

Database Foundations

Option Presentation - M1 MOSIG

Databases

Database: *organized collection of data; regular structure, to capture a part of the real world*

- Started with **tabular data**: records (employee, census, banking)
- Nowadays more **varied data**: medical databases, Web search logs, sensor logs, financial data (time-series)

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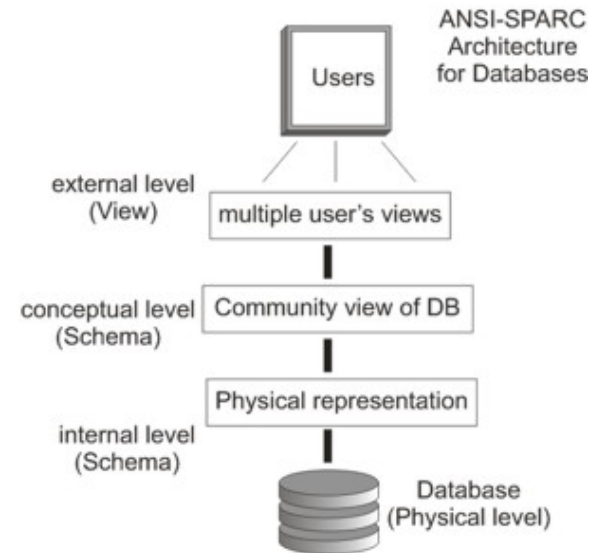


Database Management Systems

DBMS - dedicated software to manage databases: *data storage, data transactions, querying data*

Applications:

- Enterprise management: accounting, supply chain, staff, order
- Web applications: online retailers (Amazon), streaming providers, search engines
- Web backends: CMS, emails, certificates
- Scientific data: medicine, biology, etc.



ORACLE®

IBM

Microsoft
SQL Server

MySQL®

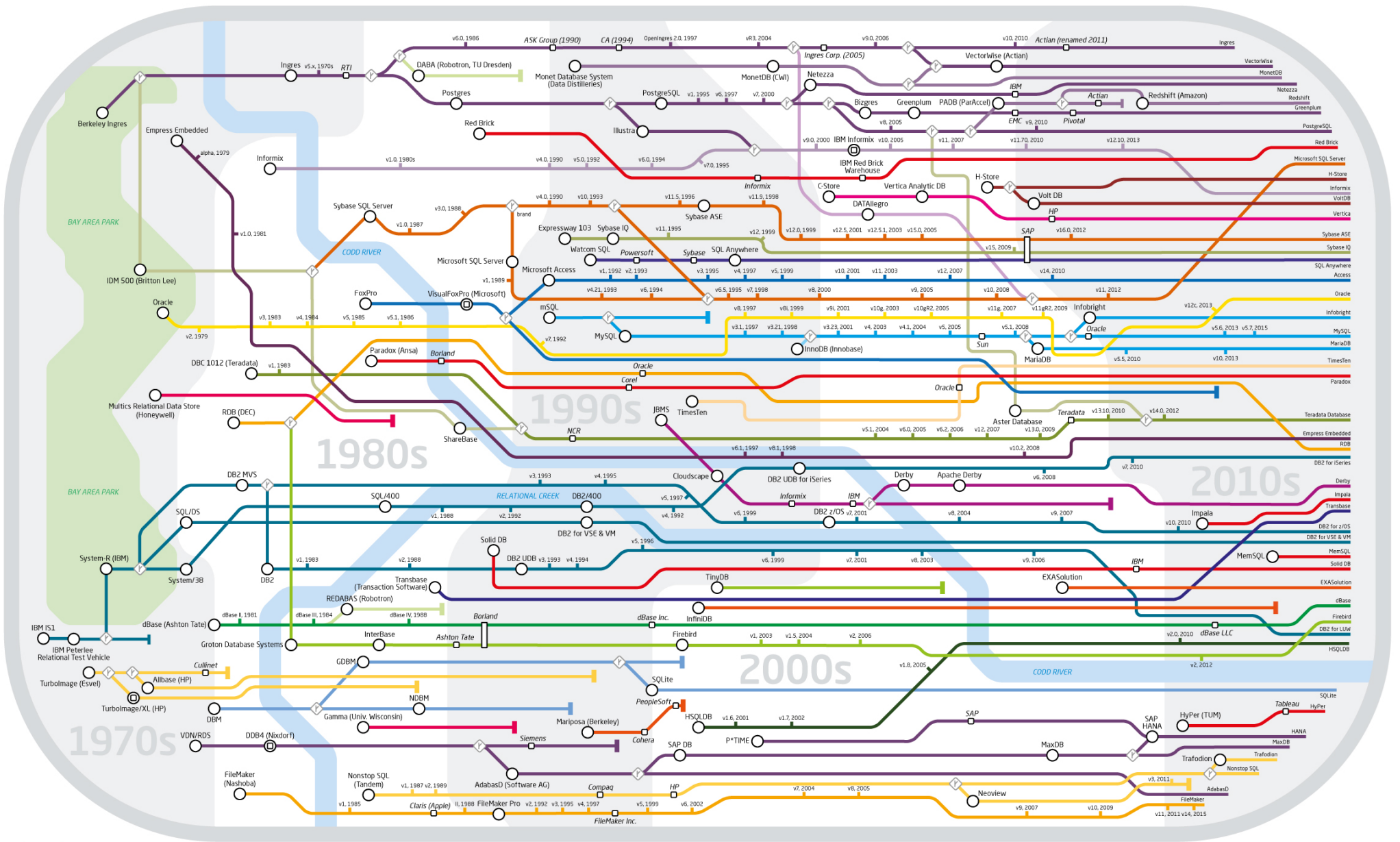
MariaDB

PostgreSQL

SQLite

mongoDB.

Genealogy of Relational Database Management Systems



Key to lines and symbols

- DBMS name (Company)
- Acquisition
- v9, 2006 Versions
- Discontinued
- ◇ Branch (intellectual and/or code)
- Crossing lines have no special semantics

Database Foundations

Objectives

1. To learn the **fundamental concepts** behind database models: relations, constraints, dependencies
2. To learn how to **design databases** for your application
3. To learn how to **query and program databases**

Database Foundations

Contents

- Applications of databases
- **Data models**: relational model, constraints, functional dependencies
- **Database design**: entity/relationship model, normalisation
- **Database programming**: relational algebra+SQL, procedural languages, triggers, views

“**Cours-TD**”: lecture + practical lab (exercises, implementation)