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Internet and telecommunication have become a part of our life. The last decade has brought us closer to people in terms of innovation and digital technology. Multi-purpose communications are creating ...

Distributed Antenna System (DAS)—The Backbone of the Digital World

Control Engineering - Robert Harman, 38 Senior Control System Engineer/Project Engineer Plus Group Cincinnati, Ohio, United States BS Chemical & Biomolecular Engineering, ...

2021 Engineering Leader Under 40: Robert Harman, 38

The energy sector should follow telecommunications with software-defined infrastructure rather than hardware-centric updates.

How open-source software could revamp the aging electrical grid

The newly designed system utilizes a three-speaker 'antenna' system, controlled by the company's HOLOPHONIX spatial sound processor.

Amadeus Designs Innovative Sound System For Normandy National Drama Centre

Galileo satellites 5 and 6 (E18, E14) were declared unusable in February 2021 after reports indicating repeatable daily problems with RTK. This article explores ...

Are Elliptical Galileo Satellites Usable for RTK?

Who are the most innovative, up-and-coming scientists in the US today? And what makes their ideas so fresh? Popular Science's Brilliant 10 returns with a list of the geniuses you need to know in 2021.

The Brilliant 10: The most innovative up-and-coming minds in science

Increasing amounts of processing are being done on the edge, but how the balance will change between what's computed in the cloud versus the edge remains unclear. The answer may depend as much on the ...

Tradeoffs Between Edge Vs. Cloud

Artificial intelligence systems are the product of constructed algorithms that inherit many of the biases that help to perpetuate the global challenges we hope to solve.

Can we get rid of bias in artificial intelligence?

Today, companies across every industry are deploying millions of machine learning models across multiple lines of business. Soon every enterprise will take part.

Machine learning is moving beyond the hype

The two new supercomputers, according to the company, will provide DoD with a combined total of over 365,000 cores, more than 775 terabytes of memory, and a total of 47 petabytes of high-performance ...

DoD Buys Two New Supercomputers That Rank Among Its Most Powerful Ever

Digital tools enabled by advanced analytics, artificial intelligence, and machine learning offer the fastest and most effective path to abating the O&G industry's greenhouse gas emissions.

The AI Angle in Solving the Oil and Gas Emissions Challenge

As we tackle the logistics behind building the new system and untangling and migrating ... We are able to overcome these challenges through a distributed cache, and implementing the interface with the ...

Looking for a New Engineering Role? These Companies Are Hiring.

IoT news - All the essential news and articles related to the Internet of Things (IoT), on a daily basis, and with a business perspective.

IoT technology market attractiveness — Where to invest going into 2022

At the edge of a sandstone outcropping, Teresa Leger Fernández looks out on the Rio Chama. The river tracks a diverse landscape from the southern edge of the Rocky Mountains ...

Brought tests centuries-old water traditions in New Mexico

Creative mums Lynne Rowntree and Nicola Dorrian-Clark are on a mission. They have set themselves a target of making 60 beautiful handmade quilts by Christmas, and they are appealing for sewers and ...

Quilt to last: Mums on a mission to make handmade quilts for young care leavers

A full explanation of the problem causing every single Bolt EV to be under recall for a potential fire-causing defect.

Chevy Bolt Battery Recall: How Could This Have Happened?

WHAT YOU NEED TO KNOW Verizon and the National Football League (NFL) have extended their longstanding relationship with a 10-year partnership, naming Verizon an ...

Verizon and NFL kick off a 5G future for football

A former Airbnb executive is counting on remote workers and business travelers to fuel his new accommodation venture.

Former Airbnb Exec Pitches Remote Work as Reward Not a Right

The best weighted blankets combine comfort with function, contributing to less anxiety and a better night's sleep.

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.

Without established design patterns to guide them, developers have had to build distributed systems from scratch, and most of these systems are very unique indeed. Today, the increasing use of containers has paved the way for core distributed system patterns and reusable containerized components. This practical guide presents a collection of repeatable, generic patterns to help make the development of reliable distributed systems far more approachable and efficient. Author Brendan Burns—Director of Engineering at Microsoft Azure—demonstrates how you can adapt existing software design patterns for designing and building reliable distributed applications. Systems engineers and application developers will learn how these long-established patterns provide a common language and framework for dramatically increasing the quality of your system. Understand how patterns and reusable components enable the rapid development of reliable distributed systems Use the side-car, adapter, and ambassador patterns to split your application into a group of containers on a single machine Explore loosely coupled multi-node distributed patterns for replication, scaling, and communication between the components Learn distributed system patterns for large-scale batch data processing covering work-queues, event-based processing, and coordinated workflows

Designing Distributed Control Systems presents 80 patterns for designing distributed machine control system software architecture (forestry machinery, mining drills, elevators, etc.). These patterns originate from state-of-the-art systems from market-leading companies, have been tried and tested, and will address typical challenges in the domain, such as long lifecycle, distribution, real-time and fault tolerance. Each pattern describes a separate design problem that needs to be solved. Solutions are provided, with consequences and trade-offs. Each solution will enable piecemeal growth of the design. Finding a solution is easy, as the patterns are divided into categories based on the problem field the pattern tackles. The design process is guided by different aspects of quality, such as performance and extensibility, which are included in the pattern descriptions. The book also contains an example software architecture designed by leading industry experts using the patterns in the book. The example system introduces the reader to the problem domain and demonstrates how the patterns can be used in a practical system design process. The example architecture shows how useful a toolbox the patterns provide for both novices and experts, guiding the system design process from its beginning to the finest details. Designing distributed machine control systems with patterns ensures high quality in the final product. High-quality systems will improve revenue and guarantee customer satisfaction. As market need changes, the desire to produce a quality machine is not only a primary concern, there is also a need for easy maintenance, to improve efficiency and productivity, as well as the growing importance of environmental values; these all impact machine design. The software of work machines needs to be designed with these new requirements in mind. Designing Distributed Control Systems presents patterns to help tackle these challenges. With proven methodologies from the expert author team, they show readers how to improve the quality and efficiency of distributed control systems.

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

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

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.

When it comes to big data processing, we can no longer ignore concurrency or try to add it in after the fact. Fortunately, the solution is not a new paradigm of development, but rather an old one. With this hands-on guide, Java and Scala developers will learn how to embrace concurrent and distributed applications with the open source Akka toolkit. You'll learn how to put the actor model and its associated patterns to immediate and practical use. Throughout the book, you'll deal with an analogous workforce problem: how to schedule a group of people across a variety of projects while optimizing their time and skillsets. This example will help you understand how Akka uses actors, streams, and other tools to stitch your application together. Model software that reflects the real world with domain-driven design Learn principles and practices for implementing individual actors Unlock the real potential of Akka with patterns for combining multiple actors Understand the consistency tradeoffs in a distributed system Use several Akka methods for isolating and dealing with failures Explore ways to build systems that support availability and scalability Tune your Akka application for performance with JVM tools and dispatchers

Summary Reactive Design Patterns is a clearly written guide for building message-driven distributed systems that are resilient, responsive, and elastic. In this book you'll find patterns for messaging, flow control, resource management, and concurrency, along with practical issues like test-friendly designs. All patterns include concrete examples using Scala and Akka. Foreword by Jonas Bonér. Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the Technology Modern web applications serve potentially vast numbers of users - and they need to keep working as servers fail and new ones come online. Users overwhelm limited resources, and information is distributed globally. A Reactive application adjusts to partial failures and varying loads, remaining responsive in an ever-changing distributed environment. The secret is message-driven architecture - and design patterns to organize it. About the Book Reactive Design Patterns presents the principles, patterns, and best practices of Reactive application design. You'll learn how to keep one slow component from bogging down others with the Circuit Breaker pattern, how to shepherd a many-staged transaction to completion with the Saga pattern, how to divide datasets by Sharding, and more. You'll even see how to keep your source code readable and the system testable despite many potential interactions and points of failure. What's Inside The definitive guide to the Reactive Manifesto Patterns for flow control, delimited consistency, fault tolerance, and much more Hard-won lessons about what doesn't work Architectures that scale under tremendous load About the Reader Most examples use Scala, Java, and Akka. Readers should be familiar with distributed systems. About the Author Dr. Roland Kuhn led the Akka team at Lightbend and coauthored the Reactive Manifesto. Brian Hanafee and Jamie Allen are experienced distributed systems architects. Table of Contents PART 1 - INTRODUCTION Why Reactive? A walk-through of the Reactive Manifesto Tools of the trade PART 2 - THE PHILOSOPHY IN A NUTSHELL Message passing Location transparency Divide and conquer Principled failure handling Delimited consistency Nondeterminism by need Message flow PART 3 - PATTERNS Testing reactive applications Fault tolerance and recovery patterns Replication patterns Resource-management patterns Message flow patterns Flow control patterns State management and persistence patterns

Kubernetes radically changes the way applications are built and deployed in the cloud. Since its introduction in 2014, this container orchestrator has become one of the largest and most popular open source projects in the world. The updated edition of this practical book shows developers and ops personnel how Kubernetes and container technology can help you achieve new levels of velocity, agility, reliability, and efficiency. Kelsey Hightower, Brendan Burns, and Joe Beda—who've worked on Kubernetes at Google and beyond—explain how this system fits into the lifecycle of a distributed application. You'll learn how to use tools and APIs to automate scalable distributed systems, whether it's for online services, machine learning applications, or a cluster of Raspberry Pi computers. Create a simple cluster to learn how Kubernetes works Dive into the details of deploying an application using Kubernetes Learn specialized objects in Kubernetes, such as DaemonSets, jobs, ConfigMaps, and secrets Explore deployments that tie together the lifecycle of a complete application Get practical examples of how to develop and deploy real-world applications in Kubernetes

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