

Building Microservices

Building Microservices Building Microservices A Guide to Modern Architecture The world of software development is constantly evolving and one of the most significant shifts in recent years has been the move towards microservices architecture. This approach breaks down monolithic applications into smaller independent services that communicate with each other. But why all the fuss? Why are microservices the new hot topic in the world of software development? Let's dive into the world of microservices and explore its benefits, challenges, and how you can get started with building your own microservices.

The Rise of Microservices Why the Hype Gone are the days of giant monolithic applications that were difficult to maintain, scale, and update. Microservices offer a more modular and agile approach, allowing developers to build and deploy independent services at lightning speed. Here's why microservices are gaining so much traction:

- Increased Agility** With microservices, teams can focus on smaller independent units of functionality, leading to faster development cycles and quicker deployment times.
- Improved Scalability** Scaling individual microservices is easier than scaling a monolithic application. You can scale only the services that need more resources, optimizing your infrastructure and reducing costs.
- Enhanced Resilience** If one service fails, the rest of your application can continue to function, leading to improved system stability and uptime.
- Technology Diversity** Different microservices can be built using different technologies, allowing developers to choose the best tools for the job, fostering innovation and flexibility.
- Independent Deployment** You can deploy and update individual services without affecting other parts of the application, minimizing downtime and enabling continuous delivery.

Navigating the Microservices Landscape: Challenges and Considerations While microservices offer significant benefits, they also come with their own set of challenges:

- Increased Complexity** Managing multiple services, their dependencies, and communication protocols can be complex and require careful planning and orchestration.
- Distributed Systems Challenges** Debugging, monitoring, and tracing issues across distributed services can be more challenging than in monolithic applications.
- Communication Overhead** Services need to communicate with each other, adding network latency and potential performance bottlenecks.
- Data Consistency** Maintaining data consistency across multiple services can be complex, especially when dealing with transactions that span multiple services. Despite these challenges, the benefits of microservices often outweigh the complexities.

By carefully considering these challenges and implementing appropriate strategies, you can successfully adopt microservices and reap their rewards.

Building Your Own Microservices: A Step-by-Step Guide Now that we've discussed the benefits and challenges, let's dive into the practical

aspects of building microservices

- 1 Define Your Services Start by breaking down your application into smaller independent services with welldefined boundaries and responsibilities
- 2 Choose a Communication Protocol Determine how your services will communicate with each other Popular options include REST APIs gRPC or message queues
- 3 Select a Technology Stack Choose the right programming languages frameworks and libraries for each service based on its specific requirements
- 4 Implement Service Discovery and Load Balancing Ensure your services can find each other and distribute traffic effectively
- 5 Design for Fault Tolerance Implement strategies to handle failures and ensure that your application remains resilient
- 6 Build Monitoring and Logging Monitor your services performance and health log events and implement error tracking for troubleshooting
- 7 Test Thoroughly Test individual services and their interactions to ensure proper functionality and performance
- 8 Deploy and Manage Choose a suitable containerization and orchestration platform for deploying and managing your microservices

Essential Tools for Building Microservices

Containerization Docker and Kubernetes are popular tools for containerizing your microservices and managing their deployment

3 Communication REST APIs gRPC and message queues like Kafka or RabbitMQ are commonly used for service communication

Service Discovery Tools like Consul Eureka or Zookeeper help services find each other

Monitoring and Logging Prometheus Grafana and ELK stack are powerful tools for monitoring and logging

Testing Frameworks like JUnit Mocha or Jest can be used for unit testing and integration testing

Conclusion Microservices architecture is a powerful approach to building modern scalable and agile applications By embracing microservices you can unlock new levels of efficiency flexibility and innovation While there are challenges to overcome the potential benefits are undeniable As you navigate the world of microservices remember to carefully plan choose the right tools and embrace a culture of continuous learning and improvement

FAQs

- 1 Is microservices architecture suitable for all applications Not necessarily If your application is simple and does not require high scalability or complex features a monolithic architecture might be a better fit
- 2 How do I choose the right microservices for my application Consider the functionality of your application and break it down into smaller independent services with clearly defined responsibilities
- 3 What are some examples of companies using microservices Amazon Netflix Uber and Spotify are just a few examples of companies successfully using microservices
- 4 Is it difficult to migrate from a monolithic architecture to microservices Yes migration can be complex and require careful planning but its often a worthwhile investment in the long run
- 5 What are the future trends in microservices architecture Serverless computing edge computing and artificial intelligence are expected to play a significant role in shaping the future of microservices

Building Microservices with SpringPractical Serverless and Microservices with C#Microservices with Spring Boot and Spring CloudSpring System Design in

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learn and use the design patterns and best practices in spring to solve common design problems and build user friendly microservices key features study the benefits of using the right design pattern in your toolkit manage your code easily with spring s dependency injection pattern explore the features of docker and mesos to build successful microservices book description getting started with spring microservices begins with an overview of the spring framework 5 0 its design patterns and its guidelines that enable you to implement responsive microservices at scale you will learn how to use gof patterns in application design you will understand the dependency injection pattern which is the main principle behind the decoupling process of the spring framework and makes it easier to manage your code then you will learn how to use proxy patterns in aspect oriented programming and remoting moving on you will understand the jdbc template patterns and their use in abstracting database access after understanding the basics you will move on to more advanced topics such as reactive streams and concurrency written to the latest specifications of spring that focuses on reactive

programming the learning path teaches you how to build modern internet scale java applications in no time next you will understand how spring boot is used to deploying serverless autonomous services by removing the need to have a heavyweight application server you ll also explore ways to deploy your microservices to docker and managing them with mesos by the end of this learning path you will have the clarity and confidence for implementing microservices using spring framework this learning path includes content from the following packt products spring 5 microservices by rajesh r v spring 5 design patterns by dinesh rajputwhat you will learn develop applications using dependency injection patterns build web applications using traditional spring mvc patterns utilize the reactive programming pattern to build reactive web apps learn concurrency and handle multiple connections inside a web server use spring boot and spring cloud to develop microservices leverage reactive programming to build cloud native applications who this book is for getting started with spring microservices is ideal for spring developers who want to use design patterns to solve common design problems and build cloud ready internet scale applications and simple restful services

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creation and management of containers apply best practices to secure a microservices application accurately assess and calculate costs and usage limits in serverless solutions who this book is for this book is for engineers and senior software developers looking to advance into modern cloud and distributed applications it helps professionals evolve their knowledge of microservices and serverless architecture to get the best of both architectural models prior experience with c net and the microsoft stack entity framework and asp net core is required to get the most out of this book if you ve enjoyed the authors previous software architecture with c and net series this new book offers an in depth exploration of select topics in those earlier works

2025 edition create and deploy production grade microservices based applications with this edition fully updated to the latest versions of spring boot java and spring cloud key features build cloud native production ready microservices and stay ahead of the curve understand the challenges of building large scale microservice architectures learn how to get the best out of the latest updates including java spring boot spring cloud kubernetes and istio purchase of the print or kindle book includes a free pdf ebook book descriptiondo you want to build and deploy microservices but are unsure where to begin check out the fully updated 2025 edition of microservices with spring boot and spring cloud drawing from magnus decades of experience you ll start with simple microservices and progress to complex distributed applications learning essential functionality and deploying microservices using kubernetes and istio along the way this book covers java 24 spring boot 3 5 and spring cloud 2025 featuring updated code examples and replacing deprecated apis you ll get a clear understanding of spring s ahead of time aot module observability distributed tracing and helm for kubernetes packaging the chapters show you how to use docker compose to run microservices with databases and messaging services and deploy microservices on kubernetes with istio you ll also explore persistence resilience reactive microservices and api documentation with openapi as well as learn service discovery with netflix eureka edge servers with spring cloud gateway and monitoring with prometheus grafana and the efk stack by the end of this book you ll be able to confidently build scalable microservices 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 and spring security to protect public apis implement docker to bridge the gap between development testing and production deploy and manage microservices with kubernetes apply istio for improved security observability and traffic management write and run automated microservice tests with junit test containers gradle and bash use spring aot and graalvm to compile your microservices into native executables utilize micrometer for distributed tracing who this book is for if you re a java or spring boot developer learning how to build microservice landscapes from scratch then this book is for you prior experience in building apps with java or spring boot will help you get started with this book

transform raw requirements into scalable resilient web applications with spring and build secure high performance systems from the ground up using expert guidance and best practices key features establish yourself as the go to person for strategic decision making and solutions design with proven strategies write clean modular and testable code with the power of dependency injection optimize your development efforts by artfully connecting diverse use cases with the right spring components purchase of the print or kindle book includes a free pdf ebook book description software system design goes beyond just writing code it requires a structured approach to translating real world requirements into scalable maintainable solutions with rodrigo santiago s hands on mentoring style and java spring expertise he makes system design accessible to developers at all levels spring system design in practice guides you through building robust software architectures with spring from breaking down complex business needs into actionable use cases to implementing services using spring boot this book equips you with the tools and best practices needed for developing secure high performance applications you ll explore inter service communication security and aspect oriented programming to streamline development covering microservices architecture the book demonstrates how to create self configuring resilient and event driven services that integrate seamlessly into the cloud through hands on experience you ll apply best practices to enhance reliability and scalability while tackling complex challenges such as state management resilience patterns concurrency issues and distributed transactions including bottlenecks related to asynchronous and reactive programming by the end of this book you ll have the confidence to analyze system requirements and design well structured scalable architectures what you will learn implement microservices for scalable resilient web systems break down business goals into well structured product requirements weigh tradeoffs between writing asynchronous vs synchronous services and sql vs nosql storage accelerate service development and reliability through the adoption of test driven development identify and eliminate hidden performance bottlenecks to maximize speed and efficiency achieve real time processing and responsiveness in distributed environments who this book is for if you re an entry level it professional with junior to mid level java and spring experience this pragmatic guide will fast track your journey to mastering the spring ecosystem designed to accelerate your career path toward becoming a senior software engineer system architect technical lead or aspiring cto it provides clear explanations of the spring ecosystem and its intricate patterns for experienced developers or architects this book offers essential insights and hands on knowledge to deepen your architectural skills and design resilient web systems

summary the tao of microservices guides you on the path to understanding how to apply microservice architectures to your own real world projects this high level book offers a conceptual view of microservice design along with core concepts and their application purchase of the print book includes a free ebook in pdf kindle and epub formats from

manning publications about the technology an application even a complex one can be designed as a system of independent components each of which handles a single responsibility individual microservices are easy for small teams without extensive knowledge of the entire system design to build and maintain microservice applications rely on modern patterns like asynchronous message based communication and they can be optimized to work well in cloud and container centric environments about the book the tao of microservices guides you on the path to understanding and building microservices based on the invaluable experience of microservices guru richard rodger this book exposes the thinking behind microservice designs you'll master individual concepts like asynchronous messaging service apis and encapsulation as you learn to apply microservices architecture to real world projects along the way you'll dig deep into detailed case studies with source code and documentation and explore best practices for team development planning for change and tool choice what's inside principles of the microservice architecture breaking down real world case studies implementing large scale systems when not to use microservices about the reader this book is for developers and architects examples use javascript and node js about the author richard rodger ceo of voxgig a social network for the events industry has many years of experience building microservice based systems for major global companies table of contents part 1 building microservices brave new world services messages data deployment part 2 running microservices measurement migration people case study nodezoo com

from fundamentals and design patterns to the latest techniques such as generative ai machine learning and cloud native architecture gain all you need to be a pro solutions architect crafting secure and reliable aws architecture get with your book pdf copy ai assistant and next gen reader free key features hits all the key areas rajesh sheth vp elastic block store aws offers the knowledge you need to succeed in the evolving landscape of tech architecture luis lopez soria senior specialist solutions architect google a valuable resource for enterprise strategists looking to build resilient applications cher simon principal solutions architect aws book description build a strong foundation in solution architecture and excel in your career with the solutions architect's handbook authored by seasoned aws technology leaders saurabh shrivastav and neelanjali srivastav this book goes beyond traditional certification guides offering in depth insights and advanced techniques to meet the specific needs and challenges of solutions architects today this edition introduces exciting new features that keep you at the forefront of this evolving field from large language models and generative ai to deep learning innovations these cutting edge advancements are shaping the future of technology key topics such as cloud native architecture data engineering architecture cloud optimization mainframe modernization and building cost efficient secure architectures remain essential today this book covers both emerging and foundational technologies guiding you through solution architecture design with key principles and providing the knowledge you need to succeed

as a solutions architect it also sharpens your soft skills providing career accelerating techniques to stay ahead by the end of this book you will be able to harness cutting edge technologies apply practical insights from real world scenarios and enhance your solution architecture skills with the solutions architect s handbook what you will learn explore various roles of a solutions architect in the enterprise apply design principles for high performance cost effective solutions choose the best strategies to secure your architectures and boost availability develop a devops and cloudops mindset for collaboration operational efficiency and streamlined production apply machine learning data engineering llms and generative ai for improved security and performance modernize legacy systems into cloud native architectures with proven real world strategies master key solutions architect soft skills who this book is for this book is for software developers system engineers devops engineers architects and team leaders who already work in the it industry and aspire to become solutions architect professionals solutions architects who want to expand their skillset or get a better understanding of new technologies will also learn valuable new skills to get started you ll need a good understanding of the real world software development process and some awareness of cloud technology

this is an outdated edition and we have a new third edition live covering real world patterns genai strategies cost optimization techniques and certification aligned best practices key features comprehensive guide to automating networking migrating and adopting cloud technologies using aws extensive insights into aws technologies including ai ml iot big data blockchain and quantum computing to transform your business detailed coverage of aws solutions architecture and the latest aws certification requirements book descriptionthe second edition of aws for solutions architects provides a practical guide to designing cloud solutions that align with industry best practices this updated edition covers the aws well architected framework core design principles and cloud native patterns to help you build secure high performance and cost effective architectures gain a deep understanding of aws networking hybrid cloud connectivity and edge deployments explore big data processing with emr glue kinesis and msk enabling you to extract valuable insights from data efficiently new chapters introduce cloudops machine learning iot and blockchain equipping you with the knowledge to develop modern cloud solutions learn how to optimize aws storage implement containerization strategies and design scalable data lakes whether working on simple configurations or complex enterprise architectures this guide provides the expertise needed to solve real world cloud challenges and build reliable high performing aws solutions what you will learn optimize your cloud workload using the aws well architected framework learn methods to migrate your workload using the aws cloud adoption framework apply cloud automation at various layers of application workload to increase efficiency build a landing zone in aws and hybrid cloud setups with deep networking techniques select

reference architectures for business scenarios like data lakes containers and serverless apps apply emerging technologies in your architecture including ai ml iot and blockchain who this book is for this book is for application and enterprise architects developers and operations engineers who want to become well versed with aws architectural patterns best practices and advanced techniques to build scalable secure highly available highly tolerant and cost effective solutions in the cloud existing aws users are bound to learn the most but it will also help those curious about how leveraging aws can benefit their organization prior knowledge of any computing language is not needed and there s little to no code prior experience in software architecture design will prove helpful

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

the one and only book on implementing microservices with a real world cover to cover example you can relate to christian bach swiss re 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 designing and running microservices microservices at simplebank architecture of a microservice application designing new features transactions and queries in microservices designing reliable services building a reusable microservice framework deploying microservices deployment with containers and schedulers building a delivery pipeline for microservices building a monitoring system using logs and traces to understand behavior building microservice teams part 1 the lay of the land part 2 design part 3 deployment part 4 observability and ownership

discover the world of full stack development with real world examples key features leverage the full power of the jhipster platform to build complex web applications create microservices from scratch and convert jhipster monolith apps into microservices build and deploy applications locally in docker and on various cloud platforms book description jhipster is a development platform to generate develop and deploy spring boot and angular react applications and spring microservices it provides you with a variety of tools that will help you quickly build modern web applications this book will be your guide to building full stack applications with spring and angular using the jhipster tool set you will begin by understanding what jhipster is and the various tools and technologies associated with it you will learn the essentials of a full stack developer before getting hands on and building a monolithic web application with jhipster from here you will learn the jhipster domain language with entity modeling and entity creation using jdl and jdl studio moving on you will be introduced to client side technologies such as angular and bootstrap and will delve into technologies such as spring security spring mvc and spring data you will learn to build and package apps for production with various deployment options such as heroku and more during the course of the book you will be introduced to microservice server side technologies and how to break your monolithic application with a database of your choice next the book takes you through cloud deployment with microservices on docker and kubernetes going forward you will learn to build your client side with react and master jhipster best practices by the end of the book you will be able to leverage the power of the best tools available to build modern web applications what you will learn build business logic by creating and developing entity models us the jhipster domain language customize web applications with angular

bootstrap and spring tests and continuous integration with jenkins utilize the jhipster microservice stack which includes netflix eureka spring cloud config hashicorp consul and so on understand advanced microservice concepts such as api rout load balancing rate limit circuit break centralized configuration server jwt authentication and more run microservices locally using docker and kubernetes in production who this book is for this book will appeal to developers who would like to build modern web applications quickly a basic knowledge of the spring ecosystem would be an added advantage

distributed systems have become more fine grained as organizations shift from code heavy monolithic applications to smaller self contained microservices but developing these systems brings its own set of problems with lots of examples and practical advice this expanded second edition takes a holistic view of the topics system architects and administrators must consider when building managing and evolving microservices architectures author sam newman provides you with a firm grounding in the concepts while diving into the latest solutions for modeling integrating testing deploying and monitoring your own autonomous services through real world examples you ll learn how organizations worldwide are getting the most out of these architectures microservices technologies are moving quickly this book brings you up to speed get new information on user interfaces container orchestration and serverless use microservices to align system design with your organization s goals explore 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 expanded content around user to service and service to service models understand the challenges of scaling microservices architectures

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back end along the way you'll address production and operations concerns like monitoring logging and security what's inside design robust and ops friendly services build http apis with nancy expose events via feeds with nancy use owin middleware for plumbing about the reader this book is written for c developers no previous experience with microservices required about the author christian horsdal gammelgaard is a nancy committer and a microsoft mvp table of contents part 1 getting started with microservices microservices at a glance a basic shopping cart microservice part 2 building microservices identifying and scoping microservices microservice collaboration data ownership and data storage designing for robustness writing tests for microservices part 3 handling cross cutting concerns building a reusable microservice platform introducing owin writing and testing owin middleware cross cutting concerns monitoring and logging securing microservice to microservice communication building a reusable microservice platform part 4 building applications creating applications over microservices

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apriorit experts wrote this ebook to share their experience working with microservice architectures this guide shows you how to speed up microservices development using code generation tools and connect grpc based microservices to a graphql client

summary the best way to learn microservices development is to build something bootstrapping microservices with docker kubernetes and terraform guides you from zero through to a complete microservices project including fast prototyping development and deployment you'll get your feet wet using industry standard tools as you learn and practice the practical skills you'll use for every microservices application following a true bootstrapping approach you'll begin with a simple familiar application and build up your knowledge and skills as you create and deploy a real microservices project purchase of the print book includes a free ebook in pdf kindle and epub formats from manning publications about the technology taking microservices from proof of concept to production is a complex multi step operation relying on tools like docker terraform and kubernetes for packaging and deployment the best way to learn the process is to build a project from the ground up and that's exactly what you'll do with this book about the book in bootstrapping microservices with docker kubernetes and terraform author ashley davis lays out a comprehensive approach to building microservices you'll start with a simple design and work layer by layer until you've created your own video streaming application as you go you'll learn to configure cloud infrastructure with terraform package microservices using docker and deploy your finished project to a kubernetes cluster what's inside developing and testing microservices applications working with cloud providers applying automated testing implementing infrastructure as code and setting up a continuous delivery pipeline monitoring managing and troubleshooting about the reader examples are in javascript no experience with microservices kubernetes terraform or docker required about the author ashley davis is a software developer entrepreneur stock trader and the author of manning's data wrangling with javascript table of contents 1 why microservices 2 creating your first microservice 3 publishing your first microservice 4 data management for microservices 5 communication between microservices 6 creating your production environment 7 getting to continuous delivery 8 automated testing for microservices 9 exploring flixtube 10 healthy microservices 11 pathways to scalability

microservices discover and manage microservices architecture this book is an exploration of microservices it begins by explaining what they are so as to help the reader better understand them after reading this book you will know how and where microservices are used the unique characteristics of microservices have been mentioned and then explored in detail this will help to give a deep understanding about how microservices function especially in a production environments the next part of the book is a guide on how to implement microservices you will learn how to use qbit and gradle

for the purpose of developing them java pojo has also been explored so you will find out how to use it for development of microservices the use of spring boot for development of microservices has also been explored so you can use it for the same purpose the next chapter of this book explains the reasons many companies prefer to implement their software using a microservice architecture rather than the alternatives these reasons have been explained with no details left out the issue of security in microservices has also been discussed thoroughly on reading this book you will know how to use spring to enhance or implement the security of your microservice application there are certain factors that need to be considered when developing a microservice if these are not adhered to then the microservice will not function effectively these factors have been outlined in this book the following topics have been discussed in this book understanding microservices patterns and application implementation of microservices why microservices factors to consider while developing microservices building microservices download your copy of microservices by scrolling up and clicking buy now with 1 click button

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with more than 20 years of experience building projects from large scale microservice systems to tiny embedded systems table of contents part 1 getting started with microservices 1 microservices at a glance 2 a basic shopping cart microservice 3 deploying a microservice to kubernetes part 2 building microservices 4 identifying and scoping microservices 5 microservice collaboration 6 data ownership and data storage 7 designing for robustness 8 writing tests for microservices part 3 handling cross cutting concerns building a reusable microservice platform 9 cross cutting concerns monitoring and logging 10 securing microservice to microservice communication 11 building a reusable microservice platform part 4 building applications 12 creating applications over microservices

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

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