CENGN Academy

Cloud System Specialist

CENGN's Cloud System Specialist program provides solid grounding in the essential concepts and hands-on skills required to work successfully in a cloud systems environment. Modules focus on: Linux and open-source tools; containerization with Docker and Kubernetes; network configuration; cloud deployment with OpenStack.

Audience:
- New grads in IT and networking
- New hires in software and cloud
- Software and network engineers

Delivery Mode: Learn on your own schedule with self-paced online training and labs

Duration: Learners will need approximately 60-65 hours to complete the course. Learners will have access to the online content and labs for 3 months

Hands-on Labs: This course features hands-on labs performed on CENGN's private cloud infrastructure. The labs simulate real-world scenarios learners may face when working with containers and cloud systems. In particular, learners will install and manage a web service using multiple methods

Recommended Prequisites:
This course is best suited for learners with the following knowledge and skills
- Intermediate experience with networking
- Intermediate experience with Linux, including command line interface
- Moderate level of understanding of virtualization
- Beginner level with system administration

Learner Support: The CENGN Academy team of subject matter experts will be available to support you while you take this course. We will answer your questions, confirm your labs, and check in with you after your course to assist with your badge exam preparations

Course Objectives

After completing this course, the learner will be able to:
- Work with Linux filesystem and file processing commands
- Create and use SSH keys for remote access
- Work with distributed revision control systems
- Explain key container concepts
- Manage Docker containers
- Describe Kubernetes components and architecture
- Create a single-node Kubernetes cluster
- Work with standard Kubernetes objects
- Create basic configurations and security settings on an IP network
- Create networked VMs in OpenStack using Heat templates
- Deploy an application using multiple methodologies

Exam and Certification

Learners who complete this course are ready for the CENGN Cloud System Specialist certification exam. Those who successfully complete the exam will earn a CENGN Cloud System Specialist digital badge, which can be posted on LinkedIn and other social media.

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CLOUD SYSTEM SPECIALIST

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Course Content

Module 1 – Open-source Tool Basics
- Explain the open-source software paradigm
- Use standard Linux CLI filesystem commands
- Use awk to extract and print specified data
- Use sed to find and replace strings using regex expressions
- Explain symmetric and asymmetric encryption techniques
- Generate SSH keys using the ssh-keygen command
- Utilize SSH keys to authenticate securely into a Linux system
- Install an application in Linux using a package manager
- Manage Linux services using systemctl
- Compare the three main types of Version Control Systems (Local, Centralized, and Distributed)
- Describe how Git manages source code
- Demonstrate basic skills with Git, such as cloning repos and committing files

Module 2 – Docker and Kubernetes Basics
- Compare virtual machines and containers
- Describe how containers use Linux namespaces
- Describe how Docker manages containers
- Compare Host and Guest operating systems
- Describe Type 1 and Type 2 hypervisors
- Manage containers using Docker CLI commands such as docker run, docker start/stop, docker ps, docker images
- Manage Docker images through Docker Hub
- Modify a running Docker container
- Commit changes to a new Docker container image with a tag
- Explain why a container orchestrator is needed
- Describe the components of the Kubernetes architecture (nodes, pods, api-server, etc.)
- Compare Kubernetes worker nodes and master nodes
- Describe Kubernetes cluster types
- Retrieve details about Kubernetes objects using kubectl get, kubectl describe, and kubectl explain
- Describe ClusterIP and NodePort service types, and their associated ports
- Compare Kubernetes deployments, replication controllers, and replica sets
- Install and configure a single-node Kubernetes cluster
- Define standard Kubernetes objects using manifest files

- Create and manage Kubernetes objects using kubectl commands
- Use Kubernetes labels and selectors to group objects and organize clusters
- Find and resolve errors in an existing Kubernetes manifest file

Module 3 – Networking Basics
- Describe the OSI networking model
- Describe the layers of the TCP/IP networking protocol suite
- Compare the TCP and UDP protocols
- Explain the main concepts of Ethernet LANs
- Explain the basics of routing
- Describe physical and logical network addressing
- Review subnetting with IPv4 addresses
- Configure static routes on a network
- Confirm network connectivity using ping and traceroute
- Compare stateless and stateful firewalls
- Describe the basics of DNS, its architecture, and the name resolution process.
- Describe the purpose of NTP and how it works
- Describe the basics of OSPF and its hierarchy
- Manage and configure routers with services such as DNS, NTP, OSPF, and firewall rules

Module 4 – OpenStack Basics
- Compare Cloud Computing and traditional networking
- List the main benefits of Cloud Computing
- Describe cloud computing deployment models and service categories
- Describe the purpose of OpenStack
- Describe OpenStack's architecture and operations
- Explain the purpose and benefits of NFV/NFVI
- Explain underlay and overlay networks
- Connect to and navigate through the OpenStack Horizon UI
- Perform standard compute operations through Horizon such as creating instances and images
- Perform standard network operations through Horizon such as creating networks, routers, and security groups
- Describe the OpenStack Heat orchestration service
- Build and launch a Heat template to define resources including instances, security groups, images, and floating IPs