ComS 252 Homework 11: Samba

Group assignment (with 5% penalty per group member)

Due November 16, 2021

1 Objectives

For this assignment, you will share files over the network between Linux and Windows (virtual) machines. For more information, consult

- Chapter 23 of the textbook.
- The Official Samba documentation at `http://www.samba.org`.

2 Downloads

There are *four* virtual machines for this assignment:

- `server11W.ova`, a Windows server.
- `client11W.ova`, a Windows client.
- `server11L.ova`, a Linux server.
- `client11L.ova`, a Linux client.

You should not need to install any software on any of the VMs. Note that, for this assignment, you will need to run one of the server VMs and one of the client VMs *simultaneously* to test your configurations. Take care when shutting down the VMs: be sure to shut down the client VM before shutting down the server VM, and be patient during annoyingly long shutdowns.

2.1 Windows VMs

The Windows machines have accounts for `admin`, `alice`, and `bob` with passwords `adminpw`, `alicepw`, `bobpw`. They each are configured with *one* network adapter, on the "Internal network" named `intnet`. Thus, these VMs cannot connect to the Internet. You *will not* turn in these VMs; however, you will still need to configure them correctly to test your Linux configurations.

2.2 Linux VMs

The Linux machines have accounts for `root`, `alice`, and `bob` with passwords `rootpw`, `alicepw`, `bobpw`. They each are configured with *two* network adapters. The first is of type "NAT", to connect to the Internet (so you can submit your work). The second is for the "Internal network" named `intnet`. Therefore, all four VMs can communicate with each other using the Internal network, once you configure them to do so.

3 Windows Client with Windows Server

3.1 Name and Workgroup

First, you will need to configure the networking information on the client and server. You will need to run the "Set up a home or small office network" wizard on both Windows machines. This is found under "Control Panel", then "Network Connections" (this usually takes a while the first time you click it).

Server

- Computer description: `Hw11 windows server`
- Computer Name: `SERVER11W`
- Workgroup: `CS252`

Client

- Computer description: `Hw11 windows client`
- Computer Name: `CLIENT11W`
- Workgroup: `CS252`

3.2 IP addresses

You will also need to set both IP addresses; this can be done under "Network Connections", then by right–clicking on "Local Area Connection" selecting "Properties", and then "Internet Protocol". Use the following addresses.

Server

- IP address[1]: `172.27.11.3`
- Subnet Mask: `255.255.255.0`

Client

- IP address: `172.27.11.91`
- Subnet Mask: `255.255.255.0`

3.3 Testing

Once these have been configured properly, restart both Windows VMs, and check that the machines are visible under "View Workgroup Computers". Then, make sure the client can access (read and write to) the server's "Shared Documents" folder.

4 Linux client with Windows Server

4.1 Linux client network configuration

The Linux client is *mostly* configured already to use both network interfaces; you will need to make a few small changes to complete the configuration. First, add lines of the form

```
HWADDR=xx:xx:xx:xx:xx:xx
```

to the configuration files for both the first network adapter (interface `enp0s3`) and the second network adapter (interface `enp0s8`), where "`xx:xx:xx:xx:xx:xx`" is replaced with the MAC address for the network adapter. Then, set `ONBOOT` to `yes` for interface `enp0s8`. Reboot and make sure both interfaces work (e.g., try to `ping` either the Windows Server or the Windows Client machine, and some Internet host like `www.google.com`).

[1] If this happens to be an IP address or subnet that your host machine uses, you will need to choose a subnet other than `172.27.11` for this assignment, say `192.168.99`. You will then need to modify all IP addresses used in this assignment, but keep the machine numbers the same (e.g., `172.27.11.3` becomes `192.168.99.3`).

4.2 Mounting by hand

Test the Linux client by mounting (by hand) the "Shared Documents" folder for `SERVER11W` to (not yet existing) mount point `/shares/SERVER11W`. You will need to specify the following mount options (the `man` pages for `mount` and `mount.cifs` might be useful for this assignment):

- `noperm`, so that no permission checks are performed.
- `vers=1.0`, because Windows XP uses version 1.0 of the CIFS protocol.
- `user=foo`, because without specifying a user (even a bogus one), the CIFS mount will fail.
- `guest`, to avoid prompting for a password.

Use the IP address of the Windows Server VM as the server name. Be sure that `alice` or `bob` can create, modify, or remove files in this shared directory (just like in Windows). Unmount this when it works. The `smbclient` utility is helpful for debugging, in Linux.

4.3 Mouting using `autofs`

Next, configure the Linux client to *automount* the "Shared Documents" folder for `SERVER11W` to mount point `/shares/SERVER11W`. Use the same mount options as when you mounted "by hand". Make this the default configuration when the machine boots.

Note that this **does not** mean to put an entry in `/etc/fstab`. Instead, automounting means, the device is mounted "on demand" (this is done by the `autofs` service), whenever a user accesses directory `/shares/SERVER11W`. This is a safer configuration for network shares because the client will still boot successfully if the server is down.

To do this, you will need to set the `autofs` service to start at boot time, and configure the service appropriately. You should set up `/shares` as a family of mount points, and then configure `autofs` so that `SERVER11W` mounts within `/shares`.

To test your configuration, boot the client and login as an ordinary user. Then boot the server. After the server is up, on the client, run `ls /shares`; you should see an empty directory. Then, change into directory `/shares/SERVER11W` (even though it is not there). Then try `ls`. You should see the files from the windows server. If you cannot change into the directory, then there is a problem with the `autofs` configuration or with the mount options.

5 Windows client with Linux Server

5.1 Linux server network configuration

Just like you did for the Linux client VM, add lines

```
HWADDR=xx:xx:xx:xx:xx:xx
```

to the configuration files for both network adapters (interfaces `enp0s3` and `enp0s8`), and set `ONBOOT` to `yes` for interface `enp0s8`. Reboot and make sure both interfaces work.

5.2 Samba services and firewall

Configure the Linux server VM so that the following happens whenever the machine boots.

- Services `smb` and `nmb` are started.
- The `samba` service is allowed through the firewall.

5.3 Add Samba users

On the Linux server VM, using `smbpasswd`, add the following Samba users.

- `alice`, with password `alicepw`
- `bob`, with password `bobpw`
- `public`, with an empty password

5.4 Configuring the Samba server

On the Linux server VM, edit the Samba configuration file, `/etc/samba/smb.conf`, with the following configuration settings. Note that this file contains many default settings, so take care not to specify a setting more than once.

- You will need to add the option

  ```
  ntlm auth = yes
  ```

  under the `[global]` section, so that the Windows XP client will work properly.
- The server `netbios name` (as it appears in "Network Neighborhood") should be `server11L`.
- The workgroup name should be `CS252`.
- Only machines on the local subnet `127.`, and the "Internal network" subnet `172.27.11.`, should have access to this machine.
- Users' home directories should be exported, such that each regular user[2] has access to his or her own directory. This should already be set up.
- Directory `/share` should be exported (readable and writable), with name `share`. Any files created in this directory (by a client) should be owned by user `public` and have a group of `public`. Any regular user should be able to view, create, modify, or remove files in this directory.

5.5 Testing

While the Linux Server VM is running, boot the Windows Client VM, and login as `alice` or `bob`. Then, under "Start" → "My Computer" → "My Network Places" → "View workgroup computers", you should see your Linux Server VM. If you click on this, you should see `alice` or `bob`'s home directory, and the `share` directory you set up. Make sure you are able to view, create, modify, or remove files.

6 Linux client with Linux Server

On the Linux client VM, (re)configure the automounter as follows; these should happen whenever the machine boots. If you have trouble, make sure you can mount things "by hand" (you may need to use a different mount point if mounting "by hand", to avoid conflicts with the automounter).

1. The `/share` folder for `server11L` should be automounted at `/shares/server11L`, with the Samba user fixed to user `public`. Any user should be able to create, modify, or delete any file, and these should have owner and group `public`. You will need to set the `noperm`, `user`, and `password` options for `mount.cifs` for this share.

[2] The "regular" users are `alice` and `bob`.

2. A user's home folder should be automouted at `/shares/<username>` with appropriate ownership (e.g., `/shares/alice` and everything below should be owned by `alice`). When mounting a user's home folder `/shares/<username>`, the user's password information should be taken from the file `/home/<username>/.samba.txt`; this is more secure than specifying each user's password in the `autofs` configuration file. The format of `.samba.txt` should be:

   ```
   username=xxxx
   password=xxxx
   ```

   Because there are only two users, you may create separate entries in the map file for each user. Alternatively, you may use wildcard characters. You will need to set the `uid` and `credentials` options for `mount.cifs` for these shares.

7 Submitting your work

Run the `Turnin` scripts, as `root`, on both the Linux server VM and the Linux client VM. Check the `man` page for `Turnin` for more information.