NETWORK LAB MANUAL – PART 2

Exercise 1:

To learn to check for *zebra* package and start the *zebra daemon* and understand how to log into the daemon command line interface.

NOTE: For complete and detailed information, look at *http://www.zebra.org/zebra/index.html*.

To do: Make sure *zebra* is installed on the machine. (Checking for any package can be done using the command *whereis*). If it is not, you need to install the *rpm* or get the *tar.gz* file and *make* and *make install* the package.

How To: Check if there is a file called */usr/local/etc/zebra.conf* or */usr/local/etc/zebra/zebra.conf*. If there is, then proceed; otherwise, create this file and type the following into the file and save it:

```
hostname <RouterName>
password <passwd>
enable password <passwd>
```

Run zebra as a daemon – for e.g., */usr/sbin/zebra -d*. Now, you can connect to the *zebra* daemon using the following command:

```
% telnet localhost 2601
Trying 127.0.0.1...
Connected to localhost.
Escape character is '^]'.

Hello, this is zebra (version 0.94)
Copyright 1997-2000 Kunihiro Ishiguro


User Access Verification

Password: XXXXX
Router> ?
  enable            Turn on privileged commands
  exit              Exit current mode and down to previous mode
  help              Description of the interactive help system
  list              Print command list
  show              Show running system information
  who               Display who is on a vty
Router> enable
Password: XXXXX
Router# configure terminal
Router(config)# interface eth0
Router(config-if)# ip address 10.0.0.1/8
Router(config-if)# ^Z
Router#
```

As shown above, when you connect using *telnet* to port 2601, you will be asked for the password. This is the password you gave in the *zebra.conf* file you created. When you type

the password, you will be able to telnet to the command line interface of *zebra*.

Typing *enable* takes you to the administrator level. The password here is the password in the *zebra.conf* file that is on the line *enable password <passwd>*.

All configuration can be done only from the administrator level. The commands available for non-administrators are typically only the read-only commands such as *show*.

NOTE: *At any point of time, if you are not clear about what commands are available or what are the options to a command, just press* **?**. *This will display the set of commands that are relevant in the current context as well as the next parameter expected for the current command being typed.*

SUMMARY OF CISCO COMMAND STRUCTURE AND USAGE

Zebra uses Cisco's CLI. Cisco's CLI has a hierarchical structure where when you enter a command, you enter into the sub-mode corresponding to that command. For e.g., if you want to configure any parameters, you need to type *configure terminal* at the prompt. This takes you into the *config* sub-mode. Now, if you want to configure any interface parameters, you need to enter the following: *interface eth0*, where *eth0* is the ethernet interface you are configuring. This takes you to the *config-if* sub-mode. In any sub-mode, commands relevant in that context only can be used. As noted above, at any point, the set of commands that are relevant can be found by using **?**. To get out of the sub-mode to its immediate upper level, use the command *exit*. To get out of all sub-modes altogether and get to the topmost command level, use the command *end*.

NOTE: Cisco's CLI also accepts any prefix-string of a command that is unique in that context. For e.g., instead of *configure terminal* as stated above, you can just type *conf t*. Similarly, you can type *int eth0*. For getting into the administrator level, you can just type *en* and so on.

Exercise 2:

To learn to configure typical network parameters using *zebra*

To do: Configure the IP addresses of the router using *zebra CLI (command-line interface)*.

How to: Telnet into zebra CLI as in *Exercise-1*. Once you get to the administrator mode, get to the configure sub-mode and then to the interface sub-mode as detailed in the summary above. Then, type the command to configure the IP address as given below:

```
Router#conf t
Router(config)#int eth0
Router(config-if)#ip address 10.1.0.1/16
```

At any point, if you want to undo the previous configuration, such as the IP address configured above, prefix the whole command by a *no*. This negates the previous configuration. Thus, to remove the IP address 10.1.0.1/16

```
Router(config-if)#no ip address 10.1.0.1/16
```

Verify: Use the standard Linux command *ifconfig* to check that the IP address has taken effect. If it has not, try doing the following:

```
Router#conf t
Router(config)#int eth0
Router(config-if)#shut
Router(config-if)#no shut
```

This will shutdown the interface and bring it up again.

Configure all interfaces of the router as above.

Exercise 3:

To learn to check the current configuration and save it.

How to: To check current configuration, do the following:

```
Router#show running-config or
Router#sh run
```

To save the configuration, do the following:

```
Router#write memory or
Router#wr mem
```

Verify: *cat* the *zebra.conf* file to verify that the configuration is now reflected in the file. Another way is to restart the zebra service and checking that all saved configuration is restored. Restarting of zebra can be done as follows from the Linux terminal:

service zebra restart

Exercise 4:

To learn to start *RIP Daemon (ripd)*.

How to: Similar to *zebra.conf*, a *ripd.conf* file has to be created in */usr/local/etc or /usr/local/etc/zebra* directory. It has the same contents as the initial *zebra.conf* file.

Start *ripd* with the command *<path>/ripd -d*. Or, *service ripd start*.

Verify: To connect to *ripd* CLI, telnet to port 2602. It should prompt for password, if a password has been given in *ripd.conf* file.

Exercise 4:

To learn to configure RIP parameters.

How to: To enable RIP you need to do the following:

```
Router#conf t
Router(config)#router rip
Router(config-rip)#network 10.1.0.0/16
Router(config-rip)#network 10.2.0.0/16
```

The above set of commands enables RIP on the router and starts advertising networks 10.1.0.0 and 10.2.0.0 on the interfaces where they need to be advertised.

Verify: Start capture of packets in ethereal and check that RIP packets are seen on the interfaces.

To enable or disable split-horizon in RIP, do the following:

```
Router(config-rip)#split-horizon
Router(config-rip)#no split-horizon
```

By default, split-horizon is enabled.

Exercise 5:

To verify that dynamic routing is happening and routes are learnt.

How to: First, go to *neat* command in RedHat Linux deactivate all interfaces, save the configuration and exit. Ensure that there are no interfaces up and configured by typing *ifconfig* and checking that only the loopback interface is seen. After starting *zebra* and *ripd* daemons in that order and configuring their parameters, RIP packets should be exchanged between all routers and routes learnt dynamically. Verify this by using either *route -n* or *netstat -rn* commands. At the end of the learn cycle, all machines from all LANs should be reachable from one another.

Verify: If *split-horizon* is disabled, check that temporary routing loops occur in certain topologies.