

# Introduction to key-value databases

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SQL


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# Key-value databases

**Definition:** A NoSQL database that uses simple key-value pairs (similar to dictionaries in Python) to store data.

- Can be searched by key, not the value
- Store values of type string, hash, or lists
- Performant for simple read and writes of data
- Data is stored in memory, instead of on disk

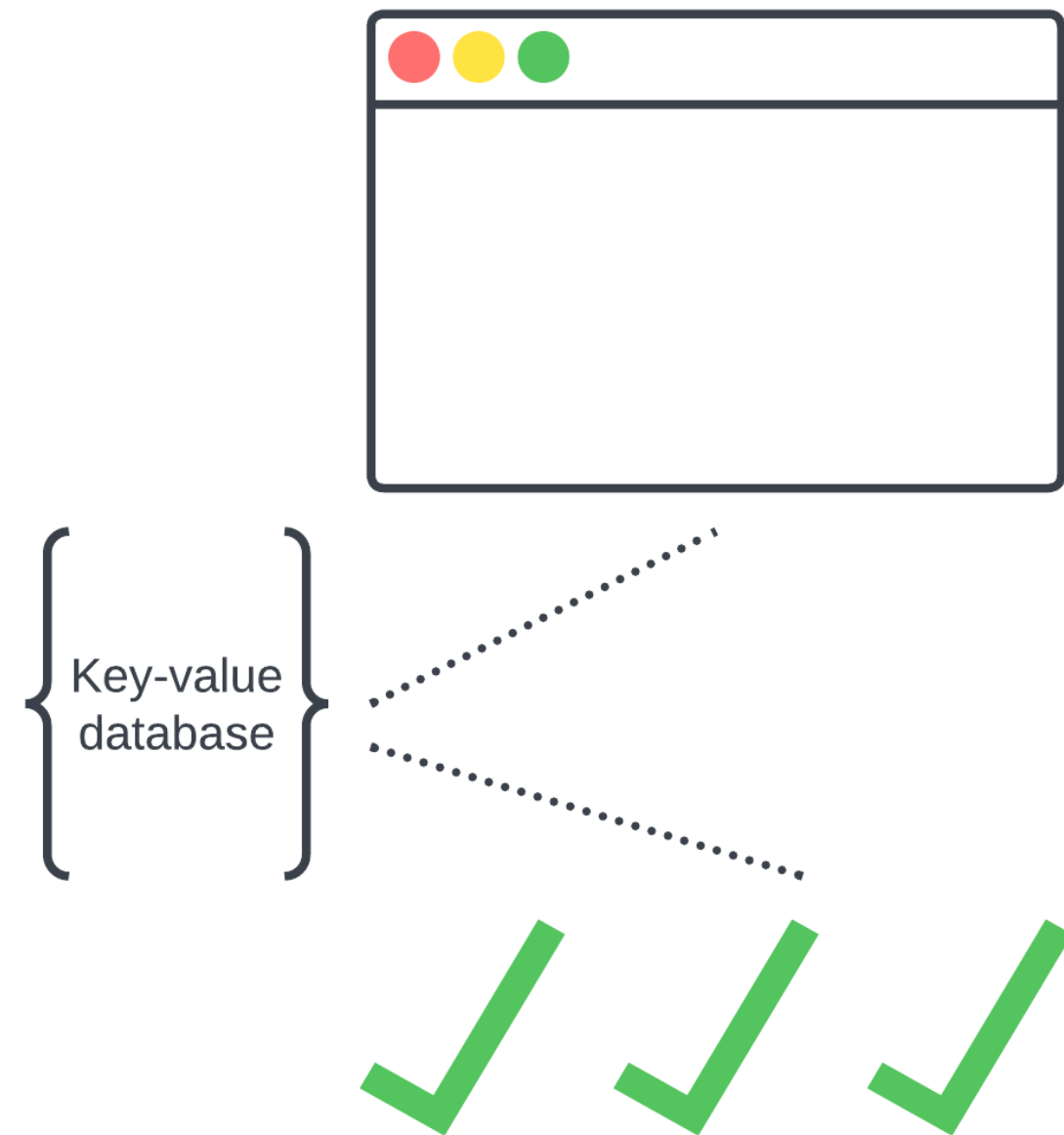
`"weather" : "sunny"`



retrieve value stored at  
**"weather"**

<sup>1</sup> <https://redis.com/nosql/key-value-databases/>

# Key-value database use-cases



Commonly used in web applications, for:

- Session management
- Caching frequently accessed data
- Track user preferences and behavior

**Key-value databases source analytics platforms:**

- Snowflake
- Redshift

# Redis



`redis` library to interact with Redis using Python

- Connect to cluster running on `localhost`
- Exposed over port `6379`
- Decode responses, instead of bytes

```
import redis

# Create a connection to Redis cluster
r = redis.Redis(
    host="localhost",
    port=6379,
    decode_responses=True
)
```

**Later, we'll:**

- Store key-value pairs
- Retrieve key-value pairs

# Let's practice!

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# Storing and retrieving key-value data

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# Storing key-value data

```
# Import redis, make a connection  
r = redis.Redis(...)
```

```
# Store a key-value pair  
r.set("username", "JDoe")
```

```
# Store another key-value pair  
r.set("age", 27)
```

```
# Overwrite an existing key  
r.set("username", "BSmith")
```

After making a connection to the Redis server:

- Pass a key and value to the `.set()` method
- Can pass native `int` or `float` types, will be stored as `strings`
- Can overwrite existing key-value pairs

# Retrieving key-value data

## Retrieve a key-value pair

```
# Store a key-value pair
r.set("username", "JDoe")

# Retrieve the key-value pair
username = r.get("username")

# Print the result
print(username)
```

JDoe

## Overwrite a key-value pair

```
r.set("username", "BSmith")
username = r.get("username")
print(username)
```

BSmith

## Attempt to access a key that does not exist

```
favorite_color = r.get("favorite_color")
print(favorite_color)
```

None



# Storing complex key-value data

```
# Store a dictionary using .hset()
r.hset(
    "shopping_cart",
    mapping={
        "item_id": "1003",
        "quantity": 2,
        "price": 79.99
    }
)
```

```
# Retrieve the dictionary
r.hgetall("shopping_cart")
```

Can store more complex data types, like `dict` ionaries:

- `.hset()` , takes key and a `dict`
- Pass a key to `.hgetall()`

```
{
    'item_id': '1003',
    'quantity': '2',
    'price': '79.99'
}
```

# Let's practice!

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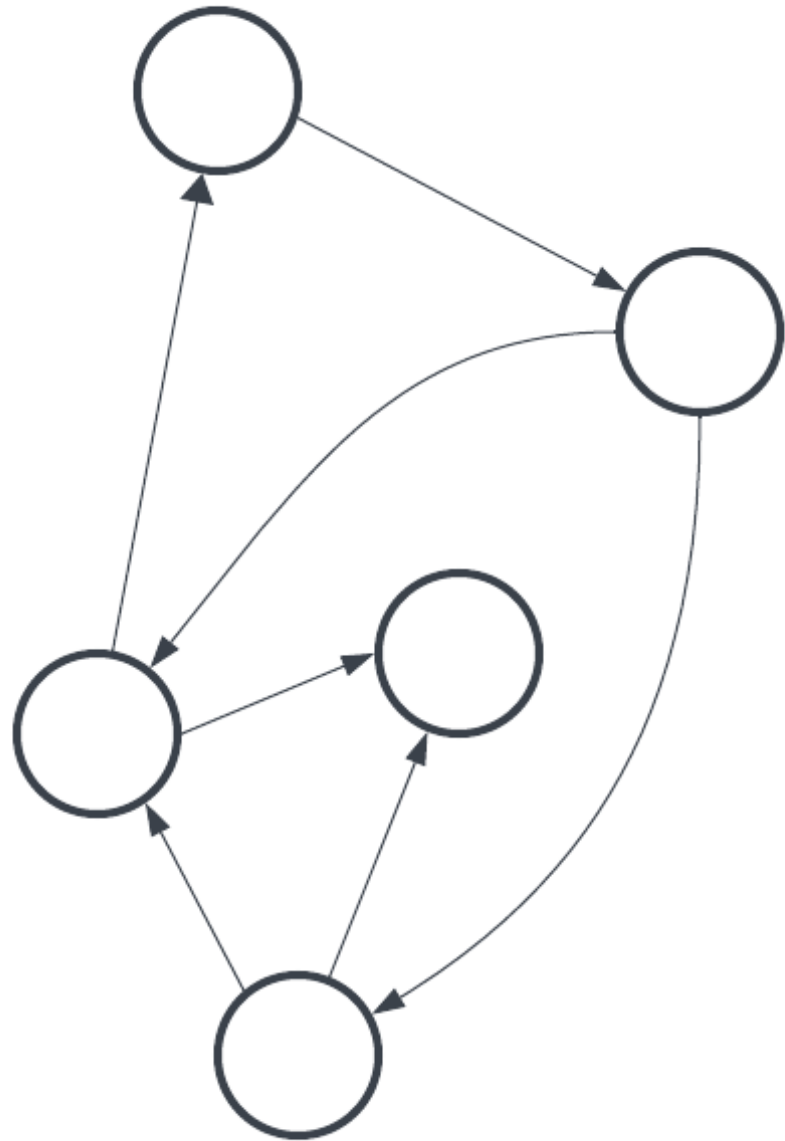
# Graph databases

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# What are graph databases?

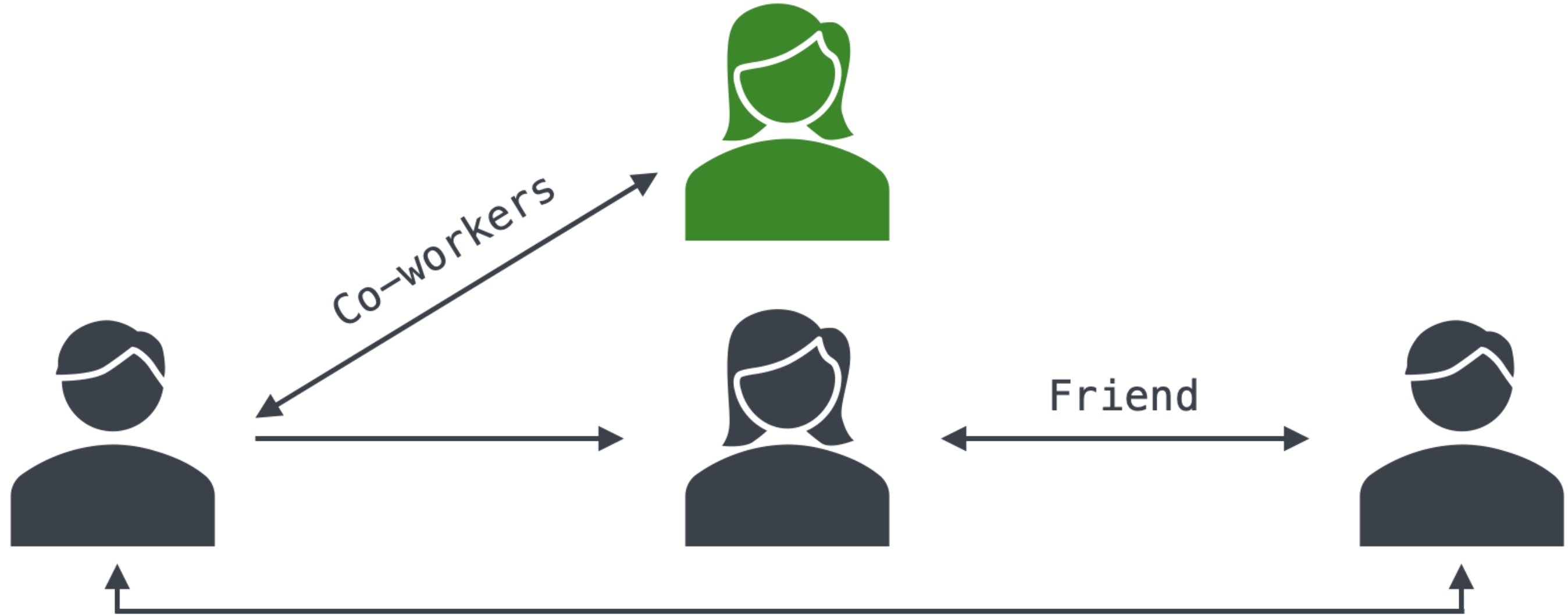


**Definition:** NoSQL data stores that persist data in a network of nodes and edges. In graph databases, each node represents an entity, and each edge represents a relationship between those entities.

- Graph query language
- Graph algorithms
- Performant and efficient

<sup>1</sup> <https://aws.amazon.com/nosql/graph/>

# A closer look at graph databases



# What are graph databases used for?

Graph databases are commonly used for:

- Social networks
- Recommendation engines
- Fraud detection
- Studying patterns and relationships



# Graph database providers



# Let's practice!

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# Wrapping up!

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# NoSQL data stores

## NoSQL:

- How is it different from RDBMS?
- Basic characteristics

## Document databases:

- Postgres JSON
- Semi-structured data
- Prepare data for analytics

## Columnar databases:

- Snowflake
- Large, structured and semi-structured data

## Key-value and graph databases:

- Redis
- Simple data, stored in key-value pairs
- Graph databases

# What next?

- Continue to practice with real-world examples
- Build projects using DataCamp Workspace
- Document takeaways



**Thank you!**  
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