IP addressing

Each TCP/IP host is identified by a logical IP address. This address is unique for each host that communicates by using TCP/IP. Each 32-bit IP address identifies a location of a host system on the network in the same way that a street address identifies a house on a city street.

Just as a street address has a standard two-part format (a street name and a house number), each IP address is separated internally into two parts—a network ID and a host ID:

- The network ID, also known as a network address, identifies a single network segment within a larger TCP/IP internetwork (a network of networks). All the systems that attach and share access to the same network have a common network ID within their full IP address. This ID is also used to uniquely identify each network within the larger internetwork.
- The host ID, also known as a host address, identifies a TCP/IP node (a workstation, server, router, or other TCP/IP device) within each network. The host ID for each device identifies a single system uniquely within its own network.

Here is an example of a 32-bit IP address:

```
10000011 01101011 00010000 11001000
```

To make IP addressing easier, IP addresses are expressed in dotted decimal notation. The 32-bit IP address is segmented into four 8-bit octets. The octets are converted to decimal (base-10 numbering system) and separated by periods. Therefore, the previous IP address example is 131.107.16.200 when converted to dotted decimal notation.

For more information about dotted decimal notation and the conversion of numbers from binary to decimal, see Converting binary to decimal.

The following illustration shows a sample view of an IP address (131.107.16.200) as it is divided into network and host ID sections. The network ID portion (131.107) is indicated by the first two numbers of the IP address. The host ID portion (16.200) is indicated by the last two numbers of the IP address.

Notes

- Because IP addresses identify devices on a network, a unique IP address must be assigned to each device on the network.
- In general, most computers have only a single network adapter installed and therefore require only a single IP address. If a computer has multiple network adapters installed, each adapter needs its own IP address.

IP address classes

The Internet community has defined five address classes. Class A, B, and C addresses are used for assignment to TCP/IP nodes.

The class of address defines which bits are used for the network and host ID parts of each address. The address class also defines how many networks and hosts per network can be supported.

The following table uses w.x.y.z to designate the four octet values in any given IP address. The table is used to show:

- How the value of the first octet (w) of any given IP address effectively indicates the class of address.
- How the octets in an address are divided into network ID and host ID.
- The number of possible networks and hosts per network available for each class.
<table>
<thead>
<tr>
<th>Class</th>
<th>Value of w</th>
<th>Network ID</th>
<th>Host ID</th>
<th>Number of networks</th>
<th>Number of hosts per network</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1-126</td>
<td>w</td>
<td>x.y.z</td>
<td>126</td>
<td>16,777,214</td>
</tr>
<tr>
<td>B</td>
<td>128-191</td>
<td>w.x</td>
<td>y.z</td>
<td>16,384</td>
<td>65,534</td>
</tr>
<tr>
<td>C</td>
<td>192-223</td>
<td>w.xy</td>
<td>z</td>
<td>2,097,152</td>
<td>254</td>
</tr>
<tr>
<td>D</td>
<td>224-239</td>
<td>Reserved for multicast addressing</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>E</td>
<td>240-254</td>
<td>Reserved for experimental use</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Community Additions

© 2014 Microsoft