Databases

Data and Information

While data is known, discrete facts that have been stored and recorded, information is data placed in context and presented. It is much more useful to humans. SQL is a tool for extracting information from a database.

Metadata

Metadata is *data about data*. For example type, length or description. It helps us to keep data storage consistent, useful and meaningful.

A database is a large, integrated, structured collection of data, used to model some real world enterprise as entities and relationships. A Database Management System or DBMS is used to interface with a database. Databases differ from simple programs interfacing with files by avoiding redundancy and ensuring consistency. They also allow better file sharing and can improve development speed and reduce maintenance.

Database Development Process

- Database Planning
- Systems Definition
  - Enterprise data model, where the components and interactions of a business is defined.
  - Specification of scope and boundaries of the system.
- Requirements Definition and Analysis
  - Take in requirements for the system and analyse them to define a system that will satisfy them.
- Design

  - Conceptual Design - construction of model of the data to be held in the database, independent of any technical considerations. Generally using *entity relationship* (ER) diagrams.
  - Logical Design - technical decisions for the conceptual design above. While in this subject this will always be a DBMS, it could also be a JSON document or even a spreadsheet.
  - Physical Design - implementation details of a given logical design; relations, data types, configurations, etc. Specification of types can help to make a database smaller and faster. It's important to consider all the factors that inform a datatype.

- Application Design
  - In parallel with the design phase, design of the application continues.
- Implementation
- Data Conversion and Loading
- Testing
- Operational Maintenance