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The Insider's Guide to Learning Kubernetes

Take your Kubernetes Knowledge to the Next Level!

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Housekeeping

1. Ask Questions in Q and A window, chat in Chat Window
2. Online Poll – we'd love your inputs
3. Stay until the end - $200 Gift Card
4. We are recording – Slides and Replay will be shared via email
5. Register for Learning labs at KubeCampus.io

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Agenda

1. The Top Challenges of Learning Kubernetes
2. What topics must I master?
3. What resources are available?
4. The Community Angle
5. KubeCampus – the Learning Journey
6. Let's do the Rookie Lab in KubeCampus
7. Latest Resources
8. Q and A
9. Gift Card Drawing

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The Challenges of Learning K8s

1. Complexity
2. Abundance of Concepts
3. Configuration and YAML
4. Distributed Nature of K8s
5. Ecosystem and Tooling

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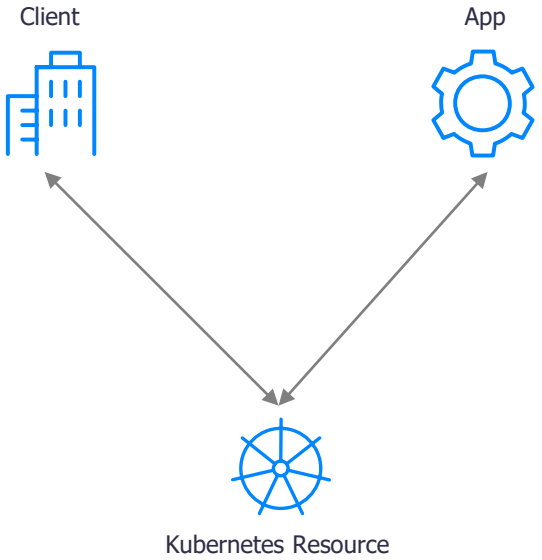
Kubernetes Complexity

- Kubernetes is a highly complex system designed to manage containerized applications across clusters of machines.
- It involves various components, such as pods, services, deployments, replica sets, and more, each with its own configuration and interactions.
- Understanding the interactions and configuring these components correctly can be overwhelming for beginners.



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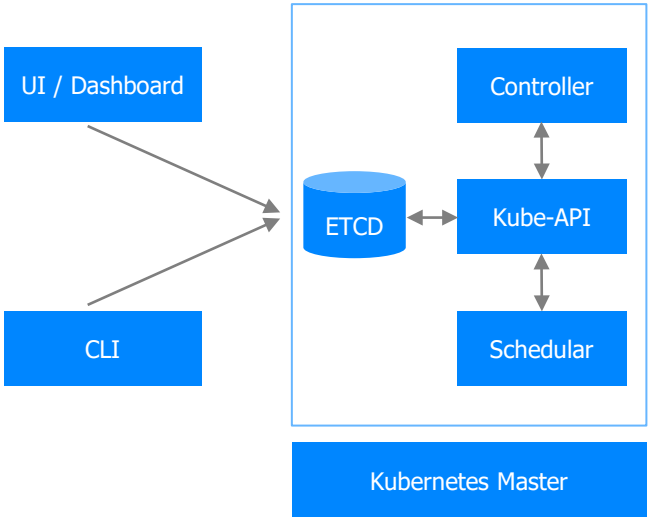
Abundance of Concepts

- Kubernetes introduces several new concepts and terminologies that may be unfamiliar to those starting out.
- Concepts like namespaces, labels, selectors, ingress, and persistent volumes require time and effort to grasp.
- This learning curve can be steep for individuals without prior experience in distributed systems or containerization.



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Configuration and YAML

- Kubernetes relies heavily on configuration files written in YAML.
- Understanding and writing YAML manifests correctly can be challenging, especially when configuring more complex features or multiple interacting components.
- A small mistake in YAML syntax or configuration can lead to unexpected issues.

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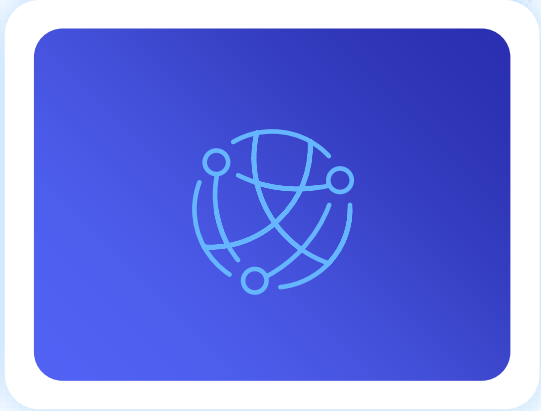
Distributed Nature of K8s

- Kubernetes operates across multiple nodes, managing containerized applications that span multiple machines.
- This distributed nature adds complexity to managing resources, networking, and scheduling, as well as handling failure scenarios and maintaining high availability.
- Understanding how to design and operate distributed systems effectively is crucial but can be difficult for newcomers.



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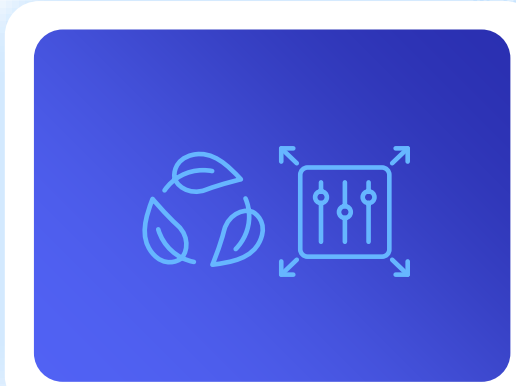
Ecosystem and Tooling

- Kubernetes has a vast and ever-growing ecosystem of tools, extensions, and integrations.
- While this ecosystem offers flexibility and customization options, it can also be overwhelming to navigate.
- Keeping up with the latest developments and selecting the right tools for specific use cases can be challenging for beginners.



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Audience Poll
Kubernetes Challenges

Top 10 Skills to Master

1. Containerization
2. Kubernetes Architecture
3. Cluster Setup and Configuration
4. Application Deployment and Management
5. Networking and Service Discovery
6. Monitoring and Logging
7. Security and Access Control
8. Troubleshooting and Debugging
9. Continuous Integration and Deployment
10. Ecosystem Tools

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Containerization

- Understanding containerization concepts, primarily Docker, is crucial as Kubernetes operates and manages containerized applications.
- Learn how to create, manage, and work with Docker containers, including building container images, managing container registries, and container networking.

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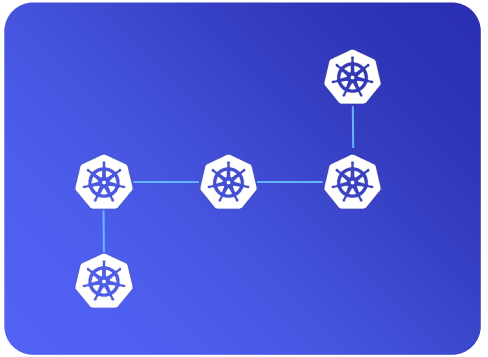
Kubernetes Architecture

- Gain a solid understanding of Kubernetes architecture, including its core components such as pods, services, deployments, replica sets, and namespaces.
- Learn how these components interact with each other and how they enable container orchestration and management.



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Cluster Setup and Configuration

- Learn how to set up and configure Kubernetes clusters. This includes understanding different deployment options, such as local development environments (e.g., Minikube, Kind), managed Kubernetes services (e.g., GKE, EKS, AKS), or self-managed cluster deployments.
- Become familiar with cluster provisioning, networking, security considerations, and cluster scaling.

What is a Kubernetes Cluster?

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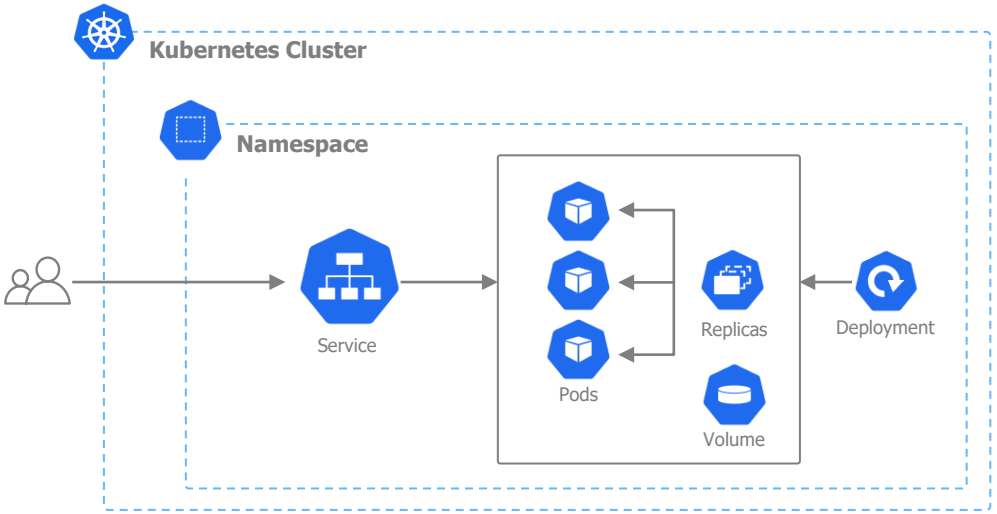
Application Deployment and Management

- Master the skills required to deploy applications on Kubernetes. This includes writing Kubernetes manifests in YAML or using declarative deployment tools like Helm.
- Learn how to manage application lifecycle, scaling, rolling updates, and health checks.
- Explore deployment strategies like blue/green, canary deployments, and A/B testing.



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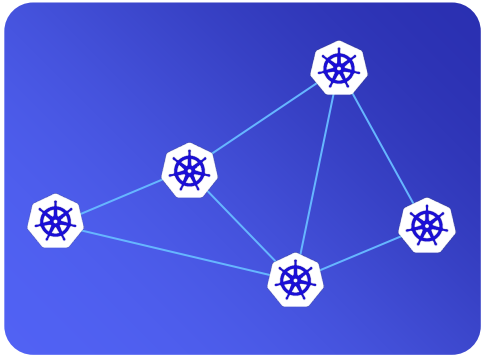
Networking and Service Discovery

- Understand Kubernetes networking concepts, including how to configure networking within a cluster, expose services to the external world, and set up service discovery.
- Learn about Kubernetes networking models, network policies, and the different types of service definitions.



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Monitoring and Logging

- Gain knowledge of monitoring and logging practices for Kubernetes clusters and applications.
- Explore popular monitoring tools like Prometheus and Grafana and learn how to collect metrics, set up alerts, and visualize cluster and application performance.
- Understand how to aggregate and analyze logs using tools like Fluentd, Elasticsearch, and Kibana.

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Security and Access Control

- Learn about Kubernetes security features and best practices. Understand how to secure your cluster, including network policies, role-based access control (RBAC), secrets management, and secure container images.
- Explore authentication and authorization mechanisms, certificate management, and encryption for data in transit and at rest.

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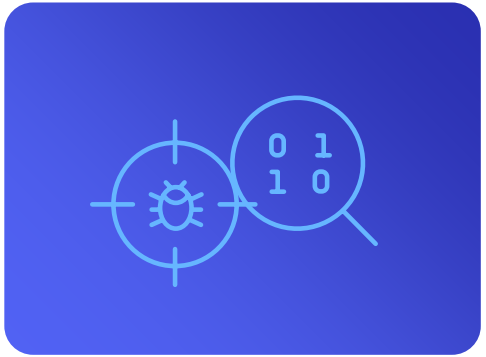
Troubleshooting and Debugging

- Develop skills in troubleshooting and debugging Kubernetes applications and cluster issues.
- Learn how to diagnose and resolve common problems related to deployments, networking, configuration, and resource constraints.
- Familiarize yourself with tools like kubectl, kube-state-metrics, and logs analysis tools to aid in troubleshooting.



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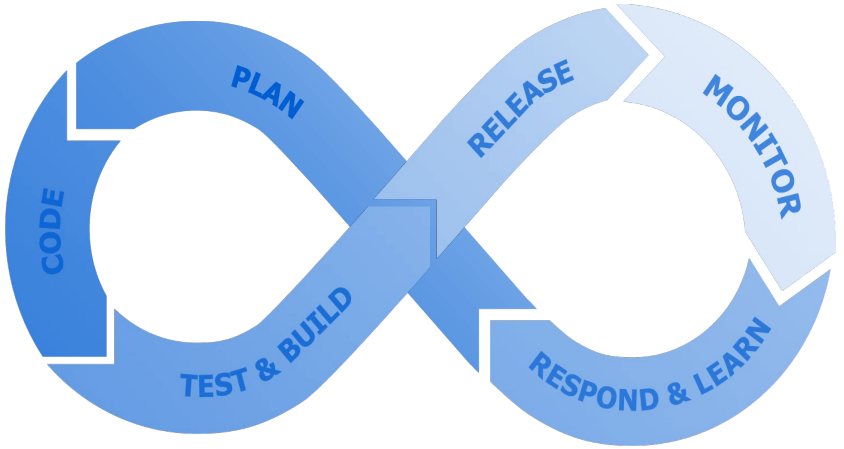
Continuous Integration and Deployment

- Understand how Kubernetes fits into CI/CD workflows.
- Learn about integrating Kubernetes with popular CI/CD tools like Jenkins, GitLab CI/CD, or Tekton.
- Explore automation of application builds, testing, and deployment pipelines to Kubernetes clusters.



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Ecosystem Tools

- Familiarize yourself with the broader Kubernetes ecosystem and associated tools.
- This includes exploring container registries, service mesh technologies (e.g., Istio, Linkerd), observability tools, Kubernetes operators, and related cloud-native technologies like Helm, Prometheus, and Fluentd.

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Resources and Community

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Resources

Helping you to Learn

Official Kubernetes Documentation

- https://Kubernetes.io/docs

Kubernetes official website

- https://Kubernetes.io

Books

- Many titles
  - e.g.: "Kubernetes up and Running" by Kelsey Hightower et al.

Online communities and forums

- Kubernetes reddit group
- Kubernetes.slack.com

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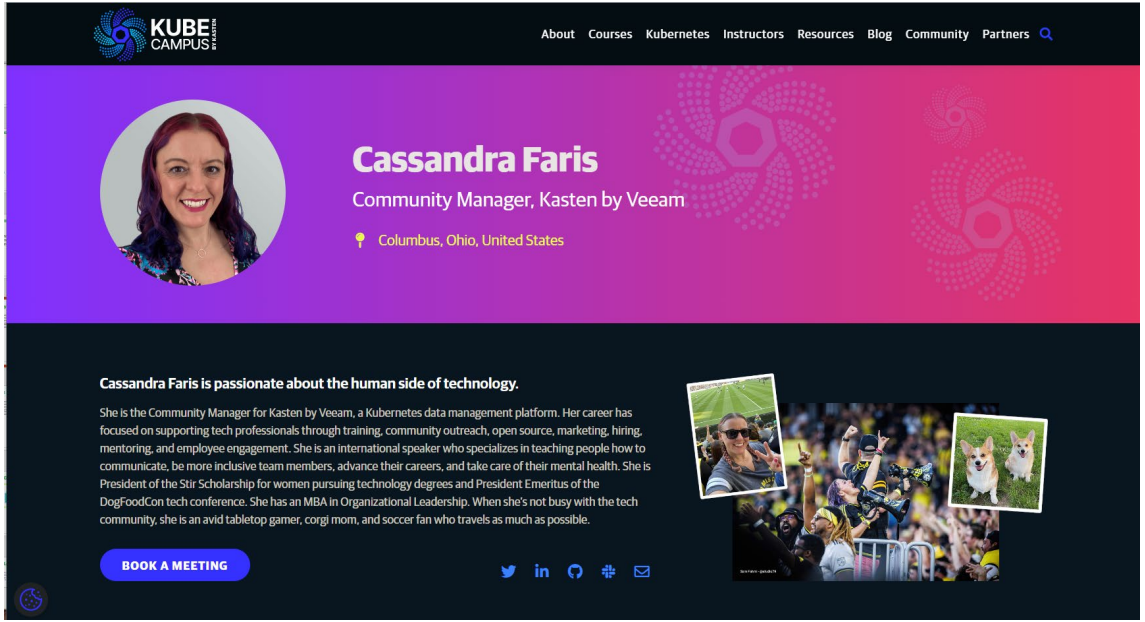
Kasten Community Manager

Goals

- Act as the voice of Kasten's communities
- Help others learn Kubernetes while sharing the learning journey
- Grow a well-respected, helpful, and inclusive community



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Community Resources

Kasten K10 Support

- Community group for members to ask product information and troubleshooting questions, share best practices provide feedback, and connect with other K10 users
- https://community.veeam.com/groups/kasten-k10-support-92

Kubernetes Korner

- The Veeam Community site for all things cloud-native, Kubernetes and DevOps.
- https://community.veeam.com/groups/kubernetes-korner-90

Open Source Projects

- Kanister – kanister.io
  An extensible open-source framework for application-level data management on Kubernetes.
- Kubestr – kubestr.io
  A handy tool which helps you in verifying, validating and evaluating your Kubernetes storage solutions.

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Audience Poll
Community Awareness

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Community First – Thank You!

Highlights

- Neutral, Community Driven
- Still free – always!
- Great Engagement
  - Over 22,000 registrants, 12,000 labs taken; 15 labs available
  - High "stickiness" and quality – Avg. of ~ 3.5 labs taken per user; 4.7/5 grading
- Learning Days Detroit and Amsterdam –great attendance

New Site: User Experience, Structure, Courses

- Optimized learning flow and navigation
- New Structure - courses composed of lessons – Blog, ppt, VOD, hands on lab

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Courses
Introduction

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Hardware, software and knowledge requirements

- Knowledge of Basic Linux commands and navigation
- Laptop with 4 GB of memory and 20 GB of hard drive available
- Windows 10 , Mac OS, Linux
- Chrome, Microsoft Edge, Chromium Browser, Safari

Courses Structure

- Review of concepts from pre-work including blog, ppt, VOD and Kasten K10 docs for advanced users
- Hands on lab, following specific Kubernetes commands to achieve mastery and success
- Badging and added resources awarded for each course completed

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Courses Summary

Special Editions

Intro - KubeCon + ClouNativeCon Special Edition Lab
Learning Day Rookie Lab - Networking Fundamentals
Learning Day Pro Lab - Troubleshooting
KubeCon EU 2023 - Pre-work

Courses

Course 1 - Build Your First Kubernetes Cluster
Course 2 - Build a Kubernetes Application
Course 3 - Backup Your Kubernetes Application
Course 4 - Application Consistency
Course 5 - Storage and Applications in Kubernetes
Course 6 - Introduction to Helm
Course 7 - Introduction to Kubernetes Security
Course 8 - Kubernetes Security – Intermediate Skills
Course 9 - Introduction to Custom Resource Definitions
Course 10 - Kubernetes Autoscaling
Course 14 - Kubernetes Observability

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Let's Do the Lab!

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Rookie Lab
Learning Day Featuring Kubernetes
Hosted by KubeCampus

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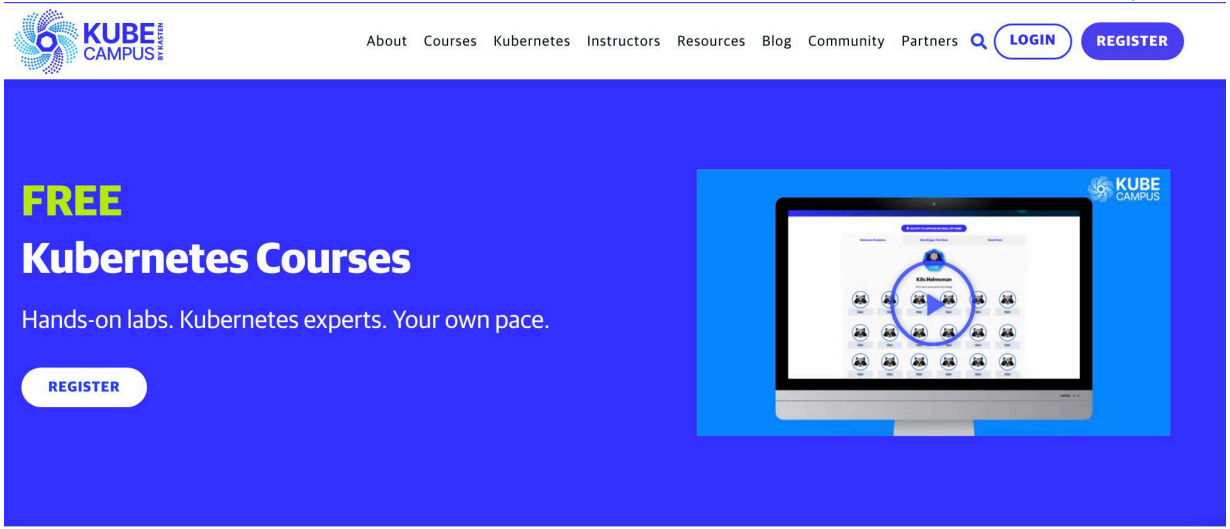
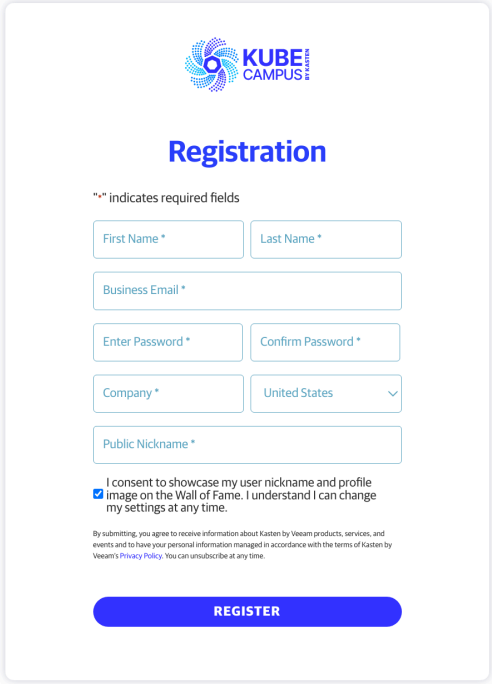
Registration





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Rookie Lab – Learning Day Featuring Kubernetes hosted by KubeCampus

Kubernetes Networking Fundamentals

Objectives

- Review K8s networking terminology
- Answer a series of initial challenge questions in the lab to ensure the user has mastered the Kubernetes terminology
- Use real keyboard networking commands

Useful links

For all users

- KubeCampus site
- KubeCampus Blog
- KubeCampus Resources

For more advanced users

- Kasten K10 documentation
- Free Kasten K10 download

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Rookie Lab – Learning Day Featuring Kubernetes hosted by KubeCampus

Kubernetes Networking Fundamentals – Part 1

Kubernetes Introduction

The network model is implemented by the container runtime on each node. The most common container runtimes use Container Network Interface (CNI) plugins to manage their network and security capabilities

Terminology

- Kubernetes Services
- Microservices
- Load Balancer
- ClusterIP
- NodePort

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Rookie Lab

Kubernetes Networking Fundamentals – Part 2

Commands for the Rookie Lab

- Kubernetes Services Review
- Deploy pod inside cluster
- Expose Pod to other Pods ina cluster via a ClusterIP service
- Expose Pod via a NodePort to external clients
- Test to confirm we can reach the pod

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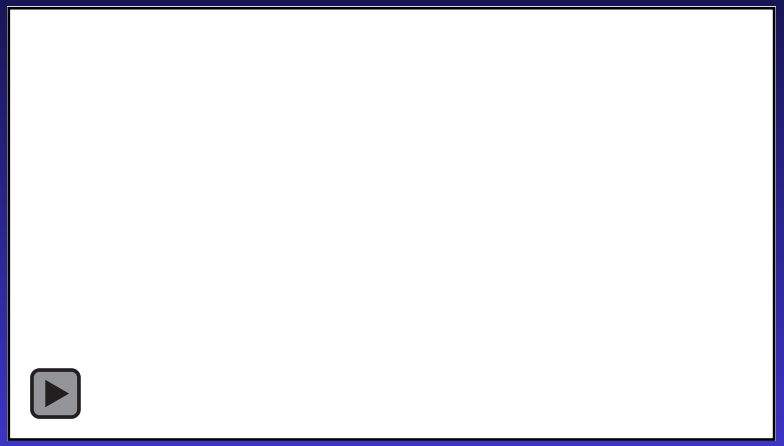

Embedded demo

Learn More

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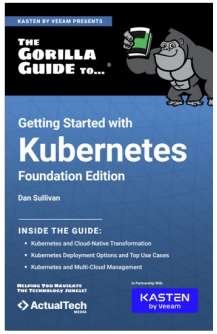
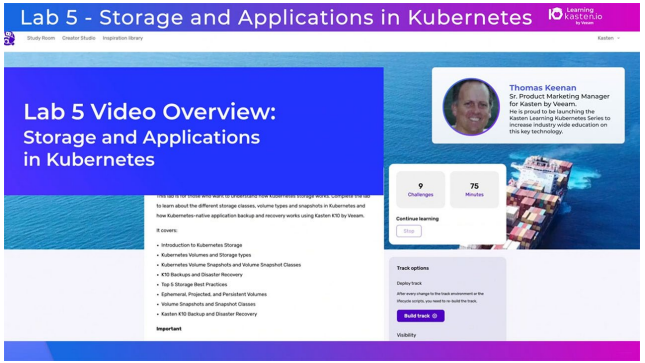
Insightful Content

Ebooks, Blog Posts, Webinars





Ebooks

- Gorilla Guides – Getting Started, Storage, Security, Observability
- Dummies Guide

Blog Posts

- Diverse topics of interest to Kubernetes Community
  - Application Consistency, OIDC, Networking, Security, Minikube
- Beginner and Pro Journeys
- Submit yours today! Contact@KubeCampus.io

Video Recordings and Webinars

- VODs accompany each Lab
- Live Webinars on Security, Storage, Application Monitoring and other topics
  - Also available on demand

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New Content

New Gorilla Guide

- ✓ What are blueprints in Kubernetes?
- ✓ Sample blueprint implementations
- ✓ Extending Kasten K10 with Blueprints
- ✓ Hands on Practice with Blueprints

- link

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Questions?

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The $200 gift card winner is...

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Thank You