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

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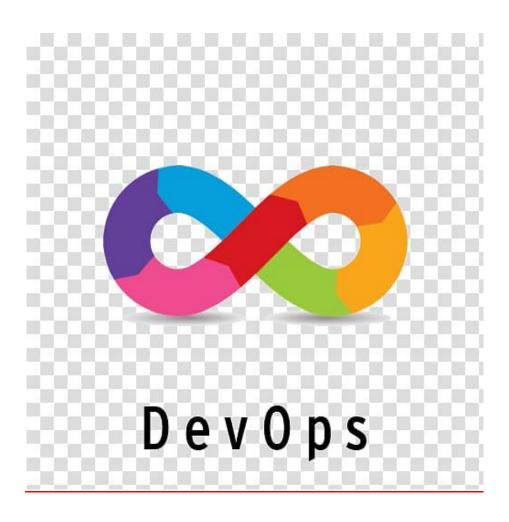
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فرع مدينة نصر 1 : عمارة 4 ــ شارع محمد توفيق دياب ــ عباس العقاد - مدينة نصر ــ الدورال 1

DevOps Engineer Diploma

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DevOps Engineer Diploma

Kubernetes Labs
Lab 04

Kubernetes Scaling, Update Strategies, and Resource Management

Lab Objectives

- **Creating and Managing Namespaces**
- **Deploying and Configuring Applications in Kubernetes**
- **Exposing Applications Using Services**
- **Scaling Deployments Manually and Automatically**
- **Configuring and Applying Resource Quotas**
- **Verifying Kubernetes Resources (Pods, Deployments, Services, Quotas)**
- **Managing Environment Variables for Deployments**

Kubernetes Lab – Scaling / Update Strategy / ResourceQuota

Lab Objectives:

- Create a Namespace and Deployment
- Apply Manual and Auto Scaling
- Perform Rolling Updates
- Configure a ResourceQuota to control resource usage

Step 1 – Create Namespace

- Create a namespace named **web-app**.

Step 2 – Create Deployment

- Create a deployment named **nginx-deploy** using the image **nginx:latest** inside the **web-app** namespace.

Step 3 – Expose Deployment

- Expose the deployment as a **ClusterIP Service** on port **80**.

Step 4 – Manual Scaling

- Scale the deployment to **4 replicas** manually.
- Verify that the number of **Pods** has increased.

Step 5 – Auto Scaling (HPA)

- Create a **Horizontal Pod Autoscaler (HPA)** that targets **70% CPU utilization**.
- Set a minimum of **2 Pods** and a maximum of **8 Pods**.
- Check the **HPA status** after creation.

Step 6 – Apply ResourceQuota

- Create a **ResourceQuota** named **webapp-quota** in the same namespace with the following limits:
  - **pods = 10**
  - **requests.cpu = 2**
  - **requests.memory = 2Gi**
  - **limits.cpu = 4**
  - **limits.memory = 4Gi**
- Verify that the **ResourceQuota** has been applied correctly.

Step 7 – Update Strategy (Rolling Update)

- Update the image of the deployment to **nginx:1.27**.

Step 8 – Rollback

- Rollback the deployment to the previous version.

Step 9 – Verification

- Verify all resources in the **web-app** namespace:
  - **Pods**
  - **Services**
  - **HPA**
  - **ResourceQuota**

You are Welcome