6.5 IP Networking

As you study this section, answer the following questions:

- What is the difference between a MAC address and an IP address? Which address can you assign to a computer?
- How does the IP address indicate both the network and the host address? What is used to identify each part of the address?
- What is the address class of IP address 133.66.155.189?
- What is the default subnet mask for the IP address 166.88.1.45? What is the network address? What is the host address?
- What happens to the MAC address when you move a computer to another network?

Key terms for this section include the following:

Term	Definition
MAC address	A unique hexadecimal identifier burned into the ROM of every network interface.
Logical network address	The numerical address that identifies a subnet.
Logical host address	The numerical address that identifies a specific host on the network.
IP address	A 32-bit binary number represented as four octets (can be represented as decimal or binary).
IP address class	The default network address portion of the IP address. The classes are A, B, C, D, and E.
Protocol	A rule that identifies some aspect of how computers communicate on a network.
Transmission Control Protocol (TCP)	A communication standard for establishing and maintaining a network connection in which application programs can exchange data.
User Data Protocol (UDP)	An alternative to TCP designed to establish low-latency and loss-tolerant connections between applications on the internet.
Network Basic Input/Output System Protocol (NetBIOS)	An industry standard network communication protocol originally developed by IBM.
Encapsulation/tunneling	A process in which non-IP packets are re-packaged as IP packets at the sending device.
Hypertext Transfer Protocol (HTTP)	A protocol used by web browsers and servers to exchange files the World Wide Web and intranets. This protocol uses port 80.
Hypertext Transfer Protocol Secure (HTTPS)	A secure form of HTTP that uses SSL as sublayer for security. This protocol uses port 443.

File Transfer Protocol (FTP)	A generic method of transferring files that uses port 21.
Simple Mail Transfer Protocol (SMTP)	A protocol that routes electronic mail through the internet using port 25.
Internet Message Access Protocol (IMAP) protocol	An email retrieval protocol that enables users to access their email from various locations without transferring messages or files back and forth between computers. This protocol uses port 143.
Post Office Protocol 3 (POP3)	A part of the IP protocol suite used to retrieve email from a remote server to a local client over and IP connection. This protocol uses port 110.
Telnet Protocol	This protocol allows an attached computer to act as a dumb terminal, with data processing taking place on the IP host computer. Telnet uses port 23.
Secure Shell Protocol (SSH)	This protocol allows secure interactive control of remote systems and uses port 22.
Secure File Transfer Protocol (SFTP)	This protocol has the same functionality as FTP but uses SSH to secure data transmissions. SFTP uses port 22.
Domain Name System (DNS) Protocol	A system distributed throughout the internetwork to provide address/name resolution using port 53.
Remote Desktop Protocol (RDP)	This protocol allows users to view and use the graphical desktop of a remote computer system. RDP uses port 3389.
Dynamic Host Configuration Protocol (DHCP)	This protocol dynamically assigns IP addressing information to network hosts when they come online. It uses ports 67 and 68.
Lightweight Directory Access Protocol (LDAP)	This protocol accesses information about network resources stored by a directory service. It uses ports 389 and 636.
Simple Network Management Protocol (SNMP)	This protocol monitors and manages network devices. It uses ports 161 and 162.
Server Message Block (SMB) Protocol	This protocol enables the sharing of folders and printers on the network. It uses port 445.
Service Location Protocol (SLP)	This protocol organizes and locates various network devices and services. It uses port 427.
Apple Filing Protocol (AFP)	This protocol is used by systems running Mac OS X or newer to support file sharing on the network. It uses port 548.

This section helps you prepare for the following certification exam objectives:

Exam	Objective
CompTIA 220-1001	2.1 Compare and contrast TCP and UDP ports, protocols, and

	their purposes
	▪ Ports and protocols
	  ▪ 21 – FTP
	  ▪ 22 – SSH
	  ▪ 23 – Telnet
	  ▪ 25 – SMTP
	  ▪ 53 – DNS
	  ▪ 80 – HTTP
	  ▪ 110 – POP3
	  ▪ 143 – IMAP
	  ▪ 443 – HTTPS
	  ▪ 3389 – RDP
	  ▪ 137-139 – NetBIOS/NetBT
	  ▪ 445 – SMB/CIFS
	  ▪ 427 – SLP
	  ▪ 548 – AFP
	  ▪ 67/68 – DHCP
	  ▪ 389 – LDAP
	  ▪ 161/162 – SNMP
	▪ TCP vs. UDP

CompTIA 220-1002	4.9 Given a scenario, use remote access technologies ▪ RDP ▪ Telnet ▪ SSH ▪ Third-party tools ▪ File share