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Introduction

Welcome to *CompTIA® Network+® Practice Tests: Exam N10-009*, *Third Edition*. This book gives you a focused, timesaving way to review your networking knowledge and prepare to pass the Computing Technology Industry Association (CompTIA) Network+ exam. The book combines realistic exam prep questions with detailed answers and two complete practice tests to help you become familiar with the types of questions that you will encounter on the Network+ exam. By reviewing the objectives and sample questions, you can focus on the specific skills that you need to improve before taking the exam.

N10-009 Objective Map

The following table gives you the extent, by percentage, that each domain is represented on the actual examination, and where you can find questions in this book that are related to each objective.

Objective	Percentage of Exam	Chapter
1.0 Networking Concepts	23%	1
2.0 Network Implementations	20%	2
3.0 Network Operations	19%	3
4.0 Network Security	14%	4
5.0 Network Troubleshooting	24%	5

How This Book Is Organized

The first five chapters of this book are based on the five objective domains published by CompTIA for the N10-009 Network+ exam. There are approximately 200 questions for each objective domain, covering each of the suggested topics. The next two chapters each contain a 100-question practice test covering all of the objective domains. Once you have prepared each of the objective domains individually, you can take the practice tests to see how you will perform on the actual exam.

Who Should Read This Book

CompTIA recommends, but does not require, that candidates for the Network+ exam meet the following prerequisites:

- CompTIA A+ certification or equivalent knowledge
- At least 9–12 months of work experience in IT networking

CompTIA's certification program relies on exams that measure your ability to perform a specific job function or set of tasks. CompTIA develops the exams by analyzing the tasks performed by people who are currently working in the field. Therefore, the specific knowledge, skills, and abilities relating to the job are reflected in the certification exam.

Because the certification exams are based on real-world tasks, you need to gain hands-on experience with the applicable technology in order to master the exam. In a sense, you might consider hands-on experience in an organizational environment to be a prerequisite for passing the Network+ exam. Many of the questions relate directly to specific network products or technologies, so use opportunities at your school or workplace to practice using the relevant tools. Candidates for the exam are also expected to have a basic understanding of enterprise technologies, including cloud and virtualization.

Like all exams, the Network+ certification from CompTIA is updated periodically and may eventually be retired or replaced. At some point after CompTIA is no longer offering this exam, the old editions of our books and online tools will be retired. If you have purchased this book after the exam was retired, or are attempting to register in the Sybex online learning environment after the exam was retired, please know that we make no guarantees that this exam's online Sybex tools will be available once the exam is no longer available.

How to Use This Book

Although you can use this book in a number of ways, you might begin your studies by taking one of the practice exams as a pretest. After completing the exam, review your results for each objective domain and focus your studies first on the objective domains for which you received the lowest scores.

As this book contains only practice questions and answers, the best method to prepare for the Network+ exam is to use this book along with a companion book that provides more extensive explanations for the elements covered in each objective domain. Todd Lammle's *CompTIA® Network+® Study Guide: Exam N10-009, Sixth Edition,* provides complete coverage of all the technology you need to know for the exam.

After you have taken your pretest, you can use the chapters for the objective domains in which you need work to test your detailed knowledge and learn more about the technologies involved. By reviewing why the answers are correct or incorrect, you can determine if you need to study the objective topics more.

What's Next

The next step is to review the objective domains for the Network+ N10-009 exam and think about which topics you need to work on most. Then, you can turn to the appropriate chapter and get started. Good luck on the exam.

How to Become Network+ Certified

As this book goes to press, Pearson VUE is the sole Network+ exam provider. Below you will find the contact information and exam-specific details for registering. Exam pricing might vary by country or by CompTIA membership.

Vendor	Website	Phone Number
Pearson VUE	`www.pearsonvue.com/comptia`	US and Canada: 877-551-PLUS (7587)

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Chapter 1

Networking Concepts

THE COMPTIA NETWORK+ EXAM N10-009 TOPICS COVERED IN THIS CHAPTER INCLUDE THE FOLLOWING:

✓ **1.1 Explain concepts related to the Open Systems Interconnection (OSI) reference model.**

- Layer 1 – Physical
- Layer 2 – Data link
- Layer 3 – Network
- Layer 4 – Transport
- Layer 5 – Session
- Layer 6 – Presentation
- Layer 7 – Application

✓ **1.2 Compare and contrast networking appliances, applications, and functions.**

- Physical and virtual appliances
  - Router
  - Switch
  - Firewall
  - Intrusion detection system (IDS)/intrusion prevention system (IPS)
  - Load balancer
  - Proxy
  - Network-attached storage (NAS)
  - Storage area network (SAN)
  - Wireless
    - Access point (AP)
    - Controller

- Applications
  - Content delivery network (CDN)
- Functions
  - Virtual private network (VPN)
  - Quality of service (QoS)
  - Time to live (TTL)

✓ **1.3 Summarize cloud concepts and connectivity options.**

- Network functions virtualization (NFV)
- Virtual private cloud (VPC)
- Network security groups
- Network security lists
- Cloud gateways
  - Internet gateway
  - Network address translation (NAT) gateway
- Cloud connectivity options
  - VPN
  - Direct Connect
- Deployment models
  - Public
  - Private
  - Hybrid
- Service models
  - Software as a service (SaaS)
  - Infrastructure as a service (IaaS)
  - Platform as a service (PaaS)
- Scalability
- Elasticity
- Multitenancy

✓ **1.4 Explain common networking ports, protocols, services, and traffic types.**

Protocols	Ports
File Transfer Protocol (FTP)	20/21
Secure File Transfer Protocol (SFTP)	22
Secure Shell (SSH)	22
Telnet	23
Simple Mail Transfer Protocol (SMTP)	25
Domain Name System (DNS)	53
Dynamic Host Configuration Protocol (DHCP)	67/68
Trivial File Transfer Protocol (TFTP)	69
Hypertext Transfer Protocol (HTTP)	80
Network Time Protocol (NTP)	123
Simple Network Management Protocol (SNMP)	161/162
Lightweight Directory Access Protocol (LDAP)	389
Hypertext Transfer Protocol Secure (HTTPS)	443
Server Message Block (SMB)	445
Syslog	514
Simple Mail Transfer Protocol Secure (SMTPS)	587
Lightweight Directory Access Protocol over SSL (LDAPS)	636
Structured Query Language (SQL) Server	1433
Remote Desktop Protocol (RDP) 3389	3389
Session Initiation Protocol (SIP)	5060/5061

- Internet Protocol (IP) types
  - Internet Control Message Protocol (ICMP)
  - Transmission Control Protocol (TCP)
  - User Datagram Protocol (UDP)
  - Generic Routing Encapsulation (GRE)

- Internet Protocol Security (IPSec)
  - Authentication Header (AH)
  - Encapsulating Security Payload (ESP)
  - Internet Key Exchange (IKE)
- Traffic types
  - Unicast
  - Multicast
  - Anycast
  - Broadcast

✓ **1.5 Compare and contrast transmission media and transceivers.**

- Wireless
  - 802.11 standards
  - Cellular
  - Satellite
- Wired
  - 802.3 standards
  - Single-mode vs. multimode fiber
  - Direct attach copper (DAC) cable
    - Twinaxial cable
  - Coaxial cable
  - Cable speeds
  - Plenum vs. non-plenum cable
- Transceivers
  - Protocol
    - Ethernet
    - Fibre Channel (FC)
  - Form factors
    - Small form-factor pluggable (SFP)
    - Quad small form-factor pluggable (QSFP)

- Connector types
  - Subscriber connector (SC)
  - Local connector (LC)
  - Straight tip (ST)
  - Multi-fiber push on (MPO)
  - Registered jack (RJ)11
  - RJ45
  - F-type
  - Bayonet Neill–Concelman (BNC)

✓ **1.6 Compare and contrast network topologies, architectures, and types.**

- Mesh
- Hybrid
- Star/hub and spoke
- Spine and leaf
- Point to point
- Three-tier hierarchical model
  - Core
  - Distribution
  - Access
- Collapsed core
- Traffic flows
  - North-south
  - East-west

✓ **1.7 Given a scenario, use appropriate IPv4 network addressing.**

- Public vs. private
  - Automatic Private IP Addressing (APIPA)
  - RFC1918
  - Loopback/localhost

- Subnetting
  - Variable Length Subnet Mask (VLSM)
  - Classless Inter-domain Routing (CIDR)
- IPv4 address classes
  - Class A
  - Class B
  - Class C
  - Class D
  - Class E

✓ **1.8 Summarize evolving use cases for modern network environments.**

- Software-defined network (SDN) and software-defined wide area network (SD-WAN)
  - Application aware
  - Zero-touch provisioning
  - Transport agnostic
  - Central policy management
- Virtual Extensible Local Area Network (VXLAN)
  - Data center interconnect (DCI)
  - Layer 2 encapsulation
- Zero trust architecture (ZTA)
  - Policy-based authentication
  - Authorization
  - Least privilege access
- Secure Access Secure Edge (SASE)/Security Service Edge (SSE)
- Infrastructure as code (IaC)
  - Automation
    - Playbooks/templates/reusable tasks
    - Configuration drift/compliance
    - Upgrades
    - Dynamic inventories

- Source control
  - Version control
  - Central repository
  - Conflict identification
  - Branching
- IPv6 addressing
  - Mitigating address exhaustion
  - Compatibility requirements
    - Tunneling
    - Dual stack
    - NAT64

1.1 Explain concepts related to the Open Systems Interconnection (OSI) reference model.

1. At which of the following layers of the Open Systems Interconnection (OSI) model do the protocols on a typical local area network (LAN) use media access control (MAC) addresses to identify other computers on the network?

- **A.** Physical
- **B.** Data link
- **C.** Network
- **D.** Transport

2. Which of the following organizations developed the Open Systems Interconnection (OSI) model?

- **A.** International Telecommunication Union (ITU-T)
- **B.** Comité Consultatif International Télégraphique et Téléphonique (CCITT)
- **C.** American National Standards Institute (ANSI)
- **D.** Institute of Electrical and Electronics Engineers (IEEE)
- **E.** International Organization for Standardization (ISO)

3. Which layer of the Open Systems Interconnection (OSI) model is responsible for the logical addressing of end systems and the routing of datagrams on a network?

- **A.** Physical
- **B.** Data link
- **C.** Network
- **D.** Transport
- **E.** Session
- **F.** Presentation
- **G.** Application

4. On a TCP/IP network, which layers of the Open Systems Interconnection (OSI) model contain protocols that are responsible for encapsulating the data generated by an application, creating the payload for a packet that will be transmitted over a network? (Choose all that apply.)

- **A.** Physical
- **B.** Data link
- **C.** Network

D. Transport

E. Session

F. Presentation

G. Application

5. Which layer of the Open Systems Interconnection (OSI) model is responsible for translating and formatting information?

A. Physical

B. Data link

C. Network

D. Transport

E. Session

F. Presentation

G. Application

6. Which of the following devices typically operates at the Network layer of the Open Systems Interconnection (OSI) model?

A. Proxy server

B. Network interface adapter

C. Hub

D. Router

7. Which layer of the Open Systems Interconnection (OSI) model provides an entrance point to the protocol stack for applications?

A. Physical

B. Data link

C. Network

D. Transport

E. Session

F. Presentation

G. Application

8. Which layer of the Open Systems Interconnection (OSI) model is responsible for dialogue control between two communicating end systems?

A. Physical

B. Data link

C. Network

D. Transport

E. Session

F. Presentation

G. Application

9. Some switches can perform functions associated with two layers of the Open Systems Interconnection (OSI) model. Which two of the following layers are often associated with network switching? (Choose all that apply.)

A. Physical
B. Data link
C. Network
D. Transport
E. Session
F. Presentation
G. Application

10. At which layer of the Open Systems Interconnection (OSI) model are there TCP/IP protocols that can provide either connectionless or connection-oriented services to applications?

A. Physical
B. Data link
C. Network
D. Transport
E. Session
F. Presentation
G. Application

11. Which of the following layers of the Open Systems Interconnection (OSI) model typically have dedicated physical hardware devices associated with them? (Choose all that apply.)

A. Physical
B. Data link
C. Network
D. Transport
E. Session
F. Presentation
G. Application

12. At which layer of the Open Systems Interconnection (OSI) model is there a protocol that adds both a header and a footer to the information that is passed down from an upper layer, thus creating a frame?

A. Physical
B. Data link
C. Network
D. Transport
E. Session
F. Presentation
G. Application

13. Identify the layer of the Open Systems Interconnection (OSI) model that controls the addressing, transmission, and reception of Ethernet frames, and also identify the media access control method that Ethernet uses.

A. Physical layer: Carrier Sense Multiple Access with Collision Detection (CSMA/CD)

B. Physical layer: Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA)

C. Data link layer: CSMA/CD

D. Data link layer: CSMA/CA

14. At which layer of the OSI model do you find the protocol responsible for the delivery of data to its ultimate destination on an internetwork?

A. Data link

B. Network

C. Session

D. Application

15. Which of the following is not a protocol operating at the Network layer of the OSI model?

A. IP

B. ICMP

C. IGMP

D. IMAP

16. Ed is a software developer who has been given the task of creating an application that requires guaranteed delivery of information between end systems. At which layer of the Open Systems Interconnection (OSI) model does the protocol that provides the guaranteed delivery run, and what type of protocol must Ed use?

A. Data link layer; connectionless

B. Network layer; connection-oriented

C. Transport layer; connection-oriented

D. Application layer; connectionless

17. Alice is a network administrator designing a new local area network (LAN). She needs to determine the type of cabling and the network topology to implement. Which layers of the Open Systems Interconnection (OSI) model apply to cabling and topology elements?

A. Physical and Data link layers

B. Data link and Network layers

C. Network and Transport layers

D. Transport and Application layers

18. Which layers of the Open Systems Interconnection (OSI) model do not have protocols in the TCP/IP suite exclusively dedicated to them? (Choose all that apply.)

A. Physical

B. Data link

C. Network

D. Transport

E. Session

F. Presentation

G. Application

19. The protocols at which layer of the Open Systems Interconnection (OSI) model use port numbers to identify the applications that are the source and the destination of the data in the packets?

A. Application

B. Presentation

C. Transport

D. Network

20. Which of the following is a correct listing of the Open Systems Interconnection (OSI) model layers, in order, from top to bottom?

A. Physical, Data link, Transport, Network, Session, Presentation, Application

B. Application, Session, Presentation, Transport, Network, Data link, physical

C. Presentation, Application, Transport, Session, Network, Physical, Data link

D. Session, Application, Presentation, Transport, Data link, Network, Physical

E. Application, Presentation, Session, Transport, Network, Data link, Physical

21. At which of the Open Systems Interconnection (OSI) model layers do switches and bridges perform their basic functions?

A. Physical

B. Data link

C. Network

D. Transport

22. On a TCP/IP network, flow control is a function implemented in protocols operating at which layer of the Open Systems Interconnection (OSI) model?

A. Presentation

B. Session

C. Transport

D. Network