

21.14.3 Limited Broadcast Address

The term *limited broadcast* refers to a broadcast on a directly-connected network; informally, we say that the broadcast is limited to a “single wire”. Limited broadcast is used during system startup by a computer that does not yet know the network number.

IP reserves the address consisting of thirty-two 1 bits to refer to limited broadcast. Thus, IP will broadcast any packet sent to the all-ones address across the local network.

21.14.4 This Computer Address

Because each Internet packet contains the address of the source as well as the destination, a computer needs to know its IP address before it can send or receive Internet packets. In Chapter 23, we will learn that TCP/IP contains protocols a computer can use to obtain its IP address automatically when the computer boots. Interestingly, the startup protocols use IP to communicate. When using such startup protocols, a computer cannot supply a correct IP source address. To handle such cases, IP reserves the address that consists of all zeroes to mean *this computer*[†].

21.14.5 Loopback Address

IP defines a *loopback address* used to test network applications. Programmers often use loopback for preliminary debugging after a network application has been created. To perform a loopback test, a programmer must have two application programs that are intended to communicate across a network. Each application includes the code needed to interact with TCP/IP protocol software. Instead of executing each program on a separate computer, the programmer runs both programs on a single computer and instructs them to use a loopback address when communicating. When one application sends data to another, data travels down the protocol stack to the IP software, which forwards it back up through the protocol stack to the second program. Thus, the programmer can test the program logic quickly without needing two computers and without sending packets across a network.

IP reserves the network prefix *127/8* for use with loopback. The host address used with *127* is irrelevant — all host addresses are treated the same. By convention, programmers often use host number *1*, making *127.0.0.1* the most popular loopback address.

During loopback testing no packets ever leave a computer — the IP software forwards packets from one application program to another. Consequently, the loopback address never appears in a packet traveling across a network.

[†]The meaning of *this computer* only applies when the address appears in a datagram. An all-zeroes entry may appear as the default route in a forwarding table along with an all-zeroes address mask. However, the use in a forwarding table is unrelated to the use in a datagram.