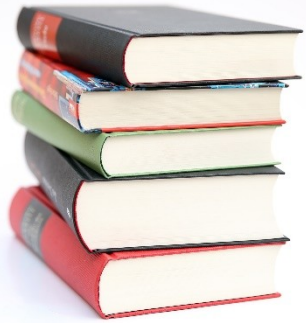




UNIVERSITY OF ŽILINA  
Faculty of Management Science  
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# Presentation 6 - Databases

## AWS M7 - Databases



# Outline

- **Amazon Relational Database Service (Amazon RDS)**
- **Amazon DynamoDB**
- **Amazon Redshift**
- **Amazon Aurora**

# Unmanaged versus managed services

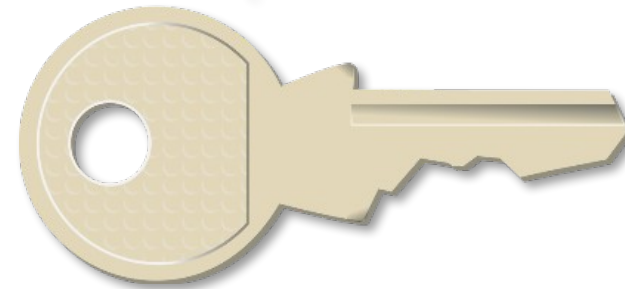
## Unmanaged

- Scaling, fault tolerance, and availability are managed by you.



## Managed

- Scaling, fault tolerance, and availability are typically built in to the service.





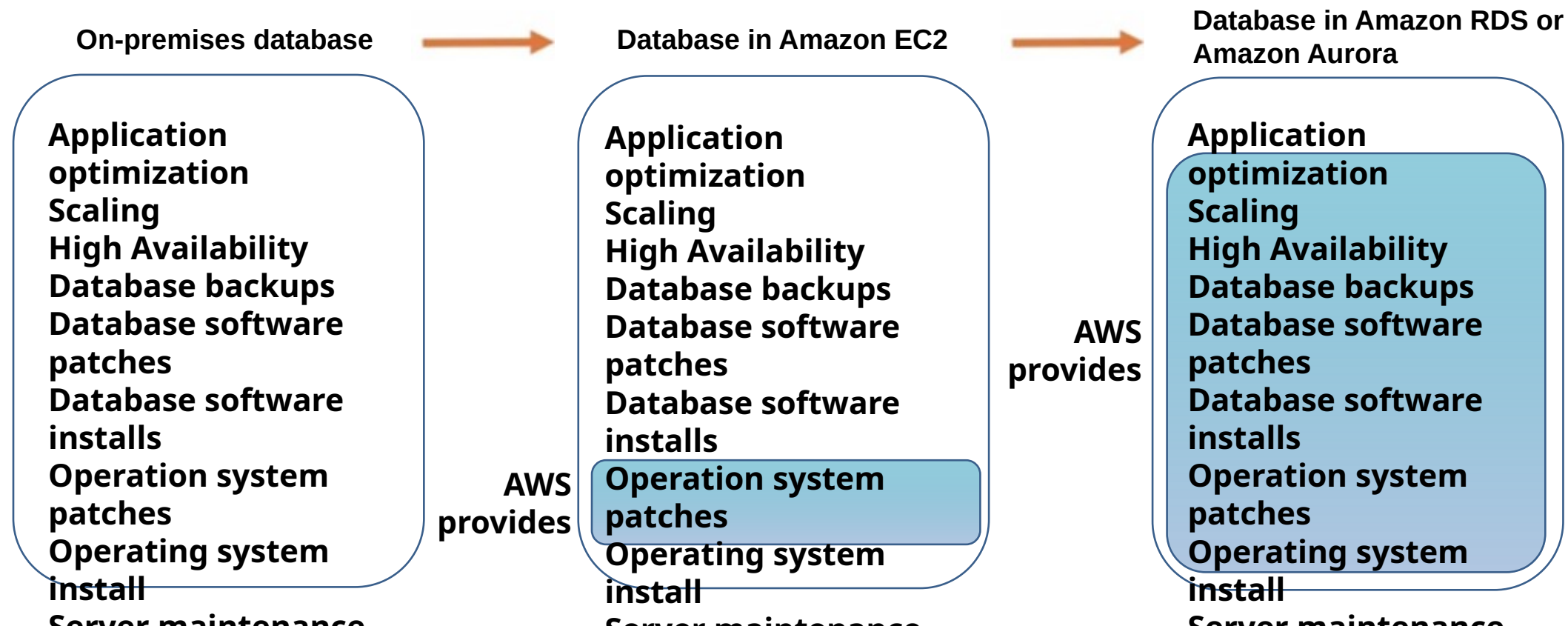
## Amazon Relational Database Service (Amazon RDS)

# Amazon RDS

- Managed service that sets up and operates a relational database in the cloud.



Amazon RDS

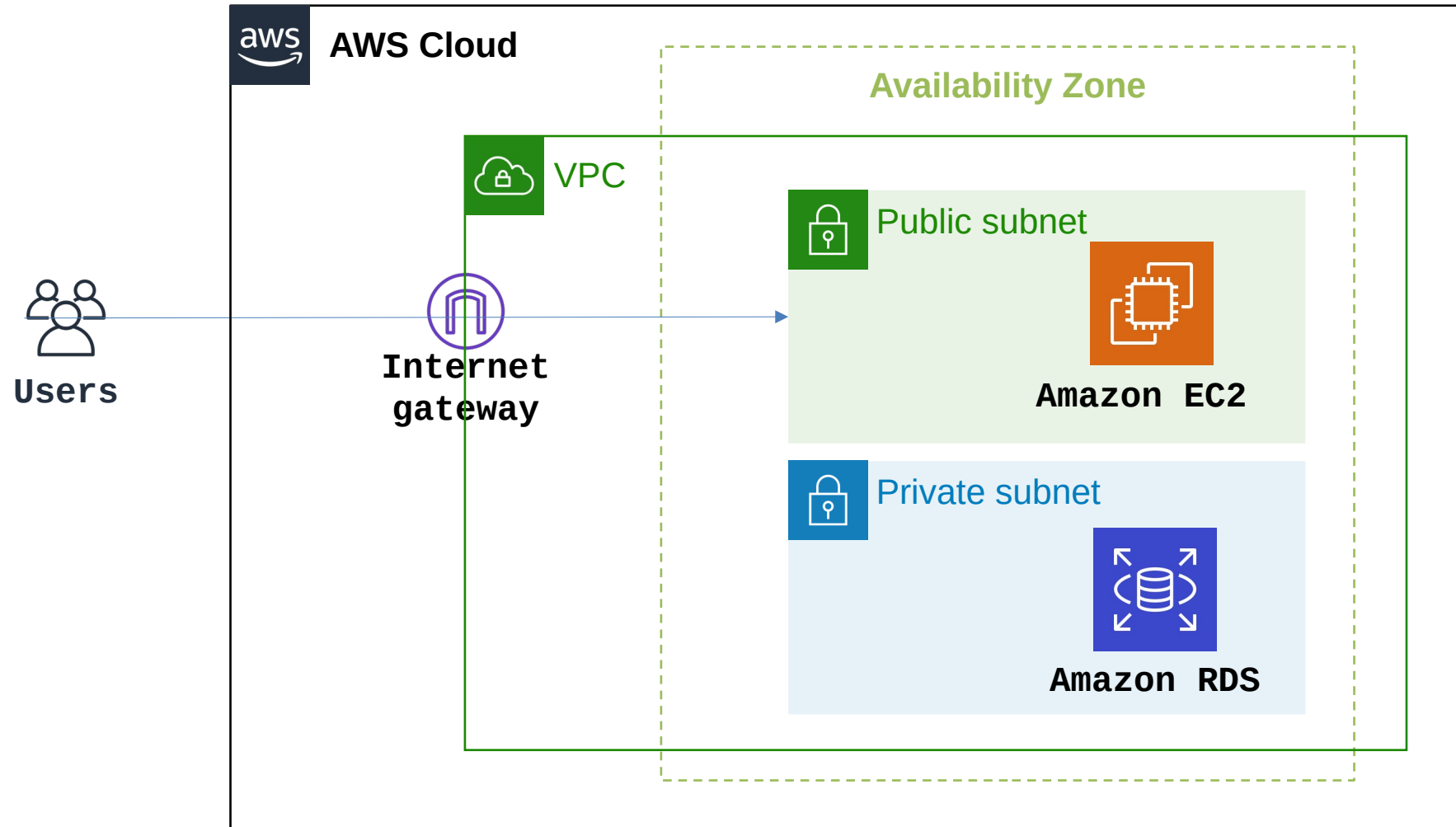


# Managed database service

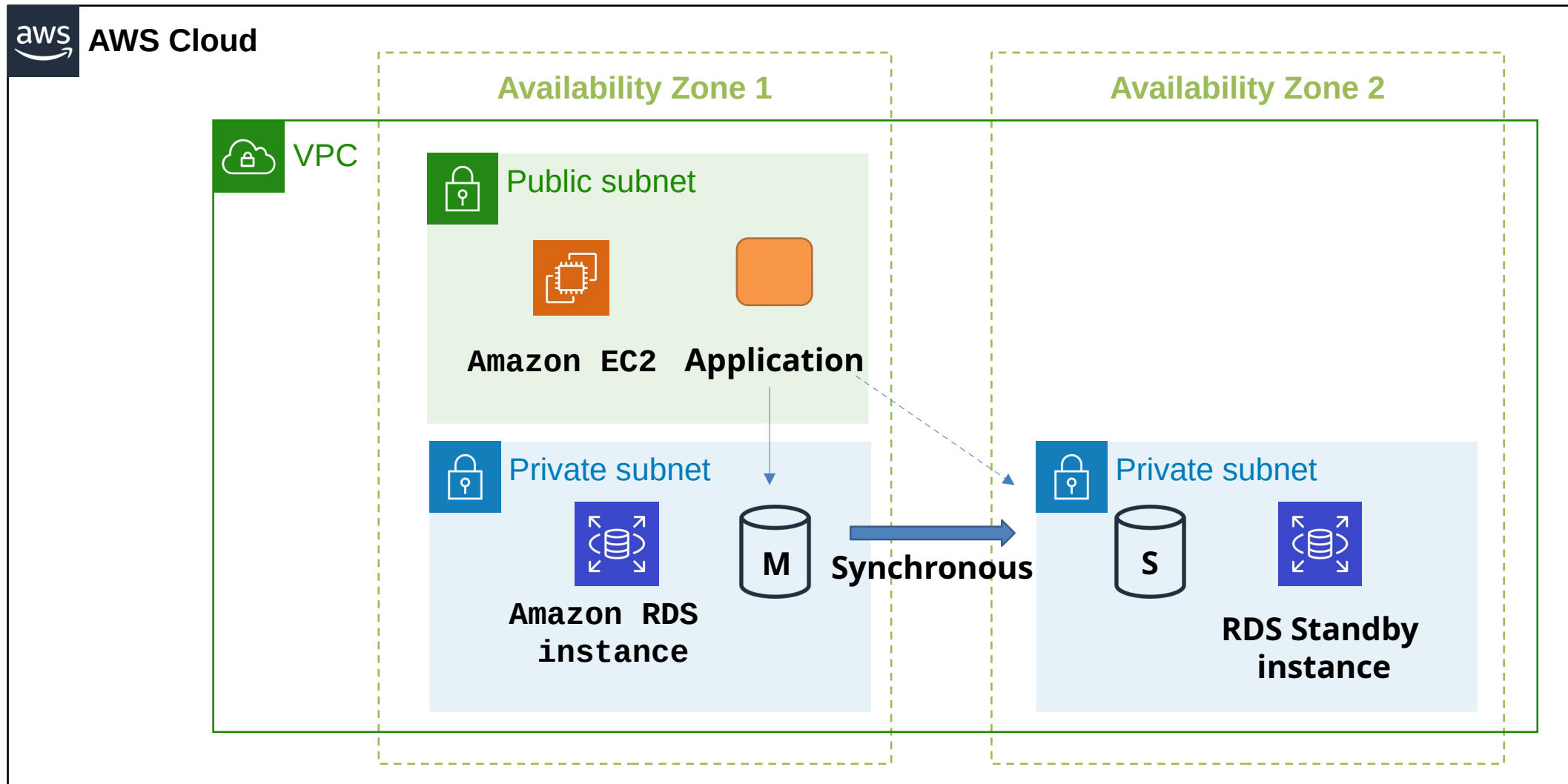
- You manage:
  - Application optimization
- AWS manages:
  - OS installation and patches
  - Database software installation and patches
  - Database backups
  - High availability
  - Scaling
  - Power and racking and stacking servers
  - Server maintenance



# Amazon RDS in a virtual private cloud (VPC)



# High availability with Multi-AZ deployment





# When to Use Amazon RDS

Use Amazon RDS when your application requires:

- Complex transactions or complex queries
- A medium to high query or write rate – Up to 30,000 IOPS (15,000 reads + 15,000 writes)
- No more than a single worker node or shard
- High durability

Do not use Amazon RDS when your application requires:

- Massive read/write rates (for example, 150,000 write/second)
- Sharding due to high data size or throughput demands
- Simple GET or PUT requests and queries that a NoSQL database can handle
- Relational database management system (RDBMS) customization

# RDS billing

- Clock-hour billing
  - Resources incur charges when running
- Database characteristics
  - Physical capacity of database:
    - Engine
    - Size
    - Memory class
- Provisioned storage
  - No charge
    - Backup storage of up to 100 percent of database storage for an active database
  - Charge (GB/month)
    - Backup storage for terminated DB instances

# RDS billing

- Additional storage
  - Charge (GB/month)
    - Backup storage in addition to provisioned storage
- Requests
  - The number of input and output requests that are made to the database
- Deployment type
  - Single Availability Zone
  - Multiple Availability Zones
- Data transfer
  - No charge for inbound data transfer
  - Tiered charges for outbound data transfer



# Amazon DynamoDB

# Relational versus non-relational databases

	Relational (SQL)	Non-Relational												
<b>Data Storage</b>	Rows and columns	Key-value, document, graph												
<b>Schemas</b>	Fixed	Dynamic												
<b>Querying</b>	Uses SQL	Focuses on collection of documents												
<b>Scalability</b>	Vertical	Horizontal												
<b>Example</b>	<table border="1"> <thead> <tr> <th>ISBN</th> <th>Title</th> <th>Author</th> <th>Format</th> </tr> </thead> <tbody> <tr> <td>3111111223439</td> <td>Withering Depths</td> <td>Jackson, Mateo</td> <td>Paperback</td> </tr> <tr> <td>3122222223439</td> <td>Wily Willy</td> <td>Wang, Xiulan</td> <td>Ebook</td> </tr> </tbody> </table>	ISBN	Title	Author	Format	3111111223439	Withering Depths	Jackson, Mateo	Paperback	3122222223439	Wily Willy	Wang, Xiulan	Ebook	<pre>{   ISBN: 311111223439,   Title: "Withering Depths",   Author: "Jackson, Mateo",   Format: "Paperback" }</pre>
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# Amazon DynamoDB

- Fast and flexible NoSQL database service for any scale
- Tables, items, and attributes are the core DynamoDB components
- DynamoDB supports two different kinds of primary keys: Partition key and partition and sort key



Amazon DynamoDB

- **NoSQL database tables**
- **Virtually unlimited storage**
- **Items can have differing attributes**
- **Low-latency queries**
- **Scalable read/write throughput**

# Partitioning



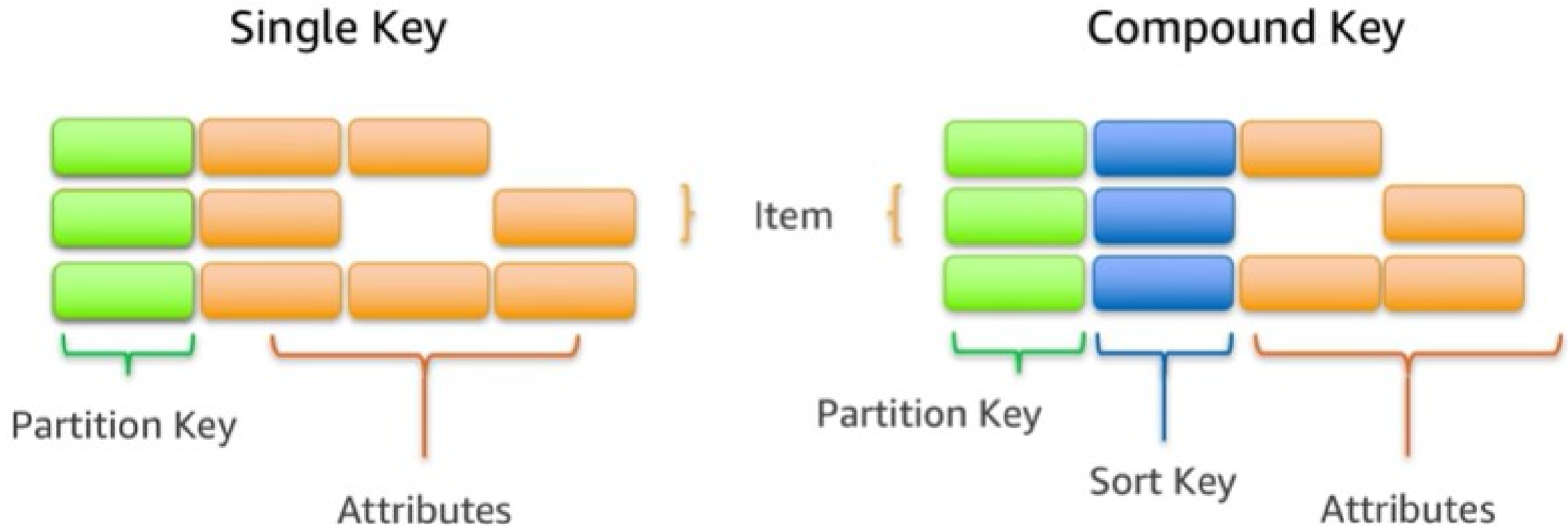
As data grows, table partitioned by key



QUERY by Key to find items efficiently  
SCAN to find items by any attribute



# Items in a table must have a key



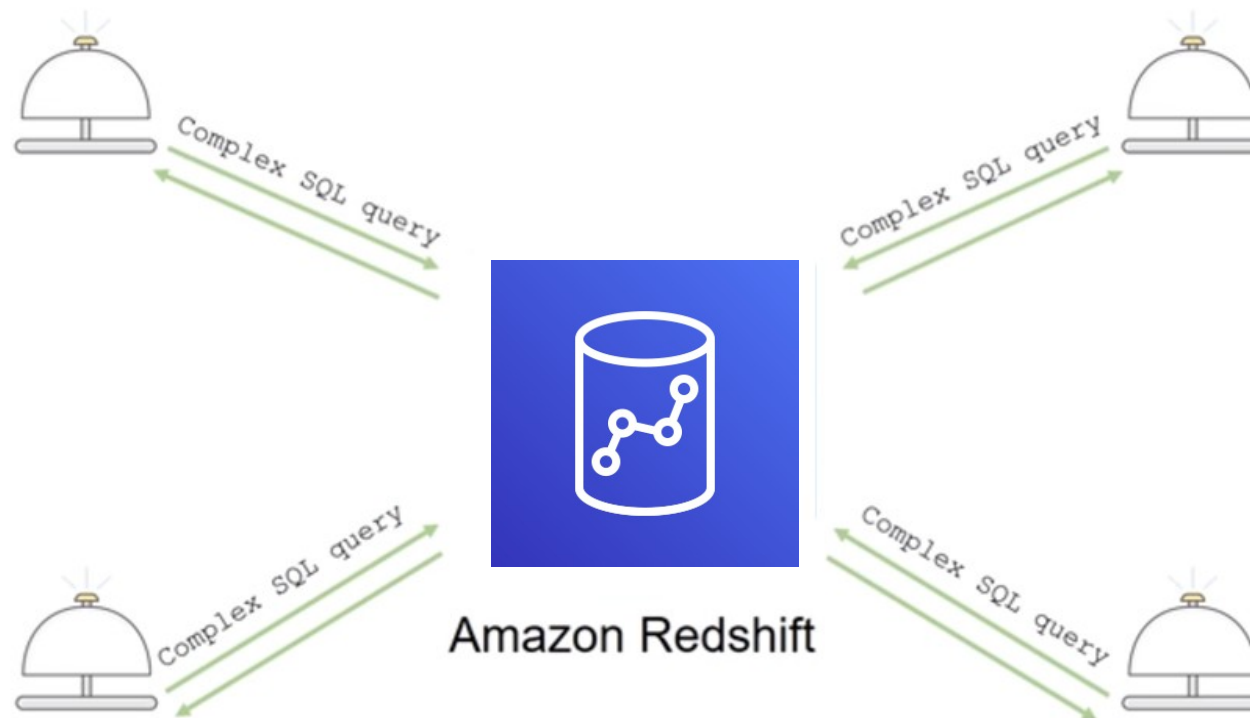




# Amazon Redshift

# Amazon Redshift

- Fast, fully managed data warehouse
- Makes it simple and cost-effective to analyze all your data by using standard SQL and your existing business intelligence (BI) tools.











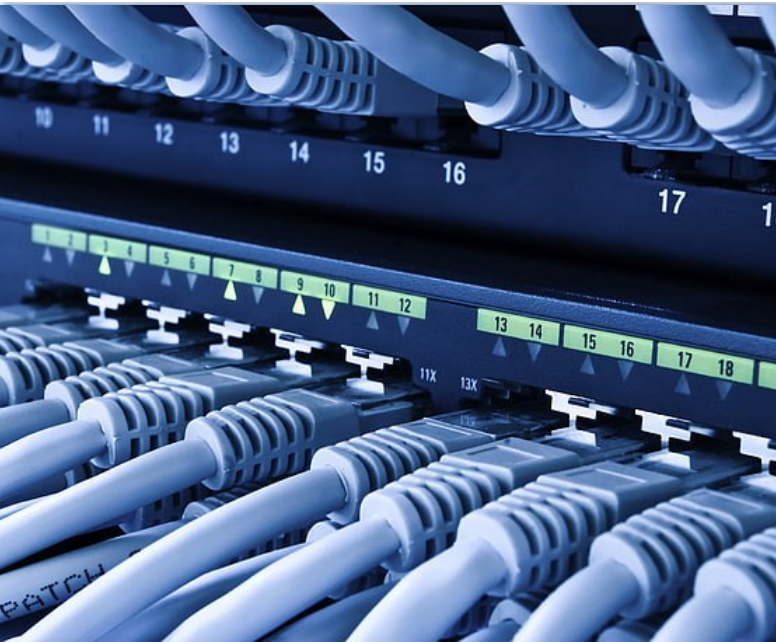












# Amazon Aurora





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VÝSKUMU A ŠPORTU  
SLOVENSKEJ REPUBLIKY

# Thank you for your attention.

The content was chapter from AWS Foundations Module 8 - Databases