Non-Relational Database Types

Google slide deck available here

Learning Objectives

At the end of this course, learners will be able to:
- Define the four non-relational database types.
- Identify the structure and strengths of each of the four types: key-value, graph, column oriented, and document.

Suggested Uses

- Part of one lecture period
- Handouts / asynchronous learning
- Supplemental reading material - read on your own / not part of formal teaching
- Complement to University course M001: MongoDB Basics

This lesson is a part of the course Introduction to Modern Databases with MongoDB.

At a Glance

Length:
15 minutes

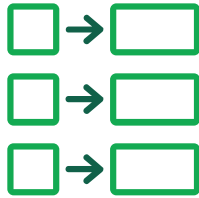Level:
Foundational

Prerequisites:
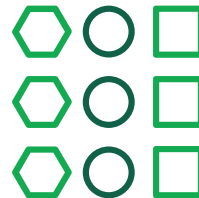Relational vs. Non-Relational Databases
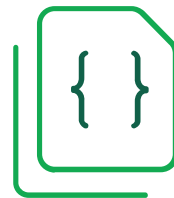
Non-Relational Database Types
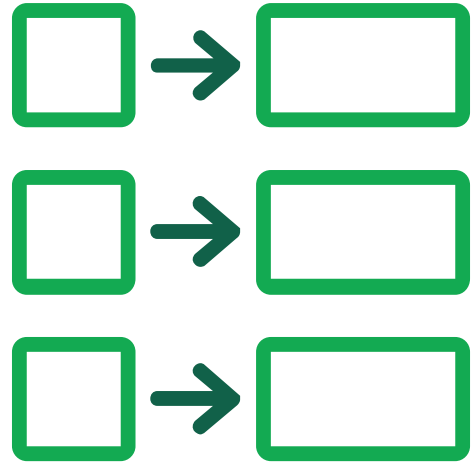
Key/Value

Graph

Column

Document

Structure

- A unique key is paired with a collection of values, where the values can be anything from a string to a large binary object.

Strength

- Simple data model.

Key/Value Database

Key/Value: Example

Key	Value
Name	Sherlock Holmes
Age	40
Address	221B Baker Street

Structure

- Captures connected data.
- Each element is stored as a node.
- Connections between nodes are called links or relationships.
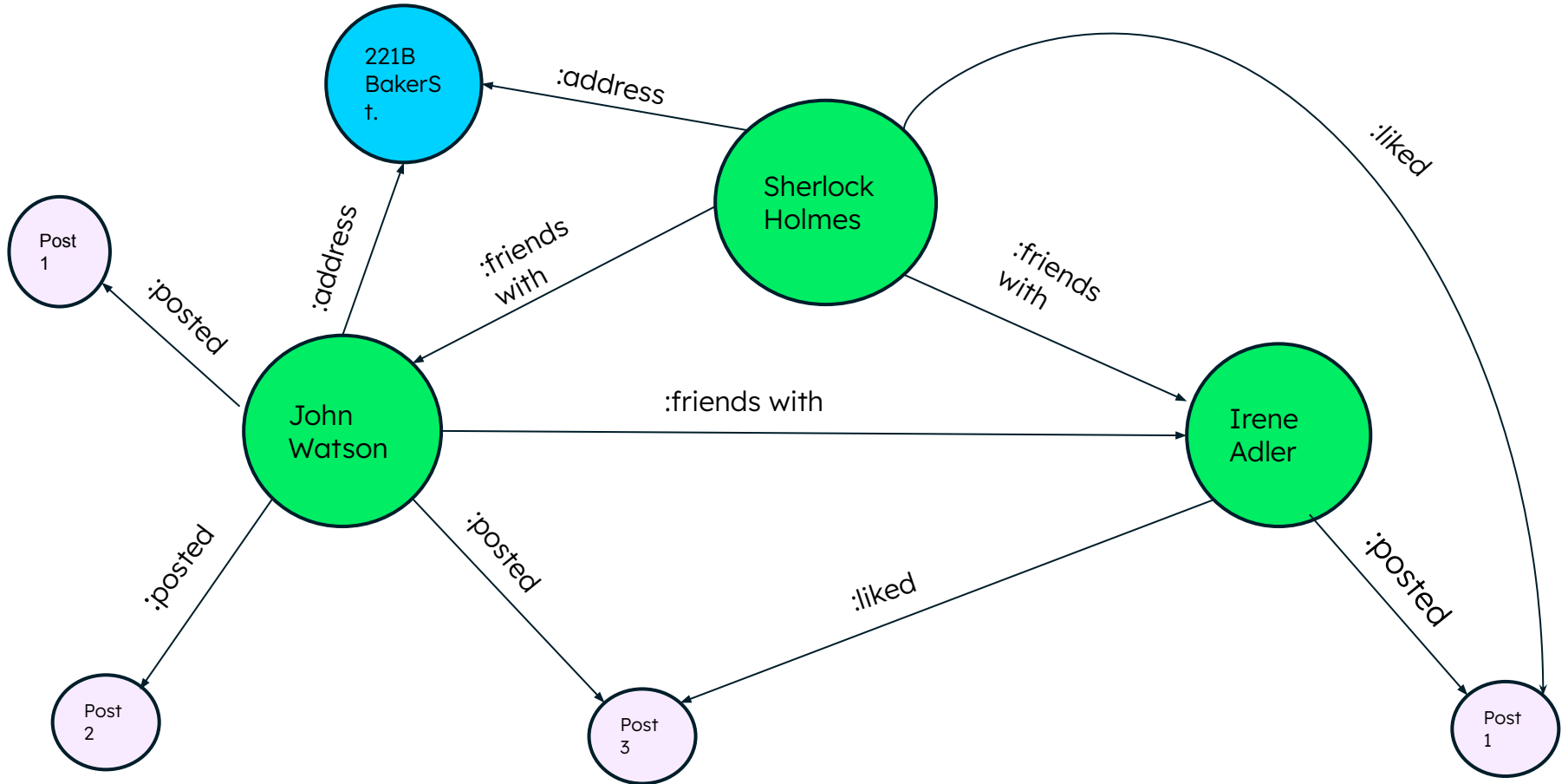
Strength

- Traverses the connections between data rapidly.

Graph Database

Graph: Example

Structure

- Data is stored using key rows that can be associated with one or more dynamic columns

Strengths

- Highly performant queries
- Designed for analytics
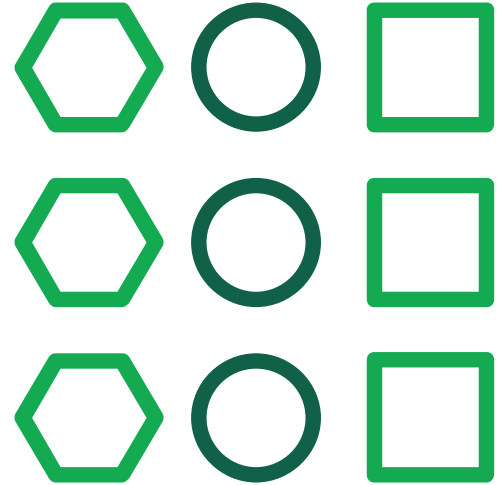
Column Oriented or Wide Column

Column Oriented Example

Name	ID
Sherlock	001
John	002
Irene	003

Age	ID
40	001
45	002
43	003

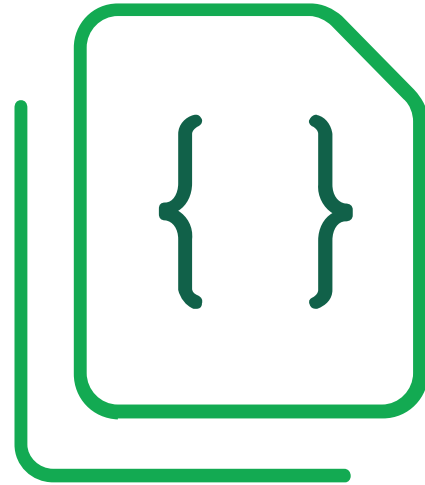| Height	ID
6'2	001
5'9	002
5'7	003

Structure

- Polymorphic data models

- Each document contains markup that identifies fields and values.

Strengths

- Obvious relationships using embedded arrays and documents

- No complex mapping

Document Database

Document Model Example

```json
{
  "_id":
ObjectId("5ef2d4b45b7f11b6d7a"
),
  "user_id": "Sherlock
Holmes",
  "age": 40,
  "address":
    {
      "Country: "England"
      "City": "London",
      "Street": "221B Baker
    St."
    },
  "Hobbies":[ violin,
crime-solving ]
}
```

```json
{
  "_id":
ObjectId("6ef8d4b32c9f12b6d4a")
,
  "user_id": "John Watson",
  "age": 45,
  "address":
    {
      "Country: "England"
      "City": "London",
      "Street": "221B Baker
    St."
    },
  "Medical license": "Active"
}
```

The Document Model
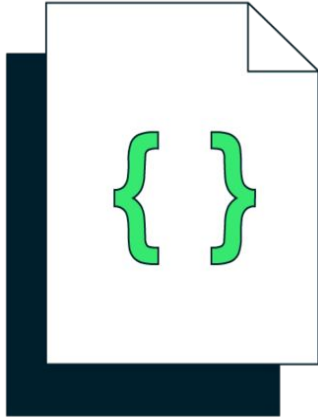
For general purpose use, the document model prevails as the preferred model by developers and database administrators.

Quiz

Quiz

Which of the following are types of non-relational databases? More than one answer choice can be correct.

- A. Key/Value
- B. Graph
- C. Column-oriented or wide-column
- D. Document
- E. Data Lake

Quiz

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✗ E. Data Lake

A key-value database is regarded as a non-relational database.

Quiz

Which of the following are types of non-relational databases? More than one answer choice can be correct.

✓ A. Key-Value

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✓ D. Document

✗ E. Data Lake

A graph database is regarded as a non-relational database.

Quiz

Which of the following are types of non-relational databases? More than one answer choice can be correct.

✅ A. Key-Value

✅ B. Graph

✅ C. Column-oriented or wide-column

✅ D. Document

❌ E. Data Lake

A column-oriented or wide-column database is regarded as a non-relational database.

Quiz

Which of the following are types of non-relational databases? More than one answer choice can be correct.

✓ A. Key-Value

✓ B. Graph

✓ C. Column-oriented or wide-column

✓ D. Document

✗ E. Data Lake

*A document database is regarded as a non-relational database.*

Quiz

Which of the following are types of non-relational databases? More than one answer choice can be correct.

✓ A. Key-Value

✓ B. Graph

✓ C. Column-oriented or wide-column

✓ D. Document

✗ E. Data Lake

A data lake is regarded as a centralised repository of data, both structured and unstructured so it is not regarded as non-relational or as relational.

Continue Learning!
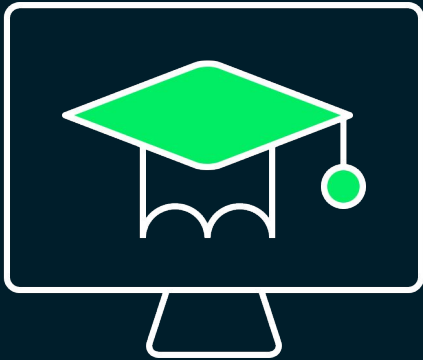
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