Data Engineering on AWS

AWS Classroom Training

Course description

Data Engineering on AWS is a 3-day intermediate course, designed for professionals seeking a deep dive into data engineering practices and solutions on AWS. Through a balanced combination of theory, practical labs, and activities, participants learn to design, build, optimize, and secure data engineering solutions using AWS services. From foundational concepts to hands-on implementation of data lakes, data warehouses, and both batch and streaming data pipelines, this course equips data professionals with the skills needed to architect and manage modern data solutions at scale.

- Course level: Intermediate
- Duration: 3 day

Activities

This course includes presentations, demonstrations, hands-on labs, and group exercises.

Course objectives

In this course, you will learn to do the following:

- Understand the foundational roles and key concepts of data engineering, including data personas, data discovery, and relevant AWS services.
- Identify and explain the various AWS tools and services crucial for data engineering, encompassing orchestration, security, monitoring, CI/CD, IaC, networking, and cost optimization.
- Design and implement a data lake solution on AWS, including storage, data ingestion, transformation, and serving data for consumption.
- Optimize and secure a data lake solution by implementing open table formats, security measures, and troubleshooting common issues.
- Design and set up a data warehouse using Amazon Redshift Serverless, understanding its architecture, data ingestion, processing, and serving capabilities.
- Apply performance optimization techniques to data warehouses in Amazon Redshift, including monitoring, data optimization, query optimization, and orchestration.
- Manage security and access control for data warehouses in Amazon Redshift, understanding authentication, data security, auditing, and compliance.
- Design effective batch data pipelines using appropriate AWS services for processing and transforming data.
- Implement comprehensive strategies for batch data pipelines, covering data processing, transformation, integration, cataloging, and serving data for consumption.
- Optimize, orchestrate, and secure batch data pipelines, demonstrating advanced skills in data processing automation and security.
- Architect streaming data pipelines, understanding various use cases, ingestion, storage, processing, and analysis using AWS services.
- Optimize and secure streaming data solutions, including compliance considerations and access control.

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Intended audience

This course is designed for professionals who are interested in designing, building, optimizing, and securing data engineering solutions using AWS services.

Prerequisites

We recommend that attendees of this course have:

- Familiarity with basic machine learning concepts, such as supervised and unsupervised learning, regression, classification, and clustering algorithms.
- Working knowledge of Python programming language and common data science libraries like NumPy, Pandas, and Scikit-learn.
- Basic understanding of cloud computing concepts and familiarity with the AWS platform.
- Familiarity with SQL and relational databases is recommended but not mandatory.
- Experience with version control systems like Git is beneficial but not required.

Course outline

Day 1

Module 1: Data Engineering Roles and Key Concepts

- Role of a Data Engineer
- Key functions of a Data Engineer
- Data Personas
- Data Discovery
- AWS Data Services

Module 2: AWS Data Engineering Tools and Services

- Orchestration and Automation
- Data Engineering Security
- Monitoring
- Continuous Integration and Continuous Delivery
- Infrastructure as Code
- AWS Serverless Application Model
- Networking Considerations
- Cost Optimization Tools

Module 3: Designing and Implementing Data Lakes

- Data lake introduction
- Data lake storage
- Ingest data into a data lake
- Catalog data
- Transform data
- Server data for consumption

Hands-on lab: Setting up a Data Lake on AWS

Module 4: Optimizing and Securing a Data Lake Solution

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- Open Table Formats
- Security using AWS Lake Formation
- Setting permissions with Lake Formation
- Security and governance
- Troubleshooting

Hand-on lab: Automating Data Lake Creation using AWS Lake Formation Blueprints

Day 2

Module 5: Data Warehouse Architecture and Design Principles

- Introduction to data warehouses
- Amazon Redshift Overview
- Ingesting data into Redshift
- Processing data
- Serving data for consumption

Hands-on Lab: Setting up a Data Warehouse using Amazon Redshift Serverless

Module 6: Performance Optimization Techniques for Data Warehouses

- Monitoring and optimization options
- Data optimization in Amazon Redshift
- Query optimization in Amazon Redshift
- Orchestration options

Module 7: Security and Access Control for Data Warehouses

- Authentication and access control in Amazon Redshift
- Data security in Amazon Redshift
- Auditing and compliance in Amazon Redshift

Hands-on lab: Managing Access Control in Redshift

Module 8: Designing Batch Data Pipelines

- Introduction to batch data pipelines
- Designing a batch data pipeline
- AWS services for batch data processing

Module 9: Implementing Strategies for Batch Data Pipeline

- Elements of a batch data pipeline
- Processing and transforming data
- Integrating and cataloging your data
- Serving data for consumption

Hands-on lab: A Day in the Life of a Data Engineer

Day 3

Module 10: Optimizing, Orchestrating, and Securing Batch Data Pipelines

- Optimizing the batch data pipeline
- Orchestrating the batch data pipeline

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- Securing the batch data pipeline

Hands-on lab: Orchestrating Data Processing in Spark using AWS Step Functions

Module 11: Streaming Data Architecture Patterns

- Introduction to streaming data pipelines
- Ingesting data from stream sources
- Streaming data ingestion services
- Storing streaming data
- Processing Streaming Data
- Analyzing Streaming Data with AWS Services

Hands-on lab: Streaming Analytics with Amazon Managed Service for Apache Flink

Module 12: Optimizing and Securing Streaming Solutions

- Optimizing a streaming data solution
- Securing a streaming data pipeline
- Compliance considerations

Hands-on lab: Access Control with Amazon Managed Streaming for Apache Kafka

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