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This volume focuses on the theory and practice of data stream management, and the novel challenges this emerging domain poses for data-management algorithms, systems, and applications. The collection of chapters, contributed by authorities in the field, offers a comprehensive introduction to both the algorithmic/theoretical foundations of data streams, as well as the streaming systems and applications built in different domains. A short introductory chapter provides a brief summary of some basic data streaming concepts and models, and discusses the key elements of a generic stream query processing architecture. Subsequently, Part I focuses on basic streaming algorithms for some key analytics functions (e.g., quantiles, norms, join aggregates, heavy hitters) over streaming data. Part II then examines important techniques for basic stream mining tasks (e.g., clustering, classification, frequent itemsets). Part III discusses a number of advanced topics on

stream processing algorithms, and Part IV focuses on system and language aspects of data stream processing with surveys of influential system prototypes and language designs. Part V then presents some representative applications of streaming techniques in different domains (e.g., network management, financial analytics). Finally, the volume concludes with an overview of current data streaming products and new application domains (e.g. cloud computing, big data analytics, and complex event processing), and a discussion of future directions in this exciting field. The book provides a comprehensive overview of core concepts and technological foundations, as well as various systems and applications, and is of particular interest to students, lecturers and researchers in the area of data stream management. Why have stream-oriented data systems become so popular, when batch-oriented systems have served big data needs for many years? In the updated edition of this report, Dean Wampler examines the rise of streaming systems for handling time-sensitive problems-such as detecting fraudulent financial activity as it happens. You'll explore the characteristics of fast data architectures, along with several open source tools for implementing them. Batch processing isn't going away, but exclusive use of these systems is now a competitive disadvantage. You'll learn that, while fast data architectures using tools such as Kafka, Akka, Spark, and Flink are much harder to build, they represent the state of the art for dealing with mountains of data that require immediate attention. Learn how a basic fast data architecture works, step-by-step Examine how Kafka's data backplane combines the best abstractions of log-oriented and message queue systems for integrating components Evaluate four streaming engines, including Kafka Streams, Akka Streams, Spark, and Flink Learn which streaming engines work best for different use cases Get recommendations for making real-world streaming systems responsive, resilient, elastic, and message driven Explore an example IoT streaming application that includes telemetry ingestion and anomaly detection. Design and administer fast, reliable enterprise messaging systems with Apache Kafka About This Book Build efficient real-time streaming applications in Apache Kafka to process data streams of data Master the core Kafka APIs to set up Apache Kafka clusters and start writing message producers and consumers A comprehensive guide to help you get a solid grasp of the Apache Kafka concepts in Apache Kafka with pracitcalpractical examples Who This Book Is For If you want to learn how to use Apache Kafka and the different tools in the Kafka ecosystem in the easiest possible manner, this book is for you. Some programming experience with Java is required to get the most out of this book What You Will Learn Learn the basics of Apache Kafka from scratch Use the basic building blocks of a streaming application Design effective streaming applications with Kafka using Spark, Storm &, and Heron Understand the importance of a low -latency , high-throughput, and fault-tolerant messaging system Make effective capacity planning while deploying your Kafka Application Understand and implement the best security practices In Detail Apache Kafka is a popular distributed streaming platform that acts as a messaging queue or an enterprise messaging system. It lets you publish and subscribe to a stream of records, and process them in a fault-tolerant way as they occur. This book is a comprehensive guide to designing and architecting enterprise-grade streaming applications using Apache Kafka and other big data tools. It includes best practices for building such applications, and tackles some common challenges such as how to use Kafka efficiently and handle high data volumes with ease. This book first takes you through understanding the type messaging system and then provides a thorough introduction to Apache Kafka and its internal details. The second part of the book takes you through designing streaming application using various frameworks and tools such as Apache Spark, Apache Storm, and more. Once you grasp the basics, we will take you through more advanced concepts in Apache Kafka such as capacity planning and security. By the end of this book, you will have all the information you need to be comfortable with using Apache Kafka, and to design efficient streaming data applications with it. Style and approach A step-by –step, comprehensive guide filled with practical and real- world examples A handy reference guide for data analysts and data scientists to help to obtain value from big data analytics using Spark on Hadoop clusters About This Book This book is based on the latest 2.0 version of Apache Spark and 2.7 version of Hadoop integrated with most commonly used tools. Learn all Spark stack components including latest topics such as DataFrames, DataSets,

GraphFrames, Structured Streaming, DataFrame based ML Pipelines and SparkR. Integrations with frameworks such as HDFS, YARN and tools such as Jupyter, Zeppelin, NiFi, Mahout, HBase Spark Connector, GraphFrames, H2O and Hivemall. Who This Book Is For Though this book is primarily aimed at data analysts and data scientists, it will also help architects, programmers, and practitioners. Knowledge of either Spark or Hadoop would be beneficial. It is assumed that you have basic programming background in Scala, Python, SQL, or R programming with basic Linux experience. Working experience within big data environments is not mandatory. What You Will Learn Find out and implement the tools and techniques of big data analytics using Spark on Hadoop clusters with wide variety of tools used with Spark and Hadoop Understand all the Hadoop and Spark ecosystem components Get to know all the Spark components: Spark Core, Spark SQL, DataFrames, DataSets, Conventional and Structured Streaming, MLLib, ML Pipelines and Graphx See batch and real-time data analytics using Spark Core, Spark SQL, and Conventional and Structured Streaming Get to grips with data science and machine learning using MLLib, ML Pipelines, H2O, Hivemall, Graphx, SparkR and Hivemall. In Detail Big Data Analytics book aims at providing the fundamentals of Apache Spark and Hadoop. All Spark components – Spark Core, Spark SQL, DataFrames, Data sets, Conventional Streaming, Structured Streaming, MLlib, Graphx and Hadoop core components – HDFS, MapReduce and Yarn are explored in greater depth with implementation examples on Spark + Hadoop clusters. It is moving away from MapReduce to Spark. So, advantages of Spark over MapReduce are explained at great depth to reap benefits of in-memory speeds. DataFrames API, Data Sources API and new Data set API are explained for building Big Data analytical applications. Real-time data analytics using Spark Streaming with Apache Kafka and HBase is covered to help building streaming applications. New Structured streaming concept is explained with an IOT (Internet of Things) use case. Machine learning techniques are covered using MLLib, ML Pipelines and SparkR and Graph Analytics are covered with GraphX and GraphFrames components of Spark. Readers will also get an opportunity to get started with web based notebooks such as Jupyter, Apache Zeppelin and data flow tool Apache NiFi to analyze and visualize data. Style and approach This step-by-step pragmatic guide will make life easy no matter what your level of experience. You will deep dive into Apache Spark on Hadoop clusters through ample exciting real-life examples. Practical tutorial explains data science in simple terms to help programmers and data analysts get started with Data Science With the continuing necessity of moving to many core architectures, it has become imperative for programming paradigms to evolve. Programming languages, compilers and architectures need to work together to make it easier to extract as much concurrency as possible from an application with little increase in programmer effort. Explore Kinesis managed services such as Kinesis Data Streams, Kinesis Data Analytics, Kinesis Data Firehose, and Kinesis Video Streams with the help of practical use cases Key FeaturesGet well versed with the capabilities of Amazon KinesisExplore the monitoring, scaling, security, and deployment patterns of various Amazon Kinesis servicesLearn how other Amazon Web Services and third-party applications such as Splunk can be used as destinations for Kinesis dataBook Description Amazon Kinesis is a collection of secure, serverless, durable, and highly available purpose-built data streaming services. This data streaming service provides APIs and client SDKs that enable you to produce and consume data at scale. Scalable Data Streaming with Amazon Kinesis begins with a quick overview of the core concepts of data streams, along with the essentials of the AWS Kinesis landscape. You'll then explore the requirements of the use case shown through the book to help you get started and cover the key pain points encountered in the data stream life cycle. As you advance, you'll get to grips with the architectural components of Kinesis, understand how they are configured to build data pipelines, and delve into the applications that connect to them for consumption and processing. You'll also build a Kinesis data pipeline from scratch and learn how to implement and apply practical solutions. Moving on, you'll learn how to configure Kinesis on a cloud platform. Finally, you'll learn how other AWS services can be integrated into Kinesis. These services include Redshift, Dynamo Database, AWS S3, Elastic Search, and third-party applications such as Splunk. By the end of this AWS book, you'll be able to build and deploy your own Kinesis data pipelines with

Kinesis Data Streams (KDS), Kinesis Data Firehose (KFH), Kinesis Video Streams (KVS), and Kinesis Data Analytics (KDA). What you will learnGet to grips with data streams, decoupled design, and real-time stream processingUnderstand the properties of KFH that differentiate it from other Kinesis servicesMonitor and scale KDS using CloudWatch metricsSecure KDA with identity and access management (IAM)Deploy KVS as infrastructure as code (IaC)Integrate services such as Redshift, Dynamo Database, and Splunk into KinesisWho this book is for This book is for solutions architects, developers, system administrators, data engineers, and data scientists looking to evaluate and choose the most performant, secure, scalable, and cost-effective data streaming technology to overcome their data ingestion and processing challenges on AWS. Prior knowledge of cloud architectures on AWS, data streaming technologies, and architectures is expected. Learn the right cutting-edge skills and knowledge to leverage Spark Streaming to implement a wide array of real-time, streaming applications. This book walks you through end-to-end real-time application development using real-world applications, data, and code. Taking an application-first approach, each chapter introduces use cases from a specific industry and uses publicly available datasets from that domain to unravel the intricacies of production-grade design and implementation. The domains covered in Pro Spark Streaming include social media, the sharing economy, finance, online advertising, telecommunication, and IoT. In the last few years, Spark has become synonymous with big data processing. DStreams enhance the underlying Spark processing engine to support streaming analysis with a novel micro-batch processing model. Pro Spark Streaming by Zubair Nabi will enable you to become a specialist of latency sensitive applications by leveraging the key features of DStreams, micro-batch processing, and functional programming. To this end, the book includes ready-to-deploy examples and actual code. Pro Spark Streaming will act as the bible of Spark Streaming. What You'll Learn Discover Spark Streaming application development and best practices Work with the low-level details of discretized streams Optimize production-grade deployments of Spark Streaming via configuration recipes and instrumentation using Graphite, collectd, and Nagios Ingest data from disparate sources including MQTT, Flume, Kafka, Twitter, and a custom HTTP receiver Integrate and couple with HBase, Cassandra, and Redis Take advantage of design patterns for side-effects and maintaining state across the Spark Streaming micro-batch model Implement real-time and scalable ETL using data frames, SparkSQL, Hive, and SparkR Use streaming machine learning, predictive analytics, and recommendations Mesh batch processing with stream processing via the Lambda architecture Who This Book Is For Data scientists, big data experts, BI analysts, and data architects. The purpose of this study is to propose a Markovian model to evaluate general P2P streaming applications with the assumption of chunk-delivery approach similar to Bit-Torrent file sharing applications. The state of the system was defined as the number of useful pieces in a peer's buffer. The model was numerically solved to find out the probability distribution of the number of useful pieces. The central theme of this study revolved around answering the question: what is the probability that a peer can play the stream continuously? This is one of the most important metrics to evaluate the performance of a streaming application. By finding the numerical solution of the Markov chain, we found that increasing the number of neighbours enhances the continuity to a certain threshold, after which the continuity improvement is marginal which complies with empirical results conducted with DONet, a data-driven overlay network for media streaming. We also found that increasing the buffer length increases the continuity but there is a trade-off because peers exchange information about the buffer map, hence increasing the buffer length increases the overhead. We discussed the continuity for both homogeneous and heterogeneous peers regarding the uploading bandwidth. Then we discussed the case when the first chunk is downloaded, but not played out because the playtime deadline was missed. We suggested a general approach for freezing and skipping the playback pointer, that can be used to take advantage of the available delay tolerance, finally given a specific configuration we measured the probability of sliding action, that could be used to initiate peers' adaptation process. Get started with Apache Flink, the open source framework that powers some of the world’s largest stream processing applications. With this practical book, you’ll explore the fundamental concepts of parallel stream processing and discover

how this technology differs from traditional batch data processing. Longtime Apache Flink committers Fabian Hueske and Vasia Kalavri show you how to implement scalable streaming applications with Flink's DataStream API and continuously run and maintain these applications in operational environments. Stream processing is ideal for many use cases, including low-latency ETL, streaming analytics, and real-time dashboards as well as fraud detection, anomaly detection, and alerting. You can process continuous data of any kind, including user interactions, financial transactions, and IoT data, as soon as you generate them. Learn concepts and challenges of distributed stateful stream processing Explore Flink's system architecture, including its event-time processing mode and fault-tolerance model Understand the fundamentals and building blocks of the DataStream API, including its time-based and statefuloperators Read data from and write data to external systems with exactly-once consistency Deploy and configure Flink clusters Operate continuously running streaming applications Before you can build analytics tools to gain quick insights, you first need to know how to process data in real time. With this practical guide, developers familiar with Apache Spark will learn how to put this in-memory framework to use for streaming data. You'll discover how Spark enables you to write streaming jobs in almost the same way you write batch jobs. Authors Gerard Maas and François Garillot help you explore the theoretical underpinnings of Apache Spark. This comprehensive guide features two sections that compare and contrast the streaming APIs Spark now supports: the original Spark Streaming library and the newer Structured Streaming API. Learn fundamental stream processing concepts and examine different streaming architectures Explore Structured Streaming through practical examples; learn different aspects of stream processing in detail Create and operate streaming jobs and applications with Spark Streaming; integrate Spark Streaming with other Spark APIs Learn advanced Spark Streaming techniques, including approximation algorithms and machine learning algorithms Compare Apache Spark to other stream processing projects, including Apache Storm, Apache Flink, and Apache Kafka Streams This book constitutes the refereed proceedings of the 5th European Workshop on Wireless Sensor Networks, EWSN 2008, held in Bologna, Italy, in January/February 2008. The 23 revised full papers presented were carefully reviewed and selected from 110 submissions. The papers are organized in topical sections on localization, detection of space/time correlated events, network coding, ZigBee, topology, software, as well as deployment and application development. "The Spring Framework is one of the most widely used open source projects in the Java world. It combines dependency injection and lifecycle management with a large library of useful classes to provide enterprise services like transactions, security, and persistence. The Spring Boot project added powerful auto-configuration capabilities to the framework, making it easy to create and customize applications, including RESTful microservices. The Spring 5 and Spring Boot 2 releases brought the Reactive Streams standard to the overall architecture. The reactive approach in Spring adds nonblocking, asynchronous capabilities to the framework, with backpressure, in a way consistent with the new Java 9 specification. This intermediate-level video course shows you how to write applications in the new reactive style by taking advantage of the capabilities now available in Spring and Spring Boot. Participants should be comfortable with lambdas, streams, and method references in Java 8; they should also have a basic understanding of the Spring framework in any version prior to 5."--Resource description page. "Spark is one of todays most popular distributed computation engines for processing and analyzing big data. This course provides data engineers, data scientist and data analysts interested in exploring the technology of data streaming with practical experience in using Spark. You'll learn about the Spark Structured Streaming API, the powerful Catalyst query optimizer, the Tungsten execution engine, and more in this hands-on course where youll build small several applications that leverage all the aspects of Spark 2.0. While not a requirement, the course works best for those with some Scala experience."--Resource description page. * Learn the end-to-end process, starting with capture from a video or audio source through to the consumer's media player * A quick-start quide to streaming media technologies * How to monetize content and protect revenue with digital rights management For broadcasters, web developers, project managers implementing streaming media systems, David

Austerberry shows how to deploy the technology on your site, from video and audio capture through to the consumer's media player. The book first deals with Internet basics and gives a thorough coverage of telecommunications networks and the last mile to the home. Video and audio formats are covered, as well as compression standards including Windows Media and MPEG-4. The book then guides you through the streaming process, showing in-depth how to encode audio and video. The deployment of media servers, live webcasting and how the stream is displayed by the consumer's media player are also covered. A final section on associated technologies illustrates how you can protect your revenue sources with digital rights management, looks at content delivery networks and provides examples of successful streaming applications. The supporting website, www.davidausterberry.com/streaming.html, offers updated links to sources of information, manufacturers and suppliers. David Austerberry is co-owner of the new media communications consultancy, Informed Sauce. He has worked with streaming media since the late nineties. Before that, he has been product manager for a number of broadcast equipment manufacturers, and formerly had many years with a leading broadcaster. Get Streaming with this fun, easy-to-read guide! Streaming your audio and video online is inexpensive, easy, and fun. Get the fast results you need with Get Streaming! - a step-by-step, introductory level book that gets you up and running today. Streaming media technology is growing into an indispensable part of a successful business communications strategy. This book will not only give you a professional boost, it will help you deliver your home videos to family and friends anywhere in the world! Why slog through a technology tome for weeks when you can start right now with the simple, easy-to-follow procedures in this book. Use the comprehensive glossary of terms with one sentence definitions to lay the foundation for your streaming know-how. You'll take away a practical understanding of streaming media without feeling overwhelmed by confusing detail. Tips and insights from leading streaming pros are also at your fingertips. Whether you want to stream a corporate video, home videos, or your favorite music for friends - after reading this book, you will: * Understand the three steps of streaming: Capture, Encode, Broadcast * Install free streaming software, capture raw media, encode into a streamable file, place that file on a streaming server, and link it all up to the Internet! * Know the fundamentals of how the Internet works in relation to streaming media * Build simple, effective streaming applications with free tools * Learn how to make the right streaming media technology choices, including codecs, for your specific situation * Understand RealVideo, Windows Media, QuickTime, Flash MX and MPEG-4 software * Make informed choices from among the leading streaming media content creation tools made by RealNetworks, Microsoft, Apple Computer, and Macromedia * Master the steps for creating on-demand streaming audio and video files as well as learning about live audio and video streaming * Understand the computer hardware and Internet bandwidth you'll need for maximum success * Glimpse the future business and career opportunities in the expanding streaming media field. Acceleration of streaming applications on FPGAs from high level constructs. Summary Kafka Streams in Action teaches you everything you need to know to implement stream processing on data flowing into your Kafka platform, allowing you to focus on getting more from your data without sacrificing time or effort. Foreword by Neha Narkhede, Cocreator of Apache Kafka Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the Technology Not all stream-based applications require a dedicated processing cluster. The lightweight Kafka Streams library provides exactly the power and simplicity you need for message handling in microservices and real-time event processing. With the Kafka Streams API, you filter and transform data streams with just Kafka and your application. About the Book Kafka Streams in Action teaches you to implement stream processing within the Kafka platform. In this easy-to-follow book, you'll explore real-world examples to collect, transform, and aggregate data, work with multiple processors, and handle real-time events. You'll even dive into streaming SQL with KSQL! Practical to the very end, it finishes with testing and operational aspects, such as monitoring and debugging. What's inside Using the KStreams API Filtering, transforming, and splitting data Working with the Processor API Integrating with external systems About the Reader Assumes some experience with distributed systems. No

knowledge of Kafka or streaming applications required. About the Author Bill Bejeck is a Kafka Streams contributor and Confluent engineer with over 15 years of software development experience. Table of Contents PART 1 - GETTING STARTED WITH KAFKA STREAMS Welcome to Kafka Streams Kafka quicklyPART 2 - KAFKA STREAMS DEVELOPMENT Developing Kafka Streams Streams and state The KTable API The Processor APIPART 3 - ADMINISTERING KAFKA STREAMS Monitoring and performance Testing a Kafka Streams applicationPART 4 - ADVANCED CONCEPTS WITH KAFKA STREAMS Advanced applications with Kafka StreamsAPPENDIXES Appendix A - Additional configuration information Appendix B - Exactly once semantics Designing and writing a real-time streaming publication with Apache Apex About This Book Get a clear, practical approach to real-time data processing Program Apache Apex streaming applications This book shows you Apex integration with the open source Big Data ecosystem Who This Book Is For This book assumes knowledge of application development with Java and familiarity with distributed systems. Familiarity with other real-time streaming frameworks is not required, but some practical experience with other big data processing utilities might be helpful. What You Will Learn Put together a functioning Apex application from scratch Scale an Apex application and configure it for optimal performance Understand how to deal with failures via the fault tolerance features of the platform Use Apex via other frameworks such as Beam Understand the DevOps implications of deploying Apex In Detail Apache Apex is a next-generation stream processing framework designed to operate on data at large scale, with minimum latency, maximum reliability, and strict correctness guarantees. Half of the book consists of Apex applications, showing you key aspects of data processing pipelines such as connectors for sources and sinks, and common data transformations. The other half of the book is evenly split into explaining the Apex framework, and tuning, testing, and scaling Apex applications. Much of our economic world depends on growing streams of data, such as social media feeds, financial records, data from mobile devices, sensors and machines (the Internet of Things - IoT). The projects in the book show how to process such streams to gain valuable, timely, and actionable insights. Traditional use cases, such as ETL, that currently consume a significant chunk of data engineering resources are also covered. The final chapter shows you future possibilities emerging in the streaming space, and how Apache Apex can contribute to it. Style and approach This book is divided into two major parts: first it explains what Apex is, what its relevant parts are, and how to write well-built Apex applications. The second part is entirely application-driven, walking you through Apex applications of increasing complexity. This book provides both a basic understanding of stream processing in general, and practical guidance for development and research with Apache Heron in particular. It delivers to developers of streaming applications basic and systematic knowledge about Heron, which is today only scattered across project documents, technique blogs and code snippets on the Web. The book is organized in four parts: Part I describes basic knowledge about stream processing, Apache Storm, and Apache Heron (Incubating), and also introduces the Heron source repository. Part II then goes into details and describes two data models to write Heron topologies and often used topology features, including stateful processing. This part is especially targeted at software developers who write topologies using Heron APIs. Next, part III describes Heron tools, including the command-line interface and the user interface, needed to manage a single topology or multiple topologies in a data center. This part is particularly aimed at operators who deploy and manage running jobs. Eventually, part IV describes the Heron source code and how to customize or extend Heron. This part is especially suggested for software engineers who would like to contribute code to the Heron repository and who are curious about Heron insights. Overall, this book aims at professionals who want to process streaming data based on Apache Heron. A basic knowledge of Java and Bash commands for Linux is assumed. Summary Streaming Data introduces the concepts and requirements of streaming and real-time data systems. The book is an idea-rich tutorial that teaches you to think about how to efficiently interact with fast-flowing data. Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the Technology As humans, we're constantly filtering and deciphering the information streaming toward us. In the same way, streaming data applications can accomplish amazing tasks

like reading live location data to recommend nearby services, tracking faults with machinery in real time, and sending digital receipts before your customers leave the shop. Recent advances in streaming data technology and techniques make it possible for any developer to build these applications if they have the right mindset. This book will let you join them. About the Book Streaming Data is an idea-rich tutorial that teaches you to think about efficiently interacting with fast-flowing data. Through relevant examples and illustrated use cases, you'll explore designs for applications that read, analyze, share, and store streaming data. Along the way, you'll discover the roles of key technologies like Spark, Storm, Kafka, Flink, RabbitMQ, and more. This book offers the perfect balance between big-picture thinking and implementation details. What's Inside The right way to collect real-time data Architecting a streaming pipeline Analyzing the data Which technologies to use and when About the Reader Written for developers familiar with relational database concepts. No experience with streaming or real-time applications required. About the Author Andrew Psaltis is a software engineer focused on massively scalable real-time analytics. Table of Contents PART 1 - A NEW HOLISTIC APPROACH Introducing streaming data Getting data from clients: data ingestion Transporting the data from collection tier: decoupling the data pipeline Analyzing streaming data Algorithms for data analysis Storing the analyzed or collected data Making the data available Consumer device capabilities and limitations accessing the data PART 2 - TAKING IT REAL WORLD Analyzing Meetup RSVPs in real time This comprehensive volume provides state-of-the art guidance on Quality of Service (QoS) and Quality of end-user Experience (QoE) management in UMTS cellular systems, tackling planning, provisioning, monitoring and optimisation issues in a single accessible resource. In addition, a detailed discussion is provided on service applications, QoS concept, architecture and functions in access, packet & circuit switched core and backbone networks. Defines and explains the differences between QoS and QoE, and end-to-end concept, based on the premise that it is the end-user who is the ultimate beneficiary of QoS. Covers QoS and QoE issues related to present and forthcoming service applications, including multimedia messaging service (MMS), Video Sharing (VS), content download, business connectivity, Push to talk over Cellular (PoC), Voice over IP (VoIP), presence, instant messaging, gaming, streaming and browsing. Presents QoS concepts and architecture as defined in 3GPP Releases 97/98, 99, 5, 6, and 7, and provides a comprehensive description of protocols and packet data transfer across WCDMA evolved and (E)GPRS networks. Discusses service driven radio network planning aspects for (E)GPRS and WCDMA. Includes three detailed chapters covering concepts, means and methods for QoS provisioning, QoS & QoE performance monitoring and optimisation. This book is aimed at operators, vendors, deployers, consultants and managers specialising in the research, development, implementation, marketing and sales of products and tools for QoS and QoE management in UMTS networks. It will also be of interest to postgraduate students and researchers in the field of telecommunications and specialising in UMTS QoS and QoE principles and practices. "This book spans a number of interdependent and emerging topics in streaming media, offering a comprehensive collection of topics including media coding, wireless/mobile video, P2P media streaming, and applications of streaming media"--Provided by publisher. Every enterprise application creates data, including log messages, metrics, user activity, and outgoing messages. Learning how to move these items is almost as important as the data itself. If you're an application architect, developer, or production engineer new to Apache Pulsar, this practical guide shows you how to use this open source event streaming platform to handle real-time data feeds. Jowanza Joseph, staff software engineer at Finicity, explains how to deploy production Pulsar clusters, write reliable event streaming applications, and build scalable real-time data pipelines with this platform. Through detailed examples, you'll learn Pulsar's design principles, reliability guarantees, key APIs, and architecture details, including the replication protocol, the load manager, and the storage layer. This book helps you: Understand how event streaming fits in the big data ecosystem Explore Pulsar producers, consumers, and readers for writing and reading events Build scalable data pipelines by connecting Pulsar with external systems Simplify event-streaming application building with Pulsar Functions Manage Pulsar to perform monitoring, tuning, and maintenance tasks Use Pulsar's

operational measurements to secure a production cluster Process event streams using Flink and query event streams using Presto Working with unbounded and fast-moving data streams has historically been difficult. But with Kafka Streams and ksqlDB, building stream processing applications is easy and fun. This practical guide shows data engineers how to use these tools to build highly scalable stream processing applications for moving, enriching, and transforming large amounts of data in real time. Mitch Seymour, data services engineer at Mailchimp, explains important stream processing concepts against a backdrop of several interesting business problems. You'll learn the strengths of both Kafka Streams and ksqlDB to help you choose the best tool for each unique stream processing project. Non-Java developers will find the ksqlDB path to be an especially gentle introduction to stream processing. Learn the basics of Kafka and the pub/sub communication pattern Build stateless and stateful stream processing applications using Kafka Streams and ksqlDB Perform advanced stateful operations, including windowed joins and aggregations Understand how stateful processing works under the hood Learn about ksqlDB's data integration features, powered by Kafka Connect Work with different types of collections in ksqlDB and perform push and pull queries Deploy your Kafka Streams and ksqlDB applications to production Researchers in data management have recently recognized the importance of a new class of data-intensive applications that requires managing data streams, i.e., data composed of continuous, real-time sequence of items. Streaming applications pose new and interesting challenges for data management systems. Such application domains require queries to be evaluated continuously as opposed to the one time evaluation of a query for traditional applications. Streaming data sets grow continuously and queries must be evaluated on such unbounded data sets. These, as well as other challenges, require a major rethink of almost all aspects of traditional database management systems to support streaming applications. Stream Data Management comprises eight invited chapters by researchers active in stream data management. The collected chapters provide exposition of algorithms, languages, as well as systems proposed and implemented for managing streaming data. Stream Data Management is designed to appeal to researchers or practitioners already involved in stream data management, as well as to those starting out in this area. This book is also suitable for graduate students in computer science interested in learning about stream data management. This book provides a comprehensive overview of core concepts and technological foundations for continuous engineering of Web streams. It presents various systems and applications and includes real-world examples. Last not least, it introduces the readers to RSP4J, a novel open-source project that aims to gather community efforts in software engineering and empirical research. The book starts with an introductory chapter that positions the work by explaining what motivates the design of specific techniques for processing data streams using Web technologies. Chapter 2 briefly summarizes the necessary background concepts and models needed to understand the remaining content of the book. Subsequently, chapter 3 focuses on processing RDF streams, taming data velocity in an open environment characterized by high data variety. It introduces query answering algorithms with RSP-QL and analytics functions over streaming data. Chapter 4 presents the life cycle of streaming linked data, it focuses on publishing streams on the Web as a prerequisite aspect to make data findable and accessible for applications. Chapter 5 touches on the problems of benchmarks and systems that analyze Web streams to foster technological progress. It surveys existing benchmarks and introduces guidelines that may support new practitioners in approaching the issue of continuous analytics. Finally, chapter 6 presents a list of examples and exercises that will help the reader to approach the area, get used to its practices and become confident in its technological possibilities. Overall, this book is mainly written for graduate students and researchers in Web and stream data management. It collects research results and will guide the next generation of researchers and practitioners. This book provides a comprehensive overview of the state-of-the-art, data flow-based techniques for the analysis, modeling and mapping technologies of concurrent applications on multi-processors. The authors present a flow for designing embedded hard/firm real-time multiprocessor streaming applications, based on data flow formalisms, with a particular focus on wireless modem applications. Architectures are described for the design tools and run-time

scheduling and resource management of such a platform. The second focus of the study is Video-on-Demand applications. A characteristic of VoD traffic is its high redundancy. Due to the demand on popular content, the same video traffic flows through Internet Service Provider's network as overlapping but separate streams. In previous studies on redundancy elimination, overlapping streams are merged into each other in link-level by receiving the packet only for the first stream, and re-using it for the subsequent duplicated streams. In this study, we significantly improve these techniques by introducing a merger-aware routing method.

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