

Building Distributed Systems And Microservices In Go With

Explore microservices by developing with Express, deploying with Docker, and scaling with Swarm and Kubernetes. Key Features Build cloud-native microservices using only Node and Express Write clean and maintainable code with JavaScript for improved microservices development Learn ways to monitor and manage your services in a production environment Book Description Microservices are a popular way to build distributed systems that power modern web and mobile apps. With the help of this Learning Path, you'll learn how to develop your applications as a suite of independently deployable and scalable services. Using an example-driven approach, this Learning Path will uncover how you can dismantle your monolithic application and embrace microservice architecture, right from architecting your services and modeling them to integrating them into your application. You'll also explore ways to overcome challenges in testing and deploying these services by setting up deployment pipelines that break down the application development process into several stages. You'll study serverless architecture for microservices and understand its benefits. Furthermore, this Learning Path delves into the patterns used for organizing services, helping you optimize request handling and processing. You'll then move on to learn the fault-tolerance and reliability patterns that help you use microservices to isolate failures in your applications. By the end of this Learning Path, you'll have the skills necessary to build enterprise-ready applications using microservices. This Learning Path includes content from the following Packt products: Hands-On Microservices with Node.js by Diogo Resende Microservices Development Cookbook by Paul Osman What you will learn Use Docker and Swarm for continuous deployment and scaling Build and deploy cloud-native microservices and avoid vendor lock-in Explore different service architectures such as Hydra and Seneca Create services that don't impact users upon failure Monitor your services to perform debugging and create observable systems Develop fast and reliable deployment pipelines Manage multiple environments for your services Simplify the local development of microservice-based systems Who this book is for If you're a JavaScript developer looking to put your skills to work by building microservices and moving away from the monolithic architecture, this book is for you. To understand the concepts explained in this Learning Path, you must have knowledge of Node.js and be familiar with the microservices architecture.

MVC and CRUD make software easier to write, but harder to change. Microservice-based architectures can help even the smallest of projects remain agile in the long term, but most tutorials meander in theory or completely miss the point of what it means to be microservice-based. Roll up your sleeves with real projects and learn the most important concepts of evented architectures. You'll have your own deployable, testable project and a direction for where to go next. Much ink has been spilled on the topic of microservices, but all of this writing fails to accurately identify what makes a system a monolith, define what microservices are, or give complete, practical examples, so you're probably left thinking they have nothing to offer you. You don't have to be at Google or Facebook scale to benefit from a microservice-based architecture. Microservices will keep even small and medium teams productive by keeping the pieces of your system focused and decoupled. Discover the basics of message-based architectures, render the same state in different shapes to fit the task at hand, and learn what it is that makes something a monolith (it has nothing to do with how many machines you deploy to). Conserve resources by performing background jobs with microservices. Deploy specialized microservices for registration, authentication, payment processing, e-mail, and more. Tune your services by defining appropriate service boundaries. Deploy your services effectively for continuous integration. Master debugging techniques that work across different services. You'll

finish with a deployable system and skills you can apply to your current project. Add the responsiveness and flexibility of microservices to your project, no matter what the size or complexity. What You Need: While the principles of this book transcend programming language, the code examples are in Node.js because JavaScript, for better or worse, is widely read. You'll use PostgreSQL for data storage, so familiarity with it is a plus. The book does provide Docker images to make working with PostgreSQL a bit easier, but extensive Docker knowledge is not required.

Summary Microservices in Action is a practical book about building and deploying microservice-based applications. Written for developers and architects with a solid grasp of service-oriented development, it tackles the challenge of putting microservices into production. Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the Technology Invest your time in designing great applications, improving infrastructure, and making the most out of your dev teams. Microservices are easier to write, scale, and maintain than traditional enterprise applications because they're built as a system of independent components. Master a few important new patterns and processes, and you'll be ready to develop, deploy, and run production-quality microservices. About the Book Microservices in Action teaches you how to write and maintain microservice-based applications. Created with day-to-day development in mind, this informative guide immerses you in real-world use cases from design to deployment. You'll discover how microservices enable an efficient continuous delivery pipeline, and explore examples using Kubernetes, Docker, and Google Container Engine. What's inside An overview of microservice architecture Building a delivery pipeline Best practices for designing multi-service transactions and queries Deploying with containers Monitoring your microservices About the Reader Written for intermediate developers familiar with enterprise architecture and cloud platforms like AWS and GCP. About the Author Morgan Bruce and Paulo A. Pereira are experienced engineering leaders. They work daily with microservices in a production environment, using the techniques detailed in this book. Table of Contents PART 1 - The lay of the land Designing and running microservices Microservices at SimpleBank PART 2 - Design Architecture of a microservice application Designing new features Transactions and queries in microservices Designing reliable services Building a reusable microservice framework PART 3 - Deployment Deploying microservices Deployment with containers and schedulers Building a delivery pipeline for microservices PART 4 - Observability and ownership Building a monitoring system Using logs and traces to understand behavior Building microservice teams

Distributed systems have become more fine-grained in the past 10 years, shifting from code-heavy monolithic applications to smaller, self-contained microservices. But developing these systems brings its own set of headaches. With lots of examples and practical advice, this book takes a holistic view of the topics that system architects and administrators must consider when building, managing, and evolving microservice architectures. Microservice technologies are moving quickly. Author Sam Newman provides you with a firm grounding in the concepts while diving into current solutions for modeling, integrating, testing, deploying, and monitoring your own autonomous services. You'll follow a fictional company throughout the book to learn how building a microservice architecture affects a single domain. Discover how microservices allow you to align your system design with your organization's goals Learn options for integrating a service with the rest of your system Take an incremental approach when splitting monolithic codebases Deploy individual microservices through continuous integration Examine the complexities of testing and monitoring distributed services Manage security with user-to-service and service-to-service models Understand the challenges of scaling microservice architectures

Spring Microservices in Action, Second Edition teaches you to build microservice-based applications using Java and Spring. Summary By dividing large applications into separate self-

contained units, Microservices are a great step toward reducing complexity and increasing flexibility. Spring Microservices in Action, Second Edition teaches you how to build microservice-based applications using Java and the Spring platform. This second edition is fully updated for the latest version of Spring, with expanded coverage of API routing with Spring Cloud Gateway, logging with the ELK stack, metrics with Prometheus and Grafana, security with the Hashicorp Vault, and modern deployment practices with Kubernetes and Istio. Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the technology Building and deploying microservices can be easy in Spring! Libraries like Spring Boot, Spring Cloud, and Spring Cloud Gateway reduce the boilerplate code in REST-based services. They provide an effective toolbox to get your microservices up and running on both public and private clouds. About the book Spring Microservices in Action, Second Edition teaches you to build microservice-based applications using Java and Spring. You'll start by creating basic services, then move to efficient logging and monitoring. Learn to refactor Java applications with Spring's intuitive tooling, and master API management with Spring Cloud Gateway. You'll even deploy Spring Cloud applications with AWS and Kubernetes. What's inside Microservice design principles and best practices Configuration with Spring Cloud Config and Hashicorp Vault Client-side resiliency with Resilience4j, and Spring Cloud Load Balancer Metrics monitoring with Prometheus and Grafana Distributed tracing with Spring Cloud Sleuth, Zipkin, and ELK Stack About the reader For experienced Java and Spring developers. About the author John Carnell is a senior cloud engineer with 20 years of Java experience. Illary Huaylupo Sánchez is a software engineer with over 13 years of experience. Table of Contents 1 Welcome to the cloud, Spring 2 Exploring the microservices world with Spring Cloud 3 Building microservices with Spring Boot 4 Welcome to Docker 5 Controlling your configuration with the Spring Cloud Configuration Server 6 On service discovery 7 When bad things happen: Resiliency patterns with Spring Cloud and Resilience4j 8 Service routing with Spring Cloud Gateway 9 Securing your microservices 10 Event-driven architecture with Spring Cloud Stream 11 Distributed tracing with Spring Cloud Sleuth and Zipkin 12 Deploying your microservices Learn how to build, test, secure, deploy, and efficiently consume services across distributed systems. Key Features - Explore the wealth of options provided by Spring Cloud for wiring service dependencies in microservice systems. - Create microservices utilizing Spring Cloud's Netflix OSS - Architect your cloud-native data using Spring Cloud. Book Description Developing, deploying, and operating cloud applications should be as easy as local applications. This should be the governing principle behind any cloud platform, library, or tool. Spring Cloud—an open-source library—makes it easy to develop JVM applications for the cloud. In this book, you will be introduced to Spring Cloud and will master its features from the application developer's point of view. This book begins by introducing you to microservices for Spring and the available feature set in Spring Cloud. You will learn to configure the Spring Cloud server and run the Eureka server to enable service registration and discovery. Then you will learn about techniques related to load balancing and circuit breaking and utilize all features of the Feign client. The book now delves into advanced topics where you will learn to implement distributed tracing solutions for Spring Cloud and build message-driven microservice architectures. Before running an application on Docker container s, you will master testing and securing techniques with Spring Cloud. What you will learn - Abstract Spring Cloud's feature set - Create microservices utilizing Spring Cloud's Netflix OSS - Create synchronous API microservices based on a message-driven architecture. - Explore advanced topics such as distributed tracing, security, and contract testing. - Manage and deploy applications on the production environment Who this book is for This book appeals to developers keen to take advantage of Spring cloud, an open source library which helps developers quickly build distributed systems. Knowledge of Java and Spring Framework will be

helpful, but no prior exposure to Spring Cloud is required.

Your one-stop guide to the common patterns and practices, showing you how to apply these using the Go programming language

About This Book This short, concise, and practical guide is packed with real-world examples of building microservices with Go It is easy to read and will benefit smaller teams who want to extend the functionality of their existing systems Using this practical approach will save your money in terms of maintaining a monolithic architecture and demonstrate capabilities in ease of use

Who This Book Is For You should have a working knowledge of programming in Go, including writing and compiling basic applications. However, no knowledge of RESTful architecture, microservices, or web services is expected. If you are looking to apply techniques to your own projects, taking your first steps into microservice architecture, this book is for you.

What You Will Learn Plan a microservice architecture and design a microservice Write a microservice with a RESTful API and a database Understand the common idioms and common patterns in microservices architecture Leverage tools and automation that helps microservices become horizontally scalable Get a grounding in containerization with Docker and Docker-Compose, which will greatly accelerate your development lifecycle Manage and secure Microservices at scale with monitoring, logging, service discovery, and automation Test microservices and integrate API tests in Go

In Detail Microservice architecture is sweeping the world as the de facto pattern to build web-based applications. Golang is a language particularly well suited to building them. Its strong community, encouragement of idiomatic style, and statically-linked binary artifacts make integrating it with other technologies and managing microservices at scale consistent and intuitive. This book will teach you the common patterns and practices, showing you how to apply these using the Go programming language. It will teach you the fundamental concepts of architectural design and RESTful communication, and show you patterns that provide manageable code that is supportable in development and at scale in production. We will provide you with examples on how to put these concepts and patterns into practice with Go. Whether you are planning a new application or working in an existing monolith, this book will explain and illustrate with practical examples how teams of all sizes can start solving problems with microservices. It will help you understand Docker and Docker-Compose and how it can be used to isolate microservice dependencies and build environments. We finish off by showing you various techniques to monitor, test, and secure your microservices. By the end, you will know the benefits of system resilience of a microservice and the advantages of Go stack.

Style and approach The step-by-step tutorial focuses on building microservices. Each chapter expands upon the previous one, teaching you the main skills and techniques required to be a successful microservice practitioner.

This book takes you through tried and tested approaches to building distributed systems and implementing microservices architecture. It follows a single real-world project from start to finish, using Spring Boot, Spring Cloud, and a full suite of related tools and frameworks for development, security, testing, and deployment.

Microservices are responsible for very tightly focused capabilities that are part of a more complex server-side software system. Microservices, when done well, are malleable, scalable, resilient, and allow a short lead time from start of implementation to deployment to production. When using microservices, the need for the technology to be lightweight and low ceremony grows, because creating new microservices needs to be quick and easy. OWIN is great for reuse of plumbing code and a lightweight web framework, like Nancy, is ideal.

Microservices in .NET Core teaches readers how to build and deploy secure and operations-friendly microservices using Nancy. The book starts with an

introduction to the microservices architectural style. Next, readers learn important practical aspects of developing microservices from simple core concepts to more sophisticated. Throughout the book, readers will see many code examples implementing it with lightweight .NET technologies' most prominently Nancy. By the end, they'll be able to quickly and easily build reliable and operations-friendly microservices using Nancy, OWIN and other open technologies. Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications.

This book teaches you how to evaluate a distributed system from the perspective of immutable objects. You will understand the problems in existing designs, know how to make small modifications to correct those problems, and learn to apply the principles of immutable architecture to your tools. Most software components focus on the state of objects. They store the current state of a row in a relational database. They track changes to state over time, making several basic assumptions: there is a single latest version of each object, the state of an object changes sequentially, and a system of record exists. This is a challenge when it comes to building distributed systems. Whether dealing with autonomous microservices or disconnected mobile apps, many of the problems we try to solve come down to synchronizing an ever-changing state between isolated components. Distributed systems would be a lot easier to build if objects could not change. After reading *The Art of Immutable Architecture*, you will come away with an understanding of the benefits of using immutable objects in your own distributed systems. You will learn a set of rules for identifying and exchanging immutable objects, and see a collection of useful theorems that emerges and ensures that the distributed systems we build are eventually consistent. Using patterns, you will find where the truth converges, see how changes are associative, rather than sequential, and come to feel comfortable understanding that there is no longer a single source of truth. Practical hands-on examples reinforce how to build software using the described patterns, techniques, and tools. By the end, you will possess the language and resources needed to analyze and construct distributed systems with confidence. The assumptions of the past were sufficient for building single-user, single-computer systems. But as we expand to multiple devices, shared experiences, and cloud computing, they work against us. It is time for a new set of assumptions. Start with immutable objects, and build better distributed systems.

What You Will Learn

- Evaluate a distributed system from the perspective of immutable objects
- Recognize the problems in existing designs, and make small modifications to correct them
- Start a new system from scratch, applying patterns
- Apply the principles of immutable architecture to your tools, including SQL databases, message queues, and the network protocols that you already use
- Discover new tools that natively apply these principles

Who This Book Is For Software architects and senior developers. It contains examples in SQL and languages such as JavaScript and C#. Past experience with distributed computing, data modeling, or business analysis is

helpful.

An effective guide to learning how to build a large-scale distributed application using the wide range of functionalities in Gin Key Features Explore the commonly used functionalities of Gin to build web applications Become well-versed with rendering HTML templates with the Gin engine Solve commonly occurring challenges such as scaling, caching, and deployment Book Description Gin is a high-performance HTTP web framework used to build web applications and microservices in Go. This book is designed to teach you the ins and outs of the Gin framework with the help of practical examples. You'll start by exploring the basics of the Gin framework, before progressing to build a real-world RESTful API. Along the way, you'll learn how to write custom middleware and understand the routing mechanism, as well as how to bind user data and validate incoming HTTP requests. The book also demonstrates how to store and retrieve data at scale with a NoSQL database such as MongoDB, and how to implement a caching layer with Redis. Next, you'll understand how to secure and test your API endpoints with authentication protocols such as OAuth 2 and JWT. Later chapters will guide you through rendering HTML templates on the server-side and building a frontend application with the React web framework to consume API responses. Finally, you'll deploy your application on Amazon Web Services (AWS) and learn how to automate the deployment process with a continuous integration/continuous delivery (CI/CD) pipeline. By the end of this Gin book, you will be able to design, build, and deploy a production-ready distributed application from scratch using the Gin framework. What you will learn Build a production-ready REST API with the Gin framework Scale web applications with event-driven architecture Use NoSQL databases for data persistence Set up authentication middleware with JWT and Auth0 Deploy a Gin-based RESTful API on AWS with Docker and Kubernetes Implement a CI/CD workflow for Gin web apps Who this book is for This book is for Go developers who are comfortable with the Go language and seeking to learn REST API design and development with the Gin framework. Beginner-level knowledge of the Go programming language is required to make the most of this book.

Microservices can have a positive impact on your enterprise—just ask Amazon and Netflix—but you can fall into many traps if you don't approach them in the right way. This practical guide covers the entire microservices landscape, including the principles, technologies, and methodologies of this unique, modular style of system building. You'll learn about the experiences of organizations around the globe that have successfully adopted microservices. In three parts, this book explains how these services work and what it means to build an application the Microservices Way. You'll explore a design-based approach to microservice architecture with guidance for implementing various elements. And you'll get a set of recipes and practices for meeting practical, organizational, and cultural challenges to microservice adoption. Learn how microservices can help you drive business objectives Examine the principles, practices, and culture that

define microservice architectures Explore a model for creating complex systems and a design process for building a microservice architecture Learn the fundamental design concepts for individual microservices Delve into the operational elements of a microservices architecture, including containers and service discovery Discover how to handle the challenges of introducing microservice architecture in your organization

Summary Spring Microservices in Action teaches you how to build microservice-based applications using Java and the Spring platform. Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the technology Microservices break up your code into small, distributed, and independent services that require careful forethought and design. Fortunately, Spring Boot and Spring Cloud simplify your microservice applications, just as the Spring Framework simplifies enterprise Java development. Spring Boot removes the boilerplate code involved with writing a REST-based service. Spring Cloud provides a suite of tools for the discovery, routing, and deployment of microservices to the enterprise and the cloud. About the Book Spring Microservices in Action teaches you how to build microservice-based applications using Java and the Spring platform. You'll learn to do microservice design as you build and deploy your first Spring Cloud application. Throughout the book, carefully selected real-life examples expose microservice-based patterns for configuring, routing, scaling, and deploying your services. You'll see how Spring's intuitive tooling can help augment and refactor existing applications with micro services. What's Inside Core microservice design principles Managing configuration with Spring Cloud Config Client-side resiliency with Spring, Hystrix, and Ribbon Intelligent routing using Netflix Zuul Deploying Spring Cloud applications About the Reader This book is written for developers with Java and Spring experience. About the Author John Carnell is a senior cloud engineer with twenty years of experience in Java. Table of contents Welcome to the cloud, Spring Building microservices with Spring Boot Controlling your configuration with Spring Cloud configuration server On service discovery When bad things happen: client resiliency patterns with Spring Cloud and Netflix Hystrix Service routing with Spring Cloud and Zuul Securing your microservices Event-driven architecture with Spring Cloud Stream Distributed tracing with Spring Cloud Sleuth and Zipkin Deploying your microservices

Most applications today are distributed in some fashion. Monitoring the health and performance of these distributed architectures requires a new approach. Enter distributed tracing, a method of profiling and monitoring applications—especially those that use microservice architectures. There's just one problem: distributed tracing can be hard. But it doesn't have to be. With this practical guide, you'll learn what distributed tracing is and how to use it to understand the performance and operation of your software. Key players at Lightstep walk you through instrumenting your code for tracing, collecting the data that your instrumentation produces, and turning it into useful, operational

insights. If you want to start implementing distributed tracing, this book tells you what you need to know. You'll learn: The pieces of a distributed tracing deployment: Instrumentation, data collection, and delivering value Best practices for instrumentation (the methods for generating trace data from your service) How to deal with or avoid overhead, costs, and sampling How to work with spans (the building blocks of request-based distributed traces) and choose span characteristics that lead to valuable traces Where distributed tracing is headed in the future

Apply microservices patterns to build resilient and scalable distributed systems
Key Features Understand the challenges of building large-scale microservice landscapes Build cloud-native production-ready microservices with this comprehensive guide Discover how to get the best out of Spring Cloud, Kubernetes, and Istio when used together Book Description Microservices architecture allows developers to build and maintain applications with ease, and enterprises are rapidly adopting it to build software using Spring Boot as their default framework. With this book, you'll learn how to efficiently build and deploy microservices using Spring Boot. This microservices book will take you through tried and tested approaches to building distributed systems and implementing microservices architecture in your organization. Starting with a set of simple cooperating microservices developed using Spring Boot, you'll learn how you can add functionalities such as persistence, make your microservices reactive, and describe their APIs using Swagger/OpenAPI. As you advance, you'll understand how to add different services from Spring Cloud to your microservice system. The book also demonstrates how to deploy your microservices using Kubernetes and manage them with Istio for improved security and traffic management. Finally, you'll explore centralized log management using the EFK stack and monitor microservices using Prometheus and Grafana. By the end of this book, you'll be able to build microservices that are scalable and robust using Spring Boot and Spring Cloud. What you will learn Build reactive microservices using Spring Boot Develop resilient and scalable microservices using Spring Cloud Use OAuth 2.0/OIDC and Spring Security to protect public APIs Implement Docker to bridge the gap between development, testing, and production Deploy and manage microservices using Kubernetes Apply Istio for improved security, observability, and traffic management Who this book is for This book is for Java and Spring developers and architects who want to learn how to break up their existing monoliths into microservices and deploy them either on-premises or in the cloud using Kubernetes as a container orchestrator and Istio as a service Mesh. No familiarity with microservices architecture is required to get started with this book.

Building Microservices Designing Fine-Grained Systems"O'Reilly Media, Inc."
Developers often struggle when first encountering the cloud. Learning about distributed systems, becoming familiar with technologies such as containers and functions, and knowing how to put everything together can be daunting. With this practical guide, you'll get up to

speed on patterns for building cloud native applications and best practices for common tasks such as messaging, eventing, and DevOps. Authors Boris Scholl, Trent Swanson, and Peter Jausovec describe the architectural building blocks for a modern cloud native application. You'll learn how to use microservices, containers, serverless computing, storage types, portability, and functions. You'll also explore the fundamentals of cloud native applications, including how to design, develop, and operate them. Explore the technologies you need to design a cloud native application Distinguish between containers and functions, and learn when to use them Architect applications for data-related requirements Learn DevOps fundamentals and practices for developing, testing, and operating your applications Use tips, techniques, and best practices for building and managing cloud native applications Understand the costs and trade-offs necessary to make an application portable

This is the book for Gophers who want to learn how to build distributed systems. You know the basics of Go and are eager to put your knowledge to work. Build distributed services that are highly available, resilient, and scalable. This book is just what you need to apply Go to real-world situations. Level up your engineering skills today. Take your Go skills to the next level by learning how to design, develop, and deploy a distributed service. Start from the bare essentials of storage handling, then work your way through networking a client and server, and finally to distributing server instances, deployment, and testing. All this will make coding in your day job or side projects easier, faster, and more fun. Create your own distributed services and contribute to open source projects. Build networked, secure clients and servers with gRPC. Gain insights into your systems and debug issues with observable services instrumented with metrics, logs, and traces. Operate your own Certificate Authority to authenticate internal web services with TLS. Automatically handle when nodes are added or removed to your cluster with service discovery. Coordinate distributed systems with replicated state machines powered by the Raft consensus algorithm. Lay out your applications and libraries to be modular and easy to maintain. Write CLIs to configure and run your applications. Run your distributed system locally and deploy to the cloud with Kubernetes. Test and benchmark your applications to ensure they're correct and fast. Dive into writing Go and join the hundreds of thousands who are using it to build software for the real world. What You Need: Go 1.13+ and Kubernetes 1.16+

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.

44 reusable patterns to develop and deploy reliable production-quality microservices-based

applications, with worked examples in Java Key Features 44 design patterns for building and deploying microservices applications Drawing on decades of unique experience from author and microservice architecture pioneer Chris Richardson A pragmatic approach to the benefits and the drawbacks of microservices architecture Solve service decomposition, transaction management, and inter-service communication Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About The Book Microservices Patterns teaches you 44 reusable patterns to reliably develop and deploy production-quality microservices-based applications. This invaluable set of design patterns builds on decades of distributed system experience, adding new patterns for composing services into systems that scale and perform under real-world conditions. More than just a patterns catalog, this practical guide with worked examples offers industry-tested advice to help you design, implement, test, and deploy your microservices-based application. What You Will Learn How (and why!) to use microservices architecture Service decomposition strategies Transaction management and querying patterns Effective testing strategies Deployment patterns This Book Is Written For Written for enterprise developers familiar with standard enterprise application architecture. Examples are in Java. About The Author Chris Richardson is a Java Champion, a JavaOne rock star, author of Manning's POJOs in Action, and creator of the original CloudFoundry.com. Table of Contents Escaping monolithic hell Decomposition strategies Interprocess communication in a microservice architecture Managing transactions with sagas Designing business logic in a microservice architecture Developing business logic with event sourcing Implementing queries in a microservice architecture External API patterns Testing microservices: part 1 Testing microservices: part 2 Developing production-ready services Deploying microservices Refactoring to microservices Architect your .NET applications by breaking them into really small pieces—microservices—using this practical, example-based guide About This Book Start your microservices journey and understand a broader perspective of microservices development Build, deploy, and test microservices using ASP.Net MVC, Web API, and Microsoft Azure Cloud Get started with reactive microservices and understand the fundamentals behind it Who This Book Is For This book is for .NET Core developers who want to learn and understand microservices architecture and implement it in their .NET Core applications. It's ideal for developers who are completely new to microservices or have just a theoretical understanding of this architectural approach and want to gain a practical perspective in order to better manage application complexity. What You Will Learn Compare microservices with monolithic applications and SOA Identify the appropriate service boundaries by mapping them to the relevant bounded contexts Define the service interface and implement the APIs using ASP.NET Web API Integrate the services via synchronous and asynchronous mechanisms Implement microservices security using Azure Active Directory, OpenID Connect, and OAuth 2.0 Understand the operations and scaling of microservices in .NET Core Understand the testing pyramid and implement consumer-driven contract using pact net core Understand what the key features of reactive microservices are and implement them using reactive extension In Detail Microservices is an architectural style that promotes the development of complex applications as a suite of small services based on business capabilities. This book will help you identify the appropriate service boundaries within the business. We'll start by looking at what microservices are, and what the main characteristics are. Moving forward, you will be introduced to real-life application scenarios, and after assessing the current issues, we will begin the journey of transforming this application by splitting it into a suite of microservices. You will identify the service boundaries, split the application into multiple microservices, and define the service contracts. You will find out how to configure, deploy, and monitor microservices, and configure scaling to allow the application to quickly adapt to increased demand in the future. With an introduction to the reactive microservices, you strategically gain further value to keep your code base simple,

focusing on what is more important rather than the messy asynchronous calls. Style and approach This guide serves as a stepping stone that helps .NET Core developers in their microservices architecture. This book provides just enough theory to understand the concepts and apply the examples.

“For software developers of all experience levels looking to improve their results, and design and implement domain-driven enterprise applications consistently with the best current state of professional practice, Implementing Domain-Driven Design will impart a treasure trove of knowledge hard won within the DDD and enterprise application architecture communities over the last couple decades.” –Randy Stafford, Architect At-Large, Oracle Coherence Product Development “This book is a must-read for anybody looking to put DDD into practice.” –Udi Dahan, Founder of NServiceBus Implementing Domain-Driven Design presents a top-down approach to understanding domain-driven design (DDD) in a way that fluently connects strategic patterns to fundamental tactical programming tools. Vaughn Vernon couples guided approaches to implementation with modern architectures, highlighting the importance and value of focusing on the business domain while balancing technical considerations. Building on Eric Evans’ seminal book, Domain-Driven Design, the author presents practical DDD techniques through examples from familiar domains. Each principle is backed up by realistic Java examples—all applicable to C# developers—and all content is tied together by a single case study: the delivery of a large-scale Scrum-based SaaS system for a multitenant environment. The author takes you far beyond “DDD-lite” approaches that embrace DDD solely as a technical toolset, and shows you how to fully leverage DDD’s “strategic design patterns” using Bounded Context, Context Maps, and the Ubiquitous Language. Using these techniques and examples, you can reduce time to market and improve quality, as you build software that is more flexible, more scalable, and more tightly aligned to business goals. Coverage includes Getting started the right way with DDD, so you can rapidly gain value from it Using DDD within diverse architectures, including Hexagonal, SOA, REST, CQRS, Event-Driven, and Fabric/Grid-Based Appropriately designing and applying Entities—and learning when to use Value Objects instead Mastering DDD’s powerful new Domain Events technique Designing Repositories for ORM, NoSQL, and other databases

Annotation Over the past 10 years, distributed systems have become more fine-grained. From the large multi-million line long monolithic applications, we are now seeing the benefits of smaller self-contained services. Rather than heavy-weight, hard to change Service Oriented Architectures, we are now seeing systems consisting of collaborating microservices. Easier to change, deploy, and if required retire, organizations which are in the right position to take advantage of them are yielding significant benefits. This book takes an holistic view of the things you need to be cognizant of in order to pull this off. It covers just enough understanding of technology, architecture, operations and organization to show you how to move towards finer-grained systems.

"Spring expert Kevin Bowersox offers a clear and practical path to building and deploying microservices in this detailed look at the Spring software components used to create those systems. This is a hands-on course designed for intermediate level Java developers. You'll review the meaning of microservice architecture and distributed systems; learn the basics of using Spring Boot and Spring Cloud; learn to use the Spring-based toolsets for service discovery, service registry, routing, load balancing, and fault tolerance; see how Spring Cloud makes it easier to access Netflix components; and build a small scale microservices project of your own."--Resource description page.

Software services are established as a programming concept, but their impact on the overall architecture of enterprise IT and business operations is not well-understood. This has led to problems in deploying SOA, and some

disillusionment. The SOA Source Book adds to this a collection of reference material for SOA. It is an invaluable resource for enterprise architects working with SOA. The SOA Source Book will help enterprise architects to use SOA effectively. It explains: What SOA is How to evaluate SOA features in business terms How to model SOA How to use The Open Group Architecture Framework (TOGAF™) for SOA SOA governance This book explains how TOGAF can help to make an Enterprise Architecture. Enterprise Architecture is an approach that can help management to understand this growing complexity.

Explore different aspects of building modular microservices such as development, testing, maintenance, and deployment using the Micronaut framework Key Features Learn how to build scalable, fast, and resilient microservices with this concise guide Explore the many advantages of using reflection-free, compile-time dependency injections and aspect-oriented programming Build cloud-native applications easily with the Micronaut framework Book Description The open source Micronaut® framework is a JVM-based toolkit designed to create microservices quickly and easily. This book will help full-stack and Java developers build modular, high-performing, and reactive microservice-based apps using the Micronaut framework. You'll start by building microservices and learning about the core components, such as ahead-of-time compilation, reflection-less dependency injection, and reactive baked-in HTTP clients and servers. Next, you will work on a real-time microservice application and learn how to integrate Micronaut projects with different kinds of relational and non-relational databases. You'll also learn how to employ different security mechanisms to safeguard your microservices and integrate microservices using event-driven architecture in the Apache Kafka ecosystem. As you advance, you'll get to grips with automated testing and popular testing tools. The book will help you understand how you can easily handle microservice concerns in Micronaut projects, such as service discovery, API documentation, distributed configuration management, fallbacks, and circuit breakers. Finally, you'll explore the deployment and maintenance aspects of microservices and get up to speed with the Internet of Things (IoT) using the Framework. By the end of this book, you'll be able to build, test, deploy, and maintain your own microservice apps using the framework. What you will learn Understand why the Micronaut framework is best suited for building microservices Build web endpoints and services in the Micronaut framework Safeguard microservices using Session, JWT, and OAuth in Micronaut projects Get to grips with event-driven architecture in Micronaut applications Discover how to automate testing at various levels using built-in tools and testing frameworks Deploy your microservices to containers and cloud platforms Become well-versed with distributed logging, tracing, and monitoring in Micronaut projects Get hands-on with the IoT using Alexa and the Micronaut framework Who this book is for This book is for developers who have been building microservices on traditional frameworks such as Spring Boot and are looking for a faster alternative. Intermediate-level knowledge of Java

programming and implementing web services development in Java is required. One of the biggest challenges for organizations that have adopted microservice architecture is the lack of architectural, operational, and organizational standardization. After splitting a monolithic application or building a microservice ecosystem from scratch, many engineers are left wondering what's next. In this practical book, author Susan Fowler presents a set of microservice standards in depth, drawing from her experience standardizing over a thousand microservices at Uber. You'll learn how to design microservices that are stable, reliable, scalable, fault tolerant, performant, monitored, documented, and prepared for any catastrophe. Explore production-readiness standards, including: Stability and Reliability: develop, deploy, introduce, and deprecate microservices; protect against dependency failures Scalability and Performance: learn essential components for achieving greater microservice efficiency Fault Tolerance and Catastrophe Preparedness: ensure availability by actively pushing microservices to fail in real time Monitoring: learn how to monitor, log, and display key metrics; establish alerting and on-call procedures Documentation and Understanding: mitigate tradeoffs that come with microservice adoption, including organizational sprawl and technical debt

As organizations shift from monolithic applications to smaller, self-contained microservices, distributed systems have become more fine-grained. But developing these new systems brings its own host of problems. This expanded second edition takes a holistic view of topics that you need to consider when building, managing, and scaling microservices architectures. Through clear examples and practical advice, author Sam Newman gives everyone from architects and developers to testers and IT operators a firm grounding in the concepts. You'll dive into the latest solutions for modeling, integrating, testing, deploying, and monitoring your own autonomous services. Real-world cases reveal how organizations today manage to get the most out of these architectures. Microservices technologies continue to move quickly. This book brings you up to speed. Get new information on user interfaces, container orchestration, and serverless Align system design with your organization's goals Explore options for integrating a service with your system Understand how to independently deploy microservices Examine the complexities of testing and monitoring distributed services Manage security with expanded content around user-to-service and service-to-service models

Data is at the center of many challenges in system design today. Difficult issues need to be figured out, such as scalability, consistency, reliability, efficiency, and maintainability. In addition, we have an overwhelming variety of tools, including relational databases, NoSQL datastores, stream or batch processors, and message brokers. What are the right choices for your application? How do you make sense of all these buzzwords? In this practical and comprehensive guide, author Martin Kleppmann helps you navigate this diverse landscape by examining the pros and cons of various technologies for processing and storing

data. Software keeps changing, but the fundamental principles remain the same. With this book, software engineers and architects will learn how to apply those ideas in practice, and how to make full use of data in modern applications. Peer under the hood of the systems you already use, and learn how to use and operate them more effectively Make informed decisions by identifying the strengths and weaknesses of different tools Navigate the trade-offs around consistency, scalability, fault tolerance, and complexity Understand the distributed systems research upon which modern databases are built Peek behind the scenes of major online services, and learn from their architectures Build Java-based microservices architecture using the Spring Boot 3 framework by evolving an application from a small monolith to an event-driven architecture composed of several services. This revised book follows an incremental approach in teaching the structure of microservices, test-driven development, Eureka, Ribbon, Zuul, and end-to-end tests with Cucumber. This updated book now covers what's been added to the new Spring Boot 3 release, including support for the latest Java SE LTS; changes to the Stream Editor UI; Maven preemptive authentication; building Docker images using cloud-native build packs; building layered jars for optimized Docker images; E2E traceability for configuration properties; many dependency upgrades; support for Spring Data Neumann; and more. Author Moises Macero uses a pragmatic approach to explain the benefits of using this type of software architecture, instead of keeping you distracted with theoretical concepts. He covers some of the state-of-the-art techniques in computer programming, from a practical point of view. You'll focus on what's important, starting with the minimum viable product but keeping the flexibility to evolve it. What You Will Learn Build microservices with Spring Boot 3 Use event-driven architecture and messaging with RabbitMQ Master service discovery with Eureka and load balancing with Ribbon Route requests with Zuul as your API gateway Write end-to-end tests for an event-driven architecture using Cucumber Carry out continuous integration and deployment Who This Book Is For Those with at least some prior experience with Java programming. Some prior exposure to Spring Boot recommended but not required.

The Comprehensive, Proven Approach to IT Scalability—Updated with New Strategies, Technologies, and Case Studies In The Art of Scalability, Second Edition, leading scalability consultants Martin L. Abbott and Michael T. Fisher cover everything you need to know to smoothly scale products and services for any requirement. This extensively revised edition reflects new technologies, strategies, and lessons, as well as new case studies from the authors' pioneering consulting practice, AKF Partners. Writing for technical and nontechnical decision-makers, Abbott and Fisher cover everything that impacts scalability, including architecture, process, people, organization, and technology. Their insights and recommendations reflect more than thirty years of experience at companies ranging from eBay to Visa, and Salesforce.com to Apple. You'll find updated strategies for structuring organizations to maximize agility and

scalability, as well as new insights into the cloud (IaaS/PaaS) transition, NoSQL, DevOps, business metrics, and more. Using this guide's tools and advice, you can systematically clear away obstacles to scalability—and achieve unprecedented IT and business performance. Coverage includes

- Why scalability problems start with organizations and people, not technology, and what to do about it
- Actionable lessons from real successes and failures
- Staffing, structuring, and leading the agile, scalable organization
- Scaling processes for hyper-growth environments
- Architecting scalability: proprietary models for clarifying needs and making choices—including 15 key success principles
- Emerging technologies and challenges: data cost, datacenter planning, cloud evolution, and customer-aligned monitoring
- Measuring availability, capacity, load, and performance

Microservices is an architectural style in which large, complex software applications are composed of one or more smaller services. Each of these microservices focuses on completing one task that represents a small business capability. These microservices can be developed in any programming language. They communicate with each other using language-neutral protocols, such as Representational State Transfer (REST), or messaging applications, such as IBM® MQ Light. This IBM Redbooks® publication gives a broad understanding of this increasingly popular architectural style, and provides some real-life examples of how you can develop applications using the microservices approach with IBM Bluemix™. The source code for all of these sample scenarios can be found on GitHub (<https://github.com/>). The book also presents some case studies from IBM products. We explain the architectural decisions made, our experiences, and lessons learned when redesigning these products using the microservices approach. Information technology (IT) professionals interested in learning about microservices and how to develop or redesign an application in Bluemix using microservices can benefit from this book.

Microservices architectures offer faster change speeds, better scalability, and cleaner, evolvable system designs. But implementing your first microservices architecture is difficult. How do you make myriad choices, educate your team on all the technical details, and navigate the organization to a successful execution to maximize your chance of success? With this book, authors Ronnie Mitra and Irakli Nadareishvili provide step-by-step guidance for building an effective microservices architecture. Architects and engineers will follow an implementation journey based on techniques and architectures that have proven to work for microservices systems. You'll build an operating model, a microservices design, an infrastructure foundation, and two working microservices, then put those pieces together as a single implementation. For anyone tasked with building microservices or a microservices architecture, this guide is invaluable. Learn an effective and explicit end-to-end microservices system design

- Define teams, their responsibilities, and guidelines for working together
- Understand how to slice a big application into a collection of microservices
- Examine how to isolate and embed data into corresponding microservices
- Build a simple yet powerful CI/CD pipeline for infrastructure changes
- Write code for sample microservices
- Deploy a

working microservices application on Amazon Web Services

Many companies, from startups to Fortune 500 companies alike, use Node.js to build performant backend services. And engineers love Node.js for its approachable API and familiar syntax. Backed by the world's largest package repository, Node's enterprise foothold is only expected to grow. In this hands-on guide, author Thomas Hunter II proves that Node.js is just as capable as traditional enterprise platforms for building services that are observable, scalable, and resilient. Intermediate to advanced Node.js developers will find themselves integrating application code with a breadth of tooling from each layer of a modern service stack. Learn why running redundant copies of the same Node.js service is necessary Know which protocol to choose, depending on the situation Fine-tune your application containers for use in production Track down errors in a distributed setting to determine which service is at fault Simplify app code and increase performance by offloading work to a reverse proxy Build dashboards to monitor service health and throughput Find out why so many different tools are required when operating in an enterprise environment

Reactive programming is a better, scalable, and faster way to build applications, and one that helps us write code that is concise, clear, and readable. It can be used for many purposes such as GUIs, robotics, music, and more, and is central to many concurrent systems. This book will be your guide to getting started with Reactive programming ...

Organizations today often struggle to balance business requirements with ever-increasing volumes of data. Additionally, the demand for leveraging large-scale, real-time data is growing rapidly among the most competitive digital industries. Conventional system architectures may not be up to the task. With this practical guide, you'll learn how to leverage large-scale data usage across the business units in your organization using the principles of event-driven microservices. Author Adam Bellemare takes you through the process of building an event-driven microservice-powered organization. You'll reconsider how data is produced, accessed, and propagated across your organization. Learn powerful yet simple patterns for unlocking the value of this data. Incorporate event-driven design and architectural principles into your own systems. And completely rethink how your organization delivers value by unlocking near-real-time access to data at scale. You'll learn: How to leverage event-driven architectures to deliver exceptional business value The role of microservices in supporting event-driven designs Architectural patterns to ensure success both within and between teams in your organization Application patterns for developing powerful event-driven microservices Components and tooling required to get your microservice ecosystem off the ground

Quickly learn and employ practical methods for developing microservices Key Features Get to grips with microservice architecture to build enterprise-ready applications Adopt the best practices to find solutions to specific problems Monitor and manage your services in production Book Description Microservices have become a popular way to build distributed systems that power modern web and mobile apps. Deploying your application as a suite of independently deployable, modular, and scalable services has many benefits. In this book, you'll learn to employ microservices in order to make your application more fault-tolerant and easier to scale and change. Using an example-driven approach, *Microservice Development Cookbook* introduces you to the

microservice architectural style. You'll learn how to transition from a traditional monolithic application to a suite of small services that interact to provide smooth functionality to your client applications. You'll also learn about the patterns used to organize services, so you can optimize request handling and processing and see how to handle service-to-service interactions. You'll then move on to understanding how to secure microservices and add monitoring in order to debug problems. This book also covers fault-tolerance and reliability patterns that help you use microservices to isolate failures in your applications. By the end of the book, you'll be able to work with a team to break a large, monolithic codebase into independently deployable and scalable microservices. You'll also study how to efficiently and effortlessly manage a microservice-based architecture. What you will learn

- Learn how to design microservice-based systems
- Create services that fail without impacting users
- Monitor your services to perform debugging and create observable systems
- Manage the security of your services
- Create fast and reliable deployment pipelines
- Manage multiple environments for your services
- Simplify the local development of microservice-based systems

Who this book is for *Microservice Development Cookbook* is for developers who would like to build effective and scalable microservices. Basic knowledge of the microservices architecture is assumed.

How do you detangle a monolithic system and migrate it to a microservice architecture? How do you do it while maintaining business-as-usual? As a companion to Sam Newman's extremely popular *Building Microservices*, this new book details a proven method for transitioning an existing monolithic system to a microservice architecture. With many illustrative examples, insightful migration patterns, and a bevy of practical advice to transition your monolith enterprise into a microservice operation, this practical guide covers multiple scenarios and strategies for a successful migration, from initial planning all the way through application and database decomposition. You'll learn several tried and tested patterns and techniques that you can use as you migrate your existing architecture. Ideal for organizations looking to transition to microservices, rather than rebuild

- Helps companies determine whether to migrate, when to migrate, and where to begin
- Addresses communication, integration, and the migration of legacy systems
- Discusses multiple migration patterns and where they apply
- Provides database migration examples, along with synchronization strategies
- Explores application decomposition, including several architectural refactoring patterns
- Delves into details of database decomposition, including the impact of breaking referential and transactional integrity, new failure modes, and more

Learn to develop, test, and deploy your Spring Boot distributed application and explore various best practices. Key Features

- Build and deploy your microservices architecture in the cloud
- Build event-driven resilient systems using Hystrix and Turbine
- Explore API management tools such as KONG and API documentation tools such as Swagger

Book Description Spring is one of the best frameworks on the market for developing web, enterprise, and cloud ready software. Spring Boot simplifies the building of complex software dramatically by reducing the amount of boilerplate code, and by providing production-ready features and a simple deployment model. This book will address the challenges related to power that come with Spring Boot's great configurability and flexibility. You will understand how Spring Boot configuration works under the hood, how to overwrite default configurations, and how to use advanced techniques to

prepare Spring Boot applications to work in production. This book will also introduce readers to a relatively new topic in the Spring ecosystem – cloud native patterns, reactive programming, and applications. Get up to speed with microservices with Spring Boot and Spring Cloud. Each chapter aims to solve a specific problem or teach you a useful skillset. By the end of this book, you will be proficient in building and deploying your Spring Boot application. What you will learn

- Build logically structured and highly maintainable Spring Boot applications
- Configure RESTful microservices using Spring Boot
- Make the application production and operation-friendly with Spring Actuator
- Build modern, high-performance distributed applications using cloud patterns
- Manage and deploy your Spring Boot application to the cloud (AWS)
- Monitor distributed applications using log aggregation and ELK

Who this book is for The book is targeted at experienced Spring and Java developers who have a basic knowledge of working with Spring Boot. The reader should be familiar with Spring Boot basics, and aware of its benefits over traditional Spring Framework-based applications.

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