**Data Modeling in the Age of Big Data**

Course Outline

**Module 1 – Big Data Fundamentals**

* What is Big Data
	+ Big Data
	+ NoSQL
	+ Structured Data
	+ Beyond Structured Data
* Big Data Opportunities
	+ Beyond Enterprise Data
	+ Beyond Transactions
	+ Understanding Cause and Effect
	+ Business Impact
* NoSQL Technologies
	+ Relational Technology
	+ Key-Value Stores
	+ Document-Oriented Databases
	+ Graph Databases
	+ Summary of Database Technologies
	+ Vendor Landscape
* Big Data Challenges
	+ Beyond Enterprise Data
	+ Multiple Management Platforms
	+ Lack of Fixed Schema
	+ Multiple Uses for Data
	+ Traditional Focus on Transactions
	+ Relational Perspective
* Exercise: Big Data Opportunities

**Module 2 – Modeling and Data**

* Models
	+ What is a Model?
	+ What is a Data Model?
	+ Why Model Data?
	+ More than a Diagram
* Modeling for Relational Storage
	+ Relational Storage and BI
	+ Fixed Structure and Content
	+ Schema on Write
	+ Requirements First
	+ Data Modelers and Architects
* Modeling for Non-Relational Storage
	+ Big Data and BI
	+ Flexible Schema
	+ Big Data Notation
	+ Schema on Read
	+ Data First, Requirements Last
	+ Business SMEs, Analytic Modelers, and Programmers
* Complementary Approaches
	+ Relational and Non-Relational Data
	+ Incremental Value of Big Data
	+ Rigor vs. Agility
	+ Roles
* Exercise: Modeling Purpose

**Module 3 – Key-Value Stores**

* Key-Value Stores Defined
	+ The Basics
	+ NoSQL Foundation
* Key-Value Data Representation
	+ Representing Things
	+ Representing Identities
	+ Representing Properties
	+ Representing Associations
	+ Representing Metrics
* Use Cases
	+ Embedded Systems
	+ High-Performance In-Process Databases
	+ NoSQL Foundation
* Examples
	+ Common Key-Value Store Products
* Exercise: Key-Value Pairs Modeling

**Module 4 – Document Stores**

* Document Stores Defined
	+ Document-Oriented Databases
	+ Basic Terminology
	+ Flexible Internal Structure
	+ Document Stores and Key-Value Stores
	+ Fields Can Have Multiple Values
	+ Fields Can Contain Sub-Documents
	+ Summary of Characteristics
* Document Data Representation
	+ Representing Things
	+ Representing Identifiers
	+ Representing Properties
	+ Representing Associations
	+ Representing Metrics
* Use Cases
	+ Choosing Document Storage
	+ Capture: Data Arrives in Document Format
	+ Explore Sources that Track Information Differently
	+ Augment
	+ Extend
* Examples
	+ Common Document Store Databases
* Exercise: Document Modeling

**Module 5 – Graph Databases**

* Graph Databases Defined
	+ The Basics
	+ Data about Relationships
	+ The Terminology – Nodes and Edges
	+ The Terminology – Hyperedges
	+ The Terminology – Properties
* Graph Data Representation
	+ Representing Things
	+ Representing Identities
	+ Representing Associations
	+ Representing Properties
	+ Representing Metrics
* Use Cases
	+ Social Networks
	+ Network Analysis and Visualization
	+ Semantic Networks
* Examples
	+ Common Graph Database Products

**Module 6 – Embracing Big Data**

* BI Programs and Big Data
	+ Big Data and Information Asset Management
	+ The Gaps
		- What Is Lost with Non-Relational
		- BI and Analytics Gap
		- Role/Skill Gaps
	+ Organization and Planning
		- Balancing Standards with Flexibility
		- Organize Around Purpose, Not Tools
		- IAM Roadmap Including Big Data
		- Architecture Still Important
	+ The Journey
		- Cataloging and Prioritizing Opportunities
		- Evolving Skills
		- Technology Decision Models
		- Responding to Tool Failures
* Human Side of Big Data
	+ Changing Role of Data Modeling
	+ Traditional Data Modeler Role
	+ More Roles Doing Data Modeling
	+ When Data Modeling Occurs
	+ Merging Data Modeling and Profiling
* Tapping Into Big Data
	+ Process Agility and Flexibility Over Formality
	+ More Exploration, Iteration, and Risk
	+ Importance of Metadata
* Taking the Next Steps
	+ Conversations to Gather Opportunities
	+ Proofs of Concept
	+ Business Case / ROI
	+ Ongoing Value of Data Modeling
	+ New Tools, Same Workbench
* Exercise: Embracing Big Data

**Module 7 – Summary and Conclusion**

* Summary of Key Points
	+ A Quick Review
* References and Resources
	+ To Learn More