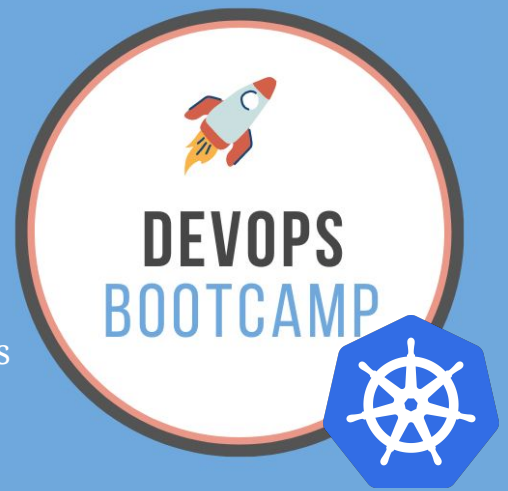


Module Checklist

Container Orchestration with Kubernetes

By Techworld with Nana

Video Overview



- ★ Introduction to Kubernetes
- ★ Basic Concepts and Main K8s Components
- ★ Kubernetes Architecture
- ★ Minikube and kubectl - Local Setup
- ★ Kubernetes CLI - Main kubectl commands
- ★ Introduction to YAML Configuration File
- ★ Demo project: Deploying MongoDB and Mongo Express
- ★ Organizing components with Namespaces
- ★ Kubernetes Services
- ★ Kubernetes Ingress
- ★ Persisting Data with Volumes
- ★ ConfigMap & Secret Volume Types
- ★ Deploying stateful Apps with StatefulSet
- ★ Introduction to Managed Kubernetes Services
- ★ Helm - Package Manager of Kubernetes
- ★ Helm Demo: Install a Stateful Application on Kubernetes using Helm
- ★ Demo: Deploy App from Private Docker Registry
- ★ Extending the K8s API with Operators
- ★ Prometheus Operator Demo with Helm: Setup Prometheus Monitoring in K8s

Demo Projects	
K8s Demo Repo	https://gitlab.com/nanuchi/bootcamp-kubernetes
Demo Project for Private Repo	https://gitlab.com/nanuchi/developing-with-docker

Check your progress... 1/8



Introduction to Kubernetes

- ☐ Watched video

Basic Concepts and Main K8s Components

- ☐ Watched videos

Useful Links:

- Managing K8s Secrets: <https://blog.aquasec.com/managing-kubernetes-secrets>

Kubernetes Architecture

- ☐ Watched videos

Minikube and Kubectl - Local Setup

- ☐ Watched videos
- ☐ **Demo executed:**
 - ☐ Installed and setup Minikube
 - ☐ Installed Kubectl

Useful Links:

- Installation guide for Minikube (Mac, Linux and Windows):
<https://minikube.sigs.k8s.io/docs/start/>
- Installation guide for Kubectl:
<https://kubernetes.io/docs/tasks/tools/install-kubectl/>



Check your progress... 2/8

Kubernetes CLI - Main kubectl commands

- ☐ Watched video
- ☐ **Demo executed:**
 - ☐ Created nginx Deployment
 - ☐ Edited Deployment
 - ☐ Created mongodb Deployment
 - ☐ Inspected logs of a Pod
 - ☐ Got shell of a running container - kubectl exec
 - ☐ Deleted deployment
 - ☐ Applied configuration file



Useful Links:

- Example commands repo:
<https://gitlab.com/nanuchi/bootcamp-kubernetes/-/tree/master/basic-kubectl-commands>

YAML Configuration File

- ☐ Watched videos

Useful Links:

- Configuration File:
<https://kubernetes.io/docs/tasks/manage-kubernetes-objects/declarative-config/>
- Example files repo:
<https://gitlab.com/nanuchi/bootcamp-kubernetes/-/tree/master/kubernetes-configuration-file-explained>

Best practices:

- Store Configuration Files with your application code or own Git Repository just for the configuration files

Check your progress... 3/8

Demo project: Deploying MongoDB and Mongo Express

- ☐ Watched videos
- ☐ **Prerequisite:**
 - ☐ Minikube cluster running
- ☐ **Demo executed - Deploying MongoDB and MongoExpress:**
 - ☐ Created MongoDB Deployment
 - ☐ Created Secret for Mongo Credentials
 - ☐ Created MongoDB Internal Service
 - ☐ Created MongoExpress Deployment
 - ☐ Created ConfigMap for DB Server URL
 - ☐ Created Mongo Express External Service



Useful Links:

- MongoDB Docker Image: https://hub.docker.com/_/mongo
- Mongo Express Docker Image: https://hub.docker.com/_/mongo-express
- Project Repo:
<https://gitlab.com/nanuchi/bootcamp-kubernetes/-/tree/master/demo-kubernetes-components>

Organizing components with Namespaces

- ☐ Watched videos

Useful Links:

- Kubectl: <https://github.com/ahmetb/kubectx#installation>

Check your progress... 4/8

Kubernetes Services

☐ Watched video

Useful Links:

- Service: <https://kubernetes.io/docs/concepts/services-networking/service/>

Best Practice:

- Do NOT use NodePort Service Type for external connections. Use Ingress or Load Balancer instead.

Ingress

☐ Watched video

Useful Links:

- Project repo:
<https://gitlab.com/nanuchi/bootcamp-kubernetes/-/tree/master/kubernetes-ingress>
- List of Ingress Controllers you can choose from:
<https://kubernetes.io/docs/concepts/services-networking/ingress-controllers/>
- Ingress Controller Bare Metal:
<https://kubernetes.github.io/ingress-nginx/deploy/baremetal/>

Persisting Data with Volumes

☐ Watched video

Useful Links:

- Volume Types:
<https://kubernetes.io/docs/concepts/storage/volumes/#volume-types>
- Project demo:
<https://gitlab.com/nanuchi/bootcamp-kubernetes/-/tree/master/kubernetes-volumes>



Check your progress... 5/8

ConfigMap & Secret Volume Types

- ☐ Watched video
- ☐ **Demo executed:**
 - ☐ Created Mosquitto Deployment without any volumes
 - ☐ Created ConfigMap component to overwrite mosquitto.conf file
 - ☐ Created Secret component to add passwords file
 - ☐ Adjusted Mosquitto Deployment to include volumes

Useful Links:

- Project demo: <https://gitlab.com/nanuchi/bootcamp-kubernetes/-/tree/master/configmap-and-secret-volumes>
- ConfigMap Volume Type: <https://kubernetes.io/docs/concepts/storage/volumes/#configmap>
- Secret Volume Type: <https://kubernetes.io/docs/concepts/storage/volumes/#secret>
- Mosquitto Public Docker Image: https://hub.docker.com/_/eclipse-mosquitto

Deploying Stateful Apps with StatefulSet

- ☐ Watched videos

Introduction to Managed Kubernetes Services

- ☐ Watched videos

Helm - Package Manager of Kubernetes

- ☐ Watched videos

Useful Links:

- Install Helm: <https://helm.sh/docs/intro/install/>
- Helm Hub: <https://artifacthub.io/>



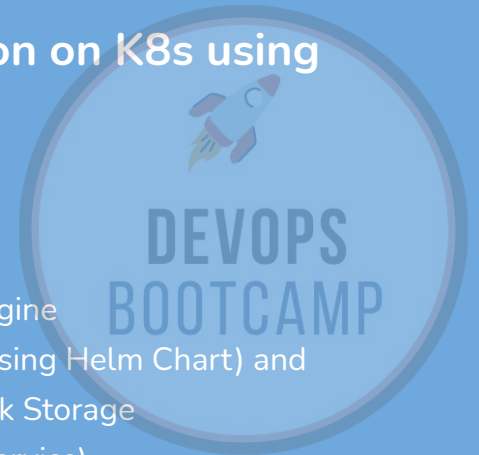
Check your progress... 6/8

Helm Demo: Install a Stateful Application on K8s using Helm

- ☐ Watched video
- ☐ **Demo executed:**
 - ☐ Created K8s cluster on Linode Kubernetes Engine
 - ☐ Deployed replicated MongoDB (StatefulSet using Helm Chart) and configured Data Persistence with Linode Block Storage
 - ☐ Deployed MongoExpress (Deployment and Service)
 - ☐ Deployed NGINX Ingress Controller as Loadbalancer (using Helm Chart)
 - ☐ Configured Ingress rule

Useful Links:

- Project Repo: <https://gitlab.com/nanuchi/bootcamp-kubernetes/-/tree/master/linode-kubernetes-engine-demo>
- Create a Linode account (\$100 - 60day credit with this link: <https://bit.ly/31p4GW2>)
- Mongo Express Docker Image: https://hub.docker.com/_/mongo-express



Check your progress... 7/8

Demo: Deploy App from Private Docker Registry

- ❑ Watched videos
- ❑ **Demo executed:**
 - ❑ Logged in to AWS Container Repository | docker login and create docker config.json file
 - ❑ Created Secret component
 - ❑ Configured Deployment for demo app
- ❑ **Pre-Requisites:**
 - ❑ Setup a Private Docker Repository (e.g. AWS Elastic Container Registry)
 - ❑ Have a demo application (see provided one)

Useful Links:

- K8s Project Repo:
<https://gitlab.com/nanuchi/bootcamp-kubernetes/-/tree/master/pull-images-from-private-repository-in-k8s>
- Sample NodeJs application Repo:
<https://gitlab.com/nanuchi/developing-with-docker>

Extending the K8s API with Operators

- ❑ Watched videos

Useful Links:

- Find Operators: <https://operatorhub.io/>



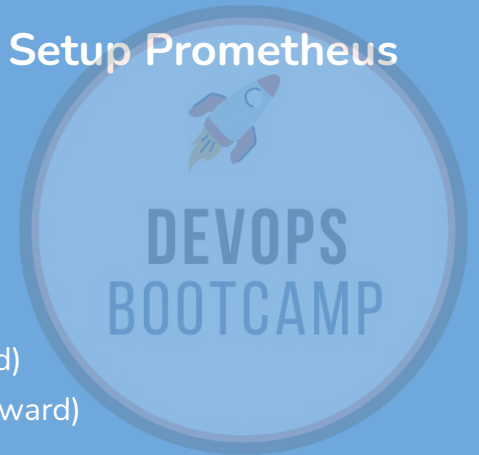
Check your progress... 8/8

Prometheus Operator Demo with Helm: Setup Prometheus Monitoring on Kubernetes

- ☐ Watched videos
- ☐ **Demo executed:**
 - ☐ Installed Prometheus Operator Helm Chart
 - ☐ Accessed Grafana UI (configured port-forward)
 - ☐ Accessed Prometheus UI (configured port-forward)

Useful Links:

- Prometheus Monitoring - What it is and how it works:
<https://youtu.be/h4Sl21AKiDg>
- Project Repo:
<https://gitlab.com/nanuchi/bootcamp-kubernetes/-/tree/master/setup-prometheus-operator>



More Resources...

Best practices

- Configuration Best Practices: <https://kubernetes.io/docs/concepts/configuration/overview/>
- 9 Security Best Practices: <https://www.cncf.io/blog/2019/01/14/9-kubernetes-security-best-practices-everyone-must-follow/>

Cheatsheet

- K8s CLI Cheat Sheet: <https://kubernetes.io/docs/reference/kubectl/cheatsheet/>

