WHAT ABOUT IPV6?

Most of the current Internet is based on version 4 of the Internet Protocol, also known as IPv4. IPv4 has served the Internet well for more than 20 years. However, the growth of the Internet has put a lot of pressure on IPv4's limited 32-bit address space. This chapter describes how IPv4 has evolved to make the best possible use of 32-bit addresses, but eventually all the addresses will be assigned; the IPv4 address space will be filled to capacity. When that happens, the Internet will have to migrate to the next version of IP, known as IPv6.

IPv6 is also called *IP next generation,* or *IPng,* in honor of the favorite television show of most Internet gurus, *Star Trek: The Next Generation.*

IPv6 offers several advantages over IPv4, but the most important is that it uses 128 bits for Internet addresses rather than 32 bits. The number of host addresses possible with 128 bits is a number so large that it would make Carl Sagan proud. It doesn't just double or triple the number of available addresses. Just for the fun of it, here's the number of unique Internet addresses provided by IPv6:

340,282,366,920,938,463,463,374,607,431,768,211,456

This number is so large that it defies understanding. If the IANA had been around at the creation of the universe and started handing out IPv6 addresses at a rate of one per millisecond, it would now, 15 billion years later, have not yet allocated even 1 percent of the available addresses.

Unfortunately, the transition from IPv4 to IPv6 has been a slow one. Thus, the Internet will continue to be driven by IPv4 for at least a few more years.

Subnetting

Subnetting is a technique that lets network administrators use the 32 bits available in an IP address more efficiently by creating networks that aren't limited to the scales provided by Class A, B, and C IP addresses. With subnetting, you can create networks with more realistic host limits.

Subnetting provides a more flexible way to designate which portion of an IP address represents the network ID and which portion represents the host ID. With standard IP address classes, only three possible network ID sizes exist: 8 bits for