FollowSymLinks
    AllowOverride All
    Require all granted
</Directory>
```

The terminal prompt is ':wq'.

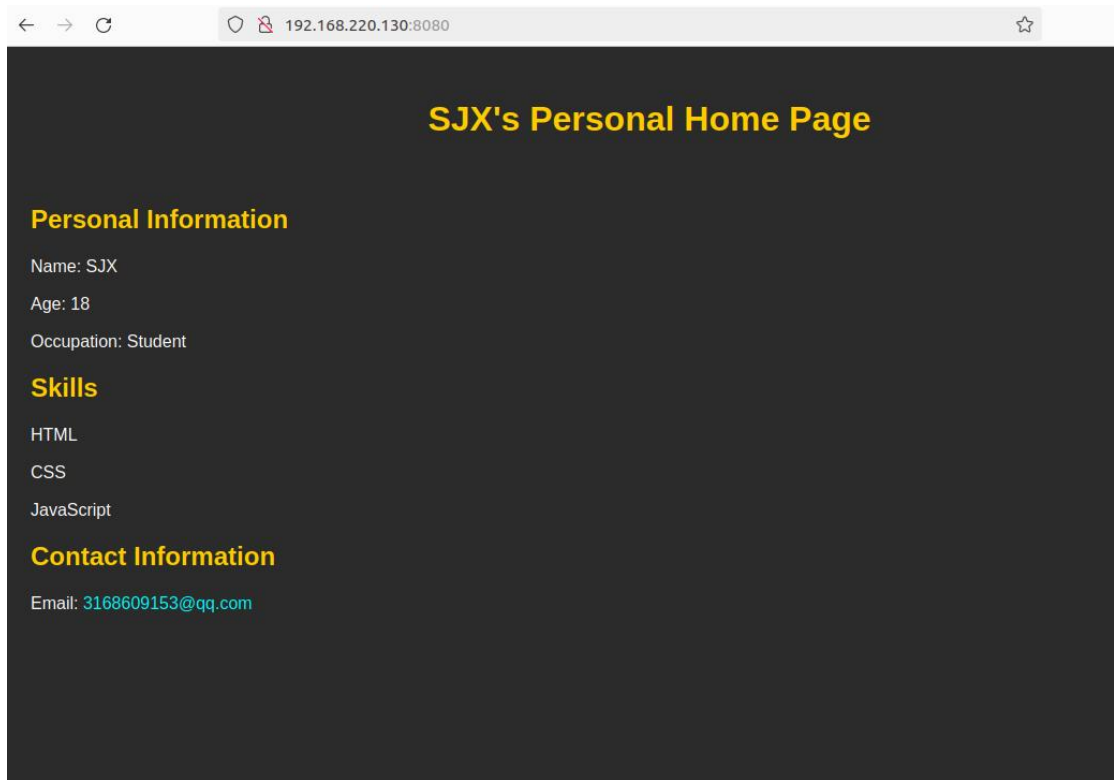
配置文件目录和登录用户:



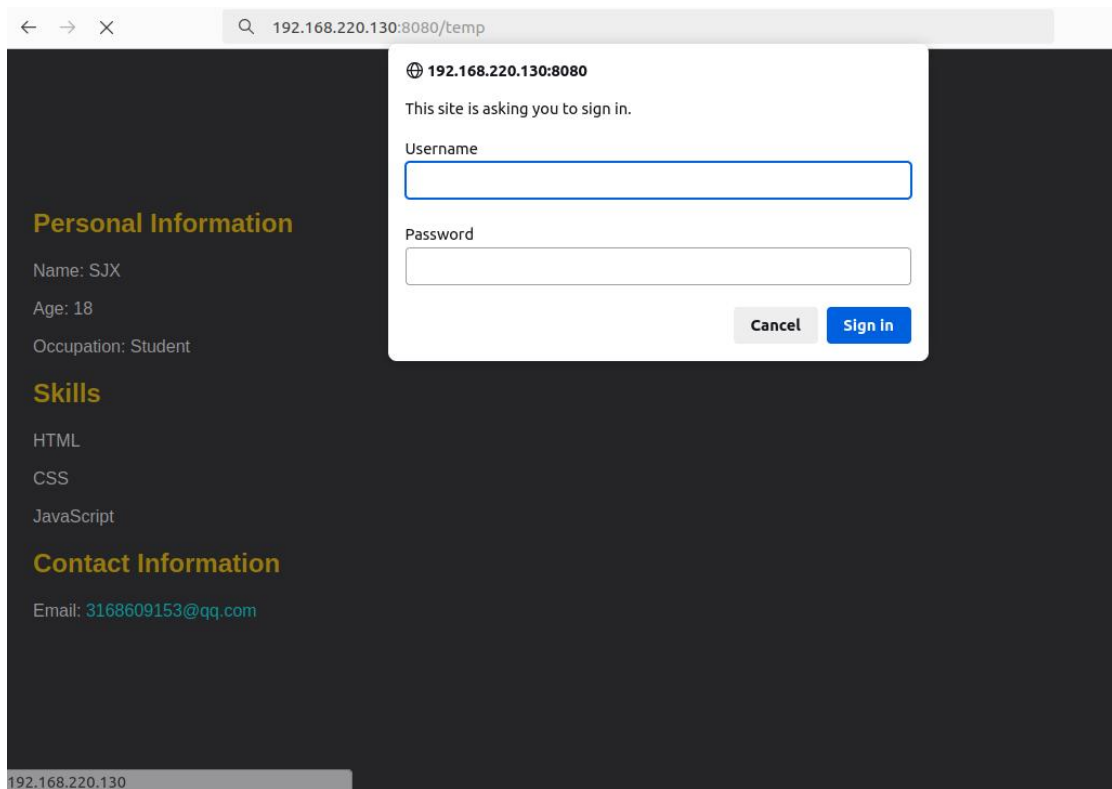
The screenshot shows a terminal window titled 'root@localhost:/etc/httpd/conf'. The terminal displays the configuration of the httpd.conf file and the creation of the .htpasswd file. The configuration includes the following lines:

```
gshadow-          prelink.conf.d  yp.conf
gssapi_mech.conf  printcap          yum
gtk-2.0           profile           yum.conf
hal               profile.d          yum.repos.d
host.conf         protocols
[root@localhost etc]# cd httpd/
[root@localhost httpd]# ls
conf  conf.d  logs  modules  run
[root@localhost httpd]# cd conf
[root@localhost conf]# ls
httpd.conf  magic
[root@localhost conf]# vi httpd.conf
[root@localhost conf]# mkdir /var/www/web
[root@localhost conf]# mkdir /var/www/temp
[root@localhost conf]# touch /var/www/temp/file-test
[root@localhost conf]# htpasswd -c /etc/httpd/htpasswd tux
New password:
Re-type new password:
Adding password for user tux
[root@localhost conf]# touch /var/www/web/index.html
[root@localhost conf]# vi /var/www/web/index.html
[root@localhost conf]#
```

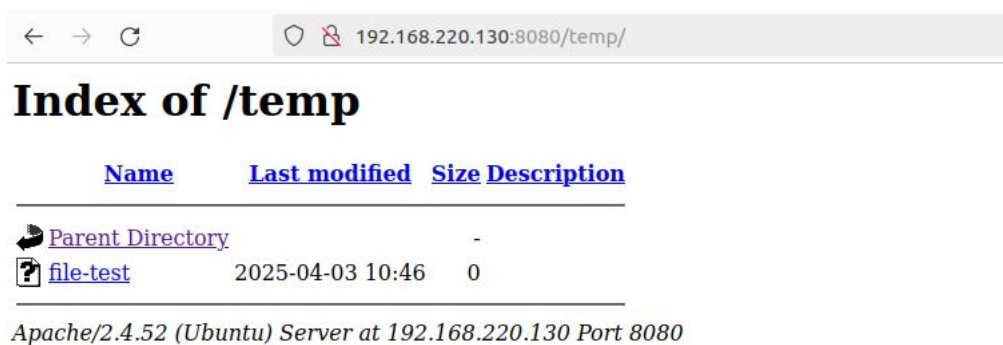
访问 8080 端口，可以显示出个人主页。如果其他用户也要上传个人主页，允许它们将编辑好的 html 文件上传至/var/www/web 文件夹即可。



访问 temp 目录，网页要求进行身份验证：



使用 tux 身份登录后，显示文件目录内容。



五、实验中出现的问题和解决

1. Samba 配置结束后，使用 tux 用户访问 samba 服务器，只能访问到 public 而不能访问到 share，也没有用户的主目录。这是因为在 samba 配置时应该创建与用户对应的 samba 用户并为其设置密

码，这样才能使该用户正常访问，对应的命令是 `smbpasswd -a`。

六、实验体会

通过本次实验，我深入掌握了 Linux 系统中网络服务命令的操作技巧，并成功搭建了 NFS 和 Samba 服务来实现高效的文件共享功能。此外，我还利用 Apache 搭建了一个简单的 Linux 服务器网站。经过此次实践，我对 Linux 系统的运用已经相当熟练，能够将文件管理、用户与进程管理以及网络服务等知识有机结合并灵活运用。