سرفصل آموزشی

پک پایه مهندسی دواپس

فهرست سرفصل‌های دوره‌های آموزشی

سرفصل‌های دوره آموزشی

Docker

- Introduction of DevOps
- Understanding DevOps Concepts
- DevOps Culture
- DevOps Automation
- Continuous Integration (CI)
- Continuous Integration Benefits
- Continues Delivery (CD)
- Continuous Deployment (CD)
- Continuous Integration vs Continuous Delivery vs Continuous Deployment
- The Benefits of CI/CD
- The Roles of Docker in CI/CD
- Monolithic Architecture (Benefits and Drawbacks)
- Microservice Architecture (Benefits and Drawbacks)
- Monolithic vs Microservice Architecture
- Applications on bare metals
- Hypervisor-based Virtualization
- Traditional vs Virtualized Architecture
- What is Docker?
- Docker Image
- Docker Image Architecture
- Docker Container
- Docker Registry
- Install Docker on CentOS
- Install Docker on Ubuntu

- Understanding the Docker Setup (Docker version and Docker info)
- Downloading the first Docker image
- Running the first Docker Container
- Manage Docker as a non-root user
- Containers vs Virtual machines
- Run containers on bare metals or VMs?
- Benefits of Docker containers
- What problems does Docker solve?
- Docker History
- LXC vs Docker
- Docker family tree
- Docker Engine Architecture
- Cgroups and Namespaces
- Getting rid of LXC and the monolithic Docker daemon
- Runc and containerd and shim
- Understand what happens when running a container
- Daemonless containers
- Live Restore
- The point of Docker daemon
- Docker Storage Drivers
- Storage driver types
- How to change the storage driver
- choose which storage driver to use
- Docker sock
- Run and manage containers
- List containers
- Runtime constraints on resources (Ram, Swap, CPU and Disk)
- Containers resource usage statistics (stats)
- Image naming and tagging
- Dangling images
- Search images from the CLI
- Multi Architecture images
- Show details of image or containers (inspect)

- Delete image/containers
- Docker attach vs exec
- Copy file(s) between containers and docker host
- Run script inside a container
- Manage container lifecycle (stop, wait, start, restart, kill, pause, unpause, commit, save, load, export and import)
- Container Environment Variables
- Docker Logs
- Docker Events
- Docker Flow
- Docker logging and log drivers
- Blocking and non-blocking log delivery
- Customize log driver output
- Docker Volume
- Volume management (Create, List, Display detailed information, remove, prune)
- Create an NFS Docker volume
- Bind mounts
- Tmpfs
- Sharing volumes
- Volume advantages over bind mounts
- Docker Networking
- Container network model (CNM)
- Sandbox
- Endpoints
- Network
- libnetwork
- Network Drivers (bridge, host, none, overlay, macvlan)
- Bridge network
- Docker network commands
- User-defined bridge vs default bridge
- Port mapping
- Assign dynamic or static IP to containers

- Macvlan drivers
- Service discovery
- Docker network troubleshoot (tcpdump, iperf, nestat, nmap, iftop, ctop, termshark, netcat)
- Build custom Docker image
- Dockerfile instructions (from, label, copy, add, run, env, user, workdir, volume, expose, cmd, entrypoint, shell, healthcheck)
- Dockerfile best practices
- Order matters for caching
- More specific copy to limit cache busts
- Line buddies
- Remove unnecessary dependencies
- Remove package manager cache
- Use official image
- Use more specific tags
- Look for minimal flavors
- Dockerize two sample application
- Distroless images
- Sample distroless images (Java, Python, Nodejs)
- Multistage dockerfile
- History of an image
- Container restart policy
- Docker containers exit codes
- Setup a private registry server
- Docker compose
- Docker compose file
- Deploying applications with docker compose
- Build and run applications with compose
- Docker commands to manage the compose
- Docker-compose syntax and instructions
- Docker compose network
- Docker compose volume
- Docker compose logs

- Docker compose and service dependency
- Container health check
- Setup a Python/Java application with Docker compose
- Install Wordpress via Docker compose
- Install NextCloud via Docker compose
- Install Mattermost server via Docker compose
- Install Jitsi server via Docker compose
- Install Minio server via Docker compose
- Docker swarm
- Clustering and Orchestration
- Concepts relating to Docker swarm services (node, manager, worker, service, task, ingress load balancing)
- Initializing a swarm cluster
- Join nodes to a swarm cluster
- Promote and demote a node
- Swarm manager high availability (HA)
- Raft consensus algorithm in swarm mode
- Split brain and quorum
- Swarm services
- Sync desired state with current/actual state
- Scaling a service
- Replicated vs global services
- Rolling updates in swarm mode
- Overlay network
- Ingress vs host mode
- Drain a node on the swarm
- Run a sample application on swarm, scale and update
- Run a sample application behind a HAProxy on swarm
- Docker Stack
- Deploying a sample application with Docker stack on swar
- Docker security
- Linux security technology
- Docker platform security technology

- Docker daemon attack surface
- Docker security - capabilities
- Docker security - seccomp
- Docker security - AppArmor
- Privileged container
- Container Escape
- Trivy
- Swarm tokens
- Swarm TLS and mutual authentication
- Swarm cluster store
- Docker secrets
- Swarm lock

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Kubernetes

Core Concepts

- Core Concepts Section Introduction
- Cluster Architecture
- Docker vs ContainerD
- ETCD For Beginners
- ETCD in Kubernetes
- Kube API Server
- Kube Controller Manager
- Kube Scheduler
- Kubelet
- Kube Proxy
- Pods
- Practice Test PODs
- ReplicaSets
- Practice Tests ReplicaSet
- Deployments
- Namespaces
- Practice Test Namespaces
- Services
- Services ClusterIP
- Practice Test Services
- Imperative Commands with kubectl
- Practice Test Imperative Commands

Scheduling

- Scheduling Section Introduction
- Manual Scheduling
- Practice Test Manual Scheduling
- Labels and Selectors
- Practice Test Labels and Selectors
- Taints and Tolerations
- Practice Test Taints and Tolerations
- Node Selectors
- Node Affinity
- Practice Test Node Affinity
- Taints and Tolerations vs Node Affinity
- Resource Limits
- Practice Test Resource Limits
- DaemonSets
- Practice Test DaemonSets
- Static Pods
- Practice Test StaticPods
- Multiple Schedulers
- Practice Test Multiple Schedulers
- Configuring Kubernetes Schedulers

Logging and Monitoring

- Logging and Monitoring Section Introduction
- Monitor Cluster Components
- Practice Test Monitor Cluster Components
- Managing Application Logs
- Download Presentation Deck
- Practice Test Managing Application Logs

Application Lifecycle Management

- Application Lifecycle Management Section Introduction
- Rolling Updates and Rollback
- Practice Test Rolling Updates Rollback
- Commands and Arguments in Docker
- Commands and Arguments in Kubernetes
- Practice Test Commands and Arguments
- Configure Environment Variables in Applications
- Configure ConfigMaps in Applications
- Practice Test Env Variables
- Secrets
- Practice Test Secrets
- Multi Containers PODs
- Practice Test Multi Container Pods
- Multi Container Pods Design Patterns
- Init Containers
- Practice Test Init Containers
- Self-Healing Applications

Cluster Maintenance

- Cluster Maintenance Section Introduction
- OS Upgrades
- Practice Test OS Upgrades
- Kubernetes Software Versions
- Cluster Upgrade Introduction
- Practice Test Cluster Upgrade Process
- Backup and Restore Methods
- Working with ETCDCTL
- Practice Test Backup and Restore Methods
- Practice Test Backup and Restore Methods 2

Security

- Security Section Introduction
- Kubernetes Security Primitives
- Authentication
- TLS Certificates
- TLS Basics
- TLS in Kubernetes
- TLS in Kubernetes Certificate Creation
- View Certificate Details
- Certificate Health Check Spreadsheet
- Practice Test View Certificate Details
- Certificate API
- Practice Test Certificates API
- kubeconfig
- Practice Test KubeConfig
- API Groups
- Authorization
- RBAC
- Practice Test RBAC
- Cluster Roles
- Practice Test Cluster Roles
- Image Security
- Practice Test Image Security
- Security Context
- Practice Test Security Context
- Network Policies
- Practice Test Network Policies
- kubectx and kubens commands
- Download Presentation Deck

Storage

- Storage Section Introductio
- Introduction to Docker Storage
- Storage in Docker
- Volume Driver Plugins in Docker
- Container Storage Interface
- Volumes
- Persistent Volumes
- Persistent Volume Claims
- Using PVC in PODs
- Practice Test Persistent Volume Claims
- Download Presentation Deck
- Storage Class
- Practice Test Storage Class

Networking

- Networking Introduction
- Pre requisite Switching Routing Gateways
- Pre requisite DNS
- Pre requisite CoreDNS
- Pre requisite Network Namespace
- Pre requisite Docker Networking
- Pre requisite CNI
- Cluster Networking
- Practice Test Explore Env
- Pod Networking
- CNI in Kubernetes
- CNI weave
- Practice Test CNI weave
- Practice Test Deploy Network Solution
- ipam weave
- Practice Test Networking weave

- Service Networking
- Practice Test Service Networking
- DNS in kubernetes
- CoreDNS in Kubernetes
- Practice Test CoreDNS in Kubernetes
- Ingress
- Ingress Annotations and rewrite target
- Practice Test CKA Ingress Net 1
- Practice Test CKA Ingress Net 2
- Download The Presentation Deck

Design and Install Kubernetes Cluster

- Designing a Kubernetes Cluster
- Choosing Kubernetes Infrastructure
- Configure High Availability
- ETCD in HA
- Important update k8s hard way
- Download Presentation Deck

Install Kubernetes the kubeadm way

- Introduction to Deployment with kubeadm
- Resources
- Provision VMs with Vagrant
- Demo Deployment with Kubeadm
- Practice Test Deploy Kubernetes Cluster using Kubeadm

سرفصل‌های دوره آموزشی

Ansible

Introduction of DevOps

Understanding DevOps concepts

DevOps Automation

Continuous Integration

Continues Delivery

Continuous Deployment

The roles of Ansible in CI/CD

The benefit of CICD

What is Ansible?

Automation Deployment Pipeline

Need of Ansible

What Ansible can do?

Advantages of using Ansible?

Agent-Based VS Agentless systems

Ansible's Agentless Architecture

Install Ansible

Validate Ansible Installation

Ansible Vs Puppet Vs Chef Vs SaltStack

Ansible Architecture

Host, Group and Host Inventory

Ansible Ad-Hoc commands

Playbooks, plays, tasks and modules

Ansible configuration

Ansible-playbook Structure

Taks, vars, files, templates, meta, defaults, handlers

Ansible-playbook Syntax

Run ansible playbook

Variables, variable types and priorities

Command, expect, script, shell and raw modules

file, copy and fetch modules

Group and user modules

zyper_repository, zypper, yum_repository and you modules

Template, lineinfile, replace and service module

Archive and unarchive module

Async actions and concurrent tasks

wait_for and wait_for_connection modules

Mail module

Subversion and git modules

get_url, timezone and iptables modules

Mariadb modules

Find module and local_action feature

Conditions

Loops

Standard loops

Nested loops

Import playbooks and tasks

Handlers

Ansible Vault

Encrypt files and strings

Vault ID

Implement an Ansible playBook to Setup a webserver

Integrate Jenkins & Ansible

CICD with Git, Jenkins and Ansible (Application Deployment)

Ansible & VMWare

Ansible & Cisco

Ansible & Mikrotik

Develop Custom Module

Module format

Module’s return value and error handling

Setup nginx servers behind haproxy via Ansible playBook

Ansible & Windows Hosts

Manage windows features

Manage windows services

Execute shell module on windows

Windows Package management

Package Silent Installation

Implement an Ansible PlayBook to Setup IIS

Integrate Ansible and Docker

Docker_image and docker_image modules

docker_container and docker_container modules

docker_network and docker_network_info modules

docker_volume and docker_volume_info modules

docker_swarm module

Ansible Galaxy

Ansible Tower

Ansible AWX

AWX prerequisites and Installation

AWX Dashboard

AWX - organizations, teams and users

AWX - hosts, groups and inventory

AWX - credentials

AWX - projects and templates

AWX - Schedule templates, notification and permissions