Data Architecture

Fundamentals

By

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Module 0. About the Course (5 min)

Module 1. Introduction to Data Architecture (49 mins)
- *Architecture Concepts*
  - What is Architecture? Part 1 & 2
  - Architecture Examples
  - Why We Need Architecture
- *Data Architecture Concepts*
  - Data Architecture Defined
  - Data Architecture as Design
  - Data Architecture as Method
  - Evolution of Data Architecture – A Timeline Perspective
  - Why Data Architecture?
  - The Business Case for Data Architecture Part 1 & 2
  - The Technical Case for Data Architecture Part 1 & 2
- *Data Architecture Context*
  - Enterprise Architecture – Where Does Data Architecture Fit
  - Business Capabilities – How Do They Influence Architecture
  - Business Capabilities – Some Examples
  - Data Capabilities – What is Needed to Support Business Capabilities?
  - Data Capabilities – What is Needed for Effective Data Management?
  - The Human Side of Data Architecture: People
  - The Human Side of Data Architecture: Culture
  - Data Architecture and Data Governance
  - Data Architecture and Metadata
- *Data Architecture Perspectives*
  - Six Perspectives on Data Architecture Part 1 & 2
- *Data Architecture Products*
  - Data Models
  - Semantic Models
  - Process Models
  - Architectural Frameworks
  - Standards & Guidelines
- *Applied Data Architecture*
  - Data Strategy
  - Use & Reuse
  - Data Management
  - Data Projects

Module 2. Data Architecture Business Perspective (29 mins)
- *Data Stakeholders*
  - Data and Stakeholders
  - Business Stakeholders
  - Technical Stakeholders
  - Societal Stakeholders
- *Data & Business Processes*
  - Operational Data & Business Processes
  - Analytic Data & Business Processes
  - Data Flows and Data Sharing
  - Levels & Layers of Data

- *Data Domains*
  - o Multiple Meanings of Data Domain
  - o Data Domains as Areas of Data Management
- *Data Services & Data Products*
  - o Data Products
  - o Data as a Product
  - o Information as a Product
  - o Data Services
- *Data Monetization*
  - o Data Monetization Defined
  - o Data Monetization and Data Architecture

Module 3. Data Architecture Lifecycle Perspective (32 mins)
- *Lifecycle Concepts*
  - o Lifecycle Management
- *Introducing Data Assets and Data Products*
  - o Operational Data
  - o *Data Assets*
  - o *Data Products*
  - o *Revisiting Data Assets and Products*
- *Operational Data Lifecycle*
- *Data Assets Lifecycle: Schema on Write & Schema on Read*
- *Data Products Lifecycle*
- *Data Architecture and Data Lifecycles*
  - o Lifecycle Interactions
  - o Lifecycle Objectives

Module 4. Data Architecture Usage Perspective (26 mins)
- *Data Use Cases*
  - o Anatomy of a Data Use Case
  - o Example of a Data Use Case
  - o Components of a Data Use Case
  - o Architecture Requirements of a Data use Case
- *Blending Humans with Technology*
  - o Data Architecture Implications
- *Types of Use Cases*
  - o Comparing Use Case Requirements
  - o Operational vs Analytical Use Cases
- *Role for Data Architecture*
- *Application Areas and Data Architecture*
- *Questions Data Architecture Needs to Answer*

Module 5. Data Architecture Content and Structure Perspectives (37 mins)
- *Architecture Impact of Data Structure*
- *Digital Representation of the World*
- *Building Blocks of Information – A Metaphor*
- *Event Data and Reference Data*
- *Measures and Metrics*

- *Transformed and Refined Data*
- *Multi-Media Data*
- *Relational Data Model (Entity Relationship Model)*
  - Relational Model Implementation
- *Dimensional Data Model*
  - Star Shema
  - Snowflake Schema
  - Data Cube
- *Non-Relational Data*
- *NoSQL Data Model*

Module 6. Data Architecture Processing and Storage Perspective (46 mins)

- *Operational Systems & Databases*
  - Operational Systems in the Data Environment
  - OLTP Systems
  - Automation and IoT
  - Master Data and Reference Data
- *Data Integration Systems & Databases*
  - Integration Systems in the Data Environment
  - Data Warehousing Definitions
  - Data Warehousing Architectures
  - Operational Data Store (ODS) Definition
  - Operational Data Store (ODS) Architecture
  - Master Data Management (MDM) Definition
  - MDM Architectures
  - MDM Summary
- *Data Resources*
  - Data Resource Systems in the Data Environment
  - Operational Data Store(s)
  - Data Warehouse(s)
  - Master Data Hub(s)
  - Data Lake Defined
  - Data Lake Architecture
  - Data Lake vs. Data Warehouse
- *Data Management Architectures*
  - Data Fabric
  - Data Fabric Architecture
  - Data Mesh
  - Data Mesh Architecture
  - Data Network
  - Data Network Architecture

Module 7. Data Architecture Technology Perspective (32 mins)

- *Establishing a Framework*
  - Start with Capabilities
  - Framework Overview
  - Step 1 - Define the Business Value
  - Step 2 - Define the Required Business Capabilities
  - Step 3 - Define the Required Analytic Capabilities

- o Step 4 - Define the Required Data Capabilities
- o Step 5 - Define the Required Technology Capabilities
- o Step 6 - Define the Required Organizational Capabilities
- o Example Scenario
- o Example - Value
- o Example - Required Business Capabilities
- o Example - Required Analytics Capabilities
- o Example - Required Data Capabilities
- o Example - Required Technology Capabilities
- o Example - Required Organizational Capabilities
- *Architecture Decisions*
  - o Required Data Capabilities
  - o Required Technology Architecture
  - o Making Architectural Decisions
- *Summary of the Capability Framework*
- *Role of Technology Architecture*

Module 8. Putting the Pieces Together (37 mins)

- *Developing Data Management Architecture*
  - o Data Management Step-by-Step
  - o Data Architecture Current State
  - o Data Architecture & Business Capabilities
  - o Data Architecture & Business Requirements
  - o Data Architecture & Data Management Capabilities
  - o Data Architecture & Data Management Requirements
  - o Designing Data Management Architecture
  - o A Data Architecture Example
  - o A Data Architecture Example – Managing for Data Analytics
  - o Standards & Guidelines Example
- *Implementing Data Management Architecture*
  - o Six Methods of Implementation
  - o Implementation Planning – Mix & Match Methods
  - o Managing & Evolving Data Architecture
- *Apply Data Architecture*
- *Data Architecture Best Practices*
  - o Best Practices for Data Architecture
  - o Best Practices for Data Architects