

Syllabus

Module 1: Introduction to Cloud Data Architecture

- **Overview of the Cloud Data Architect role**
Defining responsibilities, strategic impact on the organization, and position within the organizational structure.
- **Fundamental principles of cloud data architecture:**
High availability, scalability, reliability, data security, performance, and cost management.
- **Types of data architectures:**
Comparative review of traditional, cloud, hybrid, and multi-cloud architectures – characteristics, advantages, and disadvantages.
- **The relationship between data architecture and cloud services:** Cloud service models (IaaS, PaaS, SaaS) and their implementation in data architecture.

Module 2: Data Methodologies in the Cloud

- **Relevant development methodologies:**
Agile, DevOps, and DataOps in the context of cloud data projects – principles and practical implementation.
- **Data Lifecycle Management:**
Planning and implementing an effective and secure data lifecycle in the cloud using managed services.
- **Data Quality Management:**
Data quality dimensions, quality improvement processes, and use of automated tools in the cloud.
- **Data Governance:**
Data governance policies, roles and responsibilities, data catalog, data mesh, information security, and regulatory compliance in the cloud



Syllabus

Module 3: Cloud Data Storage: Technologies and Applications

- **Relational Databases (SQL Databases) in the cloud:**
In-depth review of managed services (RDS, Azure SQL Database, Cloud SQL), selection considerations, and practical implementation.
- **Non-Relational Databases (NoSQL Databases) in the cloud:**
Comprehensive review of NoSQL types (Document, Key-Value, Column-Family, Graph) and managed services (DynamoDB, Cosmos DB, Datastore, etc.), use cases, and selection considerations.
- **Data Warehouse in the cloud:**
Cloud Data Warehouse solutions (Snowflake, Redshift, BigQuery), architecture, advantages, data models, ETL/ELT tools, and implementation considerations.
- **Data Lake in the cloud:**
Cloud Data Lake architecture (S3, Data Lake Storage, Cloud Storage), advantages, use cases, data processing in Data Lake, and implementation considerations.
- **Selecting appropriate storage technology in the cloud:**
Selection criteria, use cases, and comparison between different storage technologies



Syllabus

Module 4: Advanced Data Architectures: Data Mesh and Data Lakehouse in the Cloud

- **Data Mesh in the cloud:**

Data Mesh principles (Domain Ownership, Data as a Product, Self-serve Data Platform, Federated Computational Governance), architecture, advantages, disadvantages, and implementation challenges in the cloud.

- **Data Lakehouse in the cloud:**

Evolution from Data Lake to Data Lakehouse, combining advantages, architecture, leading technologies (Databricks, Iceberg, Delta Lake), and implementation considerations in the cloud.

- **Comparison between architectural approaches:**

Comparative analysis between Data Mesh, Data Lakehouse, and Data Warehouse in the cloud – advantages, disadvantages, use cases, and selection considerations.

- **Case Studies and practical examples:**

Analysis of use cases and implementation examples of Data Mesh and Data Lakehouse in cloud projects.



Syllabus

Module 5: Types of Data Processing in the Cloud

- **Batch Processing in the cloud:**
Applications, cloud technologies (AWS Batch, Azure Batch, managed Hadoop/Spark), advantages, disadvantages, and cost optimization.
- **Stream Processing in the cloud:**
Applications (IoT, real-time monitoring), cloud technologies (managed Kafka, Kinesis, Event Hubs, managed Flink), advantages, disadvantages, and selection considerations.
- **Real-time Processing and Micro-batch Processing in the cloud:**
Characteristics, applications, relevant technologies (Fast Data Platforms, Serverless Functions), and implementation considerations.
- **Selecting the appropriate processing type in the cloud:**
Selection criteria, use cases, and guidance for informed decision-making.

Module 6: Information Security and AI Implementation in Cloud Data Architecture

- **Information security in cloud data architecture:**
Shared responsibility model, identity and access services (IAM), data security at rest and in transit, network security, compliance, and regulation.
- **Introduction to working with AI in cloud data architecture:**
Overview of AI/ML services in the cloud, data architecture for AI/ML applications, the role of the data architect in AI/ML projects, and future trends (Serverless AI, AutoML).



Syllabus

Module 7: Analysis of Sample Architecture Documents and Case Studies

- **Architecture document analysis:**

Review and analysis of real architecture documents of cloud data solutions from leading companies.

- **Case Studies:**

Analysis of case studies of cloud data architecture implementations in various industries – business challenges, architectural solutions, and results.

- **Open discussion and in-depth analysis:**

Open classroom discussion, breaking down architectures, understanding design considerations, trade-offs, and key lessons.

Module 8: Summary, Future Trends & Final Project

- **Course summary:**

Review of key concepts and acquired skills.

- **Future trends in cloud data architecture:**

Overview of key technological trends and their impact on the field.

- **Final project guidelines:**

Presentation of requirements, goals, evaluation criteria, and brainstorming for project ideas.

Final Project

Practical application of knowledge acquired in the course in planning cloud data architecture for a defined business scenario. The project includes requirements analysis, logical and physical architecture design, selection of cloud technologies, documentation, and project presentation.



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