## Course ID: 1035000 - Docker Mastery: with Kubernetes +Swarm from a Docker Captain

### Section 01 - Quick Start! (Index: 1)

01 - What is Docker in 2025? The Three Innovations (Time: 10 min)

Resource: Kuberenetes vs. Docker (bretfisher.com)

Resource: OCI Overview

Resource: Read this Lecture on GitHub

Resource: Section Commands and Links.pdf

02 - Quick Container Run (Time: 11 min)

Resource: Play With Docker

Resource: Docker Hub

Resource: Docker Official Images

Resource: Apache httpd Image

Resource: Read this Lecture on GitHub

03 - Why Docker? Why Now in 2025? (Time: 11 min)

Resource: A Brief History of Containers: From the 1970s till now (aquasec.com)

Resource: Read this Lecture on GitHub

### Section 02 - Course Introduction (Index: 2)

04 - Course Roadmap (overview) (Time: 4 min)

05 - Getting Course Resources (GitHub Repo) (Time: 1 min)

Resource: GitHub Repository For This Course

Resource: Docker Mastery Slides 3.0.zip

Resource: Docker Mastery Commands 2.0.zip

Resource: docker\_cheatsheet.pdf

06 - Course Chat with Students Learning Containers (Time: 0 min)

07 - YouTube Live Q&A with Bret (Time: 0 min)

08 - The Big FAQ (Time: 5 min)

### Section 03 - The Best Way to Setup Docker for Your OS (Index: 3)

09 - Installing The Right Docker for this course (Time: 10 min)

Resource: Docker Desktop Alternatives

Resource: Download Docker Desktop

Resource: OCI: Open Container Initiative

10 - Installing Docker: The Fast Way (Time: 2 min)

11 - Docker for Windows: Setup and Tips (Time: 17 min)

Resource: Docker Desktop Install on Windows

Resource: Alternatives to Docker Desktop

Resource: Course GitHub Repo

12 - Docker for Mac: Setup and Tips (Time: 10 min)

Resource: Docker Desktop Install for Mac

Resource: Alternatives to Docker Desktop

Resource: Course GitHub Repo

13 - Docker for Linux Desktop: Setup and Tips (Time: 13 min)

Resource: Docker Desktop Install for Linux Desktops

Resource: Alternatives to Docker Desktop

Resource: Course GitHub Repo

14 - Docker for Linux Server: Setup and Tips (Time: 14 min)

Resource: Docker Engine install for Linux server

Resource: Course GitHub Repo

15 - VS Code for DevOps, Docker, and YAML Editing (Time: 9 min)

Resource: Download VS Code

Resource: Extension: Docker

Resource: Extension Kubernetes

Resource: Extension: Remote Development

Resource: Extension: Live Share

16 - Docker Version and Products Changes (Time: 2 min)

### Section 04 - Creating and Using Containers Like a Boss (Index: 4)

17 - Check Our Docker Install and Config (Time: 7 min)

Resource: S03 Containers Slides.pdf

Resource: DM S03 Commands.txt

18 - Starting a Nginx Web Server (Time: 9 min)

19 - Debrief: What Happens When We Run a Container (Time: 2 min)

20 - Container VS. VM: It's Just a Process (Time: 4 min)

Resource: Mike Coleman (Docker Employee) "Docker for the Virtualization Admin" eBook

Resource: Docker Internals: cgroups, namespaces, and beyond (YouTube)

Resource: Docker for Mac Commands for Getting Into Local Docker VM

Resource: Docker for Windows Command for Getting Into Local Docker VM

21 - Windows Containers: Should You Consider Them? (Time: 2 min)

22 - Assignment: Manage Multiple Containers (Time: 4 min)

23 - Assignment Answers: Manage Multiple Containers (Time: 6 min)

24 - What's Going On In Containers: CLI Process Monitoring (Time: 5 min)

25 - Use MariaDB rather than MySQL (Time: 0 min)

26 - Getting a Shell Inside Containers: No Need for SSH (Time: 11 min)

Resource: Package Management Basics: apt, yum, dnf, pkg

27 - Docker Networks: Concepts for Private and Public Comms in Containers (Time: 12 min)

Resource: Docker's --format option for filtering cli output

28 - FIXME: Change In Official Nginx Image Removes Ping (Time: 0 min)

29 - Docker Networks: CLI Management of Virtual Networks (Time: 8 min)

30 - Docker Networks: DNS and How Containers Find Each Other (Time: 6 min)

Resource: DNS Basics (blog and video)

Resource: DNS Basics (in a comic, fun!)

31 - Assignment: Using Containers for CLI Testing (Time: 2 min)

32 - Assignment Answers: Using Containers for CLI Testing (Time: 3 min)

33 - Changes To Upcoming Assignment (Time: 3 min)

34 - Assignment: DNS Round Robin Test (Time: 5 min)

Resource: Round-robin DNS, what is it?

35 - Assignment Answers: DNS Round Robin Test (Time: 4 min)

### Section 05 - Container Images, Where To Find Them and How To Build Them (Index: 5)

36 - What's In An Image (and What Isn't) (Time: 2 min)

Resource: DM S04 Commands.txt

Resource: S04 Images Slides.pdf

Resource: Docker Image Specification

37 - The Mighty Hub: Using Docker Hub Registry Images (Time: 12 min)

Resource: List of Official Docker Images

38 - Images and Their Layers: Discover the Image Cache (Time: 13 min)

Resource: Docs: Image storage, drivers, and layers

39 - Image Tagging and Pushing to Docker Hub (Time: 12 min)

40 - Building Images: The Dockerfile Basics (Time: 7 min)

Resource: Dockerfile Command Details (BOOKMARK AND REVIEW, lots of good details you'll use often when making Dockerfiles)

41 - Building Images: Running Docker Builds (Time: 4 min)

42 - Building Images: Extending Official Images (Time: 5 min)

43 - Assignment: Build Your Own Dockerfile and Run Containers From It (Time: 4 min)

44 - Assignment Answers: Build Your Own Dockerfile and Run Containers From It (Time: 8 min)

45 - Using Prune to Keep Your Docker System Clean (YouTube) (Time: 0 min)

### Section 06 - Persistent Data: Volumes, Volumes, Volumes (Index: 6)

46 - Container Lifetime & Persistent Data (Time: 4 min)

Resource: Intro to Immutable Infrastructure Concepts

Resource: The 12-Factor App (Everyone Should Read: Key to Cloud Native App Design, Deployment, and Operation)

Resource: 12 Fractured Apps (A follow-up to 12-Factor, a great article on how to do 12F correctly in containers)

Resource: Docker Storage Introduction in Docker Docs

Resource: DM S05 Commands.txt

Resource: S05 Volumes Slides.pdf

47 - Persistent Data: Data Volumes (Time: 9 min)

48 - Shell Differences for Path Expansion (Time: 1 min)

49 - Persistent Data: Bind Mounting (Time: 7 min)

50 - Database Passwords in Containers (Time: 2 min)

51 - Updated Postgres Version for Next Video Assignment (Time: 0 min)

52 - Assignment: Database Upgrades with Named Volumes (Time: 4 min)

53 - Assignment Answers: Update for Recent Postgres Changes (Time: 0 min)

54 - Assignment Answers: Database Upgrades with Named Volumes (Time: 4 min)

55 - File Permissions Across Multiple Containers (Time: 3 min)

56 - Assignment: Edit Code Running In Containers With Bind Mounts (Time: 4 min)

Resource: Jekyll, a Static Site Generator (just as background info, no need to install)

57 - Assignment Answers: Edit Code Running In Containers With Bind Mounts (Time: 3 min)

### Section 07 - Dockerfile ENTRYPOINT (Index: 7)

58 - Intro: Review before ENTRYPOINT (Time: 2 min)

Resource: Docs: Dockerfile reference

Resource: S07 Dockerfile Entrypoint.md

59 - Buildtime vs. Runtime (Time: 4 min)

Resource: Dockerfile Buildtime vs Runtime Cheatsheet 2025-01.pdf

60 - What's an ENTRYPOINT? (Time: 9 min)

Resource: Docs: ENTRYPOINT

61 - Using ENTRYPOINT and CMD together (Time: 11 min)

Resource: MySQL Docker Hub Image

Resource: SIGINT, SIGTERM, and SIGKILL

Resource: Docker Blog: Choosing between RUN, CMD, and ENTRYPOINT

Resource: PIDs in Linux and Unix

62 - Shell vs Exec Form (Time: 7 min)

Resource: (Docs) Shell and Exec Form

Resource: (Docs) How CMD and ENTRYPOINT interact

Resource: (Docs) The SHELL statement

Resource: (Docs) ENTRYPOINT Examples

Resource: Crazy ENTRYPOINT, CMD, and SHELL examples

63 - Assignment 1: Create CLI Utilities (Time: 4 min)

Resource: Assignment instructions

64 - Assignment 1: Your Homework (Time: 0 min)

65 - Assignment 1 Answer: Create CLI Utilities (Time: 18 min)

Resource: Assignment instructions

66 - Assignment 2: Startup Scripts (Time: 1 min)

Resource: Assignment instructions

67 - Assignment 2: Your Homework (Time: 0 min)

68 - Assignment 2 Answer: Startup Scripts (Time: 19 min)

Resource: Assignment instructions

### Section 08 - Making It Easier with Docker Compose: The Multi-Container Tool (Index: 8)

69 - Docker Compose and The docker-compose.yml File (Time: 10 min)

Resource: The YAML Format: Quick Reference

Resource: Compose File Version Differences (Docker Docs)

Resource: Docker Compose Release Downloads (good for Linux users that need to download manually)

Resource: S06 Compose Slides.pdf

Resource: DM S06 Commands.txt

Resource: S06 Compose Slides.pdf

Resource: YAML Official Site

Resource: YAML vs. JSON

70 - Compose V2 (Time: 0 min)

71 - Trying Out Basic Compose Commands (Time: 9 min)

Resource: docker-compose download for Linux via GitHub, Win/Mac already have it.

Resource: Compose vs. Swarm for production

72 - Version Dependencies in Multi-Tier Apps (Time: 1 min)

73 - Compose Assignments (Time: 0 min)

74 - Compose-Assignment-1: Build a Compose File For a Multi-Container Project (Time: 3 min)

Resource: Compose File References

Resource: Don't use Links, it's a legacy feature

75 - Compose-Assignment-1 Answers: Build a Compose File For a Multi-Container Project (Time: 10 min)

76 - Adding Image Building to Compose Files (Time: 9 min)

Resource: Compose Build documentation

77 - Using MariaDB rather than PostgreSQL (Time: 0 min)

78 - Compose-Assignment-2: Compose For Image Building (Time: 3 min)

79 - Compose-Assignment-2 Answers: Compose For Image Building (Time: 11 min)

### Section 09 - Swarm Intro and Creating a 3-Node Swarm Cluster (Index: 9)

80 - Swarm Mode: Built-In Orchestration (Time: 9 min)

Resource: Docker 1.12 Swarm Mode Deep Dive Part 1: Topology (YouTube)

Resource: Docker 1.12 Swarm Mode Deep Dive Part 2: Orchestration (YouTube)

Resource: Heart of the SwarmKit: Topology Management (slides)

Resource: Heart of the SwarmKit: Store, Topology & Object Model (YouTube)

Resource: Raft Consensus Visualization (Our Swarm DB and how it stays in sync across nodes)

Resource: DM S07 Commands.txt

Resource: S07 Swarm Intro Slides.pdf

81 - Create Your First Service and Scale It Locally (Time: 12 min)

Resource: Deploy services to a swarm (Docker Docs)

82 - UI Change For Service Create/Update (Time: 1 min)

83 - Use Multipass to create Docker, Swarm, and K8s VMs (Time: 1 min)

84 - Creating a 3-Node Swarm Cluster (Time: 15 min)

Resource: Create and Upload a SSH Key to Digital Ocean

Resource: Docker Swarm Firewall Ports

Resource: Configure SSH for Saving Options for Specific Connections

Resource: Windows Hyper-V driver for docker-machine

Resource: DigitalOcean $100 credit on new signups

### Section 10 - Swarm Basic Features and How to Use Them In Your Workflow (Index: 10)

85 - Sections Requirements for Swarm, Drupal, and Postgres (Time: 1 min)

86 - Jan 2025: Bug in Play-with-Docker Swarm networking (Time: 0 min)

87 - Scaling Out with Overlay Networking (Time: 7 min)

Resource: S08 Swarm Basic Features Slides.pdf

Resource: DM S08 Commands.txt

88 - Scaling Out with Routing Mesh (Time: 9 min)

Resource: Use swarm mode routing mesh (Docker Docs)

89 - Assignment: Create A Multi-Service Multi-Node Web App (Time: 6 min)

90 - Assignment Answers: Create A Multi-Service Multi-Node Web App (Time: 11 min)

91 - Swarm Stacks and Production Grade Compose (Time: 14 min)

Resource: Swarm vs. Compose

92 - Secrets Storage for Swarm: Protecting Your Environment Variables (Time: 5 min)

93 - Using Secrets in Swarm Services (Time: 7 min)

Resource: Manage sensitive data with Docker secrets (Docker Docs) (Lots of good reading and examples)

94 - Using Secrets with Swarm Stacks (Time: 4 min)

Resource: Secrets in Compose Files

95 - Assignment: Create A Stack with Secrets and Deploy (Time: 2 min)

96 - Assignment Answers: Create A Stack with Secrets and Deploy (Time: 4 min)

### Section 11 - Swarm App Lifecycle (Index: 11)

97 - Using Secrets With Local Docker Compose (Time: 3 min)

Resource: DM S09 Commands.txt

Resource: S09 Swarm App Lifecycle Slides.pdf

98 - Full App Lifecycle: Dev, Build and Deploy With a Single Compose Design (Time: 10 min)

Resource: Using Multiple Compose Files (Docker Docs)

Resource: Using Compose Files In Production (Docker Docs)

99 - Service Updates: Changing Things In Flight (Time: 9 min)

Resource: Service Update command (Docker Docs)

100 - Healthchecks in Dockerfiles (Time: 13 min)

Resource: PHP Laravel Good Defaults with Docker

Resource: HEALTHCHECK in Dockerfile (Docker Docs)

Resource: Healthcheck in Compose files (Docker Docs)

101 - Info on Swarm Mastery (Time: 1 min)

### Section 12 - Container Registries: Image Storage and Distribution (Index: 12)

102 - Docker Hub: Digging Deeper (Time: 8 min)

Resource: Docker Hub

Resource: DM S10 Commands.txt

Resource: S10 Container Registries Slides.pdf

103 - Understanding Docker Registry (Time: 4 min)

Resource: Use Registry As A "Mirror" of Docker Hub

Resource: Registry Docs

Resource: Registry Garbage Collection

104 - Run a Private Docker Registry (Time: 7 min)

105 - Assignment: Secure Docker Registry With TLS and Authentication (Time: 1 min)

106 - Using Docker Registry With Swarm (Time: 9 min)

107 - Third Party Image Registries (Time: 1 min)

### Section 13 - Docker in Production (Index: 13)

108 - My DockerCon Talk on Docker and Swarm in Production (Time: 45 min)

Resource: Road to Production.pdf

109 - The Future of Swarm (Time: 0 min)

110 - Swarm Raft Quorum and Recovery (Laura Frank from DockerCon 2017) (Time: 0 min)

### Section 14 - The What and Why of Kubernetes (Index: 14)

111 - Kubernetes Intro (Time: 1 min)

Resource: Slides The What and Why of Kubernetes.pdf

112 - What Is Kubernetes (Time: 4 min)

Resource: History of Kubernetes

Resource: Kubernetes Home Page

113 - Why Kubernetes (Time: 7 min)

Resource: List of Certified Kubernetes Distributions

114 - Kubernetes vs Swarm (Time: 10 min)

### Section 15 - Kubernetes Architecture and Install (Index: 15)

115 - Section Intro (Time: 1 min)

Resource: Slides Kubernetes Architecture and Install.pdf

Resource: Section Commands and Links.pdf

116 - Kubernetes Architecture Terminology (Time: 9 min)

Resource: Kubernetes Components

117 - Kubernetes Local Install (Time: 8 min)

Resource: Minikube Download

Resource: MikroK8s for Linux Hosts

Resource: Install kubectl on Windows when you don't have Docker Desktop

Resource: Play-with-K8s in a Browser

Resource: Killercoda: K8s labs in your browser

118 - Kubernetes Container Abstractions (Time: 4 min)

Resource: Pod Overview (docs)

Resource: Service (docs)

Resource: Namespace (docs)

### Section 16 - Your First Pods (Index: 16)

119 - Kubectl run, create, and apply (Time: 3 min)

Resource: Slides Your First Pods.pdf

Resource: Section Commands and Links.pdf

Resource: Kubectl Reference (Docs)

120 - Your First Pod With kubectl run (Time: 9 min)

Resource: kubectl Cheat Sheet

Resource: kubectl for Docker Users

121 - Cheat Sheets for Kubectl (Time: 0 min)

122 - Your First Deployment With kubectl create (Time: 11 min)

Resource: kubectl create deployment (Docs)

Resource: Deployments (Docs)

123 - Scaling ReplicaSets (Time: 7 min)

Resource: ReplicaSets (Docs)

124 - 1.18 Changes to Kubectl Run (Time: 1 min)

### Section 17 - Inspecting Kubernetes Resources (Index: 17)

125 - Section Intro (Time: 1 min)

Resource: Slides Inspecting Kubernetes Resources.pdf

Resource: Commands and Links Inspecting Kubernetes Resources.pdf

126 - Inspecting Resources with Get (Time: 8 min)

127 - Inspecting Resources with Describe (Time: 9 min)

128 - Watching Resources (Time: 7 min)

129 - Container Logs in Kubernetes (Time: 9 min)

Resource: System Logs (Docs)

Resource: Logging Architecture (Docs)

Resource: Debug Running Pods (Docs)

Resource: Loki - Like Prometheus, but for logs

Resource: ELK Stack

Resource: Stern multi-pod log tailing

### Section 18 - Exposing Kubernetes Ports (Index: 18)

130 - Section Intro (Time: 1 min)

Resource: Slides Exposing Kubernetes Ports with Services.pdf

Resource: Commands and Links Exposing Kubernetes Ports.pdf

131 - Service Types (Time: 7 min)

Resource: Service (docs)

Resource: Service Types (docs tutorial)

132 - MicroK8s and DNS for Services (Time: 1 min)

133 - Creating a ClusterIP Service (Time: 5 min)

Resource: Using Services (docs tutorial)

134 - Running Netshoot in Kubernetes (Time: 2 min)

135 - Creating a NodePort and LoadBalancer Service (Time: 9 min)

Resource: NodePort (docs)

136 - Kubernetes Services DNS (Time: 5 min)

Resource: Kubernetes DNS Specification

Resource: CoreDNS for Kubernetes

### Section 19 - Kubernetes Management Techniques (Index: 19)

137 - Section Intro (Time: 1 min)

Resource: Slides Kubernetes Management Techniques.pdf

Resource: Commands and Links Kubernetes Management Techniques.pdf

138 - YAML Generators in kubectl Commands (Time: 8 min)

Resource: kubectl Usage Conventions (docs)

139 - Imperative vs. Declarative (Time: 7 min)

140 - Three Management Approaches (Time: 6 min)

Resource: Kubernetes Management Techniques (docs)

Resource: Imperative Command Examples (docs tutorial)

Resource: Imperative Config Files (doc tutorials)

Resource: Declarative Config Files

### Section 20 - Moving to Declarative Kubernetes YAML (Index: 20)

141 - Section Intro (Time: 1 min)

Resource: S16 Slides Moving to Declarative YAML.pdf

Resource: DM S16 (Moving to Declarative Kubernetes YAML).txt

142 - Kubectl apply (Time: 4 min)

Resource: Declarative Management of Kubernetes (Docs)

143 - Kubernetes Configuration YAML (Time: 6 min)

Resource: Understanding Kubernetes Objects and Spec's (Docs)

144 - Building Your YAML Files (Time: 7 min)

145 - Building Your YAML Spec (Time: 9 min)

Resource: Kubernetes API Reference (Docs)

146 - Dry Run CLI Changes (Time: 1 min)

147 - Dry Runs and Diff's (Time: 5 min)

Resource: APIServer dry-run and kubectl diff

148 - Labels and Label Selectors (Time: 8 min)

Resource: Label Selectors (Docs)

Resource: Difference Between Labels and Annotations

Resource: Recommended Labels (Docs)

Resource: Assigning Pods to Nodes (Docs)

Resource: Taints and Tolerations (Docs)

### Section 21 - Your Next Steps and The Future of Kubernetes (Index: 21)

149 - Section Intro (Time: 1 min)

Resource: S17 Slides Your Next Steps and The Future of Kubernetes.pdf

Resource: DM S17 (Your Next Steps, and the Future of Kubernetes).txt

150 - Storage in Kubernetes (Time: 6 min)

Resource: Volumes (Docs)

Resource: StatefulSets (Docs)

Resource: PersistentVolume (Docs)

151 - Ingress (Time: 4 min)

Resource: Ingress (Docs)

Resource: Ingress Controllers (Docs)

Resource: Set up Ingress on Minikube with the NGINX Ingress Controller (Docs)

Resource: Traefik Ingress

152 - CRD's and The Operator Pattern (Time: 4 min)

Resource: Custom Resources (Docs)

Resource: The Operator Pattern (Docs)

Resource: OperatorHub

Resource: Awesome Operators List

153 - Higher Deployment Abstractions (Time: 10 min)

Resource: Spreadsheet of Kubernetes Deployment Tools

Resource: Deploying Compose on Kubernetes

Resource: Introducing Kustomize

Resource: Kustomize (GitHub)

Resource: Docker App (GitHub)

Resource: CNAB spec

154 - Kubernetes Dashboard (Time: 3 min)

Resource: The Kubernetes Dashboard

155 - Namespaces and Context (Time: 5 min)

Resource: Configure Access to Multiple Clusters (Docs)

Resource: Namespaces (Docs)

156 - Future of Kubernetes (Time: 9 min)

Resource: Kubernetes Release Notes

### Section 22 - Automated CI Workflows (Index: 22)

157 - Section Intro: Automation (Time: 3 min)

158 - The Pull Request (Time: 7 min)

Resource: GitHub Flow

Resource: The DevOps Handbook

Resource: GitHub Flow in Docs

159 - Automation is the Glue of DevOps (Time: 4 min)

160 - Basic PR Workflow (Time: 2 min)

161 - Intermediate PR Workflow (Time: 2 min)

162 - Advanced PR Workflow (Time: 2 min)

### Section 23 - GitHub Actions Workflow Examples (Index: 23)