

## Persistent Configuration

In this lesson, we'll learn to define the network configuration in the system so that your interface is configured automatically at boot time. We'll also cover the **ifup** and **ifdown** tools.

### System-Wide Interface Configuration

On a vast majority of servers, one or more addresses are assigned to the installed interfaces, and those addresses stay the same on that server for a long time. Most Linux-based operating systems provide a means by which to define a static configuration for installed interfaces that is applied whenever the system boots. This configuration is also read whenever the administrator uses tools such as **ifup** and **ifdown** to manually start and stop the interface. We'll cover those two tools later in the lesson.

### Interface Configuration Files

If you took the first course in this series, you may recall that system configuration files are almost always located in `/etc`. The same holds true for network configuration. On Redhat (and Redhat derivatives such as CentOS), network configuration files are located in `/etc/sysconfig/network-scripts`. Each configuration file contains a set of parameters and values in the format **PARAMETER=value**. These configuration files are read by the scripts that are responsible for bringing the interfaces up and down. Go ahead and take a look at the configuration file for `eth0`, `/etc/sysconfig/network-scripts/ifcfg-eth0`, using your favorite method (`vi`, `less`, `cat`, or other method). You'll see something like this:

#### OBSERVE:

```
DEVICE=eth0
BOOTPROTO=none
ONBOOT=no
```

The first line makes sense, but what do "BOOTPROTO=none" and "ONBOOT" mean? The "BOOTPROTO=none" parameter defines how the IP address is assigned to the given interface, either statically (we supply the address that the interface uses) or with *Dynamic Host Configuration Protocol (DHCP)*. DHCP allows the host to send a message to a server on the network that is responsible for assigning IP addresses and other information to hosts that make a DHCP request. This is how most home or work computers are configured; servers usually have their IP addresses statically assigned. The logic behind this is that if the DHCP server becomes unavailable, servers will not have their address assignments affected by the outage. For this course, we will use static address assignments, so edit the configuration file as shown (the file is owned by root, so you will need to open it with **sudo**):

#### CODE TO TYPE:

```
DEVICE=eth0
BOOTPROTO=static
ONBOOT=yes
```

At this point we have instructed the machine to bring eth0 up on boot, use a static IP address, and to bring up our interface on boot. But we haven't supplied it with an address or netmask to assign to the interface. We do this with the "IPADDR" and "NETMASK" parameters. In this file, the netmask is specified in dotted quad notation, not in prefix length notation. Add the "IPADDR" (changing 172.16.4.14 to your IP address) and "NETMASK" lines to your configuration file and supply the information you obtained about the address and netmask in the last lesson (as with most configuration files, it is important that you enter only one parameter per line):

#### CODE TO TYPE:

```
DEVICE=eth0
BOOTPROTO=static
ONBOOT=yes
IPADDR=172.16.4.14
NETMASK=255.240.0.0
```

Now write the file out, quit the text editor, and reboot your machine using the **reboot** command (you'll need to use **sudo** again). When it finishes booting up, use the **ping** command to test out your interface, trying both 172.16.0.1 and 199.27.144.89:

#### INTERACTIVE SESSION:

```
[username@username-m0 ~]$ ping 172.16.0.1
PING 172.16.0.1 (172.16.0.1) 56(84) bytes of data.
64 bytes from 172.16.0.1: icmp_seq=1 ttl=64 time=0.844 ms
64 bytes from 172.16.0.1: icmp_seq=2 ttl=64 time=0.561 ms
^C
--- 172.16.0.1 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1348ms
rtt min/avg/max/mdev = 0.561/0.702/0.844/0.143 ms
[username@username-m0 ~]$ ping 199.27.144.89
connect: Network is unreachable
[username@username-m0 ~]$
```

## Configuring the Default Route

You can't ping 199.27.144.89, right? That's because you haven't defined a default route yet. Use the **ip** command to confirm this. The default route is not set in the **ifcfg-eth\*** files; it is defined in the **/etc/sysconfig/network** file. Open this file for editing so we can define a default route. You'll see that it has the same "PARAMETER=value" format as the **ifcfg-eth\*** files. You'll also see that it's where the hostname for your machine is set. Edit the file as shown:

#### CODE TO TYPE:

```
NETWORKING=yes
HOSTNAME=username-m0.unix.useractive.com
GATEWAY=172.16.0.1
```

This time, instead of rebooting your machine to apply the changes, we'll do it another way. Rebooting a server for small system configuration changes causes costly downtime and should be avoided whenever possible.

We can manually force the network configuration scripts on our system to take down and bring up interfaces using the commands **ifup** and **ifdown**. The syntax for these commands is identical, and looks like this:

```
OBSERVE:
ifup interface
```

Stop eth0 using ifdown, and then start it back up using ifup. When the interface is back up, confirm that the default route has now been configured using ip. Ping 199.27.144.89 to confirm that everything is working as expected.

#### INTERACTIVE SESSION:

```
[username@username-m0 ~]$ ifdown eth0
[username@username-m0 ~]$ ifup eth0
[username@username-m0 ~]$ ping 199.27.144.89
PING 199.27.144.89 (199.27.144.89) 56(84) bytes of data.
64 bytes from 199.27.144.89: icmp_seq=1 ttl=63 time=13.2 ms
64 bytes from 199.27.144.89: icmp_seq=2 ttl=63 time=0.905 ms
^C
--- 199.27.144.89 ping statistics ---
2 packets transmitted, 2 received, 0% packet loss, time 1349ms
rtt min/avg/max/mdev = 0.905/7.076/13.248/6.172 ms
[username@username-m0 ~]$
```

So far we have referred to other hosts using their IP address rather than host name. That's because until now your machine has not been configured to look up IP addresses based on a given host name using the *Domain Name Service (DNS)*. This service is critical to the operation of most systems.

Source: [http://courses.oreillyschool.com/sysadmin2/persistent\\_configuration.html](http://courses.oreillyschool.com/sysadmin2/persistent_configuration.html)