

## Intro To Apache Spark

Apache Spark is amazing when everything clicks. But if you haven't seen the performance improvements you expected, or still don't feel confident enough to use Spark in production, this practical book is for you. Authors Holden Karau and Rachel Warren demonstrate performance optimizations to help your Spark queries run faster and handle larger data sizes, while using fewer resources. Ideal for software engineers, data engineers, developers, and system administrators working with large-scale data applications, this book describes techniques that can reduce data infrastructure costs and developer hours. Not only will you gain a more comprehensive understanding of Spark, you'll also learn how to make it sing. With this book, you'll explore: How Spark SQL's new interfaces improve performance over SQL's RDD data structure The choice between data joins in Core Spark and Spark SQL Techniques for getting the most out of standard RDD transformations How to work around performance issues in Spark's key/value pair paradigm Writing high-performance Spark code without Scala or the JVM How to test for functionality and performance when applying suggested improvements Using Spark MLlib and Spark ML machine learning libraries Spark's Streaming components and external community packages

Discover how graph algorithms can help you leverage the relationships within your data to develop more intelligent solutions and enhance your machine learning models. You'll learn how graph analytics are uniquely suited to unfold complex structures and reveal difficult-to-find patterns lurking in your data. Whether you are trying to build dynamic network models or forecast real-world behavior, this book illustrates how graph algorithms deliver value—from finding vulnerabilities and bottlenecks to detecting communities and improving machine learning predictions. This practical book walks you through hands-on examples of how to use graph algorithms in Apache Spark and Neo4j—two of the most common choices for graph analytics. Also included: sample code and tips for over 20 practical graph algorithms that cover optimal pathfinding, importance through centrality, and community detection. Learn how graph analytics vary from conventional statistical analysis Understand how classic graph algorithms work, and how they are applied Get guidance on which algorithms to use for different types of questions Explore algorithm examples with working code and sample datasets from Spark and Neo4j See how connected feature extraction can increase machine learning accuracy and precision Walk through creating an ML workflow for link prediction combining Neo4j and Spark

"Apache Hadoop is helping drive the Big Data revolution. Now, its data processing has been completely overhauled: Apache Hadoop YARN provides resource management at data center scale and easier ways to create distributed applications that process petabytes of data. And now in Apache Hadoop™ YARN, two Hadoop technical leaders show you how to develop new applications and adapt existing code to fully leverage these revolutionary advances." -- From the Amazon

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

Ready to use statistical and machine-learning techniques across large data sets? This practical guide shows you why the Hadoop ecosystem is perfect for the job. Instead of deployment, operations, or software development usually associated with distributed computing, you'll focus on particular analyses you can build, the data warehousing techniques that Hadoop provides, and higher order data workflows this framework can produce. Data scientists and analysts will learn how to perform a wide range of techniques, from writing MapReduce and Spark applications with Python to using advanced modeling and data management with Spark MLlib, Hive, and HBase. You'll also learn about the analytical processes and data systems available to build and empower data products that can handle—and actually require—huge amounts of data. Understand core concepts behind Hadoop and cluster computing Use design patterns and parallel analytical algorithms to create distributed data analysis jobs Learn about data management, mining, and warehousing in a distributed context using Apache Hive and HBase Use Sqoop and Apache Flume to ingest data from relational databases Program complex Hadoop and Spark applications with Apache Pig and Spark DataFrames Perform machine learning techniques such as classification, clustering, and collaborative filtering with Spark's MLlib

Build data-intensive applications locally and deploy at scale using the combined powers of Python and Spark 2.0 About This Book Learn why and how you can efficiently use Python to process data and build machine learning models in Apache Spark 2.0

Develop and deploy efficient, scalable real-time Spark solutions Take your understanding of using Spark with Python to the next level with this jump start guide Who This Book Is For If you are a Python developer who wants to learn about the Apache Spark 2.0 ecosystem, this book is for you. A firm understanding of Python is expected to get the best out of the book. Familiarity with Spark would be useful, but is not mandatory. What You Will Learn Learn about Apache Spark and the Spark 2.0 architecture Build and interact with Spark DataFrames using Spark SQL Learn how to solve graph and deep learning problems using GraphFrames and TensorFrames respectively Read, transform, and understand data and use it to train machine learning models Build machine learning models with MLlib and ML Learn how to submit your applications programmatically using spark-submit Deploy locally built applications to a cluster In Detail Apache Spark is an open source framework for efficient cluster computing with a strong interface for data parallelism and fault tolerance. This book will show you how to leverage the power of Python and put it to use in the Spark ecosystem. You will start by getting a firm understanding of the Spark 2.0 architecture and how to set up a Python environment for Spark. You will get familiar with the

modules available in PySpark. You will learn how to abstract data with RDDs and DataFrames and understand the streaming capabilities of PySpark. Also, you will get a thorough overview of machine learning capabilities of PySpark using ML and MLlib, graph processing using GraphFrames, and polyglot persistence using Blaze. Finally, you will learn how to deploy your applications to the cloud using the spark-submit command. By the end of this book, you will have established a firm understanding of the Spark Python API and how it can be used to build data-intensive applications.

**Style and approach** This book takes a very comprehensive, step-by-step approach so you understand how the Spark ecosystem can be used with Python to develop efficient, scalable solutions. Every chapter is standalone and written in a very easy-to-understand manner, with a focus on both the hows and the whys of each concept.

**Work with Apache Spark using Scala** to deploy and set up single-node, multi-node, and high-availability clusters. This book discusses various components of Spark such as Spark Core, DataFrames, Datasets and SQL, Spark Streaming, Spark MLlib, and R on Spark with the help of practical code snippets for each topic. Practical Apache Spark also covers the integration of Apache Spark with Kafka with examples. You'll follow a learn-to-do-by-yourself approach to learning – learn the concepts, practice the code snippets in Scala, and complete the assignments given to get an overall exposure. On completion, you'll have knowledge of the functional programming aspects of Scala, and hands-on expertise in various Spark components. You'll also become familiar with machine learning algorithms with real-time usage.

**What You Will Learn**

- Discover the functional programming features of Scala
- Understand the complete architecture of Spark and its components
- Integrate Apache Spark with Hive and Kafka
- Use Spark SQL, DataFrames, and Datasets to process data using traditional SQL queries
- Work with different machine learning concepts and libraries using Spark's MLlib packages

**Who This Book Is For** Developers and professionals who deal with batch and stream data processing.

The professional's one-stop guide to this open-source, Java-based big data framework

**Professional Hadoop** is the complete reference and resource for experienced developers looking to employ Apache Hadoop in real-world settings. Written by an expert team of certified Hadoop developers, committers, and Summit speakers, this book details every key aspect of Hadoop technology to enable optimal processing of large data sets. Designed expressly for the professional developer, this book skips over the basics of database development to get you acquainted with the framework's processes and capabilities right away. The discussion covers each key Hadoop component individually, culminating in a sample application that brings all of the pieces together to illustrate the cooperation and interplay that make Hadoop a major big data solution. Coverage includes everything from storage and security to computing and user experience, with expert guidance on integrating other software and more. Hadoop is quickly reaching significant market usage, and more and more developers are being called upon to develop big data solutions using the Hadoop framework. This book covers the process from beginning to end, providing a crash course for professionals needing to learn and apply Hadoop quickly. Configure storage, UE, and in-memory computing

**Integrate Hadoop with other programs** including Kafka and Storm

**Master the fundamentals of Apache Big Top and Ignite**

**Build robust data security with expert tips and advice**

Hadoop's popularity is largely due to its accessibility. Open-source and

written in Java, the framework offers almost no barrier to entry for experienced database developers already familiar with the skills and requirements real-world programming entails. Professional Hadoop gives you the practical information and framework-specific skills you need quickly.

This IBM® Redbooks® publication provides topics to help the technical community take advantage of the resilience, scalability, and performance of the IBM Power Systems™ platform to implement or integrate an IBM Data Engine for Hadoop and Spark solution for analytics solutions to access, manage, and analyze data sets to improve business outcomes. This book documents topics to demonstrate and take advantage of the analytics strengths of the IBM POWER8® platform, the IBM analytics software portfolio, and selected third-party tools to help solve customer's data analytic workload requirements. This book describes how to plan, prepare, install, integrate, manage, and show how to use the IBM Data Engine for Hadoop and Spark solution to run analytic workloads on IBM POWER8. In addition, this publication delivers documentation to complement available IBM analytics solutions to help your data analytic needs. This publication strengthens the position of IBM analytics and big data solutions with a well-defined and documented deployment model within an IBM POWER8 virtualized environment so that customers have a planned foundation for security, scaling, capacity, resilience, and optimization for analytics workloads. This book is targeted at technical professionals (analytics consultants, technical support staff, IT Architects, and IT Specialists) that are responsible for delivering analytics solutions and support on IBM Power Systems.

If you're like most R users, you have deep knowledge and love for statistics. But as your organization continues to collect huge amounts of data, adding tools such as Apache Spark makes a lot of sense. With this practical book, data scientists and professionals working with large-scale data applications will learn how to use Spark from R to tackle big data and big compute problems. Authors Javier Luraschi, Kevin Kuo, and Edgar Ruiz show you how to use R with Spark to solve different data analysis problems. This book covers relevant data science topics, cluster computing, and issues that should interest even the most advanced users. Analyze, explore, transform, and visualize data in Apache Spark with R Create statistical models to extract information and predict outcomes; automate the process in production-ready workflows Perform analysis and modeling across many machines using distributed computing techniques Use large-scale data from multiple sources and different formats with ease from within Spark Learn about alternative modeling frameworks for graph processing, geospatial analysis, and genomics at scale Dive into advanced topics including custom transformations, real-time data processing, and creating custom Spark extensions

Analytics is increasingly an integral part of day-to-day operations at today's leading businesses, and transformation is also occurring through huge growth in mobile and digital channels. Enterprise organizations are attempting to leverage

analytics in new ways and transition existing analytics capabilities to respond with more flexibility while making the most efficient use of highly valuable data science skills. The recent growth and adoption of Apache Spark as an analytics framework and platform is very timely and helps meet these challenging demands. The Apache Spark environment on IBM z/OS® and Linux on IBM z Systems™ platforms allows this analytics framework to run on the same enterprise platform as the originating sources of data and transactions that feed it. If most of the data that will be used for Apache Spark analytics, or the most sensitive or quickly changing data is originating on z/OS, then an Apache Spark z/OS based environment will be the optimal choice for performance, security, and governance. This IBM® Redpaper™ publication explores the enterprise analytics market, use of Apache Spark on IBM z Systems™ platforms, integration between Apache Spark and other enterprise data sources, and case studies and examples of what can be achieved with Apache Spark in enterprise environments. It is of interest to data scientists, data engineers, enterprise architects, or anybody looking to better understand how to combine an analytics framework and platform on enterprise systems.

There's growing interest in learning how to analyze streaming data in large-scale systems such as web traffic, financial transactions, machine logs, industrial sensors, and many others. But analyzing data streams at scale has been difficult to do well—until now. This practical book delivers a deep introduction to Apache Flink, a highly innovative open source stream processor with a surprising range of capabilities. Authors Ellen Friedman and Kostas Tzoumas show technical and nontechnical readers alike how Flink is engineered to overcome significant tradeoffs that have limited the effectiveness of other approaches to stream processing. You'll also learn how Flink has the ability to handle both stream and batch data processing with one technology. Learn the consequences of not doing streaming well—in retail and marketing, IoT, telecom, and banking and finance. Explore how to design data architecture to gain the best advantage from stream processing. Get an overview of Flink's capabilities and features, along with examples of how companies use Flink, including in production. Take a technical dive into Flink, and learn how it handles time and stateful computation. Examine how Flink processes both streaming (unbounded) and batch (bounded) data without sacrificing performance.

Big Data Analytics with Spark is a step-by-step guide for learning Spark, which is an open-source fast and general-purpose cluster computing framework for large-scale data analysis. You will learn how to use Spark for different types of big data analytics projects, including batch, interactive, graph, and stream data analysis as well as machine learning. In addition, this book will help you become a much sought-after Spark expert. Spark is one of the hottest Big Data technologies. The amount of data generated today by devices, applications and users is exploding. Therefore, there is a critical need for tools that can analyze large-scale data and unlock value from it. Spark is a powerful technology that meets that need. You

can, for example, use Spark to perform low latency computations through the use of efficient caching and iterative algorithms; leverage the features of its shell for easy and interactive Data analysis; employ its fast batch processing and low latency features to process your real time data streams and so on. As a result, adoption of Spark is rapidly growing and is replacing Hadoop MapReduce as the technology of choice for big data analytics. This book provides an introduction to Spark and related big-data technologies. It covers Spark core and its add-on libraries, including Spark SQL, Spark Streaming, GraphX, and MLlib. Big Data Analytics with Spark is therefore written for busy professionals who prefer learning a new technology from a consolidated source instead of spending countless hours on the Internet trying to pick bits and pieces from different sources. The book also provides a chapter on Scala, the hottest functional programming language, and the program that underlies Spark. You'll learn the basics of functional programming in Scala, so that you can write Spark applications in it. What's more, Big Data Analytics with Spark provides an introduction to other big data technologies that are commonly used along with Spark, like Hive, Avro, Kafka and so on. So the book is self-sufficient; all the technologies that you need to know to use Spark are covered. The only thing that you are expected to know is programming in any language. There is a critical shortage of people with big data expertise, so companies are willing to pay top dollar for people with skills in areas like Spark and Scala. So reading this book and absorbing its principles will provide a boost—possibly a big boost—to your career.

Summary Spark in Action teaches you the theory and skills you need to effectively handle batch and streaming data using Spark. Fully updated for Spark 2.0. Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the Technology Big data systems distribute datasets across clusters of machines, making it a challenge to efficiently query, stream, and interpret them. Spark can help. It is a processing system designed specifically for distributed data. It provides easy-to-use interfaces, along with the performance you need for production-quality analytics and machine learning. Spark 2 also adds improved programming APIs, better performance, and countless other upgrades. About the Book Spark in Action teaches you the theory and skills you need to effectively handle batch and streaming data using Spark. You'll get comfortable with the Spark CLI as you work through a few introductory examples. Then, you'll start programming Spark using its core APIs. Along the way, you'll work with structured data using Spark SQL, process near-real-time streaming data, apply machine learning algorithms, and munge graph data using Spark GraphX. For a zero-effort startup, you can download the preconfigured virtual machine ready for you to try the book's code. What's Inside Updated for Spark 2.0 Real-life case studies Spark DevOps with Docker Examples in Scala, and online in Java and Python About the Reader Written for experienced programmers with some background in big data or

machine learning. About the Authors Petar Zečević and Marko Bonacci are seasoned developers heavily involved in the Spark community. Table of Contents

PART 1 - FIRST STEPS Introduction to Apache Spark Spark fundamentals Writing Spark applications The Spark API in depth

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PART 3 - SPARK OPS Running Spark Running on a Spark standalone cluster Running on YARN and Mesos

PART 4 - BRINGING IT TOGETHER Case study: real-time dashboard Deep learning on Spark with H2O Unleash the data processing and analytics capability of Apache Spark with the language of choice: Java

About This Book Perform big data processing with Spark—without having to learn Scala! Use the Spark Java API to implement efficient enterprise-grade applications for data processing and analytics Go beyond mainstream data processing by adding querying capability, Machine Learning, and graph processing using Spark Who This Book Is For If you are a Java developer interested in learning to use the popular Apache Spark framework, this book is the resource you need to get started. Apache Spark developers who are looking to build enterprise-grade applications in Java will also find this book very useful. What You Will Learn Process data using different file formats such as XML, JSON, CSV, and plain and delimited text, using the Spark core Library. Perform analytics on data from various data sources such as Kafka, and Flume using Spark Streaming Library Learn SQL schema creation and the analysis of structured data using various SQL functions including Windowing functions in the Spark SQL Library Explore Spark Mlib APIs while implementing Machine Learning techniques to solve real-world problems Get to know Spark GraphX so you understand various graph-based analytics that can be performed with Spark In Detail Apache Spark is the buzzword in the big data industry right now, especially with the increasing need for real-time streaming and data processing. While Spark is built on Scala, the Spark Java API exposes all the Spark features available in the Scala version for Java developers. This book will show you how you can implement various functionalities of the Apache Spark framework in Java, without stepping out of your comfort zone. The book starts with an introduction to the Apache Spark 2.x ecosystem, followed by explaining how to install and configure Spark, and refreshes the Java concepts that will be useful to you when consuming Apache Spark's APIs. You will explore RDD and its associated common Action and Transformation Java APIs, set up a production-like clustered environment, and work with Spark SQL. Moving on, you will perform near-real-time processing with Spark streaming, Machine Learning analytics with Spark MLlib, and graph processing with GraphX, all using various Java packages. By the end of the book, you will have a solid foundation in implementing components in the Spark framework in Java to build fast, real-time applications. Style and approach This practical guide teaches readers the fundamentals of the Apache Spark framework and how to implement

components using the Java language. It is a unique blend of theory and practical examples, and is written in a way that will gradually build your knowledge of Apache Spark.

If you want to build an enterprise-quality application that uses natural language text but aren't sure where to begin or what tools to use, this practical guide will help get you started. Alex Thomas, principal data scientist at Wisecube, shows software engineers and data scientists how to build scalable natural language processing (NLP) applications using deep learning and the Apache Spark NLP library. Through concrete examples, practical and theoretical explanations, and hands-on exercises for using NLP on the Spark processing framework, this book teaches you everything from basic linguistics and writing systems to sentiment analysis and search engines. You'll also explore special concerns for developing text-based applications, such as performance. In four sections, you'll learn NLP basics and building blocks before diving into application and system building:

- Basics: Understand the fundamentals of natural language processing, NLP on Apache Spark, and deep learning
- Building blocks: Learn techniques for building NLP applications—including tokenization, sentence segmentation, and named-entity recognition—and discover how and why they work
- Applications: Explore the design, development, and experimentation process for building your own NLP applications
- Building NLP systems: Consider options for productionizing and deploying NLP models, including which human languages to support

In this practical book, four Cloudera data scientists present a set of self-contained patterns for performing large-scale data analysis with Spark. The authors bring Spark, statistical methods, and real-world data sets together to teach you how to approach analytics problems by example. You'll start with an introduction to Spark and its ecosystem, and then dive into patterns that apply common techniques—classification, collaborative filtering, and anomaly detection among others—to fields such as genomics, security, and finance. If you have an entry-level understanding of machine learning and statistics, and you program in Java, Python, or Scala, you'll find these patterns useful for working on your own data applications. Patterns include:

- Recommending music and the Audioscrobbler data set
- Predicting forest cover with decision trees
- Anomaly detection in network traffic with K-means clustering
- Understanding Wikipedia with Latent Semantic Analysis
- Analyzing co-occurrence networks with GraphX
- Geospatial and temporal data analysis on the New York City Taxi Trips data
- Estimating financial risk through Monte Carlo simulation
- Analyzing genomics data and the BDG project
- Analyzing neuroimaging data with PySpark and Thunder

Data in all domains is getting bigger. How can you work with it efficiently? Recently updated for Spark 1.3, this book introduces Apache Spark, the open source cluster computing system that makes data analytics fast to write and fast to run. With Spark, you can tackle big datasets quickly through simple APIs in Python, Java, and Scala. This edition includes new information on Spark SQL, Spark Streaming, setup, and Maven coordinates. Written by the developers of Spark, this book will have data scientists and engineers up and running in no time. You'll learn how to express parallel jobs with just a few lines of code, and cover applications from simple batch jobs to stream processing and machine learning. Quickly dive into Spark capabilities such as distributed datasets, in-memory caching, and the interactive shell. Leverage Spark's powerful built-in libraries, including Spark SQL, Spark Streaming, and MLlib. Use one programming paradigm instead of mixing and matching tools like Hive, Hadoop, Mahout, and



Storm Learn how to deploy interactive, batch, and streaming applications Connect to data sources including HDFS, Hive, JSON, and S3 Master advanced topics like data partitioning and shared variables

Get started using Apache Spark via C# or F# and the .NET for Apache Spark bindings. This book is an introduction to both Apache Spark and the .NET bindings. Readers new to Apache Spark will get up to speed quickly using Spark for data processing tasks performed against large and very large datasets. You will learn how to combine your knowledge of .NET with Apache Spark to bring massive computing power to bear by distributed processing of extremely large datasets across multiple servers. This book covers how to get a local instance of Apache Spark running on your developer machine and shows you how to create your first .NET program that uses the Microsoft .NET bindings for Apache Spark. Techniques shown in the book allow you to use Apache Spark to distribute your data processing tasks over multiple compute nodes. You will learn to process data using both batch mode and streaming mode so you can make the right choice depending on whether you are processing an existing dataset or are working against new records in micro-batches as they arrive. The goal of the book is leave you comfortable in bringing the power of Apache Spark to your favorite .NET language. What You Will Learn Install and configure Spark .NET on Windows, Linux, and macOS Write Apache Spark programs in C# and F# using the .NET bindings Access and invoke the Apache Spark APIs from .NET with the same high performance as Python, Scala, and R Encapsulate functionality in user-defined functions Transform and aggregate large datasets Execute SQL queries against files through Apache Hive Distribute processing of large datasets across multiple servers Create your own batch, streaming, and machine learning programs Who This Book Is For .NET developers who want to perform big data processing without having to migrate to Python, Scala, or R; and Apache Spark developers who want to run natively on .NET and take advantage of the C# and F# ecosystems

No need to spend hours ploughing through endless data – let Spark, one of the fastest big data processing engines available, do the hard work for you. Key Features Get up and running with Apache Spark and Python Integrate Spark with AWS for real-time analytics Apply processed data streams to machine learning APIs of Apache Spark Book Description Processing big data in real time is challenging due to scalability, information consistency, and fault-tolerance. This book teaches you how to use Spark to make your overall analytical workflow faster and more efficient. You'll explore all core concepts and tools within the Spark ecosystem, such as Spark Streaming, the Spark Streaming API, machine learning extension, and structured streaming. You'll begin by learning data processing fundamentals using Resilient Distributed Datasets (RDDs), SQL, Datasets, and Dataframes APIs. After grasping these fundamentals, you'll move on to using Spark Streaming APIs to consume data in real time from TCP sockets, and integrate Amazon Web Services (AWS) for stream consumption. By the end of this book, you'll not only have understood how to use machine learning extensions and structured streams but you'll also be able to apply Spark in your own upcoming big data projects. What you will learn Write your own Python programs that can interact with Spark Implement data stream consumption using Apache Spark Recognize common operations in Spark to process known data streams Integrate Spark streaming with Amazon Web Services (AWS) Create a collaborative filtering model with the movielens dataset Apply processed data streams to Spark machine learning APIs Who this book is for Data Processing with Apache Spark is for you if you are a software engineer, architect, or IT professional who wants to explore distributed systems and big data analytics. Although you don't need any knowledge of Spark, prior experience of working with Python is recommended.

Solve Data Analytics Problems with Spark, PySpark, and Related Open Source Tools Spark is at the heart of today's Big Data revolution, helping data professionals supercharge efficiency and performance in a wide range of data processing and analytics tasks. In this guide, Big

Data expert Jeffrey Aven covers all you need to know to leverage Spark, together with its extensions, subprojects, and wider ecosystem. Aven combines a language-agnostic introduction to foundational Spark concepts with extensive programming examples utilizing the popular and intuitive PySpark development environment. This guide's focus on Python makes it widely accessible to large audiences of data professionals, analysts, and developers—even those with little Hadoop or Spark experience. Aven's broad coverage ranges from basic to advanced Spark programming, and Spark SQL to machine learning. You'll learn how to efficiently manage all forms of data with Spark: streaming, structured, semi-structured, and unstructured. Throughout, concise topic overviews quickly get you up to speed, and extensive hands-on exercises prepare you to solve real problems. Coverage includes:

- Understand Spark's evolving role in the Big Data and Hadoop ecosystems
- Create Spark clusters using various deployment modes
- Control and optimize the operation of Spark clusters and applications
- Master Spark Core RDD API programming techniques
- Extend, accelerate, and optimize Spark routines with advanced API platform constructs, including shared variables, RDD storage, and partitioning
- Efficiently integrate Spark with both SQL and nonrelational data stores
- Perform stream processing and messaging with Spark Streaming and Apache Kafka
- Implement predictive modeling with SparkR and Spark MLlib

Updated for the latest database management systems -- including MySQL 6.0, Oracle 11g, and Microsoft's SQL Server 2008 -- this introductory guide will get you up and running with SQL quickly. Whether you need to write database applications, perform administrative tasks, or generate reports, *Learning SQL, Second Edition*, will help you easily master all the SQL fundamentals. Each chapter presents a self-contained lesson on a key SQL concept or technique, with numerous illustrations and annotated examples. Exercises at the end of each chapter let you practice the skills you learn. With this book, you will:

- Move quickly through SQL basics and learn several advanced features
- Use SQL data statements to generate, manipulate, and retrieve data
- Create database objects, such as tables, indexes, and constraints, using SQL schema statements
- Learn how data sets interact with queries, and understand the importance of subqueries
- Convert and manipulate data with SQL's built-in functions, and use conditional logic in data statements

Knowledge of SQL is a must for interacting with data. With *Learning SQL*, you'll quickly learn how to put the power and flexibility of this language to work.

Apache Spark's speed, ease of use, sophisticated analytics, and multilanguage support makes practical knowledge of this cluster-computing framework a required skill for data engineers and data scientists. With this hands-on guide, anyone looking for an introduction to Spark will learn practical algorithms and examples using PySpark. In each chapter, author Mahmoud Parsian shows you how to solve a data problem with a set of Spark transformations and algorithms. You'll learn how to tackle problems involving ETL, design patterns, machine learning algorithms, data partitioning, and genomics analysis. Each detailed recipe includes PySpark algorithms using the PySpark driver and shell script. With this book, you will:

- Learn how to select Spark transformations for optimized solutions
- Explore powerful transformations and reductions including `reduceByKey()`, `combineByKey()`, and `mapPartitions()`
- Understand data partitioning for optimized queries
- Design machine learning algorithms including Naive Bayes, linear regression, and logistic regression
- Build and apply a model using PySpark design patterns
- Apply motif-finding algorithms to graph data
- Analyze graph data by using the GraphFrames API
- Apply PySpark algorithms to clinical and genomics data (such as DNA-Seq)

Take a journey toward discovering, learning, and using Apache Spark 3.0. In this book, you will gain expertise on the powerful and efficient distributed data processing engine inside of Apache Spark; its user-friendly, comprehensive, and flexible programming model for processing data in batch and streaming; and the scalable machine learning algorithms and practical utilities to build machine learning applications. *Beginning Apache Spark 3* begins by

explaining different ways of interacting with Apache Spark, such as Spark Concepts and Architecture, and Spark Unified Stack. Next, it offers an overview of Spark SQL before moving on to its advanced features. It covers tips and techniques for dealing with performance issues, followed by an overview of the structured streaming processing engine. It concludes with a demonstration of how to develop machine learning applications using Spark MLlib and how to manage the machine learning development lifecycle. This book is packed with practical examples and code snippets to help you master concepts and features immediately after they are covered in each section. After reading this book, you will have the knowledge required to build your own big data pipelines, applications, and machine learning applications. What You Will Learn Master the Spark unified data analytics engine and its various components Work in tandem to provide a scalable, fault tolerant and performant data processing engine Leverage the user-friendly and flexible programming model to perform simple to complex data analytics using dataframe and Spark SQL Develop machine learning applications using Spark MLlib Manage the machine learning development lifecycle using MLflow Who This Book Is For Data scientists, data engineers and software developers.

**Summary** The Spark distributed data processing platform provides an easy-to-implement tool for ingesting, streaming, and processing data from any source. In *Spark in Action, Second Edition*, you'll learn to take advantage of Spark's core features and incredible processing speed, with applications including real-time computation, delayed evaluation, and machine learning. Spark skills are a hot commodity in enterprises worldwide, and with Spark's powerful and flexible Java APIs, you can reap all the benefits without first learning Scala or Hadoop.

Purchase of the print book includes a free eBook in PDF, Kindle, and ePub formats from Manning Publications. About the technology Analyzing enterprise data starts by reading, filtering, and merging files and streams from many sources. The Spark data processing engine handles this varied volume like a champ, delivering speeds 100 times faster than Hadoop systems. Thanks to SQL support, an intuitive interface, and a straightforward multilanguage API, you can use Spark without learning a complex new ecosystem. About the book *Spark in Action, Second Edition*, teaches you to create end-to-end analytics applications. In this entirely new book, you'll learn from interesting Java-based examples, including a complete data pipeline for processing NASA satellite data. And you'll discover Java, Python, and Scala code samples hosted on GitHub that you can explore and adapt, plus appendixes that give you a cheat sheet for installing tools and understanding Spark-specific terms. What's inside Writing Spark applications in Java Spark application architecture Ingestion through files, databases, streaming, and Elasticsearch Querying distributed datasets with Spark SQL About the reader This book does not assume previous experience with Spark, Scala, or Hadoop. About the author Jean-Georges Perrin is an experienced data and software architect. He is France's first IBM Champion and has been honored for 12 consecutive years. Table of Contents PART 1 - THE THEORY CRIPPLED BY AWESOME EXAMPLES 1 So, what is Spark, anyway? 2 Architecture and flow 3 The majestic role of the dataframe 4 Fundamentally lazy 5 Building a simple app for deployment 6 Deploying your simple app PART 2 - INGESTION 7 Ingestion from files 8 Ingestion from databases 9 Advanced

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Gain expertise in processing and storing data by using advanced techniques with Apache Spark

About This Book- Explore the integration of Apache Spark with third party applications such as H2O, Databricks and Titan- Evaluate how Cassandra and Hbase can be used for storage- An advanced guide with a combination of instructions and practical examples to extend the most up-to date Spark functionalities

Who This Book Is For- If you are a developer with some experience with Spark and want to strengthen your knowledge of how to get around in the world of Spark, then this book is ideal for you. Basic knowledge of Linux, Hadoop and Spark is assumed. Reasonable knowledge of Scala is expected.

What You Will Learn- Extend the tools available for processing and storage- Examine clustering and classification using MLlib- Discover Spark stream processing via Flume, HDFS- Create a schema in Spark SQL, and learn how a Spark schema can be populated with data- Study Spark based graph processing using Spark GraphX- Combine Spark with H2O and deep learning and learn why it is useful- Evaluate how graph storage works with Apache Spark, Titan, HBase and Cassandra- Use Apache Spark in the cloud with Databricks and AWS

In Detail Apache Spark is an in-memory cluster based parallel processing system that provides a wide range of functionality like graph processing, machine learning, stream processing and SQL. It operates at unprecedented speeds, is easy to use and offers a rich set of data transformations. This book aims to take your limited knowledge of Spark to the next level by teaching you how to expand Spark functionality. The book commences with an overview of the Spark eco-system. You will learn how to use MLlib to create a fully working neural net for handwriting recognition. You will then discover how stream processing can be tuned for optimal performance and to ensure parallel processing. The book extends to show how to incorporate H2O for machine learning, Titan for graph based storage, Databricks for cloud-based Spark. Intermediate Scala based code examples are provided for Apache Spark module processing in a CentOS Linux and Databricks cloud environment.

Style and approach This book is an extensive guide to Apache Spark modules and tools and shows how Spark's functionality can be extended for real-time processing and storage with worked examples.

Data is bigger, arrives faster, and comes in a variety of formats—and it all needs to be processed at scale for analytics or machine learning. But how can you process such varied workloads efficiently? Enter Apache Spark. Updated to include Spark 3.0, this second edition shows data engineers and data scientists why structure and unification in Spark matters. Specifically, this book explains

how to perform simple and complex data analytics and employ machine learning algorithms. Through step-by-step walk-throughs, code snippets, and notebooks, you'll be able to: Learn Python, SQL, Scala, or Java high-level Structured APIs Understand Spark operations and SQL Engine Inspect, tune, and debug Spark operations with Spark configurations and Spark UI Connect to data sources: JSON, Parquet, CSV, Avro, ORC, Hive, S3, or Kafka Perform analytics on batch and streaming data using Structured Streaming Build reliable data pipelines with open source Delta Lake and Spark Develop machine learning pipelines with MLlib and productionize models using MLflow

Frank Kane's hands-on Spark training course, based on his bestselling Taming Big Data with Apache Spark and Python video, now available in a book.

Understand and analyze large data sets using Spark on a single system or on a cluster. About This Book Understand how Spark can be distributed across computing clusters Develop and run Spark jobs efficiently using Python A hands-on tutorial by Frank Kane with over 15 real-world examples teaching you Big Data processing with Spark Who This Book Is For If you are a data scientist or data analyst who wants to learn Big Data processing using Apache Spark and Python, this book is for you. If you have some programming experience in Python, and want to learn how to process large amounts of data using Apache Spark, Frank Kane's Taming Big Data with Apache Spark and Python will also help you. What You Will Learn Find out how you can identify Big Data problems as Spark problems Install and run Apache Spark on your computer or on a cluster Analyze large data sets across many CPUs using Spark's Resilient Distributed Datasets Implement machine learning on Spark using the MLlib library Process continuous streams of data in real time using the Spark streaming module Perform complex network analysis using Spark's GraphX library Use Amazon's Elastic MapReduce service to run your Spark jobs on a cluster In Detail Frank Kane's Taming Big Data with Apache Spark and Python is your companion to learning Apache Spark in a hands-on manner. Frank will start you off by teaching you how to set up Spark on a single system or on a cluster, and you'll soon move on to analyzing large data sets using Spark RDD, and developing and running effective Spark jobs quickly using Python. Apache Spark has emerged as the next big thing in the Big Data domain – quickly rising from an ascending technology to an established superstar in just a matter of years. Spark allows you to quickly extract actionable insights from large amounts of data, on a real-time basis, making it an essential tool in many modern businesses. Frank has packed this book with over 15 interactive, fun-filled examples relevant to the real world, and he will empower you to understand the Spark ecosystem and implement production-grade real-time Spark projects with ease. Style and approach Frank Kane's Taming Big Data with Apache Spark and Python is a hands-on tutorial with over 15 real-world examples carefully explained by Frank in a step-by-step manner. The examples vary in complexity, and you can move through them at your own pace.

Apache Spark is a fast, scalable, and flexible open source distributed processing engine for big data systems and is one of the most active open source big data projects to date. In just 24 lessons of one hour or less, Sams Teach Yourself Apache Spark in 24 Hours helps you build practical Big Data solutions that leverage Spark's amazing speed, scalability, simplicity, and versatility. This book's straightforward, step-by-step approach shows you how to deploy, program, optimize, manage, integrate, and extend Spark—now, and for years to come. You'll discover how to create powerful solutions encompassing cloud computing, real-time stream processing, machine learning, and more. Every lesson builds on what you've already learned, giving you a rock-solid foundation for real-world success. Whether you are a data analyst, data engineer, data scientist, or data steward, learning Spark will help you to advance your career or embark on a new career in the booming area of Big Data. Learn how to • Discover what Apache Spark does and how it fits into the Big Data landscape • Deploy and run Spark locally or in the cloud • Interact with Spark from the shell • Make the most of the Spark Cluster Architecture • Develop Spark applications with Scala and functional Python • Program with the Spark API, including transformations and actions • Apply practical data engineering/analysis approaches designed for Spark • Use Resilient Distributed Datasets (RDDs) for caching, persistence, and output • Optimize Spark solution performance • Use Spark with SQL (via Spark SQL) and with NoSQL (via Cassandra) • Leverage cutting-edge functional programming techniques • Extend Spark with streaming, R, and Sparkling Water • Start building Spark-based machine learning and graph-processing applications • Explore advanced messaging technologies, including Kafka • Preview and prepare for Spark's next generation of innovations

Instructions walk you through common questions, issues, and tasks; Q-and-As, Quizzes, and Exercises build and test your knowledge; "Did You Know?" tips offer insider advice and shortcuts; and "Watch Out!" alerts help you avoid pitfalls. By the time you're finished, you'll be comfortable using Apache Spark to solve a wide spectrum of Big Data problems.

Learn how to use, deploy, and maintain Apache Spark with this comprehensive guide, written by the creators of the open-source cluster-computing framework. With an emphasis on improvements and new features in Spark 2.0, authors Bill Chambers and Matei Zaharia break down Spark topics into distinct sections, each with unique goals. You'll explore the basic operations and common functions of Spark's structured APIs, as well as Structured Streaming, a new high-level API for building end-to-end streaming applications. Developers and system administrators will learn the fundamentals of monitoring, tuning, and debugging Spark, and explore machine learning techniques and scenarios for employing MLlib, Spark's scalable machine-learning library. Get a gentle overview of big data and Spark Learn about DataFrames, SQL, and Datasets—Spark's core APIs—through worked examples Dive into Spark's low-level APIs, RDDs, and execution of SQL and DataFrames Understand how Spark

runs on a cluster Debug, monitor, and tune Spark clusters and applications Learn the power of Structured Streaming, Spark's stream-processing engine Learn how you can apply MLlib to a variety of problems, including classification or recommendation

Apache Spark is a flexible in-memory framework that allows processing of both batch and real-time data. Its unified engine has made it quite popular for big data use cases. This book will help you to quickly get started with Apache Spark 2.0 and write efficient big data applications for a variety of use cases.

Mastering Spark with R The Complete Guide to Large-Scale Analysis and Modeling" O'Reilly Media, Inc."

Learn about the fastest-growing open source project in the world, and find out how it revolutionizes big data analytics About This Book Exclusive guide that covers how to get up and running with fast data processing using Apache Spark Explore and exploit various possibilities with Apache Spark using real-world use cases in this book Want to perform efficient data processing at real time? This book will be your one-stop solution. Who This Book Is For This guide appeals to big data engineers, analysts, architects, software engineers, even technical managers who need to perform efficient data processing on Hadoop at real time. Basic familiarity with Java or Scala will be helpful. The assumption is that readers will be from a mixed background, but would be typically people with background in engineering/data science with no prior Spark experience and want to understand how Spark can help them on their analytics journey. What You Will Learn Get an overview of big data analytics and its importance for organizations and data professionals Delve into Spark to see how it is different from existing processing platforms Understand the intricacies of various file formats, and how to process them with Apache Spark. Realize how to deploy Spark with YARN, MESOS or a Stand-alone cluster manager. Learn the concepts of Spark SQL, SchemaRDD, Caching and working with Hive and Parquet file formats Understand the architecture of Spark MLlib while discussing some of the off-the-shelf algorithms that come with Spark. Introduce yourself to the deployment and usage of SparkR. Walk through the importance of Graph computation and the graph processing systems available in the market Check the real world example of Spark by building a recommendation engine with Spark using ALS. Use a Telco data set, to predict customer churn using Random Forests. In Detail Spark juggernaut keeps on rolling and getting more and more momentum each day. Spark provides key capabilities in the form of Spark SQL, Spark Streaming, Spark ML and Graph X all accessible via Java, Scala, Python and R. Deploying the key capabilities is crucial whether it is on a Standalone framework or as a part of existing Hadoop installation and configuring with Yarn and Mesos. The next part of the journey after installation is using key components, APIs, Clustering, machine learning APIs, data pipelines, parallel programming. It is important to understand why each framework component is key, how widely it is being used, its stability and pertinent use cases. Once we understand the individual components, we will take a couple of real life advanced analytics examples such as 'Building a Recommendation system', 'Predicting customer churn' and so on. The objective of these real life examples is to give the reader confidence of using Spark for real-world problems. Style and approach With the help of practical examples and real-world use cases, this guide will take you from scratch to building efficient data applications using Apache Spark. You will learn all about this excellent data processing engine in a step-by-step manner, taking one aspect of it at a time. This highly practical guide will include how to work with data pipelines, dataframes, clustering, SparkSQL, parallel programming, and such insightful topics with the help of real-world use cases.

Combine advanced analytics including Machine Learning, Deep Learning Neural Networks and

Natural Language Processing with modern scalable technologies including Apache Spark to derive actionable insights from Big Data in real-time Key Features Make a hands-on start in the fields of Big Data, Distributed Technologies and Machine Learning Learn how to design, develop and interpret the results of common Machine Learning algorithms Uncover hidden patterns in your data in order to derive real actionable insights and business value Book Description Every person and every organization in the world manages data, whether they realize it or not. Data is used to describe the world around us and can be used for almost any purpose, from analyzing consumer habits to fighting disease and serious organized crime. Ultimately, we manage data in order to derive value from it, and many organizations around the world have traditionally invested in technology to help process their data faster and more efficiently. But we now live in an interconnected world driven by mass data creation and consumption where data is no longer rows and columns restricted to a spreadsheet, but an organic and evolving asset in its own right. With this realization comes major challenges for organizations: how do we manage the sheer size of data being created every second (think not only spreadsheets and databases, but also social media posts, images, videos, music, blogs and so on)? And once we can manage all of this data, how do we derive real value from it? The focus of Machine Learning with Apache Spark is to help us answer these questions in a hands-on manner. We introduce the latest scalable technologies to help us manage and process big data. We then introduce advanced analytical algorithms applied to real-world use cases in order to uncover patterns, derive actionable insights, and learn from this big data. What you will learn Understand how Spark fits in the context of the big data ecosystem Understand how to deploy and configure a local development environment using Apache Spark Understand how to design supervised and unsupervised learning models Build models to perform NLP, deep learning, and cognitive services using Spark ML libraries Design real-time machine learning pipelines in Apache Spark Become familiar with advanced techniques for processing a large volume of data by applying machine learning algorithms Who this book is for This book is aimed at Business Analysts, Data Analysts and Data Scientists who wish to make a hands-on start in order to take advantage of modern Big Data technologies combined with Advanced Analytics.

Ready to unlock the power of your data? With this comprehensive guide, you'll learn how to build and maintain reliable, scalable, distributed systems with Apache Hadoop. This book is ideal for programmers looking to analyze datasets of any size, and for administrators who want to set up and run Hadoop clusters. You'll find illuminating case studies that demonstrate how Hadoop is used to solve specific problems. This third edition covers recent changes to Hadoop, including material on the new MapReduce API, as well as MapReduce 2 and its more flexible execution model (YARN). Store large datasets with the Hadoop Distributed File System (HDFS) Run distributed computations with MapReduce Use Hadoop's data and I/O building blocks for compression, data integrity, serialization (including Avro), and persistence Discover common pitfalls and advanced features for writing real-world MapReduce programs Design, build, and administer a dedicated Hadoop cluster—or run Hadoop in the cloud Load data from relational databases into HDFS, using Sqoop Perform large-scale data processing with the Pig query language Analyze datasets with Hive, Hadoop's data warehousing system Take advantage of HBase for structured and semi-structured data, and ZooKeeper for building distributed systems

Develop applications for the big data landscape with Spark and Hadoop. This book also explains the role of Spark in developing scalable machine learning and analytics applications with Cloud technologies. Beginning Apache Spark 2 gives you an introduction to Apache Spark and shows you how to work with it. Along the way, you'll discover resilient distributed datasets (RDDs); use Spark SQL for structured data; and learn stream processing and build real-time applications with Spark Structured Streaming. Furthermore, you'll learn the fundamentals of



Spark ML for machine learning and much more. After you read this book, you will have the fundamentals to become proficient in using Apache Spark and know when and how to apply it to your big data applications. What You Will Learn Understand Spark unified data processing platform How to run Spark in Spark Shell or Databricks Use and manipulate RDDs Deal with structured data using Spark SQL through its operations and advanced functions Build real-time applications using Spark Structured Streaming Develop intelligent applications with the Spark Machine Learning library Who This Book Is For Programmers and developers active in big data, Hadoop, and Java but who are new to the Apache Spark platform.

"With its ability to perform fast, in-memory cluster computing, Apache Spark is emerging as a favorite technology for analytics on large datasets. This video workshop from Paco Nathan (host of the Just Enough Math workshop) provides developers with an introduction to Spark and its core APIs. By working with hands-on technical exercises, you'll get up to speed on how to use Spark for data exploration, analysis, and building big data applications in Python, Java, or Scala."--Resource description page.

"This video series highlights what's new in Apache 2.0 and reviews its core concepts. The course starts with a high-level overview of Spark's components and then dives into Spark 2.0's three main themes: simplicity, speed, and intelligence. The simplicity section describes how Spark 2.0 unifies the Spark APIs and Spark session, and how Spark 2.0 simplifies machine learning via ML pipelines. The speed section illustrates how Spark 2.0 improves Spark performance with the push toward whole-stage code generation. And the intelligence section provides a quick primer on Spark Streaming and an introduction to the concepts of Structured Streaming. The course is designed for data scientists and data engineers with some basic experience using machine learning tools such as Python scikit-learn."--Resource description page.

Get up to speed on Scala, the JVM language that offers all the benefits of a modern object model, functional programming, and an advanced type system. Packed with code examples, this comprehensive book shows you how to be productive with the language and ecosystem right away, and explains why Scala is ideal for today's highly scalable, data-centric applications that support concurrency and distribution. This second edition covers recent language features, with new chapters on pattern matching, comprehensions, and advanced functional programming. You'll also learn about Scala's command-line tools, third-party tools, libraries, and language-aware plugins for editors and IDEs. This book is ideal for beginning and advanced Scala developers alike. Program faster with Scala's succinct and flexible syntax Dive into basic and advanced functional programming (FP) techniques Build killer big-data apps, using Scala's functional combinators Use traits for mixin composition and pattern matching for data extraction Learn the sophisticated type system that combines FP and object-oriented programming concepts Explore Scala-specific concurrency tools, including Akka Understand how to develop rich domain-specific languages Learn good design techniques for building scalable and robust Scala applications

Deep Learning is a subset of Machine Learning where data sets with several layers of complexity can be processed. This book teaches you the different techniques using which deep learning solutions can be implemented at scale, on Apache Spark. This will help you gain experience of implementing your deep learning models in many real-world use cases.

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