

## 6.6.4 IP Configuration Facts

The following table summarizes the configuration settings required to connect to a TCP/IP network:

Parameter	Description
IP Address	<p>The IP address identifies both the logical host and the logical network addresses.</p> <ul style="list-style-type: none"><li>Each host on the entire network must have a unique IP address.</li><li>Two devices on the same subnet must have IP addresses with the same network portion of the address.</li><li>Two devices on the same subnet must have unique host portions of the IP address.</li><li>Do not use the first or the last host address on a subnet address range.</li></ul>
Subnet Mask	<p>The subnet mask identifies which portion of the IP address is the network address and which portion is the host address. Two devices on the same subnet must be configured with the same subnet mask.</p>
Default Gateway	<p>The default gateway identifies the router to which communications for remote networks are sent. The default gateway address is the IP address of the router interface on the same subnet as the local host. Without a default gateway set, most clients will be unable to communicate with hosts outside of the local subnet.</p>
DNS Server	<p>The DNS server address identifies the DNS server that is used to resolve host names to IP addresses.</p>
Hostname	<p>The hostname identifies the logical name of the local system.</p>

The following table describes the methods you can use to configure TCP/IP parameters:

Method	Description
Static	<p>With static addressing, you manually assign all configuration values. Static addressing is prone to error and should be used only under the following conditions:</p> <ul style="list-style-type: none"><li>The network has a small number of hosts.</li><li>The network will not change or grow.</li><li>You have some hosts that must have the same address each time.</li></ul>
Dynamic Host Configuration Protocol (DHCP)	<p>On a network configured with DHCP, IP hosts contact a DHCP server for IP addressing and other configuration information. This ensures error-free host configuration. With DHCP:</p> <ul style="list-style-type: none"><li>The host uses broadcast messages to locate a DHCP server when it boots.</li><li>The DHCP server assigns IP address and mask values to the host (called an <i>address lease</i>).</li><li>The DHCP server ensures that no two hosts are assigned the same IP address.</li><li>You can configure the DHCP server to deliver default gateway, DNS server, and other configuration information to hosts.</li></ul> <p>DHCP requires a special DHCP server, which is built-in to most SOHO routers.</p>

Automatic Private IP Addressing (APIPA)	<p>If a Windows client is configured to receive an IP address from a DHCP server, but cannot contact a DHCP server, it will automatically assign itself an IP address within the following range:</p> <p>169.254.0.1 to 169.254.255.254 with the subnet mask 255.255.0.0</p> <p>With APIPA:</p> <ul style="list-style-type: none"><li>■ The host is configured to obtain IP information from a DHCP server (this is the default configuration).</li><li>■ If a DHCP server cannot be contacted, the host uses APIPA to assign itself an IP address.</li><li>■ The host configures only the IP address and mask. It does not assign itself the default gateway and DNS server addresses. For this reason, APIPA can be used only on a single subnet.</li></ul> <p>You can use APIPA instead of a DHCP server, but it should be used only on a small network that does not need default gateway or DNS server settings configured.</p> <p>APIPA is the term used by Microsoft Windows. On other systems (e.g., Linux), this functionality is known as link-local addressing.</p>
Alternate IP Configuration	<p>With an alternate IP configuration, the system attempts to use DHCP for TCP/IP configuration information. If a DHCP server cannot be contacted, the static configuration values are used. When you configure an alternate IP address, APIPA is no longer used. Use an alternate configuration:</p> <ul style="list-style-type: none"><li>■ If you have a computer (e.g., a laptop) that connects to two networks (i.e., one with a DHCP server and another without a DHCP server).</li><li>■ If you want to provide values to properly configure the computer in case the DHCP server is unavailable.</li></ul>

You should know the following facts about IP address assignments:

- By default, all Windows computers try to use DHCP for TCP/IP configuration information.
- If your computer has used APIPA because the DHCP server is unavailable, it will have an IP address in the 169.254.x.x range. The workstation will be able to communicate with other hosts that have addresses in this range, but will not be able to communicate with hosts on other networks.
- When you configure a static IP address, you disable DHCP and APIPA.
- If you use a DHCP server for IP address configuration, you can still manually configure DNS server addresses.
- By default, a Windows workstation will use the hosts file to resolve hostnames into IP addresses first. If a match can't be found for the hostname to be resolved in the hosts file, the workstation will contact the DNS server it has been configured to use.

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