# Certified Network Administrator and Engineer (CNAE-101) Objectives

## Introduction

When you pass the CNAE-101 exam, you earn the CNAE certification and validate your knowledge of network administration and engineering. The CNAE-101 exam tests your knowledge of the topics tested on the CompTIA® Network+® (N10-009) exam, along with additional advanced objectives unique to the CNAE certification covered in this document. The CNAE certification does not require the Network+ certification as a prerequisite.

The Certified Network Administrator and Engineer (CNAE) has the knowledge and skill set required to implement network administration and engineering best practices in modern networks. This professional has sufficient knowledge of network hardware, software, and operations for network administration and engineering. The individual is aware of the networking tools and feature sets available and the capabilities they offer.

The exam is taken in the CWNP Learning Management System (LMS), and the purchase of the certification kit includes the e-learning material (covering all required knowledge), practice test, and final exam. The exam consists of 40 questions that must be answered within 100 minutes, requiring a score of 70% to earn the certification. Currently, the exam is offered only in English. While the exam has no verified prerequisites, it is recommended that the candidate have 1-3 years of experience in the networking industry and the full knowledge set tested on the CompTIA® Network+® exam.

The following table provides the breakdown of the exam as to the distribution of questions within each knowledge domain.

| Knowledge Domain | Percentage |
|---|---|
| Network Design | 25% |
| Network Administration | 20% |
| Network Troubleshooting | 20% |
| Network Security | 25% |
| Network Governance and Operations | 10% |

## 1.0 Network Design – 25%

1.1 Design highly available and scalable network architectures
- Redundancy
- Load Balancing
- High-Availability Clustering
- Geographic Distribution
- Network Segmentation

1.2 Implement advanced routing and switching solutions
- OSPF
- EIGRP
- DGP
- MPLS
- Data Center Switching Architectures
- QoS

1.3 Design and integrate cloud and hybrid cloud network environments
- VPC Design
- Network Function Virtualization (NFD)
- Container Networking

1.4 Develop network documentation and diagramming standards for networks

## 2.0 Network Administration – 20%

2.1 Implement and manage network services
- DHCP
- DNS
- NTP
- Syslog
- SNMPv3
- RADIUS/TACACS+
- Network Automation

2.2 Manage and maintain the network infrastructure lifecycle
- Capacity Planning
- Firmware/Software Upgrades
- Configuration Management

2.3 Implement and maintain secure remote access solutions
- VPNs
- AAA

## 3.0 Network Troubleshooting – 20%

3.1 Apply advanced troubleshooting processes for complex network issues

3.2 Troubleshoot routing and switching issues

- BGP Peering
- OSPF/EIGRP Problems
- MPLS Forwarding
- STP Convergence
- VLAN Issues

3.3 Troubleshoot network performance and connectivity issues

- Bottlenecks
- Latency
- Application-Specific Problems
- Virtualized/Cloud Networks

3.4 Utilize network tools for diagnostics and analysis

- Protocol Analyzers (Wireshark)
- NPM Tools
- Scripting

## 4.0 Network Security – 25%

4.1 Implement and manage network security controls

- NGFW
- IDS/IPS
- DLP
- NAC
- Zero Trust
- SASE/SSE

4.2 Analyze and respond to network security incidents

- Attack Vectors
- Traffic Analysis
- Incident Response
- Forensics

4.3 Implement and manage cryptographic solutions for network security

- Public Key Infrastructure (PKI)

- IPSec
- SSH/SSL/TLS

4.4 Conduct network security assessments and audits

- Vulnerability Scanning
- Configuration Audits
- Regulatory Compliance

## 5.0 Network Governance and Operations – 10%

5.1 Explain the purpose and importance of network governance

- Policies
- Change Management
- Compliance
- Risk Management

5.2 Manage network operations and support

- Operational Runbooks
- KPIs
- Incident/Problem Management

5.3 Implement and manage network capacity planning

- Forecasting Growth
- Baseline Performance
- Optimization

5.4 Understand the financial aspects of network operations

- TCO
- CapEx vs. OpEx
- Budgeting

Neither CompTIA® nor the Network+® certification are products of, or partners with, CWNP. Given that Network+ is the industry standard for entry-level, vendor-neutral networking certification, CWNP has chosen to build on this knowledge requirement set to develop the CNAE certification. The learning materials for CNAE provide knowledge that can be used to prepare for both the Network+ and CNAE certifications. CWNP does not provide Network+ testing or grant the Network+ credential and does not require holding that credential as a prerequisite to CNAE.