



# CS213

## Principles of Database Systems(H)

### Chapter 14

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# World is changing faster and faster



5MB



George Chernilevsky

1.44MB



16TB



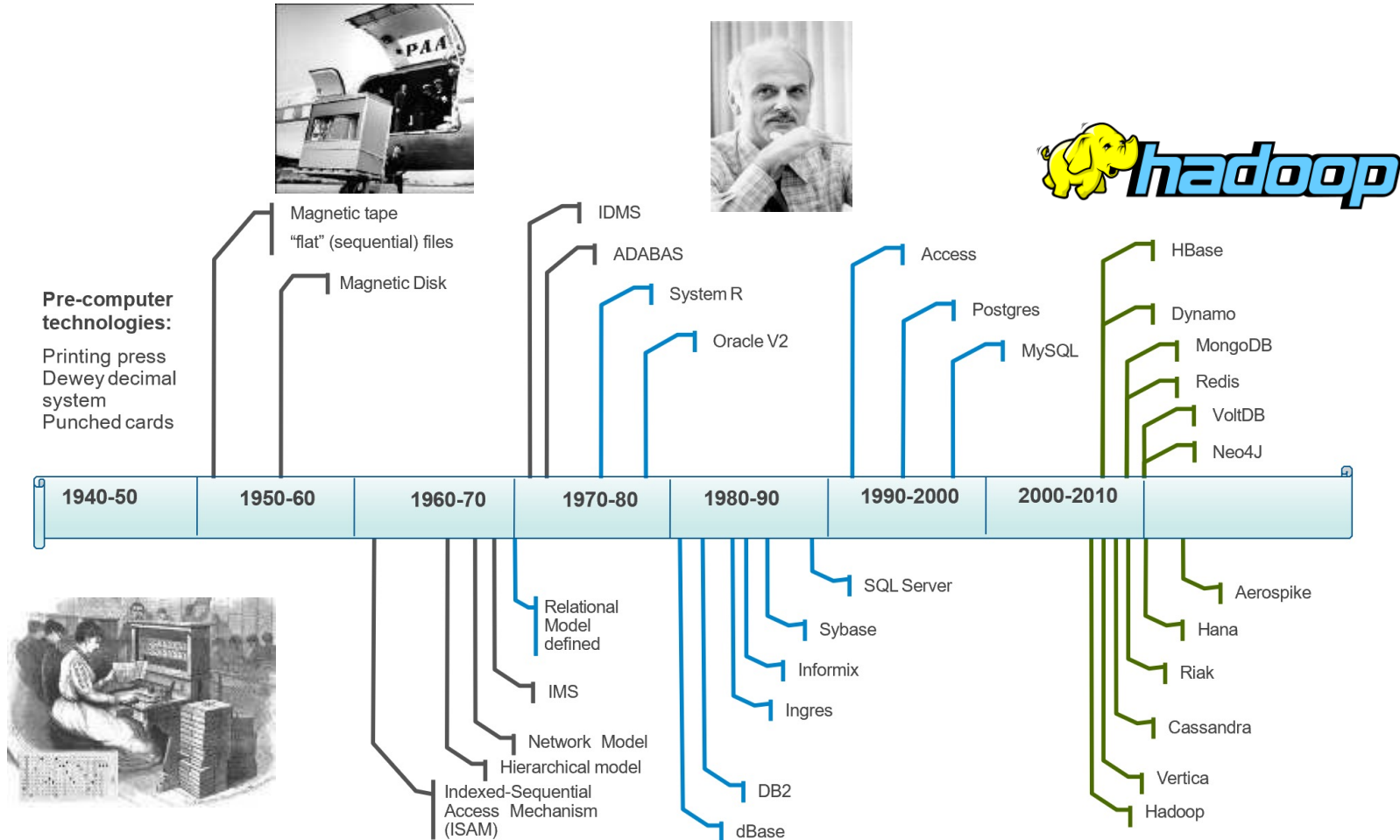
1TB







# History of databases



# A Guide to NoSQL Databases

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Traversy Media@YouTube

[https://www.youtube.com/watch?v=uD3p\\_rZPBUQ](https://www.youtube.com/watch?v=uD3p_rZPBUQ)

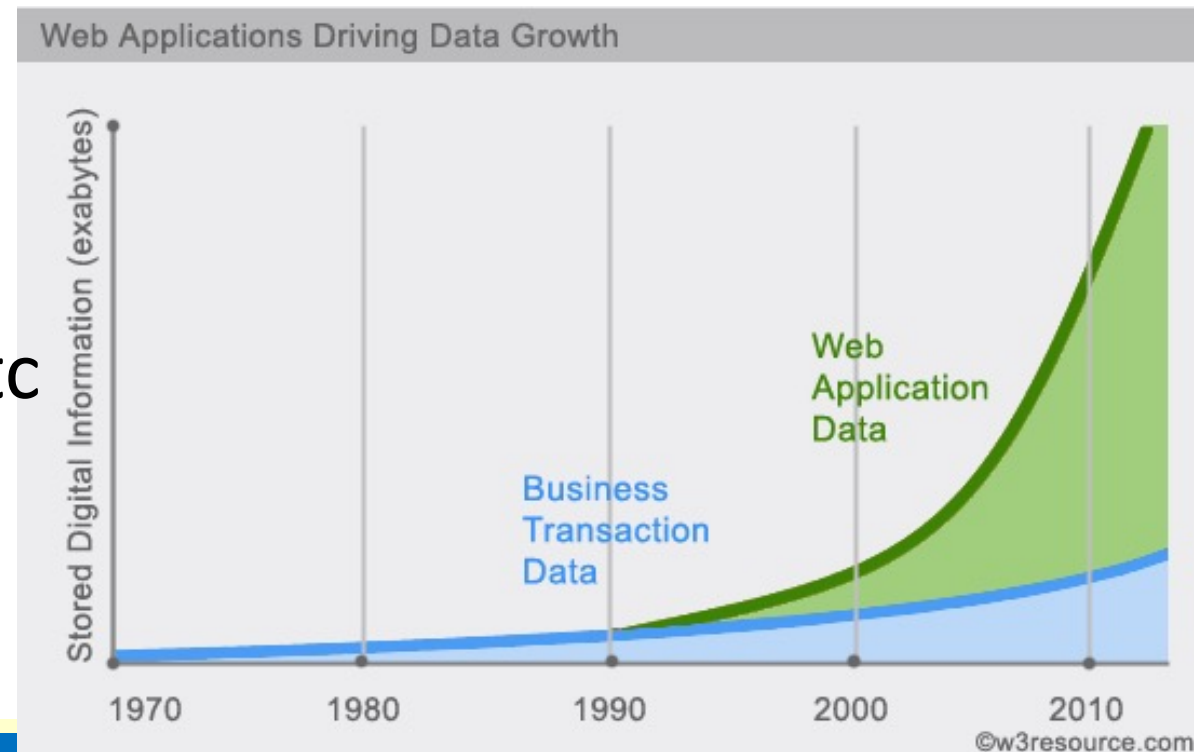
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# What is NoSQL?

- Stands for “NOT ONLY SQL”
- A **Non-Relational** database (No Tables)
- A flexible database used for **big data & real-time** web apps
- Multiple types of NoSQL databases

# What is Big Data?

- A term for data sets that are so large that traditional methods of storage & processing are inadequate.
- Massive increase in data volume within the last decade or so
- Social networks, search engines, etc
- Challenges in storage, capture, analysis, transfer, etc

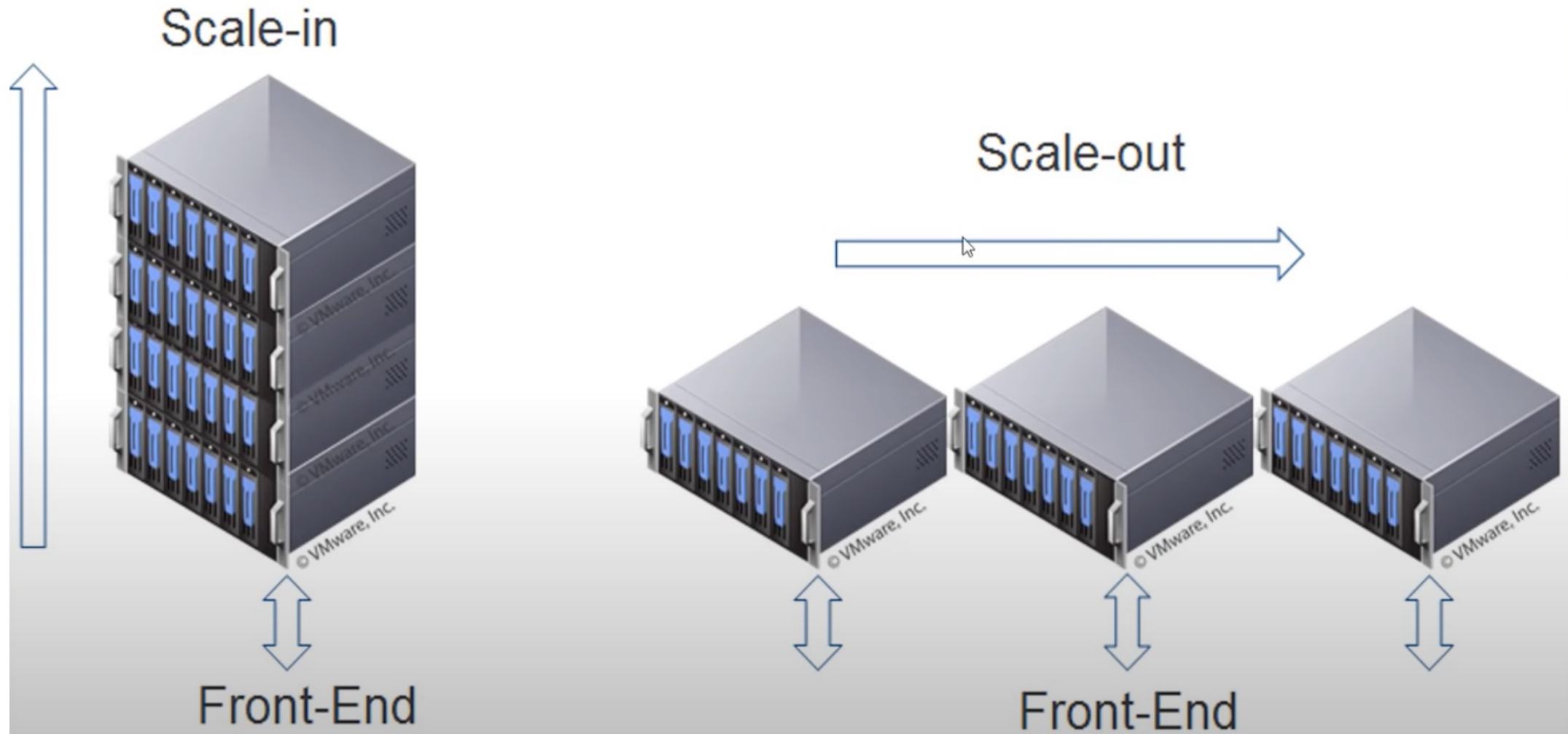


# Advantages of NoSQL over RDBMS

- Handles Big Data
- Data Models – No predefined schema
- Data Structure – NoSQL handles unstructured data
- Cheaper to manage
- Scaling – Scale out / horizontal scaling



# Scale Out vs Scale UP



# Advantages of RDBMS over NoSQL

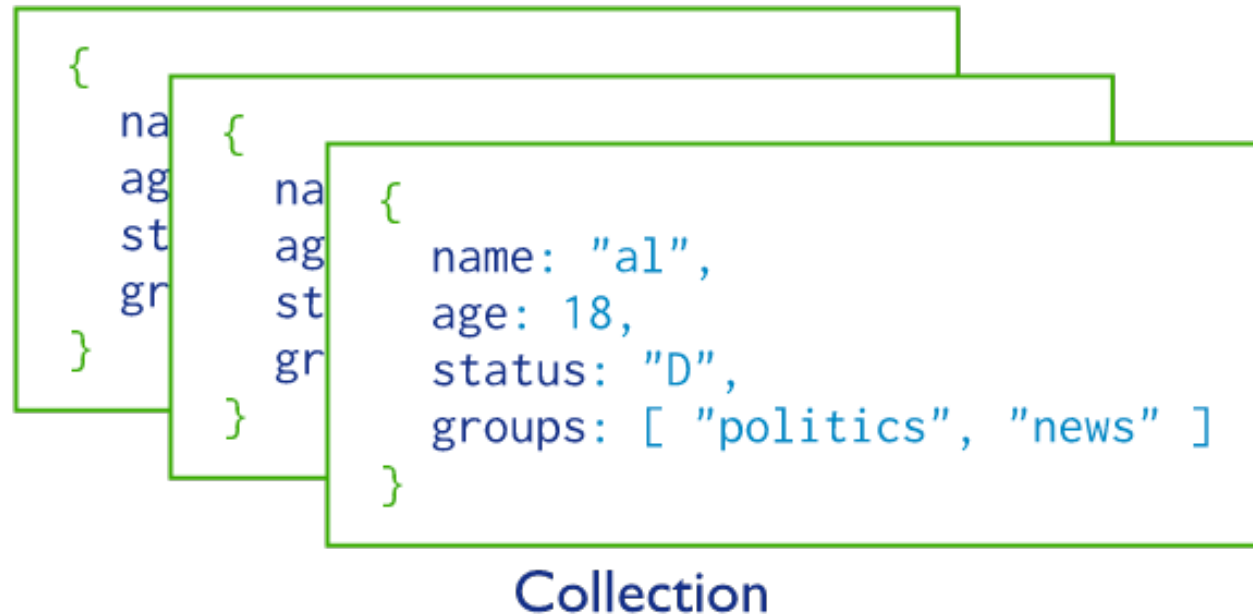
- Better for relational data
- Normalization
- Well known language (SQL)
- Data Integrity
- ACID Compliance (atomicity, consistency, isolation, durability)

# Types of NoSQL Databases

- Document Databases [MongoDB, CouchDB]
- Column Databases [Apache Cassandra]
- Key-Value Stores [Redis, Couchbase Server]
- Cache Systems [Redis, Memcache]
- Graph Databases [Neo4]

# MongoDB examples

- MongoDB stores documents in collections. Collections are analogous to tables in relational databases.
- Data is stored in json files.





# MongoDB examples

id	user_name	email	age	city
1	Mark Hanks	mark@abc.com	25	Los Angeles
2	Richard Peter	richard@abc.com	31	Dallas



```
{
  "_id": ObjectId("5146bb52d8524270060001f3"),
  "age": 25,
  "city": "Los Angeles",
  "email": "mark@abc.com",
  "user_name": "Mark Hanks"
}
{
  "_id": ObjectId("5146bb52d8524270060001f2"),
  "age": 31,
  "city": "Dallas",
  "email": "richard@abc.com",
  "user_name": "Richard Peter"
}
```

# MongoDB examples

The primary interface to the database has been the mongo shell. Since MongoDB 3.2, MongoDB Compass is introduced as the native GUI.

```
db.col.insert({title: 'MongoDB 教程',  
              description: 'MongoDB 是一个 Nosql 数据库',  
              by: '菜鸟教程',  
              url: 'http://www.runoob.com',  
              tags: ['mongodb', 'database', 'NoSQL'],  
              likes: 100  
            })
```

Intricity101@YouTube

1. What is Hadoop
2. What is Hadoop: SQL Comparison
3. What is Hadoop: Why it scales
4. What is a Data Lake
5. What is NoSQL
6. Why Hadoop is Dying
7. Why born in the cloud matters

What will be the next?