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The Five IPv4 Classes - Quick Reference

In the IPv4 IP address space, there are five classes: A, B, C, D and E. Each class has a specific range of IP addresses (and ultimately dictates the number of devices you can have on your network). Primarily, class A, B, and C are used by the majority of devices on the Internet. Class D and class E are for special uses.

The list below shows the five available IP classes, along with the number of networks each can support and the maximum number of hosts (devices) that can be on each of those networks. The four octets that make up an IP address are conventionally represented by a.b.c.d - such as 127.10.20.30.

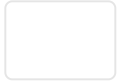
Additionally, information is also provided on private addresses and loop address (used for network troubleshooting).

Class A Public & Private IP Address Range

Class A addresses are for networks with large number of total hosts. Class A allows for 126 networks by using the first octet for the network ID. The first bit in this octet, is always zero. The remaining seven bits in this octet complete the network ID. The 24 bits in the remaining three octets represent the hosts ID and allows for approximately 17 million hosts per network. Class A network number values begin at 1 and end at 127.

- Public IP Range: 1.0.0.0 to 127.0.0.0
 - First octet value range from 1 to 127
- Private IP Range: 10.0.0.0 to 10.255.255.255 (See [Private IP Addresses](#) below for more information)
- Subnet Mask: 255.0.0.0 (8 bits)
- Number of Networks: 126
- Number of Hosts per Network: 16,777,214

Class B Public & Private IP Address Range



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- Public IP Range: 128.0.0.0 to 191.255.0.0
 - First octet value range from 128 to 191
- Private IP Range: 172.16.0.0 to 172.31.255.255 (See [Private IP Addresses](#) below for more information)
- Subnet Mask: 255.255.0.0 (16 bits)
- Number of Networks: 16,382
- Number of Hosts per Network: 65,534

Class C Public & Private IP Address Range

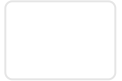
Class C addresses are used in small local area networks (LANs). Class C allows for approximately 2 million networks by using the first three octets for the network ID. In a class C IP address, the first three bits of the first octet are always 1 1 0. And the remaining 21 bits of first three octets complete the network ID. The last octet (8 bits) represent the host ID and allows for 254 hosts per network. Class C network number values begins at 192 and end at 223.

- Public IP Range: 192.0.0.0 to 223.255.255.0
 - First octet value range from 192 to 223
- Private IP Range: 192.168.0.0 to 192.168.255.255 (See [Private IP Addresses](#) below for more information)
- Special IP Range: 127.0.0.1 to 127.255.255.255 (See [Special IP Addresses](#) below for more information)
- Subnet Mask: 255.255.255.0 (24 bits)
- Number of Networks: 2,097,150
- Number of Hosts per Network: 254

Class D IP Address Range

Class D IP addresses are not allocated to hosts and are used for multicasting. Multicasting allows a single host to send a single stream of data to thousands of hosts across the Internet at the same time. It is often used for audio and video streaming, such as IP-based cable TV networks. Another example is the delivery of real-time stock market data from one source to many brokerage companies.

- Range: 224.0.0.0 to 239.255.255.255
 - First octet value range from 224 to 239
- Number of Networks: N/A



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- Range: 240.0.0.0 to 255.255.255.255
 - First octet value range from 240 to 255
- Number of Networks: N/A
- Number of Hosts per Network: Research/Reserved/Experimental

Private IP Addresses

Within each network class, there are designated IP address that is reserved specifically for private/internal use only. This IP address cannot be used on Internet-facing devices as that are non-routable. For example, web servers and FTP servers must use non-private IP addresses. However, within your own home or business network, private IP addresses are assigned to your devices (such as workstations, printers, and file servers).

- Class A Private Range: 10.0.0.0 to 10.255.255.255
- Class B Private APIPA Range: 169.254.0.0 to 169.254.255.255
 - *Automatic Private IP Addressing* (APIPA) is a feature with *Microsoft Windows*-based computers to automatically assign itself an IP address within this range if a *Dynamic Host Configuration Protocol* (DHCP) server is not available on the network. A DHCP server is a network device that is responsible for assigning IP addresses to devices on the network.

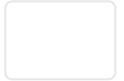
At your home, your Internet modem or router likely provides this functionality. In your work place, a *Microsoft Windows Server*, a network firewall, or some other specialized network device likely provides this functionality for the computer at your work environment.

- Class B Private Range: 172.16.0.0 to 172.31.255.255
- Class C Private Range: 192.168.0.0 to 192.168.255.255

Special IP Addresses

- IP Range: 127.0.0.1 to 127.255.255.255 are network testing addresses (also referred to as loop-back addresses). These are virtual IP address, in that they cannot be assigned to a device. Specifically, the IP 127.0.0.1 is often used to troubleshoot network connectivity issues using the [ping command](#). Specifically, it tests a computer's TCP/IP network software driver to ensure it is working properly. [Learn how to use ping 127.0.0.1 to test your computer's TCP/IP network stack.](#)

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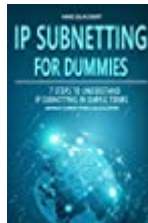


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