

Spark Architecture Distributed Systems Architecture

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Pattern-Oriented Software Architecture, A Pattern Language for Distributed Computing
Digitalmehmet

The communications-served data-processing system. Today's teleprocessing systems. System trends. Evolution of configuration and function distribution. Improving line utilization. System objectives summary. The architectural layers. Basic concepts of systems network architecture. Higher-level services of sna network. Data flow control. Transmission control. Path control. Data link control. Overview of operations. Putting it together. Finite state architecture. Reliability and security control. Advanced functions. Multidomain networks. Routing techniques. Interfacing to new data networks.

Data Intensive Computing Applications for Big Data Springer

Learn how to integrate full-stack open source big data architecture and to choose the correct technology—Scala/Spark, Mesos, Akka, Cassandra, and Kafka—in every layer. Big data architecture is becoming a requirement for many different enterprises. So far, however, the focus has largely been on collecting, aggregating, and crunching large data sets in a timely manner. In many cases now, organizations need more than one paradigm to perform efficient analyses. Big Data SMACK explains each of the full-stack technologies and, more importantly, how to best integrate them. It provides detailed coverage of the practical benefits of these technologies and incorporates real-world examples in every situation. This book focuses on the problems and scenarios solved by the architecture, as well as the solutions provided by every technology. It covers the six main concepts of big data architecture and how integrate, replace, and reinforce every layer: The language: Scala The engine: Spark (SQL, MLib, Streaming, GraphX) The container: Mesos, Docker The view: Akka The storage: Cassandra The message broker: Kafka What You Will Learn: Make big data architecture without using complex Greek letter architectures Build a cheap but effective cluster infrastructure Make queries, reports, and graphs that business demands Manage and exploit unstructured and No-SQL data sources Use tools to monitor the performance of your architecture Integrate all technologies and decide which ones replace and which ones reinforce Who This Book Is For: Developers, data architects, and data scientists looking to integrate the most successful big data open stack architecture and to choose the correct technology in every layer

Big Data Processing Using Spark in Cloud IOS Press

Explore the power of distributed computing to write concurrent, scalable applications in Java About This Book Make the best of Java 9 features to write succinct code Handle large amounts of data using HPC Make use of AWS and Google App Engine along with Java to establish a powerful remote computation system Who This Book Is For This book is for basic to intermediate level Java developers who is aware of object-oriented programming and Java basic concepts. What You Will Learn Understand the basic concepts of parallel and distributed computing/programming Achieve performance improvement using parallel processing, multithreading, concurrency, memory sharing, and hpc cluster computing Get an in-depth understanding of Enterprise Messaging concepts with Java Messaging Service and Web Services in the context of Enterprise Integration Patterns Work with Distributed Database technologies Understand how to develop and deploy a distributed application on different cloud platforms including Amazon Web Service and Docker CaaS Concepts Explore big data technologies Effectively test and debug distributed systems Gain thorough knowledge of security standards for distributed applications including two-way Secure Socket Layer In Detail Distributed computing is the concept with which a bigger computation process is accomplished by splitting it into multiple smaller logical activities and performed by diverse systems, resulting in maximized performance in lower infrastructure investment. This book will teach you how to improve the performance of traditional applications through the usage of parallelism and optimized resource

utilization in Java 9. After a brief introduction to the fundamentals of distributed and parallel computing, the book moves on to explain different ways of communicating with remote systems/objects in a distributed architecture. You will learn about asynchronous messaging with enterprise integration and related patterns, and how to handle large amount of data using HPC and implement distributed computing for databases. Moving on, it explains how to deploy distributed applications on different cloud platforms and self-contained application development. You will also learn about big data technologies and understand how they contribute to distributed computing. The book concludes with the detailed coverage of testing, debugging, troubleshooting, and security aspects of distributed applications so the programs you build are robust, efficient, and secure. Style and approach This is a step-by-step practical guide with real-world examples.

An Architecture for Fast and General Data Processing on Large Clusters Springer Nature

Why don't typical enterprise projects go as smoothly as projects you develop for the Web? Does the REST architectural style really present a viable alternative for building distributed systems and enterprise-class applications? In this insightful book, three SOA experts provide a down-to-earth explanation of REST and demonstrate how you can develop simple and elegant distributed hypermedia systems by applying the Web's guiding principles to common enterprise computing problems. You'll learn techniques for implementing specific Web technologies and patterns to solve the needs of a typical company as it grows from modest beginnings to become a global enterprise. Learn basic Web techniques for application integration Use HTTP and the Web's infrastructure to build scalable, fault-tolerant enterprise applications Discover the Create, Read, Update, Delete (CRUD) pattern for manipulating resources Build RESTful services that use hypermedia to model state transitions and describe business protocols Learn how to make Web-based solutions secure and interoperable Extend integration patterns for event-driven computing with the Atom Syndication Format and implement multi-party interactions in AtomPub Understand how the Semantic Web will impact systems design

Springer

A computer cluster consists of a set of loosely or tightly connected computers that work together so that, in many respects, they can be viewed as a single system.

Software Architecture for Big Data and the Cloud Springer Science & Business Media

This book constitutes the proceedings of the 20th IFIP International Conference on Distributed Applications and Interoperable Systems, DAIS 2020, which was supposed to be held in Valletta, Malta, in June 2020, as part of the 15th International Federated Conference on Distributed Computing Techniques, DisCoTec 2020. The conference was held virtually due to the COVID-19 pandemic. The 10 full papers presented together with 1 short paper and 1 invited paper were carefully reviewed and selected from 17 submissions. The papers addressed challenges in multiple application areas, such as privacy and security, cloud and systems, fault-tolerance and reproducibility, machine learning for systems, and distributed algorithms.

Distributed Applications Engineering Springer Nature

The primary audience for this book are advanced undergraduate students and graduate students. Computer architecture, as it happened in other fields such as electronics, evolved from the small to the large, that is, it left the realm of low-level hardware constructs, and gained new dimensions, as distributed systems became the keyword for system implementation. As such, the system architect, today, assembles pieces of hardware that are at least as large as a computer or a network router or a LAN hub, and assigns pieces of software that are self-contained, such as client or server programs, Java applets or pro tocol modules, to those hardware components. The freedom she/he now has, is tremendously challenging. The problems alas, have increased too. What was before mastered and tested carefully before a fully-fledged mainframe or a closely-coupled computer cluster came out on the market, is today left to the responsibility of computer engineers and scientists invested in the role of system architects, who fulfil this role on behalf of software vendors and in tegrators, add-

value system developers, R&D institutes, and final users. As system complexity, size and diversity grow, so increases the probability of inconsistency, unreliability, non responsiveness and insecurity, not to mention the management overhead. What System Architects Need to Know The insight such an architect must have includes but goes well beyond, the functional properties of distributed systems.

Distributed Computing in Big Data Analytics "O'Reilly Media, Inc."

We are in a frenetic and a convoluted digital age. Every organisation strives to transform its business to stay competitive in this exponentially growing digital world. Digital transformation became pervasive and ubiquitous in all business ventures. This new norm of constant transformation requires architecting our business and underlying technology stacks rapidly. Establishing agile business architecture frameworks are fundamental requirements to achieve successful digital transformation outcomes. In this book, I attempt to share my knowledge and experience using a rigorous yet agile architectural method. My aim is to add accelerated value to the broader business architecture and digital transformation communities by focusing on the practical aspect with minimal emphasis on the theoretical aspect. The content in this book is based on my architectural thought leadership experience gained in multiple large business and enterprise architecture initiatives, focusing on business capabilities, digital transformation initiatives, and enterprise modernisation engagements, reflecting hard lessons learned in these applied settings. In this book I attempt to redefine the role of business architects as primary leaders for digital transformation programs. The content reflects my experience and observations from the field. As a caveat, this book is not based on theories in the traditional business architecture textbooks which may conflict with my experience. My beta readers found this as a unique guide reflecting reality from the field. Hope it adds new insights for your role in the business digital transformation initiatives.

Mastering Spark for Data Science Morgan Kaufmann

Combine the incredible powers of Spark, Mesos, Akka, Cassandra, and Kafka to build data processing platforms that can take on even the hardest of your data troubles! About This Book This highly practical guide shows you how to use the best of the big data technologies to solve your response-critical problems Learn the art of making cheap-yet-effective big data architecture without using complex Greek-letter architectures Use this easy-to-follow guide to build fast data processing systems for your organization Who This Book Is For If you are a developer, data architect, or a data scientist looking for information on how to integrate the Big Data stack architecture and how to choose the correct technology in every layer, this book is what you are looking for. What You Will Learn Design and implement a fast data Pipeline architecture Think and solve programming challenges in a functional way with Scala Learn to use Akka, the actors model implementation for the JVM Make on memory processing and data analysis with Spark to solve modern business demands Build a powerful and effective cluster infrastructure with Mesos and Docker Manage and consume unstructured and No-SQL data sources with Cassandra Consume and produce messages in a massive way with Kafka In Detail SMACK is an open source full stack for big data architecture. It is a combination of Spark, Mesos, Akka, Cassandra, and Kafka. This stack is the newest technique developers have begun to use to tackle critical real-time analytics for big data. This highly practical guide will teach you how to integrate these technologies to create a highly efficient data analysis system for fast data processing. We'll start off with an introduction to SMACK and show you when to use it. First you'll get to grips with functional thinking and problem solving using Scala. Next you'll come to understand the Akka architecture. Then you'll get to know how to improve the data structure architecture and optimize resources using Apache Spark. Moving forward, you'll learn how to perform linear scalability in databases with Apache Cassandra. You'll grasp the high throughput distributed messaging systems using Apache Kafka. We'll show you how to build a cheap but effective cluster infrastructure with Apache Mesos. Finally, you will deep dive into the different aspect of SMACK using a few case studies. By the end of the book, you will be able to integrate all the components of the SMACK stack and use them together to achieve highly effective and fast data processing. Style and approach With the help of various industry examples, you will learn about the full stack of big data architecture, taking the important aspects in every technology. You will learn how to integrate the technologies to build effective systems rather than getting incomplete information on single technologies. You will learn how various open source technologies can be used to build cheap and fast data processing systems with the help of various industry examples

Communications Architecture for Distributed Systems "O'Reilly Media, Inc."

Both authors have taught the course of "Distributed Systems" for many years in the respective schools. During the teaching, we feel strongly that "Distributed systems" have evolved from traditional "LAN" based distributed systems towards "Internet based" systems. Although there exist many excellent textbooks on this topic, because of the fast development of distributed systems and network programming/protocols, we have difficulty in finding an appropriate textbook for the course of "distributed systems" with orientation to the requirement of the undergraduate level study for today's distributed technology. Specifically, from - to-date concepts, algorithms, and models to implementations for both distributed system designs and application programming. Thus the philosophy behind this book is to integrate the concepts, algorithm designs and implementations of distributed systems based on network programming. After using several materials of other textbooks and research books, we found that many texts treat the distributed systems with separation of concepts, algorithm design and network programming and it is very difficult for students to map the concepts of distributed systems to the algorithm design, prototyping and implementations. This book intends to enable readers, especially postgraduates and senior undergraduate level, to study up-to-date concepts, algorithms and network programming skills for building modern distributed systems. It enables students not only to master the concepts of distributed network system but also to readily use the material introduced into implementation practices.

Cluster Computing Lulu.com

There's a lot of information about big data technologies, but splicing these technologies into an end-to-end enterprise data platform is a daunting task not widely covered. With this practical book, you'll learn how to build big data infrastructure both on-premises and in the cloud and successfully architect a modern data platform. Ideal for enterprise architects, IT managers, application architects, and data engineers, this book shows you how to overcome the many challenges that emerge during Hadoop projects. You'll explore the vast landscape of tools available in the Hadoop and big data realm in a thorough technical primer before diving into: Infrastructure: Look at all component layers in a modern data platform, from the server to the data center, to establish a solid foundation for data in your enterprise Platform: Understand aspects of deployment, operation, security, high availability, and disaster recovery, along with everything you need to know to integrate your platform with the rest of your enterprise IT Taking Hadoop to the cloud: Learn the important architectural aspects of running a big data platform in the cloud while maintaining enterprise security and high availability

Distributed and Parallel Systems Springer

With Early Release ebooks, you get books in their earliest form - the author's raw and unedited content as he or she writes - so you can take advantage of these technologies long before the official release of these titles. You'll also receive updates when significant changes are made, new

chapters are available, and the final ebook bundle is released. Distributed systems have helped application development teams deal with failures, downtime, and poor scaling, but these systems bring technical challenges of their own. With this unique cookbook, system architects will get a detailed understanding of reactive systems, along with proven recipes for dealing with different architectural issues. Each self-contained chapter covers the architecture of an entire reactive system, and-since these systems share many of the same architectural issues-each chapter also focuses on a particular area, such as delivery semantics or monitoring & tracing, with detailed solutions for problems that commonly arise. Learn the architecture and implementation tips for an entire reactive microservices-based system in each chapter Understand the challenges of long-term running and evolution of your distributed system Explore different failure modes of distributed systems and the approaches to address them Learn about proper site reliability and production readiness.

Hadoop Application Architectures O'Reilly Media

Master the techniques and sophisticated analytics used to construct Spark-based solutions that scale to deliver production-grade data science products About This Book Develop and apply advanced analytical techniques with Spark Learn how to tell a compelling story with data science using Spark's ecosystem Explore data at scale and work with cutting edge data science methods Who This Book Is For This book is for those who have beginner-level familiarity with the Spark architecture and data science applications, especially those who are looking for a challenge and want to learn cutting edge techniques. This book assumes working knowledge of data science, common machine learning methods, and popular data science tools, and assumes you have previously run proof of concept studies and built prototypes. What You Will Learn Learn the design patterns that integrate Spark into industrialized data science pipelines See how commercial data scientists design scalable code and reusable code for data science services Explore cutting edge data science methods so that you can study trends and causality Discover advanced programming techniques using RDD and the DataFrame and Dataset APIs Find out how Spark can be used as a universal ingestion engine tool and as a web scraper Practice the implementation of advanced topics in graph processing, such as community detection and contact chaining Get to know the best practices when performing Extended Exploratory Data Analysis, commonly used in commercial data science teams Study advanced Spark concepts, solution design patterns, and integration architectures Demonstrate powerful data science pipelines In Detail Data science seeks to transform the world using data, and this is typically achieved through disrupting and changing real processes in real industries. In order to operate at this level you need to build data science solutions of substance -solutions that solve real problems. Spark has emerged as the big data platform of choice for data scientists due to its speed, scalability, and easy-to-use APIs. This book deep dives into using Spark to deliver production-grade data science solutions. This process is demonstrated by exploring the construction of a sophisticated global news analysis service that uses Spark to generate continuous geopolitical and current affairs insights. You will learn all about the core Spark APIs and take a comprehensive tour of advanced libraries, including Spark SQL, Spark Streaming, MLlib, and more. You will be introduced to advanced techniques and methods that will help you to construct commercial-grade data products. Focusing on a sequence of tutorials that deliver a working news intelligence service, you will learn about advanced Spark architectures, how to work with geographic data in Spark, and how to tune Spark algorithms so they scale linearly. Style and approach This is an advanced guide for those with beginner-level familiarity with the Spark architecture and working with Data Science applications. Mastering Spark for Data Science is a practical tutorial that uses core Spark APIs and takes a deep dive into advanced libraries including: Spark SQL, visual streaming, and MLlib. This book expands on titles like: Machine Learning with Spark and Learning Spark. It is the next learning curve for those comfortable with Spark and looking to improve their skills.

Scaling Machine Learning with Spark Springer Science & Business Media

With the given work we decided to help not only the readers but ourselves, as the professionals who actively involved in the networking branch, with understanding the trends that have developed in recent two decades in distributed systems and networks. Important architecture transformations of distributed systems have been examined. The examples of new architectural solutions are discussed.

Designing a New Class of Distributed Systems Springer Science & Business Media

"The papers in this volume [from a workshop titled 'Distributed and Parallel Systems' (DAPSYS) 2002] cover a broad range of research topics presented in four groups. The first one introduces cluster tools and techniques, especially the issues of load balancing and migration. Another six papers deal with grid and global computing including grid infrastructure, tools, applications and mobile computing. The next nine papers present general questions of distributed development and applications. The last four papers address a crucial issue in distributed computing: fault tolerance and dependable systems."--Page [ix].

Distributed Systems for System Architects Springer Science & Business Media

The book describes the emergence of big data technologies and the role of Spark in the entire big data stack. It compares Spark and Hadoop and identifies the shortcomings of Hadoop that have been overcome by Spark. The book mainly focuses on the in-depth architecture of Spark and our understanding of Spark RDDs and how RDD complements big data's immutable nature, and solves it with lazy evaluation, cacheable and type inference. It also addresses advanced topics in Spark, starting with the basics of Scala and the core Spark framework, and exploring Spark data frames, machine learning using MLlib, graph analytics using Graph X and real-time processing with Apache Kafka, AWS Kinesis, and Azure Event Hub. It then goes on to investigate Spark using PySpark and R. Focusing on the current big data stack, the book examines the interaction with current big data tools, with Spark being the core processing layer for all types of data. The book is intended for data engineers and scientists working on massive datasets and big data technologies in the cloud. In addition to industry professionals, it is helpful for aspiring data processing professionals and students working in big data processing and cloud computing environments.

Stream Processing with Apache Spark Morgan & Claypool

Production-targeted Spark guidance with real-world use cases Spark: Big Data Cluster Computing in Production goes beyond general Spark overviews to provide targeted guidance toward using lightning-fast big-data clustering in production. Written by an expert team well-known in the big data community, this book walks you through the challenges in moving from proof-of-concept or demo Spark applications to live Spark in production. Real use cases provide deep insight into common problems, limitations, challenges, and opportunities, while expert tips and tricks help you get the most out of Spark performance. Coverage includes Spark SQL, Tachyon, Kerberos, ML Lib, YARN, and Mesos, with clear, actionable guidance on resource scheduling, db connectors, streaming, security, and much more. Spark has become the tool of choice for many Big Data problems, with more active contributors than any other Apache Software project. General introductory books abound, but this book is the first to provide deep insight and real-world advice on using Spark in production. Specific guidance, expert tips, and invaluable foresight make this guide an incredibly useful resource for real production settings. Review Spark hardware requirements and estimate cluster size Gain insight from real-world production use cases Tighten security, schedule resources, and fine-tune performance Overcome common problems encountered using Spark in production Spark works with

other big data tools including MapReduce and Hadoop, and uses languages you already know like Java, Scala, Python, and R. Lightning speed makes Spark too good to pass up, but understanding limitations and challenges in advance goes a long way toward easing actual production implementation. *Spark: Big Data Cluster Computing in Production* tells you everything you need to know, with real-world production insight and expert guidance, tips, and tricks.

REST in Practice Packt Publishing Ltd

Designing a New Class of Distributed Systems closely examines the Distributed Intelligent Managed Element (DIME) Computing Model, a new model for distributed systems, and provides a guide to implementing Distributed Managed Workflows with High Reliability, Availability, Performance and Security. The book also explores the viability of self-optimizing, self-monitoring autonomous DIME-based computing systems. *Designing a New Class of Distributed Systems* is designed for practitioners as a reference guide for innovative distributed systems design. Researchers working in a related field will also find this book valuable.

Spark John Wiley & Sons

Client/server and distributed technologies have made great strides since their emergence in the late 1980s to become very popular in the IT industry today. This book illustrates techniques not only for

designing GUI client/server applications, but also for managing complex application environments containing both legacy and new applications. Topics covered in this book include - The what, when and how of the three tier client/server model - Coupling and dependency: key design factors in distributed systems - Distributed application design alternatives for the enterprise - The Federated application structure for integrating the applications of the enterprise - A real-life case study of a major financial institution - Systems Architects and senior technical staff Project Managers and Software Engineers involved with or interested in client/server computing, and final year undergraduate and postgraduate students will find this book useful.

Reactive Systems Architecture "O'Reilly Media, Inc."

The book is a collection of high-quality peer-reviewed research papers presented at International Conference on Information System Design and Intelligent Applications (INDIA 2017) held at Duy Tan University, Da Nang, Vietnam during 15-17 June 2017. The book covers a wide range of topics of computer science and information technology discipline ranging from image processing, database application, data mining, grid and cloud computing, bioinformatics and many others. The various intelligent tools like swarm intelligence, artificial intelligence, evolutionary algorithms, bio-inspired algorithms have been well applied in different domains for solving various challenging problems.

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