COSC 3380
Design of Database Systems

Introduction

January 22, 2024

Applications of Database Technology

- Storage and retrieval of traditional numeric and alphanumeric data in an inventory application

- Multimedia applications (YouTube, Spotify)

- Biometric applications (fingerprints, retina scans)

- Wearable applications (FitBit, Apple Watch)

- Geographical Information Systems (GIS) applications (Google Maps)

- Sensor applications (nuclear reactor)

- Big Data applications (Genome sequencing, Weather forecasting)

- Internet of Things (IoT) applications (Smart homes)

- Data Warehouses

Recent developments

- Social Networks - capture a lot of information about people and communications among people - posts, tweets, photos, videos
  - All of the above constitute data
- Search Engines - collect their own repository of web pages for search purposes
- New Technologies to manage vast amounts of data generated on the web:
  - Big data storage systems involving large clusters of distributed computers (Bigtable)
  - NOSQL (Not Only SQL) data systems
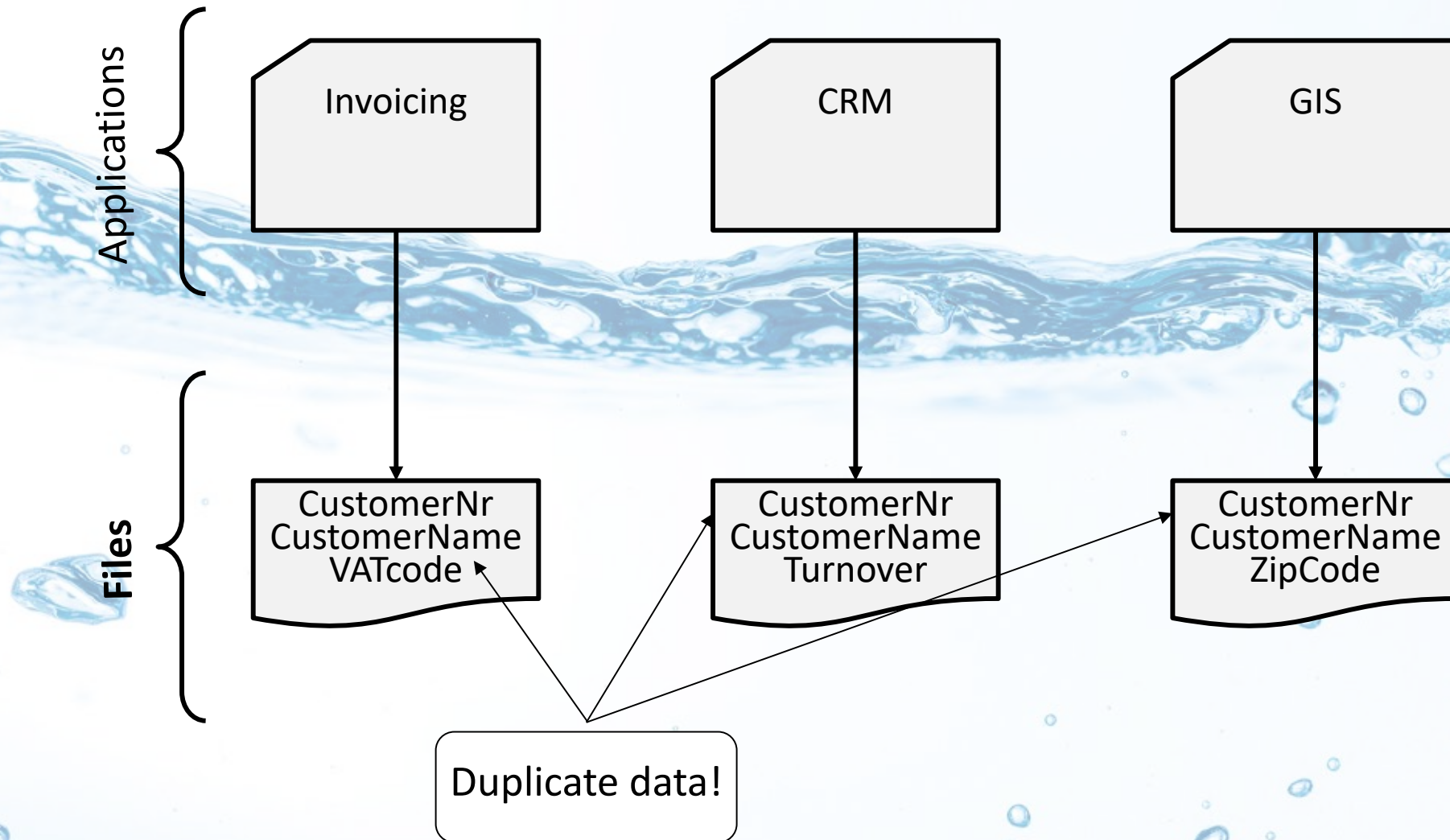 - A large amount of data now resides in the "cloud"!

Impact of Databases & Database Technology

- **Businesses:** Banking, Insurance, Retail, Transportation, Healthcare, Manufacturing

- **Service Industries:** Financial, Real-estate, Legal, Electronic Commerce, Small businesses

- **Education:** Resources for Content and Delivery

- **Recent developments:** Social Networks, Environmental and Scientific Applications, Medicine and Genetics

- **Personalized Applications:** Based on smart, mobile devices
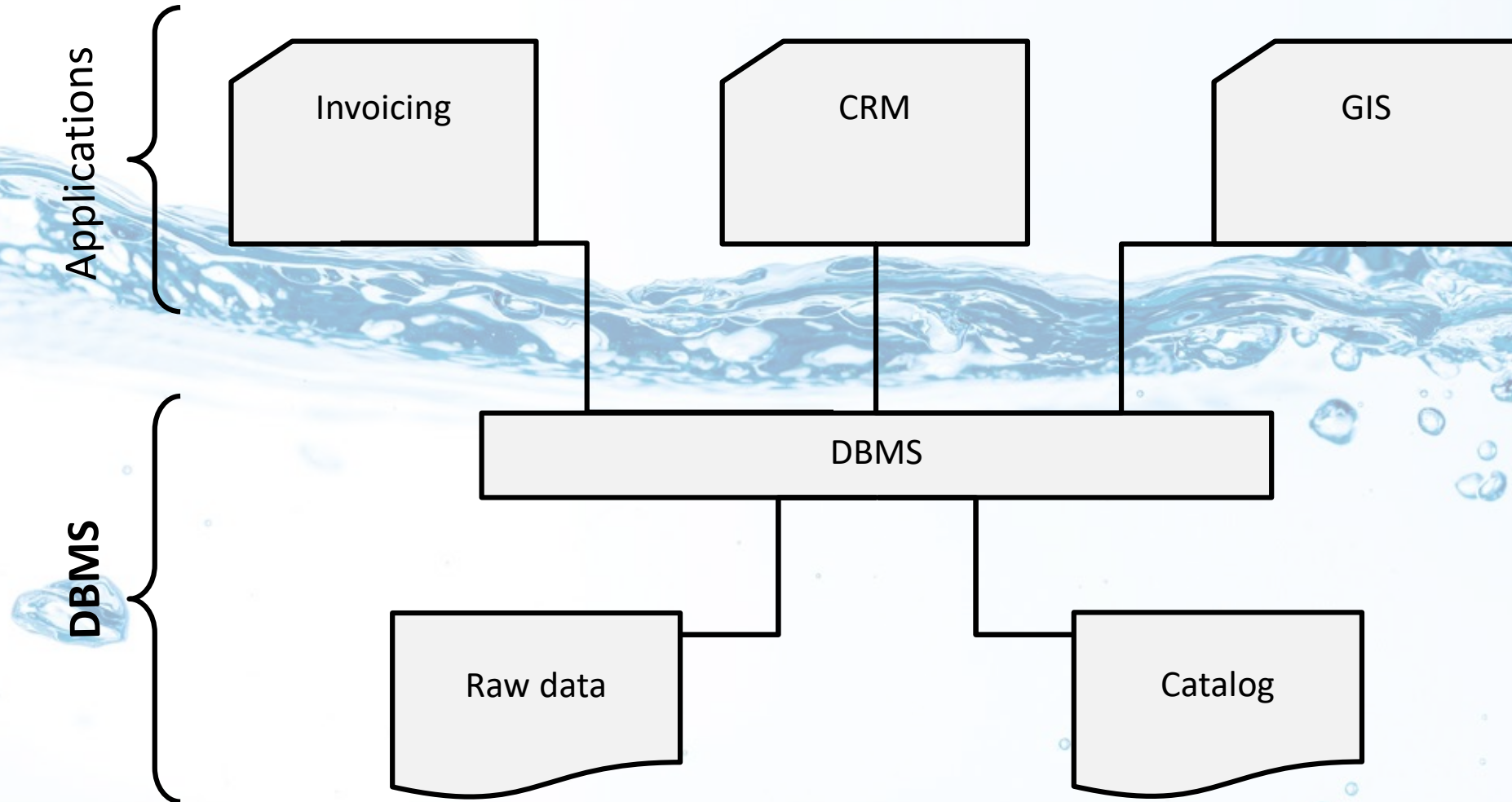
Discussion question

- Why not use files to store and manage data as we did in the 1970s?

    - File approach vs. database approach for data management
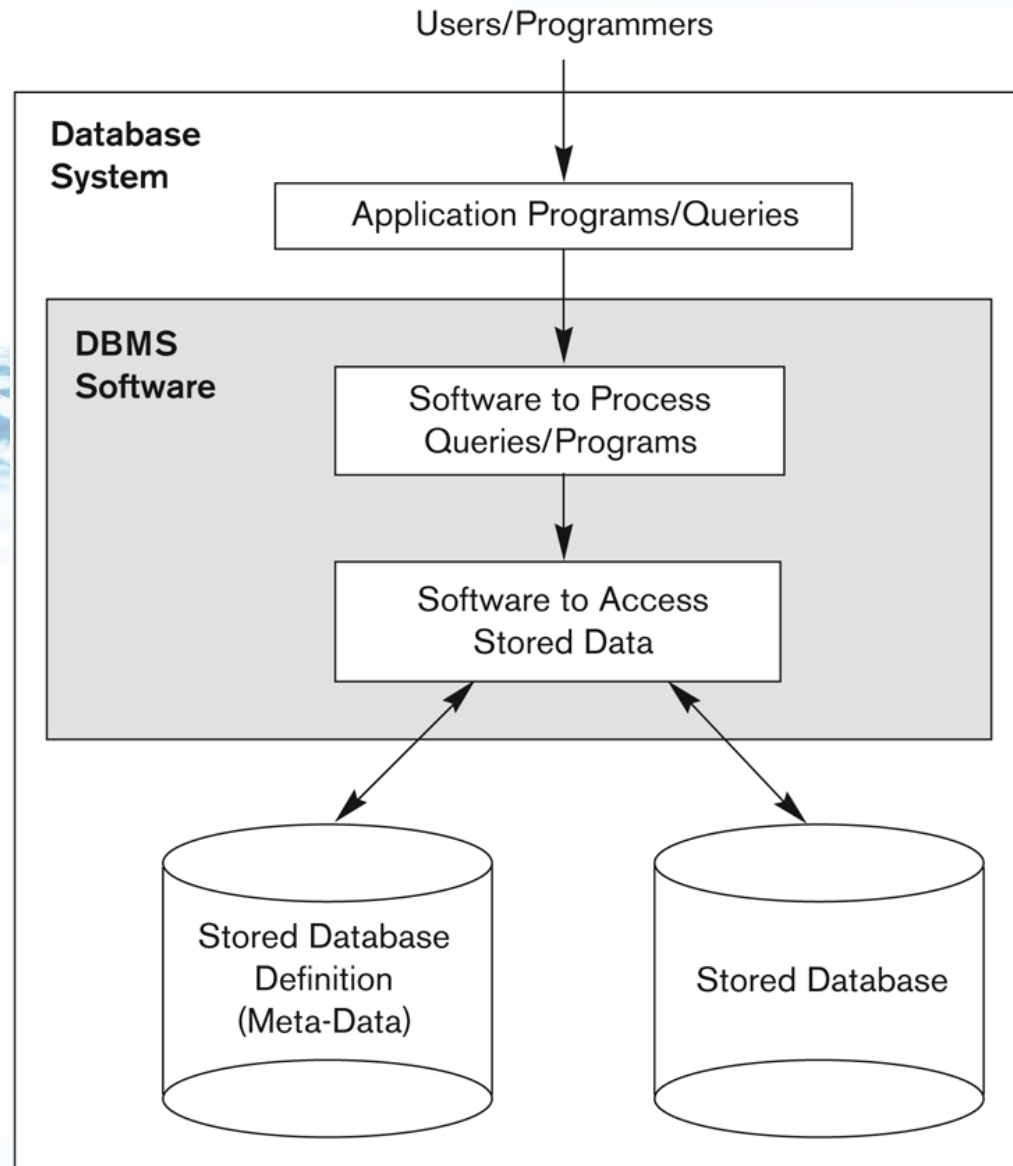
    - Text files, Excel, etc.

Discussion question

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Simplified database system environment

Typical DBMS Functionality

- ***Define*** a particular database in terms of its data types, structures, and constraints on the data to be stored

- ***Meta-data***
    - Database definition or descriptive information
    - Stored by the DBMS in the form of a database catalog or dictionary

- ***Construct*** or ***Load*** the initial database contents on a secondary storage medium