

Getting started with databases

Cal Poly Pomona CSS
Isaac Siegel
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Agenda

- Why Databases?
- SQL Databases
- NOSQL Databases
- Map-Reduce in MongoDB



Concepts

- Database = an organized collection of data
- Why use a database?
 - cost/performance for data storage/retrieval
 - powerful query languages
 - fault tolerance
 - distributable

CRUD Apps

Create

Read

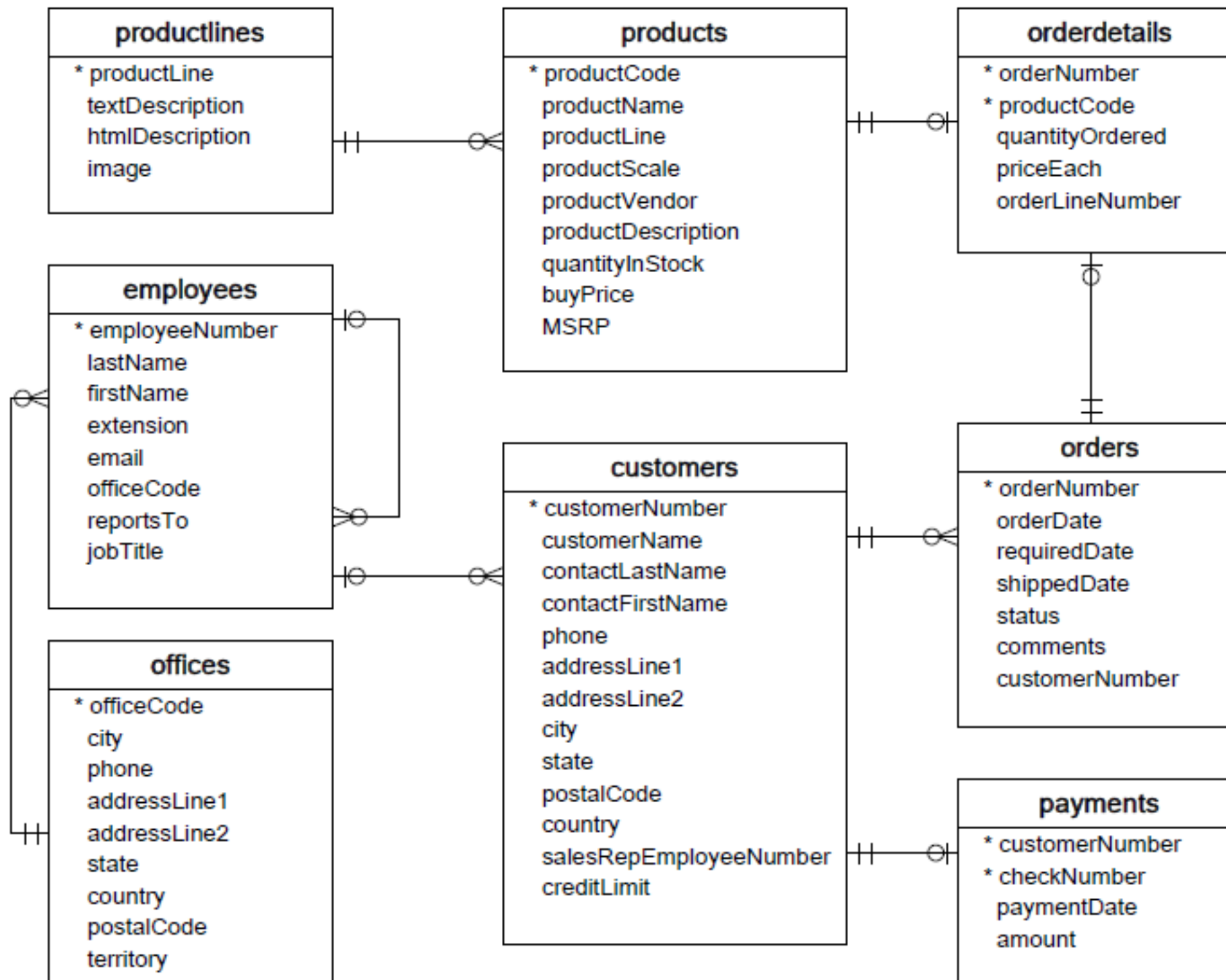
Update

Delete

SQL Databases

- Relational Database
 - A **Customer** purchases **Products** in an **Order**, and those **Products** each have a **Supplier**.
- **SQL** = **S**tructured **Q**uery **L**anguage
- Requires a pre-defined schema
 - Table — Relationship — Table

Schema



MySQL Data

customerNumber	customerName	addressLine1
112	Signal Gift Stores	8489 Strong St.
124	Mini Gifts Distributors Ltd.	5677 Strong St.
129	Mini Wheels Co.	5557 North Pendale Street
131	Land of Toys Inc.	897 Long Airport Avenue
151	Muscle Machine Inc	4092 Furth Circle

orderNumber	orderDate	shippedDate	status	customerNumber
10100	2003-01-06	2003-01-10	Shipped	363
10101	2003-01-09	2003-01-11	Shipped	128
10102	2003-01-10	2003-01-14	Shipped	181
10103	2003-01-29	2003-02-02	Shipped	121
10104	2003-01-31	2003-02-01	Shipped	141

SQL Solutions



NOSQL Databases

- **NO**-SQL = **N**ot **O**nly SQL
 - May/May not support SQL-like query languages
- Document-based Store, Key-Value Store, Column Store, Graph based
- Often no schema/no schema enforcement
- Horizontal Scalability
- Trade some consistency for availability and partition tolerance
- NO JOINS

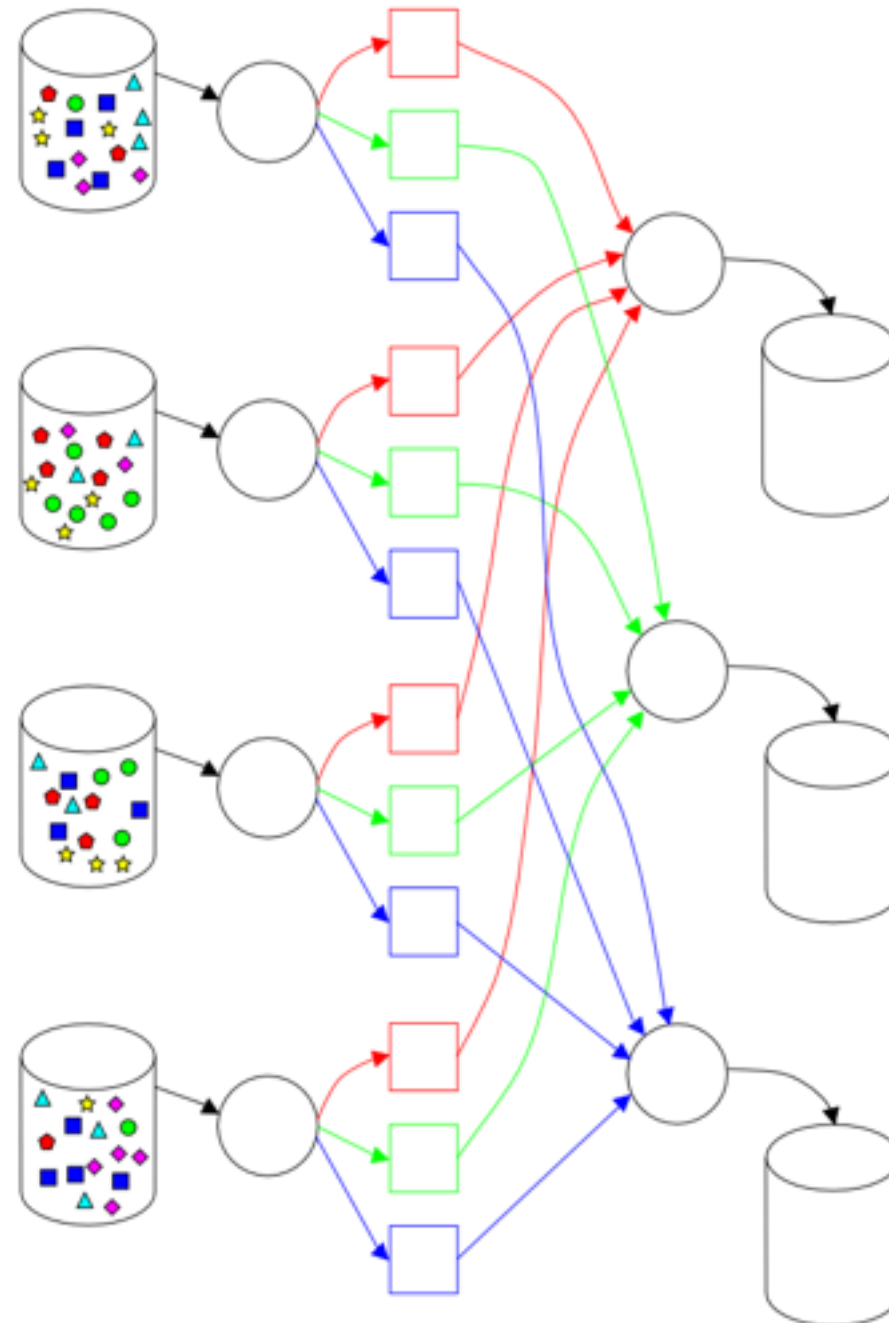
NOSQL Solutions



MongoDB Documents

```
{
  "_id" : ObjectId("581b69bd25931ba40e9a27a8"),
  "first_name" : "Isaac",
  "last_name" : "Siegel",
  "lucky_numbers" : [
    42,
    5,
    7
  ]
}
{
  "_id" : ObjectId("581b6a4f25931ba40e9a27a9"),
  "first_name" : "Isaac",
  "last_name" : "Siegel",
  "location" : {
    "city" : "Torrance",
    "state" : "CA"
  }
}
```

MongoDB Map-Reduce



SQL vs NOSQL




Tutorials

<http://www.mysqltutorial.org/>

<https://university.mongodb.com/>

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