

Professor Messer's
CompTIA Network+
N10-005 Study Guide

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The OSI Model
All People Seem To Need Ours Processing

Layer	Definition
Layer 1: Physical	The layer we see: Cables, Modem, Twisted, Backbone
Layer 2: Data Link	Encoding and error-free (CS, FCS)
Layer 3: Network	Communication between devices (Logical protocols, Addressing protocols)
Layer 4: Transport	The "door-to-door" layer (TCP segments, UDP datagrams)
Layer 5: Session	Establishing, maintaining, and terminating sessions between devices
Layer 6: Presentation	Representing data (IP address, port, packet)
Layer 7: Application	The network layer (Name, email address, URL, etc., DNS, SMTP, POP3, IMAP)

The TCP/IP Model

Application	Transport	Network	Link
FTP, SMTP, HTTP, DNS, HTTP, TELNET, RSH, RCP, NFS, NTP, etc.	TCP, UDP	IPv4, IPv6, ICMP, RARP	PPP

Binary Conversion

2 ³¹	2 ³⁰	2 ²⁹	2 ²⁸	2 ²⁷	2 ²⁶	2 ²⁵	2 ²⁴	2 ²³	2 ²²	2 ²¹	2 ²⁰	2 ¹⁹	2 ¹⁸	2 ¹⁷	2 ¹⁶	2 ¹⁵	2 ¹⁴	2 ¹³	2 ¹²	2 ¹¹	2 ¹⁰	2 ⁹	2 ⁸	2 ⁷	2 ⁶	2 ⁵	2 ⁴	2 ³	2 ²	2 ¹	2 ⁰	
4,294,967,296	2,147,483,648	1,073,741,824	536,870,912	268,435,456	134,217,728	67,108,864	33,554,432	16,777,216	8,388,608	4,194,304	2,097,152	1,048,576	524,288	262,144	131,072	65,536	32,768	16,384	8,192	4,096	2,048	1,024	512	256	128	64	32	16	8	4	2	1

Subnet Classes

Class	Leading Bits	Number of Networks	Number of Hosts per Network	Default Subnet Mask
Class A	0 (8 bits)	126	16,777,214	255.0.0.0
Class B	10 (16 bits)	16,384	65,534	255.255.0.0
Class C	110 (24 bits)	2,097,152	254	255.255.255.0
Class D (Multicast)	1111 (24 bits)	Not defined	Not defined	Not defined
Class E (Reserved)	11111 (24 bits)	Not defined	Not defined	Not defined

RFC 1918 Private Addresses

IP address range	Number of addresses	Class/Description	Usable IP range	Reserved IP range
10.0.0.0 - 10.255.255.255	16,777,214	single class A	10.0.0.1 - 10.255.255.254	10.0.0.0, 10.255.255.255
172.16.0.0 - 172.31.255.255	1,048,576	16 contiguous class B	172.16.0.1 - 172.31.255.254	172.16.0.0, 172.31.255.255
192.168.0.0 - 192.168.255.255	65,536	256 contiguous class C	192.168.0.1 - 192.168.255.254	192.168.0.0, 192.168.255.255

Network Communication

Unicast: One-to-one communication between two devices.

Broadcast: One-to-all communication within a network.

Multicast: One-to-many communication to a specific group of devices.

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