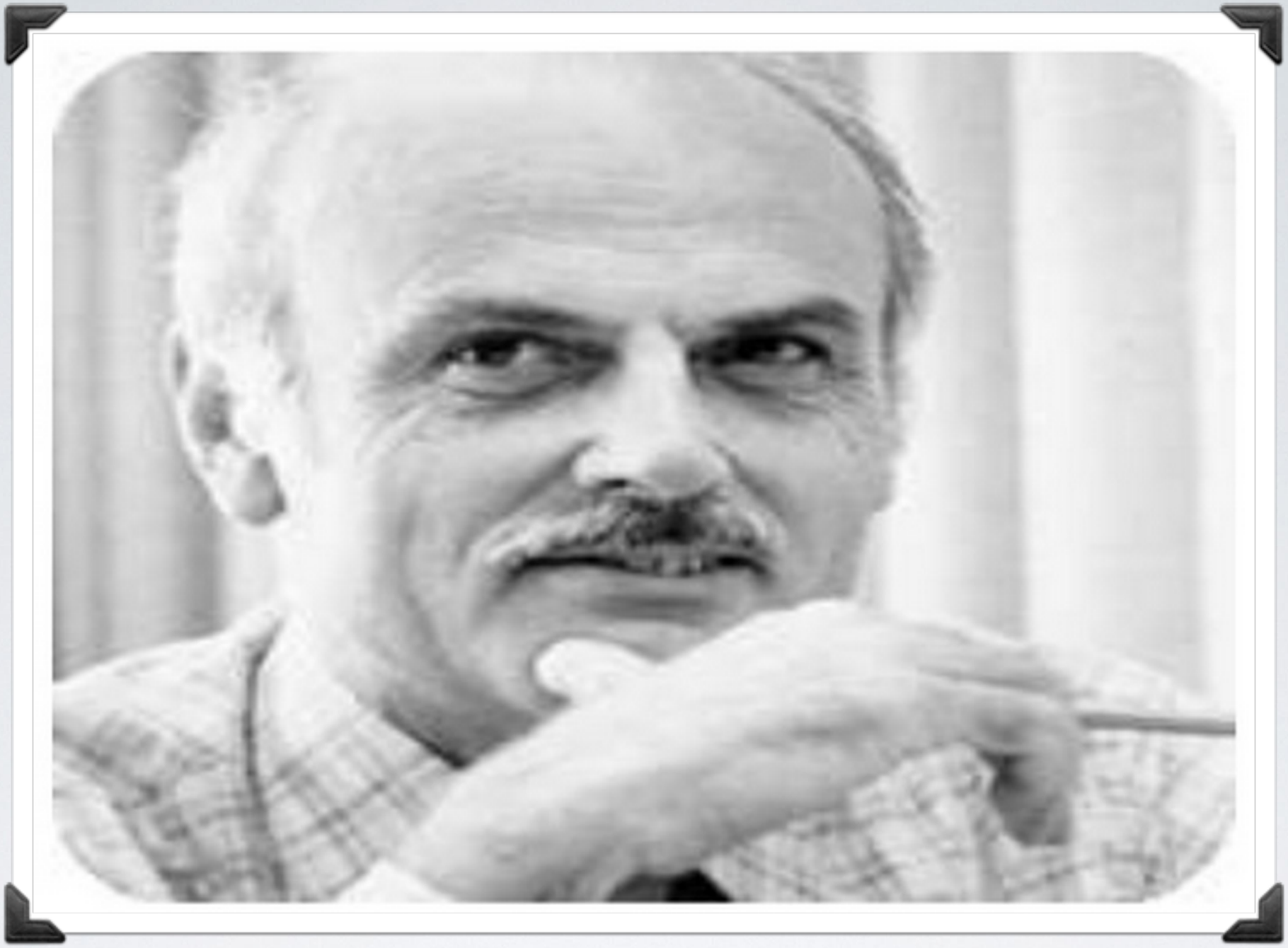
DATABASES

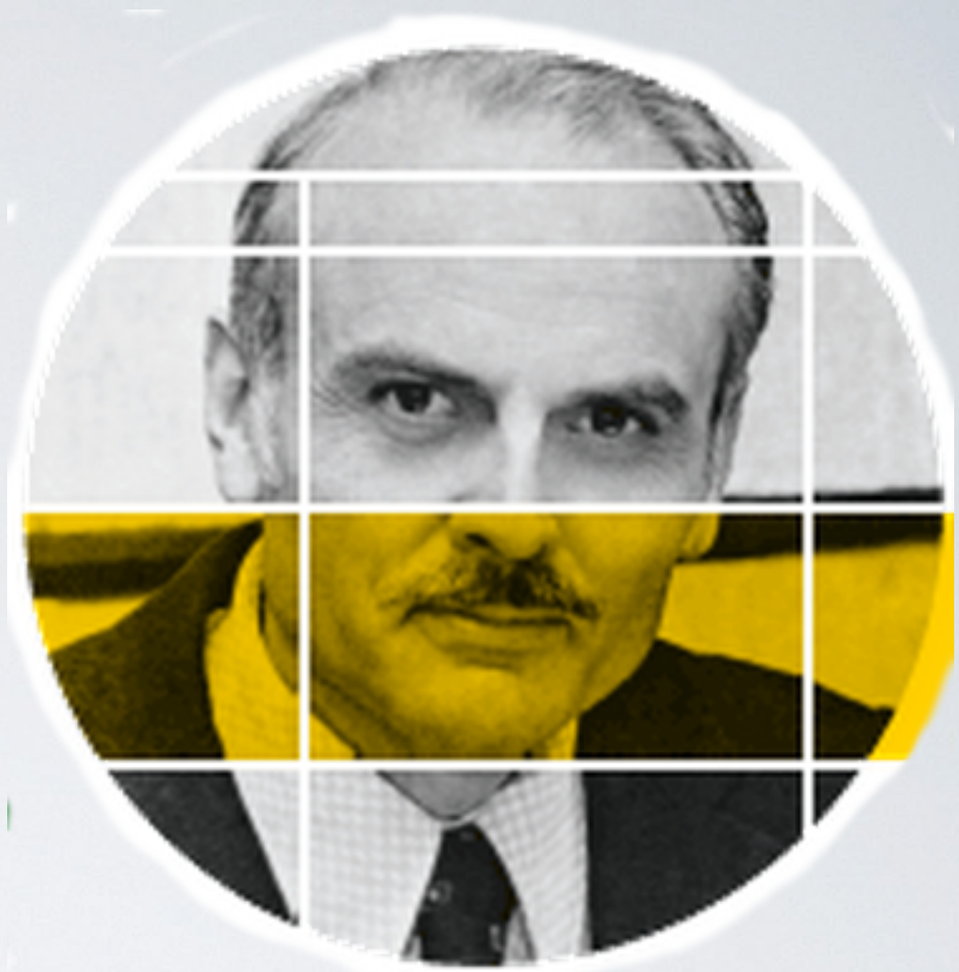
An introduction



EDGAR FRANK (E.F.) CODD

The Father of Relational Database Systems

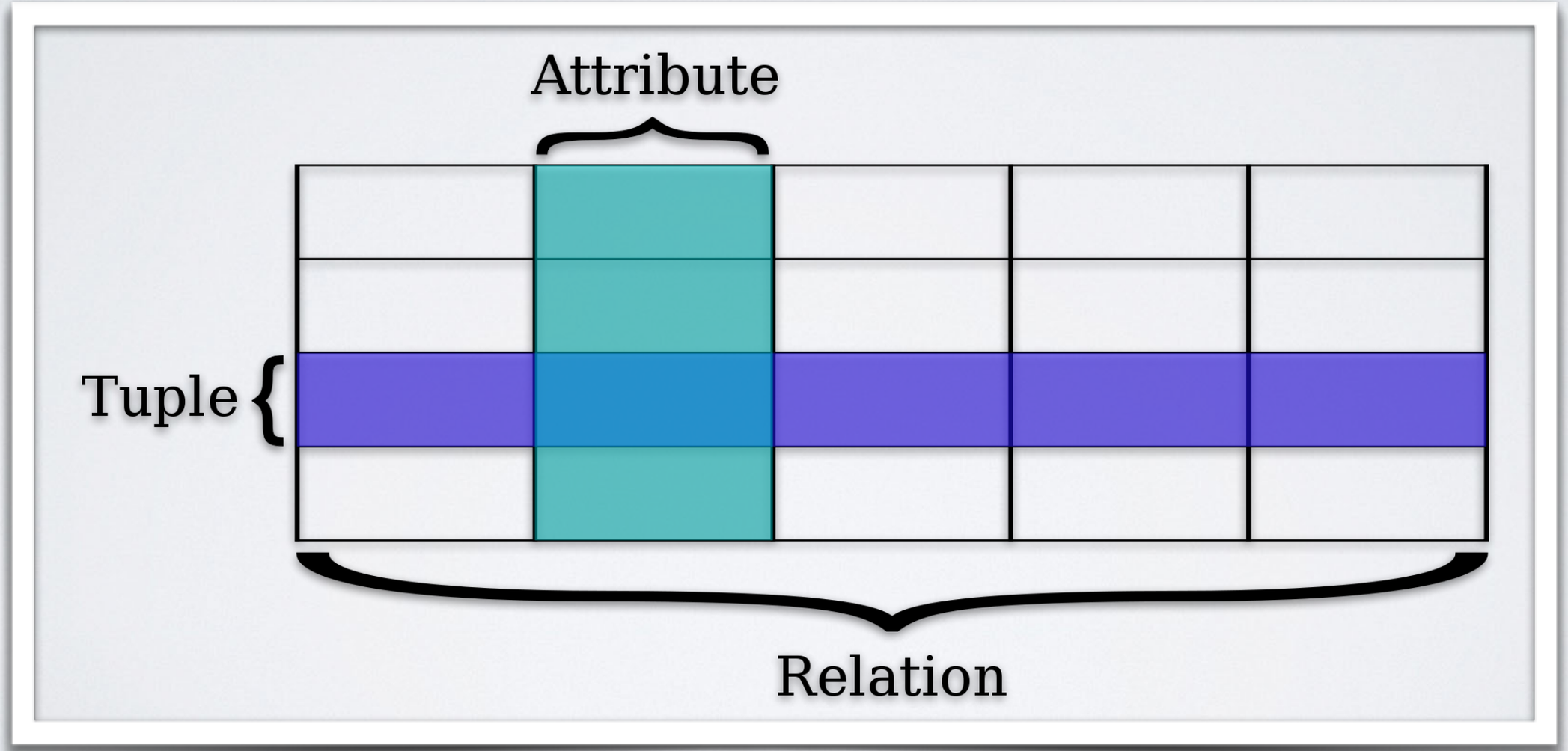
1970



In 1970, Edgar F. Codd, an Oxford-educated mathematician working at the IBM San Jose Research Lab, published a paper showing how information stored in large databases could be accessed without knowing how the information was structured or where it resided in the database.

E.F. CODD ACHIEVEMENTS

His idea was to represent data in a set of tables.



WHY USE A DATABASE?

Save it for later ~ has value ~ for analysis later on

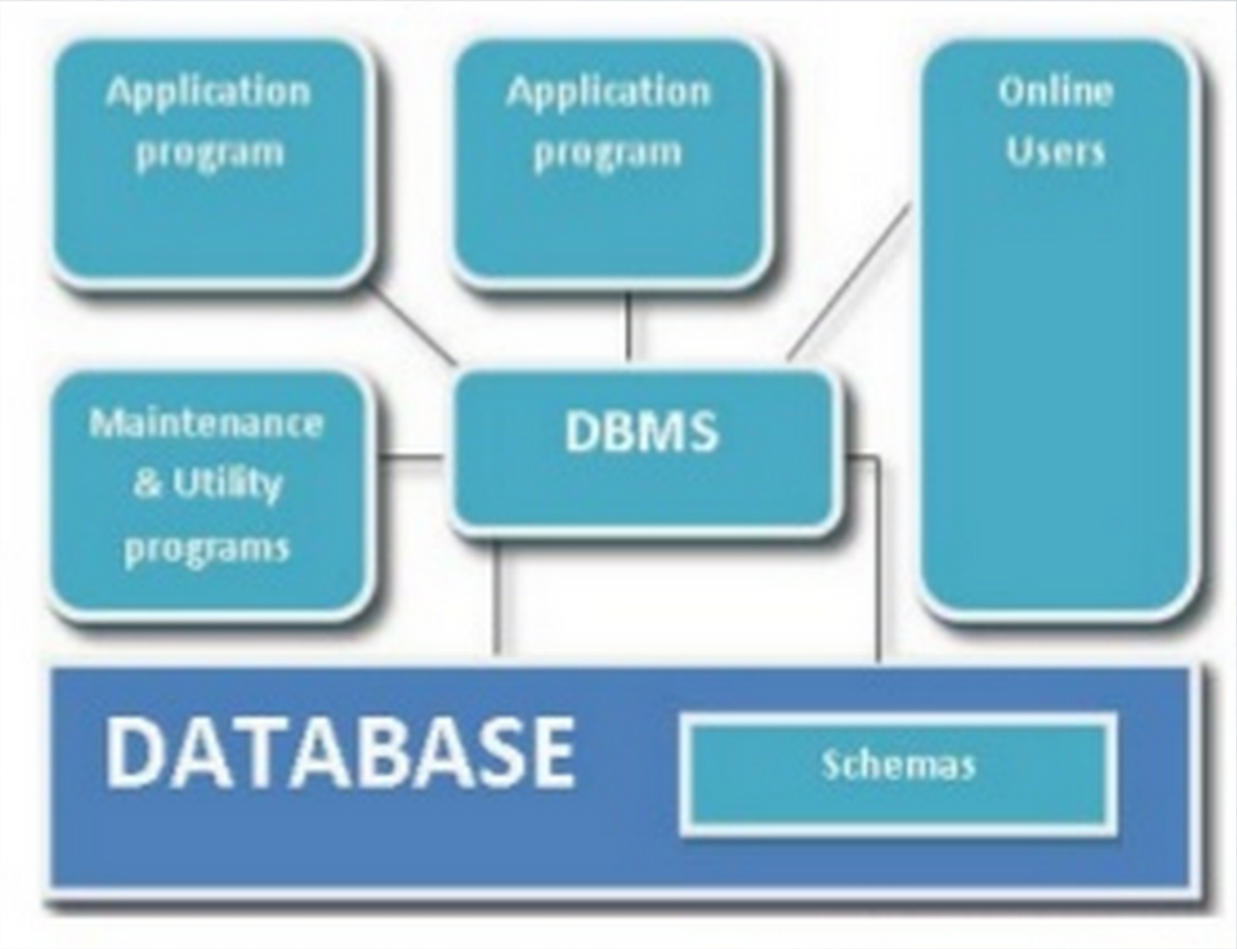
..there are many reasons

VENDORS

ORACLE
foundation
firebird
PostgreSQL
IBM DB2
SQLite
MySQL
TERADATA
CSV
123

PRACTICAL

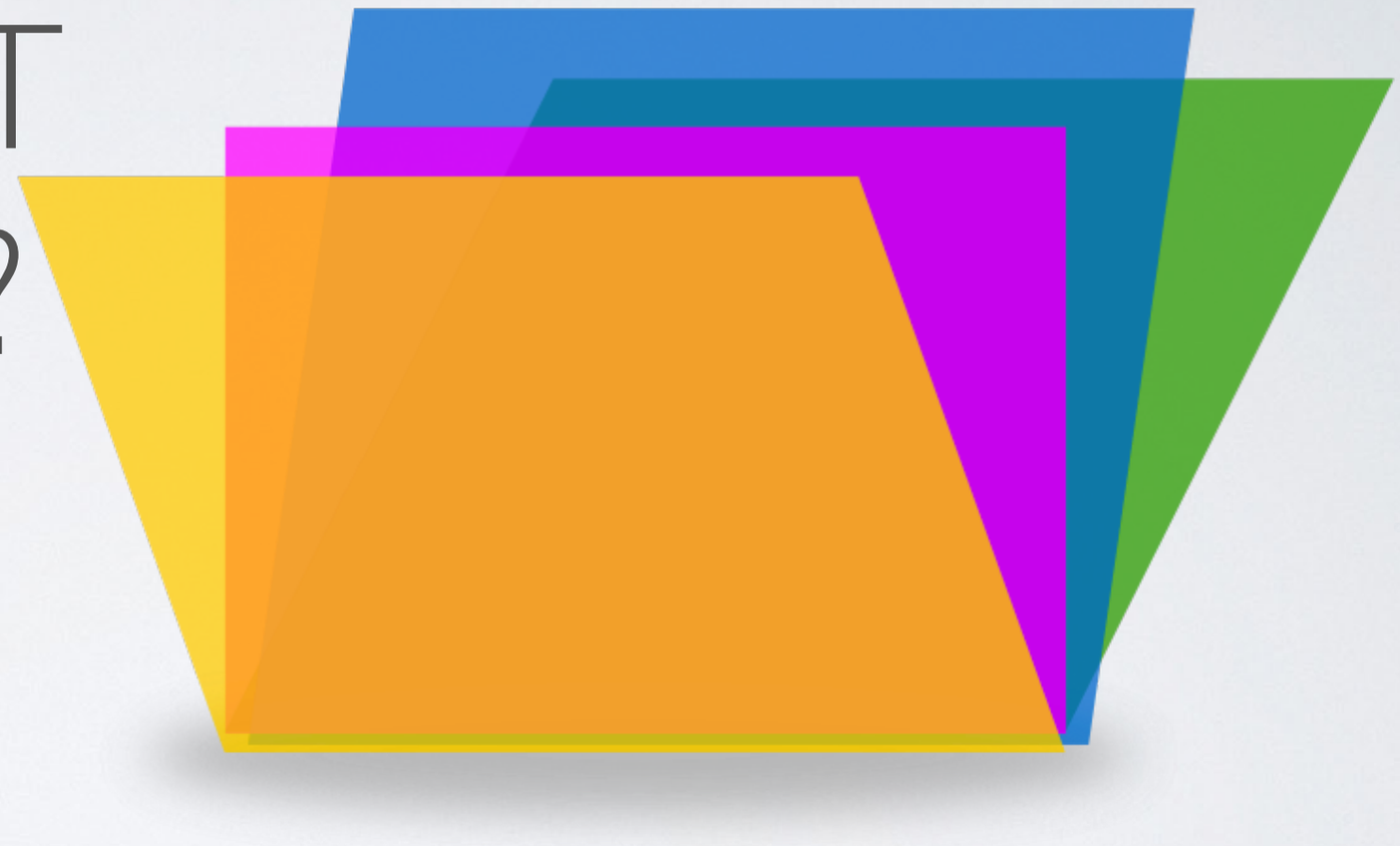
Online, native and mobile users have to save their data



WHAT IS A DATABASE?

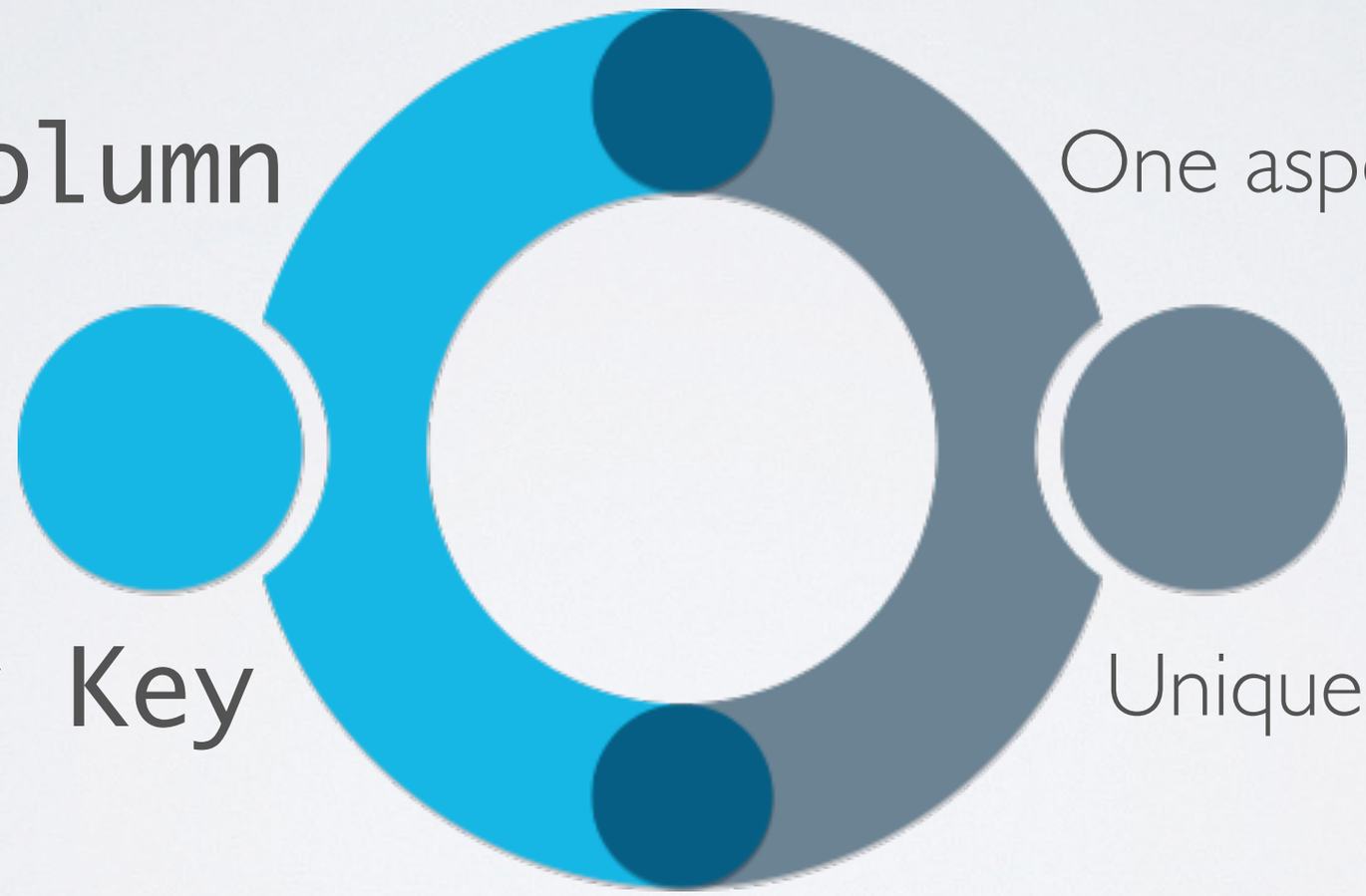
A database is a collection of 'things', organized so that it can easily be accessed, managed, and updated.

WHY NOT USE FILES?



- Not very efficient.
- Doesn't handle transactions
- Scale to millions of users?- not really.

STANDARD CONCEPTS



`Table` A set of rows in your model

`Column` One aspect of your model

Row

A set of columns

`Primary Key` Uniquely identifies a row

`Foreign Key` A primary key from another table

DDL vs DML

Data Manipulation Language

Data Definition Language

DATA TYPES

CHAR	Fixed-length strings
VARCHAR	Variable-length strings
TIMESTAMP/DATE	A date (formatted)
NUMBER	A number
BLOB	For binary object
CLOB/TEXT	For large text

FIRST EXAMPLE

```
create table Person
(
   person_id int(38) unsigned
                              primary key auto_increment,
   first_name varchar(25) not null,
   gender char(1) not null,
   middle_name varchar(25) null,
   last_name varchar(25) not null
) engine=INNODB;
```

CONSTRAINTS

```
create table Person
(
  person_id int(38) unsigned auto_increment,
  first_name varchar(25) not null,
  middle_name varchar(25) null,
  gender char(1) check (gender IN ('M', 'F')),
  last_name varchar(25) not null,
  constraint PK_Person PRIMARY KEY (person_id)
) engine=INNODB row_format=dynamic;
```

NULL

“there is no value” or
“the absence of any value”

FOREIGN-KEYS

```
create table US_Address
(
    address_id int(38) unsigned auto_increment,
    person_id int(38) unsigned not null,
    line_1 varchar(100) not null,
    line_2 varchar(100),
    city varchar(20),
    state char(2),
    zip_plus varchar(10),
    constraint PK_us_address primary key (address_id),
    constraint FK_person_id foreign key (person_id)
        references Person (person_id)
) engine=INNODB row_format=dynamic;
```

INSERTING

```
insert into <table_name>(a,b,c,d,e,f, ....)
  values(a,b,c,d...);
```

UPDATING

```
update <table_name>
  set a='a value', b=a number, c= a date
    where <some key> = <some value>
      and <some other condition> =
        <the condition you need>;
```

DELETING

```
delete from <some table>
        where <some column has> =
```