

Lab 7: DHCP

In this lab, you will learn how to setup a DHCP client and a DHCP server. Perform the indicated steps, and write the answers to questions in the appropriate spaces on this hand-out. Turn-in one completed handout per team and be sure to include the names of each team member.

Boot the System

Prepare the system for the current lab.

Step 1. Boot your system into single-user mode.

Configure the System as a DHCP Client

Configure the system to obtain IP configuration information from a DHCP server

Step 2. Comment out or remove any existing lines in the file `/etc/sysconfig/network-scripts/ifcfg-eth0` and add the lines below. This will cause the Red Hat **ifup** script to use DHCP to obtain IP configuration information.

```
DEVICE=eth0
BOOTPROTO=dhcp
ONBOOT=yes
```

Step 3. Prevent the system from using a DNS server to resolve DNS queries by removing the resolver file `/etc/resolv.conf`.

Step 4. Test that you can bring up the **eth0** interface with **ifup**.

Q1. What is your IP address, netmask, and broadcast address? _____

Step 5. Once the configuration is working, check connectivity by ping'ing another host in the lab.

Step 6. Now ping the internet host **www.yahoo.com**.

Q2. How did ping figure out the IP address of **www.yahoo.com**? _____

Q3. What is inside the file `/etc/resolv.conf`? _____

Step 7. Bring the system into multi-user mode.

Configure the DHCP Server Software

Setup the DHCP server software to provide IP network information to clients..

Step 8. Determine if the system has the DHCP server package installed (if it is installed, skip to Step 10). Look for output from:

```
$ rpm -qa | grep dhcp-2.0
```

Step 9. Obtain a copy of the DHCP server RPM (its name begins with **dhcp-**) and install it (**rpm -ihv package-name**). The software is available via anonymous FTP on the **inet-gw** system or on a Red Hat CD-ROM.

Step 10. To see the contents of an RPM, you can use **rpm -qpl package-name**. Check out the contents of the DHCP server RPM package to determine where **rpm** installed the various components.

Q4. What commands were installed? Where? _____

Q5. What configuration files were installed? Where? _____

Q6. Where was the **dhcpd.leases** files stored? _____

Q7. Where is the sample **dhcpd.conf** file? _____

Step 11. Examine the sample **dhcpd.conf.sample** taking note of some of the configuration information provided by the DHCP.

Step 12. Create a DHCP server configuration file **/etc/dhcpd.conf**. Add the following information to the file:

```
authoritative;

default-lease-time 3600;
option subnet-mask 255.255.255.0;
option domain-name "cis68c2.fhda.edu";
option domain-name-servers 153.18.8.1, 153.18.12.252;
option interface-mtu 1500;

subnet 192.168.1.0 netmask 255.255.255.0 {
    option routers 192.168.1.1;
    option broadcast-address 192.168.1.255;
    range 192.168.1.100 192.168.1.199;
}
```

Q8. What IP addresses will your DHCP server supply? _____

Step 13. Agree with your neighbor which system will be the DHCP server - the other system will be the DHCP client. Bring both server and client systems down to single user mode. Your eth0 interfaces should now be down. Disconnect the network cable from the eth0 interface, and connect a crossover cable between your machines eth0 interfaces. The server system will need its eth0 interface reconfigured to be on the same network as the IP addresses being leased. The client system is already configured to obtain its IP information via DHCP from the first part of the lab.

Step 14. **Server System:** Configure your eth0 interface to be on the same network as the addresses configured to be leased above in your **/etc/dhcpd.conf** file - the IP address for the eth0 interface will be 192.168.1.N where N is your machine number.

Step 15. **Server System:** Create an empty lease file **/var/state/dhcp/dhcpd.leases**.

```
# cat > /var/state/dhcp/dhcpd.leases
```

Step 16. **Server System:** The **dhcpd** daemon has an option to test the syntax and validity of the **dhcpd.conf** file – this is done with the **-t** option. Test that your **dhcpd.conf** file has the proper syntax. It also tests that the IP information you are going to lease makes sense for your network. Be sure to fix any errors before proceeding.

```
# dhcpd -t
```

Q9. How do you know the DHCP server will not lease your eth0 interface's IP address? _____

Step 17. **Server System:** The **dhcpd** daemon logs messages via **syslog**, which is not running since you are in single-user mode. Start the **syslog** logging daemon:

```
# /etc/init.d/syslog start
```

Step 18. **Server System:** Start **dhcpd**:

```
# dhcpd
```

Step 19. **Server System:** Messages from **dhcpd** are logged via **syslog** to the file **/var/log/messages**. Use **tail -f** on that file to see the messages as they are added to the file. Hint: hit <Return> a couple of times after running the **tail** command to clear a few blank lines to make new messages stand out more clearly.

```
# tail -f /var/log/messages
```

Step 20. **Server System:** Once it appears that the **dhcpcd** server is running correctly, the client system can now bring up its eth0 interface. If **dhcpcd** is running, DHCP requests and response will appear on the screen of the server system, and if everything is really working correctly, the client system will have a valid IP address leased from the DHCP server.

Step 21. Test the network connection by ping'ing the other system.

Q10. What is the sequence of DHCP messages sent/received by the DHCP server system? _____

Step 22. Bring down the client's eth0 interface, while watching the server's **dhcpcd** messages as they appear in **/var/log/messages**.

Q11. What is the sequence of DHCP messages sent/received by the DHCP server system? _____

Step 23. Bring up the client's eth0 interface again, still watching the server's **dhcpcd** messages.

Q12. What is the sequence of DHCP messages sent/received by the DHCP server system: _____

Step 24. Bring down the client's eth0 interface on final time, still watching the server's **dhcpcd** messages.

Q13. What is the sequence of DHCP messages sent/received by the DHCP server system: _____

Step 25. Now bring down both interfaces, kill the DHCP server on the server system, and switch roles so that the client system becomes the server, and the server becomes the client. Go back to Step 13 and repeat the steps with your roles reversed.

Extra Credit

Setup a second interface to provide DHCP leased IP addresses to a second network.

Step 26. Configure the second interface on a system with two NICs, and connect a cross-over cable from that interface to a third system. Then, configure the DHCP server to provide IP addresses for that network as well. Hint: you will need another **subnet** clause in your DHCP server configuration file.

Step 27. Even more fun, configure the server system to route traffic from the first network to the second network.