

Senior Academy - IT training center

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عمارة 4 - شارع محمد توفيق دياب - عباس العقاد - مدينة نصر - الدورال 1

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DevOps Engineer Diploma



Kubernetes Labs

Lab 05

MySQL Deployment with ConfigMap, Secrets & PV/PVC

Lab Objectives

- Working with ConfigMaps and Secrets
- Deploying Databases Using Persistent Storage (PV/PVC)
- Applying Taints and Tolerations for Node Isolation
- Managing Deployments and Services for Database Access
- Verifying Resource Binding and Scheduling in Kubernetes
- Practicing Secure Configuration and Environment Management

Lab Overview:

Deploy a **MySQL database** on a dedicated worker node using **Kubernetes best practices**.

You must use:

- **ConfigMap** and **Secret** from .txt files
- **Persistent Volume (PV)** and **Persistent Volume Claim (PVC)** for storage
- **Taint/Toleration** to isolate the database node
- **Deployment** and **Service** for database management and access

Step 1 - Node Preparation

- Apply a **Taint** on `node01` so that only pods with the correct toleration can run there.
 - **Key:** db
 - **Value:** only
 - **Effect:** NoSchedule

Step 2 - Configuration Files

Create two .txt files:

- **config.txt** → for MySQL configuration values
 - Example: port, bind address, etc.
- **secret.txt** → for MySQL credentials
 - Example: root password, user, password, database name

Step 3 - Kubernetes Resources

Create the following resources using YAML files or `kubectl` commands:

- **ConfigMap** from `config.txt`
- **Secret** from `secret.txt`
- **PersistentVolume (PV)** of size **2Gi** using `hostPath /mnt/data/mysql`
- **PersistentVolumeClaim (PVC)** requesting **1Gi** storage
- **Deployment** named **mysql-deployment**:
 - Image: `mysql:8.0`
 - Environment variables loaded from **ConfigMap** and **Secret**
 - Mount the **PVC** to `/var/lib/mysql`
 - Add a **Toleration** matching the taint applied to `node01`

- Service named **mysql-service**:
 - Type: **ClusterIP**
 - Port: **3306**
 - TargetPort: **3306**
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Step 4 - Verification

Verify that:

- The **MySQL Pod** is scheduled on `node01`.
 - The **ConfigMap** and **Secret** are correctly loaded.
 - The **PVC** is bound to the **PV**.
 - The **Service** is created successfully.
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Submission Requirements

1. Screenshot of all applied resources:
2. `kubectl get all,pv,pvc -o wide`
3. YAML files (if used).

You are Welcome