Module 1

Introduction to Data Warehousing

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Aspiring To Learning Data Engineer.

Module Overview

- Overview of Data Warehousing
- Considerations for a Data Warehouse Solution

Lesson 1: Overview of Data Warehousing

- The Business Problem
- What Is a Data Warehouse?
- Data Warehouse Architectures
- Components of a Data Warehousing Solution
- Data Warehousing Projects
- Data Warehousing Project Roles
- SQL Server As a Data Warehousing Platform

The Business Problem

A successful business needs to be able to adapt—the following problems make that difficult:

1. Business data is spread across many systems
2. Data can be inconsistent, duplicated, and contradictory
3. Fundamental questions can’t be easily answered

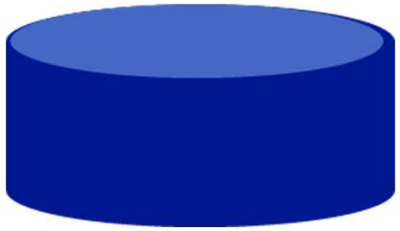
What Is a Data Warehouse?

A centralized store of business data for reporting and analysis that typically:

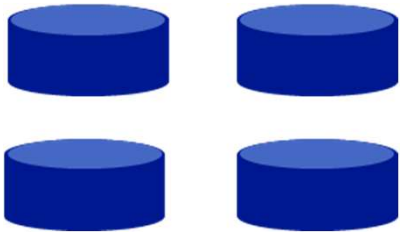
- Contains large volumes of historical data
- Is optimized for querying, as opposed to inserting or updating data
- Is incrementally loaded with new business data at regular intervals
- Provides the basis for enterprise BI solutions

Data Warehouse Architectures

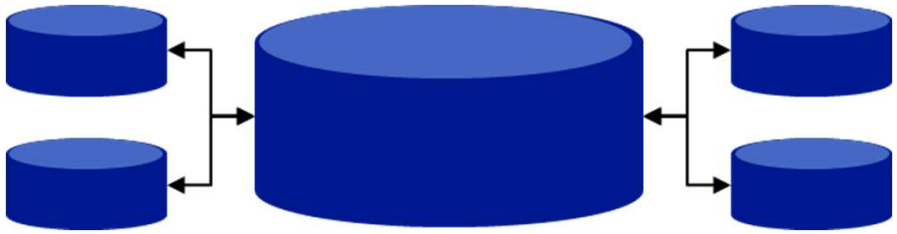
Central Data Warehouse



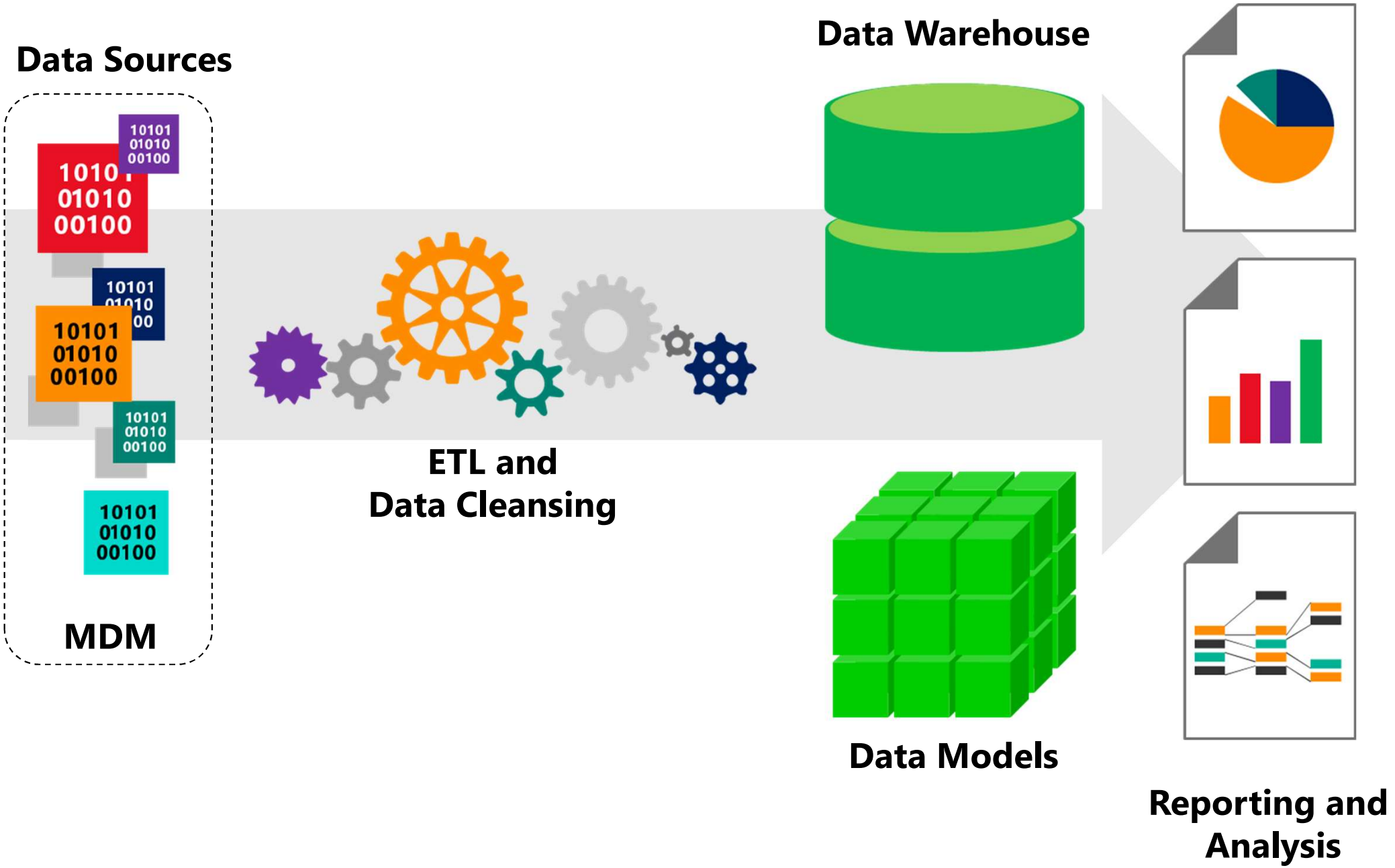
Departmental Data Marts



Hub-and-Spoke



Components of a Data Warehousing Solution



Data Warehousing Projects

1. What are the business questions that need to be answered?
2. What data is required to answer them?
3. Where is this data and how easy is it to obtain?
4. Knowing the above, assess the importance of each question against the ability to answer it from existing data

Data Warehousing Project Roles

Project Manager

Solution Architect

Data Modeler

Database Administrator

Infrastructure Specialist

ETL Developer

Business Users

Business Analyst

Testers

Data Stewards

SQL Server As a Data Warehousing Platform

Core Data Warehousing

- Database Engine
- Integration Services
- Master Data Services
- Data Quality Services

Business Intelligence

- Analysis Services
- Reporting Services

Lesson 2: Considerations for a Data Warehouse Solution

- Data Warehouse Database and Storage
- Columnstore Indexes
- Data Sources
- Extract, Transform, and Load Processes
- Data Quality and Master Data Management

Data Warehouse Database and Storage

- Database Schema
- Hardware
- High Availability and Disaster Recovery
- Security

Columnstore Indexes

Row-based index	Column-based index
• Can be clustered and nonclustered • Improve performance on row level queries, inserts and updates • Best used in OLTP databases • All data in a row is processed	• Can be clustered and nonclustered • Improve performance on queries that scan a table, aggregation and analytical queries • Best used in data warehouses • Only columns needed are processed

A clustered columnstore index can be combined with multiple nonclustered row indexes to have the benefits of both types

Data Sources

- Data Source Connection Types
- Credentials and Permissions
- Data Formats
- Data Acquisition Windows

Extract, Transform, and Load Processes

Staging:

- What data must be staged?
- Staging data format

Required transformations:

- Transformations during extraction versus data flow transformations

Incremental ETL:

- Identifying data changes for extraction
- Inserting or updating when loading

Data Quality and Master Data Management

Data quality

- Cleansing data:
  - Validating data values
  - Ensuring data consistency
  - Identifying missing values
- Deduplicating data

Master data management

- Ensuring consistent business entity definitions across multiple systems
- Applying business rules to ensure data validity

Lab: Exploring a Data Warehousing Solution

- Exercise 1: Exploring Data Sources
- Exercise 2: Exploring an ETL Process
- Exercise 3: Exploring a Data Warehouse

Logon Information
Virtual Machine: **20767C-MIA-SQL**
User name: **ADVENTUREWORKS\Student**
Password: **Pa55w.rd**

Estimated Time: 30 minutes

Lab Scenario

The labs in this course are based on a fictional company called Adventure Works Cycles that manufactures and sells cycles and cycling accessories to customers all over the world. Adventure Works sells direct to customers through an e-commerce website and also through an international network of resellers.

Throughout this course, you will develop a data warehousing solution for Adventure Works Cycles, including: a data warehouse; an ETL process to extract data from source systems and populate the data warehouse; a data quality solution; and a master data management solution.

Lab Scenario (Continued)

The lab for this module provides a high level overview of the solution that you will create in later labs. You can use this lab to become familiar with the various elements of the data warehousing solution that you will learn to build in later modules.

Lab Review

After completing this lab, you are now able to:

- Describe the data sources in the Adventure Works data warehousing scenario.
- Describe the ETL process in the Adventure Works data warehousing scenario.
- Describe the data warehouse in the Adventure Works data warehousing scenario.

Module Review and Takeaways

- Review Question(s)