

Kubernetes Up And Running Dive Into The Future Of Infrastructure

Kubernetes radically changes the way applications are built and deployed in the cloud. Since its introduction in 2014, this container orchestrator has become one of the largest and most popular open source projects in the world. The updated edition of this practical book shows developers and ops personnel how Kubernetes and container technology can help you achieve new levels of velocity, agility, reliability, and efficiency. Kelsey Hightower, Brendan Burns, and Joe Beda—who've worked on Kubernetes at Google and beyond—explain how this system fits into the lifecycle of a distributed application. You'll learn how to use tools and APIs to automate scalable distributed systems, whether it's for online services, machine learning applications, or a cluster of Raspberry Pi computers. Create a simple cluster to learn how Kubernetes works Dive into the details of deploying an application using Kubernetes Learn specialized objects in Kubernetes, such as DaemonSets, jobs, ConfigMaps, and secrets Explore deployments that tie together the lifecycle of a complete application Get practical examples of how to develop and deploy real-world applications in Kubernetes. Leverage the lethal combination of Docker and Kubernetes to automate deployment and management of Java applications About This Book Master using Docker and Kubernetes to build, deploy and manage Java applications in a jiff Learn how to create your own Docker image and customize your own cluster using Kubernetes Empower the journey from development to production using this practical guide. Who This Book Is For The book is aimed at Java developers who are eager to build, deploy, and manage applications very quickly using container technology. They need have no knowledge of Docker and Kubernetes. What You Will Learn Package Java applications into Docker images Understand the running of containers locally Explore development and deployment options with Docker Integrate Docker into Maven builds Manage and monitor Java applications running on Kubernetes clusters Create Continuous Delivery pipelines for Java applications deployed to Kubernetes In Detail Imagine creating and testing Java EE applications on Apache Tomcat Server or Wildfly Application server in minutes along with deploying and managing Java applications swiftly. Sounds too good to be true? But you have a reason to cheer as such scenarios are only possible by leveraging Docker and Kubernetes. This book will start by introducing Docker and delve deep into its networking and persistent storage concepts. You will then proceed to learn how to refactor monolith application into separate services by building an application and then packaging it into Docker containers. Next, you will create an image containing Java Enterprise Application and later run it using Docker. Moving on, the book will focus on Kubernetes and its features and you will learn to deploy a Java application to Kubernetes using Maven and monitor a Java application in production. By the end of the book, you will get hands-on with some more advanced topics to further extend your knowledge about Docker and Kubernetes. Style and approach An easy-to-follow, practical guide that will help Java developers develop, deploy, and manage Java applications efficiently.

To facilitate scalability and resilience, many organizations now run applications in cloud native environments using containers and orchestration. But how do you know if the deployment is secure? This practical book examines key underlying technologies to help developers, operators, and security professionals assess security risks and determine appropriate solutions. Author Liz Rice, Chief Open Source Officer at Isovalent, looks at how the building blocks commonly used in container-based systems are constructed in Linux. You'll understand what's happening when you deploy containers and learn how to assess potential security risks that could affect your deployments. If you run container applications with kubectl or docker and use Linux command-line tools such as ps and grep, you're ready to get started. Explore attack vectors that affect container deployments Dive into the Linux constructs that underpin containers Examine measures for hardening containers Understand how misconfigurations can compromise container isolation Learn best practices for building container images Identify container images that have known software vulnerabilities Leverage secure connections between containers Use security tooling to prevent attacks on your deployment

Do you need to figure out what Kubernetes is all about? Do you like learning through hands-on? If yes, this is the book for you... Quick Start Kubernetes, brought to you by best-selling author Nigel Poulton, assumes zero prior experience and gets you to the point you can hold deploy and manage a simple app. And it does it in less than 100 pages! You'll learn: - Why we have Kubernetes - What Kubernetes is - Where Kubernetes is going - The fundamentals of Kubernetes architecture You'll also perform the following hands-on tasks: - Build a cluster - containerize an app - Deploy the app to Kubernetes - Break the app and watch it self-heal - Scale the app - Perform a rolling update Along the way, Nigel explains everything as clearly as possible and busts every piece of jargon. When you're done, you'll be in love with Kubernetes and ready to use your skills in the real world.

Summary Kubernetes in Action is a comprehensive guide to effectively developing and running applications in a Kubernetes environment. Before diving into Kubernetes, the book gives an overview of container technologies like Docker, including how to build containers, so that even readers who haven't used these technologies before can get up and running. Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the Technology Kubernetes is Greek for "helmsman," your guide through unknown waters. The Kubernetes container orchestration system safely manages the structure and flow of a distributed application, organizing containers and services for maximum efficiency. Kubernetes serves as an operating system for your clusters, eliminating the need to factor the underlying network and server infrastructure into your designs. About the Book Kubernetes in Action teaches you to use Kubernetes to deploy container-based distributed applications. You'll start with an overview of Docker and Kubernetes before building your first Kubernetes cluster. You'll gradually expand your initial application, adding features and deepening your knowledge of Kubernetes architecture and operation. As you navigate this comprehensive guide, you'll explore high-value topics like monitoring, tuning, and scaling. What's Inside Kubernetes' internals Deploying containers across a cluster Securing clusters Updating applications with zero downtime About the

Reader Written for intermediate software developers with little or no familiarity with Docker or container orchestration systems. About the Author Marko Luksa is an engineer at Red Hat working on Kubernetes and OpenShift. Table of Contents PART 1 - OVERVIEW Introducing Kubernetes First steps with Docker and Kubernetes PART 2 - CORE CONCEPTS Pods: running containers in Kubernetes Replication and other controllers: deploying managed pods Services: enabling clients to discover and talk to pods Volumes: attaching disk storage to containers ConfigMaps and Secrets: configuring applications Accessing pod metadata and other resources from applications Deployments: updating applications declaratively StatefulSets: deploying replicated stateful applications PART 3 - BEYOND THE BASICS Understanding Kubernetes internals Securing the Kubernetes API server Securing cluster nodes and the network Managing pods' computational resources Automatic scaling of pods and cluster nodes Advanced scheduling Best practices for developing apps Extending Kubernetes

While Kubernetes has greatly simplified the task of deploying containerized applications, managing this orchestration framework on a daily basis can still be a complex undertaking. With this practical book, site reliability and DevOps engineers will learn how to build, operate, manage, and upgrade a Kubernetes cluster—whether it resides on cloud infrastructure or on-premises. Brendan Burns, cofounder of Kubernetes, and Craig Tracey, staff field engineer at Heptio, dissect how Kubernetes works internally and demonstrate ways to maintain, adjust, and improve the cluster to suit your particular use case. You'll learn how to make architectural choices for designing a cluster, managing access control, monitoring and alerting, and upgrading Kubernetes. Dive in and discover how to take full advantage of this orchestration framework's capabilities. Learn how your cluster operates, how developers use it to deploy applications, and how Kubernetes can facilitate a developer's job Adjust, secure, and tune your cluster by understanding Kubernetes APIs and configuration options Detect cluster-level problems early and learn the steps necessary to respond and recover quickly Determine how and when to add libraries, tools, and platforms that build on, extend, or otherwise improve a Kubernetes cluster

In this practical guide, four Kubernetes professionals with deep experience in distributed systems, enterprise application development, and open source will guide you through the process of building applications with this container orchestration system. Based on the experiences of companies that are running Kubernetes in production successfully, many of the methods are also backed by concrete code examples. This book is ideal for those already familiar with basic Kubernetes concepts who want to learn common best practices. You'll learn exactly what you need to know to build your best app with Kubernetes the first time. Set up and develop applications in Kubernetes Learn patterns for monitoring, securing your systems, and managing upgrades, rollouts, and rollbacks Understand Kubernetes networking policies and where service mesh fits in Integrate services and legacy applications and develop higher-level platforms on top of Kubernetes Run machine learning workloads in Kubernetes

Learn Kubernetes in a Month of Lunches is your guide to getting up and running with Kubernetes. Summary In Learn Kubernetes in a Month of Lunches you'll go from "what's a Pod?" to automatically scaling clusters of containers and components in just 22 hands-on lessons, each short enough to fit into a lunch break. Every lesson is task-focused and covers an essential skill on the road to Kubernetes mastery. You'll learn how to smooth container management with Kubernetes, including securing your clusters, and upgrades and rollbacks with zero downtime. No development stack, platform, or background is assumed. Author Elton Stoneman describes all patterns generically, so you can easily apply them to your applications and port them to other projects! Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the technology Create apps that perform identically on your laptop, data center, and cloud! Kubernetes provides a consistent method for deploying applications on any platform, making it easy to grow. By efficiently orchestrating Docker containers, Kubernetes simplifies tasks like rolling upgrades, scaling, and self-healing. About the book Learn Kubernetes in a Month of Lunches is your guide to getting up and running with Kubernetes. You'll progress from Kubernetes basics to essential skills, learning to model, deploy, and manage applications in production. Exercises demonstrate how Kubernetes works with multiple languages and frameworks. You'll also practice with new apps, legacy code, and serverless functions. What's inside Deploying applications on Kubernetes clusters Understanding the Kubernetes app lifecycle, from packaging to rollbacks Self-healing and scalable apps Using Kubernetes as a platform for new technologies About the reader For readers familiar with Docker and containerization. About the author Elton Stoneman is a Docker Captain, a 11-time Microsoft MVP, and the author of Learn Docker in a Month of Lunches. Table of Contents PART 1 - FAST TRACK TO KUBERNETES 1 Before you begin 2 Running containers in Kubernetes with Pods and Deployments 3 Connecting Pods over the network with Services 4 Configuring applications with ConfigMaps and Secrets 5 Storing data with volumes, mounts, and claims 6 Scaling applications across multiple Pods with controllers PART 2 - KUBERNETES IN THE REAL WORLD 7 Extending applications with multicontainer Pods 8 Running data-heavy apps with StatefulSets and Jobs 9 Managing app releases with rollouts and rollbacks 10 Packaging and managing apps with Helm 11 App development—Developer workflows and CI/CD PART 3 - PREPARING FOR PRODUCTION 12 Empowering self-healing apps 13 Centralizing logs with Fluentd and Elasticsearch 14 Monitoring applications with Kubernetes with Prometheus 15 Managing incoming traffic with Ingress 16 Securing applications with policies, contexts, and admission control PART 4 - PURE AND APPLIED KUBERNETES 17 Securing resources with role-based access control 18 Deploying Kubernetes: Multinode and multiarchitecture clusters 19 Controlling workload placement and automatic scaling 20 Extending Kubernetes with custom resources and Operators 21 Running serverless functions in Kubernetes 22 Never the end

This workshop takes you through a Kubernetes-oriented application delivery pipeline in a practical way. You'll learn how to manage containers efficiently and scale and stabilize cloud-native applications using Kubernetes.

Kubernetes is the operating system of the cloud native world, providing a reliable and scalable platform for running containerized workloads.

In this friendly, pragmatic book, cloud experts John Arundel and Justin Domingus show you what Kubernetes can do—and what you can do with it. You'll learn all about the Kubernetes ecosystem, and use battle-tested solutions to everyday problems. You'll build, step by step, an example cloud native application and its supporting infrastructure, along with a development environment and continuous deployment pipeline that you can use for your own applications. Understand containers and Kubernetes from first principles; no experience necessary Run your own clusters or choose a managed Kubernetes service from Amazon, Google, and others Use Kubernetes to manage resource usage and the container lifecycle Optimize clusters for cost, performance, resilience, capacity, and scalability Learn the best tools for developing, testing, and deploying your applications Apply the latest industry practices for security, observability, and monitoring Adopt DevOps principles to help make your development teams lean, fast, and effective

Manage Kubernetes applications using kubectl and discover the different Kubernetes clusters Key Features Explore the Kubernetes command line for deploying applications, inspecting clusters, and viewing logs Leverage kubectl for Kubernetes application management and container debugging Apply your knowledge of Docker to learn kubectl equivalent commands for Docker subcommands Book Description The kubectl command line tool lets you control Kubernetes clusters to manage nodes in the cluster and perform all types of Kubernetes operations. This introductory guide will get you up to speed with kubectl in no time. The book is divided into four parts, touching base on the installation and providing a general overview of kubectl in the first part. The second part introduces you to managing Kubernetes clusters and working with nodes. In the third part, you'll be taken through the different ways in which you can manage Kubernetes applications, covering how to create, update, delete, view, and debug applications. The last part of the book focuses on various Kubernetes plugins and commands. You'll get to grips with using Kustomize and discover Helm, a Kubernetes package manager. In addition to this, you'll explore how you can use equivalent Docker commands in kubectl. By the end of this book, you'll have learned how to install and update an application on Kubernetes, view its logs, and inspect clusters effectively. What you will learn Get to grips with the basic kubectl commands Delve into different cluster nodes and their resource usages Understand the most essential features of kubectl Discover how to patch Kubernetes deployments with Kustomize Find out ways to extend kubectl tools with their own plugins Explore how to use Helm as an advanced tool for deploying apps Who this book is for This book is for developers, system administrators, and anyone who wants to use the kubectl command-line tool to perform Kubernetes functionalities. A basic understanding of Kubernetes and Docker is required to get started with this book. Apply Kubernetes beyond the basics of Kubernetes clusters by implementing IAM using OIDC and Active Directory, Layer 4 load balancing using MetalLB, advanced service integration, security, auditing, and CI/CD Key Features Find out how to add enterprise features to a Kubernetes cluster with theory and exercises to guide you Understand advanced topics including load balancing, externalDNS, IDP integration, security, auditing, backup, and CI/CD Create development clusters for unique testing requirements, including running multiple clusters on a single server to simulate an enterprise environment Book Description Containerization has changed the DevOps game completely, with Docker and Kubernetes playing important roles in altering the flow of app creation and deployment. This book will help you acquire the knowledge and tools required to integrate Kubernetes clusters in an enterprise environment. The book begins by introducing you to Docker and Kubernetes fundamentals, including a review of basic Kubernetes objects. You'll then get to grips with containerization and understand its core functionalities, including how to create ephemeral multinode clusters using kind. As you make progress, you'll learn about cluster architecture, Kubernetes cluster deployment, and cluster management, and get started with application deployment. Moving on, you'll find out how to integrate your container to a cloud platform and integrate tools including MetalLB, externalDNS, OpenID connect (OIDC), pod security policies (PSPs), Open Policy Agent (OPA), Falco, and Velero. Finally, you will discover how to deploy an entire platform to the cloud using continuous integration and continuous delivery (CI/CD). By the end of this Kubernetes book, you will have learned how to create development clusters for testing applications and Kubernetes components, and be able to secure and audit a cluster by implementing various open-source solutions including OpenUnison, OPA, Falco, Kibana, and Velero. What you will learn Create a multinode Kubernetes cluster using kind Implement Ingress, MetalLB, and ExternalDNS Configure a cluster OIDC using impersonation Map enterprise authorization to Kubernetes Secure clusters using PSPs and OPA Enhance auditing using Falco and EFK Back up your workload for disaster recovery and cluster migration Deploy to a platform using Tekton, GitLab, and ArgoCD Who this book is for This book is for anyone interested in DevOps, containerization, and going beyond basic Kubernetes cluster deployments. DevOps engineers, developers, and system administrators looking to enhance their IT career paths will also find this book helpful. Although some prior experience with Docker and Kubernetes is recommended, this book includes a Kubernetes bootcamp that provides a description of Kubernetes objects to help you if you are new to the topic or need a refresher.

Kubernetes has become an essential part of the daily work for most system, network, and cluster administrators today. But to work effectively together on a production-scale Kubernetes system, they must be able to speak the same language. This book provides a clear guide to the layers of complexity and abstraction that come with running a Kubernetes network. Authors James Strong and Vallery Lancey bring you up to speed on the intricacies that Kubernetes has to offer for large container deployments. If you're to be effective in troubleshooting and maintaining a production cluster, you need to be well versed in the abstraction provided at each layer. This practical book shows you how. Learn the Kubernetes networking model Choose the best interface for your clusters from the CNCF Container Network Interface project Explore the networking and Linux primitives that power Kubernetes Quickly troubleshoot networking issues and prevent downtime Examine cloud networking and Kubernetes using the three major providers: Amazon Web Services, Google Cloud, and Microsoft Azure Learn the pros and cons of various network tools--and how to select the best ones for your stack

Kubernetes: Up and Running Dive Into the Future of Infrastructure

Selling your CTO on the merits of OpenShift and Kubernetes is only the beginning. To operate and scale OpenShift, you also need to know how to manage and expose resources to application teams and continuously deliver changes to the applications running in these environments. With this practical book, new and experienced developers and operators will learn specific techniques for operationalizing OpenShift and Kubernetes in the enterprise. Industry experts Michael Elder, Jake Kitchener, and Brad Topol show you how to run OpenShift and Kubernetes in production and deliver your applications to a highly available, secure, and scalable platform. You'll learn how to build a strong foundation in advanced cluster operational topics, such as tenancy management, scheduling and capacity management, cost management, continuous delivery, and more. Examine the fundamental concepts of Kubernetes architecture Get different Kubernetes and OpenShift environments up and running Dive into advanced resource management topics, including capacity planning Learn how to support high availability inside a single cluster Use production-level approaches for continuous delivery and code promotion across clusters Explore hybrid cloud use cases, including multicluster provisioning, upgrading, and policy support Devise and deliver disaster recovery strategies Docker is rapidly changing the way organizations deploy software at scale. However, understanding how Linux containers fit into your workflow—and getting the integration details right—is not a trivial task. With the updated edition of this practical guide, you'll learn how to use Docker to package your applications with all of their dependencies and then test, ship, scale, and support your containers in production. This edition includes significant updates to the examples and explanations that reflect the substantial changes that have occurred over the past couple of years. Sean Kane and Karl Matthias have added a complete chapter on Docker Compose, deeper coverage of Docker Swarm mode, introductions to both Kubernetes and AWS Fargate, examples on how to optimize your Docker images, and much more. Learn how Docker simplifies dependency management and deployment workflow for your applications Start working with Docker images, containers, and command line tools Use practical techniques to deploy and test Docker containers in production Debug containers by understanding their

composition and internal processes Deploy production containers at scale inside your data center or cloud environment Explore advanced Docker topics, including deployment tools, networking, orchestration, security, and configuration

Updated for Docker Community Edition v18.09! Docker book designed for SysAdmins, SREs, Operations staff, Developers and DevOps who are interested in deploying the open source container service Docker. In this book, we'll walk you through installing, deploying, managing, and extending Docker. We're going to do that by first introducing you to the basics of Docker and its components. Then we'll start to use Docker to build containers and services to perform a variety of tasks. We're going to take you through the development lifecycle, from testing to production, and see where Docker fits in and how it can make your life easier. We'll make use of Docker to build test environments for new projects, demonstrate how to integrate Docker with continuous integration workflow, and then how to build application services and platforms. Finally, we'll show you how to use Docker's API and how to extend Docker yourself. We'll teach you how to:

- * Install Docker.
- * Take your first steps with a Docker container.
- * Build Docker images.
- * Manage and share Docker images.
- * Run and manage more complex Docker containers.
- * Deploy Docker containers as part of your testing pipeline.
- * Build multi-container applications and environments.
- * Learn about orchestration using Compose and Swarm for the orchestration of Docker containers and Consul for service discovery.
- * Explore the Docker API.
- * Getting Help and Extending Docker.

Get up to speed with Helm, the preeminent package manager for the Kubernetes container orchestration system. This practical guide shows you how to efficiently create, install, and manage the applications running inside your containers. Helm maintainers Matt Butcher, Matt Farina, and Josh Dolitsky explain how this package manager fits into the Kubernetes ecosystem and provide an inside look at Helm's design and best practices. More than 70% of the organizations that work with Kubernetes use Helm today. While the Helm community provides thousands of packages, or charts, to help you get started, this book walks developers and DevOps engineers through the process of creating custom charts to package applications. If you have a working understanding of Kubernetes, you're ready to go. Explore primary features including frequently used Helm commands Learn how to build and deploy Helm charts from scratch Use Helm to manage complexity and achieve repeatable deployments Package an application and its dependencies for easy installation Manage the entire lifecycle of applications on Kubernetes Explore ways to extend Helm to add features and functionality Learn features for testing, handling dependencies, and providing security

Building models is a small part of the story when it comes to deploying machine learning applications. The entire process involves developing, orchestrating, deploying, and running scalable and portable machine learning workloads--a process Kubeflow makes much easier. This practical book shows data scientists, data engineers, and platform architects how to plan and execute a Kubeflow project to make their Kubernetes workflows portable and scalable. Authors Josh Patterson, Michael Katzenellenbogen, and Austin Harris demonstrate how this open source platform orchestrates workflows by managing machine learning pipelines. You'll learn how to plan and execute a Kubeflow platform that can support workflows from on-premises to cloud providers including Google, Amazon, and Microsoft. Dive into Kubeflow architecture and learn best practices for using the platform Understand the process of planning your Kubeflow deployment Install Kubeflow on an existing on-premises Kubernetes cluster Deploy Kubeflow on Google Cloud Platform step-by-step from the command line Use the managed Amazon Elastic Kubernetes Service (EKS) to deploy Kubeflow on AWS Deploy and manage Kubeflow across a network of Azure cloud data centers around the world Use KFServing to develop and deploy machine learning models

This book is for anyone who needs to run software on Kubernetes. Whether you're a developer, a DevOps manager or a technician, this book should help you plan and run Kubernetes workloads. I assume that you have no previous knowledge about containers or containers orchestration. I made my best to keep this book small, so that you can learn Kubernetes quickly without getting lost in petty details. If you are looking for a reference book where you'll find answers to all the questions you may have within the next 4 years of your Kubernetes practice, you'll find other heavy books for that. My purpose is to swiftly provide you with the tools you need to create and run your first cloud-ready application using Kubernetes, then be able to look for more by yourself when needed. Plus this book is packed with exercises and samples where you create, run and manage your own applications on a Kubernetes cluster. Read this book, and you can create and run your first Kubernetes application within a week.

In the race to compete in today's fast-moving markets, large enterprises are busy adopting new technologies for creating new products, processes, and business models. But one obstacle on the road to digital transformation is placing too much emphasis on technology, and not enough on the types of processes technology enables. What if different lines of business could build their own services and applications—and decision-making was distributed rather than centralized? This report explores the concept of a digital business platform as a way of empowering individual business sectors to act on data in real time. Much innovation in a digital enterprise will increasingly happen at the edge, whether it involves business users (from marketers to data scientists) or IoT devices. To facilitate the process, your core IT team can provide these sectors with the digital tools they need to innovate quickly. This report explores: Key cultural and organizational changes for developing business capabilities through cross-functional product teams A platform for integrating applications, data sources, business partners, clients, mobile apps, social networks, and IoT devices Creating internal API programs for building innovative edge services in low-code or no-code environments Tools including Integration Platform as a Service, Application Platform as a Service, and Integration Software as a Service The challenge of integrating microservices and serverless architectures Event-driven architectures for processing and reacting to events in real time You'll also learn about a complete pervasive integration solution as a core component of a digital business platform to serve every audience in your organization.

The way developers design, build, and run software has changed significantly with the evolution of microservices and containers. These modern architectures use new primitives that require a different set of practices than most developers, tech leads, and architects are accustomed to. With this focused guide, Bilgin Ibryam and Roland Huß from Red Hat provide common reusable elements, patterns, principles, and practices for designing and implementing cloud-native applications on Kubernetes. Each pattern includes a description of the problem and a proposed solution with Kubernetes specifics. Many patterns are also backed by concrete code examples. This book is ideal for developers already familiar with basic Kubernetes concepts who want to learn common cloud native patterns. You'll learn about the following pattern categories: Foundational patterns cover the core principles and practices for building container-based cloud-native applications. Behavioral patterns explore finer-grained concepts for managing various types of container and platform interactions. Structural patterns help you organize containers within a pod, the atom of the Kubernetes platform. Configuration patterns provide insight into how application configurations can be handled in Kubernetes. Advanced patterns covers more advanced topics such as extending the platform with operators.

This book is designed to help newcomers and experienced users alike learn about Kubernetes. Its chapters are designed to introduce core Kubernetes concepts and to build on them to a level where running an application on a production cluster is a familiar, repeatable, and automated process. From there, more advanced topics are introduced, like how to manage a Kubernetes cluster itself.

Go beyond simply learning Kubernetes fundamentals and its deployment, and explore more advanced concepts, including serverless computing and service meshes with the latest updates Key Features Master Kubernetes architecture and design to build and deploy secure distributed applications Learn advanced concepts like autoscaling, cluster federation, serverless computing, and service mesh integration for observability Explore Kubernetes 1.18 features and its rich ecosystem of tools like Kubectl, Knative, and Helm Book Description The third edition of Mastering Kubernetes is updated with the latest tools and code enabling you to learn Kubernetes 1.18's latest features. This book

primarily concentrates on diving deeply into complex concepts and Kubernetes best practices to help you master the skills of designing and deploying large clusters on various cloud platforms. The book trains you to run complex stateful microservices on Kubernetes including advanced features such as horizontal pod autoscaling, rolling updates, resource quotas, and persistent storage backend. With the two new chapters, you will gain expertise in serverless computing and utilizing service meshes. As you proceed through the chapters, you will explore different options for network configuration and learn to set up, operate, and troubleshoot Kubernetes networking plugins through real-world use cases. Furthermore, you will understand the mechanisms of custom resource development and its utilization in automation and maintenance workflows. By the end of this Kubernetes book, you will graduate from an intermediate to advanced Kubernetes professional. What you will learn Master the fundamentals of Kubernetes architecture and design Build and run stateful applications and complex microservices on Kubernetes Use tools like Kubectl, secrets, and Helm to manage resources and storage Master Kubernetes Networking with load balancing options like Ingress Achieve high-availability Kubernetes clusters Improve Kubernetes observability with tools like Prometheus, Grafana, and Jaeger Extend Kubernetes working with Kubernetes API, plugins, and webhooks Who this book is for If you are a system administrator or a cloud developer with working knowledge of Kubernetes and are keen to master its advanced features, along with learning everything from building microservices to utilizing service meshes, Mastering Kubernetes is for you. Basic familiarity with networking concepts will be helpful.

Giving you the confidence you need to take on Docker in the real world, this guide is the ultimate book for learning Docker, brought to you by Docker Captain and leading educator in the container ecosystem. --

Kubernetes has become the dominant container orchestrator, but many organizations that have recently adopted this system are still struggling to run actual production workloads. In this practical book, four software engineers from VMware bring their shared experiences running Kubernetes in production and provide insight on key challenges and best practices. The brilliance of Kubernetes is how configurable and extensible the system is, from pluggable runtimes to storage integrations. For platform engineers, software developers, infosec, network engineers, storage engineers, and others, this book examines how the path to success with Kubernetes involves a variety of technology, pattern, and abstraction considerations. With this book, you will: Understand what the path to production looks like when using Kubernetes Examine where gaps exist in your current Kubernetes strategy Learn Kubernetes's essential building blocks--and their trade-offs Understand what's involved in making Kubernetes a viable location for applications Learn better ways to navigate the cloud native landscape

A developer's field-guide to designing scalable services using Kubernetes Key Features Develop and run your software using containers within a Kubernetes environment Get hands-on experience of using Kubernetes with DevOps concepts such as continuous integration, benchmark testing, monitoring, and so on Pragmatic example-based approach showing how to use Kubernetes in the development process Book Description Kubernetes is documented and typically approached from the perspective of someone running software that has already been built. Kubernetes may also be used to enhance the development process, enabling more consistent testing and analysis of code to help developers verify not only its correctness, but also its efficiency. This book introduces key Kubernetes concepts, coupled with examples of how to deploy and use them with a bit of Node.js and Python example code, so that you can quickly replicate and use that knowledge. You will begin by setting up Kubernetes to help you develop and package your code. We walk you through the setup and installation process before working with Kubernetes in the development environment. We then delve into concepts such as automating your build process, autonomic computing, debugging, and integration testing. This book covers all the concepts required for a developer to work with Kubernetes. By the end of this book, you will be in a position to use Kubernetes in development ecosystems. What you will learn Build your software into containers Deploy and debug software running in containers within Kubernetes Declare and add configuration through Kubernetes Define how your application fits together, using internal and external services Add feedback to your code to help Kubernetes manage your services Monitor and measure your services through integration testing and in production deployments Who this book is for If you are a full-stack or back-end software developers interested, curious, or being asked to test as well as run the code you're creating, you can leverage Kubernetes to make that process simpler and consistent regardless of where you deploy. If you're looking for developer focused examples in NodeJS and Python for how to build, test, deploy, and run your code with Kubernetes, this is perfect for you.

Kubernetes radically changes the way applications are built and deployed in the cloud. Since its introduction in 2014, this container orchestrator has become one of the largest and most popular open source projects in the world. The updated edition of this practical book shows developers and ops personnel how Kubernetes and container technology can help you achieve new levels of velocity, agility, reliability, and efficiency. Kelsey Hightower, Brendan Burns, and Joe Beda—who've worked on Kubernetes at Google and beyond—explain how this system fits into the lifecycle of a distributed application. You'll learn how to use tools and APIs to automate scalable distributed systems, whether it's for online services, machine learning applications, or a cluster of Raspberry Pi computers. Create a simple cluster to learn how Kubernetes works Dive into the details of deploying an application using Kubernetes Learn specialized objects in Kubernetes, such as DaemonSets, jobs, ConfigMaps, and secrets Explore deployments that tie together the lifecycle of a complete application Get practical examples of how to develop and deploy real-world applications in Kubernetes Enhance your skills in building scalable infrastructure for your cloud-based applications Key Features Learn to design a scalable architecture by building continuous integration (CI) pipelines with Kubernetes Get an in-depth understanding of role-based access control (RBAC), continuous deployment (CD), and observability Monitor a Kubernetes cluster with Prometheus and Grafana Book Description Kubernetes is among the most popular open-source platforms for automating the deployment, scaling, and operations of application containers across clusters of hosts, providing a container-centric infrastructure. Hands-On Microservices with Kubernetes starts by providing you with in-depth insights into the synergy between Kubernetes and microservices. You will learn how to use Delinkcious, which will serve as a live lab throughout the book to help you understand microservices and Kubernetes concepts in the context of a real-world application. Next, you will get up to speed with setting up a CI/CD pipeline and configuring microservices using Kubernetes ConfigMaps. As

you cover later chapters, you will gain hands-on experience in securing microservices, and implementing REST, gRPC APIs, and a Delinkcious data store. In addition to this, you'll explore the Nuclio project, run a serverless task on Kubernetes, and manage and implement data-intensive tests. Toward the concluding chapters, you'll deploy microservices on Kubernetes and learn to maintain a well-monitored system. Finally, you'll discover the importance of service meshes and how to incorporate Istio into the Delinkcious cluster. By the end of this book, you'll have gained the skills you need to implement microservices on Kubernetes with the help of effective tools and best practices. What you will learn

Understand the synergy between Kubernetes and microservices
Create a complete CI/CD pipeline for your microservices on Kubernetes
Develop microservices on Kubernetes with the Go kit framework using best practices
Manage and monitor your system using Kubernetes and open-source tools
Expose your services through REST and gRPC APIs
Implement and deploy serverless functions as a service
Externalize authentication, authorization and traffic shaping using a service mesh
Run a Kubernetes cluster in the cloud on Google Kubernetes Engine

Who this book is for
This book is for developers, DevOps engineers, or anyone who wants to develop large-scale microservice-based systems on top of Kubernetes. If you are looking to use Kubernetes on live production projects or want to migrate existing systems to a modern containerized microservices system, then this book is for you. Coding skills, together with some knowledge of Docker, Kubernetes, and cloud concepts will be useful.

You did it. You successfully transformed your application into a microservices architecture. But now that you're running services across different environments—public to public, private to public, virtual machine to container—your cloud native software is beginning to encounter reliability issues. How do you stay on top of this ever-increasing complexity? With the Istio service mesh, you'll be able to manage traffic, control access, monitor, report, get telemetry data, manage quota, trace, and more with resilience across your microservice. In this book, Lee Calcote and Zack Butcher explain why your services need a service mesh and demonstrate step-by-step how Istio fits into the life cycle of a distributed application. You'll learn about the tools and APIs for enabling and managing many of the features found in Istio. Explore the observability challenges Istio addresses

Use request routing, traffic shifting, fault injection, and other features essential to running a solid service mesh
Generate and collect telemetry information
Try different deployment patterns, including A/B, blue/green, and canary
Get examples of how to develop and deploy real-world applications with Istio support

If you're looking to develop native applications in Kubernetes, this is your guide. Developers and AppOps administrators will learn how to build Kubernetes-native applications that interact directly with the API server to query or update the state of resources. AWS developer advocate Michael Hausenblas and Red Hat principal software engineer Stefan Schimanski explain the characteristics of these apps and show you how to program Kubernetes to build them. You'll explore the basic building blocks of Kubernetes, including the client-go API library and custom resources. All you need to get started is a rudimentary understanding of development and system administration tools and practices, such as package management, the Go programming language, and Git. Walk through Kubernetes API basics and dive into the server's inner structure

Explore Kubernetes's programming interface in Go, including Kubernetes API objects
Learn about custom resources—the central extension tools used in the Kubernetes ecosystem
Use tags to control Kubernetes code generators for custom resources
Write custom controllers and operators and make them production ready
Extend the Kubernetes API surface by implementing a custom API server

Master the art of container management utilizing the power of Kubernetes. About This Book This practical guide demystifies Kubernetes and ensures that your clusters are always available, scalable, and up to date

Discover new features such as autoscaling, rolling updates, resource quotas, and cluster size
Master the skills of designing and deploying large clusters on various cloud platforms

Who This Book Is For The book is for system administrators and developers who have intermediate level of knowledge with Kubernetes and are now waiting to master its advanced features. You should also have basic networking knowledge. This advanced-level book provides a pathway to master Kubernetes. What You Will Learn

Architect a robust Kubernetes cluster for long-time operation
Discover the advantages of running Kubernetes on GCE, AWS, Azure, and bare metal
See the identity model of Kubernetes and options for cluster federation
Monitor and troubleshoot Kubernetes clusters and run a highly available Kubernetes
Create and configure custom Kubernetes resources and use third-party resources in your automation workflows
Discover the art of running complex stateful applications in your container environment
Deliver applications as standard packages

In Detail
Kubernetes is an open source system to automate the deployment, scaling, and management of containerized applications. If you are running more than just a few containers or want automated management of your containers, you need Kubernetes. This book mainly focuses on the advanced management of Kubernetes clusters. It covers problems that arise when you start using container orchestration in production. We start by giving you an overview of the guiding principles in Kubernetes design and show you the best practises in the fields of security, high availability, and cluster federation. You will discover how to run complex stateful microservices on Kubernetes including advanced features as horizontal pod autoscaling, rolling updates, resource quotas, and persistent storage back ends. Using real-world use cases, we explain the options for network configuration and provides guidelines on how to set up, operate, and troubleshoot various Kubernetes networking plugins. Finally, we cover custom resource development and utilization in automation and maintenance workflows. By the end of this book, you'll know everything you need to know to go from intermediate to advanced level. Style and approach

Delving into the design of the Kubernetes platform, the reader will be exposed to the advanced features and best practices of Kubernetes. This book will be an advanced level book which will provide a pathway to master Kubernetes

Get a comprehensive understanding of gRPC fundamentals through real-world examples. With this practical guide, you'll learn how this high-performance interprocess communication protocol is capable of connecting polyglot services in microservices architecture, while providing a rich framework for defining service contracts and data types. Complete with hands-on examples

written in Go, Java, Node, and Python, this book also covers the essential techniques and best practices to use gRPC in production systems. Authors Kasun Indrasiri and Danesh Kuruppu discuss the importance of gRPC in the context of microservices development.

Introduction -- Creating and running containers -- Deploying a Kubernetes cluster -- Common kubectl commands -- Pods -- Labels and annotations -- Service discovery -- ReplicaSets -- DaemonSets -- Jobs -- ConfigMaps and secrets -- Deployments -- Integrating storage solutions and Kubernetes -- Deploying real-world applications -- Building a Raspberry Pi Kubernetes cluster Terraform has become a key player in the DevOps world for defining, launching, and managing infrastructure as code (IaC) across a variety of cloud and virtualization platforms, including AWS, Google Cloud, Azure, and more. This hands-on second edition, expanded and thoroughly updated for Terraform version 0.12 and beyond, shows you the fastest way to get up and running. Gruntwork cofounder Yevgeniy (Jim) Brikman walks you through code examples that demonstrate Terraform's simple, declarative programming language for deploying and managing infrastructure with a few commands. Veteran sysadmins, DevOps engineers, and novice developers will quickly go from Terraform basics to running a full stack that can support a massive amount of traffic and a large team of developers. Explore changes from Terraform 0.9 through 0.12, including backends, workspaces, and first-class expressions Learn how to write production-grade Terraform modules Dive into manual and automated testing for Terraform code Compare Terraform to Chef, Puppet, Ansible, CloudFormation, and Salt Stack Deploy server clusters, load balancers, and databases Use Terraform to manage the state of your infrastructure Create reusable infrastructure with Terraform modules Use advanced Terraform syntax to achieve zero-downtime deployment

Legend has it that Google deploys over two billion application containers a week. How's that possible? Google revealed the secret through a project called Kubernetes, an open source cluster orchestrator (based on its internal Borg system) that radically simplifies the task of building, deploying, and maintaining scalable distributed systems in the cloud. This practical guide shows you how Kubernetes and container technology can help you achieve new levels of velocity, agility, reliability, and efficiency. Authors Kelsey Hightower, Brendan Burns, and Joe Beda—who've worked on Kubernetes at Google and other organizations—explain how this system fits into the lifecycle of a distributed application. You will learn how to use tools and APIs to automate scalable distributed systems, whether it is for online services, machine-learning applications, or a cluster of Raspberry Pi computers. Explore the distributed system challenges that Kubernetes addresses Dive into containerized application development, using containers such as Docker Create and run containers on Kubernetes, using the docker image format and container runtime Explore specialized objects essential for running applications in production Reliably roll out new software versions without downtime or errors Get examples of how to develop and deploy real-world applications in Kubernetes

Operators are a way of packaging, deploying, and managing Kubernetes applications. A Kubernetes application doesn't just run on Kubernetes; it's composed and managed in Kubernetes terms. Operators add application-specific operational knowledge to a Kubernetes cluster, making it easier to automate complex, stateful applications and to augment the platform. Operators can coordinate application upgrades seamlessly, react to failures automatically, and streamline repetitive maintenance like backups. Think of Operators as site reliability engineers in software. They work by extending the Kubernetes control plane and API, helping systems integrators, cluster administrators, and application developers reliably deploy and manage key services and components. Using real-world examples, authors Jason Dobies and Joshua Wood demonstrate how to use Operators today and how to create Operators for your applications with the Operator Framework and SDK. Learn how to establish a Kubernetes cluster and deploy an Operator Examine a range of Operators from usage to implementation Explore the three pillars of the Operator Framework: the Operator SDK, the Operator Lifecycle Manager, and Operator Metering Build Operators from the ground up using the Operator SDK Build, package, and run an Operator in development, testing, and production phases Learn how to distribute your Operator for installation on Kubernetes clusters

April 2021 edition. Brought to you by best-selling author and video trainer, Nigel Poulton. Every page and every example has been checked and updated against the latest versions of Kubernetes (1.20+) and the latest trends in the cloud-native ecosystem. Containers have revolutionized the way we package and run applications. However, like most things, containers come with a bunch of challenges. This is where Kubernetes comes into play. Kubernetes helps you deploy and manage containerized applications at scale. It also abstracts the underlying infrastructure so that you don't need to care if you're deploying applications to Amazon Web Services, Microsoft Azure, or your own on-premises datacenter. With Kubernetes, you can develop applications on your laptop, deploy to your favourite cloud platform, migrate to a different cloud platform, and even migrate to your on-premises datacenters. The Kubernetes Book starts from the beginning, explains all concepts in a clear and friendly way, and covers everything you need to become proficient at Kubernetes. You'll learn: - Kubernetes architecture - How to build Kubernetes - How to deploy, self-heal, scale, and perform rolling updates on applications - What the Kubernetes API is and how it works - How to secure Kubernetes - The meaning of terms such as; cloud-native, microservices, desired state, containerized, and more... Finally, Kubernetes and cloud technologies are developing fast! That's why this book will be updated every year, meaning it's always up-to-date with the latest versions of Kubernetes and the latest trends in the cloud-native ecosystem.

Klingon Edition - September 2020. This is a special Klingon tribute edition of The Kubernetes Book. The front cover has the title of the book and the YAML code in Klingon script, however, the rest of the book is written in English. Every page and every example has been checked against the latest versions of Kubernetes (1.18) and the latest trends in the cloud-native ecosystem. Containers have revolutionized the way we package and run applications. However, like most things, containers come with their own set of challenges. This is where Kubernetes enters the scene. Kubernetes helps you deploy and manage containerized applications at scale. It also abstracts the underlying infrastructure so that you don't need to care if you're deploying applications to Amazon Web Services, Microsoft Azure, or your own on-premises datacenter. With Kubernetes, you can develop applications on your laptop, deploy to your favourite cloud platform, migrate to a different cloud platform, and even migrate to your private cloud at your on-premises datacenter. The Kubernetes Book starts from the beginning, explains all concepts in a clear and friendly manner, and covers everything needed for you to become proficient at Kubernetes. It even includes two chapters dedicated to threat-modeling Kubernetes and real-world security. You'll learn: - Kubernetes architecture - How to build Kubernetes - How to deploy, self-heal, scale, and perform rolling updates on applications - How to secure Kubernetes - The meaning of terms such as; cloud-native, microservices, desired state, containerized, and more... Finally, Kubernetes and cloud technologies are developing fast! That's why this book will be updated at least once per year, meaning it's always up-to-date with the latest versions of Kubernetes and the latest trends in the cloud-native ecosystem.

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