This course is subject to approval under the **New Industrialisation and Technology Training Programme (NITTP)** with up to 2/3 course fee reimbursement upon successful applications*.

For details, please refer to https://nittp.vtc.edu.hk.

Kubernetes Administration

Course Outline

Overview

In today's fast-evolving cloud-native landscape, Kubernetes has become the cornerstone of modern infrastructure and application orchestration. This comprehensive 5-day Kubernetes Administration course is meticulously designed to empower IT professionals with versatile and in-depth capabilities essential for deploying, managing, and scaling Kubernetes clusters across diverse production environments.

Participants will begin with a deep dive into Kubernetes architecture, installation, and core components, gaining a solid understanding of how container orchestration works across cloud, hybrid, and on-premise environments. As the course progresses, learners will explore advanced topics such as high availability (HA) cluster setup, network policies, StatefulSets, and horizontal pod autoscaling—ensuring they can build resilient, scalable, and secure Kubernetes environments.

The course also emphasizes real-world operational excellence, covering secrets management, scheduling strategies, logging and monitoring with the Elasticsearch, Fluentd & Kibana (EFK) stack, and Helm-based application deployment. Learners will gain hands-on experience with troubleshooting techniques, cluster upgrades, and custom resource definitions, preparing them to handle complex scenarios in enterprise-grade Kubernetes deployments.

A standout feature of this course is the Integration of DeepSeek into Kubernetes, a cutting-edge module focused on deploying and optimizing large language models (LLMs) within Kubernetes clusters. This includes performance tuning for Artificial Intelligence (AI) workloads, environment customization, and robust security practices—making this course ideal for professionals working at the intersection of AI and cloud-native technologies.

Whether you're aiming to become a Certified Kubernetes Administrator (CKA), lead DevOps initiatives, or support AI-driven applications, this course delivers the depth, breadth, and hands-on experience needed to excel.

Course Fee
Standard Fee: HK$20,000
Discounted Fee: HK$18,000

Duration & Time
Nov 24-28, 2025 (30 hours)
9:30am - 12:30pm & 2:00pm - 5:00pm
(12:30pm - 2:00pm Lunch Break)

Medium of instruction
Cantonese with English terminology

Training Venue
2/F., Centre Point, 181 Gloucester Road, Wan Chai, Hong Kong

How to Apply
- Complete Course Enrollment with Kenfil

AND

- Submit Training Grant Application to NITTP Secretariat at least five weeks before the commencement of training

*The training grant applications submitted by companies for registered courses will be vetted and approved by the NITTP Secretariat - The Vocational Training Council (VTC). A maximum amount of training grant for each course will be set out in the application approval but the actual training grant to be reimbursed will be subject to the actual expenditure. Kenfil makes no promises or representations whatsoever as to the result of your application.

Prerequisites:

To get the most out of this course, students should have an understanding of Linux administration skills and familiarity with container technologies (e.g., Docker). Students should be comfortable using the command line. Must be able to edit files using a command-line text editor.

Course Outline

Module 1: Introduction to Kubernetes (1 hour)

- Overview of Container Orchestration
- Key Features of Kubernetes
- Kubernetes Architecture Overview
- Master Node Components
- Worker Node Components
- Introduction to Container Runtime

Module 2: Kubernetes Installation and Networking (2 hours)

- Worker Node Components: Kubernetes Dashboard
- Infrastructure Requirements for Kubernetes Installation
- Kubernetes Pod Networking Concepts
- Hands-on Lab: Kubernetes Installation - On-Premise Bare Metal / Virtual Machines (1 Master Node + 3 Worker Nodes)
- Accessing the Kubernetes Application Programming Interface (API) Server
- Understanding the Kubernetes Object Model

Module 3: Kubernetes Basic Objects and Management (3 hours)

- Establishing Secure Shell (SSH) Tunnel to Master Node
- Managing Pods
- Understanding ReplicaSets and ReplicationControllers
- Deployments
- Introduction to DaemonSets

Module 4: Advanced Kubernetes Operations (3 hours)

- Working with Namespaces
- Connecting Users to Pods Using Labels and Selectors
- Node Labeling and Node Selectors
- Managing Jobs and CronJobs
- Node and Pod Networking: Routing and Overlay Networks
- Service Types: ClusterIP and NodePort
- Service Types: HostPort and HostNetwork

Module 5: Kubernetes Deployment and Resource Management (3 hours)

- Deploying an Application Using YAML File
- Setup Resource Quota for POD and Namespace
- Deploying an Application Using the Dashboard
- Package Management
- Introduction to Kubernetes Volume Management

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Module 6: Kubernetes Storage and Load Balancing (3 hours)

- Understanding Container Storage Interface (CSI)
- Persistent Volumes and Persistent Volume Claims
- Using ConfigMaps for Configuration Management
- Ingress Controller: Name-Based Virtual Hosting and Fanout
- Deploying Kubernetes-Aware Network Load Balancer
- Configuring Network Load Balancer with Ingress Controller

Module 7: Integration of DeepSeek into Kubernetes - Large Language Models Deployment (3 hours)

- Introduction to Large Language Models (LLMs)
  - Overview of LLMs and their impact on AI development
  - Introduction to DeepSeek and its performance benefits
- Deployment Prerequisites and System Requirements
  - Hardware requirements for deploying LLMs locally
  - Recommended software stack for running DeepSeek
- Step-by-Step Deployment Guide
  - Install Ollama
    - Overview and installation process for Ollama framework
    - Running large language models locally using Ollama
  - Pull the DeepSeek Model
    - Downloading and storing the DeepSeek models
    - Selecting the appropriate model variant based on hardware capabilities
  - Running DeepSeek Locally
    - Starting and interacting with the DeepSeek model using Command Line Interface (CLI)
    - Observing the model's responses and querying its functionalities
  - Deploy the Open WebUI Using kubernetes
    - Preparing the environment for deploying Open WebUI
    - Accessing and managing the DeepSeek model through a web-based interface
  - Safeguarding DeepSeek AI workloads
    - Implementing Data Leak Prevention
    - Plan and enhance data classification and protection

Module 8: Advanced Kubernetes Management and Networking - Part 1 (3 hours)

- Setting Up and Managing High Availability (HA) in Kubernetes Cluster
- Performing Kubernetes Version Upgrade Using Kubeadm
- Implementing etcd Backup and Restore Procedures

Module 9: Advanced Kubernetes Management and Networking - Part 2 (3 hours)

- Setup Horizontal PodAutoscaleer
- Create and manage Statefulset
- Understand Advance networking – network policy (Isolate Namespaces using Network Policy)

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Module 10: Advanced Kubernetes Operations: Secrets, Scheduling, Logging, Custom Resources, Helm, and Monitoring - Part 1 (3 hours)

- Create and apply the secret – Transport Layer Security (TLS)
- Introduction to Scheduling
- Logging and Troubleshooting (Setting Up EFK Stack: Elasticsearch, Fluentd, Kibana)

Module 11: Advanced Kubernetes Operations: Secrets, Scheduling, Logging, Custom Resources, Helm, and Monitoring - Part 2 (2 hours)

- Custom Resource Definition
- Working with Helm and Charts

Module 12: Integration of DeepSeek into Kubernetes - Large Language Models Performance Tuning and security Considerations (1 hour)

- Advanced Performance Tuning
  - Overview of performance optimization techniques for Ollama server
  - Environment variables customization for enhancing model inference and resource management
- Security Considerations for Kubernetes Hosting
  - Importance of access control and network security for Kubernetes hosted models
  - Data protection measures and considerations for ensuring environment security

Trainer

Sung Po Man (Simon)

Simon has about 19+ years IT training experience, out of which 10 years were working on cloud and virtualization technologies and training. He has high proficiency in a wide range of technical training spectrum and specialized in conducting IT technical and certification courses including Microsoft Windows Server, Hyper-V, Exchange Server, SQL Server, SharePoint Server, System Center Configuration Manager, System Center Operations Manager; VMware vSphere, Horizon View, Tanzu, Virtual SAN, NSX, VMware Cloud on AWS, Workspace ONE, vRealize Automation, vRealize Operations Manager, Site Recovery Manager; vCloud Director; Nutanix Hyperconverged Infrastructure for Enterprise Datacenters; DevOps, Kubernetes, Containerization, Docker, Linux, etc. to customers mainly came from enterprise/corporations, public utilities and the Government in which thousands of IT Managers/Professionals, Project Managers, Systems Engineers, Administrators, Pre-sales and Post-sales Consultants had been successfully trained up. He also designed & customized training solutions to align the training curriculum in-sync with the objectives and mission-oriented needs for the staff of clients' companies.

Apart from conducting trainings on these technologies for clients in Hong Kong, Macau, Taiwan and Greater China in the past years, Simon has experience in the IT industry with "Real-world" hands-on project experience by providing cloud or virtualized solutions to corporate houses based on their requirements. He has profound knowledge in system migration, cloud infrastructure implementation and design, and virtualization technologies.

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