

# Beginning NoSQL Modeling

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# In This Module



**What NoSQL is and is not**

**The different classifications of NoSQL**

**Document-oriented data stores**

- XML (Extensible Markup Language)
- JSON (JavaScript Object Notation)

**Deconstruct a JSON formatted document**

**Demo for creating a logical relational  
model from JSON formatted data**



# NoSQL

Basically, anything **NOT** considered a relational database

Was: no SQL

Now: not only SQL

Usually has a community or open source version to use for free



# NoSQL

## Distributed file systems

- e.g., Hadoop's HDFS

## Key-value databases/data stores

- Document-oriented
  - e.g., MongoDB, MariaDB
    - MongoDB uses a binary JSON called BSON
    - MariaDB = JSON + relational
  - XML
    - E.g., BaseX, eXist
- Wide-column data store
  - e.g., Cassandra
  - Hybrid - also uses tables and rows
  - CQL (Cassandra Query Language)



# NoSQL

## Graph databases

- Neo4j
  - Cypher query language

## Multi-modal

- OrientDB
  - ACID transactions
  - Primary keys (PK)
  - Foreign key (FK) relationships
  - Table and rows
  - Standard SQL
  - Graph
  - Object-oriented



To data modelers, it's all  
about the data, not the  
database



# Differences in Terminology

Relational	Original document-oriented
Table	Collection
Row	Record
Column	Field
Primary Key (PK)	URI
Foreign Key (FK)	Self-contained entities built-in via nesting
Schema	Considered schemaless unless enforced by design



Video 2 starts here

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From Travel Website "A":

```
<Reservation>
  <Confirmation = 123456>
    <Hotel ID>12345</Hotel ID>
    <Name>Best Hotel In AZ</Name>
    <Address>
      <Street Number>9802 N. 16th Street</Street Number>
      <City>Phoenix</City>
      <State>AZ</State>
      <Zip Code>85013</Zip Code>
    </Address>
    ...
  </Reservation>
```

# The XML Data Format

***Document-oriented***



From Travel Website "A":

```
{
  "Reservation": {
    "Confirmation": 23456,
    "Arrival Date": "01/15/2017",
    "Departure Date": "01/17/2017",
    "Room Type": "KNS",
    "Adults": 2,
    "Children": 0,
    "Hotel": {
      "Hotel ID": "12345",
      "Name": "Best Hotel In AZ",
      "Address": "9802 N. 16th Street",
      "City": "Phoenix",
      "State": "AZ",
      "Zip Code": 85013,
      "Phone": "(602)234-3467"
    },
    "Guest": {
      "Name": "John Doe Jr.",
      "Address": "1234 W. Washington Street, Smallville, AZ 85054",
      "Phone": {
        "Home": "(602)123-4567",
        "Mobile": "(480)908-1234"
      },
      "Payment Method": {
        "Credit Card": "Visa",
        "Card Number": "412356789012",
        "Exp": "04/2017"
      }
    }
  }
}
```

# The JSON Data Format

***Document-oriented***



# {JSON}

**Document-oriented**

**Semi-structured**

- Not bound by the rules of a relational model, including normalization

**Not set-based**

**Can be schemaless**

- Could have:
  - Varying columns
  - Varying datatypes among “common” columns
  - Nested documents

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```

## The JSON Data Format: Semi-structured *Document-oriented*



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## The JSON Data Format: Key-Value *Document-oriented*



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```

## The JSON Data Format: Key-Value *Document-oriented*



Key value pair

{key1: key-value, key2: key-value2, key3: key-value3}

=

Column with data

key1	key2	key3
key-value1	key-value2	key-value3



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## The JSON Data Format: Nesting

*Document-oriented*





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*Document-oriented*



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*Document-oriented*



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    }
  }
}
```

## The JSON Data Format: Nesting

*Document-oriented*



Count the ":{" to determine  
the number of entities

# The JSON Data Format: Breakdown

- 1 `"Reservation": {"Confirmation": 23456, "Arrival Date": "01/15/2017", "Departure Date": "01/17/2017", "Room Type": "KNS", "Adults": 2, "Children": 0}`
- 2 `"Hotel": {"Hotel ID": "12345", "Name": "Best Hotel In AZ", "Address": "9802 N. 16th Street", "City": "Phoenix", "State": "AZ", "Zip Code": 85013, "Phone": "(602)234-3467"},`
- 3 `"Guest": {"Name": "John Doe Jr.", "Address": "1234 W. Washington Street, Smallville, AZ 85054"}`
- 4 `"Phone": {"Home": "(602)123-4567", "Mobile": "(480)908-1234"},`
- 5 `"Payment Method": {"Credit Card": "Visa", "Card Number": "412356789012", "Exp": "04/2017"}`

# Demo



Let's put what we learned to work!



Summary (Video 4) starts here

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# Summary



What NoSQL is and is not

The different classifications of NoSQL

Document-oriented data stores

- XML
- JSON

Deconstruct a JSON formatted document

Demo for creating a logical relational model from JSON formatted data



# Next: Beginning Dimensional Modeling

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