Introduction to Databases on AWS

At the core of the lesson

You will learn how to do the following:

- Identify Amazon Web Services (AWS) database services and their benefits.

- Examine the difference between unmanaged and managed database solutions.

- Explain how to choose an AWS database that meets the needs of different business scenarios.

Databases on AWS

Challenges of running a relational database on premises

Some of the challenges that you might face can include the following:

- Server maintenance and energy footprint

- Software installation and patching

- Database backups and high availability

- Limits on scalability

- Data security

- Operating system (OS) installation and patches

Advantages of databases on AWS

Consider the following advantages of databases on AWS.

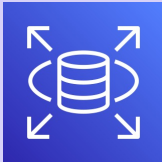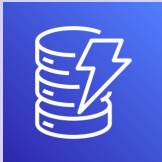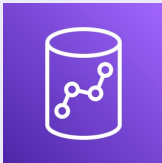Purpose-built
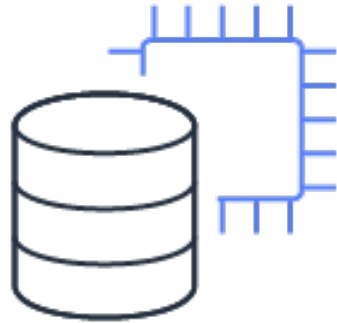
Designed for high performance

Fully managed
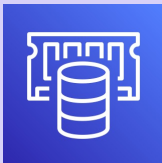
Built for business-critical workloads

Choosing a database service

You can choose a database based on purpose or application needs. Database workload factors to consider include the following:

- Data structure

- Data size

- Computation requirements

- Cost

- Access patterns

- Performance

Types of AWS data storage services

	SQL	NoSQL
Transactional databases	Amazon RDS	Amazon DynamoDB
Data analytics or relationships	Amazon Redshift	Amazon Neptune
In-memory data store and cache		Amazon ElastiCache

SQL and NoSQL database comparison

	SQL	NoSQL
Data Storage	Rows and columns	Key-value, documents, graphs, others
Schemas	Fixed	Dynamic
Querying	Uses SQL	Focuses on collection of documents
Scalability	Vertical	Horizontal

SQL and NoSQL data representation examples

SQL

CountryCode	Name	Continent	SurfaceArea
ABW	Aruba	North America	193.00

NoSQL

```
{
    "CountryCode": ABW,
    "Name": "Aruba",
    "Continent": "North America",
    "SurfaceArea": "193.00"
}
```

Differences between unmanaged and managed services

Unmanaged versus managed services

Unmanaged	Managed
Typically, you provision an unmanaged service. You manage scaling, fault tolerance, and availability.	You need only to configure a managed service. Scaling, fault tolerance, and availability are typically built into the service.
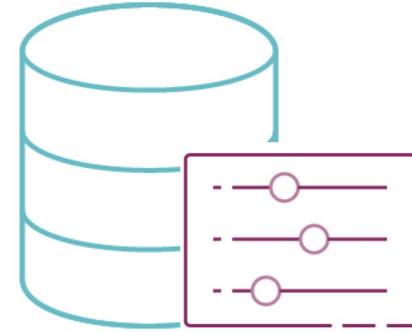
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Managed versus unmanaged responsibilities

You are responsible for the following tasks based on database type.

	Database On Premises	Database in Amazon EC2	Amazon RDS or Amazon Aurora
Power, HVAC, Network	x		
Rack and Stack	x		
Server Maintenance	x		
OS Installation	x		
OS Patches	x		
Database Installation	x	x	
DB Patches	x	x	
Database Backups	x	x	
High Availability	x	x	
Scaling	x	x	
App Optimization	x	x	x

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Use cases and recommendations

AWS database use cases

Database	Use Case
Amazon RDS Aurora	Transactional applications, such as enterprise resource planning (ERP), customer relationship management (CRM), and ecommerce, to log transactions and store structured data Aurora differentiator: Open source, high performance, and low cost
Amazon Redshift	Analytic applications for operational reporting and querying terabyte-scale to exabyte-scale data
ElastiCache	Real-time application use cases that require submillisecond latency, such as gaming leaderboards, chat or messaging, streaming, and Internet of Things (IoT)
Neptune	Applications with use cases that require the navigation of highly connected data, such as social news feeds, recommendations, and fraud detection
DynamoDB	Internet-scale applications, such as hospitality, dating, and ride sharing, that must serve content and store structured and unstructured data

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AWS database recommendations

If You Need	Product Type	Consider Using
Managed relational database that is launched with a choice of popular database engines	Relational database	Amazon RDS
MySQL-compatible and PostgreSQL-compatible relational database that is built for the cloud	Relational database	Aurora
Fully managed NoSQL database	NoSQL database	DynamoDB
Managed graph database	NoSQL database	Neptune
Managed Redis key-value store	NoSQL database	ElastiCache
Columnar storage SQL data warehouse	Relational database	Amazon Redshift

Checkpoint questions

1. You are building a customer relationship management (CRM) application. Which AWS database service should you use?

2. Which database model stores data in rows and columns?

3. Which administrative tasks do you need to perform when using Amazon RDS?

Key ideas

- Managed databases simplify and automate many operational and management tasks.

- The choice of which AWS managed database to use is based on application requirements.

- Each database offering has a primary use case. Make sure that you are familiar with it.

- Unsupported database engines or database versions can be hosted on Amazon EC2.

Thank you

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