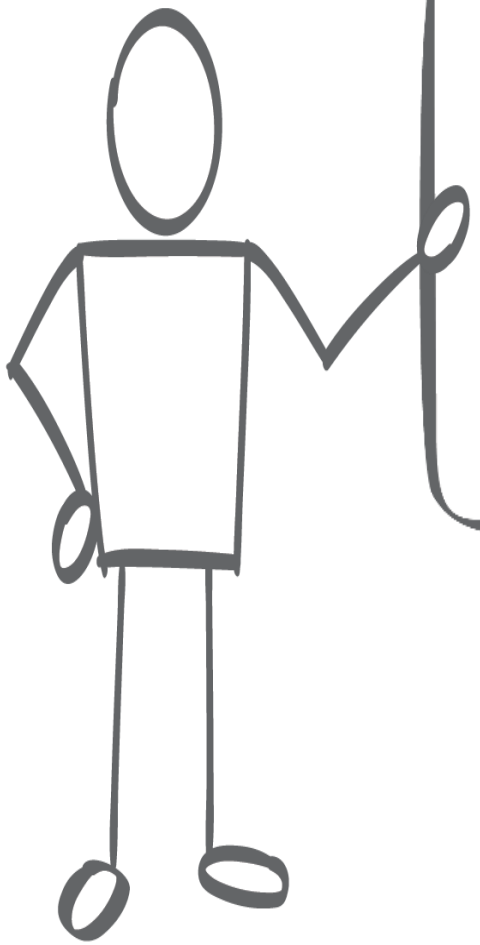


Databases - Amazon Relational Database Services (RDS)

SQL and NoSQL Databases

	SQL	NoSQL
Data Storage	Rows and Columns	Key-Value
Schemas	Fixed	Dynamic
Querying	Using SQL	Focused on collection of documents
Scalability	Vertical	Horizontal

SQL

ISBN	Title	Author	Format
9182932465265	Cloud Computing Concepts	Wilson, Joe	Paperback
3142536475869	The Database Guru	Gomez, Maria	eBook

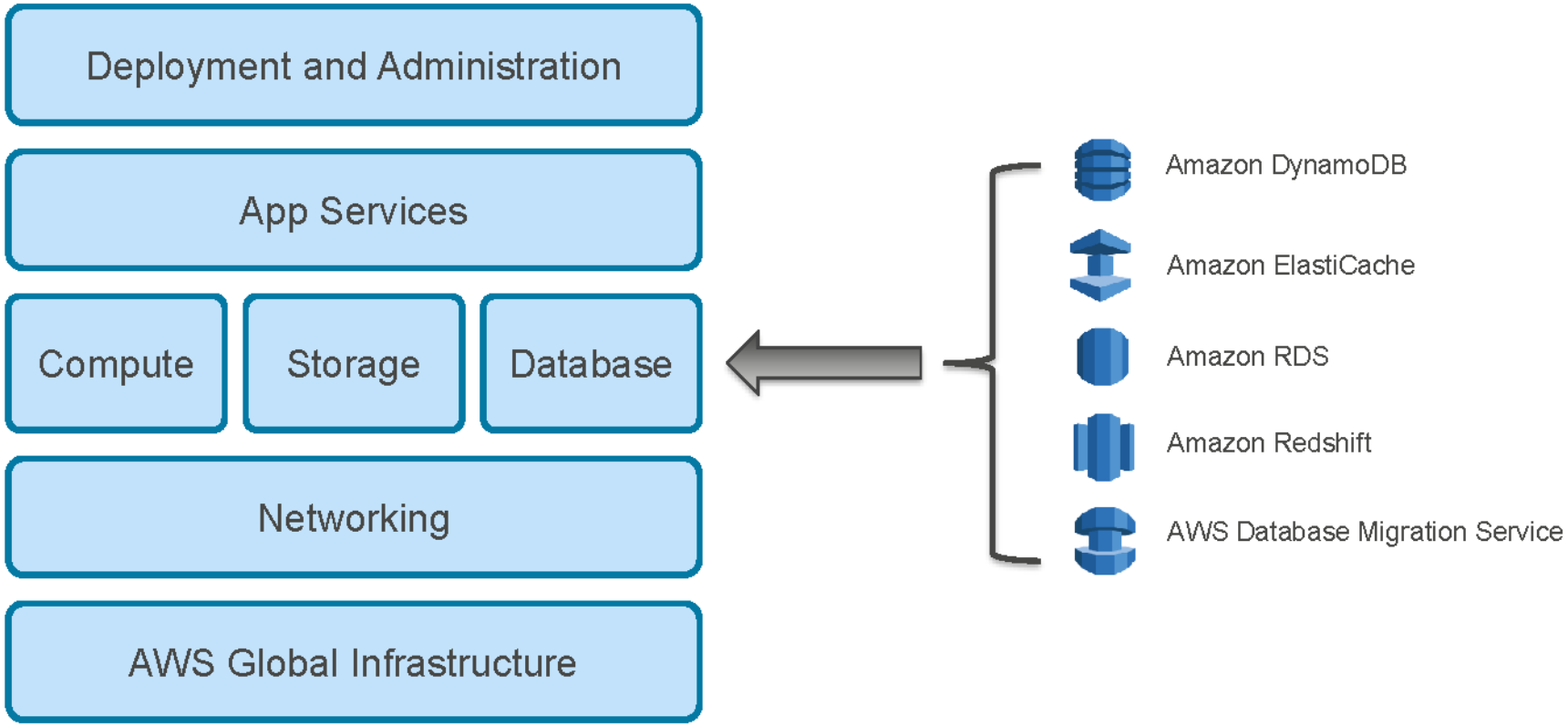
NoSQL

```
{
      ISBN: 9182932465265,
      Title: "Cloud Computing Concepts",
      Author: "Wilson, Joe",
      Format: "Paperback"
}
```

Data Storage Considerations

- No one size fits all.
- Analyze your data requirements by considering:
  - Data formats
  - Data size
  - Query frequency
  - Data access speed
  - Data retention period

AWS Managed Database Services



Amazon Relational Database Service (RDS)

Amazon RDS

- Cost-efficient and **resizable capacity**
- Manages time-consuming **database administration** tasks
- Access to the full capabilities of **Amazon Aurora**, **MySQL**, **MariaDB**, **Microsoft SQL Server**, **Oracle**, and **PostgreSQL** databases

Amazon RDS

- Simple and **fast to deploy**
- Manages common database administrative tasks
- **Compatible** with your applications
- Fast, predictable performance
- Simple and **fast to scale**
- Secure
- Cost-effective

DB Instances

- DB Instances are the basic building blocks of Amazon RDS.
- They are an **isolated database environment** in the cloud.
- They can **contain multiple user-created databases**.

How Amazon RDS Backups Work

Automatic Backups:

- Restore your database to a point in time.
- Are enabled by default.
- Let you choose a retention period up to 35 days.

Manual Snapshots:

- Let you build a new database instance from a snapshot.
- Are initiated by the user.
- Persist until the user deletes them.
- Are stored in Amazon S3.

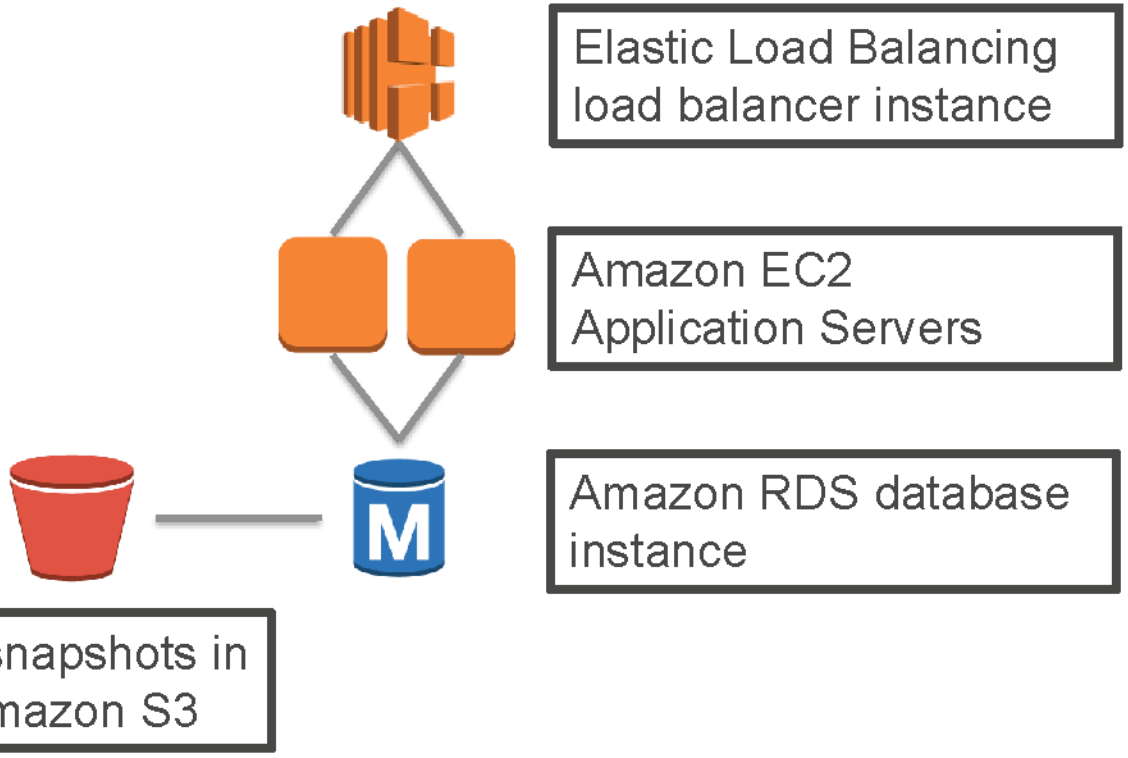
Cross-Region Snapshots

- Are a **copy** of a **database** snapshot stored in a **different AWS Region**.
- Provide a backup for disaster **recovery**.
- Can be used as a **base** for **migration** to a different region.

Amazon RDS Security

- Run your DB instance in an **Amazon VPC**.
- Use **IAM policies** to grant access to Amazon RDS resources.
- Use **security groups**.
- Use Secure Socket Layer (**SSL**) connections with DB instances (Amazon Aurora, Oracle, MySQL, MariaDB, PostgreSQL, Microsoft SQL Server).
- Use Amazon RDS **encryption** to secure your RDS instances and snapshots at rest.
- Use network encryption and transparent data encryption (**TDE**) with Oracle DB and Microsoft SQL Server instances.
- Use the security features of your DB engine to **control access** to your DB instance.

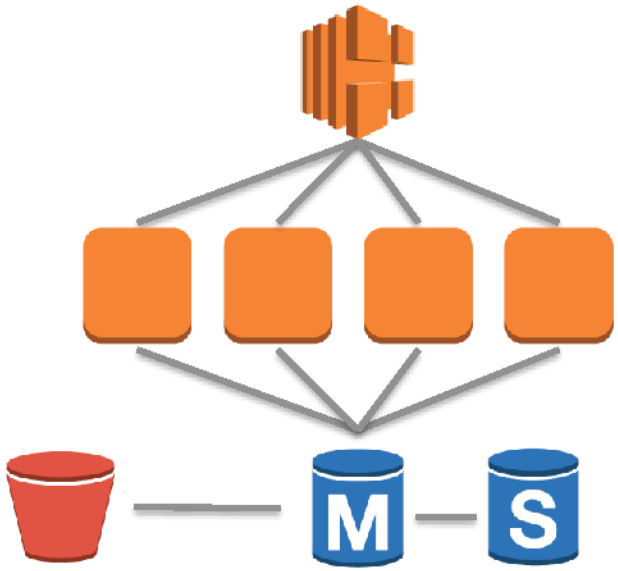
A Simple Application Architecture



Multi-AZ RDS Deployment

- With **Multi-AZ** operation, your database is **synchronously replicated to another Availability Zone** in the same AWS Region.
- **Failover** to the standby **automatically** occurs in case of master database failure.
- Planned maintenance is applied first to standby databases.

A Resilient, Durable Application Architecture



Elastic Load Balancing load balancer instance

Application, in Amazon EC2 instances

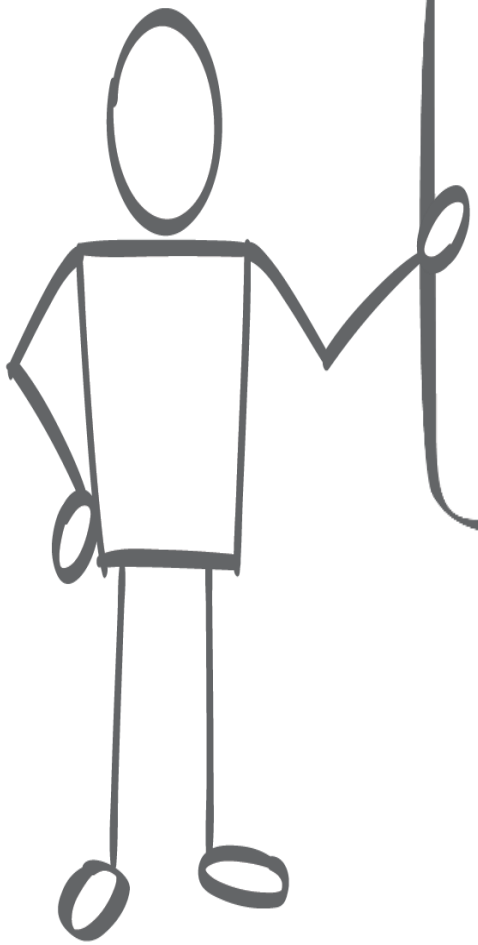
Amazon RDS database instances: Master and Multi-AZ standby

DB snapshots in Amazon S3

Amazon RDS Best Practices

- **Monitor** your memory, CPU, and storage usage.
- Use **Multi-AZ** deployments to automatically provision and maintain a synchronous standby in a different Availability Zone.
- Enable **automatic backups**.
- Set the **backup window** to occur during the daily low in WriteIOPS.
- To increase the I/O capacity of a DB instance:
  - Migrate to a DB instance class with high I/O capacity.
  - Convert from standard storage to provisioned IOPS storage and use a DB instance class optimized for **provisioned IOPS**.
  - Provision additional throughput capacity (if using provisioned IOPS storage).
- If your client application is caching the DNS data of your DB instances, set a TTL of less than 30 seconds.
- **Test** failover for your DB instance.

Knowledge Check



Amazon RDS – Hands on

Thank you