Subnet masks

Network IDs and host IDs within an IP address are distinguished by using a subnet mask. Each subnet mask is a 32-bit number that uses consecutive bit groups of all ones (1) to identify the network ID and all zeroes (0) to identify the host ID portions of an IP address.

For example, the subnet mask normally used with the IP address 131.107.16.200 is the following 32-bit binary number:

```
11111111 11111111 00000000 00000000
```

This subnet mask number is 16 one-bits followed by 16 zero-bits, indicating that the network ID and host ID sections of this IP address are both 16 bits in length. Normally, this subnet mask is displayed in dotted decimal notation as 255.255.0.0.

The following table displays subnet masks for the Internet address classes.

<table>
<thead>
<tr>
<th>Address class</th>
<th>Bits for subnet mask</th>
<th>Subnet mask</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class A</td>
<td>11111111 00000000 00000000 00000000</td>
<td>255.0.0.0</td>
</tr>
<tr>
<td>Class B</td>
<td>11111111 11111111 00000000 00000000</td>
<td>255.255.0.0</td>
</tr>
<tr>
<td>Class C</td>
<td>11111111 11111111 11111111 00000000</td>
<td>255.255.255.0</td>
</tr>
</tbody>
</table>

Typically, default subnet mask values (as shown in the previous table) are acceptable for most networks with no special requirements and where each IP network segment corresponds to a single physical network.

In some cases, you can use customized subnet masks to implement IP subnetting. With IP subnetting, you can subdivide the default host ID portion of an IP address to specify subnets, which are subdivisions of the original class-based network ID.

By customizing the subnet mask length, you can reduce the number of bits that are used for the actual host ID. For more information about using a custom subnet mask for subnetting your network, see Resource Kit.

**Important**

- To prevent addressing and routing problems, you should make sure all TCP/IP computers on any network segment use the same subnet mask.