



```
{  
  title: "MongoDB",  
  type: "meetup presentation",  
  speaker:  
    {  
      name: "Izsák Tamás",  
      company: "APPWORKS"  
    }  
  location: "BudapestNoSQL",  
  date: "2016-03-23T20:15:00.000Z"  
}
```

Relational Database Challenges

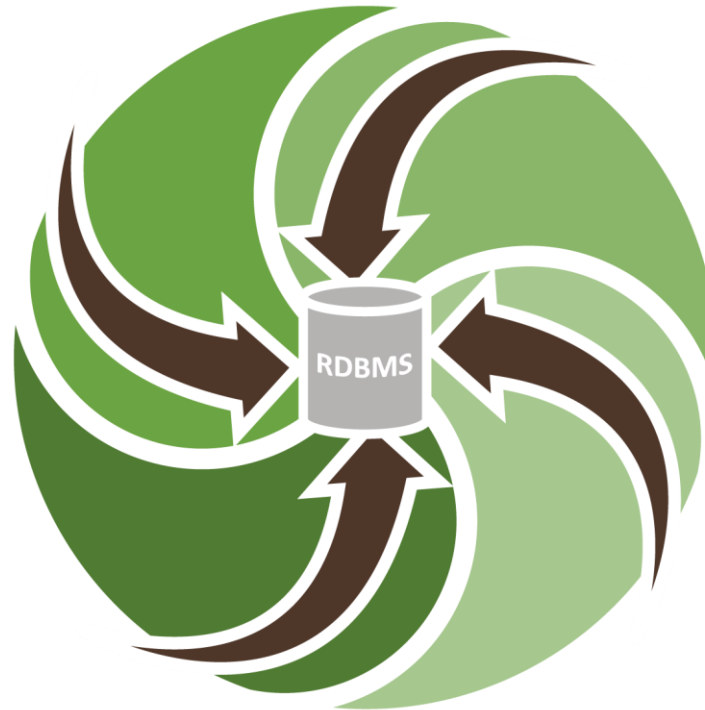
Relational Database Challenges

Data Types

- Unstructured data
- Semi-structured data
- Polymorphic data

Volume of Data

- Petabytes of data
- Trillions of records
- Millions of queries per second



Agile Development

- Iterative
- Short development cycles
- New workloads

New Architectures

- Horizontal scaling
- Commodity servers
- Cloud computing

MongoDB Solution

MongoDB

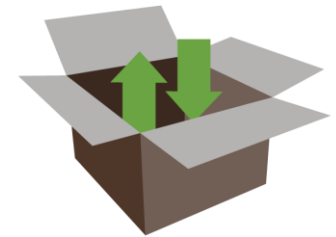
The leading NoSQL database



General
Purpose

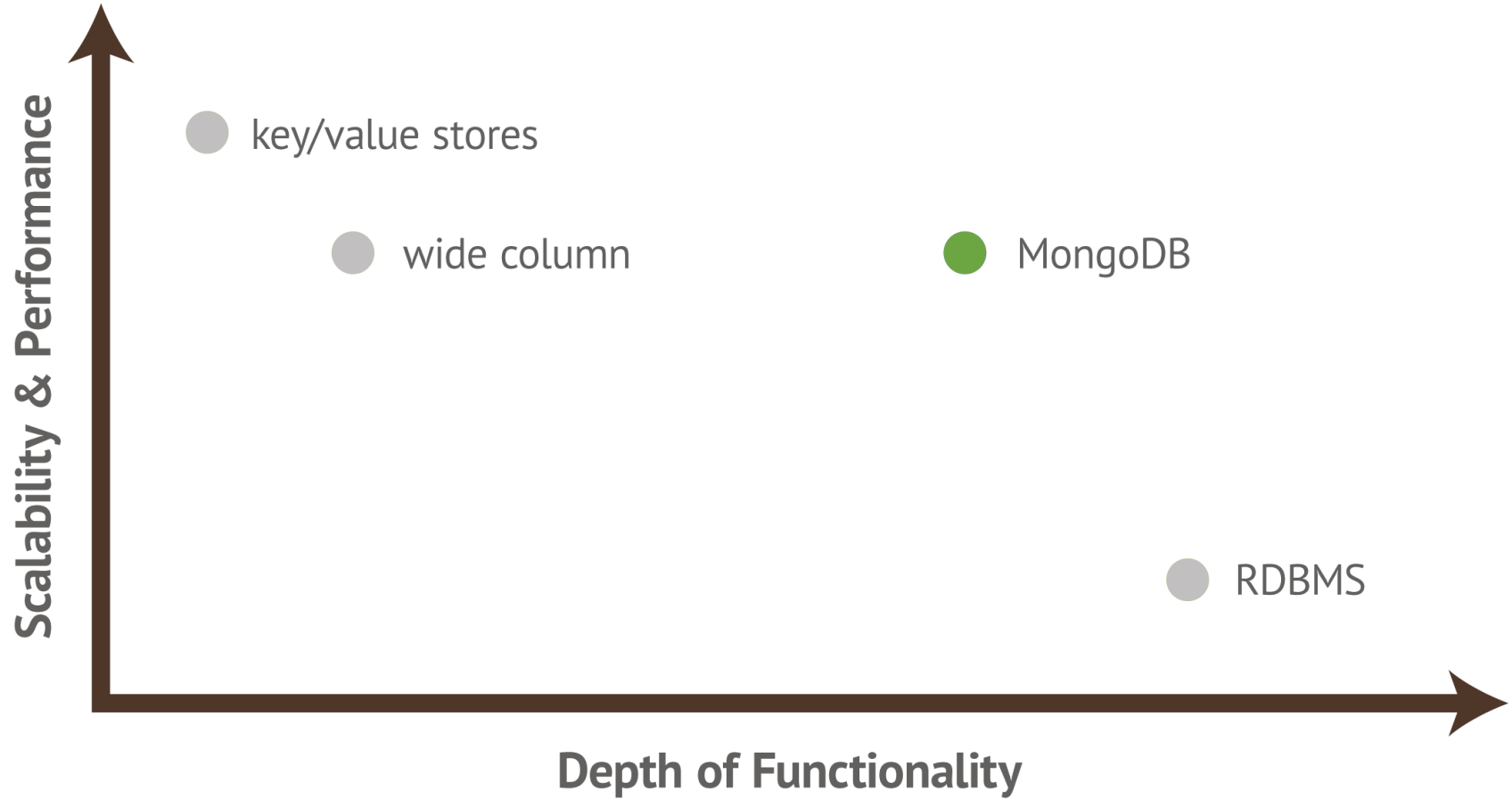


Document
Database



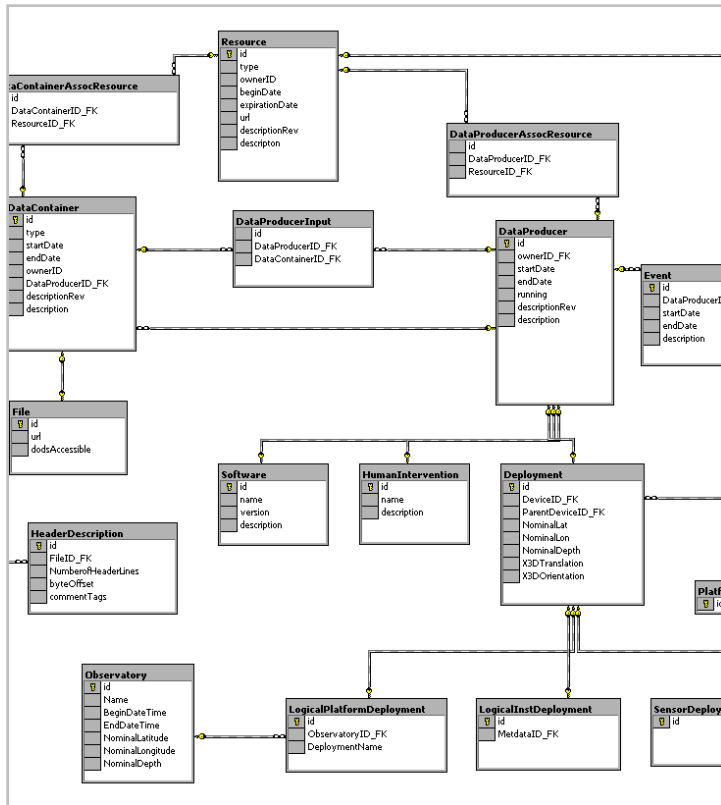
Open-
Source

mongoDB



Agility

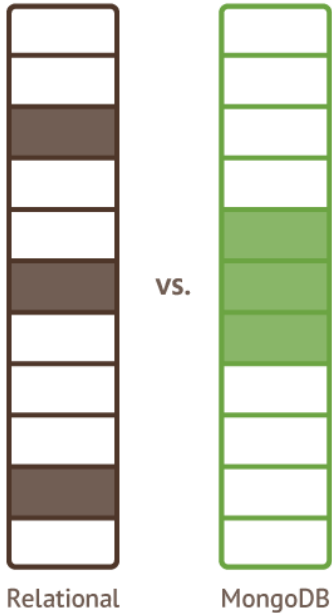
RDBMS



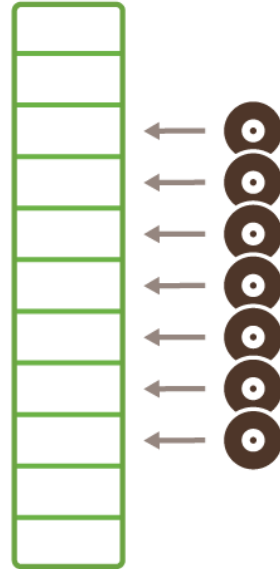
MongoDB

```
{
  _id : ObjectId("4c4ba5e5e8aabf3"),
  employee_name: "Dunham, Justin",
  department : "Marketing",
  title : "Product Manager, Web",
  report_up: "Neray, Graham",
  pay_band: "C",
  benefits : [
    { type : "Health",
      plan : "PPO Plus" },
    { type : "Dental",
      plan : "Standard" }
  ]
}
```

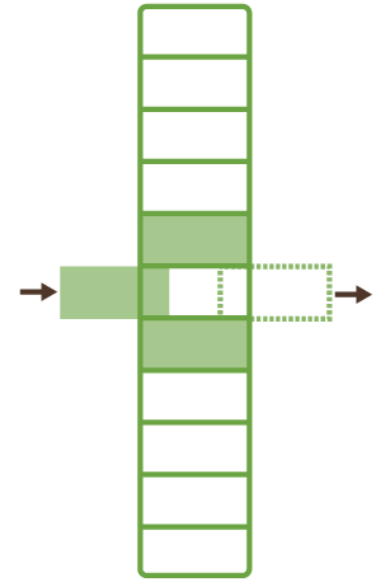
Performance



Better Data Locality



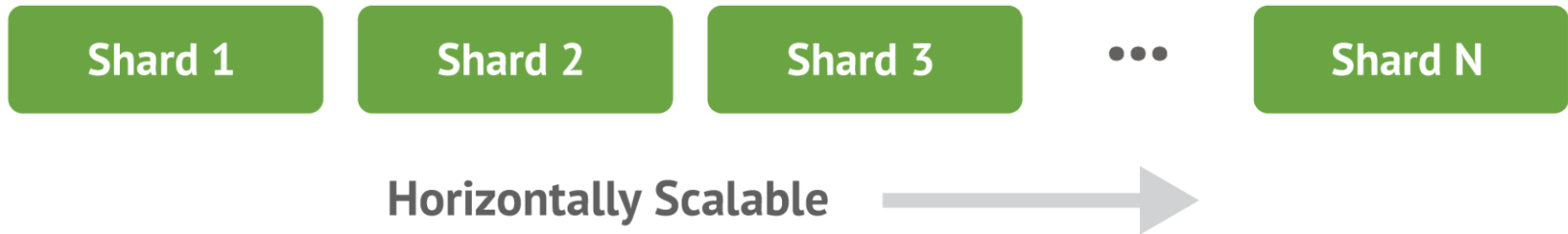
In-Memory Caching



In-Place Updates

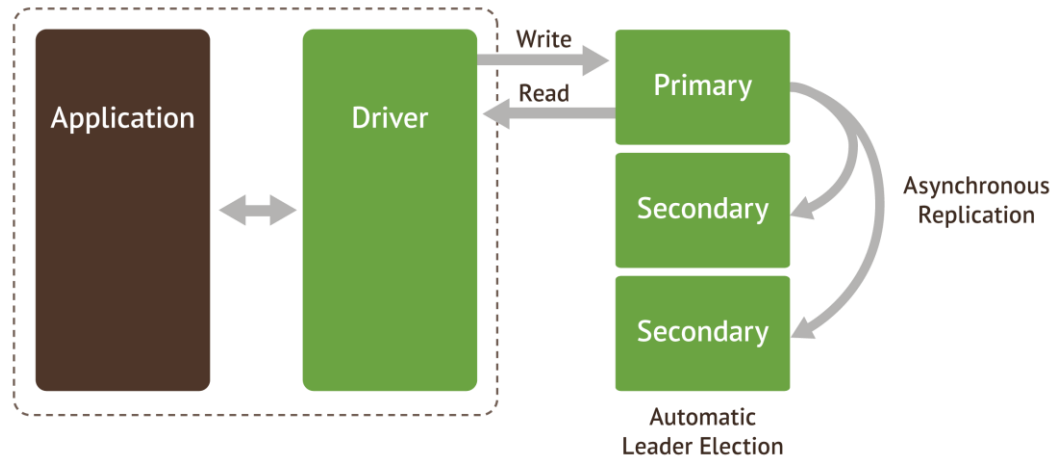
Scalability

Auto-Sharding



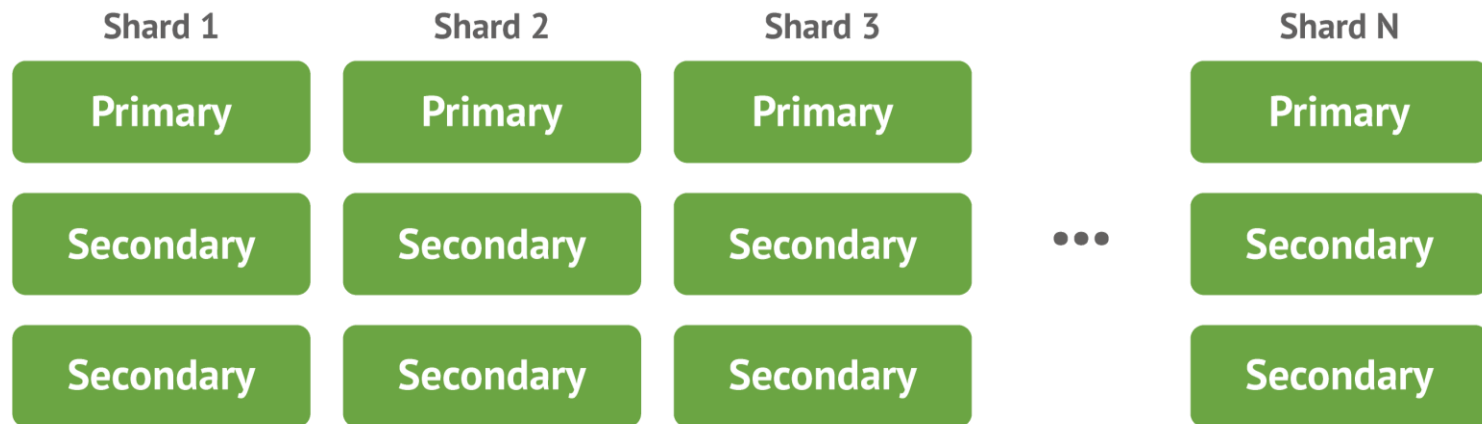
- Increase capacity as you go
- Commodity and cloud architectures
- Improved operational simplicity and cost visibility

High Availability



- Automated replication and failover
- Multi-data center support
- Improved operational simplicity (e.g., HW swaps)
- Data durability and consistency

Sharding and Replication



Shell and Drivers

Drivers

Drivers for most popular programming languages and frameworks



Java



Ruby



JavaScript



Perl



Python



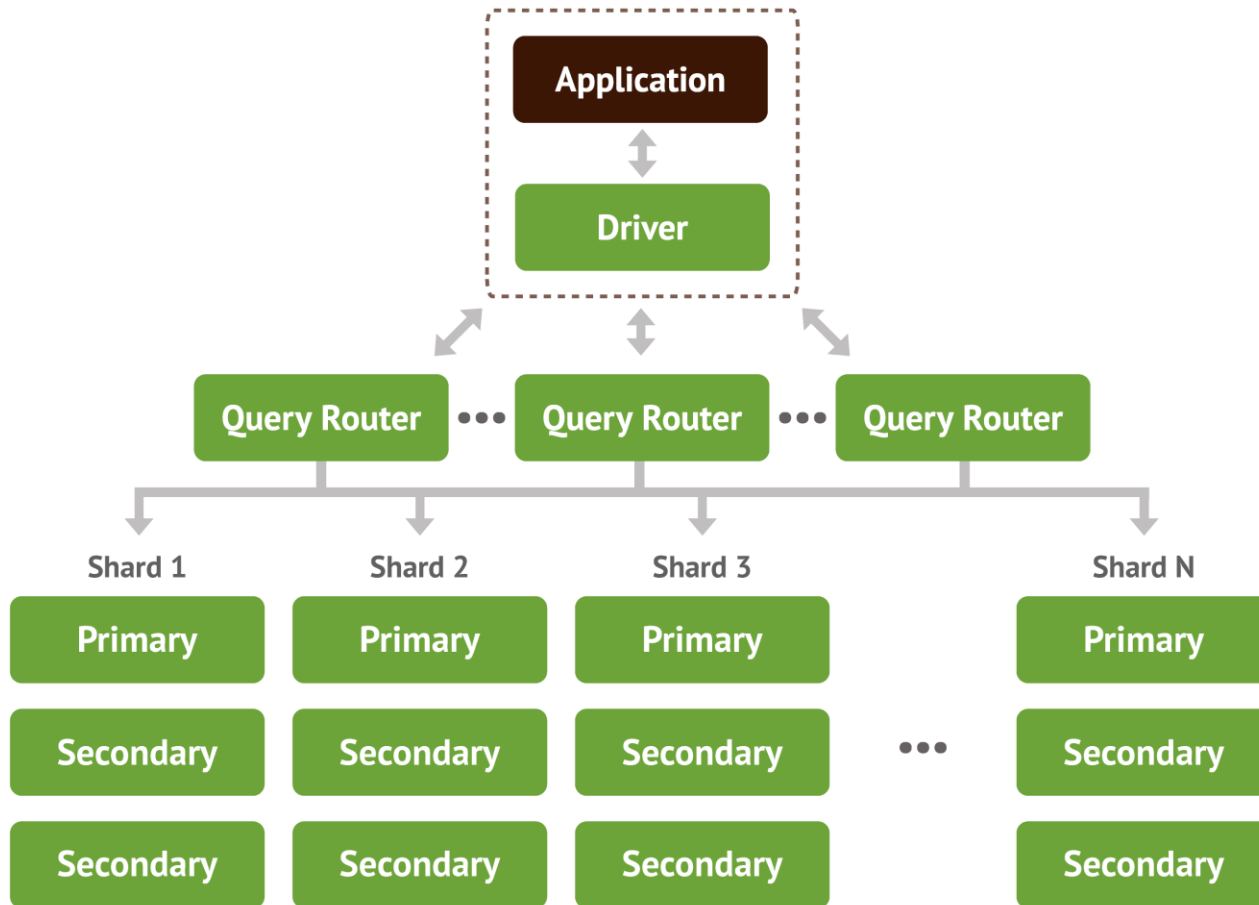
Haskell

Shell

Command-line shell for interacting directly with database

```
> db.collection.insert({product:"MongoDB",
type:"Document Database"})
>
> db.collection.findOne()
{
  "_id" :
  ObjectId("5106c1c2fc629bfe52792e86"),
  "product" : "MongoDB"
  "type" : "Document Database"
}
```

MongoDB Architecture



mongoDB

MongoDB

What we **HAVE**

- Document-Oriented storage
- Fast In-Place Updates
- Full Index Support
- Replication & High Availability
- Auto-Sharding

- Querying (aggregation framework)
- Map/Reduce

MongoDB

What we **DO NOT** have

- Transactions
- Joins

MongoDB

Document Store

RDBMS		MongoDB
Database		Database
Table, View		Collection
Row		Document (JSON, BSON)
Column		Field
Index		Index
Join		Embedded Document
Foreign Key		Reference
Partition		Shard

MongoDB

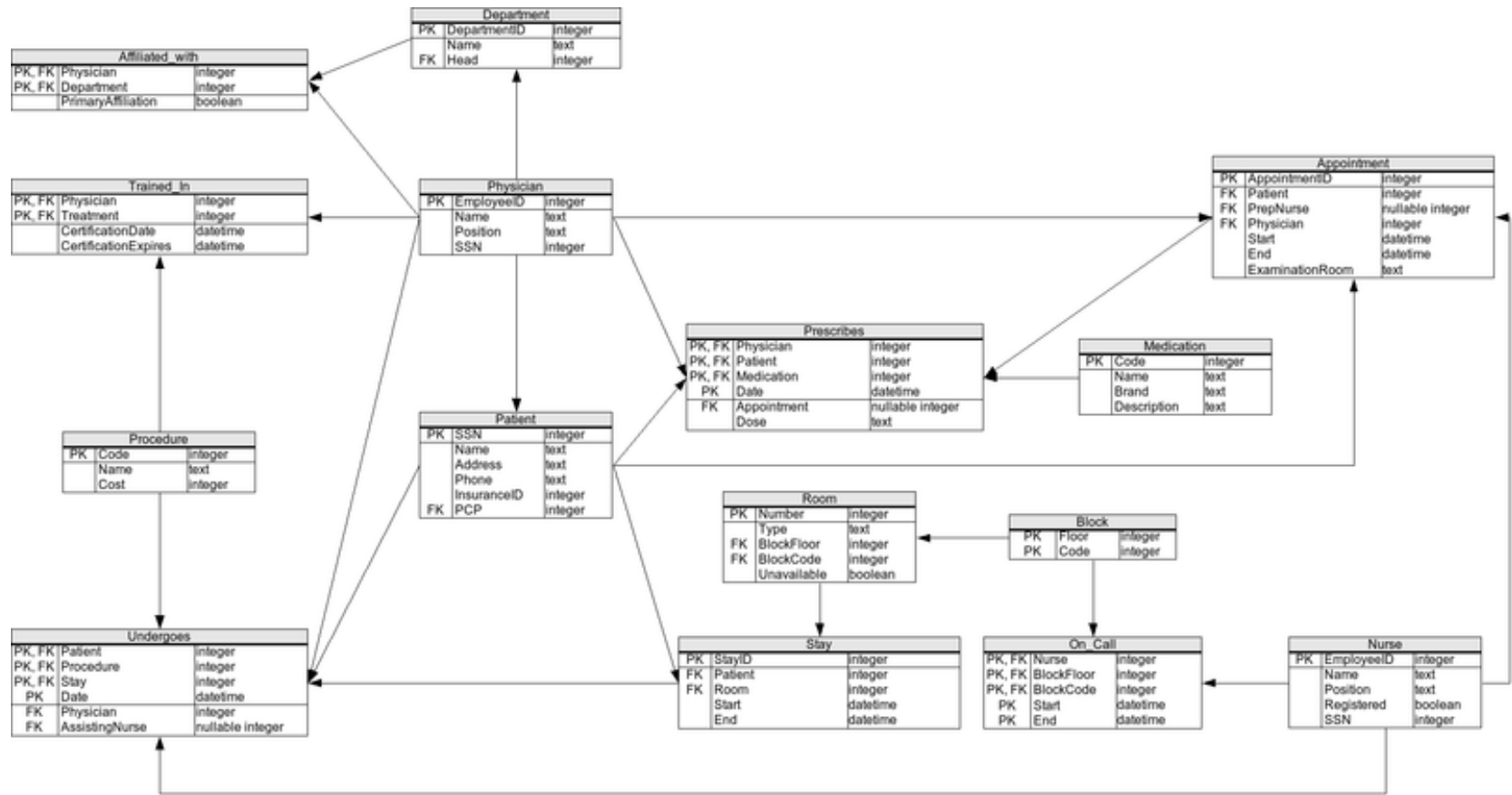
Document Store

RDBMS		MongoDB
Database		Database
Table, View		Collection
Row		Document (JSON)
Column		Field
Index		Index
Join		Embedded Document
Foreign Key		Reference
Partition		Shard

```
> db.user.findOne({age:39})
{
  "_id" : ObjectId("5114e0bd42..."),
  "first" : "John",
  "last" : "Doe",
  "age" : 39,
  "interests" : [
    "Reading",
    "Mountain Biking ]
  "favorites": {
    "color": "Blue",
    "sport": "Soccer"}
}
```

MongoDB

Relational modell



MongoDB

MongoDB

```
{
  "patient_id": "1177099",
  "first_name": "John",
  "last_name": "Doe",
  "dob": "2000-01-25",
  "gender": "Male",
  "blood_type": "B+",
  "allergies": ["Nuts", "Penicillin", "Pet Dander"],
  "current_medications": [{"name": "Zoloft",
    "dosage": "2mg",
    "frequency": "daily",
    "route": "orally"}],
  "complaint": [{"entered": "2000-11-03",
    "onset": "2000-11-03",
    "prob_desc": "",
    "icd": "250.00",
    "status": "Active"},
    {"entered": "2000-02-04",
    "onset": "2000-02-04",
    "prob_desc": "in spite of regular exercise...",
    "icd": "401.9",
    "status": "Active"}],
  "diagnosis": [{"visit": "2005-07-22",
    "narrative": "Fractured femur",
    "icd": "9999",
    "priority": "Primary"},
    {"visit": "2005-07-22",
    "narrative": "Type II Diabetes",
    "icd": "250.00",
    "priority": "Secondary"}]
}
```

MongoDB

Relational:

Focus on data storage

MongoDB:

Focus on data use

MongoDB

Relational:

What answers do I have?

MongoDB:

What questions do I have?

mongoDB

Next steps

<https://www.mongodb.org>

<https://www.mongodb.com>

<https://university.mongodb.com>

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