

## COURSE ABSTRACT

# Merative SPM on Kubernetes for Developers

SPM086

### Course Description

This course provides the essential knowledge and resources to help technical roles implement and manage Merative Social Program Management (SPM) deployments on Kubernetes. This course also guides you through the many resources to help you build your knowledge of cloud, continuous integration/continuous delivery (CI/CD), and containerization technologies.

The first section presents an overview of cloud, containerization technologies and CI/CD pipelines, which are prerequisites for the course. The next section provides a deeper knowledge of Docker, Kubernetes, and Helm, and how they can be used to deploy SPM on Kubernetes. This section also dives deeper into CI/CD pipelines and the common tools that are employed in pipelines. The last section concentrates on developing and operating SPM on Kubernetes.

### General Information

**Delivery Method:** Self-paced.

**Audience:** This is a technical course and is suited to learners with a technical background, such as developers, architects, DevOps engineers, and system administrators. This course is for Merative and IBM employees only.

**Topics:** The course covers the following topics:

- Cloud computing, containerization, and DevOps concepts.
- Docker, Kubernetes, and Helm.
- DevOps and delivery pipelines.
- SPM on Kubernetes offering.

<b>Learning Objectives:</b>	<p>After completing the course, learners should be able to:</p> <ul style="list-style-type: none"> <li>• Describe the key cloud and containerization terms and concepts, including Docker, Kubernetes, and Helm</li> <li>• Outline the DevOps approach to software development.</li> <li>• Use common tools to implement a CI/CD pipeline.</li> <li>• Configure containers for SPM images using Docker.</li> <li>• Configure and manage Kubernetes clusters.</li> <li>• Create and deploy Helm charts for SPM using best practices.</li> <li>• Select best practices to help you manage and operate your SPM cloud solution.</li> </ul>
<b>Prerequisites:</b>	None
<b>Duration:</b>	16 Hours *
<b>Skill Level:</b>	Intermediate
<b>Version:</b>	This course was developed for SPM 7.0.11. The course covers core topics that do not change much. The links are active as on Mar-2023.

## Notes

This course was available on the IBM Digital Learning Platform. However, since the move to Merative it is no longer available as a Moodle-based course. Please contact SPM Education at [spmeducation@merative.com](mailto:spmeducation@merative.com) if you are interested in taking this course.

\*The course duration gives learners an estimate of how much time they need to allocate to the course. The course duration does not specify the actual time required to complete the course, which varies by learner. In addition, the time it takes to cover the material depends on your current knowledge of the topics and which additional resources you want to review.

## Course Agenda

### Unit 1 – Core Concepts – Prerequisites

#### Lesson 1 –Cloud Computing Overview

**Duration:** 50 minutes

- Learning objectives:
- After completing this lesson, learners should be able to:
- Define the key cloud terms and concepts.
  - Distinguish between the different cloud service models.
  - Outline the features of private, public, and hybrid deployment models.
  - List typical use cases for each deployment model.

- Identify the main cloud providers in the cloud services market.

## Lesson 2 – Containerization Overview

**Duration: 200 minutes**

Learning objectives: After completing this lesson, learners should be able to:

- Briefly explain what is meant by application modernization.
- Define the following concepts:
  - Containerization
  - Microservices
  - Cloud native
  - 12-Factor applications
- Explain the purpose of Docker, Kubernetes, and Helm.
- Outline the broad approaches for moving applications to the cloud.

## Lesson 3 – DevOps Overview

**Duration: 90 minutes**

Learning objectives: After completing this lesson, learners should be able to:

- Describe the CI/CD pipeline architecture.
- List the DevOps principles.
- Describe the following DevOps concepts:
  - Continuous development
  - Continuous integration
  - Continuous deployment
  - Continuous delivery
  - Continuous testing
  - Infrastructure as code
- Access the IBM Garage Methodology

## Lesson 4 – Linux Overview

**Duration: 20 minutes**

Learning objectives: After completing this lesson, learners should be able to:

- List the main flavors of Linux.
- List resources for learning Linux.

## Unit 2 – Docker, Kubernetes & Helm – A Deeper Dive

### Lesson 1 – Docker

**Duration: 250 minutes**

Learning objectives: After completing this lesson, learners should be able to:

- Describe how Docker containers are built.
- Interpret sample SPM Dockerfiles.
- Use Docker commands to build SPM Docker images.
- List best practices for creating and maintaining containers.

- Describe the importance of hardening Docker images.
- Outline Docker features for storage and networking.
- List resources for developing a deeper understanding of Docker.

## Lesson 2 – Kubernetes

**Duration: 80 minutes**

Learning objectives: After completing this lesson, learners should be able to:

- Outline the difference between running an application in VMs and running a containerized application in a Kubernetes cluster.
- Describe the components of the Kubernetes architecture.
- Manage key API objects using kubectl.
- Describe a simple Kubernetes cluster for deploying SPM.
- State the importance of hardening Kubernetes infrastructure.

## Lesson 3 – Helm

**Duration: 30 minutes**

Learning objectives: After completing this lesson, learners should be able to:

- State the purpose of Helm.
- List basic Helm commands.
- Interpret the sample Helm charts provided for SPM on Kubernetes.

## Unit 3 – DevOps

### Lesson 1 – Delivery Pipelines

**Duration: 60 minutes**

Learning objectives: After completing this lesson, learners should be able to:

- Describe typical stages in the delivery pipeline architecture.
- List common tools that are used in the delivery pipeline stages.
- Reference the IBM Garage method to learn about the IBM approach to define, design, develop, deliver, and manage cloud applications.
- List resources for developing CI/CD skills.

## Unit 4 – Getting Started with SPM on Kubernetes

### Lesson 1 – SPM on Kubernetes Offering

**Duration: 70 minutes**

Learning objectives: After completing this lesson, learners should be able to:

- Outline the Merative SPM offering.
- Describe the technology stack that is required to support SPM on Kubernetes.

## **Lesson 2 – Architecture & Runbook**

**Duration: 60 minutes**

Learning objectives: After completing this lesson, learners should be able to:

- Outline the changes that were introduced to SPM to support SPM on Kubernetes.
- Describe the SPM on Kubernetes deployment reference architecture for OpenShift and IKS.
- Explain the main steps in the Runbook for deploying SPM on Kubernetes.

## **Lesson 3 – Operating and Monitoring SPM on Kubernetes**

**Duration: 50 minutes**

Learning objectives: After completing this lesson, learners should be able to:

- Define the service management considerations for operating and managing a cloud solution.
- Access the IBM Cloud Service Management and Operations (CSMO) guide for an approach to do this.
- List tips for monitoring and troubleshooting SPM on Kubernetes.
- Describe how to upgrade SPM on Kubernetes.