Approx time to complete the assignment: 12 hours

NFS

NFS Server Setup (Machine E)

Install nfs-utils.

```
yum install nfs-utils
```

Next, I updated */etc/exports* file to:

```
[root@nfs ~]# cat /etc/exports
/home/accounting/www 100.64.26.0/24(rw,sync,root_squash,no_all_squash)
```

So that */home/accounting/www* can only be exported to DMZ machines (100.64.26.0/24 subnet).

The permissions look like this:

```
[root@nfs ~]# ls -ld /home/accounting/www
drwxrws---. 2 root accounting 71 Dec  4 13:42 /home/accounting/www
```

Only owner (root) and members of accounting group have access to edit */home/accounting/www* folder. Since Machine E is the NFS server, all the NFS clients would serve the same permissions as the NFS server.

Members of *accounting* group:

```
[root@nfs ~]# getent group accounting
accounting:x:7002:amartin,omartinez,kmalone
```

Restart *nfs-server*:

```
systemctl restart nfs-server
```

NFS Client Setup (Machine C & Machine D):

I am configuring autofs with NFS. First, install nfs-utils.

```
yum install nfs-utils   # For RedHat
apt install nfs-common   # For Debian
```

Next, install autofs

```
yum install autofs    # For RedHat
apt install autofs    # For Debian
```

Create the mount point

```
mkdir -p /var/www/html/dundermifflin/accounting
```

Then in */etc/auto.master* file add a direct map to *auto.direct* file:

```
root@web0:~# cat /etc/auto.master
/- /etc/auto.direct
```

In the *auto.direct* file add the mount point, NFS server and the mount options:

```
root@web0:~# cat /etc/auto.direct
/var/www/html/dundermifflin/accounting -fstype=nfs,ro,soft
10.21.32.2:/home/accounting/www
```

Restart autofs:

```
systemctl restart autofs
```

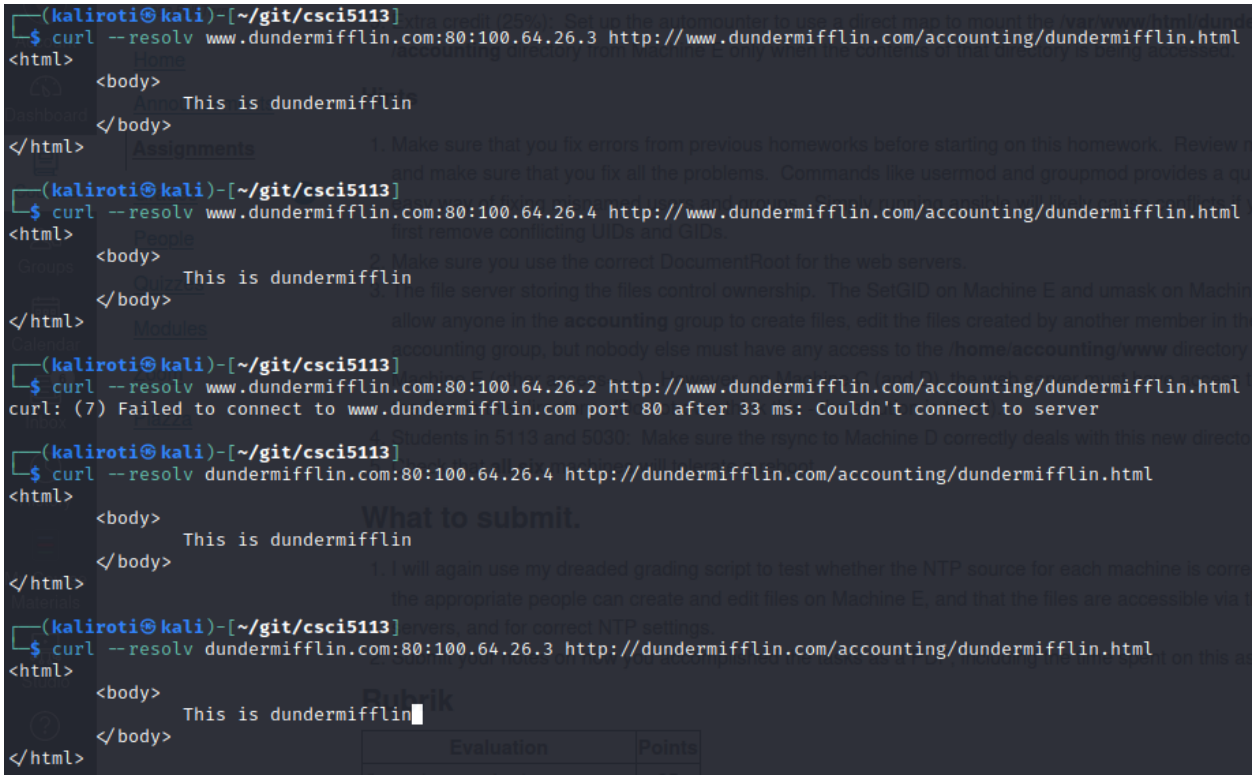
```
root@web0:/var/www/html/dundermifflin# systemctl status autofs
● autofs.service - Automounts filesystems on demand
     Loaded: loaded (/lib/systemd/system/autofs.service; enabled; preset: enabled)
     Active: active (running) since Mon 2023-12-04 16:31:22 MST; 3min 12s ago
       Docs: man:autofs(8)
    Process: 83889 ExecStart=/usr/sbin/automount $OPTIONS --pid-file
/var/run/autofs.pid (code=exited, status=0/SUCCESS)
   Main PID: 83890 (automount)
      Tasks: 4 (limit: 1099)
     Memory: 5.1M
        CPU: 39ms
     CGroup: /system.slice/autofs.service
             └─83890 /usr/sbin/automount --pid-file /var/run/autofs.pid

Dec 04 16:31:22 web0.dundermifflin.com systemd[1]: Starting autofs.service - Automounts
filesystems on demand...
Dec 04 16:31:22 web0.dundermifflin.com systemd[1]: Started autofs.service - Automounts
filesystems on demand.
```

And voila! NFS is setup with automounter!

```
root@web0:~# mount | grep dundermifflin
/etc/auto.direct on /var/www/html/dundermifflin/accounting type autofs
(rw,relatime,fd=6,pgrp=83890,timeout=300,minproto=5,maxproto=5,direct,pipe_ino=756311)
10.21.32.2:/home/accounting/www on /var/www/html/dundermifflin/accounting type nfs4
(ro,relatime,vers=4.2,rsize=131072,wsize=131072,namlen=255,soft,proto=tcp,timeo=600,retrans=2,sec=sys,clientaddr=100.64.26.3,local_lock=none,addr=10.21.32.2)
```

The issue here is we need to give www-data (for Debian) and apache (for RedHat) access to all the files serving in /var/www/html. However, the permissions are only restricted to accounting group members only. We could make the directory world-readable but it is a security concern.

Hence, to solve the issue also addressing the security concern, I added www-data to accounting group on Machine C and apache to accounting group on Machine D. This solves the issue and now, I am able to access all the files created on Machine E on both Machine C and Machine D:



NTP

NTP Server Setup (Machine A)

I updated the DHCP server (Machine A) as an NTP client that syncs the time from **time-a-wwv.nist.gov** and **time-a-b.nist.gov** in /etc/chrony.conf

```
[root@router ~]# cat /etc/chrony.conf | grep server
# Use NTP servers from DHCP.
server time-a-wwv.nist.gov iburst
server time-a-b.nist.gov iburst
```

Next, I updated DHCP server config such that all DHCP clients use Machine A as NTP server.
I updated /etc/dhcp/dhcpd.conf file on Machine A as:

```
option ntp-servers 100.64.0.26;
```

Where 100.64.0.26 is the IP of Machine A.

NTP Client Setup (Machines B-F)

Next, we want to make sure all the DHCP clients to refresh and ask DHCP server for fresh config.

On all Debian machines, I restarted networking service:

```
systemctl restart networking
```

And on all RedHat machine, I restarted NetworkManager service:

```
systemctl restart NetworkManager
```

Checked if all the time was synced:

```
chronyc sources
```