



IT Essentials v4.1 LI 8.3.2 Describe IP addressing

CompTIA A+ 220-701 Objective

4.1 IPv6 vs. IPv4

This IP addressing information applies to IPv4. IPv4 provides 2^{32} (4,294,967,296) unique IP addresses. With the growing number of devices used to access the Internet, addresses are running out quickly. To provide IP addresses for future devices, IPv6 was developed. IPv6 provides 2^{128} (340,282,366,920,938,463,463,374,607,431,768,211,456) unique IP addresses, which is more than enough for every device on the planet to obtain a unique IP address.

IPv4 uses four octets separated by periods to express an IP address. IPv6 uses 16-bit hexadecimal numbers separated by colons. The following are examples of how IPv6 addresses are expressed:

- 128 bits are separated into eight blocks of 16 bits
- Each 16-bit block is represented in hex and delimited with colons
 - 2001:00D3:0000:0000:02AA:00FF:FE28:9C5A
- In each 16-bit block, leading zeros can be removed:
 - 2001:00D3:0000:0000:02AA:00FF:FE28:9C5A
 - 2001:D3:0:0:2AA:FF:FE28:9C5A
- Consecutive 16-bit blocks of zeroes can be replaced with a double-colon (::)
 - 2001:D3:0:0:2AA:FF:FE28:9C5A
 - 2001:D3::2AA:FF:FE28:9C5A
- Zero replacement may only be used once in any address

IPv6 also offers other improvements over IPv4:

- More efficient routing
- Integrated security through the use of data encryption
- Automatic configuration so that a device can assign itself an IP address, if needed
- Quality of Service (QoS) support so that time-sensitive data has priority over other data

IT Essentials v4.1 LI 8.9.1 Install or update a NIC driver

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3.3 Install and update devices drivers

Checking wireless adapter properties for Windows 7

Click the network icon in the system tray > **Open Network and Sharing Center > Manage wireless networks > Adapter properties > Configure > Advanced.**