# Re: Problem with Cable Moden & Router.

***Source:*** http://linux.derkeiler.com/Newsgroups/comp.os.linux.misc/2007−01/msg00398.html

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On Sun, 07 Jan 2007, in the Usenet newsgroup comp.os.linux.misc, in article <pan.2007.01.07.02.50.34.925036@xxxxxxxxxxxxx>, Mark Healey wrote:

> 1) To do really big backups. It seems that it would be easier to just use
> a garage sale PC to store files rather than hassling with removable media.
> I don't have room for any more hard drives.

Very simple and valid reason. I go further and have "off−site" backups on my sister's "backups server" located on the other side of the country, while she has her "off−site" backups on one of my servers. Broad−band Internet is a wonderful thing. (The backups are encrypted before they leave − so no security problem either in transit, or in the remote site.)

> This is where I get confused. I don't know what a gateway is or dies

You have a "local" network − where each computer can talk _directly_ to each other. But there are millions of other networks. To talk to them, you need to use a gateway. Think of your computers being people in a single room. There are other people in other rooms − how do you get to them? You go through a doorway. In the "classic" garden or park, the gateway is the way in or out. A gateway is a route in/out of a network. Generally, a gateway leads to another network. There is a special one, called a "default gateway" which in Linux terms normally means "the gateway to the world". In simple terms, use "this" gateway if you want to connect to "there, and use "that" gateway if you want to connect to "the other" place, and use the "default" gateway if you want to connect to anywhere else.

> or what routing tables are.

They merely list how to get to "known" locations. Example:

Kernel IP routing table

Destination Gateway Genmask Flags Metric Ref Use Iface
192.168.1.0 0.0.0.0 255.255.255.0 U 0 0 89948 eth0
192.168.2.0 192.168.1.6 255.255.255.0 UG 0 0 32165 eth0
0.0.0.0 192.168.1.248 0.0.0.0 UG 0 0 2673 eth0

There is a local network 192.168.1.0 and all of those hosts are "directly" attached to this one on the 'eth0' interface. There is a second network 192.168.2.0 and to talk to computers on that network, your host would send the packets to the router at 192.168.1.6. There is a "gateway to the world" (really meaning all addresses except 192.168.1.0 and 192.168.2.0 networks), and that gateway is at 192.168.1.248. An important point as to gateway addresses − they must be on "this" network. What happens to the packets after you send them to the gateway isn't under your control, and you have to hope that who ever owns/controls that system has set it up so that it can send the packets on to the destination. Nearly always, they have done so.

> I also clueless about subnet masks.

Merely a mechanism for indicating how big an address range is. In the routing table above, I show '255.255.255.0' as the mask. This means:

mask 255.255.255.0
address 192.168. 1.
^^^^^^^^^^^^ has to match
^ the zero means any digit

thus, 192.168.1.0 through 192.168.1.255 are on 192.168.1.0/255/255/255/0. The '255' is maximum decimal value of an 8 bit binary (1111 1111), and a shorter way to show this is to count the number of consecutive binary ones in the mask − 255.255.255.0 has 24 ones (1111 1111 1111 1111 1111 1111 followed by the 8 zeros) so this is a "/24" mask. 24 plus 8 − this is a 32 bit mask, and there are 32 possible values from 255.255.255.255 (all digits have to match) to 0.0.0.0 (nothing needs to match − all answers are correct). RFC1519 (recently replaced by RFC4632) explains this, but RFC1878 shows actual mask/address relationships.

Other important facts: The first and last address in a series (192.168.1.0 and 192.168.1.255 in the above example) have special meanings. Normally, the first address is called the "network" address, and is normally seen with some indication of a network mask to describe how big the range is. The last address is the "broadcast" address for the network that all hosts will listen for (in addition to their own specific "unicast" address). On some operating systems, the first address can be used as a host address, but this is comparatively rare. On a few ancient operating systems, the first address was also the broadcast (and the last address wasn't special).

Where two (or more) routes with different network masks overlap

192.168.1.1 0.0.0.0 255.255.255.255 UH 0 0 0 0 eth1
192.168.1.0 0.0.0.0 255.255.255.0 U 0 0 0 0 eth0
192.168.0.0 192.168.1.15 255.255.0.0 UG 0 0 0 0 eth0
192.0.0.0 192.168.1.248 255.0.0.0 UG 0 0 0 0 eth0
0.0.0.0 192.168.1.7 0.0.0.0 UG 0 0 0 0 eth0

you use the one that more accurately defines the route. Here, 192.168.1.1
fits all of these routes, but the first is more specific. 192.168.1.22
doesn't match the first, but the second looks like the best choice. For
192.168.33.44, neither the first or second match, but number three fits
just right, and so on. Note that the routes don't have to be _shown_
in this order for things to work − the kernel is doing the math on those
network masks and chooses the correct one no matter where it's _shown_
in the routing table.

> The only reason I wanted to use DHCP was name servers. If I have a static
> setup and my ISP changes their nameservers frequently, I'd always be
> manually changing them.

Not that many ISPs play "musical nameservers". I have four ISPs, and over
the range of two to nine years that I've had them, none have moved their
name servers. At work, the name servers haven't moved in over twenty years.

Old guy
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