

# Docker

“Docker: From Beginner to pro”



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## Docker Course Syllabus

### 1. Introduction to Docker

- Overview of containerization
- Benefits of using Docker
- Comparison with traditional virtualization

### 2. Docker Architecture

- Components of Docker: Docker Engine, Images, Containers, Docker Hub
- Understanding the client-server architecture

### 3. Installing Docker

- Installation on various operating systems (Windows, macOS, Linux)
- Setting up Docker Desktop
- Verifying the installation

### 4. Working with Docker Images

- Understanding Docker images
- Pulling images from Docker Hub
- Building custom images using Dockerfile
  - o Instructions: FROM, RUN, CMD, COPY, ADD
  - o Best practices for writing Dockerfiles

### 5. Managing Docker Containers

- Creating and running containers
- Container lifecycle: start, stop, restart, remove
- Understanding container networking
- Accessing and interacting with containers (exec, logs)



## 6. Data Management

- Introduction to volumes and bind mounts
- Persisting data with Docker volumes
- Managing data in containers

## 7. Docker Networking

- Overview of Docker networking
- Types of networks: bridge, host, overlay
- Creating and managing networks
- Inter-container communication

## 8. Docker Compose

- Introduction to Docker Compose
- Defining multi-container applications with docker-compose.yml
- Common commands: up, down, logs, exec
- Example projects using Docker Compose

## 9. Docker Swarm and Orchestration

- Introduction to container orchestration
- Setting up a Docker Swarm
- Deploying services in Swarm mode
- Load balancing and scaling services

## 10. Docker Best Practices

- Image optimization techniques
- Security best practices
- Managing secrets and configuration

## 11. CI/CD Integration

- Using Docker in Continuous Integration/Continuous Deployment pipelines
- Integrating with tools like Jenkins, GitLab CI, and GitHub Actions

## 12. Advanced Topics (Optional)

- Custom Docker networks and advanced networking configurations
- Docker in production environments
- Monitoring and logging Docker containers
- Troubleshooting Docker containers and images

## Conclusion

- Review and Q&A session
- Resources for further learning (documentation, tutorials, community)

## Projects and Hands-on Labs

- Throughout the course, incorporate hands-on labs and projects to reinforce learning.