

TABLE 6-2**The Eight Subnet Octet Values**

Binary Octet	Decimal	Binary Octet	Decimal
00000000	0	11111000	248
10000000	128	11111100	252
11000000	192	11111110	254
11100000	224	11111111	255
11110000	240		

Private and public addresses

Any host with a direct connection to the Internet must have a globally unique IP address. However, not all hosts are connected directly to the Internet. Some are on networks that aren't connected to the Internet. Some hosts are hidden behind firewalls, so their Internet connection is indirect.

Several blocks of IP addresses are set aside just for this purpose — for use on private networks that aren't connected to the Internet or to use on networks hidden behind a firewall. Three such ranges of addresses exist, as summarized in Table 6-3. Whenever you create a private TCP/IP network, use IP addresses from one of these ranges.

TABLE 6-3**Private Address Spaces**

Subnet Mask	Address Range
255.0.0.0	10.0.0.1–10.255.255.254
255.255.240.0	172.16.1.1–172.31.255.254
255.255.0.0	192.168.0.1–192.168.255.254

Understanding Network Address Translation

Many firewalls use a technique called *network address translation* (NAT) to hide the actual IP address of a host from the outside world. When that's the case, the NAT device must use a globally unique IP to represent the host to the Internet; behind the firewall, however, the host can use any IP address it wants. As packets cross the firewall, the NAT device translates the private IP address to the public IP address, and vice versa.