



# Data Management Technologies

IS465: Data Management and Governance

# Outline

- Introduction

# Introduction

# Data Management Technologies: An Overview

- Data management technologies refer to the tools and systems used to collect, store, organize, and manage data across various industries and applications.
- Effective data management is crucial for making informed decisions, optimizing processes, and ensuring data security and privacy.

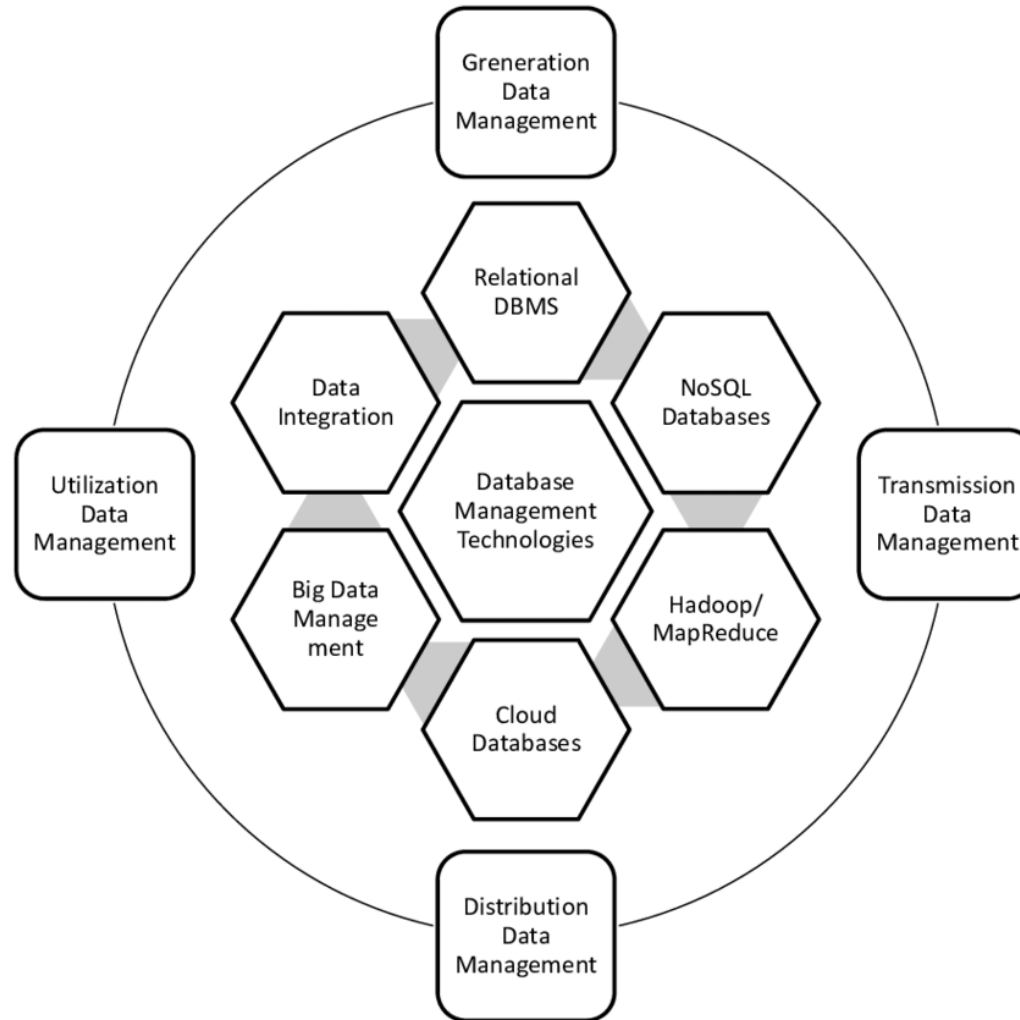
# Types of Data Management Technologies

- Data storage technologies
  - Systems used to store and retrieve data, such as relational databases, NoSQL databases, and data warehouses. Examples include MySQL, MongoDB, and Amazon Redshift.
- Data processing technologies
  - Tools used to process, transform, and analyze data, such as data integration, data cleansing, and data mining. Examples include Apache NiFi, Talend, and RapidMiner.

# Types of Data Management Technologies

- Data governance technologies
  - Systems used to manage data quality, security, and privacy, such as data catalogs, data dictionaries, and data access control. Examples include Apache Atlas, AWS Lake Formation, and DataClarity.
- Data visualization technologies
  - Tools used to create interactive and intuitive visualizations of data, such as business intelligence, data analytics, and data dashboards. Examples include Tableau, Power BI, and QlikView.

# Modern database management technologies



# Importance of Data Management Technologies

- Data management technologies are critical for organizations to collect, store, process, and analyze large volumes of data.
- Data-driven decision making has become a norm in today's business landscape.
- Data management technologies help organizations to make informed decisions, improve operational efficiency, and stay competitive.





# Improving Business Outcomes

- Data management technologies help organizations to:
  - Improve data quality and accuracy
  - Enhance data security and privacy
  - Increase operational efficiency and productivity
  - Improve customer experience and satisfaction
  - Make informed decisions based on data insights
  - Stay competitive in the marketplace

# Improving Business Outcomes

- Data management technologies also enable organizations to:
  - Identify new business opportunities
  - Optimize business processes
  - Improve financial performance
  - Enhance strategic decision making

# Types of Data Management Technologies

- Data storage technologies:
  - Relational databases (e.g., MySQL, Oracle)
  - NoSQL databases (e.g., MongoDB, Cassandra)
  - Data warehouses (e.g., Amazon Redshift, Google BigQuery)
  - Data lakes (e.g., Apache Hadoop, AWS S3)
- Data processing technologies:
  - Data integration (e.g., Talend, Informatica)
  - Data cleansing (e.g., Trifacta, DataClarity)
  - Data transformation (e.g., Apache Beam, AWS Lambda)
  - Data streaming (e.g., Apache Kafka, AWS Kinesis)

# Types of Data Management Technologies

- Data governance technologies:
  - Data catalogs (e.g., Apache Atlas, AWS Lake Formation)
  - Data dictionaries (e.g., Apache Hive, AWS Glue)
  - Data access control (e.g., Apache Ranger, AWS IAM)
- Data analytics technologies:
  - Business intelligence (e.g., Tableau, Power BI)
  - Data visualization (e.g., D3.js, Matplotlib)
  - Predictive analytics (e.g., R, Python)
  - Machine learning (e.g., TensorFlow, PyTorch)

# Key Features and Use Cases

Technology	Key Features	Use Cases
Relational databases	SQL querying, data consistency, transaction management, data security	<ul style="list-style-type: none"><li>- Traditional data storage and management</li><li>- Online transactions and e-commerce</li><li>- Enterprise data management</li></ul>
NoSQL databases	Scalability, flexible schema, high availability, big data analytics	<ul style="list-style-type: none"><li>- Big data storage and processing</li><li>- Real-time web analytics</li><li>- IoT data management</li></ul>
Cloud storage	Scalability, cost-effectiveness, data accessibility, collaboration	<ul style="list-style-type: none"><li>- File sharing and collaboration</li><li>- Backup and archiving</li><li>- Cloud-based data storage</li></ul>
Data warehousing	Data integration, data cleansing, data transformation, data mining	<ul style="list-style-type: none"><li>- Data analysis and reporting</li><li>- Business intelligence</li><li>- Data-driven decision making</li></ul>
Data lakes	Data storage, data processing, data analytics, data visualization	<ul style="list-style-type: none"><li>- Big data storage and processing</li><li>- Data science and machine learning</li><li>- Data-driven decision making</li></ul>

# Key Features and Use Cases

Technology	Key Features	Use Cases
Data governance	Data quality, data security, data compliance, data accessibility	<ul style="list-style-type: none"><li>- Data management and oversight</li><li>- Data risk management</li><li>- Data privacy and protection</li></ul>
Master data management	Data integration, data cleansing, data transformation, data security	<ul style="list-style-type: none"><li>- Data management and oversight</li><li>- Data quality and consistency</li><li>- Data-driven decision making</li></ul>
Data integration	Data integration, data transformation, data mapping, data validation	<ul style="list-style-type: none"><li>- Data migration and integration</li><li>- Data synchronization and replication</li><li>- Data integration for analytics</li></ul>
Data quality	Data validation, data cleansing, data normalization, data enrichment	<ul style="list-style-type: none"><li>- Data quality and consistency</li><li>- Data accuracy and completeness</li><li>- Data-driven decision making</li></ul>
Data security	Data encryption, data access controls, data authentication, data backup	<ul style="list-style-type: none"><li>- Data protection and privacy</li><li>- Data risk management</li><li>- Compliance and regulatory requirements</li></ul>
Data backup	Data backup and recovery, data archiving, data retention, data restore	<ul style="list-style-type: none"><li>- Data protection and recovery</li><li>- Data backup and archiving</li><li>- Compliance and regulatory requirements</li></ul>
Data analytics	Data visualization, data mining, data predictive analytics, data prescriptive analytics	<ul style="list-style-type: none"><li>- Data-driven decision making</li><li>- Business intelligence</li><li>- Predictive and prescriptive analytics</li></ul>