

# Introduction to Big Data in Banking and Finance

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# Agenda

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- Big Data for Finance

# Definition of Big Data

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- Big Data refers to the vast volumes of structured and unstructured data generated at high velocity from various sources, such as social media, transaction records, sensors, and more.
- The characteristics of big data are often described by the 5 Vs
  - Volume: The quantity of data generated.
  - Velocity: The speed at which data is generated and processed.
  - Variety: The different types of data (text, images, video, etc.).
  - Veracity: The quality and accuracy of the data.
  - Value: The potential insights and benefits derived from analyzing the data.

# Significance of Big Data in Banking and Finance

- Big Data plays a crucial role in transforming the banking and finance industry
  - **Risk Management:** Advanced analytics can predict and mitigate risks by identifying potential fraudulent activities, credit risks, and market fluctuations.
  - **Customer Insights:** Analyzing customer data helps in understanding customer behavior, preferences, and needs, enabling personalized services and targeted marketing.
  - **Operational Efficiency:** Big Data analytics streamlines operations by optimizing processes, reducing costs, and improving compliance with regulations.
  - **Product Development:** Insights from Big Data can lead to the development of new financial products and services tailored to meet customer demands.
  - **Regulatory Compliance:** Big Data helps financial institutions to comply with regulatory requirements by providing accurate and timely reporting.

# Big Data Terminologies



# Digital Transformation

- Digital transformation applications for the finance and insurance sectors are data-intensive
  - Retail banking, corporate banking, payments, investment banking, capital markets, insurance services, and financial services security
  - Data sources such as financial market data, regulatory datasets, social media data, real-time retail transactions, add additional level of data issues.
  - Internet-of-Things (IoT) devices and applications (e.g., Fitbits, smart phones, smart home devices), several FinTech and InsurTech applications

# Big Data Challenges in Digital Finance

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- Siloed Data and Data Fragmentation
  - databases, data lakes, transactional systems (e.g., e-banking), and OLAP (online analytical processing) systems (e.g., customer data warehouses)
  - Bank of England has recently established a “One Bank Data Architecture”
- Real-Time Computing
  - Order of milliseconds or seconds
  - ML/DL and big data pipelines, algorithms can take a significant amount of time and become useless in practical cases

# Big Data Challenges in Digital Finance

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- Mobility
  - There is a need for supporting mobile channels when developing big data, AI, and IoT applications for digital finance)
- Orchestration and Automation: Toward MLOps and AIOps

Well, lets check complete large scale software development cycle



# Reference Architecture (RA)

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- RAs are designed to facilitate design and development of concrete technological architectures in the IT domain.
- They help reducing development and deployment risks based on the use of a standard set of components and related structuring principles for their integration.
- When a system is designed without an RA, organizations may accumulate technical risks and end up with a complex and nonoptimal implementation architecture.
- Furthermore, RAs help improving the overall communication between the various stakeholders of a big data systems

# Reference Architecture for Banking and Finance

- [Microsoft's RA for digital finance](#)
  - Industry standard integration interfaces and techniques (e.g., interfaces from ISO (International Organization for Standardization), BIAN (Banking Industry Architecture Network), and IFX (International Foreign Exchange))
  - Master data management (MDM), [data quality services](#) (DQS), and predefined BI semantic metadata (BISM), which overlay business intelligence (BI) capabilities delivered via pre-tuned data warehouse configurations, near real-time analytics delivered through high-performance technical computing (HPC) and complex event processing (CEP)

# Reference Architecture for Banking and Finance

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- [WSO2](#) offers a modular platform for the implementation of connected digital finance applications
- Student task for submission
  - Task will help you to analyze the key components, technologies, and frameworks that constitute the architecture of modern banking and financial systems
    - Reference Architectures of EU Projects and Research Initiatives
    - Reference Architecture for Standardization Organizations and Industrial Associations
    - Enterprise architecture for Architectures for Data Pipelining

