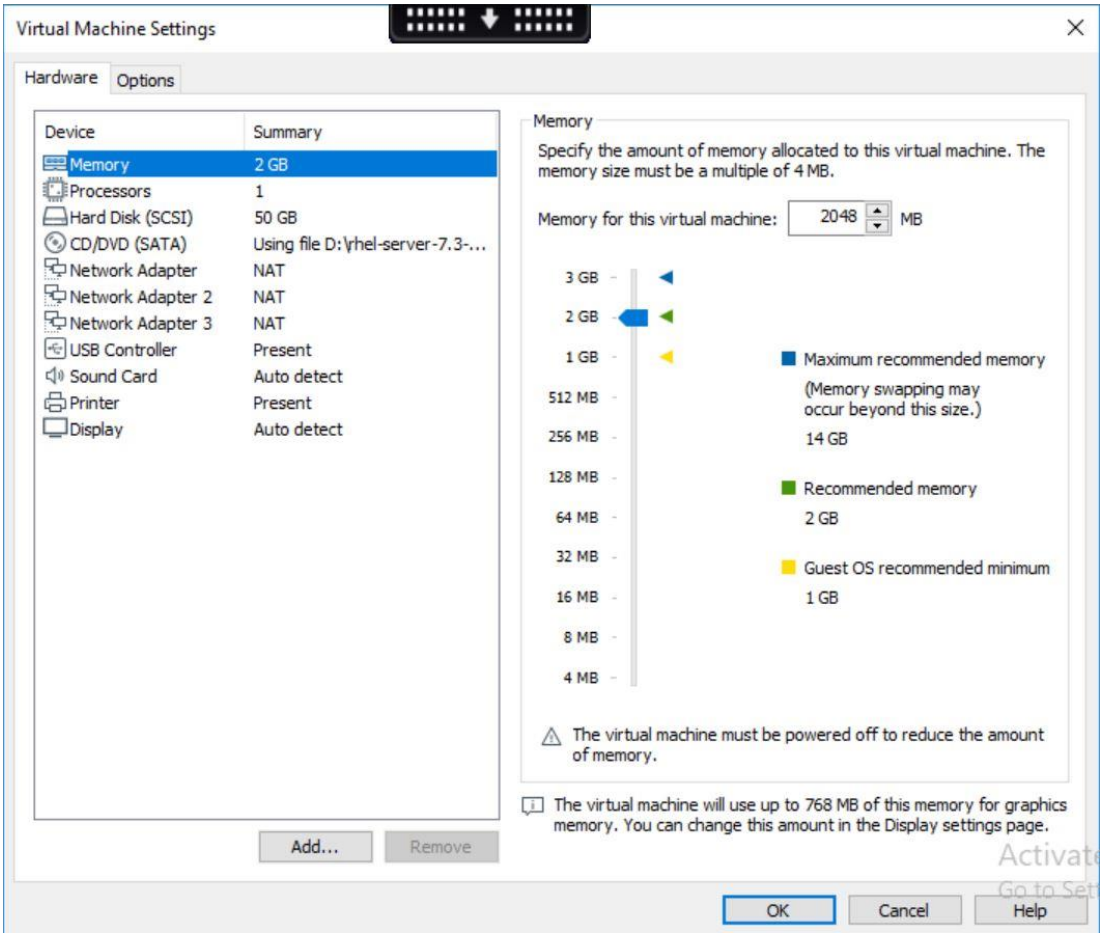
1)

Installed a new VM of RHEL 7.3 with 3 network adapters.

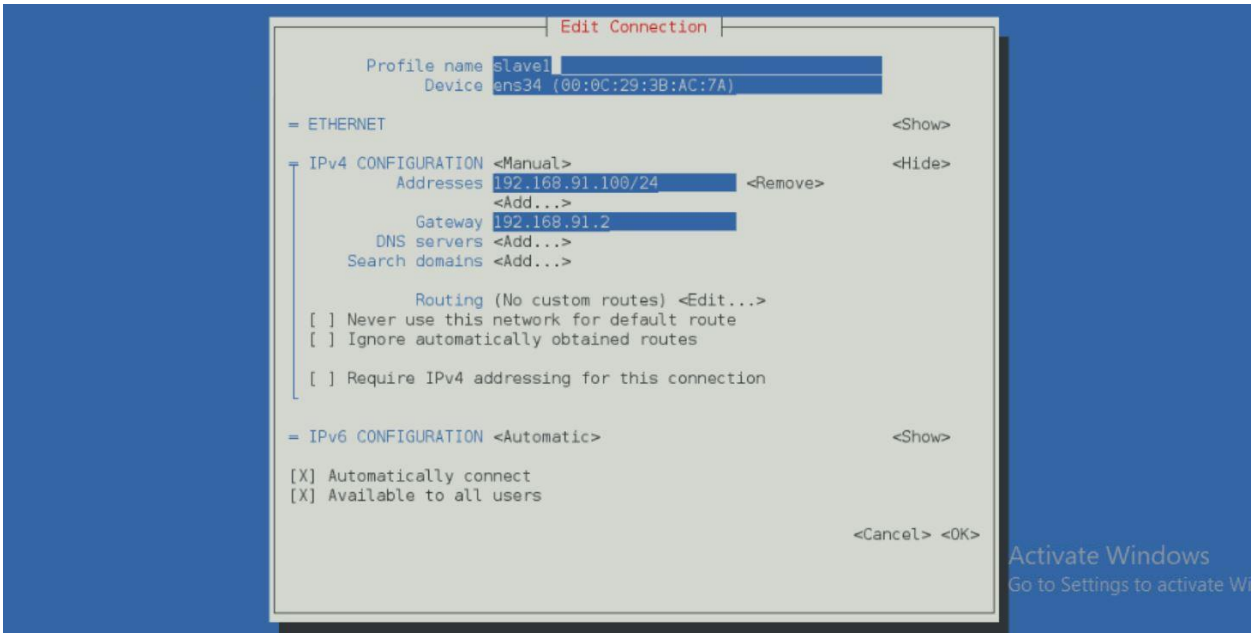


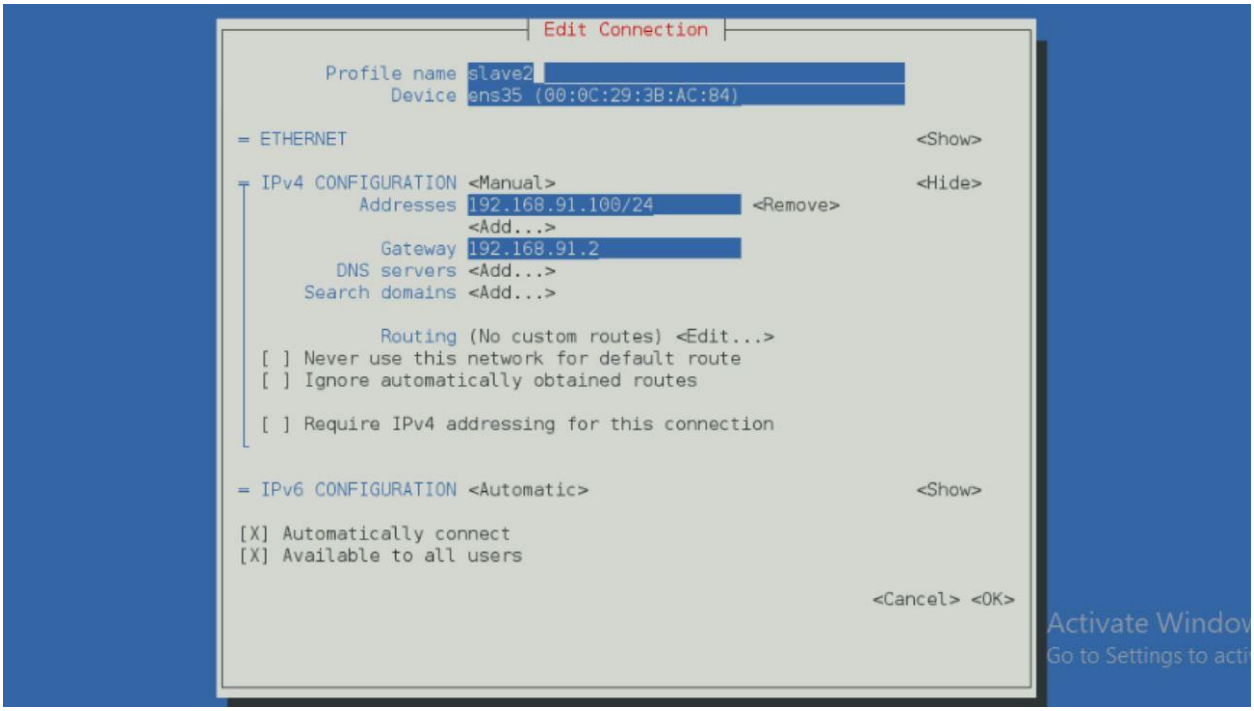
Changed the hostname to server.example.com

```
[root@localhost ~]# hostname
localhost.localdomain
[root@localhost ~]# hostnamectl set-hostname server.example.com
[root@localhost ~]# bash
[root@server ~]# hostname
server.example.com
[root@server ~]#
```

Creating two interfaces named with slave1 and slave2

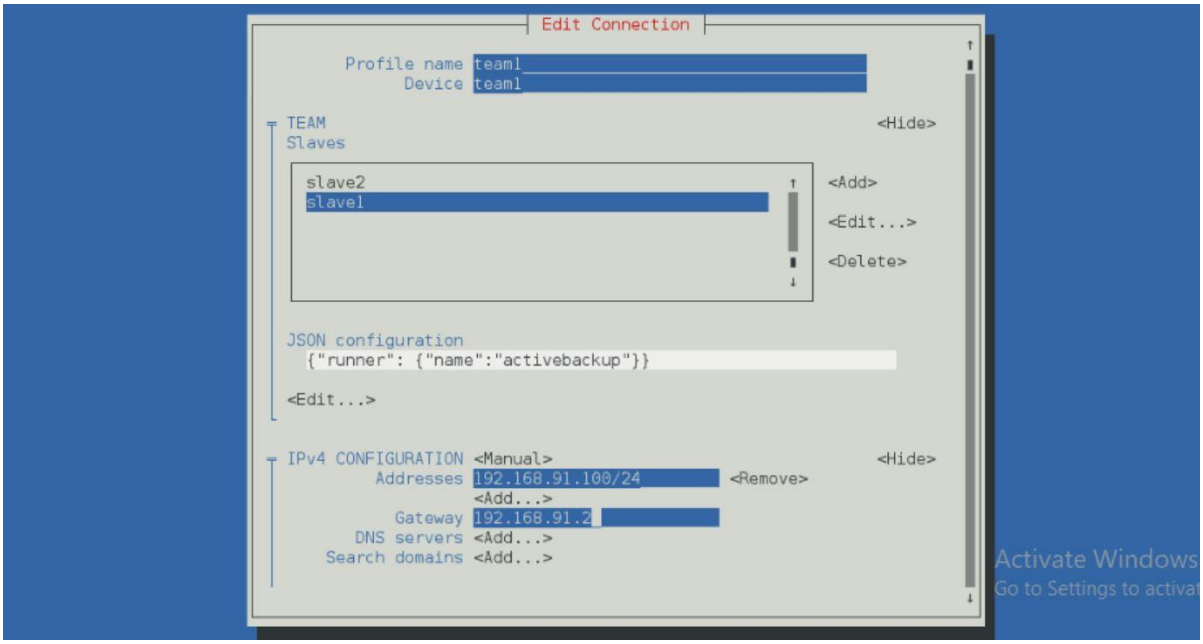
```
[root@server network-scripts]# nmcli connection add type ethernet ifname ens34 con-name slave1 ip4 192.168.91.100/24 gw4 192.168.91.2
Connection 'slave1' (7e045a54-c4c7-4d20-be92-08fe92de0d1b) successfully added.
[root@server network-scripts]# nmcli connection add type ethernet ifname ens35 con-name slave2 ip4 192.168.91.100/24 gw4 192.168.91.2
Connection 'slave2' (14a82664-4832-4178-91b3-d059bada1883) successfully added.
```





Making these interfaces as slaves to the teaming device team1 by creating one.

```
[root@server network-scripts]# nmcli connection add type team ifname team1 con-name team1 config '{"runner": {"name":"activebackup"}}'
Connection 'team1' (37c9d0f9-ecae-46bf-8894-c3d6a92fc16b) successfully added.
[root@server network-scripts]# nmcli connection add type team-slave if-name ens34 con-name slave1 master team1
Error: invalid <setting>.<property> 'if-name'.
[root@server network-scripts]# nmcli connection add type team-slave ifname ens34 con-name slave1 master team1
Connection 'slave1' (3eec11a8-f1fd-4b32-8024-bca036292f54) successfully added.
[root@server network-scripts]# nmcli connection add type team-slave ifname ens35 con-name slave2 master team1
Connection 'slave2' (c3ed32b0-c7aa-41ed-95ef-af78839fb37d) successfully added.
[root@server network-scripts]#
```




```
[root@server network-scripts]# nmcli dev status
DEVICE      TYPE      STATE         CONNECTION
virbr0      bridge    connected     virbr0
ens34       ethernet  connected     slave1
ens35       ethernet  connected     slave2
team1       team      connected     team1
```

```
slave1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        ether 00:0c:29:3b:ac:7a  txqueuelen 1000  (Ethernet)
        RX packets 95  bytes 31582 (30.8 KiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 156  bytes 25243 (24.6 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

slave2: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        ether 00:0c:29:3b:ac:7a  txqueuelen 1000  (Ethernet)
        RX packets 123  bytes 38726 (37.8 KiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 72  bytes 11920 (11.6 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

team1: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.91.100  netmask 255.255.255.0  broadcast 192.168.91.255
        inet6 fe80::e73b:3ec8:9eb2:2854  prefixlen 64  scopeid 0x20<link>
        ether 00:0c:29:3b:ac:7a  txqueuelen 1000  (Ethernet)
        RX packets 9  bytes 2952 (2.8 KiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 33  bytes 4233 (4.1 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0

virbr0: flags=4099<UP,BROADCAST,MULTICAST>  mtu 1500
        inet 192.168.122.1  netmask 255.255.255.0  broadcast 192.168.122.255
        ether 52:54:00:ed:51:11  txqueuelen 1000  (Ethernet)
        RX packets 0  bytes 0 (0.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 0  bytes 0 (0.0 B)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

```
[root@server pub]# yum install -y teamd
Loaded plugins: langpacks, product-id, search-disabled-repos, subscription-manager
This system is not registered to Red Hat Subscription Management. You can use subscription-manager to register.
server                                                                                                  | 2.9 kB  00:00:00
server/primary_db                                                                                       | 3.8 MB  00:00:00
Package teamd-1.25-4.el7.x86_64 already installed and latest version
Nothing to do
[root@server pub]#
```

```
[root@server network-scripts]# ls
ifcfg-lo      ifdown-eth   ifdown-post    ifdown-TeamPort  ifup-eth   ifup-plip    ifup-sit       init.ipv6-global
ifcfg-slave1  ifdown-ib    ifdown-ppp     ifdown-tunnel    ifup-ib    ifup-plusb   ifup-Team      network-functions
ifcfg-slave2  ifdown-ippp  ifdown-routes  ifup             ifup-ippp  ifup-post    ifup-TeamPort  network-functions-ipv6
ifdown        ifdown-ipv6  ifdown-sit     ifup-aliases     ifup-ipv6  ifup-ppp     ifup-tunnel
ifdown-bnep   ifdown-isdn  ifdown-Team    ifup-bnep        ifup-isdn  ifup-routes  ifup-wireless
[root@server network-scripts]# ls
ifcfg-lo        ifcfg-team1  ifdown-ippp  ifdown-routes    ifup          ifup-ippp   ifup-post    ifup-TeamPort      network-functions-ipv6
ifcfg-slave1    ifdown       ifdown-ipv6  ifdown-sit       ifup-aliases  ifup-ipv6   ifup-ppp     ifup-tunnel
ifcfg-slave1-1  ifdown-bnep  ifdown-isdn  ifdown-Team      ifup-bnep     ifup-isdn   ifup-routes  ifup-wireless
ifcfg-slave2    ifdown-eth   ifdown-post  ifdown-TeamPort  ifup-eth      ifup-plip   ifup-sit     init.ipv6-global
ifcfg-slave2-1  ifdown-ib    ifdown-ppp   ifdown-tunnel    ifup-ib       ifup-plusb  ifup-Team    network-functions
[root@server network-scripts]# vim ifcfg-slave1-1
[root@server network-scripts]# vim ifcfg-slave1-1
[root@server network-scripts]# vim ifcfg-slave1
[root@server network-scripts]# vim ifcfg-slave2-1
[root@server network-scripts]# vim ifcfg-slave2
[root@server network-scripts]#
```

```
[root@server network-scripts]# systemctl restart network
[root@server network-scripts]# teamdctl team1 state
setup:
  runner: activebackup
ports:
  ens34
    link watches:
      link summary: up
      instance[link_watch_0]:
        name: ethtool
        link: up
        down count: 0
  ens35
    link watches:
      link summary: up
      instance[link_watch_0]:
        name: ethtool
        link: up
        down count: 0
runner:
  active port: ens34
```

```
[root@server network-scripts]# teamnl team1 ports
 4: ens35: up 1000Mbit FD
 3: ens34: up 1000Mbit FD
[root@server network-scripts]# ip addr | grep team1
3: ens34: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast master team1 state UP qlen 1000
4: ens35: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc pfifo_fast master team1 state UP qlen 1000
5: team1: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP qlen 1000
    inet 192.168.91.100/24 brd 192.168.91.255 scope global team1
[root@server network-scripts]#
```

Below are the file content which I have edited in the directory of /etc/sysconfig/network-scripts

```
#TYPE=Ethernet
#BOOTPROTO=none
#DEFROUTE=yes
#IPV4_FAILURE_FATAL=no
#IPV6INIT=yes
#IPV6_AUTOCONF=yes
#IPV6_DEFROUTE=yes
#IPV6_FAILURE_FATAL=no
#IPV6_ADDR_GEN_MODE=stable-privacy
#NAME=slave1
#UUID=7e045a54-c4c7-4d20-be92-08fe92de0d1b
#DEVICE=ens34
#ONBOOT=yes
#IPADDR=192.168.91.100
#PREFIX=24
#GATEWAY=192.168.91.2
#IPV6_PEERDNS=yes
#IPV6_PEERROUTES=yes
NAME=slave1
UUID=3eec11a8-f1fd-4b32-8024-bca036292f54
DEVICE=ens34
ONBOOT=yes
TEAM_MASTER=team1
DEVICETYPE=TeamPort
~
~
~
~
~
~
~
"ifcfg-slave1" 25L, 472C
```

```
#TYPE=Ethernet
#BOOTPROTO=none
#DEFROUTE=yes
#IPV4_FAILURE_FATAL=no
#IPV6INIT=yes
#IPV6_AUTOCONF=yes
#IPV6_DEFROUTE=yes
#IPV6_FAILURE_FATAL=no
#IPV6_ADDR_GEN_MODE=stable-privacy
#NAME=slave2
#UUID=14a82664-4832-4178-91b3-d059bada1883
#DEVICE=ens35
#ONBOOT=yes
#IPADDR=192.168.91.100
#PREFIX=24
#GATEWAY=192.168.91.2
#IPV6_PEERDNS=yes
#IPV6_PEERROUTES=yes
NAME=slave2
UUID=c3ed32b0-c7aa-41ed-95ef-af78839fb37d
DEVICE=ens35
ONBOOT=yes
TEAM_MASTER=team1
DEVICETYPE=TeamPort
~
~
~
~
~
~
~
~
"ifcfg-slave2" 24L, 471C
```

Pinging the team1 ip from client

```
PING 192.168.91.100 (192.168.91.100) 56(84) bytes of data.
64 bytes from 192.168.91.100: icmp_seq=1 ttl=64 time=0.737 ms
64 bytes from 192.168.91.100: icmp_seq=2 ttl=64 time=0.859 ms
64 bytes from 192.168.91.100: icmp_seq=3 ttl=64 time=0.831 ms
64 bytes from 192.168.91.100: icmp_seq=4 ttl=64 time=0.707 ms
64 bytes from 192.168.91.100: icmp_seq=5 ttl=64 time=1.12 ms
64 bytes from 192.168.91.100: icmp_seq=6 ttl=64 time=0.536 ms
64 bytes from 192.168.91.100: icmp_seq=7 ttl=64 time=1.00 ms
64 bytes from 192.168.91.100: icmp_seq=8 ttl=64 time=0.708 ms
64 bytes from 192.168.91.100: icmp_seq=9 ttl=64 time=0.592 ms
64 bytes from 192.168.91.100: icmp_seq=10 ttl=64 time=0.675 ms
64 bytes from 192.168.91.100: icmp_seq=11 ttl=64 time=0.835 ms
64 bytes from 192.168.91.100: icmp_seq=12 ttl=64 time=0.620 ms
64 bytes from 192.168.91.100: icmp_seq=13 ttl=64 time=0.550 ms
64 bytes from 192.168.91.100: icmp_seq=14 ttl=64 time=0.788 ms
64 bytes from 192.168.91.100: icmp_seq=15 ttl=64 time=0.788 ms
64 bytes from 192.168.91.100: icmp_seq=16 ttl=64 time=0.534 ms
64 bytes from 192.168.91.100: icmp_seq=17 ttl=64 time=0.658 ms
64 bytes from 192.168.91.100: icmp_seq=18 ttl=64 time=0.762 ms
64 bytes from 192.168.91.100: icmp_seq=19 ttl=64 time=0.575 ms
64 bytes from 192.168.91.100: icmp_seq=20 ttl=64 time=0.635 ms
64 bytes from 192.168.91.100: icmp_seq=21 ttl=64 time=0.508 ms
```

From Server end I have made an ip ens34 down

```
[root@server network-scripts]# ifdown ens34
```

```
64 bytes from 192.168.91.100: icmp_seq=20 ttl=64 time=0.635 ms
64 bytes from 192.168.91.100: icmp_seq=21 ttl=64 time=0.508 ms
64 bytes from 192.168.91.100: icmp_seq=49 ttl=64 time=1.24 ms
64 bytes from 192.168.91.100: icmp_seq=50 ttl=64 time=0.863 ms
64 bytes from 192.168.91.100: icmp_seq=51 ttl=64 time=0.682 ms
64 bytes from 192.168.91.100: icmp_seq=52 ttl=64 time=0.562 ms
64 bytes from 192.168.91.100: icmp_seq=53 ttl=64 time=0.671 ms
64 bytes from 192.168.91.100: icmp_seq=54 ttl=64 time=0.532 ms
64 bytes from 192.168.91.100: icmp_seq=55 ttl=64 time=0.609 ms
64 bytes from 192.168.91.100: icmp_seq=56 ttl=64 time=0.762 ms
64 bytes from 192.168.91.100: icmp_seq=57 ttl=64 time=0.860 ms
64 bytes from 192.168.91.100: icmp_seq=58 ttl=64 time=0.658 ms
64 bytes from 192.168.91.100: icmp_seq=59 ttl=64 time=0.721 ms
64 bytes from 192.168.91.100: icmp_seq=60 ttl=64 time=0.889 ms
64 bytes from 192.168.91.100: icmp_seq=61 ttl=64 time=0.754 ms
64 bytes from 192.168.91.100: icmp_seq=62 ttl=64 time=0.851 ms
64 bytes from 192.168.91.100: icmp_seq=63 ttl=64 time=0.769 ms
64 bytes from 192.168.91.100: icmp_seq=64 ttl=64 time=0.930 ms
64 bytes from 192.168.91.100: icmp_seq=65 ttl=64 time=0.497 ms
64 bytes from 192.168.91.100: icmp_seq=66 ttl=64 time=0.510 ms
64 bytes from 192.168.91.100: icmp_seq=67 ttl=64 time=0.830 ms
64 bytes from 192.168.91.100: icmp_seq=68 ttl=64 time=1.90 ms
64 bytes from 192.168.91.100: icmp_seq=69 ttl=64 time=0.537 ms
64 bytes from 192.168.91.100: icmp_seq=70 ttl=64 time=0.805 ms
64 bytes from 192.168.91.100: icmp_seq=71 ttl=64 time=0.635 ms
```

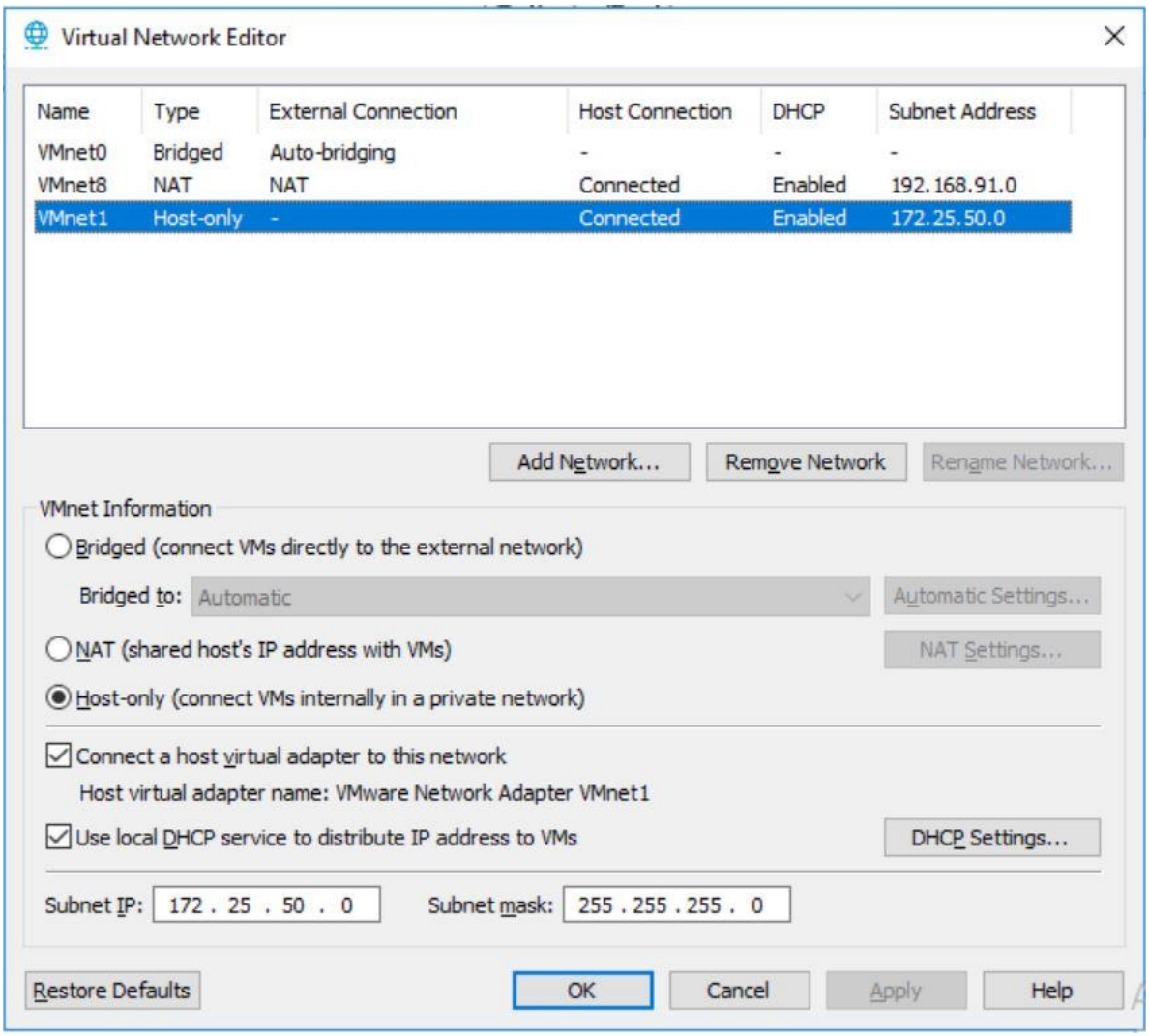
Content of /etc/resolv.conf file

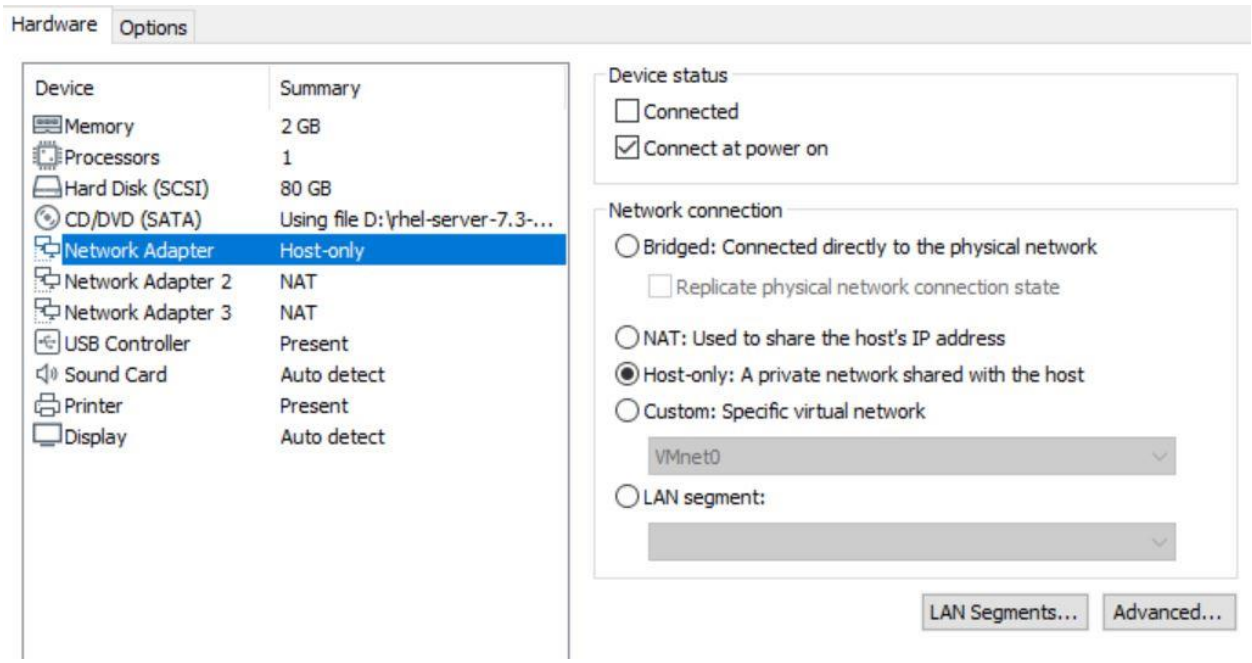
```
[root@server bigbang]# cat /etc/resolv.conf
# Generated by NetworkManager
search example.com
```

2) Exporting **/exports/hyponated** directory using nfsv4

```
[root@server ~]# rpm -q nfs-utils
nfs-utils-1.3.0-0.33.el7.x86_64
[root@server ~]# mkdir -p /exports/hyponated
[root@server ~]# vim /etc/exports
[root@server ~]# cat /etc/exports
/exports/hyponated      172.25.50.0/24(rw,sync)
[root@server ~]#
```

Now, changed the NAT settings in virtual network editor and applied that at client VM and change the connection type in setting.





Below is the ip address which was generated in client machine

```
[root@client1 ~]# ifconfig | more
ens33: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 172.25.50.129  netmask 255.255.255.0  broadcast 172.25.50.255
        inet6 fe80::eb3a:30e8:d3ac:adle  prefixlen 64  scopeid 0x20<link>
        ether 00:0c:29:f6:25:c9  txqueuelen 1000  (Ethernet)
        RX packets 129  bytes 14948 (14.5 KiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 146  bytes 14641 (14.2 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

Now, adding a route through the gateway of 192.168.91.2 to the client ip in server

```
[root@server ~]# ip route add 172.25.50.129 via 192.168.91.2
[root@server ~]# ip r
default via 192.168.91.2 dev ens34  proto static  metric 100
default via 192.168.91.2 dev team1  proto static  metric 350
172.25.50.129 via 192.168.91.2 dev ens34
```

Below is the routing table of server machine. Where we can find the route to client IP

```
[root@server network-scripts]# netstat -nr
Kernel IP routing table
Destination     Gateway         Genmask         Flags   MSS Window  irtt Iface
0.0.0.0         192.168.91.2    0.0.0.0         UG        0 0          0 ens34
0.0.0.0         192.168.91.2    0.0.0.0         UG        0 0          0 team1
172.25.50.129   192.168.91.2    255.255.255.255 UGH       0 0          0 ens34
192.168.91.0    0.0.0.0         255.255.255.0   U         0 0          0 ens34
192.168.91.0    0.0.0.0         255.255.255.0   U         0 0          0 team1
192.168.122.0   0.0.0.0         255.255.255.0   U         0 0          0 virbr0
```

Added the same info in /etc/sysconfig/network-scripts/route-ens34

```
[root@server network-scripts]# vim route-ens34
[root@server network-scripts]# cat route-ens34
172.25.50.129   via     192.168.91.2    dev     ens34
```

3)

I have created a directory of /exports/bigbang and group named with bigbang. Created a user Natasha by adding into bigbang group. Later, I have changed the group owner to bigbang. In order to share the directory through samba we have to install Samba packages.

```
[root@server ~]# mkdir /exports/bigbang
[root@server ~]# groupadd bigbang
[root@server ~]# useradd -G bigbang natasha
[root@server ~]# chgrp bigbang   /exports/bigbang/
[root@server ~]# ls -ld /exports/bigbang/
drwxr-xr-x. 2 root bigbang 6 Aug 28 19:43 /exports/bigbang/
[root@server ~]# yum install samba -y
```

```
[root@server bigbang]# groupmems -g bigbang -l
natasha
```

After installing the packages. I have change the contexts of the directory /exports/bigbang and checked by creating a file whether, the context is getting reflecting automatically or not.

```
[root@server ~]# chcon -Rt samba_share_t /exports/bigbang/
[root@server ~]# semanage fcontext -a -t samba_share_t '/exports/bigbang(/.*)?'
[root@server ~]# cd /exports/bigbang/
[root@server bigbang]# touch f1
[root@server bigbang]# ls -l
total 0
-rw-r--r--. 1 root root 0 Aug 28 19:59 f1
[root@server bigbang]# ls -lZ
-rw-r--r--. root root unconfined_u:object_r:samba_share_t:s0 f1
[root@server bigbang]#
```

Changing the directory permissions so that the files group owner will get updated automatically

```
[root@server ~]# chmod 2775 /exports/bigbang/
[root@server ~]# ls -ld /exports/bigbang/
drwxrwsr-x. 2 root bigbang 46 Aug 28 22:29 /exports/bigbang/
```

Now, I have created a share named with bigbang. Where it will be sharing /exports/bigbang directory which can be accessible only by the user Natasha.

```
[root@server bigbang]# vim /etc/samba/smb.conf
You have new mail in /var/spool/mail/root
[root@server bigbang]# systemctl restart smb
```

Below is the content which I have updated in /etc/samba/smb.conf file.

```
[bigbang]
        comment = Bigbang Stuff
        path = /exports/bigbang
        public = no
        valid users = natasha
        browseable = yes
        writable = no
        printable = no
        write list = @bigbang
```

Now, I have created a smb password so that user Natasha will be able to access by using that to access the files from client side.

```
[root@server bigbang]# smbpasswd -a natasha
New SMB password:
Retype new SMB password:
Added user natasha.
[root@server bigbang]#
```

Now, we need to check if sebools are enabled. Because even if we give all the permissions and access to the users Selinux may block that due to security. In order to make it accessible through Selinux. We need to enable some Booleans.

```
[root@server bigbang]# getsebool -a | grep samba
samba_create_home_dirs --> off
samba_domain_controller --> off
samba_enable_home_dirs --> off
samba_export_all_ro --> off
samba_export_all_rw --> off
samba_load_libgfapi --> off
samba_portmapper --> off
samba_run_unconfined --> off
samba_share_fusefs --> off
samba_share_nfs --> off
sanlock_use_samba --> off
tmpreaper_use_samba --> off
use_samba_home_dirs --> off
virt_use_samba --> off
[root@server bigbang]# setsebool -P samba_create_home_dirs=1
[root@server bigbang]# setsebool -P samba_domain_controller=1
[root@server bigbang]# setsebool -P samba_enable_home_dirs=1
[root@server bigbang]# setsebool -P samba_export_all_ro=1
[root@server bigbang]# setsebool -P samba_export_all_rw=1
[root@server bigbang]# getsebool -a | grep samba
samba_create_home_dirs --> on
samba_domain_controller --> on
samba_enable_home_dirs --> on
samba_export_all_ro --> on
samba_export_all_rw --> on
samba_load_libgfapi --> off
samba_portmapper --> off
samba_run_unconfined --> off
samba_share_fusefs --> off
samba_share_nfs --> off
sanlock_use_samba --> off
tmpreaper_use_samba --> off
```

After making the required Booleans enabled. Restart and enable the services of samba. So that the changes will get updated. I have flushed the iptables in order for not to facing any issues in accessing.

```
[root@server bigbang]# systemctl restart smb
[root@server bigbang]# systemctl enable smb
Created symlink from /etc/systemd/system/multi-user.target.wants/smb.service to /usr/lib/systemd/system/smb.service.
[root@server bigbang]# iptables -F
[root@server bigbang]#
```


At client end we need to install samba-client packages inorder to access the sharable folder of Server.

```
[root@client1 ~]# yum install samba-client* -y
```

Later, I have checked if package was installed or not and listed the available shares through natasha user.

```
[root@client1 ~]# rpm -q samba-client
samba-client-4.4.4-9.el7.x86_64
[root@client1 ~]# smbclient -L //192.168.91.100/bigbang -U  natasha
Enter natasha's password:
Domain=[SAMBA] OS=[Windows 6.1] Server=[Samba 4.4.4]

        Sharename       Type      Comment
        ---------       ----      -------
        print$          Disk      Printer Drivers
        bigbang         Disk      Bigbang Stuff
        IPC$            IPC       IPC Service (Samba 4.4.4)
        natasha         Disk      Home Directories
Domain=[SAMBA] OS=[Windows 6.1] Server=[Samba 4.4.4]

        Server               Comment
        ---------            -------

        Workgroup            Master
        ---------            -------
```

Mounting the server directory on client machine

```
[root@client1 ~]# mount -o username=natasha //192.168.91.100/bigbang /server
Password for natasha@//192.168.91.100/bigbang:  *********
[root@client1 ~]# df -hT
Filesystem              Type      Size  Used Avail Use% Mounted on
/dev/mapper/rhel-root   xfs        50G   11G   40G  22% /
devtmpfs                devtmpfs  977M     0  977M   0% /dev
tmpfs                   tmpfs     993M  144K  993M   1% /dev/shm
tmpfs                   tmpfs     993M  9.1M  984M   1% /run
tmpfs                   tmpfs     993M     0  993M   0% /sys/fs/cgroup
/dev/mapper/rhel-home   xfs        28G   33M   28G   1% /home
/dev/sda1               xfs       497M  179M  319M  36% /boot
tmpfs                   tmpfs     199M  8.0K  199M   1% /run/user/0
/dev/sr0                iso9660   3.6G  3.6G     0 100% /run/media/root/RHEL-7.3 Server.x86_64
//192.168.91.100/bigbang cifs      47G  7.0G   40G  15% /server
```

Cifscreds is a tool which is used to manage the credentials

```
[root@client1 ~]# su - natasha
Last login: Fri Aug 28 16:17:01 IST 2020 on pts/0
[natasha@client1 ~]$ cifscreds add 192.168.91.100
Password:
[natasha@client1 ~]$ cd /server
[natasha@client1 server]$ touch f2
[natasha@client1 server]$ touch f3
[natasha@client1 server]$ ls  -l
total 0
-rw-r--r--. 1 root    root 0 Aug 28  2020 f1
-rw-r--r--. 1 natasha 1002 0 Aug 28 16:37 f2
-rw-r--r--. 1 natasha 1002 0 Aug 28 16:37 f3
```

Now, I have checked in server whether group owner is getting applied automatically or not and it is working as we have given set group ID.

```
[root@server ~]# ls -l /exports/bigbang/
total 0
-rw-r--r--. 1 root    bigbang 0 Aug 28 19:59 f1
-rw-r--r--. 1 natasha bigbang 0 Aug 28 16:37 f2
-rw-r--r--. 1 natasha bigbang 0 Aug 28 16:37 f3
-rw-r--r--. 1 natasha bigbang 0 Aug 28 17:02 f4
```

4)

I have installed httpd service. To configure a webpage in my server.

```
[root@server ~]# rpm -q httpd
httpd-2.4.6-45.el7.x86_64
[root@server ~]# cd /var/www/html/
[root@server html]# cat index.html
Hello
This is just a trial and beginning.
[root@server html]# cd /etc/httpd/conf.d/
[root@server conf.d]# vim web.conf
[root@server conf.d]# httpd -t
Syntax OK
[root@server conf.d]# systemctl restart httpd
[root@server conf.d]#
```

Below is the content which I have given in web.conf file.

```
<VirtualHost server.example.com:80>
ServerAdmin root@server.example.com
DocumentRoot /var/www/html
ServerName server.example.com
ErrorLog logs/www.example.com-error_log
CustomLog logs/www.example.com-access_log common
</VirtualHost>
```

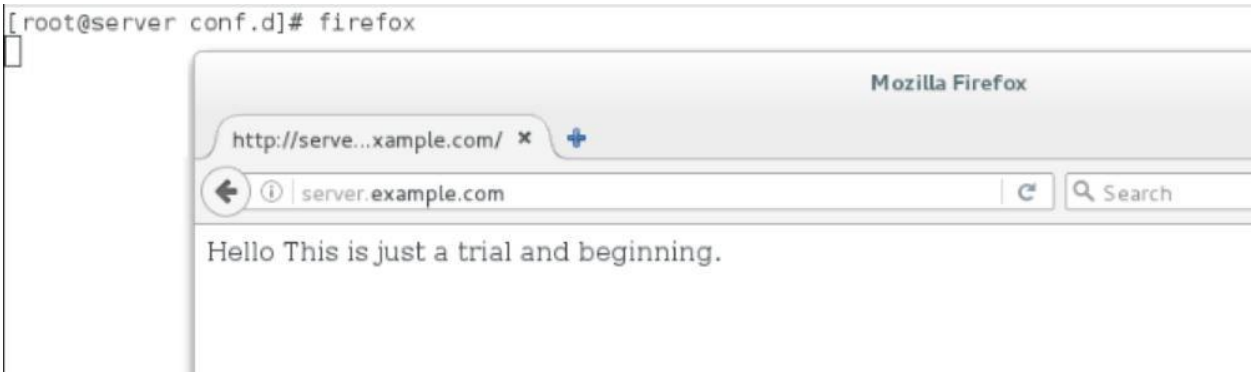
Client IP address:

```
ens33: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.91.132  netmask 255.255.255.0  broadcast 192.168.91.255
        inet6 fe80::eb3a:30e8:d3ac:ad1e  prefixlen 64  scopeid 0x20<link>
        ether 00:0c:29:f6:25:c9  txqueuelen 1000  (Ethernet)
        RX packets 358  bytes 26750 (26.1 KiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 22  bytes 4152 (4.0 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

Adding source and services to firewall.

```
[root@server conf.d]# firewall-cmd --permanent --zone=work --add-source=192.168.91.132
success
[root@server conf.d]# firewall-cmd --permanent --zone=work --add-service=http
success
[root@server conf.d]# firewall-cmd --permanent --zone=work --add-service=ftp
success
[root@server conf.d]# firewall-cmd --reload
success
[root@server conf.d]# firewall-cmd --zone=work --list-all
work (active)
  target: default
  icmp-block-inversion: no
  interfaces:
  sources: 192.168.91.132
  services: dhcpv6-client ftp http ssh
  ports:
  protocols:
  masquerade: no
  forward-ports:
  sourceports:
  icmp-blocks:
  rich rules:
```

Checked whether web page is working or not.



Now install squid services and make them persistant.

```
[root@server conf.d]# yum install squid -y
```

```
[root@server conf.d]# rpm -q squid
squid-3.5.20-2.el7.x86_64
[root@server conf.d]# systemctl start squid
[root@server conf.d]# systemctl enable squid
Created symlink from /etc/systemd/system/multi-user.target.wants/squid.service to /usr/lib/systemd/system/squid.service.
[root@server conf.d]# systemctl status squid
● squid.service - Squid caching proxy
   Loaded: loaded (/usr/lib/systemd/system/squid.service; enabled; vendor preset: disabled)
   Active: active (running) since Mon 2020-08-31 02:00:56 IST; 13s ago
 Main PID: 5057 (squid)
   CGroup: /system.slice/squid.service
           ├─5057 /usr/sbin/squid -f /etc/squid/squid.conf
           ├─5062 (squid-1) -f /etc/squid/squid.conf
           └─5063 (logfile-daemon) /var/log/squid/access.log

Aug 31 02:00:56 server.example.com systemd[1]: Starting Squid caching proxy...
Aug 31 02:00:56 server.example.com systemd[1]: Started Squid caching proxy.
Aug 31 02:00:56 server.example.com squid[5057]: Squid Parent: will start 1 kids
Aug 31 02:00:56 server.example.com squid[5057]: Squid Parent: (squid-1) process 5062 started
[root@server conf.d]#
```


Add he below lines in /etc/squid/squid.conf

```
acl localnet src 192.168.91.0/24

acl SSL_ports port 443
acl Safe_ports port 8080        #http access
```

Now, install httpd tools in server and create htpasswd

```
[root@server ~]# yum install httpd-tools
```

```
[root@server ~]# yum install httpd-tools
Loaded plugins: langpacks, product-id, search-disabled-repos, subscription-manager
This system is not registered to Red Hat Subscription Management. You can use subscription-manager to register.
Package httpd-tools-2.4.6-45.el7.x86_64 already installed and latest version
Nothing to do
[root@server ~]# touch /etc/squid/passwd
[root@server ~]# chown squid:squid /etc/squid/passwd
[root@server ~]# htpasswd /etc/squid/passwd proxyclient
New password:
Re-type new password:
Adding password for user proxyclient
[root@server ~]# vim /etc/squid/squid.conf
```

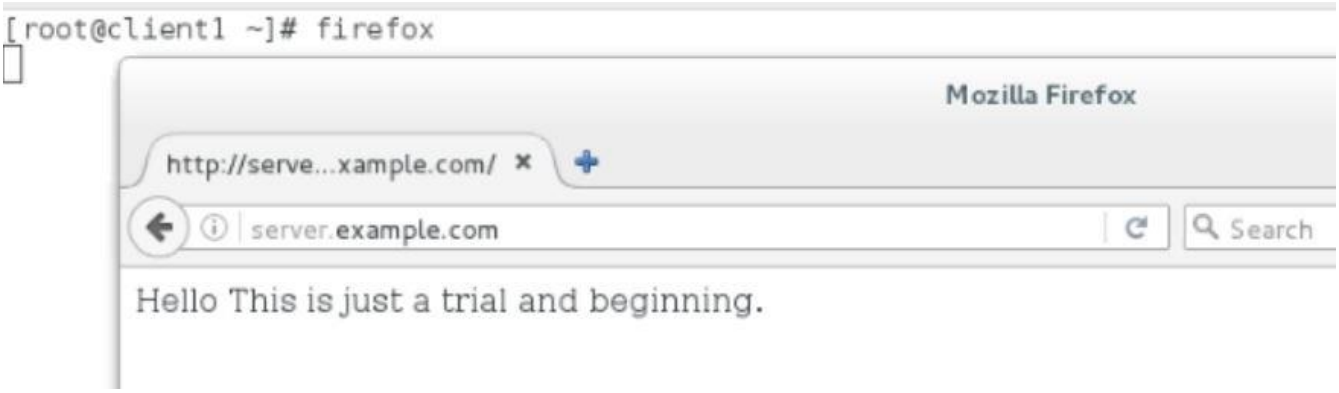
Below content was added in /etc/squid/squid.conf and restarted the service and flushed the iptables.

```
auth_param basic program /usr/lib64/squid/basic_ncsa_auth /etc/squid/passwd
auth_param basic children 5
auth_param basic realm squid basic authentication
auth_param basic credentialsttl 2 hours
acl auth_users proxy_auth REQUIRED
http_access allow example.com
```

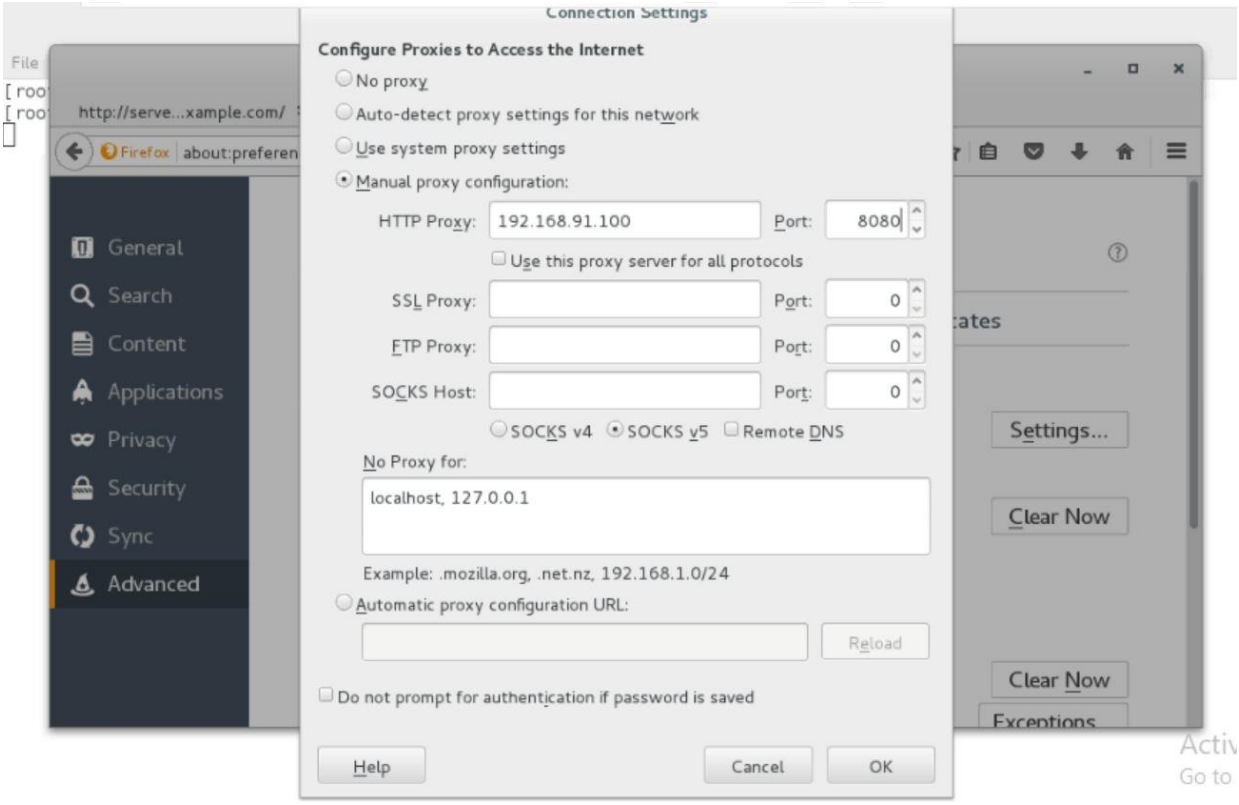
```
[root@server ~]# vim /etc/squid/squid.conf
[root@server ~]# systemctl restart squid
[root@server ~]# iptables -F
[root@server ~]# vim /etc/hosts
[root@server ~]# cat /etc/hosts
127.0.0.1   localhost localhost.localdomain localhost4 localhost4.localdomain4
::1         localhost localhost.localdomain localhost6 localhost6.localdomain6
192.168.91.132  client1.example.com
[root@server ~]#
```

Client /etc/hosts file:

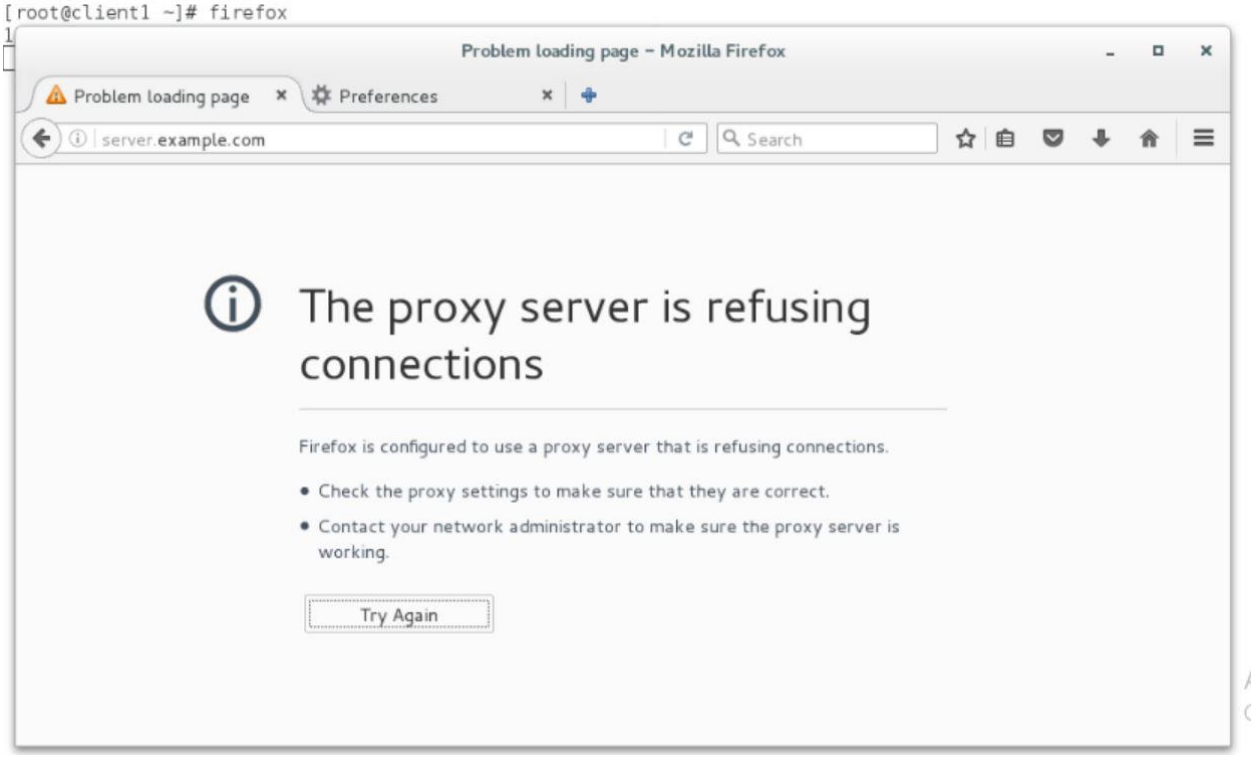
```
[root@client1 ~]# cat /etc/hosts
127.0.0.1   localhost localhost.localdomain localhost4 localhost4.localdomain4
::1         localhost localhost.localdomain localhost6 localhost6.localdomain6
192.168.91.142  desktop.example.com
192.168.91.100  server.example.com
192.168.91.128  client1.example.com
192.168.91.158  server3.example.com
[root@client1 ~]# firefox
```



Added the server ip in clinet connection settings and the port which we have added in squid.conf file



```
[root@client1 ~]# firefox
```



5) checking the mounted directories and edited /etc/fstab

```
[root@server ~]# df -hT
Filesystem            Type      Size  Used Avail Use% Mounted on
/dev/mapper/rhel-root xfs        50G  8.3G   42G  17% /
devtmpfs              devtmpfs  896M     0  896M   0% /dev
tmpfs                 tmpfs     912M  144K  912M   1% /dev/shm
tmpfs                 tmpfs     912M  9.1M  903M   1% /run
tmpfs                 tmpfs     912M     0  912M   0% /sys/fs/cgroup
/dev/mapper/rhel-home xfs        48G   39M   48G   1% /home
/dev/sda1             xfs       497M  200M  298M  41% /boot
/dev/mapper/teja      xfs       5.0G   33M  5.0G   1% /secret
tmpfs                 tmpfs     183M  8.0K  183M   1% /run/user/0
/dev/sr0              iso9660   3.6G  3.6G     0 100% /run/media/root/RHEL-7.3 Server.x86_64
[root@server ~]# umount /home
[root@server ~]# vim /etc/fstab
[root@server ~]# mount /home
```

Below is the content which I have edited in /etc/fstab

```
/dev/mapper/rhel-home   /home                   xfs     defaults,uquota,gquota        1 2
```

Added soft and hard limit for user Natasha

```
[root@server ~]# xfs_quota -x -c 'limit -u bsoft=80k bhard=120k natasha' /home
[root@server ~]# xfs_quota -x -c 'report -h' /home
User quota on /home (/dev/mapper/rhel-home)
                        Blocks
User ID      Used   Soft   Hard Warn/Grace
---------- --------------------------------
root            0      0      0  00 [------]
teja          20K      0      0  00 [------]
natasha       16K    80K   120K  00 [------]
```

```
[natasha@server ~]$ dd if=/dev/zero of=/home/natasha/somefile bs=1024 count=80
80+0 records in
80+0 records out
81920 bytes (82 kB) copied, 0.000353945 s, 231 MB/s

[natasha@server ~]$ dd if=/dev/zero of=/home/natasha/somefile bs=1024 count=120
dd: failed to open '/home/natasha/somefile': Disk quota exceeded
```