eLearningCurve

Architecture and Design for Data Interoperability

Dave Wells

Module 0: About the Course (3 min)

Module 1: Operational Data Architecture (37 min)

- The Operational Data Landscape
  - Operational Data vs. Analytical Data
  - Operational Data and Analytical Data
  - Operational Systems – More than OLTP
  - Operational Systems – Management Complexities
  - Operational Systems – Management Challenges
  - The Operational Data Architecture Problem
  - Operational Data and Technical Debt
- Managing Operational Data
  - Operational Data Management Challenges
  - Data Sprawl
  - Data Silos
  - Data Disparity
  - Data Friction
  - Global Data Challenges
  - Data Chaos
  - The Nature of Data Chaos
  - Typical Response to Data Chaos
- An Architectural View of Data Management
  - Typical Data Management Architecture
  - Rethinking Data Management Architecture
- Module Summary

Module 2: Data Interoperability (43 min)

- The *What* and *Why* of Data Interoperability
  - What is Data Interoperability?
  - Data Interoperability vs. Data Integration
  - Why Interoperability? – Operational Systems Realities
  - Why Interoperability? – System-to-System Communications
  - Why Interoperability? – System-to-System Complexity
  - Why Interoperability? – Point-to-Point Data Flow Does Not Scale
  - Why Interoperability? – Manageable App-to-App Communications
  - Why Interoperability? – Master Data Reconciliation & Management
  - Why Interoperability? – Analytical Data Production & Preparation
- Architectural Barriers to Data Interoperability
  - Focus on Integration & Analytical Data
  - Common Data Architectures
  - Analytical Data Architecture – Data Warehousing
  - Analytical Data Architecture – Data Lake

- o   Analytical Data Architecture – Data Lake & Data Warehouses
- o   Analytical Data Architecture – Data Lake with Enterprise Data Warehouse
- o   Analytical Data Architecture – Data Lakehouse
- o   Analytical Data Architecture – Data Mesh
- o   Operational Data Architecture – the Complexities
- o   Operational Data Architecture – Operational Data Store (ODS)
- o   Operational Data Architecture – Master Data Registry
- o   Operational Data Architecture – Master Data Synchronization
- o   Operational Data Architecture – Master Data Consolidation
- Module Summary

Module 3: Data Semantic and Data Interoperability (41 min)

- Data Semantics & Data Management
  - o   What is Data Semantic?
  - o   The Role of Semantics in Data Management
  - o   Semantics and Data Interoperability
- Semantic Data Modeling
  - o   Semantic Data Modeling
  - o   Graph Concepts – Part 1
  - o   Graph Concepts – Part 2
  - o   The Semantic Data Modeling Process
  - o   Terminology Analysis
  - o   Taxonomy Analysis
  - o   Semantic Data Modeling Results
  - o   Ontology and Taxonomy
  - o   Entity Analysis
  - o   Relationship Analysis
  - o   Ontology as a Knowledge Graph
  - o   Properties Analysis
  - o   Ontology as a Property Graph
  - o   Extending Ontology with Taxonomy
  - o   Taxonomy – Where and Why?
  - o   Entity Taxonomy – Classification of Things
  - o   Properties Taxonomy – Classification of Attribute Values
  - o   Semantic Data Model – Putting the Pieces Together
- Semantic Data Mapping
  - o   Mapping Local Dialects to Standard Language
  - o   Semantics-Based Data Translation
- Module Summary

Module 4: The Enterprise Semantic Layer (56 min)

- Semantic Layer Perspectives
  - o   Data Context

© 2025 by eLearningCurve LLC.

- - o Data Architecture
  - o Data Access
- APIs
  - o APIs
  - o APIs and Data Sharing
- Data Products
  - o Data Products
  - o Data Product Components
  - o Common Kind of Data Product
  - o Data Product Characteristics
  - o Data Products and Data Interoperability
  - o Data Products and Application Interoperability
  - o Data Products in Data Mesh Architecture
- Data Contracts
  - o Data Contracts
  - o Implementing Data Contracts
- Data Virtualization
  - o Data Virtualization
  - o Data Virtualization – Layers of Abstraction
  - o Virtualized Data Products
- Interoperability in Data Management Architecture
  - o A Semantic Layer for Data Interoperability
  - o Think Semantics and Data Translation
  - o Adapting Data Architecture for Interoperability
  - o Data Architecture Example – Before Data Interoperability
  - o Data Architecture Example – With Data Interoperability
- Technology Overview
- Module Summary