



# Microsoft Data Warehouse in Depth

## ***Duration***

4 days

## ***What's new***

The course materials have been refreshed to align with the second edition of the companion volume *The Microsoft Data Warehouse Toolkit with SQL Server 2008 R2*, published in February 2011. The course materials are as new as the Microsoft business intelligence products.

## ***Why attend***

With SQL Server, Office, and SharePoint, Microsoft provides a complete suite of tools for you to build data warehouse and business intelligence systems. This course prepares you to deal with the many facets of developing, deploying, operating, and growing your Microsoft data warehouse system. This course is directed to SQL Server 2008 R2, but most of the content applies to SQL Server 2005 and 2008. Examples and demos are based on SQL Server 2008 R2.

Taught by [Joy Mundy](#) and [Warren Thornthwaite](#), co-authors of the best selling *Microsoft Data Warehouse Toolkit*, this lecture and demo course will provide you a detailed technical introduction to building a Microsoft data warehouse / business intelligence system that meets the needs of your business users. The class offers Microsoft-specific detailed guidance for working through the data warehouse lifecycle, from requirements gathering and design through the ETL system, relational data warehouse, OLAP and data mining applications, to reporting and other BI applications. We'll also discuss issues around deploying, operating, and securing the Microsoft data warehouse system. This course covers a lot of material in a short time.

## ***Who should attend***

We've designed this course to appeal to all major roles on a data warehouse project on the Microsoft platform. It's for data warehouse team managers, system architects, ETL system architects and developers, data warehouse operational staff, and BI application designers and developers.

## ***Course format and prerequisites***

The focus of the course is architectural—how should you design the components of the system. We expect our attendees to be able to read documentation and follow Microsoft's generally straightforward user interfaces. Our goal is to teach you the hard stuff: not which button to push, but how to design and build a successful Microsoft DW/BI system. The pace of the course permits only demos by the instructor; do not expect hands on tutorials during class time.

You should be familiar with the SQL Server product family, including the BI Studio, SQL Manager Studio, SSIS, SSAS, Reporting Services, and the relational database, at least at the tutorial level.

You should also have a basic understanding of the principles of dimensional modeling; the class only covers dimensional

modeling topics at a high level. These principles are summarized in the following articles:

- [The 10 Essential Rules of Dimensional Modeling](#)
- [Essential Steps for the Integrated Enterprise Data Warehouse, Part 1](#)
- [Essential Steps for the Integrated Enterprise Data Warehouse, Part 2](#)
- [Facts and Fables about Dimensional Modeling](#)

## **Course outline at a glance**

### **Day 1**

- Introduction to the Kimball Lifecycle
- Project Planning and Management
- Defining Business Requirements
- Designing the Business Process Dimensional Model
- Microsoft Data Warehouse/Business Intelligence System Architecture
- System Setup

### **Day 2**

- SQL Server Relational Data Warehouse, Physical Design
- Business Intelligence Applications
- Delivering BI Applications with Reporting Services
- Adding Business Value with Data Mining
- The Metadata Morass
- ETL System Design
- Master Data Management

### **Day 3**

- ETL System Development Using Integration Services
- The Analysis Services OLAP Database: Designing Dimensions

### **Day 4**

- The Analysis Services OLAP Database: Designing Cubes
- Securing the Microsoft Data Warehousing and Business Intelligence System
- Deployment: The Great Unveiling
- Operations, Maintenance, and Growth
- Real Time Business Intelligence

## **Detailed course outline**

### **Day 1**

#### **Introduction to the Kimball Lifecycle**

- Roadmap for creating the data warehouse/business intelligence system

#### **Project Planning and Management**

- Assess readiness
- Define, plan, and manage the project

### **Defining Business Requirements**

- Gathering business requirements
- Requirements prioritization session
- Exercise: Translating requirements into the DW Bus Matrix

### **Designing the Business Process Dimensional Model**

- Basic dimensional modeling concepts
- Conformed dimensions
- Slowly changing dimensions
- Additional concepts in dimensional modeling
  - Hierarchies and snowflaking
  - Degenerate and junk dimensions
  - Many to many dimensions
- The dimensional modeling process and design spreadsheet

### **Microsoft Data Warehouse/Business Intelligence System Architecture**

- Common components of DW/BI system architecture
- Mapping Microsoft components to the general DW/BI architecture
- Process: How to create an architecture plan
- Exercise/discussion: Develop and present summary architecture for attendees' systems

### **System Setup**

- System configuration: location of components, memory, and storage
- System sizing factors
- Installing SQL Server and issues to consider during installation and configuration

## **Day 2**

### **SQL Server Relational Data Warehouse, Physical Design**

- Column names, data types, keys, and compression
- Initial index plan
- Setting up the Resource Governor
- Fact table partitioning

### **Business Intelligence Applications**

- Basic BI application concepts
- The reporting system design process
  - Standard report template
  - Report specifications
  - Reporting system navigation design

- The BI application development process

### **Delivering BI Applications with Reporting Services**

- Reporting Services overview
- Extended demo: Designing and deploying a report
  - Sourcing from the relational database
  - Sourcing from Analysis Services
  - Report Manager and the BI portal
- Reporting Services metadata
- Report Builder and PowerPivot

### **Adding Business Value with Data Mining**

- Data Mining overview
- The SQL Server data mining architecture
- The data mining process
- Extended demo: Creating a data mining model
  - Developing the input data set
  - Selecting algorithms
  - The data mining designer
- Validating the model
- Using the data mining model in production
- Data mining metadata and maintenance

### **The Metadata Morass**

- Defining metadata
- Managing metadata
- Metadata in SQL Server
- A simple business metadata data model

### **ETL System Design**

- Develop a high-level map
- Exercise: High-level map for Adventure Works customer dimension
- Develop standard design patterns for common tasks
- The ETL system specification

### **Master Data Management**

- Defining master data management
- Introducing Microsoft Master Data Services (MDS)
- Getting started with MDS

## **Day 3**

### **ETL System Development Using Integration Services**

- Introduction to Integration Services and the BI Studio tools
  - Control flow and data flow
  - Demo: debugging within the BI Studio development environment

- General SSIS design techniques
  - Modularize packages
  - Extended demo: Variables, expressions, and configurations
- Extended demo: Extracting and staging data
- Extended demo: Populating dimension tables
  - Using the slowly changing dimension wizard
  - Avoiding the slowly changing dimension wizard
- Extended demo: populating fact tables
  - The surrogate key pipeline
  - Advanced issues in fact table processing
- A simple Audit system

### **The Analysis Services OLAP Database: Designing Dimensions**

- Why Use Analysis Services OLAP?
  - Aggregation design and management
  - Query performance
  - Complex calculation logic
- Getting Ready
  - Partially populate the relational DW
  - Create a data source and data source view
- Extended demo: Designing dimensions
  - The vocabulary of dimensions
  - The Dimension Wizard
  - The Dimension Editor

## **Day 4**

### **The Analysis Services OLAP Database: Designing Cubes**

- Extended demo: Designing cubes
  - Cube structure
  - Dimension usage
  - Process and browse the cube
  - Calculations, KPIs, and Actions
  - Translations and Perspectives
- Physical design considerations
  - Physical design terminology
  - Storage mode, aggregations, and partitions
- Processing cubes

### **Securing the Microsoft Data Warehousing and Business Intelligence System**

- Developing a security plan
- Securing the SQL Server components

### **Deployment: The Great Unveiling**

- System deployment
  - Pre-deployment testing
  - Testing the deployment process
  - Deploying the DW/BI system components
- User readiness
  - DW/BI documentation
  - User training and support

#### **Operations, Maintenance, and Growth**

- Providing ongoing user support
- Monitoring the DW/BI system
  - General operating system monitoring
  - Monitoring the individual components
- Performance tuning
- Backup and recovery
- Growing the Data Warehousing and Business Intelligence System

#### **Real Time Business Intelligence**

- Defining real-time BI
- Making the case for (and against) real-time
- Alternative approaches to providing real-time data
  - Executing reports in real-time
  - Loading the DW/BI system in real-time
  - Using Analysis Services with real-time data